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420T Service Manual

ISSUE 2006/04

071-27755-400(D)

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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 alphanumeric combination is followed by a decimal and a lower case letter. This represents a smaller division under a subdivision (Section A.1a. is a subdivision of A.1, Section A.1a1 is a subsection of A.1a).

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
- Run and Setup Screens
- Line Code Read with Setup Screens
- Laser Bar Code Read w/Setup Screens

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- Error Codes
- Possible Causes of Errors

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- Repair Checkout Procedures
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- Folder Section
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SECTION E PRINTED WIRING BOARD INFORMATION

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- Connecting to an Inserter

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SECTION I PARTS 1 (Top assembly & Cabinet)

- PARTS 2 (Feeder)

- PARTS 3 (Accumulator-Folder)**

[PARTS 4 \(Output Devices\)](#)

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2. HEADERS / FOOTERS

The information listed along the left edge refers to the machine, the manual type, and the part number and revision level for that manual

The particular issue listed in the center is an internal tracking device.

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. LIST OF CHANGES IN THIS REVISION

420T Service Manual 071-27755-400

New Revision: Rev. C Issue: 05/02 ECN: 8125
Previous release: Rev. B Issue 12/01 ECN: 7879
Software release: 069-26412-602 version .063

Changes incorporated in this manual:

<u>Section</u>	<u>Change</u>
A.5	Added batch processing information
A.7	Removed "Job" button
A.7b	Removed sheet length "5.5" and added adjustability in tenths of an inch Removed GBR 8 and GBR 16 read types Added batch processing information
A.7d	Added "Accumulator Max" setting in Accumulator Setup screen
A.7g	Changed "Cutter" to "Cutter 1"
A.7h	Added "Job Number" setup Added "Line Calib" and "B+H Sensors" in Line Read Setup 0 screen
A.7j	Added "Demand State", "Avg Dmd Rate", "ON Deg", and "OFF Deg" Added "Bad Pack Stop Enable" to Inserter Setup 1 Added "Open Stations 5-9", "Demand Type" and "Demand Degree" to Inserter Setup 1
A.8c	Removed "Blank Stop" from setup 1 screen Removed "No. Windows" and checkboxes "one" and "two" from setup 2 screen
A.9d	Removed "Blank Stop" and "Random Mark" from Bar Read Setup 1 screen Added "Total Up", "Total Down" to Bar Read Setup 1 Added "Reverse", "Total Page" and "Read First", "Yes/No", and "First Page" to Bar Read Setup 1 Added "Sequence Stop" and "Mod10" to Bar Read Setup 1 screen Added "Bar Read Setup 3" screen and "Setup 3" button in "Bar Read Setup" screen
C.1	Removed "Touch Setup" from Test screen

E Page 3, updated board 042-26932-500, page 5 updated board 042-26746-000
F Updated schematic 002E-08111, Tecna Cutter added
H Update Engineering Values

I Page 9, Fixed the parts list it was incorrect, appeared to be the same as page 7.
Page 45 & 47, Rearranged the numbers' so that parts list match the photo.
Page 52, Item #17 & 19 should be the same as item #20, 186-033500515 Transport Roller
Added replacement # for 186-2823500088 as 118-30307-600h, 8-19-2009

4. SECTION ISSUE DATES

Sect A 05/02

Sect B 11/01

Sect C 05/02

Sect D 11/01

Sect E 05/02

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A.1 REQUIRED MANUALS

- 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 420T. Installation of the 420T is also described.

A.3 INTRODUCTION TO THE MACHINE

A.3a FEEDER SECTION

The 420T's feeder is bottom fed, top loading for continuous operation, with a capacity of 1500 sheets (20 lb stock).

Creepers Conveyor

The Creepers 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.

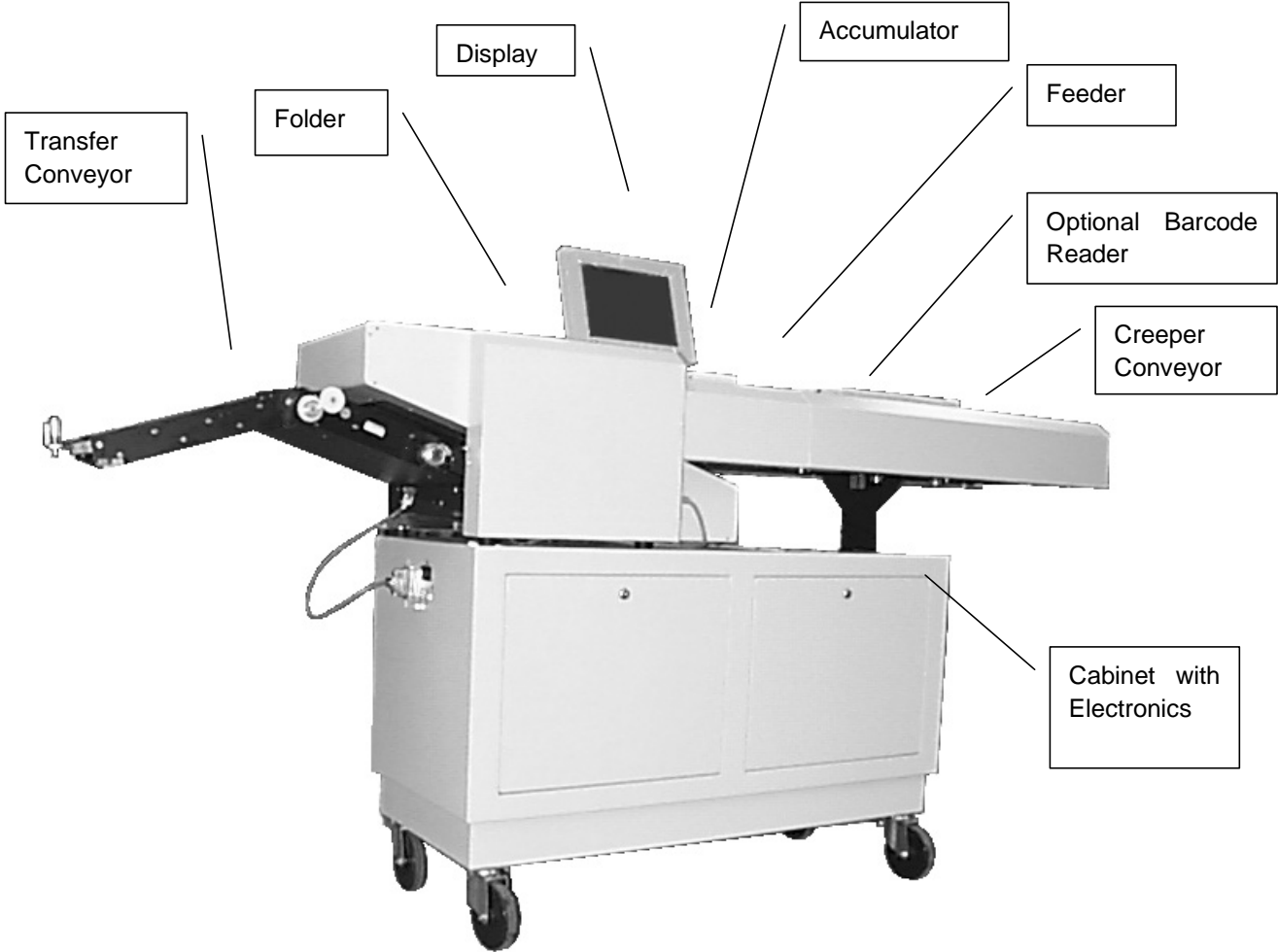
Hopper and Feeder Paper Guide Rails:

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, and 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 creepers 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 creepers conveyor motor.

Layout of Model 420T



Feed Belt

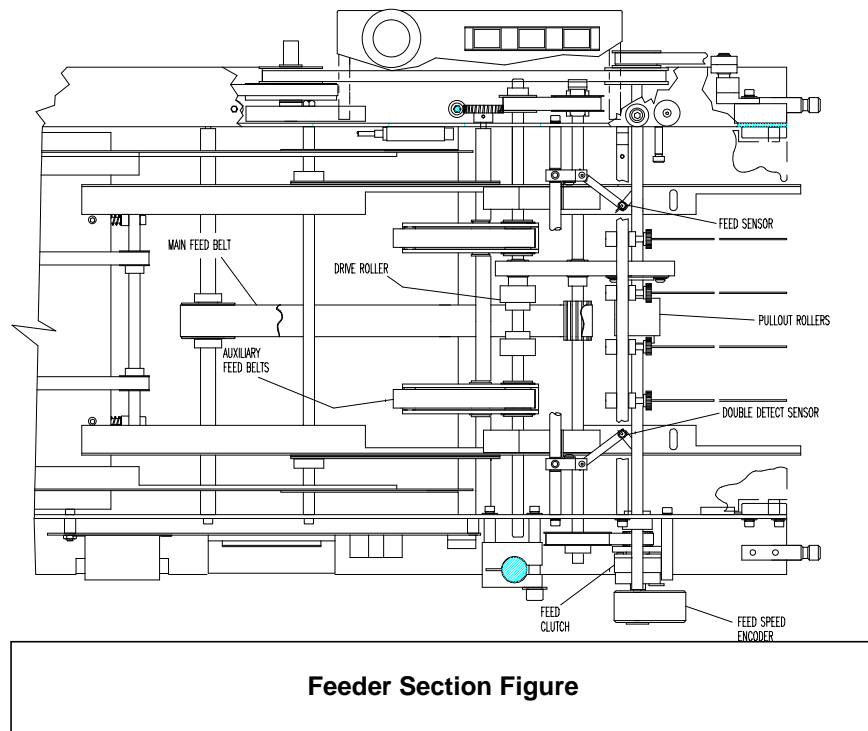
The Main Feed Belt is a one inch wide yellow timing belt which drives the bottom sheet of paper under the singulator roller. Also called Singulator Belt.

Auxiliary Feed Belts

These are two yellow 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 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

The singulator is a two inch stationary 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

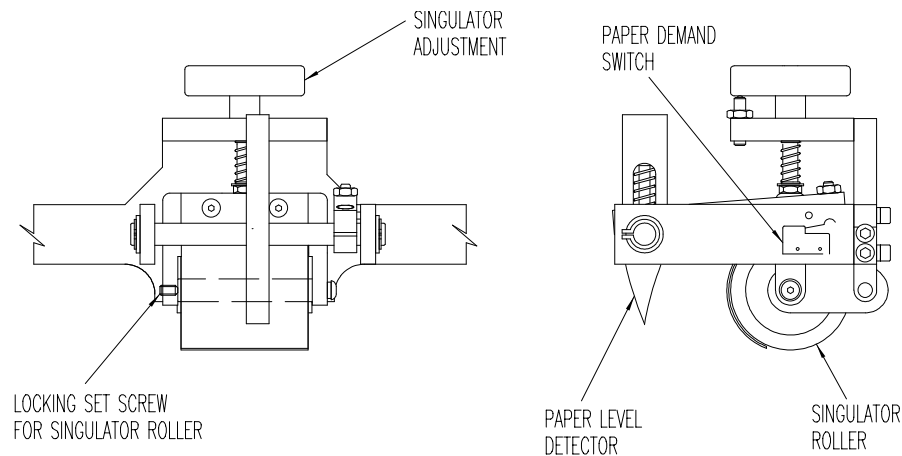
The Feed Sensor monitors the output of the singulator for proper singulation or non-feed of paper. It is a light-actuated through-beam sensor, identified by an "F". The sensor module is located on the feeder side frame in the singulator area.

Double Detect Sensor

The double detect sensor is ultra sonic sensor which does not require electrical adjustment. The mechanical position of the sensor is 40mm above the mounting plate +/- 2mm. The sensor determines that two sheets have been fed by a field induced between the two pages.

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.

Read Sensor (TJ Reader)

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.

Read Sensor (CP30 Reader)

Thru beam sensor mounted within the brackets holding the CP30 Reader. It tells the reader to begin looking for line code marks when the sensor sees the leading edge of the paper.

A.3b ACCUMULATOR SECTION

The accumulator catches and holds paper coming from the feeder stacking groups of one to seven documents. When the document package is complete, the computer releases the group to be folded by the folder.

Stacking Ramps

Stacking Ramps are the black Delrin wedges which stack successive pages of a document package in page sequential order.

Stacking or Dump Rollers

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

Dump Brake

This prohibits the rollers from releasing paper from the accumulator.

Dump Clutch

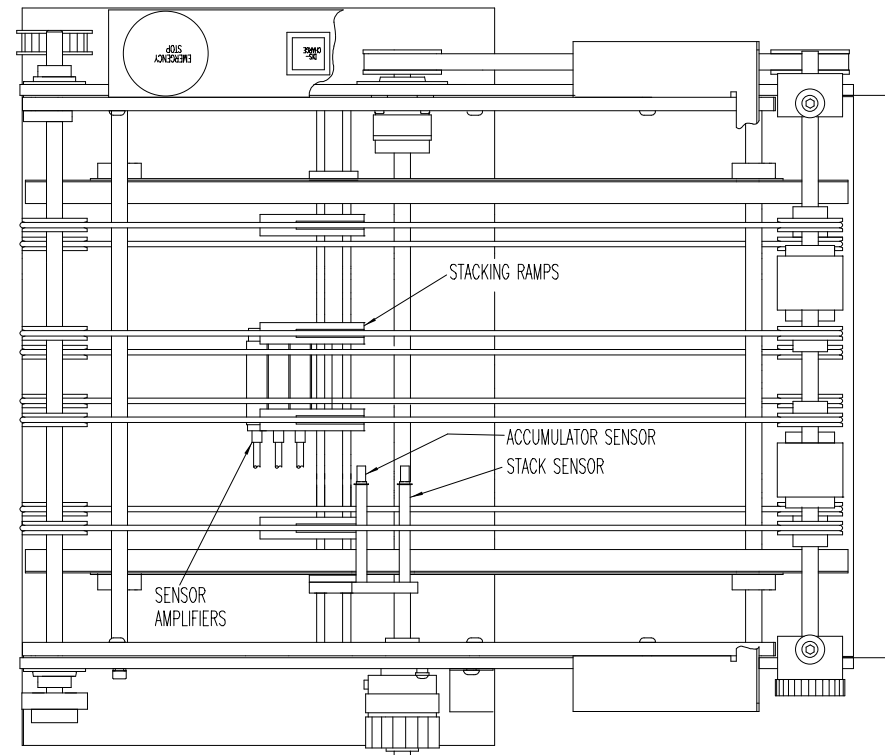
This activates the stacking rollers, releasing the accumulated pages.

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.

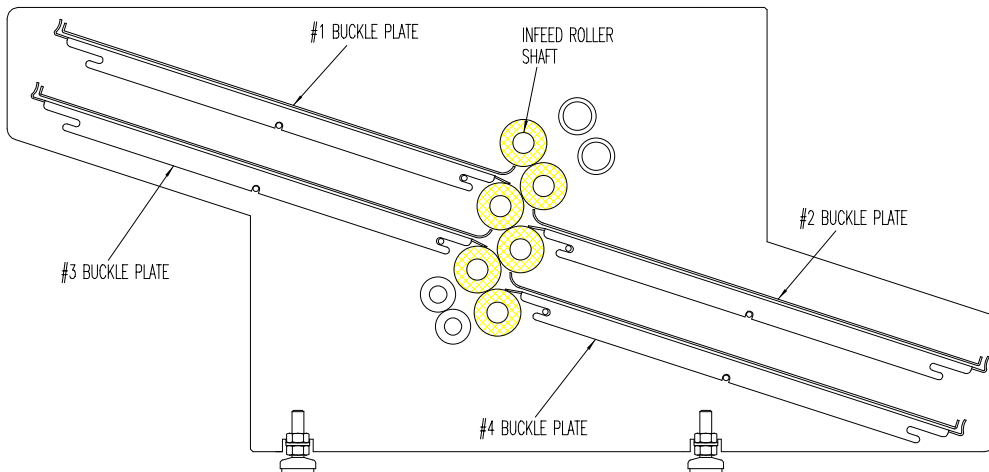
Rollers

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



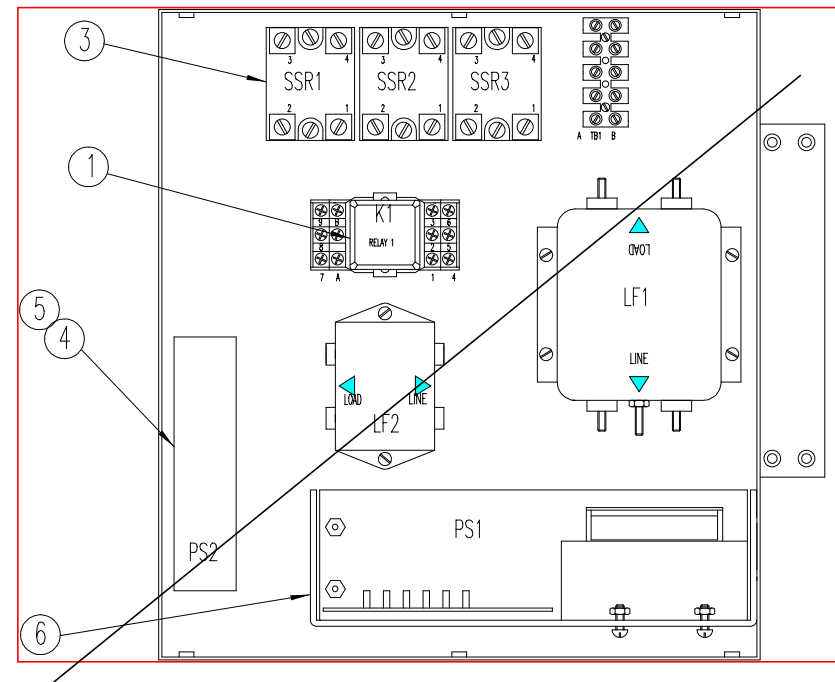
An encoder, located on the infeed roller shaft, which provides a folder speed signal.

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

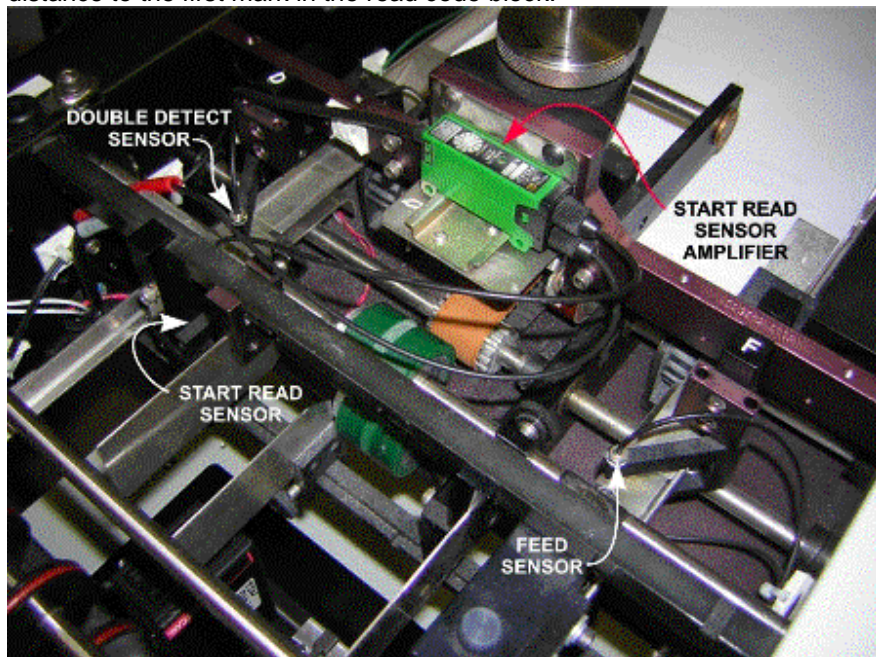
The Feed Sensor monitors the output of the singulator for proper singulation or non-feed of paper. It is a light-actuated through-beam sensor, identified by an “F” on the top. The sensor is located on the left paper rail in the feeder section.

Double Detect Sensor (Prior to October-2005)

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.

Start Read Sensor

The Start Read Sensor detects the leading edge of the paper to set the distance to the first mark in the read code block.



420T (Before Oct. 2005)

Accumulator Sensor

The Accumulator Sensor indicates detects that a page which has just been fed from the feeder has passed into the accumulator.

Stack Sensor

The Stack Sensor detects that the page group that was stacked in the accumulator has left the accumulator.

Folder Exit Sensor

The folder exit sensor is near the output shaft of the folder and checks there are no jams either in or at the exit of the folder.

Transfer Conveyor Sensors

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

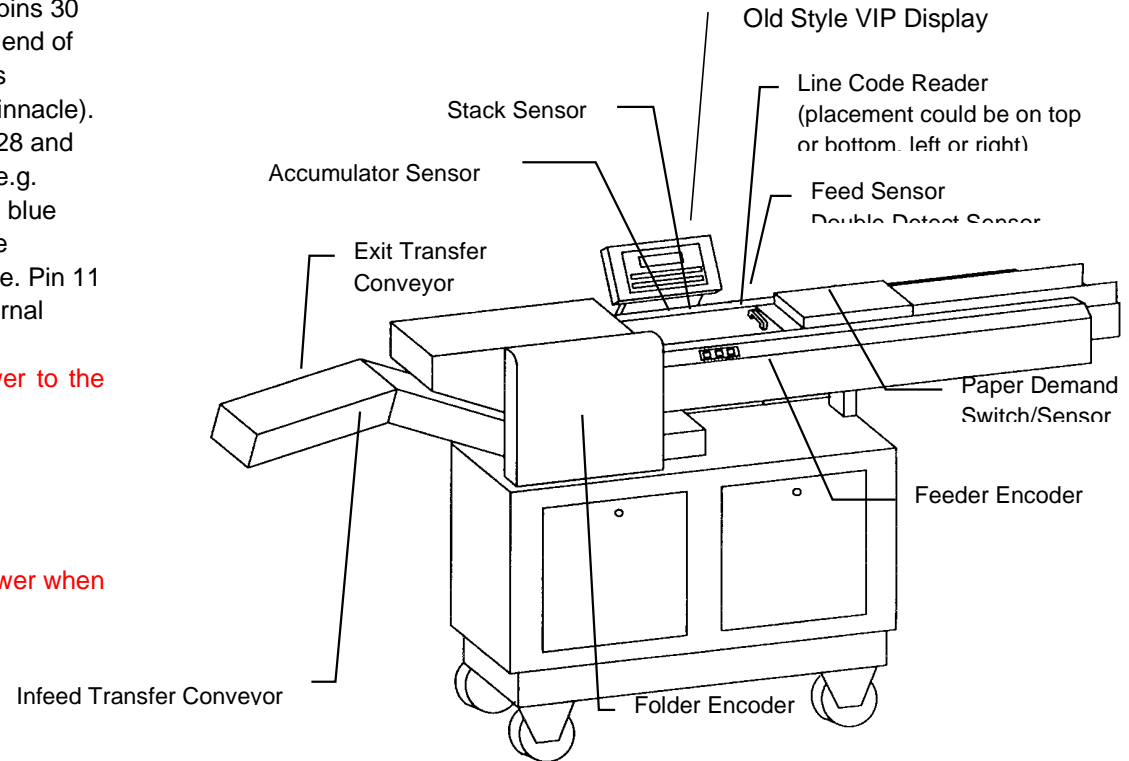
A3.f EMERGENCY STOP INTERLOCKS

The main E-stop located on the operator panel will interrupt power to the conveyors and folder when pressed down. All motors will halt immediately. This switch must be twisted to bring it back to its 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 420T 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 420T. 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 420T:

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 7 page document groups. Larger group batch setting available upon request.

Folder: 4 plates.

Group selector: Manual group selection for 1 to 7 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 420T 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. Must purchase optional Power Transformer

1,000 BTU/hr

Fuse List - Refer to Section D10

Dimensions

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

Width: 26" (660 mm)

Height: 52" (1321 mm)

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

Read Options

T.J. Line Code

GBR Line Code

Bar Code (3 of 9), (2 of 5) (128)

A.5 RUN SCREEN

This screen is displayed continuously for informational purposes until “Test” or “Setup” is selected.

-See Section A7 for “Setup” Screens

-See Section C Problem Analysis” for “Test” screens.

- **Run** -
- **Test** – Press to enter diagnostic screens (for more information, refer to Section C).
- **Setup** – Press to enter setup screens (for more information, refer to Section A7).
- **Release Brakes** – Releases/Applies all Accumulator and Feed etc. Brakes to allow jam clearing.

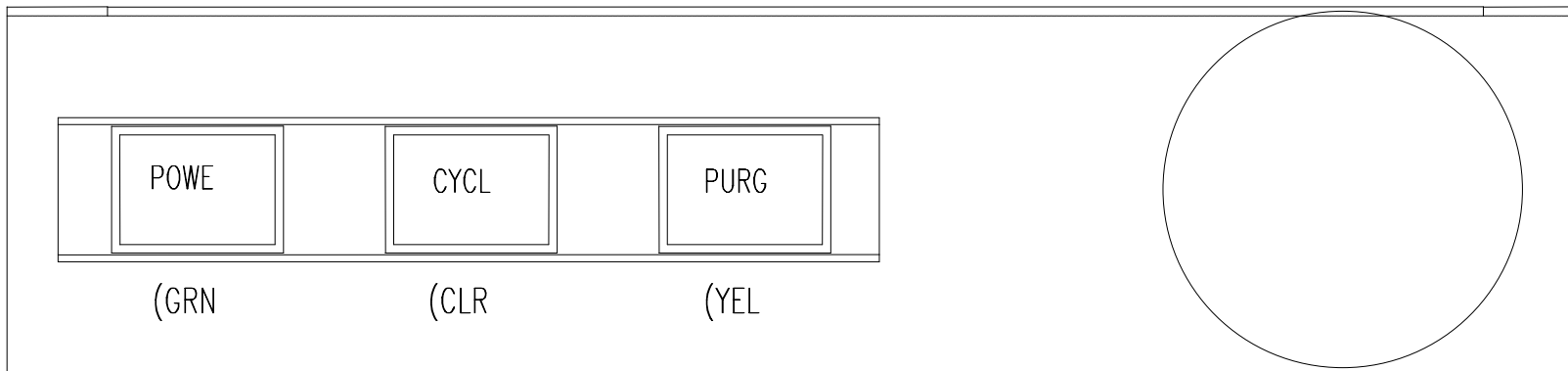
Information Displayed:

- **Revision** (Software) and **Build Date** – top line
- **Packages** – Total package counter. Reset in **System Setup**. Also resets during bootup.
- **Sheet** – Displays the # of sheets in the accumulator.
- **Package Rate** – Used to monitor throughput of the 420T. Calculated at every pack dumped from accumulator (not averaged).
- **Demand Rate**– Displays the package demand rate from the inserter. Calculated at every demand signal transition (not averaged).
- **Date and Time** - (not functional at this time)
- **EOG** – (Read Mode Only) Displays end of group (ready for dump) – Set Complete - Ready
- **Group** – (Read Mode Only) OnSet No. seq if defined in Brd or hrd – Same on each page of set
- **Page** – (Read Mode Only) No. Seq if defined in Brd or Lrd – changes, sequences with each page
- **Total Sheets** - resets on machine power down
- **Batch** - displays “Batch Sheet” or “Batch Package” count, resets on sequential stop
- **Insert Marks** – 1 to 8 if defined in Brd or Lrd
- **Control Marks** – In = Inkmark, PM = Postal Meter Divert
 - SS = Subset
 - RC = Random Count
 - SQ = Sequential Stop
 - US = Unseal

- ST = Stitch
- **Monitor Events** – Displays event history, however, entire list is lost when power is turned off.

The screenshot displays the 'GBR Systems - Run' interface. At the top, it shows 'Revision 31264.006 (Mar 14, 2006 16:01:14)'. Below this, there are several data fields: Packages (0), Sheet (0), Total Sheets (0), Pack Rate (0), Demand Rate (0), and a date/time stamp (3/29/06 15:01:30). Further down, there are fields for EOG (0), Group (0), Page (0), Total Diverts (0), and Batch (--- Off ---). There are also fields for Insert Marks, Control Marks, and Diagnostic (000000000000_000000000000). A 'Monitor Events' section contains a list of system events with timestamps, such as '15:01:01 NV IniFile OK' and '15:01:05 LineReader Software Version:08103.003'. At the bottom, there is a 'Status' field showing 'Power Off' and three buttons: 'Run', 'Test', and 'Setup', along with a 'Release Brakes' button.

A.6 KEYBOARD OPERATION



EMERGENCY STOP

Press to shut down all motors on the 420T in emergencies
Lifting any cover will also shut down all motors on the 420T

POWER ON

Press to start all motors and enter ready mode
Press while in ready mode to shut down the 420T

CYCLE

Press quickly to feed one sheet

- In Read Mode (Only) Repeat until **EOG** on display is "1", See Purge
– Press Purge once, then press and hold cycle (2 sec) until screen shows "Auto Cycle".

Press and hold **CYCLE** to start continuous feeding or "Auto Cycling"

While "Auto Cycling" press quickly to stop "Auto Cycling". Stop occurs with a completed set in the Accumulator.

Press and hold to restart "Auto Cycling" or press power to power down.

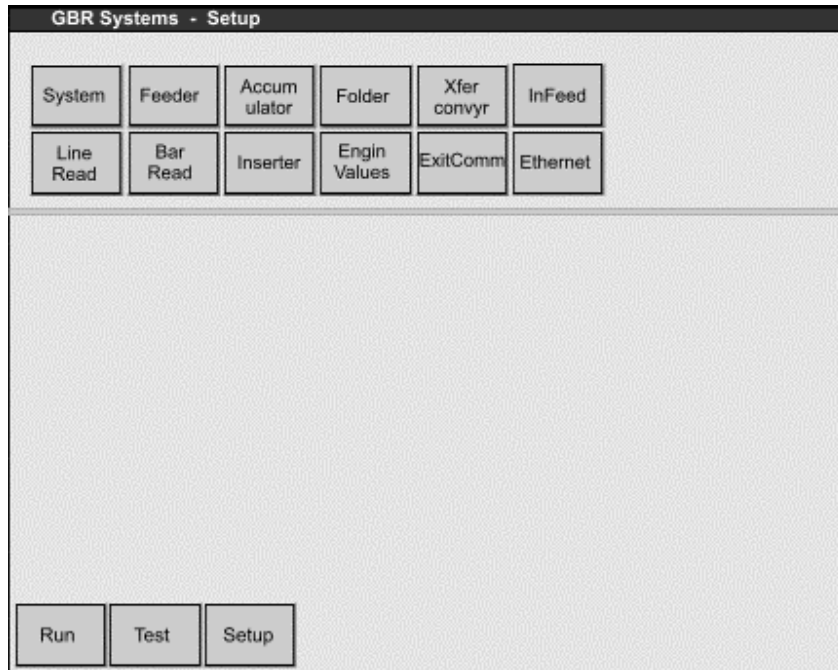
PURGE

After completing a set in the accumulator manually, press quickly before "Auto Cycle" to force the accumulator to be purged.

Press and hold to clear the accumulator and transfer conveyor to the inserter.

Press quickly twice to clear one pack through the accumulator and transfer conveyor to inserter.

A.7 SETUP SCREENS



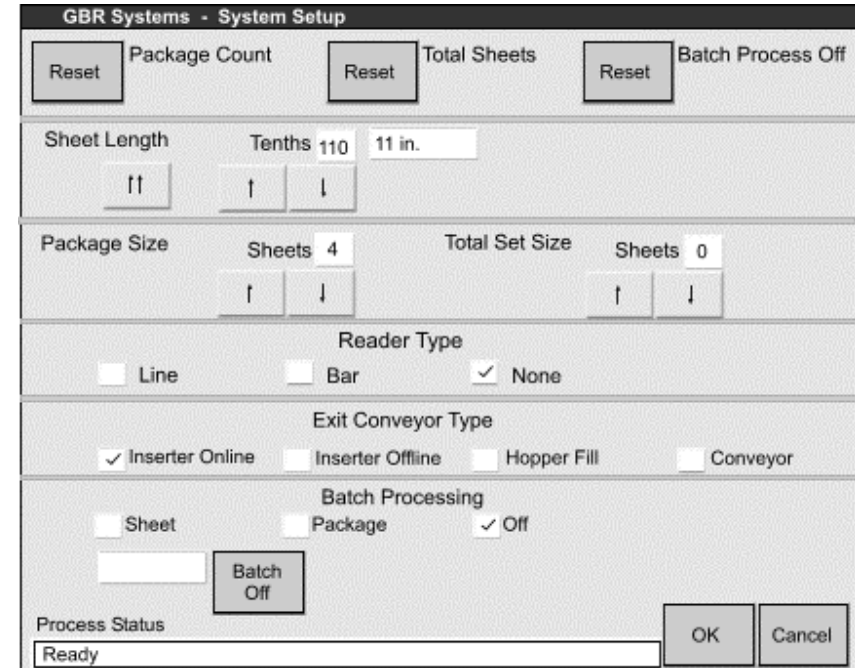
Press **Setup** while in the **Run** screen.

This screen provides access to all 420T setup screens.

Press **Run** to return to the "Run" screen.

Note: Normal factory settings are in bold font.

A.7a System Setup



Package Count "Reset"

Resets total package count ("Packages") found in Run screen. This value will also reset automatically on power down of machine.

Batch Process "Reset" (On/Off status is also displayed)

Resets the "Total Sheets" or "Total Packs" (depending on which option was selected) found in the Run screen. This value will also reset automatically after the sequential stop determined by the batch size entered. A sequential stop occurs when the last pack is accumulated, the machine stops feeding, purges the accumulator and transfer conveyor to the inserter, then powers down.

Sheet Length

- Double Arrow Up" button increments to standard sheet sizes
- 7", 8.5", **11"**, 14", A4, and A5
- "Single Arrow" buttons adjust sheet length in tenths of an inch

Package Size

- No Read fixed pack size. 1 to 12
- For Read, 1 greater than max expected (5 for the LineCode test set). Or number of fixed pages with no read.

Total Set size

- Default 0 not active
- In “No Read”, allows fixed pack subset testing when value > 0
 - Total set size is complete set count
 - Pack size is subset count

Reader Type.

- Line, Bar, None/Off. (Fixed packs. See Package Size in “System Setup” screen).

Exit Conveyor Type

- **Inserter Online.** By demand. See Inserter Setup 1 for Open or Gripper setup.
- **Inserter Offline.** Selecting this allows the inserter to run independent of the 420T without physically detaching.
- **Hopper Fill.** Select “HOPPER FILL” when the inserter will be **taking the folded documents from a hopper. With or without demand.** See Eng. Value 20. With no Inserter.
- **Conveyor.** with or without demand. See Eng. Value 20. With no Transfer Conveyor (Xcvy). Exit at Folder with Folder Exit Sensor.

Batch Processing

- **Sheet**
Select job size by entering the number of sheets to run. When selected the “Batch Off” button changes to “Set Sheets”. When “Sheet” is selected and a batch size entered, the machine will complete the package containing the last sheet.
- **Package**
Select job size by entering the number of packages to run. When selected the “Batch Off” button changes to “Set Packs”
- **Off**
Disables Batch Processing
- **“Batch Off” Button**
Changes to “Set Packs” or “Set Sheets” depending on the option selected. Press to enter batch value, a numeric keyboard is displayed, then press “=” to set. Batch value is displayed to the

left of the button. This button is not available when Batch Processing “Off” is selected.

A.7b Feeder Setup

GBR Systems - Feeder Setup

Double Detect Off Optical Ultrasonic

Pulse Feed Off Page End Timed Read

Pulse Feed Time 30

Process Status
Ready

OK Cancel

Double Detect Enable

- Select to have the 420T detect double feeds. Eng Value # 33, "Double Detect Count" is count of number of doubles before an error is tripped.
- Deselect if paper stock is causing false double detects.
Select Ultrasonic if installed.

Pulse Feed

- Off to engage clutch for the entire pack. AKA "Stream Feed".
- When selected the feeder will place a larger gap between the sheets.

Page End.

- Clutch is off at lead edge of page, on again at trail edge of page.

Timed

- "Pulse Feed Time" must be set when using this option.
- Clutch is off at lead edge of page, on after Time(for Timed).

Read

- Clutch is off at lead edge of page, on after read received. (With clutch OFF for minimum time dialed in, 31264.002 >)

Pulse Feed Time (Default = 30)

- Use when "Timed" is selected
- Higher the number, the larger the gap between sheets.
- Used with read as a minimum clutch OFF time. (31264.002 >)

A.7c Accumulator Setup

GBR Systems - Accumulator Setup

Accumulator Max Sheets 12

Accum. Type: Flat Normal

Process Status
Ready

OK Cancel

Accumulator Type

- “Flat” (FPF35) Replaces Accumulator and Folder – max. sheets increases to 99.

Accumulator Max

- Select up to 12 sheets maximum, the 420T will shut down on the 13th sheet fed into the accumulator. This function prevents damage to the folder.
- 12 may be selected when it is not desirable to have a package split into subsets. The 420T will still shutdown on the 13th sheet. The operator must clear the accumulator and manually process the package.
- If doing a “C” fold 5 sheets may be accumulated, or 7 sheets max. if doing a half fold.

A.7d Folder Setup (Future Option)

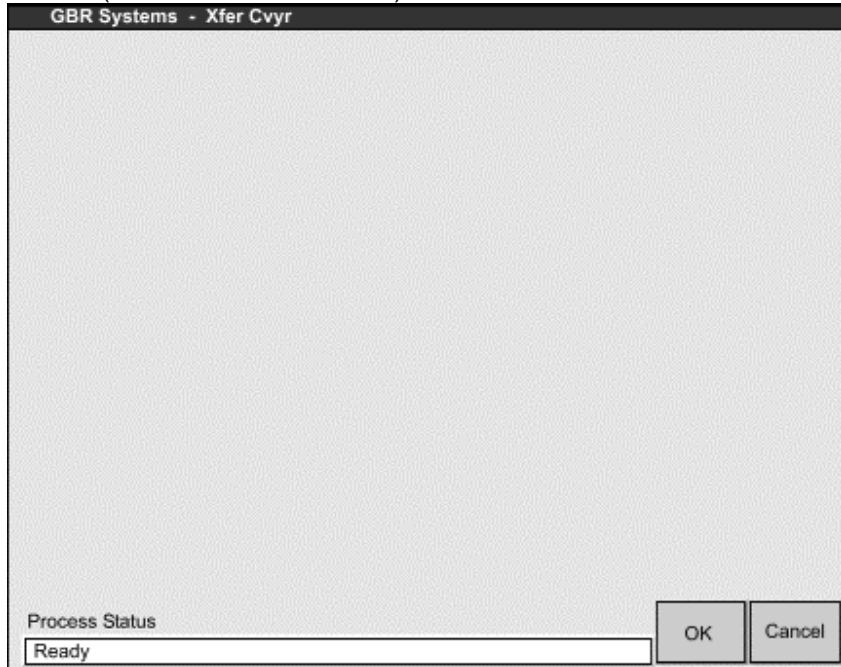
GBR Systems - Folder Setup

Process Status
Ready

OK Cancel

A.7e Xfer Cvyr (Transfer Conveyor)

- (not functional at this time)



A.7f Infeed Setup

Select the type of infeed:

Off

Creeper

- Select when using the standard 2000 sheet creeper conveyor.

Bulk

- 470 type bulk loader with on/off control by software monitoring the paper demand switch.

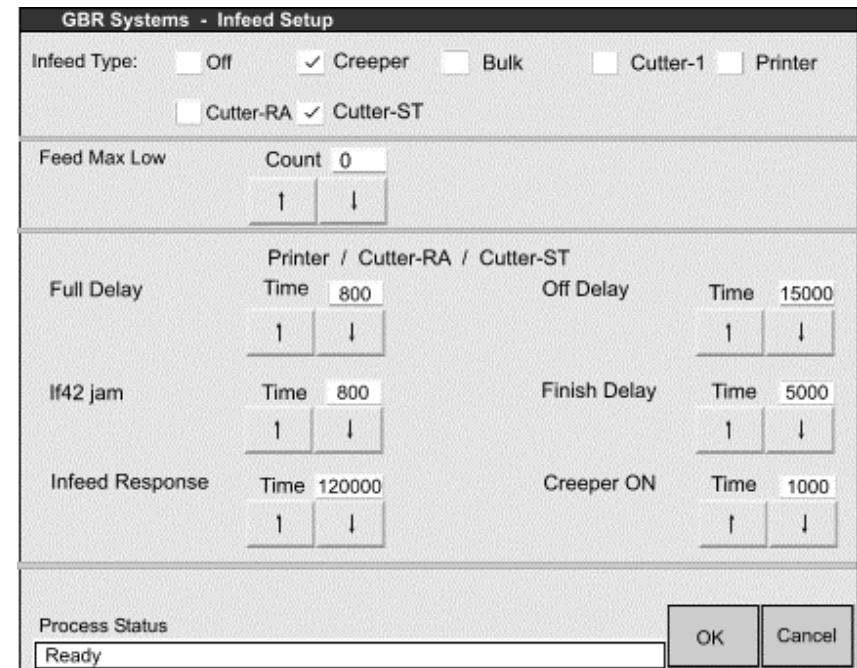
Cutter-1

- Cutter control by monitoring the paper demand switch.

- Cutter-ST, cutter Straight to 438 Creeper
- Add Cutter Output Sensor
- Use finish time, full time (see doc)

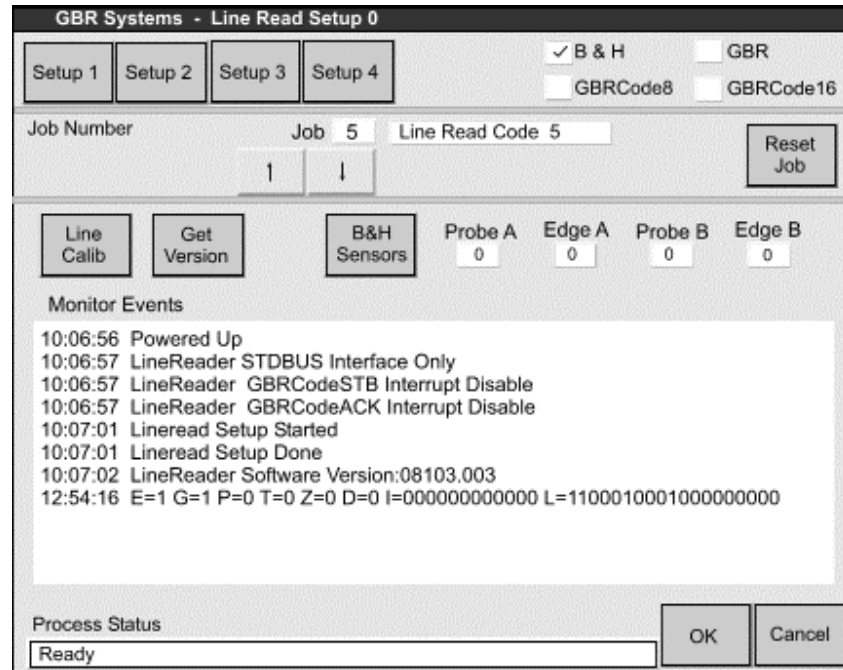
Printer

- Special support of the Xerox DFA & MB IF42 right angle module
- Additional parameters adjust the printer infeed type
- (See rdd) doc
 - Cutter RA, Cutter to Right Angle to 438 Creeper
 - Add Right Angle Input & Output Sensors
 - Use finish time, full time, off time (see doc)



A.7g Line Read Setup 0

Note: Refer to Section A8 for an explanation of GBR Line Code Read.



- Setup 1** – Refer to Section A.8c
- Setup 2** – Refer to Section A.8c
- Setup 3** – Refer to Section A.8c
- Setup 4** – Refer to Section A.8c

Select Line Read Type:

- BB+H Read**
- GBR Read**

Job Number

System will save all the parameters for up to 10 line code jobs. To program select a job number, set all settings for the job in Line Read Setup 1, 2, and 3 screens. Pressing the OK button in each setup screen saves those parameters to the job number selected.

Reset Job

Press this button to reset the job parameters for the job selected to factory defaults.

Line Calibration

Note: Used only for BB+H Line Read, not GBR Line Read

This function will calibrate the line code reader for proper location of marks for interpretation of code. Before pressing “Line Calib” make sure Reader Type “Line” in System Setup screen is selected. All sensors must be properly adjusted. All Line Read Setup screens must be setup. Select Calibration “On” in BB+H Line Read Setup 2 before starting.

A “Calibration Sheet” is a single white printed page with two lines going from side to side. The first line is placed one inch from the leading edge and the second line is placed six inches further back from the first line.

- Press the “Line Calib” button, display shows “Start Line Calib”.
- Power up, Single Cycle Calib Sheet through reader
- Display shows “Calib – “ OK or NOT with Calib results.
- Results: Expected no. encoder ticks between mark + actual no. counted.

BB+H Sensors

Note: For use with BB+H Line Read Only

Enables viewing the action of the sensor signals for diagnostic purposes.

A.7h Inserter Setup

GBR Systems - Inserter Setup 0

Setup 1 Setup 2 Setup 3

Inserter Protocol Type Inserter Postar

Selection Direction 6 to 1 1 to 6

Setup 4 Postal Meter By Weight Enable

Degrees Home Demand State Avg Dmd Rate

ON Deg OFF Deg

Inserter Monitor

10:06:56 Powered Up
10:07:01 6000 5000 4000 3000 2000 1000 0000 0000

Process Status
Ready

OK Cancel

Degrees

Encoder Updated as Inserter runs.

Home

Toggles I/O or O/I at home

Demand State

Operates in Demand Type "Switch" or "Degree" (see Inserter Setup 1), 3=ON, 0=OFF

Average Dmd Rate

Diagnostic - averages Demand Rate over three cycles

ON Degrees

Degrees where demand goes on by either "Switch" or "Degree" demand

OFF Degrees

Degrees where demand goes off by either "Switch" or "Degree" demand

Event List

Setup 1

Setup 2

Setup 3

Setup 4 (for TJ Read only)

Inserter Protocol Type

- Inserter
- Postar

Selection Direction

- 6 to 1
- 1 to 6

A.7i Inserter Setup 1

Ins Stations

- 4, 6, 4+4, Choose Inserter configuration.

GBR Systems - Inserter Setup 1

Ins Stations 4 6 4 + 4

Xfer At Stations Xfer Type Open Encoder 100 36
 Gripper Logic 775 AC/DC

Demand Switch Degree Serial Bad Pack Stop
 Subset None Pause Remove

Station Setup 1 1 2 2 3 3 4 4

Station Setup 5 5 6 6 7 0 8 0

Demand Degree Rate x1000
 ON Deg 0 2 4 6 8 10 12
 0 350 330 310 290 270 250
 Window 80 90 110 110 100 100 80

Process Status

Xfer At Stations

- “1” – “9” for Open feed, “0” Ins Sta 1
- Select "OPEN FEED" "Xfer Type" when the 420T will be placing the folded documents directly on the inserter track. When using open feed, selected number represents the number of stations prior to the first insert station the package was placed. Gripper if handing off to inserter gripper.

Encoder Type

- 100 Tick or 36 Tick per revolution. Subset Pause: Pause or hold inserter while collecting subsets in track. Release Ins when complete.

Remove: Stop when collecting subsets, allow removal. Operator restarts inserter

Demand

- Switch - Select when demand signal is provided by a magnetic switch (one pulse per rev).
- Degree - Select when demand signal is provided by an encoder, see Demand Degree.
- Serial – Talk to Tom Nelson!!!!!!

Logic Type

- 775 – 420/420T control of 775 Inserter functions, station Select, Envelope Disable, Envelope Flap Detect Disable, InkMark, Divert, Postal Meters.
- AC/DC – 420/420T control of non-775 Inserter functions, station Select, Envelope Disable, Envelope Flap Detect Disable, InkMark, Divert, Postal Meters.

Bad Pack Stop Enable

This box is defaulted “on” or “checked”. The machine will stop the inserter on a bad pack and energize the bad pack indicator light on the inserter. If unchecked or “off”, the machine will not stop on a bad pack.

Station Setup

When set to “0” the station is always off.

When set to “9” the station is always on.

- Norm 1: 1 Read1, Select1
- Map 1: 3 Read 1, Select3
- Invert 1: -1 Read 1, NO Select else Select 1

If a station is down the next station in line can be programmed to take it's place.

- Station Setup 1-4
- Station Setup 5-8

Demand Degree

This is similar to setting dwell time on an engine. As the speed of the machine is increased, home may be programmed at a position prior to 0 degrees allowing for lag time in components at higher speeds.

Degrees may be set for 0 -- 12,000 cycles per hour in increments of 2,000.

Note: Inserter degrees are reset to zero at the occurrence of a home pulse for either inserter encoder.

A.7j Inserter Setup 2

GBR Systems - Inserter Setup 2					
Env Station Vac	At 230	Station 2			
	↑ ↓	↑ ↓			
Env Flap Detect	On At 10	Off At 350	Station 0		
	↑ ↓	↑ ↓	↑ ↓		
Ink Mark	On At 200	Off At 10	Station 7		
	↑ ↓	↑ ↓	↑ ↓		
PM Divert	On At 10	Off At 10	Station 0	Station 0	
	↑ ↓	↑ ↓	↑ ↓	↑ ↓	
Ins Sta. Vac	On At 100	Logic Shift	On At 90	Bad Pk Stop	On At 80
	↑ ↓		↑ ↓		↑ ↓
Kicker	On Time 250	Delay 100	Station 0	Shift At 150	
	↑ ↓	↑ ↓	↑ ↓	↑ ↓	
Process Status					OK Cancel
Ready					

Envelope Station Vac 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. (upstream from stuffing station)

Env Flap Detect is normally set On at: 010, Off at: 350, and Insert Sta -:1(this is the location of the flap detect).

Ink Mark 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. Ink Marking is normally located at Station 7.

Insert Station Vacuum is normally enabled/disabled at "100". This is the position of the encoder (in degrees) at which vacuum is applied to the insert station.

Kicker

Logical Shift is normally set to "On At: 90". Degrees at which data array is shifted toward the stuffing station.

Bad Package Stop is normally set to "On At: 80".

**A.7k Inserter Setup 3
 PM Divert, Postal Meter 2, and Postal Meter 3**

GBR Systems - Inserter Setup 3									
Postal Meter 2	On At	200	Off At	2	Station	0	Point	1	
		↑ ↓		↑ ↓		↑ ↓		↑ ↓	
Postal Meter 3	On At	200	Off At	10	Station	0	Point	2	
		↑ ↓		↑ ↓		↑ ↓		↑ ↓	
Weight Breaks	1 / 2	0	2 / 3	0					
		↑ ↓		↑ ↓					
Page Env Wts	Page	0	Env	0					
		↑ ↓		↑ ↓					
Ins 1 - 4 Wts		1 5		2 14		3 1		4 1	
		↑ ↓		↑ ↓		↑ ↓		↑ ↓	
Ins 5 - 8 Wts		5 9		6 0		7 0		8 1	
		↑ ↓		↑ ↓		↑ ↓		↑ ↓	
Process Status								OK	Cancel
Ready									

NOTE ON POSTAL METER WEIGHING: The 420T can accommodate up to three postal meters (PM Divert 2 and 3 are located in Inserter Setup 3). Based on the values entered in "Weight Breaks", "Page Env Wts", "Ins 1-4 Wts", and "Ins 5-8 Wts" (located in Inserter Setup 3) the document will be stamped by the appropriate postal meter. The dollar value must be manually entered in the postal meter.

The value you enter in the Postal Meter Weights can be any unit of measure as long as it is consistent. If one weight break is set to reflect ounces, all other settings must reflect ounces including the inserts and the postal meter itself. Likewise, if one is set to reflect grams, they must all be set to reflect grams. The numbers entered are relevant only to each other.

Postal Meter 1 (PM Divert in Inserter Setup 2) 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** (found in Inserter Setup 3) 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 "10" for all three.

"Station: 0" 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.

"Point :xx" selects the postal meter output line to the 420T, this is normally set to "0" for PM Divert, "1" for Postal Meter 2, and "2" for Postal Meter 3.

Weight Breaks

The 420T will total the weights of all documents, inserts, and the envelope and then send it to the correct postal meter. Because you are setting the weight breaks as well as the envelope, page, and insert weights it is important to keep the unit of weight (i.e. oz) consistent.

1 / 2 Enter the Weight Break of Postal Meter 1 to Postal Meter 2.

2 / 3 Enter the Weight Break of Postal Meter 2 to Postal Meter 3.

Page Env Wts

Page

Enter the weight of the individual page, the 420T will sum the weight of all pages automatically.

Env

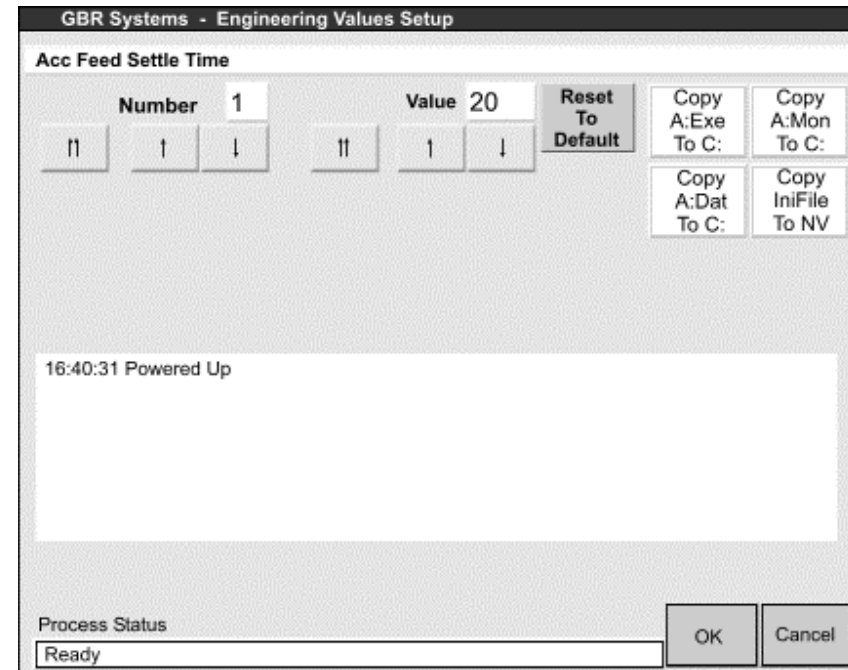
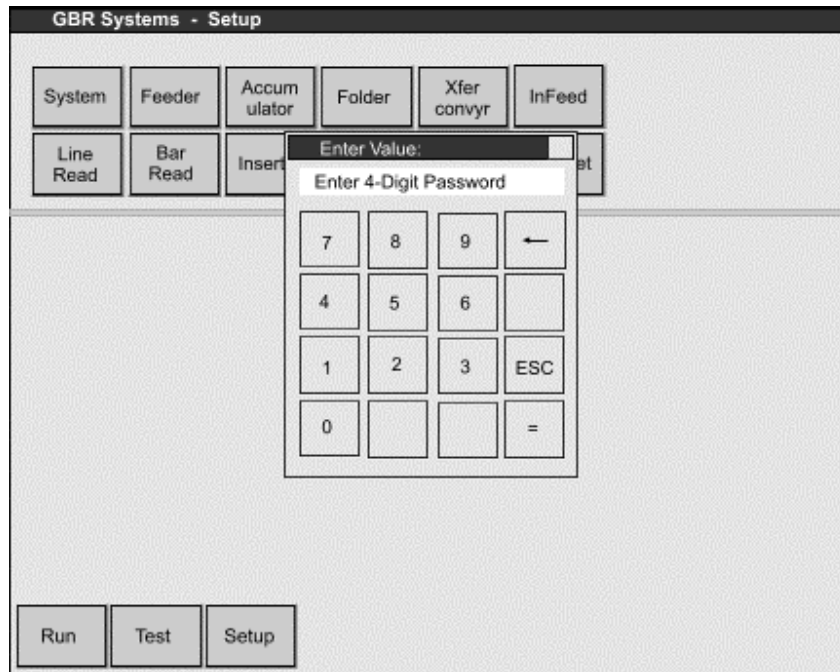
Enter the weight of an individual envelope.

Ins 1-4 Wts and Ins 5-8 Wts

Enter the weight of each insert in stations 1-4 and stations 5-8.

Refer to Section H.4 for an example of a Typical Postal Metering Setup Preset.

A.7I Engineering Values (Password Protected)



Number

Value

For settings refer to Section H Misc. for the Engineering Values List.

Password = 4444

A.7m ExitComm

GBR Systems - Exit Comm Setup

Exit Comm Type 4 Pinnacle 2

↑ ↓

Start Exit Comm Test

```
09:18:08 Powered Up
13:43:04 Xmit :000302
13:43:32 Xmit :000304
13:44:02 Xmit :000304
13:44:05 Xmit :000304
13:44:08 Xmit :000304
```

Process Status OK Cancel

Ready

Type

- 0 No Comm
- 1 RR Donnelly 1
- 2 RR Donnelly 2
- 3 Pinnacle 1
- 4 Pinnacle 2
- 5 General
- 6 Tampa 1
- 7 Zaandam 1

Start Button

- Xmits test data in type selected. Displays response terminated by a CR, LF. Press again to stop.

A.8 GBR LINE CODE READ SYSTEMS OPTION

A.8a 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 an 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 420T's touchscreen.

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 420T.
-

Reader Board Values that can be Adjusted Through The 420T Touchscreen

Refer to "Line Read Setup 4".

- **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.

For GBR (TJ read) Only

For CP30 set to BB+H read

A.8b Setting Up the GBR Line Code Reader (For TJ Read Only)

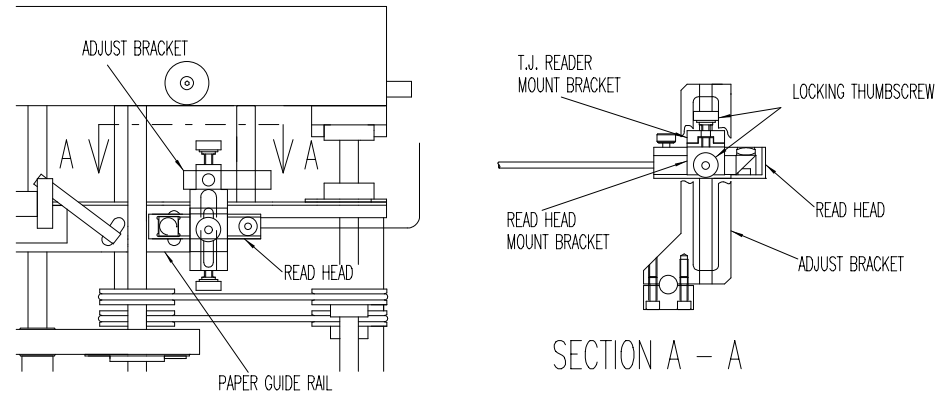
Setting the Probe

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: Go to: SETUP>LINE READ>LINE READ SETUP 4. 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 partial code resulting in a read error.



TJ Read Probe Assembly Figure

A.8c 420T Line Read Setup Screens (GBR &BB+H)

Line Read Setup 1

("Setup" > "Line Read" > "Setup 1")

The screenshot shows the 'GBR Systems - Line Read Setup 1' screen. It is divided into several sections with various options and controls:

- Demand Feed:** Normal, Reverse, Yes/No, First Page, Last Only, 1st Only (checked), Ttl Pg.
- Group Seq:** Up, Down, Matching, Same ID, None (checked).
- Page Seq:** Page Up, Page Down, Roll Up, Roll Down, Item Count, Total Up, Total Dn, None (checked).
- Parity Mark:** Odd, Even, None (checked).
- Seq Shutdown:** Clr. Last, Stop Last, Clr. 1st, Stop 1st, None (checked).
- Item Verify:** First Pg, Last Pg, Off (checked).
- Ink Mark:** Ink Mark, PM Divert, Unseal, Subset Mk, Random Mk.
- Max. Errors:** 0, with up/down arrows.
- Subset:** By Count 0, Random, Count 0, with up/down arrows.
- Process Status:** Ready.
- Buttons:** OK, Cancel.

DEMAND FEED

NORMAL - The machine will end the set on the presence 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 end the set on the absence 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 one mark. Each page will have an End of Group or a NOT End Of Group mark.

FIRST PAGE –

- Used with Page Seq Down
- EOG on first page of sel.
- Page Seq Dn to 4, last page and End Of Group generated.

LAST ONLY - When this option is selected, the system looks not both and not neither.

1ST ONLY – Set It enable verify exact data.

- Uses IT enable verify comt to count down to 1, End of Grp

TTL PG – (Total Page)

- Set It enable verify
- Set pg seq total up
 - EOG at pg Seq = total
- Set pg seq total dn
 - EOG at

Press "Cancel" to void any changes made to this screen or "Ok" to set the changes and return to the "Line Read Setup 0" screen.

GROUP SEQUENCE

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.

SAME ID -

NONE - No group sequence.

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.

PAGE SEQUENCE

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

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

ROLL UP - Cycle counts up sequentially to a selectable value set in "Line Read Setup 3 (Group Seq and Page Seq - Min and Max)

ROLL DOWN - Cycle counts down sequentially from a selectable value set in "Line Read Setup 3 (Group Seq and Page Seq - Min and Max)

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

Total UP -

Total Down -

Parity Mark: -

Odd -

Even -

NONE- No page sequence.

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.

Seq Shutdown

Clr Last -

Stop Last -

Clr First -

Stop First -

None -

Item Verify –

First Pg –

Last Pg –

Off –

Ink Mark

PM Divert

Unseal

Subset Mark

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.

Random Mark

Press "OK"

Line Read Setup 2

("Setup" > "Line Read" > "Setup 2")

Lines / Inch

The code marks can be at 1/6, 1/8, or 1/10 inch spacing. This is 6, 8, or 10 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.

Probes A/B

Select the reading probe to be used.

Bit Weight

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

MSB First is the first bit encountered when reading.

MSB Last is the last bit encountered when reading

<u>Example MSB Last</u>	<u>Example MSB First</u>
GRV	GRV
EOG	EOG
GS1	GS8
GS2	GS4
GS4	GS2
GS8	GS1
PS1	PS4
PS2	PS2
PS4	PS1
PAR	PAR

Calibration (This procedure is used for the “TJ” read system only) Please check with The GBR Customer Service Team for information on later reading systems.

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

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.

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.

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) Line Read Setup 4 and all preceding Setup 2 must be performed first.
- 3) Select “Calibration On”.
- 4) Press “OK”.
- 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
- 6) If a bad calibration is indicated RECALIBRATE must be selected before another Calibration document is fed. (Go back to step 4.)

Tolerance

Press "OK"

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.

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.

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.

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.

Line Read Setup 3

(“Setup” > “Line Read” > “Setup 3”)

GBR Systems - Line Read Setup 3										
Group Seq. Mark	Start	3	Length	3	Min.	1	Max.	4		
	↑	↓	↑	↓	↑	↓	↑	↓		
Page Seq. Mark	Start	6	Length	3	Min.	1	Max.	7	IncType 0	
	↑	↓	↑	↓	↑	↓	↑	↓	↑	
Inserts Mark	Start	11	Length	6						
	↑	↓	↑	↓						
Item Verify	Start	0	Length	0	Min.	1	Max.	0		
	↑	↓	↑	↓	↑	↓	↑	↓		
Gate At	5	Total Marks	14	EOG At	1	Not EOG At	2	Ink Mark At	10	
	↑	↓	↑	↓	↑	↓	↑	↓	↑	
PM Divert At	9	Subset At	0	Random At	0	Seq Stop At	0	Unseal At	0	
	↑	↓	↑	↓	↑	↓	↑	↓	↑	
Process Status	Ready								OK	Cancel

To Begin:

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

Group Seq. Mark

Purpose - Identify each page as being a part of an individual package. Depending on how the operator wishes to use the Group Seq. The sequential incrementing or decrementing 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.

Page Seq. Mark

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.

Inserts Mark

Gate Mark

Location - First OMR mark within a code 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.

Total Marks

This refers to the total number of marks in the code block. It is possible to have more marks listed than what is required or actually in the code block, but you must have all that are required listed as the total.

EOG Mark

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

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

Not EOG Mark

Ink Mark

PM Divt Mark

Postal Meter Divert Mark

Parity Mark (not available at this time)

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.

Subset Mark

Random Mark

Press "OK"

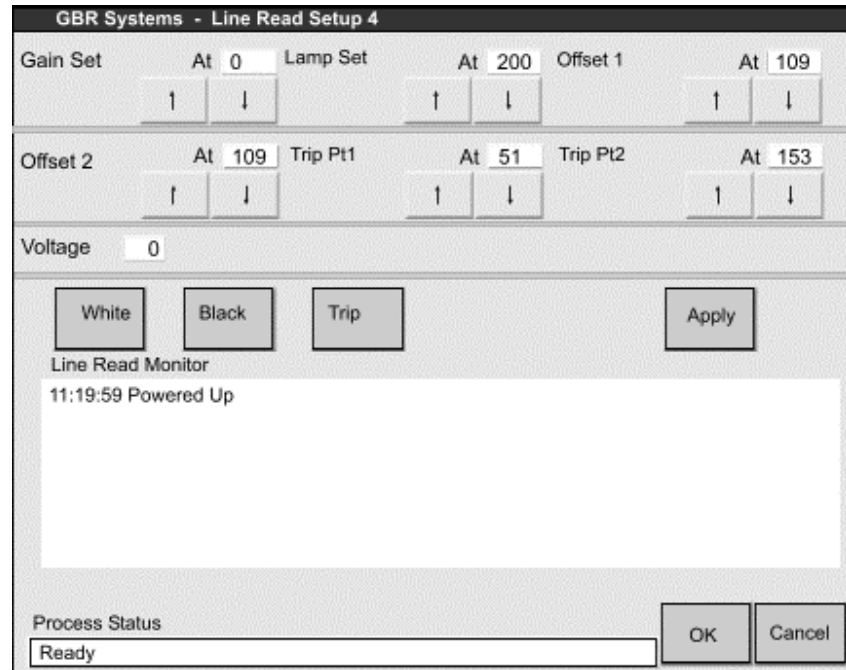
Line Read Setup 4 (TJ Read System Only)

("Setup" > "Line Read" > "Setup 4")

Note: This screen is used only for B+H Line Read, not used for GBR Line Read.

- 1) Turn on the 420T, press the SETUP button then press the LINE READ button.
- 2) Select "GBR".
- 3) Press "OK".
- 4) Press "LINE READ" again.
- 5) Press "SETUP 4".
 - 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 "WHITE". The system will indicate that when it is done.
- 6) Press "BLACK" and slowly move the paper until a black bar is under the light.
- 7) Press "BLACK" a second time when the voltage reaches "0" (the black bar is directly under the light)
- 8) Remove the paper from under the light and press "TRIP".
 - a) Event list will say finished when done.
 - TRIP POINT #1 value should be between 40 and 150
 - OFFSET #1 should be between 100 and 250.If these values are not obtained, go to section A.8b and reset the probe.
- 9) Find the average of the recorded OFFSET #1 and #2 values.
- 10) 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)
- 11) Change GAIN to 0.
- 12) Record these settings in the area to the right. In the future this procedure can be eliminated by entering these values directly.
- 13) Press "APPLY" to download these parameters to the read system and then press "OK".
- 14) The reader setup is complete. Line Read screens "SETUP 1, 2, and 3" must be completed before running paper.

NOTE: When switching between probes or after the 420T has been switched off, it may be necessary to repeat this setup procedure.



NOTE VALUES FOR FUTURE REFERENCE

(To find the values, go to "Setup" > "Line Read" > "Setup 4" and write down the values listed there)

GAIN: _____

OFFSET #1: _____

OFFSET #2: _____

TRIP POINT #1: _____

TRIP POINT #2: _____

A.8d Troubleshooting the GBR Line Code Reader(TJ Read System Only)

White Level Setup Problems

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 3/4" from the paper.)

Frequent Misreads, Lamp is Bright

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

- Go to section A.8c and make sure that all of your page settings are properly configured.
- After running one sheet, go into "Setup" > "Line Read" 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" > "Line Read" > "Setup 4" and increase OFFSET #2 by .1 volts (1 increment). Repeat this step until a good read is obtained.
- If more 0's appear on the screen than lines on the page, go "Setup" > "Line Read" > "Setup 4" and decrease OFFSET #2 by .1 volts (1 decrement). Repeat this step until a good read is obtained.
- 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 to "Setup" > "Line Read" > "Setup 3" 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.** If you have a line 1/4" above your gate mark (say, your gate mark is at line 15 on the page) and you are set to 1/8" line spacing,

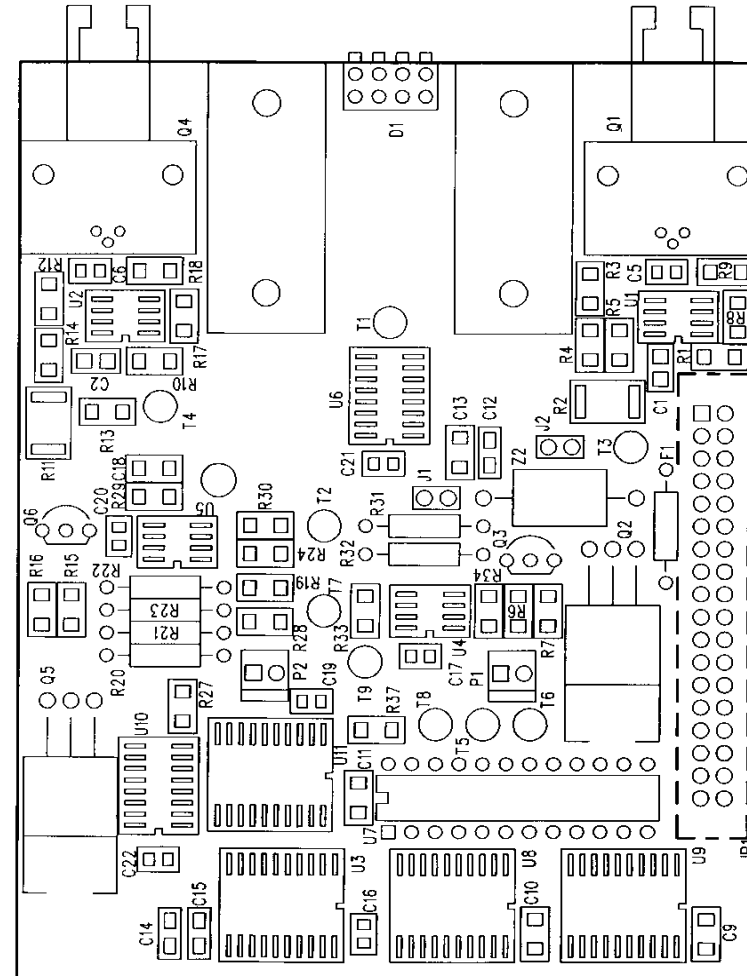
unless you set your read window to start 1 line below your gate mark (line 16 on the page), the reader is going to catch the first line as your gate mark. If the correct number of 1's appear, but they seem to have shifted on the page (there are not the proper number of spaces between the 1's), read encoder 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.

Lamp is Not Bright

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" > "Line Read" > "Setup 4" 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" > "Line Read" > "Setup 2" and select the other probe. Exit out of the setup screens. Set up the Line Code Reader (see Section A..8b **SETTING UP THE GBR LINE CODE READER**).



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

A.8e Physical Specifications of the Line Code System

Code location on paper

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"

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.

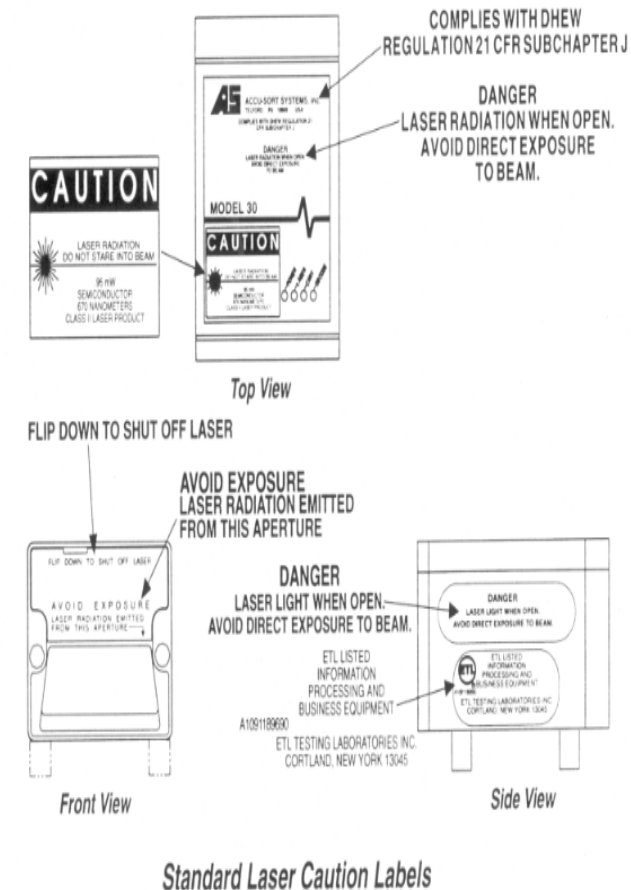
A.9 LASER BAR CODE READ OPTION

A.9a 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 bar code. 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.

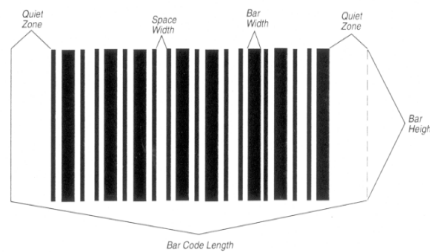


A.9b Bar Code Basics

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 420T 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.

A.9c Adjusting Your 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.

A.9d Setting the 420T to Read Laser Bar Code

“Setup” > “Bar Read”

Modifications to the bar setups are retained as long as the bar job defaults are not restored or the internal non-volatile storage is not overwritten by a new ‘ini’ file or is lost.

GBR Systems - Bar Read Setup

Setup 1 Setup 2 Setup 3 Setup 4

Job Number Job 5 BAR USER SETUP 1

↑ ↓

Start Bar Read Test Reset Job Defaults

11:19:59 Powered Up
11:20:03 Barcode Setup Started
11:20:03 Barcode Setup Done

Process Status Ready OK Cancel

Job Number

Job - Select the job to run by pressing “↑” or “↓”.

Note: If your job is not listed, go the next section “Setup 1” to program it in. Refer to the Appendix in this manual for setup parameters for various jobs. If your job is not listed call the factory.

Start

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.

Reset Job Defaults

Sets the bar job selected to its defaults, erasing any modifications that may have been done in the setups.

Press **OK** to set the job.

Bar Read Setup 1

GBR Systems - Bar Read Setup 1

Demand Feed: Normal Reverse Total Pg. Read First
 BOG Mark Group Chg CustID Chg

Group Seq: Up Down Matching Same ID None

Group Seq: Min. 1 Max. 4

Page Seq: Page Up Page Down Roll Up Roll Down Total UP
 Total Dn None

Page Seq: Min. 1 Max. 9 Count Skip 1

Ink Mark Meter Divert Subset Mark UnSeal Mark Stitch Mark

Seq Shutdown: Clr. Last Stop Last Clr. 1st Stop 1st None

Bit Direction: Normal Reverse Normal-A Reverse-A

Bit Number: 3 4 5 6 7 8

Process Status
Ready

Demand Feed

- **Normal**

Mark is on the last page fed. Last page is "1" all others in the pack are "0".

- **Reverse**

If checked, will handle an inverted Demand Feed sequence. Last page is "0", all others in the pack are "1".

- **Total Page**

Each sheet has a page number and the total number of pages for its group. Select "Total Up" or "Total Down" in Page Sequence.

- **Read First**

The first sheet (Banner Page) of the document is read. The page count information is used to determine how many more sheets to

feed and not read. After the last non-read sheet is fed, the next fed sheet will be scanned by the barcode reader to process the next document group.

BOG Mark

Group Chg

CustID Chg

Group Seq:

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.

- **Up** – Match in set. Min to Max to Min
- **Down** – Match in set. Max to Min to Max
- **Matching** – Match in set. Must change each set.
- **Same ID** – Match in set. No change needed
- **None**
- **Min (0 to 1)**
- **Max (0 to 99999)**

"Max Keypad" may be used to set a "Max" value through a keypad instead of using the arrow scroll button.

Page Seq. Mark

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

- **Page Up** - Min to Max within sets.
- **Page Down** - Max to Min within sets.
- **Roll Up** – Min to Max to Min across sets
- **Roll Down** – Max to Min to Max across sets
- **Total Up** - (A-Z) Supports "Total Page" demand feed option.
- **Total Dn** - (Z-A)
- **None**
- **Min (0 to 1)**
- **Max (0 to 999)**
- **Count Skip**

Ink Mark

- Mark to drive an ink/zip mark mechanism downstream.

Meter Divert

-
- Mark to drive a divert mark mechanism downstream.

Subset Mark (NA)

UnSeal Mark

Stitch Mark

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.

Bit Direction

- **Normal -**
Count bits 5 to 1, left to right, bit position 4 to 0, follow standard bit position of character.
- **Reverse -**
Count bits 1 to 5, left to right, bit position 4 to 0.(B&H)
- **Normal – A**
For multiple character numeric values. For 5 numeric characters converted to a number, bit positions 16 to 1: 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096, 8192, 16384, 32768.
- **Reverse – A**
For multiple character numeric values. For 5 numeric characters converted to a number, bit positions 1 to 16: 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096, 8192, 16384, 32768.

Bit Number

Establishes the maximum number of bits in one character. This is determined by the type of code being used.

Select from 5 through 8:

5 3 of 9 Bar Code

6-8 not used at this time

Bar Read Setup 2

GBR Systems - Bar Read Setup 2										
Group Seq. Code	Start	2	Length	2	StartBit	0	LengthBit	0	IncType	0
	↑ ↓		↑ ↓		↑ ↓		↑ ↓		↑ ↓	
Page Seq. Code	Start	0	Length	0	StartBit	0	LengthBit	0		
	↑ ↓		↑ ↓		↑ ↓		↑ ↓			
Inserts Code	Start	6	Length	2	StartBit	1	LengthBit	6		
	↑ ↓		↑ ↓		↑ ↓		↑ ↓			
Demand Feed Code	Start	1	Length	1	StartBit	1				
	↑ ↓		↑ ↓		↑ ↓					
Ink Mark Code	Start	5	Length	14	StartBit	1				
	↑ ↓		↑ ↓		↑ ↓					
PmDivert Code	Start	9	Length	0	StartBit	0				
	↑ ↓		↑ ↓		↑ ↓					
Process Status										
Ready										
<input type="button" value="OK"/> <input type="button" value="Cancel"/>										

The software permits a total of 30 characters in Bar Read, however, physically that isn't always practical due to the length of the code. For instance, 3 of 9 code is physically larger than 128 code (not available on the 420T at this time). A code in excess of 15 characters becomes problematic with a 3 of 9 code but a 128 code can easily exceed 20 characters.

Define the position in the barcode string to extract the information for the following:

Group Seq Code

- Start (0 to 30). Start character.
- Length (0 to 5). Number of characters.
For individual bit management use the following.
- Start_Bit (0 to 30). Starting bit position within character.
- Length_Bit (0 to 30). Number of bits.
- IncType -

Page Seq Code

- Start (0 to 30). Start character.
- Length (0 to 3). Number of characters.
- Start_Bit (0 to 30). Starting bit position within character.
- Length_Bit (0 to 30). Number of bits.

Inserts Code

- Start (0 to 30). Start character.
- Length (0 to 20). Number of characters.
- Start_Bit (0 to 30). Starting bit position within character.
- Length_Bit (0 to 30). Number of bits.

Demand Feed Code

- Start (0 to 30). Start character.
- Length (0 to 20). Number of characters. Used with Normal-A or Reverse-A, multiple character numeric values,
- Start_Bit (0 to 20). Starting bit position within character.

Ink Mark Code

- Start (0 to 30). Start character.
- Length (0 to 20). Number of characters. Used with Normal-A or Reverse-A, multiple character numeric values,
- Start_Bit (0 to 20). Starting bit position within character.

PmDivert Code

- Start (0 to 30). Start character.
- Length (0 to 20). Number of characters. Used with Normal-A or Reverse-A, multiple character numeric values,
- Start_Bit (0 to 20). Starting bit position within character.

Bar Read Setup 3

GBR Systems - Bar Read Setup 3									
Total Page Code	Start	5	Length	1	StartBit	0	LengthBit	0	
Sq Stop Code	Start	0	StartBit	0	Subset Code	Start	0	StartBit	0
Unseal Code	Start	0	Length	0	Stitch Code	StartBit	0	LengthBit	0
No Stop	Max. Errors	0	Subset		By Count	2			
Item Verify:	<input type="checkbox"/> First Pg	<input checked="" type="checkbox"/> Last Pg	<input type="checkbox"/> Off						
Item Verify:	Start	1	Length	4					
Check Digit:	<input type="checkbox"/> Mod 10A	<input type="checkbox"/> Mod 10B	<input type="checkbox"/> Mod 43	<input checked="" type="checkbox"/> None					
Process Status	Ready								OK Cancel

Total Page Code

- Start (0 to 30). Start character.
 - Length (0 to 5). Number of characters.
- For bit management use the following.
- Start_Bit (0 to 30). Starting bit position within character.
 - Length_Bit (0 to 30). Number of bits.

Sq Stop Code

- Start (0 to 30). Start character.
- Length (0 to 20). Number of characters.
- Start_Bit (0 to 20). Starting bit position within character.

Subset Code

- Start
- StartBit

Unseal Code

- Start
- Length

Stitch Code

- StartBit
- LengthBit

No Stop

- Max. Errors

Subset

- By Count

Item Verify:

- First Pg
- Last Pg
- Off

Item Verify

- Start
- Length

Check Digit:

- Mod 10A
- Mod 10B
- Mod 43
- None

A.9e 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 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.

NOTES:

Bar Read Setup 4

GBR Systems - Bar Read Setup 4

ReadFeed Type: Feed&Read Read&Feed

Read&Feed Start Delay 0

Cust ID Seq: Same ID Matching Off

Customer ID Code Start 10 Length 10

Code Lengths Code 39 0 I 2 of 5 0 Code 128 0

Number Reads Num. Reads 0

Process Status Ready

OK Cancel

ReadFeed Type:

- Feed&Read – When it is desired to Feed first and then Read (normal)
- Read&Feed – When it is desired to Read before Feed (In cases where the EOG (end of group) must be known before feeding next page).

Read&Feed:

- Start Delay – Only used with Read&Feed, and it is to delay the read to let the previously fed document get clear of the feeder.

Cust ID Seq:

- Same ID – Code group matching between sets.
- Matching – Code group matching only within a set.

- Off – disables code group matching

Customer ID Code:

- Start – Customer number, group ID or other number can be found beginning with this character in the Bar Code.
- Length – Number of lines after the start, i.e. start=6 length=3 (From the gatemark the start is found at line 6 and the length is line 6, 7 and 8)

Code Lengths: -1 disables reading in each category, 0 enables reading with variable length and any number indicates length, e.g. Code 39 with a length of 6 = a code block with 6 characters.

- Code 39 – 3 of 9 Bar Code
- I 2 of 5 – Interleaved 2 of 5 Bar Code
- Code 128

Number Reads:

- Num. Reads – the number of times the reader should scan and take average to ensure good read. (poor printing can sometimes be a reason for multiple reads)

ADDENDUM I

Overview

This document outlines the setup of the Postal Meters, Weight Calculation and Operation of Postal Metering on the GBR 438/420T.

Note: The order of postal meters to weight was reversed at 26412.044 on the GBR438

- GBR 420 and GBR438/420T prior to 26412.044(Aug. 2001):
 - LOW to High, Postal Meter 1 to Postal Meter 3.
- GBR438/420T after 26412.044(Aug. 2001)::
 - HIGH to Low, Postal Meter 1 to Postal Meter 3 to allow Postal Meter 1, Postal Meter Divert, to divert an over weight/size package first before the meters.

Note: Revised from the GBR 438 document: n4wght1.doc.

Installation

- The Postal Meter kit uses existing Input/Output(IO) points in the GBR438 and an existing cable kit and normally operates:
 - Postal Meter Divert(Test point “Postal Meter Divert”, Rack1:Point19) is Postal Meter 1(PM1).
 - Select Station 7(Test point “Separation Sol #7”, Rack1:Point4) is Postal Meter 2(PM2).
 - Select Station 8(Test point “Separation Sol #8”, Rack1:Point6) is Postal Meter 3(PM3).
 - If you use Stations 7 and 8, there are alternate IO points that can be used, call the factory.

- In general the Postal Meters are driven by 24VDC, 3AMP output modules. 24VDC power generally comes from the inserter, but may come from the GBR438. If there are two power supplies, care must be taken not to cross connect them.
- General installations use 1 or 2 postal meters and we normally use GBR438 postal meter 2 and 3 leaving postal meter 1, Postal Meter Divert, to be used as a postal meter or an oversize divert station.
- The actual order of the meters after the end of the Inserter should be Hi to Lo weight, PM1, PM2, PM3.
- The Postal Meters must be positioned after the last index position of the Inserter and all meters must be stacked as close as possible together.

Operation

- The GBR438 tracks the pack only to the last index position of the inserter. The GBR438 actually disables the meters which are not to be used leaving the one meter enabled to meter the pack .
- The GBR438 uses the inserter degree encoder to provide “fine timing” by degrees of the disable/enable signal to the Postal Meters.
- The “ON At” degree must come AFTER the Logical Shift(90 Deg.) of the pack data in the GBR438 inserter software module. The “OFF At” degree must come BEFORE the next Logical Shift(90 Deg.) of the pack data in the GBR438 inserter

software module. This cycle should occur between 100 and 80 degrees.

- Only one pack can traverse the meters at any time.

Setups

Lineread, Barread Setup:

Postal Meter Divert Enable(Postal Meter 1).

- Select Postal Meter Divert Enable “ON”, to operate from a read mark ONLY.
- Select Postal Meter Divert Enable “OFF”, to operate from Weights ONLY.

Insertor Setup:

Postal Meter By Weight Enable

- Check ON to enable Postal Meters

Insertor Setup 2:

Postal Meter Divert(Postal Meter 1)

- Enter Meter “ON AT:” in degrees, 0 to 350. After 90 degrees.
- Enter Meter “OFF AT:” in degrees, 0 to 350. Before 90 degrees.
- Enter Meter Position ‘STA:’
 - 1 to 12 after envelope insert station.
 - ‘0’ to Disable this meter.
- Enter Point Option ‘PT:’
 - 9 = Postal Meter Divert - DEFAULT
 - 10 = Postal Meter Divert - Inverted Signal

Insertor Setup 3:

Postal Meter 2

- Enter Meter “ON AT:” in degrees, 0 to 350. After 90 degrees.
 - Enter Meter “OFF AT:” in degrees, 0 to 350. Before 90 degrees.
-

- Enter Meter Position 'STA:
 - 1 to 12 after envelope insert station.
 - '0' to Disable this meter.
- 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
 - 9 = Postal Meter Divert. DO NOT USE.
 - 10 = Inverted Postal Meter Divert. DO NOT USE.
 - 11 = Moistener
 - 12 = Moistener - Inverted

- 8 = Station 1 Error - Inverted Signal
- 9 = Postal Meter Divert. DO NOT USE.
- 10 = Inverted Postal Meter Divert. DO NOT USE.
- 11 = Moistener
- 12 = Moistener - Inverted

Postal Meter 3

- Enter Meter "ON AT:": in degrees, 0 to 350. After 90 degrees.
- Enter Meter "OFF AT:": in degrees, 0 to 350. Before 90 degrees.
- Enter Meter Position 'STA:
 - 1 to 12 after envelope insert station.
 - '0' to Disable this meter.
- 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

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

Weight Calculation

Postal Meter Selection Calculation. Done when pack is transferred to the Inserter.

Package Weight = Envelope Weight + (No. Pages * Page Weight) + (Insert1 * Insert1 Weight)
+ (Insert2 * Insert2 Weight) + . . . through 8 inserts.

If Package Weight is greater than or equal(\geq) to Meter 1 to 2 Weight Break Value

- Then Meter 1 operates.

If Package Weight is less than($<$) Meter 1 to 2 Weight Break Value and greater than or equal(\geq) to Meter 2 to 3 Weight Break Value

- Then Meter 2 operates.

If Package Weight less than($<$) Meter 2 to 3 Weight Break Value (and less than($<$) Meter 1 to 2 Weight Break Value)

- Then Meter 3 operates.

THREE METER EXAMPLE

Meter 1 to 2 Weight Break Value = 30

Meter 2 to 3 Weight Break Value = 20

Package Weight	Meter 1	Meter 2	Meter 3
X			
10			X
15			X
X			
25		X	
X			
35	X		

THREE METER SETUP

Lineread Setup:

- Select Postal Meter Divert Enable “OFF”, to operate from Weights ONLY.

Insertor Setup:

- Postal Meter By Weight : Check ON to enable Postal Meters.

Insertor Setup 2:

- Postal Meter Divert(Postal Meter 1)
 - 200. Meter “ON AT:” in degrees.
 - 10. Meter “OFF AT:” in degrees.
 - 6. Meter Position ‘STA:’ (6 stations after envelope insert station).
 - 9. Enter Point Option ‘PT:’ (9 = Postal Meter Divert)

Insertor Setup 3:

- Postal Meter 2
 - 240. Meter “ON AT:” in degrees.
 - 10. Meter “OFF AT:” in degrees.
 - 6. Meter Position ‘STA:’ (6 stations after envelope insert station).
 - 1. Enter Point Option ‘PT:’ (1 = Select Station 7)
- Postal Meter 3
 - 280. Meter “ON AT:” in degrees.
 - 10. Meter “OFF AT:” in degrees.
 - 6. Meter Position ‘STA:’ (6 stations after envelope insert station).
 - 2. Enter Point Option ‘PT:’ (2 = Select Station 8)
- Postal Meter Weights
 - 30. Meter 1 to 2 Weight Value.
 - 20. Meter 2 to 3 Weight Value.

TWO METER EXAMPLE

Meter 1 to 2 Weight Break Value = 99. Must be greater than any pack expected.

Meter 2 to 3 Weight Break Value = 20

Package Weight	Meter 2	Meter 3
6		X
11		X
19		X
20	X	
26	X	
31	X	

THREE METER SETUP

Lineread Setup:

- Select Postal Meter Divert Enable "OFF", to operate from Weights ONLY.

Inserter Setup:

- Postal Meter By Weight : Check ON to enable Postal Meters.

Inserter Setup 2:

- Postal Meter Divert(Postal Meter 1)
 - 200. Meter "ON AT:" in degrees.
 - 10. Meter "OFF AT:" in degrees.
 - 0. Meter Position 'STA:' (0 disabled).
 - 9. Enter Point Option 'PT:' (9 = Postal Meter Divert)

Inserter Setup 3:

- Postal Meter 2
 - 200. Meter "ON AT:" in degrees.
 - 10. Meter "OFF AT:" in degrees.

- 6. Meter Position 'STA:' (6 stations after envelope insert station).
- 1. Enter Point Option 'PT:' (1 = Select Station 7)
- Postal Meter 3
 - 240. Meter "ON AT:" in degrees.
 - 60. Meter "OFF AT:" in degrees.
 - 6. Meter Position 'STA:' (6 stations after envelope insert station).
 - 2. Enter Point Option 'PT:' (2 = Select Station 8)
- Postal Meter Weights
 - 99. Meter 1 to 2 Weight Value.
 - 20. Meter 2 to 3 Weight Value.

Notes

- Weight Values are 5 digit numbers of arbitrary dimension. Be consistent, use tens or hundreds of an ounce(or gram) for all values. The maximum allowable internally computed package(pages + envelope + inserts)total value is 64000.
- Meter Output Point Option selection locks out standard operation of the output selected, i.e. 'Station 7 Select' selection does not allow standard Inserter Station 7 select through reading. Choose another Meter Output Point to resolve conflicts with actual installations.
- All meters are positioned at the same Station. This is the station after the last index track station of the inserter. The number is counted from the Envelope Insert Station of the inserter.
- Factory testing has shown that the pack moves out of the last index track station between 200 and 350 degrees. Meter enable imprint is timing is based on the 'ON AT' degree for each meter. The first meter in line tested at 200 degrees. The second meter inline required some delay and

was tested at 240 degrees. At higher speeds, packs imprinted with the first meter inline were mistakenly being imprinted by the second meter inline unless its 'ON AT' degree was slightly delayed.

Addendum II

New 4381420 - Exit Interface Serial Communication Specification
January 21, 2003-- V. 02 - File:g:\engineering_software\gbr_n420\n423202.doc

The purpose of this document is to specify a method of passing Inserter control data across a serial interface (RS-232) as the package exits the machine

Signal Specification

RS-232

- 19200 Baud, 7-Bit, Even Parity, 2-Stop Bits
- 19200 Baud, 8-Bit, No Parity, 1 -Stop Bits(Only for 8.. Friedberg 1 Protocol)

Connection

- DB9, TXD, RXD, GND

Note

- An Inserter Demand Signal or Inserter Degree Encoder Signal(separate signals) is required from the Inserter synchronizing the passing of the pack to the Inserter and data transmission
- INSERTER OPEN FEED: Transmission starts when the transfer conveyor is indexed and a pack is being transferred out.
- INSERTER GRIPPER: Transmission starts when the trail edge of the pack is being transferred out.
- HOPPERFILL or CONVEYOR: Transmission starts when the

transfer conveyor is indexed and a pack is being transferred out.

Protocols:

NA = Not Available

0) No Comm.

Exit Communication is disabled

1) RR Donnelly 1 Protocol:

<u>Character</u>	<u>Data</u>	<u>Description</u>
1	'0' - '7' ASCII numbers 0 to 7, 30' hex to 37 hex.	Barcode character 1 Bit 0 = Station 1 Bit 1 = Station 2 Bit 2 = Station 3
2	'0' - '7' ASCII numbers 0 to 7, 30 hex to 37 hex,	Barcode character 2 Bit 0 = Station 4 Bit 1 = Station 5 Bit 2 = Station 6
3	'0' -'7' ASCII numbers 0 to 7, 30 hex to 37 hex.	Barcode character 3 Bit 0 = Station 7 Bit 1 = Station 8 Bit 2 = Station 9

4	'0' - '7' ASCII numbers 0 to 7, 30 hex to 37 hex. Barcode character 4 Bit 0 = Station 10 Bit 1 = Station 11 Bit 2 = Station 12
5	'0' - '9' ASCII numbers 0 to 9, 30 hex to 39 hex.. Barcode character 5 End of Bag. NA.
6	'0' - '9' ASCII numbers 0 to 9, 30 hex to 39 hex. Barcode character 6 Future NA..
7	CR ASCII Carriage Return, OD hex

Notes

- Characters 1 to 6 are set to '9', 39 hex, if the pack is not valid.
- A 5 msec delay between characters is used. NA
- There is no acknowledge or response from the Inserter.

2) RR Donnelly 2 Protocol:

Character Data Description

1	'0' - '7' ASCII numbers 0 to 7, 30 hex to 37 hex.. Barcode character 1 Bit 0 = Station 1 Bit 1 = Station 2 Bit 2 = Station 3
2	'0' - '7' ASCII numbers 0 to 7, 30 hex to 37 hex. Barcode character 2 Bit 0 = Station 4 Bit 1 = Station 5 Bit 2 = Station 6
3	'0' - '7' ASCII numbers 0 to 7, 30 hex to 37 hex.. Barcode character 3 Bit 0 = Station 7 Bit 1 = Station 8

4	Bit 2 = Station 9 '0' - '7' ASCII numbers 0 to 7, 30 hex to 37 hex. Barcode character 4 Bit 0 = Station 10 Bit 1 = Station 11 Bit 2 = Station 12
5	'0' - '9' ASCII numbers 0 to 9, 30 hex to 39 hex.. Barcode character 5 End of Bag.. NA
6	'0' - '9' ASCII numbers 0 to 9, 30 hex to 39 hex.. Barcode character 6 Future NA.
7	'0' - '9' ASCII numbers 0 to 9, 30 hex to 39 hex. Barcode character 7 --
8	'0' - '9' ASCII numbers 0 to 9, 30 hex to 39 hex. Barcode character 8 --
9	'0' - '9' ASCII numbers 0 to 9, 30 hex to 39 hex.. Barcode character 9 --
10	'0' - '9' ASCII numbers 0 to 9, 30 hex to 39 hex.. Barcode character 10
11	'0' - '9' ASCII numbers 0 to 9, 30 hex to 39 hex, Barcode character 11
12	'0' - '9' ASCII numbers 0 to 9, 30 hex to 39 hex.. Barcode character 12
13	CR ASCII Carriage Return, OD hex.

Notes

- Characters 1 to 6 are set to '9', 39 hex, if the pack is not valid.
- A 5 msec delay between characters is used . NA
- There is no acknowledge or response from the Inserter.

3) Pinnacle 1 Protocol:

<u>Character</u>	<u>Data</u>	<u>Description</u>
1	'0' -'7'	ASCII numbers 0 to 7, 30 hex to 37 hex.. Bit 0 = Station 1 Bit 1 = Station 2 Bit 2 = Station 3
2	'0' - '7'	ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = Station 4 Bit 1 = Station 5 Bit 2 = Station 6
3	'0' - '7'	ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = Station 7 Bit 1 = Station 8 Bit 2 = Station 9
4	'0' -'9'	ASCII numbers 0 to 9, 30 hex to 39 hex. Package Page Count - Count 0 to 9 pages.(9, 3A hex, 3B hex etc..)
5	'0' -'7'	ASCII numbers 0 to 7, 30 hex to 37 hex., Bit 0 = 0 Bit 1 = Sequential Stop Clear Accumulator Pack Bit 2 = Sequential Stop Stop and Retain Accumulator Pack
6	'0' - '7'	ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = Postal Sort Mark, Ink Mark, Kick Mark, Envelope Mark Bit 1 = Divert by Read Mark, Divert by Read Errors Bit 2 = Pack Valid, Good Pack
7	CR	ASCII Carriage Return, 0D hex.

Notes

Characters 1 to 6 are set to '9', 39 hex, if the pack is not valid.

There is no acknowledge or response from the inserter.

4) Pinnacle 2 Protocol:

<u>Character</u>	<u>Data</u>	<u>Description</u>
1	'0' -'7'	ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = Station 1 Bit 1 = Station 2 Bit 2 = Station 3
2	'0' - '7'	ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = Station 4 Bit 1 = Station 5 Bit 2 = Station 6
3	'0' - '7'	ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = Station 7 Bit 1 = Station 8 Bit 2 = Station 9
4	'0' - '9'	ASCII numbers 0 to 9, 30 hex to 39 hex. Package Page Count – count 0 to 9 pages.(>9,hex, 3B hex etc.)
5	'0' - '7'	ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = 0 Bit 1 = Sequential Stop Clear Accumulator Pack Bit 2 = Sequential Stop Stop and Retain Accumulator Pack
6	'0' - '7'	ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = Postal Sort Mark, Ink Mark, Kick Mark, Envelope Mark Bit 1 = Divert by Read Mark, Divert by Read Errors Bit 2 = Pack Valid, Good pack
7	CR	ASCII Carriage Return, 0D hex.

Notes

- Package Page Count -- Count 0 to 9 pages.(>9, 3A hex, 3B hex etc.)
- 10 pages = 3A hex = ':', 11 pages = 3B hex = ';', etc through the ASCII chart.
- There is no acknowledge or response from the inserter.

5) General Protocol:

<u>Character</u>	<u>Data</u>	<u>Description</u>
1	'0' - '7'	ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = Station 1 Bit 1 = Station 2 Bit 2 = Station 3
2	'0' - '7'	ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = Station 4 Bit 1 = Station 5 Bit 2 = Station 6
3	'0' -- '7'	ASCII numbers 0 to 7, 30 hex to 37 hex.. Bit 0 = Station 7 Bit 1 = Station 8 Bit 2 = Station 9
4	'0' -- '9'	ASCII numbers 0 to 9, 30 hex to 39 hex. Package Page Count - Count 0 to 9 pages.(> 9, 3A hex, 3B hex etc)
5	'0' - '7'	ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = 0 Bit 1 = Sequential Stop Clear Accumulator Pack Bit 2 = Sequential Stop Stop and Retain Accumulator Pack
6	'0' - '7'	ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = Postal Sort Mark, Ink Mark, Kick Mark, Envelope Mark Bit 1 = Divert by Read Mark, Divert by Read Errors Bit 2 = Pack Valid, Good Pack
7-11	"1 nnnn"	ASCII numbers "10000" - "19999" Nnnn is four low digits of group number
12	'0' - '9'	ASCII numbers 0 to 9, 30 hex to 39 hex. Internal generated rolling sequence number,
13	CR	ASCII Carriage Return, OD hex.

Notes

- Package Page Count - Count 0 to 9 pages.(> 9, 3A hex, 3B hex etc..) W 10 pages = 3A hex = '.', 11 pages = 3B hex = ';', etc through the ASCII chart.
- There is no acknowledge or response from the inserter.

6) Tampa 1 Protocol:

<u>Character</u>	<u>Data</u>	<u>Description</u>
1	'0' --'7'	ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = Station 1 Bit 1 = Station 2 Bit 2 = Station 3
2	'0' --'7'	ASCII numbers 0 to 7, 30 hex to 37 hex Bit 0 = Station 4 Bit 1 = Station 5 Bit 2 = Station 6
3	'0' - '7'	ASCII numbers 0 to 7, 30 hex to 37 hex Bit 0 = Station 7 Bit 1 = Station 8 Bit 2 = Station 9
4	'0' --'9'	ASCII numbers 0 to 9, 30 hex to 39 hex Package Page Count - Count 0 to 9 pages.(> 9, 3A hex, 3B hex etc.)
5	'0' - '7'	ASCII numbers 0 to 7, 30 hex to 37 hex Bit 0 = End NA Bit1=-- Bit2 = -
6	'0' - '7'	ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = Postal Sort Mark, ink Mark, Kick Mark, Envelope Mark Bit 1 = Divert by Read Mark, Divert by Read Errors Bit 2 = Pack Valid, Good Pack
7	CR	ASCII Carriage Return, OD hex

Response:

Character Data Description

- | | | |
|---|-----|---|
| 1 | '0' | ASCII number 0, 30 hex.
Acknowledge from the inserter that previous transmittal was accepted and next transmittal can be made. Previous package has moved forward an index position. |
|---|-----|---|

Notes

- Package Page Count – Count 0 to 9 pages.(>9, 3A hex, 3B hex etc.)
- 10 pages = 3A hex =';, 11 pages = 3B hex =';, etc through the ASCII chart.
- Acknowledge is required from the Inserter.
- Acknowledge response timeout is set by Engin. Value 36, default is 250 msec.
- Acknowledge response number of re-xmits is set by Engin. Value 37, default is 1.

7) Zaandam I Protocol:

Character Data Description

1	'0' -- '7' ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = Station 1 Bit 1 = Station 2 Bit 2 = Station 3
2	'0' -'7' ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = Station 4 Bit 1 = Station 5 Bit 2 = Station 6
3	'0' - '7' ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = Station 7 Bit 1 = Station 8 Bit 2 = Station 9
4	'0' - '9' ASCII numbers 0 to 9, 30 hex to 39 hex.. Package Page Count - Count 0 to 9 pages.(> 9, 3A hex, 3B hex etc.)
5	'0' - '7' ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = End NA
6	'0' - '7' ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = Postal Sort Mark, Ink Mark, Kick Mark, Envelope Mark Bit 1 = Divert by Read Mark, Divert by Read Errors Bit 2 = Pack Valid, Good Pack
7	CR ASCII Carriage Return, OD hex.

Notes

- Package Page Count --- Count 0 to 9 pages.(> 9, 3A hex, 3B hex etc..)

- 10 pages = 3A hex 11 pages = 3B hex = ';, etc through the ASCII chart.
- There is no acknowledge or response from the Inserter.

8) Friedberg 1 Protocol:

Character Data Description

1	0x2 2 hex.
2	'0' ASCII number 0, 30 hex.
3	'0' ASCII number 0, 30 hex
4	'0' -- `9' ASCII numbers 0 to 9, 30 hex to 39 hex. Package Page Count-- 10's digit
5	'0' -- '9' ASCII numbers 0 to 9, 30 hex to 39 hex. Package Page Count - 1's digit
6	'0' - '7' ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = Station 1 Bit 1 = Station 2 Bit 2 = Station 3
7	'0' - '7' ASCII numbers 0 to 7, 30 hex to 37 hex.. Bit 0 = Station 4 Bit 1 = Station 5 Bit 2 = Station 6
8	'0' – '7' ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = Station 7 Bit 1 = Station 8 Bit 2 = Station 9
9	'0' – '7' ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = Postal Sort Mark, Ink Mark, Kick Mark, Envelope Mark Bit 1 = Divert by Read Mark, Divert by Read Errors Bit 2 = Pack NOT Valid, BAD Pack
10	CRASCII Carriage Return, 0D hex.

Notes

- Bad Pack is opposite logic of Pack Valid: "0" = no known errors, "1" = may contain an error.
- The protocol for this format is as follows:
Baud Rate = 19200, Bits = 8, Stop Bits = 1, Parity = NONE
- There is no acknowledge or response from the Inserter.

8) General 2 Protocol:

Character Data Description

1	'0' - '7' ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = Station 1 Bit 1 = Station 2 Bit 2 = Station 3
2	'0' -- '7' ASCII numbers 0 to 7, 30 hex to 37 hex, Bit 0 = Station 4 Bit 1 = Station 5 Bit 2 = Station 6
3	'0' - '7' ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = Station 7 Bit 1 = Station 8 Bit 2 = Station 9
4	'0' - '9' ASCII numbers 0 to 9, 30 hex to 39 hex, Package Page Count - 10's digit
5	'0' - '9' ASCII numbers 0 to 9, 30 hex to 39 hex. Package Page Count - 1's digit
6	'0' --'7' ASCII numbers 0 to 7, 30 hex to 37 hex. Bit 0 = 0 Bit 1 = Sequential Stop Clear Accumulator Pack Bit 2 = Sequential Stop Stop and Retain Accumulator Pack
7	'0' --'7' ASCII numbers 0 to 7, 30 hex to 37 hex, Bit 0 = Postal Sort Mark, Ink Mark, Kick Mark, Envelope Mark Bit 1 = Divert by Read Mark, Divert by Read Errors Bit 2 = Pack Valid, Good Pack
8-12	"1 nnnn"ASCII numbers "10000" - "19999". Nnnn is four low digits of group number
13	'0' -- '9' ASCII numbers 0 to 9 to 9, 30 hex to 39 hex.

14 Internal generated rolling sequence number.
CR ASCII Carriage Return, OD hex.

Notes

- There is no acknowledge or response from the inserter

General Notes

- There is no acknowledge or response from the Inserter except for 6) Tampa 1 Protocol,
- Pack Valid or Good Pack.. 11ON: no known errors, 0/OFF; may contain an error.
- Divert by Read Mark, Divert by Read Errors. 1/ON: divert pack, 0/OFF: DO NOT divert pack..
 - If Divert is ON and Pack Valid is OFF the pack is being diverted because it may have an error.
 - If Divert is ON and Pack Valid is ON the pack is being diverted because of a read mark..

Read or NO Read(Fixed Pack) Station Selection Operation

- Read
 - The machine Inserter Setup Station Selection allows stations to be selected by read mark or operator set ON, or operator set OFF.
- NO Read
 - Normally with Read Off all stations are set ON.
 - We will modify the machine to set ON stations which are selected for read mark or operator set ON. We set OFF only those stations operator set for OFF,
 - Postal Sort Mark/Envelope Mark and Divert by *Read* will be set OFF. Pack Valid will be set ON
 - **Exit Comm Setup Test Button:** The package data is set to:
 - Number pages = 3
 - Pack valid = 1

- Divert = 1
- Ink mark = 1
- Group = 321
- Sequence number = 9
- Station 1 = 1
- Station 2 = 0
- Station 3 = 1
- Station 4 = 0
- Station 5 = 1
- Station 6 = 0
- Station 7 = 1
- Station 8 = 0
- Station 9 = 1

The selected protocol formats the
test data and sends the message.

X

SECTION B. PREVENTIVE MAINTENANCE

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B.1 TEST EQUIPMENT AND TOOLS

- Portable 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 420T should be cleaned daily to remove any dirt or dust that 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 420T. 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 420T 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.

B.2.b LUBRICATION

No lubrication is required on the 420T.

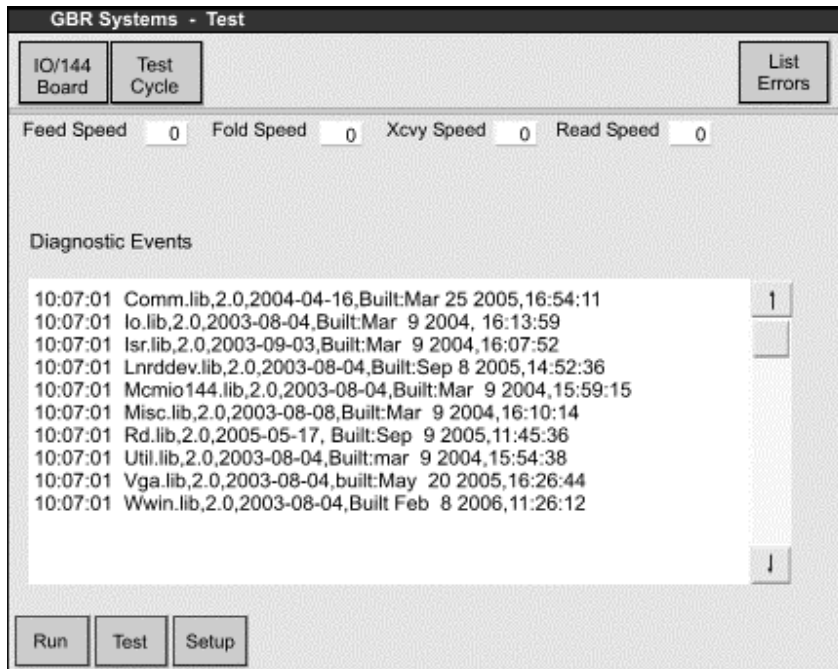
NOTE: If a mechanical component is out of line or deformed, a small amount of oil may be used as a short term fix (to eliminate noise or binding) until the component can be replaced.

SECTION C - PROBLEM ANALYSIS

- SECTION C - PROBLEM ANALYSIS 1**
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C.1 “TEST” SCREEN OPERATION

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.



Speed Test

Pressing the green “Power On” switch on the keyboard will start the feeder and folder motors and display the speeds of the feeder, folder, transfer conveyor, and read encoders.

Test Cycle

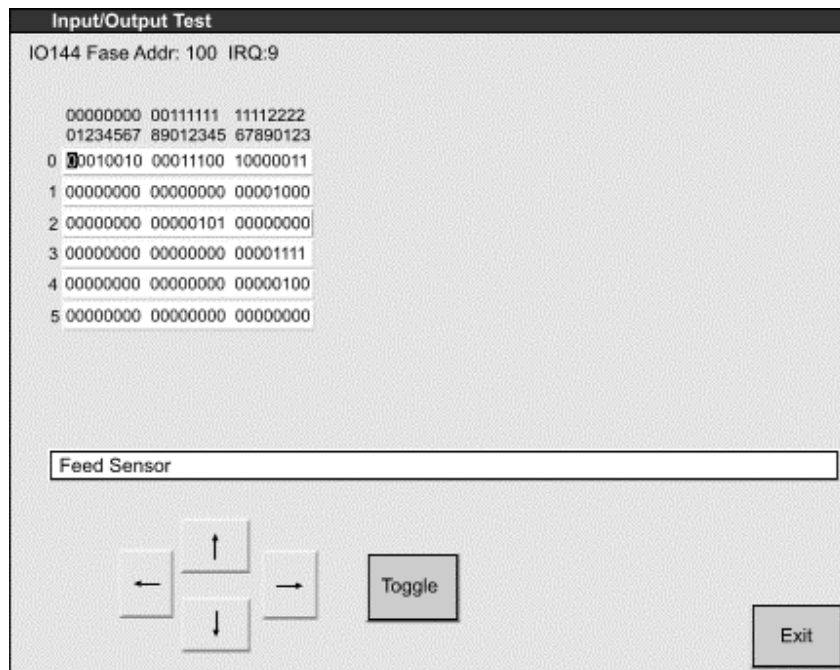
Press “Test Cycle” for 100 msec On/300 msec Off cycle.
Press “Test Cycle” again to stop test.

The speeds indicated are approximate (inches per second).

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

IO/144 Board (Inputs and Outputs)

- Use this screen to test inputs and outputs.
- The name of the output or input will be displayed when the cursor is positioned on its Opto Rack and Opto Location block.
- Inputs will change state when sensors are blocked or encoders are rotated.
- Use the “Toggle” button to toggle the outputs on and off. (Interlocks must be closed and Master Relay output 1:3 must be toggled ON for this to function.)



Rack	Opto	Type	
0	00	Input	Feed Sensor
0	01	Input	Stack Sensor
0	02	Input	Feeder Speed Encoder
0	03	Input	Folder Speed Encoder
0	04	Input	Demand Switch
0	05	Input	Inserter Deg. Encoder
0	06	Input	Conv Option Line 0
0	07	Input	Conv Option Line 1
0	08	Input	Key Power
0	09	Input	Key Cycle
0	10	Input	Key Dump
0	11	Input	Interlock
0	12	Input	Transfer Conv IN SNS
0	13	Input	Transfer Conv OUT SNS
0	14	Input	Inserter Home Encoder
0	15	Input	Conv Option Line 2
0	16	Input	2 Sheet Sensor
0	17	Input	Folder Sensor
0	18	Input	Acc Sensor
0	19	Input	Cutter Busy Signal
0	20	Output	Acc Dump Clutch
0	21	Output	Transfer Conv. Clutch
0	22	Output	Transfer Conv. Brake
0	23	Output	Acc Dump Brake

Rack	Opto	Type	
1	00	Output	Feed Clutch
1	01	Output	Folder Motor
1	02	Output	Feed Motor
1	03	Output	Master Relay
1	04	Output	Separation Sol 7 (inserter signal)
1	05	Output	Separation Sol 1 (inserter signal)
1	06	Output	Separation Sol 8 (inserter signal)
1	07	Output	Shingle Conveyor Motor
1	08	Output	Separation Sol 2 (inserter signal)
1	09	Output	Separation Sol 3 (inserter signal)
1	10	Output	Separation Sol 4 (inserter signal)
1	11	Output	Separation Sol 5 (inserter signal)
1	12	Output	Separation Sol 6 (inserter signal)
1	13	Output	Separation Sol Env (inserter signal)
1	14	Output	Ink Mark Solenoid (inserter signal)
1	15	Output	Env Flap Sns Dis (inserter signal)
1	16	Output	Emergency Stop (inserter signal)
1	17	Output	Insert Station 1 Error (inserter signal)
1	18	Output	Paper Hopper Request
1	19	Output	Postal Meter Divert (inserter signal)
1	20	Input	Paper Demand Wand
1	21	Input	Ins. Run Lamp
1	22	Input	Cutter Jam Sensor
1	23	Input	Inserter Sta. 1 Sns

Rack	Opto	Type	
2	00		Not Used
2	01		Not Used
2	02		Not Used
2	03		Not Used
2	04		Not Used
2	05		Not Used
2	06		Not Used
2	07		Not Used
2	08		Not Used
2	09		Not Used
2	10		Not Used
2	11		Not Used
2	12		Not Used
2	13	Output	First Hold Kicker
2	14	Output	First Hold Brake
2	15	Output	First Hold Clutch
2	16	Input	Ins Ink Mark Pres
2	17		Not Used
2	18		Not Used
2	19		Not Used
2	20		Not Used
2	21		Not Used
2	22		Not Used
2	23		Not Used

C.2 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 420T 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 420T, the operator must remove any packages in the accumulator to be sure there will be no initial error conditions.

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.3 ERROR CODES

Error	A unique error number. The first two digits specify a machine area or module. The last three define the specific error.
EVENT	The event or process being monitored.
EVENT CHECK	The mechanism or 'thing' used to monitor the event.
ERROR ON	The reason an error is flagged.
CHECK VALUE	The value being used to flag the error. Some are calculated based on speed, sheet length etc.
ADJUST VALUE	Where the check value can be adjusted.

ERROR CODE SECTIONS

- 11xxx // System Messages
- 12xxx // Feeder Messages
- 13xxx // Accumulator Messages
- 14xxx // Folder Messages
- 15xxx // Xfer Conveyor Messages
- 16xxx // Barreader Messages
- 17xxx // Inserter Messages
- 18xxx // Linereader Messages
- 19xxx // EngValue Messages
- 20xxx // COMMPORT3 Messages
- 21xxx // InFeed Messages

An "8" in the third digit position is the same as a "0".
Example - "18836" is the same as "18036".

C.3a (11xxx) System

Error Description

11820	"Exit Demand Timeout" EVENT: Accum. Package Ready to Exit Demand. EVENT CHECK: ExitDemandTimer. ERROR ON: Time exceeded. CHECK VALUE: 60 sec. ADJUST VALUE: Engin. Value 21
11821	"Cover Interlock Open or Emergency Stop Set" EVENT: Interlock ON. EVENT CHECK: Interlock. ERROR ON: Interlock ON at power ON. CHECK VALUE: -- ADJUST VALUE: --
11822	"Cover Interlock Open or Emergency Stop Set" EVENT: Interlock ON. EVENT CHECK: Interlock. ERROR ON: Interlock ON at machine powered. CHECK VALUE: -- ADJUST VALUE: --
11824	"Exit Sensor Error" EVENT: Exit Demand. EVENT CHECK: Exit Demand and Exit Sense, Inserter Station 1 Sense. ERROR ON: Inserter Station 1 Sense covered for 6 demands. Sensor blocked CHECK VALUE: -- ADJUST VALUE: --

C.3b (12xxx) Feeder

Error Description

- 12001 "No Feed Error"
EVENT: Feed Clutch ON, page lead edge to Feed Sensor
EVENT CHECK: NoFeedTimer.
ERROR ON: Time exceeded.
CHECK VALUE: 500 msec.
ADJUST VALUE: --
- 12820 "DOUBLE PAGE FED"
EVENT: Under Feed Sensor, Double Detect Sensor.
EVENT CHECK: DoubleDetectCount.
ERROR ON: DoubleDetectCount exceeds 2.
CHECK VALUE: > 2
ADJUST VALUE: --
- 12821 "MISSED PAGE"
EVENT: Page lead edge to Feed Sensor, next page lead edge to Feed Sensor.
EVENT CHECK: Page lead edge to Feed Sensor.
ERROR ON: No page trail edge. Trail of previous page not sensed.
CHECK VALUE: --
ADJUST VALUE: --
- 12822 "LONG PAGE FED"
EVENT: Feed Clutch ON, page lead edge and trail edge through Feed Sensor.
EVENT CHECK: JamTimer
ERROR ON: Time exceeded.
CHECK VALUE: 150 msec. [(Sheet Length * 150) / Speed]
ADJUST VALUE: --
- 12823 "EXTRA PAGE WAS FED"
EVENT: Page lead edge at Feed Sensor.
EVENT CHECK: Feed Sensor.

ERROR ON: Page lead edge at Feed Sensor. Feed not processing.

- CHECK VALUE: --
ADJUST VALUE: --
- 12825 "FEED TO ACCUMULATOR JAM(TIME)"
EVENT: Feed Clutch ON, page lead edge and lead edge through Accum. Sensor.
EVENT CHECK: FeedToAccumTimer.
ERROR ON: Time exceeded.
CHECK VALUE: 170 msec. [(CHECK VALUE * 160) / Speed]
ADJUST VALUE: Engin. Value 24
- 12826 "SPEED LOW"
EVENT: Feed Encoder Sensor.
EVENT CHECK: Calculate and Average speed.
ERROR ON: Speed less than value.
CHECK VALUE: 25 inches per second
ADJUST VALUE: --
- 12827 "FEED SENSOR COVERED"
EVENT: Feed Sensor ON.
EVENT CHECK: Check at Feeder Power On.
ERROR ON: Feed Sensor ON.
CHECK VALUE: --
ADJUST VALUE: --

C.3c (13xxx) Accumulator

Error Description

- 13000 "Stack Error"
EVENT: Page passing through Acc. Stack Sensor.
EVENT CHECK: StackTimer.
ERROR ON: Time exceeded.
CHECK VALUE: 500 msec.
ADJUST VALUE: --

13001 "Misfeed Error"
EVENT: Acc. Clutch ON, page passing out of Acc. Presence Sensor.
EVENT CHECK: NoDumpTimer.
ERROR ON: Time exceeded.
CHECK VALUE: 150 msec. [(Sheet Length * 150) / Speed]
ADJUST VALUE: --

C.3d (14xxx) Folder

Error Description

14001 "Jam In Folder"
EVENT: Accum. Clutch ON to lead edge Folder Exit Sensor.
EVENT CHECK: FolderExitTimer.
ERROR ON: Time exceeded.
CHECK VALUE: 400 msec.
ADJUST VALUE: Engin. Value 4

14002 "Jam At Folder Exit"
EVENT: Accum. Clutch ON, increment. Lead edge at Folder Exit Sensor, decrement.
EVENT CHECK: PackageCounter.
ERROR ON: > 2.
CHECK VALUE: 2.
ADJUST VALUE: Engin. Value 4

14820 "SPEED LOW"
EVENT: Folder Encoder Sensor.
EVENT CHECK: Calculate and Average speed.
ERROR ON: Speed less than value.
CHECK VALUE: 25 inches per second
ADJUST VALUE: --

C.3e (15xxx) Xfer Conveyor(Xfer Cvyr, Xcvy)

Error Description

15001 "Jam Error"
EVENT: Pack at Xcvy Sta. 1/In Sensor, increment. Pack at Xcvy Out Sensor, decrement.
EVENT CHECK: PackageCounter.
ERROR ON: > 5.
CHECK VALUE: 5.
ADJUST VALUE: Engin. Value 18

15002 "Jam At In Sensor Error"
EVENT: INSERTER. Xcvy. Clutch ON to Pack out of Xcvy Sta. 1/In Sensor.
EVENT CHECK: JamAtInTimer.
ERROR ON: Time exceeded.
CHECK VALUE: 500 msec.
ADJUST VALUE: Engin. Value 23

15003 "Jam At Out Sensor Error"
EVENT: INSERTER. Xcvy. Clutch ON to Pack into Xcvy Out Sensor.
EVENT CHECK: JamAtOutTimer.
ERROR ON: Time exceeded.
CHECK VALUE: 3000 msec.
ADJUST VALUE: Engin. Value 22

15002 "Jam At In Sensor Error"
EVENT: HOPPERFILL. Xcvy. Clutch ON to Pack into Xcvy Sta. 1/In Sensor.
EVENT CHECK: JamAtInTimer.
ERROR ON: Time exceeded.
CHECK VALUE: 500 msec.
ADJUST VALUE: Engin. Value 23

15003 "Jam At Out Sensor Error"
EVENT: HOPPERFILL. Pack into Xcvy Sta. 1/In Sensor to Pack into Xcvy Out Sensor.
EVENT CHECK: JamAtOutTimer.
ERROR ON: Time exceeded.
CHECK VALUE: 3000 msec.
ADJUST VALUE: Engin. Value 22

15820 "Jam Into Xfer Cnvy Station 1"
EVENT: HOPPERFILL. Xcvy. Clutch ON to Pack into Xcvy Sta. 1/In Sensor.
EVENT CHECK: IntoStation1Timer.
ERROR ON: Time exceeded.
CHECK VALUE: 225 msec. [(CHECK VALUE * 100) / Speed]
ADJUST VALUE: Engin. Value 8

15821 "Jam Out Of Xfer Cnvy Station 1"
EVENT: HOPPERFILL. Xcvy. Clutch ON to Pack out of Xcvy Sta. 1/In Sensor.
EVENT CHECK: OutOfStation1Timer.
ERROR ON: Time exceeded.
CHECK VALUE: 60 msec. [(CHECK VALUE * 100) / Speed]
ADJUST VALUE: Engin. Value 9

C.3f (16xxx or 18xxx) Reader

(nn=16 Bar Read Messages or nn=18 Line Read Messages)

Error Description

nn001 "GROUP NUMBER OUT OF SEQUENCE"
nn002 "EXPECTED END OF GROUP"
nn003 "BLANK PAGE"
nn004 "SHORT GROUP"
nn005 "DUPLICATE PAGE"
nn006 "PAGE OUT OF SEQUENCE"
nn007 "INVALID GROUP"
nn008 "EXPECTED PAGE ONE"
nn009 "GROUP NUMBER OUT OF RANGE"

nn010 "PAGE OUT OF RANGE"
nn011 "INVALID!"
nn012 "NOT ENOUGH NV-RAM"

nn013 "PRESETS CORRUPT"
nn014 "NV RAM FAILED"
nn015 "DUAL PORT RAM FAILED"
nn016 "INVALID COMMAND"
nn017 "INVALID PIC INT."
nn018 "INVALID SETUP DATA"
nn019 "PARITY ERROR"

nn020 "computed in action" REGISTRATION_BAD
nn021 "BAD ON-CHIP 8501 RAM"
nn022 "INVALID READER ERROR"
nn023 "INVALID CAL. SETUP"
nn024 "NO BANK 2 GATE MARK"
nn025 "computed in action" "CALIB_OUT_OF_RANGE"
nn026 "YES NO EOG ARE SAME"
nn027 "ROLL PAGE OUT OF SEQUENCE"
nn028 "UNEXPECTED RESPONSE"
nn029 "EXPECTED READING"

nn030 "READER REBOOTED"
nn031 "computed in action" CALIBRATION_IN_RANGE
nn032 "NO RANDOM CHECK MK."
nn033 "UNEXPECTED RANDOM CHECK"
nn034 "PACK LARGER THAN SET"
nn035 "PACK LESS THAN SET"
nn036 "GROUP NUMBER CHANGED IN SET"
nn037 "LAST SET SAME GROUP NUMBER"
nn038 "MAX SHEETS IN ACCUM."
nn039 "UNEXPECTED EOG"

nn040 "NO RESPONSE TIMEOUT"
nn041 "BAD READ" bar read
nn042 "MAX PAGE NOT = NO. PAGES" bar read
nn043 "INVALID GROUP NUMBER" bar read

nn044	"BAD CHECK DIGIT"	bar read
nn045	"EXPECTED END OF SET"	bar read
nn046	"EXPECTED PAGE ZERO"	bar read

A demand for paper was sent to infeed device (i.e. feeder), paper was not detected by the feed sensor within the time frame set in engineering values.

nn099 "Undefined Error"

Notes:

C.3g (17xxx) Inserter Messages

Error Description

Currently no error messages for this module.

C.3h (19xxx) EngValue Messages

Error Description

Currently no error messages for this module.

C.3i (20xxx) EXITCOMM Messages

Error Description

20001 "No Message Response"

A message was sent to an exit device (i.e. Inserter), the exit device did not respond.

C.3j (21xxx) InFeed

Error Description

21801 "Paper Demand Timeout"

EVENT: Paper Demand Switch ON to Paper Demand Switch OFF.

EVENT CHECK: PaperDemandTimer.

ERROR ON: Time exceeded.

CHECK VALUE: 20000 msec.

ADJUST VALUE: Engin. Value 17

21001 "Paper Demand Timeout"

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D.1 INITIAL ACTIONS

Initial Actions are used to gather information from the operator concerning problems in 420T.

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 420T 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 420T, 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)

REPAIR CHECKOUT PROCEDURE FOR PAPER COULD NOT BE FED.....15

REPAIR CHECKOUT PROCEDURE FOR FEEDER MOTOR.....16

REPAIR CHECKOUT PROCEDURE FOR FEEDER SPEED ENCODER.....16

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REPAIR CHECKOUT PROCEDURE FOR FEED SENSOR.....19

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REPAIR CHECKOUT PROCEDURE FOR STACK SENSOR.....22

REPAIR CHECKOUT PROCEDURE FOR ACCUMULATOR SENSOR23

REPAIR CHECKOUT PROCEDURE FOR ACCUMULATOR DUMP CLUTCH24

REPAIR CHECKOUT PROCEDURE FOR FOLDER CIRCUIT BREAKER.....37

REPAIR CHECKOUT PROCEDURE FOR TRANSFER CONVEYOR INFEEED SENSOR.....42

D.1c Systems Checks

Switch the 420T 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 420T.

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 420T.

Y N

Perform the **Paper Jam in Feeder RCP**

With the 420T 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. Its 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 420T. GBR uses light-actuated through-beam devices and in some cases Retro-Reflective and in other cases Ultra-Sonic. A feed sensor monitors correct singulation or non-feed of paper. It is identified by an "F" on its mounting bracket and amplifier. The double detect sensor (identified by an "D" on its mounting bracket and 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 (older machines) or a thru-beam sensor to generate an electric signal to the reader logic board. The reader logic board interprets variation, seen by the read sensor, in light intensity as it is reflected off the paper and code marks.

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

The optical encoder (clad in a blue case, located on the right side of the upper pullout shaft) monitors feeder run speeds.

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 in 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.

LOCKING SET SCREW
FOR SINGULATOR ROLLERPAPER LEVEL
DETECTORSINGULATOR
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:

- Place a sheet of paper in the feed area, up to but not under the singulator.
- 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!
- Bring the hopper table 1/2" away from the back edge of the sheet of paper.
- Tighten the four set screws to clamp the table into 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.

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.

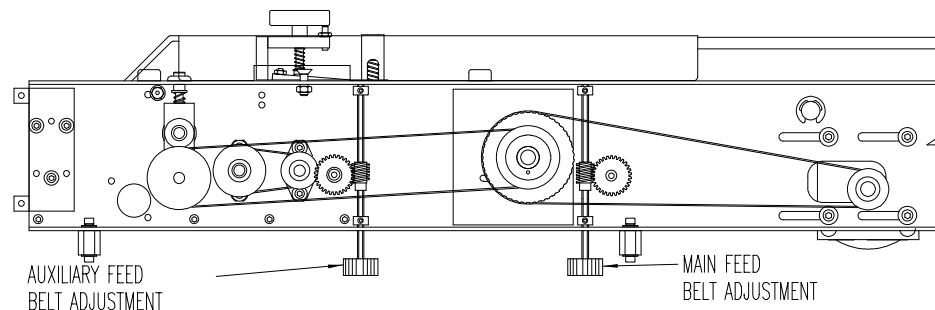
- Raise the wand to allow more paper to be fed into the feeder
- Lower the wand to reduce the amount of paper.

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:

- 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. 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.
-

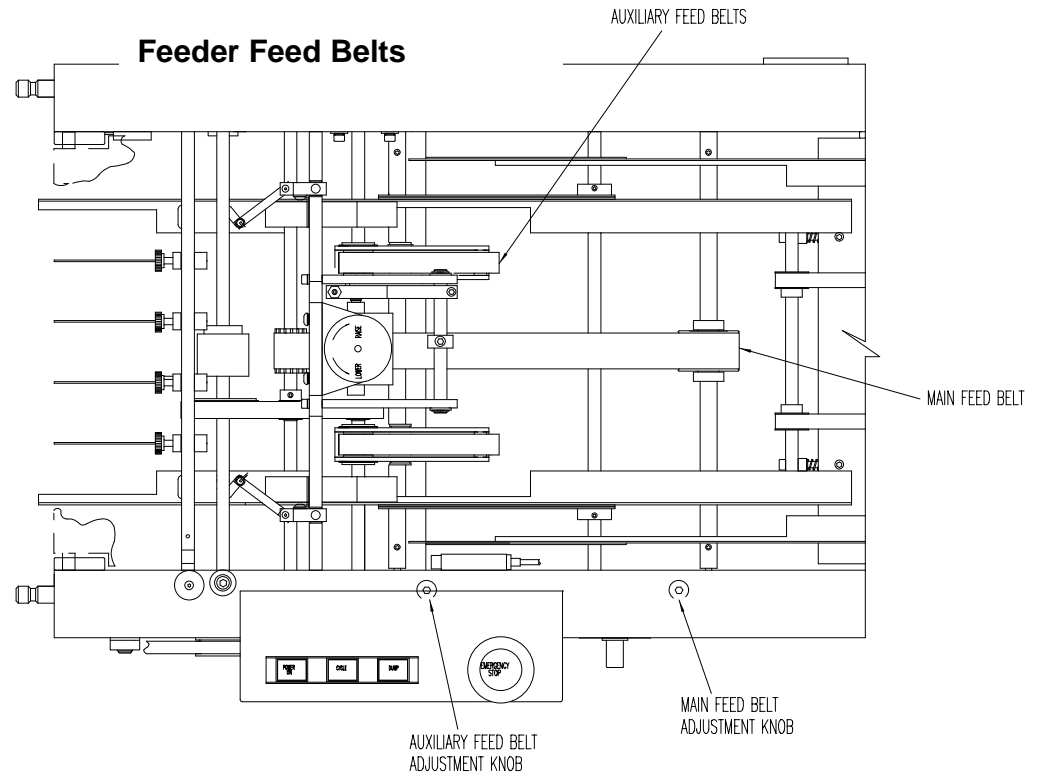
D2.c6 Auxiliary Feed Belt Adjustment

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.

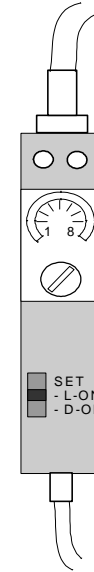


D2.c7 Sensor Adjustments

All of the paper detecting sensors on the 420T are infrared modulated digital sensors. Each sensor has its 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 420T 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 420T. 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 420T 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 420T 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 o: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 ACCUMULATOR SECTION

D.4a 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.

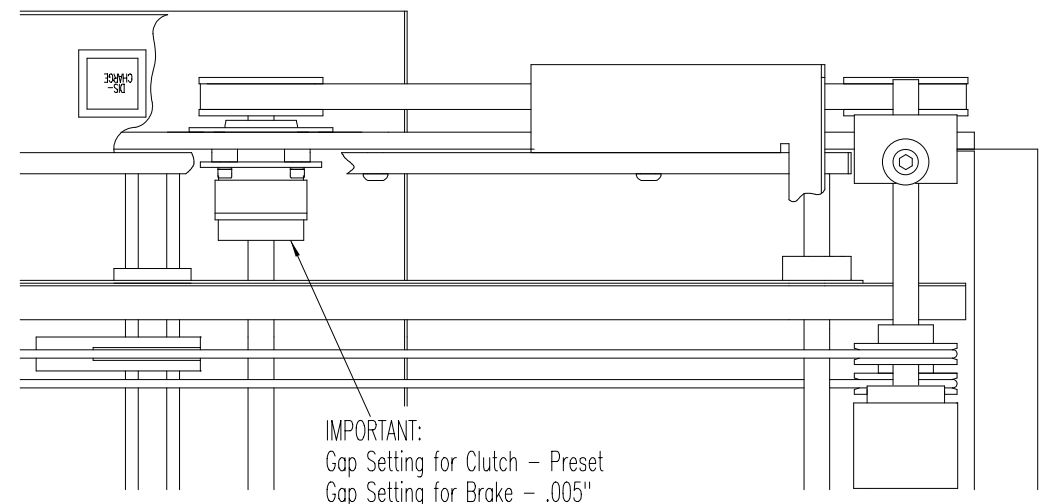
The Dump Clutch activates the stacking rollers, releasing the accumulated pages. A Stack Sensor ("S") detects paper arriving in the accumulator while the Accumulator Sensor ("A") indicates presence or absence of a package in the accumulator. It also monitors for successful package discharge when the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

D.4b 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.5 FOLDER FUNCTION

D.5a Description

Fed by the Accumulator Section, the folder is capable of placing 1 to 4 folds in a C, Z, V, or 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.
2. Transfer conveyor where the nest folded document(s) are presented to the gripper arm.

D.5b Fold Principle

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

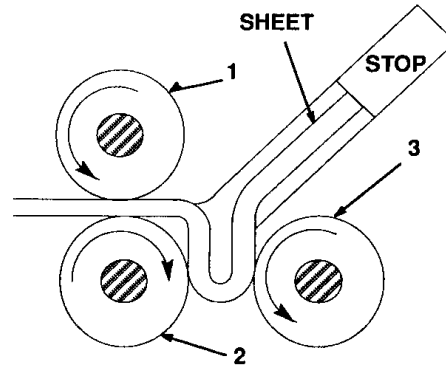
Fold rollers 1 and 2 drive the sheet into the fold plate until it comes up against the adjustable stop. The trailing edge of the sheet continues to be advanced by the roller and the sheet is buckled. The sheet is now grasped by fold rollers 2 and 3

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 moderately stiff brush, but no liquids of any kind. The rollers pull the folded sheet out of the fold plate and fold rollers and are 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.5c Components of the
Fold Unit**

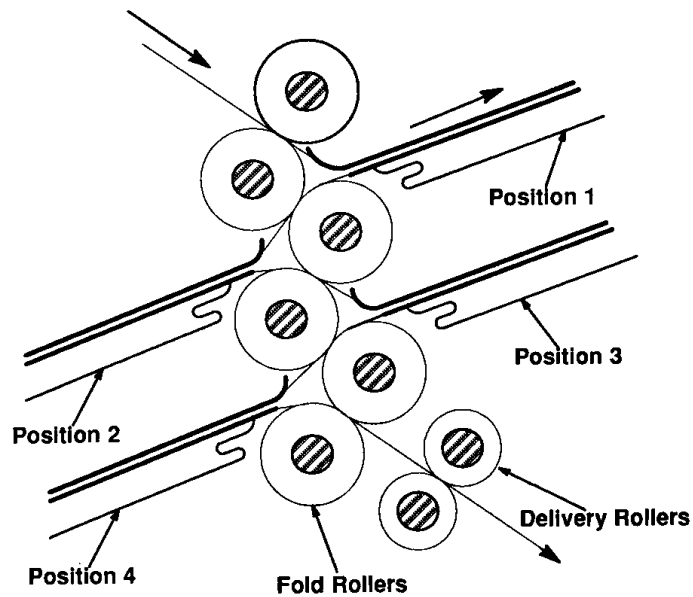


D.5c1 FOLD ROLLERS

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

D.5c2 DELIVERY ROLLERS

The delivery rollers move the package to the output module.



D5.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)

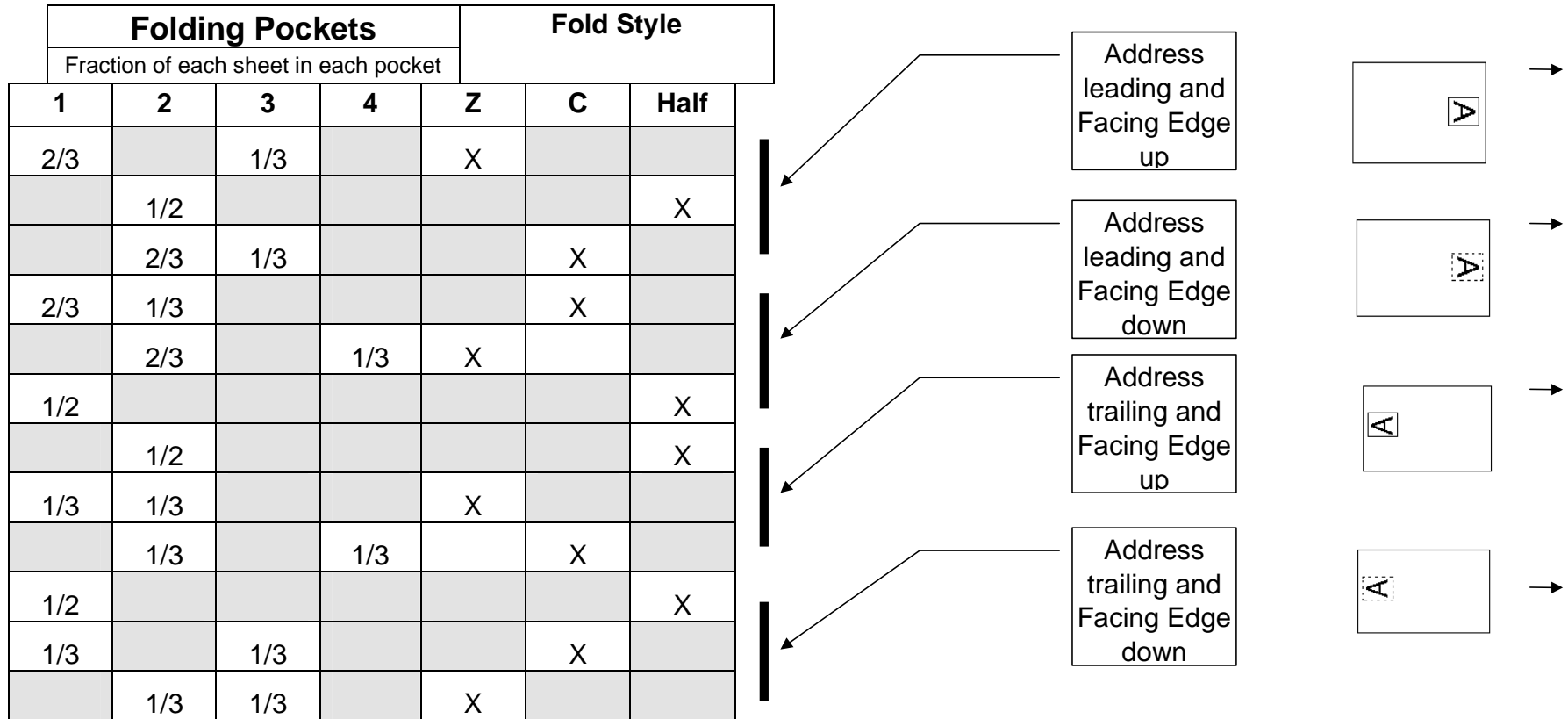
Use this plate in position 2 and 4 either as a fold plate (FP) or a deflector plate (DP). (See chart on fold plate and deflector plate positions.)

FOLD PLATE III (DP III)

This fold plate is always in position 3. Place it at the second fold. Reverse the plate to use it 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.



Setting Folds Figure

D.5d 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

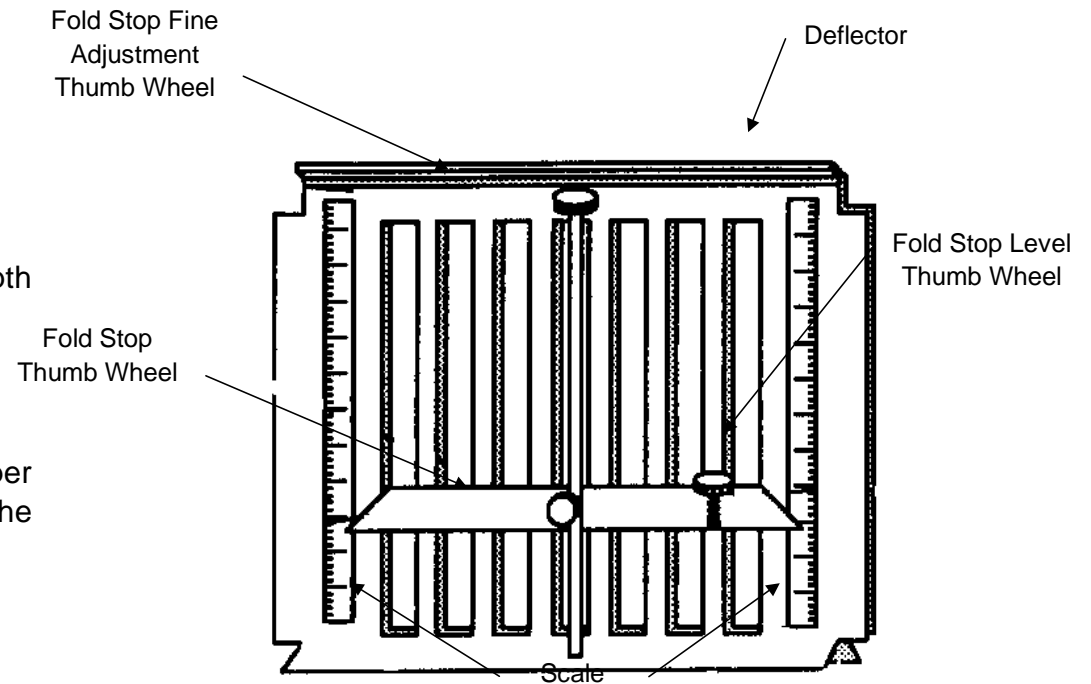
Loosen the thumbscrew to adjust the fold stop to the proper fold depth. Tightening the fold stop thumbscrew locks the fold stop into position.

FOLD STOP FINE ADJUSTMENT THUMBSCREW

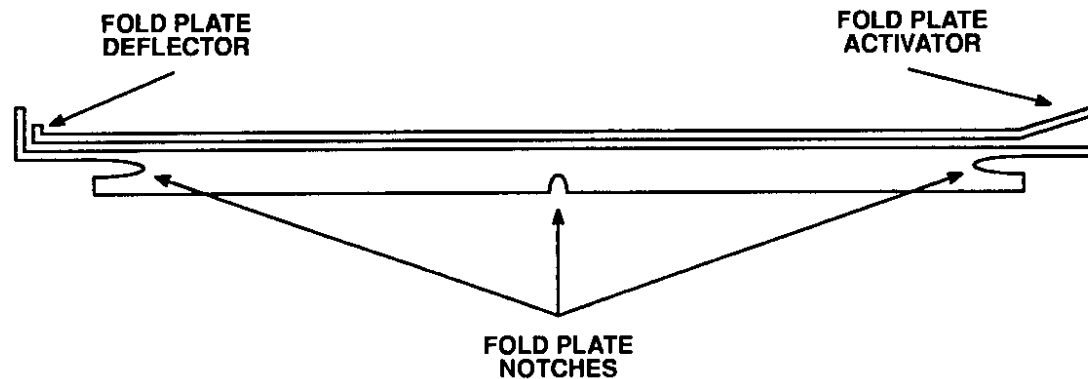
To obtain a more precise and even fold of the material use the fine adjustment thumbscrew.

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.5e 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.

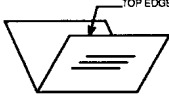
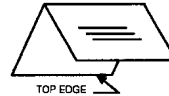
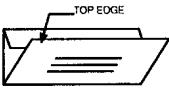
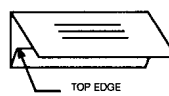
Example:





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.5e1 POSITION FOLD PLATE #3.

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.

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

NAME AT THE TOP	NAME AT THE BOTTOM
<p>C. ACCORDIAN FOLD</p>  <p>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</p>	<p>C. ACCORDIAN FOLD</p>  <p>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</p>
<p>D. QUARTER FOLD</p>  <p>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</p>	<p>D. QUARTER FOLD</p>  <p>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</p>

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

- 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.5e2 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.5e3 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.5e4 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.5f Timing Procedures (not applicable)

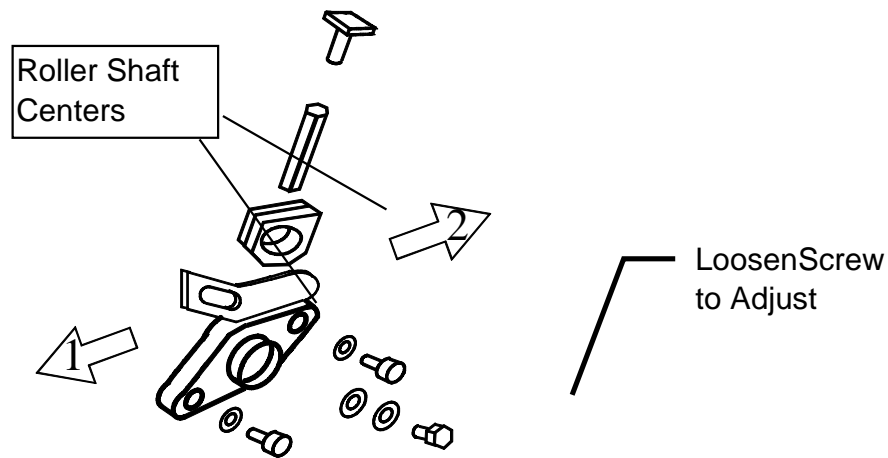
D.5g Folder Infeed Roller Tension Adjustment

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.

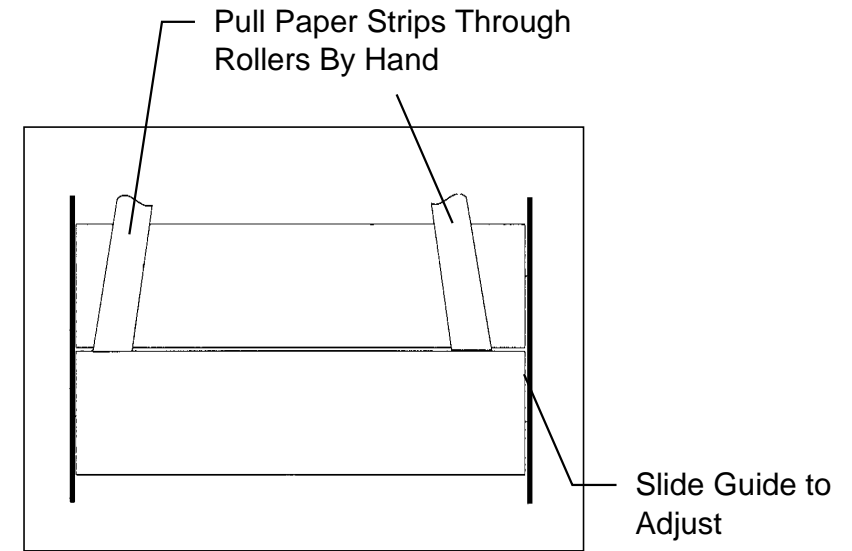
To widen gap between roller push adjuster in direction #2.

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.5h Removal and Replacement of Folder Components

NOTE: The folder portion of the 420T 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.

D.5h1 Belts

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

D.5h2 Sensors

Speed Encoder

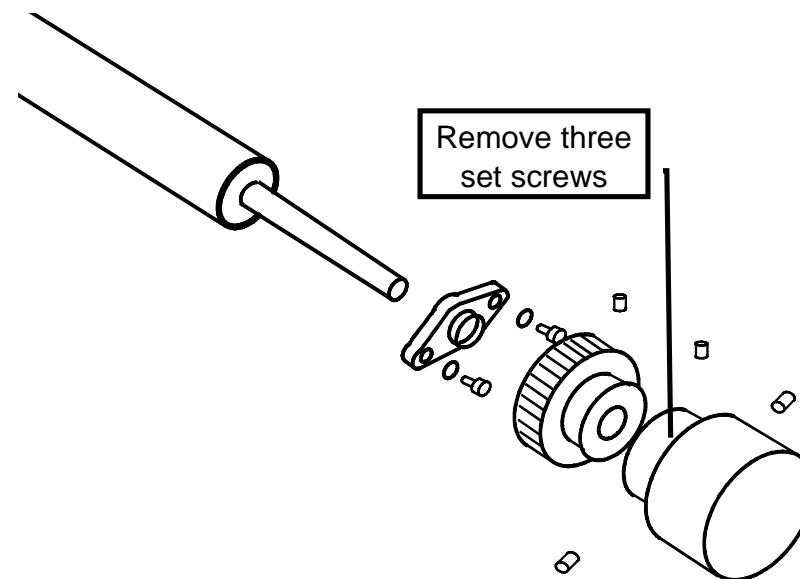
1. Remove the side covers.
2. Unplug the sensor PWB.
3. Detach the sensor PWB from the bracket .
4. Loosen the set screws which secure the encoder disc to the shaft.
5. Remove the encoder disc.
6. Replace in reverse order.

D.5h3 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.5h4 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.6 TRANSFER CONVEYOR

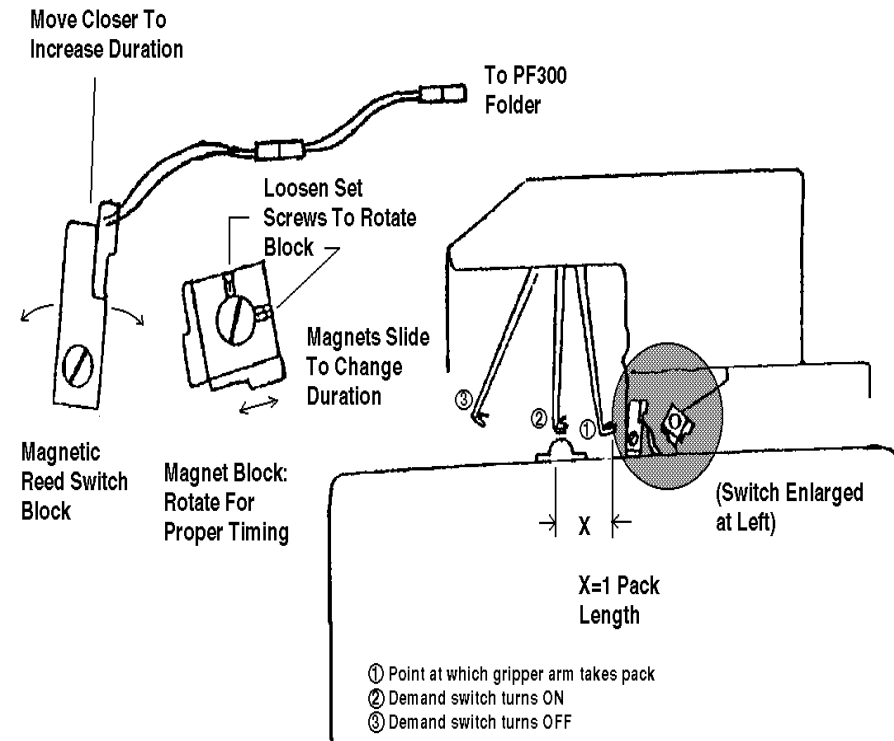
D.6a Description

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

D.6b Timing

Demand switch on/off timing is critical. The setup of this timing permits the 420T 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 its backwards motion and starts moving toward the Transfer conveyor.



Transfer Conveyor Demand Switch Figure

D.6c Exit sensor Test on the Transfer conveyor

The Exit sensor on a 420T 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.

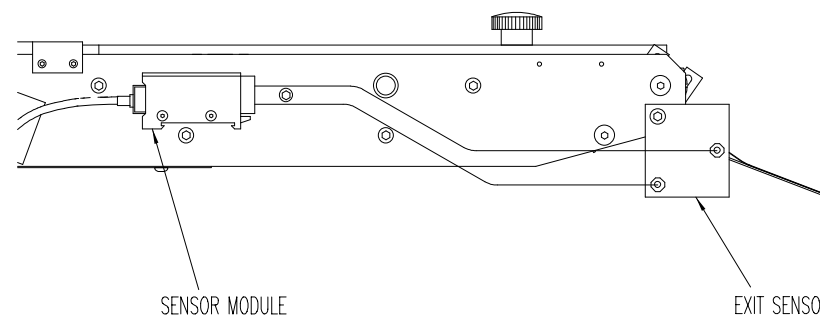
3. Run the 420T and command the machine to Dump.
4. The Transfer conveyor will index in response to the Dump command. If the package that was placed just before the exit sensor stops at the discharge end of the Transfer conveyor the interrupt is being seen by the control card. However if the document 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.6d 420T 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 420T.

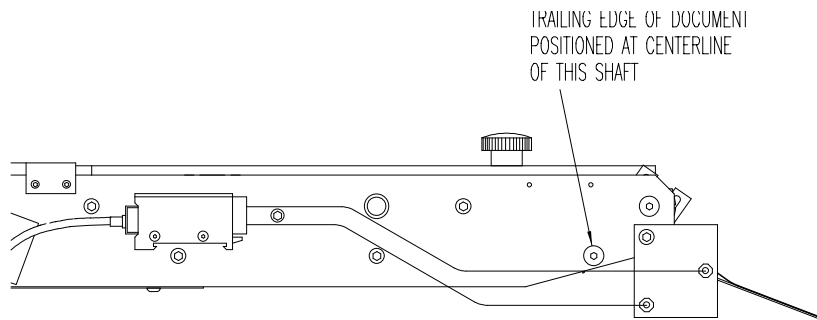


Transfer Conveyor Exit Sensor Figure

D.6e 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.6f 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.6g 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.6h 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.7 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.
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 (PS1)
5. +12VDC and -12VDC power (PS1)
6. +24 VDC Power Supply (PS1)

Transfer Conveyor Schematic - Figure D-37

SECTION E - PRINTED WIRING BOARD INFORMATION

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E.1 CPU 486(MCM-DX) CARD

GBR Part Number: 042-26932-500

E.1a Features

- Processor Rates of 25 to 50Mhz and up to 100Mhz using clock doubled CPU's
- Full PC/AT Hardware/Software Compatibility
- 16-Bit PC/104 Expansion Bus
- Up to 32 Mb of ruggedized onboard DRAM
- Two Serial Ports with RS-232/RS-422RS-485 capability
- Standard Centonics Parallel Printer Port
- Watchdog Timer with Power Fail Reset
- 16-Bit Dual IDE Disk Interface
- +5 Volt only operation

E.1b General Description

The MCM-DX is a small, high-performance embeddable computer system on a single STD-BUS board. It can be populated with any of the popular '486 Family of chips. It's full PC/AT hardware complement and industry standard AWARD BIOS assures full hardware and software compatibility with PC software and operation systems. The MCM-DX includes onboard interfaces for floppy disks, IDE fixed disks, parallel printer, and two serial channels with RS-232, RS-422, or RS-485 capability on either or both channels. A full 16-Bit PC/104 expansion BUS is provided in addition to the STD-Bus interface for further expansion to an entire industry of add on peripherals including high speed VGA controllers, sound and speech modules, SCSI

controllers, and literally hundreds of other options available form WinSystems and variety of vendors supporting the PC/104 standard. Up to 32-megabytes of factory installed DRAM is supported on board. An onboard Silicon Disk socket supports a solid-state disk of up to 1 Megabyte in size and can utilize SRAM, PEROM (Flash), EPROM or the M-Systems Disk-On-Chip as the disk media. Boot capability is provided onboard and a setoff utilities and drivers are provided to make silicon disk based system very user friendly.

E.1c Specifications

Electrical

Bus Interface:	STD-8088/188 Compatible PC/104 8-bit/16-bit expansion bus
System Clock:	Jumper Programmable form 2Mhz to 100Mhz
Interrupts:	TTL Level input
VCC:	+5V +/-5% at 930 mA typical at 40Mhz X 2 on a T1 486DX2 with 32 Mb DRAM
VCC1:	+12V +/-5% (Not required. PC/104 or Cooling Fan Use Only)
VCC2:	-12 +/-5% (Not required. PC/104 Use only)

Memory

Addressing: 64 Mb addressing (32Meg max onboard)

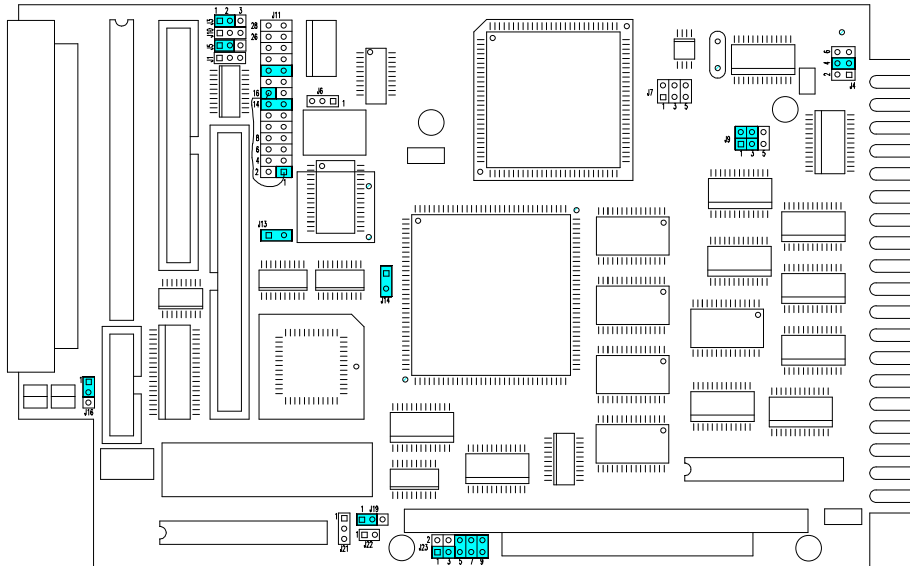
BIOS ROM Socket: 128Kb EPROM

DRAM Memory: 16 SMT J-lead locations on both sides of the board supporting factory configurations form 1M to 32 Meg.

SSD Memory: One 32-pin JEDEC Standard socket supporting 4-Mb SRAM, 4-Mb PEROM, 4-Mb EPROM, 16-Mb EPROM or the M-Systems DOC Module.

E.1d Configuration

- Jumpers as shown in diagram
- J1 to touch screen
- J1 to RS232 connector on cabinet bulkhead
- J16 to floppy drive



Environmental

Operating Temperature: -40° to +70°C.

Non-Condensing Humidity: 5 to 95%

E.2 I/O 144 CARD

GBR Part Number: 042-26750-500

E.2a Features

- 144 Digital I/O pins per card
- Extensive Interrupt Capabilities, bit selectable
- Interrupt ID register for more efficient ISR's
- Each pin capable of sinking 12ma for use with Opto modules
- Read back / Input available for each pin
- 50 Pin connector directly interfaces to Opto Racks
- 5-volt only operation
- 8-bit STD Bus interface

E.2b General Description

The I/O 144 is a low cost high density I/O card with extensive interrupt capabilities.

For a given configuration, half of the pins have interrupt capabilities. Interrupts are programmable on a bit-by-bit basis for enable, and edge polarity.

All lines are Open Collector I/O. In addition, each group of 48 lines has a six-bit Write Mask register that allows the user to disable writes on a byte wide basis.

E.2c Specifications

Electrical

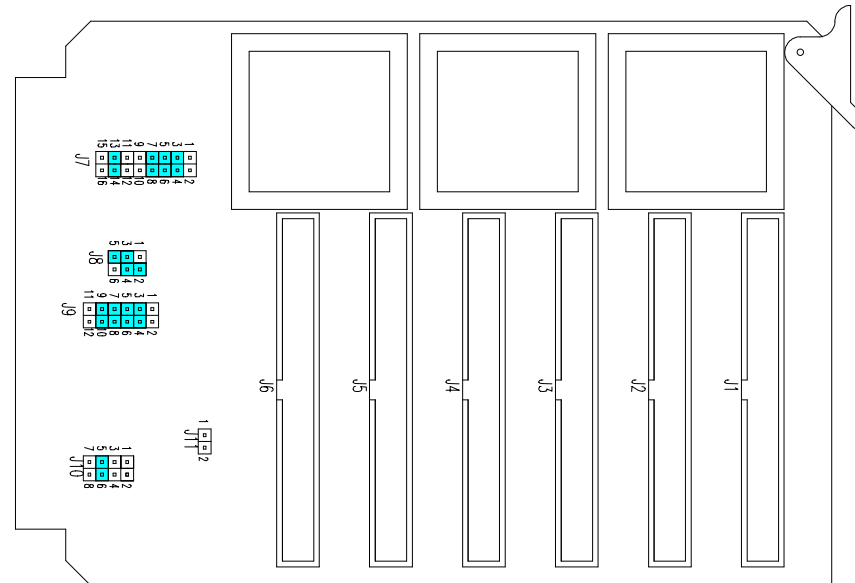
Bus Interface: STD-Bus & CMOS STD-Bus compatible
VCC: +5V @ 0.014mA / 0.090mA

Environmental

Operating Temperature: 0° to 65°C
Non-Condensing Humidity: 5 to 95%

E.2d Configuration

- Jumpers as shown in diagram
- J1 to left opto rack
- J2 to right opto rack
- J3 to the feeder brake
- J3 to ink mark sensor when applicable



E.3 SVGA VIDEO CARD

GBR Part Number: 042-26746-000

E.3a Features

- Based on Cirrus Logic GD5420 Super VGA Controller Chip
- Industry Standard VGA BIOS
- STD-BUS Compatible
- ON BOARD EEPROM, stores monitor information

E.3b General Description

The MCM/LPM-SVGA is a high resolution, Super VGA STD-BUS video display board that provides low cost standard VGA. The PCM-VGA is based on the Cirrus Logic GD5420.

E.3c Specifications

Electrical

Bus Interface: STD-8088/188 Compatible

VCC: +5v +/-5% @250mA with 256K RAM.

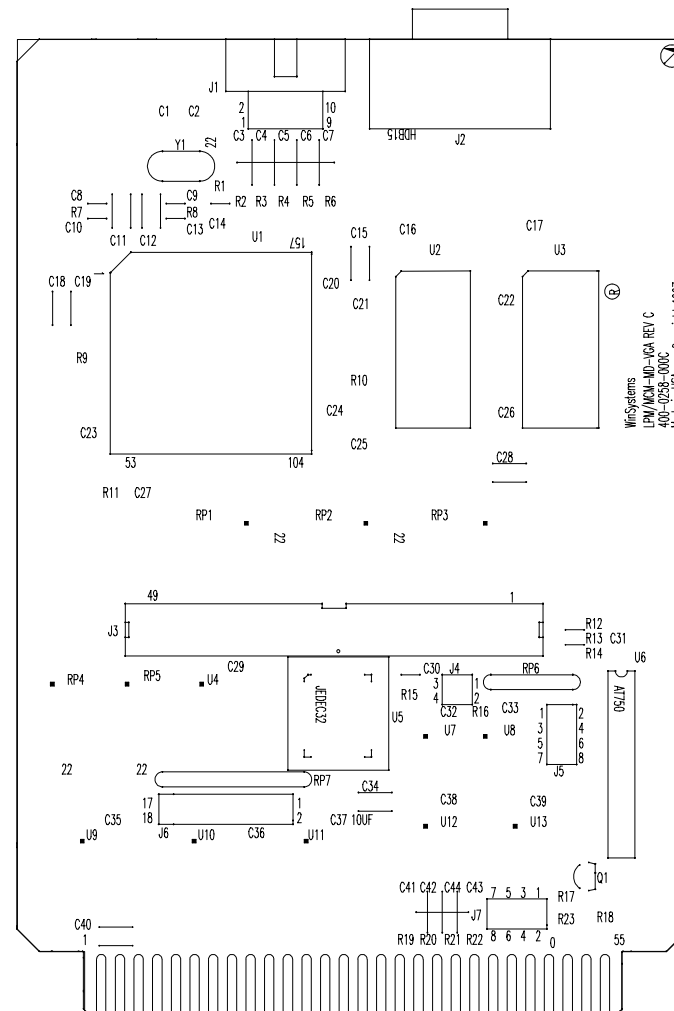
Environmental

Operating Temperature: 0° to 70°C

Non-Condensing Humidity: 5 to 95%

Configuration

- J2 to Touch Screen



E.4 Serial Card

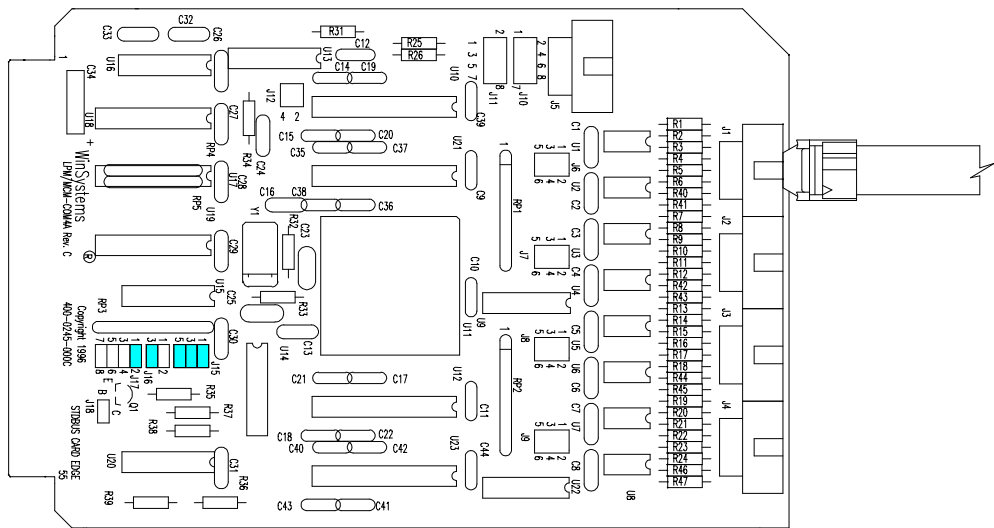
GBR Part Number: 042-27623-500

E.4a Function:

- Provides additional serial communications
- Used with Bar Code Read

E.4b Configuration:

- Jumpers as shown in diagram
- J1 to Bar Code Reader



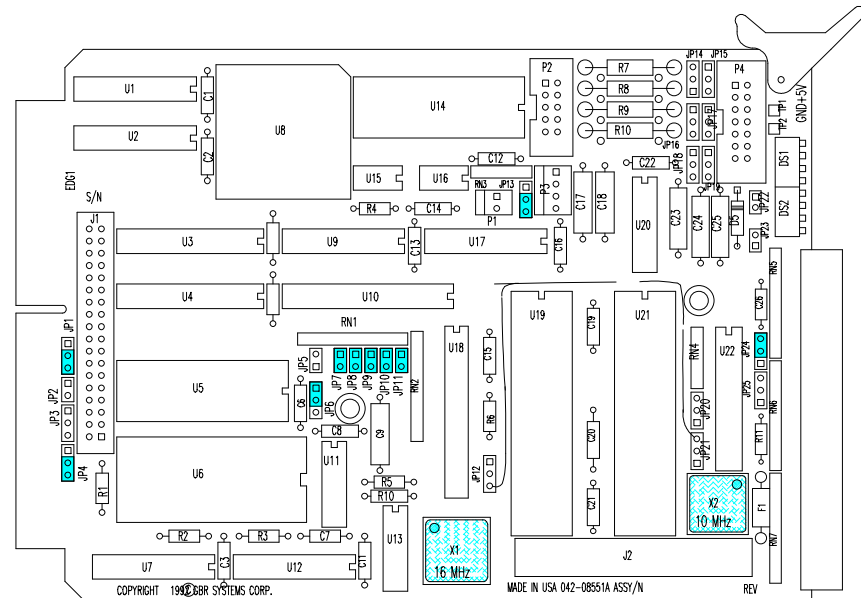
E.5 SINGLE CHANNEL READ CARD

GBR Part Number (w/GBR Line Code): 042-25272-500

GBR Part Number (w/B+H Line Code): 042-26908-500

E.5a Function:

- Interfaces with the BUS
- Processes signals from the GBR (TJ) or B+H Line Code Cards
- Processes Read Tachometer signal
- For B+H Line Read process edge detect and bar



detect

E.5b LED Indications:

The following LED indications apply only when using B+H line code.

- LED 1 ON/OFF every second indicating operation (except when LED 2 is lit)
- LED 2 ON indicates busy: line code read taking place, calibration read taking place, or machine speed sample being done.
- LED 3 ON indicates line codes will be read using calibration data that has been stored. OFF indicates line codes will be read without using calibration data that has been stored.
- LED 4 ON indicates line codes will be read using high tolerance read scheme. OFF indicates line codes will be read using low tolerance read scheme.

Note:

LED's 1-4 are all turned on while the boot functions are being done. All the lights will stay on if a problem is detected in the hardware of the line code reader card.

- LED 5 Input of lead edge detection sensor probe 1 (sensing paper LED off).
- LED 6 Input of lead edge detection sensor probe 2 (sensing paper LED off).
- LED 7 Not used.
- LED 8 Input of selected line code sensor (Probe 1 or Probe 2).

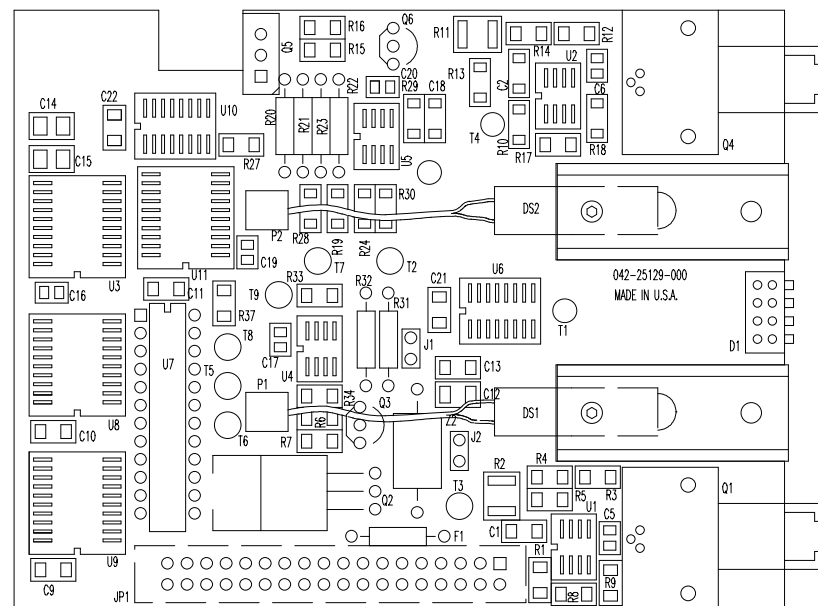
E.6 GBR (TJ) LINE CODE CARD

GBR Part Number: 042-26622-500

This card is physically mounted on the Single Channel Read Card.

Function:

- Read Sensor Light source analyzer
- Read Signal amplifier



E.7 B+H READ CARD

GBR Part Number: 186-330002717

This card is mounted separate from the Single Channel Read Card but connected with cables.

Function:

- Read Sensor Light source analyzer
 - Read Signal amplifier
-

SECTION H Machine Schematics

See 420T/438 V4 Machine Schematics Manual

NOTES:

SECTION G INSTALLATION

G.1	REMOVAL OF HOPPER SIDE PLATES	2
G.2	REMOVE HOPPER GUIDE	2
G.3	REMOVE SINGULATOR FINGER	2
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G.5B	POSITION OF THE OUTFEED GUIDES	5
G.5C	FOLD QUALITY	5
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G.5E	CONFIGURATION OF EXIT SENSOR MODULE	5
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G.6	SETUP OF DEMAND SWITCH	6

The 420T 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 420T 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 420T may be used again without going through them each time. If this is done however, this station will not be usable in normal operation.

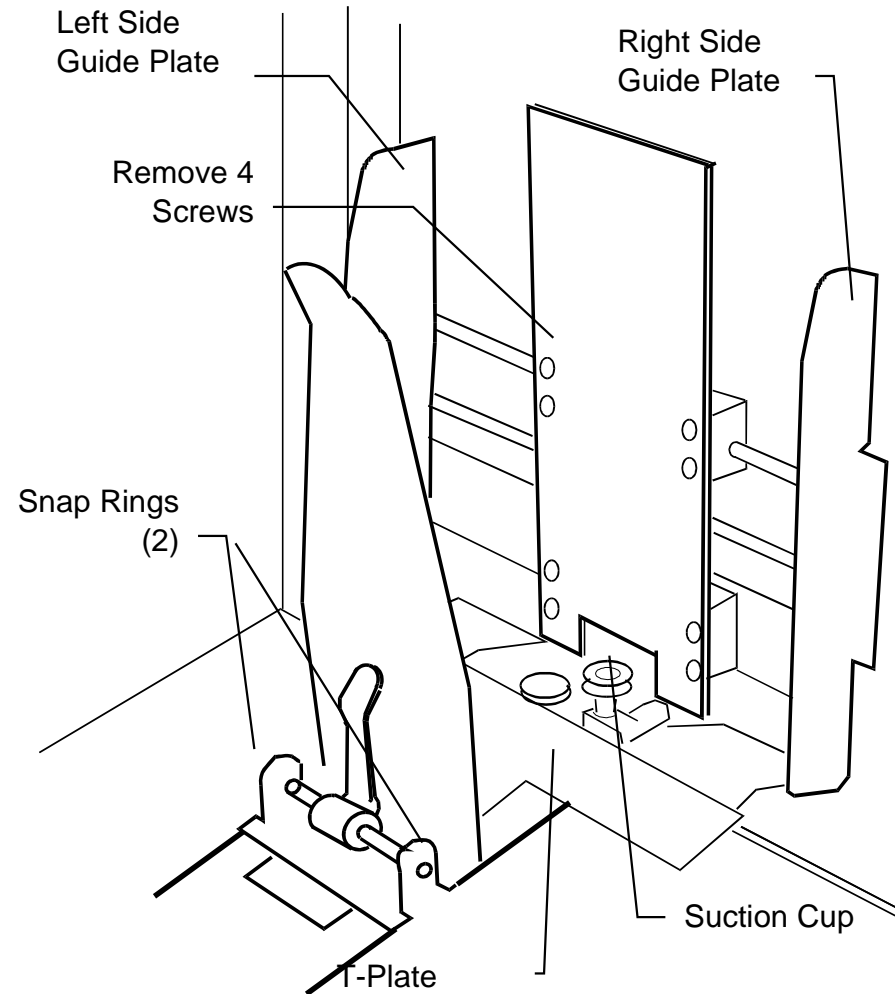
G.1 REMOVAL OF HOPPER SIDE PLATES

NOTE: View of Fig. G-1 is from 420T 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.

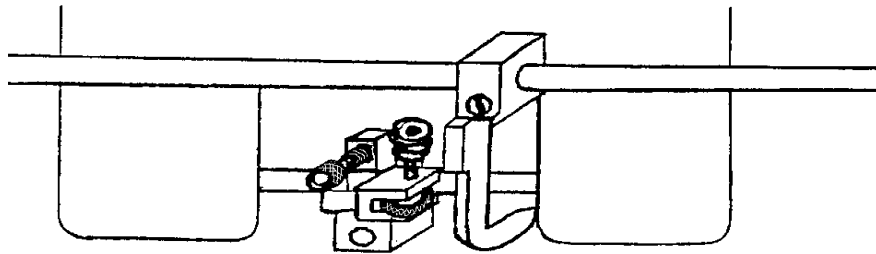


Inserter Hopper - Figure G-1

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

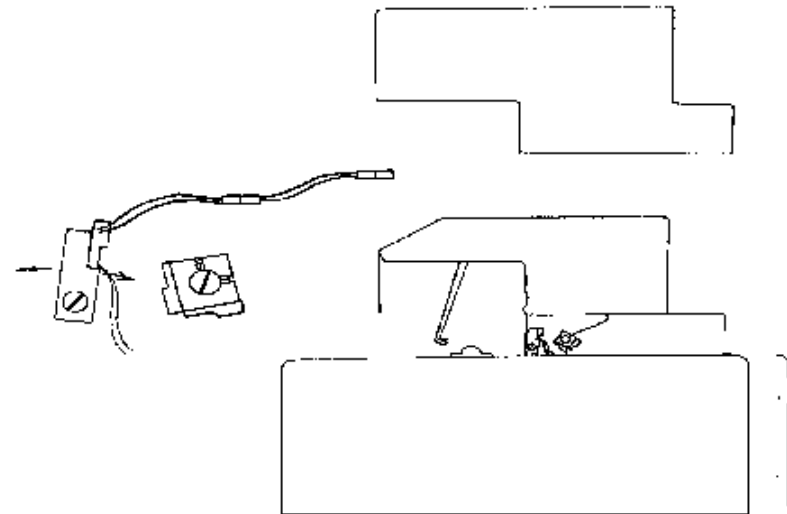
G.4 420T INTERFACE COUPLING

The machine is designed to permit the operator to connect the 420T 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.

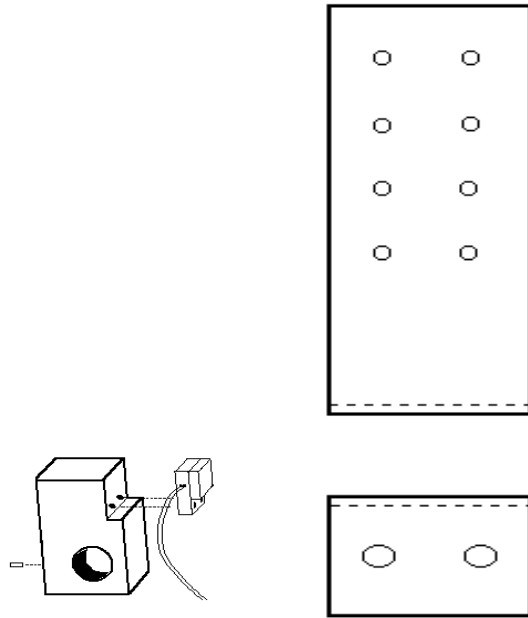
Orientation: As viewed from operator area of inserter.

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.



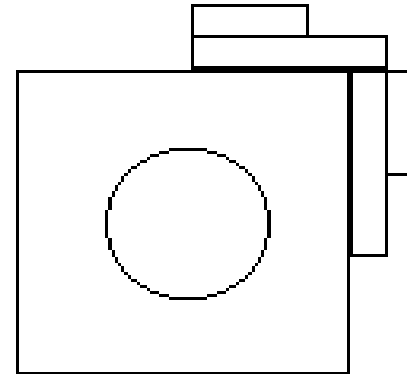
Gripper Arms Orientation to 420T - Figure G-3

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 420T, 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 420T output conveyor.
7. Jog inserter to rotate magnet block assembly. Desired timing is when the demand input (420T 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

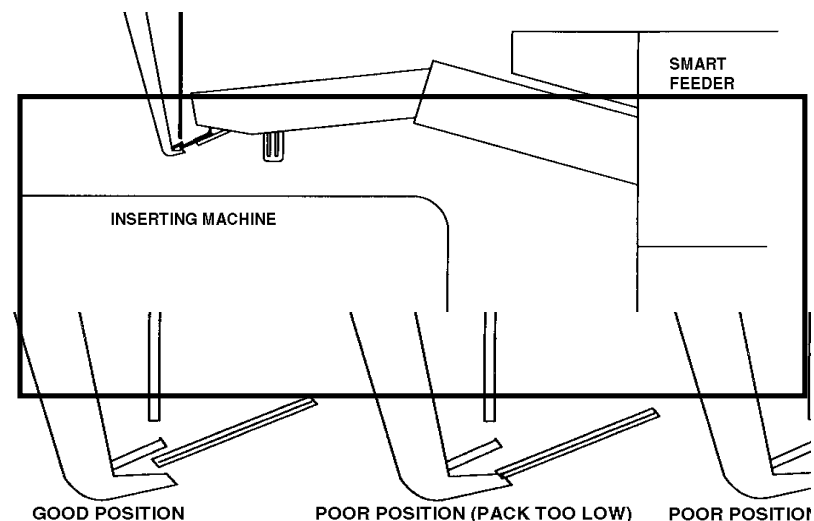
When a package is being presented to the gripper arm (last station of the Transfer conveyor) the package should have only the Trailing edge of the folded document held by the flat green belts. Positioning the trailing edge of the document even with the center line of the lower-most forward shaft accomplishes 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 420T - Figure G6



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 420T.

G.5f Testing of the exit sensor

The Exit sensor on a 420T 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 420T and command the machine to Dump.

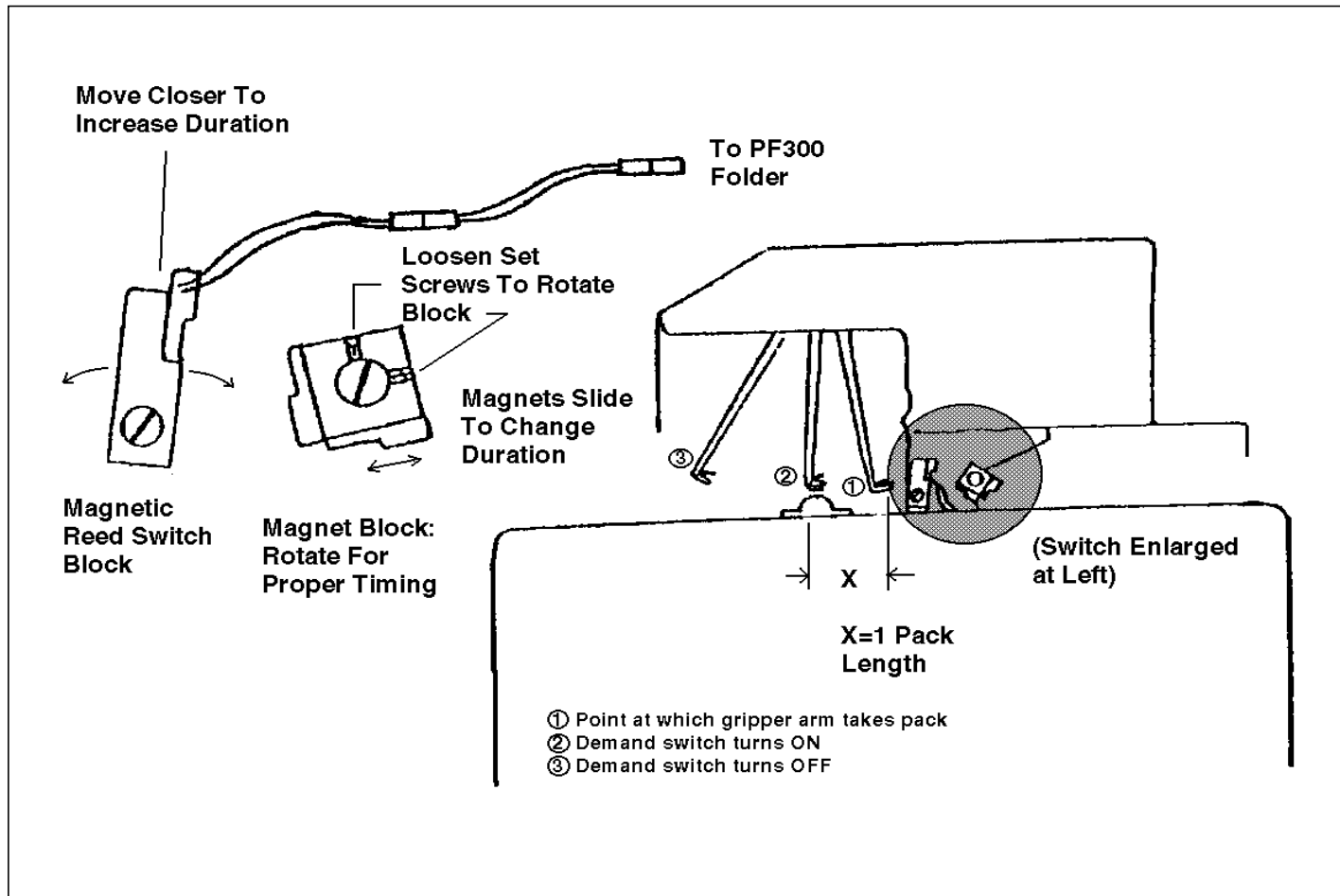
4. The Transfer conveyor will index in response to the Dump command. If the package that was placed just before the exit sensor stops at the discharge end of the Transfer conveyor the interrupt is being seen by the control card. However if the document is throughout the end of the Transfer conveyor then 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 420T 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. G7

SECTION H MISCELLANEOUS

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H.5	Typical Postal Metering Setup Presets.....	13
H.6	Service Bulletins	17
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H.1 Software Rev Update using E-Mail

The disk for the New438/426/420T is specifically bootable on the New438/426/420T. This boot software is not normally visible and cannot be copied from one disk to another. The entire disk must be 'disk copied' or 'copy disked'.

The application software ('GBR420.exe') is visible and can be copied to and from an e-mail, another disk or from the hard disk of a computer. It only operates in a New438/426/420T boot-disk.

PROCESS:

1. Attached to the New438/426/420T is a new revision 'GBR420.exe'. Save this and any other files to your hard disk in a unique folder (such as: \gbr\26412011\ where 26412 is the part number and 011 is the current revision number).
2. Make a disk copy of your current master. In Windows Explorer or My Computer, right click on the 3 ½" Floppy A: and Copy disk...your current master to a new 3 ½" disk.
3. Copy the new e-mailed software revision executable, GBR420.exe to the new disk from step 2. Overwrite the previous revision. Copy any other files sent, such as the dictionary (msgs420.dat) to the appropriate place on the new disk (such as: \gbr\msgs420.dat). This is the new master for the new revision.

4. Make a disk copy of this new master to another 3 ½" disk. Use this copy as the machine boot-disk.

File Structure on the floppy:

- A:\gbr
- gbr420.ini [Hardware/Application Initialization]
- msgs420.dat [Application Screen Text Dictionary, English]
- a:\gbr420.exe [Application]
- a:\diskmon.bin [Boot Monitor]

H.2 GBR OMR Reader Set-up

Reader Pre-Amp:

1. Adjust Focus (Ensure beam after focus sees a minimum of 4 dots of code)
2. Potentiometer on Pre-amp until 9 of 10 LED's are lit. (On white paper)
3. Move paper to a Black Line, should have 3 or 4 LED's lit.

Reader Board:

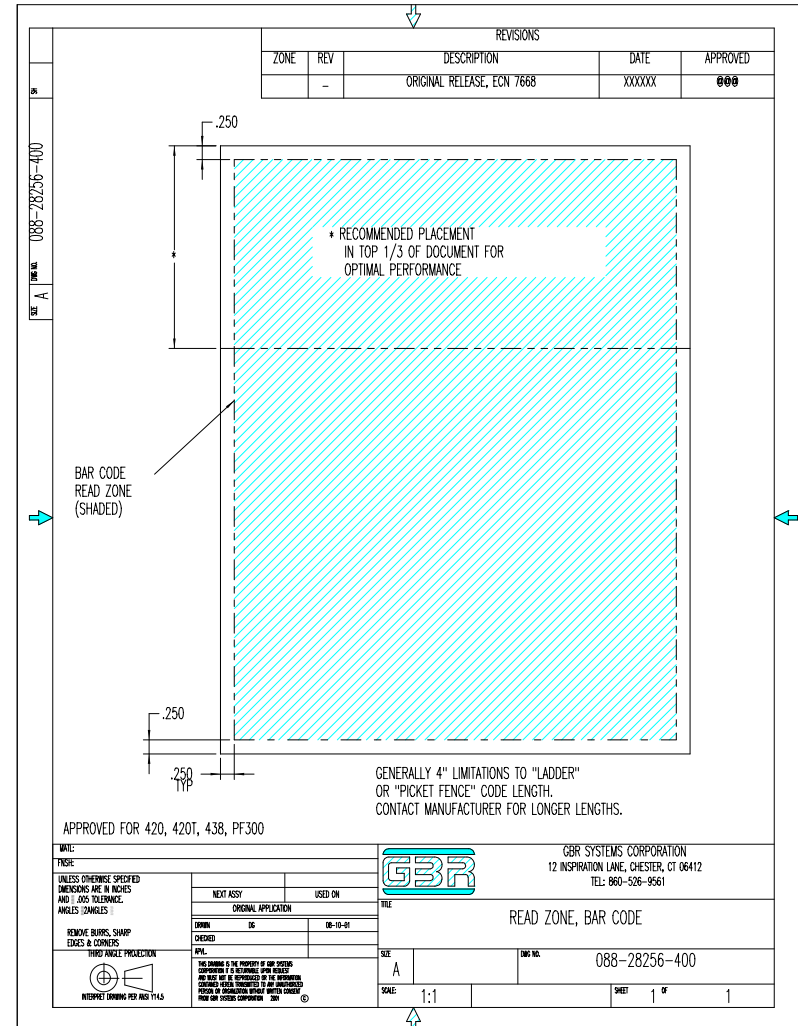
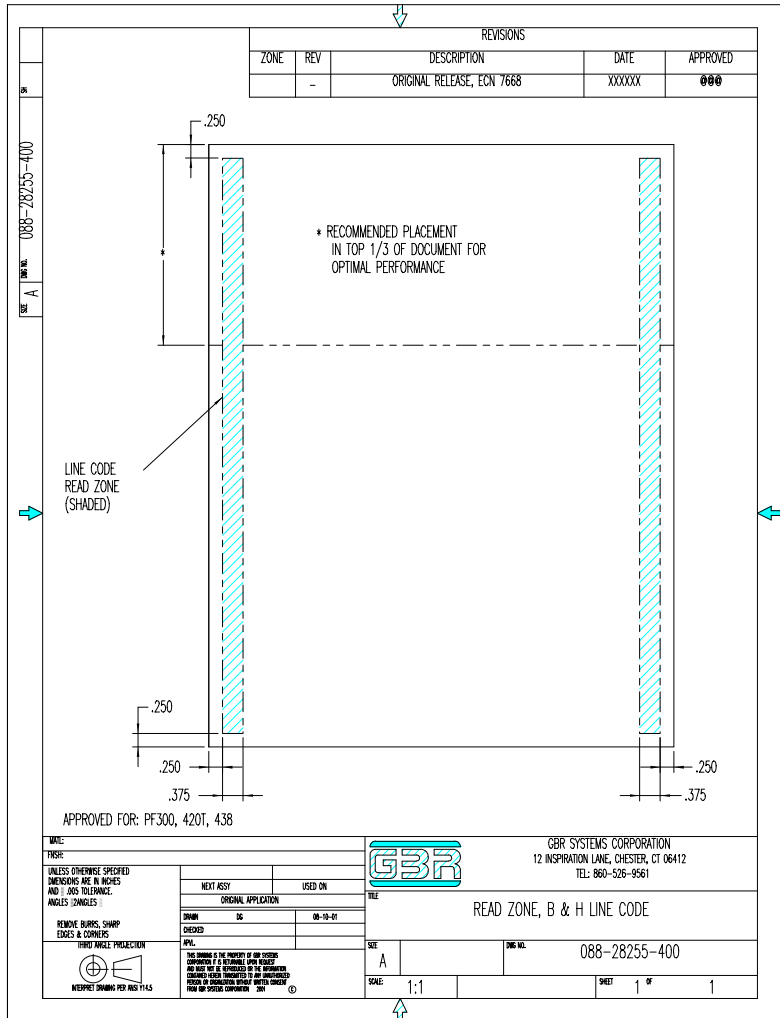
1. 2 Potentiometer L (low level) & G (high level)
 - A. L (low level) should be set to .6v to .8v.
 - B. G (high level) should be set to 3.9v to 4.1v.

Low Level should be reading on blank white paper.

High Level should be reading on black line.

Dots should read 2.4v to 2.6v (approx.).

Note: It is very important while setting up voltages to continue to monitor Bars on Pre-Amp Board (setting voltages sometimes will change numbers of bars). Also ensure that you do not max out potentiometers while adjusting voltages.



H.3 Read Zone Diagrams

H.4 Engineering Values

These values are to be used as a starting point. These values may vary, depending on type and weight of paper being processed, environmental conditions, and system tolerances, in order to obtain optimal performance.

(Eng. Software Version)

Number (26412.028) (26412.049)

Number	Value	Description
01	20	“Acc Feed Settle Time” (Range: 0 > 9995, Inc: 5) Time(msec) after trail edge of last page passes Accumulator stack sensor into Accumulator until Accumulator clutch is fired.
02	40	“Acc Dump Done Time” (Range: 0 > 9995, Inc: 5) Advance Feed ON: Time(msec) from “Accumulator is going to dump” until next feed is started. A short value advance feeds, before the pack moves from the Accumulator. A longer time allows pack movement detected at the Accumulator presence sensor to start the next pack feed. Higher is safer, lower is faster, but assumes pack leaves Accumulator. Advance Feed OFF: Time(msec) from pack movement at the detected at the Accumulator presence sensor to start the next pack feed.
03	150	“Bar Read Time” (Range: 0 > 9995, Inc: 5) Time(msec) waiting for reader response.
04	250	“Folder Exit Time” (Straight Conveyor Only) (Range: 0 > 9995, Inc: 5) Time(msec) allowed for pack to reach the folder exit sensor.
05	150	“Line Read Time” (Range: 0 > 9995, Inc: 5) Time(msec) waiting for reader response.

Number	Value	Description
06	10	“Xcvy Dump To Acc Dump Time” (Range: 0 > 9995, Inc: 5) Time(msec) from “Xcvy is going to move” until next Accum dump is started.
07	100	“Xcvy Clutch On Time” (Range: 0 > 9995, Inc: 5) Time(msec) Xcvy clutch is on adjusted for number of stations. Adjust up/down to place the last pack at the Xcvy exit.
08	300	“Xcvy Into Station 1 Time” (Range: 0 > 9995, Inc: 5)
09	50	“Xcvy Outof Station 1 Time” (Range: 0 > 9995, Inc: 5)
10	400	“Folder Start To Conveyor Time” (Range: 0 > 9995, Inc: 5) Should be greater than Eng Value 04, Folder Exit Time when Exit Type is Conveyor and not in test.
11	0	“Test Console Switch” (Range: 0 > 1, Inc: 1) 0 = turns off diagnostics only used in debug mode.
12	1	“Language Select” (Range: 1 > 2, Inc: 1) 1 = English. 2 = English
13	0	“Xcvy Package InOut Counter” (Range: 0 > 9995, Inc: 5) Max Number of packages expected in Xcvy. 0 disables this check.
14	150	“Acc Dump Clutch On Time” (Range: 0 > 9995, Inc: 5) Constant value Accumulator clutch is on adjusted for speed. Adjust up so pack fully exits. Adjust down if next pack is partially pulled under rollers.
15	5	“TouchScreen X Correction” (Range: -60 > 60, Inc: 1) Constant value for touch sensing. Adjust up to move sense right. Adjust down to move sense left.

Number	Value	Description
16	-10	“TouchScreen Y Correction” (Range: -60 > 60, Inc: 1) Constant value for touch sensing. Adjust down to move sense up. Adjust up to move sense down
17	20000	“Paper Demand Time” (Range: 0 > 60000, Inc: 500) Time(msec) waiting for paper stack switch in feeder to be satisfied by infeed.
18	3	“Max Xcvy Stations” (Range: 2 > 6, Inc: 1) Max Number of package positions in Xcvy “2-6”.
19	0	“Test ExitComm Test List Switch” (Range: 0 > 255, Inc: 1) 0 = No extra ExitComm (Comm3) list messages. 1 = Extra ExitComm list messages, times in msec, Demand time, receive character (for Sure-Feed). Bit level assignment: (D7 D6 D5 D4 D3 D2 D1 D0. D7 > D1 = unassigned D0 = ExitComm messages
20	0	“Exit Demand Switch” (Range: 0 > 1, Inc: 1) Applies to Hopper Fill and Conveyor. 0 = No Exit Demand required. 1 = Exit Demand required (for Conveyor for Sure-Feed).
21	215	“Exit Demand Time Out” (Range: 0 > 999, Inc: 1) Default 60 = 60 seconds to shut down on no demand. Range 0 to 999 seconds.
22	3000	“Xcvy Jam At Out Time” (Range: 0 > 9000, Inc: 10) Default 3000 = 3000 msec to pass pack through exit sensor. Range 0 to 9000 msec.
23	350	“Xcvy Jam At In Time” (Range: 0 > 9000, Inc: 10) Default 500 = 500 msec to pass from folder to in sensor. Range 0 to 9000 msec.
24	250	“Feed to Accum Time” (Range: 0 > 5000, Inc: 10) Default 170 = 170 msec for the lead edge of paper fed at the feed sensor to the lead edge entering the accumulator. Range 0 to 5000 msec.

Number	Value	Description
25	1	<p>“Advance Feed Switch” (Range: 0 > 1, Inc: 1) 1=ON, allows the next pack to be started when the Accumulator is supposed to dump plus the Accumulator Dump Time. 0=OFF, starts the next pack after Accumulator Presence Sensor is cleared plus the Accumulator Dump Time. When EV #25 is set to “1”, EV’s #1,2,23,24 should be adjusted as close to numbers on the right of “→” to obtain optimal performance. These values may vary depending on type and weight of paper being processed, environmental conditions, and system tolerances.</p>
26	1	<p>“Comm Hardware Type” (Range: 0 > 1, Inc: 1) 0 = Ziatech, 1 = WinSystems.</p>
27	4444	<p>“Eng Values Password” (Range: 0 > 9999, Inc: 1) 4444 = Default(9561 is backup).</p>
28	1	<p>“Eng Values Enable Password” (Range: 0 > 1, Inc: 1) 1 = Enable(Default), 0 = Disable. This enables or disables password to access Engineering Values.</p>
29	3	<p>“Max. Exit Demand power On Cycles” (Range:0 > 99, Inc: 1) 3 = Default. Number of inserter demand cycles before 438 outputs a package.</p>
30	2	<p>“Bar Read Commport” (Cycle Machine Power) (Range: 1 > 2, Inc: 1) 1 = Commport on CPU-PCB. 2 = (Default) Commport on Serial Expansion PCB.</p>
31	700	<p>“System ON/OFF Time Cycles”. (Range: 500 > 700, Inc: 5) 700 = Default. Debounce time in msec to acknowledge cycling of POWER ON Button Presses from OFF to ON, ON to OFF.</p>
32	100	<p>“Straight Conveyor Table ON Time” (Range: 5 > 500, Inc: 5) Default – 100. Time in milliseconds for conveyor table ON time for each pack out of folder.</p>

Number	Value	Description
33	2	“Number of Double Detect Sample Counts” (Range: 1 > 4, Inc: 1) Default = 2. Number of Double Detect Sample Counts per sheet fed. 20msec sample rate.
34	0	“This EV intentionally left blank” (Range: 0 > 1, Inc: 1) (Maximum Sheets Allowed to Accumulate moved to “Accumulator Setup” in version 26412.051).
35	80	“Feed Control Brake Delay Time” (Range: 0 > 160, Inc: 10) Default = 130 msec. Allows the page trail to leave the singulator before the feed brake is applied. Delay calculation based on sheet length, speed, and this constant.
36	100	“Exit Comm Rcvd Ack Time” (Range: 0 > 500, Inc: 10) Default = 100msec. In Tampa 1 only, if no Ack Response is received the machine errors out and resets the comm. To try transmit again. (See EV#37 for retries.) If set to =0 there is no Exit Comm Rcvd Ack Timer check and no machine error
37	0	“Exit comm. Xmit Retries” (Range: 0 > 2, Inc: 1) 1 + Default. In Tampa 1 only, if no Ack Response is received defined in EV#36, a retry is initiated and sends a duplicate serial string. A range of 0->2 retries can be indicated before the machine stops and displays the error: “Exit Comm: No Message Response (E20801)”. (See EV#36 for time setting). If set to =0, no retries are initiated and if an Ack Response is not received in the allotted time (EV#36), an error is generated.

Number	Value	Description
38	2	<p>“Barcode Reader (1=AS 30+, 2=MS911. 3=DL2031)” (Range: 1 > 3, Inc: 1) Default = 2. Will select the Start and Stop protocol for either an Accusort Model 30+ or a microscan MS911. 1 = Accusort Model 30+ Bar Read Start Serial Trigger = “S” Bar Read End Serial Trigger = “E” 2 = (Default) Microscan MS911 Bar Read Start Serial Trigger = “<S>” Bar Read End Serial Trigger = “<J>” 3 = DataLogic 2031 Bar Read Start Serial Trigger = “S” Bar Read End Serial Trigger = “E”</p>
39	0	<p>“Bad pack, Retain Selects? (1=Yes, 0=no)” (Range: 0 > 1, Inc: 1), Default = 0) 0 = Default. Normal operation. Upon Bad Pack, select and envelope bits are set to zero. 1 = Upon Bad Pack, select and envelope bits are retained.</p>
40	1	<p>“Electronics? (1 = New, 0 = Old)” (Range: 0 > 1, Inc: 1, Default = 1) 1 = Default. Enables I/O configuration for new modular electronics. 0 = Enables I/O for classic 420 two rack electronics.</p>
41	0	<p>“Sequential Stop Cycles (0=Off)” (Range: 0 > 99, Inc: 1, Default = 0) 0 = Default. Normal operation. 1 – 99 = Demand cycles after package leaves transfer conveyor that I/O point 0:16 “Inserter Stop” is asserted upon the occurrence of a Sequential Stop command.</p>
42	70	<p>“Max. pages in track 1 – 200” (Range: 1 > 200, Inc: 1, Default = 70) Used with Flat Feeder configuration. Limits maximum pages that can be accumulated in a track section.</p>
43	0	<p>“Feed Sensor interrupt (1=ON, 0+OFF)” (Range: 0 > 1, Inc: 1, Default = 0) 0 = Default. Utilizes poling method for input. 1 = Utilizes interrupt method for input.</p>

Number	Value	Description
44	1	“Accum Pack Bad: Set Pack After Bad Also” (Range:0 > 1, Inc:1, Default = 1) 1 = Default. Upon occurrence of a bad pack, the next pack processed is tagged as bad also until a good pack is processed. 0 = Next pack, if no error in normal processing, is not tagged as a bad pack.
45	1	“Accum Pack has Single: Set Pack Bad” (Range: 0 > 1, Inc:1, Default = 1) 1 = Default. Upon a single cycle accumulation of a pack in the accumulator, the pack processed is tagged as bad. 0 = pack is not tagged as a bad pack.
46	1	“Accum Pack Bad: Set Previous Pack Bad Also” (Range: 0 > 1, Inc: 1, Default = 1) 1 = Default. Upon occurrence of a bad pack, the previous pack processed is tagged as bad pack also. (pack in Xfer conveyor). 0 = Previous pack, if no error in normal processing, is not tagged as a bad pack.
47	0	“Flap Detect IO Inversion (1=Invert, 0+Normal)” (Range: 0 > 1, Inc:1, Default = 0) 0 = Default. Normal operation. 1 = Logic inversion for the signal. (Incserco mailcrafter).
48	0	“Intrack Sns Method (0=Normal, 1=Subset-pause)” (Range: 0 > 1, Inc: 1, Default = 0) 0 = Default. Normal operation. 1 = Support for Subset-Pause operation utilizing both Transfer Conveyor out Sensor and Intrack/Open Feed Sensor to track folded subsets in same track.
49	0	“Accum pack Bad: Set Divert By Read Bit” (Range: 0 > 1, Inc:1, Default = 0) 0 = Default. Normal operation. 1 = Sets Divert by Read bit if the pack is not valid.
50	0	“ReadLess Read Mode” (Range: 0 > 1, Inc: 1, Default = 0) 0 = Default. Normal operation. 1 = Special error recovery routine when using Demand Feed type “Read first” in barcode for FPF-35.

Number	Value	Description
51	1	<p>“First pack Dumped Error Enable” (Range: 0 > 1, Inc: 1, Default = 1) 1 = Default. Normal operation. 0 = Disables setting bad pack on first pack processed after startup or purge.</p>
52	1	<p>“Feed & Accum pack Error Enable” (Range: 0 > 1, Inc:1,Default = 1) 1 = Default. Normal operation. 0 = Disable setting bad pack on Feeder or Accum. Errors.</p>
53	0	<p>“Inserter Error Pause mode Switch” (Range: 0 > 7, Inc: 1, Default = 0) 0 = Default. Normal operation 1 = Pulse I/O (1:16) upon a read or processing error. 2 = Pulse I/O (1:16) upon a Demand Feed occurrence while accumulating a package. 3 = combines functions 1 & 2 4 = Steady state on I/O (1:16) upon a Demand Feed occurrence while accumulating a package. 5 = combines functions 1 & 4 6 = Illegal combination. 7 = Illegal combination.</p>

H.5 Typical Postal Metering Setup Presets

The following are 'Typical Presets' for the 438 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

Ink Marking	Insert Sta.-:1
	On at:010
	Off at:010
Postal Meter Divert	Insert Sta.:00
	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 - "GBR 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

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)
- 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.

H.6 Service Bulletins

n/a

H.7 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 (PRIOR TO FEEDER SN
05110256 & FOLDER SN 05110247)**

720-27734-500 (rev A), 420T FOLDER TOP ASSEMBLY 2

720-27734-500 (rev A), 420T FOLDER TOP ASSEMBLY 4

005-27736-500 (rev B), CABINET ASSEMBLY 6

091-28220-500 (rev -), ADAPTOR PLATE ASSEMBLY 8

580-28204-500 (rev -), CONTROL PANEL ASSEMBLY 10

002D-08135 (rev M), POWER UNIT A/C BOX 12

FEEDER SECTION15

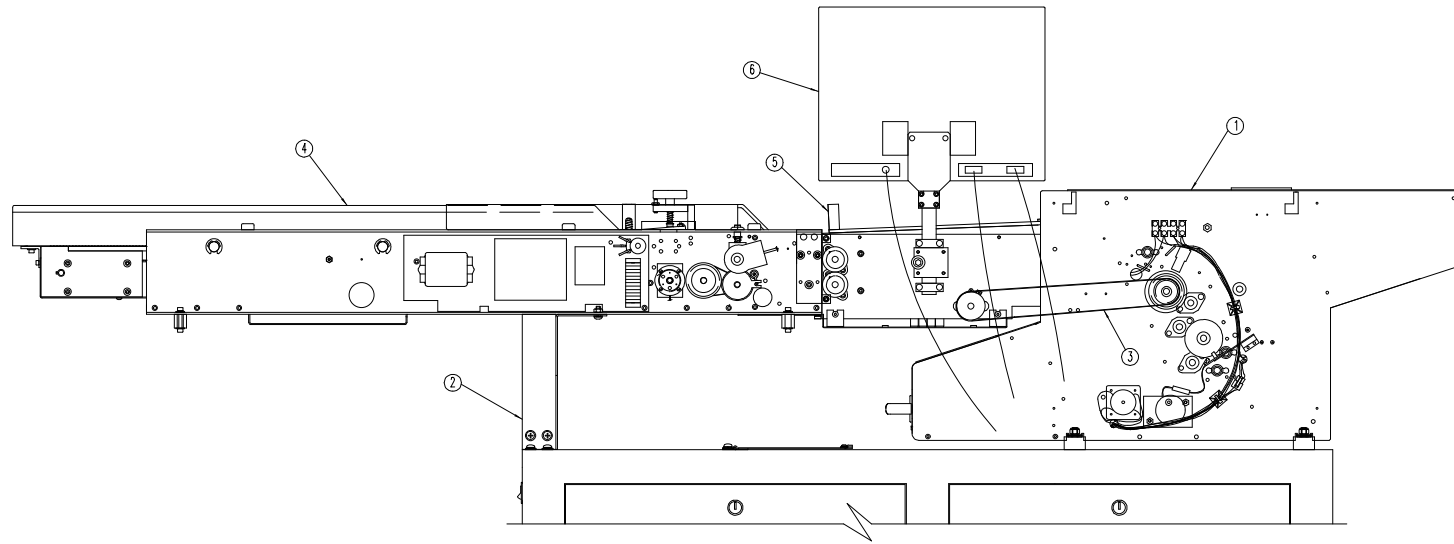
ACCUMULATOR – FOLDER SECTION33

OUTPUT DEVICES SECTION57

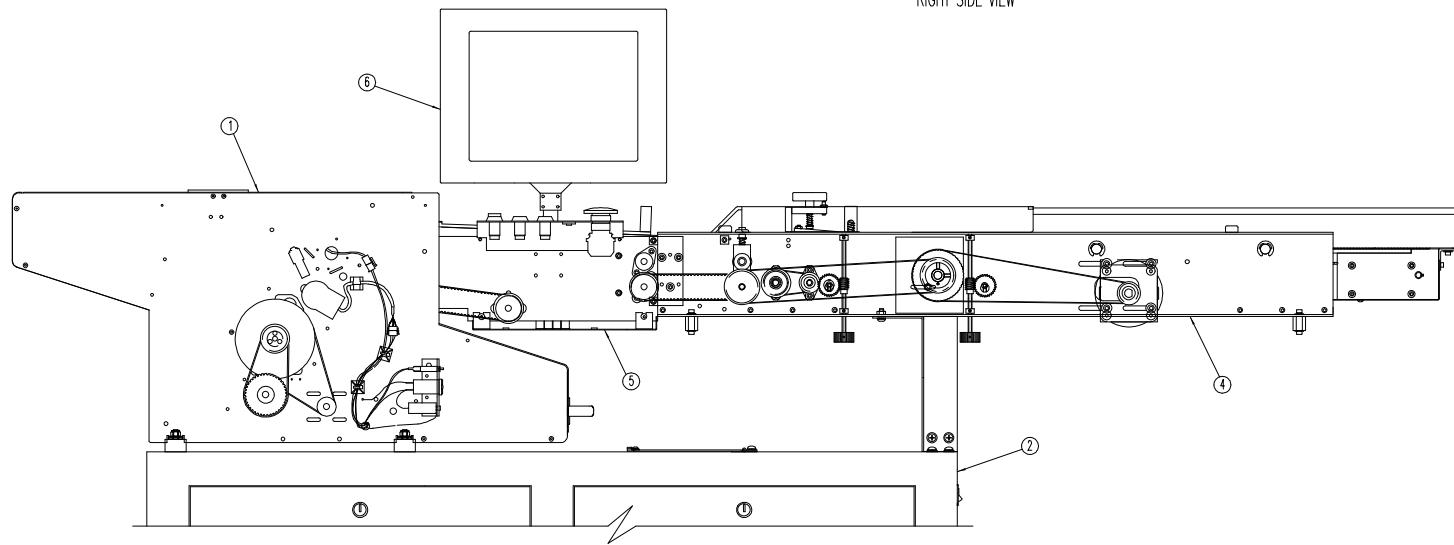
INPUT DEVICES SECTION71

OPTIONS SECTION101

720-27734-500 (REV A), 420T TOP ASSEMBLY



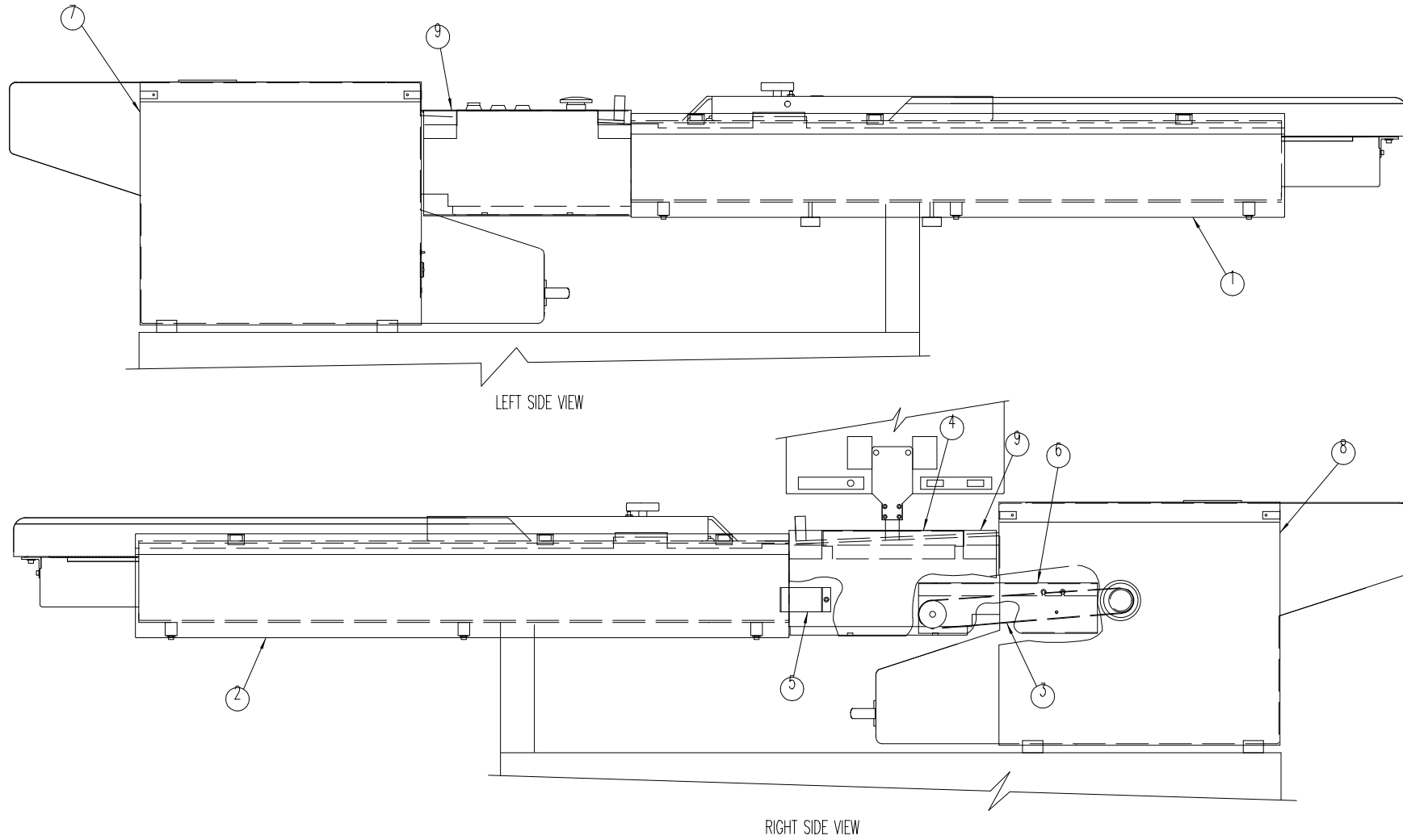
RIGHT SIDE VIEW



LEFT SIDE VIEW

720-27734-500 (rev A), 420T FOLDER TOP ASSEMBLY

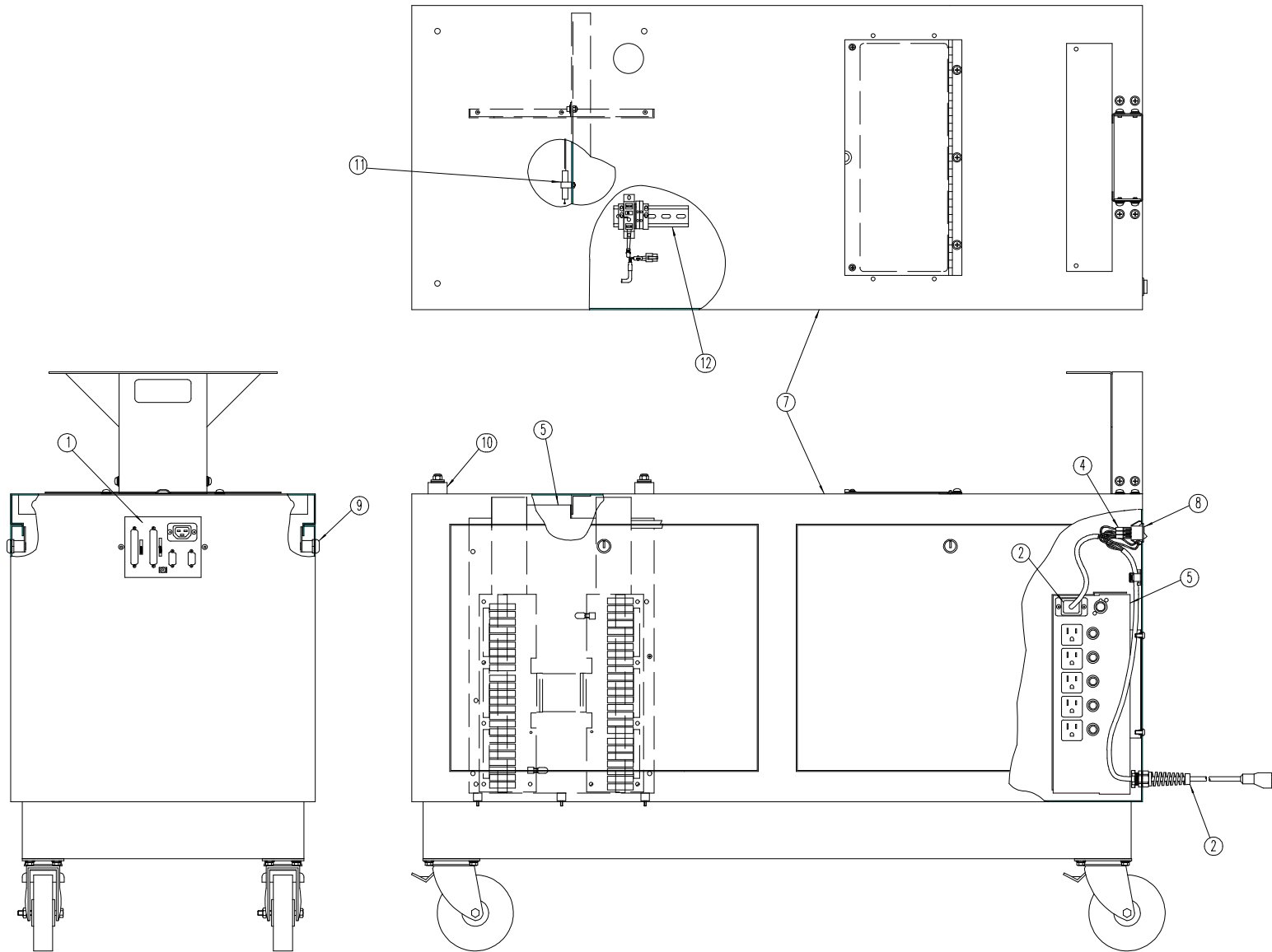
INDEX	PART NUMBER	DESCRIPTION
1	002D-19048	FOLDER
2	005-27736-500	CABINET
3	113-20028003701	BELT,TIMING,28 PL
4	549-27756-500	FEEDER
5	702-27735-500	ACCUMULATOR
6	709-27961-500	TOUCHSCREEN-CARD CAGE



720-27734-500 (rev A), 420T COVER ASSEMBLY

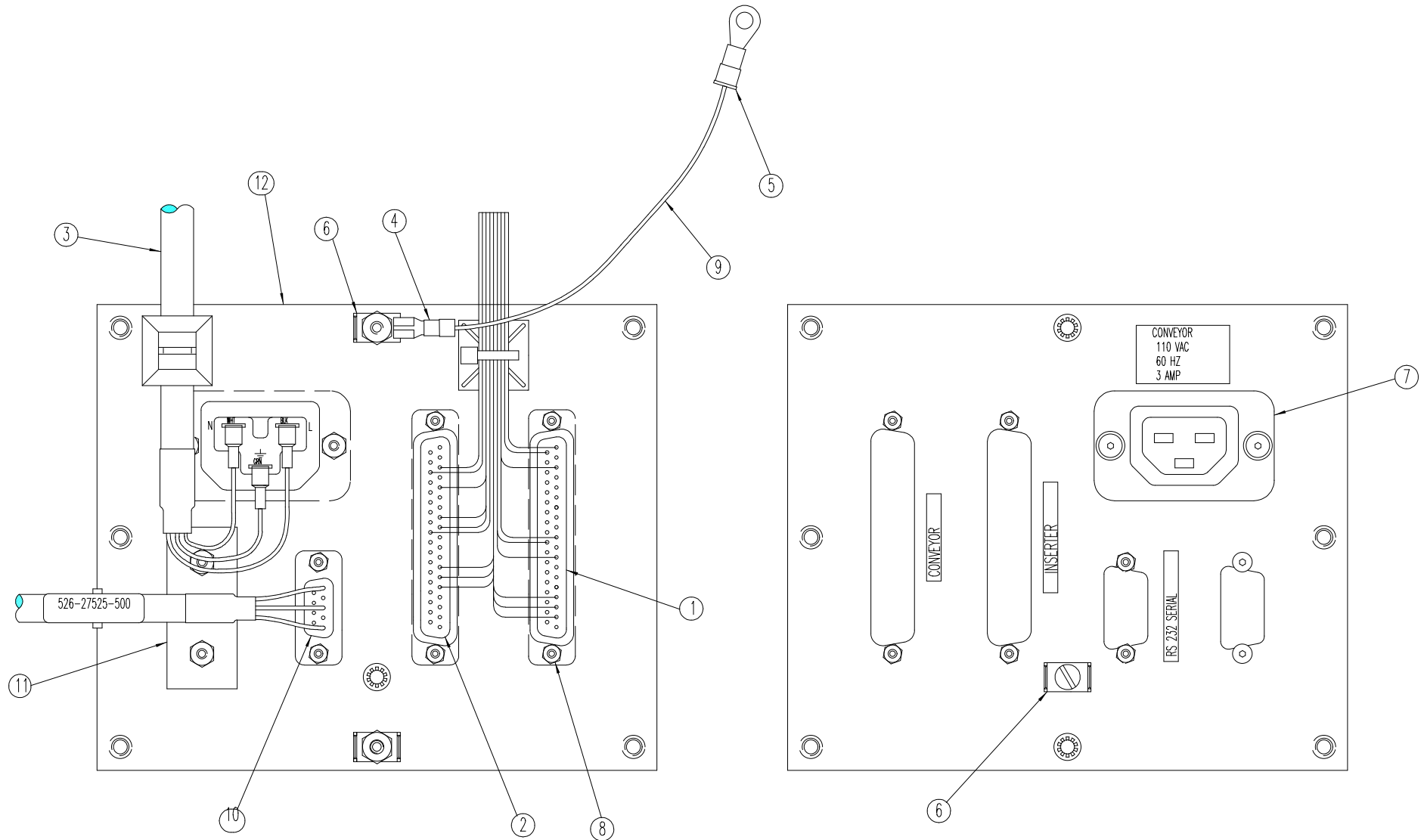
INDEX	PART NUMBER	DESCRIPTION
1	002D-18033	LEFT FEEDER COVER
2	002D-18034	RIGHT FEEDER COVER
3	113-20028003701	BELT, TIMING
4	600B-18780	FILL COVER, ACCUMULATOR
5	600B-20738	ROLLER COVER
6	600C-20707	BELT COVER
7	186-032029977	LEFT FOLDER COVER
8	186-032029976	RIGHT FOLDER COVER
9	600D-18779	ACCUMULATOR SIDE COVER

005-27736-500 (REV B), CABINET ASSEMBLY



005-27736-500 (rev B), CABINET ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	091-28220-500	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	580-28204-500	CONTROL PANEL ASSEMBLY
7	005-25960-500	CABINET
8	041-4LTGU0511TR	ROCKER SWITCH
9	172-CR7300	LOCK WITH KEY
10	173-10Z2314C	VIBRATION MOUNT
11	026-450937372C	SPRING CLIP
	047-27782-500	RESISTOR ASSEMBLY
12	024-27033-500	FEEDER BRAKE MODULE



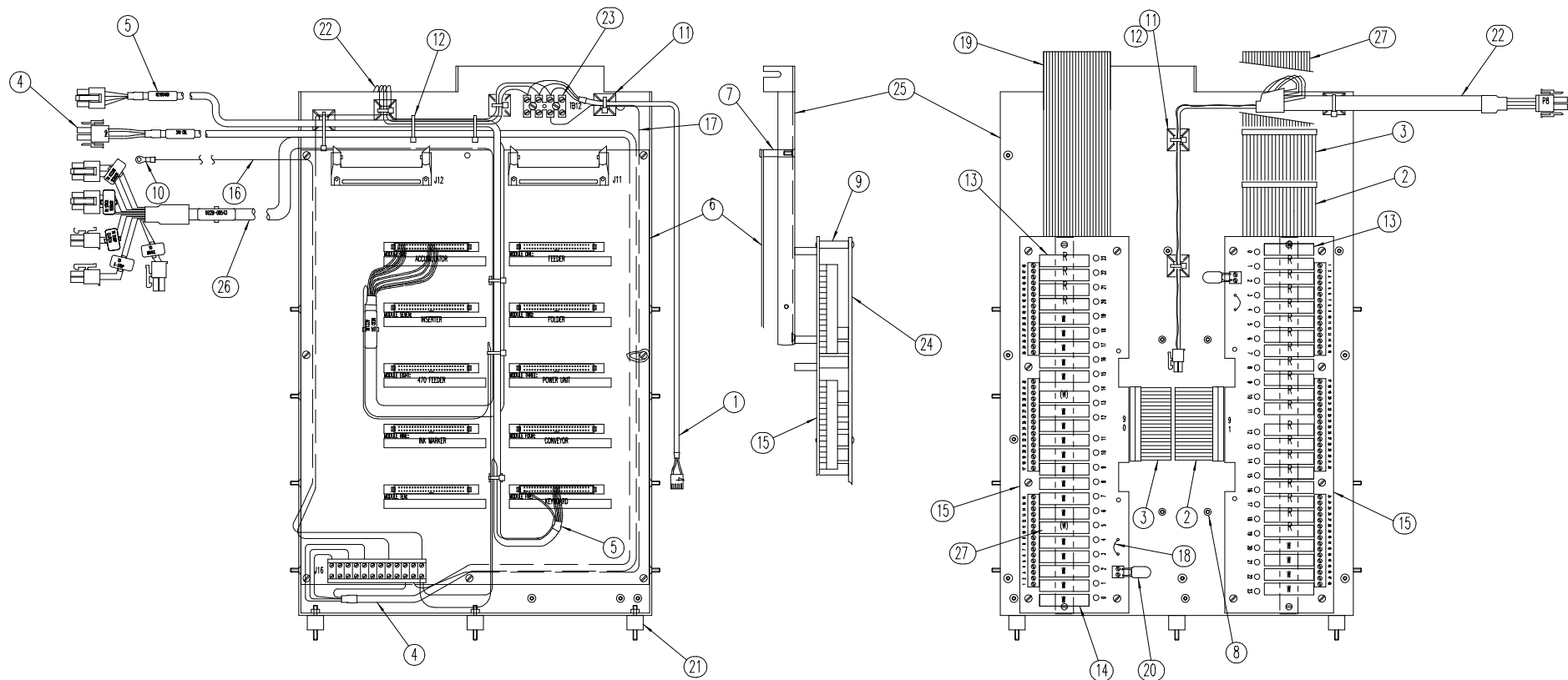
INTERNAL SIDE

EXTERNAL SIDE

091-28220-500 (REV -), ADAPTOR PLATE ASSEMBLY

091-28220-500 (rev -), ADAPTOR PLATE ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	002B-07723	CABLE, I/O MODULE 4 CONV.
2	002B-07724	CABLE, I/O MODULE 7 INSERTER
3	002B-08501	POWER INLET CABLE ASSY.
4	025-43125VN	SLEEVE, INSULATED 16-14 AWG
5	025-B398VN	RING LUG, #8, 16-14 AWG
6	025-MT523	ADAPTOR
7	035-83011220	OUTLET, POWER IEC
8	039-2058173	SCREWLOCK ASSY. FEMALE
9	045-13165	WIRE, HOOK-UP, 16 AWG, GRN
10	526-27525-500	CABLE, SERIAL TO ADAPTOR PLATE
11	600B-19109-001	PLATE, BLANK, 9 POSITION
12	600C-19054	PLATE, ADAPTOR

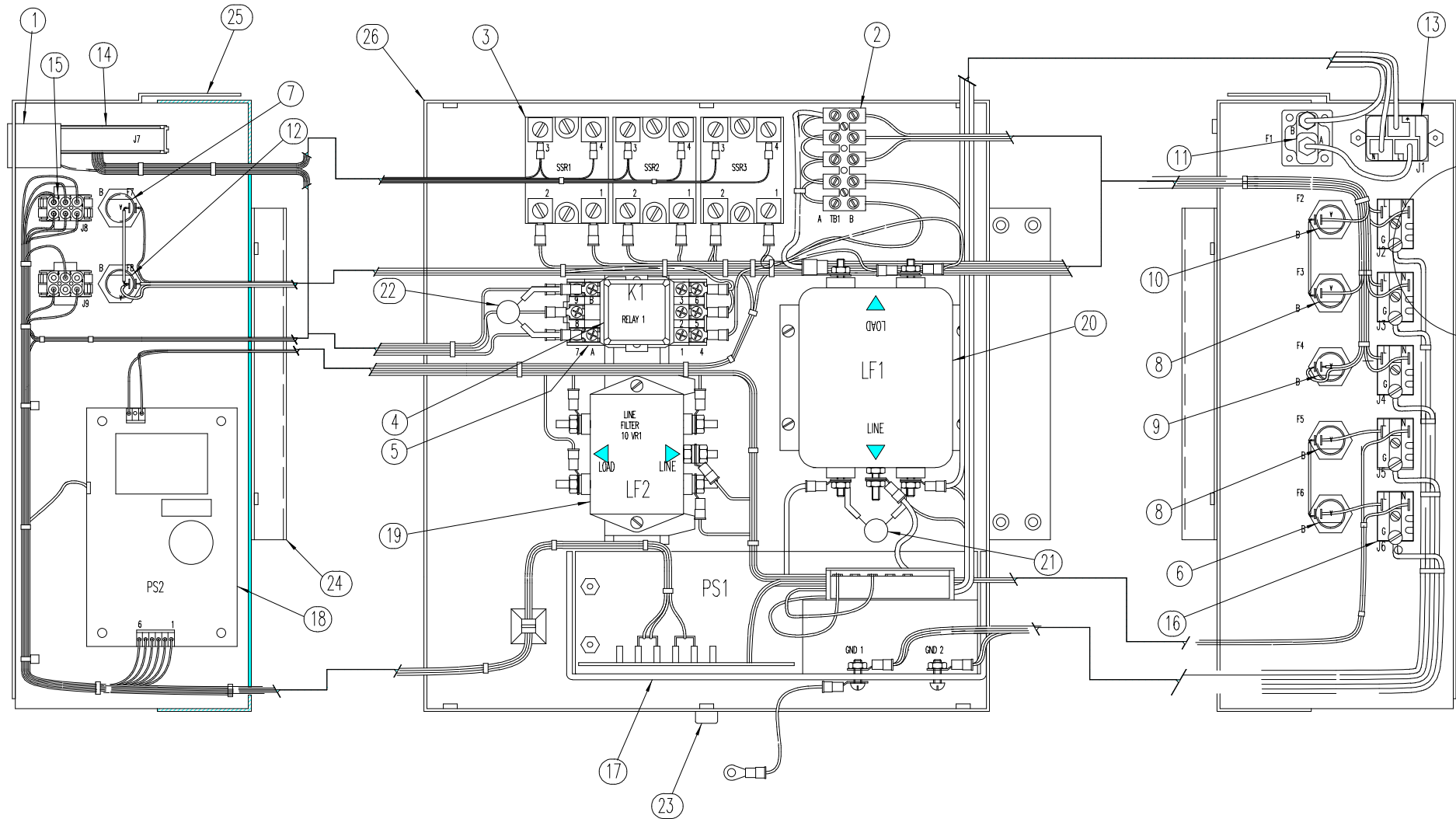


580-28204-500 (REV -), CONTROL PANEL ASSEMBLY

580-28204-500 (rev -), CONTROL PANEL ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	002B-08523	READER 5V CABLE
2	046-28180-500	CABLE 91 ASSEMBLY
3	046-28179-500	CABLE 90 ASSEMBLY
4	002B-08537	P9 CABLE ASSEMBLY
5	002B-08541	KEYBOARD CABLE
6	002D-08138	INTERCONNECT BOARD
7	020-RN00620416	STANDOFF,ROUND,1"LONG
8	020-RN00620425	STANDOFF,ROUND,#6-32 X 1.56
9	020-RN00820416	STANDOFF,ROUND,1"LONG
10	025-A218VN	RING,LUG,#8
11	026-ABMMA	TY-WRAP ANCHOR
12	026-PLM1M	TY-WRAP
13	030-SMODC5	MODULE (RED)
14	030-SMIDC5	MODULE (WHITE)
15	042-PB24SM	I/O BOARD,PB24-SM
16	045-018135	WIRE,18 AWG,GREEN
17	045-222135	WIRE,22 AWG,GREEN
18	045-22202A	WIRE,22 AWG,BUSS
19	046-27996-500	CABLE, J11
20	051-0476350	CAPACITOR,47uf,35V
21	173-VBM1062	RUBBER MOUNT
22	526-27509-500	P8 CABLE
23	600A-17923	TERMINAL BLOCK
24	600B-22454	OPTO RACK BAR
25	600D-19050	PANEL
26	002B-08543	ACCUMULATOR CABLE
27	046-28017-500	CABLE, J12

002D-08135 (REV M), POWER UNIT A/C BOX



002D-08135 (rev M), 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 1/2 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	POWER SUPPLY
18	044-VL30341010	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

NOTES:

SECTION I FEEDER SECTION PARTS(PRIOR TO FEEDER SN 05110256 & FOLDER SN 05110247)

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549-27756-500 (rev A), FEEDER ASSEMBLY, page 2..... 18

547-25937-500 (rev A), LEFT SIDE CHASSIS 20

547-27279-500 (rev A), RIGHT SIDE CHASSIS 22

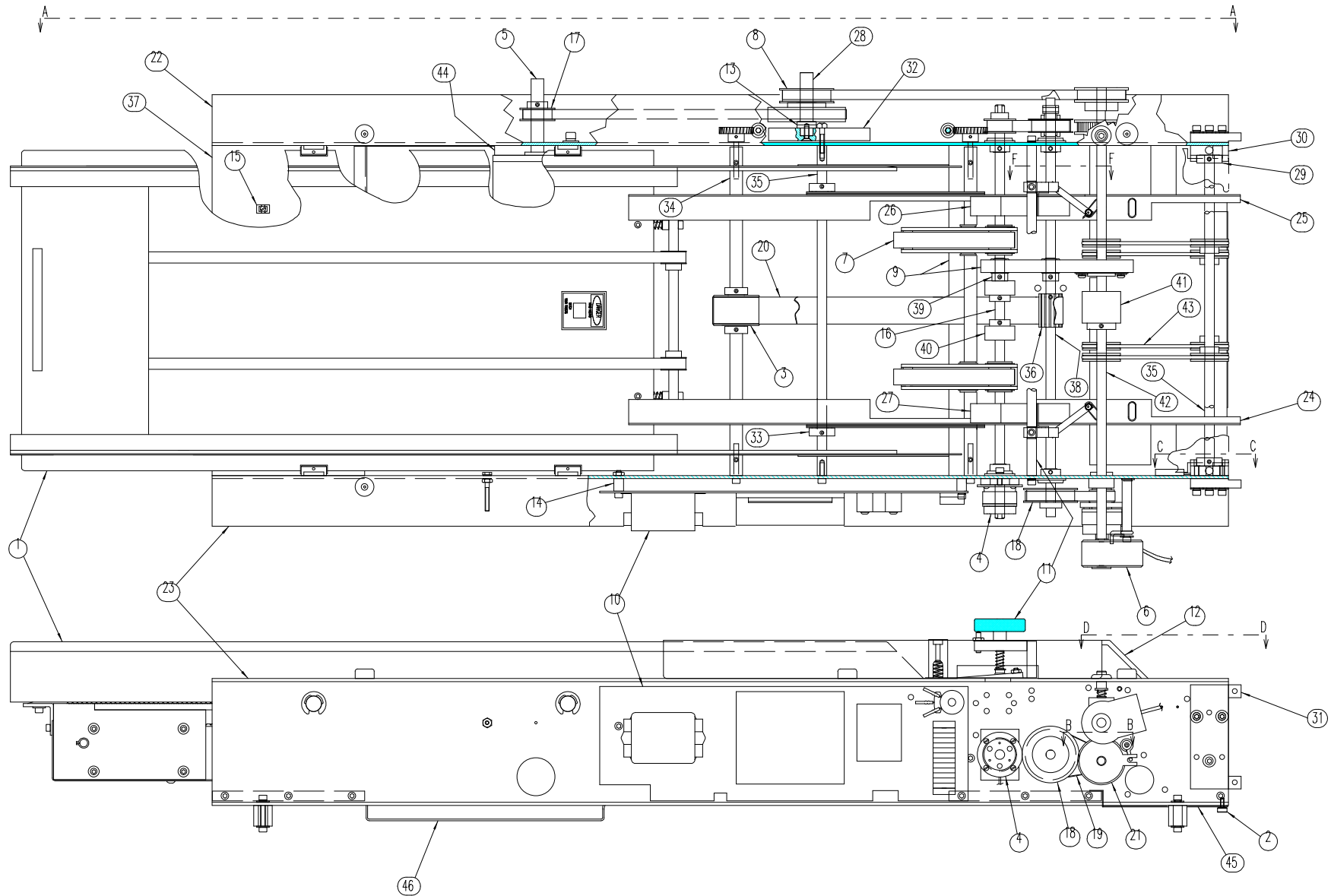
002D-16435 (rev J), SINGULATOR ASSEMBLY..... 24

002B-21905 (rev A), OUTSIDE FEED BELTS 27

002D-08522 (rev T), FEEDER ELECTRICAL ASSEMBLY 29

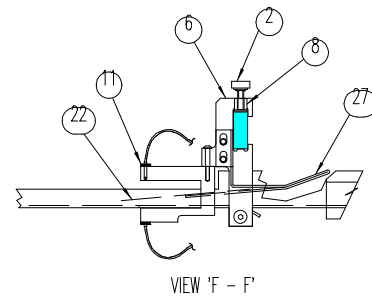
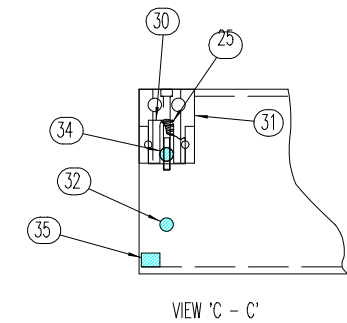
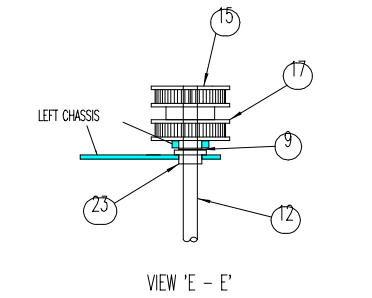
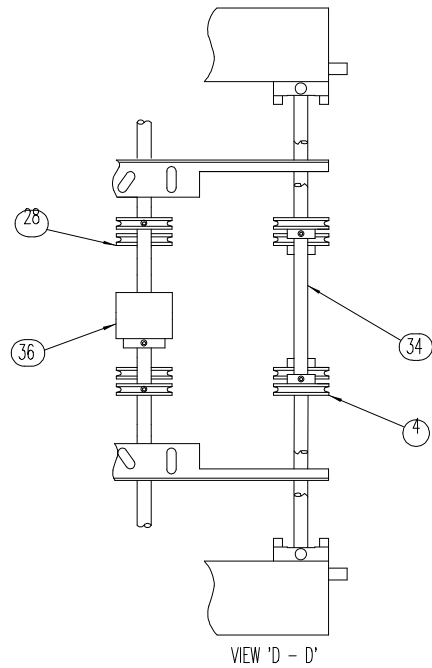
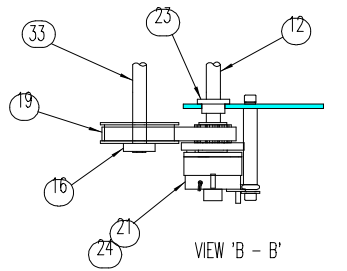
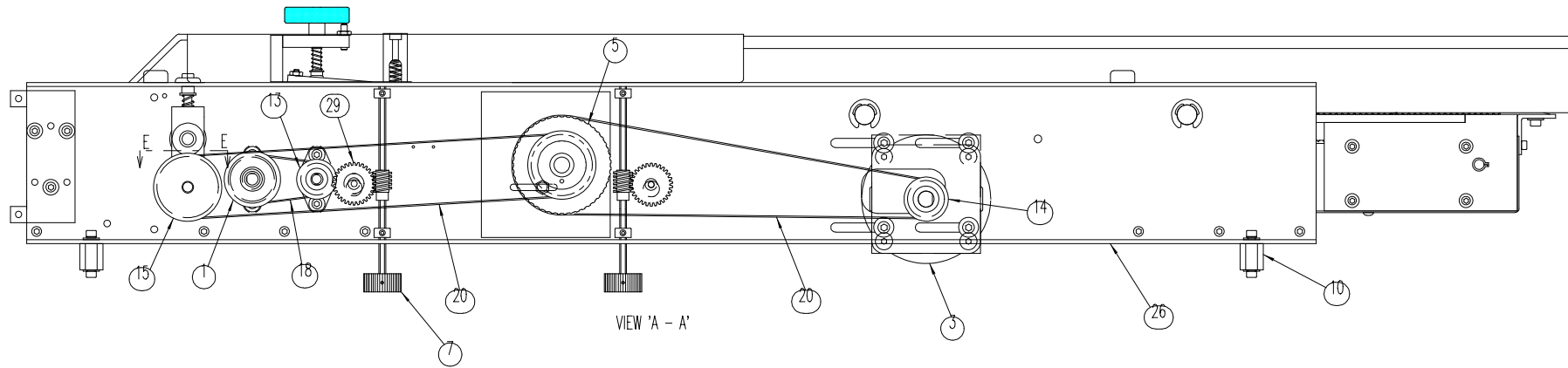
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549-27756-500 (REV A), FEEDER ASSEMBLY, PAGE 1



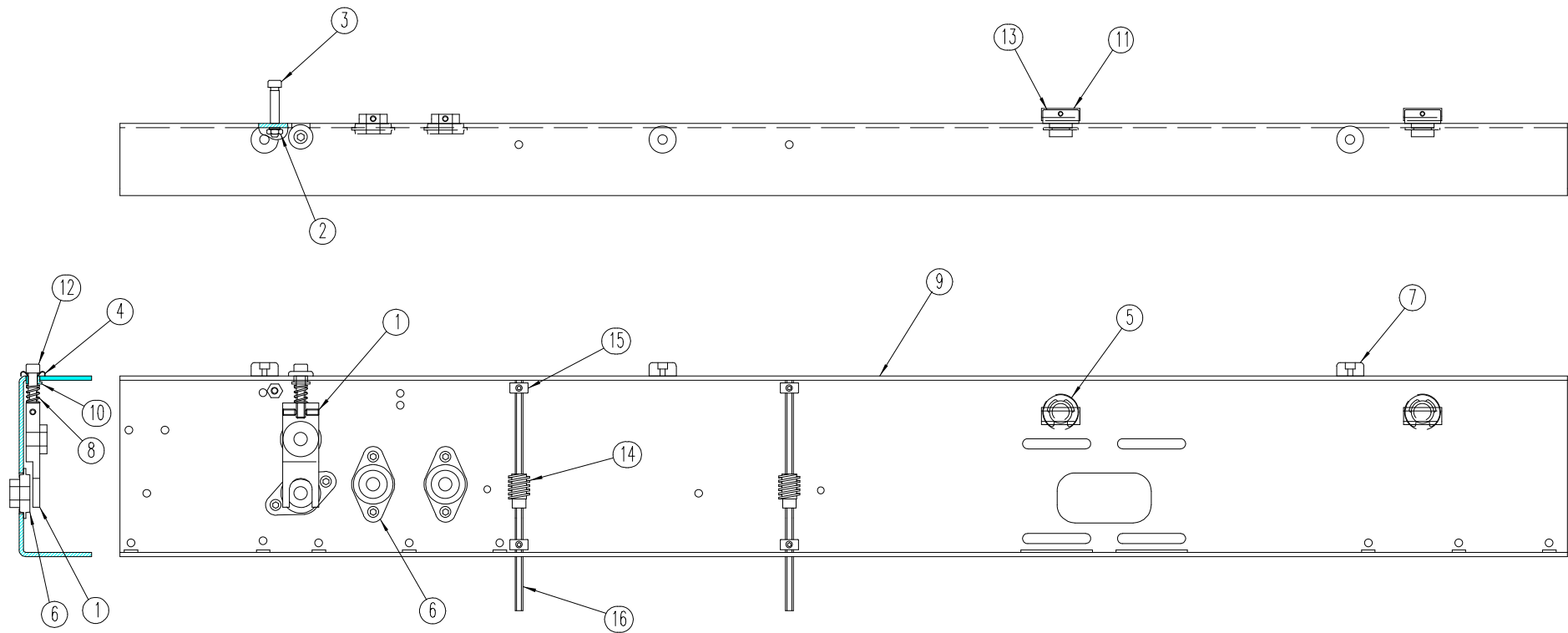
549-27756-500 (rev A), FEEDER ASSEMBLY, page 1

INDEX	PART NUMBER	DESCRIPTION			
1	001D-17505	CREEPER CONVEYOR	23	547-27279-500	RIGHT CHASSIS
2	002A-16495-004	THUMBSCREW,3/8" LONG	24	592-26208-600	RIGHT GUIDE RAIL
3	002A-22091	PULLEY ASSEMBLY	25	592-26209-600	LEFT GUIDE RAIL
4	002B-08157	BRAKE ASSEMBLY	26	592-26210-600	LEFT GUIDE SHOE
5	002B-08526	FEEDER MOTOR	27	592-26211-600	RIGHT GUIDE SHOE
6	002B-08630	ENCODER	28	600A-17661	DRIVE PULLEY SHAFT
7	002B-21905	OUTSIDE FEED BELTS	29	600A-18699	ANTI-TORSION BLOCK
8	002B-22221	PULLEY ASSEMBLY	30	600A-18700	ADJUSTMENT BLOCK
9	002C-19652	MIDDLE TIE PLATE ASSEMBLY	31	600A-18773	SCAB PLATE
	025-25947-500	STATIC BRAID ONLY	32	600A-21521	PULLEY MOUNT BLOCK
	163-JHTT89	NEEDLE BEARING ONLY	33	600B-15839-014	HANGER GUIDE RAIL
	158-S3PPB5ST	RADIAL BEARING ONLY	34	600B-15839-017	TENSIONER SHAFT
10	002D-08522	ELECTRICAL ASSEMBLY	35	600B-15839-028	TIE BAR
11	002D-16435	SINGULATOR ASSEMBLY	36	600B-15839-060	FEED DRIVE PULLEY
12	002D-18099	SINGULATOR COVER	37	600B-15839-125	TIE PLATE
13	016-S0500075012	SHIM,.5ID,.75ID,.125	38	600B-16122-033	HOPPER FEED SHAFT
14	020-RA010C0608	SPACER,#10C,.5 LONG	39	600B-16404-005	HUB, ROLLER BEARING
15	026-TM1S6	TIE WRAP MOUNT	40	600B-16430	DRIVE ROLLER
16	095-27252-600	SHAFT,SINGULATOR DRIVE	41	600B-17541	PULLOUT ROLLER
17	112-200DBA18650	PULLEY,TIMING,18T	42	600B-17848	UPPER PULLOUT ROLLER
18	112-200DBA32637	PULLEY,TIMING,32T	43	600B-18045	FEEDER BELT
19	113-200090037	BELT,TIMING,45G	44	600B-22223	ADAPTOR PLATE
20	113-S290XL100	BELT,TIMING	45	600D-17316	FEEDER DOCKING PORT
21	122-25211-500	CLUTCH	46	600D-22275	FEEDER TRAY
22	547-25937-500	LEFT CHASSIS			



549-27756-500 (rev A), FEEDER ASSEMBLY, page 2

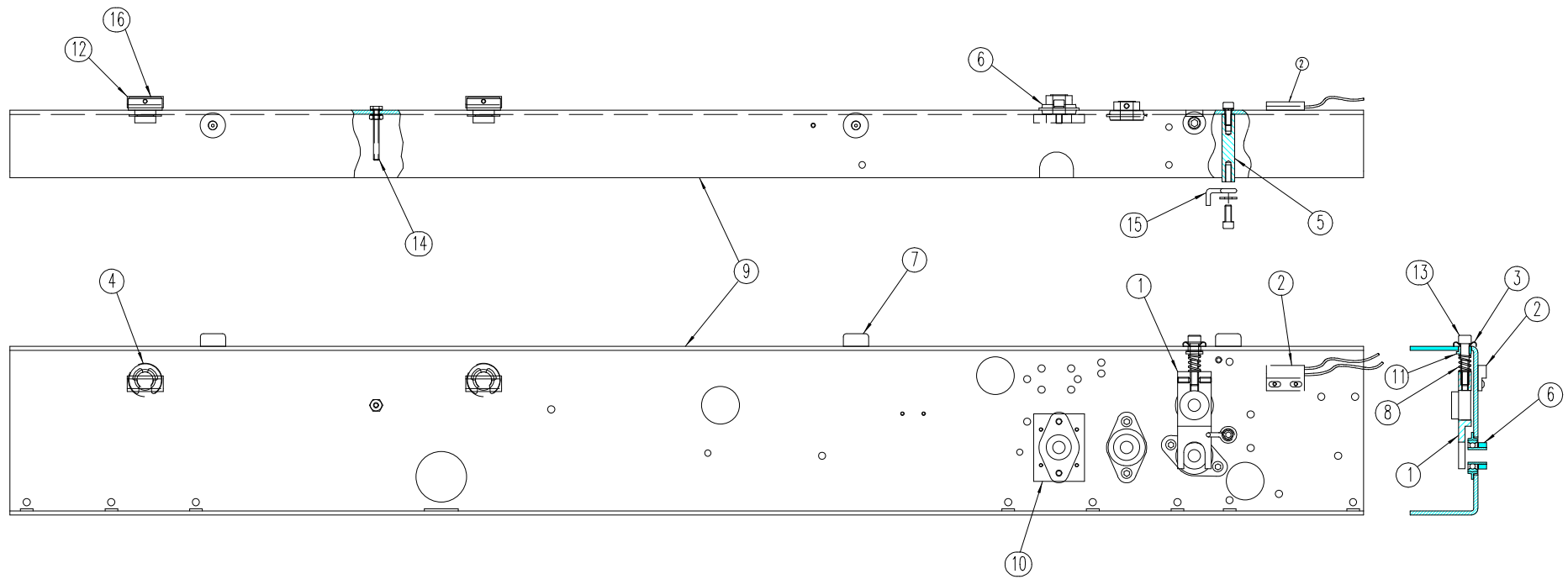
INDEX	PART NUMBER	DESCRIPTION			
1	002A-16437	PULLEY ASSEMBLY	20	113-200290037	BELT,TIMING
2	002A-16457-005	THUMBSCREW,1/2" LONG	21	122-25211-500	CLUTCH
3	002B-08526	FEEDER MOTOR	22	144-26616-600	PLASTIC STRIP
4	002B-16767	PULLEY	23	153-FB6103	FLANGE BEARING
5	002B-22221	PULLEY	24	167-125375	WOODRUFF KEY
6	007-26214-600	HANGER BRACKET	25	181-3600401000	SPRING
7	008-1131BK4	PLASTIC KNOB	26	547-25937-500	LEFT CHASSIS
8	016-26219-600	CLIP,SENSOR MOUNT	27	592-26210-600	LEFT GUIDE SHOE
9	016-S0375062503	SHIM,.375ID,.625OD,.03THK	28	600A-16349-020	DRIVE PULLEY
10	020-HA01021013	STANDOFF,#10-32 X .812	29	600A-16556	WORM GEAR
11	057-26856-500	SENSOR ASSEMBLY	30	600A-18699	ANTI-TORSION BLOCK
12	095-25212-600	CLUTCH SHAFT	31	600A-18700	ADJUSTMENT BLOCK
13	112-200DBA16637	PULLEY,TIMING, 16T	32	600B-15839-028	TIE BAR
14	112-200DBA18650	PULLEY,TIMING, 18T	33	600B-16122-033	HOPPER FEED SHAFT
15	112-200DBA30637	PULLEY,TIMING, 30T	34	600B-17045	UPPER SHAFT
16	112-200DBA32637	PULLEY,TIMING, 32T	35	600B-17312	FEEDER MOUNT BAR
17	112-200DOA30637	PULLEY,TIMING, 30T	36	600B-17541	PULLOUT ROLLER
18	113-20008003712	BELT,TIMING,40G			
19	113-200090037	BELT,TIMING,45G			



547-25937-500 (REV A), LEFT SIDE CHASSIS

547-25937-500 (rev A), LEFT SIDE CHASSIS

INDEX	PART NUMBER	DESCRIPTION
1	002A-17927	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

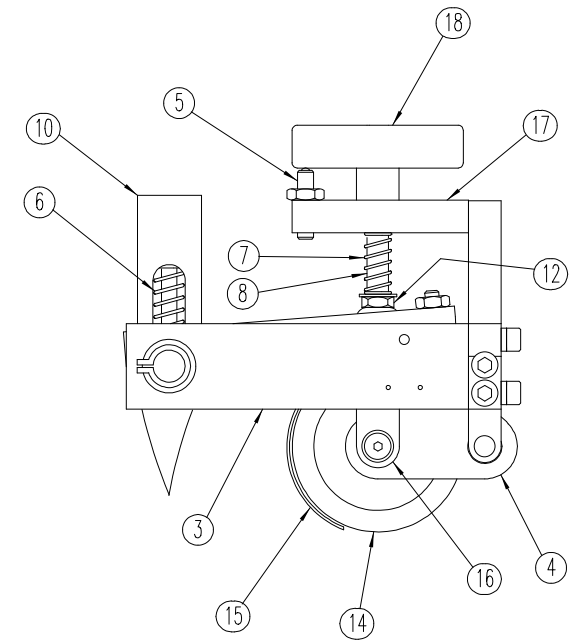
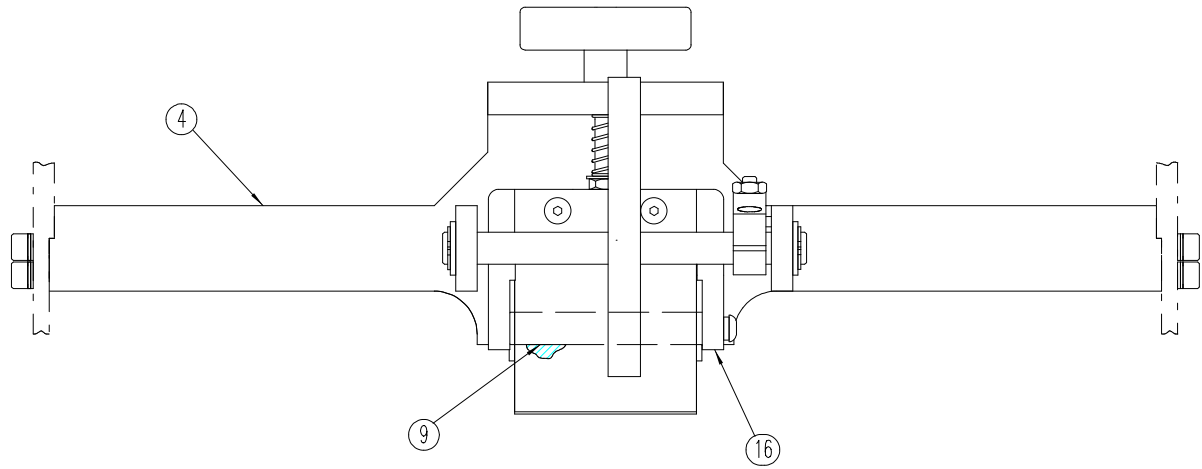
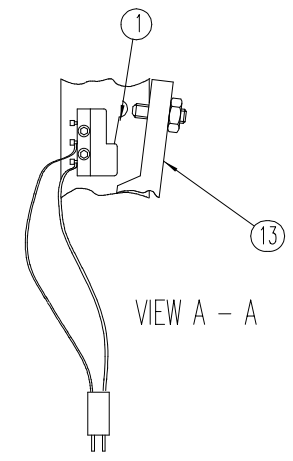
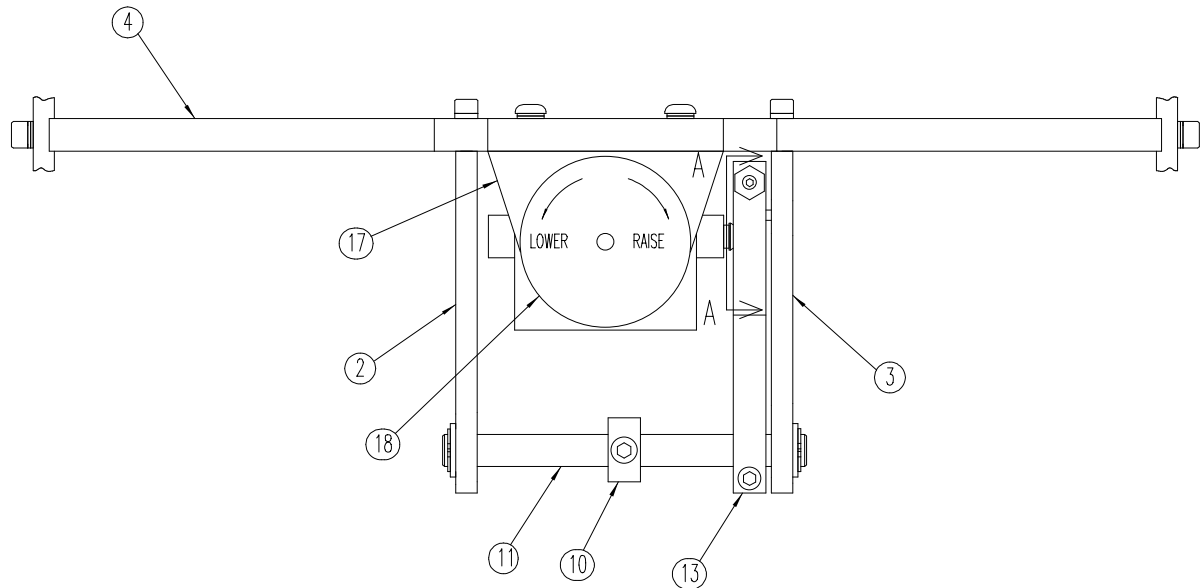


547-27279-500 (REV A), RIGHT SIDE CHASSIS

547-27279-500 (rev A), RIGHT SIDE CHASSIS

INDEX	PART NUMBER	DESCRIPTION
1	002A-17927	BEARING BLOCK
2	002B-08569	INTERLOCK ASSEMBLY
3	016-712	CUP WASHER
4	019-100062	"E" RING
5	020-RA01020632	STANDOFF,#10-32 X 2"
6	158-S3PPB5ST	RADIAL BEARING
7	173-2194	BUMPER
8	181-3600401000	SPRING
9	547-25935-600	RIGHT FRAME
10	584-27253-600	ADAPTOR PLATE
11	600A-15839-012	GUIDE BUSHING
12	600A-15839-119	TRACK BUTTON INSERT
13	600A-15915-025	ADJUSTMENT SCREW
14	600A-17921	GROUND SCREW
15	600A-18200	CLUTCH STOP
16	600B-15839-068	TRACK BUTTON

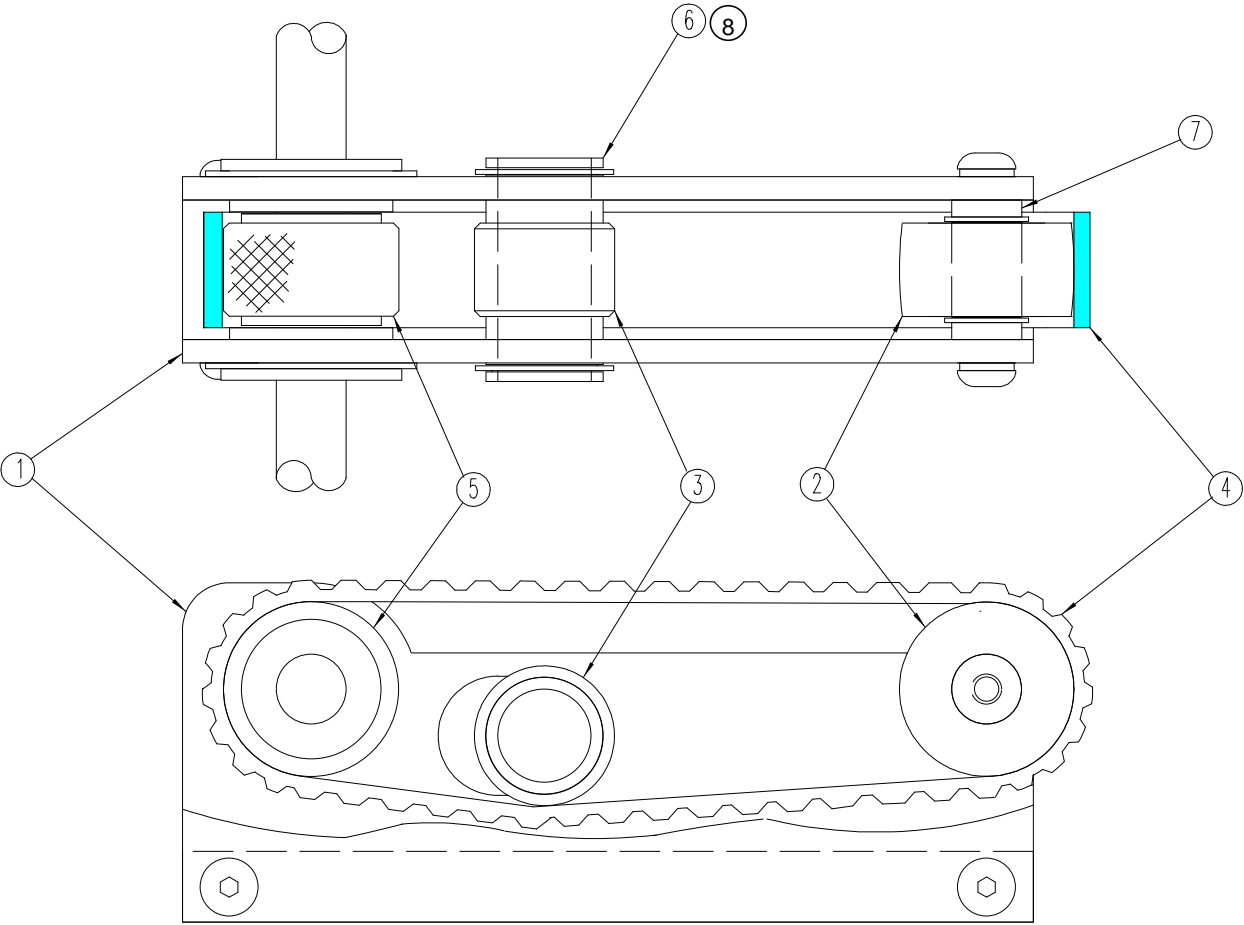
002D-16435 (REV J), SINGULATOR ASSEMBLY



002D-16435 (rev J), SINGULATOR ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	002B-08212	CREEPER CONVEYOR SWITCH
2	002B-16325	INPUT BRACKET
3	002B-16326	INFEEED SWITCH BRACKET
4	002C-16500	SUPPORT BAR
5	014-SW15N	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

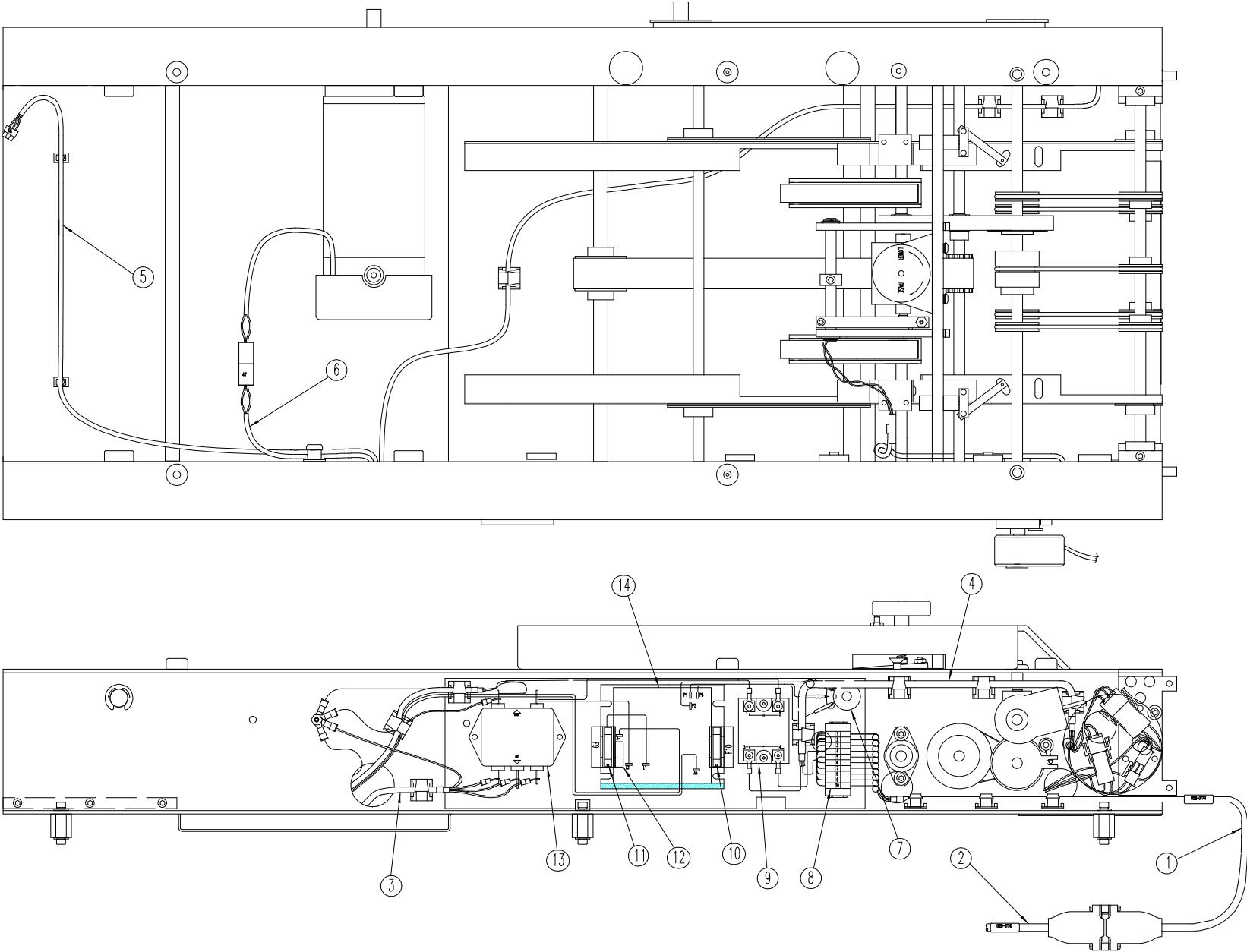
002B-21905 (REV A), OUTSIDE FEED BELTS



002B-21905 (rev A), 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
8	019-200062	C-CLIP

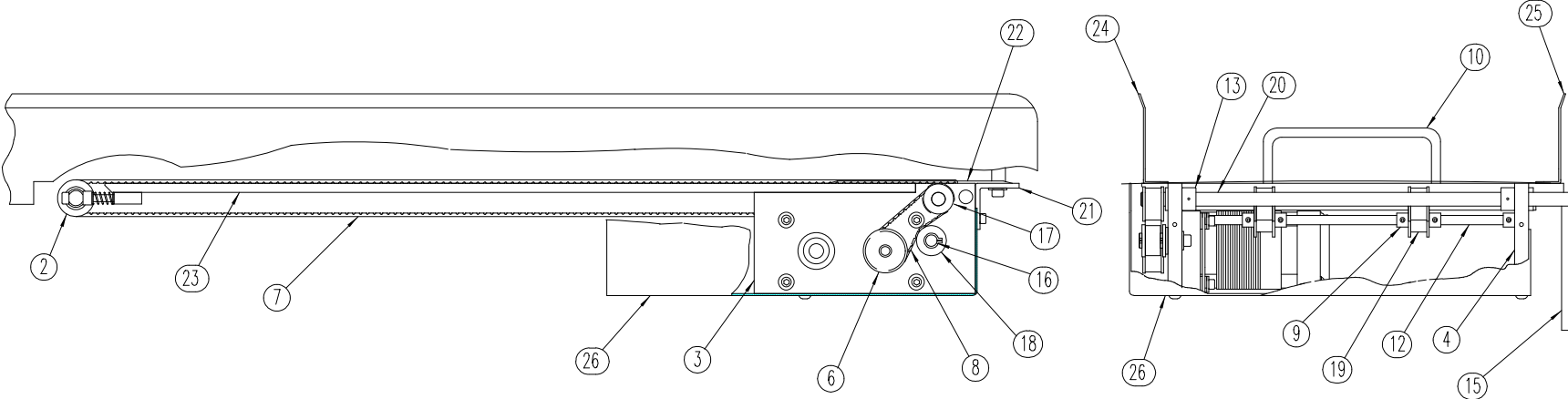
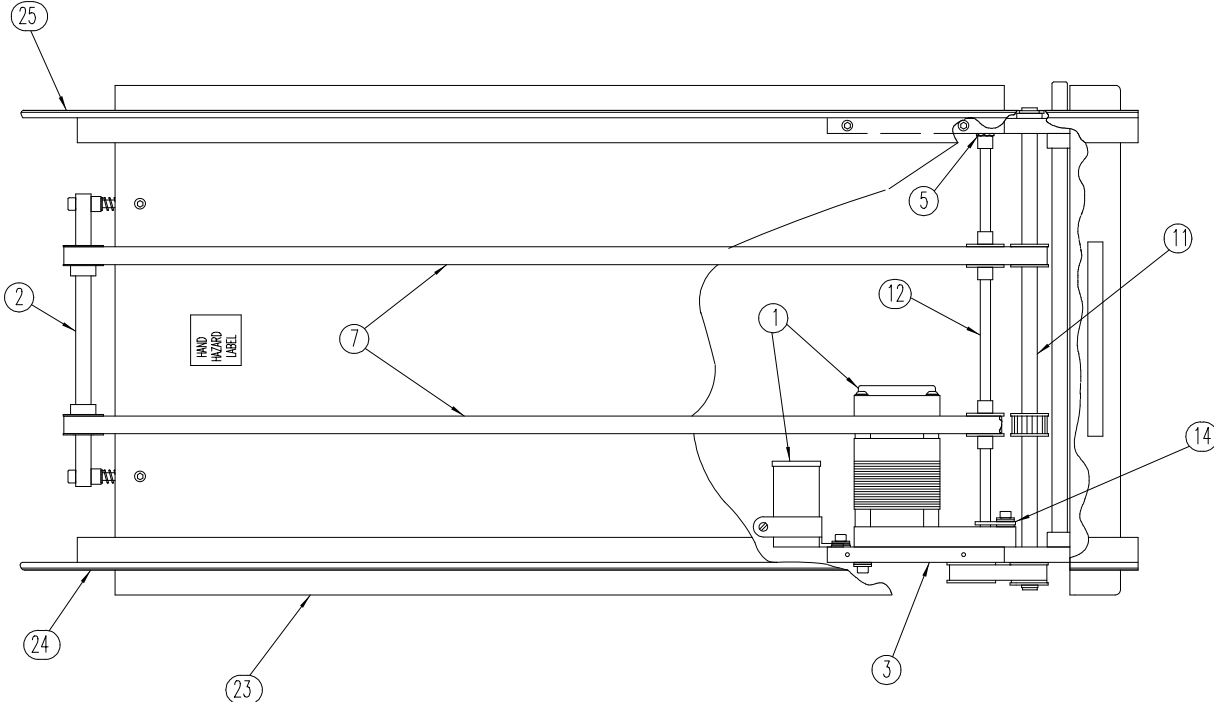
002D-08522 (REV T), FEEDER ELECTRICAL ASSEMBLY



002D-08522 (rev T), 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	032-11120250	FUSE,12 AMP
12	047-S9841	RESISTOR
13	050-20VVK1	LINE FILTER
14	054-KBIC125	MOTOR CONTROLLER

002D-17505 (REV H), CREEPER CONVEYOR



002D-17505 (rev H), CREEPER CONVEYOR

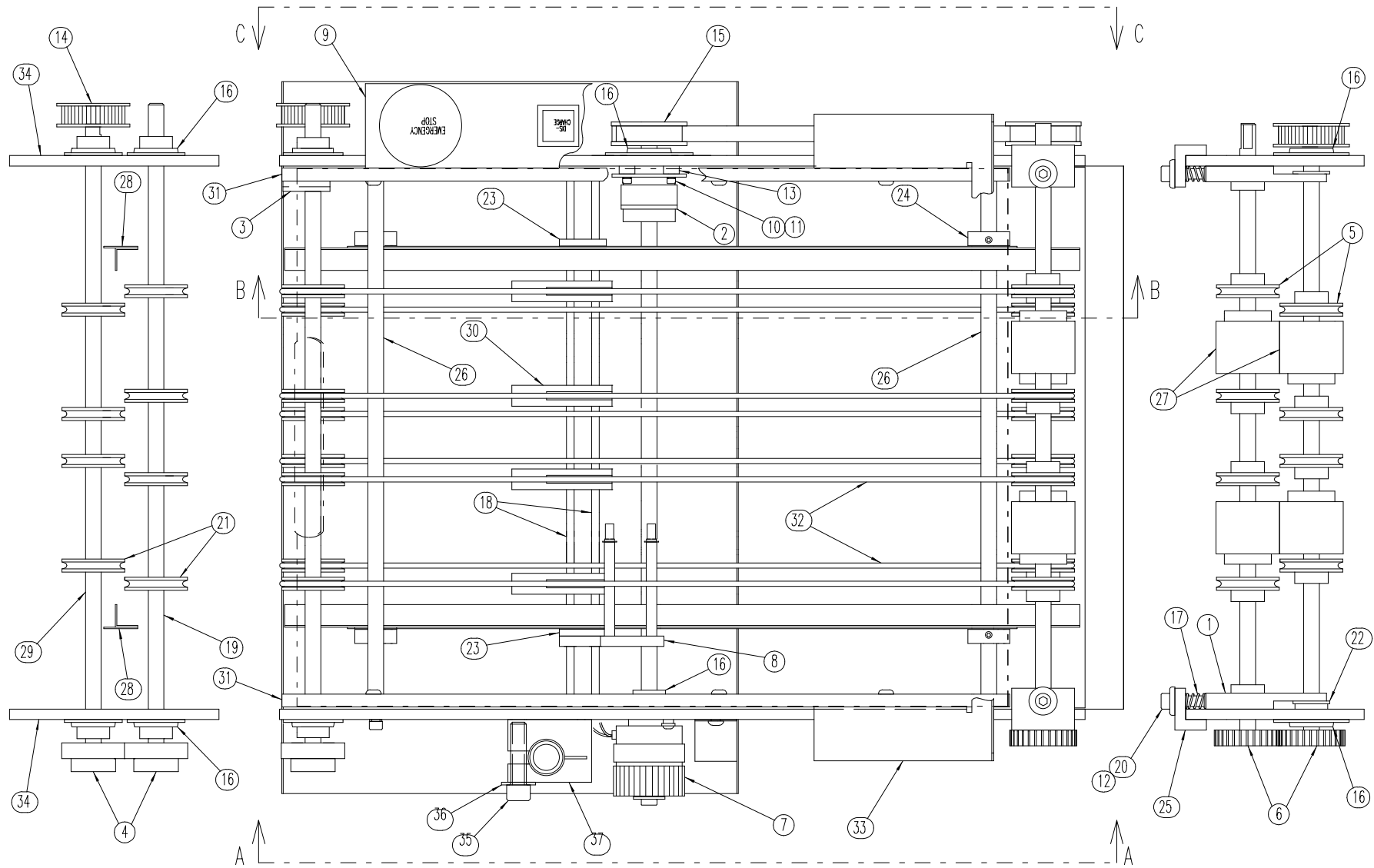
INDEX	PART NUMBER	DESCRIPTION
1	002B-09341	CREEPER MOTOR
2	002B-16631	FRONT SHAFT ASSEMBLY
3	002B-16633	MOTOR MOUNT PLATE,LEFT
4	002B-16634	MOTOR MOUNT PLATE,RIGHT
5	016-525	WAVY WASHER
6	112-200DBA15625	MOTOR DRIVE PULLEY
7	113-200500037	CONVEYOR BELT
8	113-200070037	DRIVE BELT
9	126-SSC25	SET SCREW 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

NOTES:

**SECTION I ACCUMULATOR-FOLDER
PARTS(PRIOR TO FEEDER SN 05110256 & FOLDER
SN 05110247)**

702-27735-500 (rev -), ACCUMULATOR, page 1 34
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702-27735-500 (rev -), ACCUMULATOR, page 3 39
002D-08156 (rev F), KEYBOARD ASSEMBLY 41
709-27961-500 (rev A), TOUCHSCREEN-CARDCAGE 43
002D-19048 (rev J), FOLDER ASSEMBLY, page 1 45
002D-19048 (rev J), FOLDER ASSEMBLY, page 2 47
002D-19048 (rev J), FOLDER ASSEMBLY, page 3 49
002D-19048 (rev J), FOLDER ASSEMBLY, page 4 51
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702-27735-500 (REV -), ACCUMULATOR, PAGE 1

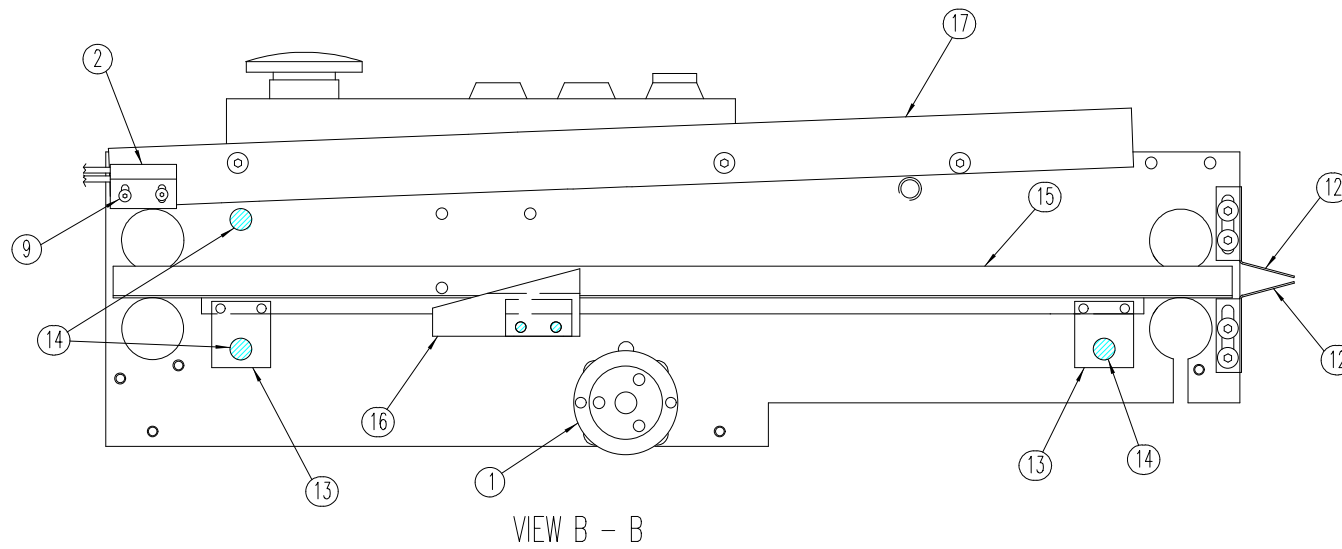
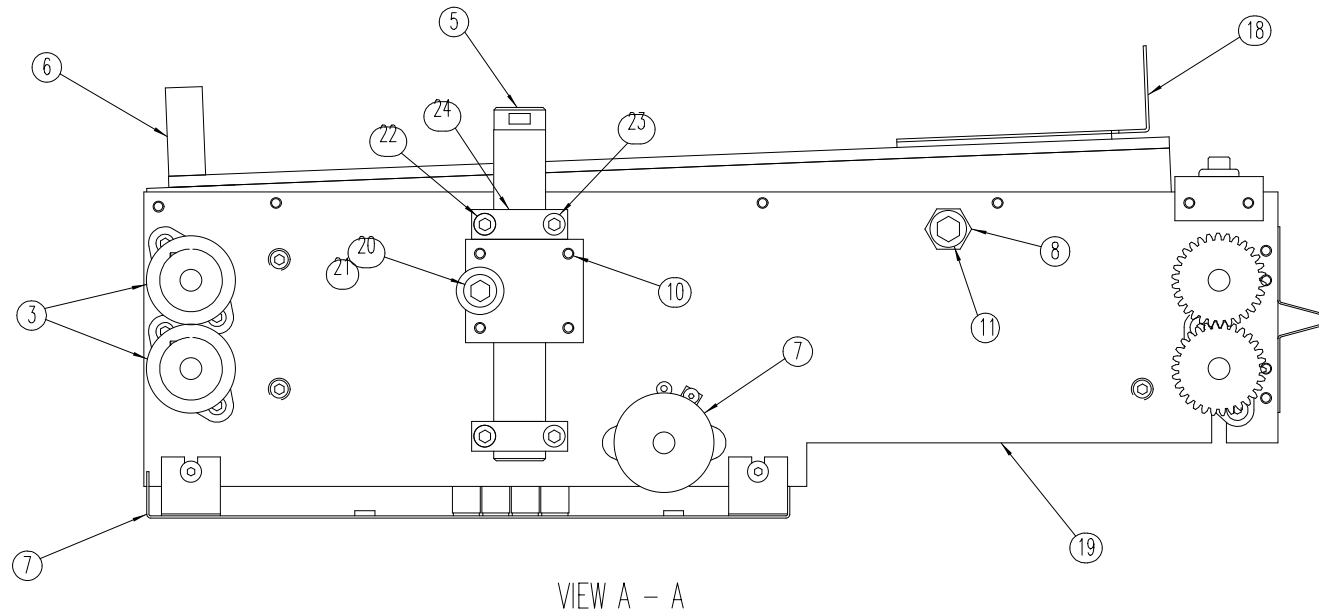


702-27735-500 (rev -), ACCUMULATOR, page 1

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

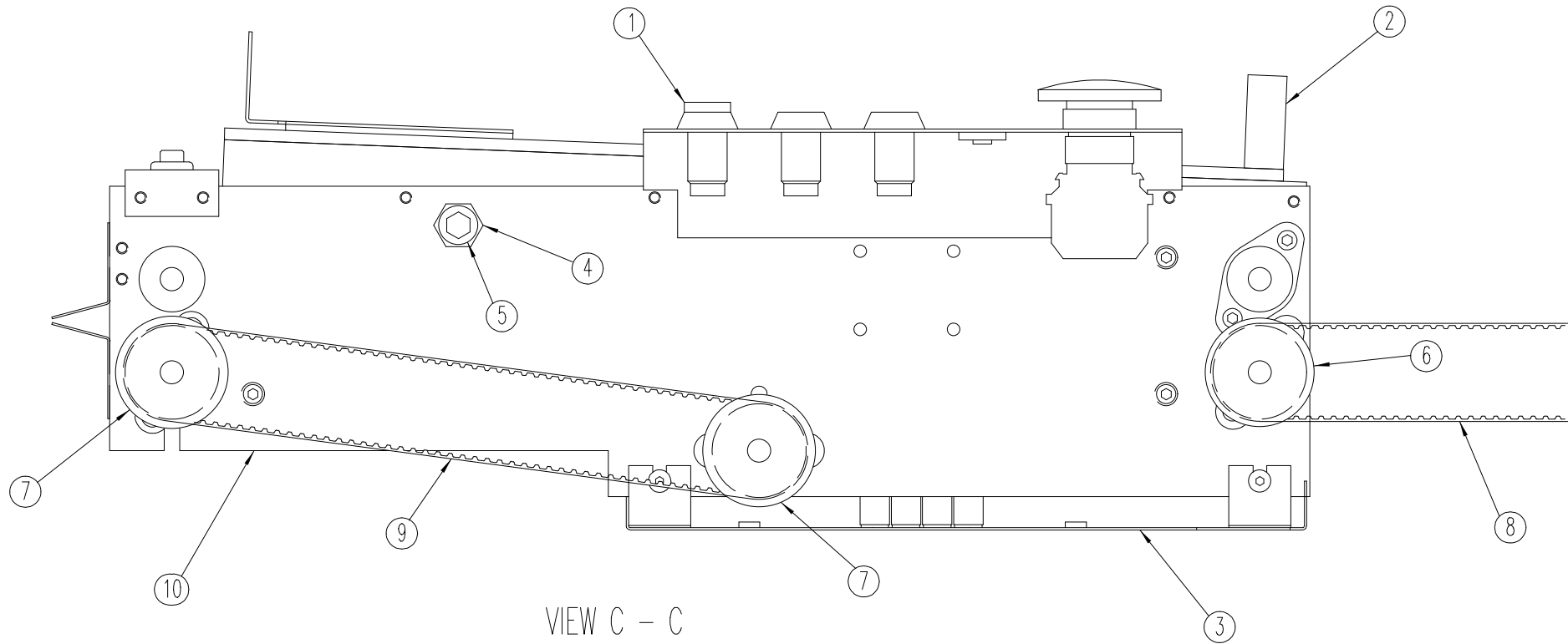
35	014-37221124	SHCS,.375-16 X 1.50
36	016-037	WASHER,FLAT,.375ID
37	600A-17597	DISPLAY CLAMP

702-27735-500 (REV -), ACCUMULATOR, PAGE 2



702-27735-500 (rev -), 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	600A-23539	DISPLAY MOUNT TUBE
6	002D-19016	TOP COVER
7	002D-19442	SENSOR PLATE
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
20	014-37221124	SHCS,.375-16 X 1.50
21	016-037	WASHER,FLAT,.375
22	600A-18104	LOCATING PIN
23	014-25821116	SHCS,.25-28 X 1.00
24	126-SP14F	SPLIT COLLAR

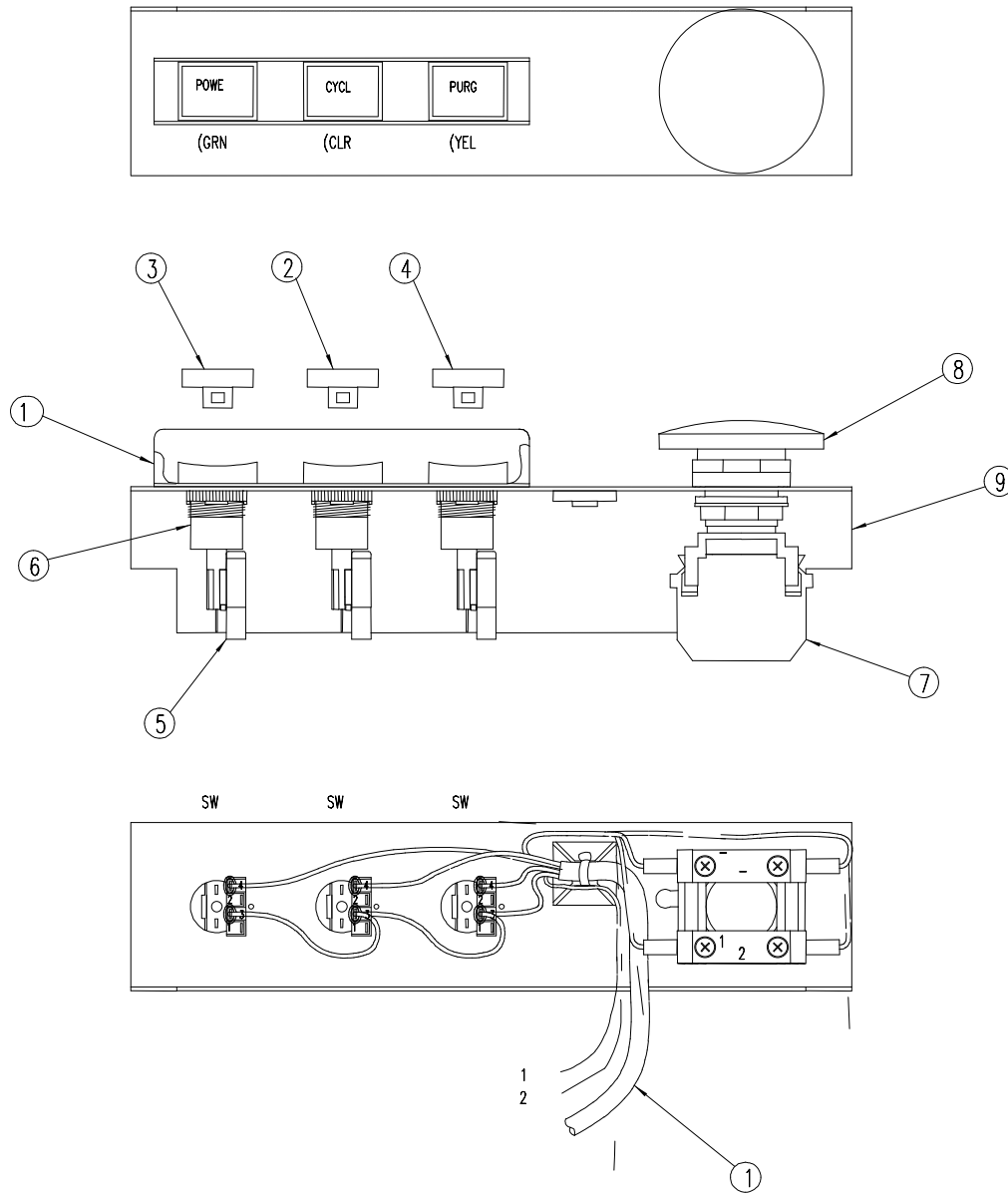


VIEW C - C

702-27735-500 (rev -), 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

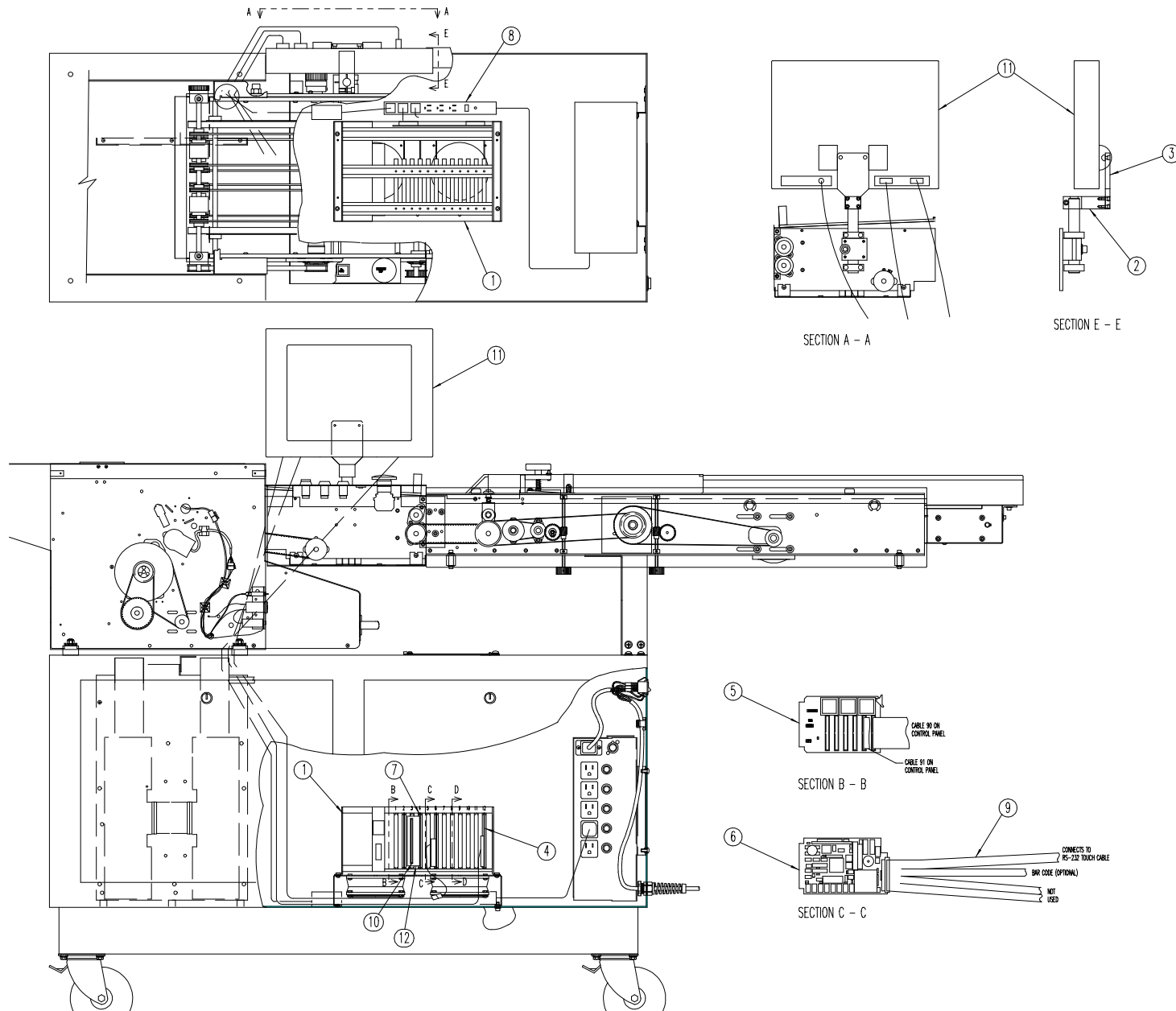
002D-08156 (REV F), KEYBOARD ASSEMBLY



002D-08156 (rev F), 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

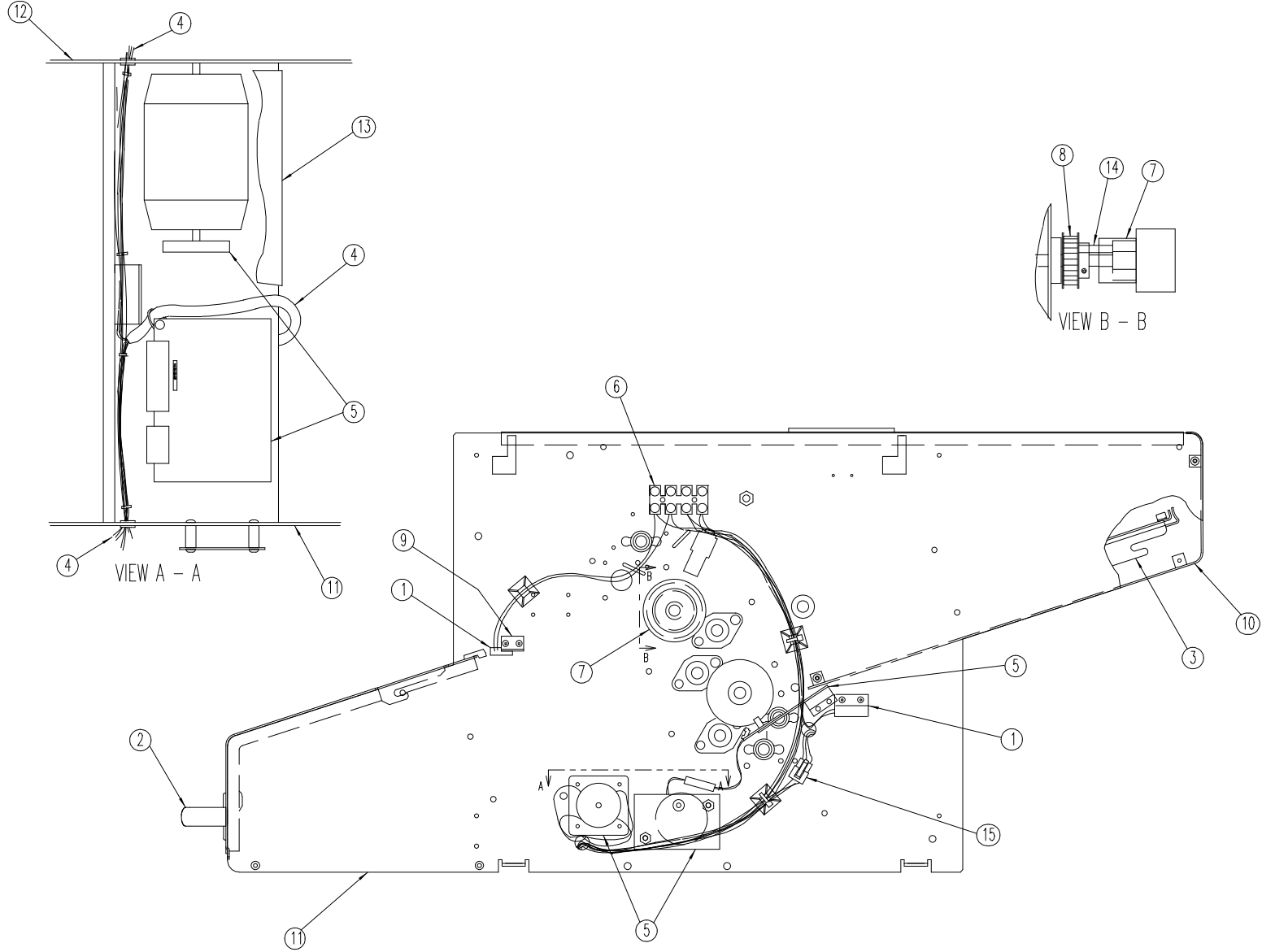
709-27961-500 (REV A), TOUCHSCREEN-CARDCAGE



709-27961-500 (rev A), TOUCHSCREEN-CARDCAGE

INDEX	PART NUMBER	DESCRIPTION
1	005-28206-500	CARDCAGE ASSEMBLY
	027-4C550	SQUARE FAN ONLY
	042-27817-000	CARD CAGE ONLY
	046-28265-500	LINE CORD ONLY
2	007-26895-600	MOUNT BLOCK,TOUCHSCREEN
3	007-26896-600	MOUNT BRACKET
4	042-26746-000	CONTROLLER,VGA & FLAT PANEL
5	042-26750-500	I/O 144 BOARD
6	042-26932-500	CPU CIRCUIT BOARD
7	042-27818-000	FLOPPY MOUNT KIT
8	067-27281-000	6 OUTLET SURGE SUPPRESSOR
9	526-26749-000	MULTI-PURPOSE CABLE
10	605-26412-400	SOFTWARE
11	709-26744-000	LCD TOUCH MONITOR
12	710-26743-000	DRIVE,3.5 FLOPPY,1.4 MB

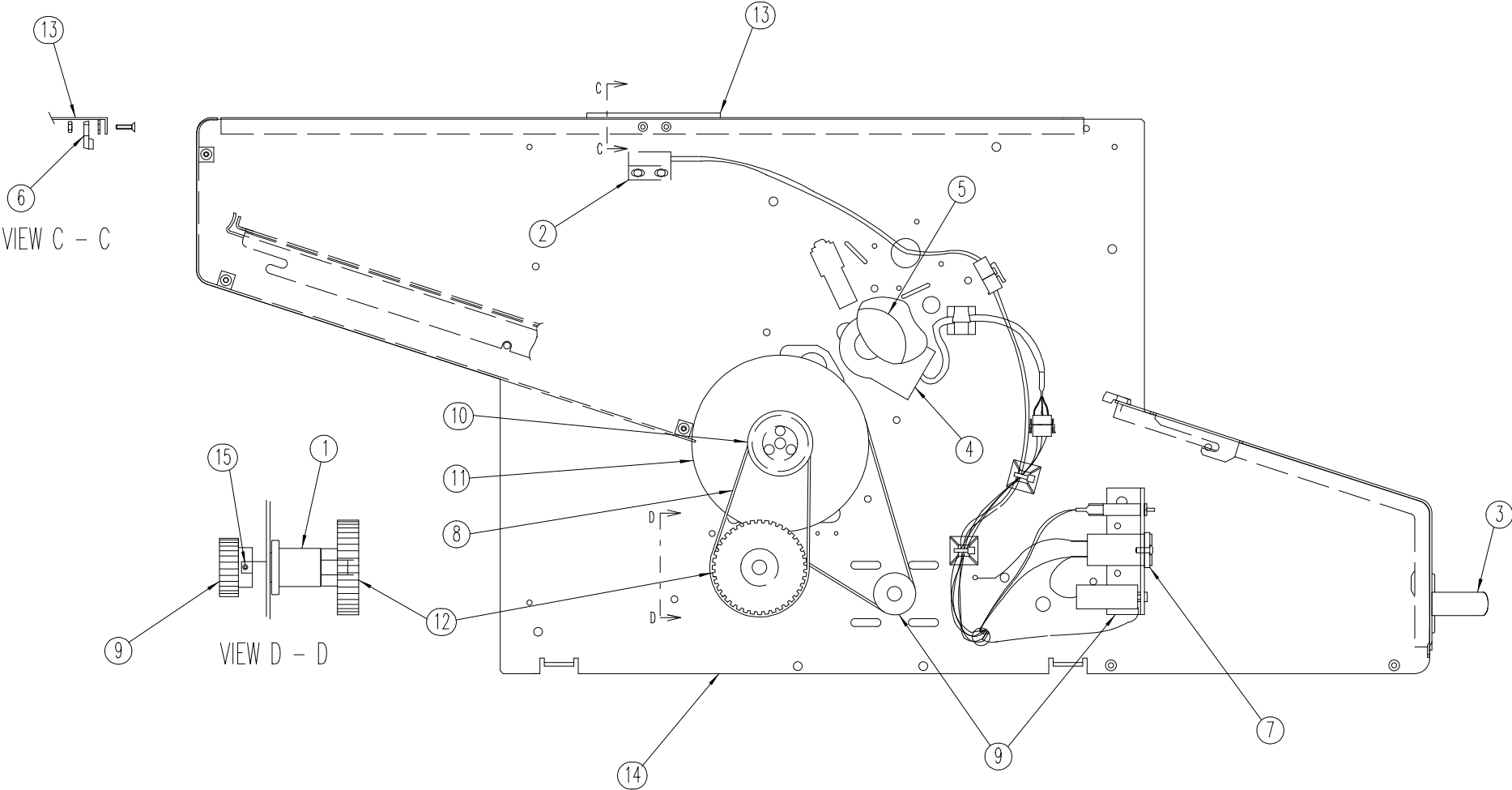
002D-19048 (REV J), FOLDER ASSEMBLY, PAGE 1



002D-19048 (rev J), 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	186-035700356	354 FOLDER PARTS FROM M.B.
6	600A-17923	TERMINAL BLOCK
7	600A-19002	HANDWHEEL MOD
8	600A-19003	PULLEY
9	600A-19083	BRACKET
10	600C-17931	FOLDER PANEL
11	600C-17851	RIGHT SIDE FRAME
12	600C-17954	LEFT SIDE FRAME
13	600B-17773	ELECTRICAL COVER
14	018-12501500	DOWEL PIN
15	039-39014030	RECEPTACLE 3 POS.

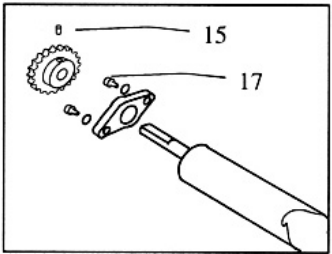
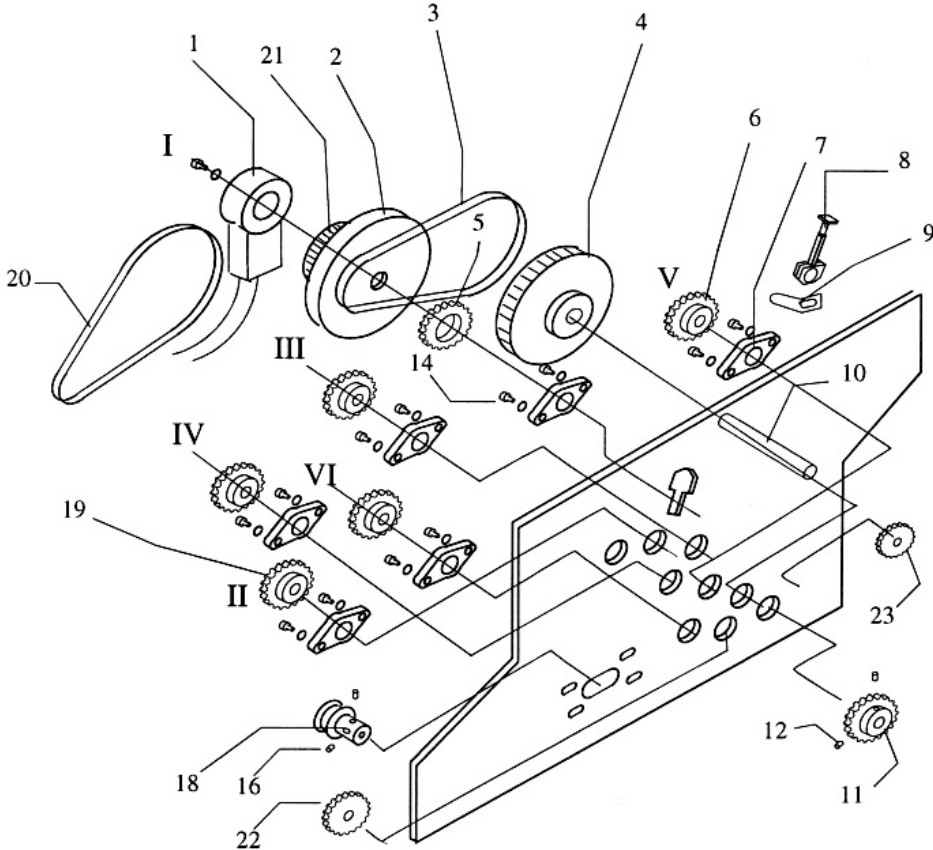
002D-19048 (REV J), FOLDER ASSEMBLY, PAGE 2



002D-19048 (rev J), FOLDER ASSEMBLY, page 2

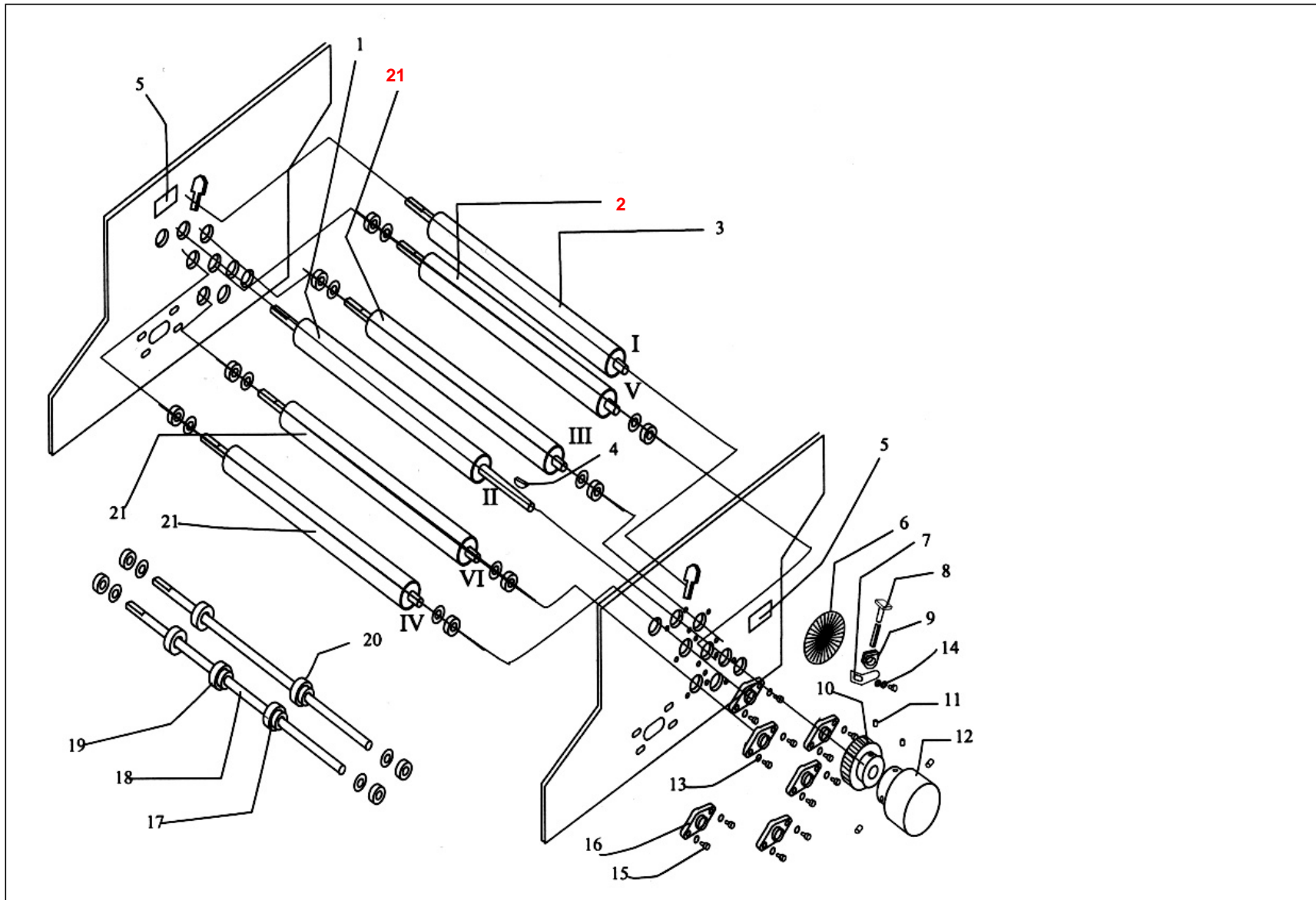
INDEX	PART NUMBER	DESCRIPTION
1	002A-23467	SHAFT
2	002B-08569	INTERLOCK
3	002C-17912	FRONT COVER
4	002B-08630	ENCODER
5	186-032017722	ROLLER
6	041-35701	MAGNET
7	050-83510590	FILTER
8	113-200130037	BELT,TIMING
9	186-035700356	354 FOLDER PARTS FROM MB
10	600A-17792	PULLEY
11	186-031025148	PULLEY
12	600A-17794	PULLEY
13	600B-18194	TOP COVER
14	600C-17954	LEFT SIDE FRAME
15	014-M0451105	SHSS,CUP POINT,M4 X 5MM

002D-19048 (REV J), FOLDER ASSEMBLY, PAGE 3



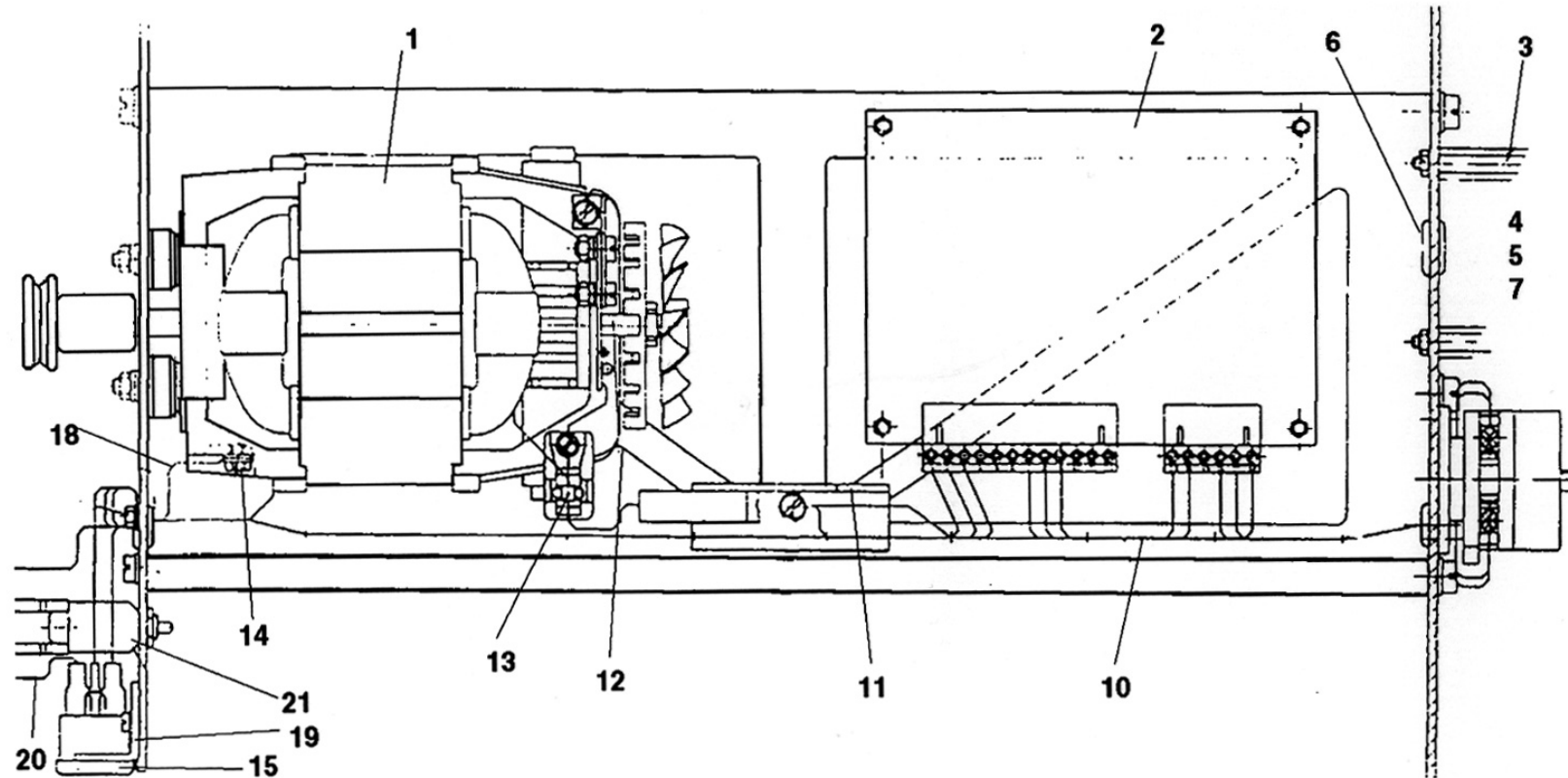
002D-19048 (rev J), FOLDER ASSEMBLY, page 3

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	ROLLER CAM
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	186-032012563	PULLEY
19	186-034006465	GEAR
20	186-031033015	"V" BELT
21	600A-17792	PULLEY
22	186-034004415	GEAR
23	186-034005622	IDLER GEAR



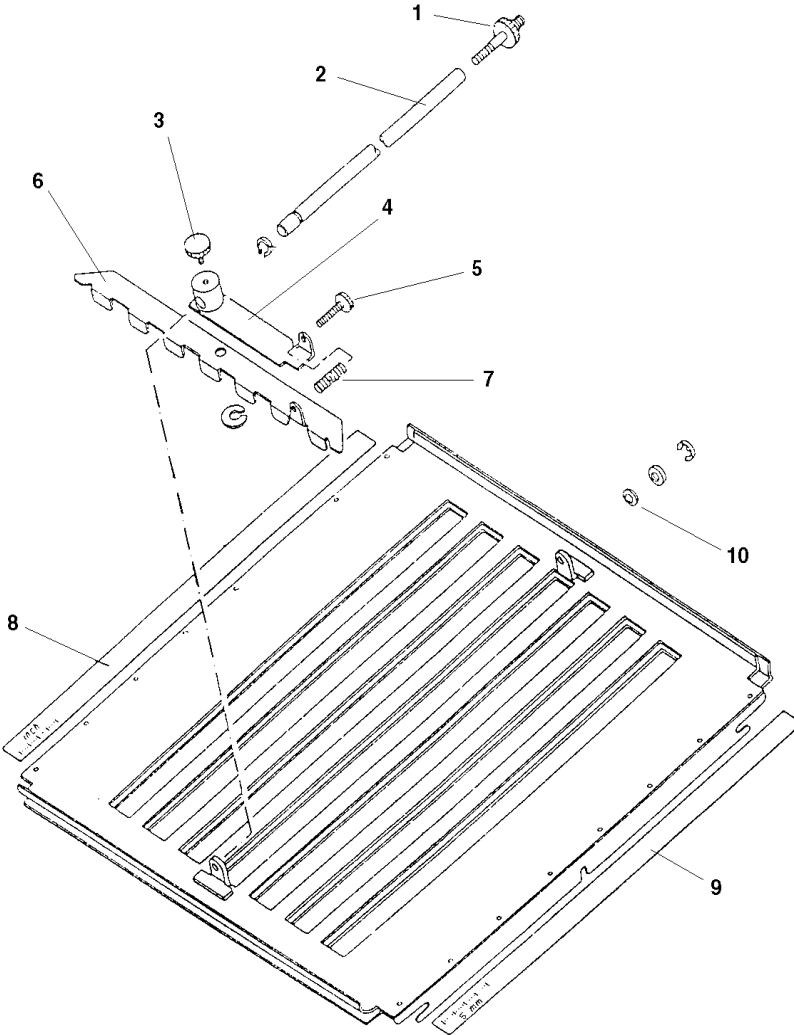
002D-19048 (rev J), FOLDER ASSEMBLY, page 4

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	186-033500274	TRANSPORT ROLLER
20	186-033500515	TRANSPORT ROLLER
21	186-034001919	ROLLER 3,4, and 6



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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



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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

NOTES:

**SECTION I OUTPUT DEVICES PARTS(PRIOR
TO FEEDER SN 05110256 & FOLDER SN 05110247)**

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002D-17812 (rev R), TRANSPORT CONVEYOR, page 2..... 60

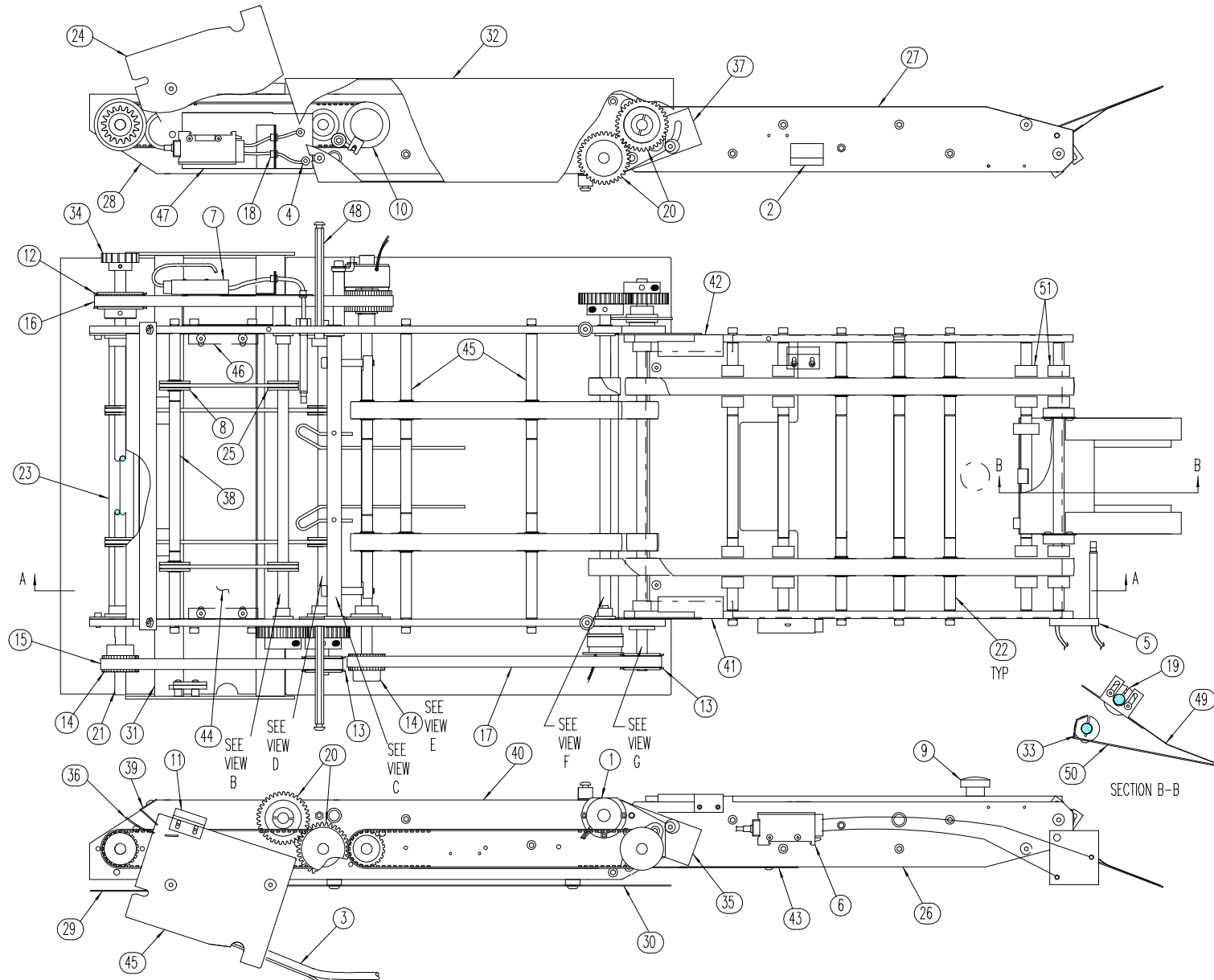
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002D-18652 (rev H), 11” TRANSPORT CONVEYOR, page 2 64

002E-19056 (rev B), STRAIGHT CONVEYOR, page 1..... 66

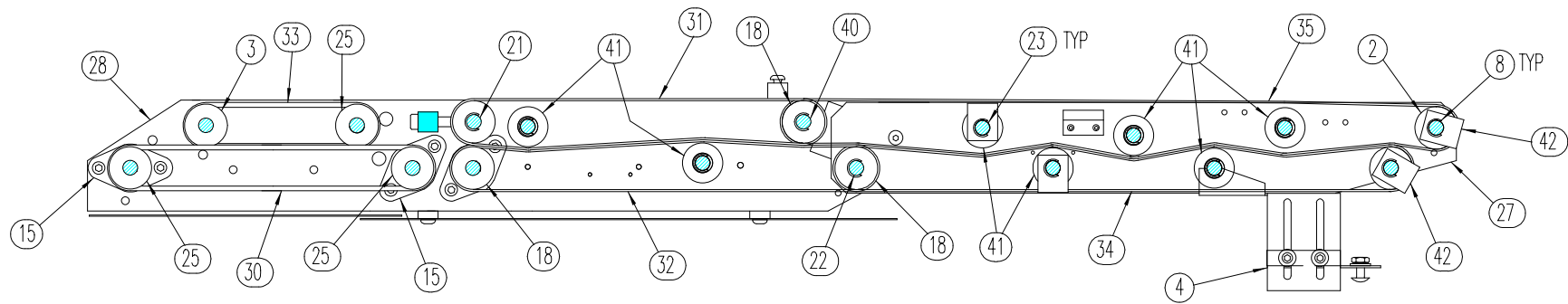
002E-19056 (rev B), STRAIGHT CONVEYOR, page 2..... 68

002D-17812 (REV R), TRANSPORT CONVEYOR, PAGE 1

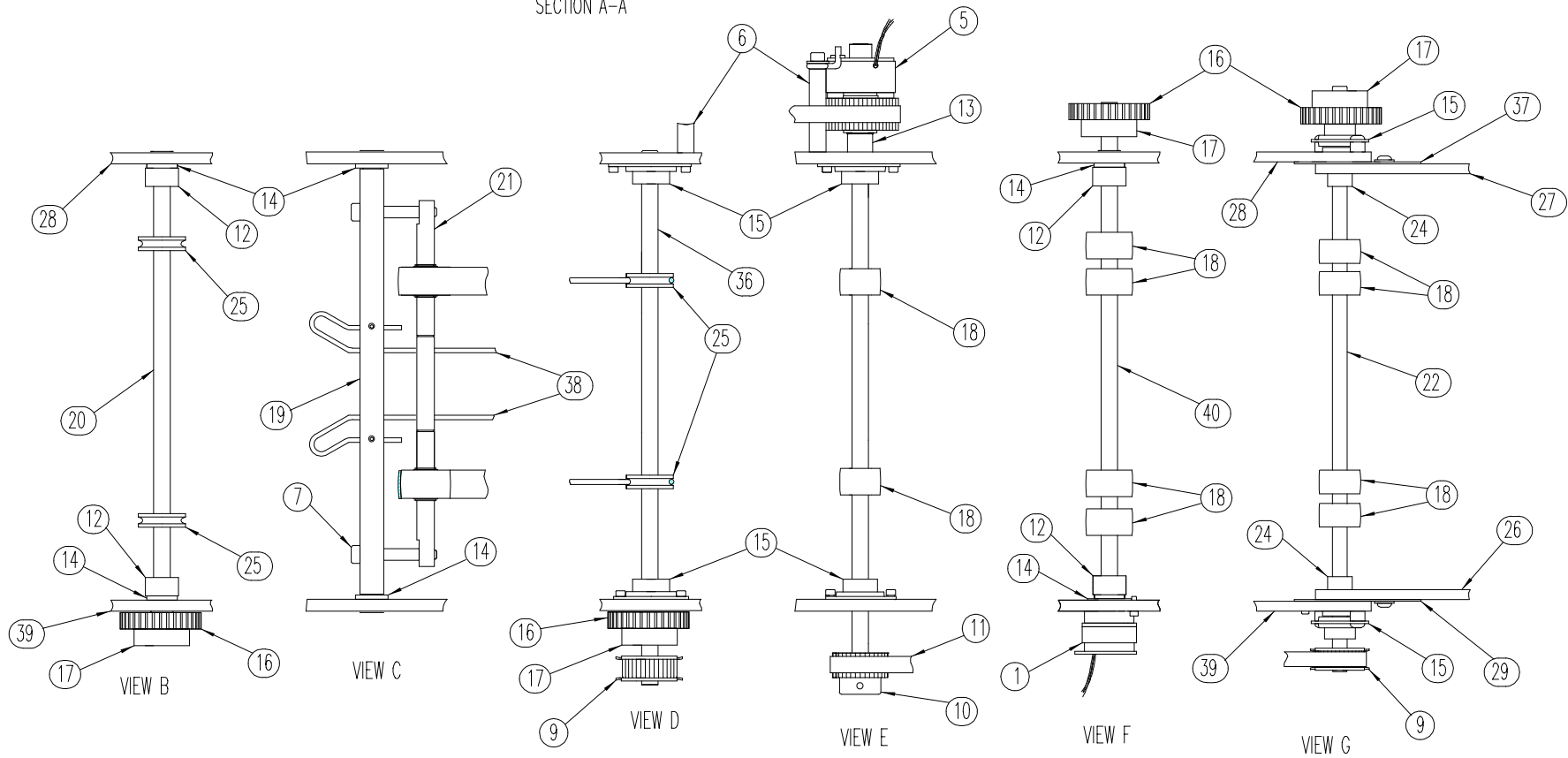


002D-17812 (rev R), TRANSPORT CONVEYOR, page 1

INDEX	PART NUMBER	DESCRIPTION			
1	002B-08408	BRAKE	26	600C-17708	RIGHT RAIL
2	002B-08413	MAGNETIC EXTENSION	27	600C-17709	LEFT RAIL
3	002D-08434	TRANSPORT CONVEYOR ELECT.	28	600D-17724	LEFT SIDE PLATE
4	002B-08457	CENTER SENSOR	29	600B-17725	CONVEYOR SHIELD
5	002B-08463	END SENSOR	30	600C-17728	CONVEYOR SHIELD
6	002B-08486	DISCHARGE SENSOR	31	600B-17729	SUPPORT BAR
7	002B-08487	PACKAGE PRESSURE SENSOR	32	600C-17732	COVER
8	002A-18044	PULLEY	33	600A-17733	COLLAR
9	002C-18243	CONVEYOR COVER	34	600A-17734	GEAR
10	002B-18850	CLUTCH/SHAFT ASSEMBLY	35	600A-17735	RIGHT PIVOT STOP
	002B-08409	CLUTCH ONLY	36	600B-17737	INFEED GUIDE
	600B-18620	SHAFT ONLY	37	600A-17785	LEFT PIVOT STOP
11	041-35701	INTERLOCK MAGNET	38	600A-17829	SHAFT
12	112-200DBA25637	PULLEY,TIMING,25T	39	600B-17882	INFEED GUIDE
13	112-S6A320H3712	PULLEY,TIMING,20T	40	600D-18035	RIGHT SIDE PLATE
14	112-S6A320NF037	PULLEY,TIMING,20T	41	600B-18108	RIGHT HINGE
15	113-200180037	BELT,TIMING	42	600B-18109	LEFT HINGE
16	113-200220037	BELT,TIMING	43	600C-18140	SHIELD
17	113-200230037	BELT,TIMING	44	600B-18540	PLATE
18	152-B187125	BUSHING,NYLON	45	600B-18567	SHAFT
19	600A-16342-001	CLAMP COLLAR	46	600A-18568	MOUNT BLOCK
20	600A-16349-031	GEAR,PLASTIC SPUR	47	600B-19011	MOUNT BRACKET
21	600B-17684	CONVEYOR DRIVE SHAFT	48	600A-19061	STANDOFF
22	600B-17693	SHAFT	49	600B-19304	UPPER EXIT GUIDE
23	600B-17694	SHAFT	50	600B-19305	LOWER EXIT GUIDE
24	600B-17695	CONVEYOR SUPPORT	51	144-27936-600	GUIDE, BELT
25	600A-17700	DRIVE PULLEY			



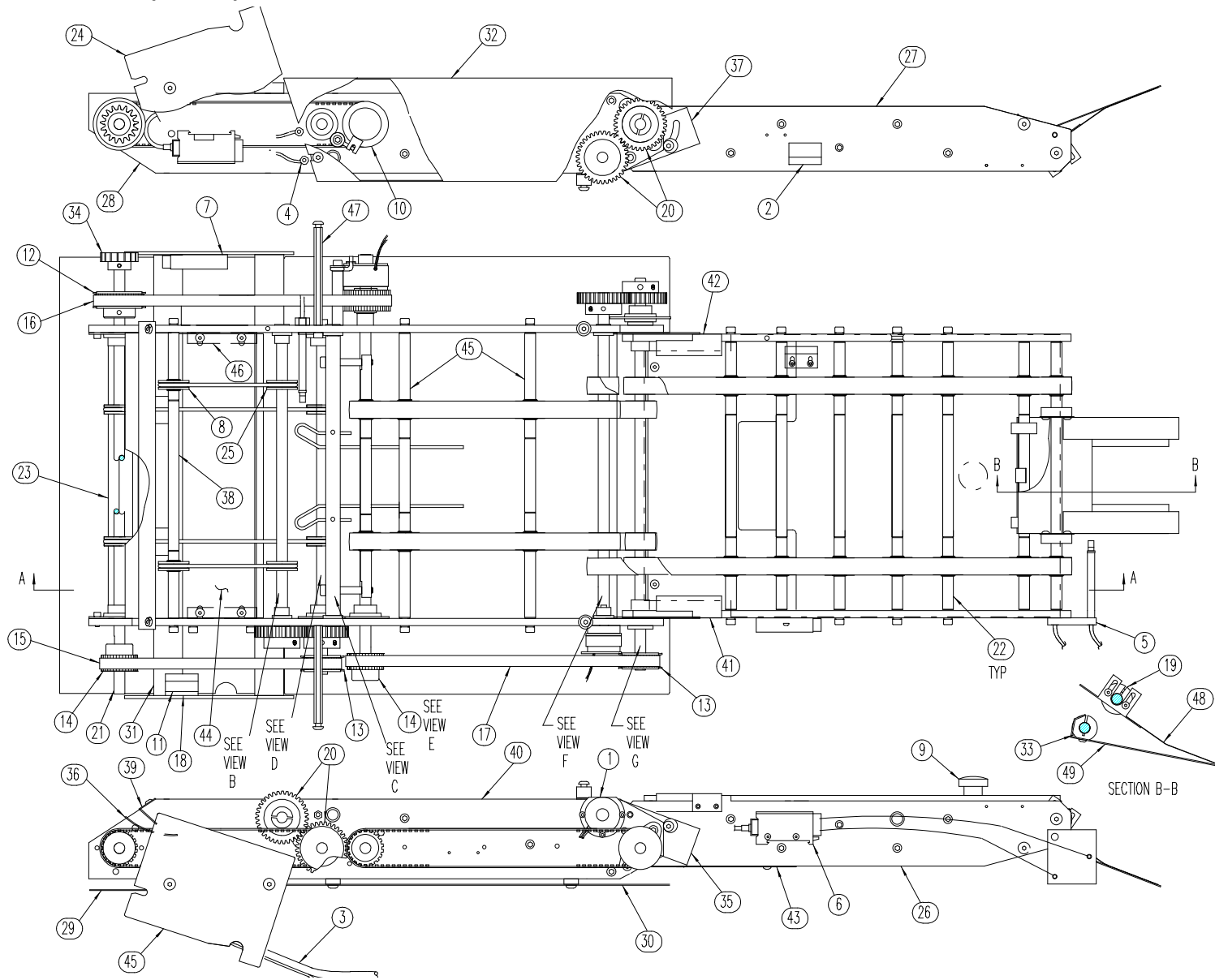
SECTION A-A



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INDEX	PART NUMBER	DESCRIPTION			
			21	600B-17689	NIP ROLLER IDLER
1	002B-08408	BRAKE	22	600B-17691	SHAFT, IDLER
2	002A-17309	IDLER ROLLER	23	600B-17693	SHAFT
3	002A-18044	PULLEY	24	600A-17697	BEARING
4	002B-18366	CONVEYOR DOCKING PORT	25	600A-17700	DRIVE PULLEY
5	002B-18850	CLUTCH/SHAFT ASSEMBLY	26	600C-17708	RIGHT RAIL SUPPORT
	002B-08409	CLUTCH ONLY	27	600C-17709	LEFT RAIL SUPPORT
	600B-18620	SHAFT ONLY	28	600D-17724	LEFT SIDE PLATE
6	002A-19600	HOOK ASSEMBLY	29	600A-17735	RIGHT PIVOT STOP
7	014-S91264A249	SHOULDER BOLT	30	600B-17743	LOWER CONVEYOR BELT
8	019-200037	"E" RING	31	600B-17744	UPPER IDLER BELT
9	112-S6A320H3712	PULLEY, TIMING, 20T	32	600B-17745	LOWER NIP DRIVE BELT
10	112-S6A320NF037	PULLEY, TIMING, 20T	33	600A-17742	UPPER CONVEYOR BELT
11	113-200230037	BELT, TIMING	34	600B-17746	LOWER EXIT BELT
12	126-SC37	SET SCREW COLLAR	35	600B-17747	UPPER EXIT BELT
13	152-B694	PLAIN BEARING	36	600B-17780	DRIVE SHAFT
14	153-FB683	FLANGE BEARING	37	600A-17785	LEFT PIVOT STOP
15	158-S3PPB5ST	RADIAL BEARING	38	600B-17888	PAPER GUIDE
16	600A-16349-031	GEAR, PLASTIC SPUR	39	600D-18035	RIGHT SIDE PLATE
17	600A-16349-034	HUB CLAMP	40	600B-18621	SHAFT
18	600A-17224	DRIVE ROLLER	41	177-27369-500	IDLER ROLLER
19	600B-17683	NIP WHEEL PIVOT BAR	42	144-27936-600	GUIDE, BELT
20	600B-17688	UPPER DRIVE SHAFT			

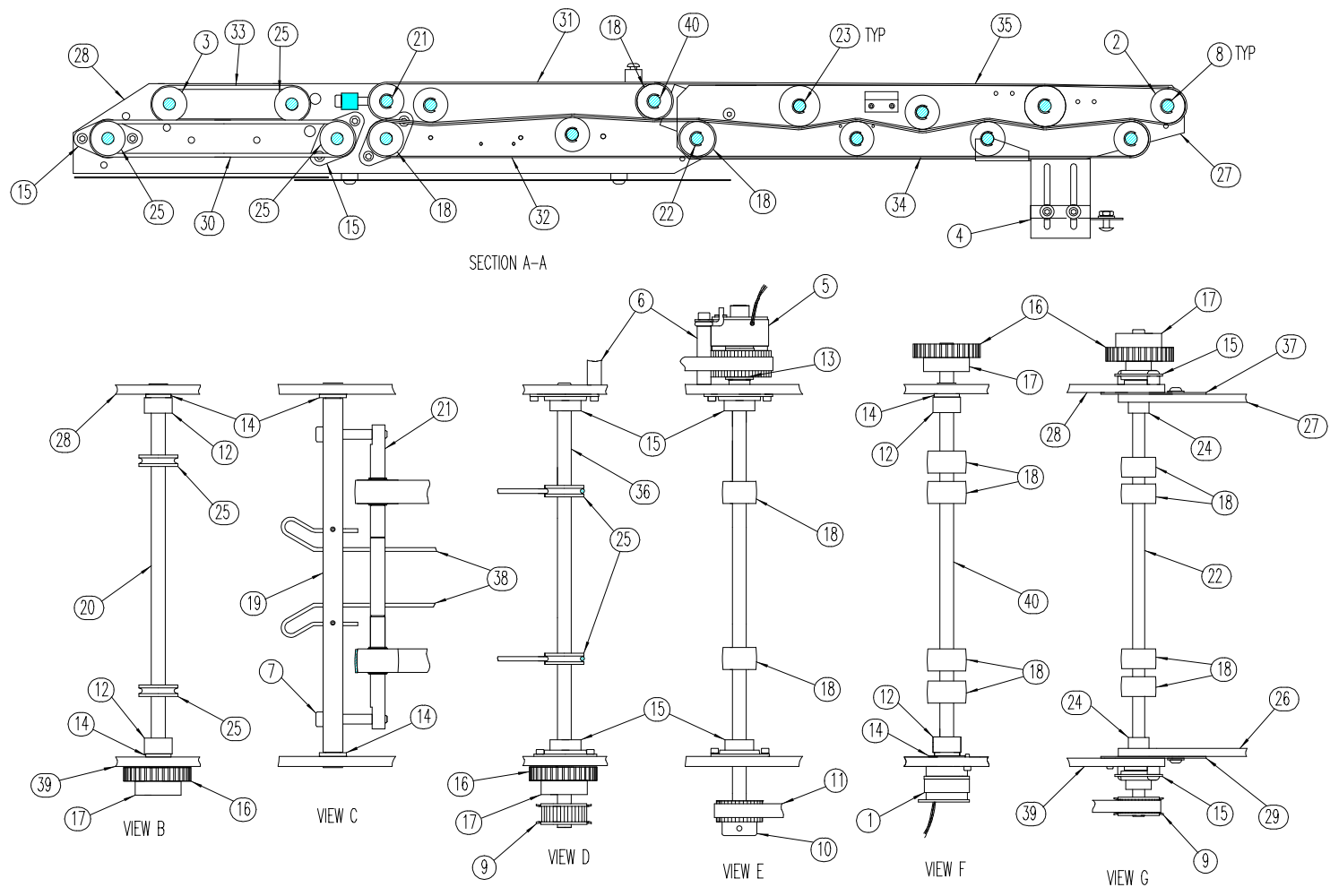
002D-18652 (REV H), 11" TRANSPORT CONVEYOR, PAGE 1



002D-18652 (rev H), 11" TRANSPORT CONVEYOR, page 1

INDEX	PART NUMBER	DESCRIPTION			
			25	600A-17700	DRIVE PULLEY
1	002B-08408	BRAKE	26	600C-17708	RIGHT RAIL
2	002B-08413	MAGNETIC EXTENSION	27	600C-17709	LEFT RAIL
3	002D-08434	TRANSPORT CONVEYOR ELECT.	28	600D-17724	LEFT SIDE PLATE
4	002B-08457	CENTER SENSOR	29	600B-18634	CONVEYOR SHIELD
5	002B-08463	END SENSOR	30	600C-18633	CONVEYOR SHIELD
6	002B-08486	DISCHARGE SENSOR	31	600B-18647	SUPPORT BAR
7	002B-08487	PACKAGE PRESSURE SENSOR	32	600E-18632	COVER
8	002A-18044	PULLEY	33	600A-17733	COLLAR
9	002C-18717	CONVEYOR COVER	34	600A-17734	GEAR
10	002B-19599	CLUTCH/SHAFT ASSEMBLY	35	600A-17735	RIGHT PIVOT STOP
	002B-08409	CLUTCH ONLY	36	600B-18637	INFEED GUIDE
	600B-18635	SHAFT ONLY	37	600A-17785	LEFT PIVOT STOP
11	041-35701	INTERLOCK MAGNET	38	600A-18639	SHAFT
12	112-200DOA25637	PULLEY,TIMING,25T	39	600B-18702	INFEED GUIDE
13	112-S6A320H3712	PULLEY,TIMING,20T	40	600D-18035	RIGHT SIDE PLATE
14	112-S6A320NF037	PULLEY,TIMING,20T	41	600B-18108	RIGHT HINGE
15	113-200180037	BELT,TIMING	42	600B-18109	LEFT HINGE
16	113-200220037	BELT,TIMING	43	600C-18716	SHIELD
17	113-200230037	BELT,TIMING	44	600B-18636	PLATE
18	600A-18654	SENSOR BRACKET	45	600B-18640	SHAFT
19	600A-16342-001	CLAMP COLLAR	46	600A-18568	MOUNT BLOCK
20	600A-16349-031	GEAR,PLASTIC SPUR	47	020-HS31020830	STANDOFF
21	600B-18644	CONVEYOR DRIVE SHAFT	48	600B-19304	UPPER EXIT GUIDE
22	600B-18649	SHAFT	49	600B-19305	LOWER EXIT GUIDE
23	600B-18646	SHAFT			
24	600B-17695	CONVEYOR SUPPORT			

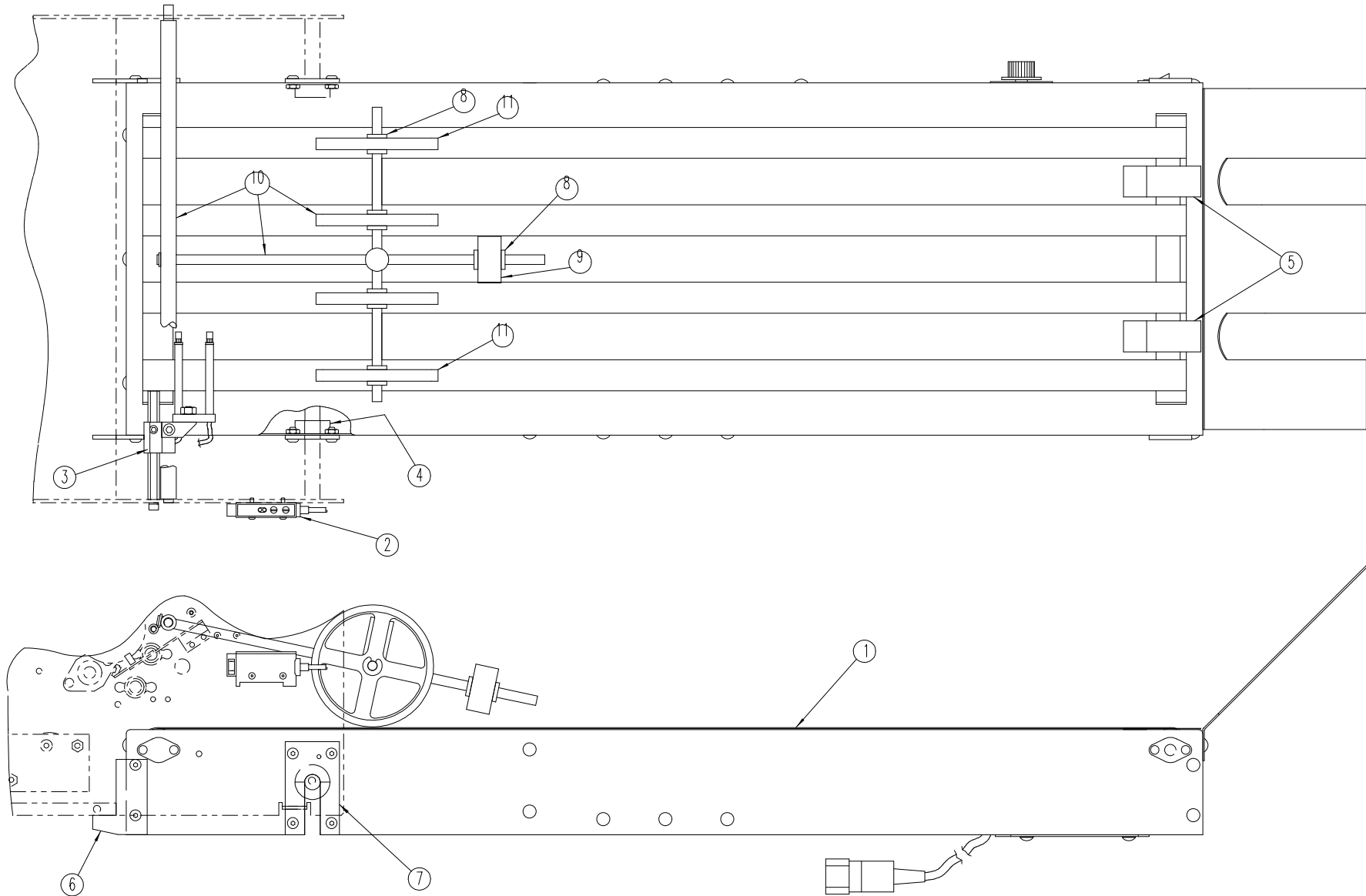
002D-18652 (REV H), 11" TRANSPORT CONVEYOR, PAGE 2



002D-18652 (rev H), 11" TRANSPORT CONVEYOR, page 2

INDEX	PART NUMBER	DESCRIPTION			
			20	600B-18650	UPPER DRIVE SHAFT
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			

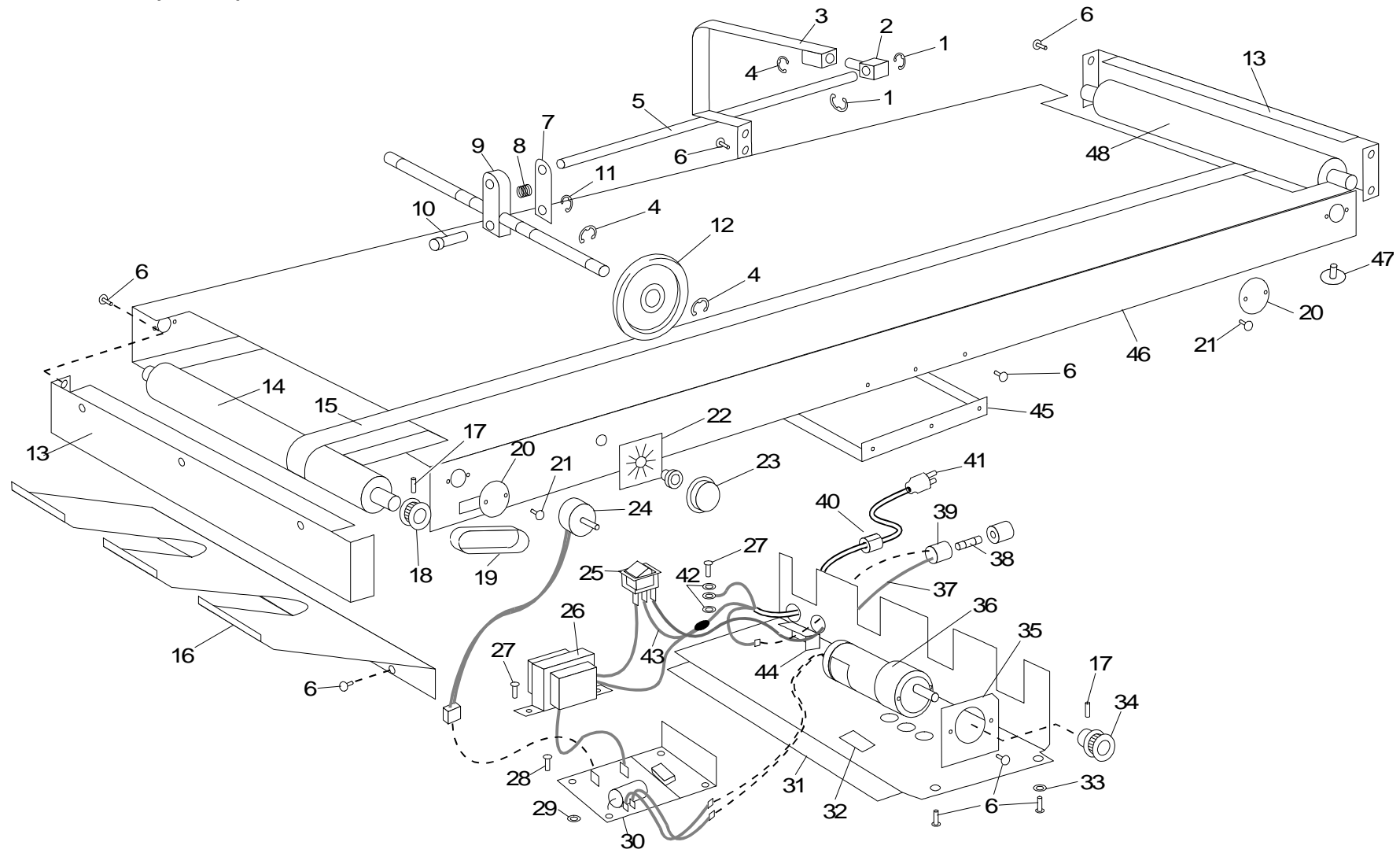
002E-19056 (REV B), STRAIGHT CONVEYOR, PAGE 1



002E-19056 (rev B), 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 REINFORCMENT BLOCK
8	186-031027342	CLAMP RING CLIP
9	186-032012468	ROLLER WEIGHT
10	186-034001925	STACKING WHEEL ASSEMBLY
11	186-031017384	PRESSURE WHEEL

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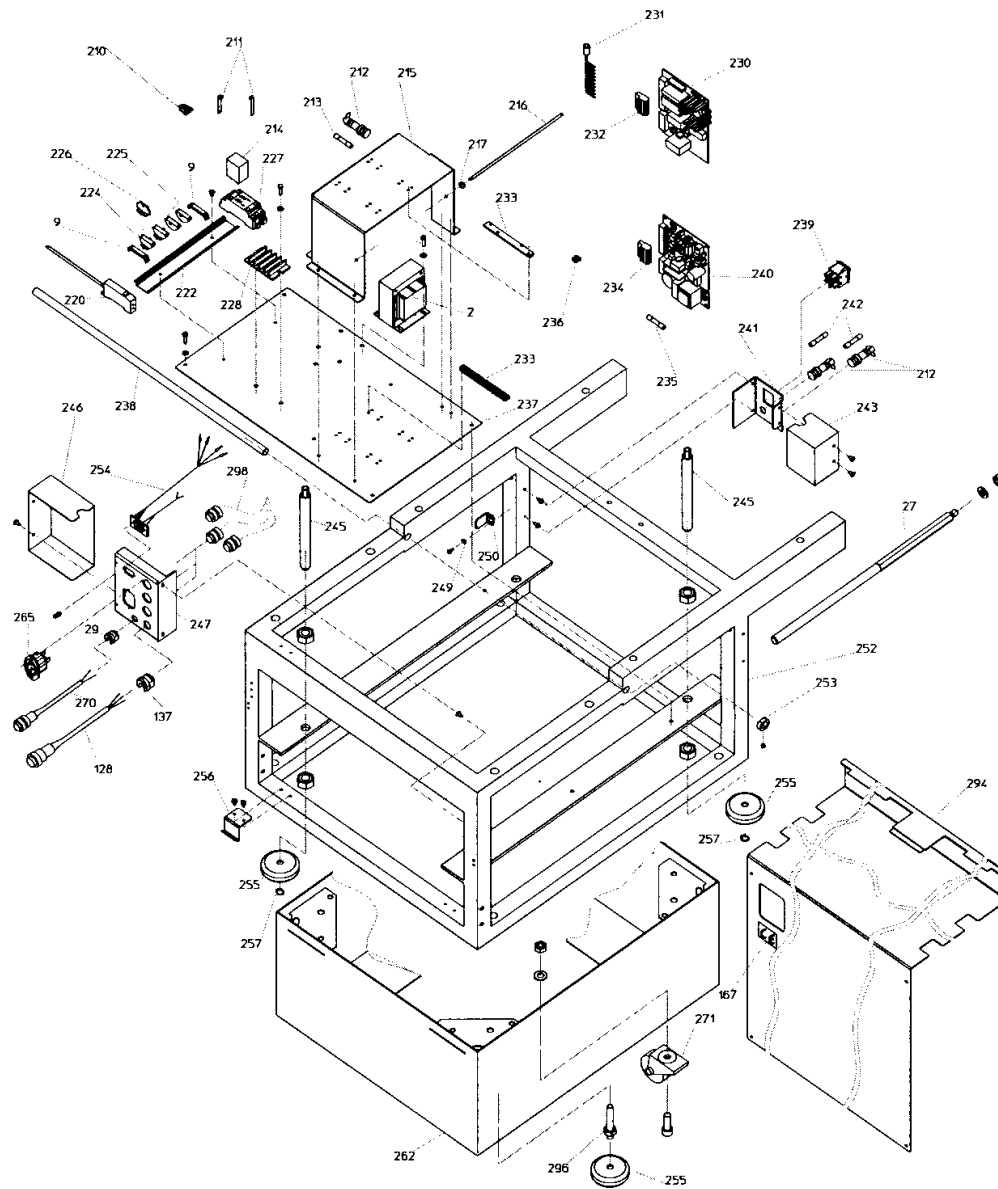
002E-19056 (rev B), STRAIGHT CONVEYOR, page 2

INDEX	PART NUMBER	DESCRIPTION			
			27	186-37123612	SCREW,#6-32 X .25
1	186-37123432	C-CLIP	28	186-37123614	SCREW,#6-32 X .50
2	186-37CD30013	PIVOT,STACKER WHEEL ROD	29	186-37123299	SPACER
3	186-37CD30014	BAIL WELDMENT	30	186-3790100500	P.C. BOARD
4	186-37123081	C-CLIP		186-379010050	P.C. BOARD (before s/n 51284)
5	186-37CD30011	ROD,STACKER WHEEL	31	186-37CD40105	ELECTRICAL CABINET
6	186-37123017	SCREW,#10-32 X .25		186-37CD40005	ELECT. CAB. (before s/n 51284)
7	186-37CD30059	CLAMP PLATE	32	186-37123607	WIRE CLAMP
8	186-377112009	SPRING	33	186-37123237	STAR WASHER,#10
9	186-375050056	STACKER WHEEL PIVOT ASM	34	186-37123601	MOTOR PULLEY,14XL
10	186-37CD30061	PIN	35	186-37CD30106	MOTOR BRACKET
11	186-37123080	C-CLIP,.187		186-37CD30006	MOTOR BRKT(before s/n 51284)
12	186-37CD30021	STACKER WHEEL	36	186-37123913	MOTOR
13	186-37CD40006A	BODY CLOSURE		186-37CD40118	MOTOR ASSEMBLY
14	186-375050040A	DRIVE ROLLER		186-37123690	MOTOR(before s/n 51284)
15	186-37123309	CONVEYOR TAPE		186-37CD40018	MOTOR ASM(before s/n 51284)
16	186-37CD30017A	RECEIVING TRAY	37	186-37CD30023	WIRE HARNESS,FUSE SWITCH
17	186-37123036	ROLL PIN	38	186-37123680	FUSE,.5A,250V(115V,60HZ)
18	186-37123102	PULLEY		186-37123725	FUSE,.25A,250V(115V,50HZ)
19	186-37123139	TIMING BELT	39	186-37123089	FUSE HOLDER
20	186-379010352	BEARING HOUSING ASSEMBLY	40	186-37123301	STRAIN RELIEF
21	186-37123275	SCREW,#6-32 X .25	41	186-37CD30025	POWER CORD
22	186-37123305	INDICATOR PLATE	42	186-37CD30032	FUSE SHIELD
23	186-37123314	KNOB	43	186-37123252	STAR WASHER,#6
24	186-37CD30120	POTENTIOMETER ASSEMBLY	44	186-37CD30022	WIRE HARNESS,TRANS. SWITCH
	186-37CD30020	POT. ASM (before s/n 51284)	45	186-37CD40009	CENTER SUPPORT
25	186-37123664	POWER SWITCH	46	186-37CD40003A	CONVEYOR BODY
26	186-37CD30130	TRANSFORMER,115V,60HZ	47	186-37123620	RUBBER FOOT(table top model)
	186-37CD30030	TRANS.,115V(before s/n 51284)	48	186-375050041	IDLER ROLLER
	186-37CD30140	TRANSFORMER,220V,50HZ			
	186-37CD30040	TRANS.,220V(before s/n 51284)			

NOTES:

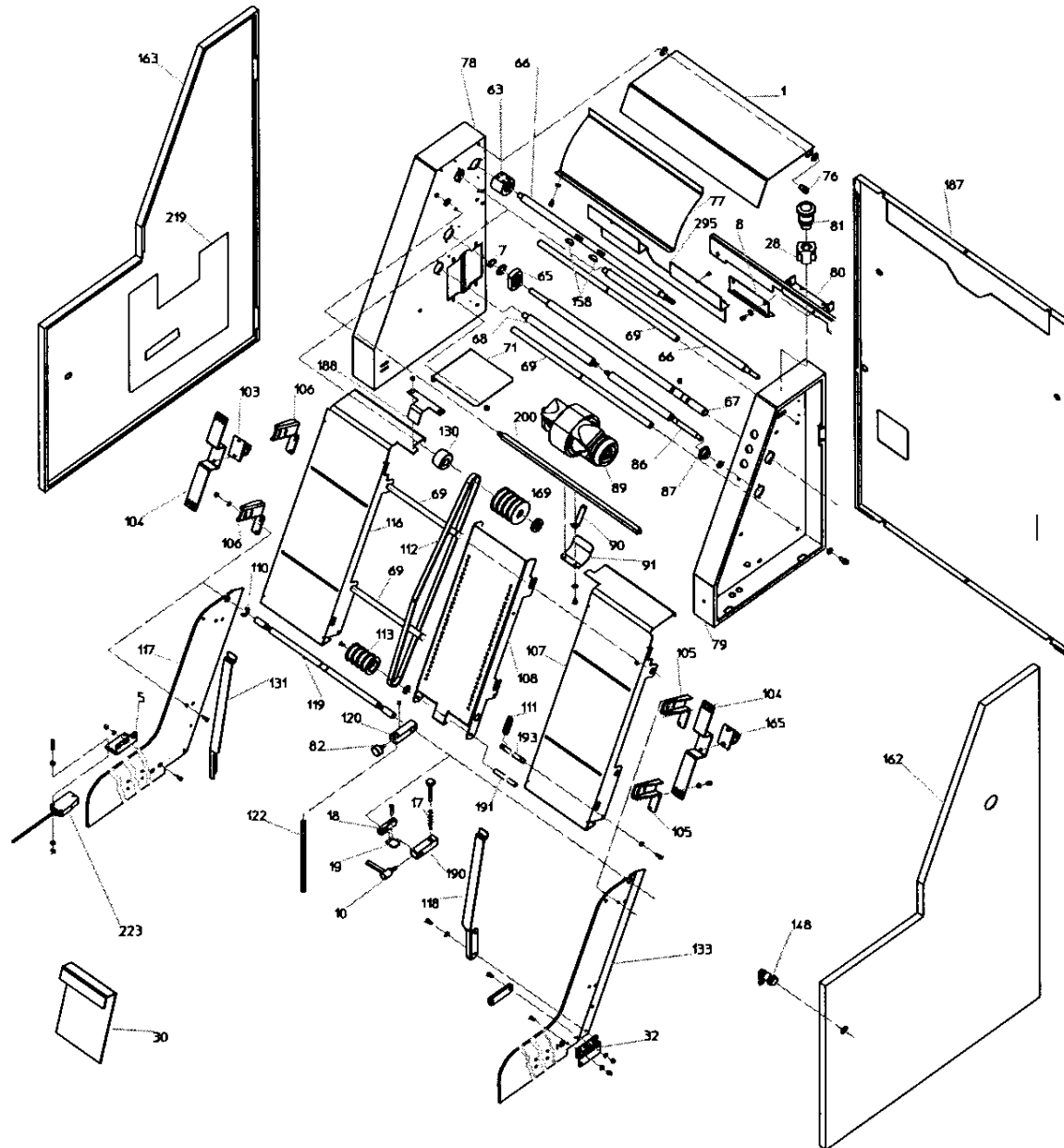
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186-035700628, 3208 DOCUMENT LOADER, page 5	80
186-035700628, 3208 DOCUMENT LOADER, page 6	82
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186-035700628, 3208 DOCUMENT LOADER, page 8	86
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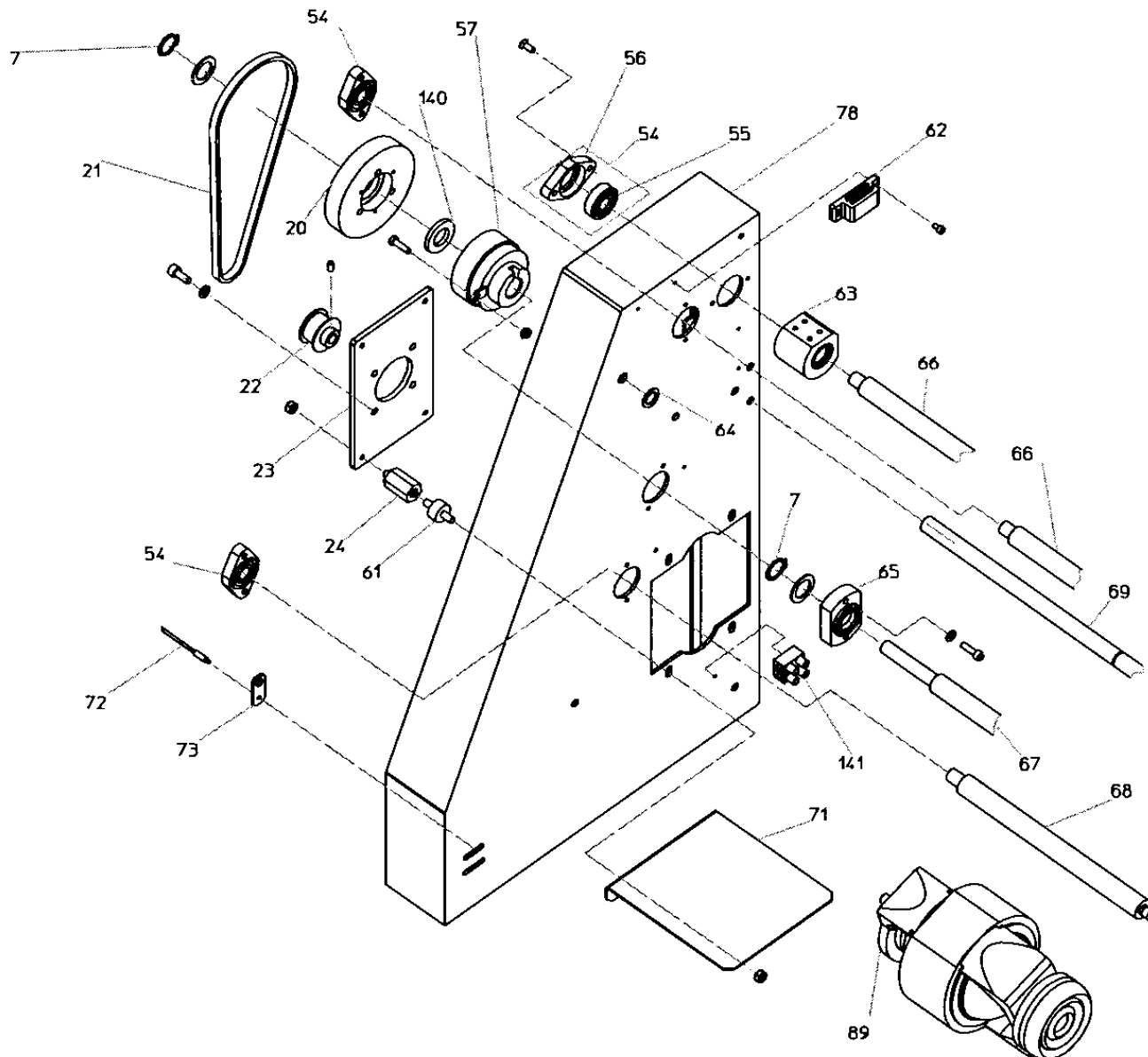
INDEX	PART NUMBER	DESCRIPTION			
2	186-031029937	TRANSFORMER	236	186-031030174	FLANGE
9	186-031030173	FOOT	237	186-034005038	PLATE
27	186-032016384	THREADED ROD	238	186-032017107	SHAFT
128	186-034007301	CONNECTING ROD	239	186-031029559	TOGGLE SWITCH
137	186-031029251	GROMMET	240	186-034004419	SPEED CONTROL PCD
210	186-034004784	PROTECTIVE DIODE	241	186-032028084	BRACKET
211	186-031030102	BRACKET	242	186-031030192	FUSE
212	186-031030195	FUSE HOLDER	243	186-032028166	COVER
	186-031030196	TWIST-ON CAP	245	186-032041179	STUD
213	186-031180006	FUSE	246	186-032029960	COVER
214	186-031030100	RELAY	247	186-032029940	BRACKET
215	186-032028106	BRACKET	249	186-031131003	C-CLIP
216	186-032017088	SHAFT	250	186-032028141	BRACKET
217	186-033003544	RUBBER GROMMET	252	186-034006689	BASE
220	186-031030456	FOTO SWITCH	253	186-032012619	COLLAR
222	186-032030230	MOUNTING RAIL	254	186-034006745	WIRING
224	186-031030170	4-TERMINAL BLOCK	255	186-034002003	FOOT
225	186-031030169	2-TERMINAL BLOCK	256	186-032028138	BRACKET
226	186-031030167	END PLATE	257	186-031110008	C-CLIP
227	186-031030101	BASE	262	186-034005042	HIGH FRAME
228	186-031030046	DISTRIBUTOR STRIP	265	186-031030194	SOCKET
230	186-034006679	CONTROL BOARD	270	186-034007335	WIRING
231	186-031030260	ENCODER PIN	271	186-031027437	CASTER
232	186-031029947	CONNECTING TERMINAL	294	186-032030148	COVER
233	186-031027190	BAR	296	186-032006249	HEXHEAD STUD
234	186-031030261	CONNECTING TERMINAL	298	186-034005121	WIRING
235	186-031029929	FUSE			



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INDEX	PART NUMBER	DESCRIPTION			
			104	186-032028100	BRACKET
1	186-034005899	CAP	105	186-032028086	RIGHT BRACKET
7	186-031110012	C-CLIP	106	186-032028087	LEFT BRACKET
8	186-032029683	PAPER GUIDE	107	186-032030682	RIGHT BRACKET
10	186-031027276	CLAMP LEVER	108	186-032029392	BRACKET
16	186-032041166	KNURLED SCREW	110	186-031133012	C-CLIP
17	186-031003016	COMPRESSION SPRING	111	186-031001032	EXTENSION SPRING
18	186-032051939	BRACKET	113	186-034005034	PULLEY
19	186-032023106	PLATE	116	186-032030683	LEFT BRACKET
28	186-031029906	CONTACTOR	117	186-032023003	RIGHT STOP
30	186-032028290	BRACKET	118	186-032029916	BRACKET
32	186-032028081	BRACKET	119	186-032017136	SHAFT
63	186-034005030	BEARING	120	186-032051974	BRACKET
65	186-034005029	BEARING FLANGE	122	186-032017753	SHAFT
66	186-032017092	SHAFT	130	186-032012684	PULLEY
67	186-032017095	SHAFT	131	186-032029915	BRACKET
68	186-032017091	LEFT SHAFT	133	186-032023004	LEFT STOP
69	186-032016969	SHAFT	148	186-031027449	LOCK
71	186-032028202	BRACKET	158	186-031135005	WOODRUFF KEY
76	186-032006604	CAM	162	186-034005896	RIGHT DOOR
77	186-034005031	PAPER GUIDE	163	186-034005897	LEFT DOOR
78	186-032028114	LEFT SIDE PLATE	165	186-031017504	BUSHING
79	186-032028113	RIGHT SIDE PLATE	169	186-032012686	PULLEY
80	186-032028316	BRACKET	187	186-034005898	COVER
81	186-031029904	MUSHROOM BUTTON	188	186-032029410	BRACKET
82	186-031027411	KNURLED SCREW	190	186-032051991	BRACKET
86	186-032017090	RIGHT SHAFT	191	186-032017483	SHAFT
87	186-031013058	SPROCKET	193	186-032017482	SHAFT
89	186-034005082	MOTOR	200	186-032051612	SHAFT
90	186-031007109	LEAF SPRING	219	186-032031253	BRACKET
91	186-032028288	PAPER GUIDE	223	186-034007169	FOTO DETECTOR
103	186-031017541	BUSHING	295	186-032028201	COVER

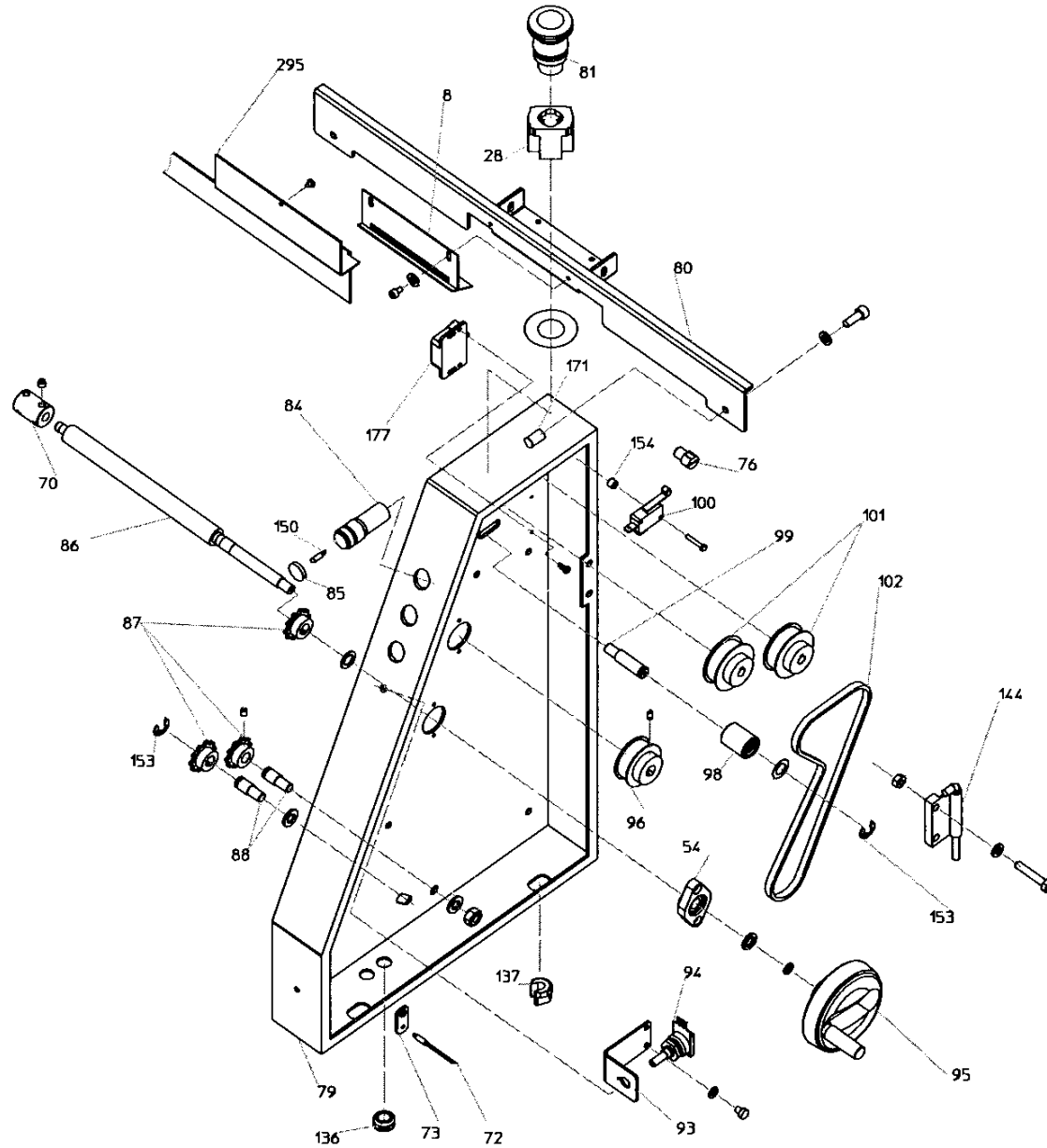
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INDEX	PART NUMBER	DESCRIPTION
7	186-031110012	C-CLIP
20	186-034005028	TIMING BELT PULLEY
21	186-031033006	TIMING BELT
22	186-034005025	TIMING BELT PULLEY
23	186-032022456	PLATE
24	186-032006293	STUD
54	186-034004539	BEARING
55	186-031112005	BEARING
56	186-031021063	FLANGE
57	186-031030249	CLUTCH
61	186-031037068	BUMPER
62	186-031027240	MAGNETIC LOCK
63	186-034005030	BEARING
65	186-034005029	BEARING FLANGE
66	186-032017092	SHAFT
67	186-032017095	SHAFT
68	186-032017091	LEFT SHAFT
69	186-032016969	SHAFT
71	186-032028202	BRACKET
72	186-031030457	FIBRE OPTICS
73	186-032022867	PLATE
78	186-032028114	LEFT SIDE PLATE
89	186-034005082	MOTOR
140	186-032012710	RING
141	186-031029206	TERMINAL STRIP

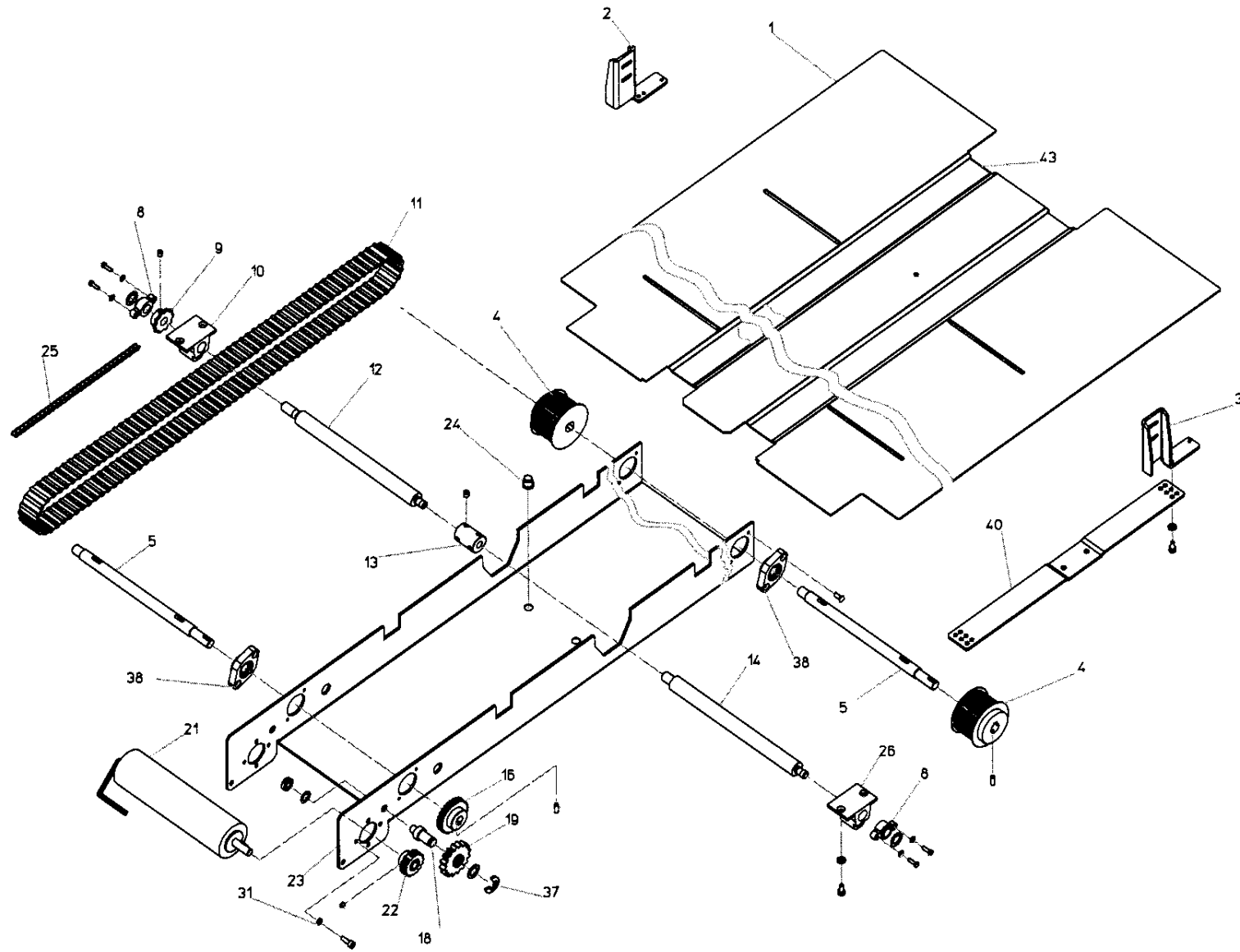
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INDEX	PART NUMBER	DESCRIPTION
8	186-032029683	PAPER GUIDE
28	186-031029906	CONTACTOR
54	186-034004539	BEARING
70	186-032001442	BUSHING
72	186-031030457	FIBRE OPTICS
73	186-032022867	PLATE
76	186-032006604	CAM
79	186-032028113	RIGHT SIDE PLATE
80	186-032028316	BRACKET
81	186-031029904	MUSHROOM BUTTON
84	186-031029244	ILLUMINATED PUSH BUTTON
85	186-031030294	CAP
86	186-032017090	RIGHT SHAFT
87	186-031013058	SPROCKET
88	186-032006591	STUD
93	186-032028137	BRACKET
94	186-031030141	POTENTIOMETER
95	186-031027441	HANDWHEEL
96	186-031027445	TIMING BELT PULLEY
98	186-034001367	ROLLER
99	186-032006185	STUD
100	186-031030717	MICROSWITCH
101	186-031027446	TIMING BELT PULLEY
102	186-031033005	TIMING BELT
136	186-031037061	GROMMET
137	186-031029251	GROMMET
144	186-031027448	HINGE
150	186-031029883	BULB
153	186-031133009	C-CLIP
154	186-031027343	BUSHING
171	186-031078013	NUT
177	186-031027409	DOOR CATCH
295	186-032028201	COVER

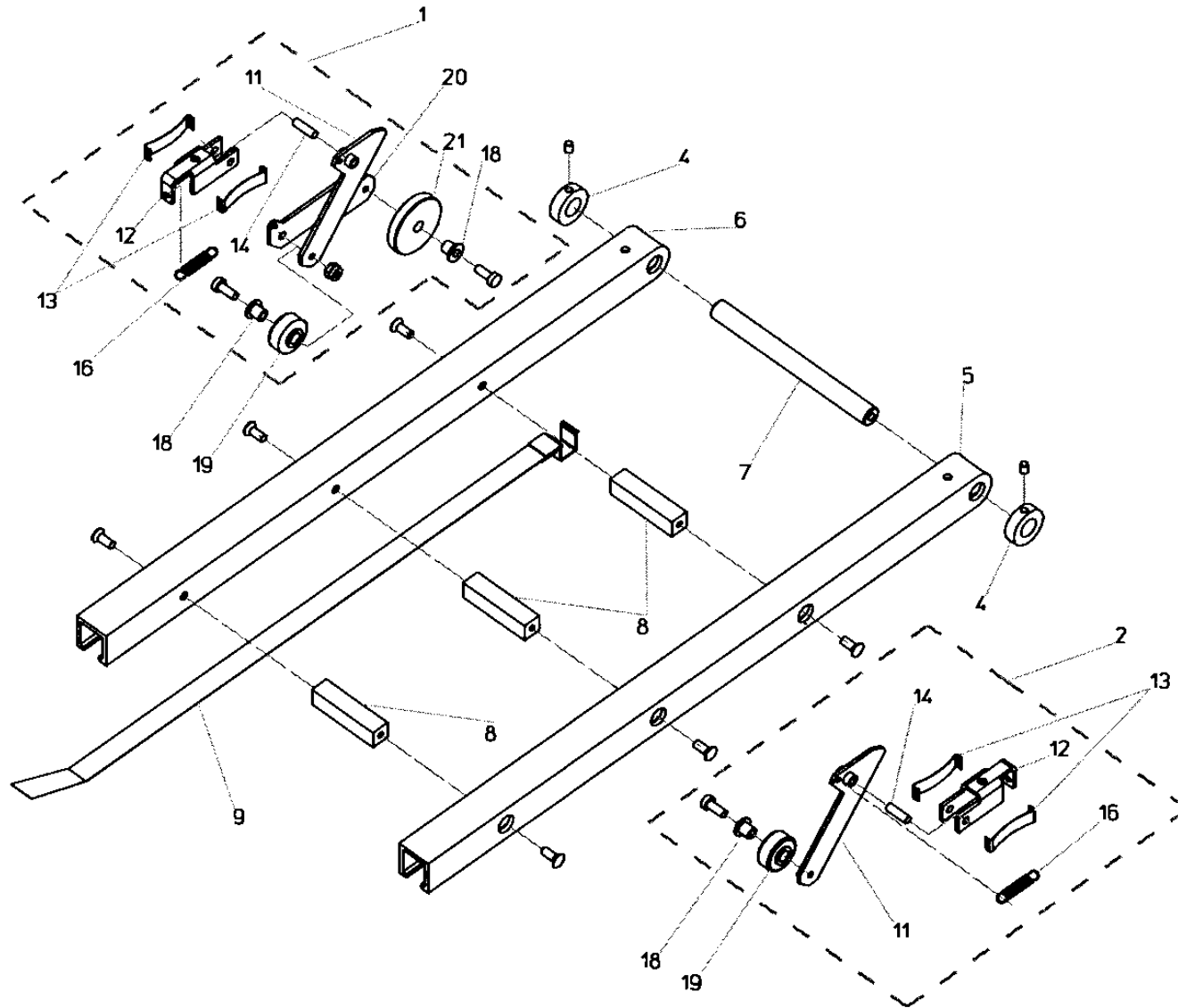
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INDEX	PART NUMBER	DESCRIPTION
1	186-034006690	TABLE PLATE
2	186-032028086	RIGHT BRACKET
3	186-032028087	LEFT BRACKET
4	186-032046320	TIMING BELT PULLEY
5	186-032017085	SHAFT
8	186-034004383	FLANGE BEARING
9	186-031013058	SPROCKET
10	186-031017504	BUSHING
11	186-031033171	DOUBLE TIMING BELT
12	186-032017098	RIGHT SHAFT
13	186-032001442	BUSHING
14	186-032017091	LEFT SHAFT
16	186-034005072	GEAR
18	186-032006590	STUD
19	186-034005070	GEAR
21	186-031030572	GEAR MOTOR
22	186-034005071	GEAR
23	186-032030145	U-BRACKET
24	186-031077004	THREADED RIVET
25	186-031011060	ROLLER CHAIN
	186-031011004	CHAIN LOCK
26	186-031017541	THREADED BUSHING
31	186-031108002	C-CLIP
37	186-031133009	C-CLIP
38	186-034004539	BEARING
40	186-032030146	BRACKET
43	186-031045623	ADHESIVE TAPE

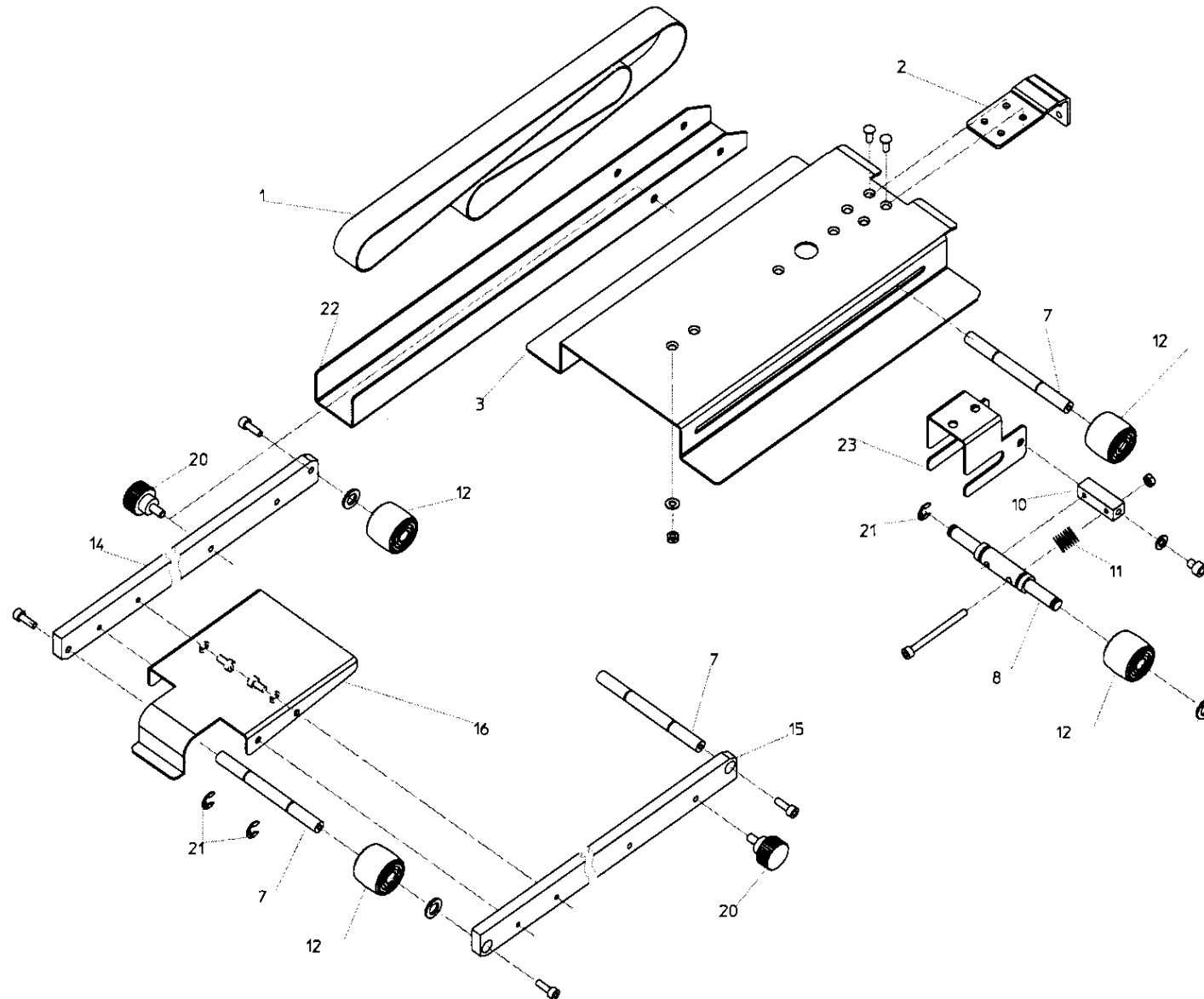
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INDEX	PART NUMBER	DESCRIPTION
1	186-034007028	TRANSPORT ROLLER
2	186-034005211	TRANSPORT ROLLER
4	186-033001105	COLLAR
5	186-032051988	LEFT GUIDE
6	186-032051987	RIGHT GUIDE
7	186-032017097	SHAFT
8	186-032051569	SHAFT
9	186-034005115	LEAF SPRING
11	186-034002763	LEVER
12	186-032026825	BRACKET
13	186-033000064	LEAF SPRING
14	186-032012008	SHAFT
16	186-031001024	EXTENSION SPRING
18	186-032012007	ROLLER
19	186-031019277	ROLLER
20	186-032023114	LEVER
21	186-032012762	ROLLER

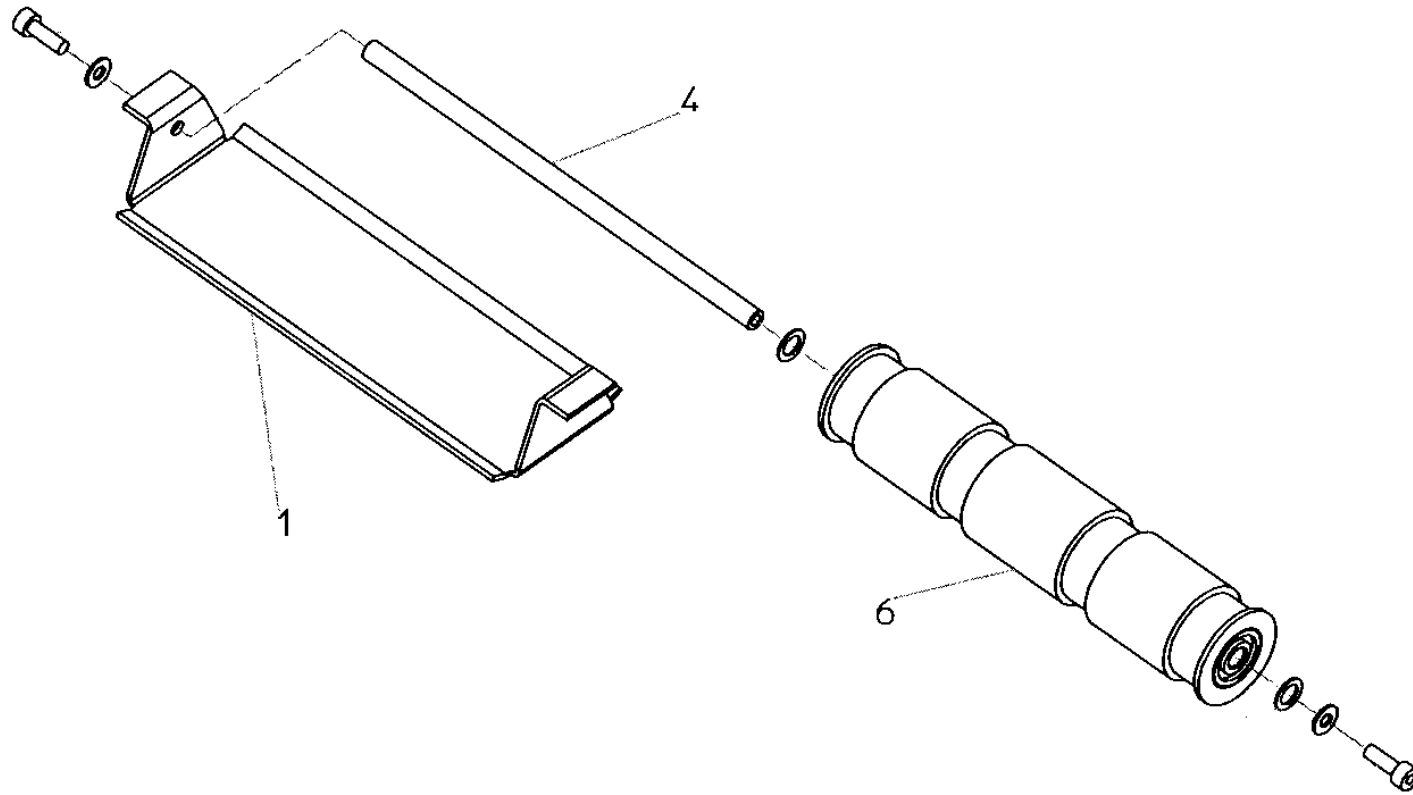
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INDEX	PART NUMBER	DESCRIPTION
1	186-031030175	FLAT BELT
2	186-032028129	BRACKET
3	186-032030149	TABLE PLATE
7	186-032012713	SHAFT
8	186-032017678	SHAFT
10	186-032051566	SHAFT
11	186-031003058	COMPRESSION SPRING
12	186-032012683	PULLEY
14	186-032051905	RIGHT GUIDE
15	186-032051906	LEFT GUIDE
16	186-032029933	PAPER GUIDE
20	186-031027411	KNURLED SCREW
21	186-031133007	C-CLIP
22	186-032030359	GUIDE
23	186-032030266	BRACKET

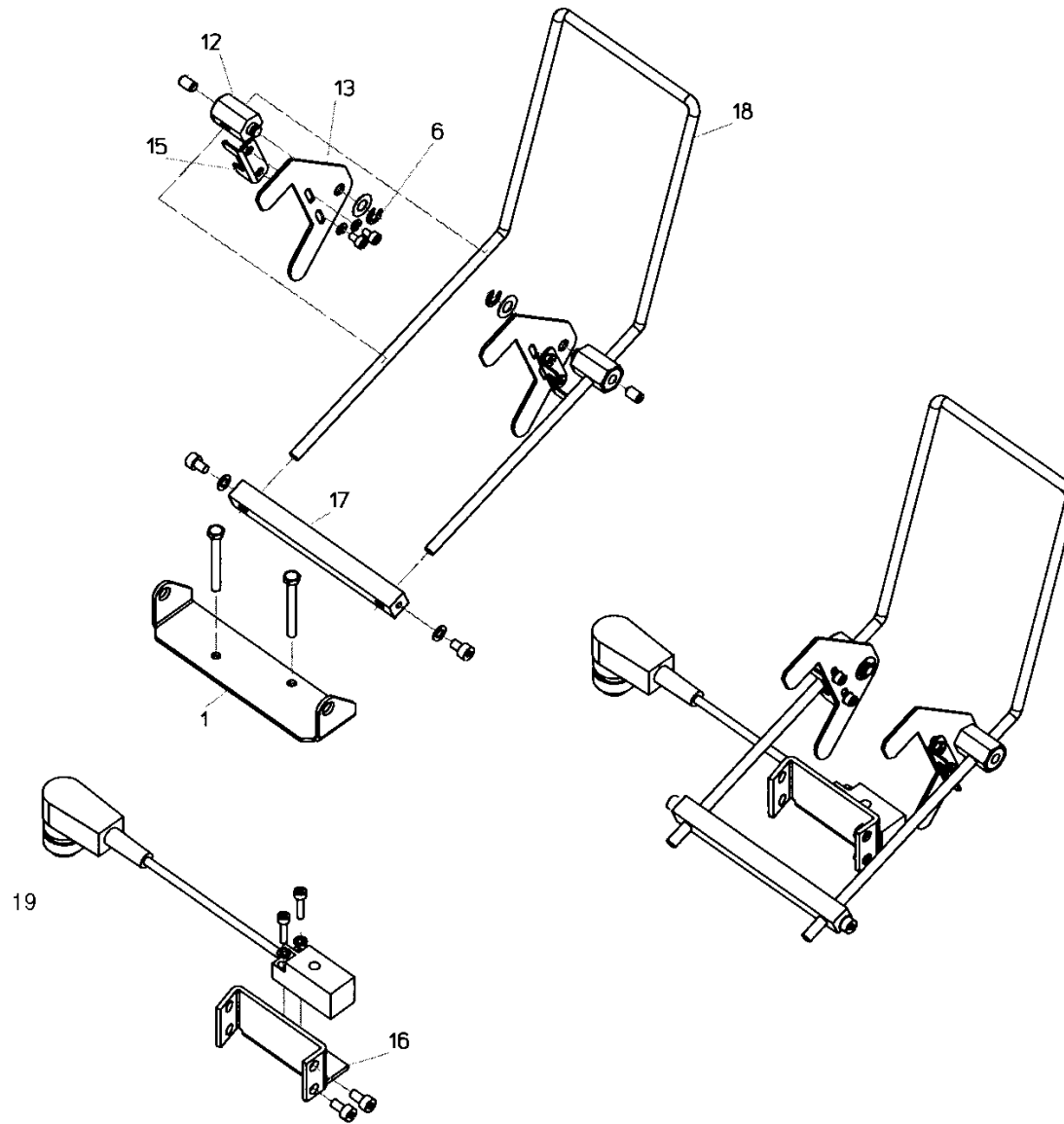
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INDEX	PART NUMBER	DESCRIPTION
1	186-032030424	BRACKET
4	186-032017489	SHAFT
6	186-032013250	ROLLER

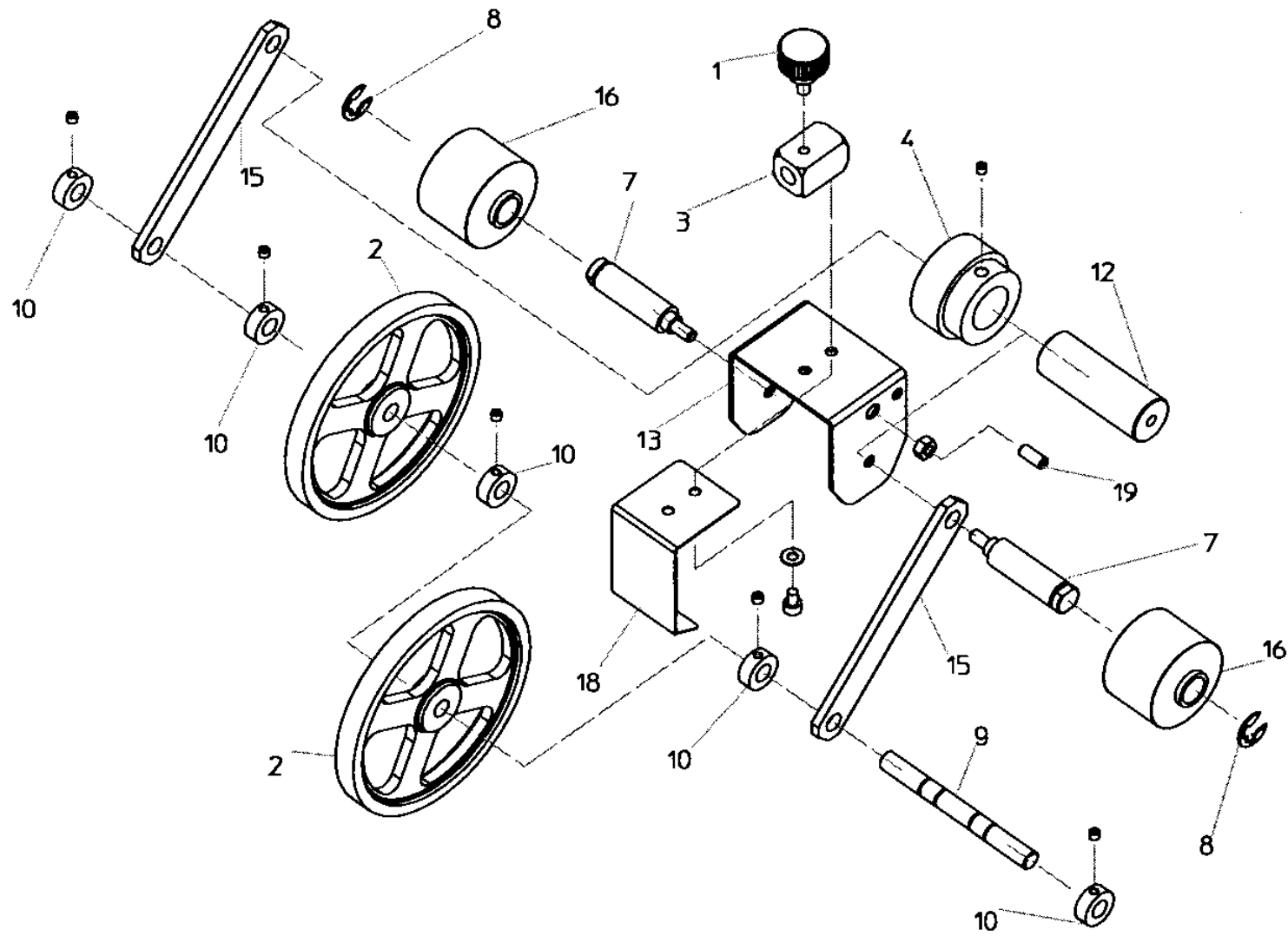
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INDEX	PART NUMBER	DESCRIPTION
1	186-032030449	BRACKET
6	186-031133015	C-CLIP
12	186-032013183	HEXHEAD STUD
13	186-032022994	KEY LEVER
15	186-032030104	STOP
16	186-032030114	BRACKET
17	186-032051899	SQUARE SHAFT
18	186-032063055	BRACKET
19	186-034006579	SENSOR

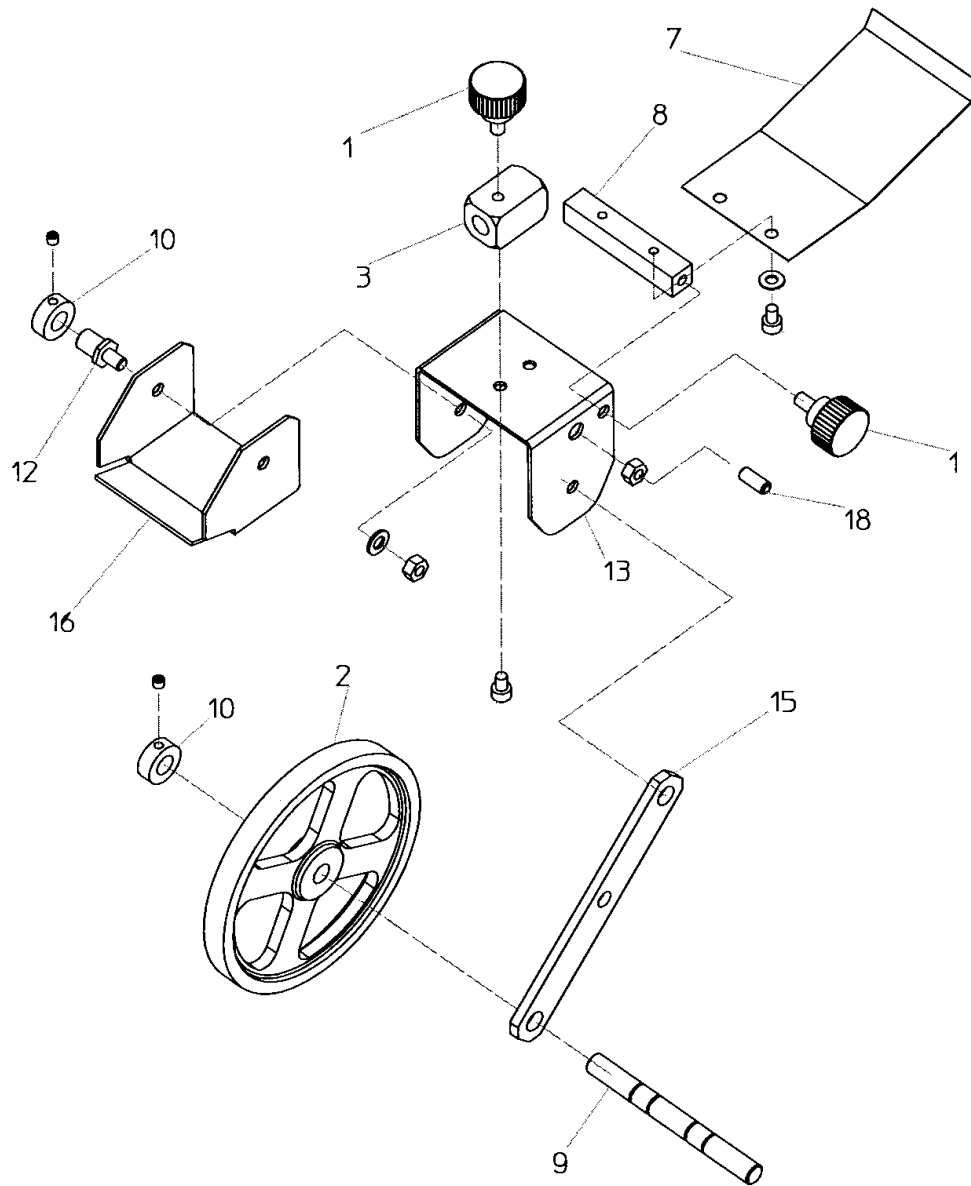
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INDEX	PART NUMBER	DESCRIPTION
1	186-031027411	KNURLED SCREW
2	186-031017384	ROLLER
3	186-032051873	BRACKET
4	186-034004629	ROLLER
7	186-032006946	STUD
8	186-031133001	C-CLIP
9	186-032012696	SHAFT
10	186-033000150	COLLAR
12	186-032013280	SHAFT
13	186-032030595	BRACKET
15	186-032023099	BAR
16	186-032013279	ROLLER
18	186-032031188	BRACKET
19	186-031027339	STOP

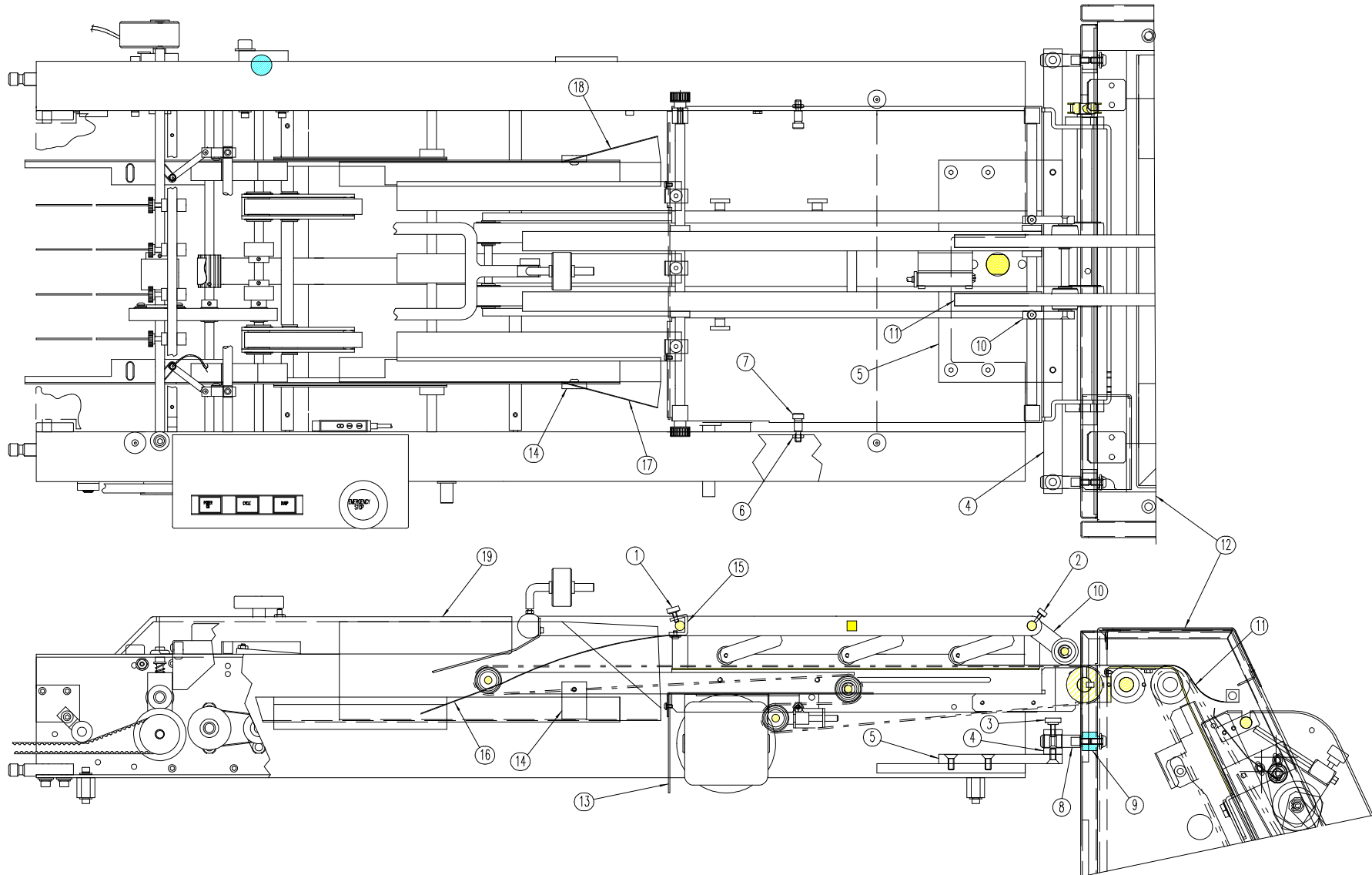
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INDEX	PART NUMBER	DESCRIPTION
1	186-031027411	KNURLED SCREW
2	186-031017384	ROLLER
3	186-032051873	BRACKET
7	186-031007140	LEAF SPRING
8	186-032051975	SHAFT
9	186-032012696	SHAFT
10	186-033000150	COLLAR
12	186-032006754	STUD
13	186-032030595	BRACKET
15	186-032023099	BAR
16	186-032030599	BRACKET
18	186-031027339	STOP

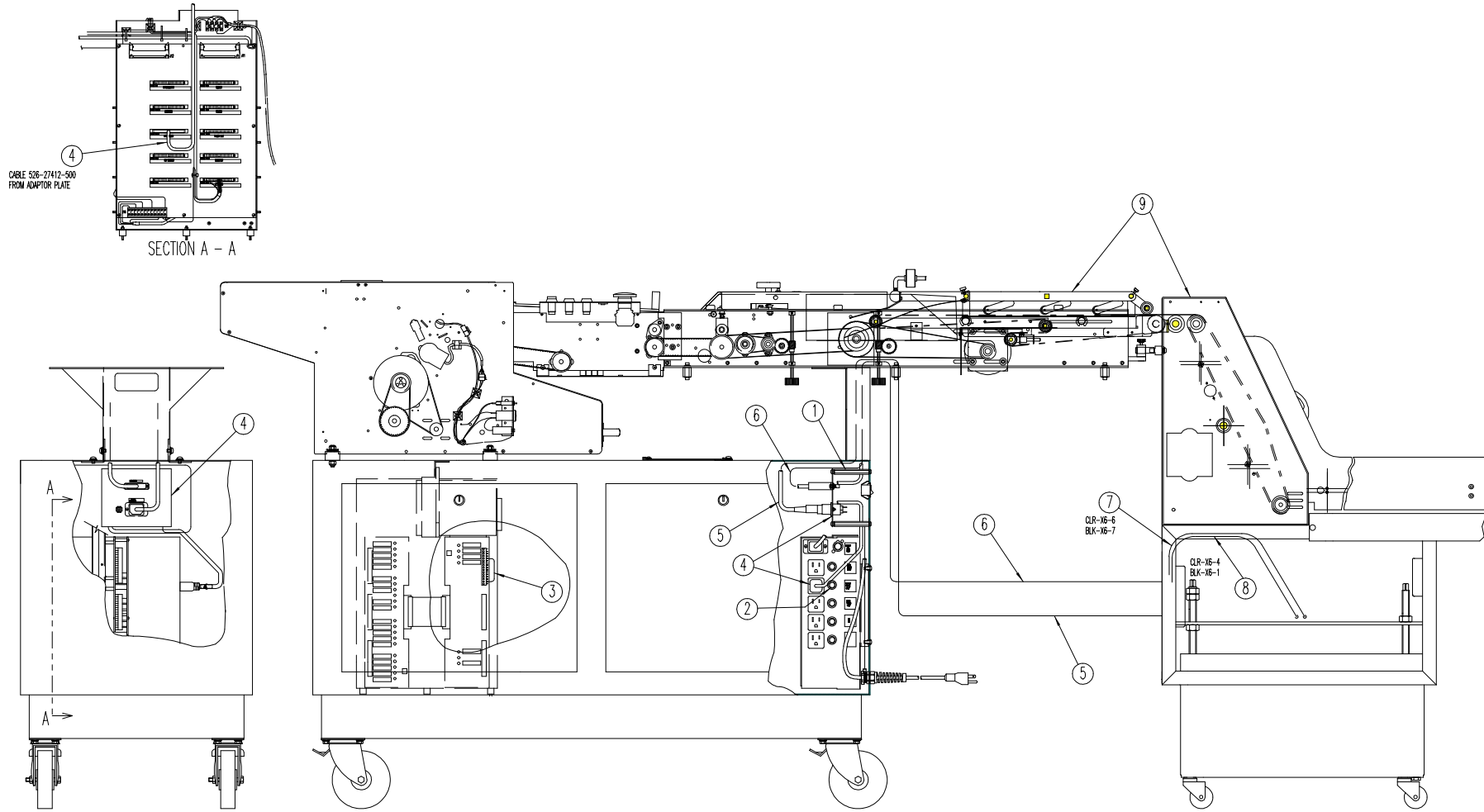
750-26978-500 (REV A), 3208/FEEDER MECH. INTERFACE



750-26978-500 (rev A), 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

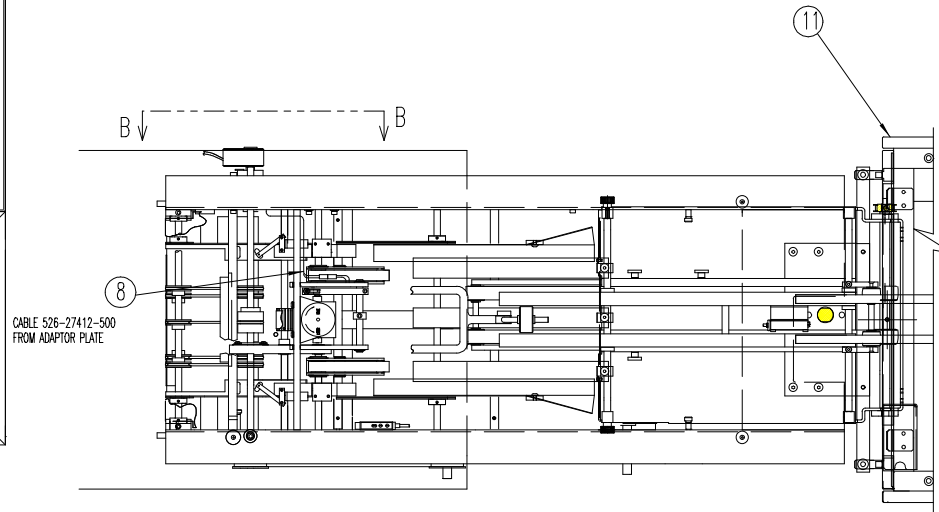
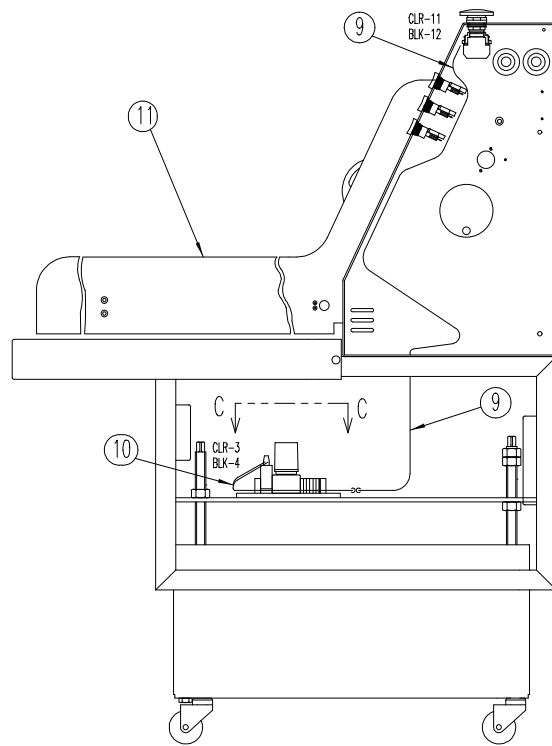
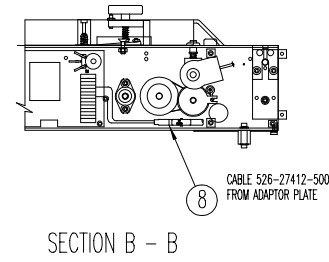
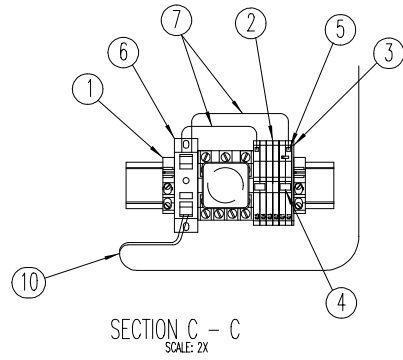
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750-27576-500 (rev -), 3208/FEEDER ELECT. INTERFACE, page 1

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 (REV -), 3208/FEEDER ELECT. INTERFACE, PAGE 2



750-27576-500 (rev -), 3208/FEEDER ELECT. INTERFACE, page 2

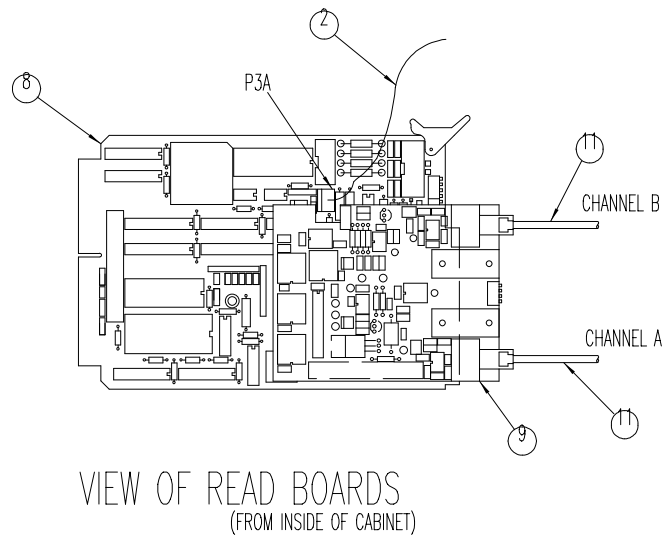
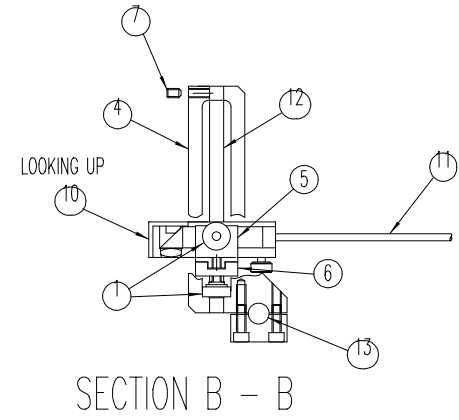
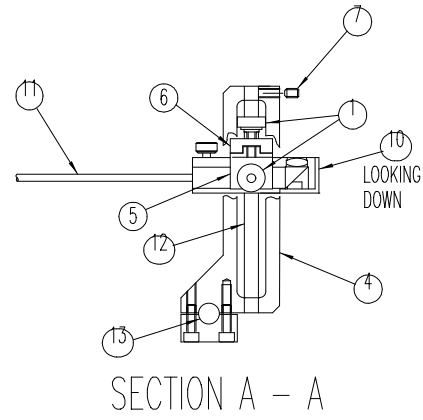
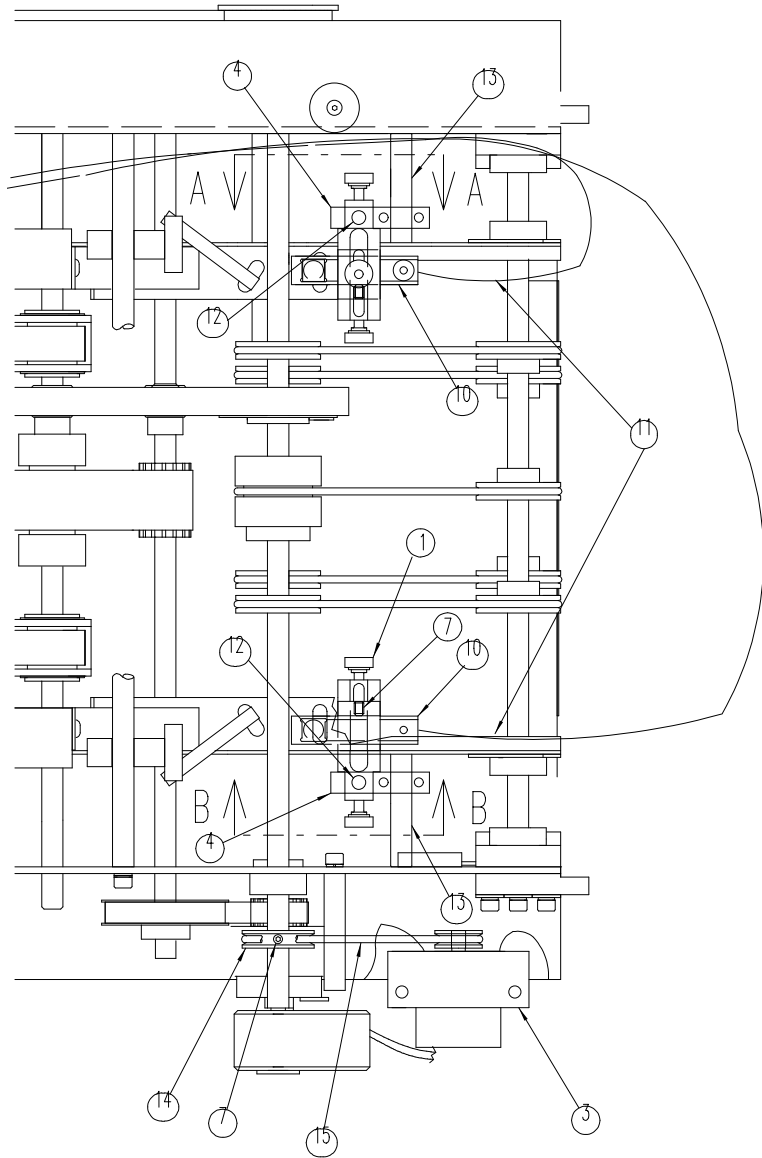
INDEX	PART NUMBER	DESCRIPTION
1	024-10300226	END STOP
2	024-26789-000	THROUGH TERMINAL BLOCK
3	024-26790-000	END PLATE
4	024-26791-000	ADJACENT JUMPER
5	025-25817-000	FERRULE,22 GA
6	030-26793-000	OUTPUT MODULE
7	045-022130	WIRE,BLK,22 GA
8	091-27411-500	ADAPTOR PLATE ASSEMBLY
9	526-27409-500	CABLE,E-STOP
10	526-27511-500	CABLE,AUTO MODE
11	750-26978-500	470-FEEDER MECH. ASSEMBLY

NOTES:

SECTION I OPTIONS PARTS

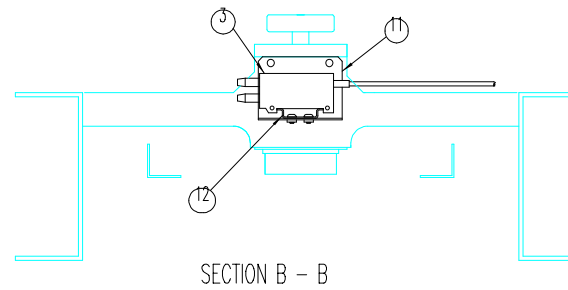
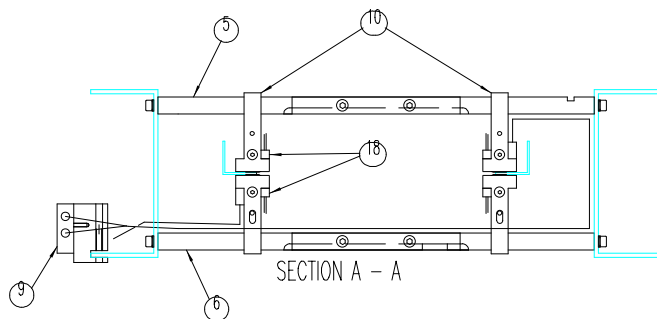
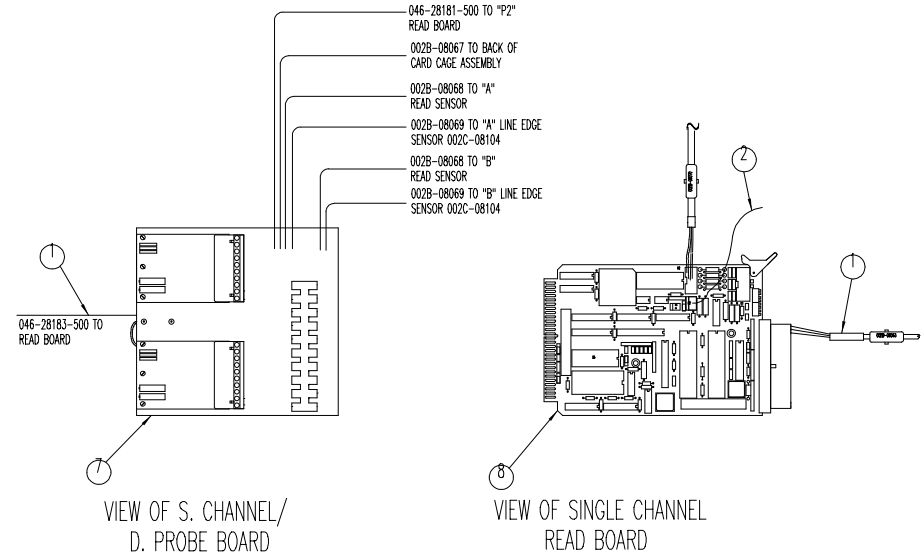
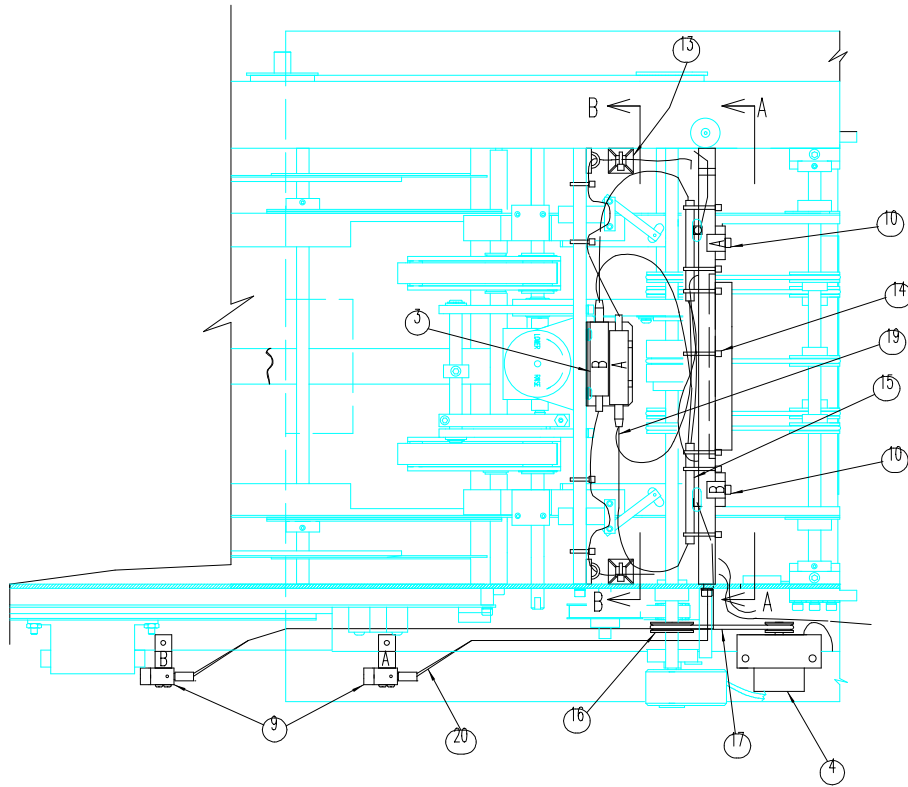
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002K-08432 (rev A), INSERTER DEMAND SWITCH KIT	117
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706-25697-400 (REV E), T.J. LINE CODE READ OPTION



706-25697-500 (rev E), T.J. LINE CODE READ

INDEX	PART NUMBER	DESCRIPTION
1	002A-16457-004	THUMBSCREW
2	046-28182-500	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

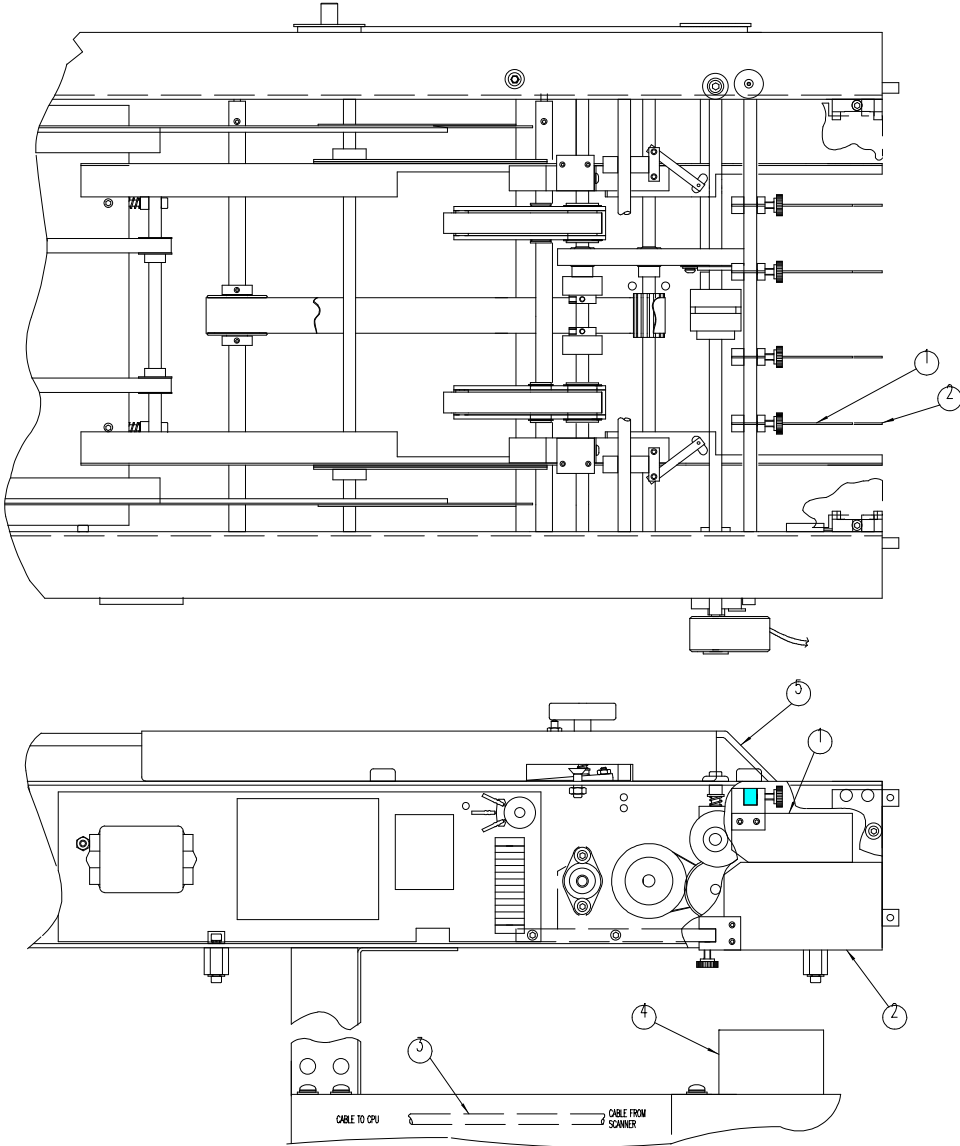


002K-08066 (REV E), B & H LINE CODE READ

002K-08066 (rev E), B & H LINE CODE READ

INDEX	PART NUMBER	DESCRIPTION
1	046-28183-500	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	502-28184-500	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

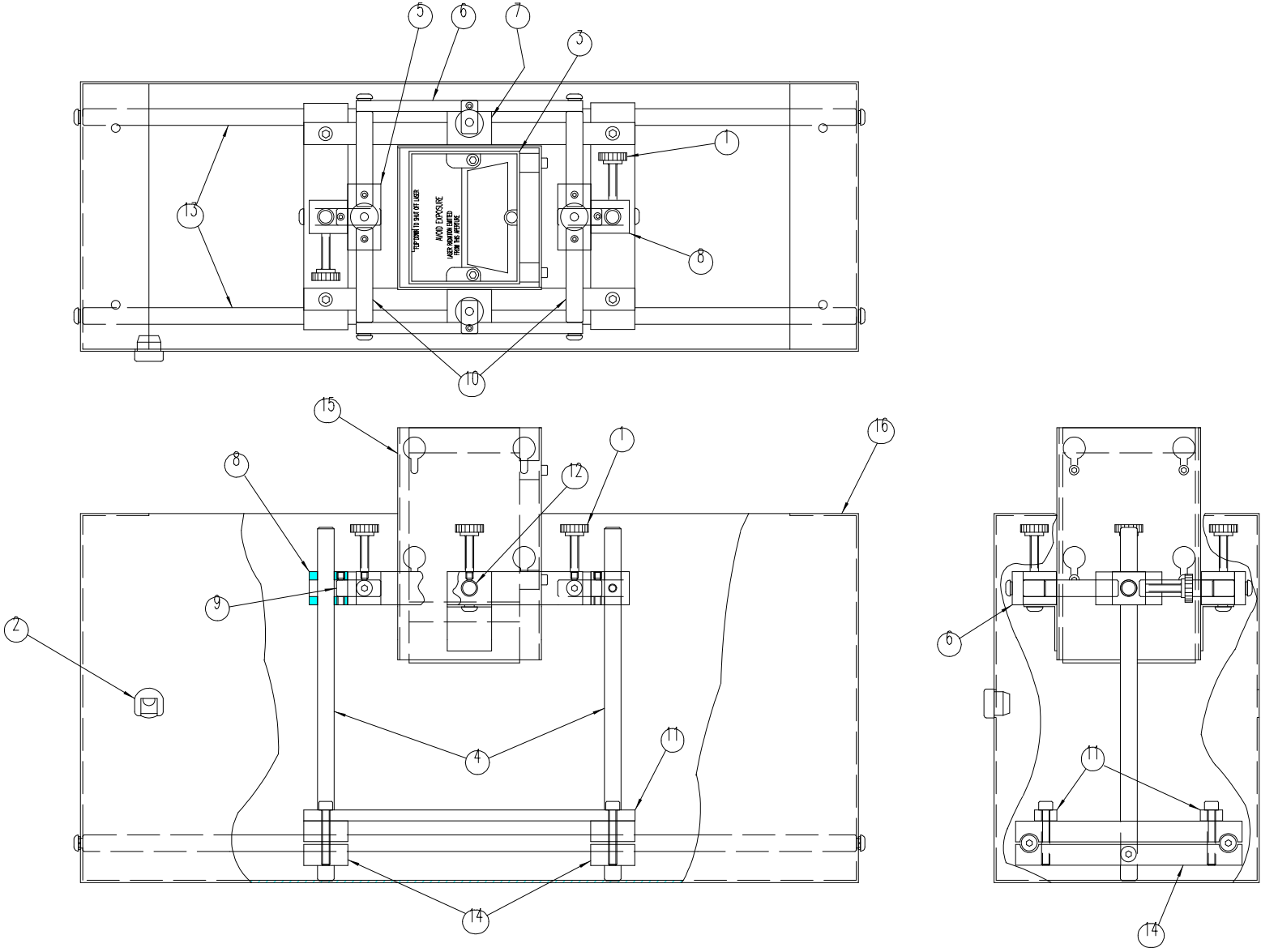
002K-20772 (REV B), BAR CODE READER (3 OF 9)



002K-20772 (rev B), BAR CODE READER

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	579-28274-400	PAINTED SINGULATOR COVER

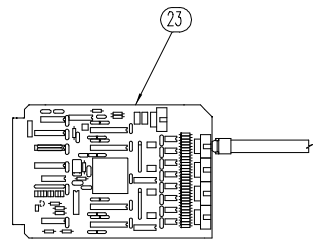
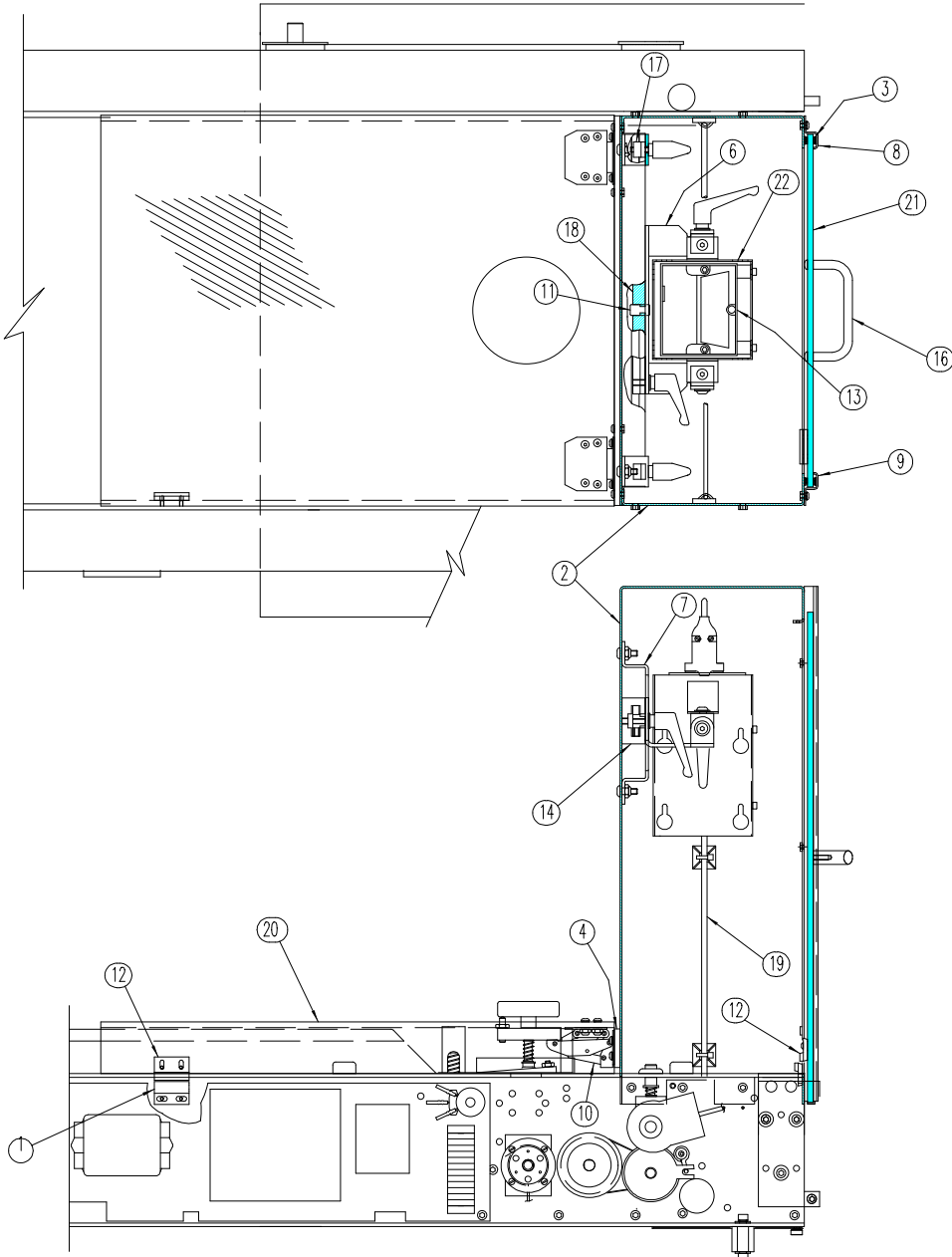
002D-20739 (REV B), LASER SCANNER ASSEMBLY



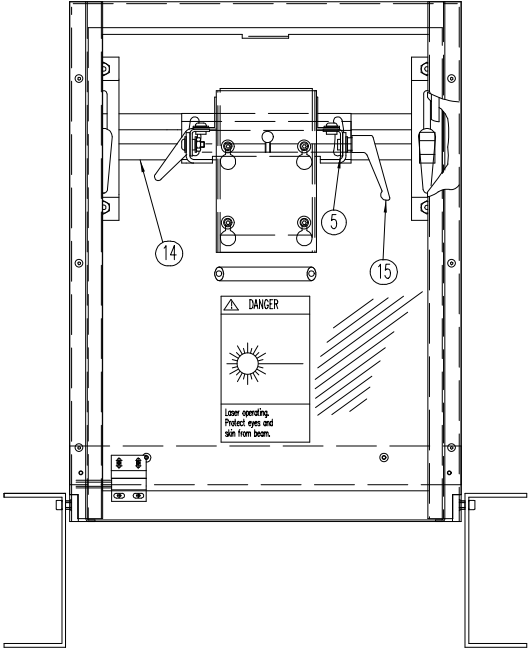
002D-20739 (rev B), LASER SCANNER ASSEMBLY

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

191-27953-500 (REV -), TOP MOUNT BAR CODE READER



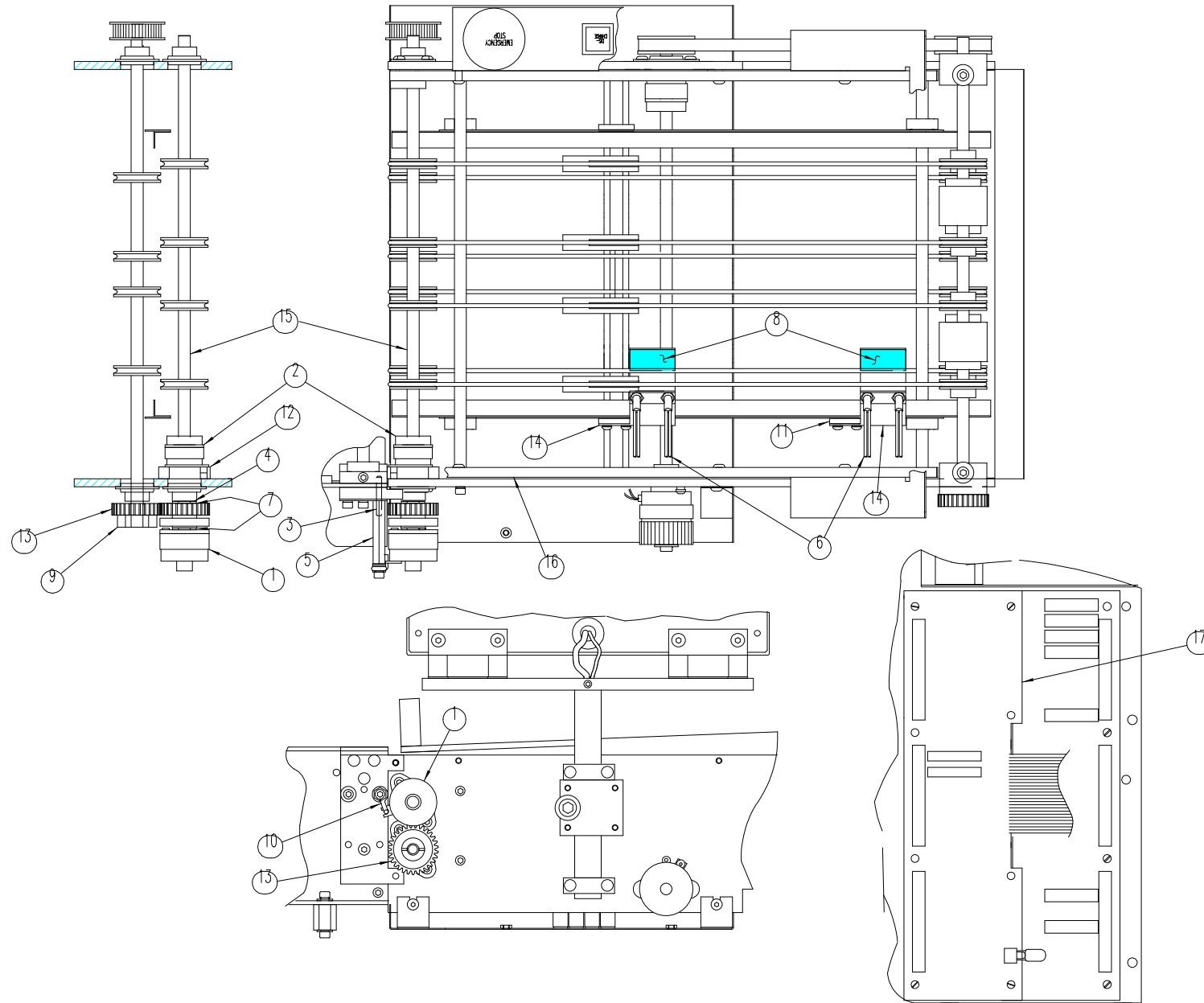
SERIAL I/O BOARD VIEW
SERIAL BOARD INSERTED INTO
CARD CAGE IN BOTTOM OF CABINET



191-27953-500 (rev -), TOP MOUNT BAR CODE READER

INDEX	PART NUMBER	DESCRIPTION
1	002B-08461	INTERLOCK ASSY (DEMAND SWITCH)
2	005-27553-600	LASER HOUSING
3	007-26347-000	SLIDE PILE, 16.75"
4	007-26398-600	COVER SUPPORT
5	007-26569-600	ANGLE BRACKET,SCANNER
6	007-26572-600	BRACKET,LASER MOUNT
7	007-27377-600	BRACKET,SIDE MOUNTING
8	007-27554-600	BRACKET,LEFT DOOR
9	007-27555-600	BRACKET,RIGHT DOOR
10	007-DLH1154	HINGE
11	018-13750625	PIN,DOWEL,.375DIA X .625
12	041-35701	INTERLOCK MAGNET
13	088-01MRB01302	LASER SCANNER
14	169-27376-600	SLIDE BAR
15	172-24280	ADJUSTING LEVER
16	172-26388-000	HANDLE
17	320-26567-600	SLIDE BLOCK,SCANNER
18	320-26568-600	SLIDE ADJUST BLOCK
19	526-27172-500	SCANNER CABLE
20	579-26393-600	FEEDER COVER
21	579-27556-600	LEXAN DOOR
22	600C-20701	SCANNER HOUSING
23	042-27623-500	QUAD SERIAL I/O BOARD

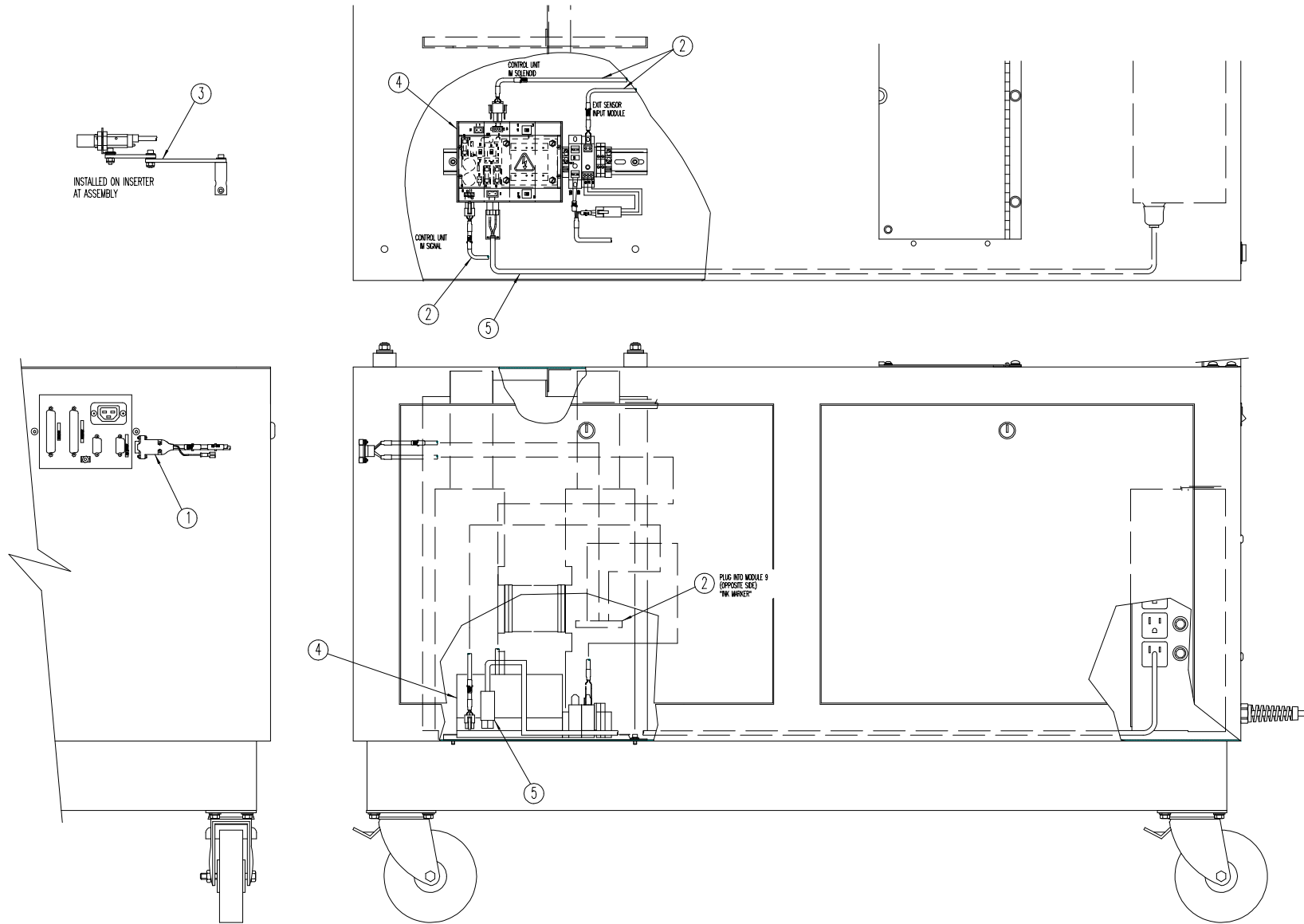
002K-21390 (REV -), FIRST PAGE HOLD KIT



002K-21390 (rev -), FIRST PAGE HOLD KIT

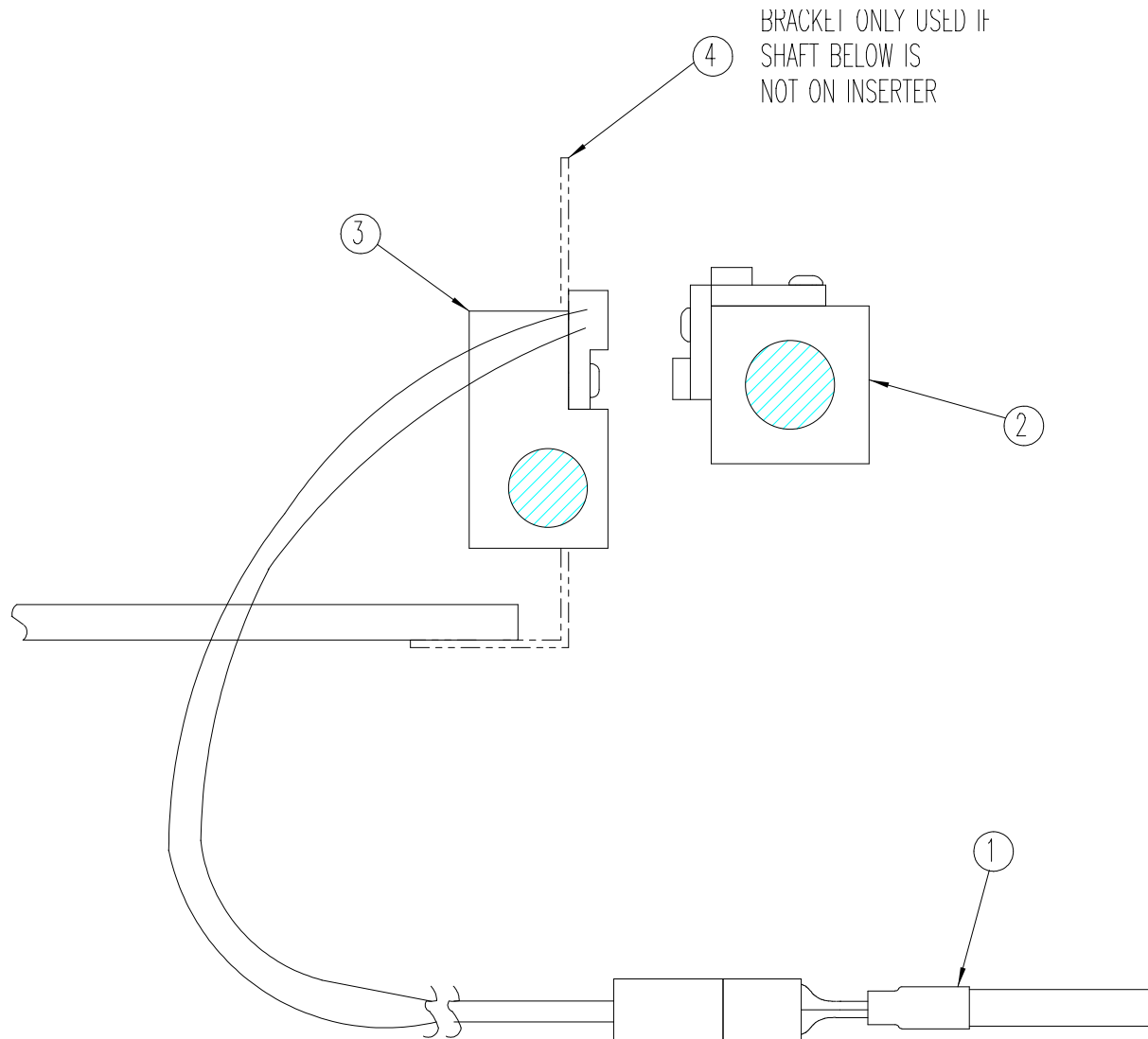
INDEX	PART NUMBER	DESCRIPTION
1	002B-07746	CLUTCH
2	002B-08414	BRAKE
3	014-10251120	SHSS,#10-32 X 1.25
4	016-S0375062501	SHIM,.01 THICK
5	020-HA01020632	STANDOFF,#10-32 X 2"
6	057-E32CC200	SENSOR FIBERS
7	163-EUT061201	THRUST BEARING
8	188-231WW	REFLECTIVE TAPE
9	600A-16349-034	HUB CLAMP
10	600A-18200	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

389-26066-400 (REV B), INK MARKER KIT



389-26066-400 (rev B), INK MARKER KIT

INDEX	PART NUMBER	DESCRIPTION
1	002B-07186	INK MARKER INTERFACE
2	002B-07188	INK MARKER INTERFACE CABLE
3	002B-23702	SENSOR & MOUNT ASSEMBLY
4	030-28377-500	INK MARKER SOLENOID & DRIVE
	030-26071-000	MODULE ONLY
	042-26080-500	DRIVE UNIT ONLY
	526-27210-500	INK MARKER CABLE ONLY
5	526-26067-500	POWER CABLE ASSEMBLY

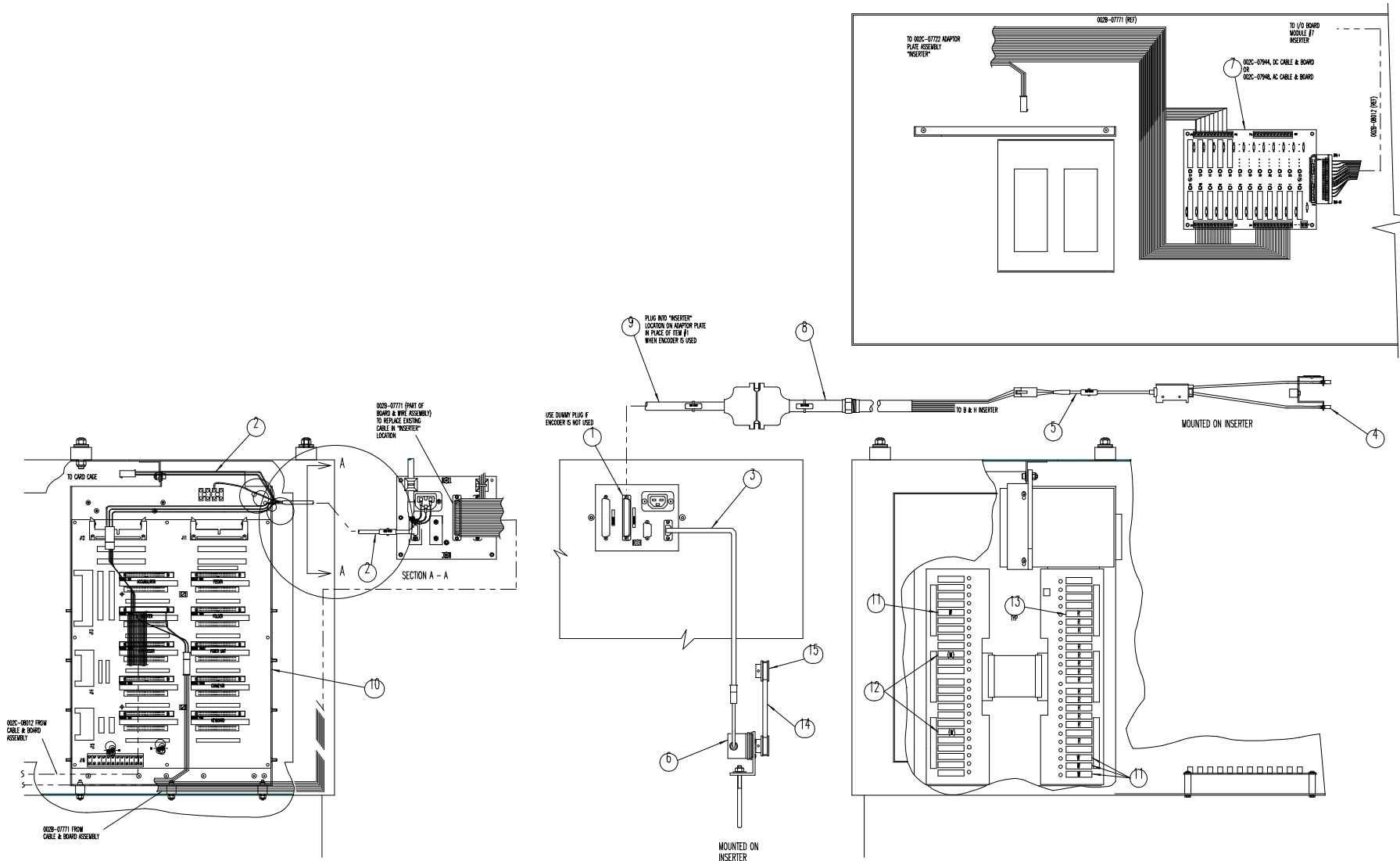


002K-08432 (REV A), INSERTER DEMAND SWITCH KIT

002K-08432 (rev A), INSERTER DEMAND SWITCH KIT

INDEX	PART NUMBER	DESCRIPTION
1	002B-08460	INTERCONNECT CABLE
2	002A-18162	MAGNETIC CAM BLOCK
3	002B-18556	INSERTER DEMAND SWITCH
4	600B-18161	SWITCH BRACKET

002K-07970 (REV F), AC/DC INSERTER CONTROL



002K-07970 (rev F), AC/DC INSERTER CONTROL

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

NOTES: