

420

Service Manual

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USING THE MANUAL

1. TABLE OF CONTENTS

Each capitalized alphabetic character represents a major division within the manual (Section A).

Under each major division, the capital letter is followed by a number. This represents a subdivision of the major section (Section A1. is a subdivision of A.).

Under each subdivision, an alpha-numeric combination is followed by a decimal and a lower case letter. This represents a smaller division under a subdivision (Section A1.a. is a subdivision of A1., Section A1.a1. is a subsection of A1.a.).

Each major section of the manual begins with page 1 and is numbered in sequence through that section only. Section A begins with page 1, section B begins with page 1, etc. There are not necessarily any subdivisions beyond level 1 in a Parts Catalog.

This manual is divided into Section A through I. A detailed table of contents is located on the first page of each section.

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- Machine Specifications

SECTION B PREVENTATIVE MAINTENANCE

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- Repair Checkout Procedures
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- GBR Line Code Read (including screen menus and error codes)
- Laser Bar Code Read (including screen menus and error codes)
- Accumulator Section
- Folder Section (includes parts lists)

SECTION E PRINTED WIRING BOARD INFORMATION

SECTION F MACHINE SCHEMATICS

SECTION G INTERFACE TO OPTIONAL EQUIPMENT

- Connecting to an Insertor

SECTION H MISCELLANEOUS

SECTION I PARTS

2. HEADERS / FOOTERS

The information listed along the left edge refers to the stated machine. In the following example, the document is the Service Manual for the BH 6000 machine. TP50429 is an index number which allows Bell and Howell to track its documents.

The particular issue listed in the center is an internal tracking device which allows Bell and Howell to make document revisions. If the issue is revised, <Rev - #> appears below the issue.

The top line of information along the right side states the title of the particular section. The bottom line lists the section and the page number within that section.

3. GLOSSARY

A glossary of terms defines and explains all acronyms, abbreviations, and symbols used in the manual.

The glossary lists terms which are cross-referenced to other terms within the manual.

4. TABS

The manual is divided by tabs for easy reference. To find information listed under section B in the table of contents, turn to the tab with the corresponding title.

Only the major divisions are separated by tabs; i.e., section B is separated from section C with a tab, but section B1 is NOT separated from section B2 with a tab.

In the back of the manual are 5 blank tab cards. Label these tabs for the subdivisions you frequently refer to and place them appropriately in the manual.

6. INDEX

The last section of the manual is an alphabetical index which lists the section and page number for each entry.

If an entry is more than one word, search under the alphabetical listing for the primary or most important word(s). If the entry is not listed under that word, search under the listing of another word in the entry. For example, you need information regarding Envelope Feeders: First, look under 'Feeder.' If it does not appear there, look under 'Envelope'.

Some entries refer you to other listings. For example, the entry 'Insert Feeders' may refer you to an entry listed as 'Feeder Modules'. These references are indicated by 'See' or 'See also'.

7. LIST OF CHANGES IN THIS REVISION

ECN: 6874

Date: 12/00

Previous release: 420 Service Manual Issue D <Rev. D>

Changes* incorporated in this manual: 420 Service Manual Issue 12/00 <Rev. E>

<u>Section</u>	<u>Change</u>
I	add 002K-08066 B & H Line Code Reader Add 389-26066-400 Ink Marker Option Add 002K-07970 AC/DC Inserter Control Add 750-26978-500 3208/Feeder Mechanical Interface Add 750-27576-500 3208/Feeder Electrical Interface Add 389-26413-401 Right Angle Interface
I-9	Update 002D-08137 Control Panel
I-11	change power supply number – item 18
I-13	change motor number – item 3, change belt number – item 17
I-15	change motor number – item 2, change item 8,23,30
I-17	add item 14,15,16
I-19	add item 14,15
I-21	change item 5 number
I-25	change AC Cord number – item 3
I-27	change Mount Plate number – item 4, change pulley number – item 17
I-29	change Shaft number – item 19
I-41	change Gear number – item 22
I-61	update T.J. Line Code Read Option
F	add 002C-07968 Sensor Interconnect Cable Add 389-26062-300 AC/DC schematic
	Added replacement # for 186-2823500088 as 118-30307-600, 8-19-2009

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A.1 REQUIRED MANUALS

The following manuals are available for the 420:

- N/A
- N/A

A.2 INTRODUCTION TO THE MANUAL

This manual is intended for service technicians and is organized to enhance preventive maintenance, troubleshooting, and repair of the Smart Feeder. Installation of the Smart Feeder is also described.

A.3 INTRODUCTION TO THE MACHINE

A.3a FEEDER SECTION

The Smart Feeder's feeder is bottom fed, top loading for continuous operation, with a capacity of 1500 sheets (20 lbs).

Creeper Conveyor

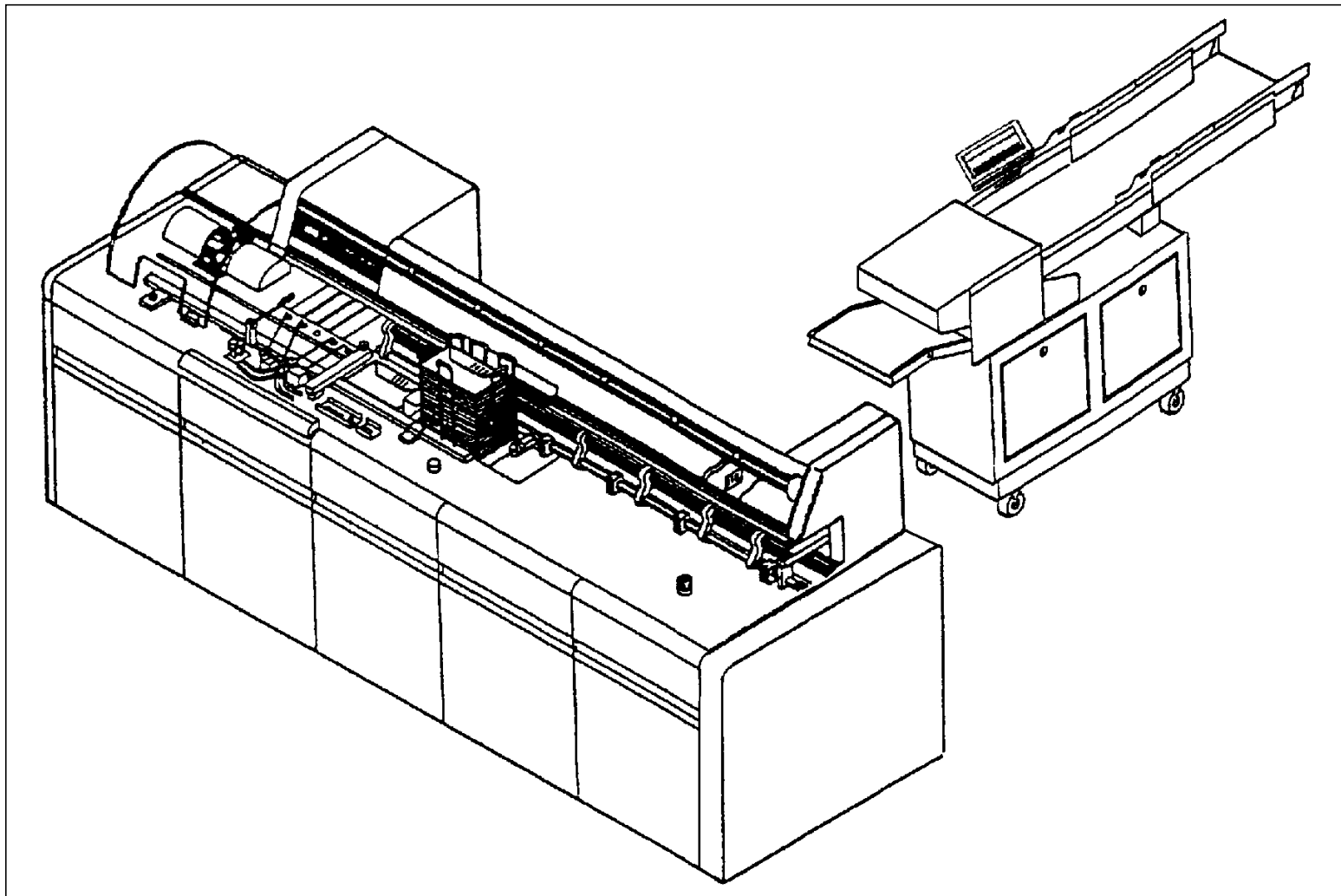
The Creeper conveyor comprises two black rubber belts driven by a motor located on the bottom side of the hopper. Controlled by a paper level detector, the motor is activated when the detector indicates that paper is low.

Hopper and Feeder Paper Guide Rails

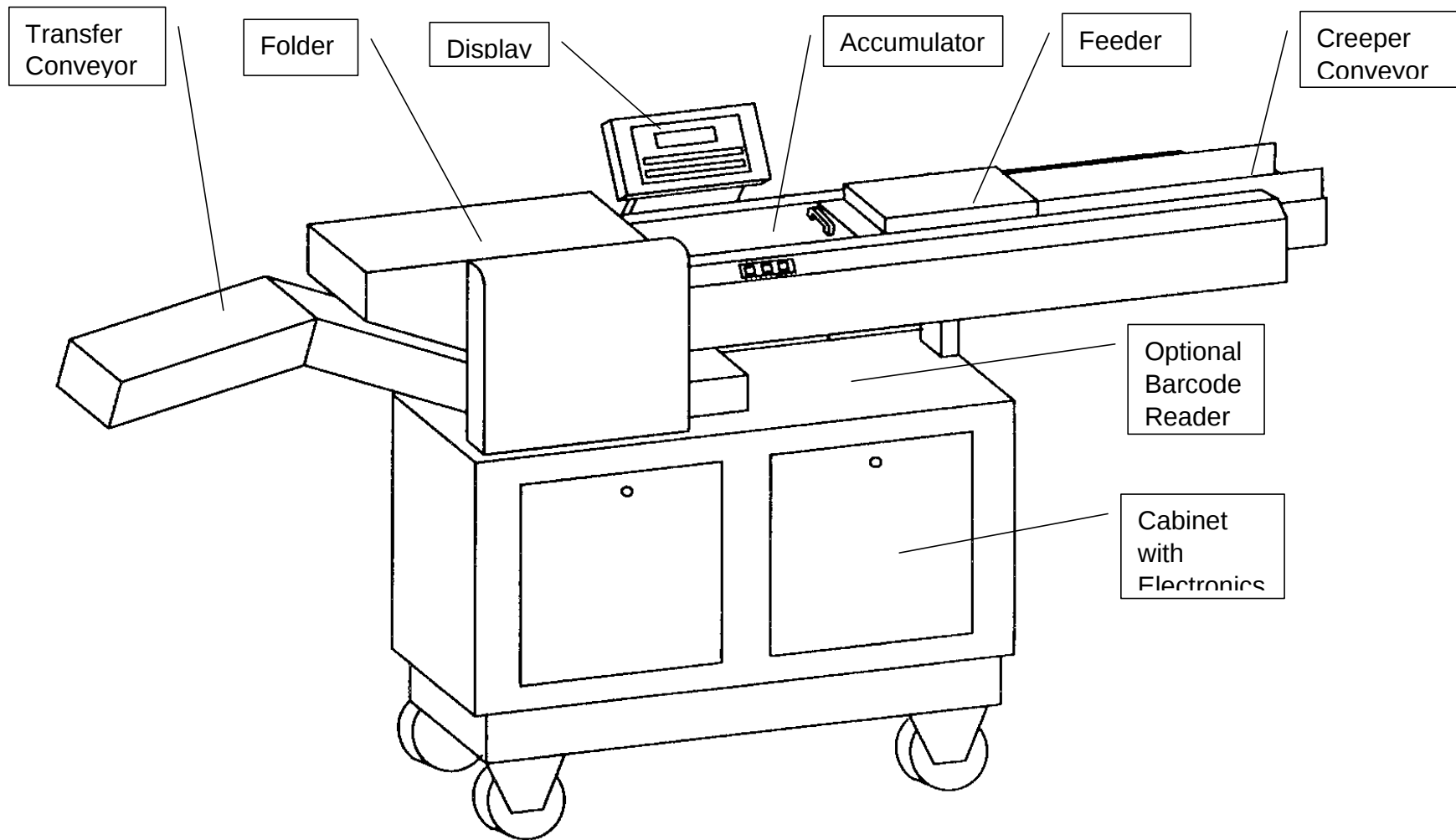
The two stainless steel rails mounted on the hopper are adjustable via a locking handle at the rear. At the front they interlock with the feeder side rails, then lock to shafts running across the machine. Both sets of rails should be adjusted together.

Paper Hopper

The Paper Hopper supplies the bottom fed friction feeder continuously while the operator loads paper from the top. It has 4 mounts (2 each side, with set screws) in which the hopper slides. The Hopper Table is located behind the feeder. Paper level in the hopper is controlled by a demand switch. The position of the hopper table determines how well the demand switch will perform this function. During normal operation a metal wand rests on the incoming paper. As more paper is needed, the metal wand will fall low enough to close the demand switch. This activates the creeper conveyor motor to drive the hopper belts, conveying paper into the feeder area under the paper level detector. When the proper level of paper is attained the wand will have been lifted enough to open the switch, shutting off the creeper conveyor motor.



SMART FEEDER and Bell & Howell Inserter - Figure A.1



Layout of Smart Feeder - Figure A.2

Main Feed Belt

The Main Feed Belt is a one inch wide yellow timing belt which drives the bottom sheet of paper under the singulator roller. Also called Singulator Belt.

Auxiliary Feed Belts

These are two red urethane belts located either side of the main feed belt. The auxiliary feed belts assist the main feed belt, smoothing variations in frictional drive (correcting erratic feeding of the paper).

Drive Rollers

These two orange rollers are located directly below the singulator. These are used in conjunction with the singulator to ensure only one sheet is fed at a time.

Paper Level Detector

This demand switch monitors the paper going into the feeder area. It's job is to limit and demand the amount of paper that is most productive to the feeding process. The Paper Level Detector monitors the paper through a metal wand.

Singulator

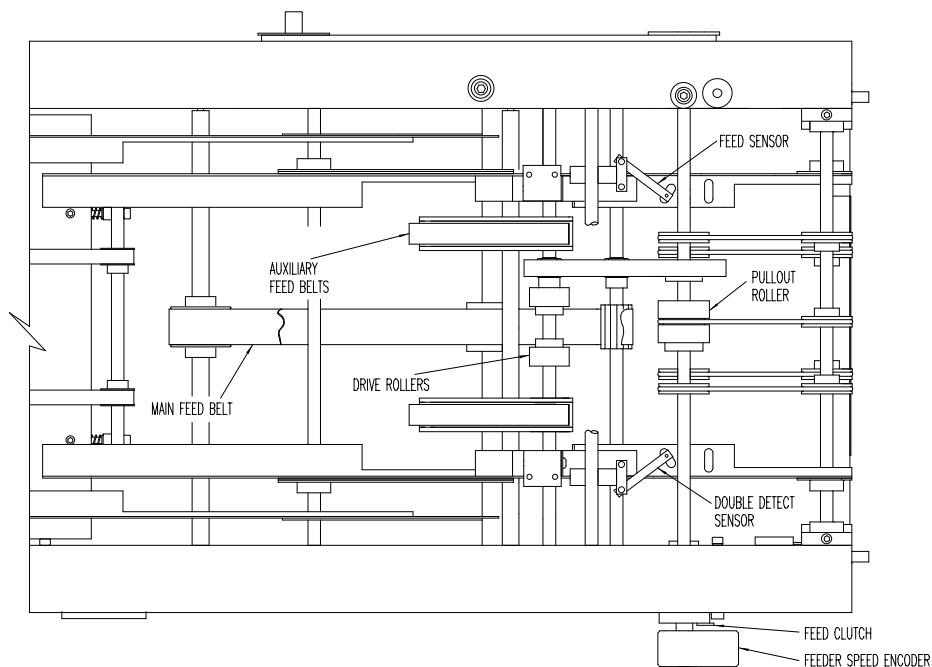
A two inch stationary orange roller which rests above the feed belt in the center of the feeder and allows only the bottom sheet of paper to be fed while holding back all others.

Feed Sensor

The Feed Sensor monitors the output of the singulator for proper singulation or non-feed of paper. It is a light-actuated through-beam sensor, identified by an "F" on the amplifier.

Double Detect Sensor

Feeder Section - Figure A.3

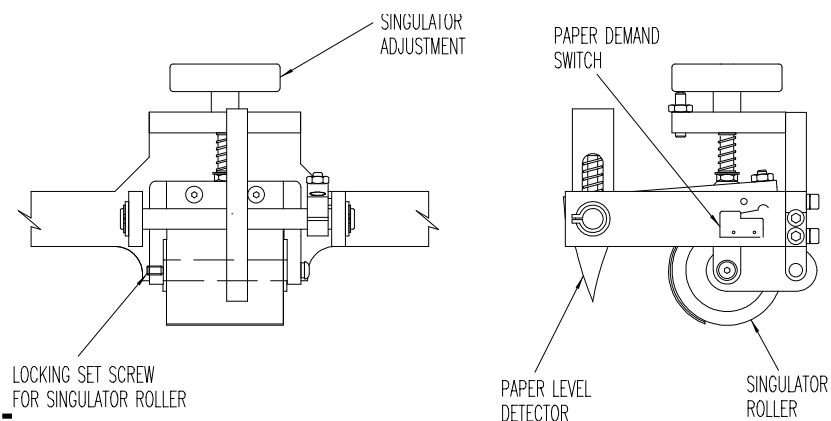


Singulator - Figure A.4

The Double Detect Sensor monitors the output of the singulator for double feeds. It is a light-actuated through-beam sensor, identified by an “D” on the amplifier.

Feeder Speed Encoder

A blue-clad optical encoder located on the right side of the upper pullout shaft. It is used to detect feeder run speed.



Feed Clutch

Electrical clutch which engages the feed belt at a signal from the controller.

Optical Mark Reader or Read Sensor

Reflective beam sensor located on either the left or right feeder side rails. A reader logic board interprets variation in light intensity as it is reflected off the paper and code marks.

A.3b ACCUMULATOR SECTION

The accumulator is fed paper from the singulator, assembling groups of one to seven documents. When the document package is complete, it is fed to the folder.

Stacking Ramps

Stacking Ramps are the plastic wedges which position successive pages of a document package in order.

Stacking Rollers

These are used to stop the paper and hold it in position. When released, the Stacking Rollers drive the collected pages out of the accumulator.

Dump Brake

This prohibits the rollers from releasing paper from the accumulator.

Dump Clutch

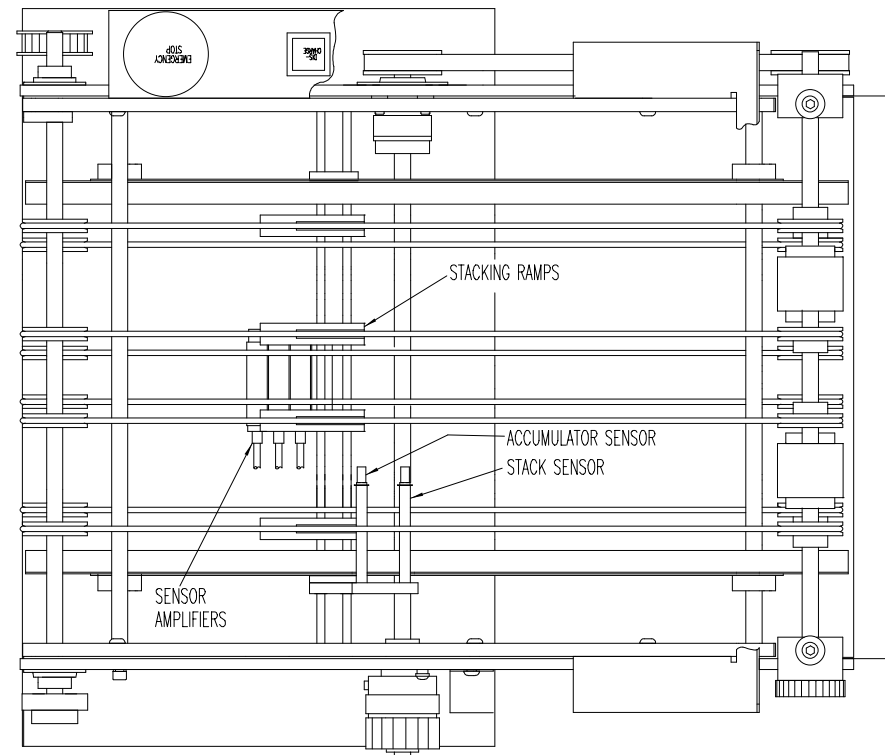
This activates the stacking rollers, releasing the accumulated pages.

Accumulator Sensor

The Accumulator Sensor indicates presence or absence of a package in the accumulator. It also monitors package discharge when the dump clutch has been engaged.

Stack Sensor

Indicates the document has cleared the stacking ramps.



Accumulator Section - Figure A.4

A.3c FOLDER SECTION

The folder is capable of placing 1 to 4 folds in a C, Z, V, or double V configuration. It is fed by the Accumulator Section.

Buckle Plates

Manual adjustable plates which set the distance of the fold from the edge of the paper.

Rollers

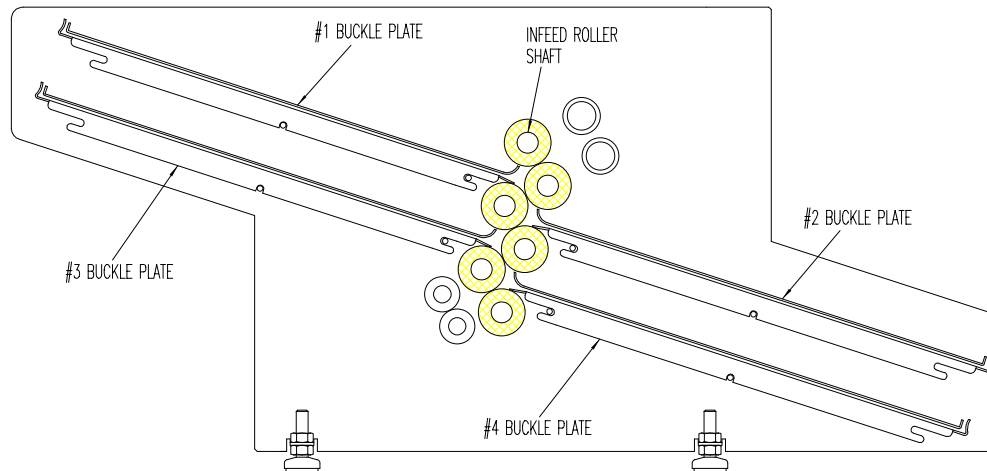
Used to nip the paper as it is buckling, creating the fold.

Folder Drive Motor

A 110VAC motor which drives all folder shafts and rollers.

Folder Speed Encoder

An encoder, located on the infeed roller shaft, which provides a folder speed signal.

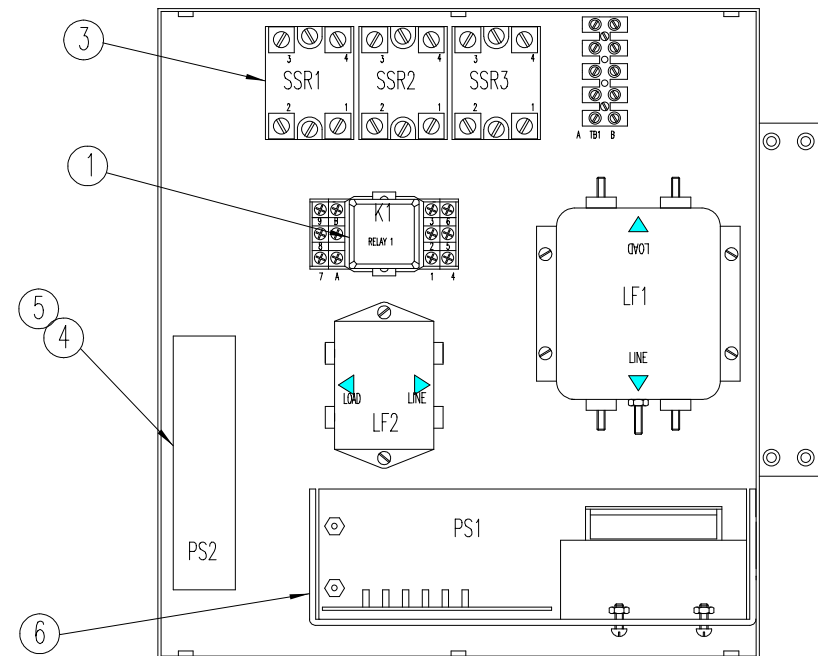


Folder Section - Figure A.5a

A.3d POWER UNIT

The Power Unit is located inside the cabinet and consists of the following components:

1. Master Relay: Electric safety interlock switch.
2. Fuses: Fuse tips illuminate when the fuse is bad
3. Solid State Relays (SSR): For switching high power items, motors, etc.
4. 5 VDC Power Supply: logic power.
5. +12VDC and -12VDC power: also logic power
6. +24 VDC Power Supply: power clutches, etc.



Power Unit Interior - Figure A-5b

A3.e SENSORS

Feed Sensor

The Feed Sensor monitors the output of the singulator for proper singulation or non-feed of paper. It is a light-actuated through-beam sensor, identified by an “F” on the top.

Double Detect Sensor

The Double Detect Sensor monitors the output of the singulator for double feeds. It is a light-actuated through-beam sensor, identified by an “D” on the top.

Transfer Conveyor Sensors

This monitors the discharge of paper packages from the output conveyor. It acts to confirm the processing of specific documents.

Accumulator Sensor

The Accumulator Sensor indicates presence or absence of a package in the accumulator. It also monitors package discharge when the dump clutch has been engaged.

A3.f EMERGENCY STOP INTERLOCKS

The main E-stop located on the operator panel will interrupt power to the conveyors and folder when pressed down. This switch must be twisted to bring it back to it's original upper position.

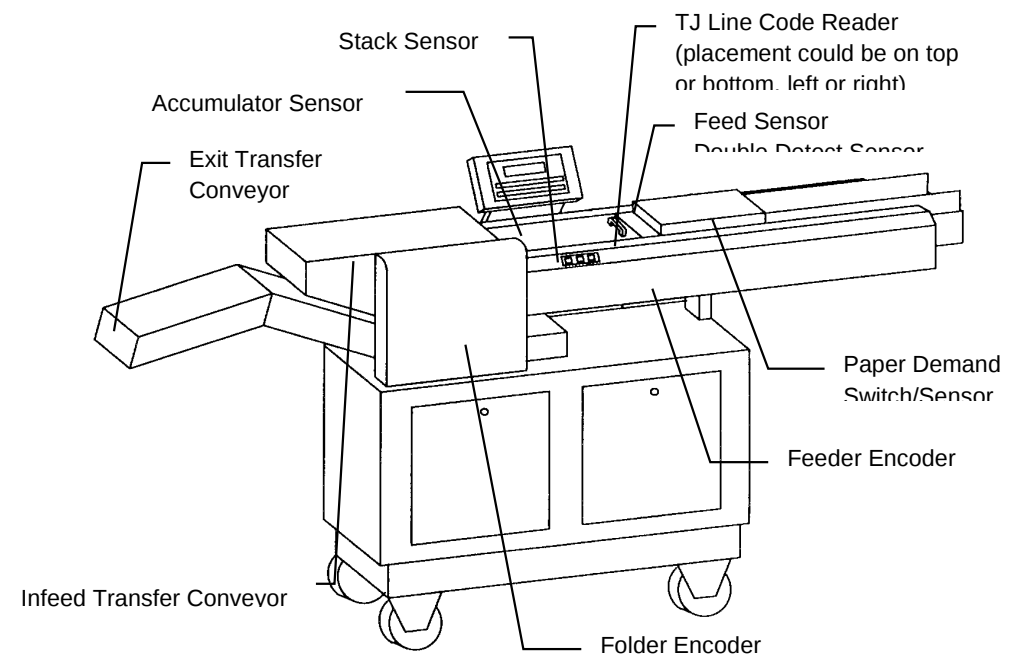
An extra contact is provided on this E-stop switch which is routed to pins 30 and 33 of the Inserter Connector located on the adaptor plate on the end of the cabinet. This will effect an E-stop to an external device when this contactor is wired to the E-stop circuit on that external device (e.g. Pinnacle).

A connection to the 420 interlock string has been provided on pins 28 and 29 of the same Inserter Connector which allows an external device (e.g. Pinnacle) to E-stop the 420. For this E-stop string to be functional a blue jumper across pins 24 and 25

of Module #7 on the I/O Board must be removed. If this E-stop string is not used this jumper must be in place. Pin 11 of this connector also provides an "Interlock Sense" signal to an external device.

There are six (6) safety interlock switches which will interrupt power to the conveyors and folder whenever a cover is opened:

- Under the cover located over the singulator mechanism
- Under the cover located over the accumulator section.
- On the top cover of the folder.
- On the lower cover over the (#2) buckle plate.
- On the folder and transfer conveyor meeting point (interrupts power when the transfer conveyor is removed).
- On the clear lexan cover of the transfer conveyor.



Sensors - Figure A.6

A.4 MACHINE SPECIFICATION

Listed below are specifications for the Smart Feeder:

Throughput
Speed: Max. 24,600 documents per hour

Material
Paper Weights: 20# (75 GSM) Inquire for heavier weights
Paper Size: 7" x 7" (178 mm x 178 mm) to 11" x 14" (305 mm x 356 mm)
Loading Capacity: 2,000 sheets of 20# bond.
Fold Types: "C", "Z", "V" & DOUBLE "V"
Porosity: 20 Gurley seconds
Stiffness: 20 Lb. Stock 170-225 Gurley Stiffness Units
24 Lb. Stock 250-300 Gurley Stiffness Units
Cross Grain Stiffness: 20 Lb. Stock 8~125 Gurley Stiffness Units
24 Lb. Stock 12~150 Stiffness Units
Moisture Content 4-6% by Weight

Components
Feeder: Bottom feed, top loading for continuous operation.
Optical Reader: Optical code reading for group batch recognition, sequencing and double printing control of 1 to 5 document groups. Larger group batch setting available upon request.
Folder: 4 plates.
Group selector: Manual group selection for 1 to 5 sheets.

Counter Modes: Total count, batch count, resettable count.

Output Conveyor Options:

Version 1—with shingling output conveyor/stacker

Version 2—with intelligent transfer conveyor interface to gripper arm of inserter's insert station.

Version 3—with a buffering, intelligent transfer conveyor interfaces to an open feed station of inserter The GBR 420-3 can also convert an intelligent, continuous form mail inserting system to a cut sheet operation.

Controller: Adjustable operator's panel with readout and push-button access to all system functions. System is microprocessor controlled with self-diagnostics and error display including double, misfeed and jam detection.

Electrical Service

110 Volts, 1 Phase, 60Hz, 9 Amp.

220 Volts, 1 Phase, 50 or 60Hz, 5 Amp.

1,000 BTU/hr

Fuse List - Refer to Section D10

Dimensions

Length: 120" (3048 mm) Model 420-1

Width: 26" (660 mm)

Height: 52" (1321 mm)

Weight: Net approx. 350 lbs. (159 kg)

Read Options

T.J. Line Code

Bar Code (3 of 9)

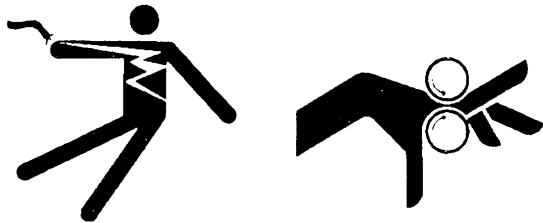
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B.2.b	LUBRICATION.....	2

B.1 TEST EQUIPMENT AND TOOLS

- Fluke Scope Meter
- Standard & Metric Hex Wrenches
- Small Blade Flat Screwdriver
- Philips Head Screwdriver

B.2 GENERAL PROCEDURES

WARNING!

DO NOT ATTEMPT TO CLEAN THE SMART FEEDER WHEN THE MACHINE IS RUNNING. ATTEMPTING TO DO SO COULD RESULT IN INJURY. BE SURE THAT MACHINE POWER IS OFF AT ALL TIMES WHEN CLEANING.

B.2a CLEANING THE MACHINE

The 420 should be cleaned daily to remove any dirt or dust which may interfere with the operation of the machine. Paper dust collected in motion areas could impede and/or damage integral parts of the folder. Paper dust can also impede read quality if it accumulates on the read heads and paper sensors. Excess dirt or toner build-up (from laser printing) on the feed belts could result in damage to the material and/or premature wear of the feed belts. Therefore, it is important to perform the following daily cleaning instructions:

1. Clean ALL Feed Belts.
2. Remove ALL Paper Dust.
3. Clean the Fold Rollers
4. Clean the Machine Cabinets and Covers.

B.2a1 Cleaning the Fold Rollers

All accumulated paper dust should either be brushed or vacuumed from the 420. Clean all accumulated paper dust from the electronic paper sensors.

B.2a2 Cleaning the Fold Rollers

DO NOT USE ANY LIQUID ON THE FOLD ROLLERS! The fold plates must be removed in order to clean all fold rollers. For

more information on cleaning the fold rollers, refer to your 420 Operator Manual.

B.2a3 Machine Cabinets and Covers

Clean the machine cabinets and covers using a soft damp cloth.

B.2a4 Paper Hopper

The feed belt should be cleaned with a substance such as isopropyl alcohol that does not leave a film. Apply some alcohol to a rag then lightly rub all dirt and film off of the belts.

B.2a5 Singulator

The Singulator must be as clean as possible at all times to insure the proper feeding and singulation of paper by the feed belt. This may be done first making sure that the singulator is not worn. If so, loosen the small set screw on the operator side and rotate the roller to a point where a rounded spot on the roller will contact the paper.

NOTE: If there is no rounded spot available, the singulator needs to be replaced immediately.

Once this is accomplished, raise the singulator roller approximately 3/4" from present setting. Pass an alcohol dampened rag under the bottom of the singulator roller. Be sure

that it is making sufficient contact to clean away all dirt and debris from the contact portion of the singulator roller.

B2.b LUBRICATION

No lubrication is required on the 420.

NOTE: If a mechanical component is out of line or deformed, a small amount of oil may be used as a short term fix (to eliminate noise or binding) until the component can be replaced.

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C.4u	SYMPTOM: Error in accumulator - "package did not dump"	49			
C.4v	SYMPTOM: Error in accumulator - "package not removed"	49			
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C.4z	SYMPTOM: Error in folder - "Speed is too low"	50			
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C.1 MACHINE DIAGNOSTICS

Diagnostics on the SMART FEEDER is performed through the display panel and related software. Refer to section C2.

C.2 SCREEN OPERATION

There are several screens available through the display. These screens provide set up, monitoring, and alteration capabilities for the SMART FEEDER. They are illustrated in the charts which follow.

READ - Refer to Section D for screen directions.

ON-OFF	SETUP	READ-TYPE	TEST
--------	-------	-----------	------

TEST - INPUT OUTPUT SPEED SETUP CYCLE INSERTER*

JOB - GET JOB SAVE JOB

SHEET LENGTH - 5.5 in 7 in 8.5 in 11 in 14 in A4 A5 A6

SIZE PACKAGE - 1 2 3 4 5 6 7 VARIABLE

INSERT -

INSERT TO PULL	0:OFF	9:ON	#:SELECT
STATION	8=0	7=0	6=6 5=5 4=4 3=3 2=2 1=1

The # SELECT settings on the lower line determine which inserts will be pulled when there is a line present in the line code for that position. For instance, when using GBR Line Code if there is a line present in the line code for the #4 station and this screen has been set for 4=4, an insert will be pulled from station #4. If the screen had been set to 3=4, an insert would be pulled from station #3. On the upper line 0:OFF indicates no inserts will be pulled if the lower line is set to zero even if there is a line in the code for that station. 9:ON indicates an insert will be pulled from a station whether or not

there is a line in the line code for that station if the lower line is set to =9.

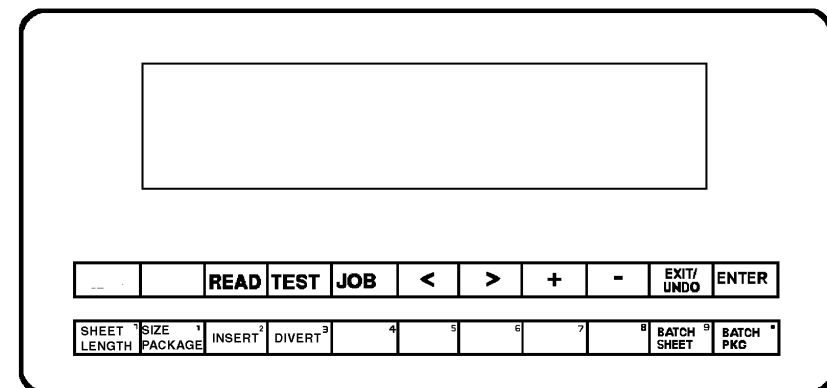
DIVERT -

BATCH SHEET - SHEET BATCH COUNT: < > UNDO/ ENTER

BATCH PKG - PACK BATCH COUNT: < > .. UNDO/ ENTER
*(if installed)

To access particular options, scroll through menu choices using the < > keys on the key pad. When the desired option is flashing, press the Enter key to select that choice.

Diagnosis of the system begins with these tests. If it is found that the displayed information indicates a problem, refer to the schematics in section D or section F.



SMART FEEDER DISPLAY - FIGURE C-1

C.2a "INPUT" TEST MENU

SELECT TEST < > ENTER (ver. 07625.xxx)
INPUT OUTPUT SPEED SETUP CYCLE INSERTER (if installed)

SELECT INPUT: < > .. + (MORE)

		Rack:Opto
1	Feed Sensor	0:0
2	2 sheet Sensor	0:16
3	Feeder Speed Encoder	0:2
4	Acc Sensor	0:18
5	Stack Sensor	0:1
6	Folder Speed Encoder	0:3
7	Transfer Conv IN SNS	0:12
8	Transf. Conv. OUT SNS	0:13
9	Ins. Run Lamp	1:21
10	Inserter Deg. Encoder	0:5
11	Inserter Home Encoder	0:14
12	Key Power	0:8
13	Key Cycle	0:9
14	Key Dump	0:10
15	Paper Demand Wand	1:20
16	Demand Switch	0:4
17	Interlock	0:11
18	Conv Option Line 0	0:6
19	Conv Option Line 1	0:7
20	Conv Option Line 2	0:15
21	Inserter Sta. 1 Sns	1:23
22	Cutter Busy Signal	0:19
23	Cutter Jam Sensor	1:22
24	Ins Ink Mark Pres	1:16

After pressing the TEST key, this message appears, asking which test to perform.

Press the < or > key to scroll through the available choices until INPUT is highlighted.

Press ENTER to select.

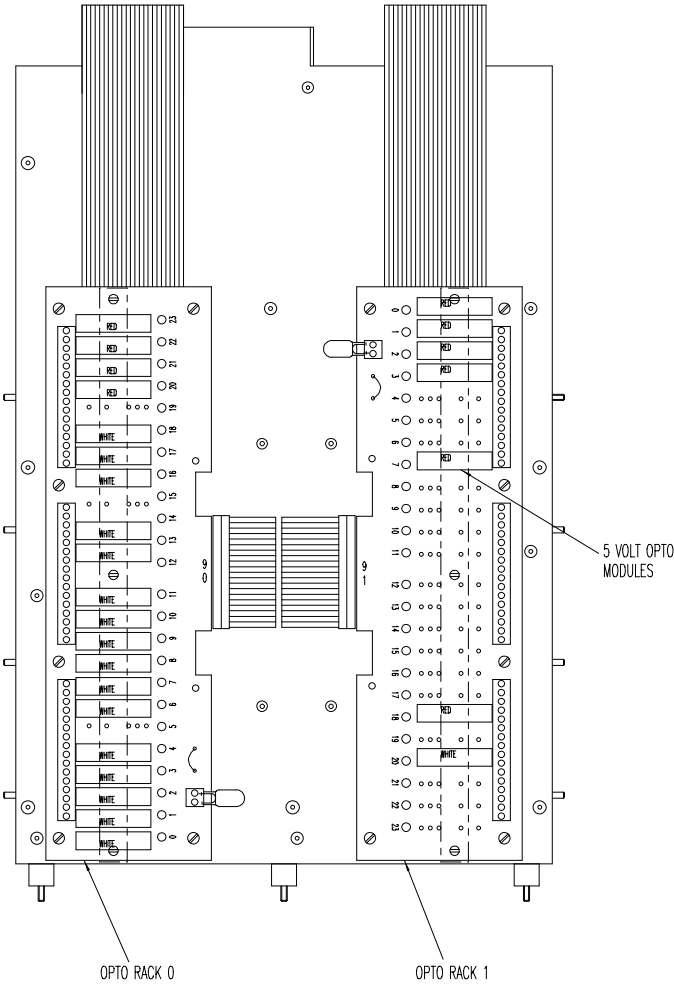
The display will then indicate the status of the input.

00/00:OFF:NAME
OFF, ON, or UNAVAILABLE

Physically change the input (for instance, cover a sensor) to diagnose that the input is operating. Its state should change as indicated on the display. Also, the LED on the associated optical relay will be OFF or ON, depending on the state of the input. Rack:Opto indicates the location of the associated optical relay.

Press + to see information for each input as described below:

Located on:
Used for:
Part No.
Style:
Type:
Opto Rack:



OPTO RACKS - FIGURE C-2

C.2b "OUTPUT" TEST MENU

SELECT TEST < > ENTER (ver. 07625.xxx)
INPUT **OUTPUT** SPEED SETUP CYCLE INSERTER

SELECT OUTPUT: < > .. START + (MORE)

After pressing the TEST key, the SELECT TEST message appears, asking which test to perform.

Press the < or > key to scroll through the available choices until OUTPUT is highlighted.

Press ENTER to select.

The display will then indicate the status of the output.

00/00:OFF:NAME

OFF, ON, or UNAVAILABLE

Cycle the machine to change the output: note that the output is operating. Its state should change as indicated on the display. Also, the LED on the associated optical relay will be OFF or ON, depending on the state of the input. Rack:Opto indicates the location of the associated optical relay.

Press + to see information for each input as described below:

Located on:
Used for:
Part No.
Style:
Type:
Opto Rack:

		Rack/Opto
1	Feed Clutch	1:0
2	Feed Motor	1:2
3	Acc Dump Clutch	0:20
4	Acc Dump Brake	0:23
5	Folder Motor	1:1
6	Master Relay	1:3
7	Transfer Conv. Clutch	0:21
8	Transfer Conv. Brake	0:22
9	Separation Sol 1 (inserter signal)	1:5
10	Separation Sol 2 (inserter signal)	1:8
11	Separation Sol 3 (inserter signal)	1:9
12	Separation Sol 4 (inserter signal)	1:10
13	Separation Sol 5 (inserter signal)	1:11
14	Separation Sol 6 (inserter signal)	1:12
15	Separation Sol 7 (inserter signal)	1:4
16	Separation Sol 8 (inserter signal)	1:16
17	Separation Sol Encoder (inserter signal)	1:13
18	Ink Marker Solenoid (inserter signal)	1:14
19	Env Flap Sns Dis (inserter signal)	1:15
20	Emr Stop (inserter signal)	1:16
21	Ins Station 1 Error (inserter signal)	1:17
22	Postal Meter divert (inserter signal)	1:19
23	Paper Hopper Request	1:18
24	First Hold Clutch	2:15
25	First Hold Brake	2:14
26	Feeder Brake	2:13

C.2c "SPEED" TEST MENU

SELECT TEST < > ENTER (ver. 07628.xxx)
INPUT OUTPUT **SPEED** SETUP CYCLE INSERTER

ALL SPEEDS IN IPS : EXIT TO LEAVE OR...
FEED: 165 FOLD: 115 DEMAND: OFF READ 150:

Note: IPS (inches per second).

The speeds indicated are approximate.

Press the ENTER key to start motors. Press the EXIT/UNDO key to stop motors.

NOTE: The FEED and READ speeds must be within 5% of each other to ensure normal operational condition.

C.2d "SETUP" TEST MENU

SELECT TEST < > ENTER (ver. 07625.xxx)
INPUT OUTPUT SPEED **SETUP** CYCLE INSERTER

SELECT SETUP: < > .. UNDO EXIT

After pressing the TEST key, the SELECT TEST message appears, asking which test to perform.

Press the < or > key to scroll through the available choices until SETUP is highlighted.

Press ENTER to select.

1	TWO SHEET DETECT DISABLE
	TWO SHEET CHECK: < > .. UNDO/EXIT
	ON OFF
2	EXIT CONTROL
	SELECT: 0
3	CHOOSE TYPE LOWER LEFT DISPLAY
	1/5 Total Sheets
	2/5 Total Packages
	3/5 Page in Package
	4/5 OMR
	5/5 No Display
4	CHOOSE TYPE LOWER RIGHT DISPLAY
	1/6 Batch Sheet
	2/6 Batch Package
	3/6 Inserter Rate/Hour
	4/6 Ave. Wait for Demand
	5/6 OMR
	6/6 No Display
5	CHOOSE NO USE SHUTDOWN TIME LENGTH
	1 - 5 - 10 - 15 - OFF
6	PULSE FEEDING ENABLE
	PULSE FEEDING ENABLE: < > .. UNDO/ EXIT
	ON OFF
7	CHOOSE TYPE TRANSFER CONVEYOR
	TYPE TRANSFER CONV.: < > .. UNDO/ EXIT
	GRIPPER ARM HOPPER FILL OPEN FEED
8	DISPLAY BELL DISABLE
	DISPLAY BELL: < > .. UNDO/ EXIT
	ON OFF
9	CHOOSE TYPE PRE-FEEDER CONVEYOR
	TYPE PRE-FEED CONV.: < > .. UNDO/ EXIT

	CREEPER ONLY 470 BULK CUTTER CONT.
10	HIGH COUNT STOP
	1-10: < > ...UNDO/EXIT
11	PERFORMANCE: < >...UNDO/EXIT
	OFF ON
12	INSERTER: ONLINE/OFFLINE
	< >...Enter
13	FIRST PAGE HOLD DELAY
	FIRST PAGE HOLD DELAY: 05
14	CONFIG. ID (NOTE: Cycle machine power to set change)
	XFER CONVEYOR (W/INSERTER)
	STRAIGHT CONVEYOR
	XFER CONVEYOR (STAND ALONE)
	XFER CONVEYOR (W-INSERTER - P)
15	DUMP TO FEED DELAY TIMER SETUP
	DUMP TO FEED :10 DUMP BRAKE: 05
16	DUMP DELAY TIMER SETUP
	DUMP DELAY TIMER VALUE: 25
17	SERIAL COMMUNICATION PROTOCOL
	SERIAL COMM PROTOCOL NUMBER: 0-5
18	FEED BRAKE ENABLE/DISABLE
	FEED BRAKE: DISABLE ENABLE

1/18 Two Sheet Detect Disable is normally set to "ON" but can be turned off if varying thickness stock is being run or if printing on the stock is affecting the double detect sensor.

2/18 EXIT CONTROL is normally set to "0".

- 0 Standard Inserter Control
- 1 12 Bit Control (preliminary)
- 2 8 Bit Collector Control (preliminary)

3/18 Lower Left Display can be customized to the operator's preference.

4/18 Lower Right Display can be customized to the operator's preference.

5/18 No Use Shutdown Time Length sets the time the Smart Feeder will run without being used before it cycles down.

6/18 Pulse Feeding Enable is normally turned "OFF". When turned "ON" the feeder will place a larger gap between the sheets being fed.

7/18 Choose Type Transfer Conveyor is normally set to "GRIPPER ARM" when the inserter will be taking the folded document from the Smart Feeder. Select "HOPPER FILL" when the inserter will be taking the folded documents from a hopper. Select "OPEN FEED" when the Smart Feeder will be placing the folded documents directly on the inserter track.

8/18 Display Bell Disable is normally set to "ON". Turning this "OFF" will turn the bell on the Smart Feeder display off.

9/18 Choose Type Pre-Feeder Conveyor is normally set to "CREEPER ONLY".

10/18 High Count is normally set at "7". High Count allows the operator to define the number of documents in a group which will trigger a required stop. Operator can then process the group manually. This might be used to accommodate odd groups in metered mail applications.

1. Press the TEST button.
2. Scroll to SETUP.
3. Press ENTER button.
4. Scroll to feature 10 of 10: HIGH COUNT STOP.
5. Press ENTER button. Menu will display, "HIGH COUNT STOP." This parameter should be set to "7" (from the factory) but can range from 1 to 10. Use settings greater than "7" only when processing "V-folds".
6. Enter the number of documents representing the highest total documents in a group.
7. Press ENTER.

When the SmartFeeder accumulates the set number of documents and recognizes that it is not the end of a group, the machine will stop and an error message will be displayed:

MAX PAGES IN ACCUM. (single cycle)
MAX SHEETS IN ACCUM. (auto cycle)

Remove the document packet and reset the machine to resume operation.

Process the removed packet manually.

If the error occurs but the document packet is correct, make sure the High Count Stop is set to the proper value (see above).

11/18 Performance OFF is the normal setting, however if increased throughput of the Smart Feeder is needed to maintain the speed of the interfaced unit then Performance ON should be selected. If this mode is set to **"ON"** Setup 15 (DUMP TO FEED DELAY) should be set to **05** and Setup 16 (DUMP DELAY TIMER SETUP) should be set to **40**. These settings may need to be adjusted if other than 11" documents are being fed.

12/18 Inserter ONLINE allows the Smart Feeder to control the operation of the inserter. OFFLINE returns control to the inserter, allowing the operator to run the inserter as a standalone unit.

- ◆ This feature only works if the optional AC/DC opto logic kit is installed
- ◆ This feature replaces the "Dummy Plug" that needed to be installed for inserter "off-line" operation.

13/18 First Page Hold Delay is normally set at 05. If the First Page Hold Option is installed on the Smart Feeder this time can be adjusted to leave a document on the accumulator ramps for a longer period of time if necessary.

14/18 Config. ID is normally set to XFER CONVEYOR (W/INSERTER). XFER CONVEYOR (W-INSERTER - P) is selected when an insert from the Smart Feeder may not be desired and always selected when feeding a Pinnacle inserter. Refer to Section for more information on

15/18 Dump to Feed Delay Timer Setup is normally set to "10" ("30" if First Page Hold is being used). A "DUMP TO FEED DELAY" of less than 10 may cause the first page of the set to be passed to the accumulator while the dump clutch is still engaged causing a "DUMP BRAKE FAILURE" error.

The amount of time allotted to the reader is dictated by the value of the single digit place, 0 being the shortest time and 9 the longest time allotted for a reading. This should be set as low as possible without causing a "Blank Page" error. The tens digit place is only used in setting the amount of time from an accumulator dump to when the next sheet is fed. It does not affect the time allotted for a reading. The single digit place however, does affect the feed delay time.

"DUMP BRAKE" is normally set to "5"ms. This time period is a delay in energizing the Dump Brake after a package has left the accumulator section and into the folder section. This delay allows the package to clear the dump rollers before the Dump Brake is energized. Should the trailing edge of the package get stopped in the dump rollers, increase this time until the package clears the rollers. The range of this variable is 0 to 99ms, but should be kept as short as possible to not effect performance.

16/18 Dump Delay Timer Setup is set to 25 for normal run and 40 when First Page Hold is being used.

17/18 Serial Communication Protocol - If RS232 communications to an external device will be used, the correct external device protocol must be selected:

- 0 No external device
- 1 RR Donnelly Short message output.
- 2 RR Donnelly Long message output.
- 3 Pinnacle old message output.
- 4 Pinnacle new, EDA-5109, message output.
- 5 General Message output. Pinnacle new plus Group number on end.

18/18 FEED BRAKE ENABLE / DISABLE

“FEED BRAKE:” is normally set to DISABLE. This setup option allows ENABLING or DISABLING the energizing of a feeder brake when the Feed Clutch is de-energized. Should the paper in the feeder section begin to prematurely exit under the pinch roller (due to higher operation speeds) and block the feed sensor, then the FEED BRAKE can be enabled to retard the paper feed. This feed brake is only available on the Model 438 and the enable or disable will not affect earlier production machines.

C.2e CYCLE TEST MENU

SELECT TEST < > ENTER (ver. 07625.024) INPUT OUTPUT SPEED SETUP CYCLE INSERTER
--

SELECT CYCLE TEST: < > .. UNDO/ EXIT

After pressing the TEST key, the SELECT TEST message appears, asking which test to perform.

Press the < or > key to scroll through the available choices until CYCLE is highlighted.

Press ENTER to select.

1	CYCLE ACCUMULATOR CLUTCH/ BRAKE
	CYCLING ACCUMULATOR .. UNDO/ EXIT
	SIMULATING 10,000 PACKAGES PER HOUR
2	CYCLE FEEDER CLUTCH
	CYCLING FEEDER .. UNDO/ EXIT
	SIMULATING 10,000 PACKAGES PER HOUR
3	CYCLE ENTIRE SYSTEM
	CYCLING SYSTEM .. UNDO/ EXIT
	SIMULATING 10,000 PACKAGES PER HOUR
4	CYCLE TRANSFER CLUTCH/ BRAKE
	CYCLE TRANSFER CONVEYOR .. UNDO/ EXIT
	SIMULATING 10,000 PACKAGES PER HOUR

Scroll through the choices within the option and press ENTER to accept.

C.2f INSERTER TEST MENU

This is only available if the CONFIG ID SETUP (Section C2.d) is set to **XFER CONVEYOR (W/INSERTER)**.

SELECT TEST < > ENTER (ver. 07625.024) INPUT OUTPUT SPEED SETUP CYCLE INSERTER
--

INSERTER SETUP: < > .. UNDO/ EXIT ENCODER TEST/TIMING
--

INSERTER ENCODER POSITION .. UNDO
DEGREES:000 HOME:0

TIMING

SELECT TIMING TO SET: < > .. ENTER	
1	INSERT VACUUM
	INSERT VACUUM +- UNDO/ EXIT
	ENABLE AT: 100
2	ENVELOPE HOPPER VACUUM
	ENVELOPE HOPPER VACUUM +- UNDO/ EXIT
	ON AT: 230 Insert Sta -:2
3	ENVELOPE FLAP DETECT
	ENVELOPE FLAP DETECT +- UNDO/ EXIT
	ON AT: 010 OFF AT: 350 Insert Sta -:1
4	INK MARKING
	INK MARK +- UNDO/ EXIT
	ON AT: 010 OFF AT: 180 STA. AT: 00
5	POSTAL METER DIVERT 1
	ON at: 200 OFF at: 010 STA: 07 PT: 09
6	LOGICAL SHIFT
	LOGICAL SHIFT +- UNDO/ EXIT
	ENABLE AT: 090
7	BAD PACKAGE STOP
	BAD PACKAGE STOP +- UNDO/ EXIT
	ENABLE AT: 080
8	NUMBER OF INSERT STATIONS
	GRIPPER LAYOUT: < > .. UNDO/ EXIT
	4 6 4+4 6+4 4+6 654321
9	NUMBER OF EMPTY STATIONS (MUST BE ENTERED)
	NUMBER OF EMPTY STA. +- UNDO/ EXIT
	STATIONS: 02
10	ENCODER TYPE

	SELECT ENCODER TYPE: < > .. UNDO/ EXIT
	B&H ROTATIONAL POSITION BOX 36 TICK/ REV.
	GBR 100 TICK ENCODER
11	OPTO LOGIC TYPE
	SELECT OPTO TYPE: < > .. UNDO/ EXIT
	AC/DC DUMB INSERTER
	LEFT HAND CONTROL CARD (775)
12	POSTAL METER 2
	ON at: 240 OFF at: 010 STA: 07 PT: 01
13	(NOT USED)
14	POSTAL METER 3
	ON at: 280 OFF at: 010 STA: 07 PT: 02
15	POSTAL METER WEIGHTS
	METER 1 to 2: 00000 METER 2 to 3: 00000
16	WEIGHT PAGE AND ENVELOPE
	PAGE: 00000 ENVELOPE: 00000
17	WEIGHT INSERTS 1234
	>: 00000 >: 00000 >: 00000 >: 00000
18	WEIGHT INSERTS 5678
	>: 00000 >: 00000 >: 00000 >: 00000

Note: Insert Station positions are referenced from the station at which the documents are inserted into the envelope ("Insert Sta: 0"). Insert Station 1 would be the station downstream from Insert Station 0. Insert Station -1 is the Insert Station upstream from Insert Sta 0.

- 1 **Insert Vacuum** is normally enabled at "100". This is the position of the encoder (in degrees) at which vacuum is applied to the insert station.
- 2 **Envelope Hopper Vacuum** is normally enabled at "230". This is the position of the encoder (in degrees) at which vacuum is applied to the envelope hopper. Insert Sta -: is normally set at -2.
- 3 **Envelope Flap Detect** is normally set On at: 010, Off at: 350, and Insert Sta -:1(this is the location of the flap detect).
- 4 **Ink Marking** is an optional device that places an ink mark in varying locations to sort zip codes visually. "OFF" is the number of chain movements AFTER envelope insertion.

NOTE ON POSTAL METER WEIGHING: The 420 can accommodate up to three postal meters. Based on the values entered in "Postal Meter Weights", "Weight Page and Envelope", "Weight Inserts 1234", and "Weight Inserts 5678" the document will be stamped by the appropriate postal meter. The dollar value must be manually entered in the postal meter.

- 1 Enter the weight of the individual document in the PF300 in 16 "Weight Page and Envelope".

- 2 Enter the weight of an individual envelope in 16 "Weight Page and Envelope".
- 3 Enter the weight of each insert in stations 1-4 (17 "Weight Inserts 1234") and stations 5-8 (18 "Weight Inserts 5678").
- 4 Enter the upper weight limit of the entire envelope package for postage meter 1 and 2 in 15 "Postage Meter Weights".
- 5 Enter "ON at:xx" value for 5- "Postal Meter 1", 12- "Postal Meter 2", and 14- "Postal Meter 3". Normally these value are 200,240,and 280 respectively. If one of these values must be changed the others should also be changed to remain 40 apart from each other.
- 6 Enter "OFF at: 010" for Postal Meter 1, 2, and 3.
- 7 Enter the Postal Meter Station "STA: 00" (see Postal Meter 1, 2, and 3).
- 8 Enter the postal meter output point to the 420 (see Postal Meter 1, 2, and 3).

The 420 will total the weights of all documents, inserts, and the envelope and then send it to the correct postal meter.

- 5 **Postal Meter 1** is normally set to "ON at: 200". This will enable the postal meter at the correct time. This value may need to be adjusted if the postal meter doesn't place the postage in the correct place. Postal Meter 2 should then be set to 40 higher than the new meter 1 value and postal meter 3 should be 40 higher than 2. "OFF at: xx" should be set to "010". "STA:00" is set to the value of the last chain section of the inserter after the envelope stuffer and the turnover (04, 05, 06, 07, etc.), this is normally set to

"07" on a six station inserter. "PT:xx" selects the postal meter output line to the 420, this is normally set to "9".

- 6 Logical Shift** is normally set to "ENABLE at:090". This is used to carry the data with the physical document.
- 7 Bad Package Stop** is normally set to "ENABLE at:080".
- 8 Number of Insert Stations** should be selected to match your inserter configuration.

IMPORTANT: Number of Empty Stations must be set correctly for Postal Meter Weighing to work correctly.

- 9 Number of Empty Stations** are the number of stations that do not have inserters. This would be the space taken by the 420, usually 02.
- 10 Encoder Type** (select your encoder type).
- 11 Opto Logic Type** (select your type).
- 12 Postal Meter 2** (see Postal Meter 1), PT:xx is usually set to "01".
- 13 (Not Used)**
- 14 Postal Meter 3** (see Postal Meter 1), PT:xx is usually set to "02".
- 15 Postal Meter Weights** should be set to the upper weight limit of Postal Meter 1 for "METER 1 to 2:00000 and the upper weight limit of Postal Meter 2 for "METER 2 to 3:00000.
- 16 Weight Page and Envelope** should be set to the weight of a single sheet from the 420 for "PAGE: 00000" and the weight of an envelope for "ENVELOPE: 00000".

17 Weight Inserts 1234 should be set to the weight of an insert for each insert station (1-4).

18 Weight Inserts 5678 should be set to the weight of an insert for each insert station (5-8).

C.2g POSTAL METERING SETUP PRESETS

The following are 'Typical Presets' for the Smart Feeder configured for 6-Station AC/DC Open Feed Inserter Control with two postal meters, Meter 2 and Meter 3, Meter 1 and Meter 2. This may vary from your actual application.

Test - "Setup"

Double Detect	ON
Presets Reset	NA
Lower Left Display	OMR
Lower Right Display	OMR
No Use Timeout	OFF
Pulse Feed	ON
Type of Transfer	OPEN FEED
Beep/Bell	ON
Input Conveyor	2000 Sheet Conveyor
High Count Stop	07
Performance	Off
Inserter Online/Offline	Online
First Page Hold delay	30
Config ID	Xfer Conveyor(W/Inserter)
Dump to Feed Delay Setup	05
Dump Delay Timer Setup	25

Test - "Inserter"

Insert Vacuum Enable	On at:100
Envelope Hopper Vacuum	On at:230
	Insert Sta.-:2
Envelope Flap Detect	On at:010
	Off at:350
	Insert Sta.-:1
Ink Marking	On at:010
	Off at:010
	Insert Sta.:00
Postal Meter Divert	On at:200 (First Meter inline when Meters 1 and 2 tested)
	Off at:010
	Insert Sta.:07
Logical Shift	Enable at:090
Bad Package Stop	Enable at:080
Number of Insert Stations	6
Number of Empty Stations	2
Encoder Type	GBR 100 Tick Encoder
Opto Logic Type	AC/DC Dumb Inserter
Postal Meter 2	On at:200(for first Meter inline, 240 if second meter inline)
	Off at:010
	Insert Sta.:07
	Pt:1
Postal Meter 3	On at:200(for first Meter inline, 240 if second meter inline)
	Off at:010
	Insert Sta.:07
	Pt:2
Postal Meter Weights	Meter 1 to 2: 00004 Meter 2 to 3: 00005

Weight Page and Envelope Page: 00001 Envelope: 00001
>: 00001 >: 00001 >: 00001
Weight Inserts 1 2 3 4 >: 00001 >: 00001 >: 00001 >: 00001
Weight Inserts 5 6 7 8 >: 00001 >: 00001 >: 00001 >: 00001

Read - "T.J. Line"

Demand Feed	Normal
Page sequence	Item Count
Group Sequence	Off
Ink Mark	Off
Postal Meter Divert	Off(Off = NO divert by mark and YES Meter 1 Weight)
Parity	None
End of Subset	Off
Random Check Mark	Off
Blank Page Error Stop	On
Number of Windows	1
Window Setup	1: Begin:07 Length:16
Lines Per Inch	6
Probe A or B	A
Bit Weight	LSB First
Calibration	Off
Tolerance	Low
Code Field Format	
EOG	EOG:00 NOT EOG:00
Page	Begin:5 Length:3 Min:1 Max:7
Group	Begin:2 Length:3 Min:1 Max:4
Inserts	Begin:10 Length:6 Max:6
Postal Meter Divert	At Line:0
Subset	At Line:0 By Count Size:0
Parity	At Line:0
Random Check Mark	At Line:0 Repeat Every:0

Read - "Bar"

Job Setup	Job 41
Stop for Read Errors	Yes

'READ(LINEREAD)' to 'SETUP' Menu:

Postal Meter Divert Enable(Postal Meter 1).

(May operate from a read mark as before. Consult the 420 Operating Manual)

- Select Postal Meter Divert Enable "ON", to operate from a Lineread mark.
- Select Postal Meter Divert Enable "OFF", to operate from Weights.

'TEST' to 'INSERTER' to 'TIMING' Menu:

Postal Meter Divert(Postal Meter 1)

- Enter Meter "ON AT:" in degrees, 0 to 350.
- Enter Meter "OFF AT:" in degrees, 0 to 350.
- Enter Meter Position 'STA:' (1 to 12 after envelope insert station)

Postal Meter 2

- Enter Meter "ON AT:" in degrees, 0 to 350.
- Enter Meter "OFF AT:" in degrees, 0 to 350. Not Used
- Enter Meter Position 'STA:' (1 to 12 after envelope insert station)
- Enter Meter Output Point Option 'PT:'
 - 1 = Station 7 Select - Default
 - 2 = Station 8 Select
 - 3 = Inserter E-Stop
 - 4 = Station 1 Error
 - 5 = Station 7 Select - Inverted Signal
 - 6 = Station 8 Select - Inverted Signal
 - 7 = Inserter E-Stop - Inverted Signal
 - 8 = Station 1 Error - Inverted Signal

Postal Meter 3

- Enter Meter "ON AT:" in degrees, 0 to 350.
- Enter Meter "OFF AT:" in degrees, 0 to 350. Not Used
- Enter Meter Position 'STA:' (1 to 12 after envelope insert station)
- Enter Meter Output Point Option 'PT:'
 - 1 = Station 7 Select
 - 2 = Station 8 Select - Default
 - 3 = Inserter E-Stop
 - 4 = Station 1 Error
 - 5 = Station 7 Select - Inverted Signal
 - 6 = Station 8 Select - Inverted Signal
 - 7 = Inserter E-Stop - Inverted Signal
 - 8 = Station 1 Error - Inverted Signal

- Enter Insert >6 Weight Value(00000 to 60000)
- Enter Insert >7 Weight Value(00000 to 60000)
- Enter Insert >8 Weight Value(00000 to 60000)

Operation

- Package Weight less or equal($\leq$) to Meter 1 to 2 Weight Value
 - Meter 1 operates.
- Package Weight greater than Meter 1 to 2 Weight Value and less or equal($\leq$) to Meter 2 to 3 Weight Value
 - Meter 2 operates.
- Package Weight greater than Meter 2 to 3 Weight Value
Meter 3 operates.

Postal Meter Weights

- Meter 1 to 2 Weight Value(00000 to 60000)
- Meter 2 to 3 Weight Value(00000 to 60000)

Weight Page and Envelope

- Enter Page Weight Value(00000 to 60000)
- Enter Envelope Weight Value(00000 to 60000)

Weight Inserts 1 2 3 4

- Enter Insert >1 Weight Value(00000 to 60000)
- Enter Insert >2 Weight Value(00000 to 60000)
- Enter Insert >3 Weight Value(00000 to 60000)
- Enter Insert >4 Weight Value(00000 to 60000)

Weight Inserts 5 6 7 8

- Enter Insert >5 Weight Value(00000 to 60000)

C.3 SOFTWARE ERROR CODES

C.3a General Solutions to Errors

Many error codes are the result of jammed paper (physical errors), or paper expected at specific time and location (read errors: sequence, blank page, misprinted code, etc.).

The sensors index the number of sheets as they pass, incrementing a count on the CPU-186 . If a corresponding decrement of count does not occur from the next sensor, a read error is generated. If error persists, consider failure of sensor or communication problem (poor connection, etc.).

For many read errors, check that setup parameters are correct before pursuing functional troubleshooting.

Read errors require a determination of the integrity of the pack. The operator must look at the readings on the display and manually verify each sheet.

When read errors occur, it indicates that the integrity of the package is in question. The SMART FEEDER was not able to verify a page while stream feeding a package. When the operator is satisfied that the package is complete, press the DUMP key to release the package.

Once a reading error (BLANK or MISREAD) is declared, additional feeding via the CYCLE key will continue to display BLANK or MISREAD errors, but will not stop the machine.

Before powering up the SMART FEEDER, the operator must remove any packages in the accumulator to be sure there will be no initial error conditions.

C.3b Solutions to Less Common Errors

A rare, but more difficult-to-find problem can occur with shorts in the 24VDC circuit. Intermittent failure of sensors (5VDC supply) can result from the 24VDC short. The short will only occur when a 24V component activates, dropping the 5V supply across the line. The 24V solenoid may be located some distance from the sensor which is the apparent problem: consider what is supposed to happen before or as the sensor is supposed to read.

If either the Feeder speed or Folder speed are approximately half of the other, an encoder channel is probably lost. (Check speeds through Test menu on display.)

Any time a new CPU-186 board is installed, the presets must be reset, or there will be an error displayed.

If PWB errors occur (errors with PWB as probable source), pull the board and make sure that all board components are properly seated. Re-install the board and make sure it is properly seated.

If reader problems are recurring, re-calibrate with the calibration sheet. Feed the sheet through several times to ensure that the reader encoder is returning good data. If data is inconsistent, replace the reader encoder.

An “invalid calibration” error indicates that the calibration reading was more than 15% different from the expected (stored) result. See above.

C.3c Specific Errors, Causes and Solutions

Refer to the tables on the following pages to identify likely causes and the possible solutions to errors.

BAR CODE READER ERRORS		
NO RESPONSE TIMEOUT	Answer not received, document in accumulator	1) Incorrect user input 2) Bad CPU-186 board 3) Blank CPU-186 board 4) Check, clean and adjust scanner
INVALID COMMAND	Unexpected signal	1) Incorrect user input 2) Bad CPU-186 board
BAD READ	Misread document	1) Blank or bad bar code 2) Check, clean and adjust scanner
PAGE OUT OF SEQUENCE	Page or roll sequence out of order in bar code	1) Incorrectly printed document 2) Documents out of order 3) Code not seen 4) Check, clean and adjust scanner
PRESETS CORRUPT		1) Battery jumper removed from CPU-186 2) Bad CPU-186 board
MAX NOT = NO. PAGES	Incorrect page count in accumulator	1) Page count setting incorrect 2) EOG mark not seen 3) Read error
INVALID CUST. ID.		1) Customer ID changed in the middle of a package
GROUP SEQUENCE ERROR	Group out of sequence	1) Incorrectly printed document 2) Documents out of order 3) Code not seen 4) Check, clean and adjust scanner
GROUP CHANGED IN SET	Group out of sequence	1) Incorrectly printed document 2) Documents out of order 3) Code not seen 4) Check, clean and adjust scanner

ROLL 7 OUT OF SEQ.	Roll sequence out of order	1) Incorrectly printed document 2) Documents out of order 3) Code not seen 4) Check, clean and adjust scanner
EXPECTED END OF GRP.	Page out of sequence	1) EOG mark not seen 2) Read error
EXPECTED PAGE ONE	Page out of sequence	1) Incorrectly printed document 2) Documents out of order 3) Code not seen 4) Check, clean and adjust scanner
READER ERROR	Documents not processing	1) Incorrectly printed document 2) Code not seen 3) Adjust feed sensor
NO RESPONSE/BLANK PG	Scanner did not see bar code	1) Incorrectly printed document 2) Documents out of order 3) Code not seen 4) Check, clean and adjust scanner
JOB CHANGED IN RUN	Job number changed in the bar code	1) Job setting incorrect 2) Reader error 3) Check, clean and adjust scanner
GROUP DID NOT CHANGE	Expected different group number	1) Incorrectly printed document 2) Documents out of order 3) Code not seen 4) Check, clean and adjust scanner
BAD CHECK DIGIT	Check digit in code is wrong	1) Code not seen 2) Check, clean and adjust scanner
SHORT GROUP	EOG read before expected	1) Documents out of order 2) Code not seen

		3) Check, clean and adjust scanner
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ACCUMULATOR ERRORS		
JAM/ STALL TO RAMPS	A document stalled before the stack sensor.	1) Accumulator jam. 2) The stack sensor is out of adjustment
JAM/ STALL ON RAMPS	A document stalled at the stack sensor.	1) Accumulator jam. 2) The stack sensor is out of adjustment
PACKAGE DID NOT DUMP	The package did not leave the accumulator when the discharge clutch was activated.	1) The dump nip rollers are out of adjustment. 2) The accumulator presence sensor is out of adjustment 3) The dump clutch has failed 4) Paper dust
PACKAGE NOT REMOVED	A package is still in the accumulator after POWER/ON reset	1) The accumulator presence sensor is out of adjustment 2) The accumulator presence sensor has failed
DUMP BRAKE FAILED	The package left the accumulator when it was not intended to.	1) The dump nip rollers are out of adjustment. 2) The accumulator presence sensor is out of adjustment 3) The accumulator presence sensor is out of adjustment 4) The dump brake has failed
IN Vs OUT SPEED	Folder and feeder speed are out of adjustment	1) KBIC settings need adjustment 2) Belts slipping 3) Encoder or tachometer failure
FAILED PRESENCE SNS	Documents not seen in accumulator	1) Paper dust 2) The accumulator presence sensor is out of adjustment
UNEXPECTED SHEET	Document in accumulator was not expected by the software	1) Adjust feed stack sensors
STATE DIDN'T CHANGE	Software routines could not complete a task	1) Restart machine

		2) Check 5VDC and 24VDC power supplies
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FEEDER ERRORS		
NO SHEET WAS FED	Attempt to feed a document failed.	1) The singulator/feeder belts are improperly adjusted 2) The hopper is out of paper 3) The hopper is out of paper
SHEET WAS TOO SHORT	A sheet was measured shorter than expected	1) A jam occurred at the feed sensor. 2) The user selectable length (preset by MODE key is too long 3) The feed sensor and/or accumulator presence sensor need adjustment
SHEET WAS TOO LONG	A sheet was measured longer than expected	1) Two sheets were fed shingled (thus increasing the apparent document length). 2) The user selectable length is too short 3) The feed sensor needs adjustment 4) The pullout rollers in front of the singulator need adjustment 5) Paper or debris left on feed sensor upon power up
EXTRA SHEET WAS FED	Two sheets fed together more than one sheet's thickness was detected at the feed sensor.	1) Two or more sheets were fed. 2) The feed sensor needs adjustment (see double detect sensor adjustment procedure) 3) There is excessive printing in the extreme left hand margin 4) Feed sensor is block by dust
BLOCKED FEED SNS	Obstruction of feed sensor during power up	1) The feed sensor needs adjustment 2) The pullout rollers in front of the singulator need adjustment

		3) Paper dust on sensor
CONVEYOR TOO SLOW		1) Feed motor KBIC out of adjustment 2) Motor unplugged
NV-RAM DATA CORRUPT	Data in the non-volatile ram was changed.	1) Power to the CPU-186 was unplugged directly at the board 2) Noise in the 120 VAC power 3) Battery jumper removed from CPU-186
NOT ENOUGH NV-RAM	Battery back up on the non-volatile ram chip is bad.	1) Ram needs to be replaced.
PRESETS CORRUPT	Program error internal processing error number one (1).	1) Should not occur. If error is displayed cycle the main power switch (off/on) 2) If the problem persists contact GBR field service department 3) Bad CPU-186 board
FEEDER IS TOO FAST		1) Feed motor KBIC out of adjustment
STATE DIDN'T CHANGE	Feeder software routines could not finish a task	1) State of feed sensor incorrect (ON should be OFF, or vice versa)
HOPPER EMPTY/JAM	An attempt to feed a document failed.	1) The singulator/feeder belts are improperly adjusted 2) The hopper is out of paper. 3) The feed sensor needs adjustment. 4) The feed sensor has failed.
CUTTER JAM (BUSY)	Cutter is busy for more than 2 seconds	1) Check cutter for jammed document 2) Check connections to cutter
CUTTER JAM (READY)	Cutter did not respond with a busy signal	1) Check cutter for jammed document 2) Check connections to cutter
CUTTER JAM (test)	Cutter is busy when starting a machine cycle	1) Check cutter for jammed document 2) Check connections to cutter
CUTTER JAM (SENSOR)	Cutter detects a jammed document	1) Check cutter for jammed document 2) Check connections to cutter

PRESETS CORRUPT	Memory values out of range	1) Battery jumper removed from CPU-186 2) Battery failed or battery jumper missing 3) Bad CPU-186 board
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FOLDER ERRORS		
DOC JAMMED INSIDE	Folder jam a document has not exited the folder in time.	1) A document has jammed inside the folder 2) A buckle plate is open 3) The out from folder is out of adjustment 4) The out from folder sensor has failed
STALL/JAM EXITING	Folder jam a document has not exited the folder in time.	1) A document has discharge sensor 2) A buckle plate is open 3) The out from folder sensor is out of adjustment 4) The out from folder sensor has failed
STALL/JAM INTO	Folder jam a document has not exited the folder in time.	1) A document has jammed going into the folder 2) A buckle plate is open 3) The out from folder sensor is out of adjustment 4) The out from folder sensor has failed
SPEED IS TOO SLOW	Folder speed is below 30 inches per second	1) The folder is jammed 2) The folder speed potentiometer is set too slow 3) The folder speed encoder sensor is out of adjustment or has failed
FOLDER IS TOO FAST	Folder speed is above 150 inches per second.	1) The folder speed potentiometer is set too high 2) The folder speed encoder sensor is out of adjustment or has failed
UNEXPECTED PACKAGE	Package in accumulator was not expected by the software	1) Adjust accumulator presence sensor 2) Adjust transfer conveyor infeed sensor
STATE DIDN'T CHANGE	Folder software routines could not finish a task	1) Restart machine 2) Check 5VDC and 24VDC power supplies

GBR READER ERRORS

INVALID GROUP	Group sequence has changed within a package, to group out of sequence.	1) Misread. 2) Bar code misprinted.
EXPECTED PAGE ONE	First page of package is out of sequence.	1) Correct page sequence. 2) Check sequence count in read setup (Up, Down, Off).
GROUP OUT OF RANGE	Bad Group the group ID number has changed within the same package.	1) A page from another group is mixed in with the same page number. 2) Misread.
PAGE OUT OF RANGE	The page numbers within the package are not in sequential order.	1) The pages within this group are switched or missing. 2) Misread.
NV-RAM DATA CORRUPT	Data in the non-volatile ram was changed.	1) Power to the CPU-186 was unplugged directly at the board. 2) Noise in the 120 VAC power.
PRESETS CORRUPT	Program error internal processing error number one (1).	1) Should not occur. If error is displayed cycle the main power switch (off/on). 2) If the problem persists contact support 3) Misprint of bar code.
YES NO EOG ARE SAME	(European) Mismatched group marks cause stall in accumulator	1) EOG and /EOG marks in same code 2) No EOG or /EOG mark in same code 3) Misprinted bar code.

INSERTER ERRORS

NV-RAM DATA CORRUPT	Data in the non-volatile ram was changed.	1) Power to the CPU-186 was unplugged directly at the board 2) Noise in the 120 VAC power 3) CPU-186 battery jumper removed
NOT ENOUGH NV-RAM	Battery back up on the non-volatile ram chip is bad.	1) Ram needs to be replaced.
PRESETS CORRUPT	Program error internal processing error number	1) Should not occur. If error is displayed cycle

	one (1).	the main power switch (off/on) 2) If the problem persists escalate service
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LINE READ ERRORS

NO RESPONSE TIMEOUT		1) Blank page 2) Read encoder failed 3) paper jam 4) Feed sensor out of adjustment
GROUP OUT OF SEQ.	Two consecutive packages group number were not in the proper sequence (7,6,5...0,7,6).	1) Group(s) were missing. 2) Misread. 3) Misprinted bar code. 4) Paper skewing under read sensor.
EXPECTED END OF GRP.	The end of group mark was expected but not read.	1) The document sequence is out of order. 2) Misread. 3) Bar code misprinted.
BLANK PAGE	No bar code was found within first 3 inches of travel.	1) Blank page 2) Page is backwards or upside down. 3) Misread 4) Misprinted bar code 5) Read was not reported in time (refer to Section C2.d - "DUMP TO FEED DELAY TIMER SETUP")
SHORT GROUP	End of group mark was encountered before the last page in the group was seen.	1) The rest of the package is missing. 2) Misread. 3) Bar code misprinted.
DUPLICATE PAGE	Two consecutive page's entire bar codes were the same.	1) Two identical pages were printed 2) Misread 3) Misprinted bar code 4) Paper skewed under read sensor
PAGE OUT OF SEQUENCE	The page numbers within the package are not in sequential order.	1) The pages are switched or missing 2) Misread 3) Misprint of bar code
INVALID GROUP	Group sequence has changed within a package,	1) Misread.

	to group out of sequence.	2) Bar code misprinted.
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EXPECTED PAGE ONE	Package stopped in accumulator	1) Min. or max. value for package incorrectly set up. 2) Up/Down sequence incorrectly set 3) Bad code
GROUP OUT OF RANGE	Bad Group the group ID number has changed within the same package.	1) A page from another group is mixed in with the same page number. 2) Misread.
PAGE OUT OF RANGE	The page numbers within the package are not in sequential order.	1) The pages within this group are switched or missing. 2) Misread.
INVALID COMMAND!	Reader board did not understand command	1) Shut down and check that all boards and board components are well seated 2) Restart machine 3) Swap boards with known good ones
NV-RAM DATA CORRUPT	Data in the non-volatile ram was changed.	1) Power to the CPU-186 was unplugged directly at the board. 2) Noise in the 120 VAC power.
NOT ENOUGH NV-RAM	Battery back up on the CPU-186 is bad.	1) Board needs to be replaced.
PRESETS CORRUPT	Program error internal processing error number one (1).	1) Should not occur. If error is displayed cycle the main power switch (off/on).
DUAL PORT RAM FAILED BAD ON-CHIP 8051 RAM INVALID COMMAND INVALID PIC INT.	Hardware failure on reader board	1) Battery failed or battery jumper missing 2) Bad CPU-186 board
INVALID SETUP DATA	Reader board memory corrupted	1) Restart machine
PARITY ERROR		1) Actual lines of codes must match parity setting (odd or even). 2) Bad code
UNEXPECTED RESPONSE		1) Paper jam

		2) Reader board failed 3) Reader encoder bad
EXPECTED READING		1) Blank page 2) Read encoder failed 3) paper jam 4) Feed sensor out of adjustment
READER REBOOTED		1) Reader encoder failed 2) Bad read board
INVALID READER ERROR		1) CPU-186 does not understand reader
INVALID CAL. SETUP		1) Feed through calibration sheet several times to ensure that encoder is reading properly (consistent read numbers) 2) Reader encoder bad
YES NO EOG ARE SAME	(European) Mismatched group marks cause stall in accumulator	1) EOG and /EOG marks in same code
ROLL 7 OUT OF SEQ.	Documents stalled in accumulator	1) Current page number is greater than computed cumulative count 2) Current page number is less than computed cumulative count
7 SHEETS AND NO EOG!	Accumulator full, group not complete	1) No EOG mark, accumulator full 2) No subset count in setup
NO RANDOM CHECK MK.	Incorrect document in accumulator	1) Random check mark not set correctly in Setup
UNEXPECTED RAN CHECK	(same)	2) Code bad, or misprinted
ID CHANGED IN SET!	Document does not belong to group	1) Document out of sequence 2) Code bad 3) Code misprinted
LAST SET SAME ID	Package stalled in accumulator	1) Group ID out of sequence 2) Incorrect setting for Group Sequence

		(Same sets OK)
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TRANSFER CONVEYOR ERRORS

JAM INTO CONVEYOR	Documents have jammed in the transfer conveyor.	1) More than the acceptable number of documents entered the transfer conveyor and did not exit into the accumulator 2) The transfer conveyor infeed sensor needs adjustment or cleaning of paper dust 3) The accumulator presence sensor needs adjustment
JAM IN CONVEYOR T	Documents have jammed inside Transfer Conveyor.	1) Documents have entered but not exited the Transfer Conveyor 2) The exit sensor is out of adjustment 3) The transfer conveyor sensor is out of adjustment 4) Paper dust on sensors
JAM EXITING CONVEYOR	A document stalled or jammed under the transfer conveyor exit sensor	1) A document has jammed under or into the transfer conveyor sensor 2) The into transfer conveyor or exit sensor is out of adjustment or has failed or been move 3) Paper dust on sensors
PRESETS CORRUPT NOT ENOUGH NV RAM	Battery drained or failed; presets don't match comparator	1) Power down machine to restart 2) Battery failed or battery jumper missing 3) Bad CPU-186 board
STATE DIDN'T CHANGE	Paper feed attempted but not completed	1) State of Trans IN or Trans OUT sensor incorrect (ON should be OFF, or vice versa)
INT LINE/ OVERHANG	Paper went past the exit sensor	1) Outfeed fingers misadjusted
NO PACK IN FIRST STA	Expected package at transfer conveyor infeed sensor	1) Infeed sensor is misadjusted. 2) Paper jam in folder
NO PACK IN LAST STA	Expected package at transfer conveyor. exit	1) Paper jam in transfer conveyor

	sensor	
		1) Paper jam cleared, system reset, but registers indicate need for package
FIRST STA NOT EMPTY	Did not expect a package at transfer conveyor infeed sensor	1) The package has jammed or skewed in the transfer conveyor infeed. 2) The in transfer conveyor exit sensor has failed 3) Powered down and memory cleared, but package still there.
LAST STA NOT EMPTY	A package did not exit transfer conveyor after indexing.	1) The package has jammed the transfer conveyor exit 2) The transfer conveyor station exit sensor has failed 3) Powered down and memory cleared, but package still there.
JAM IN CONVEYOR C	Into transfer Conveyor jam a document stalled or jammed under or into the transfer conveyor jam sensor.	1) A document has jammed under or into transfer conveyor sensor. 2) A document has stalled under the. into transfer conveyor sensor 3) The into transfer conveyor sensor is out of adjustment or has failed.

SYSTEM ERRORS

NV-RAM DATA CORRUPT	Data in the non-volatile ram was changed.	1) Power to the CPU-186 was unplugged directly at the board. 2) Noise in the 120 VAC power. 3) Battery jumper removed from CPU-186
NOT ENOUGH NV-RAM	Battery back up on the non-volatile ram chip is bad.	1) Ram needs to be replaced.
PRESETS CORRUPT	Program error internal processing error number one (1).	1) Should not occur. If error is displayed cycle the main power switch (off/on). 2) If the problem persists contact the technical support center.
E-STOP/ INTERLOCK	Emergency interlock circuit is open	1) The emergency stop switch was pressed while running. 2) An interlock is open (check that all covers are closed). 3) The 24V power supply is unplugged.
NO USE TIMEOUT	No use shutdown automatic shut down of the system after a period(user selected) of inactivity.	1) No documents have been fed during the preset time-out (set in maintenance mode: 2-10 minutes).
NO CONV. CONNECTED	Looking for Transfer conveyor	1) Transfer conveyor not connected
INVALID CONV. CABLE		2) Transfer conveyor cable damaged
UNEXPECTED POWR DWN	Power down mistake	1) Power key hit to shut machine off too soon (<1 second) after hitting to power up
STATE DIDN'T CHANGE	During power up, sensors did not clear paper jam	1) Check for paper jams 2) Check state of all sensors in machine
WDT CAUSED RESET	Watchdog timer reset the program	1) Power down and restart
O. S. TIME OVERUN	Operating system did not have time to complete all tasks	1) Power down and restart 2) Check 5VDC and 24VDC power supplies (short could be causing sensor problems)

		3) Contact the technical support
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C.4 TROUBLESHOOTING**C.4a SYMPTOM: Error in feeder - “no sheet was fed”**

A document entered the folder and did not exit or was not seen exiting.

Probable Cause	Solution
Paper was not seen by feed sensor	Check feed sensor for dust Check adjustment of feed sensor, adjust if necessary Check Input Test 1/19: LED on opto 0:0 should change Perform Feed Sensor RCP
Paper not fed	Perform Feeder RCP

C.4b SYMPTOM: Error in feeder - “short sheet”

A document entered the folder and did not exit or was not seen exiting.

Probable Cause	Solution
Paper did not reach accumulator	Check that sheet length is properly set in SETUP
Feed sensor	Check adjustment of feed sensor, adjust if necessary Check Input Test 5/19: LED on opto 0:1 should change Perform Feed Sensor RCP

C.4c SYMPTOM: Error in feeder - “long sheet”

A document entered the folder and did not exit or was not seen exiting.

Probable Cause	Solution
Paper did not reach accumulator	Check that sheet length is properly set in SETUP. Set correct sheet length and run another sheet.
Stack sensor	Check adjustment of stack sensor, adjust if necessary Perform Stack Sensor RCP

C.4d SYMPTOM: Error in feeder - “two sheets”

A document entered the folder and did not exit or was not seen exiting.

Probable Cause	Solution
Two pages fed through singulator	Valid error; adjust singulator for correct stock.
Double detect sensor	Check adjustment of double detect sensor, adjust if necessary (with two sheets, red LED should not be lit) Check Input Test 2/19: LED on opto 0:16 should change Perform Sensor RCP

READ ERRORS**C.4e SYMPTOM: Error in read - “no response timeout”**

GBR OMR code not being read.

Probable Cause	Solution
Code was not seen after leading edge tripped sensor	Check that code is printed on page Check wiring to CPU Perform No Response RCP

C.4f SYMPTOM: Error in read - “code misread”

GBR OMR code not read correctly.

Probable Cause	Solution
Code was not interpreted correctly	Check for paper flutter under read head Check for pullout roller slipping Perform read setup to ensure voltages are correct Perform Reader Board RCP Check UARTs on CPU: replace as necessary Replace software

C.4g SYMPTOM: Error in read - “group out of seq”

Package sequence has been corrupted.

Probable Cause	Solution
Group sequence is not correct: did not increment or decrement properly	Inspect stock for packs out of sequence Check sequence count in read setup (Up, Down, Off) Check setup voltages to ensure dots are not being seen as lines (verify by running stock with scope connected to read board)

C.4h SYMPTOM: Error in read - “expected end of group”

Package sequence has been corrupted.

Probable Cause	Solution
Group number changed without reader seeing EOG	Verify that code is not misprinted Perform read setup to ensure proper EOG parameter Observe waveform with scope connected to read board

C.4i SYMPTOM: Error in read - “blank page”

Page has no code printed.

Probable Cause	Solution
No code was seen	Verify feed sensor is functioning properly (check gain) Perform “blank page” RCP Perform read setup to ensure voltages are correct Perform reader board RCP Check UARTs on CPU: replace as necessary Replace software

C.4j SYMPTOM: Error in read - “short group”

EOG read before expected.

Probable Cause	Solution
Group number changed before page one or EOG was seen	Inspect stock for packs out of sequence Check sequence count in read setup (Up, Down, Off) Check setup voltages to ensure dots are not being seen as lines (verify by running stock with scope connected to read board) Perform reader board RCP

C.4k SYMPTOM: Error in read - “duplicate page”

Same code read on two consecutive pages.

Probable Cause	Solution
The same page number was seen twice in one group	Inspect stock for packs out of sequence Check sequence count in read setup (Up, Down, Off) Check setup voltages to ensure dots are not being seen as lines (verify by running stock with scope connected to read bd) Perform Reader Board RCP

C.4l SYMPTOM: Error in read - “page out of seq”

Page was not in correct order for package.

Probable Cause	Solution
The page sequence within a group did not properly increment or decrement	Inspect stock for packs out of sequence Check sequence count in read setup (Up, Down, Off) Check setup voltage to ensure dots are not being seen as lines (veriry by running stock with scope connect to read bd) Perform Read Board RCP

C.4m SYMPTOM: Error in read - “invalid group”

Package contains pages improperly coded.

Probable Cause	Solution
Group sequence is not correct: did not increment or decrement properly	Inspect stock for packs out of sequence Check sequence count in read setup (Up, Down, Off) Check setup voltages to ensure dots are not being seen as lines (verify by running stock with scope connected to read bd)

C.4n SYMPTOM: Error in read - “expected page one”

First page of package out of sequence.

Probable Cause	Solution
While counting page sequence down or roll sequence number = 1, page one was not seen	Inspect stock for packs out of sequence Check sequence count in read setup (Up, Down, Off) Check setup voltages to ensure dots are not being seen as lines (verify by running stock with scope connect to read bd) Perform Reader Board RCP

C.4o SYMPTOM: Error in read - “group out of range”

Package improperly coded. NOTE: This error should only occur in special code.

C.4p SYMPTOM: Error in read - “page out of range”

Package improperly coded. NOTE: This error should only occur in special code. (Generally, someone has changed the Min/Max in AirTec code.)

C.4q SYMPTOM: Error in read - “presets corrupt”

Package code can not be read.

Probable Cause	Solution
The stored values for reading have been lost	Check main CPU hardware for failure Check CPU for bad battery or battery jumper missing

C.4r SYMPTOM: Error in read - “yes no eog are same”

Read system corrupt.

Probable Cause	Solution
Error only exists in Airtel style code	Perform read setup to ensure voltages are correct Check reader board with scope, perform Reader Board RCP Check UARTs on CPU: replace as necessary Replace software

C.4s SYMPTOM: Error in accumulator - “jam/stall to ramps”

Paper is jamming at the accumulator ramps.

Probable Cause	Solution
Paper left feed sensor and stack sensor did not see it in time	Check sensor, adjust if necessary. Check that paper is being properly fed. Check speed and encoder timing. Perform Feeder Speed input RCP

C.4t SYMPTOM: Error in accumulator - “Stall on ramp”

Paper is jamming at the accumulator ramps.

Probable Cause	Solution
Paper not being fed properly into the accumulator	Check sensor, adjust if necessary. Check for paper jam into accumulator when stacking. Check belts for slickness (lack of friction). Make sure paper path is clear into the accumulator Perform Accumulator Sensor input RCP

C.4u SYMPTOM: Error in accumulator - “package did not dump”

Always occurs on power-up with paper in the accumulator.

Paper is jamming at the accumulator ramps.

Probable Cause	Solution
Paper not able to clear the accumulator	Perform Clutch RCP Perform Accumulator Sensor input RCP

C.4v SYMPTOM: Error in accumulator - “package not removed”

Paper stalled in the accumulator.

Probable Cause	Solution
Package left in accumulator	Remove package. Perform accumulator sensor input RCP if “Package Not Removed” is displayed. CPU reset

C.4w SYMPTOM: Error in accumulator - “dump brake fail”

Paper not exiting accumulator.

Probable Cause	Solution
Package stopped in accumulator improperly positioned	Check position and adjustment of stack sensor, adjust if necessary Check dump clutch brake Perform stack sensor input RCP Perform dump clutch output RCP

C.4x SYMPTOM: Error in accumulator - “in vs out speed”

Speed disparity in accumulator: only applies to special software.

C.4y SYMPTOM: Error in folder - “Doc jammed inside”

A document entered the folder and did not exit or was not seen exiting.

Probable Cause	Solution
A mechanical fault has caused the paper to crash	Make sure the buckle plates are seated correctly and are adjusted properly Observe if paper is hitting the buckle infeeds: adjust to correct. Check if the rollers are damaged: replace as necessary. Check if the infeed or outfeed guides are damaged: replace as necessary.
The transfer conveyor infeed sensor is not seeing the paper	Perform transfer conveyor infeed sensor RCP. Perform Opto RCP.

C.4z SYMPTOM: Error in folder - “Speed is too low”

The folder is running at less than 30IPS or not running at all.

Probable Cause	Solution
Folder is running	Check folder encoder: replace if necessary. Perform opto RCP.
Folder is not running	Perform circuit breaker RCP

C.4aa SYMPTOM: Error in folder - “folder too fast”

The folder is running at more than 120IPS.

Probable Cause	Solution
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Folder is running	Check the speed controller: replace as required. Speed potentiometer misadjusted, or broken leg on potentiometer. Feedback tachometer not working. If speed does not decrease by adjusting speed pot, then attempt to adjust with MaxSpeed on motor controller board: if speed does not adjust, defective board. If speed oscillates, a bad feedback sensor is indicated.
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D.1 INITIAL ACTIONS

Initial Actions are used to gather information from the operator concerning problems in Smart Feeder.

D.1a Procedure

Ask the operator to describe or demonstrate the problem. Request all information on the failure. If there is an error message, refer to the index for guidance to appropriate RCP. Some features of the machine may not be tested during the system checks and therefore, operator input will be a valuable asset to help diagnose the total system.

If the problem is the result of improper operator action, refer the operator to the operator documentation or instruct the operator on the proper actions.

Switch the Smart Feeder AC power OFF.

Check all areas of the machine for paper or other obstructions (including inside the Folder). Remove any paper or obstructions. Feed a sheet through the machine to confirm that alignment adjustments are correct.

Turn ON the Smart Feeder, press RESET/ON, and confirm the following:

- All drive belts are moving
- Sensors are not blocked or fouled
- Machine operating parameters set correctly
- Document inserted in paper hopper passes through and is properly folded

NOTE: If physical paper jams recur and mechanical adjustments are correct, escalate service. Potential trouble spots are numerous but include: worn or damaged parts; stretched drive belts; excess static.

Verify all cable connections are properly mated, and all applicable sensor connections (as per application) are mated properly and not obstructed. In SETUP, verify that correct input parameters are selected.

Verify the Emergency Stop button is not actuated.

D.1b List of Repair Checkout Procedures (RCP)

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D.1c Systems Checks

Switch the Smart Feeder power ON. The Feeder motor starts.

Y N

Close all covers

Perform the **FEEDER SPEED IS TOO SLOW RCP**

Press the CYCLE key on the Operator Control Panel momentarily.

A document is fed through the singulating area to the Smart Feeder.

Y N

Perform the **Paper Could Not Be Fed RCP**

Press the CYCLE key on the Operator Control Panel for about 1 second.

A continuous stream of documents is fed to the Smart Feeder.

Y N

Perform the **Paper Jam in Feeder RCP**

With the Smart Feeder in CYCLE mode the creeper conveyor supplies documents when needed.

Y N

Perform the **Creeper Conveyor Motor RCP**

Adjust the Paper Level Detector

D.2 FEEDER FUNCTION

D.2a Description

A paper hopper supplies the bottom fed friction feeder continuously while the operator loads paper from the top. It has 4 mounts (2 each side, with set screws) in which the hopper slides. The creeper conveyor comprises two black rubber belts driven by a motor located on the bottom side of the hopper. Controlled by a paper level detector, the motor is activated when the detector activates the paper demand switch.

The two stainless steel rails mounted on the hopper are adjustable via a locking handle at the rear. At the front they interlock with the singulator rails, then lock to shafts running across the machine. Both sets of rails should be adjusted together.

A one inch wide yellow timing belt (main feed belt) drives the bottom sheet of paper under the singulator roller. Two red urethane belts are located to either side of the main feed belt. These auxiliary feed belts assist the main feed belt, smoothing variations in frictional drive (correcting erratic feeding of the paper).

A demand switch monitors the paper going into the feeder area. It's job is to limit and demand the amount of paper that is most productive to the feeding process. A metal wand monitors the paper level in the singulator area. A two-inch stationary orange roller rests above the feed belt

in the center of the feeder and allows only the bottom sheet of paper to be fed while holding back all others.

A series of sensors monitors the flow of paper through the Smart Feeder. These are light-actuated through-beam devices. A feed sensor monitors correct singulation or non-feed of paper. It is identified by an "F" on the amplifier. The double detect sensor (identified by an "D" on amplifier) will detect multiple sheets fed from the feeder. Other sensors are located in the accumulator section (described below). On either the left or right feeder side rail is a read sensor, or optical mark reader. This sensor uses a reflective beam to generate an electric signal to a reader logic board. The reader logic board interprets variation in light intensity as it is reflected off the paper and code marks.

Paper feeding is accomplished when the feed motor drives the belts. An electric clutch engages the feed belt at a signal from the controller.

The optical encoder (blue-clad, located on the right side of the upper pullout shaft) monitors feeder run speed.

D.2b Timing Procedures

(Not applicable: timing is a function of software and CPU-186.)

D.2c Feeder Setup and Adjustments

D.2c1 Paper Guide Rails

These rails guide the paper from the Hopper Table, through the singulator area and to the accumulator area without skewing. The rails are divided into three sections on each side. These are the accumulator, feeder and hopper sections.

The singulator and hopper rails should be set so that with a single sheet of paper between them, there is a 1/16-inch space between the side of the sheet and the guide rail. Make certain that the guide rails run parallel with the side frame of the machine. The singulator rails should be set first. They are mounted on two black metal blocks, which are mounted on cross shafts. To adjust these rails, loosen the set screws locking the singulator rail blocks to the cross shafts. The hopper rails interlock with the singulator rails at one end. They are locked into place at the rear of the machine when the rail locking shaft is in the locked position. The accumulator area side rails do not actually guide the paper from side to side. They should be set so that there is approximately 1/8 inch on either side of the sheet.

NOTE: Be sure the side rails are feeding the paper parallel to the Singulating roller.

D.2c2 Paper Hopper Adjustment

The Guide Rails align the paper from the hopper table into the singulator. This permits the paper to exit the singulator area in proper alignment with the transfer conveyor, without skew. The position of the hopper table relative to the feeder is a very critical adjustment. To adjust the hopper table:

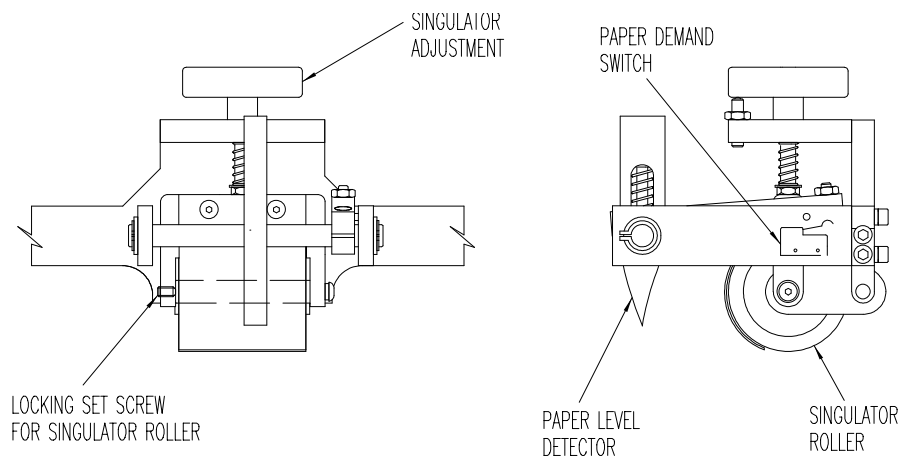
- a) Place a sheet of paper in the feed area, up to but not under the singulator.
- b) Loosen the four set screws of the hopper guide rails. Once this is accomplished the table will move freely in and out. Do not pull the table all the way out of the clamps: it will fall!
- c) Bring the hopper table 1/2" away from the back edge of the sheet of paper.
- d) Tighten four set screws down to clamp the table into this position.

Whenever document length is changed this process must be performed to ensure the proper transfer of paper from the hopper table to the feeder area.

D.2c3 Paper Level Detector

The demand switch monitors the paper through a metal wand. On the top of the wand is a spring-loaded, hex head adjustment bolt which, when turned, raises and lowers the wand.

- Raise the wand to allow more paper to be fed into the feeder
- Lower the wand to reduce the amount of paper.

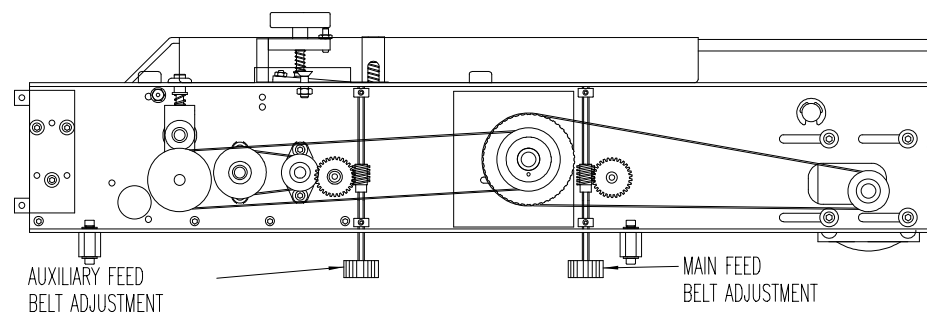


Singulator and Paper Demand Figure

D.2c4 Setting Main Feed Belt Tension

The Feed Belt provides the primary force separating a sheet from the bottom of the shingled stack. The setup procedure for this belt is described below. The Feed Belt tension adjustment knob is factory set, limited to approximately 3/4 turn. This is adequate operator adjustment for typical paper weight variations. If the Feed Belt is replaced:

1. Loosen the long set screw (3/32") on the top stop collar of the Feed Belt tension knob shaft.
2. Lay a straight edge across the top of the Feed belt (lengthwise). Make sure it lays across both pulleys.
3. Adjust the Feed Belt tension knob so 3/16 inch Feed Belt deflection is possible in the middle of the belt.
4. Now turn the Tension Knob 3/8 turn CCW.
5. Slide the stop collar to the top of the Tension Knob shaft. Position collar so the long set screw is perpendicular to the side frame. Tighten set screw to the Tension Knob shaft. This will again



limit adjustment to 3/4 turn.

Belt Adjust Figure

D.2c5 Singulating Roller

The singulating Roller creates a precise singulating gap. There are three critical adjustments required to get a precise singulating gap. These adjustments are:

- Vertical Position of Singulating Roller
- Singulating Roller parallel with lower rollers
- Occasional rotation of Singulating Roller

Position of Singulating Roller

The position of the Singulating Roller with respect to the two rollers on the lower shaft is critical. This spacing creates the singulating gateway. The setup process is as follows:

1. Place one sheet of paper under the singulator.
2. Lower the Singulating Roller so one sheet of paper can not pass under the roller. (Use chrome knurled knob.)
3. Slowly raise the Singulating Roller, using the adjusting knob.
4. Attempt to pull the document out while slowly raising the Singulating Roller with the chrome knurled knob.
5. When the document starts to move as you firmly pull it under the Singulating Roller, proper singulation adjustment is achieved.
6. Load the singulation area with paper and test feed paper.

7. If more than one sheet is fed, lower the Singulator two knob clicks. If after adjusting as many as five knob clicks proper feeding is not obtained, then all of the setup procedures for the singulator should be reviewed.

NOTE: Proper singulator adjustment depends on paper variables such as stock, finish and environmental factors. Specific adjustment on every job will be different. Adjust the singulator roller as paper runs to get best setting.

Set Singulating Roller Parallel to Lower Rollers

The precise gap created by the Singulating Roller and the two lower rollers must be equivalent for both of the rollers. The procedure for testing and making the adjustment is described below.

Note: This adjustment is normally done only when a new Singulating Roller is installed. It should not be adjusted experimentally; i.e., without need.

1. Cut two strips of paper from the same document (approximately 1/2" x 8").
 2. Put them between the two lower rollers and the large Singulating Roller.
 3. Adjust Singulating Roller until light tension is felt on the paper between the rollers.
 4. Check that the tension on both strips of paper is the same. If it is not the same, then adjust the geometry of the Singulating Roller.
 5. Loosen the 10-32 x 5/8 socket head cap screws (4) on the side rail or the back of the singulator plate. Adjust either to best advantage.
 - a. Carefully position the singulator, using the small amount of play available, to raise the side of the singulator that has the most tension.
 - b. Tighten the 10-32 x 5/8 socket head cap screws loosened in step 5.
 - c. Retest the tension of the two strips of paper by returning to step 3.
-

Rotating Singulating Roller

The Singulating Roller is the place where the highest frictional forces are created. These frictional forces wear down the Singulating Roller. This requires that the Singulating Roller be rotated approximately every 250,000 sheets fed, depending on paper type and operator's adjustment of the singulator.

1. Raise Singulating Roller off the auxiliary Singulating Rollers and belt.
2. On left hand side of the Singulating Roller use a 5/64" Allen wrench to loosen the set screw which keeps the Singulating Roller from rotating.
3. Rotate the Singulating Roller to expose a new wear surface (rotate about 1/4 inch). The worn surface should be rotated forward. This will prevent the worn surface from coming in contact with paper that is being fed into the singulation point.

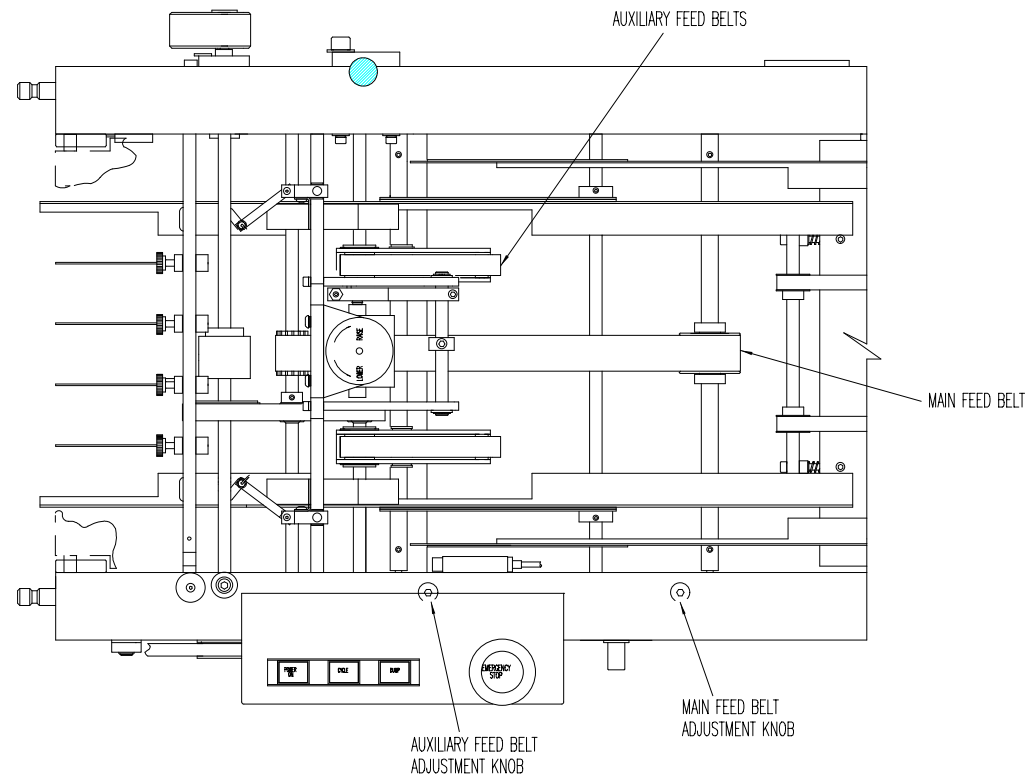
D2.c6 Auxiliary Feed Belt Adjustment

The auxiliary feed belts are adjustable by angling the back end up or down.

- Turn the knob clockwise to lower the rear end of the auxiliary drive belts
- Turn the knob counterclockwise to raise the rear end of the belts.

The ideal setting for the auxiliary belts is when the back end is raised just above the main feed belt.

The auxiliary feed belts assist the main feed belt when variations in frictional quality are encountered and the feeding of paper becomes erratic. The auxiliary feed belts would be adjusted when the gap between the fed sheets needs to be altered. Raising the auxiliary feed belts will decrease the gap; lowering the belts will increase the gap.



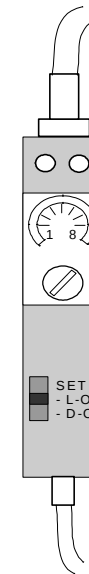
Feed Belts Figure

D2.c7 Sensor Adjustments

All of the paper detecting sensors on the 420 are infrared modulated digital sensors. Each sensor has it's own amplifier unit and can be adjusted. The proper method of adjustment for these sensors is as follows:

1. Place a single sheet of paper under the sensor. For the Double Detect Sensor place two sheets under the sensor. There should be no printing or dark background present on the documents placed under the sensor.
2. Adjust the gain potentiometer on the sensor's amplifier unit so the red LED turns off and the green LED remains on. Turning the control CCW the sensitivity is lowered and the red light will go out. Adjusting the control CW raises the sensitivity and makes the red light get brighter. (For the Double Detect Sensor, the red LED should go off only if two sheets are present.)
3. Remove the sheet(s) from under the sensor; the red LED should turn on and the green LED stay on. If this does not happen, readjust the amplifier's gain.

NOTE: The green LED, on the sensor amplifier, is the stability indicating light. It indicates that the sensor is adjusted properly. The green LED should remain on at all times.



Sensor Figure

D.3 REPAIR CHECKOUT PROCEDURES (RCP)**REPAIR CHECKOUT PROCEDURE FOR PAPER COULD NOT BE FED**

Clear the paper that was jammed in the machine and remove any obstructions. Are mechanical settings correctly made?

Y **N**



- Check the wiring and connections for intermittent connections.
- Adjust the singulator roller.
- Adjust the auxiliary feed belts.
- Check the paper guides; ensure that the paper passes under the sensor.
- Ensure that the drive pulleys are tight.
- Check the feed clutch

Are the lights on the Feed Sensor illuminated?

Y **N** - Place one sheet of the current stock in the sensor area and adjust the sensor so that the red LED goes out with the sheet blocking the sensor. Check that printing on the stock is not interfering with the sensor. Does the LED on opto 1 light when one sheet is under the sensor?



Y **N**

Check the small fuse for opto relay #1

Check the optical relay

Is there 24 VDC at TB2-1 and TB2-2?

Y **N**



- Check the connection from the controller to the Feeder
- Check the wiring
- Check the power supply

Clean the sensors. Do the LEDs come on?

Y **N** - Enter diagnostic Routines. Select display status of Feed Sensor input 0:0. Does digital input change ON with the sensor blocked by one sheet of paper?



Replace the sensor.

Check wiring between the Control Box and keyboard. Are there breaks or poor connections?

Y **N** - Replace the CPU

Correct the wiring.

REPAIR CHECKOUT PROCEDURE FOR FEEDER MOTOR

When the Smart Feeder is powered, creeper power is supplied to the Feeder via AC outlet J2 of the power supply box. The AC goes through Paper Level Detect switch (also called demand switch: SW15) to SSR4. Does the Creeper Motor go on when the level switch is closed?

Y N



- Make sure that SW15 is closed and that no emergency switch is open.
- Check fuses F1 and F2.
- Check wiring between the LF4 and creeper motor.

The power is applied to the AC outlet, then to SSR4, when rack 1, opto 2 LED is lit in the Smart Feeder. Is there voltage at the connector that feeds the motor when the RESET/ON key is pressed?

Y N - Check fuse F2. Is it good?



- Replace the fuse

Enter Test function. Select Speed from the menu. Activate the Feeder motor: does the motor run and LED of opto 2 on opto rack 1 light?

Y N

- Check relay SSR1.
- Make sure the speed pot is properly set.

Check for 120VAC across the line side of LF4. Check for 90VDC across the + and - terminals of the creeper motor. Are these voltages present?

Y N



- Replace LF4.
- Replace the creeper motor.

Paper is fed through the Feeder as the Feed Clutch fires.

Y N

- Replace the Feed Clutch

REPAIR CHECKOUT PROCEDURE FOR FEEDER SPEED ENCODER

Enter the TEST menu from the VIP display. Select INPUT from the submenu and select Feeder Speed Encoder input. Turn the machine by hand and listen for a beep, indicating encoder state is changing.

- Y** **N** - Check input opto 0:2 (opto module 2 on opto rack 0). Does LED light when encoder operates?
- Y** **N** - Replace the input opto module and repeat the test. Does the LED illuminate?
- Check the wiring between the feeder speed encoder and the opto rack.
- Check the pico fuse of the opto module. Replace if required; does this correct problem?
- Y** **N**
- Check the encoder.
- Replace encoder.
- ↓
- Y** **N** - Check a different input to ensure the audible signal on the display is working.
- ↓
- Fix or replace display board.
- Y** **N** - Check connections between opto rack and CPU-186. If bad, does correction fix problem?
- Troubleshoot or replace the CPU 186 PWB.

REPAIR CHECKOUT PROCEDURE FOR EXTRA PAGE FED

Clear any paper that was jammed in the machine and remove any obstructions.

Are mechanical settings correctly made?

Y **N**



- Check the wiring and connections for intermittent connections.
- Adjust the singulator roller.
- Adjust the auxiliary feed belts.
- Adjust the Paper Level Detector.
- Adjust the Creeping Conveyor.
- Check that the paper guides ensure that the paper passes under the sensor.
- Check that the Smart Feeder is set up to run the length of stock that is being used.

Are the lights on the Feed Sensor illuminated?

Y **N** - Go to step 4.

Place one sheet of the current stock under the feed sensor and adjust the sensor so that the red LED goes out with the sheet blocking the sensor. Check that printing on the stock is not interfering with the sensor. Does the LED on opto 0:2 light when the sheet is under the sensor?

Y **N**



- Check the small fuse for opto relay 2
- Check the optical relay
- Check wiring from the Control Box to the Display.
- Check the wiring and connections for intermittent connections.

Is there 24 VDC between TB2-1 and TB2-2?

Y **N**



- Check the connection from the controller to the Feeder
- Check the wiring
- Check 24 VDC power supply

Clean the sensors. Do the LEDs come on?

Y

N

- Replace the sensor.

REPAIR CHECKOUT PROCEDURE FOR PAPER JAM IN FEEDER

Clean the sensors. Do the LEDs come on?

Y **N** - Check sensor connections.



- Replace the sensor.

Clear the paper that was jammed in the machine and remove any obstructions. Are mechanical settings correctly made?

Y **N** - Check the wiring and connections for intermittent connections.



- Adjust the singulator roller.
- Adjust the auxiliary feed belts.
- Adjust the creeping conveyor.
- Check that the paper guides ensure that the paper passes under the sensor.
- Ensure that the drive pulleys are tight.
- Check the feed clutch
- Check that the Smart Feeder is set up to run the length of stock that is being used.

Are the lights on the Feed Sensor amplifier illuminated?

Y **N** - Enter diagnostic Routines. Select Display status of Feed Sensor (opto 0:0). Does display change to ON with the sensor blocked by a sheet of paper?



Y **N** - Make sure sensor amplifier is set for Dark ON: correct if necessary.



Check wiring between the Control Box and keyboard

Place a sheet of the current stock in the sensor area and adjust the sensor so that the red LED goes out with the a sheet blocking the sensor. Check that printing on the stock is not interfering with the sensor. Does the audible signal beep and LED on opto 0:18 light when a sheet is under the sensor?

Y **N** - Check a different input to ensure the audible signal on the display is working.



Check the small fuse for opto relay #18



Check the opto relay

Is there 24 VDC at TB2-1 and TB2-2?

Y **N** - Check the connection from the controller to the Feeder



- Check the wiring

-
- Check the power supply PS1

REPAIR CHECKOUT PROCEDURE FOR SMALL SHEET

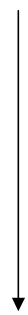
Clear the paper that was jammed in the machine and remove any obstructions. Does the paper move through the feeder properly?

- Y** **N** - Check that the paper size setup is correct.
- Check that the guide rails ensure the paper passes under the Feed and Double Detect sensors
 - Ensure that the pullout roller does not force the paper to ride up on the paper guides.
 - Check that the paper stock being used is not damaged or curled.
 - Adjust the singulator roller.
 - Adjust the auxiliary feed belts.
-

REPAIR CHECKOUT PROCEDURE FOR FEEDER SPEED IS TOO SLOW

Remove the covers from the feeder. Does the feed motor turn on?

Y **N** - Is there voltage at the connector that feeds the motor when the RESET/ON key is pressed?



Y **N**

- Check fuse F7.
- Check KBIC Controller board. Replace if necessary.
- Replace the Feeder Drive Motor (REP 8.4)

Enter Diagnostics. Select Display status of Feeder Speed Encoder input (opto 0:3). Change input to ON: does LED #3 on opto rack 0 light?

Y **N**

- Check the optical relay.
- Check optical relay fuse

Enter Diagnostics. Select TEST, "Speed." Option. Does the Feeder speed indicate 50 IPS?

Y **N**

- Adjust the speed of the Feeder.
- Replace the speed sensor.
- Replace the KBIC Controller.

REPAIR CHECKOUT PROCEDURE FOR FEED SENSOR**FEED SENSOR - REFER TO SECTION F "FEEDER" SCHEMATIC.**

Enter the TEST menu from the VIP display. Select INPUT from the submenu and select Feed Sensor input. Repeatedly block the feed sensor with a single piece of paper. As the sensor is blocked, the audible beep is heard. Does the red LED on opto 0:0 (opto module on opto rack 0) illuminate each time the sensor is blocked, and go out when the sensor is unblocked?

Y N - Is the green LED ON?

- Adjust the sensor

Y N - Check a different input to ensure the audible signal on the display is working.

- Check the wiring between the feed sensor and the opto rack. If the wiring required correction, does this correct the problem?

Y N - Make sure sensor amplifier is set for Dark ON: correct if necessary.

- Check the pico fuse of the opto module. Replace the input opto module if necessary. Is the problem corrected?

Y N - Replace the CPU 186 PWB.

Set up and run the machine.

Run the machine.

Check the singulator setup. Is the feeder providing paper to the singulator?

Y N - Did the feed belt pulse three times attempting to feed paper?

Y N - Initiate feed clutch output test. Press ENTER to energize the clutch; listen for click or feel for clutch motion. Does the feed clutch engage?

Y N - Check output opto 1:8 (opto module 8 on opto rack 1). Does LED light when ENTER is pressed? If LED does not illuminate, replace the opto and repeat the test.

Check for 24VDC at clutch connection. If 24VDC is not present, replace the clutch.

Check clutch spacing (preset for .005") and clutch surface. If clutch is worn, replace.

REPAIR CHECKOUT PROCEDURE FOR TWO SHEET SENSOR**2 SHEET SENSOR - REFER TO SECTION F "FEEDER" SCHEMATIC.**

Enter the TEST menu from the VIP display. Select INPUT from the submenu and select 2 Sheet Sensor input. Repeatedly block the 2 Sheet sensor with your hand or two sheets of paper. As the sensor is blocked, observe opto 0:16 (opto module 16 on opto rack 0). Does the red LED illuminate each time the sensor is blocked, and go out when the sensor is unblocked?

Y **N** - Check a different input to ensure the audible signal on the display is working.

Y **N** - Is the green LED ON?

Y **N** - Adjust the sensor

Y **N** - Make sure sensor amplifier is set for Dark ON: correct if necessary.

- Check input opto 0:16 (opto module 16 on opto rack 0). Does LED light when sensor activated?

Y **N** - Check the wiring between the Double Detect sensor and the opto rack. If the wiring required correction, does this correct the problem?

Y **N** - Check the pico fuse of the opto module. Replace the input opto module if necessary and repeat the test. Does the LED illuminate?

 Replace the CPU-186 PWB.

Run the machine.

Check the singulator; is it properly adjusted?

Y **N** - Adjust the singulator.

If the components of the machine are operational and correctly adjusted, make sure that the paper being run is of the correct quality and condition.

D.4 GBR LINE CODE READ SYSTEMS OPTION

D.4a Introduction

- The Line Code Recognition System is capable of decoding line code marks that are on 1/8" or 1/6" spacing. There can be as many as 25 mark locations in a bank with a possibility of two banks per each channel of Line Code marks.

A Single Line Code Recognition card supports input information from two probes. The second probe is a optional feature. The system is limited to having only one of the two probes active at any one time. If more than one channel of Line Code marks is required to be recognized on a single document, each additional channel requires another Line Code Recognition system.

The GBR Line Code reader contains an intelligent analog section that reads GBR line code. It consists of an 8051 GBR Line Code Reader Card (STD 80), an SBX Reader Card (TJ Board), an encoder and one or two fiber optic read probes. The intelligent analog section allows the reader to be setup through the Smart Feeder's VIP display.

The GBR Line Code reader uses an analog signal to read code as it passes by the fiber optic sensor. The reader board is 'intelligent' because the variables used to generate this analog signal are not hardwired into

memory, but can be modified through software. The reader can be adjusted to account for variables such as:

- Paper color changing from job to job
- Code not being printed to specification

resulting in more reliable reading from the Smart Feeder.

D.4a1 Reader Board Values that can be Adjusted Through The Smart Feeder VIP Display

- **GAIN** - controls the amplitude of the 0-5 volt analog signal
- **OFFSET #1** - controls the initial DC voltage added to the analog signal to catch the lead edge of the page
- **OFFSET #2** - controls the DC voltage added to the analog signal when reading the code
- **LAMP** - controls the brightness of the reader probe
- **TRIP POINT # 1** - controls the voltage level at which an interrupt will be generated in a low-to-high voltage transition,
- **TRIP POINT #2** - controls the voltage level at which an interrupt will be generated in a high-to-low voltage transition

D.4b Setting Up the GBR Line Code Reader**D.4b1 Setting the Probe**

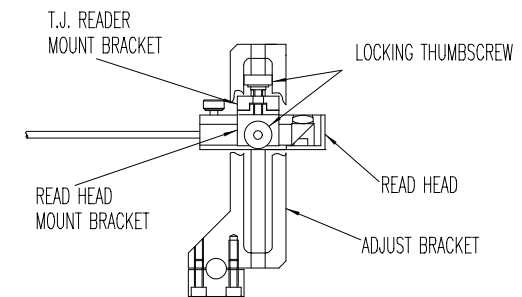
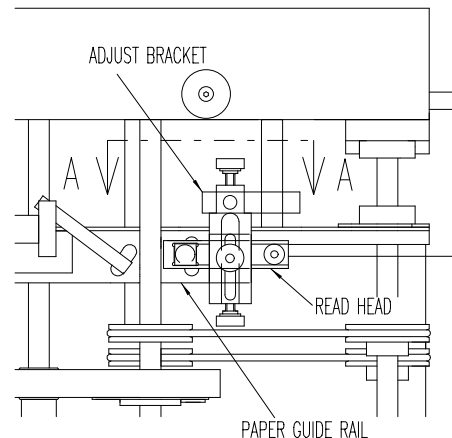
The most critical area of adjustment is the read sensor focus. The mechanical position of the read sensor must be adjusted to obtain the proper size and focus of the light emitted from the read sensor. Without the proper focus the read sensor cannot accurately interpret the GBR line code.

1. Position the read head assembly to aim the light through the hole in the paper guide rail. The lowest point on the read head should be 1/2 to 5/8 inch away from the paper surface.
2. Place a document with the GBR line code near the light from the read sensor.
3. Turn the read lamp on: Press the READ button and go into SETUP>READER SETUP>CUSTOM SETUP>4/7 LAMP.....Enter LAMP SETTING: 255 by pressing the + or - keys.
4. Loosen the read sensor locking screw and push the read sensor completely into the housing. Observe the light beam image. It should be centered on the hole in the rail and appear to be out of focus; as it is drawn out of the housing the image will appear to come more and more into focus. Proper focus is obtained when the image is at its smallest

size and a very slight halo appears around it. The width of the light beam image on the paper (not including the halo) should be equal to the width of a solid bar: 0.020 inch (+/- 0.003") and 1/4 to 3/8 inch long.

Rotating the read sensor while adjusting the focus will permit the image to be set parallel to the code block marks. Set the light beam image parallel to the lines of the code block before tightening the read sensor locking screw.

5. Before leaving the read sensor adjustments, make sure that the light beam is centered on the code block printed on the document. Code block movement from side to side, due to print quality or paper size variations may cause the read sensor to see only



SECTION A – A

partial code resulting in a read error.

Read Probe Assembly Figure

GBR Line Code Probe Assembly

D.4b2 Smart Feeder Line Read Setup Screens

The screens displayed here are found (after pressing the READ button) under the SETUP menu. Proceed to section D4.b3 to proceed with Line Read Setup.

Smart Feeder Reader Screens

ON-OFF	SETUP	READ TYPE	TEST
	Page Setup		Reader Setup
		WHT LVL	
		BLK LVL	
		TRIP PT	
		CUSTOM SETUP	

WHT LVL
GAIN: 00 OFFSET#2: 000 LAMP: 000

BLK LVL
CURRENT VOLTAGE: 0.00

TRIP POINT
OFFSET#1: 000 TRIP POINT#1: 000

CUSTOM SETUP
1/7 GAIN (enter gain value)
2/7 OFFSET #1 OFFSET #1: 000
3/7 OFFSET #2 OFFSET #2: 000
4/7 LAMP LAMP SETTING: 000
5/7 TRIP POINT #1 - LOW TO HIGH TRIP POINT #1 SETTING: 000
6/7 TRIP POINT #2 - HIGH TO LOW TRIP POINT #2 SETTING: 000
7/7 LEAD EDGE COUNT LEAD EDGE COUNT: 000

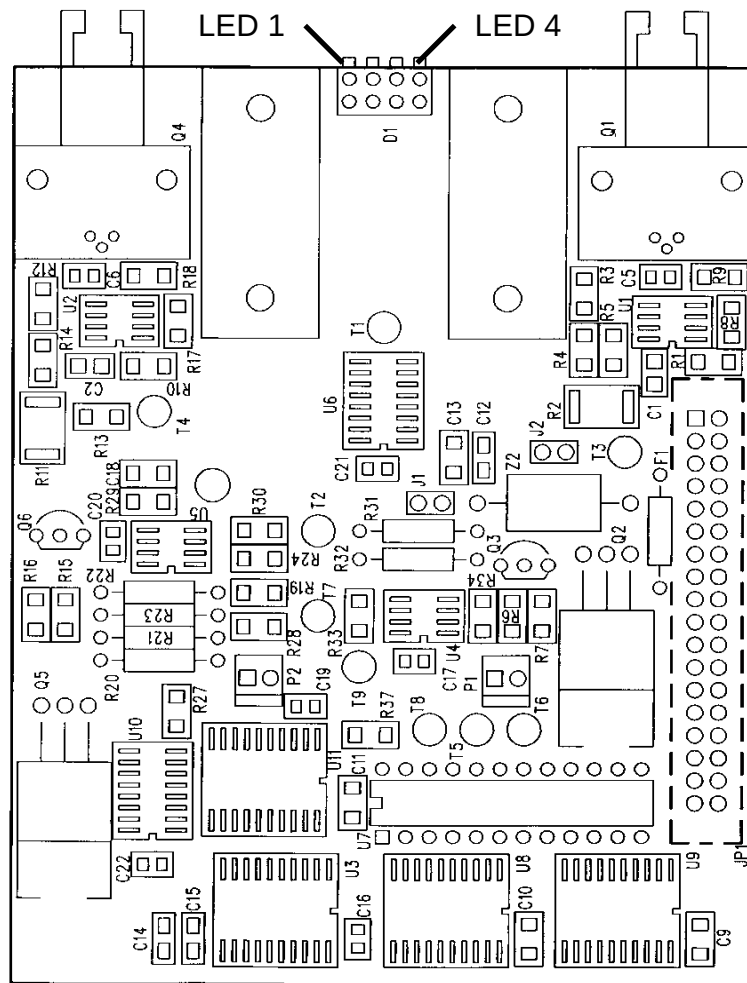
D.4b3 Setting Up the GBR Line Code Reader

- 1) Turn on the Smart Feeder, press the READ button, and go into READ-TYPE.
- 2) Make sure that GBR LINE is selected.
- 3) Go into the ON-OFF menu and set it to ON.
- 4) Exit out of the READ screens and cycle the power to the Smart Feeder (turn the Smart Feeder main power switch off and on).
- 5) Press the READ button and go into SETUP->READER SETUP->WHT LVL.
 - a) Take a piece of the stock that is going to be run through the machine and hand feed it until the light beam is on a white portion of the paper.
 - b) Press ENTER. GAIN, OFFSET #2, and LAMP will set automatically. The system will beep to indicate that it is done
 - c) Check that:
 - OFFSET #2 is between 100 and 150
 - LAMP is between 150 and 240.
 - d) Exit out of this screen and go to the next step.

NOTE: *If you do not get values within these ranges check to see that the read probe is 1/2 to 5/8 inch away from the paper, and make sure that the light beam is on a white portion of the paper. Furthermore, the wrong probe could be selected. See "Troubleshooting the GBR Line Code Reader, step #3" in this section for directions on selecting probes.*

-
- 6) Go to BLK LVL and press ENTER.
 - a) Hand feed a piece of the stock until the light beam is on one of the line code marks (voltage should drop to 0 volts).
 - b) While you are hand feeding this paper over the read probe, you will see voltages increment and decrement on the screen. When the sensor is over the white portion of the paper, the voltage reading on the screen should be about 5. When a black line from the line code is over the read probe, the voltage reading on the screen will be 0. Also, while you are performing this step, make sure that the read probe is entirely covered by the line code. If the line code does not entirely cover the read probe, the reader will not work properly. After pressing ENTER, the voltage values will no longer increment and decrement on the screen when changing from black to white.
 - c) Exit out of this screen.
 - 7) Go to TRIP PT and press ENTER.
 - a) Remove paper from the light beam and press ENTER. When the system beeps, to indicate that it is done, some numbers will be placed on the screen next to TRIP POINT #1 and OFFSET #1.
 - TRIP POINT #1 value should be between 40 and 150
 - OFFSET #1 should be between 100 and 250.
 - b) Exit out of this screen and go to the next step.
 - 8) Press the READ button and go into
SETUP>READER SETUP>CUSTOM
SETUP>2/7:OFFSET #1>Press ENTER and record OFFSET #1 value.
 - 9) Go to 3/7:OFFSET #2>Press ENTER and record OFFSET #2 value.
 - 10) Find the average of the recorded OFFSET #1 and #2 values.
 - 11) Change OFFSET #1 and #2 value to this average value by pressing the + or - keys. (example: OFFSET 1 = 129, OFFSET 2= 111, average =120, set both OFFSET 1 and 2 =120)
 - 12) Change GAIN to 00 by going into
SETUP>READER SETUP>CUSTOM
SETUP>1/7:GAIN 00 and press ENTER.
 - 13) The reader setup is complete. If the setup in section C2.d has been completed, exit out of these READ screens and begin running paper through the machine.
-

NOTE: When switching between probes or after the Smart Feeder has been switched off, it may be necessary to repeat this setup procedure.



GBR Line Code Board Figure

GBR Line Code Recognition (8051) Board

LED Indicators:

LED1 (top)	Lo to Hi Comparator
LED2	Hi to Lo Comparator
LED3	Probe B
LED4 (bottom)	Probe A

Test Points:

T1	Ground
T2	+5VDC
T3	Probe A Preamp
T4	Probe B Preamp
T5	Lo to Hi Interrupt
T6	Hi to Lo Interrupt
T7	Read Signal
T8	Lo to Hi Comparator
T9	Hi to Lo Comparator

D.4c Troubleshooting the GBR Line Code Reader**D.4c1 Line read**

1) If you cannot get proper white level setup values do the following:

- Make sure that the probe lamp is bright. If it is not bright follow the instructions in step 3.
- Move the probe closer to the paper and try again. Continue to do this until the probe is nearly touching the paper. If this does not work, the probe might be broken. (Normal setting for the probe is $\frac{3}{4}$ " from the paper.)

2) If frequent misreads are occurring and the probe lamp is bright, do the following:

- Go into READ -> SETUP -> PAGE SETUP and make sure that all of your page settings are properly configured.
- Go into READ -> TEST -> THIS READING and compare the marks on the page in question to the 1's and 0's on the screen.
- If more 1's appear on the screen than lines on the page, go into SETUP -> READER SETUP -> CUSTOM SETUP and increase OFFSET #2 by .1

volts (1 increment). Repeat this step until the misreads go away.

- If more 0's appear on the screen than lines on the page, go into SETUP -> READER SETUP -> CUSTOM SETUP and decrease OFFSET #2 by .1 volts (1 decrement). Repeat this step until the misreads go away.
- If the correct number of 1's appear, but they appear to have uniformly shifted up or down the page (all the marks shift either a space or two up the page or a space or two down the page), the gate mark is not being found properly. Go back into PAGE SETUP and make sure that your read window is set up properly. **Remember, the reader begins looking for the gate mark two lines before the start of your read window.** So, if you have a line $\frac{1}{4}$ " above your gate mark (say, your gate mark is at line 15 on the page) and you are set to $\frac{1}{8}$ " line spacing, unless you set your read window to start 1 line below your gate mark (line 16 on the page), the reader is going to catch the first line as your gate mark.

If the correct number of 1's appear, but they seem to have shifted on the page (there are not the proper number of spaces between the 1's), read encoder ticks are being missed. To correct this do the following:

- a) Check the read encoder belt for smoothness and firmness.
-

b) Check the main feed belt and the pullout rollers. Make sure that the paper is not slipping as it is fed from the feeder into the accumulator.

-There should be a significant amount of friction between the paper and the main feed belt. If there is not much friction there, clean the main feed belt (citrus cleaner seems to work well on the main feed belt).

-The pullout rollers (the rollers that are right after the singulator) should be adjusted such that they evenly grip the paper as it moves through. Rip off two strips of paper and place the paper on each side of the pullout rollers. Turn the rollers by hand and make sure that the two pieces of paper feed through evenly. If the paper does not feed through evenly, use the adjustments on the sides of the roller shaft to adjust the rollers.

3) If the probe lamp is not bright, do the following:

- Look at the probe in question and determine if it is dim or if there is no light coming from it. If it is dim, you probably have the wrong probe selected. If there is no light coming from the probe, the lamp on the reader board is probably burned out.
- Go into SETUP -> READER SETUP -> CUSTOM SETUP and set the LAMP value to 255. Look at the lamp on the other probe (or where the other probe

would have been connected on the reader card underneath the machine). If it is brighter than the probe that you are trying to read with than you probably have the wrong probe selected. Go into SETUP -> PAGE SETUP -> PROBE A OR B and select the other probe. Exit all the way out of the setup screens and cycle the power on the Smart Feeder. After cycling the power to the Smart Feeder go into SETUP -> READER SETUP and setup the reader (see **SETTING UP THE GBR LINE CODE READER**)

Miscellaneous Problems

1) If EPROMS are swapped out on the CPU-186 board and the VIP display is locked up with the message 'reader errored' when the Smart Feeder is powered, do the following:

- Turn the Smart Feeder off and hand-feed a sheet of paper into the accumulator.
- Turn the Smart Feeder on (the error 'Package Not Removed' will be displayed on the screen) and go into READ -> SETUP -> PAGE SETUP and setup your page as you would normally.
- Cycle the power to the Smart Feeder, and now it should be OK to run.

TRIP POINT #1: _____

TRIP POINT #2: _____

NOTE VALUES FOR FUTURE REFERENCE

(To find the values, go to SETUP->READER SETUP->CUSTOM SETUP and write down the values listed there)

GAIN: _____

OFFSET #1: _____

OFFSET #2: _____

LAMP: _____

D.4d Calibration of Line Code Recognition system

The Line Code Recognition system can be calibrated to the particular machine in which it is installed. Calibrating the Line Code Recognition system to the particular machine eliminates parts tolerance problems and provides a method of recalibration once parts have become worn.

Calibration of the machine is provided for both 1/8" code spacing and 1/6" code spacing. There is a different calibration number stored in battery backed memory for each type of code spacing. This means a machine must be calibrated when the proper line code spacing is selected. Once a machine has been calibrated for 1/6" and 1/8" spaced codes it will operate properly until the parts on the machine become severely worn.

The machine is calibrated by running a special Calibration sheet through the machine. The Calibration document has two precisely placed marks on the document. These marks provide the needed reference points to calibrate the machine.

D.4d1 Description Of A Calibration Document

A Calibration document has two precisely placed Line Code marks on a document. The first Line Code mark is placed one inch from the leading edge of the document. The second Line Code mark needs to be precisely placed

6 inches away from the first Line Code mark. No other marks can be in the area between the two marks. This will give the Line Code Recognition system the expected reference distance to calibrate to the machine. The Line Code Recognition card uses the two marks on the Calibration document to count the number of encoder signals which occur between the marks. If the number of encoder signals counted are within 15 % of the expected number of encoder signals, it is considered a valid calibration value.

D.4d2 Calibration Procedure

FOR 1/8" AND 1/6" SPACED LINE CODES

- 1) Check all mechanical setups in the machine.
Examples:
 - Friction feeder is free of mechanical binding
 - Singulator is adjusted properly
 - Documents are processed through machine without distorting the paper
 - All paper hold downs are set up properly
 - Paper rails are set to the proper width
- 2) On the operator's configuration keyboard (22 keys directly under display) select OMR reading enabled.
- 3) On the operator's configuration keyboard select the proper line code spacing you desire to calibrate (1/6" or 1/8").
- 4) On the operator's configuration keyboard select RECALIBRATE.
- 5) Now feed a single Calibration document on the machine.

- 6) If none of the following errors are declared when a calibration document is fed the Line Code Recognition system is calibrated for the current selected Line Code spacing.

Errors Indicating A Bad Calibration

- NO FEED
 - NO GATE MARK DETECTED
 - NO GATE MARK DETECTED IN 2ND BANK
 - CALIBRATION OUT OF RANGE
- 7) If a bad calibration is indicated RECALIBRATE must again be selected before another Calibration document is fed. (Go back to step 4.)

D.4e Computer Preset "Line Read" Page Set-Up

The reader must be taught the exact presets of the type of code you wish to read. First make sure "LINE READ" has been selected. Enter the **READ** mode and scroll to **READ TYPE**: press ENTER. Next scroll to **GBR-LINE READ** and press ENTER. Enter the **READ** mode and scroll to **SETUP**, press ENTER and scroll to **PAGE SETUP**: press ENTER. There are numerous different presets and each one has several levels of screens. Each of these presets must be set or turned off for proper reading. In some cases, entering a preset will exit you out of read set-up, and it will be necessary to re-enter and scroll to the next pre-set.

Smart Feeder Reader Screens

ON-OFF	SETUP	READ TYPE	TEST
Page Setup		Reader Setup	

1/17:DEMAND FEED

DEMAND FEED FIELD:< > .. + - UNDO/ENTER,
DEMAND FEED:NORMAL REVERSE YES/NO LAST PAGE

Use the cursor keys (< >) until the desired choice flashes. Press ENTER.

NORMAL - The machine will demand feed on the absence of an End Of Group mark. This means the only page in a set that has the mark is the last one.

REVERSE - The machine will demand feed on the presence of the End Of Group mark. This means the all pages in the set will have the mark except the last one.

YES/NO - Used where all pages have a mark. Each page will have an End of Group or a NOT End Of Group mark. The machine will demand feed on EOG, but all other documents in the set should have the NOT EOG mark.

LAST PAGE - When this option is selected, the system looks for the end of group mark (demand feed) on the last page of a set to be fed into the accumulator. This option is intended for use with page sequencing configured as "down".

2/17:PAGE SEQUENCE

PAGE SEQUENCE:< > .. UNDO/ENTER
UP DOWN ITEM COUNT ROLL DWN ROLL UP OFF

Use the cursor keys (< >) until the desired choice flashes.
Press ENTER.

UP - Choose if the page is counted UP (1, 2, 3, 4).

DOWN - Choose if the page is counted DOWN (4, 3, 2, 1).

ITEM COUNT - Choose when the first sheet in a package indicates the total number of sheets in that package.

ROLL DOWN - Cycle counts down sequentially from a selectable value

ROLL UP - Cycle counts up sequentially to a selectable value

OFF- If there is no page sequence, enter OFF.

There is a limit of three Page-Sequence marks. Their purpose is to give an individual identity to each page within the package. The maximum number of pages in a package is seven. Page-Sequence marks must be present when using PAGE SEQUENCING.

3/17:GROUP SEQUENCE

GROUP SEQUENCE:< > . UNDO/ENTER
UP, DOWN, MATCHING OFF , (entire set)
UP, DOWN , MATCHING, OFF , (same sets OK)
UP, DOWN , MATCHING, OFF , (sets must change)
UP DOWN MATCHING, OFF,
UP , DOWN, MATCHING OFF , (entire set)

Use the cursor keys (< >) until the desired choice flashes.
Press ENTER.

UP - Choose if the group is counted UPward. (1, 2, 3, 4).
Sets must be in order.

DOWN - Choose if the group is counted DOWNward. (4, 3, 2, 1). Sets must be in order.

MATCHING - will match marks within a set. All marks in the set must be the same. Sets may be in random order.

OFF - If there is no group sequence, enter OFF.

The purpose of the Group Set mark is to ensure pages from two different packages do not get processed in a single package. Group Set marks must be present when using GROUP SEQUENCING.

4/17:INK MARKING

INK MARKING < > .. UNDO/ENTER
ON , OFF

5/17:POSTAL METER

POSTAL METER < > .. UNDO/ENTER
ON, OFF

6/17:PARITY

PARITY < > .. UNDO/ENTER
EVEN ODD NONE

Use the cursor keys (< >) until the desired choice flashes.
Press ENTER.

Some code formats require an odd or even number of lines for parity. The programmer determines the use of PARITY. Parity is set at ODD, EVEN, or NONE.

7/17:END OF SUBSET

END OF SUBSET < > .. UNDO/ENTER
ON OFF BY COUNT

Use the cursor keys (< >) until the desired choice flashes.
Press ENTER.

The limit of sheets into the accumulator is seven. Subset is a special line in the code that is used to indicate whether a set is more than seven pages. When the package is more than seven pages the machine will use the subset line to break the total page count into the amount of packages necessary to complete the total count. This prevents possible damage to the folder from

packages greater than seven pages. The set and subset will go out in different envelopes.

8/17:RANDOM CHECK MARK

**RANDOM CHECK MARK < > .. UNDO/ENTER
ON , OFF**

9/17:BLANK PAGE ERROR DISABLE

**BLANK PAGE ERROR: < > .. UNDO/ ENTER
ON , OFF**

Use the cursor keys (< >) until the desired choice flashes.
Press ENTER.

10/17:NUMBER OF WINDOWS

**CHOOSE NO. of WINDOWS: < > .. UNDO/ENTER,
1 , 2**

Use the cursor keys (< >) until the desired choice flashes.
Press ENTER. Select the number of read windows required.
Currently this must be set to 1.

11/17:WINDOW SETUP

**ENTER WINDOW to SETUP: < > .. UNDO/ENTER,
1 , 2**

**WINDOW ONE: < > .. + - .. UNDO/ENTER,
BEGIN:,HT ,HT ,HT , LENGTH,**

**WINDOW TWO: < > .. + - .. UNDO/ENTER,
BEGIN:,HT ,HT ,HT , LENGTH,**

This display permits the operator to set the read window. The operator sets the distance from the leading edge of the paper to the reading start and stop point.

The read window is the distance from the edge of the page to where the first line of code starts, and the actual length of the code. This measurement is either in sixths or eighths of an inch.

Example: If there are eight lines of code to the inch, and the code, consisting of 10 lines, starts one inch down the page. The window would be set at:

BEGIN: 008 LENGTH: 10

12/17:LINES PER INCH

**CHOOSE LINE SPACING: < > . UNDO/ENTER,
Lines per Inch: 6 , 8**

Use the cursor keys (< >) until the desired choice flashes. Press ENTER.

The code marks can be at 1/6 or 1/8 inch spacing. This is 6 lines or 8 lines per inch. There can be as many as 25 mark locations in a bank.

EXAMPLE

GRV
EOG
GS1
GS2
GS4
GS8
PS1
PS2
PS4
PAR

NOTE: Presence of a bar is binary 1, and the absence of a bar is binary 0.

The GRV mark must be located in the first position. The EOG, PAR, GS_n, and PS_n marks may be shifted in the bank

of marks. The GS grouping and the PS grouping must be located as sets, however.

13/17:PROBE "A" or "B"

PROBE:A , B

Use the cursor keys (< >) until the desired choice flashes.
Press ENTER.

14/17:BIT WEIGHTING

CHOOSE LINE SPACING: < > . UNDO/ENTER

MSB LSB FIRST

Move cursor to value desired and press ENTER.

FIRST is the first bit encountered when reading.

Page and Group marks can be arranged as Most Significant Bit First (MSB) or Least Significant Bit First (LSB).

<u>EXAMPLE LSB</u>	<u>EXAMPLE MSB</u>
GRV	GRV
EOG	EOG
GS1	GS8
GS2	GS4
GS4	GS2
GS8	GS1
PS1	PS4
PS2	PS2
PS4	PS1
PAR	PAR

15/17:CALIBRATION

**CHOOSE CODE CALIBRATE: < > .. UNDO/ENTER,
OFF ON ,RECALIBRATE**

NOTE: Calibration is normally to be used by the service technician only. See section “GBR Line Code Read” for related information.

Use the cursor keys (< >) until the desired choice flashes. Press ENTER.

Calibrate the machine by running a special calibration document through the machine. The document has two precisely-placed marks that are the reference points to calibrate the machine. The numbers of encoder signals are counted by the computer. The encoder signals are considered valid if the encoder signals counted are within 12% of the expected number.

The first line code mark is placed one inch from the leading edge of the document. The second line code mark is placed six inches from the first mark code mark. No other marks can be in the area between the two sets of marks.

To calibrate the reading system, first make sure the feeder is operating properly. Correct any problems before proceeding with the calibration.

- a. Press READ on the Display Panel. Move the cursor to select reading On.
- b. Move the cursor to select Setup.
- c. Move the cursor to choose Line Code Setup. Then, move the cursor to choose Lines Per Inch. Choose 6 or 8 as applicable. (See 12/17)
- d. Move the cursor to choose Line Code Setup. Then, move the cursor to choose Calibration, and again to choose Re-calibrate. (See 15/17)
- e. Exit the Read Menu.
- f. Feed a single calibration document through the feeder and into the accumulator at normal speed. Press and hold the CYCLE key to feed the document through the feeder.

If the calibration is good the display will show “Good Calibrate!”, and if the calibration is bad the display will show “Bad Calibrate!” If a bad calibration is indicated, select RECALIBRATE before another document is fed.

16/17:TOLERANCE

**CHOOSE CODE TOLERANCE: < > .. UNDO/ENTER,
LOW , HIGH**

Use LOW setting unless there is not a good contrast between the document background and the function marks. The LOW setting will tolerate some drift in the printer registration. Use of the HIGH setting does not allow drift in

the printer registration. The mark location is very critical if the HIGH setting is used. Use it if the contrast between the document and the function marks is poor.

Use the cursor keys (< >) until the desired choice flashes. Press ENTER.

17/17:CODE FIELD FORMAT

Use the cursor keys (< >) until the desired choice flashes. Press ENTER.

The reader must be told at what point in a code field it will see page, group, parity, and inserts. Depending on the code format this indicates when the field begins, how many lines it consists of, and the maximum value of the field.

This is crucial to proper reading, and the operator should have a master code template that shows the location and value of each line in a code field. If certain fields are omitted, enter an arbitrary number not related to the specific code in that field.

Example: Where the code is page field first, and there are three lines for the page field the correct set-up would be
Begin: 01 Length: 03 Max value: 7

D.4f Read Tolerance Selection

The Line Code Recognition system supports two print line windowing schemes when interpreting a Line Code. The two windowing schemes are High tolerance and Low tolerance reading. Having two windowing schemes permits service personnel to select the windowing scheme which is best suited for the customer's application.

D.4f1 Low Tolerance Windowing

When Low Tolerance read is selected the print line windowing scheme used does not detect paper slippage. This means the integrity of the Line Code information must be ensured by the data fields represented within the code.

A Low Tolerance interpretation of a line code synchronizes the print line windows on the Gate Mark. The Print lines following the Gate Mark are divided into absolute locations. When a mark is detected it is automatically associated with a Print line number. This means the Line Code Recognition system will not look for the standard tolerances applied between Line Code marks.

D.4f2 High Tolerance Windowing

When High Tolerance read is selected the print line windowing scheme applies the standard tolerance specification between Line Code marks. This makes it likely for paper slippage in the machine to be detected during the interpretation of the Line Code. Detecting paper slippage improves the integrity of the Line Code Recognition process. It also introduces the possibility of more reading errors being created.

A High Tolerance interpretation of a line code synchronizes the print line windows on the Gate Mark. The Print lines following the Gate Mark are divided into zones of 1/2 print lines. Centered around the expected location of every Line Code Mark is a 1/2 print line zone where the Line Code mark is expected to be detected. Between two Line Code marks there is a 1/2 print line zone where a mark can not be detected without creating an error. This ensures that all Line Code marks are exactly where they are expected.

D.4g Recommended Line Code Configuration

Below is a description of the data fields recommended in a Line Code to provide optimum document processing security.

Gate mark:

Location - First OMR mark within a bank (always present)

Purpose - Indicates the start of an OMR code

Usage - synchronizes the OMR system to interpret the remaining OMR marks in the code.

End of Package:

Purpose - Controls the size of dynamic packages by indicating the end of a package.

Usage - A solid bar is placed in this location on the page with the largest page ID number. All other pages within a package should have no mark in this area.

Page ID number: (Optional)

Purpose - Identify each individual page within a package. The sequential incrementing of the number ensures the documents are assembled in the proper order.

Usage - It is interpreted as a binary number. This number sequentially counts from one to as high as seven.

Package ID number: (Optional)

Purpose - Identify each page as being a part of an individual package. The sequential incrementing of the number ensures the document's printed sequence is maintained.

Usage - It is interpreted as a binary number. This number must be constant for all the pages within a package. This number should sequentially increment from package to package (when sequentially counting sheets upward). This number sequentially counts from 0 to 15.

Error checking: (Parity bit - Optional)

Purpose - Adds parity error checking to the code

Usage - This location is used to maintain an even number of solid marks within a code.

Note: The fields that are marked Optional can be eliminated by operator configuration of the machine. However, when a data field is eliminated package security and integrity suffers.

D.4h Specifications of the Line Code System

The Print Contrast Ratio should be at least 65%

Mark size specifications: Minimum length of solid mark 0.3" (recommend .5")

Minimum width of solid mark 0.015" (recommend .020")

Maximum width of solid mark 0.030"

Clear area specifications: 0.064" when using 1/8" line spacing and 0.094" when using 1/6" line spacing (minimum clear area between marks taking into account print registration and maximum function line size)

Clear area required on each side of marks 0.2"

Clear area required at the lead edge of the Gate mark 0.332"

Clear area required at the trail edge of the code 0.166"

D.4h1 Code location on paper

Measured from the leading edge of the form the code should be placed on the first 1/3 of the form. The Gate mark registration must be held to +/- 1 print line. (0.125" with 1/8" line spacing) (0.166" with 1/6" line spacing).

The minimum distance of the Gate Mark from the leading edge is 0.25".

All other marks should be placed, with respect to the Gate mark, within a 1/4 of a print line of their expected placement.

REPAIR CHECKOUT PROCEDURE FOR READ BOARD ERROR

READ BOARD - REFER TO SECTION F "READER" SCHEMATIC.

NOTE: If read type is changed in SETUP, the Smart Feeder must be powered down and back up to clear and reset all read parameters. Also, make sure that the code is centered under the reader light. Code offset from the reader light will give spurious signals.

Refer to the error code as it appears on the Smart Feeder display. (If GBR OMR reading is active, perform test as described in section D3.c to help resolve code reading errors.)

“No Response Time-out”:

Y **N** - Perform Read setup: Is setup correct? Power must be cycled ON/OFF after a read type is selected.

Y **N** - Check these points on the cabling to determine where signal is being lost.

- ↓
- Check read probe; replace as required.
 - Check pre-amp; replace as required.
 - Check read board; replace as required.

Check the wiring to the CPU. Repair the wiring as necessary: does this correct the problem?

Y **N** - Check the CPU, replace as necessary.

“Code Misread”:

Y **N** - Is the problem corrected by any of the following tests?

- ↓
- Check read setup again, particularly focus.
 - Check for correct feed speed.
 - Check speed sensor for proper operation.
- Y** **N** - Check for failure on the CPU, replace as necessary.
- Bad UARTs.
 - Bad software.

Check for paper flutter under read head or pullout roller slipping.

If the waveform is intermittent, check the cable connection: secure or replace as required.

“Expected End of Group”:

- Y N - Check the page to determine if error is valid
- Check GBR read setup
 - Check these points on the circuit to determine where signal is being lost.
 - Check read probe; replace as required.
 - Check pre-amp; replace as required.
 - Check read board; replace as required.

“Blank Page”:

- Y N - Is the problem corrected by any of the following tests?
- Check read setup again, particularly focus.
 - Check for correct feed speed.
 - Check speed sensor for proper operation.
- Y N - Check for failure on the CPU, replace as necessary.
- Bad UARTs.
 - Bad software.

“Short Group” error:

- Y N - Check the page to determine if error is valid
- Is the problem corrected by any of the following tests?
- Check read setup again, particularly focus.
 - Check for correct feed speed.
 - Check speed sensor for proper operation.
- Y N - Check for failure on the CPU, replace as necessary.
- Bad UARTs.
 - Bad software.

“Duplicate Page” error:

- Y N - Is the problem corrected by any of the following tests?
- Check read setup again, particularly focus.
 - Check for correct feed speed.
 - Check speed sensor for proper operation.
- Y N - Check for failure on the CPU, replace as necessary.
- Bad UARTs.
 - Bad software.

“Page Out of Seq.” error:

- Y N - Is the problem corrected by any of the following tests?
- Check read setup again, particularly focus.
 - Check for correct feed speed.
 - Check speed sensor for proper operation.
- Y N - Check for failure on the CPU, replace as necessary.
- Bad UARTs.
 - Bad software.

“Invalid Group” error:

- Y N - Is the problem corrected by any of the following tests?
- Check read setup again, particularly focus.
 - Check for correct feed speed.
 - Check speed sensor for proper operation.
- Y N - Check for failure on the CPU, replace as necessary.
- Bad UARTs.
 - Bad software.

“Expected Page One” error:

- ↓
- | | |
|---|--|
| Y | N - Is the problem corrected by any of the following tests? |
| | <ul style="list-style-type: none">• Check read setup again, particularly focus.• Check for correct feed speed.• Check speed sensor for proper operation. |
| Y | N - Check for failure on the CPU, replace as necessary. |
| | <ul style="list-style-type: none">• Bad UARTs.• Bad software. |

“Group Out of Range” error:

- | | |
|---|--|
| Y | N - Is the group code in the range 0-7? |
| | <ul style="list-style-type: none">• Check that code is OK. |

“Page Out of Range” error: similar to Group Out of Range error (page range must be within 1-7)

“Presets Corrupt” error: a CPU-186 error that would likely occur on power up

“Yes No EOG Are Same” error: (this error is only associated with European machines)

- ↓
- | | |
|---|--|
| Y | N - Is the problem corrected by any of the following tests? |
| | <ul style="list-style-type: none">• Check read setup again, particularly focus.• Check for correct feed speed.• Check speed sensor for proper operation. |
| Y | N - Check for failure on the CPU, replace as necessary. |
| | <ul style="list-style-type: none">• Bad UARTs.• Bad software. |

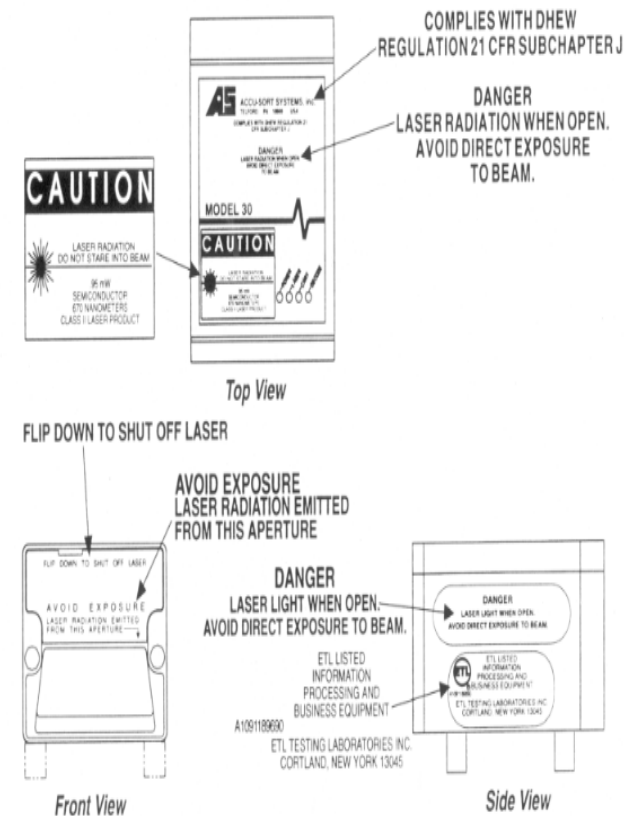
D.5 3 OF 9 LASER BAR CODE READ OPTION

D.5a Laser Safety

To prevent possible exposure to laser light that may exceed the CDRH's Accessible Emission Limit for a Class II laser, Your Model 30 has a "Scanning Safeguard" feature, a Laser Shutoff Flip Panel. It shuts off the laser power if the mirror wheel fails to rotate, which ensures that a stationary laser beam cannot exit the scan head. **This is a required feature, and it should not be tampered with. Use only in case of an emergency.**

The radiation level from the laser does not constitute a health hazard. Exercise care to avoid any unnecessary, direct exposure to the eyes. Avoid staring at the light source, since prolonged exposure could result in eye damage. Avoid deliberate eye exposure to the beam. Inadvertent contact, however, is not a cause for alarm.

Any service should be performed so as not to violate compliance with the Code of Federal Regulations, Title 21. Part 1040, Section 10 (21 CFR 1040.10), as administered by the Center for Devices and Radiological Health, a service of the Food and Drug Administration under the Department of Health and Human Services. Do not attempt to defeat any safety provisions.



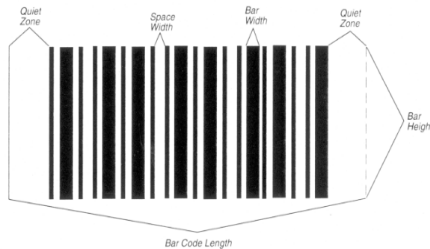
Standard Laser Caution Labels

D.5b Bar Code Basics

A bar code is a group of rectangular bars and spaces arranged in a preset pattern. The pattern is organized to represent elements of data referred to as characters. The standard industry codes can represent several alphanumeric characters.

There are many different types of bar codes. Each type uses its own symbology, which defines how the bars and spaces represent the letters and numbers.

The figure below shows each part of a bar code. The labels for each part remain the same even if the position, orientation, or type of bar code changes.



The GBR 420 with the Accu-Sort Model 30 uses the 3 of 9 code or Code 39 - fixed or variable length. This was the first code developed that used both numbers and upper-case letters. It is the most recognized and widely used for non-retail applications. Each character is represented by a stand-alone group of 5 bars and 4

spaces. The basic code set includes 0-9, A-Z, * which is used for the start and stop characters, and six other symbols - . \$ / + and % for a total of 43 characters. Because each of the characters are discrete and self-checking, Code 39 provides a high level of data security. The Model 30 automatically checks all data for this symbology.

The bar code width must not be printed smaller than 0.010" (.025 mm). Recommended width is 0.015", code height is 3/8 inch. Minimum quiet zone start and end of .25 inches.

Bar coding, sizing, tolerance ratio tolerance per ANSI MH10.8-1983. Print quality must meet or exceed ANSI Grade B per ANSI X3.182, BAR CODE PRINT QUALITY GUIDELINE.

D.5c Adjusting the Model 30 Scanner

Your scanner can be mounted in any direction depending on the scheme of your bar codes. **Ladder** orientation refers to a bar code whose bars look like a ladder when facing the bar code's direction of travel. **Picket Fence** appear as a picket fence when facing the direction of travel. Regardless of the direction of travel, the scan line must be perpendicular to the bars.

In some applications, codes are printed on glossy paper or covered with a shiny material such as cellophane. When this happens, it is possible that the code surface reflects so much laser light that it is very difficult for the scan head to decode the bar code.

To avoid reflections from the surface of glossy bar codes do not mount the scan head parallel with the object to be scanned. Mount the scan head at a five to ten degree angle so the laser beam reaches the bar code at a slight angle.

D.5d Setting the 420 to Read 3 of 9 Laser Bar Code

Select **READ** on the Smart Feeder display screen.

Select **READ TYPE**, Press **ENTER**.

Select **BAR**, Press **ENTER**. This will return you to the read type screen, at this point press **EXIT**.

Switch the Smart Feeder **main power** OFF and then back ON to set the newly selected read type in the Smart Feeder's memory.

Select **READ** again.

Select **TEST**, press **ENTER**.

Select **CONTINUOUS BAR READ**, press **ENTER**. This will turn the laser on continuously to hand test the lasers positioning. The screen will read **BAR READ:** and an audible beep will sound when the laser reads the code. The results of the read will be shown on the screen.

Press **EXIT**.

Select **READ** again.

Select **SETUP**, press **ENTER**.

Select **SELECT BAR JOB**, press **ENTER**.

Select the Job Number for you code by using the **+** or **-** keys. This number is provided to you by GBR at the time of sale or installation, if you are unsure of this number please give the GBR Sales Department a call.

Press **ENTER** and then press **EXIT** to get out of the main menu.

D.5e Adjusting the Paper Guides

In order for your laser scanner to read the bar code there can be nothing blocking its path. The Paper Guides provided with the 3 of 9 Laser Option are custom adjustable for your specific code location.

Place these guides to provide as much support evenly across the paper path as possible without interfering with the lasers path.

D.5f Laser Bar Code Read Errors

"NO RESPONSE TIMEOUT " -The reader did not respond with a reading in the proper amount of time.

ERROR SUGGESTION

- Make sure that the barcode reader is aligned with the code properly.
- Make sure that the machine power was cycled after the read-type had been set to BAR.

"INVALID COMMAND" -The software was asked to do something that it does not know how to do.

ERROR SUGGESTION

- You should never get this error. If you do get this error, either the software is bad or the 186 cpu board is bad.

"BAD READ " -The barcode reader returned an error code.

ERROR SUGGESTION

- Make sure that the barcode reader is lined up with the code.
- Make sure that the barcode print on the paper is good quality.

"PAGE OUT OF SEQUENCE" -The page that was just fed did not follow the selected page sequencing pattern.

ERROR SUGGESTION

- If the page is not out of sequence, check to see that the proper barcode is printed on the page and that the barcode matches the specifications.
- Check to see that the proper barcode job is selected.

"NOT ENOUGH NV-RAM " -The program has run out of non-volatile ram.

ERROR SUGGESTION

- You should never get this error. If you do get this error, either the software is bad or the 186 cpu board is bad.

,

PRESETS CORRUPT' -Some of the preset parameters have fallen out of their defined maximum or minimum range.

ERROR SUGGESTION:

- If new EPROMS were just installed this error might occur. If this is the case, ignore the error.
- If the battery jumper was pulled from the cpu-186 board this error might occur. If this is the case, install the battery jumper and ignore the error.
- If neither of the previous scenarios happened, the cpu-186 board is probably bad.

"INVALID CUST. ID." -A page within a set has a customer id that does not match the other pages in the set.

ERROR SUGGESTION

- If the customer id did not change within the set, check to see that the proper barcode is printed on the page and that the barcode matches the specifications.

"GROUP SEQUENCE ERROR" -The page that was just fed did not follow the selected group sequencing pattern.

ERROR SUGGESTION

- If the group is not out of sequence, check to see that the proper barcode is printed on the page and that the barcode matches the specifications.
- Check to see that the proper barcode job is selected.

"GROUP CHANGED IN SET" -Every page within a set is supposed to have the same group number and the page that was just fed did not.

ERROR SUGGESTION

- If the group did not change within the set, check to see that the proper barcode is printed on the page and that the barcode matches the specifications
- Check to see that the proper barcode job is selected.

"ROLL 7 OUT OF SEQ. " -The page that was just fed did not follow the selected roll sequencing pattern.

ERROR SUGGESTION

- If the roll 7 is not out of sequence, check to see that the proper barcode is printed on the page and that the barcode matches the specifications.
-

-Check to see that the proper barcode job is selected.

"EXPECTED END OF GRP." -If page sequencing down and the last page fed was page 1, the software expects the next page to have an end of set mark on it (new set and highest page of that set) or if 6 pages are fed into the accumulator, the software expects the next page to have a subset mark or an end of group mark on it.

ERROR SUGGESTION

-If an end of group mark was present, check to see that the proper barcode is printed on the page and that the barcode matches the specifications.

-Check to see that the proper barcode job is selected.

"EXPECTED PAGE ONE " -If page sequencing up, the software expects the first page of each set to be either a 0 or 1 (depending on what minimum page number was selected in the page setup).

ERROR SUGGESTION

-If the page was page 1, check to see that the proper barcode is printed on the page and that the barcode matches the specifications.

-Check to see that the proper barcode job is selected.

"READER ERROR " -An undefined error was flagged by the program.

ERROR SUGGESTION

-This error should never appear, if it does, it means that there is a bug in the program

"NO RESPONSE/BLANK PG" -The reader did not return a reading in the proper amount of time.

ERROR SUGGESTION

-Make sure that the barcode reader is lined up with the code.

-Make sure that the barcode print on the paper is good quality.

"JOB CHANGED IN RUN " -The page that was just read did not have the same group/job number as the other pages within that set.

ERROR SUGGESTION

-If the job did not change within the set, check to see that the proper barcode is printed on the page and that the barcode matches the specifications

-Check to see that the proper barcode job is selected.

"GROUP DID NOT CHANGE" -If the last set/group that passed has the same number of the next set/group this error will occur.

ERROR SUGGESTION

-If the group did change within the set, check to see that the proper barcode is printed on the page and that the barcode matches the specifications.

-Check to see that the proper barcode job is selected.

"BAD CHECK DIGIT" -The check character read in the barcode did not match the software's computed check character for the read barcode characters.

ERROR SUGGESTION

-Check to see that the proper barcode is printed on the page and that the barcode matches the specifications

-Check to see that the proper barcode job is selected.

"SHORT GROUP " -If page sequencing down and an end of group mark is seen (besides the end of group on the highest page of the set) before page 1 is reached this error will occur.

ERROR SUGGESTION

-Check to see that the proper barcode is printed on the page and that the barcode matches the specifications

-Check to see that the proper barcode job is selected.

D.6 ACCUMULATOR SECTION

D.6a Description

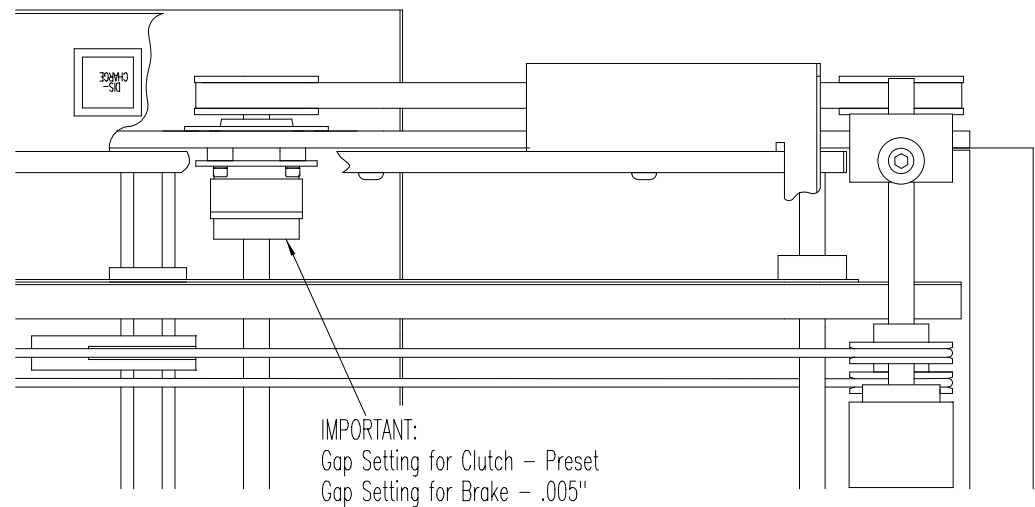
Fed by the Feeder Section, the accumulator is used to group up to seven documents before it sends them to the folder. Plastic-wedge stacking ramps position pages sequentially. Stacking rollers are used to stop the paper and hold it in position. When released, the stacking rollers drive the collected pages out of the accumulator.

The Dump Clutch activates the stacking rollers, releasing the accumulated pages. A Stack Sensor ("S") detects paper arriving in the accumulator while the Accumulator Sensor ("A") indicates presence or absence of a package in the accumulator. It also monitors for successful package discharge when the dump clutch has been engaged.

D.6b Accumulator Clutch and Brake Adjustments

The Accumulator Clutch is designed with a preset gap, no adjustments are possible or necessary. There should be a slight amount of rotational freeplay in the clutch body to prevent binding.

The Accumulator Brake does require a gap setting of .005". This setting is critical, too tight and the drag on the clutch will cause premature wearing of the clutch and the brake. Too wide of a gap and the Stacking Rollers won't stop the documents correctly in the Accumulator.



Accumulator Clutch Setting Figure

REPAIR CHECKOUT PROCEDURE FOR STACK SENSOR**STACK SENSOR - REFER TO SECTION F "ACCUMULATOR".**

Enter the TEST menu from the VIP display. Select INPUT from the submenu and select Stack Sensor input. Repeatedly block the stack sensor with your hand or a piece of paper. As the sensor is blocked, the audible beep is heard and opto 0:1 (opto module 1 on opto rack 0) red LED illuminates each time the sensor is blocked, and goes out when the sensor is unblocked?

Y **N** - Check a different input to ensure the audible signal on the display is working.

Y **N** - Check input opto 0:1 (opto module 1 on opto rack 0). Does LED light when sensor is blocked?

↓ **Y** **N** - Check the wiring between the stack sensor and the opto rack. If the wiring required correction, does this correct the problem?

↓ **Y** **N** - Check the pico fuse of the opto module. Replace the input opto module if necessary and repeat the test. Does the LED illuminate?

↓ ↓ Replace the CPU 186 PWB.

↓ Run the machine.

Check the paper transport. Are belts carrying paper?

Y **N** - Adjust the transport belts.

REPAIR CHECKOUT PROCEDURE FOR ACCUMULATOR SENSOR

ACCUMULATOR SENSOR - REFER TO SECTION F "ACCUMULATOR".

Enter the TEST menu from the VIP display. Select INPUT from the submenu and select Acc Sensor input. Repeatedly block the accumulator presence sensor with your hand or a piece of paper. As the sensor is blocked, the audible beep is heard and opto 0:18 (opto module 18 on opto rack 0) red LED illuminates each time the sensor is blocked, and goes out when the sensor is unblocked?

Y **N** - Check a different input to ensure the audible signal on the display is working.

Y **N** - Check input opto 0:18 (opto module 18 on opto rack 0). Does LED light when sensor is blocked?

Y **N** - Check the wiring between the accumulator sensor and the opto rack. If the wiring required correction, does this correct the problem?

Y **N** - Check the pico fuse of the opto module. Replace the input opto module if necessary and repeat the test. Does the LED illuminate?

 ↓
 Replace the CPU 186 PWB.

Check the stack sensor.

REPAIR CHECKOUT PROCEDURE FOR ACCUMULATOR DUMP CLUTCH**ACCUMULATOR DUMP CLUTCH - REFER TO SECTION F "ACCUMULATOR".**

Enter the TEST menu from the VIP display. Select OUTPUT from the submenu and select "Acc Dump Clutch" output. Repeatedly press the ENTER key and note whether the clutch engages (feel with fingers or listen for click). As the clutch engages, observe opto 0:20 (opto module 20 on opto rack 0). Does the red LED illuminate each time the clutch engages, and go out when the clutch disengages?

- Y** **N** - Check the wiring between the accumulator dump clutch and the opto rack. If the wiring required correction, does this correct the problem?
- Y** **N** - Check the pico fuse of the opto module. Replace the output opto module if necessary and repeat the test. Does the clutch engage?
- Y** **N** - Does LED light when ENTER is pressed?
- Y** **N** - Check wiring to clutch
- Replace the CPU 186 PWB.

Check the accumulator sensor.

D.7 FOLDER FUNCTION

D.7a Description

Fed by the Accumulator Section, the folder is capable of placing 1 to 5 folds in a C, Z, V, or 7 double V configuration. (See Fold Capability Chart at the end of this manual.) Adjustable buckle plates set the distance of the fold from the edge of the paper. Fold rollers nip the paper as it is buckling, creating the fold. A 110VAC motor drives all folder shafts and rollers. The folder speed encoder, located on the infeed roller shaft, provides a folder speed signal.

Depending on the particular configuration, document(s) exit the folder one of three ways:

1. Shingling conveyor stacker. The stacker allows easy continuous removal of document(s) while avoiding any loss of sequence.
2. Buffered transfer conveyor where nest folded document(s) are placed in an open inserter feed/gripper arm station.
4. Transfer conveyor where the nest folded document(s) are presented to the gripper arm.

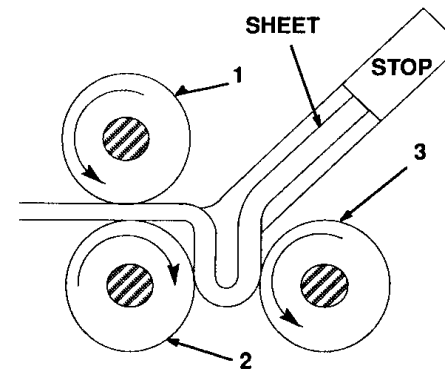
D.7b Fold Principle

The folder works on the buckle fold principle using a fold plate and fold rollers.

Fold rollers 1 and 2 drive the sheet into the fold plate until it comes up against the adjustable stop. The trailing edge of the sheet continues to be advanced by the roller and the sheet is buckled. The sheet is now grasped by fold rollers 2 and 3

NOTE: The fold rollers are made of polyurethane foam material. Do not wash the rollers with any cleaning fluid. This will destroy the anti-static coating and folding problems will occur. Clean using a stiff brush, but no liquids of any kind.

The rollers pull the folded sheet out of the fold plate and the pair of fold rollers and carried to the next fold plate. After the last fold, the sheet is transferred by the delivery rollers to the delivery belt.



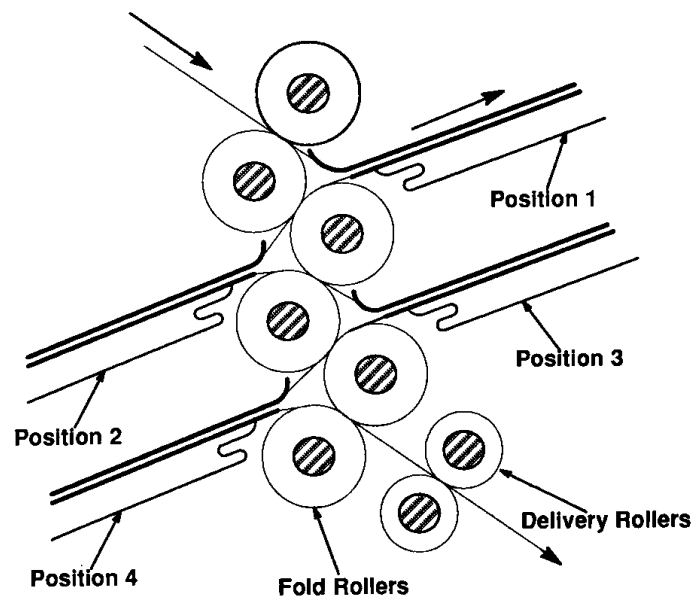
Fold Roller Diagram Figure

D.7c Components of the Fold Unit**Fold Roller Diagram Figure****D.7c1 FOLD ROLLERS**

The fold rollers move the document through the fold plates or paper stops to complete the desired folded package.

D.7c2 DELIVERY ROLLERS

The delivery rollers move the package to the output module.



D7.c3 FOLD PLATES (DEFLECTOR PLATES)

FOLD PLATE I

This fold plate is always in Position 1. (See chart on fold plate and deflector plate positions.)

FOLD PLATE II (DP II)

Use this plate in position 2 and 4 either as a fold plate (FP) or a deflector plate (DP). (See chart on fold plate and deflector plate positions.)

FOLD PLATE III (DP III)

This fold plate is always in position 3. Place it at the second fold. Reverse the plate to use H as deflector plate. (See chart on fold plate and deflector plate positions.)

WARNING!

DO NOT ATTEMPT TO ADJUST THE FOLDER WHILE THE POWER IS ON. HANDS CAN BE SERIOUSLY INJURED! SHUT OFF MAIN POWER BEFORE OPENING THE SAFETY COVERS.

Folding Pockets				Fold Style		
Fraction of each sheet in each pocket						
1	2	3	4	Z	C	Half
2/3		1/3		X		
	1/2					X
	2/3	1/3			X	
2/3	1/3				X	
	2/3		1/3	X		
1/2						X
	1/2					X
1/3	1/3			X		
	1/3		1/3		X	
1/2						X
1/3		1/3			X	
	1/3	1/3		X		

Address leading and Facing Edge up

Address leading and Facing Edge down

Address trailing and Facing Edge up

Address trailing and Facing Edge down

Setting Folds Figure

D.7d Features of the Fold Plates

The operator should become familiar with the parts and features of the folder.

FOLD STOP

The fold stop is an adjustable bar that regulates the fold height for a particular fold plate.

SCALE

Use the scales at each fold plate to set the proper fold depth for that fold plate.

FOLD STOP THUMBSCREW

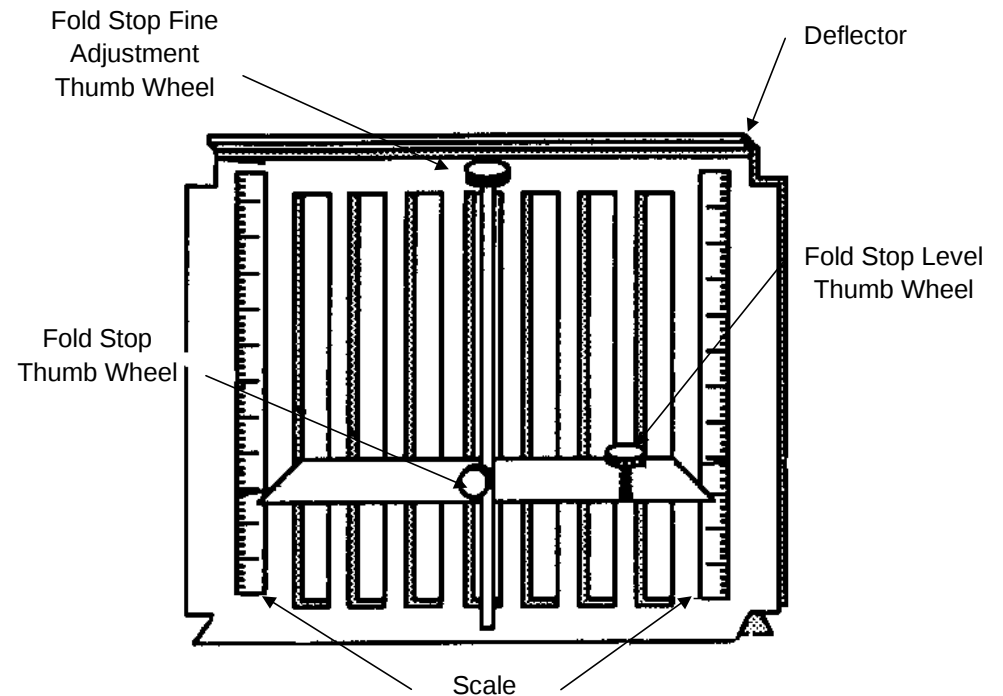
Loosen the thumbscrew to adjust the fold stop to the proper fold depth. Tightening the fold stop thumbscrew locks the fold stop into position.

FOLD STOP FINE ADJUSTMENT THUMBSCREW

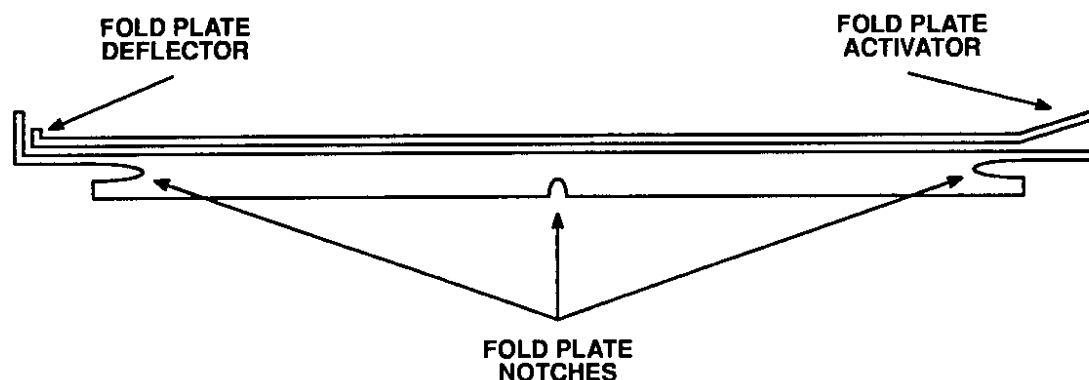
To obtain a more precise and even fold of the material use the fine adjustment thumbscrew.

DEFLECTOR

Remove and reverse the fold plate to act as a deflector when a fold plate is not required for the selected fold.



Fold Plate Features Figure



Side View of Folder Plates Figure

D.7e Setup and Adjustments

1. Determine the type of fold required for the job.
2. Refer to the FOLDS CHART (Figure D-12) to determine set up of fold plates for your application.

The first fold line from the lead edge of the material will always be created by the lowest number fold plate selected from the fold chart. The second fold line from the lead edge will be created with the next highest number fold plate from the chart. If a third fold line exists, this fold

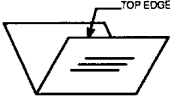
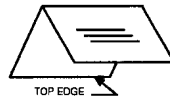
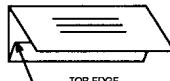
will be created with the highest number fold plate from the chart.

Example:

Using fold plates #1 and #3. Fold plate #1 will create the first fold from the lead edge and fold plate #3 will create the second fold from the lead edge.

3. Lift folder cover and lift fold plate #1 up and back to remove it, allowing access to fold plate #3.
4. Lift fold plate #3 up and back to remove it from folder.

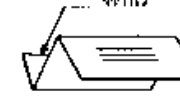
D.7e1 POSITION FOLD PLATE #3.

NAME AT THE TOP	NAME AT THE BOTTOM
A. HALF FOLD  Feed form face down Bottom edge leading Z to A collation Use Plate #1 Plates #2, #3, and #4 are deflected	A. HALF FOLD  Feed form face up Bottom edge leading Z to A collation Use Plate #2 Plates #1, #3, and #4 are deflected
B. LETTER FOLD  Feed form face down Bottom edge leading Z to A collation Use Plate #1 (1/3) and Plate #3 (1/3) Plates #2 and #4 are deflected	B. LETTER FOLD  Feed form face up Bottom edge leading Z to A collation Use Plate #2 (1/3) and Plate #3 (1/3) Plates #1 and #4 are deflected

Fold Charts Figure

- Loosen the thumbscrew on the Fold Stop.
- Slide the Fold Stop so its front edge lines up with the appropriate setting on the Left and Right Fold Plate Scales for fold plate #3.
- Tighten the Fold Stop thumb wheel.

NOTE: Fold plate #3 will always be used. Modify fold plate #3 to perform either the second or final document fold. Always use fold plate #3 for the second or final fold. 8. If necessary, adjust the Fold Stop Level thumb wheel until the measurement on each of the fold plate scales is exactly the same.

NAME AT THE TOP	NAME AT THE BOTTOM
C. ACCORDIAN FOLD  Feed form face down Bottom edge leading Z to A collation Use Plate #2 (1/3) and Plate #3 (1/3) Plates #1 and #4 are deflected	C. ACCORDIAN FOLD  Feed form face down Bottom edge leading Z to A collation Use Plate #1 (1/3) and Plate #2 (1/3) Plates #3 and #4 are deflected
D. QUARTER FOLD  Feed form face down Bottom edge leading Z to A collation Use Plate #1 (1/2) and Plate #3 (1/4) Plates #2 and #4 are deflected	D. QUARTER FOLD  Feed form face down Bottom edge leading Z to A collation Use Plate #1 (1/2) and Plate #3 (1/4) Plates #2 and #4 are deflected

- Insert the open end of fold plate #3 back into the folder making sure that the fold plate rests on the fold plate stops.

D.7e2 POSITION FOLD PLATE #1.

NOTE: If it is determined fold plate #1 should not perform a fold, continue with step 10. If fold plate #1 will perform a fold, skip step 10 and go directly to step 11.

10. Insert the deflector end of fold plate #1 into the folder. Make sure that fold plate #1 rests on the fold plate stops.

GO TO STEP 15.

11. Loosen the thumb-screw on the Fold Stop.

12. Slide the Fold Stop so its front edge lines up with the appropriate setting on the Left and Right Fold Plate Scales for fold plate #1.

13. If necessary, adjust the Fold Stop Level thumb wheel until the measurement on each of the fold plate scales is exactly the same.

14. Insert the open end of fold plate #1 back into the folder making sure that the fold plate rests on the fold plate stops.

D.7e3 POSITION FOLD PLATE #2.

NOTE: if it is determined fold plate #2 should not perform a fold, continue with step 15. If fold plate #2 will perform a fold, skip step 15 and go directly to step 16.

15. Insert the deflector end of fold plate #2 into the folder. Make sure that fold plate #2 rests on the fold plate stops.

GO TO STEP 21.

16. Loosen the thumbscrew on the Fold Stop.

17. Slide the Fold Stop so its edge lines up with the appropriate setting on the Left and Right Fold Plate Scales for fold plate #2.

18. Tighten the Fold Stop thumb wheel.

19. If necessary, adjust the Fold Stop Level thumb wheel until the measurement on each of the fold plate scales is exactly the same.

20. Insert the open end of fold plate #2 back into the folder making sure that the fold plate rests on the fold plate stops.

D.7e4 POSITION FOLD PLATE #4.

NOTE: IF IT IS DETERMINED FOLD PLATE #4 SHOULD NOT PERFORM A FOLD, CONTINUE WITH STEP 21. IF FOLD PLATE #4 WILL PERFORM A FOLD, SKIP STEP 21 AND GO DIRECTLY TO STEP 22.

21. Insert the deflector end of fold plate #4 into the folder. Make sure that fold plate #4 rests on the fold plate stops.

GO TO STEP 27.

22. Loosen the thumbscrew on the Fold Stop.

23. Slide the Fold Stop so its front edge lines up with the appropriate setting on the Left and Right Fold Plate Scales for fold plate #4.

24. Tighten the Fold Stop thumb wheel.

25. If necessary, adjust the Fold Stop Level thumb wheel until the measurement on each of the fold plate scales is exactly the same.

26. Insert the open end of fold plate #4 back into the folder making sure that the fold plate rests on the fold plate stops.

27. Turn the folder hand-wheel and turn it clockwise to manually feed a sample piece of material completely through the folder.

28. Check to see if the folds are straight. If they are straight, the set-up is complete. If any fold is not straight, continue with step 29.

29. Turn the Fold Plate Fine Adjustment Thumbscrew for any of the necessary plates.

30. Check to see that the Fold Stop measurement is the same on both scales. Adjust the Fold Stop Level Thumbscrew if necessary.

THE FOLDER SET-UP IS NOW COMPLETE

D.7f Timing Procedures (not applicable)

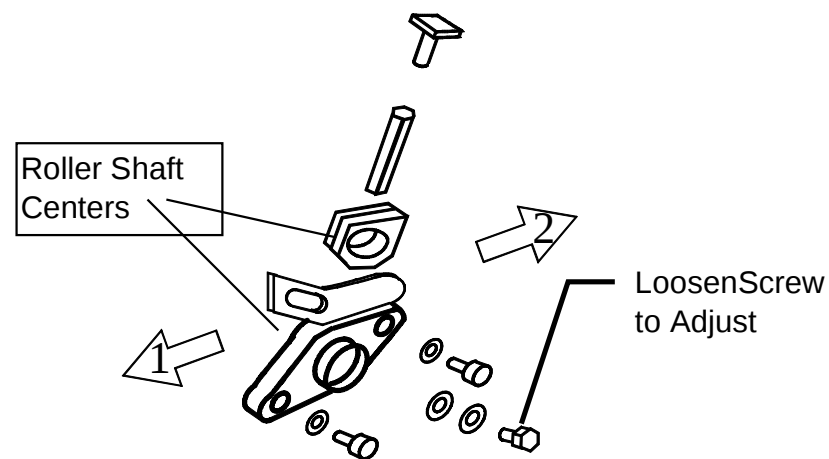
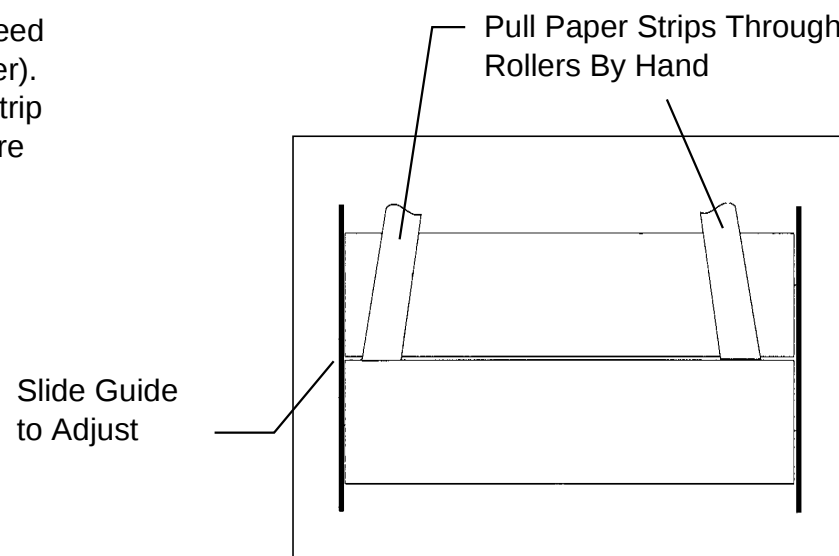
D.7g Folder Infeed Roller Tension Adjustment

There is a tension adjustment between rollers 1 and 2 only. This adjustment is found on each end of the rollers. To bring rollers closer together loosen locking bolt and slide tension adjuster in direction #1.

To widen gap between roller push adjuster in direction #2.

Ensure that the spacing between rollers is equal on both sides. This may be accomplished by feeding a strip of paper between the rollers and checking for equal drag at both sides.

Feed a strip of paper approx. 2 in. wide into the infeed rollers (using the hand knob on the side of the folder). Hold the hand knob still and slowly pull the paper strip from the rollers. Repeat on other side of roller. There should be an equal amount of drag on each side.

**Tension Adjuster Figure****Roller Tension Figure**

D.7h Removal and Replacement of Folder Components

NOTE: The folder portion of the Smart Feeder is extensively modified from the original equipment. DO NOT use the MB 354 Folder parts Catalog as a reference when working on or ordering parts for the folder.

D7.h1 Belts

1. Remove the side covers.
2. Slip the belt off of the pulleys.
3. Put the new belt onto the pulleys.

D7.h.2 Sensors

Speed Encoder

1. Remove the side covers.
2. Unplug the sensor PWB.
3. Detach the sensor PWB from the bracket .
4. Loosen the set screws which secure the encoder disc to the shaft.
5. Remove the encoder disc.
6. Replace in reverse order.

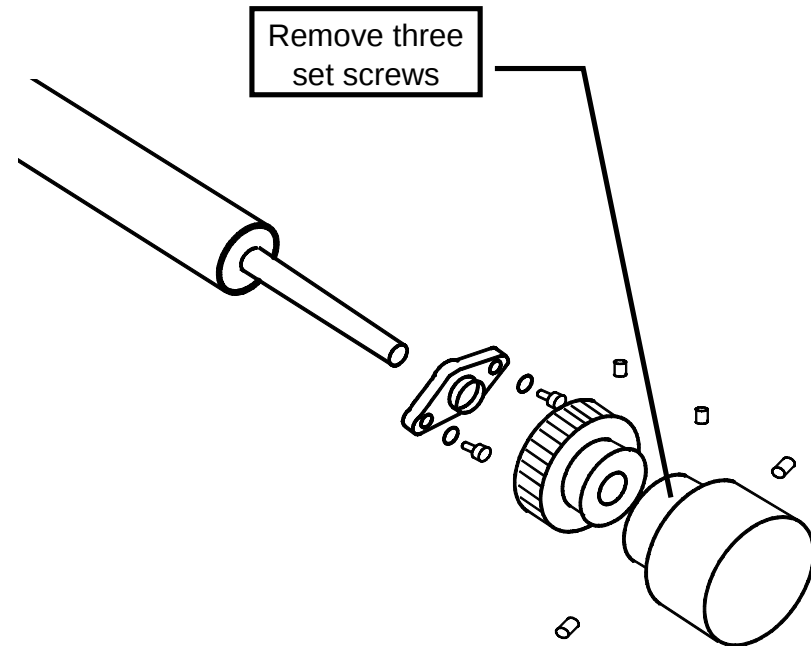
D.7h3 Bearings (take rollers out from side of folder with speed encoder)

1. Remove the side covers.
2. Remove the sheet metal screws and bearing.
3. Remove the bearing.

4. Replace in reverse order.

D.7h4 Red handle

1. Loosen the three set screws from the shaft.
2. Pull the handle off of the shaft.
3. Replace in reverse order.



Folder Handle Figure

REPAIR CHECKOUT PROCEDURE FOR FOLDER CIRCUIT BREAKER

- REFER TO SECTION F "FOLDER POWER" SCHEMATIC.

NOTE: The folder motor switch/breaker is mechanically locked ON and the control shaft has been removed. Check the circuit breaker located in the Folder wall, and check the folder fuse (F4). Are they tripped/blown?

1. The motor is running but speed or timing is incorrect.

Y **N** Go to step 4

2. Check speed pot: is it correctly set? Check the Speed Control Pot and Timer Disk: are the connections to the Motor Control Board physically and electrically intact?

Y **N** Ensure physical connections are secure.

3. Troubleshoot the following components: replace as required

- Motor Control Board
- Speed Encoder (blue, on infeed roller shaft) to Opto 3 (Rack 0)
- Folder Discharge Sensor to Opto 17 (Rack 0)

4. Unplug folder cord from power box. Enter the TEST menu from the VIP display. Select OUTPUT from the submenu and select "Folder Motor" output (opto 1:1). Press the ENTER key and measure voltage at power box outlet J4: is it 120VAC?

Y **N** - Solid State Relay (SSR3) may be bad. Perform SSR RCP.
↓

5. Reconnect folder cord and measure voltage at input end of motor control board (terminals 16 and 17): is it 120VAC?

Y **N** - Test the circuit for correct operating voltages (refer to schematic in Figure D.nn). Locate the defective component and repair or replace as necessary. Check wiring between power box and motor controller.
↓

6. Measure output voltage of motor control board (terminals 13 and 14): 110VAC?
Y N - Controller is bad: replace.

D.8 TRANSFER CONVEYOR

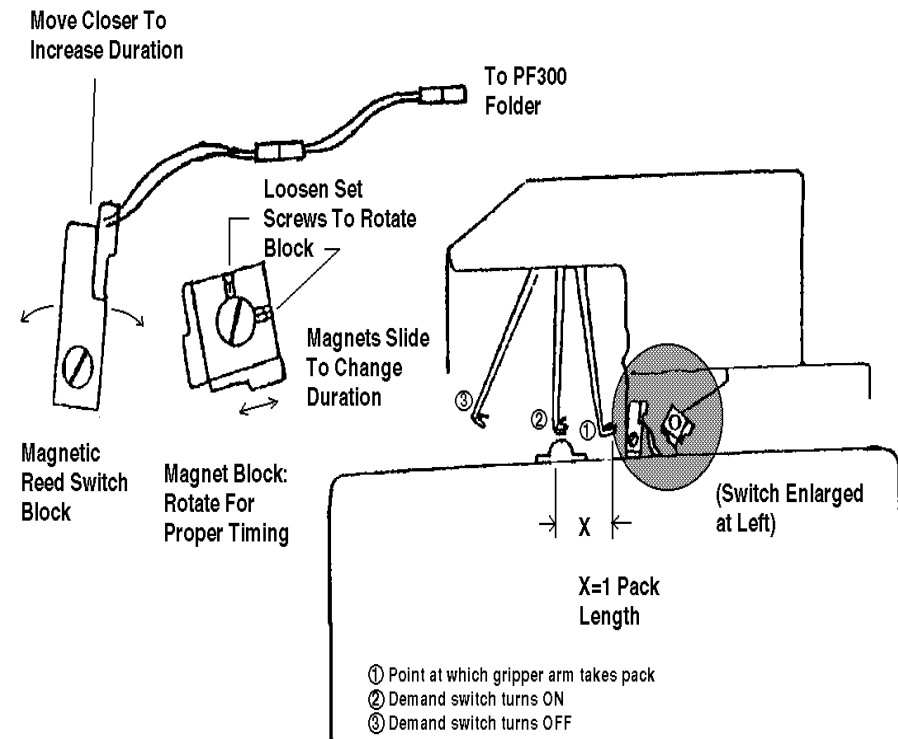
D.8a Description

The transfer conveyor is an articulated belt system which presents the nest folded document(s) to the Inserter gripper arm.

D.8b Timing

Demand switch on/off timing is critical. The setup of this timing permits the Smart Feeder to achieve optimal handoff to the Inserter.

The Demand switch should turn on (contacts closed) when the gripper arm is approximately perpendicular to the deck of the Inserter. The Demand switch should then turn off (contacts open) as the gripper arm completes it's backwards motion and starts moving toward the Transfer conveyor.



Transfer Conveyor Demand Switch Figure

D.8c Exit sensor Test on the Transfer conveyor

The Exit sensor on a 420 creates an interrupt to the control card. This interrupt is what permits accurate positioning of packages on the Transfer conveyor. Testing the interrupt communication is done in the following manner:

1. Clear Transfer conveyor of all documents
2. Place a folded document approximately 1/2 inch before the Exit sensor on the Transfer conveyor.

NOTE: Be sure the inserter is running to supply a Demand signal.

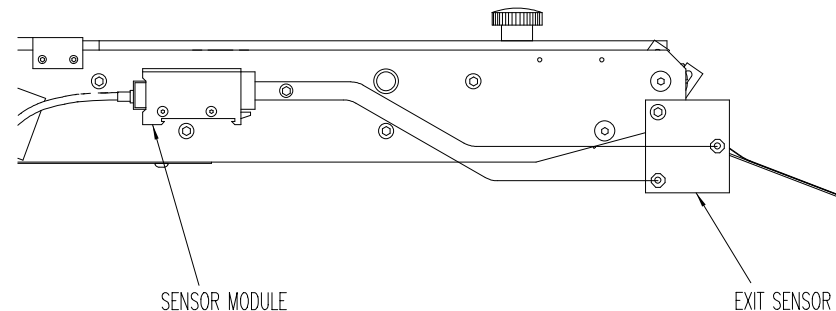
3. Run the Smart Feeder and command the machine to Dump.
4. The Transfer conveyor will index in response to the Dump command. If the package that was placed just before the exit sensor stops at the discharge end of the Transfer conveyor the interrupt is being seen by the control card. However if the document is throughout the end of the Transfer conveyor then the interrupt is not being seen by the control card.

NOTE: The Interrupt signal enters the Control card CPU-186 at header J9. The signal comes from J10: a 50-pin, in-line ribbon cable header.

D.8d 420 configuration of Exit sensor module

The Exit sensor amplifier module on the Transfer conveyor has an “active state” selection switch on it. This switch can set to LIGHT ON or LIGHT OFF. The proper position for the switch is LIGHT ON.

NOTE: This active state setting is the opposite to most of the other sensor modules on the Smart Feeder.

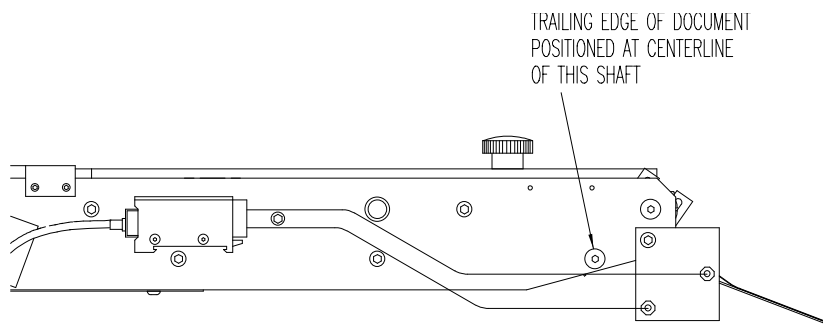


Transfer Conveyor Exit Sensor Figure

D.8e Package overhang at last station

When a package is being presented to the gripper arm (last station of the Transfer conveyor) the package should have only the trailing edge of the folded document held by the flat green belts. Positioning the trailing edge of the document at the centerline of the lower, forward-most shaft accomplished the desired document position.

When the gripper arm removes a package from the Transfer conveyor the flat green belts of the Transfer conveyor will creep if more than 3/4 of inch of the package is being pinched by the flat green belts. The creeping of the flat green belts will cause the packages to become improperly gapped in the Transfer conveyor.



Transfer Conveyor Figure

D.8f Position of the Transfer conveyor's outfeed guides

It is recommended that the Transfer conveyor arm be positioned parallel to the deck of the inserter and it should be close enough to the deck so the outfeed guides do not need to drastically deflect the folded document. This will help prevent the flat green belts from creeping and ease the extraction force required to remove the folded document.

D.8g Fold quality

Consistent fold quality is required or the package size can vary enough to cause the Transfer conveyor packages to be improperly positioned in the conveyor.

D.8h Transfer conveyor package spacing problem

If package spacing problems occurs in the Transfer conveyor it should be purged of all the remaining documents in it. This will insure that documents will be properly positioned.

REPAIR CHECKOUT PROCEDURE FOR TRANSFER CONVEYOR INFEED SENSOR**TRANSFER CONVEYOR INFEED SENSOR - REFER TO SECTION F "TRANSFER CONVEYOR" SCHEMATIC.**

Enter the TEST menu from the VIP display. Select INPUT from the submenu and select "Transfer Conv IN Sens" input. As the package enters the transfer conveyor, the audible beep should be heard. Observe opto 0:12 (opto module 12 on opto rack 0). Does the red LED illuminate each time the sensor is blocked, and go out when the sensor is unblocked?

Y **N** - Check a different input to ensure the audible signal on the display is working.

- Replace display board.

Does the sensor state change (as indicated by red LED off/green LED on) when sensor is covered?

Y **N** - Check the 24V supply to sensor. Is the sensor powered?

Y **N** - Check the following: is the problem corrected?

- Alignment of prism
- Gain adjustment on sensor
- Damaged fibers

Replace the opto module.

Does the opto module work (as indicated by LED on/off as sensor state changes)?

Y **N** - Check the wiring between the transfer conveyor infeed sensor and the opto rack. If the wiring required correction, does this correct the problem?

Y **N** - Check the pico fuse of the opto module. Replace the input opto module if necessary and repeat the test. Does the LED illuminate?

Check wiring to CPU. Troubleshoot or replace CPU-186 if necessary.

D.9 POWER UNIT

REFER TO SECTION F "POWER UNIT" SCHEMATIC.

The Power Unit is located inside the cabinet and consists of the following components:

- | | |
|---|----------------------------------|
| 1. Master Relay: Electric safety interlock switch. | 4. 5 VDC Power Supply (PS1) |
| 2. Fuses: Fuse tips illuminate when the fuse is bad | 5. +12VDC and -12VDC power (PS1) |
| 3. Solid State Relays (SSR): For switching high power items, motors, etc. | 6. +24 VDC Power Supply (PS1) |

E PRINTED WIRING BOARD INFORMATION

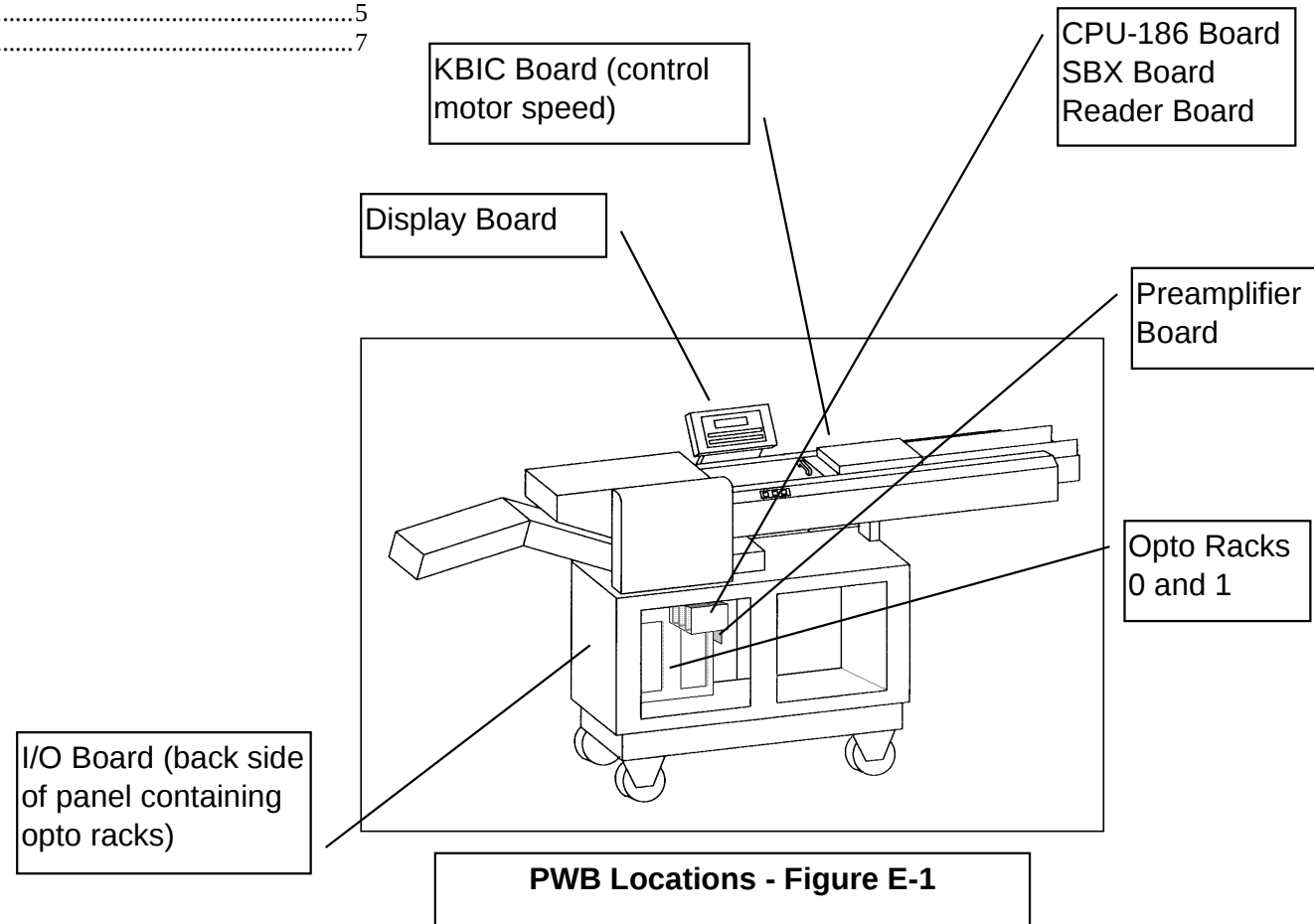
E.2 CONNECTOR DESIGNATIONS 2

E.3 Printed wiring boards (PWB) 3

E.3a Introduction 3

E.3b Specifications 5

E.3c Functional description 7



E.2 CONNECTOR DESIGNATIONS

CPU-186 I/O CONNECTORS	
J1	STD BUS EDGE CONNECTOR
J2	To Opto Rack "1" via SBX Board
J3	RS-232 COM1
J4	To Display ; RS-232 COM2
J5	RS-232 COM3
J6	RS-232 COM4
J7	RS485 COM3
J8	To Encoder (via Pin 7, Opto 5,Rack "0"); RS-485 COM4
J9	COUNTER/TIMER INTERFACE
J10	To Opto Rack "0"

Preamplifier Board	
CN1	to Read Sensor
CN2	to CN2 of Reader Board

Reader Board	
CN1	To J1 of SBX Board
CN2	to CN2 of Preamplifier Board
CN4	to reader power cable

Display Assembly Board	
J1	to 5VDC power and Alarm Bell
J2	to J4 of CPU-186 Board

SBX Board	
J0	to J91 of Opto Board #1
J1	to CN1 of Reader Board
J2	to J2 of CPU-186 Board

I/O Board	
Module #1	Feeder
Module #2	Folder
Module #3	Power Unit
Module #4	Transport Conveyor
Module #5	Keyboard
Module #6	Accumulator
Module #7	Insertor
Module #8	470 Feeder (option)

CP-186	
LED #1	Heartbeat (green)
LED #2	(red) not used
LED #3	(green) not used
LED #4	Reset (red)

E.3 PRINTED WIRING BOARDS (PWB)

E.3a Introduction

The CPU-186 is a multifunction, single board computer designed for use on the STD Bus. The board uses the 80186 microprocessor for high performance 16-bit processing of up to 512k bytes of on-board data. Off-board I/O and memory accesses are eight bits.

The board features four asynchronous serial ports with programmable data rates from 50 baud to 38,400 baud. Two ports are dedicated RS-232 channels, and two can be configured in one of the following combinations:

Two RS-232 channels

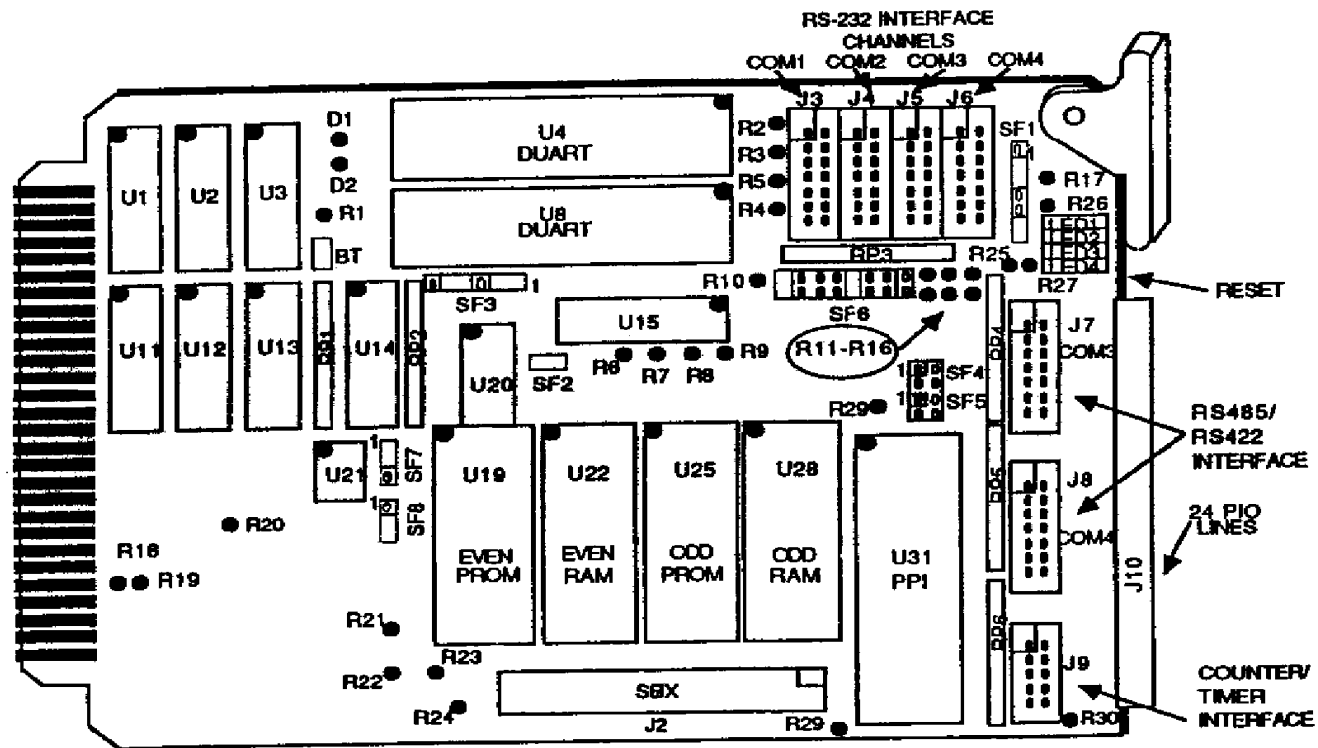
Two RS-485 channels One RS-485 channel and one RS-232 channel One RS-422 channel and one RS-232 channel

Other functions include 24 parallel I/O lines, 4 counter/timers for digital acquisition and control, a battery-backed real-time clock, battery-backed RAM, and an optional math co-processor.

The standard board uses CMOS parts for low power operation and runs at 8 MHz. 10 MHz and 12 MHz options are available.

Standard Features:

- 64k,128k, 256k, or 512k battery-backed RAM
- 1 6k, 32k,128k, or 256k EPROM
- Two dedicated RS-232 serial ports
- Two configurable RS-232/RS-485/RS-422 serial ports
- Battery-backed real-time clock
- 24 programmable I/O lines
- Four counter/timers
- SBX interface
- 8-MHz 80186 microprocessor
- All CMOS for low power consumption
- Interrupt processing of serial ports, timer/counters, SBX interface, and STD Bus
- DMA transfers from STD Bus and SBX interface
- 16- and 20-bit STD Bus addressing



CPU-186 Board - Figure E-2

E.3b Specifications

Microprocessor (80186):

- 16-bit external data bus
- Up to 16 MHz operation
- Unlimited external wait state duration
- Zero to three programmed wait states for I/O or memory
- INTO: SBX interrupt
- INT1: STD Bus interrupt
- INT2: Serial interrupt
- INT3: STD Bus INT1 acknowledge
- DMA0: SBX DMA transfer
- DMA1: STD Bus DMA transfer

On-Board Static RAM:

- Word or byte access
- JEDEC standard 28- or 32-pin devices
- Up to 512k bytes
- Minimum battery-backed data retention of five years
- Minimum access time of 150 ns
- Address Range: 0 to 3FFFFH (with up to 256k bytes installed) 0 to 7FFFFH (with 512k-byte RAM option)

On-Board EPROM:

- Word or byte access
- JEDEC standard 28- or 32-pin devices
- Up to 256k bytes
- Minimum access time of 254 ns at 8 MHz
- Address range: C0000H to FFFFFH

STD Bus Memory:

- Byte access only
- 16- and 20-bit addressing
- Up to 1 M byte
- Minimum access time of 207 ns at 8 MHz with no wait states
- Address Range: 40000H to BFFFFH (with up to 256k bytes of on-board RAM) 80000H to BFFFFH (with 512k-byte on-board RAM option)

STD Bus I/O:

- Byte access only
- Minimum access time of 207 ns at 8 MHz with no wait states
- Address range from 0 to 7FFFH with no programmed wait states
- Address range from 8000H to 80FFH with three programmed wait states

SBX Interface:

- Byte access only
- Two module selects
- One DMA acknowledge select

Serial I/O (two DUART's):

- Two dedicated RS-232 serial ports
- Two configurable RS-232/RS-485/RS-422 serial ports
- Asynchronous data rates from 50 baud to 38,400 baud

Programmable I/O (8255):

- 24 parallel I/O lines
- Default to input mode
- Interface direct to Opto-22 rack with 50-pin connector

Real Time Clock (RTC72421):

- Binary coded decimal format
- Seconds, minutes, hours, day of month, month, year, and day of week

Electrical Requirements:

- +5 Vdc at 500 mA
 - +12 Vdc at 30 mA
 - -12 Vdc at 30 mA
 - Operating temperature range from 0° C to 55° C
-

E.3c Functional description

Using the Connectors

I/O connectors are used for serial communication, the STD Bus peripherals, an interface to SBX daughter boards, four timer/counters, and 24 parallel I/O lines.

CPU-186 I/O CONNECTORS	
J1	STD BUS EDGE CONNECTOR
J2	SBX CONNECTOR
J3	RS-232 COM1
J4	RS-232 COM2
J5	RS-232 COM3
J6	RS-232 COM4
J7	RS-85 COM3 OR RS-422 COM3 TxD
J8	RS-485 COM4 OR RS-422 COM3 RxD
J9	COUNTER/TIMER INTERFACE
J10	24 PROGRAMMABLE I/O LINES

Serial channels COM3 and COM4 can be configured for either RS-232 or RS-485/RS-422, but not both. If COM3 is configured for RS-232, then a cable connection is made to J5. If COM3 is configured for RS-485, then a cable connection is made to J7. If COM3 is configured for RS-422, then a cable connection is made to both J7

(TxD) and J8 (RxD) and COM4 must then be configured for RS-232.

Refer to the CPU-186 component layout in paragraph E3.a for connector locations.

The STD Bus manufacturers' group has developed a standard definition of the STD Bus connections and timing for the 8088 family of microprocessors. The CPU-186 follows this standard closely except for two deviations. One is that address lines AS through A10 are not tri-stated during interrupt acknowledge cycles. The other is that MCSYNC is not tri-stated during a BUSRQ period. Neither of these deviations will cause problems for those using general STD Bus peripherals.

The CPU-186 cannot execute programs or attempt word accesses of the STD Bus. The STD Bus is an 8-bit bus end currently there is no accepted standard for 16-bit date transfers. Since instruction fetches can be word accesses, user programs can only be executed from internal memory.

The unused line CNTRL, pin 50 on the STD Bus, is commonly used by CDI for DMA request inputs to STD Bus CPU boards. This is done for the CPU-186.

The chart below illustrates the STD Bus connections with the CPU-186.

STD BUS (J1)**STD BUS INTERFACE FOR CPU-186 STD BUS MASTER**

The CPU-186 is always the STD Bus master. When the STD Bus is enabled by setting output bit 6 (OP6) of the US DUART low, BUSRQ periods are allowed. This allows other STD Bus peripherals to temporarily control the STD Bus. A BUSRQ period is started with a peripheral setting its BUSRQ output low. This will put the 80186 microprocessor in a hold state and disable the STD Bus outputs, except for MCSYNC, CLK and BUSAK. BUSAK going low signals the peripheral the STD Bus is free for use. No CPU-186 peripherals can be accessed by this temporary STD Bus master.

Excessive use of BUSRQ can interfere with the watch-dog timer refresh, which could result in a hardware reset of the CPU-186. Most STD Bus peripherals do not use BUSRQ.

DMA channel 1 is interfaced to the STD Bus CNTRL line. A peripheral setting CNTRL low will enable the DMA request input to DMA channel 1.

SBX Interface (J2)

The Small Bus eXpansion concept was developed by Intel for use with its Multi-Bus I boards. This concept allows inexpensive I/O modules to be added to the main processor board. The SBX

module has become an industry and IEEE standard. The following diagram shows the SBX connections on the CPU-186.

+12	1	+12	-12	2	-12
GND	3	GND	+5	4	+5
RESET	5	RESET	MCLK	6	NC
A3	7	MA2	/MPST	8	GND
A2	9	MA1	RESERVED	10	NC
A1	11	MA0	MINTR1	12	INT0
/WR	13	/IOWRT	MINTR0	14	INT0
/RD	15	/IORD	/MWAIT	16	ARDY
GND	17	GND	+5	18	+5
AD7	19	MD7	/MCS1	20	PCS5
ADO	21	MD6	/MCS0	22	PCS4
AD5	23	MD5	RESERVED	24	NC
AD4	25	MD4	TDMA	26	NC
AD3	27	MD3	OPT1	28	NC
AD2	29	MD2	OPT0	30	NC
AD1	31	MD1	/MDACK	32	PCS6
ADO	33	MD0	MDRQT	34	DRQ0
GND	35	GND	+5	36	+5

SBX INTERFACE CONNECTIONS

RS-232 Serial Interface (J3, J4, J5 and J6)

Up to four active RS-232 channels can be used on the CPU-186. Each channel has its own 14-pin ; Connector which can be connected to a DB-25 connector with a 14-pin ribbon cable to provide Communication with most DTE RS-232 devices.

DB-25 PINS	RS-232 SIGNAL	CPU-186 SIGNAL	CPU-186 J3, J4, J5 OR J6 PINS
1	CHASSIS GND TXD RXD	GROUND	1 2
2		RXD	3 4
3		TXD	5 6
4			7 8
5	CTS	RTS	9 10
6			11 12
7	SIGNAL GND	GROUND	13 14
20			
	DTR	CTS	

J3, J4, J5 AND J6 RS-232 Serial Interface Connectors
Figure E-3

See the Figure E-2 for the physical placement of the RS-232 connectors.

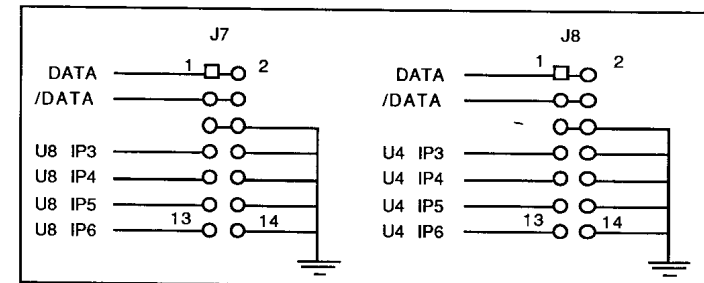
RS-485/RS-422 Serial Interface (J7 and J8)

The RS-485/RS-422 interface connectors are J7 and J8. The cabling for J7 and J8 is illustrated in the figure below. Four DUART input bits are supplied on each connector so that the node address can be hard-wired into the mating connector for remote configuration. To obtain the J7 node address, D3 through D6 of the U8DUART input port must be read at address 811AH. To obtain the J8 node address, D3 through D6 of the U4DUART input port must be read at address 813AH. To avoid conflicts, SF6 must

not be jumpered if the node address is to be configured remotely.

When configured for RS-422, J7 is used for transmit and J8 is used for receive. When configured for RS-485, J7 and J8 are used as independent serial channels.

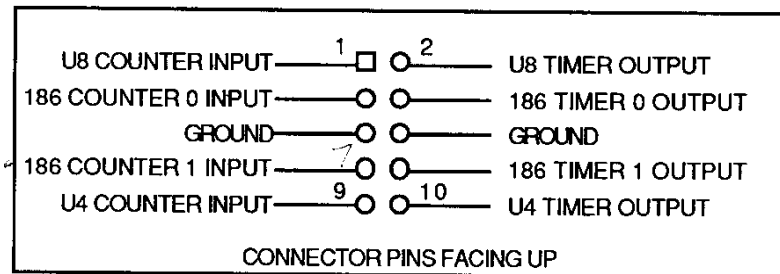
J7 uses the RXDA and TXDA lines from the U8DUART for serial communication. J8 uses the RXDB and TXDB lines from the U8DUART except when RS-422 is selected, and then RXDA is used instead of RXDB. This allows COM port protocols to remain consistent.



J7 and J8 RS-485/RS-422 Connector Interface
Figure E-4

Counter/Timer Interface (J9)

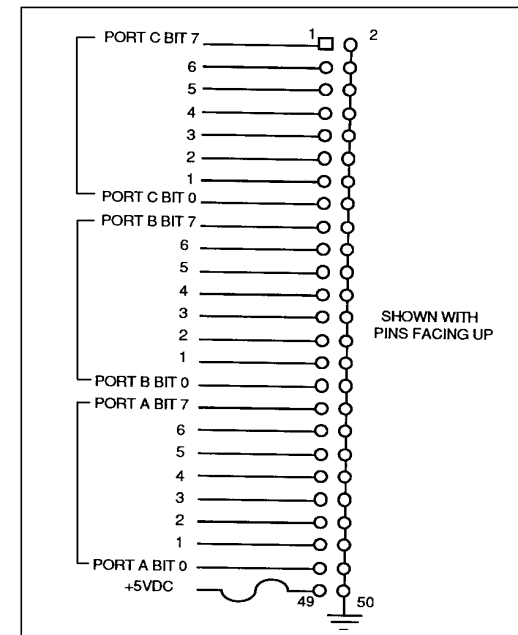
The CPU-186 has four counter/timers. These timer outputs and their corresponding counter inputs are brought to J9. The following illustration shows the pinout of This connector. Counter/timer sources come from the 80186 and the U4 and U8DUARTs.



J9 Counter/Timer Connector Pinout
Figure E-5

Parallel DO (PIO) Interface (J10)

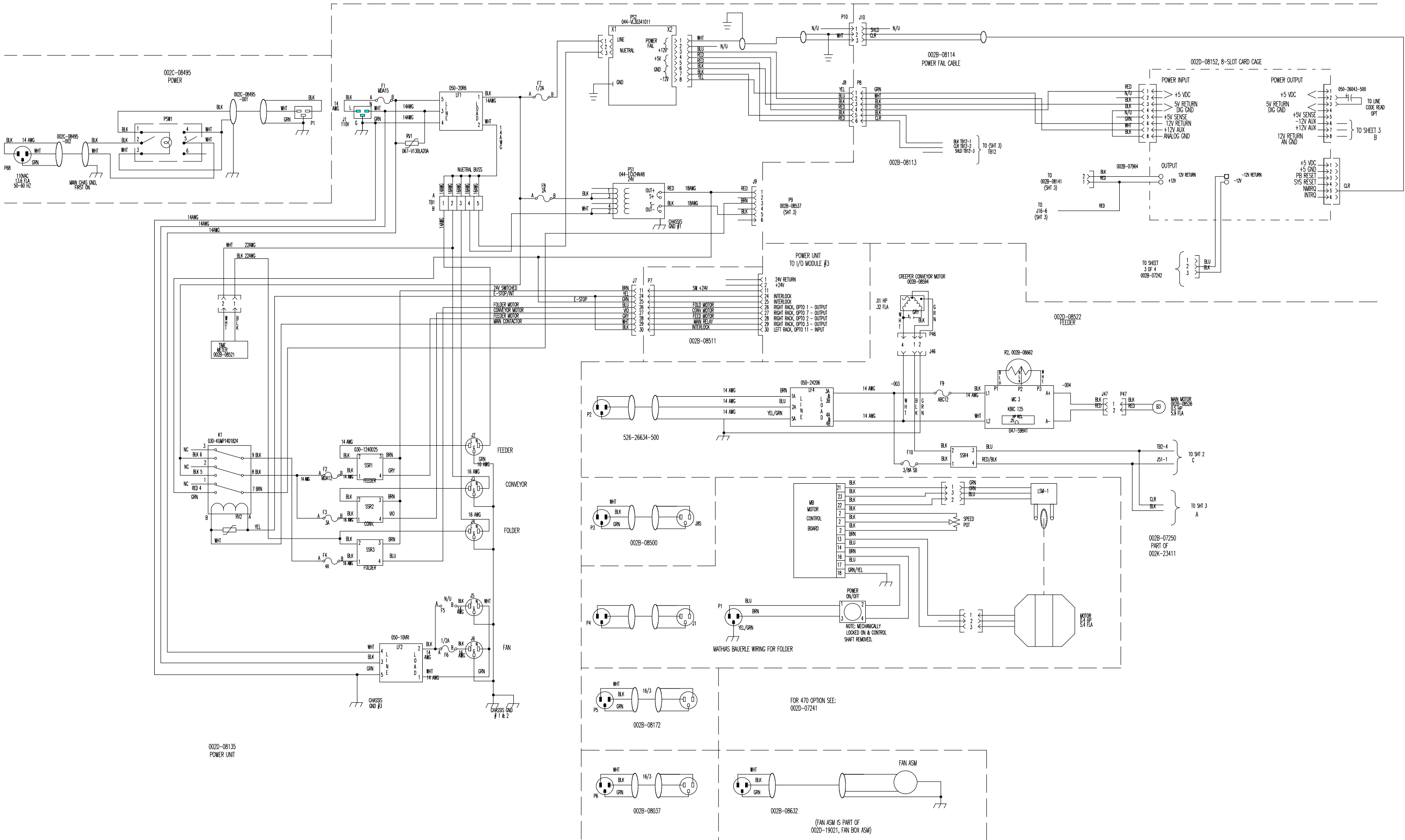
J10 is a 50-pin connector with 24 PIO pins controlled by an on-board 8255. It can be connected directly to an OPTO-22 module with a 50-pin ribbon cable. The following illustrates the pinout of J10.

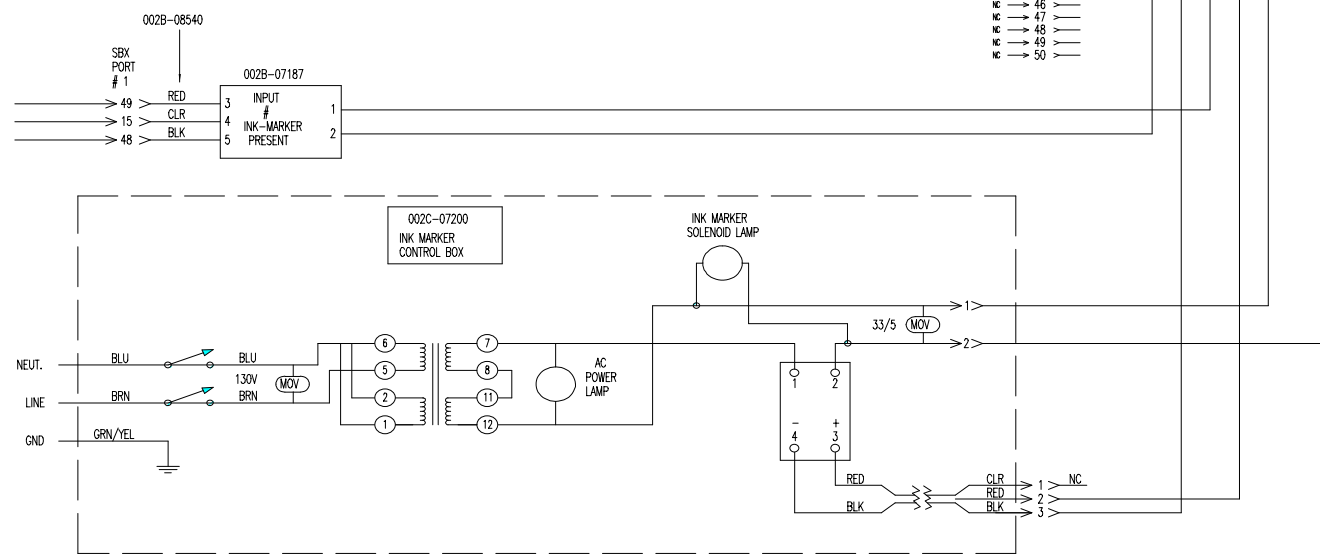
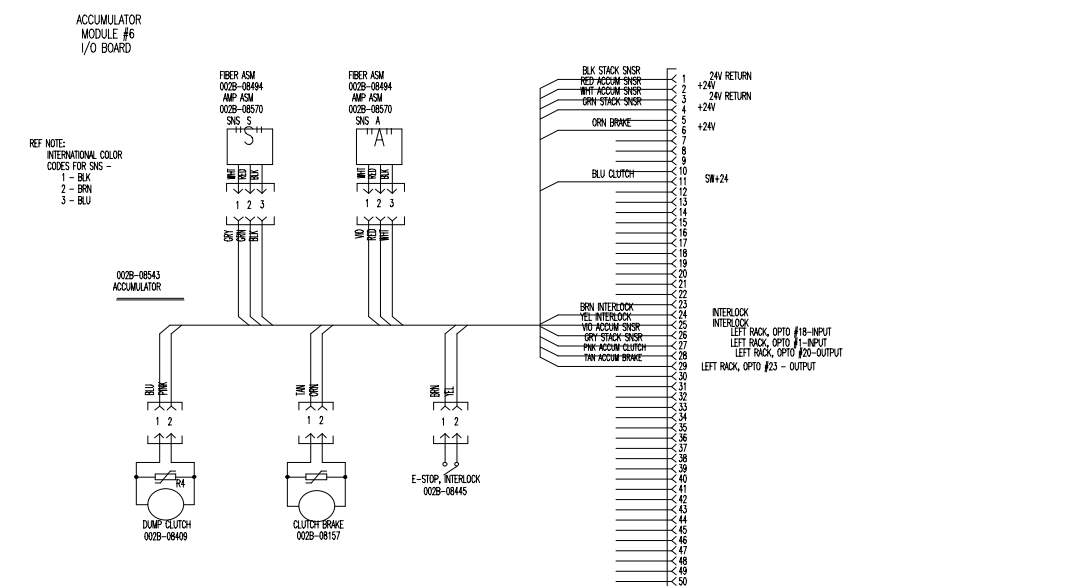
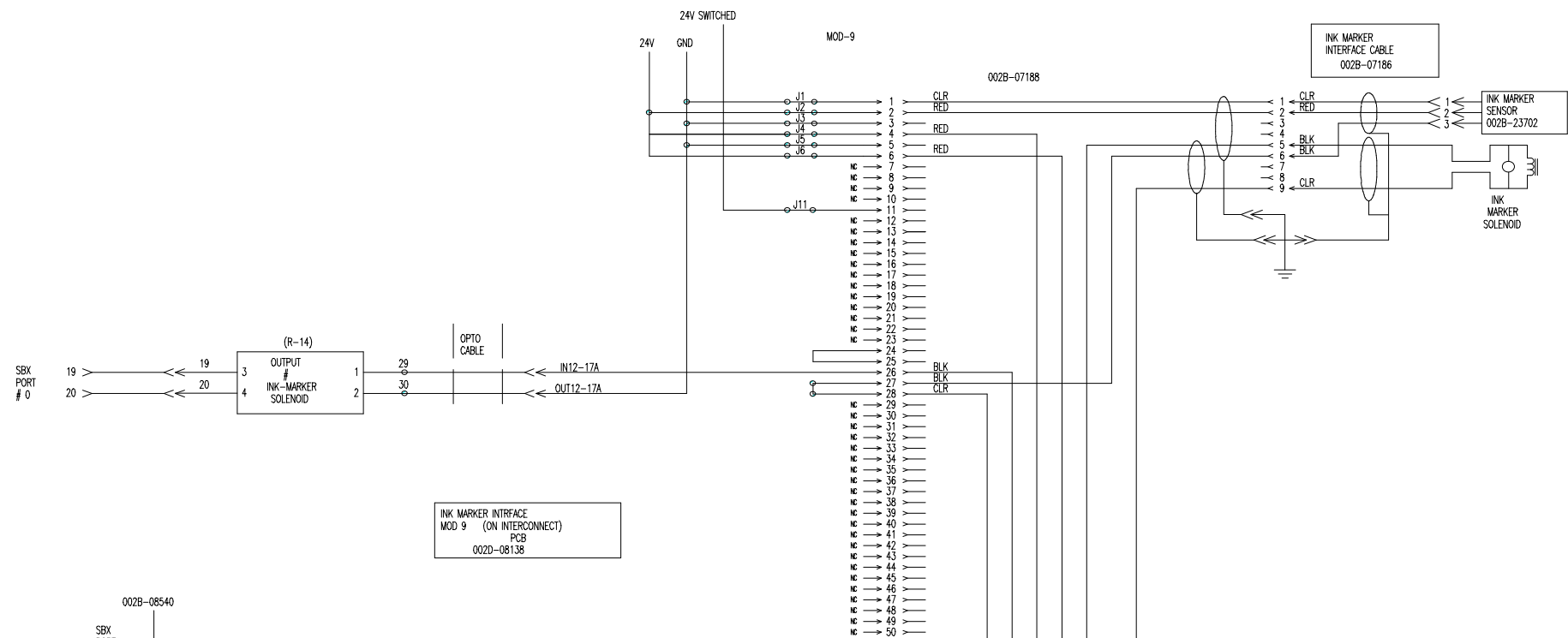
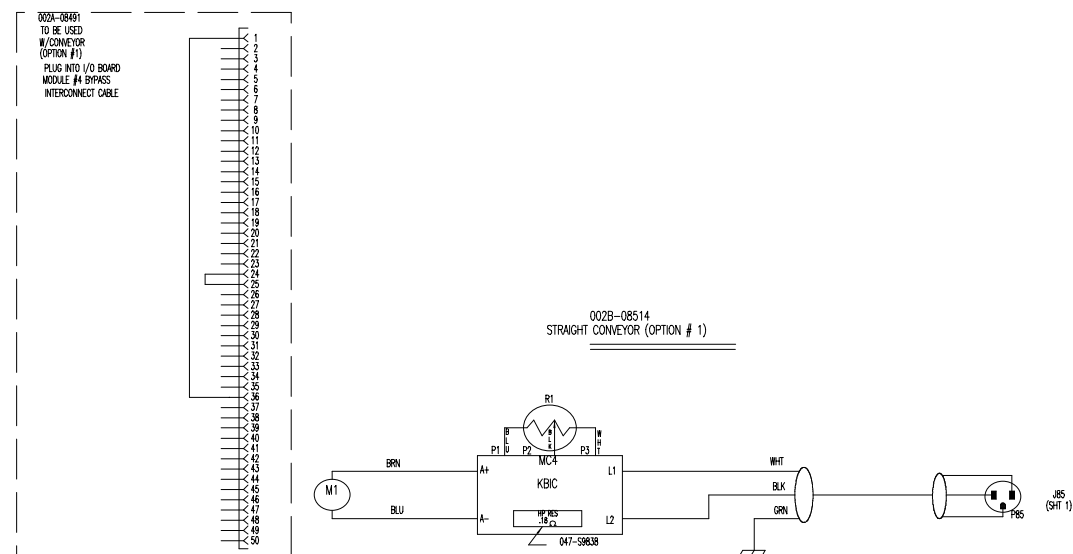
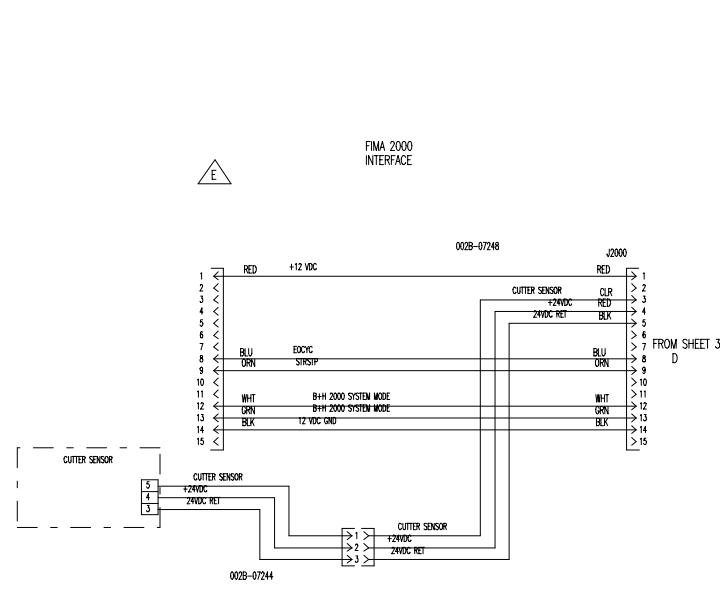


J10 Parallel I/O Connections - figure E-6

SECTION F. MACHINE SCHEMATICS

Schematic	Page
002E-08111 SHEET 1 of 5 Main Power Power Unit Feeder Power Folder Power 8-Slot Card Cage Power	2
002E-08111 SHEET 2 of 5 Keyboard Emergency Stop Feeder Folder	3
002E-08111 Sheet 3 of 5 Opto Racks Display Assembly Inserter Module #7 Cable	4
002E-08111 Sheet 4 of 5 Transfer Conveyor Straight Conveyor FIMA 2000 Interface 470/3208 Feeder Accumulator Ink Marker	5
002E-08111 Sheet 5 of 5 First Page Hold FIMA 2000	6
002K-08133 Sheet 4 of 4 6 Station Inserter	7
002C-07968 Sensor Interconnect Cable	8





NOTES:
1. ALL SWITCHES SHOWN IN NORMAL POSITION.
2. DOT INDICATES ELECTRICAL TIE POINT,
MADE AT TERMINAL BLOCK UNLESS OTHERWISE
NOTED.
3. THESE SENSORS ARE WIRED WITH
REVERSE POLARITY FOR WIDE SELECTION.

ALL POINTS WITH THIS SYMBOL ARE EARTH GND	
THIS SYMBOL ARE MASS GND	
ALL GROUNDS TIE INTO THE MAIN GROUND STUD AND ARE COMMON TO EARTH GND.	

FIMA WIRING IS AN OPTION.
NORMALLY WIRED FOR 470.

TO SHEET 4
D

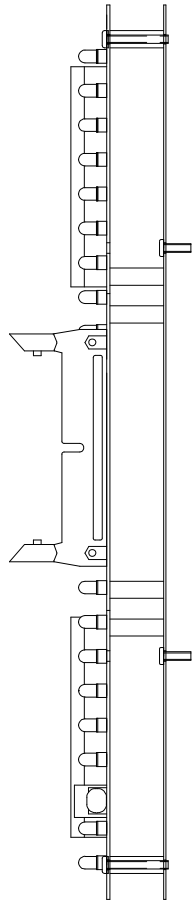
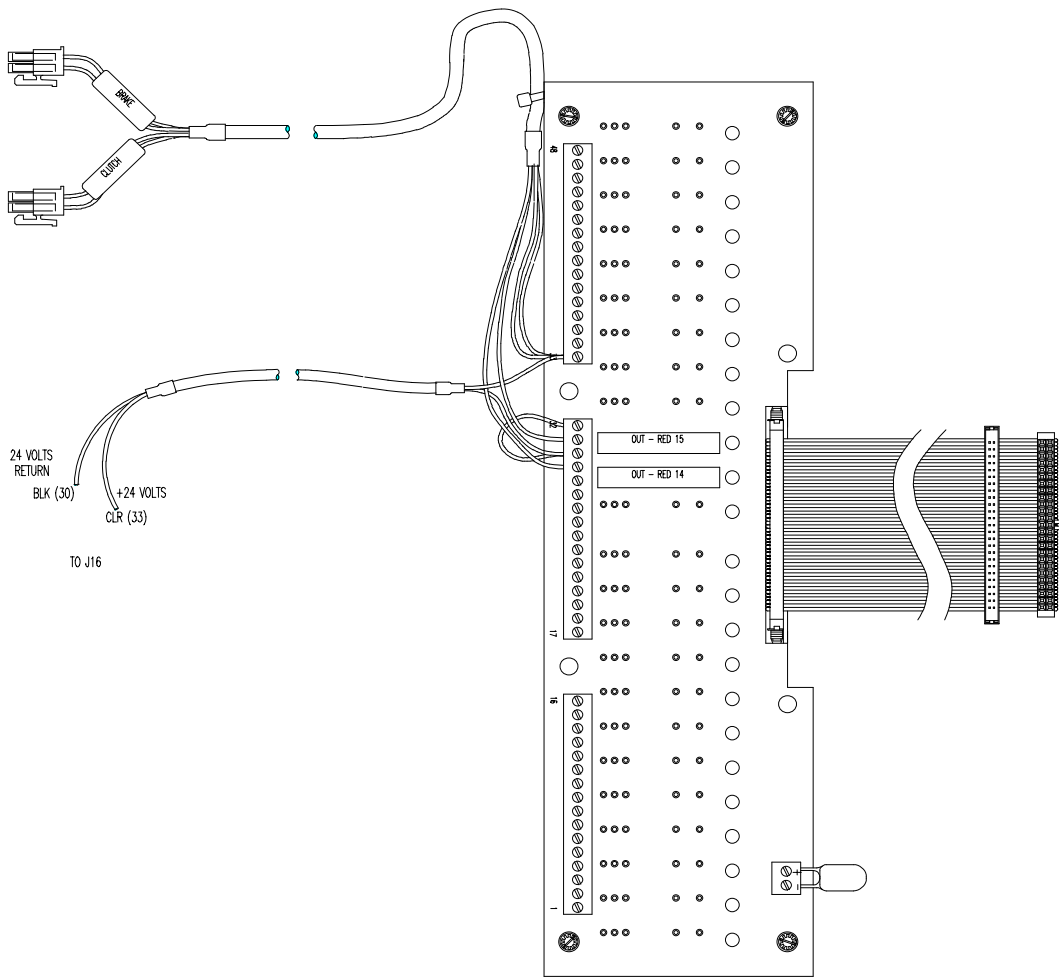
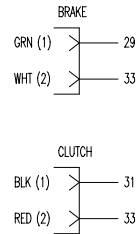
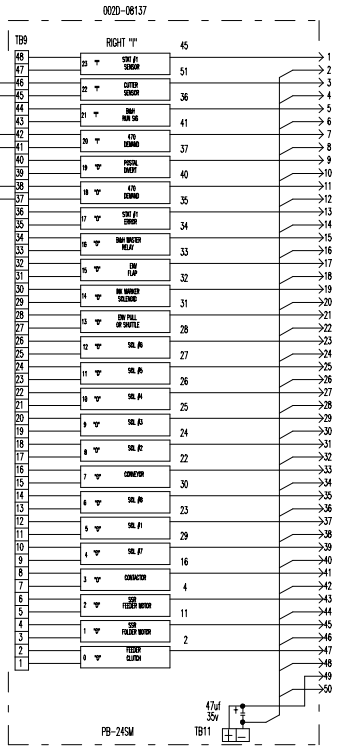
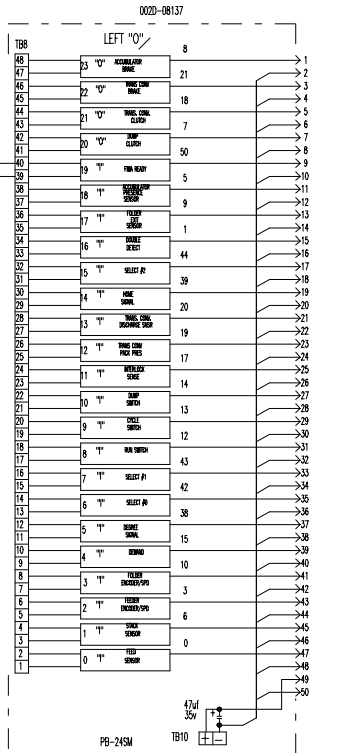
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TO SHEET 1
B

TO SHEET 1
A

8 SLOT CARD CAGE

002B-07250



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Chester Research Park, Chester Ct.		Fac: 203 526-2747		Telephone: 203 526-9561	
TITLE		420/PF300 SCHEMATIC		SHEET 5 OF 5	
MATERIAL		SHEET 5 OF 5			
DRAWN	LFC	DATE	2-10-93	FINISH	
CHECKED		DATE		ASSY TITLE	
APPROVED		DATE		R & D NUMBER	
SCALE	1:1	NO NET SCALE NO DIMS		PART NO.	002E-08111
					REV N

PIGTAIL WIRE COLOR		DESCRIPTION OF CONNECTION	NOTES FOR INSERTERS WITH A.C. CONTROL *SEE NOTE 1	NOTES FOR INSERTERS WITH D.C. CONTROL
1	BLK	CONNECTION BETWEEN STATION 2 CONTROL SWITCH AND STATION 2 SOLENOID – BREAK CONNECTION OTHER SIDE OF CONNECTION BROKEN ABOVE	CONNECT TO SWITCH	CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL, PROBABLY SWITCH
2	BRN		CONNECT TO SOLENOID	CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL, PROBABLY SOLENOID
3	RED	CONNECT THESE TWO WIRES IN SERIES WITH STATION 2 ERROR DETECT SWITCH		CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL
4	ORN		CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL	
5	YEL	CONNECTION BETWEEN STATION 3 CONTROL SWITCH AND STATION 3 SOLENOID – BREAK CONNECTION OTHER SIDE OF CONNECTION BROKEN ABOVE	CONNECT TO SWITCH	CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL, PROBABLY SWITCH
6	GRN		CONNECT TO SOLENOID	CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL, PROBABLY SOLENOID
7	BLU	CONNECT THESE TWO WIRES IN SERIES WITH STATION 3 ERROR DETECT SWITCH		CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL
8	VIO		CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL	
9	GRY	CONNECTION BETWEEN STATION 4 CONTROL SWITCH AND STATION 4 SOLENOID – BREAK CONNECTION OTHER SIDE OF CONNECTION BROKEN ABOVE	CONNECT TO SWITCH	CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL, PROBABLY SWITCH
	WHT		CONNECT TO SOLENOID	CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL, PROBABLY SOLENOID
	WHT/BLK	CONNECT THESE TWO WIRES IN SERIES WITH STATION 4 ERROR DETECT SWITCH		CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL
	WHT/BRN		CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL	
	WHT/RED	CONNECTION BETWEEN STATION 5 CONTROL SWITCH AND STATION 5 SOLENOID – BREAK CONNECTION OTHER SIDE OF CONNECTION BROKEN ABOVE	CONNECT TO SWITCH	CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL, PROBABLY SWITCH
	WHT/ORN		CONNECT TO SOLENOID	CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL, PROBABLY SOLENOID
	WHT/YEL	CONNECT THESE TWO WIRES IN SERIES WITH STATION 5 ERROR DETECT SWITCH		CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL
	WHT/GRN		CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL	
	WHT/BLU	CONNECTION BETWEEN STATION 6 CONTROL SWITCH AND STATION 6 SOLENOID – BREAK CONNECTION OTHER SIDE OF CONNECTION BROKEN ABOVE	CONNECT TO SWITCH	CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL, PROBABLY SWITCH
	WHT/VIO		CONNECT TO SOLENOID	CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL, PROBABLY SOLENOID
	WHT/GRY	CONNECT THESE TWO WIRES IN SERIES WITH STATION 6 ERROR DETECT SWITCH		CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL
	WHT/BLK/BRN		CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL	
	WHT/BLK/RED	CONNECT TO A POINT IN THE CIRCUIT THAT WILL GENERATE A MACHINE ERROR WHEN GROUNDED		
	TAN	CONNECTION BETWEEN MOISTENER CONTROL SWITCH AND MOISTENER SOLENOID – BREAK CONNECTION OTHER SIDE OF CONNECTION BROKEN ABOVE	CONNECT TO SWITCH	CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL, PROBABLY SWITCH
	PNK		CONNECT TO SOLENOID	CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL, PROBABLY SOLENOID
	WHT/BLK/GRN	CONNECTION BETWEEN FLAP DETECT ERROR CIRCUIT AND GROUND – BREAK CONNECTION OTHER SIDE OF CONNECTION BROKEN ABOVE – MUST BE CIRCUIT GROUND *SEE NOTE 2		CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL
	WHT/BLK/BLU		MUST BE CIRCUIT GROUND	
	WHT/BLK/VIO	CONNECTION BETWEEN ENVELOPE CONTROL SWITCH AND ENVELOPE SOLENOID – BREAK CONNECTION OTHER SIDE OF CONNECTION BROKEN ABOVE – MUST BE CIRCUIT GROUND	CONNECT TO SWITCH	CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL, PROBABLY SWITCH
	WHT/BLK/GRY		CONNECT TO SOLENOID	CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL, PROBABLY SOLENOID
	WHT/BLK/YEL	CONNECT THESE TWO WIRES ACROSS A POINT IN THE CIRCUIT THAT WILL PROVIDE VOLTAGE WHEN THE INSERTER IS RUNNING		CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL
	WHT/BLK/ORN		CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL	
	WHT/BLK/RED	CONNECTION BETWEEN STATION 1 CONTROL SWITCH AND STATION 1 SOLENOID – BREAK CONNECTION OTHER SIDE OF CONNECTION BROKEN ABOVE *SEE NOTE 3	CONNECT TO SWITCH	CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL, PROBABLY SWITCH
	RED/BLK		CONNECT TO SOLENOID	CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL, PROBABLY SOLENOID
	RED/YEL	CONNECT THESE TWO WIRES IN SERIES WITH STATION 1 ERROR DETECT SWITCH *SEE NOTE 3		CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL
	RED/GRN		CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL	
	WHT/BLK/BLK	NO CONNECTION		
	WHT/RED/RED	1		
	WHT/RED/BLK	3		
	WHT/RED/GRN	2		

* NOTE 1 – GENERAL NOTE FOR INSERTERS WITH A.C. CONTROL – CONTROL VOLTAGES MUST BE 12–280VAC.

* NOTE 2 – ASSUMES THAT FLAP DETECT CIRCUIT CONNECTS TO CIRCUIT GROUND TO CREATE AN ERROR.

* NOTE 3 – ONLY MAKE STATION 1 CONNECTIONS IF 420/PF300 IS NOT LOCATED AT STATION 1, I.E. OPEN ENDED.

002C-07968

SENSOR INTERCONNECT CABLE

SECTION G. INSTALLATION

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G.6	SETUP OF DEMAND SWITCH	7

The 420 is designed to be run on-line with the inserter. It can be docked to any of the insert stations, however, station #1 is preferable. Before the 420 may be mated up to the Inserter there are a few pieces on the Inserter which need to be removed or repositioned. The parts to be removed are the hopper side and rear plates, T-plate, and insert cushion cup. The singulator finger and cushion cup mount must be repositioned. A demand switch must be added to the Inserter.

These changes may be done once and left that way so the 420 may be used again without going through them each time. If this is done however, this station will not be usable in normal operation.

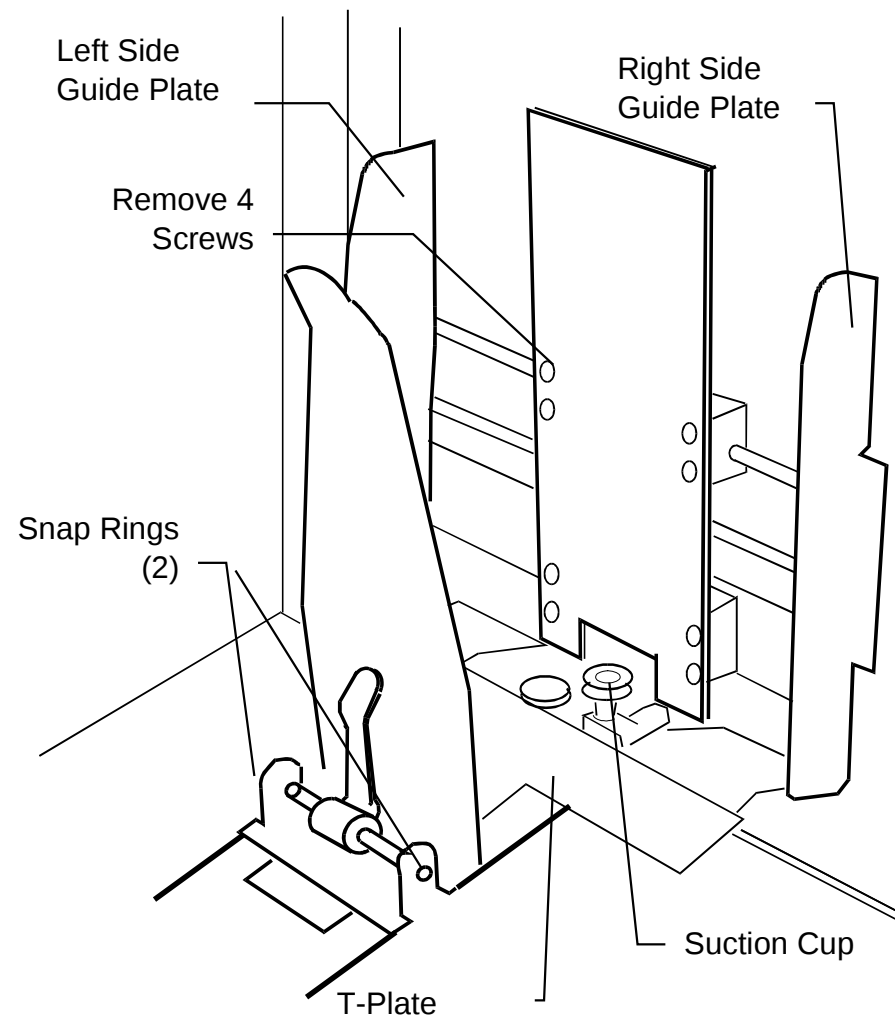
G.1 REMOVAL OF HOPPER SIDE PLATES

NOTE: View of Fig. G-1 is from 420 side of inserter.

1. Remove four screws holding side plate adjustment shaft blocks.
2. Remove shaft E-clips.
3. Unlock right side plate and slide off end of shaft.
4. Slide left side plate out to end of shaft (near adjustment knob). The shaft and side plate now may be removed (you may find it necessary to turn the plate and shaft to free it from the inserter).

G.2 REMOVE HOPPER GUIDE

1. Remove cover directly behind insert station.
2. Unlock mount, remove outer snap rings.
3. Slide shaft to right, the left side mounting bracket will drop down under the inserter deck.
4. Slide shaft to left, the right side bracket will drop.
5. Remove rear plate. Remove two phillips head screws holding T-plate in place, remove T-plate.

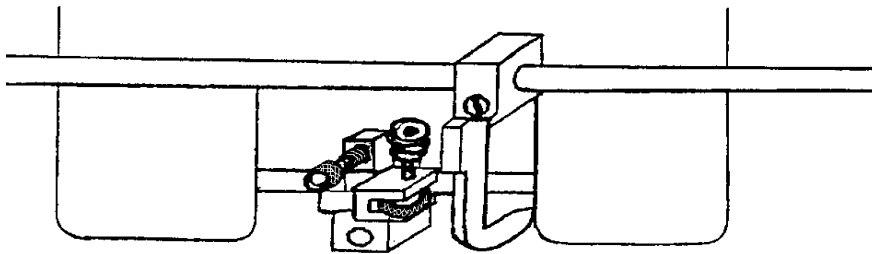


Inserter Hopper - Figure G-1

G.3 REMOVE SINGULATOR FINGER

NOTE: View of Fig. G-2 is from opposite side of inserter.

1. Cycle the inserter so that the gripper arm is at its furthest point from hopper area.
2. Loosen singulator finger, then rotate it away from hopper and to right.
3. Remove suction cup. Loosen the cup mount and swing it down away from the hopper area. Do not tighten yet.
4. Jog the inserter slowly through one cycle, observing mount closely. You will notice that as the mount swings downward it will bottom against the shaft behind it. If it does not, swing mount further down and cycle the inserter again.



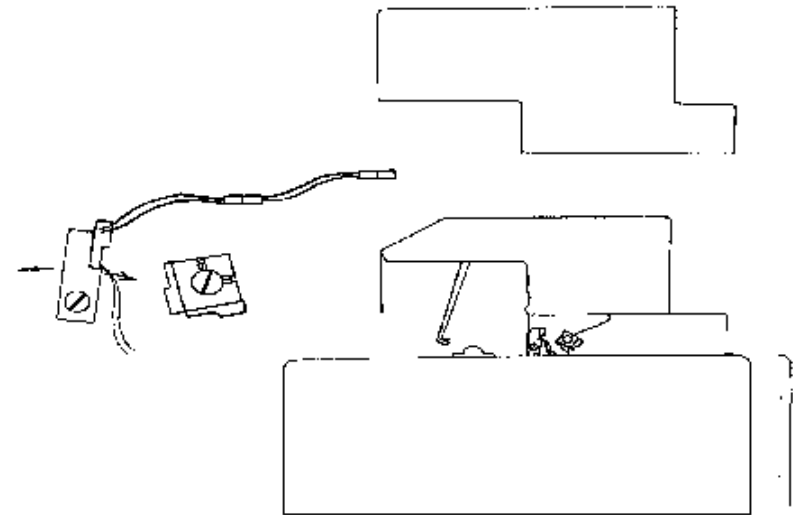
Singulator Finger - Figure G-2

G.4 420 INTERFACE COUPLING

The machine is designed to permit the operator to connect the 420 directly to the inserting device. The output is conveyed to the inserting device by an articulated conveyor arm. The arm places the document directly in position for the inserter's gripper arm to pull the document out of the conveying arm and place it directly onto the track of the inserter.

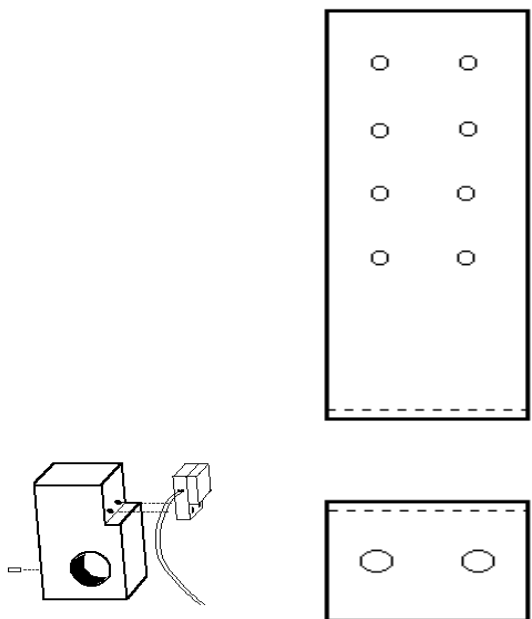
Orientation: As viewed from operator area of inserter.

1. Gain access to shafts located under cover to the right of station 1, at table height.
2. Jog inserter so gripper arms are moving towards insert stations: stop when vertical.



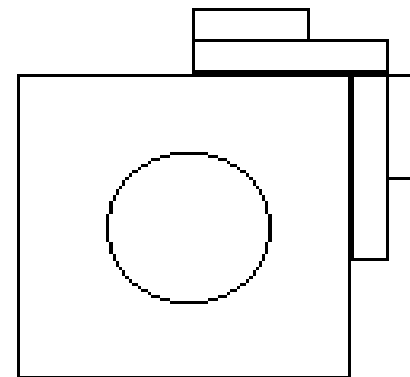
Gripper Arms Orientation to 420 - Figure G-3

-
3. Install switch block on small shaft, with the switch to the top, rear. Looking end on, block should have 5 degree tilt towards other shaft. If shaft is not long enough use universal bracket, on outer frame cover, or deck.



Switch Block and Bracket - Figure G-4

4. Install double magnet block on large shaft. NOTE: Do not tighten yet: snug one screw.
5. Turn on the 420, press the following keys on the operator keypad: TEST, >>, ENTER, ENTER



Magnetic Block - Figure G5

6. You are now in the input test section. Connect demand switch to the provided cable from the 420 output conveyor.
7. Jog inserter to rotate magnet block assembly. Desired timing is when the demand input (420 display) goes on when the grip arm is one insert from output conveyor while moving away, adjust position of magnet block to accomplish this. When satisfied with the timing, tighten all set screws.

G.5 TRANSFER CONVEYOR ADJUSTMENTS

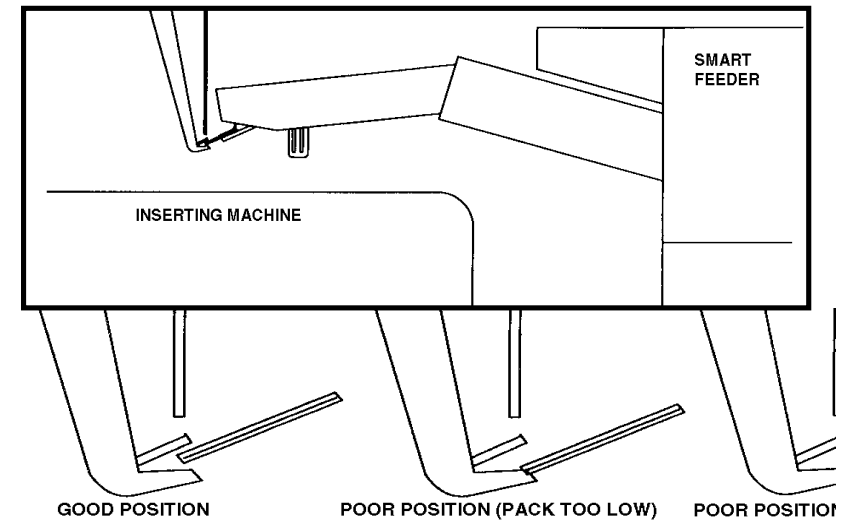
G.5a Package overhang at last station

When a package is being presented to the gripper arm (last station of the Transfer conveyor) the package should have only the Trailing edge of the folded document held by the flat green belts. Positioning the trailing edge of the document even with the center line of the lower-most forward shaft accomplishes the desired document position.

When the gripper arm removes a package from the Transfer conveyor the flat green belts of the Transfer conveyor will creep if more than 3/4 of inch of the package is being pinched by the flat green belts. The creeping of the flat green belts will cause the packages to become improperly spaced in the Transfer conveyor.

G.5b Position of the outfeed guides

It is recommended that the Transfer conveyor arm be positioned parallel to the deck of the inserter and it should be close enough to the deck so the outfeed guides do not need to drastically deflect the folded document. This will help prevent the flat green belts from creeping and ease the extraction force required to remove the folded document.



Gripper Arms Orientation to 420 - Figure G-6

G.5c Fold quality

Constant fold quality is required or the package size can vary enough to cause the Transfer conveyor packages to be improperly positioned in the conveyor.

G.5d If a package spacing problem occurs

If package spacing problems occur in the Transfer conveyor it should be purged of all the remaining documents in it. This will insure that documents will be properly positioned.

G.5e Configuration of Exit sensor module

The Exit sensor module on the Transfer conveyor has an “active state” selection switch on it. This switch can set to LIGHT ON or LIGHT OFF. The proper position for the switch is LIGHT ON.

Note: This active state setting is the opposite to most of the other sensor modules on the 420.

G.5f Testing of the exit sensor

The Exit sensor on a 420 creates an interrupt to the control card. This interrupt is what permits accurate position of packages on the Transfer conveyor. Testing that the interrupt is seen is done in the following manner.

1. Clear Transfer conveyor of all documents
2. Place a folded document approximately 1/2 inch before the Exit sensor on the Transfer conveyor.

Note: Be sure the inserter is running to supply a Demand signal.

3. Run the 420 and command the machine to Dump.

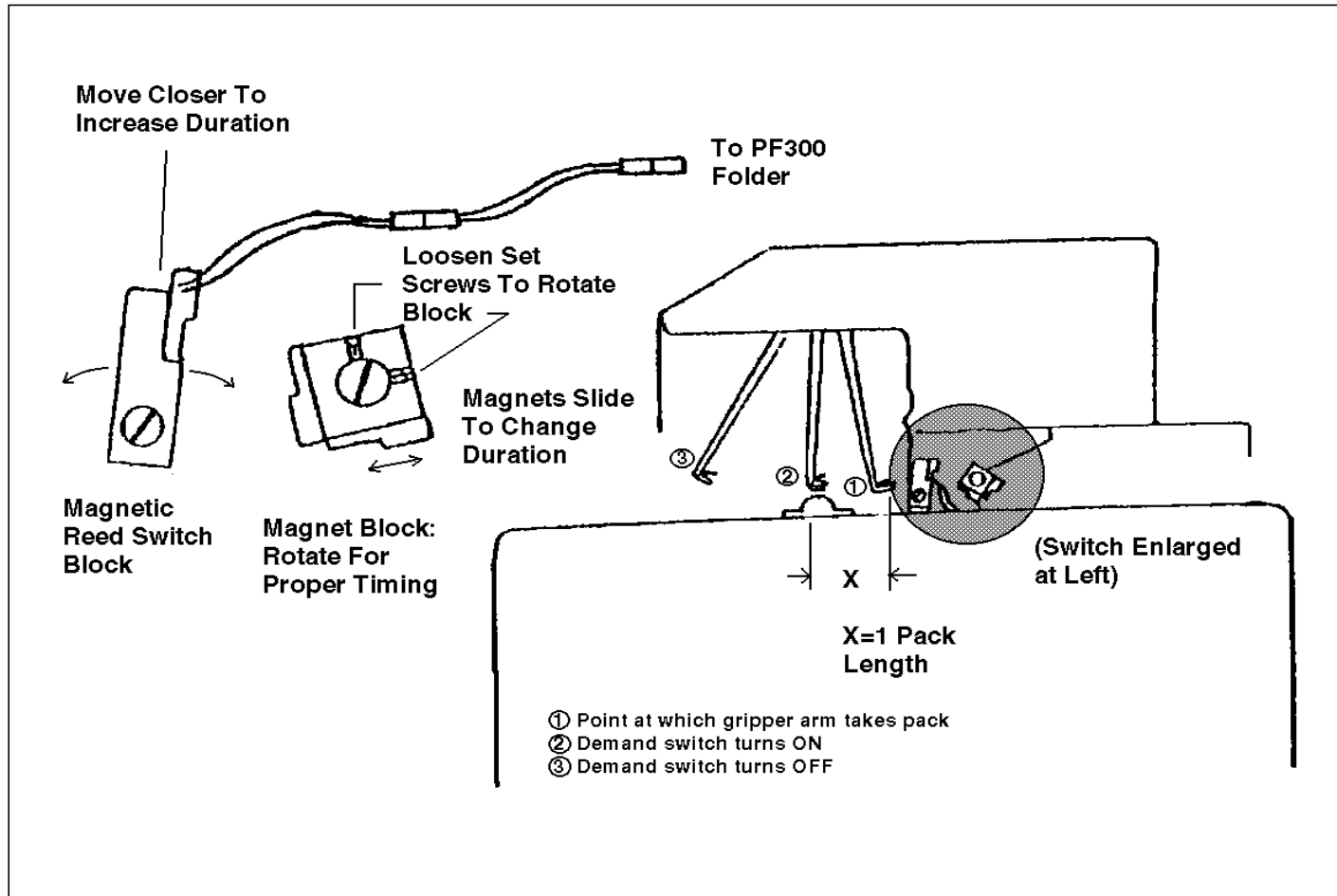
4. The Transfer conveyor will index in response to the Dump command. If the package that was placed just before the exit sensor stops at the discharge end of the Transfer conveyor the interrupt is being seen by the control card. However if the document is throughout the end of the Transfer conveyor then the interrupt is not being seen by the control card.

Note: The Interrupt signal enters the Control card CPU-186 at header J9. The signal comes from J10: a 50-pin, in-line ribbon cable header.

G.6 SETUP OF DEMAND SWITCH

Demand switch on/off timing is critical. The setup of this timing permits the 420 to achieve a good interface to the Inserting machine.

The Demand switch should turn on (contacts closed) when the Gripper arm is approximately perpendicular to the deck of the Inserter. The Demand switch should then turn off (contacts open) as the Gripper arm completes it's backwards motion and starts moving toward the Transfer conveyor.



Demand Switch Adjustment - Fig. G.7

SECTION H - MISCELLANEOUS

H.1 Service Bulletins

n/a

H.2 Purchased Components Manuals

Model 30 Hardware Operations Manual

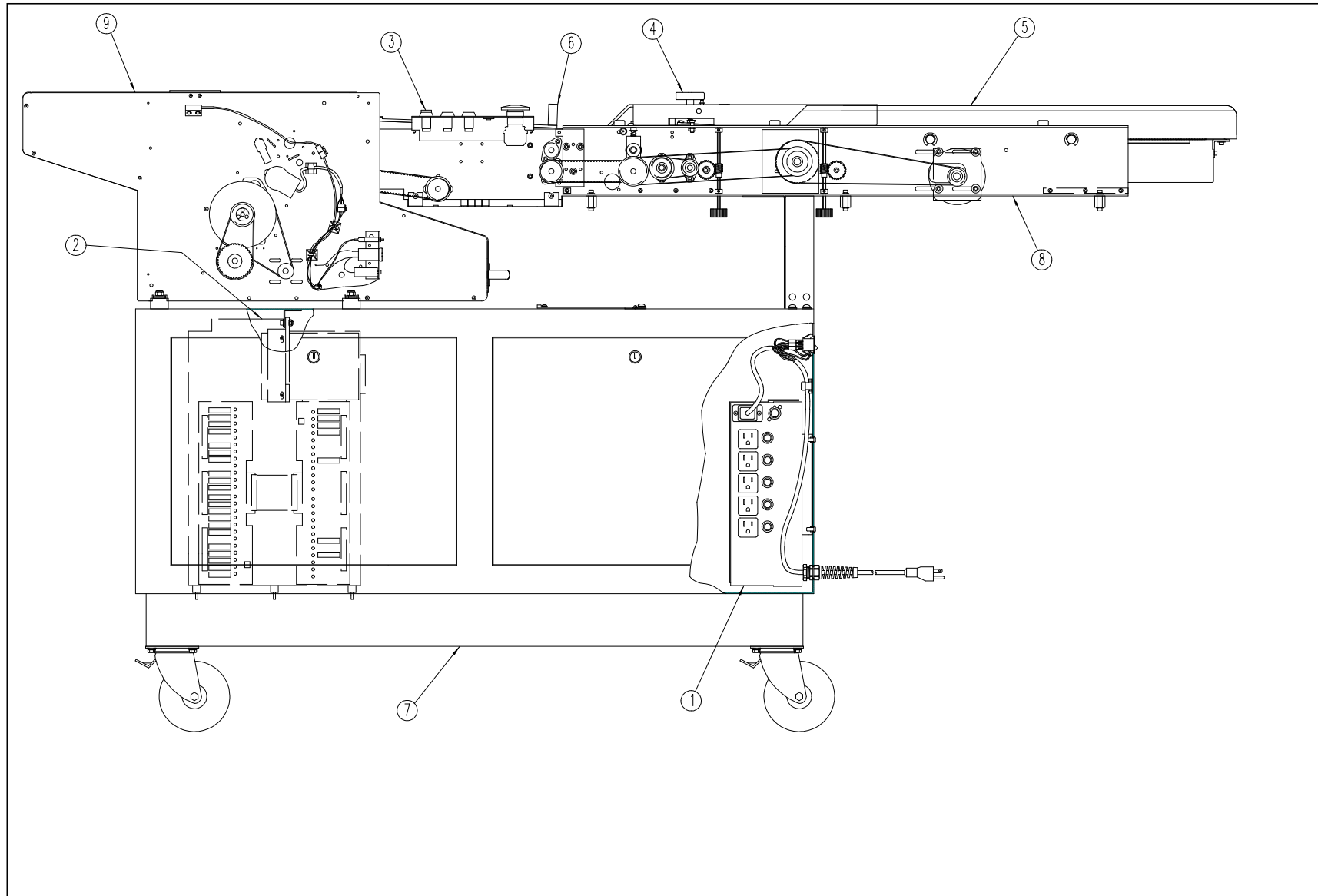
The Accu-Sort® Model 30 Scanner is used to read bar code. SmartFeeder machines with bar code capabilities are shipped with the Model 30 Scanner manual from Accu-Sort® Systems, Inc. 511 School House Road, Telford, PA 18969

NOTES:

SECTION I – PARTS

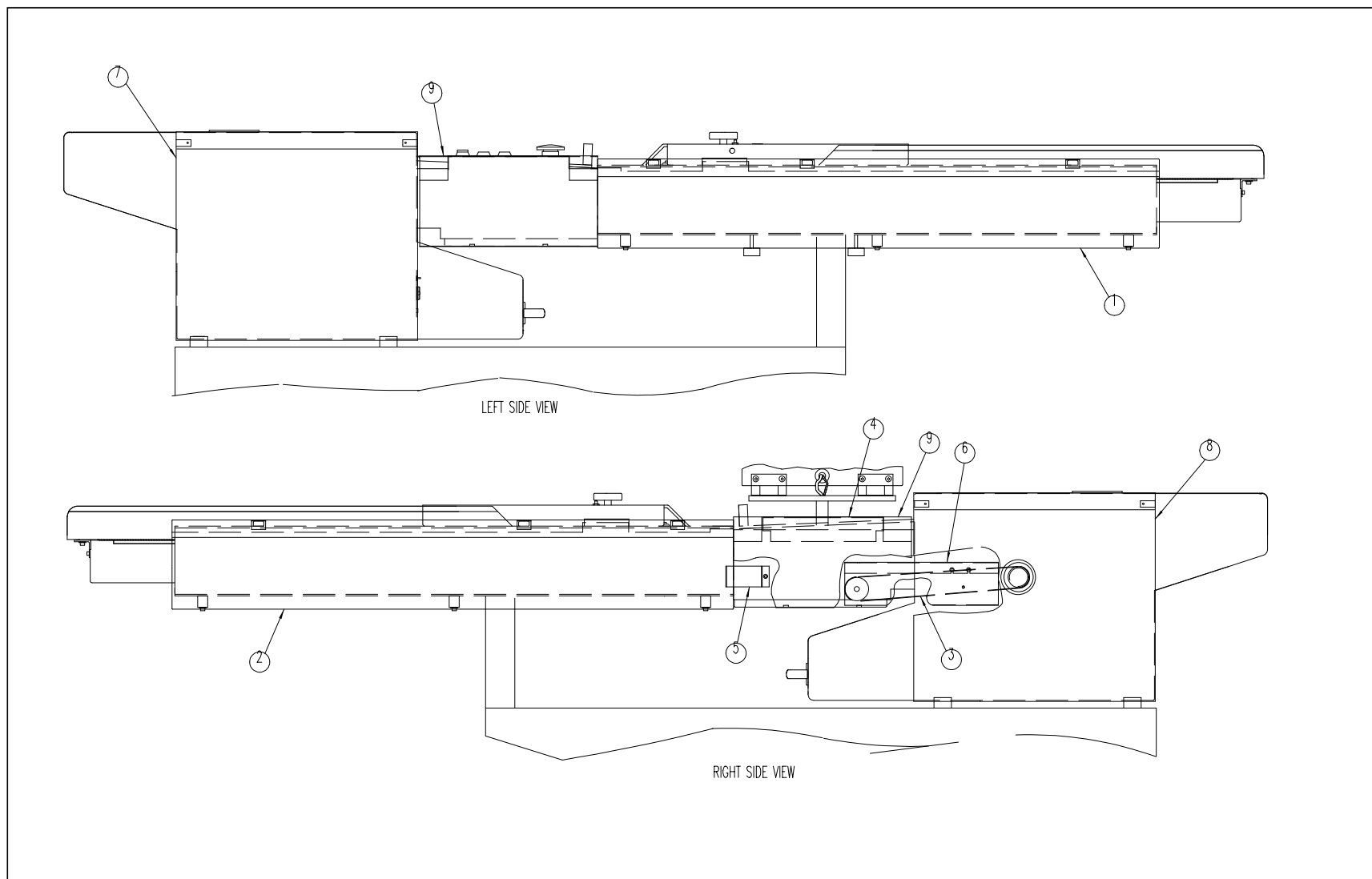
001D-19045, SMART FEEDER FOLDER TOP ASSEMBLY.....	2
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389-26066-400, INK MARKER KIT	76

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001D-19045, SMART FEEDER FOLDER TOP ASSEMBLY

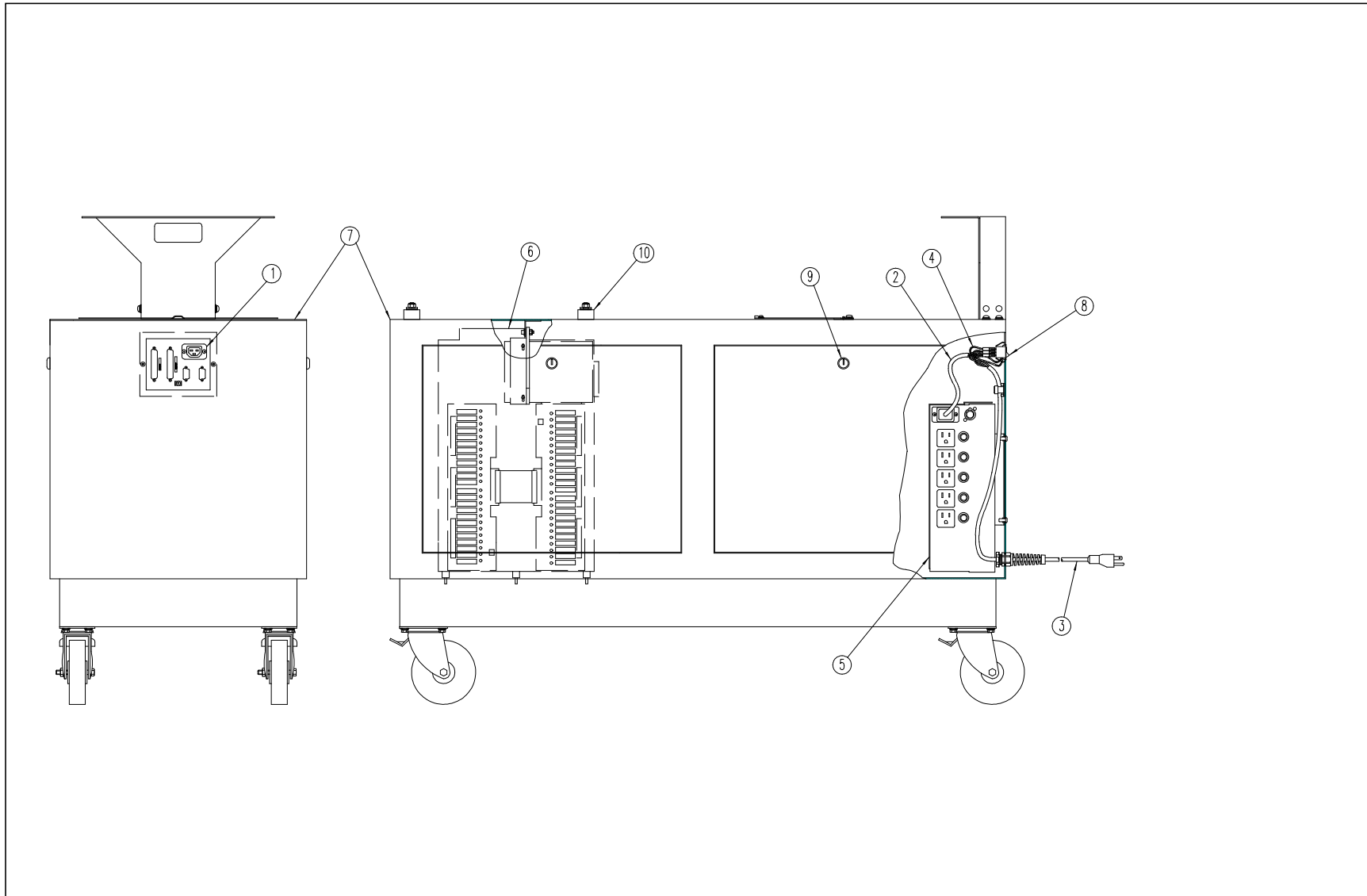
001D-19045, SMART FEEDER FOLDER TOP ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	002D-08135	POWER UNIT A/C BOX
2	002D-08137	CONTROL PANEL
3	002D-08156	KEYBOARD
4	002D-16435	SINGULATOR
5	002D-17505	CREEPER CONVEYOR
6	002D-19017	ACCUMULATOR
7	002E-19046	CABINET
8	002D-19047	FEEDER
9	002D-19048	FOLDER

001D-19045, SMART FEEDER FOLDER COVER ASSEMBLY

001D-19045, SMART FEEDER FOLDER COVER ASSEMBLY

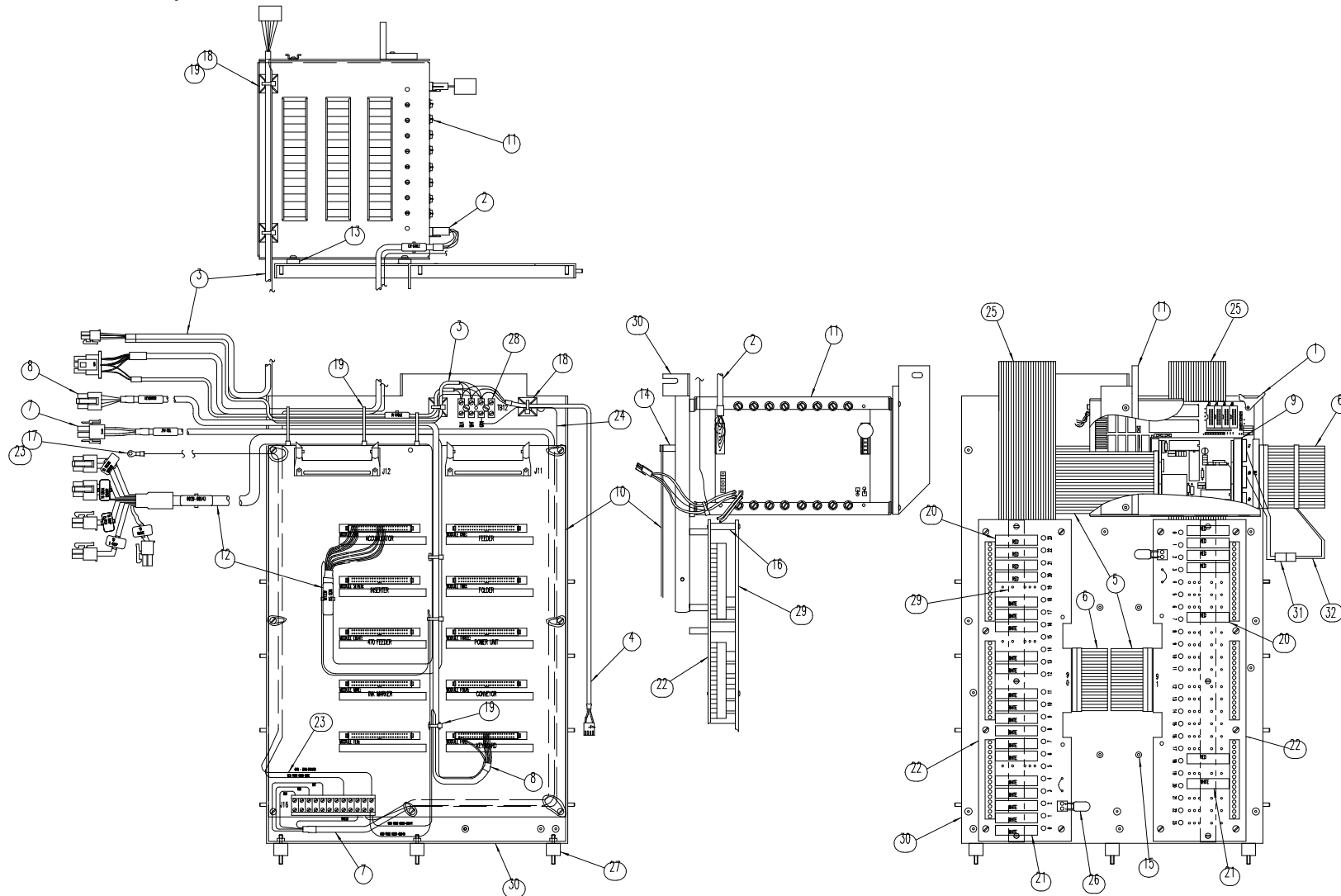
INDEX	PART NUMBER	DESCRIPTION
1	002D-18033	LEFT FEEDER COVER
2	002D-18034	RIGHT FEEDER COVER
3	113-20028003701	BELT,TIMING
4	600B-18780	FILL COVER,ACCUMULATOR
5	600B-20738	ROLLER COVER
6	600C-20707	BELT COVER
7	186-032029977	LEFT FOLDER COVER
8	186-032029976	RIGHT FOLDER COVER
9	600D-18779	ACCUMULATOR SIDE COVER

002E-19046, CABINET ASSEMBLY

002E-19046, CABINET ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	002C-07722	ADAPTER PLATE ASSEMBLY
2	002C-08495-001	POWER CABLE
3	002C-08495-002	POWER CABLE
4	002C-08495-005	POWER CABLE
5	002D-08135	POWER UNIT ASSEMBLY
6	002D-08137	CONTROL PANEL ASSEMBLY
7	005-25960-500	CABINET
8	041-4LTGU0511TR	ROCKER SWITCH
9	172-CR7300	LOCK WITH KEY
10	173-10Z2314C	VIBRATION MOUNT

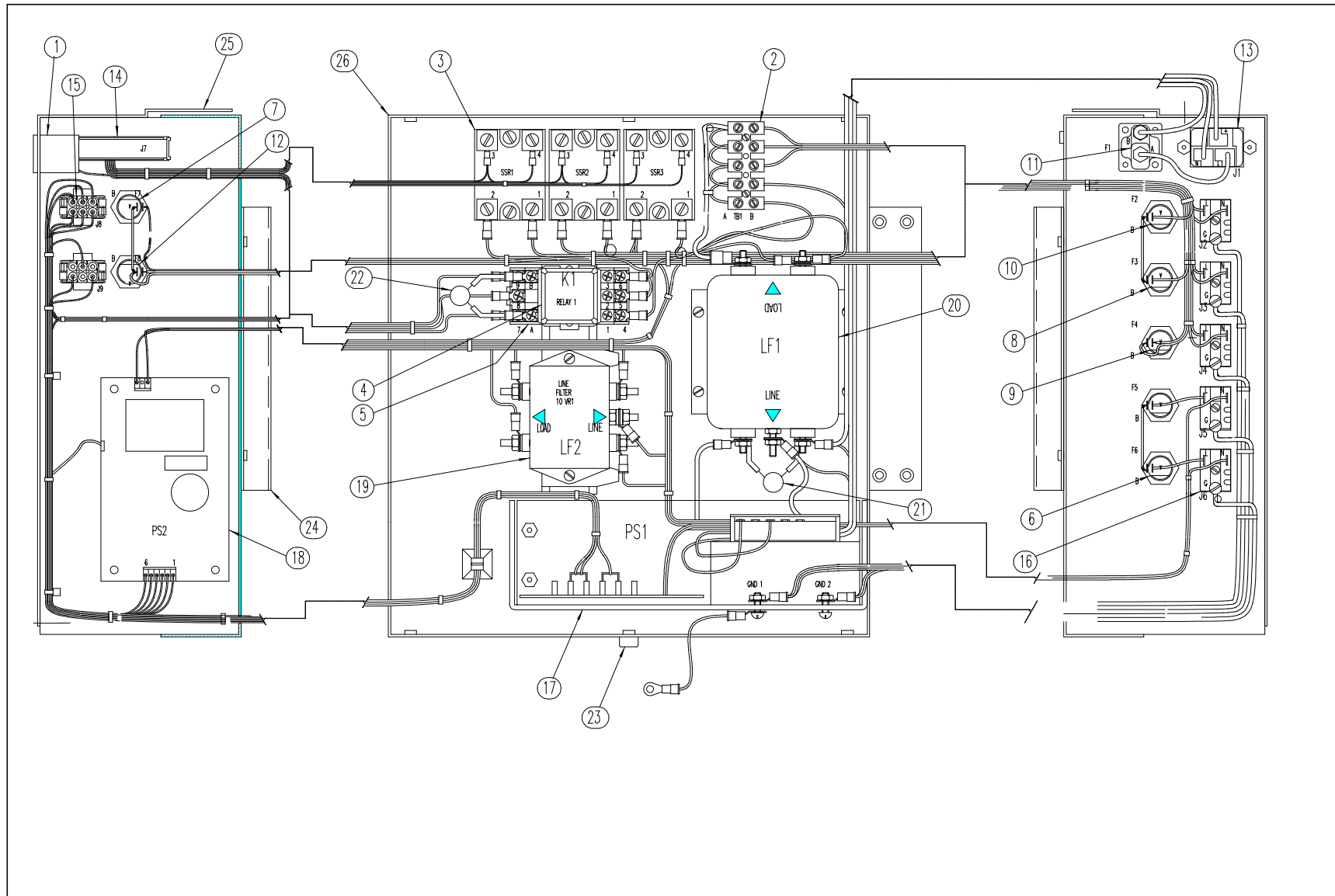
002D-08137, CONTROL PANEL ASSEMBLY 002D-08137, CONTROL PANEL ASSEMBLY



INDEX PART NUMBER DESCRIPTION

1	002B-08076B	CPU-186 BOARD
2	002B-08113	P8 CABLE ASSEMBLY
3	002B-08505	DISPLAY TO CPU 5V CABLE
4	002B-08523	READER 5V CABLE
5	002B-08524	CABLE 91 ASSEMBLY
6	002B-08525	CABLE 90 ASSEMBLY
7	002B-08537	P9 CABLE ASSEMBLY
8	002B-08541	KEYBOARD CABLE
9	002C-08106	SBX I/O & SECURITY KEY CARD
10	002D-08138	INTERCONNECT BOARD ASM
11	002D-08152	8 SLOT CARD CAGE ASM
12	002D-08543	ACCUMULATOR CABLE
13	020-RA025C0803	SPACER,ROUND,.187 LONG
14	020-RN00620416	STANDOFF,ROUND,1" LONG
15	020-RN00620425	STANDOFF,ROUND,#6-32 X 1.56
16	020-RN00820416	STANDOFF,ROUND,1" LONG
17	025-A218VN	RING,LUG,#8
18	026-ABMMA	TY-WRAP ANCHOR
19	026-PLM1M	TY-WRAP
20	030-SMODC5	MODULE (RED)
21	030-SMIDC5	MODULE (WHITE)
22	042-PB24SM	I/O BOARD,PB24-SM
23	045-018135	WIRE,18 AWG,GREEN
24	045-222135	WIRE,22 AWG,GREEN
25	046-4285011B	CABLE,RIBBON,28 GA,50 COND
26	051-0476350	CAPACITOR,47uf,35V
27	173-VBM1062	RUBBER MOUNT
28	600A-17923	TERMINAL BLOCK
29	600B-22454	OPTO RACK BAR
30	600D-19050	PANEL
31	002B-07725	ENCODER INTERRUPT CABLE
32	002B-08002	ENCODER INTERRUPT CABLE

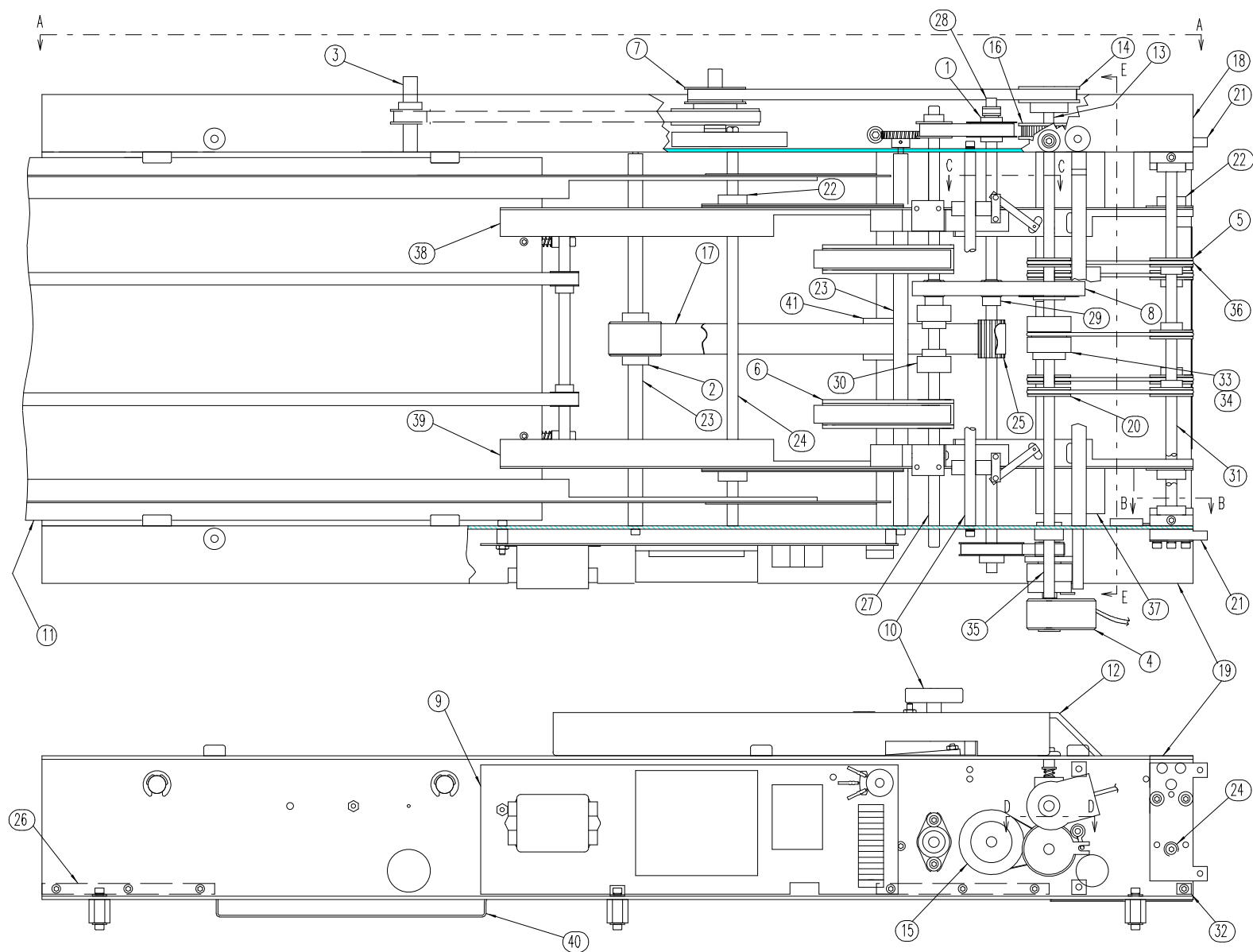
002D-08135, POWER UNIT A/C BOX



002D-08135, POWER UNIT A/C BOX

INDEX	PART NUMBER	DESCRIPTION
1	002B-08521	METER ASSEMBLY
2	024-213406253	TERMINAL STRIP
3	030-1240D25	SOLID STATE RELAY
4	030-2KUMP14D182	RELAY,SPDT,24VDC
5	031-24200	SOCKET,RELAY,11 PIN
6	032-00005250	FUSE,1/2 AMP
7	032-00015250	FUSE,1 ½ AMP
8	032-00030250	FUSE,3 AMP
9	032-00040250	FUSE,4 AMP
10	032-01120250	FUSE,12 AMP
11	032-00150250	FUSE,15 AMP
12	032-10020250	FUSE,2 AMP
13	035-H320B	POWER INLET
14	037-60950SM1	SOCKET CONNECTOR
15	039-67293001	CONNECTOR
16	039-88010641	RECEPTACLE
17	044-ECV24N48	24v POWER SUPPLY
18	044-VL30341010	5v POWER SUPPLY
19	050-24206	LINE FILTER,10 AMP
20	050-20R6	EMI FILTER,20 AMP
21	067-V130LAZOA	VARISTOR
22	067-V33ZA5	VARISTOR
23	173-2192	BUMPER
24	600B-17246	BRACKET
25	600D-17897	COVER
26	600D-19051	PANEL ENCLOSURE

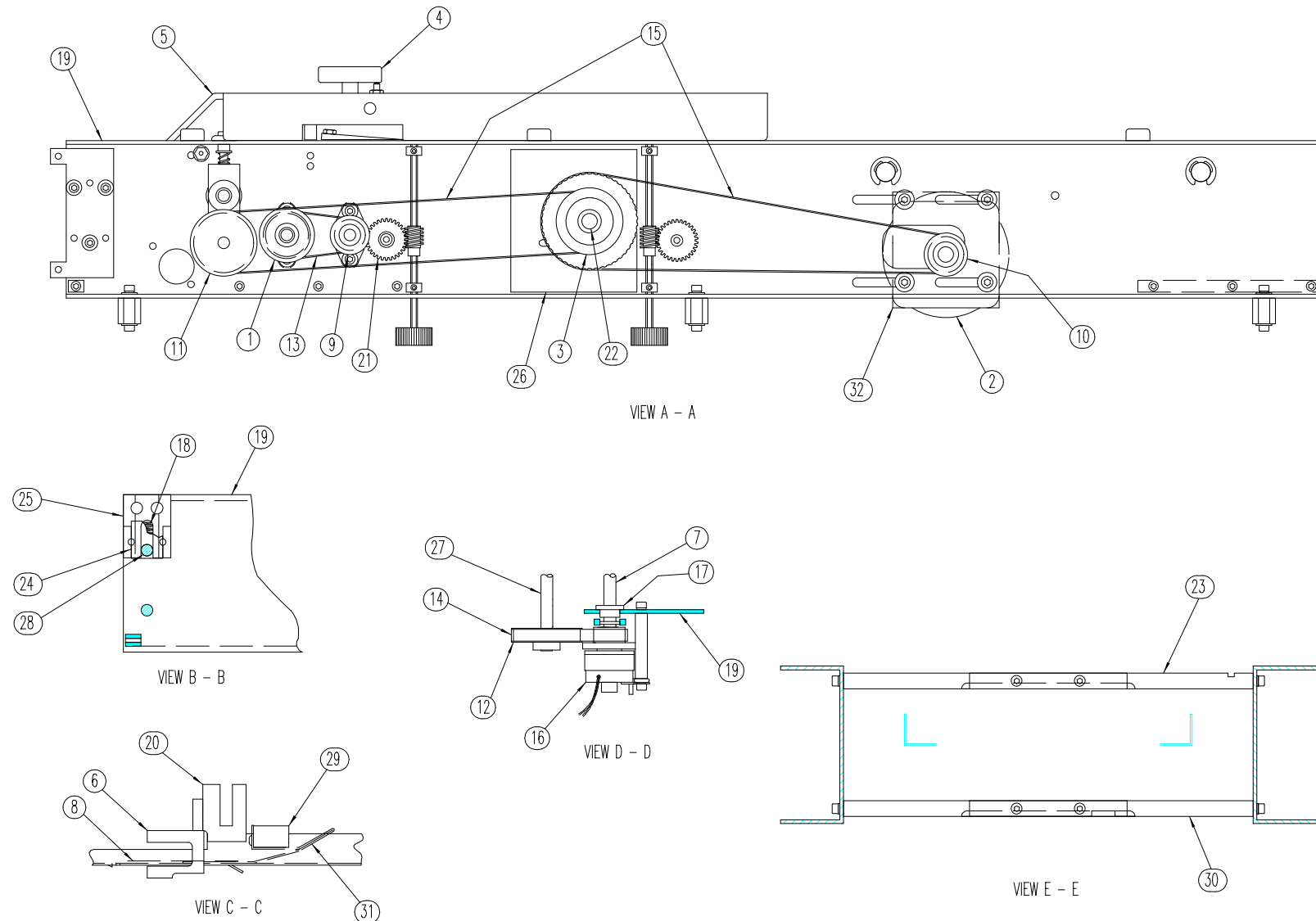
002E-19047, FEEDER ASSEMBLY, PAGE 1



002E-19047, FEEDER ASSEMBLY, PAGE 1

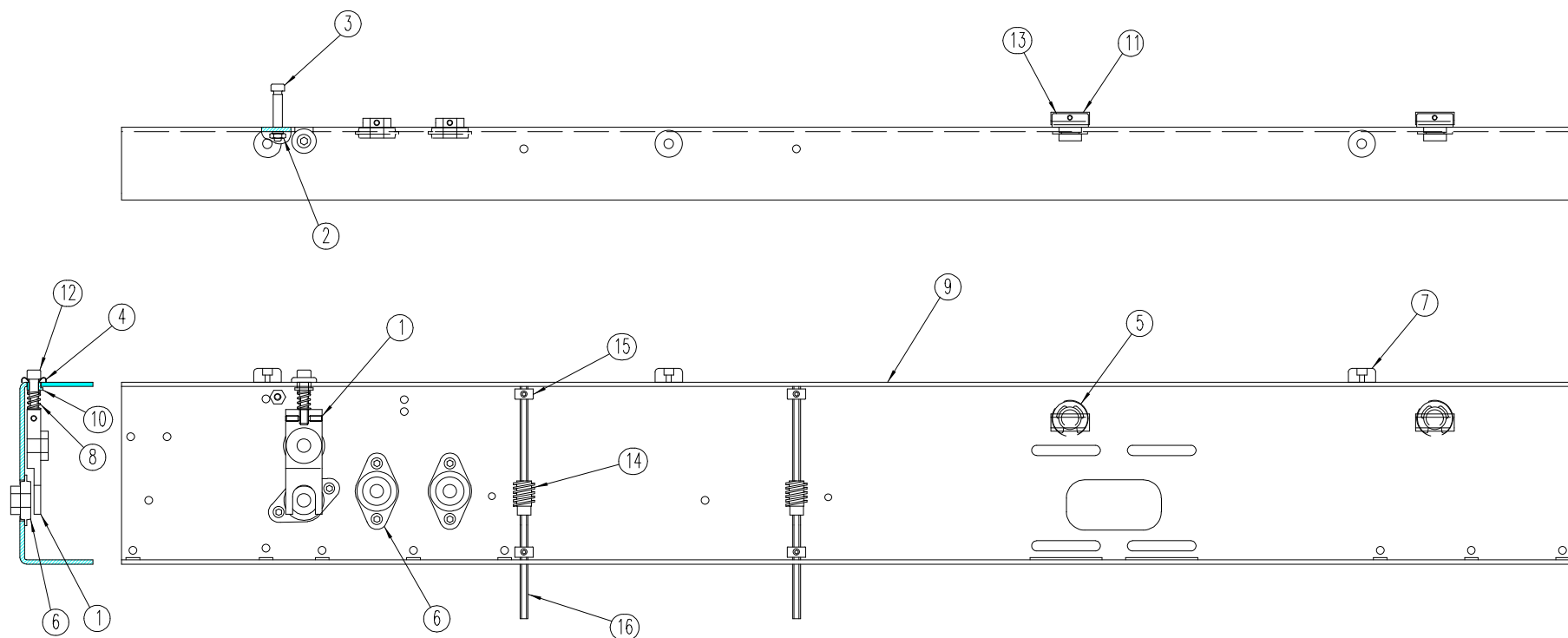
INDEX	PART NUMBER	DESCRIPTION			
1	002A-16437	PULLEY	22	600B-15839-014	HANGER, GUIDE RAIL
2	002A-22091	PULLEY	23	600B-15839-017	TENSIONER SHAFT
3	002B-08526	MOTOR	24	600B-15839-028	TIE BAR RAIL GUIDE
4	002B-08630	ENCODER	25	600B-15839-060	DRIVE PULLEY
5	002B-16767	PULLEY	26	600B-15839-125	FRONT TIE PLATE
6	002B-21905	OUTSIDE FEED BELTS	27	600B-20151	SINGULATOR DRIVE SHAFT
7	002B-22221	PULLEY	28	600B-16122-033	HOPPER FEED SHAFT
8	002B-19633	TRIPLE BEARING BLOCK	29	600B-16404-005	ROLLER BEARING HUB
9	002D-08522	FEEDER ELECTRICAL ASSEMBLY	30	600B-16430	DRIVE ROLLER
10	002D-16435	SINGULATOR	31	600B-17045	UPPER SHAFT
11	002D-17505	CREEPER CONVEYOR	32	600B-17312	FEEDER MOUNT BAR
12	002D-18099	SINGULATOR COVER	33	600B-17540	UPPER PULLOUT ROLLER
13	095-25212-600	SHAFT	34	600B-17541	LOWER PULLOUT ROLLER
14	112-200DBA30637	PULLEY,TIMING,30T	35	600B-17848	UPPER PULLOUT SHAFT
15	112-200DBA32637	PULLEY,TIMING,32T	36	600B-18045	FEEDER BELT
16	112-200DOA30637	PULLEY,TIMING,30T	37	600D-17316	FEEDER DOCKING PORT
17	113-S290XL100	BELT,TIMING	38	600D-19007	PAPER GUIDE RAIL,LEFT
18	547-25937-500	LEFT CHASSIS ASSEMBLY	39	600D-19008	PAPER GUIDE RAIL,RIGHT
19	547-25938-500	RIGHT CHASSIS ASSEMBLY	40	600D-22275	FEEDER TRAY
20	600A-16349-020	DRIVE PULLEY	41	025-25947-500	STATIC BRAID
21	600A-18773	SCAB PLATE		002B-08462	GROUND WIRE

002E-19047, FEEDER ASSEMBLY, PAGE 2



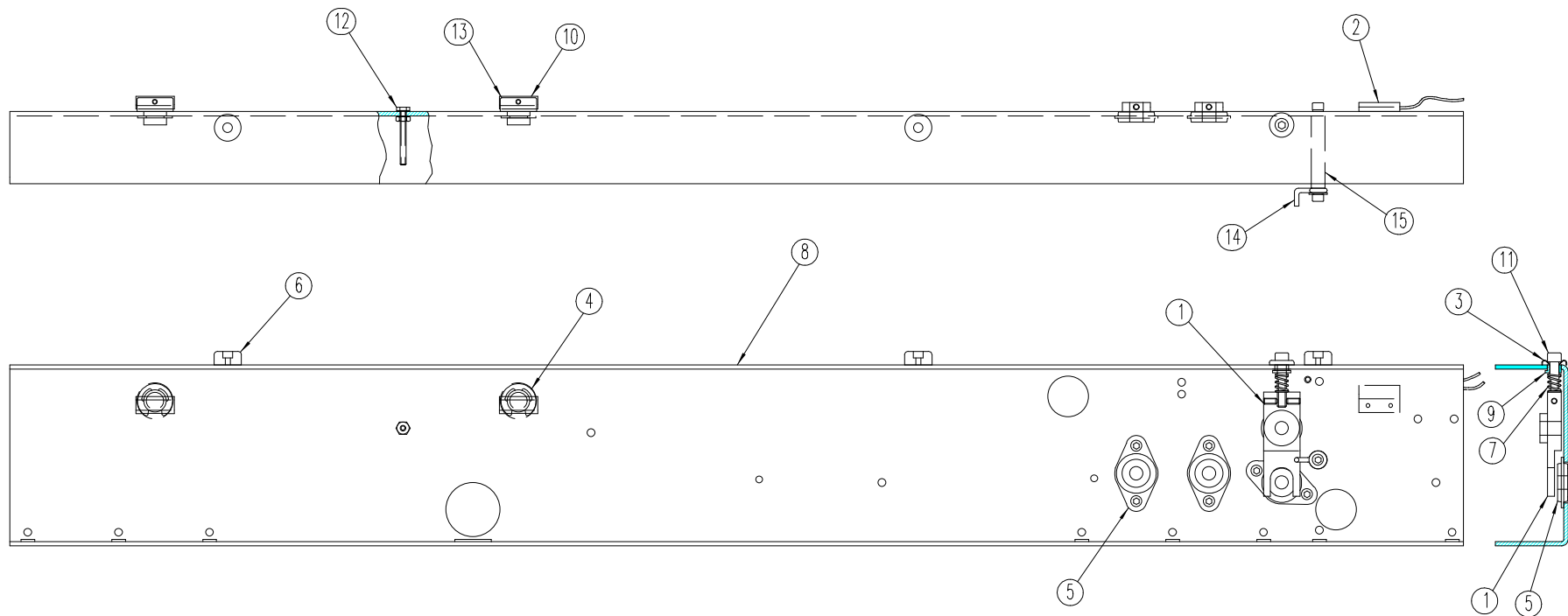
002E-19047, FEEDER ASSEMBLY, PAGE 2

INDEX	PART NUMBER	DESCRIPTION
1	002A-16437	PULLEY
2	002B-08526	MOTOR
3	002B-22221	PULLEY
4	002D-16435	SINGULATOR
5	002D-18099	SINGULATOR COVER
6	057-25971-500	SENSOR
7	095-25212-600	SHAFT
8	144-26616-600	PLASTIC STRIP
9	112-200DBA16637	PULLEY,TIMING,16T
10	112-200DBA18650	PULLEY,TIMING,18T
11	112-200DBA30637	PULLEY,TIMING,30T
12	112-200DBA32637	PULLEY,TIMING,32T
13	113-20008003712	BELT,TIMING
14	113-200090037	BELT,TIMING
15	113-200290037	BELT,TIMING
16	122-25211-500	FRICTION CLUTCH
17	153-FB6103	FLANGE BEARING
18	181-3000401000	SPRING
19	547-25938-500	RIGHT CHASSIS ASSEMBLY
20	600A-16122-030	RAIL STIFFENER
21	600A-16556	WORM GEAR
22	600A-17661	DRIVE SHAFT
23	002B-19351	TOP PROBE MOUNT
24	600A-18699	ANTI-TORSION BLOCK
25	600A-18700	ADJUSTMENT BLOCK
26	600A-21521	MOUNT BLOCK
27	600B-16122-033	HOPPER FEED SHAFT
28	600B-17045	UPPER SHAFT
29	600B-17228	MOUNT BLOCK
30	002B-19352	BOTTOM PROBE MOUNT
31	600B-19690	GUIDE SHOE

547-25937-500, LEFT SIDE CHASSIS ASSEMBLY

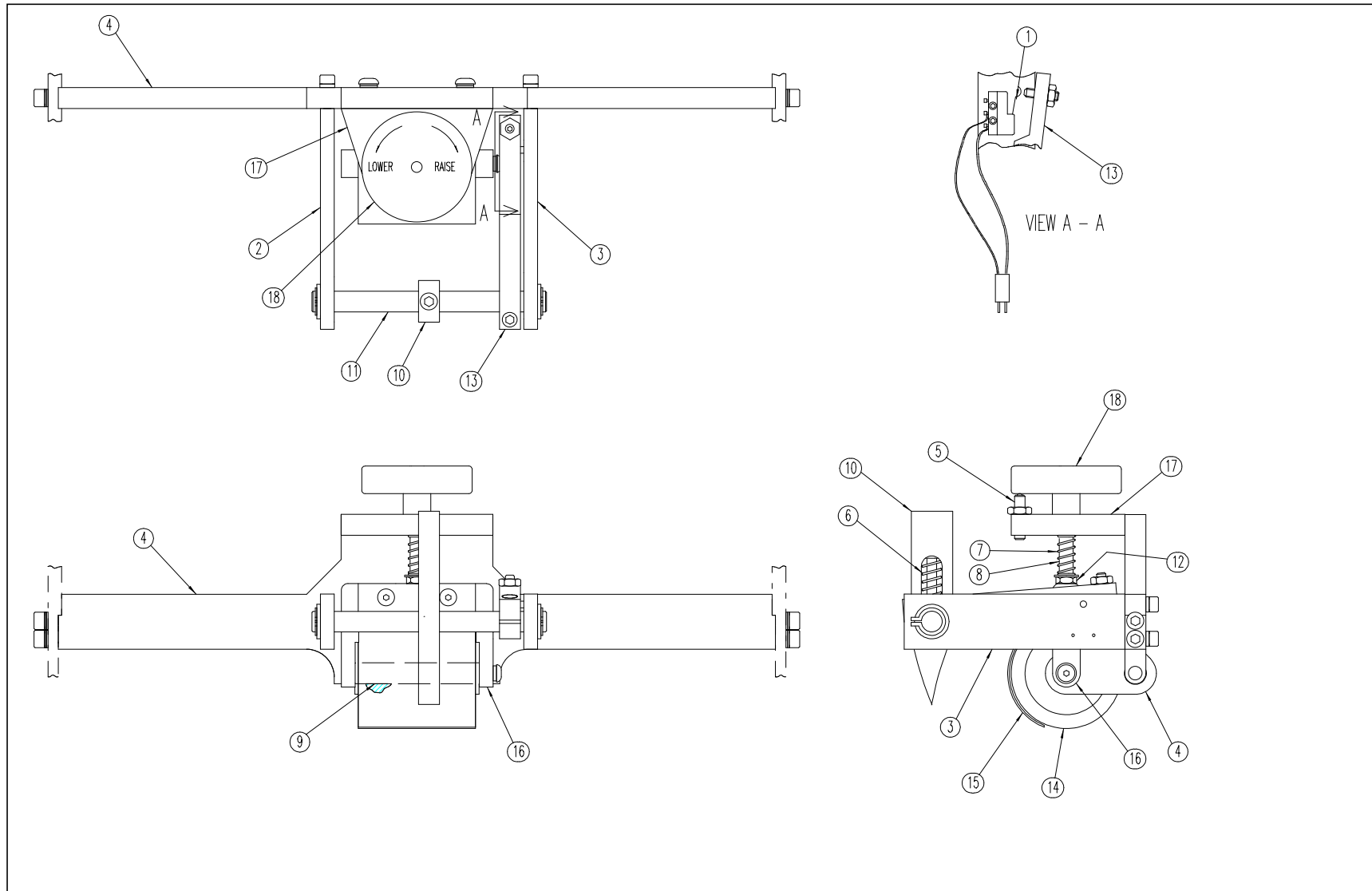
547-25937-500, LEFT SIDE CHASSIS ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	002A-17929	BEARING BLOCK
2	013-0104	HEX NUT,#10-24
3	014-025031116	SHOULDER BOLT
4	016-712	CUP WASHER
5	019-100062	"E" RING
6	158-S3PPB5ST	RADIAL BEARING
7	173-2194	BUMPER
8	181-3600401000	SPRING
9	547-25934-600	LEFT FRAME
10	600A-15839-012	GUIDE BUSHING
11	600A-15839-119	TRACK BUTTON INSERT
12	600A-15915-025	ADJUSTMENT SCREW
13	600B-15839-068	TRACK BUTTON
14	104-1M5N25	WORM
15	126-SSC25	CLAMP COLLAR
16	600B-17666	TENSION ADJUST

547-25938-500, RIGHT SIDE CHASSIS ASSEMBLY

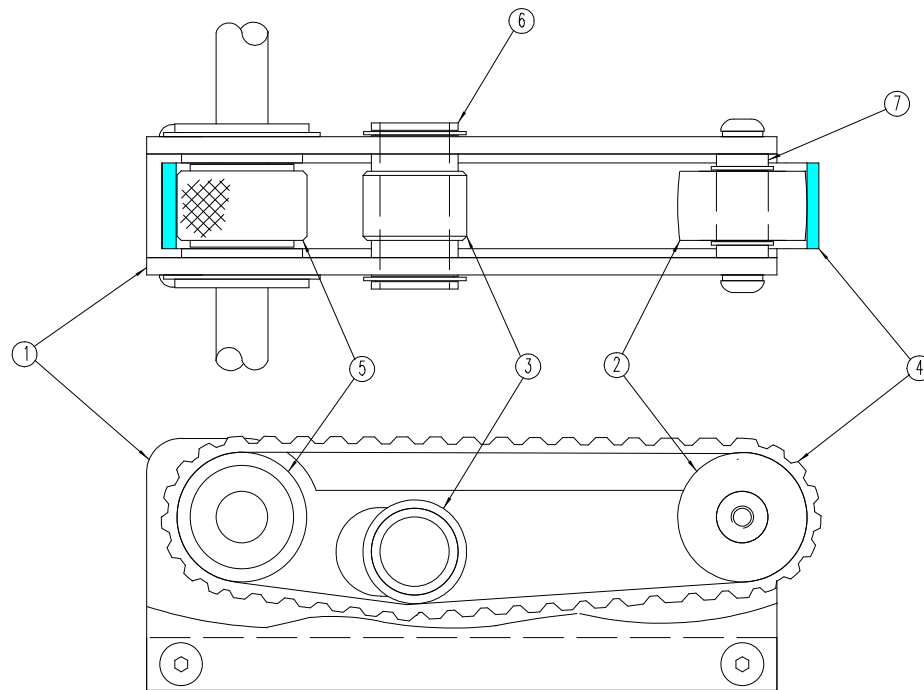
547-25938-500, RIGHT SIDE CHASSIS ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	002A-17929	BEARING BLOCK
2	002B-08569	INTERLOCK ASSEMBLY
3	016-712	CUP WASHER
4	019-100062	"E" RING
5	158-S3PPB5ST	RADIAL BEARING
6	173-2194	BUMPER
7	181-3600401000	SPRING
8	547-25935-600	RIGHT FRAME
9	600A-15839-012	GUIDE BUSHING
10	600A-15839-119	TRACK BUTTON INSERT
11	600A-15915-025	ADJUSTMENT SCREW
12	600A-17921	GROUND SCREW
13	600B-15839-068	TRACK BUTTON
14	600A-18200	CLUTCH STOP
15	020-RAO1020632	STANDOFF,#10-32 X 2"

002D-16435, SINGULATOR ASSEMBLY

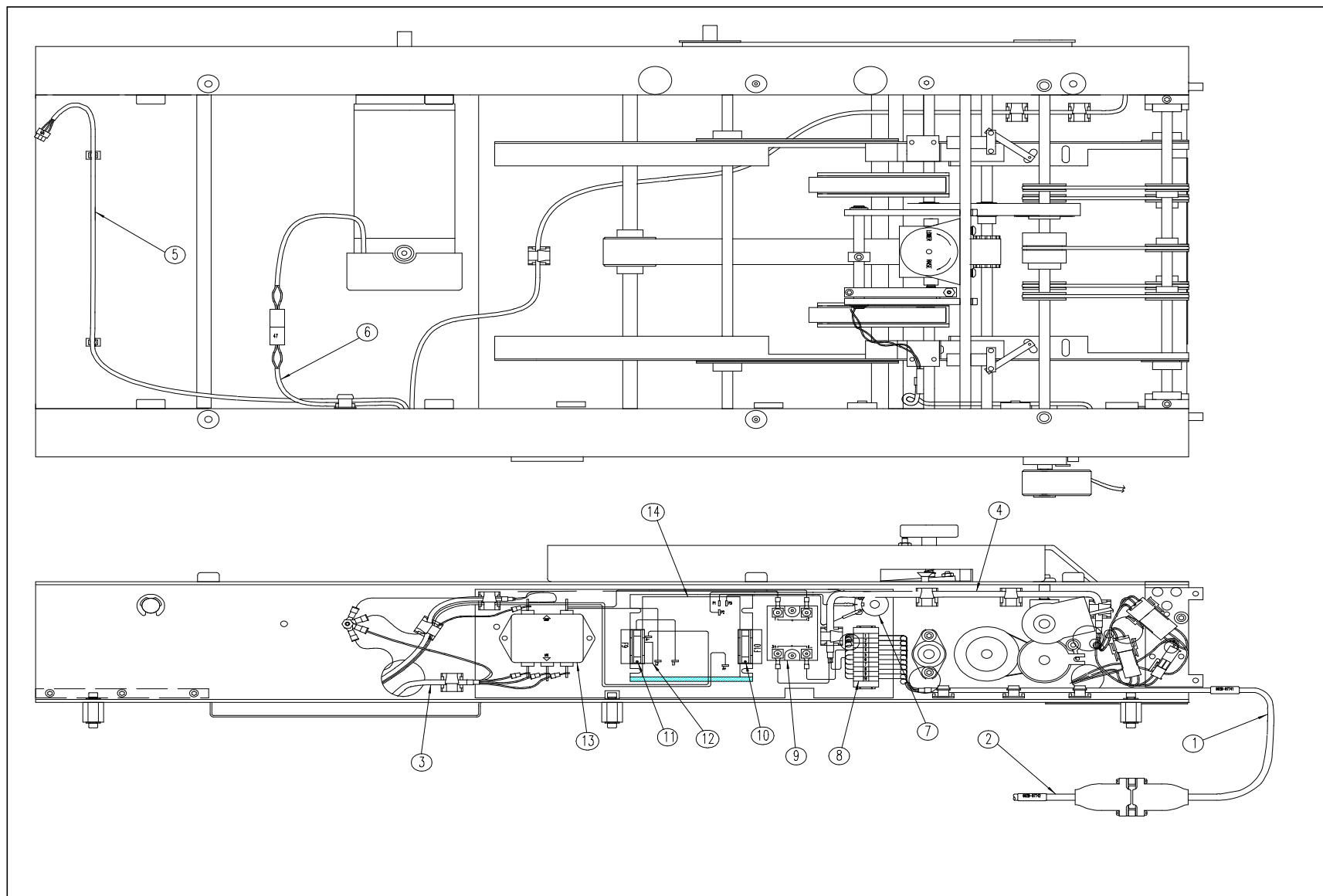
002D-16435, SINGULATOR ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	002B-08212	CREEPER CONVEYOR SWITCH
2	002B-16325	INPUT BRACKET
3	002B-16326	INFEED SWITCH BRACKET
4	002C-16500	SUPPORT BAR
5	014-SW15	ADJUSTING SCREW
6	181-03000301000	SPRING
7	181-05000808125	SPRING
8	600A-16435-003	ADJUSTING SCREW
9	600A-16435-004	ROLLER AXLE
10	600A-16435-005	DETENT WAND
11	600A-16435-006	PAPER DETENT AXLE
12	600A-16914	HEX NUT
13	600B-15915-044	STACK SWITCH ACTUATOR
14	177-25913-600	SINGULATOR ROLLER
15	600B-16435-002	ROLLER GUARD
16	600B-16435-007	ADJUSTING FORK
17	600B-16435-008	ADJUSTING PLATE
18	600B-16435-009	ADJUSTING KNOB

002B-21905, OUTSIDE FEED BELTS

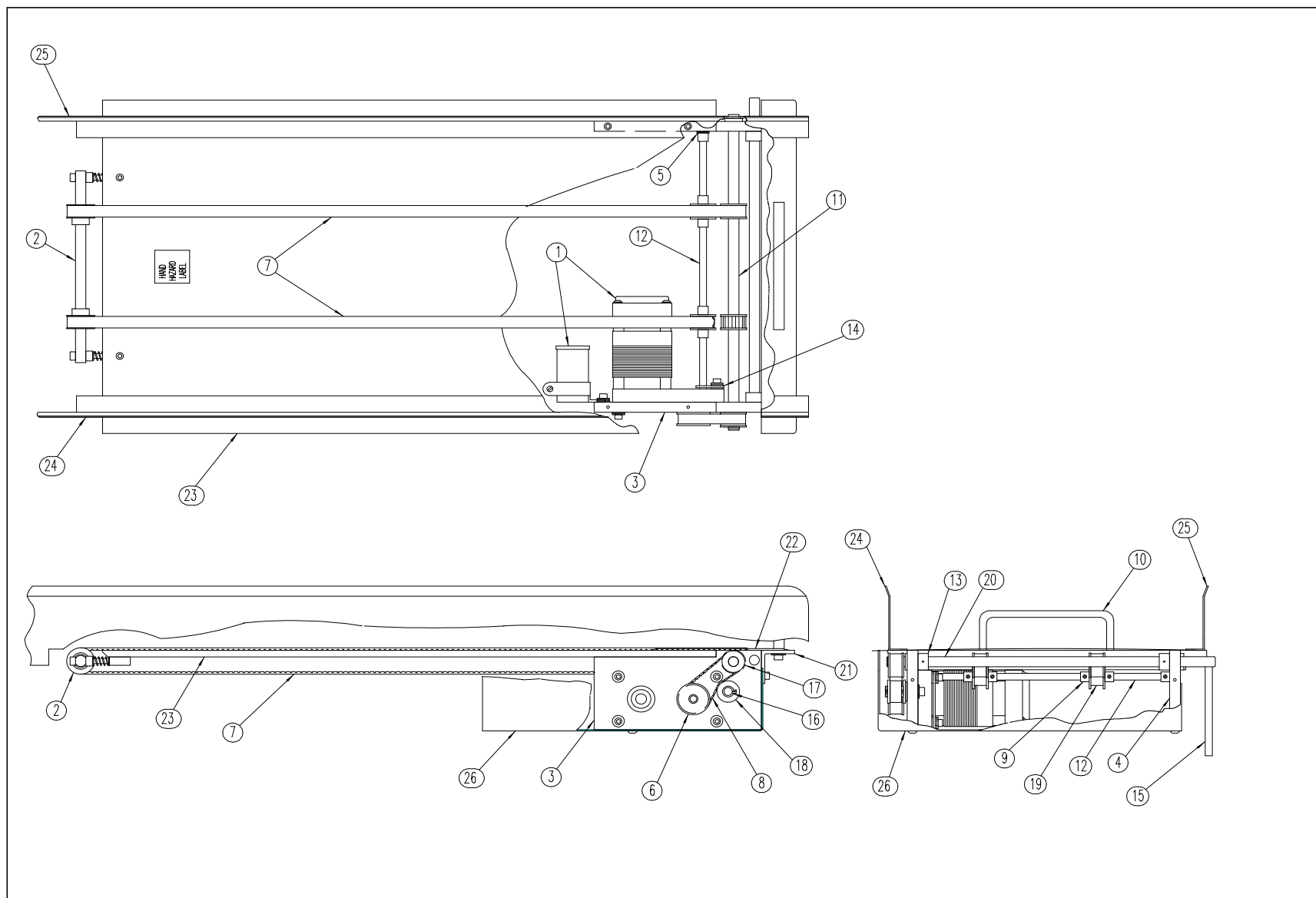
002B-21905, OUTSIDE FEED BELTS

INDEX	PART NUMBER	DESCRIPTION
1	002B-21906	HOUSING ASSEMBLY
2	002A-21927	ROLLER ASSEMBLY
3	600A-22189	IDLER ROLLER
4	186-2823500088	TRACTOR BELT- Replaced by 118-30307-600
5	600A-20965	PULLEY
6	600A-21908	BUSHING
7	600A-21909	AXLE

002D-08522, FEEDER ELECTRICAL ASSEMBLY

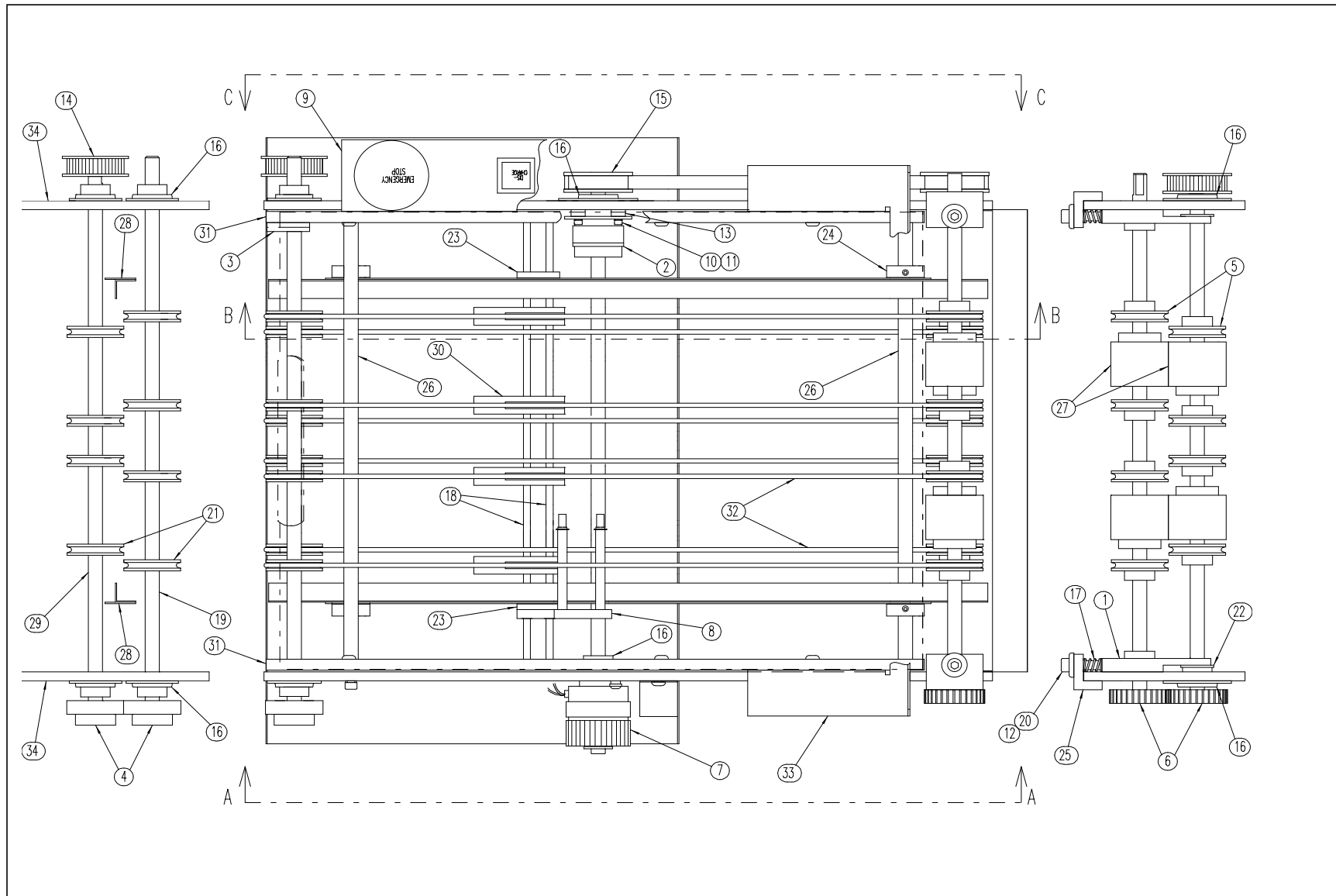
002D-08522, FEEDER ELECTRICAL ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	002B-07741	I/O CABLE
2	002B-07742	I/O #1 INT. CABLE`
3	526-26634-500	AC CORD
4	002D-08522-001	SENSOR & SIGNAL CABLE
5	002D-08522-003	CREEPER CABLE
6	002D-08522-004	MAIN MOTOR CABLE
7	002B-08662	SPEED CONTROL POT
8	024-1401019	TERMINAL BLOCK
9	030-1240025	SOLID STATE RELAY
10	032-003/8250	FUSE,3/8 AMP
11	032-10120250	FUSE,12 AMP
12	047-S9841	RESISTOR
13	050-20VDK1	LINE FILTER
14	054-KBIC125	MOTOR CONTROLLER

002D-17505, CREEPER CONVEYOR

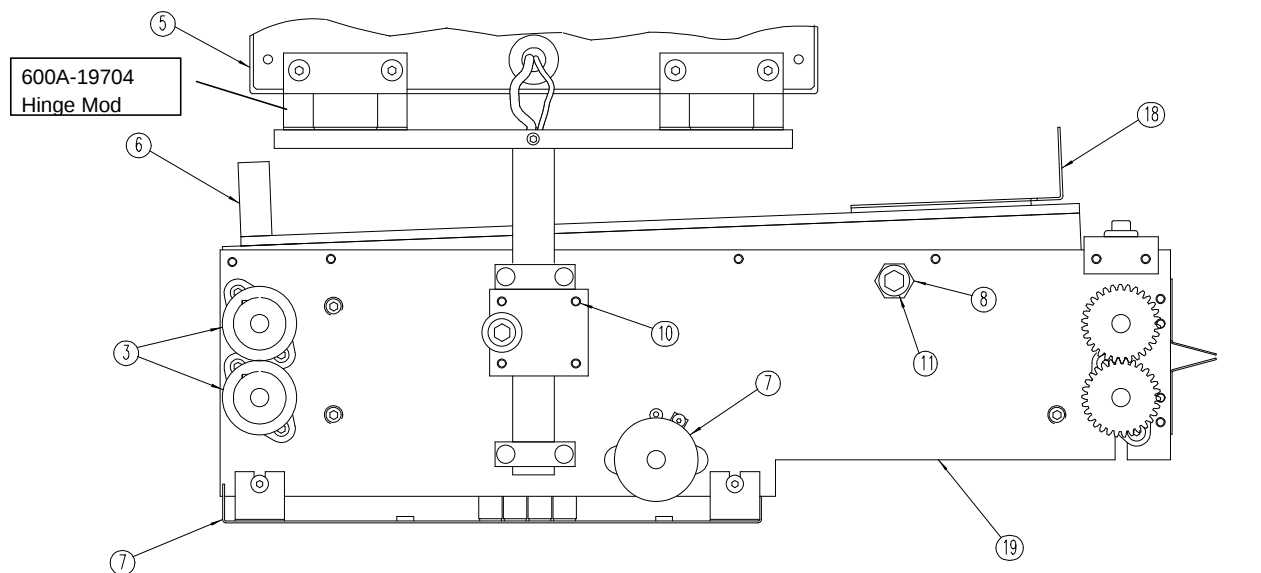
002D-17505, CREEPER CONVEYOR

INDEX	PART NUMBER	DESCRIPTION
1	002B-09341	CREEPER MOTOR
2	002B-16631	FRONT SHAFT ASSEMBLY
3	002B-16633	MOTOR MOUNT PLATE,RIGHT
4	002B-16634	MOTOR MOUNT PLATE,LEFT
5	016-525	WAVY WASHER
6	112-200DBA15625	MOTOR DRIVE PULLEY
7	113-200500037	CONVEYOR BELT
8	113-200070037	DRIVE BELT
9	126-SSC25	SET SCREW COLLAR
10	172-1039A1032	HANDLE
11	600A-15841-009	DRIVE SHAFT
12	600A-15841-011	SHAFT
13	600A-15841-015	STACK GUIDE LOCK ECCENTRIC
14	600B-15841-017	IDLER ROLLER SHAFT BRACKET
15	600A-15841-020	HANDLE
16	600A-15841-021	IDLER STUD
17	112-200NOA14638	PULLEY, 14T
18	600A-16651	ROLLER
19	600A-16652	ROLLER
20	600B-15841-014	TENSION BAR
21	600B-15841-019	LOCK ANGLE
22	600B-15917-005	MYLAR COVER
23	600C-15841-001	BED
24	600C-16575-001	STACK GUIDE,LEFT
25	600C-16575-002	STACK GUIDE,RIGHT
26	600C-17771	REAR CREEPER COVER

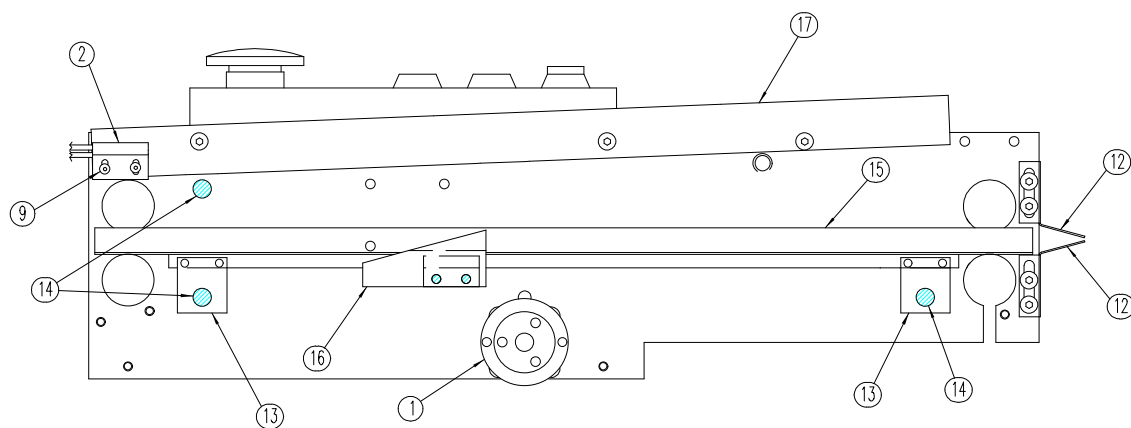
002D-19017, ACCUMULATOR, PAGE 1

002D-19017, ACCUMULATOR,PAGE 1

INDEX	PART NUMBER	DESCRIPTION
1	002A-17927	BEARING BLOCK
2	002B-08157	BRAKE
3	002B-08445	INTERLOCK
4	002B-16342	DRIVE ROLLER
5	002B-16767	PULLEY
6	002B-17806	DUMP SHAFT
7	002B-19014	CLUTCH/SHAFT ASSEMBLY
8	002B-23963	SENSOR
9	002D-08156	KEYBOARD ASSEMBLY
10	014-05021108	SHCS,#5-40 X .5
11	016-105	WASHER,LOCK,#5
12	016-710	WASHER,TRAP
13	020-RA006C0603	STANDOFF
14	112-200DOA24637	PULLEY,TIMING,24T
15	112-200DOA25637	PULLEY,TIMING,25T
16	158-S3PPB5ST	RADIAL BEARING
17	181-3600401000	SPRING
18	332-301870107	ST. STL. SHAFT
19	600B-17023	ST. STL. SHAFT
20	600A-15915-025	ADJUSTMENT SCREW
21	600A-16349-020	DRIVE ROLLER
22	600A-16962	BEARING
23	600A-18704	SPAN BLOCK
24	600A-18836	GUIDE BLOCK
25	600A-18986	SUPPORT BRACKET
26	600B-15839-028	TIE BAR
27	600B-17541	PULLOUT ROLLER
28	600B-17669	PAPER RAIL
29	600B-17714	INPUT SHAFT
30	600B-18707	STACK BLOCK
31	600B-18983	COVER SLIDE
32	600B-18995	BELT
33	600D-18715	PAW GUARD
34	600D-18771	CHASSIS

002D-19017, ACCUMULATOR, PAGE 2

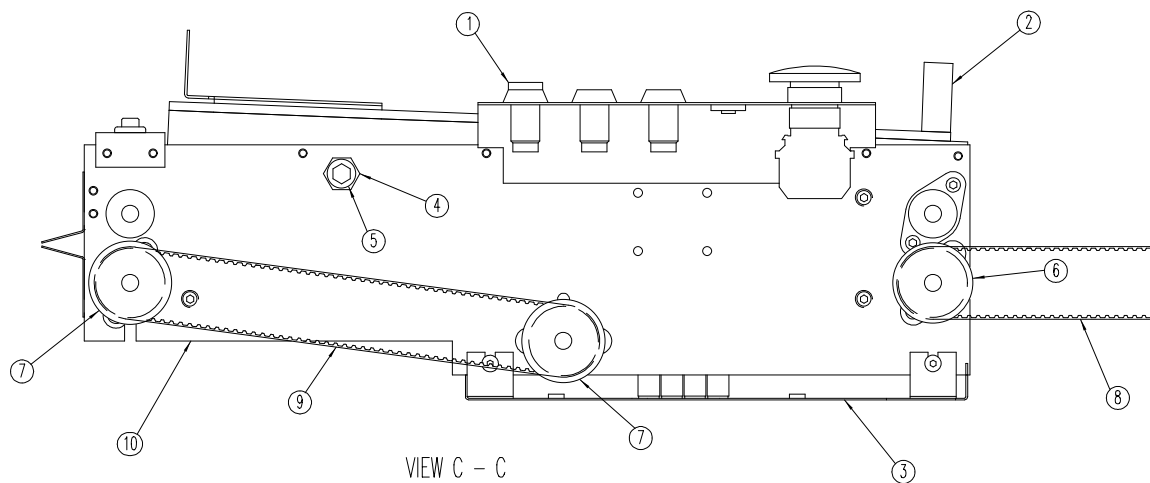
VIEW A - A



VIEW B - B

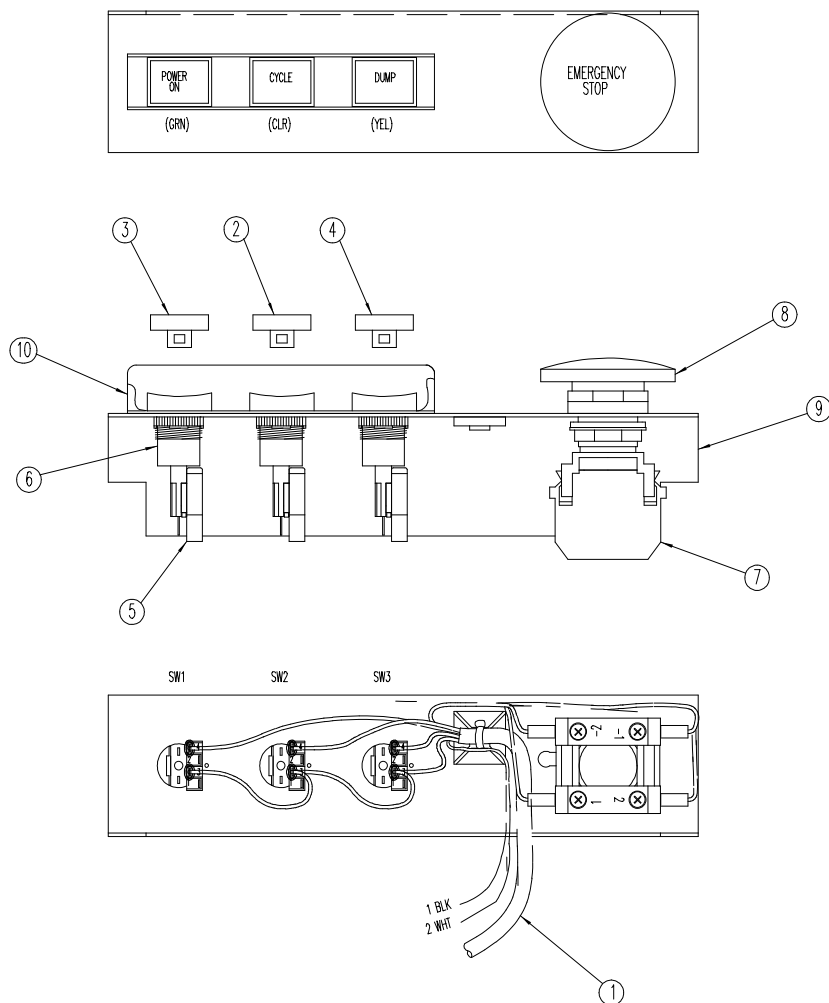
002D-19017, ACCUMULATOR, PAGE 2

INDEX	PART NUMBER	DESCRIPTION
1	002B-08157	BRAKE
2	002B-08445	INTERLOCK
3	002B-16342	DRIVE ROLLER
4	002B-19014	CLUTCH/SHAFT ASSEMBLY
5	002D-08528	DISPLAY PANEL
6	002D-19016	TOP COVER
7	002D-19442	SENSOR PLATE ASSEMBLY
	002B-08570	SENSOR MODULE ONLY
8	013-M10041	HEX NUT,M10
9	014-04041104	BHSCS,#4-40 X .25
10	014-10421110	SHCS,#10-24 X .625
11	014-M10021130	SHCS,M10 X 30MM
12	592-25338-600	GUIDE
13	600A-18836	GUIDE BLOCK
14	600B-15839-028	TIE BAR
15	600B-17669	PAPER RAIL
16	600B-18707	STACK BLOCK
17	600B-18983	COVER SLIDE
18	600D-18715	PAW GUARD
19	600D-18771	CHASSIS

002D-19017, ACCUMULATOR, PAGE 3

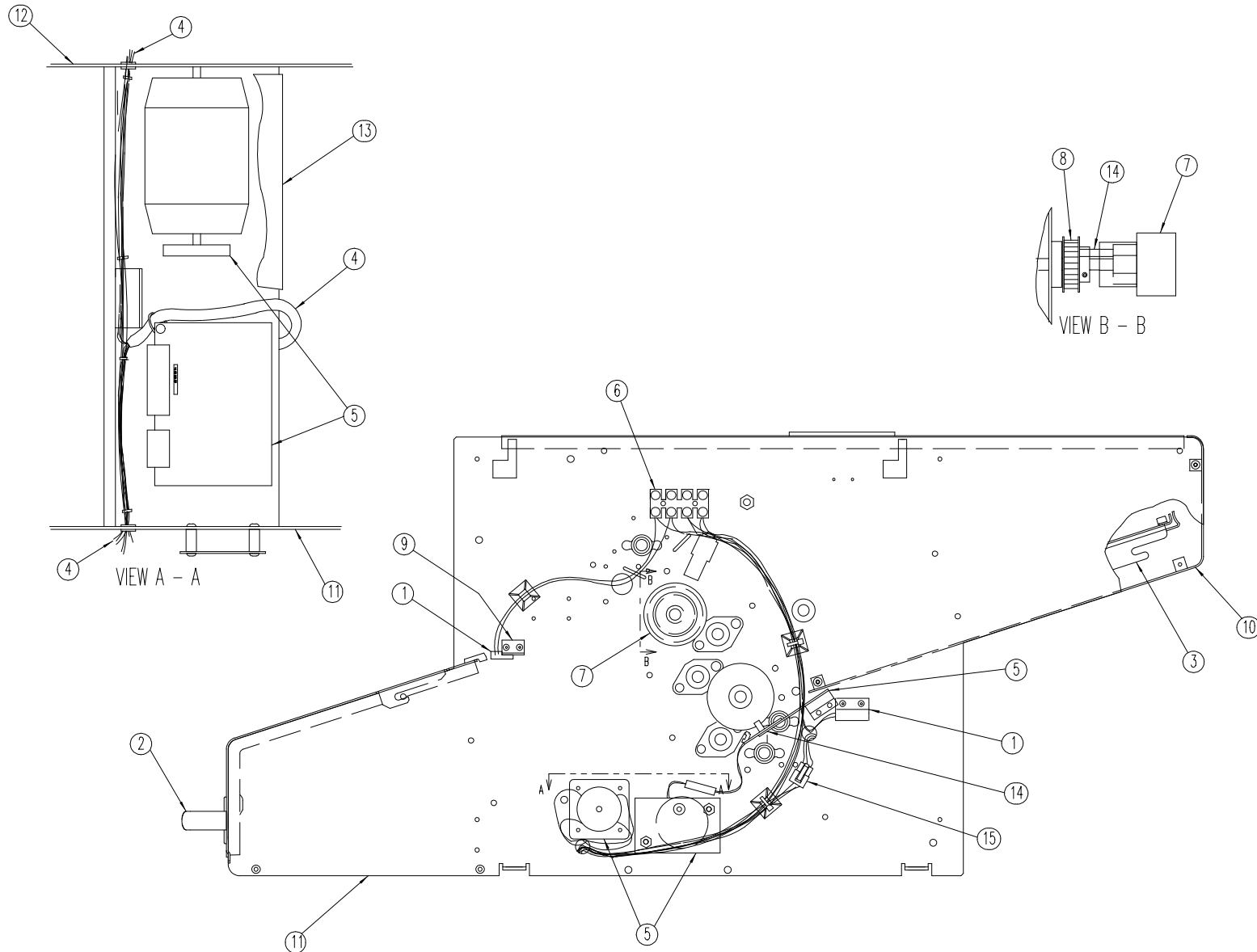
002D-19017, ACCUMULATOR,PAGE 3

INDEX	PART NUMBER	DESCRIPTION
1	002D-08156	KEYBOARD ASSEMBLY
2	002D-19016	TOP COVER
3	002D-19442	SENSOR PLATE
4	013-M10041	HEX NUT,M10
5	014-M10021130	SHCS,M10 X 30MM
6	112-200DOA24637	PULLEY,TIMING,24T
7	112-200DOA25637	PULLEY,TIMING,25T
8	113-200170037	BELT,TIMING
9	113-200240037	BELT,TIMING
10	600D-18771	CHASSIS

002D-08156, KEYBOARD ASSEMBLY

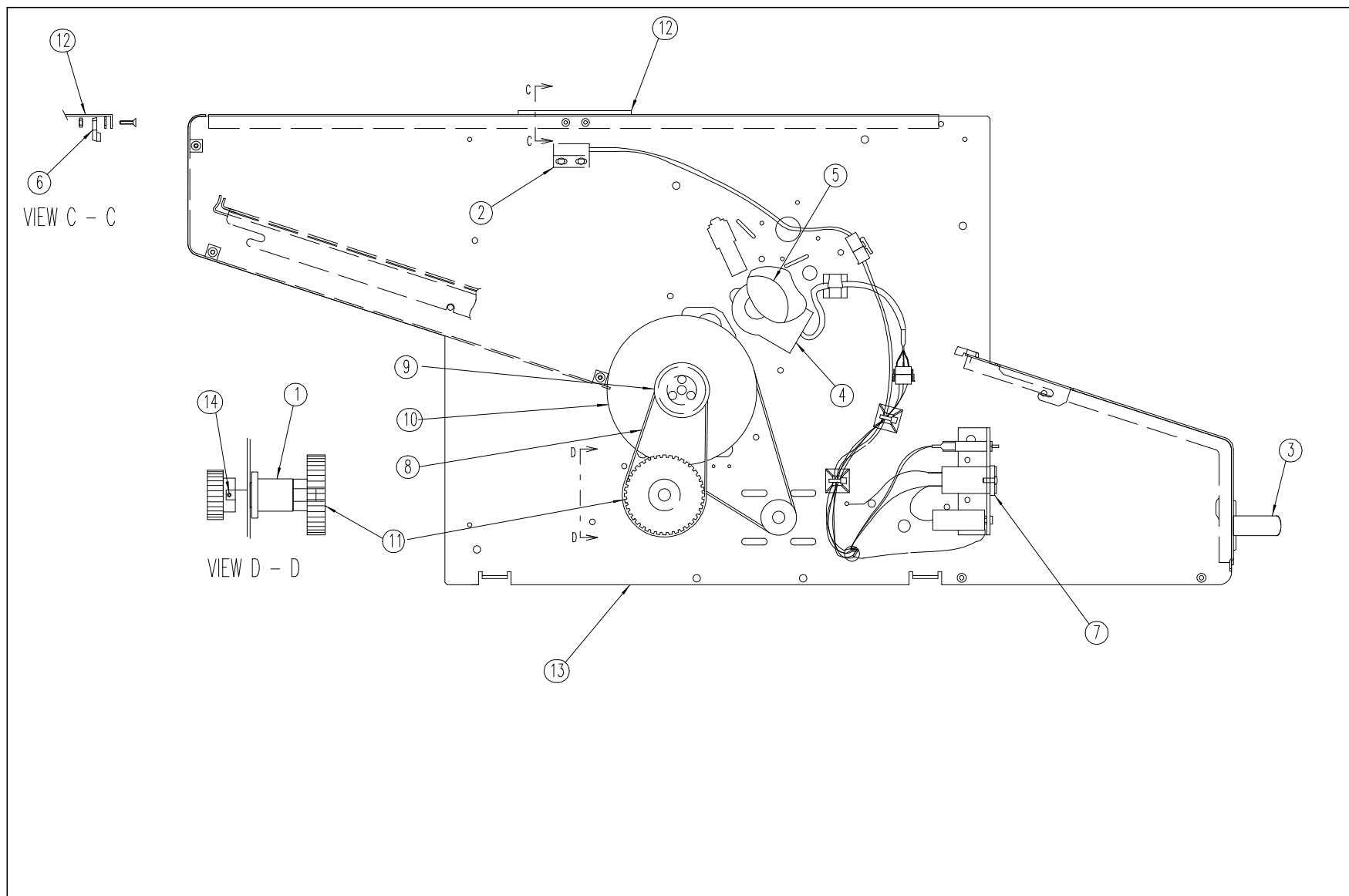
002D-08156, KEYBOARD ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	002B-08542	KEYBOARD CABLE
2	041-ATH01982CLR	CLEAR LENS CAP
3	041-ATH01982GRN	GREEN LENS CAP
4	041-ATH01982YEL	YELLOW LENS CAP
5	041-ATH25F1	SWITCH ELEMENT
6	041-OTH36F220	SWITCH
7	041-E22B1	CONTACT BLOCK
8	041-E22JLB2N8	E-STOP SWITCH
9	600C-18709	KEYBOARD
10	600B-20846	KEY FOB

002D-19048, FOLDER ASSEMBLY, PAGE 1

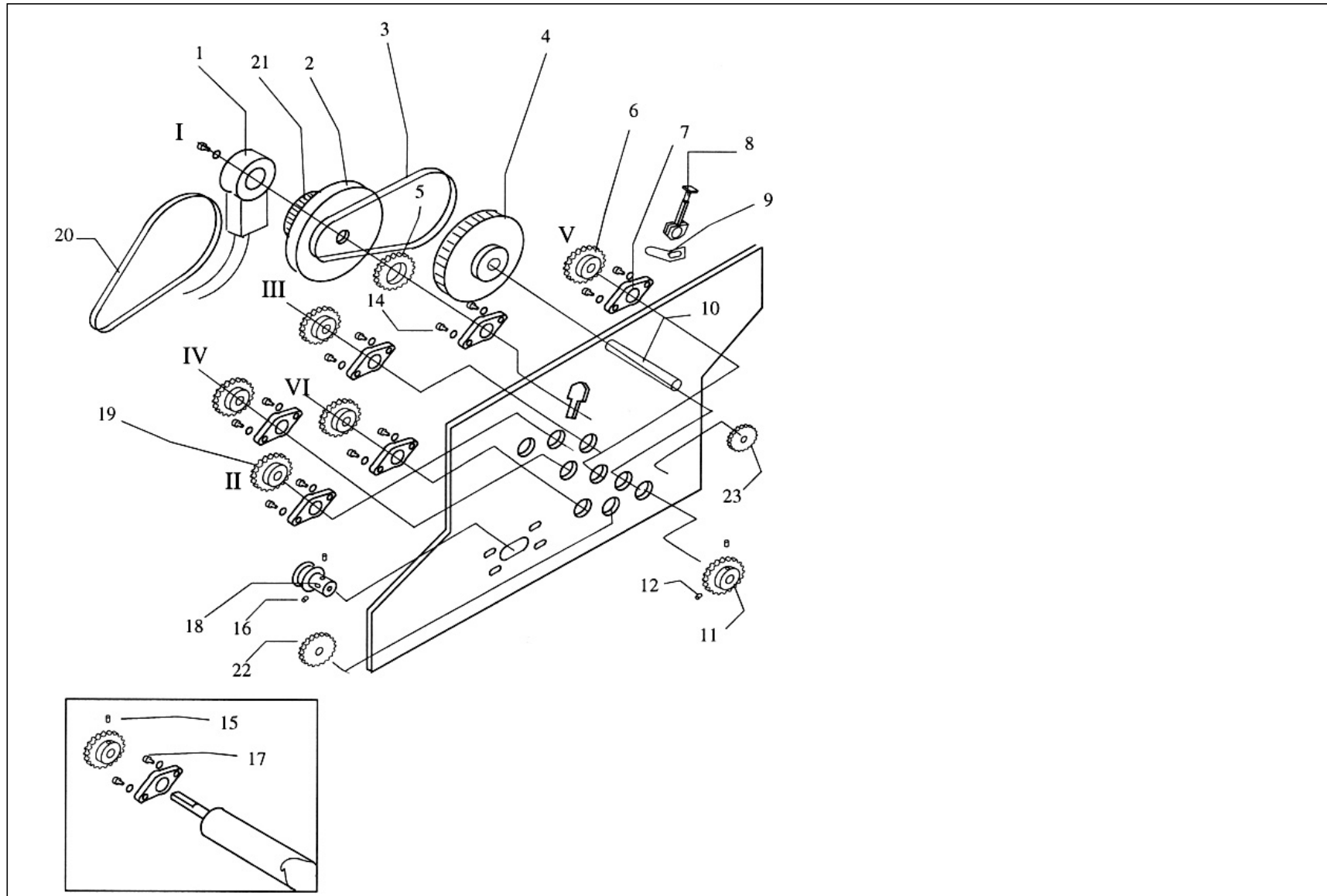
002D-19048, FOLDER ASSEMBLY, PAGE 1

INDEX	PART NUMBER	DESCRIPTION
1	041-35801	MAGNETIC REED SWITCH
2	002C-17912	FRONT COVER
3	186-0340069800	FOLD PLATE #3
4	002B-08539	I/O MODULE TWO
5	600A-17923	TERMINAL BLOCK
6	600A-19002	HANDWHEEL MOD
7	600A-19003	PULLEY
8	600A-19083	BRACKET
9	600C-17931	FOLDER PANEL
10	600C-17851	RIGHT SIDE FRAME
11	600C-17954	LEFT SIDE FRAME
12	600B-17773	ELECTRICAL COVER
13	018-12501500	DOWEL PIN
14	186-034004422	PHOTO DETECTOR
15	039-39014030	MALE CONNECTOR
	039-39014036	FEMALE CONNECTOR

002D-19048, FOLDER ASSEMBLY, PAGE 2

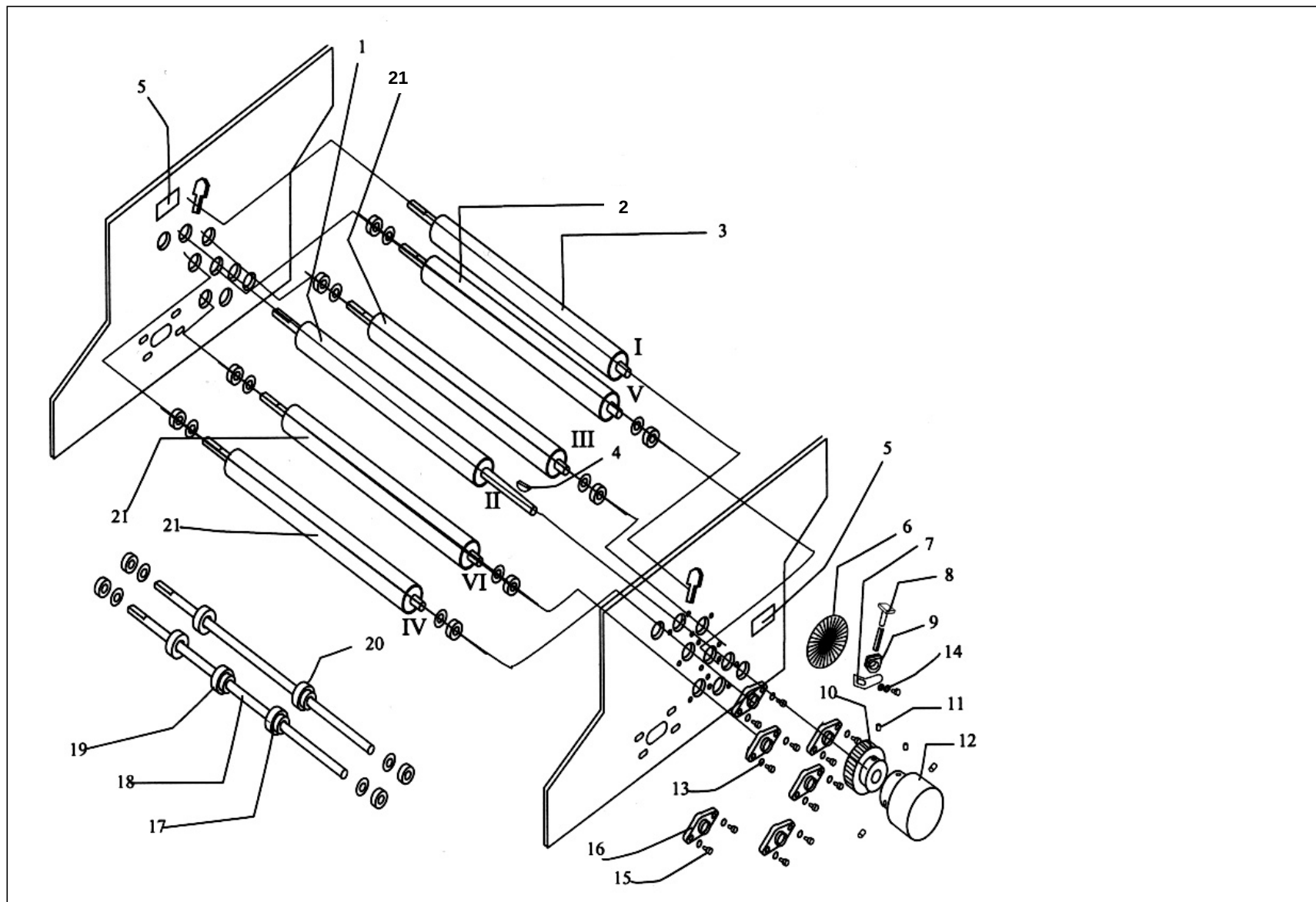
002D-19048, FOLDER ASSEMBLY, PAGE 2

INDEX	PART NUMBER	DESCRIPTION
1	002A-23467	SHAFT
2	002B-08569	INTERLOCK
3	002C-17912	FRONT COVER
4	002B-08630	ENCODER
5	186-032017722	ROLLER
6	041-35701	MAGNET
7	050-83510590	FILTER
8	113-200130037	BELT,TIMING
9	600A-17792	PULLEY
10	186-031025148	PULLEY
11	600A-17794	PULLEY
12	600B-18194	TOP COVER
13	600C-17954	LEFT SIDE FRAME
14	014-M0451105	SHSS,CUP POINT,M4 X 5MM

002D-19048, FOLDER ASSEMBLY, PAGE 3

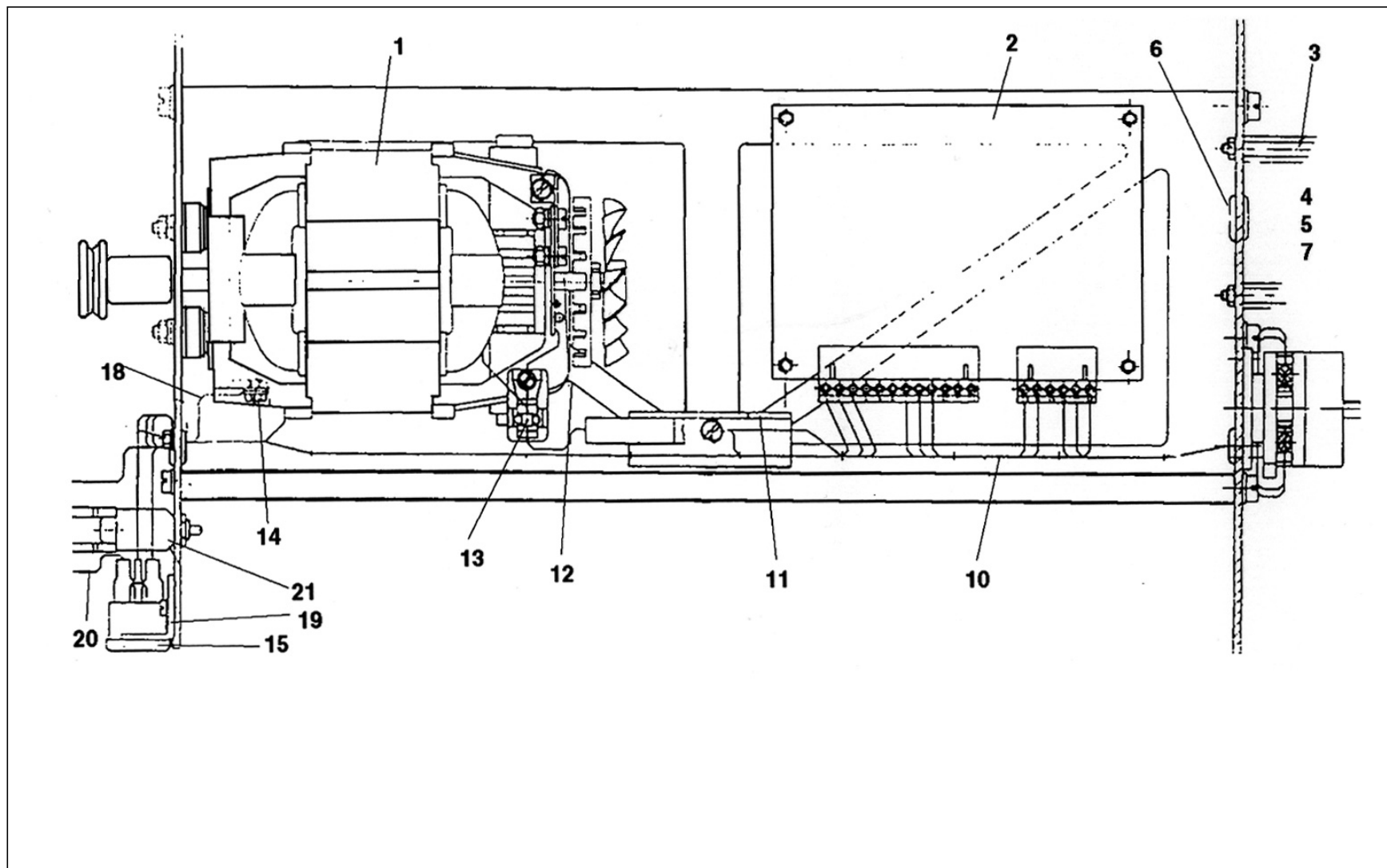
002D-19048, FOLDER ASSEMBLY, PAGE 3

INDEX	PART NUMBER	DESCRIPTION
1	002B-08630	ENCODER
2	186-031025148	PULLEY
3	113-200130037	BELT,TIMING
4	600A-17794	PULLEY
5	186-034002514	GEAR ASSEMBLY
6	186-034004389	GEAR
7	186-034004539	BEARING ASSEMBLY
	INCLUDES:	
	161-26250-00	BEARING
	186-031021063	FLANGE
8	186-033500114	SPRING PLATE
	186-034001917	BEARING ASSEMBLY
9	186-033000644	BRACKET
10	600A-18845	SHAFT
11	186-033500174	GEAR WITH BUSHING
12	186-031119002	SET SCREW
13	186-034004383	BEARING
14	186-031176001	SHEET METAL SCREW
15	186-031146003	SET SCREW
16	186-031118005	SET SCREW
17	186-031176001	SHEET METAL SCREW
18	186-031025061	PULLEY
19	186-034006465	GEAR
20	186-031033015	"V" BELT
21	600A-17792	PULLEY
22	186-034004415	GEAR
23	186-034005622	IDLER GEAR

002D-19048, FOLDER ASSEMBLY, PAGE 4

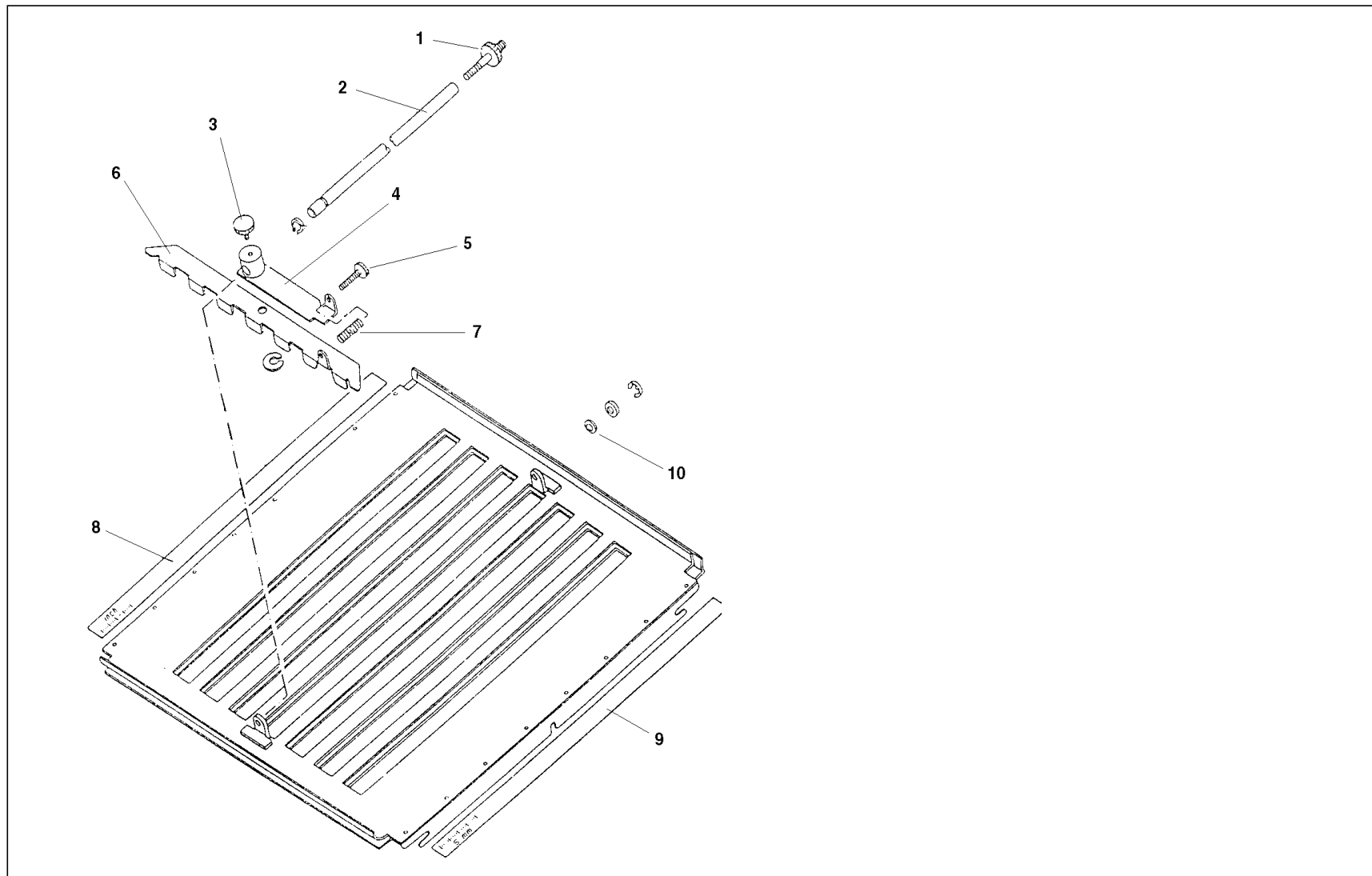
002D-19048, FOLDER ASSEMBLY, PAGE 4

INDEX	PART NUMBER	DESCRIPTION
1	186-034001918	ROLLER 2
2	186-034001910	ROLLER 5
3	186-032017722	ROLLER 1
4	186-031135001	KEY
5	002B-08569	INTERLOCK MAGNET
6	186-034004401	ENCODER DISC
7	186-033000644	BRACKET
8	186-033500114	SPRING PLATE
9	186-033500495	BEARING
10	600A-19003	PULLEY
11	014-082511030	SET SCREW
12	600A-19002	HANDWHEEL
13	186-031107005	WASHER
14	186-031108001	LOCK WASHER
15	186-031176001	SHEET METAL SCREW
16	186-031052021	BEARING ASSEMBLY
	INCLUDES:	
	161-26250-000	BEARING
	186-031021063	FLANGE
17	186-033500515	TRANSPORT ROLLER
18	186-032016443	SHAFT
19	186-033500515	TRANSPORT ROLLER
20	186-033500515	TRANSPORT ROLLER
21	186-034001919	ROLLER 3,4, and 6

002D-19048, FOLDER ASSEMBLY, PAGE 5

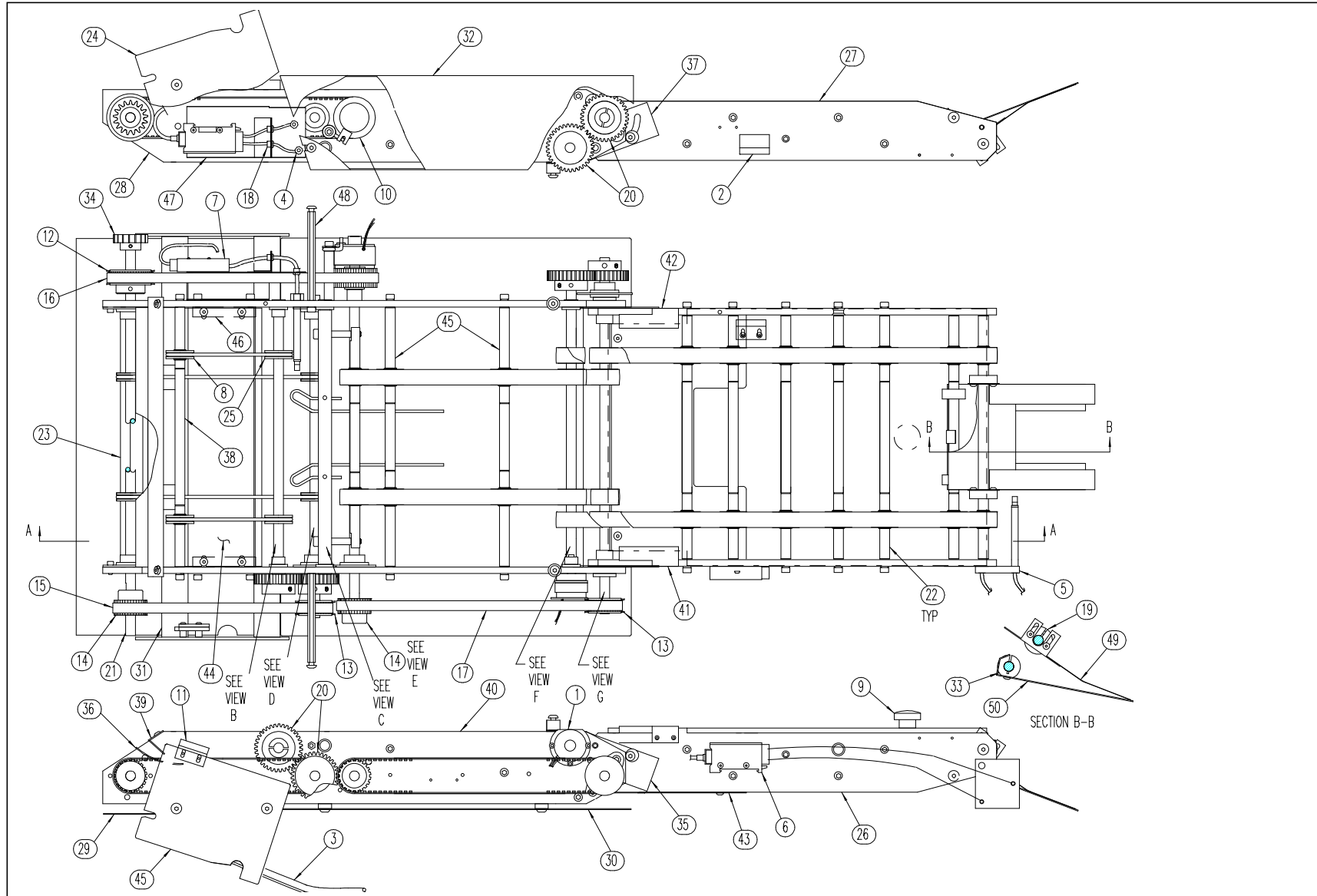
002D-19048, FOLDER ASSEMBLY, PAGE 5

INDEX	PART NUMBER	DESCRIPTION
1	186-034003873	MOTOR,120V
	186-034003872	MOTOR,220V
	186-031029637	(SET OF TWO MOTOR BRUSHES)
2	186-034003900	110-120V/PC BOARD
	186-034003899	220-240V/PC BOARD
3	186-032012435	PIN
4	186-032022136	PLATE
5	186-031029939	POTENTIOMETER
6	186-031037061	GROMMET
7	186-031027332	KNOB
8	186-031118010	SET SCREW
9	186-032012436	EXTENSION
10	186-034003910	WIRING HARNESS
11	186-032027503	BRACKET
12	186-034003874	PHOTODETECTOR
13	186-031029287	CABLE TIE
14	186-031029290	GROUND SCREW,M4
15	186-031029589	PLUG
16	186-031027284	SLEEVE
17	186-032001001	SPACER RING
18	186-034003925	CABLE
19	186-032026398	BRACKET
20	186-034004372	CABLE
21	186-031029368	OVERLOAD PROT. SWITCH,4A
	186-031029610	OVERLOAD PROT. SWITCH,2.5A

002D-19048, FOLDER ASSEMBLY, PAGE 6

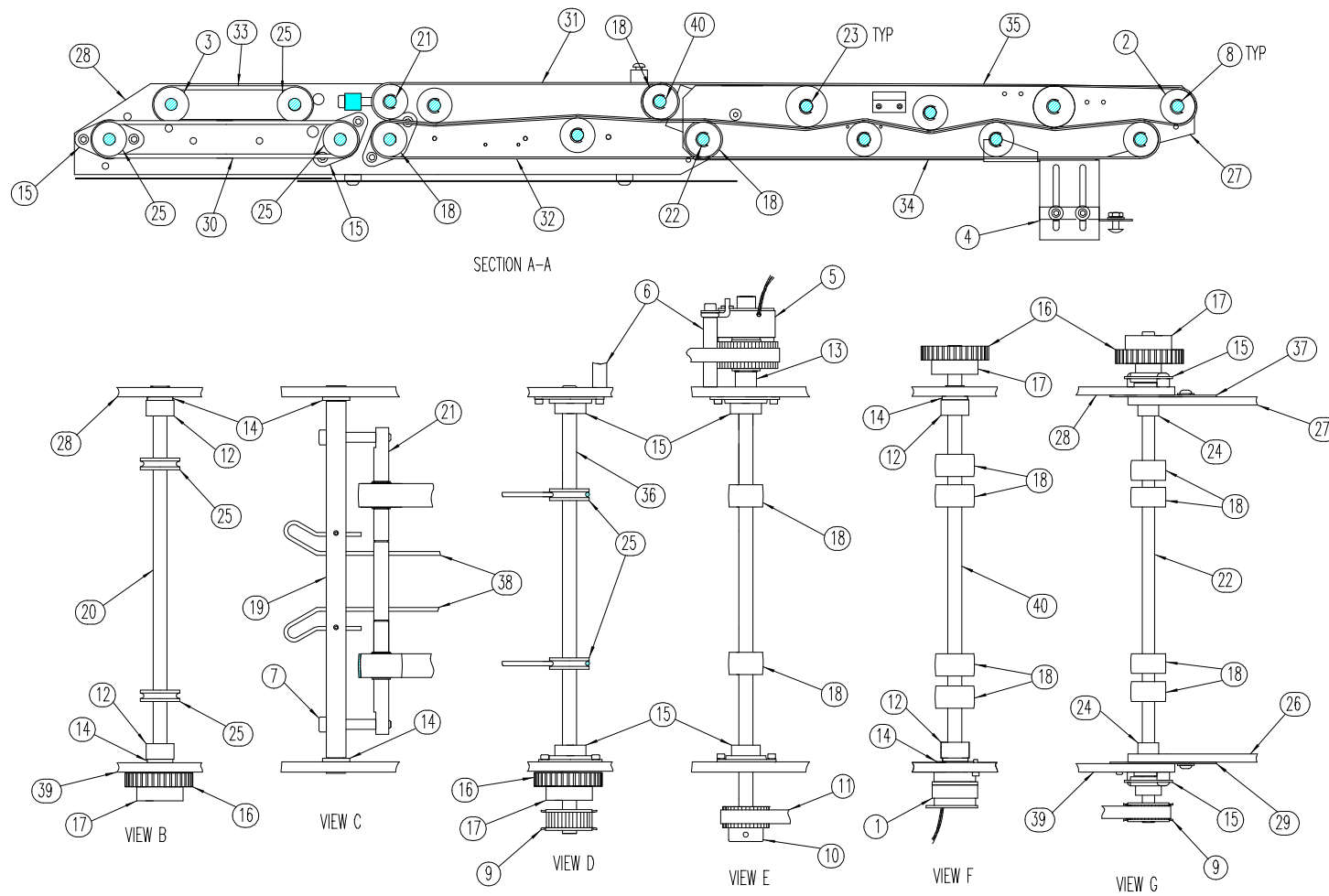
002D-19048, FOLDER ASSEMBLY, PAGE 6

INDEX	PART NUMBER	DESCRIPTION
1	186-032011949	KNURLED NUT
2	186-032016568	SHAFT
3	186-032012520	KNURLED SCREW
4	186-034001911	LEVER ASSEMBLY
5	186-032012350	KNURLED SCREW
6	186-032026556	PAPER STOP
7	186-031003044	SPRING
8	186-031043025	SCALE,INCH
9	186-031043024	SCALE,METRIC
10	186-031027183	SPACER DISK
	186-034002486	FOLD PLATE 1 ASSEMBLY

002D-17812, TRANSPORT CONVEYOR, PAGE 1

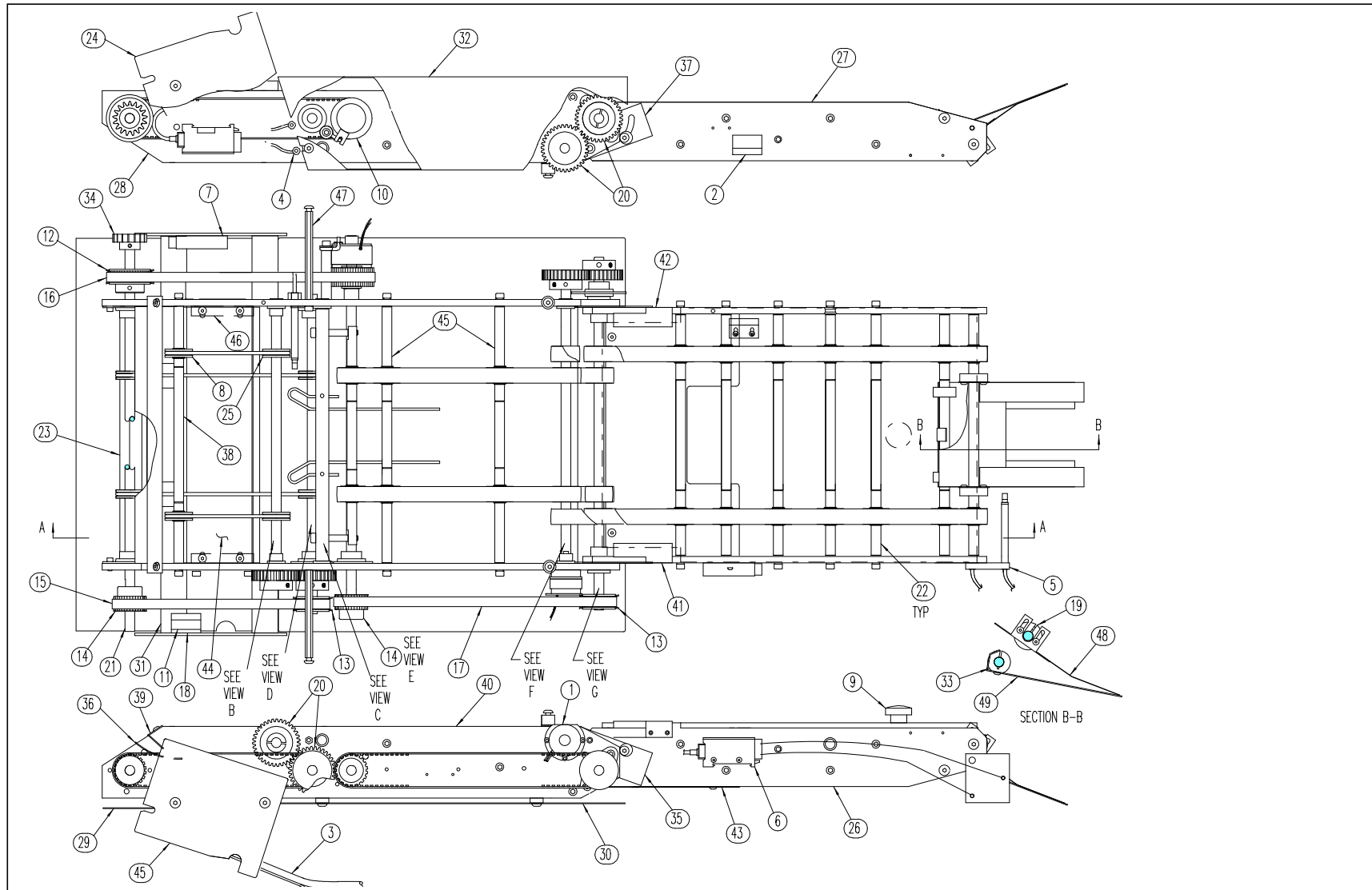
002D-17812, TRANSPORT CONVEYOR, PAGE 1

INDEX	PART NUMBER	DESCRIPTION			
1	002B-08408	BRAKE	25	600A-17700	DRIVE PULLEY
2	002B-08413	MAGNETIC EXTENSION	26	600C-17708	RIGHT RAIL
3	002D-08434	TRANSPORT CONVEYOR ELECT.	27	600C-17709	LEFT RAIL
4	002B-08457	CENTER SENSOR	28	600D-17724	LEFT SIDE PLATE
5	002B-08463	END SENSOR	29	600B-17725	CONVEYOR SHIELD
6	002B-08486	DISCHARGE SENSOR	30	600C-17728	CONVEYOR SHIELD
7	002B-08487	PACKAGE PRESSURE SENSOR	31	600B-17729	SUPPORT BAR
8	002A-18044	PULLEY	32	600C-17732	COVER
9	002C-18243	CONVEYOR COVER	33	600A-17733	COLLAR
10	002B-18850	CLUTCH/SHAFT ASSEMBLY	34	600A-17734	GEAR
	002B-08409	CLUTCH ONLY	35	600A-17735	RIGHT PIVOT STOP
	600B-18620	SHAFT ONLY	36	600B-17737	INFEED GUIDE
11	041-35701	INTERLOCK MAGNET	37	600A-17785	LEFT PIVOT STOP
12	112-200DBA25637	PULLEY,TIMING,25T	38	600A-17829	SHAFT
13	112-S6A320H3712	PULLEY,TIMING,20T	39	600B-17882	INFEED GUIDE
14	112-S6A320NF037	PULLEY,TIMING,20T	40	600D-18035	RIGHT SIDE PLATE
15	113-200180037	BELT,TIMING	41	600B-18108	RIGHT HINGE
16	113-200220037	BELT,TIMING	42	600B-18109	LEFT HINGE
17	113-200230037	BELT,TIMING	43	600C-18140	SHIELD
18	152-B187125	BUSHING,NYLON	44	600B-18540	PLATE
19	600A-16342-001	CLAMP COLLAR	45	600B-18567	SHAFT
20	600A-16349-031	GEAR,PLASTIC SPUR	46	600A-18568	MOUNT BLOCK
21	600B-17684	CONVEYOR DRIVE SHAFT	47	600B-19011	MOUNT BRACKET
22	600B-17693	SHAFT	48	600A-19061	STANDOFF
23	600B-17694	SHAFT	49	600B-19304	UPPER EXIT GUIDE
24	600B-17695	CONVEYOR SUPPORT	50	600B-19305	LOWER EXIT GUIDE

002D-17812, TRANSPORT CONVEYOR, PAGE 2

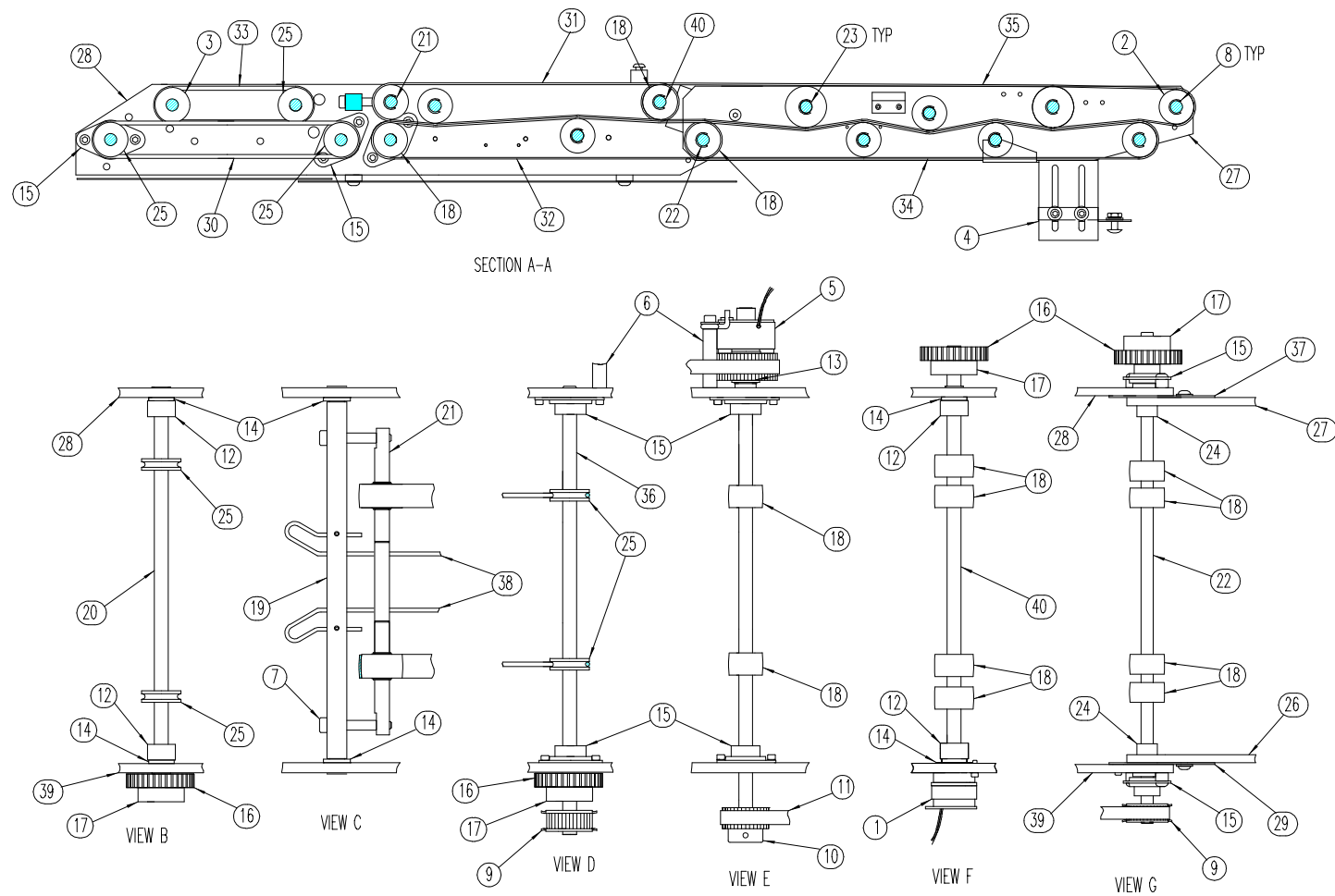
002D-17812, TRANSPORT CONVEYOR, PAGE 2

INDEX	PART NUMBER	DESCRIPTION			
1	002B-08408	BRAKE	21	600B-17689	NIP ROLLER IDLER
2	002A-17309	IDLER ROLLER	22	600B-17691	SHAFT, IDLER
3	002A-18044	PULLEY	23	600B-17693	SHAFT
4	002B-18366	CONVEYOR DOCKING PORT	24	600A-17697	BEARING
5	002B-18850	CLUTCH/SHAFT ASSEMBLY	25	600A-17700	DRIVE PULLEY
	002B-08409	CLUTCH ONLY	26	600C-17708	RIGHT RAIL SUPPORT
	600B-18620	SHAFT ONLY	27	600C-17709	LEFT RAIL SUPPORT
6	002A-19600	HOOK ASSEMBLY	28	600D-17724	LEFT SIDE PLATE
7	014-S91264A249	SHOULDER BOLT	29	600A-17735	RIGHT PIVOT STOP
8	019-200037	"E" RING	30	600B-17743	LOWER CONVEYOR BELT
9	112-S6A320H3712	PULLEY, TIMING, 20T	31	600B-17744	UPPER IDLER BELT
10	112-S6A320NF037	PULLEY, TIMING, 20T	32	600B-17745	LOWER NIP DRIVE BELT
11	113-200230037	BELT, TIMING	33	600A-17742	UPPER CONVEYOR BELT
12	126-SC37	SET SCREW COLLAR	34	600B-17746	LOWER EXIT BELT
13	152-B694	PLAIN BEARING	35	600B-17747	UPPER EXIT BELT
14	153-FB683	FLANGE BEARING	36	600B-17780	DRIVE SHAFT
15	158-S3PPB5ST	RADIAL BEARING	37	600A-17785	LEFT PIVOT STOP
16	600A-16349-031	GEAR, PLASTIC SPUR	38	600B-17888	PAPER GUIDE
17	600A-16349-034	HUB CLAMP	39	600D-18035	RIGHT SIDE PLATE
18	600A-17224	DRIVE ROLLER	40	600B-18621	SHAFT
19	600B-17683	NIP WHEEL PIVOT BAR			
20	600B-17688	UPPER DRIVE SHAFT			

002D-18652, 11" TRANSPORT CONVEYOR, PAGE 1

002D-18652, 11" TRANSPORT CONVEYOR, PAGE 1

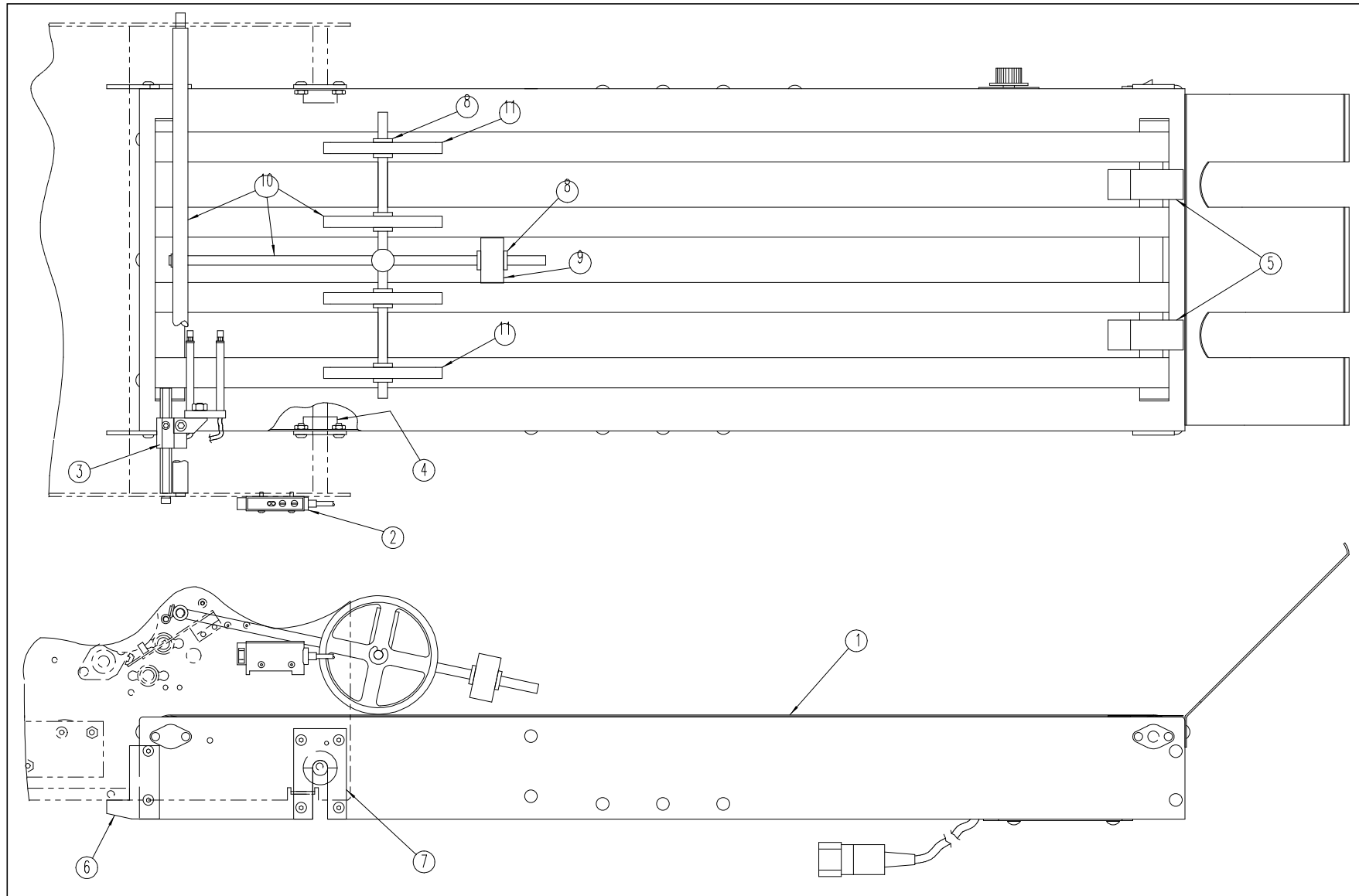
INDEX	PART NUMBER	DESCRIPTION			
1	002B-08408	BRAKE	25	600A-17700	DRIVE PULLEY
2	002B-08413	MAGNETIC EXTENSION	26	600C-17708	RIGHT RAIL
3	002D-08434	TRANSPORT CONVEYOR ELECT.	27	600C-17709	LEFT RAIL
4	002B-08457	CENTER SENSOR	28	600D-17724	LEFT SIDE PLATE
5	002B-08463	END SENSOR	29	600B-18634	CONVEYOR SHIELD
6	002B-08486	DISCHARGE SENSOR	30	600C-18633	CONVEYOR SHIELD
7	002B-08487	PACKAGE PRESSURE SENSOR	31	600B-18647	SUPPORT BAR
8	002A-18044	PULLEY	32	600E-18632	COVER
9	002C-18717	CONVEYOR COVER	33	600A-17733	COLLAR
10	002B-19599	CLUTCH/SHAFT ASSEMBLY	34	600A-17734	GEAR
	002B-08409	CLUTCH ONLY	35	600A-17735	RIGHT PIVOT STOP
	600B-18635	SHAFT ONLY	36	600B-18637	INFEED GUIDE
11	041-35701	INTERLOCK MAGNET	37	600A-17785	LEFT PIVOT STOP
12	112-200DOA25637	PULLEY,TIMING,25T	38	600A-18639	SHAFT
13	112-S6A320H3712	PULLEY,TIMING,20T	39	600B-18702	INFEED GUIDE
14	112-S6A320NF037	PULLEY,TIMING,20T	40	600D-18035	RIGHT SIDE PLATE
15	113-200180037	BELT,TIMING	41	600B-18108	RIGHT HINGE
16	113-200220037	BELT,TIMING	42	600B-18109	LEFT HINGE
17	113-200230037	BELT,TIMING	43	600C-18716	SHIELD
18	600A-18654	SENSOR BRACKET	44	600B-18636	PLATE
19	600A-16342-001	CLAMP COLLAR	45	600B-18640	SHAFT
20	600A-16349-031	GEAR,PLASTIC SPUR	46	600A-18568	MOUNT BLOCK
21	600B-18644	CONVEYOR DRIVE SHAFT	47	020-HS31020830	STANDOFF
22	600B-18649	SHAFT	48	600B-19304	UPPER EXIT GUIDE
23	600B-18646	SHAFT	49	600B-19305	LOWER EXIT GUIDE
24	600B-17695	CONVEYOR SUPPORT			

002D-18652, 11" TRANSPORT CONVEYOR, PAGE 2

002D-17812, 11" TRANSPORT CONVEYOR, PAGE 2

INDEX	PART NUMBER	DESCRIPTION			
1	002B-08408	BRAKE	21	600B-17689	NIP ROLLER IDLER
2	002A-17309	IDLER ROLLER	22	600B-18648	SHAFT, IDLER
3	002A-18044	PULLEY	23	600B-18649	SHAFT
4	002B-18366	CONVEYOR DOCKING PORT	24	600A-17697	BEARING
5	002B-19599	CLUTCH/SHAFT ASSEMBLY	25	600A-17700	DRIVE PULLEY
	002B-08409	CLUTCH ONLY	26	600C-17708	RIGHT RAIL SUPPORT
	600B-18635	SHAFT ONLY	27	600C-17709	LEFT RAIL SUPPORT
6	002A-19600	HOOK ASSEMBLY	28	600D-17724	LEFT SIDE PLATE
7	014-S91264A249	SHOULDER BOLT	29	600A-17735	RIGHT PIVOT STOP
8	019-200037	"E" RING	30	600B-17743	LOWER CONVEYOR BELT
9	112-S6A320H3712	PULLEY, TIMING, 20T	31	600B-17744	UPPER IDLER BELT
10	112-S6A320NF037	PULLEY, TIMING, 20T	32	600B-17745	LOWER NIP DRIVE BELT
11	113-200230037	BELT, TIMING	33	600A-17742	UPPER CONVEYOR BELT
12	126-SC37	SET SCREW COLLAR	34	600B-17746	LOWER EXIT BELT
13	016-S0375062512	SHIM	35	600B-17747	UPPER EXIT BELT
14	153-FB683	FLANGE BEARING	36	600B-18640	DRIVE SHAFT
15	158-S3PPB5ST	RADIAL BEARING	37	600A-17785	LEFT PIVOT STOP
16	600A-16349-031	GEAR, PLASTIC SPUR	38	600B-17888	PAPER GUIDE
17	600A-16349-034	HUB CLAMP	39	600D-18035	RIGHT SIDE PLATE
18	600A-17224	DRIVE ROLLER	40	600B-18643	SHAFT
19	600B-18645	NIP WHEEL PIVOT BAR			
20	600B-18650	UPPER DRIVE SHAFT			

002E-19056, STRAIGHT CONVEYOR, PAGE 1

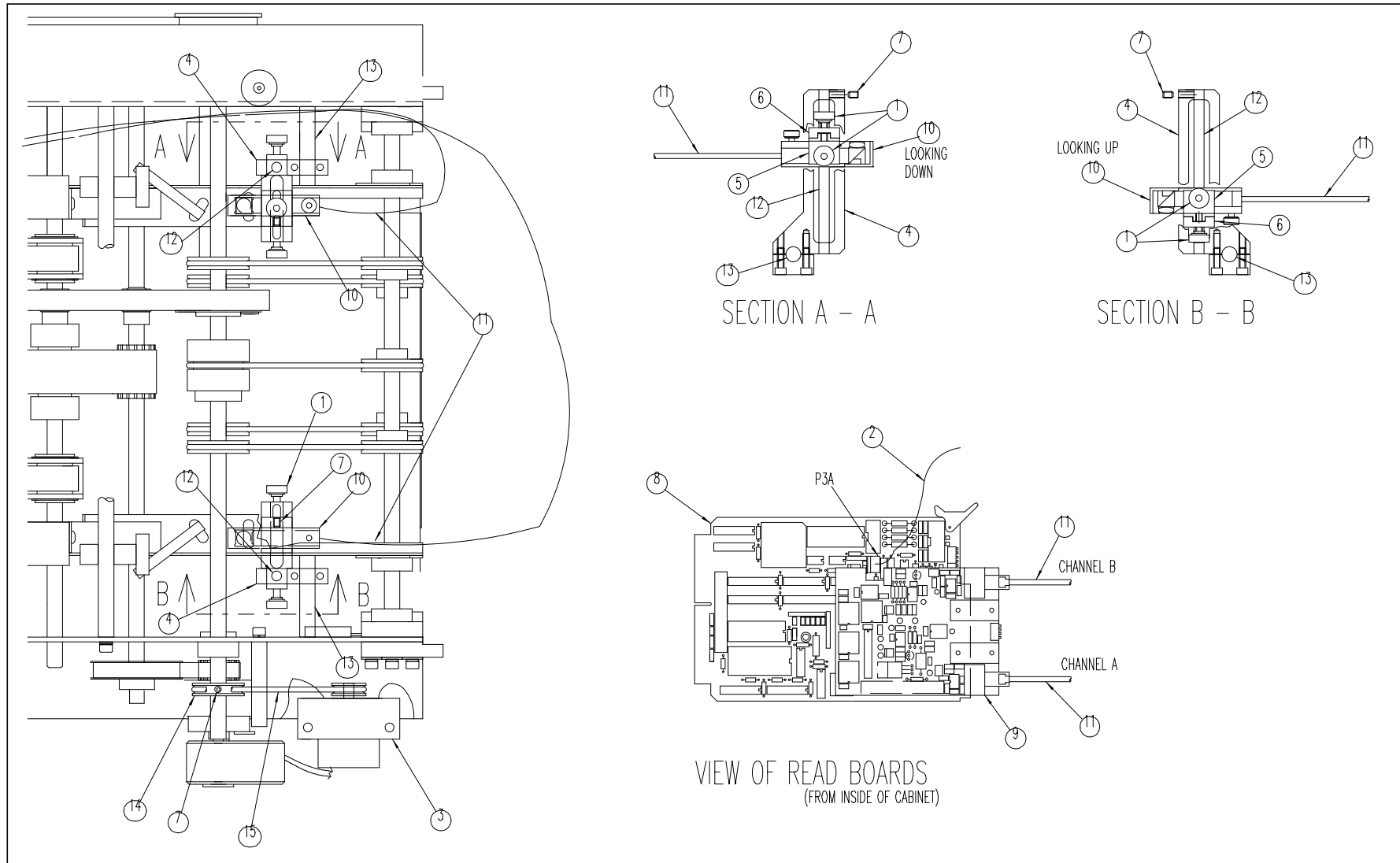


002E-19056, STRAIGHT CONVEYOR, PAGE 1

INDEX	PART NUMBER	DESCRIPTION
1	002D-08053	EXIT CONVEYOR
2	002B-08570	SENSOR
3	002B-19404	EXIT SENSOR
4	124-15914	SPLIT CLAMP COLLAR
5	600A-18855	EXIT GLIDE STRIP
6	600A-19057	REAR ANCHOR BLOCK
7	600A-19058	SIDE REINFORCEMENT BLOCK
8	186-031027342	CLAMP RING CLIP
9	186-032012468	ROLLER WEIGHT
10	186-034001925	STACKING WHEEL ASSEMBLY
11	186-034003980	PRESSURE WHEEL

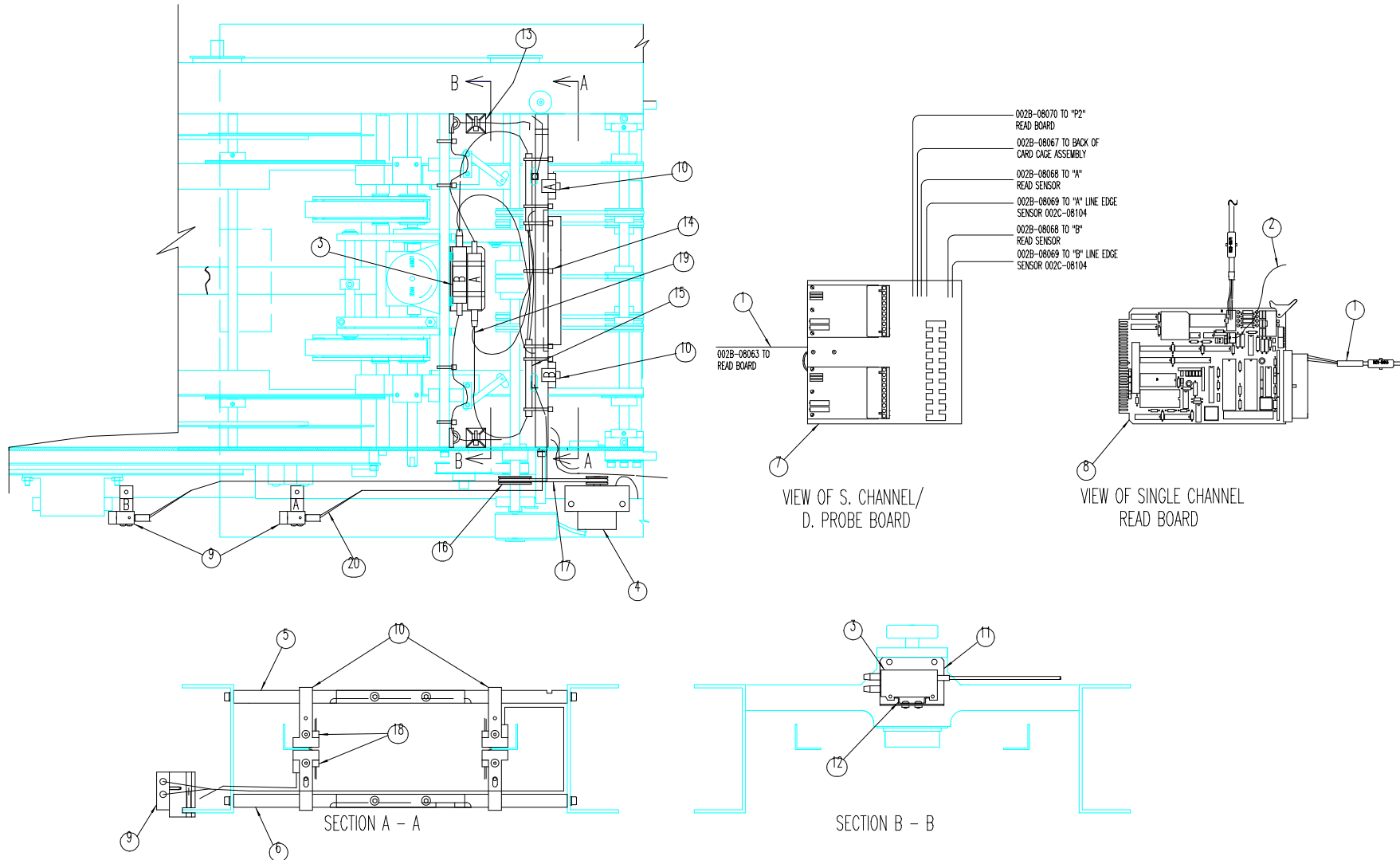
002E-19056, STRAIGHT CONVEYOR, PAGE 2

INDEX	PART NUMBER	DESCRIPTION			
1	186-37123432	C-CLIP	27	186-37123612	SCREW,#6-32 X .25
2	186-37CD30013	PIVOT,STACKER WHEEL ROD	28	186-37123614	SCREW,#6-32 X .50
3	186-37CD30014	BAIL WELDMENT	29	186-37123299	SPACER
4	186-37123081	C-CLIP	30	186-3790100500	P.C. BOARD
5	186-37CD30011	ROD,STACKER WHEEL		186-379010050	P.C. BOARD (before s/n 51284)
6	186-37123017	SCREW,#10-32 X .25	31	186-37CD40105	ELECTRICAL CABINET
7	186-37CD30059	CLAMP PLATE		186-37CD40005	ELECT. CAB. (before s/n 51284)
8	186-377112009	SPRING	32	186-37123607	WIRE CLAMP
9	186-375050056	STACKER WHEEL PIVOT ASM	33	186-37123237	STAR WASHER,#10
10	186-37CD30061	PIN	34	186-37123601	MOTOR PULLEY,14XL
11	186-37123080	C-CLIP,.187	35	186-37CD30106	MOTOR BRACKET
12	186-37CD30021	STACKER WHEEL		186-37CD30006	MOTOR BRKT(before s/n 51284)
13	186-37CD40006A	BODY CLOSURE	36	186-37123913	MOTOR
14	186-375050040A	DRIVE ROLLER		186-37CD40118	MOTOR ASSEMBLY
15	186-37123309	CONVEYOR TAPE		186-37123690	MOTOR(before s/n 51284)
16	186-37CD30017A	RECEIVING TRAY		186-37CD40018	MOTOR ASM(before s/n 51284)
17	186-37123036	ROLL PIN	37	186-37CD30023	WIRE HARNESS,FUSE SWITCH
18	186-37123102	PULLEY	38	186-37123680	FUSE,.5A,250V(115V,60HZ)
19	186-37123139	TIMING BELT		186-37123725	FUSE,.25A,250V(115V,50HZ)
20	186-379010352	BEARING HOUSING ASSEMBLY	39	186-37123089	FUSE HOLDER
21	186-37123275	SCREW,#6-32 X .25	40	186-37123301	STRAIN RELIEF
22	186-37123305	INDICATOR PLATE	41	186-37CD30025	POWER CORD
23	186-37123314	KNOB	42	186-37CD30032	FUSE SHIELD
24	186-37CD30120	POTENTIOMETER ASSEMBLY	43	186-37123252	STAR WASHER,#6
	186-37CD30020	POT. ASM (before s/n 51284)	44	186-37CD30022	WIRE HARNESS,TRANS. SWITCH
25	186-37123664	POWER SWITCH	45	186-37CD40009	CENTER SUPPORT
26	186-37CD30130	TRANSFORMER,115V,60HZ	46	186-37CD40003A	CONVEYOR BODY
	186-37CD30030	TRANS.,115V(before s/n 51284)	47	186-37123620	RUBBER FOOT(table top model)
	186-37CD30140	TRANSFORMER,220V,50HZ	48	186-375050041	IDLER ROLLER
	186-37CD30040	TRANS.,220V(before s/n 51284)			

706-25697-400, T.J. LINE CODE READ OPTION

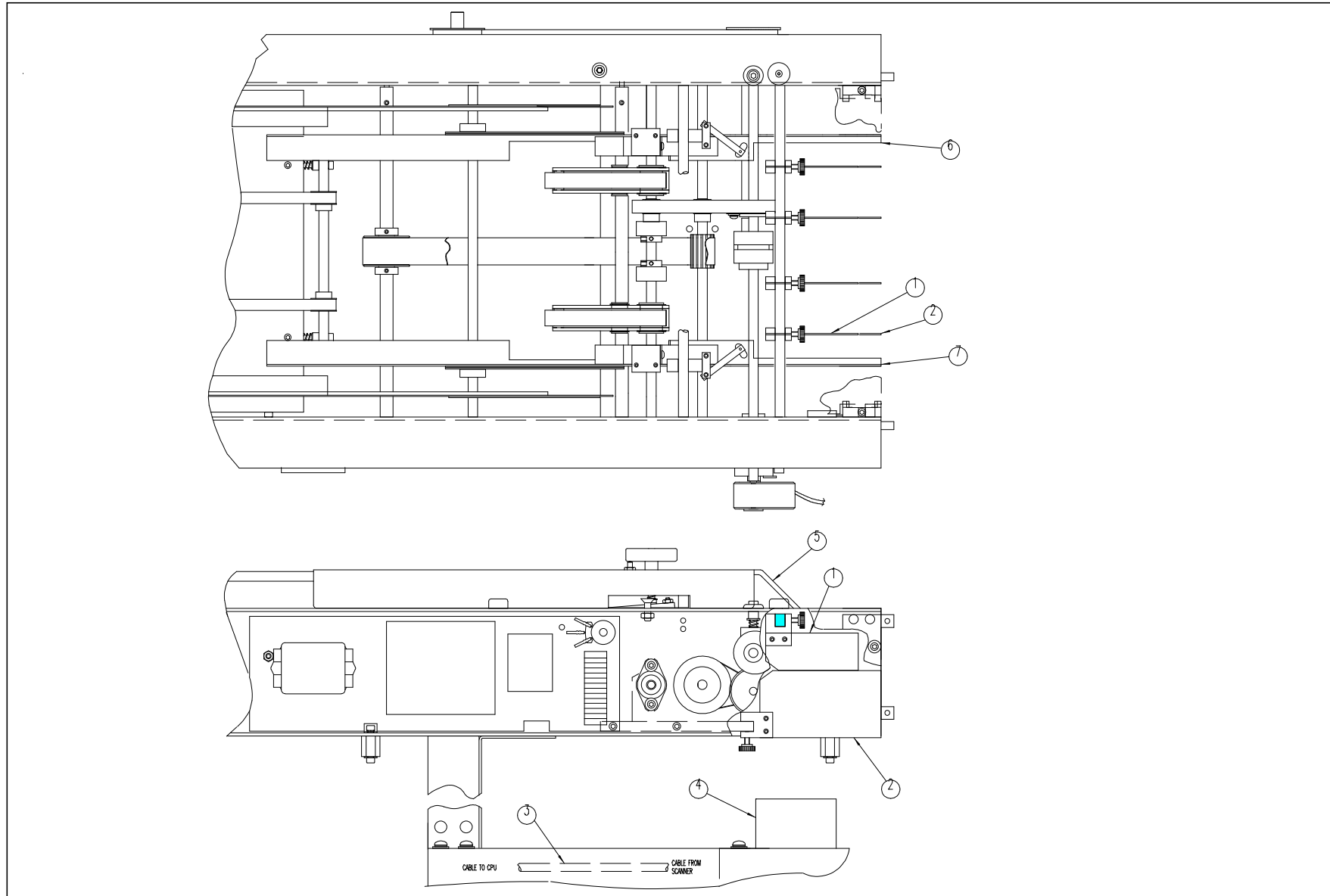
706-25697-400, T.J. LINE CODE READ OPTION

INDEX	PART NUMBER	DESCRIPTION
1	002A-16457-004	THUMBSCREW
2	002B-08126	DUAL READ ENCODER CABLE
3	002B-18518	ENCODER
4	007-25586-600	READ HEAD ADJUST BRACKET
5	007-26925-600	BRACKET,MOUNT
6	007-26926-600	BRACKET,READER
7	014-082511040	SHSS,#8-32 X .25,BRASS TIP
8	042-25272-500	SINGLE CHANNEL READ BOARD
9	042-26622-500	GBR OMR SBX ASSEMBLY
10	088-25588-500	READ HEAD ASSEMBLY
11	192-50122302B	FIBER OPTIC READER PROBE
12	595-25585-600	SHAFT
13	595-25698-600	STUB SHAFT
14	600A-18374	PULLEY
15	600A-18378	BELT

002K-08066, B & H LINE CODE READER

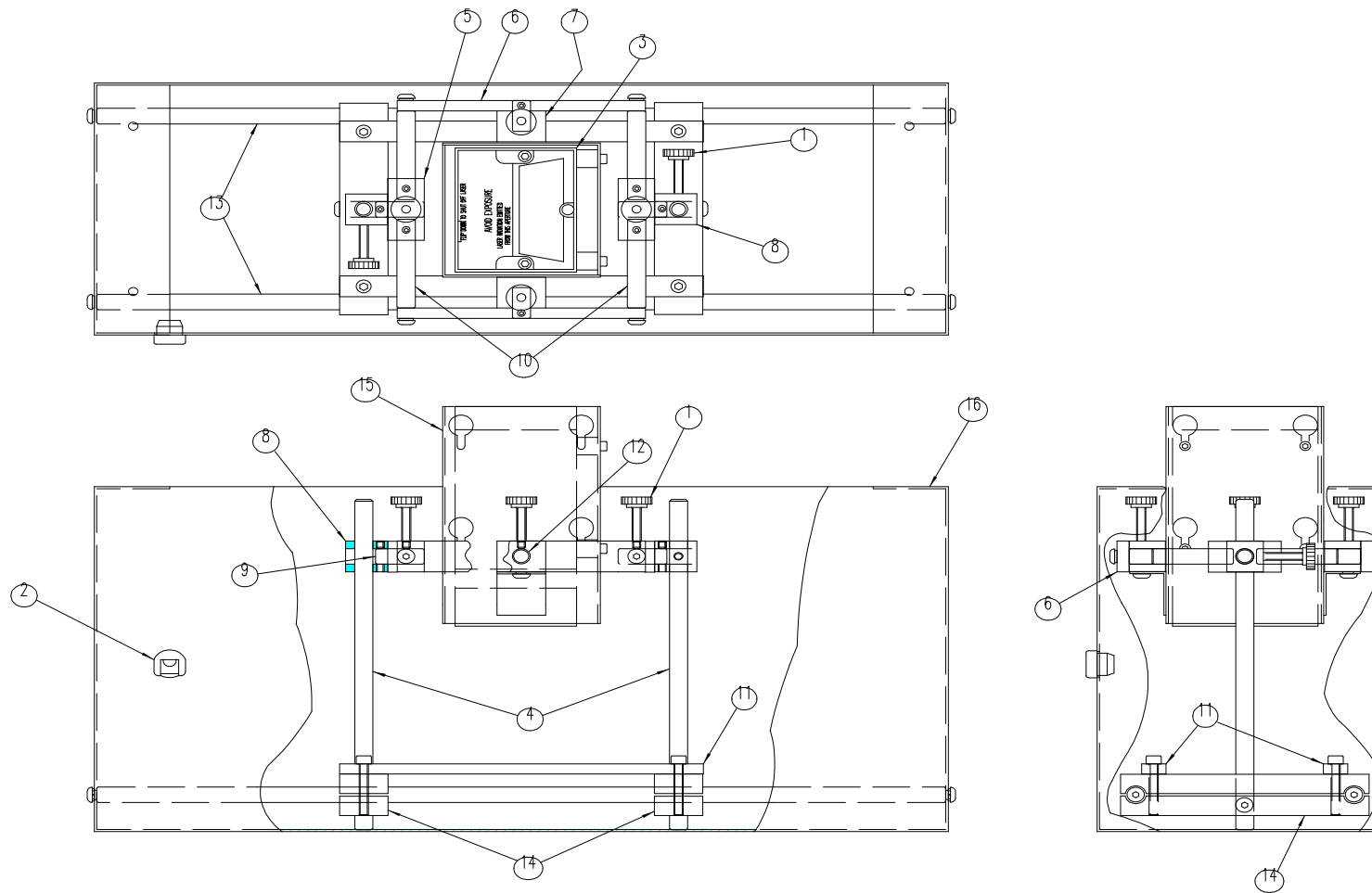
002K-08066, B & H LINE CODE READER

INDEX	PART NUMBER	DESCRIPTION
1	002B-08063	DUAL PROBE OUTPUT CABLE
2	002B-08126	DUAL READ ENCODER CABLE
3	002B-08407	LINE CODE SENSOR
4	002B-18518	ENCODER ASSEMBLY
5	002B-19351	TOP PROBE MOUNTING BAR
6	002B-19352	BOTTOM PROBE MOUNT
7	002C-08013	S. CHANNEL-D.PROBE PLATE
8	002C-08101A	SINGLE CHANNEL READ BOARD
9	002C-08104	OMR FIBER – SENSOR ASSEMBLY
10	002B-19353	READ BLOCK
11	007-26389-600	BRACKET
12	024-26390-600	DIN RAIL
13	026-ABMMA	TIE WRAP ANCHOR
14	026-PLT1MM	TIE WRAP
15	140-02500170E2	TUBING,.25, 3" LONG
16	600A-18374	PULLEY
17	600A-18378	BELT
18	600A-19261	SENSOR MOUNT
19	057-FT500	SENSOR FIBER
20	186-330525774	SENSOR

002K-20772, BAR CODE READER (3 OF 9)

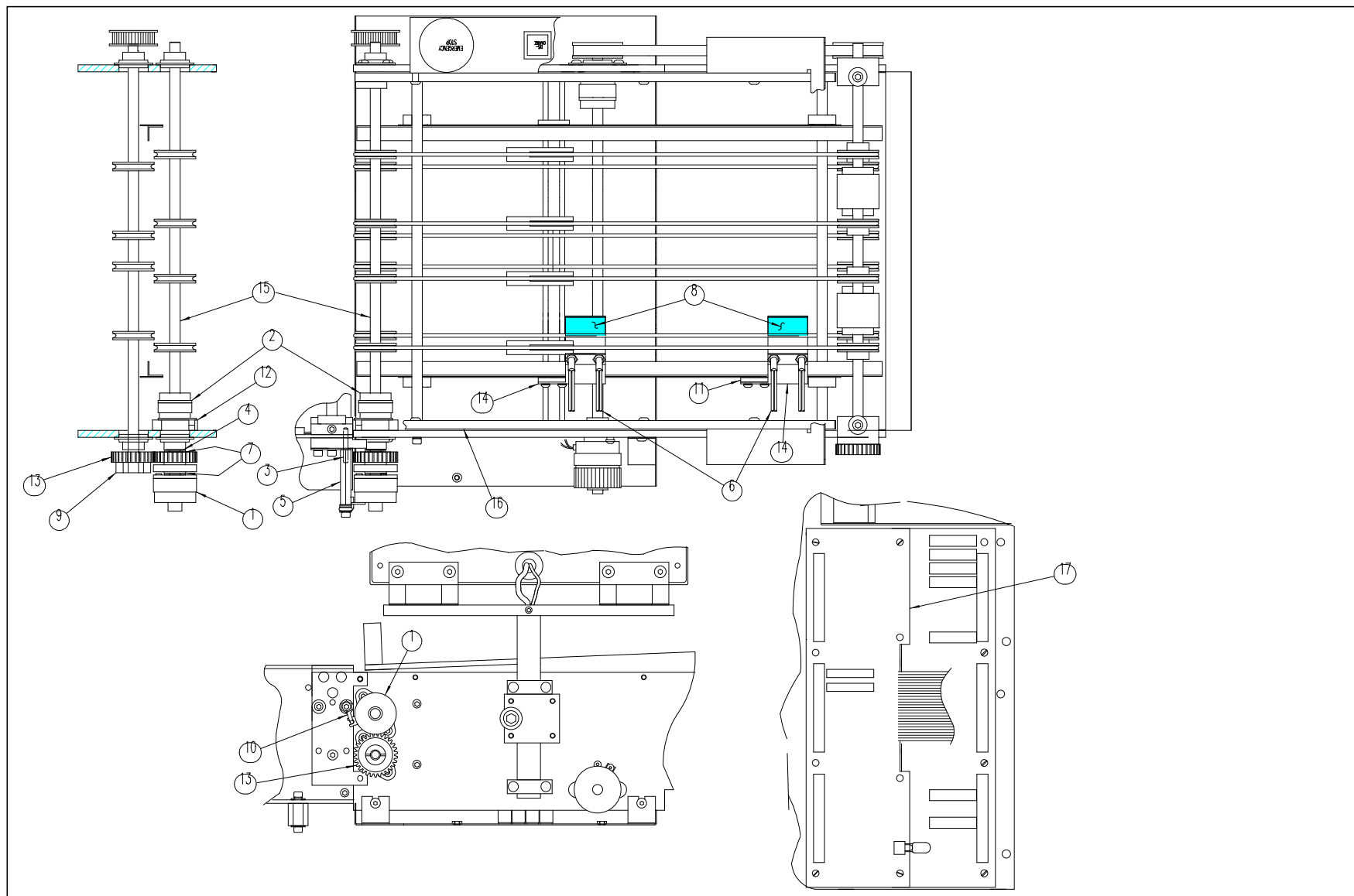
00K-20772, BAR CODE READER (3 OF 9)

INDEX	PART NUMBER	DESCRIPTION
1	002A-20916	UPPER PAPER GUIDE
2	002A-20917	LOWER PAPER GUIDE
3	002B-07757	SCANNER CABLE
4	002D-20739	LASER SCANNER ASSEMBLY
5	002D-20746	SINGULATOR COVER
6	600D-20727	LEFT PAPER GUIDE RAIL
7	600D-20728	RIGHT PAPER GUIDE RAIL

002D-20739, LASER SCANNER ASSEMBLY

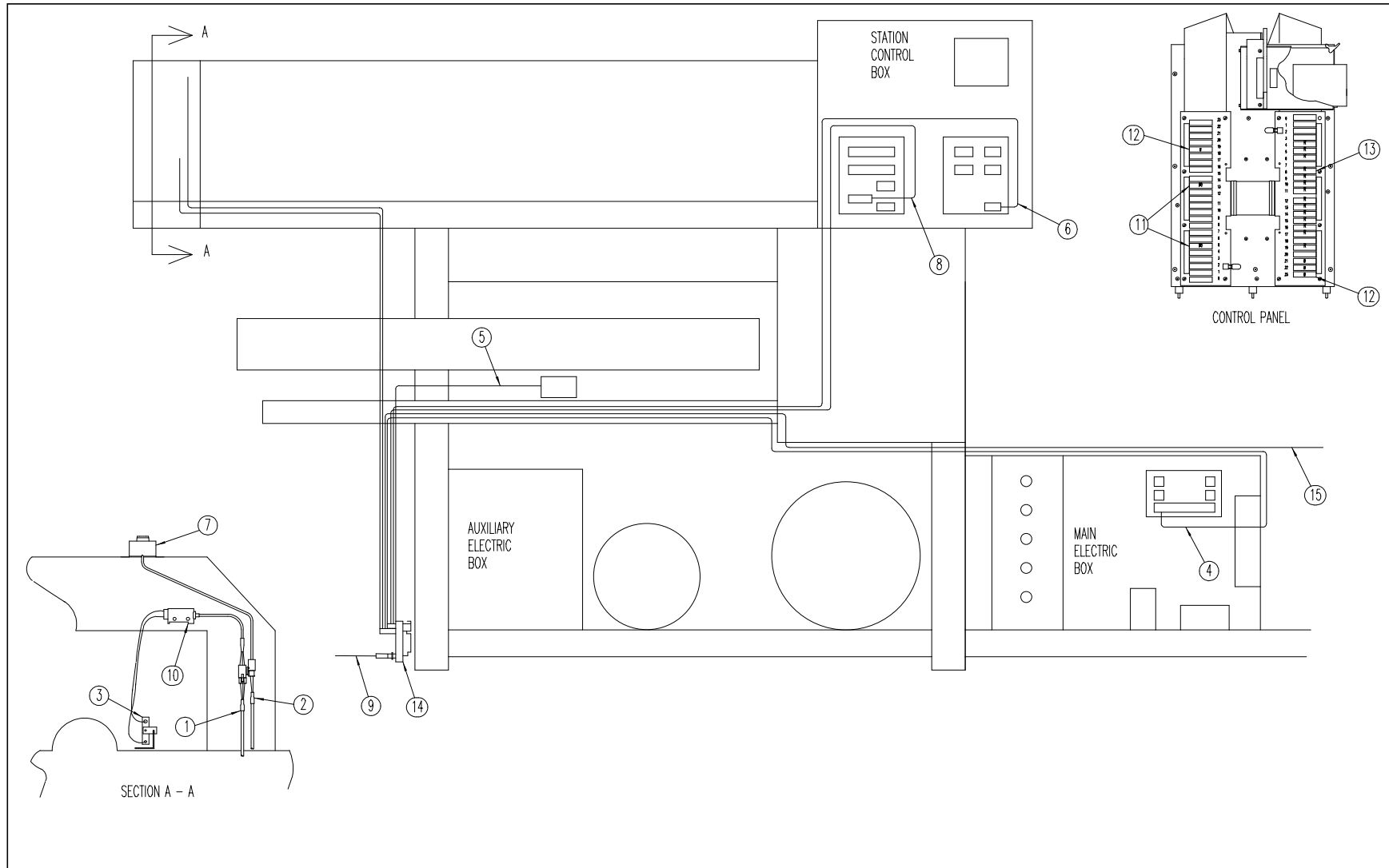
002D-20739, LASER SCANNER ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	002A-16496-009	THUMBSCREW
2	026-1200	STRAIN RELIEF BUSHING
3	088-01MRB01302	LASER SCANNER
4	332-375	PRECISION SHAFT
5	600A-20700	"Y" SWIVEL BLOCK
6	600A-20770	"X-Y" SIDE PLATE
7	600A-20771	"X"SWIVEL BLOCK
8	600A-20830	"Y" UP SWIVEL BLOCK
9	600A-20831	"Y" SWIVEL SHAFT
10	600A-20832	SWIVEL SHAFT
11	600A-20836	LASER SCANNER SPACER
12	600A-20849	"X" SWIVEL SHAFT
13	600B-20703	GUIDE SHAFT
14	600B-20769	HEIGHT CONTROL BRACKET
15	600C-20701	LASER SCANNER HOUSING
16	600D-20704	WELDED BOX

002K-21390, FIRST PAGE HOLD KIT

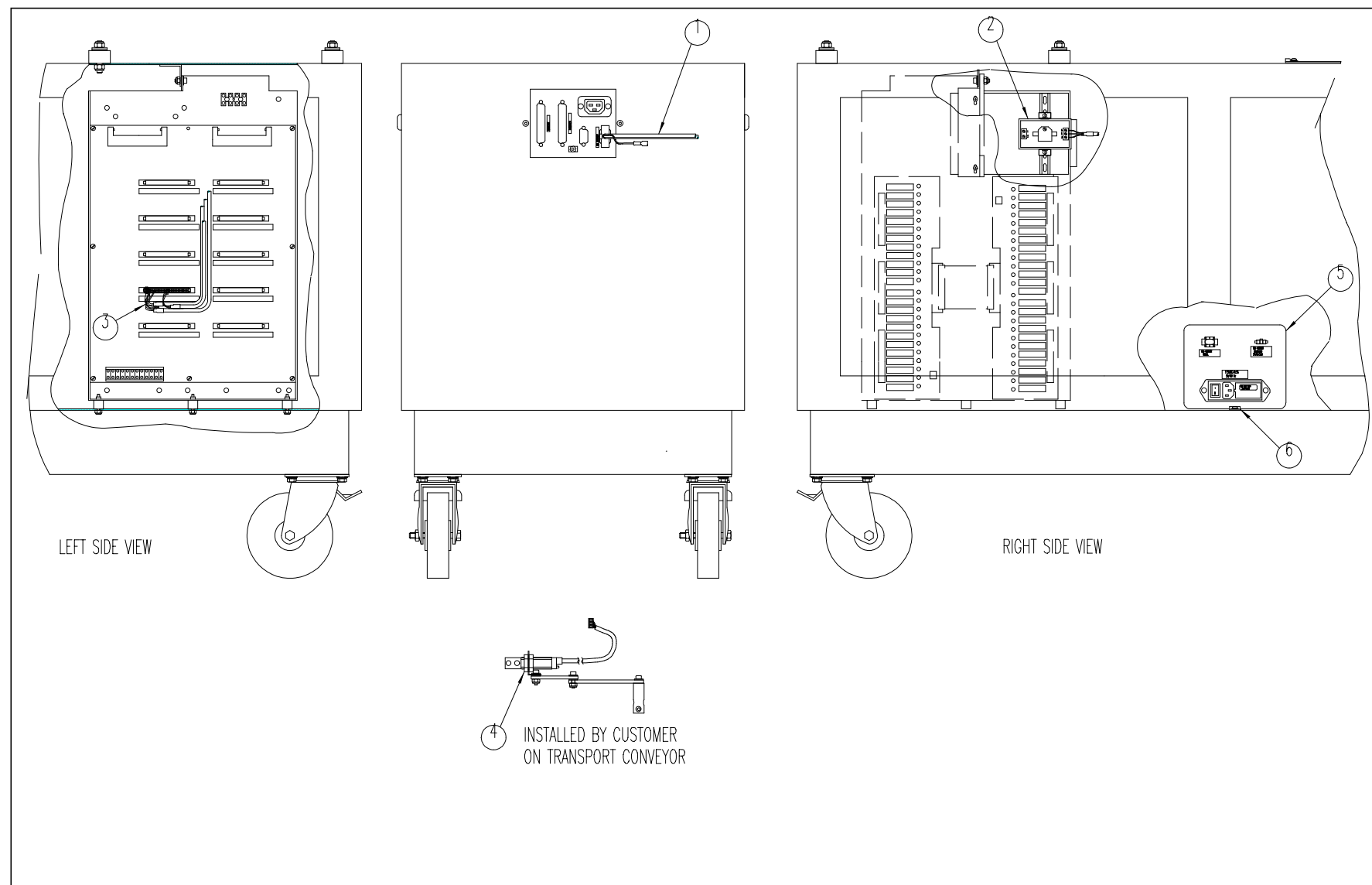
002K-21390, FIRST PAGE HOLD KIT

INDEX	PART NUMBER	DESCRIPTION
1	002B-07746	CLUTCH
2	002B-08414	BRAKE
3	014-10251120	SHSS,#10-32 X 1.25
4	016-S0375062501	SHIM,.01 THICK
5	020-HA01020632	STANDOFF,#10-32 X 2"
6	057-E32CC200	SENSOR FIBERS
7	163-EUT061201	THRUST BEARING
8	188-231WW	REFLECTIVE TAPE
9	600A-16349-034	HUB CLAMP
10	600A-18200	CLUTCH STOP
11	600A-18704	SPAN BLOCK
12	600A-20796	BRAKE MOUNT
13	600B-16349-027	SPUR GEAR
14	600B-19006	"C" SENSOR BRACKET
15	600B-20768	SHAFT
16	600B-20795	RIGHT COVER SLIDE MOD
17	002D-07755	FIRST PAGE HOLD CONTROL PANEL

002K-08133, 775 LEFT-HAND 6-STATION INSERTER KIT

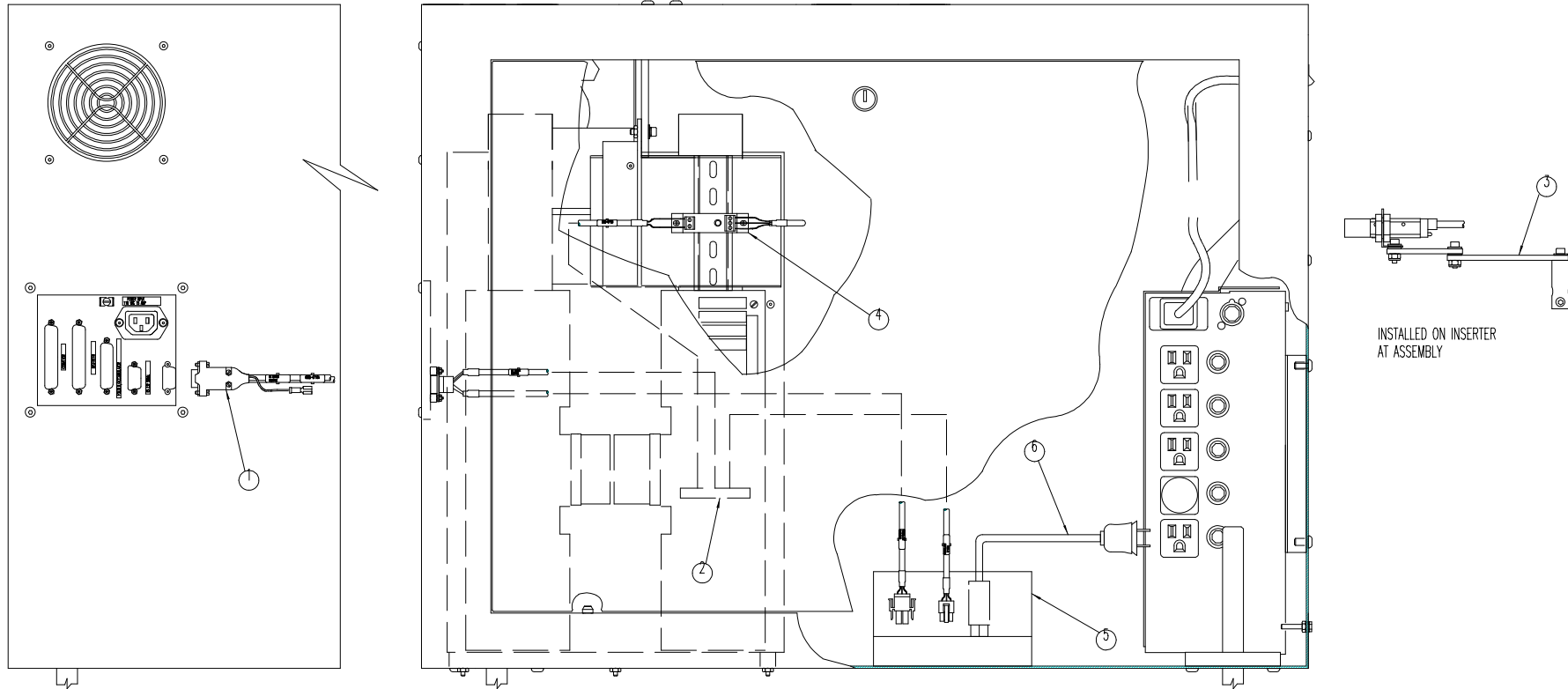
002K-08133, 775 LEFT-HAND 6-STATION INSERTER KIT

INDEX	PART NUMBER	DESCRIPTION
1	002B-08019	STATION #1 SENSOR CABLE
2	002B-08021	STATION ERROR T.B. CABLE
3	002B-08024	STATION #1 SENSOR ASSEMBLY
4	002B-08046	ELECTRIC BOX CABLE
5	002B-08051	ENCODER CABLE
6	002B-08052	CABLE B,6-STATION CONTROL
7	002B-08056	ERROR INDICATOR LAMP
8	002B-08120	CABLE A,6-STATION CONTROL
9	002C-08132	INTERCONNECT CABLE
10	002B-08213	SENSOR AMPLIFIER
11	030-SMIDCF	MODULE,WHT,SM-IDC-F
12	030-SMIDC5	MODULE,WHT,SM-IDC5
13	030-SMODC5	MODULE,RED,SM-ODC5
14	042-2281115	CONNECTOR BOARD,37 SUB D
15	526-26040-500	775 POSTAL METER INTERFACE CABLE

002K-23756, INK MARKER OPTION (BELL & HOWELL)

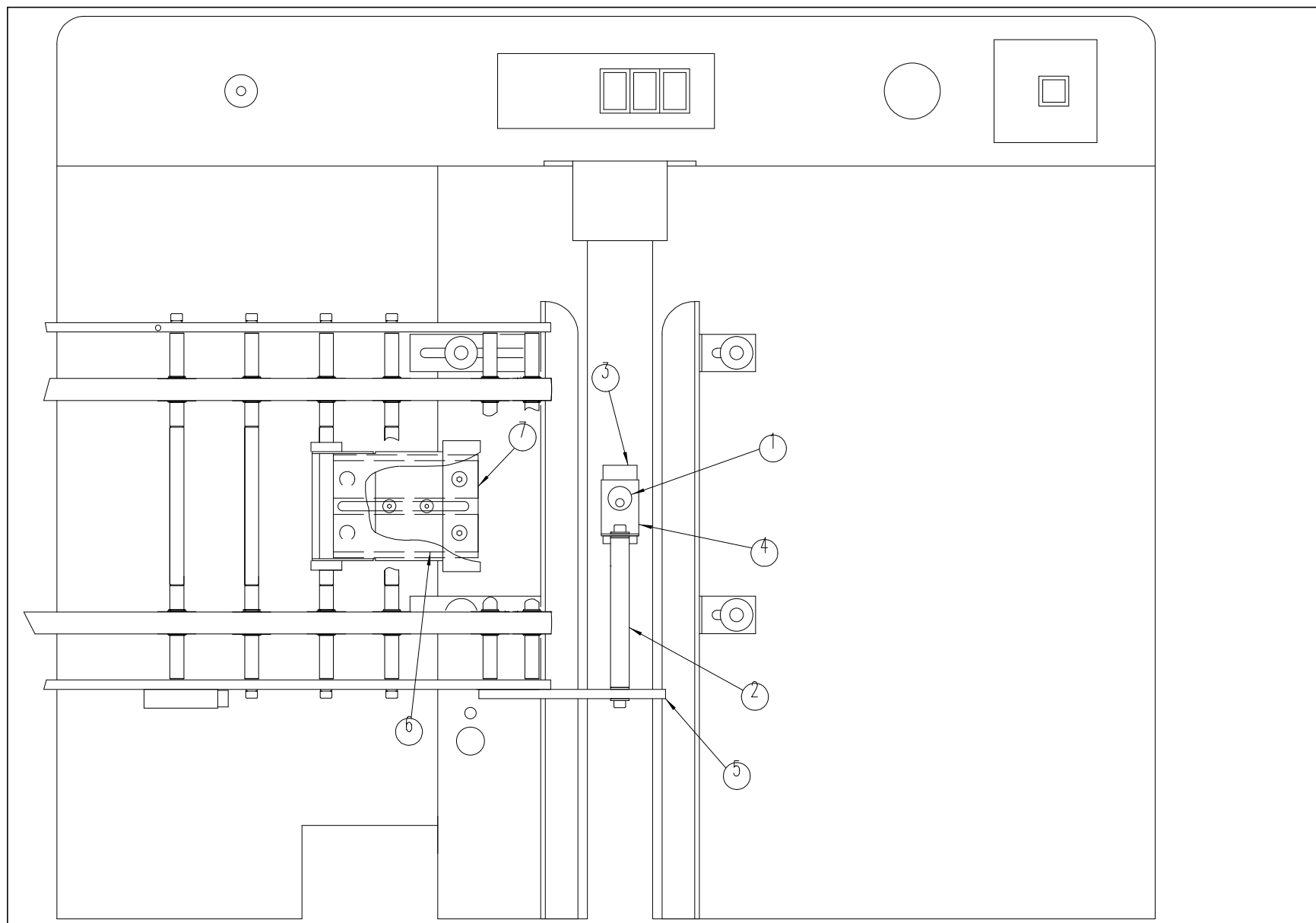
002K-23756, INK MARKER OPTION (BELL & HOWELL)

INDEX	PART NUMBER	DESCRIPTION
1	002B-07186	INK MARKER INTERFACE CABLE
2	002B-07187	SENSOR INPUT MODULE
3	002B-07188	MODULE 9 INTERFACE CABLE
4	002B-23702	SENSOR ASSEMBLY
5	002C-07200	INK MARKER CONTROL BOX
6	007-24265-600	HOLD DOWN BRACKET

389-26066-400, INK MARKER KIT

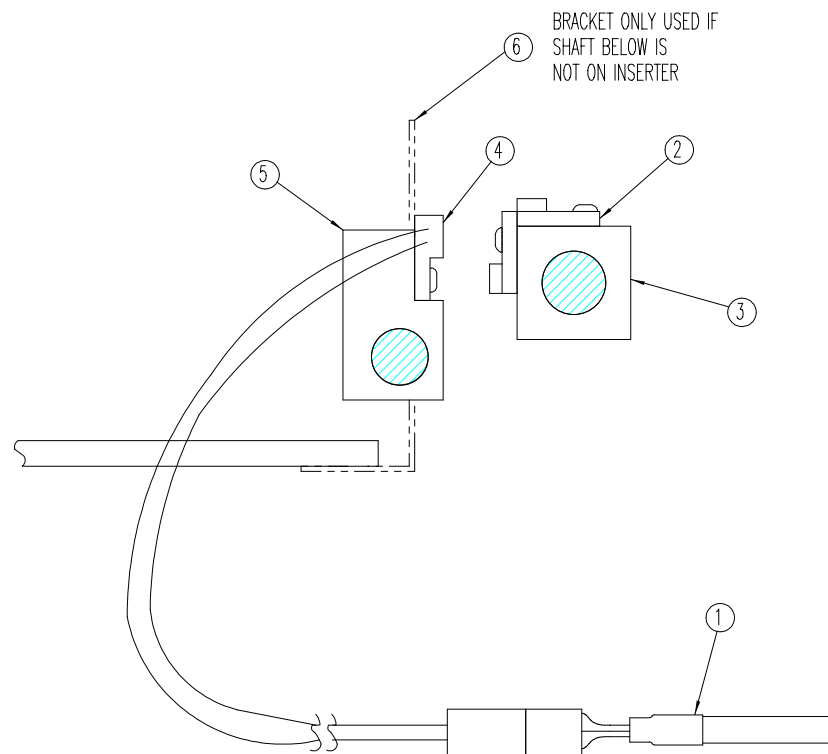
389-26066-400, INK MARKER KIT

INDEX	PART NUMBER	DESCRIPTION
1	002B-07186	INK MARKER INTERFACE CABLE
2	002B-07188	MODULE 9 INTERFACE CABLE
3	002B-23702	SENSOR ASSEMBLY
4	002B-08540	CABLE
	030-26071-000	MODULE
5	042-26080-500	INK MARKER DRIVE UNIT
6	526-26067-500	POWER CABLE

002K-21395, OPEN FEED SENSOR ASSEMBLY

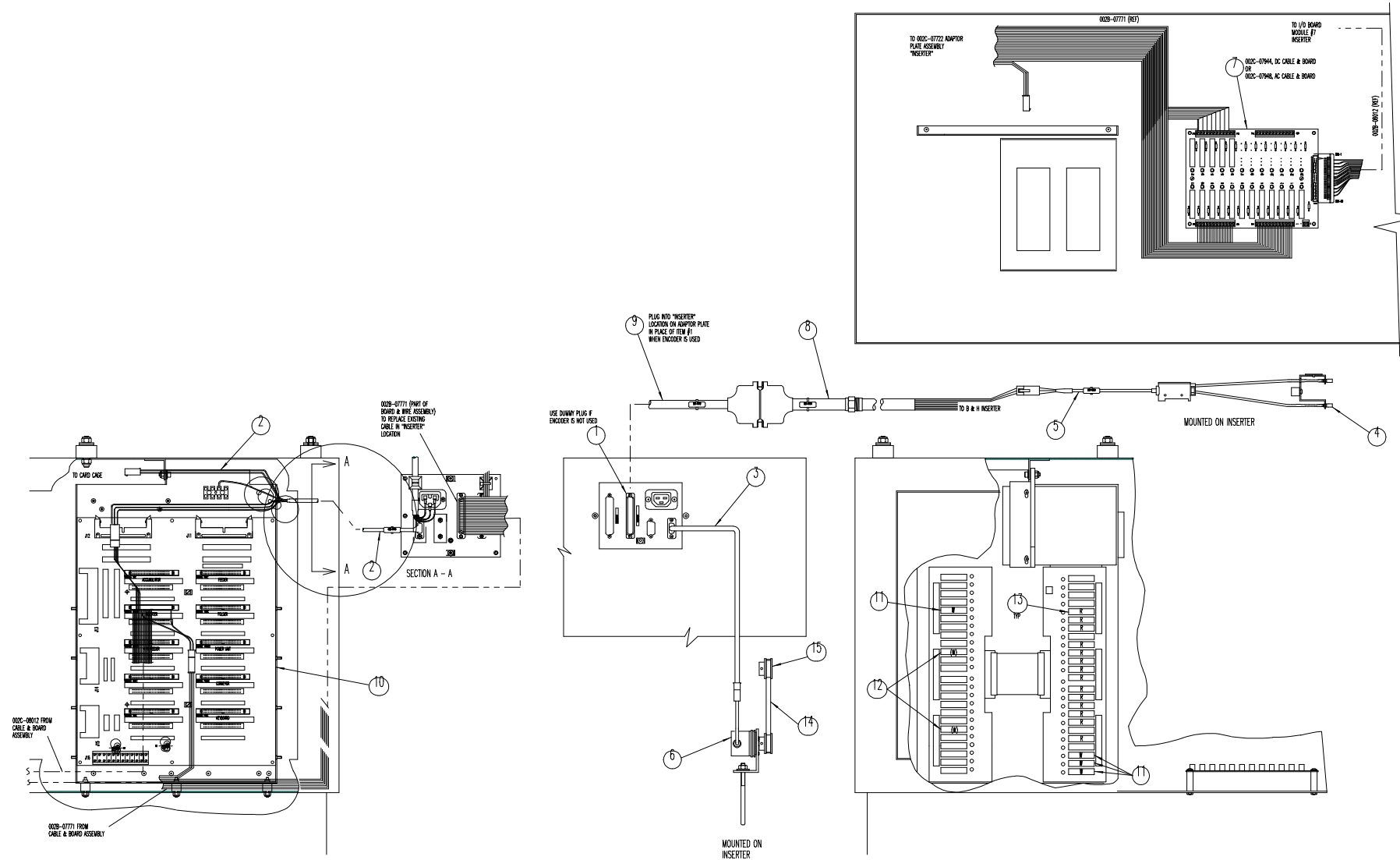
002K-21395, OPEN FEED SENSOR KIT ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	002B-07663	SENSOR ASSEMBLY
2	020-RA01020864	STANDOFF,#10-32 X 4"
3	600A-21394	REFLECTOR
4	600A-21880	SENSOR BRACKET
5	600A-21881	ADJUSTABLE SUPPORT
6	600A-22671	MOUNTING BLOCK
7	600A-22672	MOUNTING PLATE

002K-08432, INSERTER DEMAND SWITCH KIT

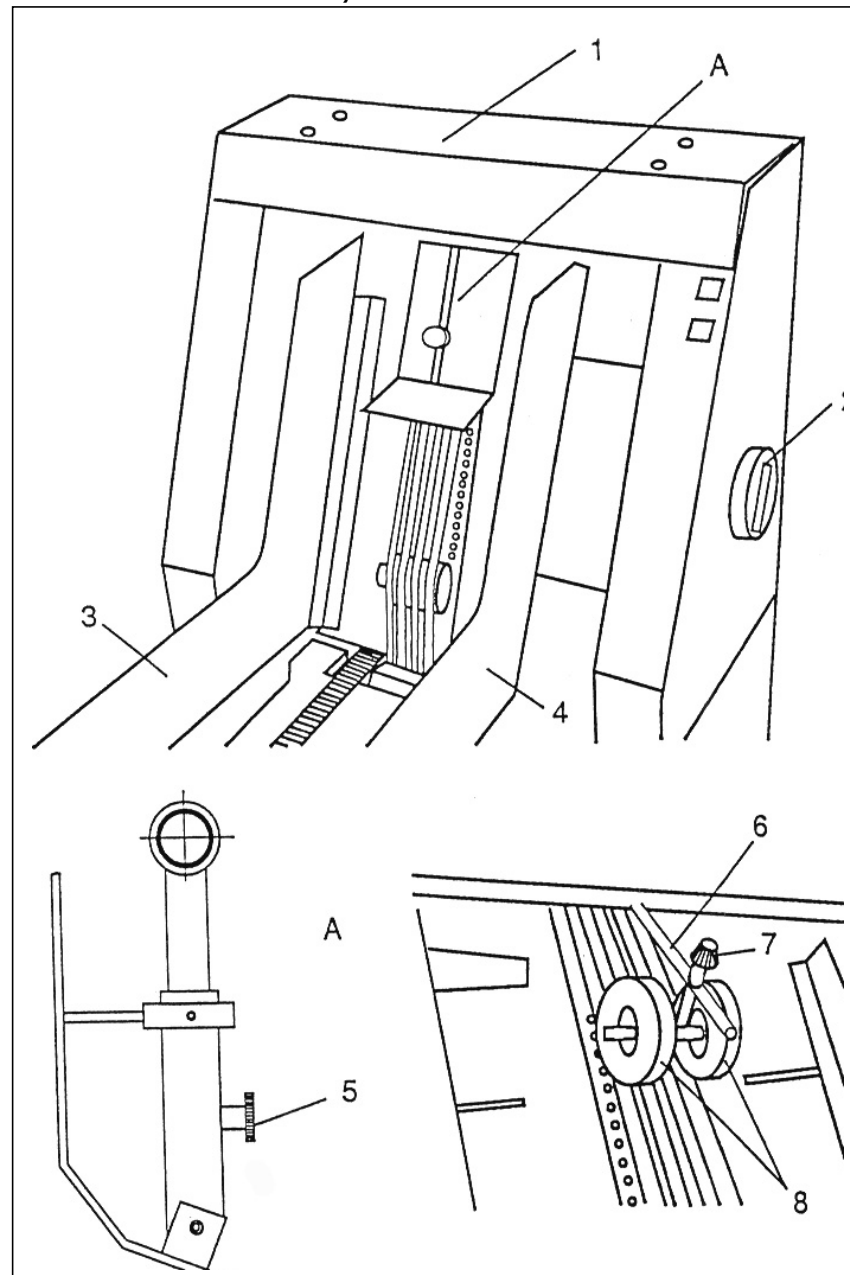
002K-23756, INK MARKER OPTION (BELL & HOWELL)

INDEX	PART NUMBER	DESCRIPTION
1	002B-07186	INK MARKER INTERFACE CABLE
2	002B-07187	SENSOR INPUT MODULE
3	002B-07188	MODULE 9 INTERFACE CABLE
4	002B-23702	SENSOR ASSEMBLY
5	002C-07200	INK MARKER CONTROL BOX
6	007-24265-600	HOLD DOWN BRACKET

002K-07970, AC/DC INSERTER CONTROL OPTION

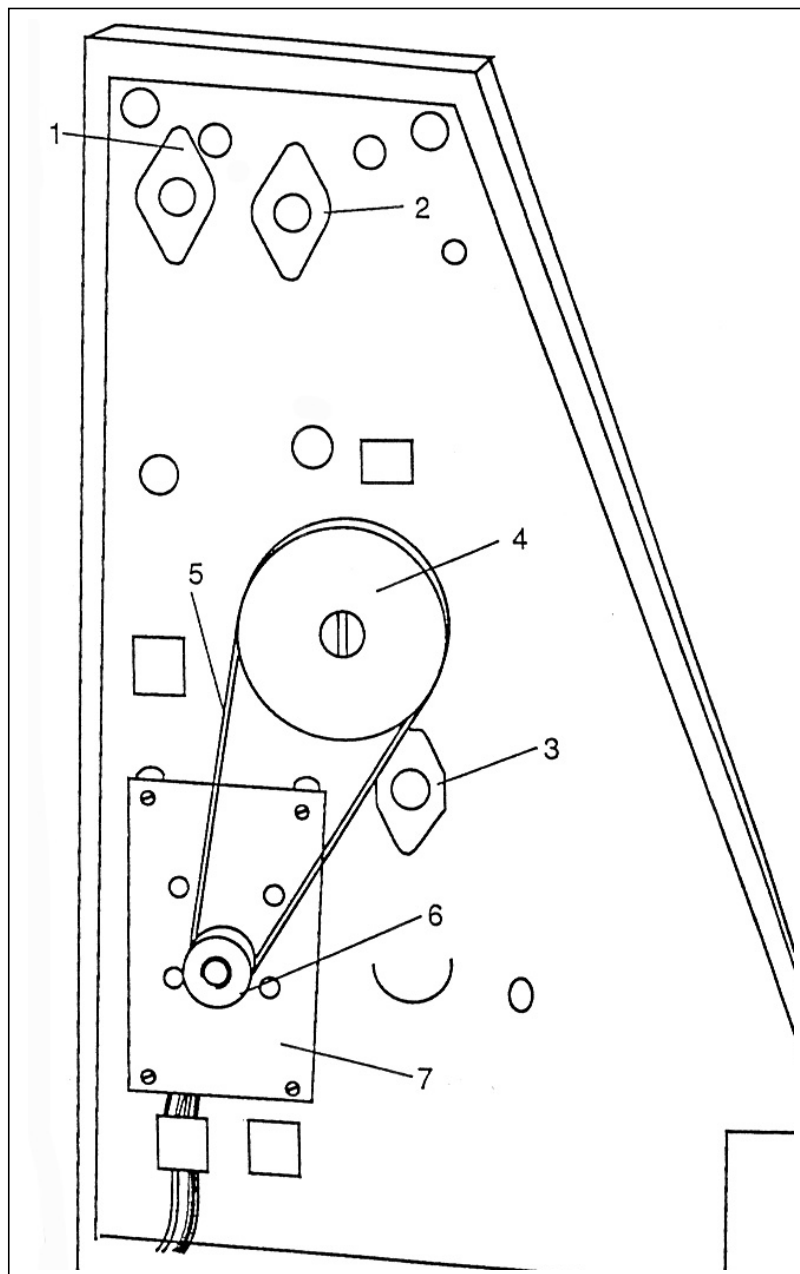
002K-07970, AC/DC INSERTER CONTROL OPTION

INDEX	PART NUMBER	DESCRIPTION
1	002A-07940	PLUG, INSERTER DUMMY
2	002B-07769	CABLE, 9 POS
3	002B-08009	ENCODER CABLE
4	002B-08024	STATION 1 SENSOR
5	002B-08213	SENSOR AMPLIFIER
6	002B-20856	ENCODER & MOUNT ASSEMBLY
7	002C-07944	DC CABLE & BOARD
	002C-07948	AC CABLE & BOARD
8	002C-07968	SENSOR INTERCONNECT CABLE
9	002C-08132	INSERTER INTERCONNECT CABLE
10	002D-07972	INTERCONNECT BOARD
11	030-SMIDC5	MODULE,WHITE,"W"
12	030-SMIDC5F	MODULE,WHITE,HIGH SPEED,"(W)"
13	030-SMODC5	MODULE,RED,"R"
14	113-082150025	BELT,TIMING,40DP
15	600A-20855	PULLEY

186-035700600, 3208 DOCUMENT LOADER, PAGE 1

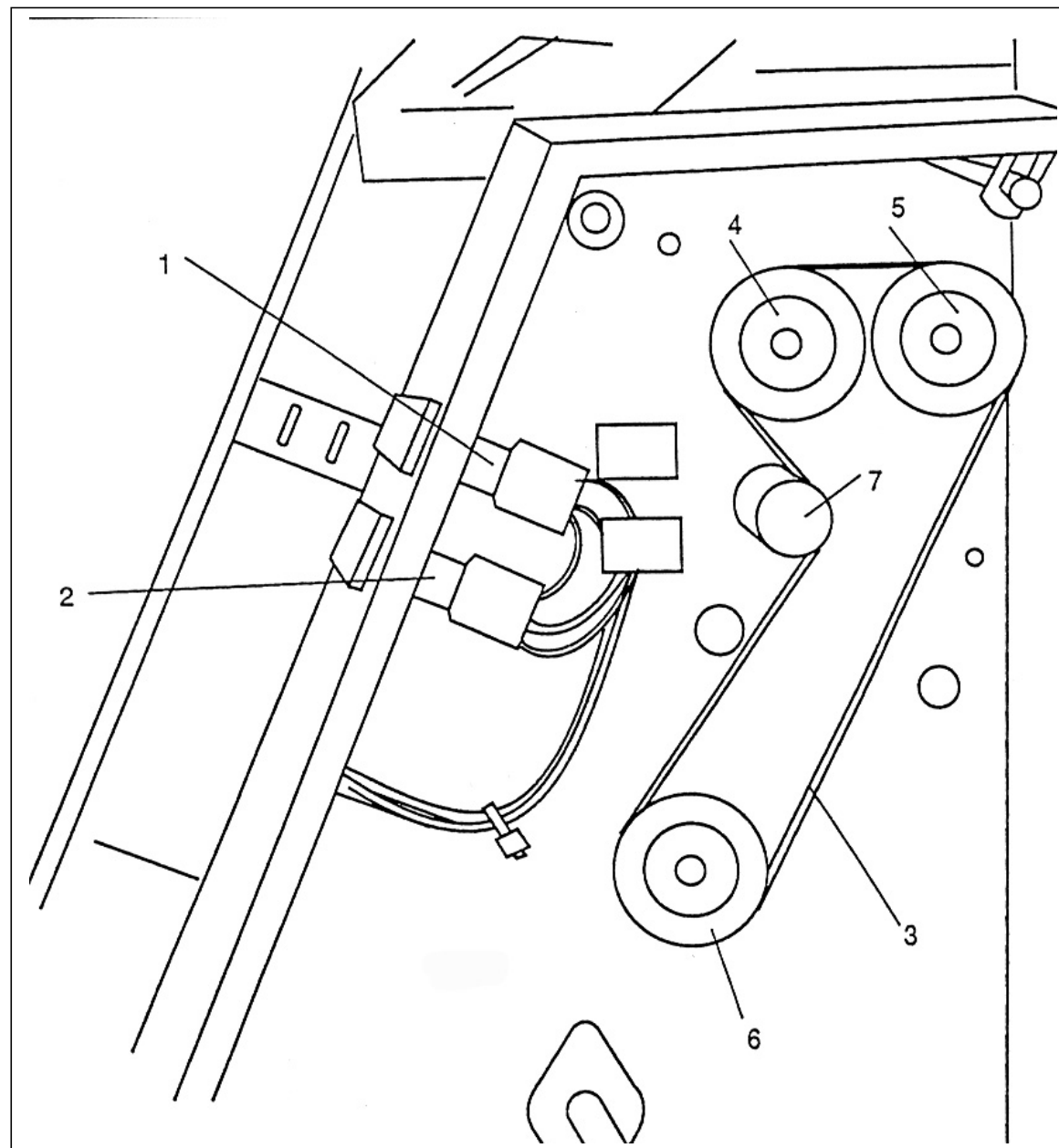
186-035700600, 3208 DOCUMENT LOADER, PAGE 1

INDEX	PART NUMBER	DESCRIPTION
1	4.005.039	COVER,COMPLETE
	1.027.444	HINGE
2	1.027.441	HAND WHEEL
3	4.005.081	LEFT GUIDE RAIL,COMPLETE
	1.027.411	KNURLED SCREW
	1.007107	LEAF SPRING
4	4.005.080	RIGHT GUIDE RAIL,COMPLETE
	1.027.411	KNURLED SCREW
	1.007.107	LEAF SPRING
A	4.005.022	HOLD DOWN,COMPLETE
5	1.155.587	KNURLED SCREW
6	4.005.022	HOLD DOWN,COMPLETE
7	1.114.001	KNURLED SCREW
8	4.005.036	STOP ROLLER

186-035700600, 3208 DOCUMENT LOADER, PAGE 2

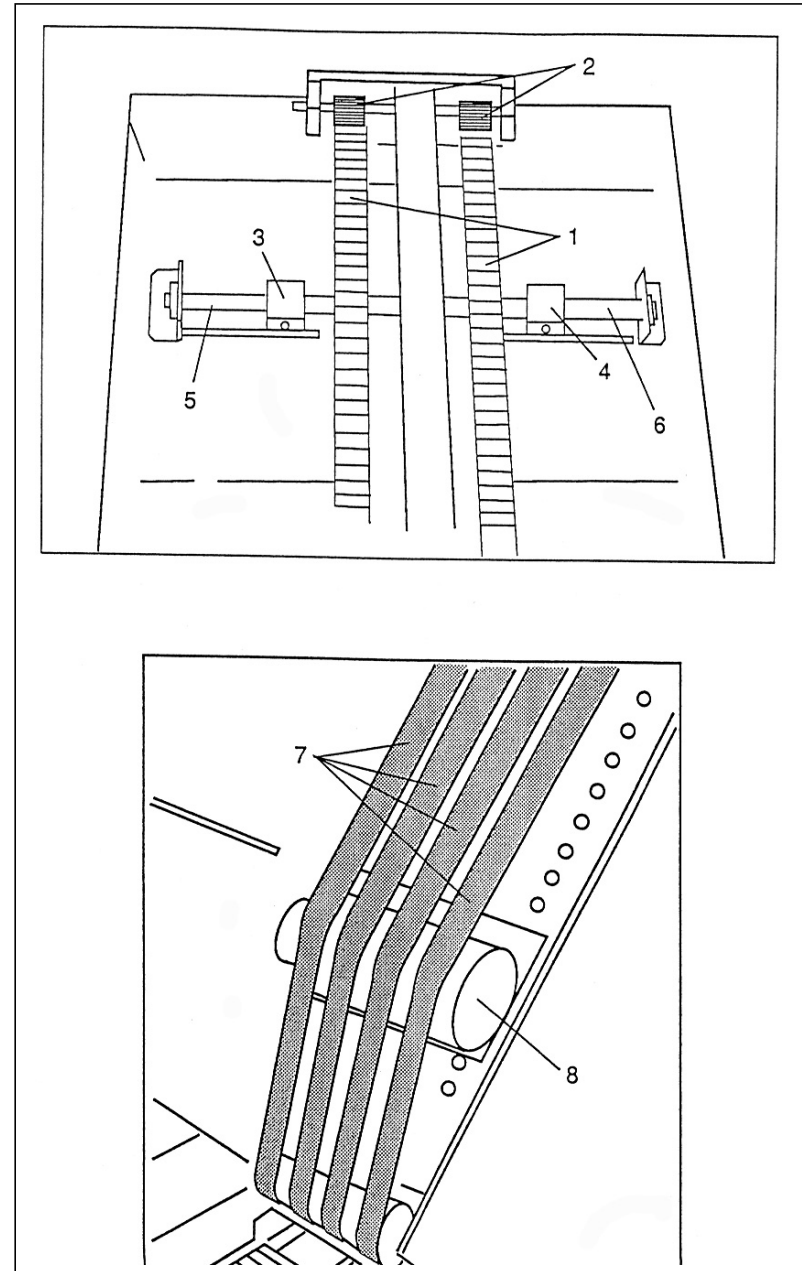
186-035700600, 3208 DOCUMENT LOADER, PAGE 2

INDEX	PART NUMBER	DESCRIPTION
1	4.004.539	BEARING
2	4.004.539	BEARING
3	4.004.539	BEARING
4	4.005.028	PULLEY
5	1.033.006	BELT
6	4.005.025	PULLEY
7	2.022.456	PLATE

186-035700600, 3208 DOCUMENT LOADER, PAGE 3

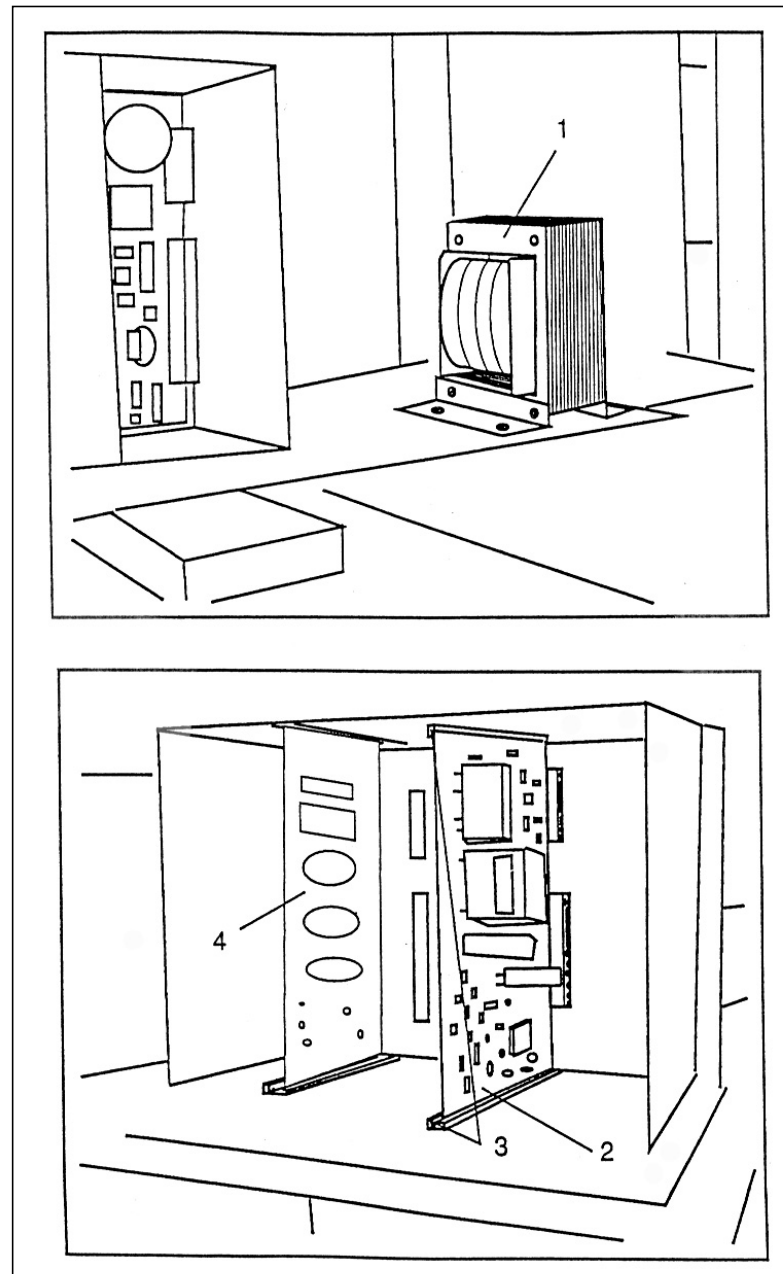
186-035700600, 3208 DOCUMENT LOADER, PAGE 3

INDEX	PART NUMBER	DESCRIPTION
1	1.029.244	SWITCH
2	1.029.244	SWITCH
3	1.033.005	BELT
4	1.027.446	PULLEY
5	1.027.446	PULLEY
6	1.027.445	PULLEY
7	4.005.049	ROLLER

186-035700600, 3208 DOCUMENT LOADER, PAGE 4

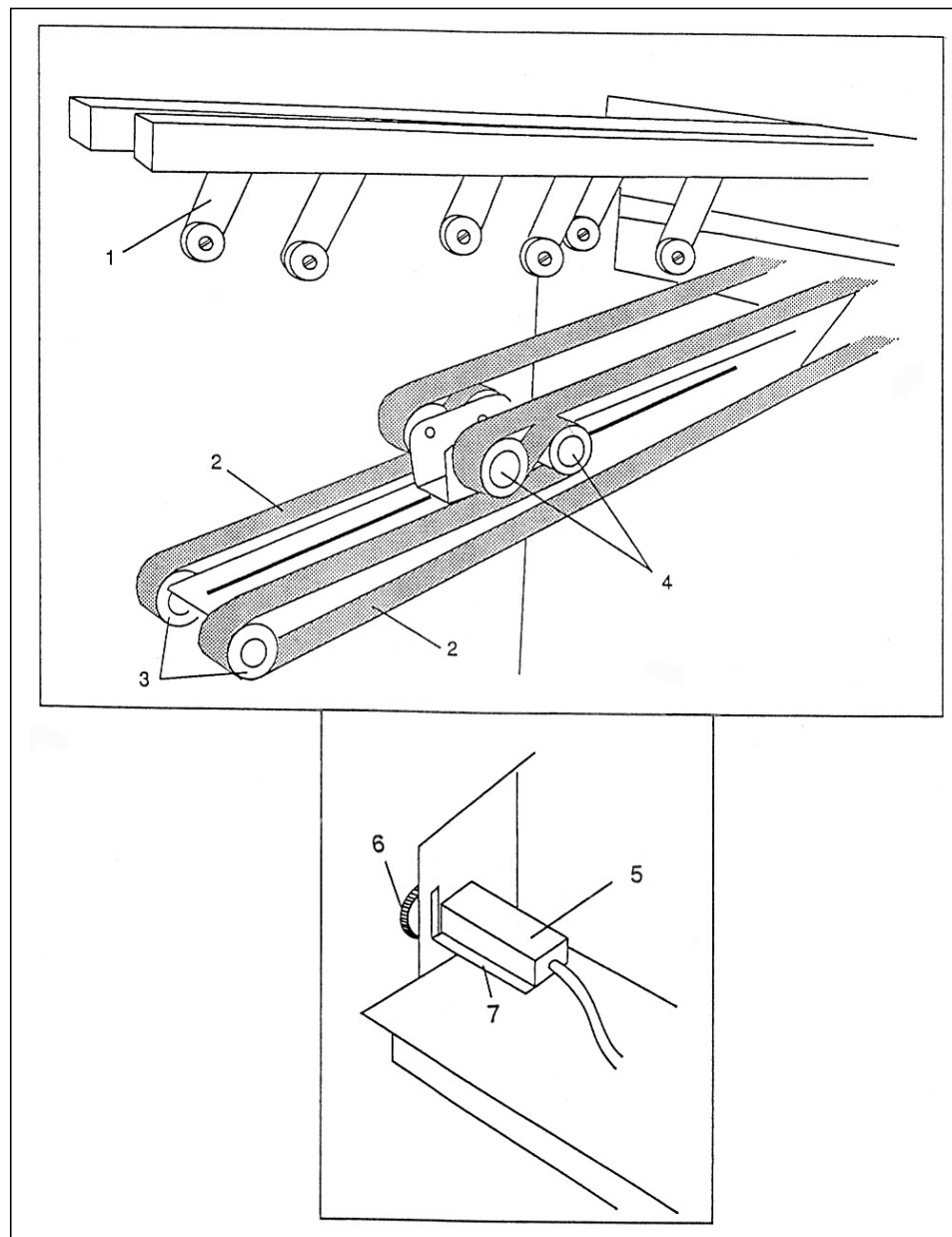
186-035700600, 3208 DOCUMENT LOADER, PAGE 4

INDEX	PART NUMBER	DESCRIPTION
1	1.033.088	BELT
2	1.027.447	ROLLER
3	1.017.504	BUSHING
4	1.017.541	BUSHING
5	2.017.098	RIGHT SHAFT
6	2.017.091	LEFT SHAFT
7	1.031.090	FLAT BELT
8	4.005.032	SIDE UNIT,COMPLETE

186-035700600, 3208 DOCUMENT LOADER, PAGE 5

186-035700600, 3208 DOCUMENT LOADER, PAGE 5

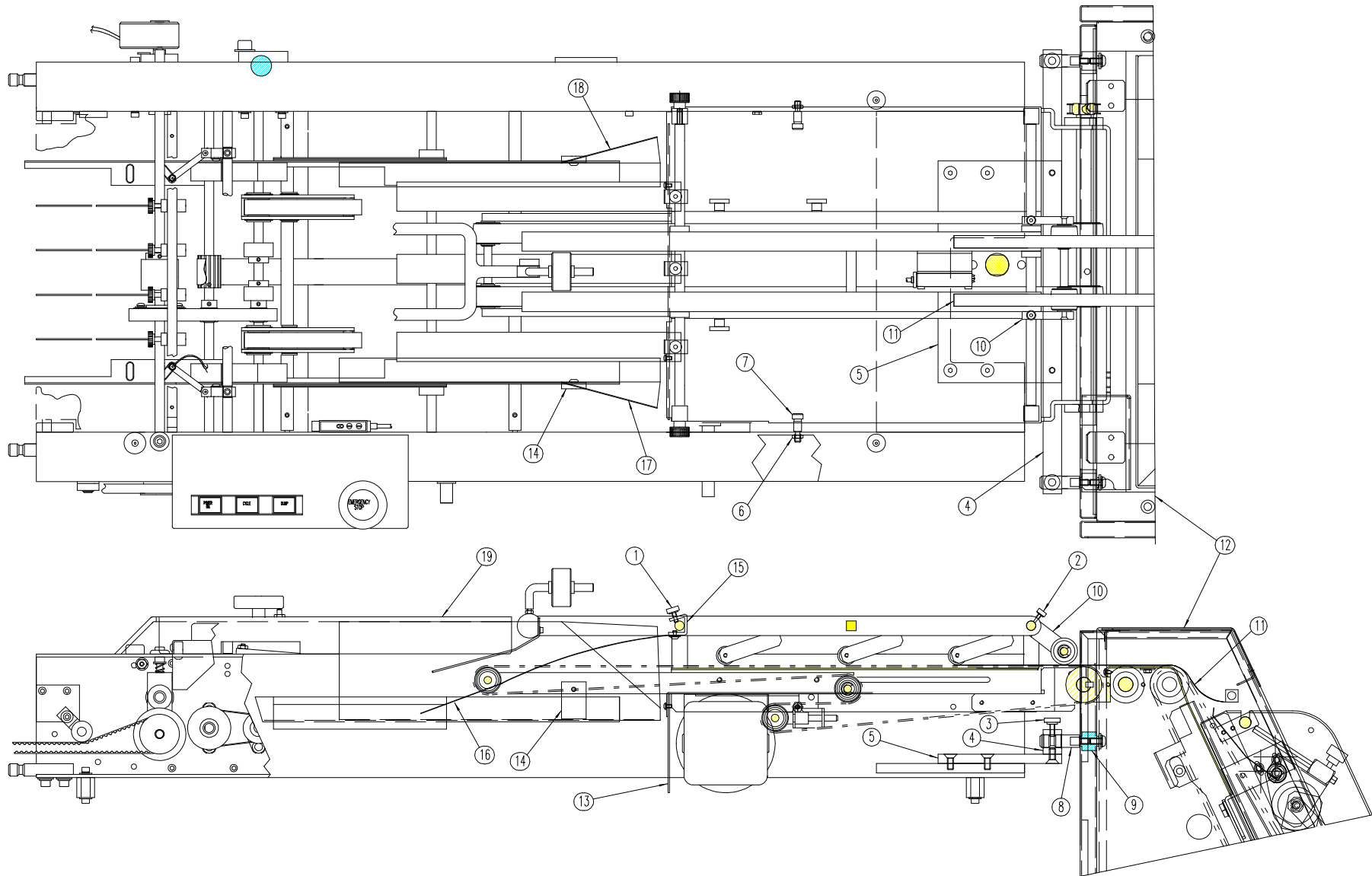
INDEX	PART NUMBER	DESCRIPTION
1	1.029.937	TRANSFORMER
2	4.005.097	PC –MB VERSION
	4.005.098	PC –GBR VERSION
3	1.027.190	MOUNTING BRACKET,PCB
4	4.004.419	SPEED CONTROL,220V
	4.004.420	SPEED CONTROL,115V
	4.005.102	MOTOR,220V
	4.005.101	MOTOR,110V

186-035700600, 3208 DOCUMENT LOADER, PAGE 6

186-035700600, 3208 DOCUMENT LOADER, PAGE 6

INDEX	PART NUMBER	DESCRIPTION
1	4.005.099	HOLD DOWN,COMPLETE
2	1.031.089	BELT
3	4.005.033	ROLLER
4	4.005.033	ROLLER
	3.512.190	LEAF SPRING
5	1.029.910	PHOTODETECTOR
6	1.027.427	KNURLED SCREW
7	2.028.091	BRACKET

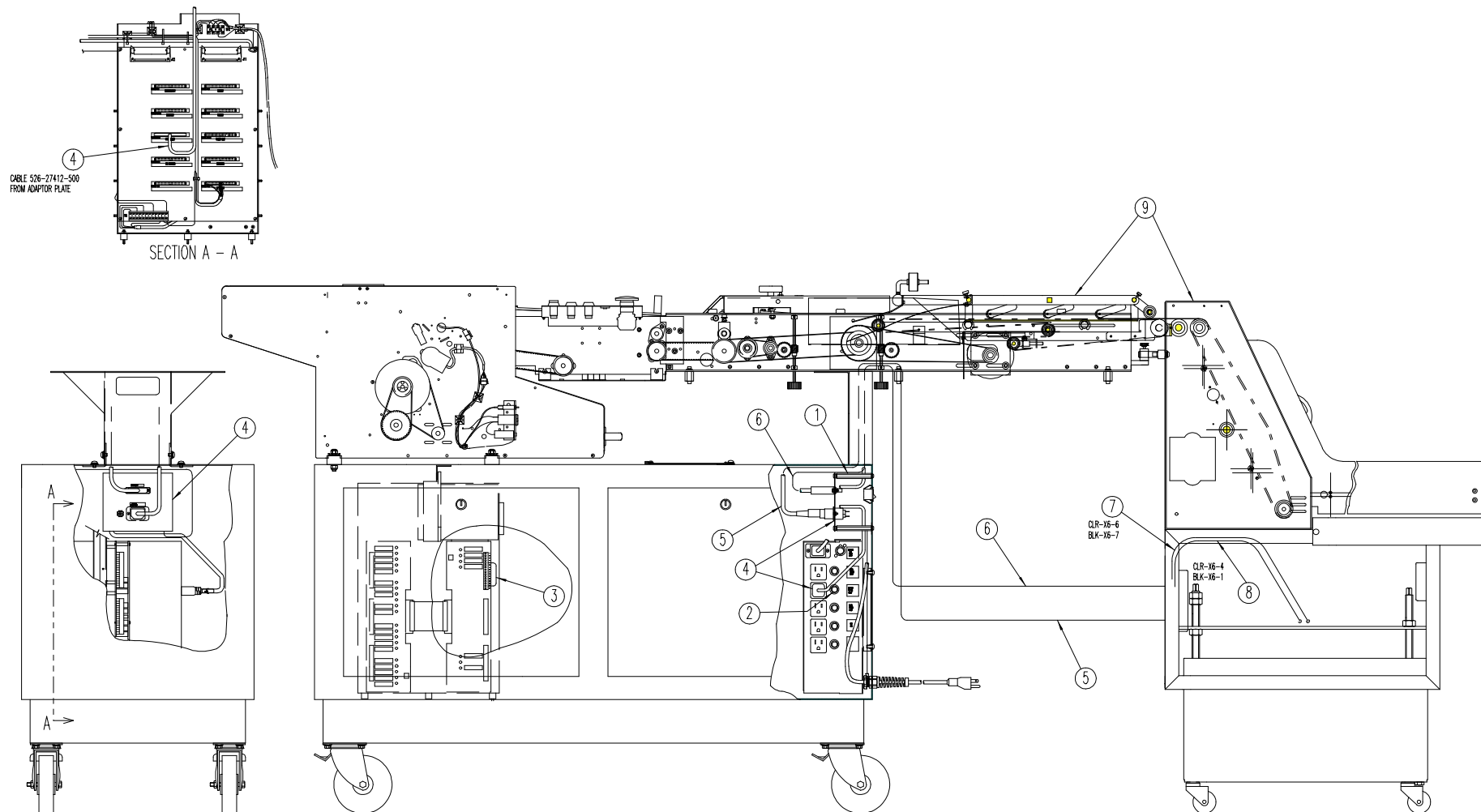
750-26978-500, 3208/FEEDER MECH. INTERFACE



750-26978-500, 3208/FEEDER MECH. INTERFACE

INDEX	PART NUMBER	DESCRIPTION
1	002A-16457-004	THUMBSCREW,#8-32 X .375
2	002A-16495-003	THUMBSCREW,#6-32 X .25
3	002A-16496-005	THUMBSCREW,#10-32 X .5
4	007-26955-600	BRACKET,DOCKING
5	007-26956-600	PLATE,DOCKING
6	013-2104	NUT,NYLOCK,#10-24
7	014-31031308	BOLT,SHOULDER, .312 X .5
8	018-26958-600	PIN,DOCKING
9	020-26957-600	SPACER,DOCKING
10	108-26979-600	LINK MOD
11	144-26981-600	PLASTIC STRIP
12	186-035700675	BULK LOADER
13	584-26980-600	PLATE
14	600A-19367	MOUNT BLOCK
15	600A-23340	CLAMP BRACKET
16	600A-23485	MYLAR STRIP
17	600B-18872	LEFT GUIDE RAIL
18	600B-18873	RIGHT GUIDE RAIL
19	600D-20963	SINGULATOR COVER

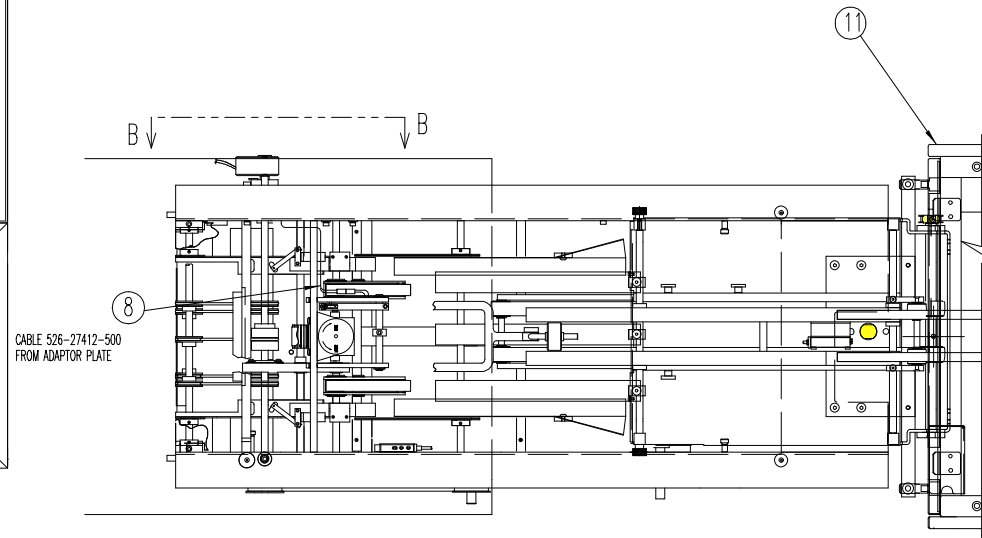
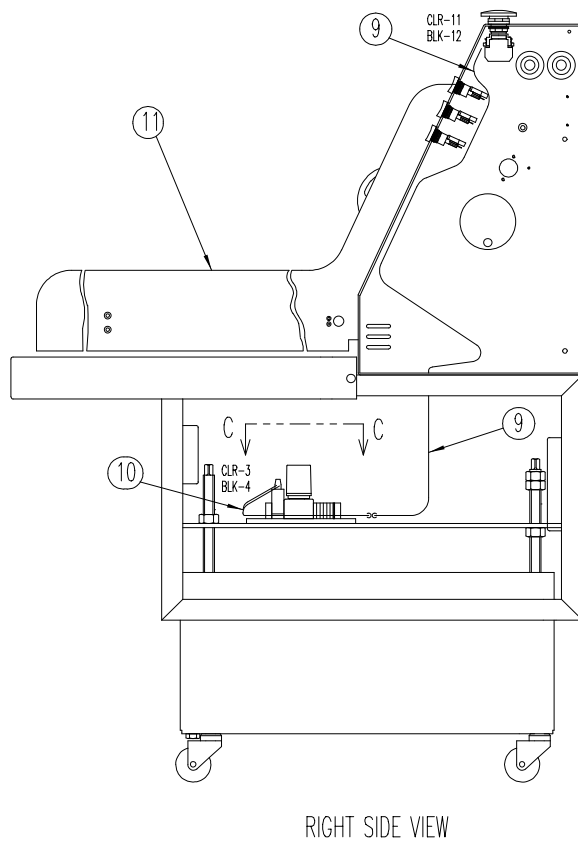
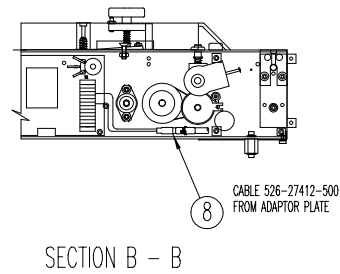
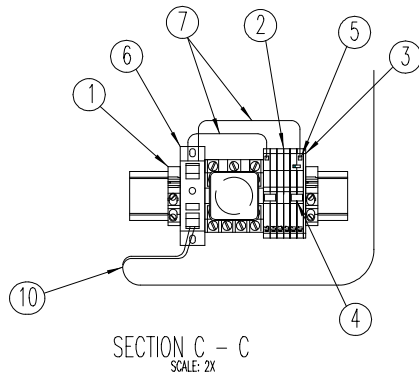
750-27576-500, 3208/FEEDER ELECT. INTERFACE, PAGE 1



750-26978-500, 3208/FEEDER ELECT. INTERFACE, PAGE 1

INDEX	PART NUMBER	DESCRIPTION
1	020-HA01020636	STANDOFF,#10-32 X 3"
2	032-00080250	FUSE,8 AMP,250V,SB
3	045-022115	WIRE,GRN,22 GA
4	091-27411-500	ADAPTOR PLATE ASM
5	526-27407-500	LINE CORD ASSEMBLY
6	526-27408-500	CABLE,470 INTERCONNECT
7	526-27409-500	CABLE,E-STOP
8	526-27511-500	CABLE,AUTO MODE
9	750-26978-500	470-FEEDER MECH. ASSEMBLY

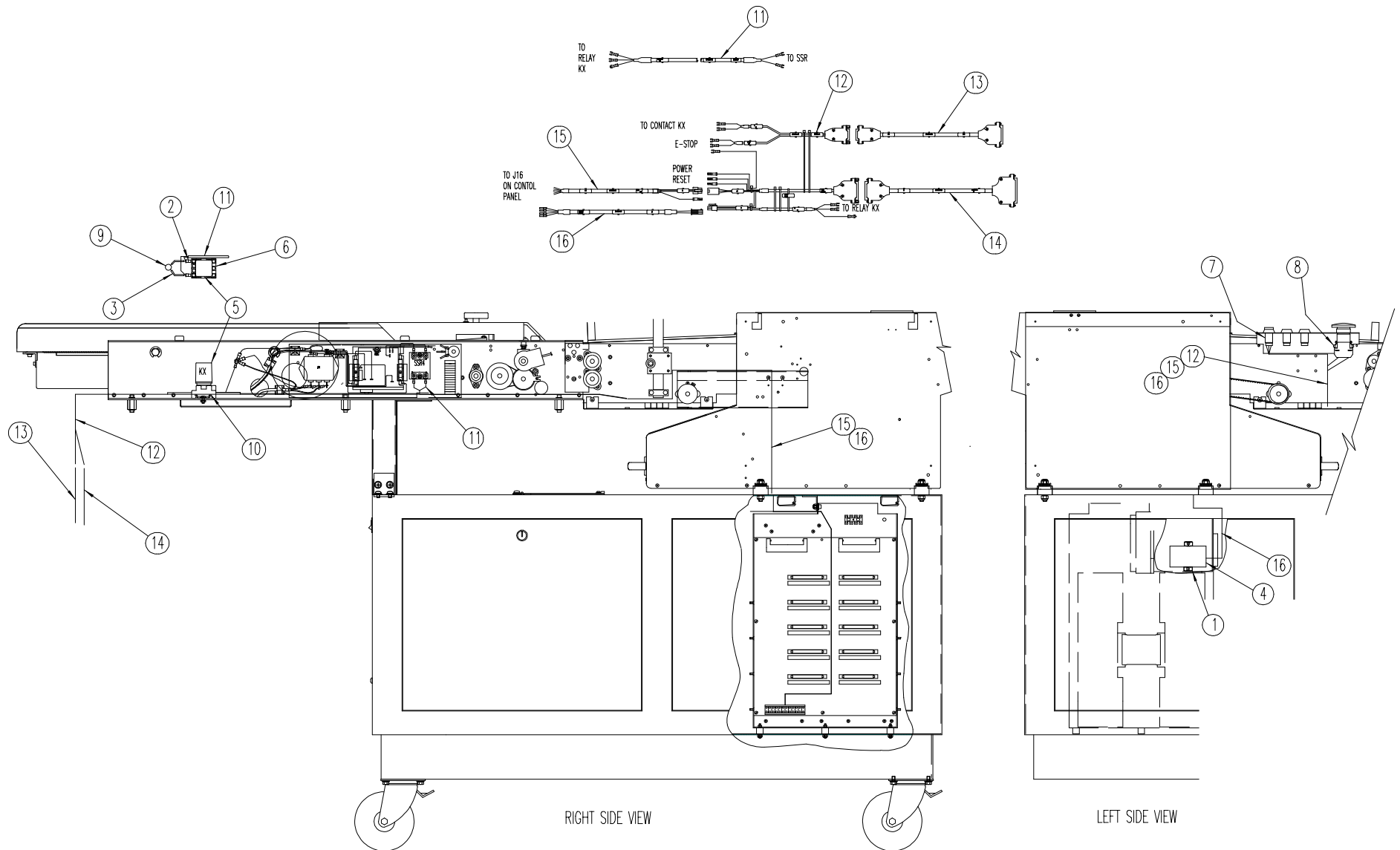
750-27576-500, 3208/FEEDER ELECT. INTERFACE, PAGE 2



750-26978-500, 3208/FEEDER ELECT. INTERFACE, PAGE 2

INDEX	PART NUMBER	DESCRIPTION
1	024-10300226	END STOP
2	024-26789-000	THROUGH TERMINAL BLOCK
3	024-26790-000	END PLATE
4	024-26791-000	ADJACENT JUMPER
5	025-25817-000	FERRULE,22 GA
6	030-26793-000	OUTPUT MODULE
7	045-022130	WIRE,BLK,22 GA
8	091-27411-500	ADAPTOR PLATE ASSEMBLY
9	526-27409-500	CABLE,E-STOP
10	526-27511-500	CABLE,AUTO MODE
11	750-26978-500	470-FEEDER MECH. ASSEMBLY

389-26413-401, 420 RIGHT ANGLE INTERFACE



389-26413-401, 420 RIGHT ANGLE INTERFACE

INDEX	PART NUMBER	DESCRIPTION
1	024-16471621	END STOP
2	025-PN226F	SPADE,LUG,#6
3	026-TFT20018	TEFLON TUBING
4	030-26318-500	BOWE STOP RELAY ASSEMBLY
5	030-2CAD14D10	RELAY
6	031-SR3PO5	RELAY SOCKET
7	041-ATH25F1	SWITCH ELEMENT
8	041-E22B2	CONTACT BLOCK,NO
9	067-V33ZA5	VARISTOR
10	194-25606-602	DIN RAIL
11	526-26312-500	CABLE,DEMAND
12	526-26313-500	CABLE,90 DEGREE CUTTER
13	526-26414-500	CABLE,420 TO BOWE
14	526-26315-500	CABLE,420 TO 90 DEGREE
15	526-26316-500	CABLE,24VDC POWER
16	526-26317-500	CABLE,BOWE STOP RELAY

NOTES: