![GERA]

HP Butterfly Folder

Student Workbook Rev. 3.0

Butterfly Plus M950XXLT	Butterfly Base M950XXSL	Butterfly - Simple M952XXSL	Butterfly - Complete M952XXLTM	Butterfly - Extra M950XLTX

Ladybird I
M860LADY

Ladybird II

Ladybird III

Update 2 November 2015

This is a document designed by GERA for Butterfly and Lady Folder engine.

Table of contents

Module 1. Folder Overview

Introduction

Welcome to the HP Butterfly Folder familiarization program.

The primary objective of this Student Workbook is to familiarize the student with an understanding of the HP Butterfly Folder operation and optimization. The workbook has been designed to direct the Student through the mechanical folding process by subsystem following the paper path starting from the printer output.

In addition, videos will further illustrate operation and system set-up.

The Student Workbook is divided into the following modules:

Folder Overview
Folder Configurations
Power and Interlocks
Extra and Plus versions Fan Folder
Ladybird I-IIversion Fan Folder
Extra and Plus version Cross Folder
Control Panel

In addition to each Module Objective, the primary objective of this workbook is to familiarize you with the HP Butterfly and Ladybird Folders and to provide you with an understanding of the necessary elements of folder operation and optimization.

Module Overview

This module will give you an overview of the Butterfly Folder, and will present:

- A folder description
- The folder specifications
- The major subsystems

Folder Description

The Butterfly and Ladybird Folders are online, large document, convenience folder, designed to fold copies of engineering drawings.

The Butterfly Folder is designed as a stationary device. The folder provides 2 folding programs and is suitable for the HP plotter 4000, 4020, 4500, 4520, T1200, T770, T2300, T1300, T790, T7100, . The folder requires a power source of 115/230 VAC ±5%, 50/60 Hz.

The Butterfly Folder consists of one or two module, upon model type and the printer configuration:

- Fan Folder
- Cross Folder
- Basket

The Ladybird I Folder provides four programs and is designed to be combined with HP 2300 Plotter and consist only of Fan Folder and Basket.

The Fan Folder folds the prints longitudinally, copy length divided in several panels named a with a fold process beginning from lead edge or trail edge title block.

The Cross Folder folds the prints fan folded to reduce the copy to the final size of A4/A size. Minimum paper roll width 11" or 297mm up to a maximum of 36", 914mm.

The basket or bin receives the fan and/or cross folded prints in order to stack, designed differently in order to collate more prints

The Ladybird II Folder is developed from Ladybird I project to be joined with HP T2500, T1500 and T920 Plotters. The collector tray is optimized with mobile parts, the Cross Folding program is automatically defined through the fan fold one.

The Ladybird III Folder id developed from previous Ladybird projects to be joined with HP T3500 plotters.

Folder Subsystems Overview

Each of the folder subsystems will be presented in a separate module later in this training program.

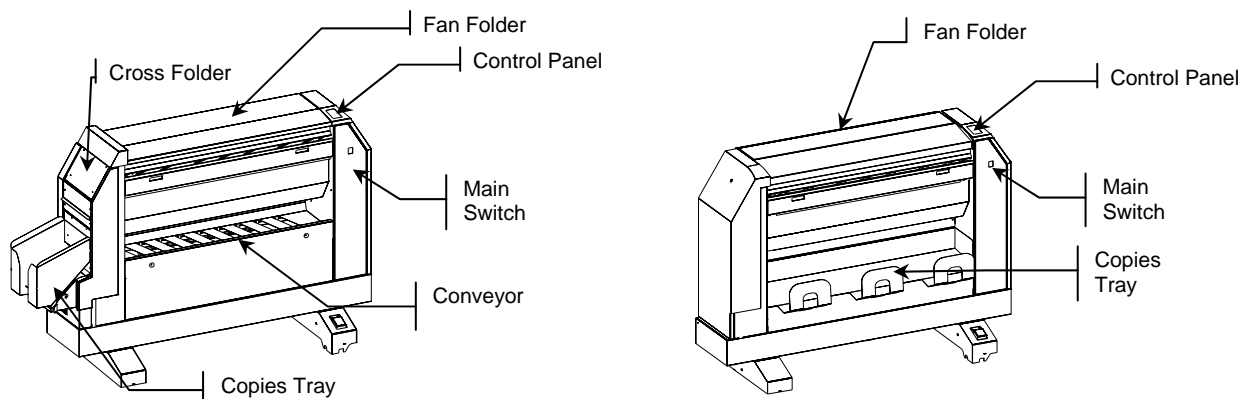Refer to Figure 1 or 2 and your folder (if available) to locate the major subsystems.

Figure 1 Butterfly Folder Overview
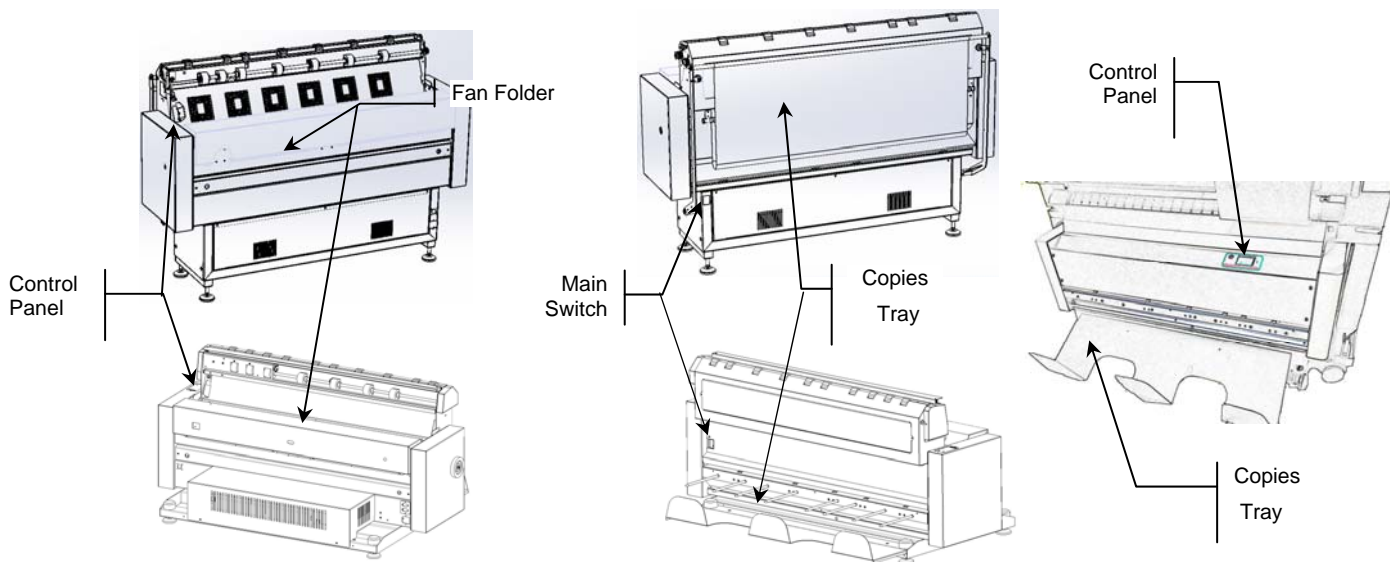
Figure 2 Ladybird I – II – III Folder Overview

Visual and Audible Indicators

The Butterfly and Ladybird Folders are equipped with an Attention Lamp, an Audible Sound Alarm and a Control Panel, that are used by the control logic to identify conditions that will require operator assistance.

Electro-Static Charge Control

Anti-static brushes are installed in various locations throughout the print path in the folder. These anti-static brushes at the input and output points of each functional area are to ensure that the static charges are dissipated prior to building up to levels that would cause problems. To insure proper print static dissipation is very important a good ground connection and avoid carpet floor install.

Left or Right, Top or Bottom and Motor Rotation

In the manual, you will often read left pocket or right door. In order to avoid misunderstanding, these directions always refer to the paper entrance in the Fan or Cross Folder. Therefore, always use this principle to distinguish which is left and right.
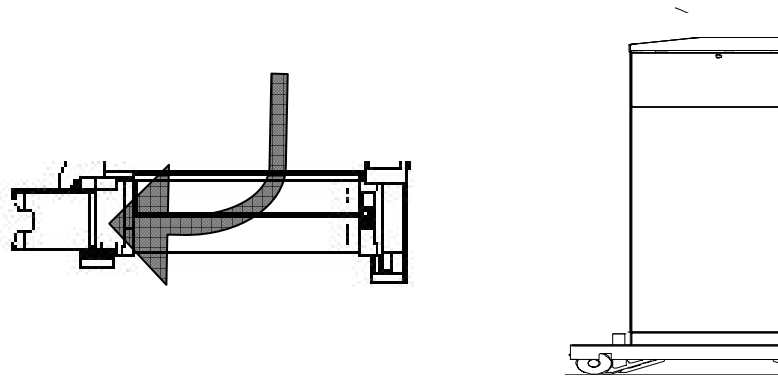
Figure 3 Left/right, top/bottom, back/front identification

To avoid misunderstanding, the rotation direction, clockwise (CW) or counter clockwise (CCW), is defined by viewing the motor from the output shaft.

The example below illustrates counter clockwise rotation, the viewing position (straight arrow) and the direction of rotation (circular arrow).

The words CW or CCW are always intended as depicted in the Illustration.
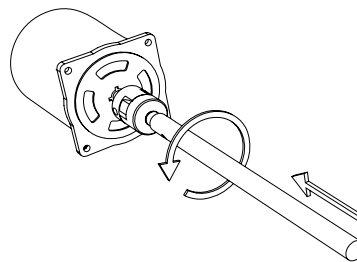
Refer to the drawing below to identify the Title Block position

Folder Specifications

Activity

Refer to the Butterfly and Ladybird Folders Operator Manual and read the *Folder Overview* section. Then, return to this point and continue with the Student Workbook.

Electronic Main Controller

An Electronic Main Controller provides:
- Folding process control
- Print position sensing
- Printer communication for fold style and format selection
- Jam detection and reporting
- Service diagnostic features

Folder Configurations

There are 4 folder configurations available:

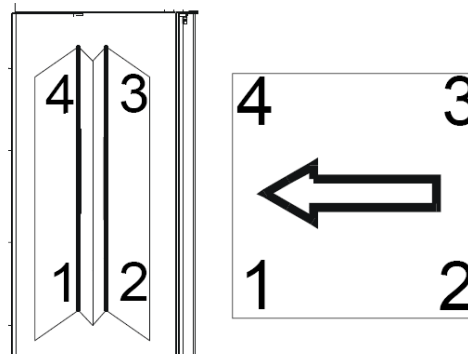- Butterfly Extra, Plus: It is provided with the fan folder section for the longitudinal folding and the cross folder section to get a complete folding in both directions. The copies are conveyed automatically from the fan to the cross folder section. It can work on line with the plotter and in off line with manual feeding
- Base: It is not provided with the cross folder as the Extra, Plus version. Copies are fan folded in on line mode and collected in the rear tray; the cross folder can be performed by feeding manually the fan folded copies. This configuration can work also in off line mode and is provided with a table for help in the manual feed mode.
- Complete: provided both with fan folder and cross folder but there's not conveyor to the fan section to the cross one; the fan folded copies are to be collected from the tray and fed manually in the cross folder.
- Simple: provided with the fan folder; it is not possible perform the cross folder
- Ladybird I – II - III: it is a folder with a different folding engine from the Butterfly; it is not provided with Cross Folder assembly so the cross folder has to be performed with manual infeed.

Input Media Folding Capabilities

The folder will process only bond type media. It can fold media with weights in the range of 80 to 90 g/m^2.

The Butterfly folder is designed for 3 " 75mm media core, however for printer supporting only 2" 50mm core is accepted to use plain paper type; the Ladybird, supports 2" core only.

For more information about media specifications refer to the Quick Guide applied on the Folder Body.

Tracing media, vellum, and polyester film cannot be folded. When using these other types of media, the folder has to be excluded.

Module 2. Folder Configurations

Folder Configurations

Configuration "Extra"

"Butterfly Extra" Configuration is the folder that can be coupled with the HP plotters T7100 – T7200

It is provided with the fan folder section for the longitudinal folding and the cross folder section to get a complete folding in both directions. The copies are conveyed automatically from the fan to the cross folder section.

"Butterfly Extra II" Configuration is equipped with Canbus protocol communication enabling folder function by EWS.
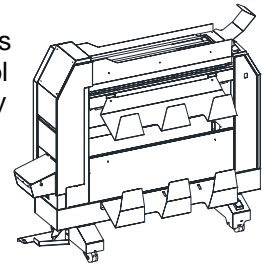
Fig. 4 "Butterfly Extra" Configuration

Configuration "Plus"

"Butterfly Plus" Configuration is the folder that can be coupled with the HP plotters 4000, 4020, 4500, 4520 T7100.

It is provided with the fan folder section for the longitudinal folding and the cross folder section to get a complete folding in both directions. The copies are conveyed automatically from the fan to the cross folder section. It can work on line with the plotter and in off line with manual feeding.
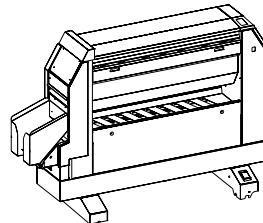
Fig. 5 "Butterfly Plus" Configuration

Configuration "Base"

"Butterfly Base" Configuration is the folder that can be coupled with the HP plotters 4000, 4020.

It is not provided with the cross folder as the Extra, Plus version. Copies are fan folded in on line mode and collected in the rear tray; the cross folder can be performed by feeding manually the fan folded copies. This configuration can work also in off line mode and is provided with a table for help in the manual feed mode.
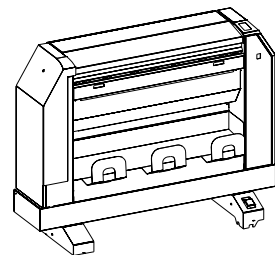
Fig. 6 "Butterfly Base" Configuration

Configuration "Ladybird I", "Ladybird II" and "Ladybird III"

Ladybird folder works only in line mode and is provided both with fan folder and cross folder without conveyor to the fan section to the cross one; the fan folded copies are to be collected from the tray and fed manually in the cross folder.

There are three configurations, "Ladybird I" that can be coupled with the HP plotters T2300 and T1300; the "Ladybird II" that can be coupled HP T2500, T1500 and T920 Plotters.Fonally Ladybird III that can be cpupled with HP T3500.

"Ladybird I" Configuration   **"Ladybird II" Configuration**   **"Ladybird III" Configuration**
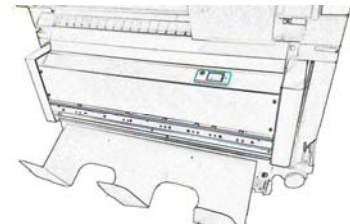
Configuration "Complete"

"Butterfly Complete" Configuration is the folder that can be coupled with the HP plotters T770 and T1200.

It works only in line mode and is provided both with fan folder and cross folder but there's not conveyor to the fan section to the cross one; the fan folded copies are to be collected from the tray and fed manually in the cross folder.
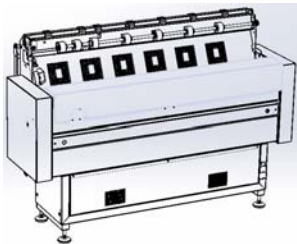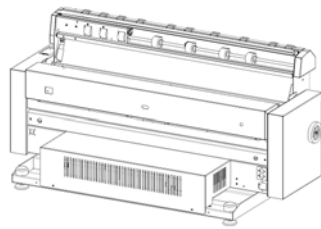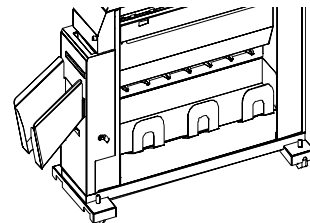

Figure 7 "Butterfly Complete" Configuration

Configuration "Simple"

"Butterfly Simple" Configuration is the folder that can be coupled with the HP plotters T770 and T1200. It works only in on line mode and is only provided with the fan folder; it is not possible perform the cross folder
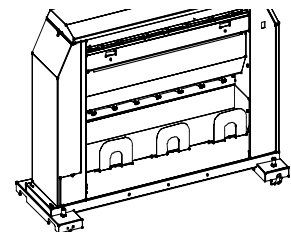
Figure 8 "Butterfly Simple" Configuration

Folder Noise Level

All Butterfly – Ladybird folders configurations have a low noise emission from a minimum of 58 dBa of 62 dBa all the step motors are drive with micro steps and mounted of soft block to eliminate vibrations and acute noise emissions.

TAG Configuration

When a Kit is installed, the appropriate identification number is marked on the TAG Configuration Label to indicate that a change to the product has been made.

In Figure 9, the configuration change when a KIT is added must be marked on the first row, the other numbers from 1 to 80 will be used to identify the most important factory installed modifications of the folder.

TAG MODIFICATION No.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80

Figure 9 TAG Configuration label

The TAG label in the Butterfly Folder is applied inside the Left Door and in the Ladybird Folder on the Folder body.
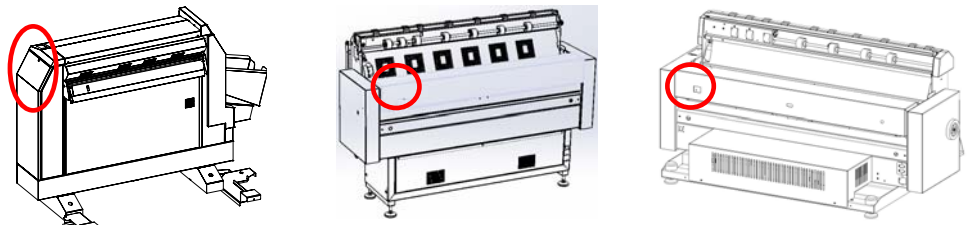
Module Summary

You should now be familiar with the major folder options

If you have any questions about the information that was discussed in this module, review the module and research the reference material.

This concludes Module 2, HP Butterfly - Ladybird Folder Configuration. If you do not have any questions, proceed to Module 3.

Module 3. Power and Interlocks

Module Overview

This module will provide an overview of the following:

- AC power input and distribution
- DC voltage generation and distribution
- The interlock circuits

Module Objective

When you complete this module, you will:

- Understand the AC power input and distribution
- Understand the DC voltage generation and distribution
- Be able to locate and describe the functions of the electrical components
- Be able to identify and locate the interlocks of the Folder

POST Description

The POST, (Power On Self Test), is a test that the folder initiates at power on to check the status of the electrical components and the position of the motors to prevent malfunctions or damage to the folder. When the folder is turned on the following checks are performed:

1. Sensor status: all the sensors must be in uncovered status, if a sensor detects something (paper jam), or does not function as programmed, the logic will generate an alarm and or a message displayed on the user interface.

2. Motor position: the logic checks the position of the motors controlled by the Main Controller board. If these motors are not in their Home Position, the logic drives them into Home Position. Refer to each motor description to understand Home Position and Work Position differences.

Interlock Description

The Butterfly folders they have door for user or CSE access for paper removal, all these doors not under screws are protected by safety switches with double contact.

The safety circuit is handled by one line that enable the Power Supply PS1 to detect an open door and remove the output power to the motor, solenoids to avoid unexpected movement of the mechanical folder components.

Electronic Description

The Folder is available in a single-phase 50/60 Hz configuration that requires a 115/230 VAC ±5% input.

The major AC and DC power components are installed on front side of the machine

- The Power Supply PS1 with a 115/230 VAC ±5% input distributes the power 24Vdc to:
➢ the Main Controller J18 and J17
➢ the Stepper Motor Driver AM2-1 Am2-2

- The Main Controller with input J18 24Vdc supplies
  ➢ Led on +12 Vdc to sensors and position sensors and switches
  ➢ Led on +5 Vdc to the Drive Controller
  ➢ Led on +3.3 for the controller logic
  The Main Controller with input J17 24Vdc supplies
  ➢ Led on +24 Vdc to output components motors, solenoids.

- The Drive Controller with input 5Vdc, logic of the stepper motor supplied by main controller J14 :
  ➢ Led D1 on 5Vdc on J10 provides drive logic to the Stepping motor Drives.

- The Stepping Motor Drive :
  ➢ Leds green +24Vdc input to drive stepping motors (1 or 2 according to the version)
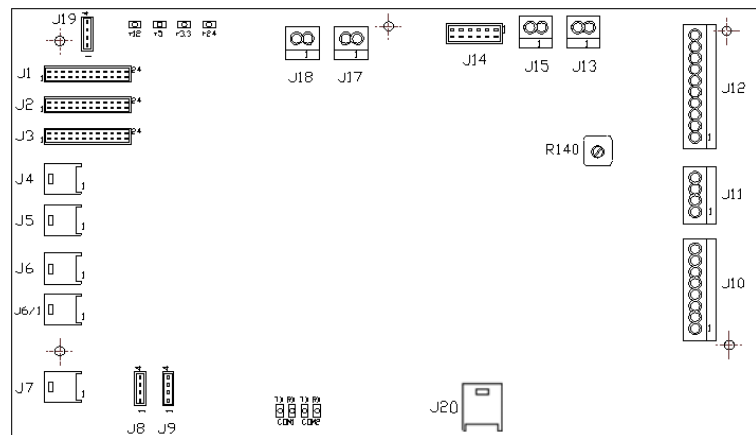
Location of Major Components

Refer to your folder to locate the major power electronic components. The folder contains four main PWBs:

- Main Controller
- Stepper Motor Drive Controller
- Power Supply PS1
- Driver PWBs

Main Controller

The Main Controller is located inside the rear panel of the folder. It contains two Communication Serial Ports (J8,J9) the Com port 1 & 2 LEDs flashing indicate the communication ports working, a list of other LEDs indicated the voltage line operating.

ITEM	DESCRIPTION	TYPE
J1	Input Fan sensors	AMP 12x2
J2	Input Fan sensors	AMP 12x2
J3	Input cross sensors	AMP 12x2
J4	Input Flap Sensor PS10 (No Ladybird)	AMP 4x1
J5	Key Reset	AMP 4x1
J6	Input C3	AMP 4x1
J6/1	+ 12 V CANBUS 12 Vdc (Lady Print Alarm)	AMP 4x1
J7	Diagnostic & Adjustment Tool connection	AMP 4x1
J8	RIP (No Ladybird)	AMP 4x1
J9	Serial Port for Gera Download software	4x1
J10	Output Cross (Ladybird: E1 / M1)	10x1
J11	Output M5 24 Vdc (No Ladybird)	4x1
J12	Fan Output (Ladybird:Output MT / M2 / M4)	8x1
J13		
J14	Voltage Power Supply to Drive Controller	8x1
J15	Output M8 24 Vdc (Ladybird: Fan)	2x1
J17	Input 24 V dc from Power Supply	AMP 2x1
J18	Input 24 Vdc from Power Supply	AMP 2x1
J19	Input Flap Sensor PS10 (No Ladybird)	4x1
J20	CANBUS (No Ladybird)	AMP 4x1

- The LED +24 turns off when J17 is disconnected or 24VDC is not available.
- The LED +12, +5, +3,3 turns off when J18 is disconnected or 24Vdc is not available.

Stepper Motor Driver PWBs

The Stepper Motor Drive PWBs are located inside the lower panel of the folder. It contains the CPU and Firmware that controls (according to the folder configuration, one Drive can be missed):

- The Entry Roller Stepper Motor [M2] to feed the paper for fan folding (not present in Ladybird Folder)
- The Fan Folder Stepper Motor [M3] to reverse the folding sequence, depending on the fold length.
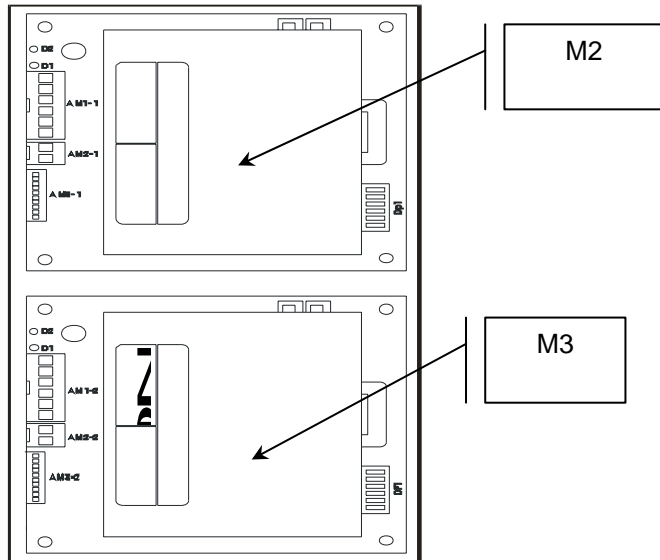

Figure 10

ITEM	DESCRIPTION	TYPE	STATUS
D1	Driver Fault condition	RED	OFF
D2	24 VDC	GREEN	ON
AM1-1	M2 Start / M3 Start	Connector 6 PIN	-
AM2-1	24 VDC	Connector 2 PIN	-
AM3-3	Motor Control	Connector 10 PIN	-

Power Supply PWB PS1

The Power Supply PS1 is located e under a hardware fixed panel.

When the folder is switched on, PS1 supplies 24Vdc voltage to the Main Controller PWB J18.

When the Safety Interlock (not present in Ladybird) circuit is closed via J17, PS1 supplies the following voltages:

1. The 24 Vdc line input to the Main Controller and to the Stepper Motor Drive Controller
2. The 24Vdc line input to the Stepper Motor Drive PWBs

Green LED L1 is illuminated in normal operation, when 230 VAC is applied, and off when the Interlock Circuit is open.

Connection		
	single	dual
1	AC L	AC L
2	AC N	AC N
3	AC FG	AC FG
4	−V out	Common
5	+V out	V out 1
6	No con.	V out 2

Drive Controller

The Drive Controller is located inside the rear panel between the Main Controller and the Stepper Motor Drive PWBs.

The function of the Drive Controller is to provide logic control to the "Stepper Motor Drive PWBs".

The Drive Controller works when the 5 Vdc led is lit on, supplied by the Main Controller and receives logic command by the flat cable J14 Main Controller to J1 Drive Controller.
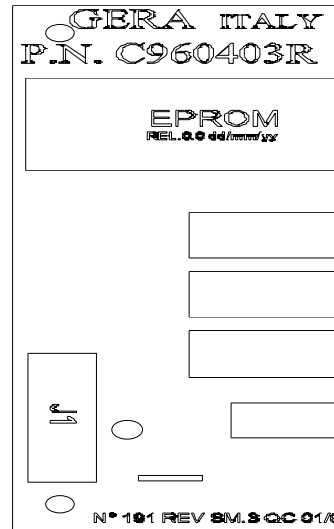
Figure 11 Drive Controller

Logic Board PWB (Ladybird III)

The Logic Boar PWB provides the Folder Main Control

ITEM	DESCRIPTION	TYPE
J1	POWER 12 V	AMP 2x1
J4B	MOTOR SIGNAL	AMP 4x1
J8	SENSOR SIGNAL	AMP 12x2
COM2	SERIAL	AMP 4x1
KEYB	TOUCH SCREEN	AMP 10x2

Stepper Motor Drive (Ladybird III)
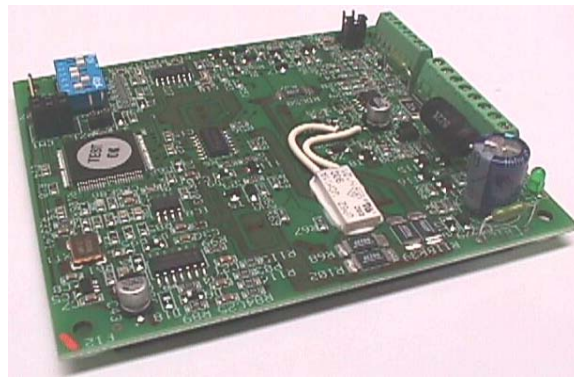
GENERIC FEATURE:

Vdc nom. (V)	22 - 50
Inf. min. (A)	2.6
Inf. max. (A)	4.4
Dimensions (mm)	92 x 85 x 23
Working Temp.	+5°C÷ +45°C

Chart Terminology Used

Vdc nom. = DC nominal value
Vac nom. = AC RMS voltage value
Iinf. = Phase nominal voltage (peak value). The voltage, can be set by the technician in four different values through DIP-SWITCHES.
Inf min and max = Minimum and maximum voltage values are set through DIP-SWITCHES
Step Inf = Sets voltage spacer value.

Input / Output PWB

Input /Output PWB provides Folder Solenoid, Motors and Sensor Controls from Logic Board PWB

Sensors

The Optical Sensors are LED Emitter/Phototransistor pairs, assembled on a PWB. They operate by sending an infrared signal produced by the LED emitter, which is reflected by the print towards the phototransistor receiver. The electronic circuit demodulates the signal and sends it to the logic board. There are three types of sensors:

A. Standard sensor

B. Reflection sensor

C. Barrier sensor

Type A Standard Sensor:

This sensor type works when the blank side of the print covers the sensor the infrared signal is reflected to the receiver and it operates a red led is lit on The black images can absorb the ray and the sensor may not operate and sunset light may be confuse the operation.
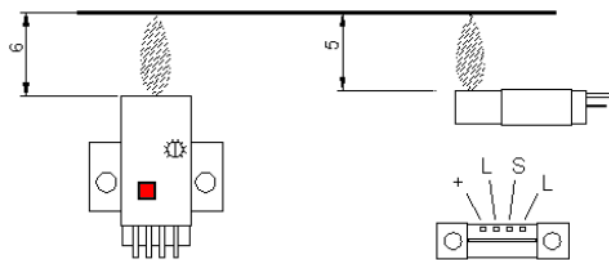
Figure 12 Standard sensor

Type B Reflection Sensor

This type of sensor uses a stainless plate acting as a mirror reflecting the infrared signal to the phototransistor, when the paper interrupt the ray, the phototransistor read the paper and a yellow led is lit on
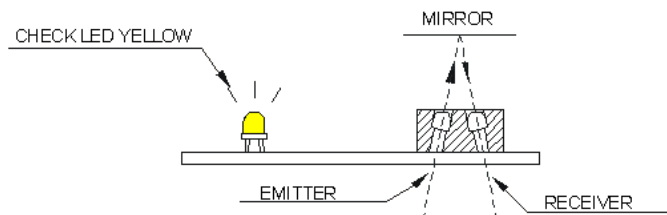
Figure 13 Reflection Sensors

Type C Barrier Sensor:

The Barrier sensor has an emitter and a receiver located on the surface of the folding pocket, when the paper interrupts the infrared ray, the phototransistor read the paper and the Yellow LED is off.
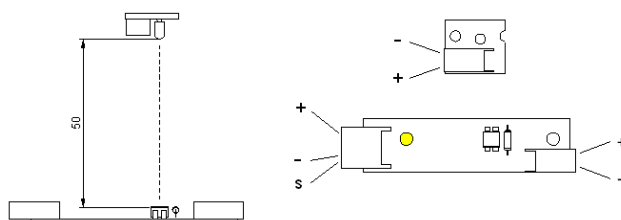
Figure 14 Barrier Sensor

The sensor is relatively insensitive to external light but should be shielded from sunlight or intense ambient light. The plates in front of the sensors are painted black to avoid reflections. They do not require any calibration.

Paper and toner may produce a lot of dust, clean sensors with a brush every 4 months and ensure the emitter and receiver LEDs are aligned for correct operation. It's possible to measure a dc voltage between the signal (S) and the ground (-)

Two conditions are possible:

1. Uncovered sensor: Voltage ca. > 9 Vdc (LED emitter off)

2. Covered sensor: Voltage ca. < 2 Vdc (LED emitter on)

Interlocks

The folder has safety interlocks located in areas that may require operator access.

These components are located inside the doors that the operator opens to clear jams.

These components have a single contact, to open a 24 Vdc voltage circuit.

	INTERLOCK	LOCATION
S1	(SWITCH)	Front upper fan left side
DS1	(MICROSWITCH)	Left feet (Base and Extra, Plus)
	(SWITCH)	Flap Bypass (Simple and Complete)
DS2	(MICROSWITCH)	Fan Folder Door
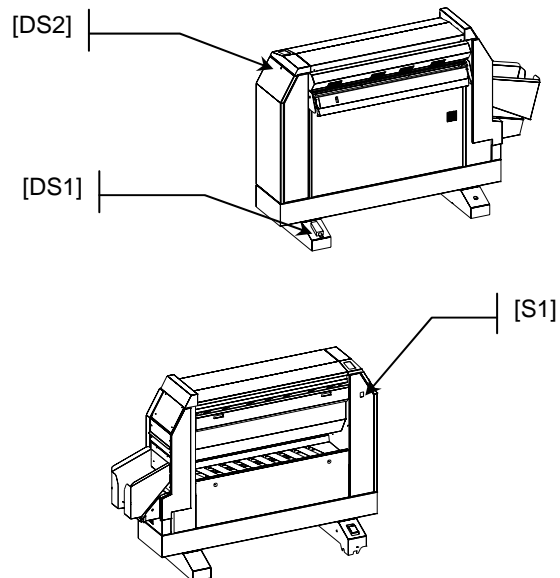
Figure 15 Interlocks

Module 4. Fan Folder

Fan Folder Description

The Fan Folder receives the prints from the printer and performs longitudinal folds. The Fan Folder process design is based on an electro-mechanical assembly, the fold process requires documents with title block located in the lead edge.

The rollers are known as the:
- In feed rubber roll driven by step motor M2 and four steel cylinders rolling over.

- Folding Roller (A) (B) and Mobile Roller (C) drive by Step Motor M3
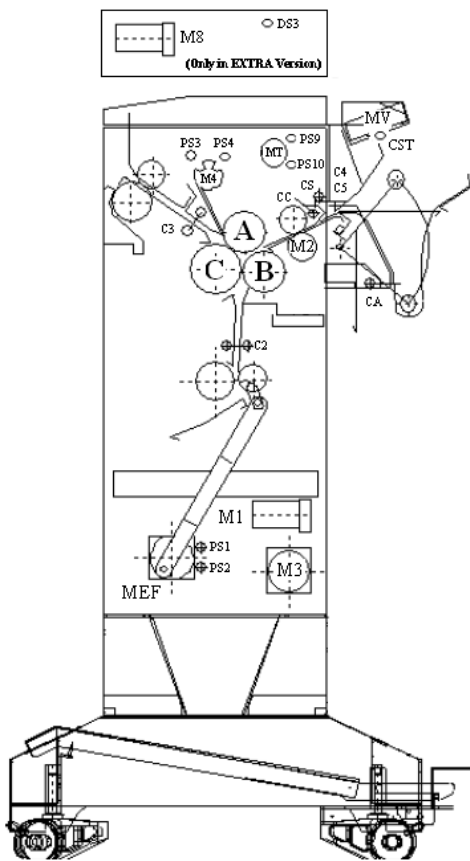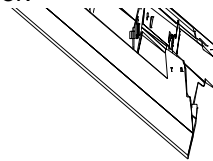
The fold pockets are steel plates designed to guide the paper during the fold process and known as the:
- Lower Pocket where is located the with sensor C2
- Upper Pocket where is located the sensor C3

Paper feeding

CS,CC

C4

C5
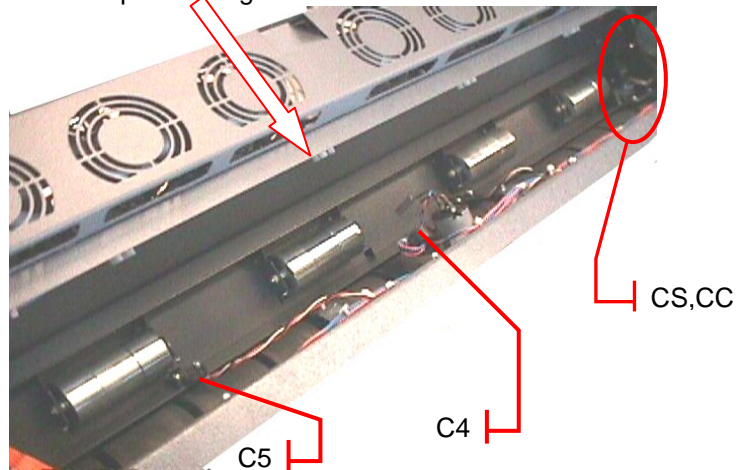
(*) Only Extra Plus Version

ITEM	DESCRIPTION	ITEM	DESCRIPTION
CS	Start Sensor	PS3	M4 Position Sensor (*)
CC	Conveyor Sensor	PS4	M4 Drive Sensor(*)
C2	Lower Pocket Sensor	M1	Transport Motor (*)
C3	Upper Pocket Sensor	MEF	Flap Motor (*)
C4	Format Sensor A2/A1 (*)	M2	Entry Stepper Motor
C5	Format Sensor A0/ A0+ 36" (*)	M3	Fan Main Stepper Motor
CST	No Tear Sensor	M4	Knife Motor (*)
CA	Advancing Sensor	MT	Feed Flap Motor
PS1	MEF Position Sensor (*)	MV	Entry Fan (8 items)
PS2	MEF Drive Sensor (*)	M8	Upper Basket Motor (only Extra Version)
PS9	MT Position Sensor	DS3	Full Bin Sensor(only Extra Version)
PS10	MT Position Sensor		

Figure 16 Extra and Plus – Base versions Fan Folder Layout
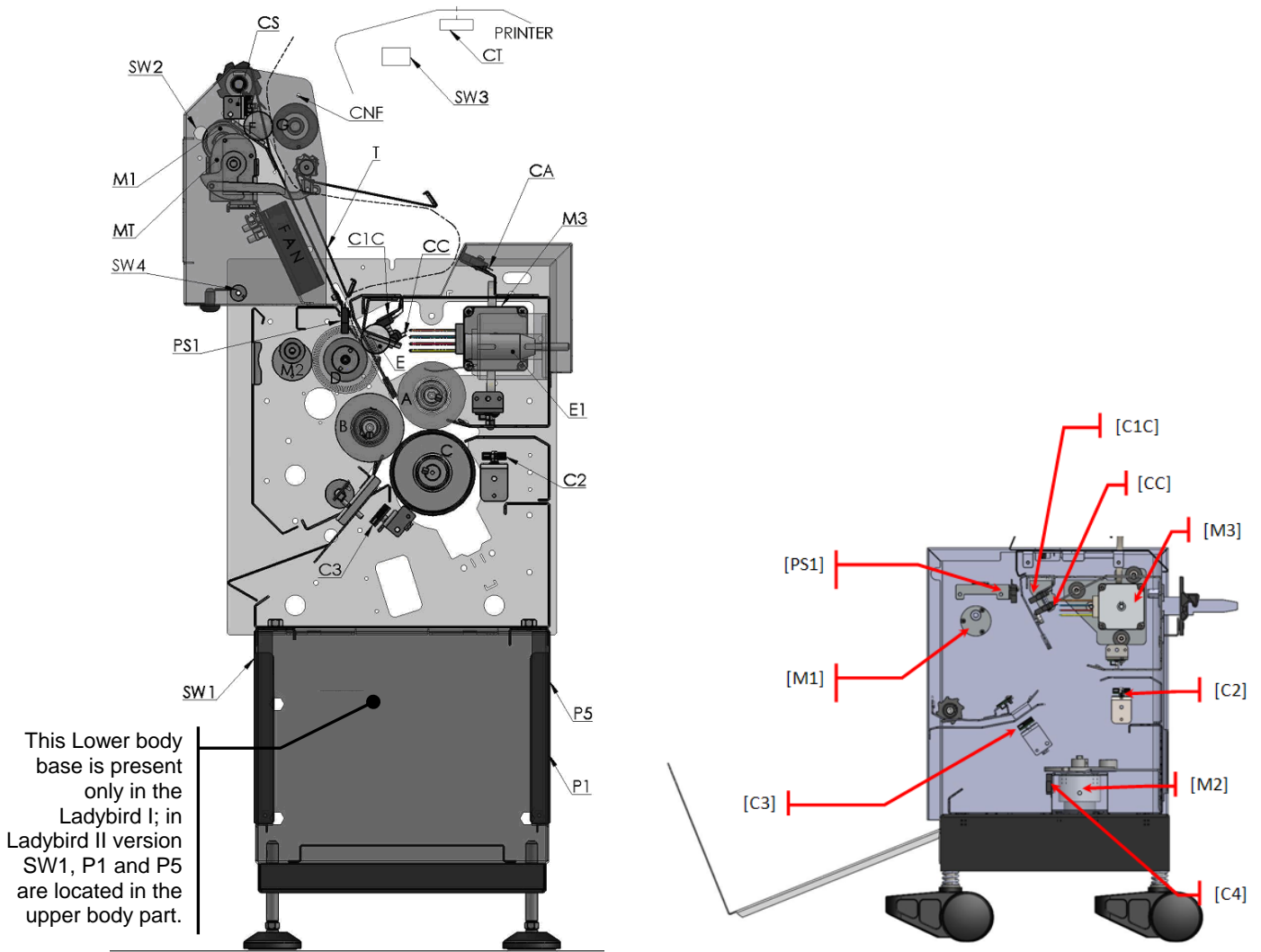
This Lower body base is present only in the Ladybird I; in Ladybird II version SW1, P1 and P5 are located in the upper body part.

ITEM	DESCRIPTION	ITEM	DESCRIPTION
CS	Start Sensor	E1	Solenoid
CA	Sensor Loop	M1	Bridge – Feed Motor
C2	1° Pocket Sensor	M2	Feeding – Rack Motor
C3	2° Pocket Sensor	M3	Fan Main Stepper Motor
C4	Rack Sensor		
CT	Cut Sensor	MT	Flap Motor
C1C	Sensor Feeding	FAN	Fans Group
CC	Advancing Sensor		
CNF	No Fold Sensor	PS1	Encoder Sensor
SW1	Switch On / Off	P1	Line Plug
SW2	Switch No Fold	P5	Download Port
SW3	Switch Cut	T	Flap
SW4	Switch Cut Manual		

Figure 17 Ladybird I - II and Ladybird III Fan Folder Layout

The Fold Sensors descriptions (Butterfly)

- Sensor CS, this sensor begin the fold process and grab the document lead edge , then Feed Flap lowering (moved by the motor MT) when CC sensor is covered to enable the paper to make a small paper buckle long enough for to perform the first fan fold panel
- Sensor CC provide a precise movement of the paper against the Mobile Roller C and provide the Print Guide step
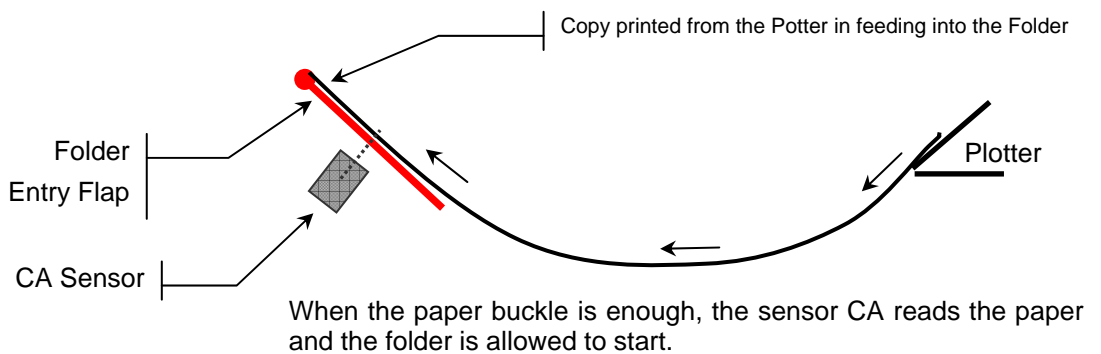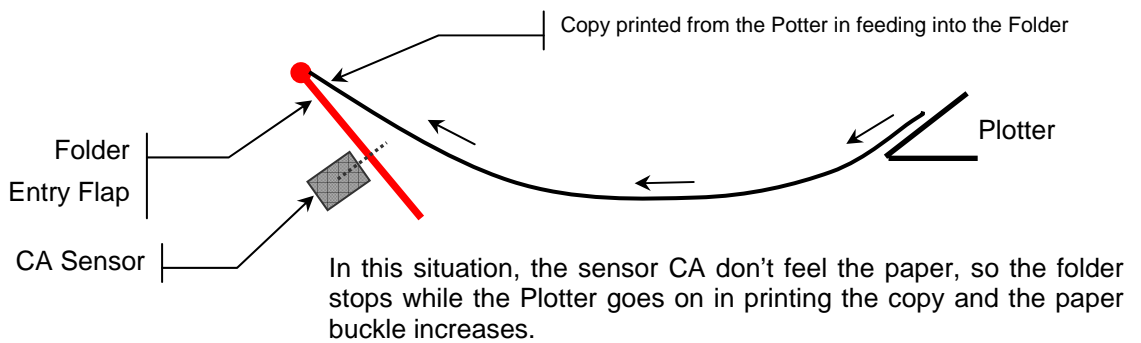- The sensor C4 provides to the folder logic the information of the paper width requiring one cross folds (only Extra, Plus version)
- The sensor C5 provides to the folder logic the information of the paper width requiring two cross folds (only Extra, Plus version)
- The sensor CA provides to assure that between the folder and the printer there's always a paper buckle in order to avoid jams or that the folder tears the paper and the plotter itself. The CA sensor reads through a hole in the entry flap.

Folder
Entry Flap

Folder
Entry Flap

CA Sensor
Up Sn°900012544

CA Sensor
From Sn° 900012551
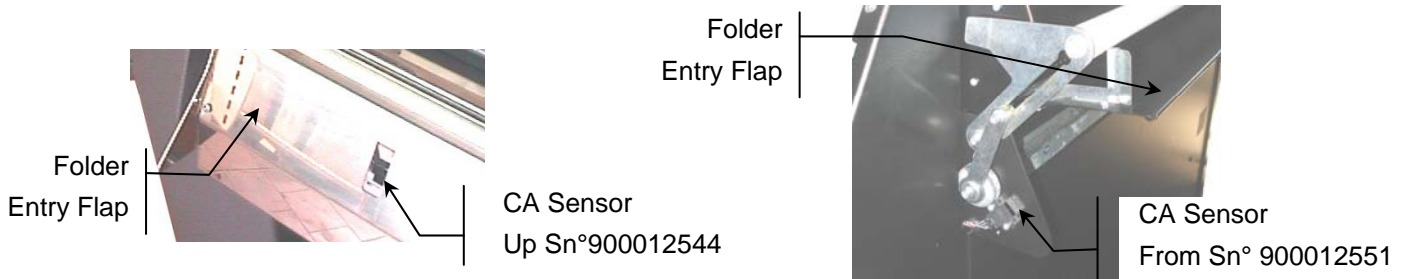
Below is schematically explained how the CA sensor works:

Copy printed from the Potter in feeding into the Folder

Folder
Entry Flap

Plotter

CA Sensor

In this situation, the sensor CA don't feel the paper, so the folder stops while the Plotter goes on in printing the copy and the paper buckle increases.

Copy printed from the Potter in feeding into the Folder

Folder
Entry Flap

Plotter

CA Sensor

When the paper buckle is enough, the sensor CA reads the paper and the folder is allowed to start.

- The sensor CST is designed to prevent copy tear. The CST sensor is at the fan folder entry on the left part protected by a cover. When this sensor is covered, the paper is tight, the folder rise an alarm and stop the print process, this avoids any jams inside the printer and folder.
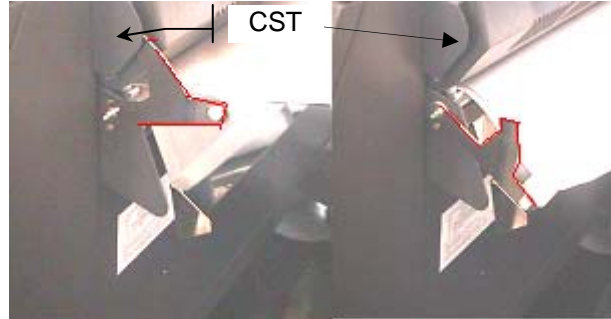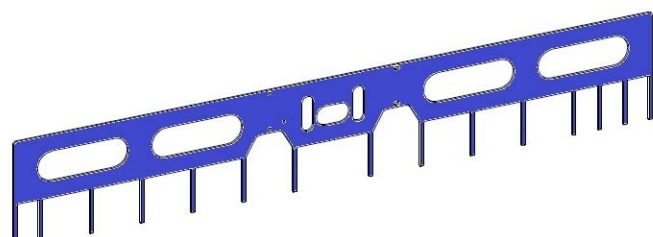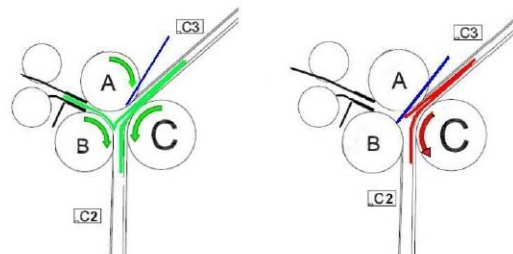

The Flap descriptions (Butterfly):

- The **Entry Feed Flap** provides copy lead edge support when the print comes and it moved up and down by a dc motor (MT).
  When the folder detects a folder jam, is lowered by impeding the entry of other prints.
- The **Exit Fan Flap** (only in the Extra, Plus version) provide drive of the fan fold package to lay down on the transport rollers with different timing related to copy size (A2 210x297). It moves up and down by a dc motor (MEF) , two position sensors PS1 and PS2 have to define the home position of the Exit Fan Flap , PS1 covered means assembly on work position.

The Finger Guide Assembly descriptions (Butterfly):

- The Finger Guide assembly provides copy support when the prints completely fan folded is located in the upper pocket and the last panel is not the exit favor (example: copy length folded into 2 or 4 panels) the trail edge may hit during the exit through the lower pocket the fold roller B.
  The Finger Guide is moved up and down with a rotation of half turn of the motor (M4). The sensor PS4 (top) define the home position, the PS3 sensor moves it to next position
  The green path shows copy length not requiring Finger Guide
  The red path shows copy length requiring Finger Guide

The Transport Rollers descriptions (Butterfly)

The Transport Rollers (only present in the Extra, Plus version) provide copy transport from the fan folder to the cross folder module, when the prints comes and it can moved towards the cross folder left way or to the right first and the to the left when is required to align special copy size. The Transport Rollers rotate by a belt contact located underneath driven by a dc motor (M1).

Preferred Title Block position (Butterfly)

The folder requires most of document introduces short edge feed with title lead edge since the first panel where is locate the title block is guided into the lower pocket.

User must trained on use the folder properly following the quick guide sticker attached on the folder entry.

The user must print all documents with short edge first and title block corner 4, no standard size or document with different width from media roll loaded must be justified x= left and Y= top in this way all plots will be well folded

Most of used system configuration is by using roll 841, and 594. This will enable to Get A0, A0 banner, A1, A1 banner and A2 size will be printed automatically long edge title block tb1, but the A2 size must be within the tolerance +-5mm , is recommended to setup everywhere the over and under tolerance to 5% .

Less common system configuration roll 841 and 420 mm will allow A0, A0 banner, A2, A2 banner and A1 printed long edge lead and A3 long edge.

Please read carefully the A2 Butterfly Quick guide where is illustrated the best use printer with 2 rolls, how to print and not fold paper or vellum and tracing, how to justify title block for no standard sizes and how configure the instant hot folder and avoid installation of windows driver on each pc on network

How it works (Butterfly)

The Folder consists of fixed steel pockets, fixed Folding Roller A and B rollers and a Mobile Roller (C) textured.

The Folder fold engine performs the fan fold operation in four steps as follows: Print Pinch, Print Guide, Print Fold, Print Exit

• Print Pinch

When the copy gets out from the Plotter, it covers the CS sensor, after that the sensor CS is covered, the feeding roller moved by M2 starts moving also the upper steel infeed rollers and the paper copy is moved on.

CC sensor

CS sensor

Feeding rubber roller (M2 motor)
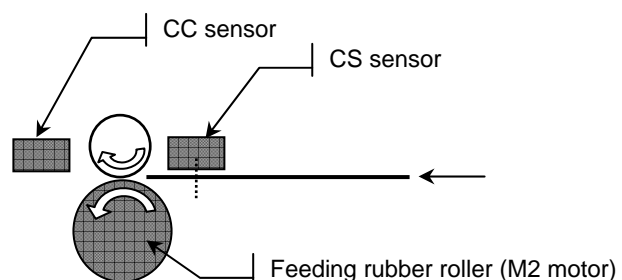
The copy advance and covers CC sensor, just after the feeding rollers

CC sensor

CS sensor

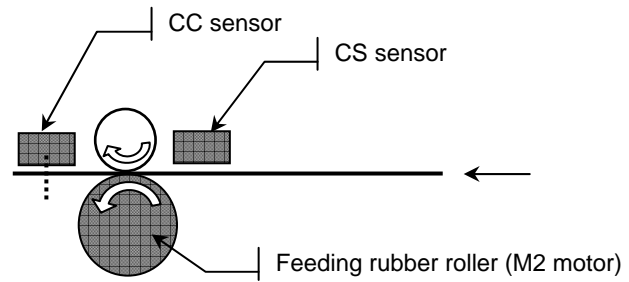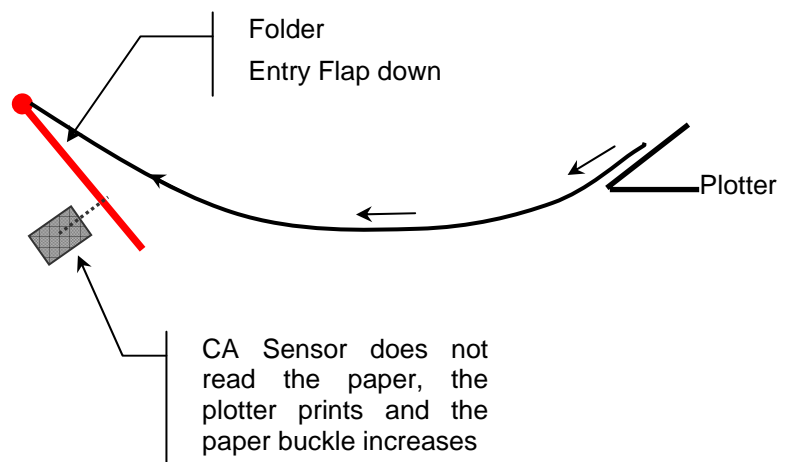Feeding rubber roller (M2 motor)

when the CC sensor is covered the copy stops (M2 stops) and the entry flap goes down to enable the paper buckle process previously described through CA sensor reading

Folder

Entry Flap down

Plotter

CA Sensor does not read the paper, the plotter prints and the paper buckle increases

• Print Guide

After the Print Pinch, The Entry Rollers advance the print towards the rotating Mobile Roller (C) until paper edge touch the roller textured, the paper lead edge is guided gently into the Upper or Lower Pocket as determined by the selected fold style parameters:

• The green path shows a copy with fold program request.

• The red path shows a copy with a no fold program request.
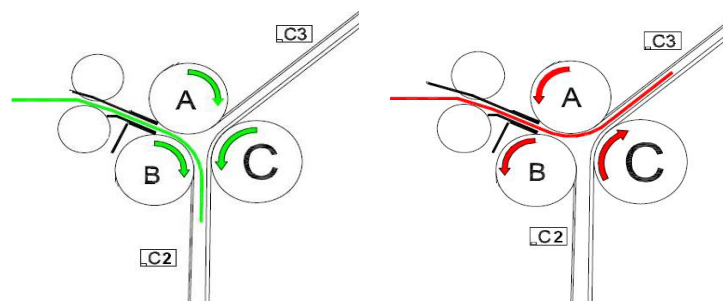
• *Print Fold*

The paper is pinched between the Mobile Roller (C) and the Folding Rollers (A) and (B), the paper is drive into the pocket for the correct length of the first panel and then is reversed to form the next fold panel. This process of alternatively driving the print through the Upper and in reverse through Lower Pockets performs the Fan Folding process.
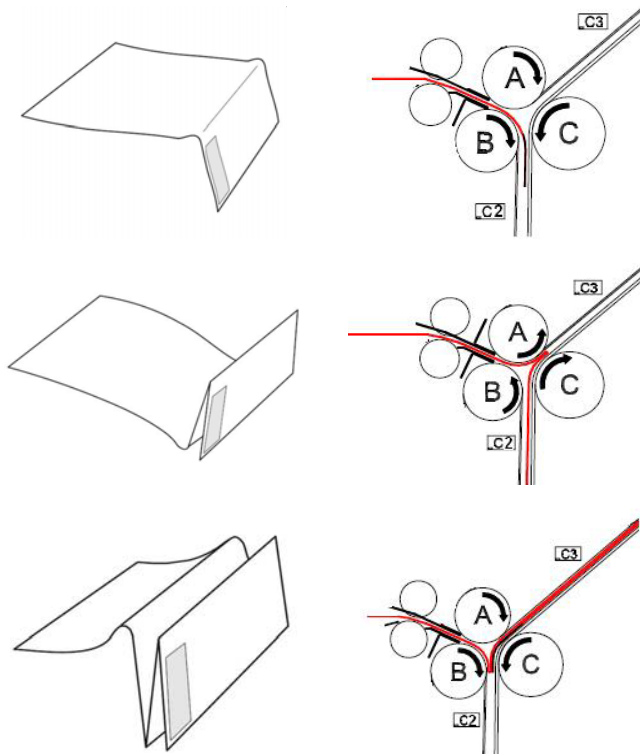
When the trail edge uncovers the sensor CS, the folder logic calculates the length of the pre-fold compensation fold so that the last panel will be complete.

• *Print output*

At the completion of the Fan Folding process the print is driven down through the lower pocket:
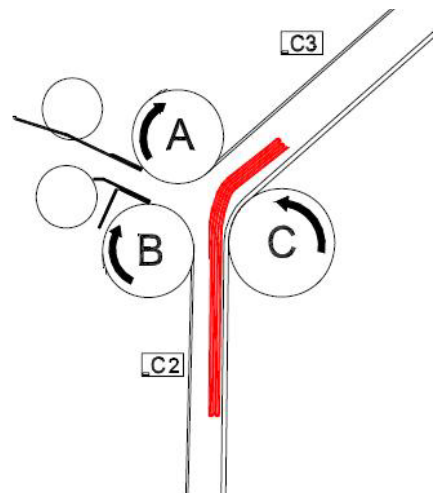
in the Base, Complete and Simple versions the copy is delivered in the folder rear tray while, in the Extra, Plus version, the copy is conveyed into the Fan Transport thanks to the movement of the Fax Exit Flap that provides to put down the fan folded copy gently on the Fan Transport with rollers moves the copy into the Cross Folder moved by the motor M1.

The Fold Sensors descriptions (Ladybird I, II and III)

Sensor CT, this sensor is placed inside the printer and recognize the copy that gets out from the Printer and actuated the Folder Entry Rollers moved by the M1 motor.

The Start Sensor CS when covered starts the folding process.

The paper is conveyed through the path until C1C sensor and stops quickly before be taken between D and E rollers; then goes on and covers CC sensor.
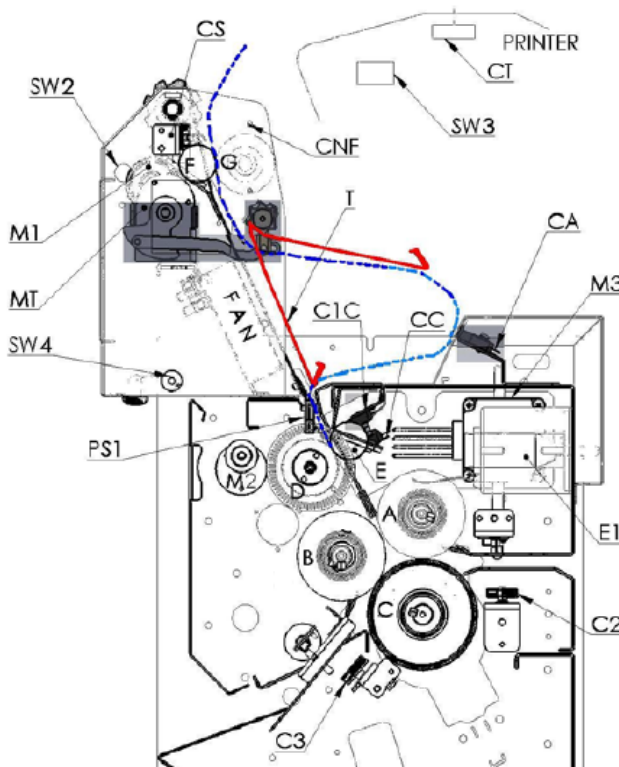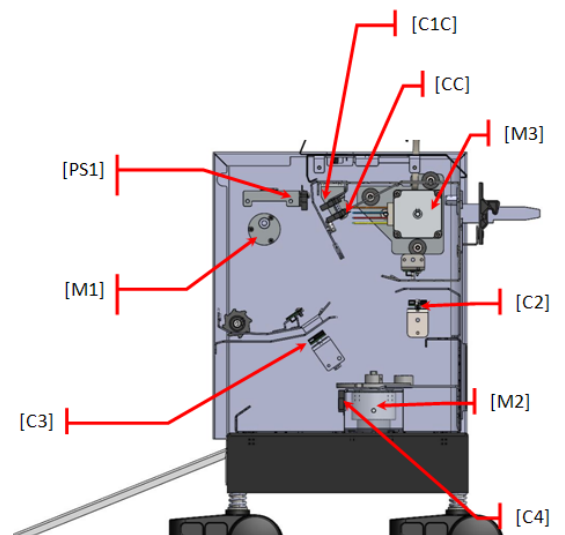
When CC sensor is covered the Flap T (in red color) is actuated and lift by MT motor to allow to the paper (that meanwhile continue to exit from the Printer) to shape a buckle until covers CA sensor.

Ladybird I- II   **Ladybird III**

When CA sensor is covered the folding process can advance since there's enough paper buckle otherwise, when CA sensor is off, the folding process can stops until CA is again covered to prevent that the folder tears the paper.

The Infeed Motor M2 is not a stepping motor as in the Butterfly Folder; It works under the logic that receives the signal from the Encoder assembled on the Infeed Roller D.

Ladybird III does not include the Upper Feed Entry Assembly; the folding process starts with C1C sensor. M2 Motor moves the lower rack for collect the folded copies in the tray.

The folding engine in the following paper path is similar of the Butterfly one with two pockets and corresponding C2 and C3 sensors

The two Folding Rollers C and B and the Mobile Roller A works as in the Butterfly Folder.

Module 5. Cross Folder

Cross Folder Butterfly Extra Plus

Extra Version

Plus Version
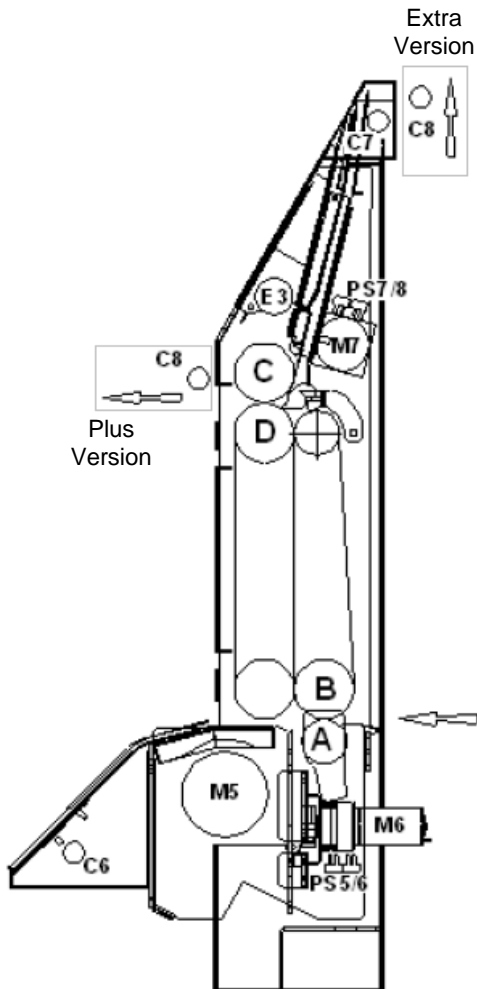
The Cross Folder receives the prints from Transport Rollers and performs the cross folds process.

The cross fold process may just a bypass without cross folds, or can provide one or two cross folds related the paper roll width.

The Knife descriptions:

The Cross Folder provides copy cross fold by activating the first pocket knife driven by the Motor M6 and the second pocket knife driven the Motor M7

ITEM	DESCRIPTION
C6	Lower Pocket Sensor
C7	Upper Pocket Sensor
C8	Cross Exit Sensor (*)
PS7	M7 Position Sensor
PS8	M7 Drive Sensor
PS5	M6 Position Sensor
PS6	M6 Drive Sensor

ITEM	DESCRIPTION
M5	Main Cross Motor
M6	Lower Knife Motor
M7	Upper Knife Motor
E3	Solenoid
(*) C8 sensor position is on the Cross Folder exit that is different in extra and plus version	

Figure 17 Butterfly Extra and Plus Cross Folder Layout

The Cross Folder performs the folds, which are at a 90° angle to the paper path, prior to feeding the prints onto the Exit Basket.

The Cross Folder design is based on four rollers, a conveyer belt, one main motor, one solenoid and two cross fold motors, two knives and an Exit Basket.

The four cross fold rollers are known as:
- The Feeding Roller A
- The Feeding Roller B
- The Cross Fold Right Exit Roll C
- The Cross Fold Right Exit Roll D

The movement of the print into the pocket is described as:
- The Lower Pocket
- The Upper Pocket

The paper stops is described as:
- Solenoid [E3]

The knifes are described as:
- Lower knife
- Upper knife

The Cross Folder is driven by:
- Cross Folder Main Motor [M5]
- Lower Knife Motor [M6]
- Upper Knife Motor [M7]

The copy just fan folded is fed into the Cross Folder by the rollers A and B through the lower pocket until the sensor C6 is covered; when the copy is on C6 the main motor M5 stops.

The paper is conveyed through the conveyer belt by the lower knife that gets up moved by the motor M6; meanwhile, the conveyer belt moves in upper direction performing the first fold.

cross section modification

fan folded print entry

Black area new knife design (16-4-08)
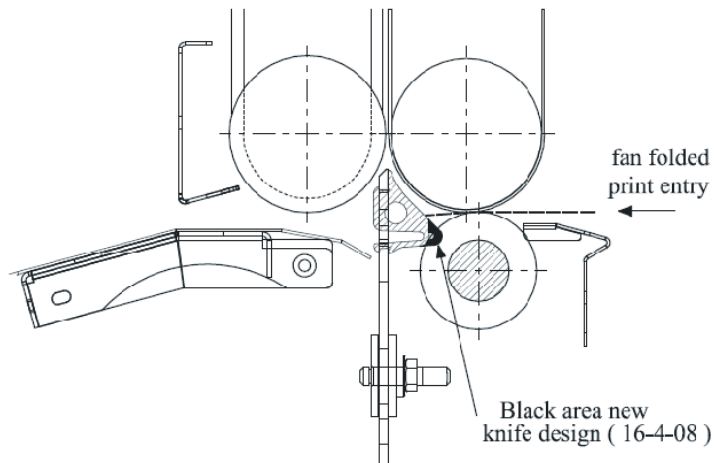
If the folding process needs one cross fold like A2, A1 size, the copy is conveyed through the exit rollers C and D, the knife (M7) moving into work position provides a guidance for the exit.
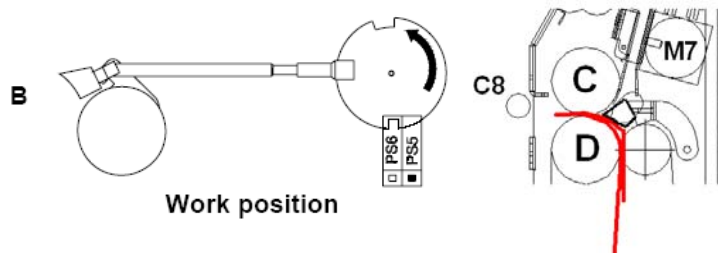
Work position

When the folding process requires two cross folds as A0 size, the copy is conveyed into the Upper Pocket until the sensor C7 is covered. Then, the Upper knife (M7) moves to work position to perform the copy fold while the solenoid [E3] actuates keeping the copy in place (blue line), the copy exit through the rollers C and D.

Home position
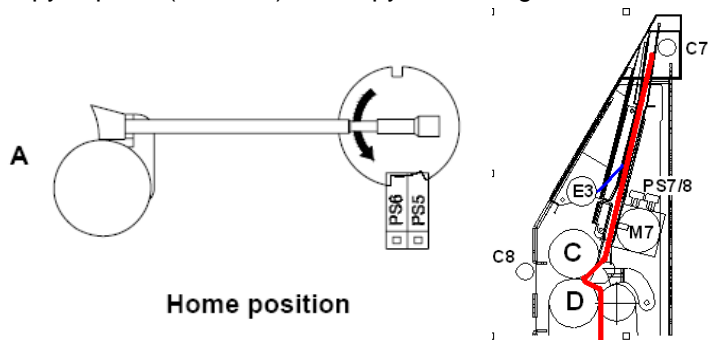
0 Cross Fold A3/B size

1 Cross Fold A2/C , A1/D

2 Cross Fold A0/E , 914

Module 6. Control Panel

The Control Panel is the manual means used to communicate with the folder.

The Control Panel uses universal symbols and the button labeling and their functions are described in the following chart:

The simplified Folder Control Panel contains two keys and five indicator lights.

|	
	Selection Key: - Press to select the fold output package for print introduced manually - Press to perform Manual Eject and clear the folder jams
	Reset Key Performs RESET

Control Panel

In Butterfly and Ladybird Folder the control panel is the one showed below; the control panel is different according the printer version the folder is joined with: Hp plotters 4000, 4020, 4500. 4520 T7100, T1200 T770, T2500, T1500 and T920 . The selection key select the fold output package for print introduced manually and performs the Manual Eject for clear the folder jams; the Reset Key performs the folder reset.

The four led indicators near the Selection Key indicate the current folding program in use. When in Manual Feed Mode only the 210 or 190 Programs are available and can be selected.

According to the folder version the control panel is different for the cross folding that can be available in on line mode or off line or, again, can be not available.
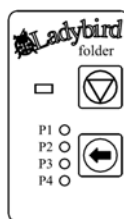
Ladybird Folder   Butterfly Plus Extra   Butterfly Base
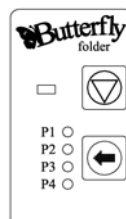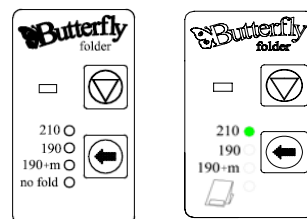
Touchscreen Control Panel (for Ladybird III)

The LadyBird III Folder is provided with a touch screen control panel. Through it is possible choose folding programs, perform diagnostic test and folding adjustment.

Activity

Refer to the Folder Operator Manual and read the Folding Procedures, and Programming the Folder sections.

Module Summary

You should now be familiar with the Control Panel. You have learned that:

- The Control Panel contains two buttons and five leds

- The buttons are used to select the folding program that you require

If you have any questions about the information that was discussed in this module, read the module.

Module 7. Installation, Adj. , Operator Training, Firmware Upgrade

Module Overview

In the previous modules, you have been given an overview of the folder and its functional areas. This module will provide you with information on the following

1. Folder installation
2. Adjustments
3. Operator training
4. Firmware Upgrade

In the Folder Installation section of this module, you will learn where the installation instructions are located, the elements of the installation instructions, and the key points to consider when performing an installation.

In the adjustment section of this module, you will learn information about optimizing the Butterfly Folder for each account and the adjustments associated with it.

In the Operator Training section of this module, you will learn about the role you will play in training the operator once you have installed the Butterfly Folder at an account.

In the Firmware Upgrade section of this module, you will learn information about the firmware upgrade.

Module Objective

This module will review some of the important aspects of the Butterfly Folder installation, adjustment setups, and operator training. When you complete this module, you will

- Know where to find the installation instructions to be able to perform a more efficient folder installation, and understand techniques to deal with sensitive issues involved in a folder installation
- Understand the limitations which are inherent in the operation of the folder
- Be familiar with the adjustments necessary to optimize each folder
- Understand the elements the operator must know, and be able to train the operator to use the Butterfly Folder
- Be familiar how do the firmware upgrade and NVM setting.

Task 1 Firmware Upload procedure

At the end of this module a task will familiarize you with the Firmware Upload procedure.

Task 2 Setup of the WebPMT / Driver

At the end of this module a task will familiarize you with the webPMT/Printer settings required by the folder.

Task 3 Scanner default template

At the end of this module a task will familiarize you with how to save as power on template the scanner settings for the folder use.

Task 4 Fold Panel Adj.

At the end of this module a task will familiarize you with the Fan and Cross fold panels settings required by the folder.

Installation Overview

When you install the Butterfly Folder, you may encounter a problem of uneven or unleveled floors. You may also encounter a floor that is not rigid, such as one covered by carpeting or made of wood. These situations can make it difficult to level the folder.

It is not intended that the folder be moved after it has been installed. Therefore, it is important that the installation site be as flat, smooth, level, and rigid as possible so that the folder can be leveled correctly. If the folder is moved for any reason, it will have to be leveled again.

Once unpacked check that the folder structure has not been damaged. Refer to installation Check list. A damaged folder structure could cause poor folding quality and no adjustments can be made to improve it.

Once installed, the folder operation will need to be checked to ensure that all size prints are transported reliably and folded correctly. In addition, there are certain elements in the folder installation that may not be intuitively obvious. It is for this reason that the entire installation procedure will be discussed at this time. It will provide you with an opportunity to familiarize yourself with the tasks involved before you actually have to perform an installation.

Folder Installation Procedure

The installation procedure contains kit contents, as well as detailed step by step instructions.
You will be required to make an Installation Check List of the operation performed this will ensure that you have made all the required steps to perform a faultless installation.

Activity ☐

Refer to the Butterfly Folder Service Manual section 6, and review the Butterfly Folder Installation Procedure. Then, return to this point and continue with the Student Workbook. Keep the installation procedure handy for reference as you continue.
The following key points are important when performing an installation. Refer to your installation procedure as you review the points.

1. As you unpack the folder, ensure that you have all the components required and listed on the packing list.
2. The space requirements are an important element. They should be adhered to as closely as possible in order to allow adequate clearance around all borders of the folder, to allow access of all areas.
3. Then Install the Output Tray and the other separated parts to complete the physical installation.
4. Modify the HP Printer by installing the necessary printer parts
5. The next task is to level the folder correctly, place the rubber pad under the printer and folder caster, align the Bridge Transport to it, and then adjust the feet of the folder to make sure it is leveled. This will ensure that the folder operates correctly.
6. Connect and route the cables, connect the power cord, and install the interface harness to the printer as illustrated. This will complete the electrical connections.

7. Ensure that the folder is adjusted accurately so that it will transport and fold the prints correctly. Check folding quality with the kind of paper and documents used by the customer. Included in these steps is a check of the printer cut length adjustment and squareness.

This concludes the discussion of the Butterfly Folder Installation Procedure. Remember:

- That all sizes of prints must be checked and/or adjusted using the procedure in the Butterfly Folder Service Manual

- If an adjustment is within specification, it should not be adjusted to try to achieve 0 mm because doing so may cause an out of specification fold quality

- To record all changes on the Machine Log Book final test report

Before the adjustment overview section is discussed, the following folder limitations will be presented.

Folder Limitations

The following items are important for you to know concerning the Butterfly Folder and its limitations.

- For safety reasons, two CSE's are required for removal of the Cross folder in the event that it needs to be removed

- For the proper title block location, the prints must enter the Butterfly Folder from the printer in the manner indicated in the Butterfly Folder Service Manual Section4 fold adj.

- Printer cut skew can be as much as ± 2.0 mm. This does not mean that the printer is out of specification, but rather that this much cut skew can cause some folding skew which may exceed the folding specifications.

These items will be important to remember when you perform your 'Train the Operator' activities after the installation.

Adjustments Overview

As you have learned, the Butterfly Folder is capable of handling a wide range of print sizes and media weights. Different types of media and environmental conditions are all factors, which can affect the final output result. This section of the module will help you to ensure that some of the more critical parameters are setup correctly so that the folder operates most efficiently and reliably.

There are three adjustments that we will review. The procedures are documented in Section Four of your Butterfly Folder Service Manual. The first two are mechanical adjustments while the last is an electronic adjustment. They are:

1. Fan Folder Pressure Roller Adjustment - The purpose of this adjustment is to ensure that there is equal and the correct pressure value between the left and right side (see ADJ 2.1) of the Pressure Roller, the Mobile Roller and the folding roller during the work process.

2. Cross Roller Pressure - The purpose of this procedure is to ensure that the pressure of the rollers (see ADJ 3.2, 3.3) is correct.

3. Calibration of Fold Quality - The purpose of this adjustment is to ensure that the fan folded output meets the customer's expectations.

The folder comes from the factory already adjusted with a set of NVM folding values.. However, different manufacturer's bonds may

affect the output results. Any adjustment required is to be based on the customer's expectations of the bond being used. The Calibration Fold Quality will overwrite the preset values in ROM to allow a more precise fold.

Activity

Refer to the Butterfly Folder Operator Manual, and review the steps for performing the adjustments mentioned above. Then, return to this point and continue with the Student Workbook.

Adjustments Optimisation

Now that you have seen the calibration procedures, you will be more prepared to perform them on the folder as required. The specific customer application, environmental conditions, and the type of media being used will be a determining factor in which adjustments you will perform and when.

The factory preset NVM values in ROM as was mentioned earlier. They are printed on a card called the Final Test Report, which, is inserted into the pocket in the cross folder.

Document pocket
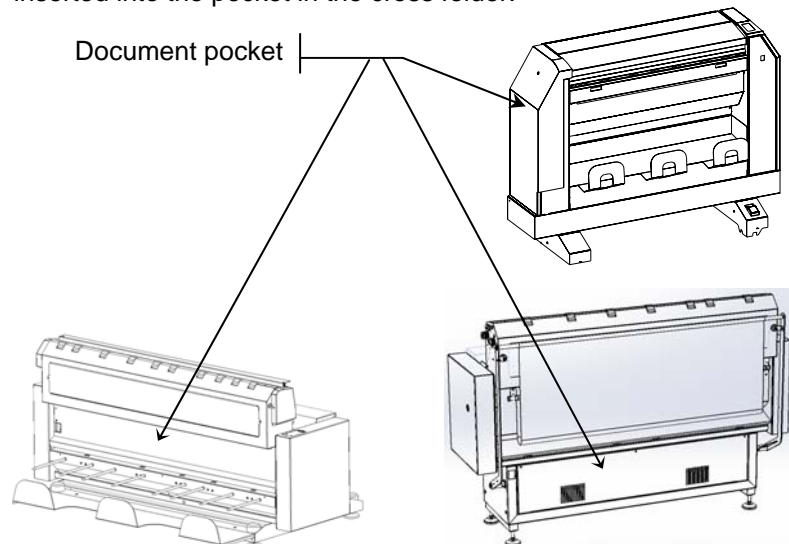
Figure 18 Location of the Machine Documents

The preprogrammed default NVM values allow the folder to perform basic folds. The CSE can measure the folds and reprogram the values in NVM. This allows for a more precise optimization for the customer paper being used.

Operator Training

This section of the module will explain the role you will play in training the operator once you have installed the Butterfly Folder at an account. The information will give you an overview of the Butterfly Folder operator training strategy to help you understand the elements the operator must know. You will:

- Prepare by familiarizing yourself with the Butterfly Folder Operator Manual

- Use the Folder Operator Manual to explain to the operator how to use the folder and how to effectively use the Operator Manual when questions arise

The operator will rely on you to answer any questions which may not be answered in the Operator Manual and which may not be intuitively obvious from operating the folder.

Therefore, ensure that you use the Operator Manual during this demonstration. The illustrations will assist you and the operator will become familiar with the manual for future use.

1. Refer to the **Safety Notes** section of the Operator Manual and review the safety notes.

2. Refer to the **Folder Overview** section and review the following:

    - Reference information
    - Folder description
    - Folder options
    - Folding Styles INVERSE DIN, UNI, AFNOR, ANSI

3. Refer to the **Quick Guide** section and review the following.

    - Control panels menu
    - Switching on the folder and folding basics

4. Refer to the **Jam Clearance Procedures** section and review the following:

    - Message Display
    - Introduction to Jam Clearance Procedures
    - Clearing Bridge Jams
    - Clearing Fan Folder Jams
    - Clearing Upper and Lower Pocket Jams
    - Clearing Cross Folder jams

5. Refer to the **Problem Solving** section. Review the Symptom, Cause, and Solution table with the operator, and then review the procedure for switching between folding programs A and B.

6. Refer to the **Miscellaneous Information** section and review the following:

    - Folder Specifications
    - Space Requirements

7. Ask the Customer if there is any questions that you can answer, or if there are any areas of the folder that require further explanation.

8. Explain to the operator the problems that he/she could have when using undefined sizes.

Firmware Upgrade

Flash EPROM, in the main Folder Controller, contains the firmware release able to define the folder functionality and it's identified with a revision number with this format x.yy, where x stands for family firmware and yy numbers from 00 to 99.

When you upgrade the firmware you must use the download procedure available on the GERA web site

Communications between the printer and folder are bi-directional through the Serial Communication Port. When the printer is programming the folder (selection folding program, number of the prints, width and length) the folder displays the last fold program selected and m=xxxxx C=xxxxx.

At power on, the folder executes a self-test to establish whether all inputs sensors, switches and encoders are functional. If there is a fault, the operator is informed by an alarm message.

Check List and Folder Registration Form

After the folder installation procedure is performed it is mandatory to perform the **Install Check List** and the **Folder Registration**.

At the end of the Installation Procedure in Service Manual Section 6 are the Install Check List and the Folder Registration. These are provided as a convenience to insure that all the elements of the installation procedure are completed.

The Folder Registration Form can be completed on line at http://www.gera.it/en/supporto-tecnico/registrazione   and   is required to:

▶Order Spare
▶Activate Warranty
▶Contact Tech support with the online Problem Report Form

Instructions

1. Install the GERA Utility application by using the wizard available on the Gera web site at tech support page.

2. Refer to document for a complete description and procedure.

- The Firmware is available on the Gera Web site

- The Firmware can be downloaded to the Main Controller using an USB serial cable adapter or USB cable connected from the folder to the laptop.

Module 8. Technical Support, Parts Ordering Process

Module Overview

This module will provide you with information on the following

1. Technical Support
2. Parts Ordering Process
3. CSE Call escalation

Technical Support

GERA provides 2nd Level Service Engineering Support in Europe, Africa, Asia (8:00 AM to 5:00 PM Rome time) GERA SERVICE TEAM

1. The CSE can submit via web the Problem Report Form to GERA for assistance in problem resolution at any time.
2. Gera Service Team logs the Problem Report Form information into a database and responds with support via Email ,SMS.

CSE Call Escalation

To enter the Call Escalation Flow the Customer Service Engineer must first:

1. Make sure that the Product has been registered on the GERA web site and store a copy of the form in the folder. This will enable
   ▶ Ordering Spares
   ▶ Activate Warranty
   ▶ Contact Tech support with a Problem Report Form
2. Get the Gera Folder serial number
3. Evaluate the problem using Section 3 Fold Quality or Section 2 RAP in the Service Manual and adjust or repair as necessary
4. If problem is not resolved, open a call to Xerox and one to GERA by using the Problem Report Form on-line at this web address Tech Support
5. Fill out the PRF with the required details per the folder model, make a copy for your records and submit to GERA.

Task 1 Web Folder Registration Form

At the end of this module a task will familiarize you with the Web Folder Registration Form:

* Fill this form on line by adding TEST in the note field
  Folder Registration Form

Task 2 Web Problem Report Form

At the end of this module a task will familiarize you with the Web Problem Report Form

Task 3 Spare part ordering process

Familiarize you with the Spare part ordering process.