SERVICE MANUAL

24-PIN SERIAL IMPACT DOT MATRIX PRINTER

EPSON LQ-630/630K

COLOR IMAGING EPSON

EPSON®

SEDM02001

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PRECAUTIONS

Precautionary notations throughout the text are categorized relative to 1)Personal injury and 2) damage to equipment.

DANGER Signals a precaution which, if ignored, could result in serious or fatal personal injury. Great caution should be exercised in performing procedures preceded by DANGER Headings.

WARNING Signals a precaution which, if ignored, could result in damage to equipment.

The precautionary measures itemized below should always be observed when performing repair/maintenance procedures.

DANGER

1. ALWAYS DISCONNECT THE PRODUCT FROM THE POWER SOURCE AND PERIPHERAL DEVICES PERFORMING ANY MAINTENANCE OR REPAIR PROCEDURES.
2. NO WORK SHOULD BE PERFORMED ON THE UNIT BY PERSONS UNFAMILIAR WITH BASIC SAFETY MEASURES AS DICTATED FOR ALL ELECTRONICS TECHNICIANS IN THEIR LINE OF WORK.
3. WHEN PERFORMING TESTING AS DICTATED WITHIN THIS MANUAL, DO NOT CONNECT THE UNIT TO A POWER SOURCE UNTIL INSTRUCTED TO DO SO. WHEN THE POWER SUPPLY CABLE MUST BE CONNECTED, USE EXTREME CAUTION IN WORKING ON POWER SUPPLY AND OTHER ELECTRONIC COMPONENTS.
4. WHEN DISASSEMBLING OR ASSEMBLING A PRODUCT, MAKE SURE TO WEAR GLOVES TO AVOID INJURIER FROM METAL PARTS WITH SHARP EDGES.

WARNING

1. REPAIRS ON EPSON PRODUCT SHOULD BE PERFORMED ONLY BY AN EPSON CERTIFIED REPAIR TECHNICIAN.
2. MAKE CERTAIN THAT THE SOURCE VOLTAGES IS THE SAME AS THE RATED VOLTAGE, LISTED ON THE SERIAL NUMBER/RATING PLATE. IF THE EPSON PRODUCT HAS A PRIMARY AC RATING DIFFERENT FROM AVAILABLE POWER SOURCE, DO NOT CONNECT IT TO THE POWER SOURCE.
3. ALWAYS VERIFY THAT THE EPSON PRODUCT HAS BEEN DISCONNECTED FROM THE POWER SOURCE BEFORE REMOVING OR REPLACING PRINTED CIRCUIT BOARDS AND/OR INDIVIDUAL CHIPS.
4. IN ORDER TO PROTECT SENSITIVE MICROPROCESSORS AND CIRCUITRY, USE STATIC DISCHARGE EQUIPMENT, SUCH AS ANTI-STATIC WRIST STRAPS, WHEN ACCESSING INTERNAL COMPONENTS.
5. DO NOT REPLACE IMPERFECTLY FUNCTIONING COMPONENTS WITH COMPONENTS WHICH ARE NOT MANUFACTURED BY EPSON. IF SECOND SOURCE IC OR OTHER COMPONENTS WHICH HAVE NOT BEEN APPROVED ARE USED, THEY COULD CAUSE DAMAGE TO THE EPSON PRODUCT, OR COULD VOID THE WARRANTY OFFERED BY EPSON.

About This Manual

This manual describes basic functions, theory of electrical and mechanical operations, maintenance and repair procedures of the printer. The instructions and procedures included herein are intended for the experienced repair technicians, and attention should be given to the precautions on the preceding page.

Manual Configuration

This manual consists of six chapters and Appendix.

CHAPTER 1.PRODUCT DESCRIPTIONS

Provides a general overview and specifications of the product.

CHAPTER 2.OPERATING PRINCIPLES

Describes the theory of electrical and mechanical operations of the product.

CHAPTER 3.TROUBLESHOOTING

Describes the step-by-step procedures for the troubleshooting.

CHAPTER 4.DISASSEMBLY / ASSEMBLY

Describes the step-by-step procedures for disassembling and assembling the product.

CHAPTER 5.ADJUSTMENT

Provides Epson-approved methods for adjustment.

CHAPTER 6.MAINTENANCE

Provides preventive maintenance procedures and the lists of Epson-approved lubricants and adhesives required for servicing the product.

APPENDIX

Provides the following additional information for reference:

- Connector pin assignments
- Electric circuit boards components layout
- Electrical circuit boards schematics
- Exploded diagram & Parts List

Symbols Used in this Manual

Various symbols are used throughout this manual either to provide additional information on a specific topic or to warn of possible danger present during a procedure or an action. Be aware of all symbols when they are used, and always read NOTE, CAUTION, or WARNING messages.

Indicates an operating or maintenance procedure, practice or condition that is necessary to keep the product's quality.

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

May indicate an operating or maintenance procedure, practice or condition that is necessary to accomplish a task efficiently. It may also provide additional information that is related to a specific subject, or comment on the results achieved through a previous action.

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

Indicates that a particular task must be carried out according to a certain standard after disassembly and before re-assembly, otherwise the quality of the components in question may be adversely affected.

Revision Status

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CHAPTER

1

PRODUCT DESCRIPTION

1.1 Specifications

This specifications provide characteristics of the serial impact dot matrix printer LQ-630/LQ-630K.

NOTE: *<LQ-630K> designates Chinese specifications. <LQ-630> designates non-Chinese specifications. Listed specifications without <LQ-630> or <LQ-630K> designations are specifications that are common to both the LQ-630 and LQ-630K models.*

1.1.1 Features

The major features of this printer are;

- ☐ Printing Speed
  - : High speed draft 300cps
  - : Draft 225cps
  - : LQ 79cps (at 10cpi)
  - : Hanzi Super draft <Characteristic of LQ-630K>
    - 150kps (at 6.7cpi)
    - 168kps (at 7.5cpi)
  - : Hanzi high speed <Characteristic of LQ-630K>
    - 100kps (at 6.7cpi)
    - 112kps (at 7.5cpi)
  - : Hanzi <Characteristic of LQ-630K>
    - 52kps (at 6.7cpi)
    - 59kps (at 7.5cpi)
- ☐ Feeding Method
  - : Friction feed (front)
  - : Push tractor feed (rear)
- ☐ Feeder : Rear push tractor
- ☐ Paper / Media : Single sheet, Continuous paper, Multi part paper, Label
- ☐ Fonts
  - : <LQ-630>
    - 9 LQ & 1 Draft Bitmap
    - 4 Scalable typefaces
    - 8 Barcode fonts
  - : <LQ-630K>
    - 2 Hanzi
    - 4 LQ & 1 Draft Bitmap
    - 4 Scalable typefaces
    - 8 Barcode fonts
- ☐ Character tables
  - : <LQ-630>
    - Standard version 13 tables
    - NLS version 43 tables
  - : <LQ-630K>
    - Hanzi GB18030
    - ASCII Italic, PC437, PC850, PC860, PC863, PC865, PC858
- ☐ Input buffer : 32 Kbytes
- ☐ Acoustic noise : 57dB (A) (ISO7779 pattern)
- ☐ Reliability
  - : Mean print volume between failure (MVBF) (MTBF 25% duty cycle) 12 million lines (except print head)
  - : MTBF 6000 POH
  - : Print head life 200 million strokes / wire
  - : Ribbon life 2 million characters
- ☐ Interface : Bi-directional parallel interface (IEEE-1284 nibble mode supported) USB I/F ver.1.1
- ☐ Control code
  - : <LQ-630>
    - ESC/P 2 and IBM PPDS emulation
  - : <LQ-630K>
    - ESC/P-K, IBM PPDS emulation and OKI5530SC emulation
- ☐ Copy capability
  - : <LQ-630>
    - 1 original + 4 copies
  - : <LQ-630K>
    - 1 original + 6 copies
- ☐ Control panel functions : Pause, LF / FF, Load / Eject, Micro Adjust, Self test, Data dump and the Default settings

☐ Exterior view of LQ-630/LQ-630K

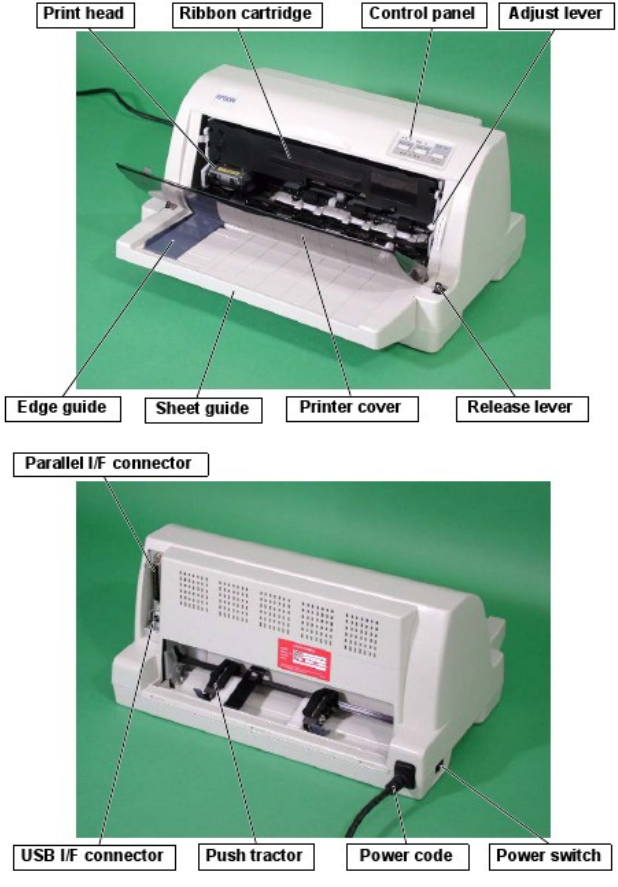


Figure 1-1. Exterior of LQ-630/LQ-630K

☐ Accessories

Table 1-1. Enclosed Part

Name	Quantity
User's manual	1
Driver disk	1
Ribbon cartridge	1
Power supply cable (Only LQ-630)	1

Table 1-2. Consumables

Name	Part number
Fabric ribbon cartridge (Black)	S015290

Table 1-3. Options

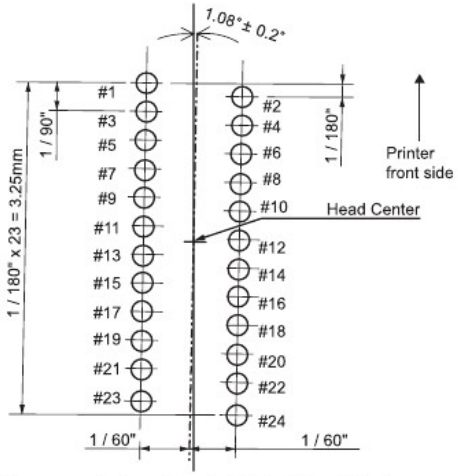
Name	Part number
Epson Net 10/100 Base TX Ext. Print Server	C82378*

1.2 Hardware Specifications

This section describes hardware specification for the LQ-630/LQ-630K.

1.2.1 Printing Specifications

- Printing Method : Impact dot matrix
- Number of pins : 24 pins
- Print pin arrangement : 12 x 2 staggered (See Figure 1-2. "Pin Arrangement".)
- Print pin diameter : 0.20mm (0.0079inch)
- Color : Black
- Print direction : Bi-direction with logic seeking



NOTE: Arrangement shown from back of print head, facing paper surface.

Figure 1-2. Pin Arrangement

- Print speed and printable columns

Table 1-4. Print Speed and Printable Columns

Printing mode		Character pitch	Printable columns	Printing speed (cps)	
				Normal	Copy
High speed draft		10cpi	80	300	240
		12cpi	96	360	288
Draft		10cpi	80	225	180
		12cpi	96	270	216
		15cpi	120	337	270
Draft condensed		17cpi	137	192	154
		20cpi	160	225	180
LQ		10cpi	80	79	60
		12cpi	96	94	72
		15cpi	120	118	90
LQ condensed		17cpi	137	135	102
		20cpi	160	158	120
Characteristic of LQ-630K	Hanzi super draft	5cpi	40	112	90
		6cpi	48	135	108
		6.7cpi	53	150	120
		7.5cpi	60	168	135
	Hanzi high speed	5cpi	40	75	60
		6cpi	48	90	72
		6.7cpi	53	100	80
		7.5cpi	60	112	90
	Hanzi	5cpi	40	39	30
		6cpi	48	47	36
		6.7cpi	53	52	40
		7.5cpi	60	59	45

NOTE: *When the power supply voltage drops to the lower limit, the printer stops printing and then starts printing remains on that line again more slowly than before.*

NOTE: *When the head temperature rises to the upper limit, the printer stops printing. When the head temperature falls to the normal level, the printer starts printing again more slowly than before.*

☐ Resolution

Table 1-5. Resolution

Printing mode		Horizontal density	Vertical density	Adjacent dot print
High speed draft		90dpi	180dpi	No
Draft		120dpi	180dpi	No
Draft condensed		240dpi	180dpi	No
LQ		360dpi	180dpi	No
8 pins bit image		60, 80, 90 or 120dpi	60dpi	Yes
		120 or 240dpi	60dpi	No
24 pins bit image		60, 90, 120 or 180dpi	180dpi	Yes
		360dpi	180dpi	No
Raster graphics*1		180 or 360dpi	180 or 360dpi	Yes
Characteristic of LQ-630K	Hanzi super draft	120dpi	180dpi	No
	Hanzi high speed	180dpi	180dpi	No
	Hanzi	360dpi	180dpi	No

NOTE: *(*1) Do not disclose to the public.*

☐ Control code : <LQ-630>
ESC/P 2 and IBM PPDS emulation

: <LQ-630K>
ESC/P K, IBM PPDS emulation and
OKI5530SC emulation

☐ Character tables

■ Standard version (13 character tables) <LQ-630>:

Italic table	PC437 (US, Standard Europe)
PC850 (Multilingual)	PC860 (Portuguese)
PC861 (Icelandic)	PC863 (Canadian-French)
PC865 (Nordic)	Abicomp
BRASCII	Roman 8
ISO Latin 1	
PC858	ISO 8859-15

■ NLSP version (39 character tables) <LQ-630>:

Italic table	PC437 (US, Standard Europe)
PC850 (Multilingual)	PC437 Greek
PC853 (Turkish)	PC855 (Cyrillic)
PC852 (East Europe)	PC857 (Turkish)
PC864 (Arabic)	PC866 (Russian)
PC869 (Greek)	MAZOWIA (Poland)
Code MJK (CSFR)	ISO 8859-7 (Latin/Greek)
ISO Latin 1T (Turkish)	Bulgaria (Bulgarian)
PC774 (LST 1283:1993)	Estonia (Estonia)
ISO 8859-2	PC866 LAT. (Latvian)
PC866 UKR (Ukraina)	PC860 (Portuguese)
PC861 (Icelandic)	PC865 (Nordic)
PC APTEC (Arabic)	PC708 (Arabic)
PC720 (Arabic)	PCAR 864 (Arabic)
PC863 (Canadian-French)	Abicomp
BRASCII	Roman 8
ISO Latin 1	Hebrew7 *1
Hebrew8 *1	PC862 (Hebrew) *1
PC858	ISO 8859-15
PC771 (Lithuania)	
PC437 Slovenia *1	PC1250 *1
PCMC*1	PC1251 *1

NOTE: *(*1) This item is not displayed with a default setting mode.*
Do not disclose to the public.

- ASCII <LQ-630K>:
  Italic table, PC437 (US, Standard Europe), PC850 (Multilingual), PC860 (Portuguese), PC863 (Canadian-French), PC865 (Nordic), PC858 (Multilingual Euro)
- Hanzi <LQ-630K>:
  GB18030 (21887 characters)

☐ International character sets: 14 countries and legal

U.S.A	France	Germany
U.K.	Denmark 1	Sweden
Italy, Spain 1	Japan	Norway
Denmark 2	Spain 2	Latin America
Korea	Legal	

NOTE: *The international and legal characters are these 12 codes; 23H, 24H, 40H, 5BH, 5CH, 5DH, 5EH, 60H, 7BH, 7CH, 7DH, 7EH.*

☐ Typeface

- Bit map font <LQ-630>:

EPSON Draft	10CPI, 12CPI, 15CPI
EPSON Roman	10CPI, 12CPI, 15CPI, Proportional
EPSON Sans Serif	10CPI, 12CPI, 15CPI, Proportional
EPSON Courier	10CPI, 12CPI, 15CPI
EPSON Prestige	10CPI, 12CPI
EPSON Script	10CPI
EPSON OCR-B	10CPI
EPSON Orator	10CPI
EPSON Orator-S	10CPI
EPSON Script C	Proportional

- Bit map font <LQ-630K>:

宋体	24 x 24
黑体	24 x 24
EPSON Draft	10CPI, 12CPI, 15CPI
EPSON Roman	10CPI, 12CPI, 15CPI, Proportional
EPSON Sans Serif	10CPI, 12CPI, 15CPI, Proportional
EPSON OCR-B	10CPI

- Scalable font:

EPSON Roman	10.5pt., 8pt. - 32pt. (every 2pt.)
EPSON Sans Serif	10.5pt., 8pt. - 32pt. (every 2pt.)
EPSON Roman T	10.5pt., 8pt. - 32pt. (every 2pt.)
EPSON Sans Serif H	10.5pt., 8pt. - 32pt. (every 2pt.)

- Bar code:
  EAN-13
  EAN-8
  Interleaved 2 of 5
  UPC-A
  UPC-E
  Code 39
  Code 128
  POSTNET
  Coda bar (NW-7) *1
  Industrial 2 of 5 *1
  Matrix 2 of 5 *1

NOTE: *(*1) Do not disclose to the public.*

☐ Character tables and typefaces <Characteristic of LQ-630>:
The standard version has 13 character tables and the NLSP version has 39 character tables, as shown in the following table.

Table 1-6. Character Tables

	Character table	Bit map font	Scalable font
Standard version	Italic table PC437 (US Standard Europe) PC850 (Multilingual) PC860 (Portuguese) PC861 (Icelandic) PC863 (Canadian-French) PC865 (Nordic) Abicomp BRASCII Roman 8 ISO Latin 1 PC858 ISO8859-15	EPSON Draft EPSON Roman EPSON Sans Serif EPSON Courier EPSON Prestige EPSON Script EPSON OCR-B EPSON Orator EPSON Orator-S EPSON Script C	EPSON Roman EPSON Sans Serif EPSON Roman T EPSON Sans Serif H
	OCR-A *1	EPSON Draft EPSON Roman	(Not supported)
NLSP version	Italic table PC437 (US, Standard Europe) PC850 (Multilingual) PC860 (Portuguese) PC861 (Icelandic) PC863 (Canadian-French) PC865 (Nordic) Abicomp BRASCII Roman 8 ISO Latin 1 PC858 ISO8859-15	EPSON Draft EPSON Roman EPSON Sans Serif EPSON Courier EPSON Prestige EPSON Script EPSON OCR-B EPSON Orator EPSON Orator-S EPSON Script C	EPSON Roman EPSON Sans Serif EPSON Roman T EPSON Sans Serif H
	PC437 Greek PC852 (East Europe) PC853 (Turkish) PC855 (Cyrillic) PC857 (Turkish) PC866 (Russian) PC869 (Greek) MAZOWIA (Poland) Code MJK (CSFR) ISO 8859-7 (Latin/Greek) ISO Latin 1T (Turkish) Bulgaria (Bulgarian) Estonia (Estonia) PC744 (LST 1283:1993) ISO 8859-2 PC866 LAT. (Latvian) PC866UKR (Ukraine) PC771 (Lithuania) PC437 Slovenia *1 PCMC *1 PC1250 *1 PC1251 *1	EPSON Draft EPSON Roman EPSON Sans Serif EPSON Courier EPSON Prestige EPSON Script	EPSON Roman EPSON Sans Serif
	PC864 (Arabic)	EPSON Draft EPSON Roman	(Not supported)
	Hebrew7 *1 Hebrew8 *1 PC862 (Hebrew) *1	EPSON Draft (Hebrew) EPSON Roman EPSON Courier	(Not supported)
	PCAPTEC (Arabic) PC708 (Arabic) PC720 (Arabic) PCAR864 (Arabic)	EPSON Draft (Arabic) EPSON Roman EPSON Sans Serif	(Not supported)
	OCR-A *1	EPSON Draft EPSON Roman	(Not supported)

NOTE: *(*1) This item is not displayed with a default setting mode. Do not disclose to the public.*

NOTE: *ESC R command is effective on the character tables with bold weight.*

1.2.2 Paper Feeding Specifications

- Feeding method : Friction feed (front)
  Push tractor feed (rear)
- Feeder : Rear push tractor
- Paper path : Manual Insertion Front in, front out
  Tractor Rear in, front out
- Line Spacing : 4.23mm (1/6 inch) or programmable in increments of 0.0706mm (1/360 inch)
- Feed speed : Refer to the following table;

Table 1-7. Feeding Speed

	Normal mode	Copy mode
4.23mm (1/6 inch) feed	53 msec	57 msec
Continuous feed	0.092 MPS (m/sec) [3.61 IPS (inches/sec)	0.085 MPS (m/sec) [3.33 IPS (inches/sec)

- Release Lever:
  The release lever must be set according to the following table.

Table 1-8. Release Lever Position

Lever position	Paper path / Feeder	Paper / Media
Friction	Manual insertion (front)	Cut sheet (Single sheet & Multi part), Label
Tractor	Push tractor feed (rear)	Continuous paper (Single sheet & Multi part), Label

- Paper thickness lever:
  The paper thickness lever must be set at the proper position according to the following table.

Table 1-9. Paper Thickness Lever Position <LQ-630>

Lever position	Paper thickness (mm)		Paper thickness (inch)	
	Minimum	Maximum	Minimum	Maximum
-1	-	-	-	-
0	0.06	0.12	0.0024	0.0047
1	0.12	0.19	0.0047	0.0075
2	0.19	0.25	0.0075	0.0098
3	0.25	0.32	0.0098	0.0126
4	0.32	0.36	0.0126	0.0141
5	0.36	0.39	0.0141	0.0154

Table 1-10. Paper Thickness Lever Position <LQ-630K>

Lever position	Paper thickness (mm)		Paper thickness (inch)	
	Minimum	Maximum	Minimum	Maximum
-1	-	-	-	-
0	0.06	0.12	0.0024	0.0047
1	0.12	0.19	0.0047	0.0075
2	0.19	0.25	0.0075	0.0098
3	0.25	0.32	0.0098	0.0126
4	0.32	0.36	0.0126	0.0141
5	0.36	0.40	0.0141	0.0157
6	0.40	0.46	0.0157	0.0181
7	0.46	0.53	0.0181	0.0208

1.2.3 Paper Specification

This section describes types of paper that can be used in this printer.

☐ Cut Sheets
The following table shows specification for cut sheets.

Table 1-11. Cut Sheets (Single sheet, Not Multi Part)

		Manual insertion	
		Minimum	Maximum
Width	(inch) (mm)	3.5 90	10.1 257
Length	(inch) (mm)	2.8 70	14.3 364
Thickness	(inch) (mm)	0.0025 0.065	0.0055 0.14
Weight	(g/m^2) (lb)	52 14	90 24
Quality		Plain paper, Recycled paper, Not curled, not folded, not crumpled	

NOTE: *Printing on recycled paper is available only under normal temperature and humidity conditions.*

Table 1-12. Cut Sheets (Multi part)

		Minimum	Maximum	
Width	(inch) (mm)	3.5 90	10.1 257	
Length (Glued at the top)	(inch) (mm)	2.8 70	14.3 364	
Length (Glued at the side)	(inch) (mm)	2.8 70	11.7 297	
Copies		1 original + 4 copies <LQ-630> 1 original + 6 copies <LQ-630K>		
Total thickness	(inch) (mm)	0.0047 0.12	<LQ-630> 0.015 0.39	<LQ-630K> 0.021 0.53
Weight (one sheet of multi part)	(g/m^2) (lb)	40 12	58 15	
Quality		Plain paper, Recycled paper, Not curled, not folded, not crumpled		
Jointing		Line glue at the top or one side of form		

NOTE: *Printing on multi part paper is available only under normal temperature and humidity conditions.*

NOTE: *Type of paper of multi-part forms should be Carbonless or Carbon-backed. Don' t use Carbon-interleaved.*

Table 1-13. Handling possible cut sheets of fixed forms

Direction	Paper size			
	A3	A4	A5	A6
Vertical	x / x	O / O	O / O	O / O
Horizontal	x / x	x / x	O / O	O / O

☐ Continuous paper
The following table shows specification for Continuous paper.

Table 1-14. Continuous paper (Single sheet and Multi part)

		Rear entry		
		Minimum	Maximum	
Width	(inch) (mm)	4 101.6	10.0 254	
Length (one page)	(inch) (mm)	4 101.6	22 558.8	
Copies		1 original + 4 copies <LQ-630> 1 original + 6 copies <LQ-630K>		
Total thickness	(inch) (mm)	0.0025 0.065	<LQ-630> 0.015 0.39	<LQ-630K> 0.021 0.53
Weight (not multi part)	(g/m^2) (lb)	52 14	82 22	
Weight (one sheet of multi part)	(g/m^2) (lb)	40 12	58 15	
Quality		Plain paper, Recycled paper, Carbonless multi part paper		
Jointing		Spot gluing on both side Paper staple on both side Spot gluing and Paper staple on each side		

NOTE1: *Never use continuous multi-part forms that are jointed with metal staples, paper staples by one side, tape staples, bar-gluing.*

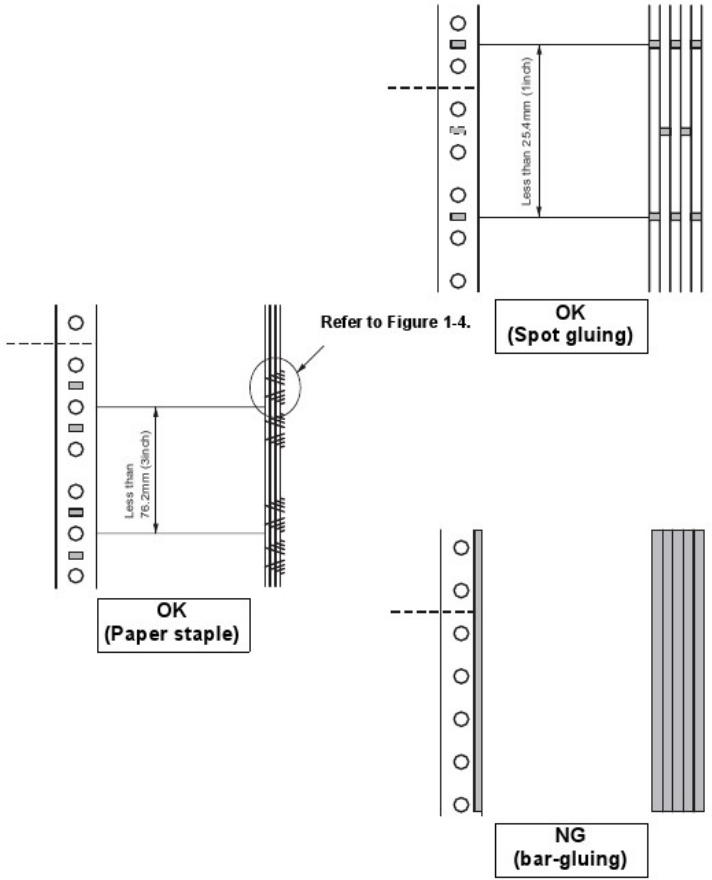


Figure 1-3. Note 1

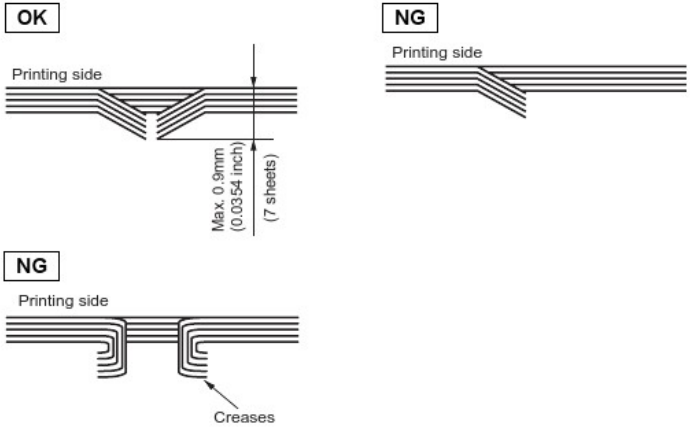
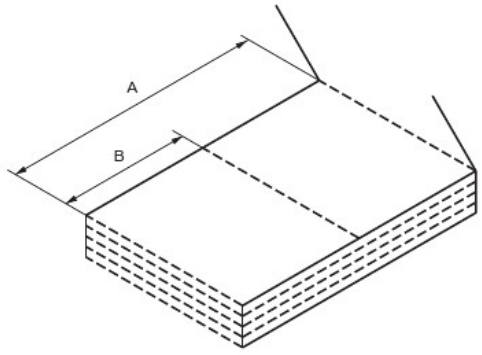


Figure 1-4. Note1-1



The length between folds (A) is over 101.6mm (4 inches).
The page length of continuos paper (B) is over 101.6mm (4 inches).

NOTE2: *The printing side that is jointed with paper staples must be flat.*

Figure 1-5. Note2

NOTE3: *The ratio of the cut/uncut length at the perforation should be between 3:1 and 5:1.*

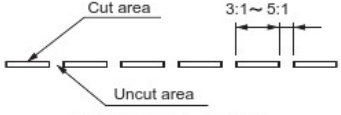


Figure 1-6. Note3

NOTE4: *The perforation between pages must not extend all the way to edges of the paper.*

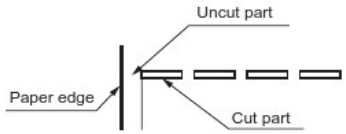


Figure 1-7. Note4

NOTE5: *At the perforation between pages, the horizontal and vertical perforation cuts must not cross.*

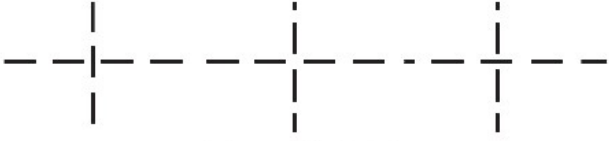


Figure 1-8. Note5

NOTE6: *The thickness of the perforation part when extended must be 1mm or less.*

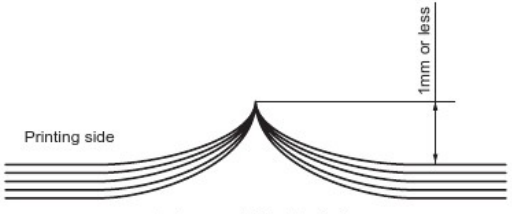


Figure 1-9. Note6

NOTE7: *The paper must be flat and have no creases.*

NOTE8: *The sprocket holes must be a circle or notched circle.*

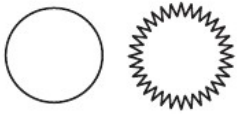


Figure 1-10. Note8

NOTE9: *The sprocket holes of all sheets in the form must be aligned properly.*

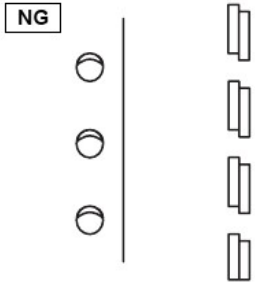


Figure 1-11. Note9

NOTE10: *The leavings of the sprocket holes must be left.*

NOTE11: *The printing area must be flat.*

☐ Label

The following table shows specification for Label.

Table 1-15. Label (Cut sheet)

		Manual insertion	
		Minimum	Maximum
Base sheet width	(inch) (mm)	(3.9) 100	(8.3) 210
Base sheet length (one page)	(inch) (mm)	(3.9) 100	(11.7) 297
Base sheet thickness	(inch) (mm)	(0.0028) 0.07	(0.0035) 0.09
Total thickness	(inch) (mm)	(0.0063) 0.16	(0.0075) 0.19
Label size		<23.8mm (15/16inch) or more> X <63.5mm (2.5inch) or more>	
Label weight	(g/m^2) (lb)	64 (17)	
Quality		Plain paper	

NOTE1: *Printing on label is available only under normal temperature and humidity conditions.*

NOTE2: *If printer is turned off, label should be ejected.*

NOTE3: *Do not print on the base sheet of labels.*

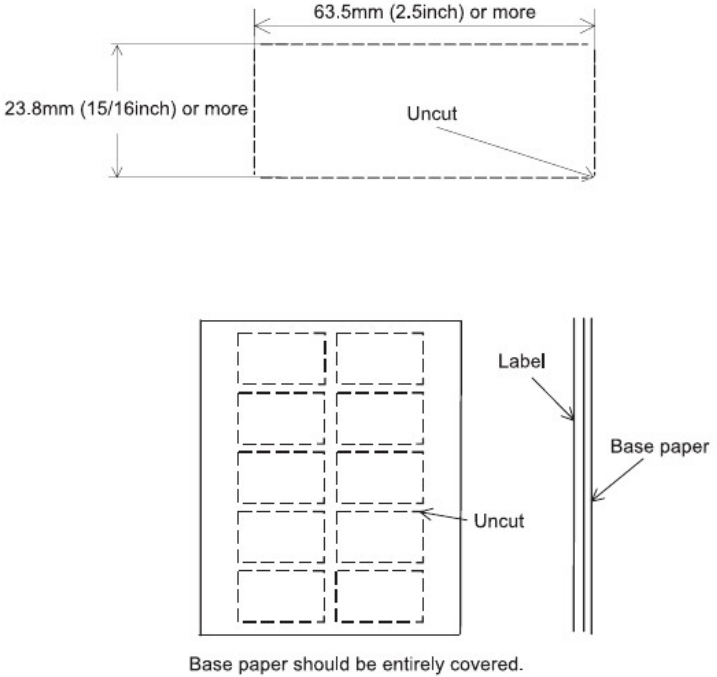


Figure 1-12. Label (Cut sheet)

Table 1-16. Label (Continuous paper)

		Rear entry (Tractor)	
		Minimum	Maximum
Base sheet width	(inch) (mm)	(4) 101.6	(10) 254
Base sheet length (one page)	(inch) (mm)	(4) 101.6	(10) 254
Base sheet thickness	(inch) (mm)	(0.0028) 0.07	(0.0035) 0.09
Total thickness	(inch) (mm)	(0.0063) 0.16	(0.0075) 0.19
Label size		<23.8mm (15/16inch) or more> X <63.5mm (2.5inch) or more>	
Label weight	(g/m^2) (lb)	64 (17)	
Quality		Plain paper	

NOTE1: *Printing on label is available only under normal temperature and humidity conditions.*

NOTE2: *If printer is turned off, label should be ejected.*

NOTE3: *Do not print on the base sheet of labels.*

NOTE4: *Do not pull out paper from backward.*

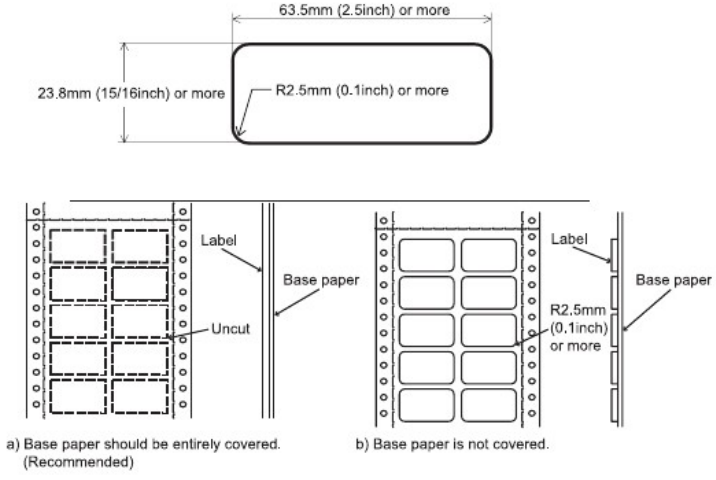


Figure 1-13. Label (Continuous paper)

1.2.4 Printable Area

☐ Cut sheets

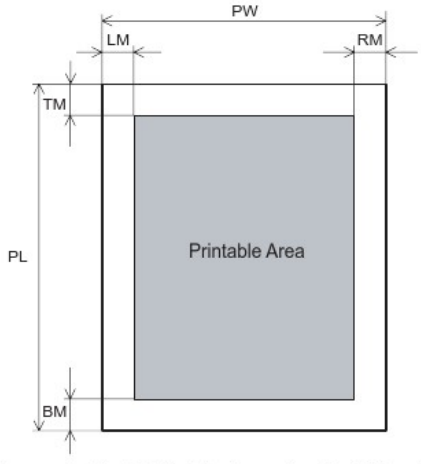


Figure 1-14. Printable Area for Cut Sheets

Table 1-17. Printable Area for Cut Sheets

		Single sheet
PW	(Width)	(Refer to 1.2.3 "Paper Specification".)
PL	(Length)	(Refer to 1.2.3 "Paper Specification".)
LM	(Left margin)	3mm or more (PW<=209.2mm) 26.9mm or more (PW=257mm)
RM	(Right margin)	3mm or more (PW<=209.2mm) 26.9mm or more (PW=257mm)
TM	(Top margin)	4.2 mm or more
BM	(Bottom margin)	4.2 mm or more

NOTE: *The maximum horizontal printable area is 203.2mm.*

☐ Continuous paper

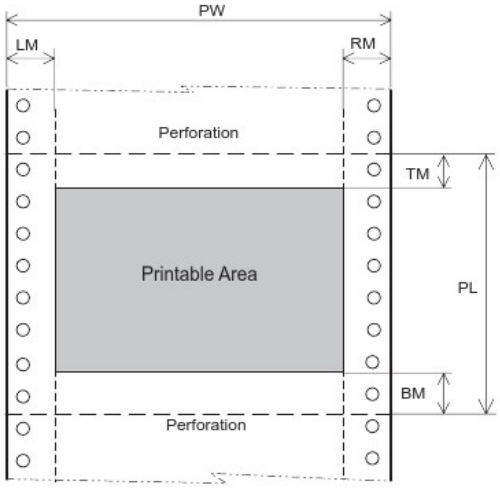


Figure 1-15. Printable Area for Continuous Paper

Table 1-18. Printable Area for Continuous Paper

		Continuous paper
PW	(Width)	(Refer to 1.2.3 "Paper Specification".)
PL	(Length)	(Refer to 1.2.3 "Paper Specification".)
LM	(Left margin)	13mm or more (PW<=241.3mm) 26mm or more (PW=254mm)
RM	(Right margin)	13mm or more (PW<=241.3mm) 26mm or more (PW=254mm)
TM	(Top margin)	4.2mm or more
BM	(Bottom margin)	4.2mm or more

NOTE: *The maximum horizontal printable area is 203.2mm.*

☐ Label (Cut sheets)

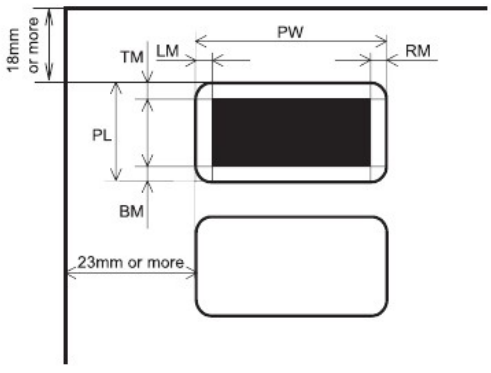


Figure 1-16. Printable area for Label (Cut sheets)

Table 1-19. Printable area for Label (Cut sheets)

		Label (Cut sheets)
PW	(Width)	63.5mm (2.5inch) or more
PL	(Length)	23.8mm (15/16inch) or more
LM	(Left margin)	3mm or more
RM	(Right margin)	3mm or more
TM	(Top margin)	3mm or more
BM	(Bottom margin)	3mm or more

☐ Label (Continuous paper)

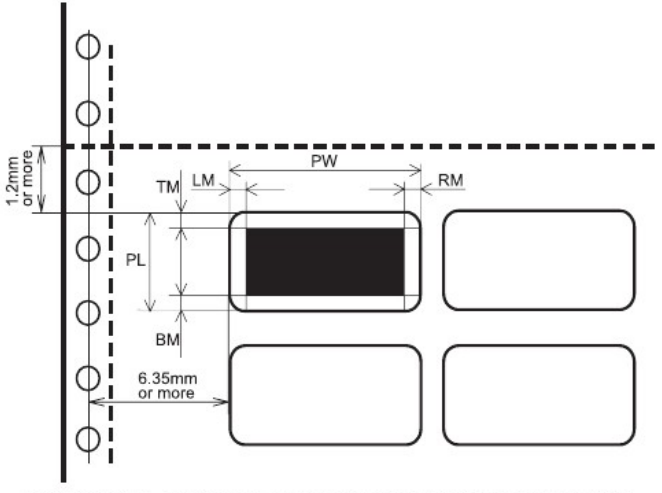


Figure 1-17. Printable area for Label (Continuous paper)

Table 1-20. Printable area for Label (Continuous paper)

		Label (Continuous paper)
PW	(Width)	63.5mm (2.5inch) or more
PL	(Length)	23.8mm (15/16inch) or more
LM	(Left margin)	3mm or more
RM	(Right margin)	3mm or more
TM	(Top margin)	3mm or more
BM	(Bottom margin)	3mm or more

1.2.5 Input data buffer

- 32 Kbyte

1.2.6 Electrical Specification

- Rated voltage range : AC220 to 240V
- Input voltage range : AC198 to 264V
- Rated frequency range : 50 to 60Hz
- Input frequency range : 49.5 to 60.5Hz
- Rated current : 0.3 A (max. 0.9 A)
- Power consumption : Approx. 20 W (ISO / IEC10561 Letter pattern)
  Approx. 5 W in sleep mode
  Approx. 0 W in powered off mode
  Energy Star Compliant
- Insulation resistance : 10 MΩ min.
  (between AC line and chassis, DC 500V)
- Dielectric strength : AC1500Vrms. 1min.
  (between AC line and chassis)

1.2.7 Reliability

- Mean print volume between failure (MVBF)
  : 12 million lines (except print head)
- MTBF : 6000 POH
- Print head life : 200 million strokes / wire

1.2.8 Ribbon Cartridge

- Type : Fabric
- Color : Black
- Ribbon life : Approx. 2 million characters
  (LQ 10cpi, 48dots / character)

1.2.9 Acoustic Noise

- Level : Approx. 57dB (A) (ISO 7779 pattern)

1.2.10 Environmental Condition

Table 1-21. Environmental Condition

	Operating (Without condensation)	Non-operating
Temperature	5 to 35°C	-30 to 60°C
	15 to 25°C (during printing on Recycled paper)	
Humidity	10 to 80% RH	0 to 85% RH
	30 to 60% RH (during printing on Recycled paper)	
Resistance to shock	1G, within 1ms	2G, within 2ms (With shipment container)
Resistance to vibration	0.25G, 10 to 55Hz	0.50G, 10 to 55Hz (With shipment container)

1.2.11 Safety Approvals

LQ-630

- Safety standards : EN60950
- EMI : EN55022 (CISPR pub.22) class B
  AS/NZS 3548 class B

LQ-630K

- Safety standards : GB4943
- EMC(EMI) standards : GB9254

1.2.12 CE Marking

LQ-630

- Low Voltage Directive 73/23/EEC: EN60950
- EMC Directive 89/336/EEC : EN55022 class B
  : EN61000-3-2
  : EN61000-3-3
  : EN55024

1.3 Interface Specification

This printer provides bi-directional 8-bit parallel interface and USB interface. Optional interface board is not supported on this model.

1.3.1 Parallel interface (Forward channel)

- ☐ Transmission mode : 8 bit parallel, IEEE-1284 compatibility mode
- ☐ Adaptable connector : 57-30360 (Amphenol) or equivalent
- ☐ Synchronization : *STROBE pulse
- ☐ Handshaking : BUSY and *ACKNLG signals
- ☐ Signal level : TTL compatible (IEEE-1284 level 1 device)

Table 1-22. Parameter

Parameter	Minimum	Maximum	Condition
V_{OH}*1	-	5.5V	
V_{OL}*1	-0.5V	-	
I_{OH}*1	-	0.32mA	V_{OH}=2.4V
I_{OL}*1	-	12mA	V_{OL}=0.4V
Co	-	50pF	
V_{IH}	-	2.0V	
V_{IL}	0.8V	-	
I_{IH}	-	0.32mA	V_{IH}=2.0V
I_{IL}	-	12mA	V_{IL}=0.8V
Ci	-	50pF	

NOTE: *(*1) Logic-H signal is 2.0 V or lower when the printer is off and the signal is 3.0 V or higher when the printer is on. The receiver has impedance which is equivalent to 7.5 kΩ.*

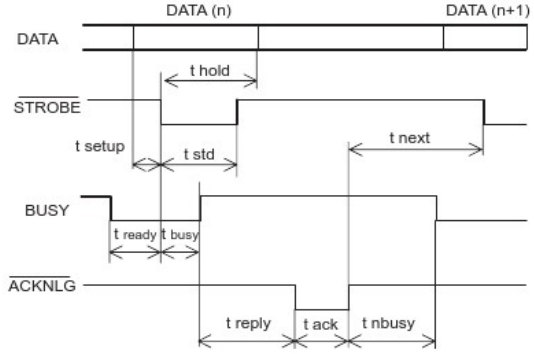


Figure 1-18. Data transmission timing

Table 1-23. Maximum and Minimum Timings for Data Transmission

Parameter	Minimum	Maximum
t setup	500 nsec	-
t hold	500 nsec	-
t stb	500 nsec	-
t ready	0	-
t busy	-	500 nsec
t reply	-	-
t ack	500 nsec	10 us
t nbusy	0	-
t next	0	-
t tout*1	-	120 nsec
t tin*2	-	200 nsec

NOTE: *(*1) Rise and fall time of output signals.*
NOTE: *(*2) Rise and fall time of input signals.*

- BUSY signal is active (high level) under the condition as shown below:
  - In the process of receiving data
  - In the condition of being input buffer full
  - In the condition of being *INIT signal active (low level)
  - During hardware initialization
  - In the condition of being *ERROR or PE signal active (low level, high level, respectively)
  - In the self test mode
  - In the adjustment mode
  - In the default-setting mode
- *ERROR signal is active (low level) under the condition as shown below:
  - In the condition of the paper-out error
  - In the condition of the release lever error
- *PE signal is active (high level) under the condition as shown below:
  - In the condition of paper-out error

Table 1-24. Connector Pin Assignment and Signals

Pin No.	Signal name	Return GND Pin	In/Out*1	Function description
1	*STROBE	19	In	Strobe pulse. Input data is latched at falling edge of the signal.
2	DATA1	20	In	Parallel input data to the printer. bit 0: LSB
3	DATA2	21	In	bit 1
4	DATA3	22	In	bit 2
5	DATA4	23	In	bit 3
6	DATA5	24	In	bit 4
7	DATA6	25	In	bit 5
8	DATA7	26	In	bit 6
9	DATA8	27	In	bit 7: MSB
10	*ACKNLG	28	Out	This signal (negative pulse) indicates that the printer has received data and is ready to accept next one.
11	BUSY	29	Out	This signal's "HIGH" level means that the printer is not ready to accept data.
12	PE	28	Out	This signal's "HIGH" level means that the printer is in a state of paper-out error.
13	SLCT	28	Out	Always at high level when the printer is powered on.
14	*AFXT	30	In	Not used.
31	*INIT	30	In	This signal's negative pulse initializes printer.
32	*ERROR	29	Out	This signal's "LOW" level means the printer is in a state of error.
36	*SLIN	30	In	Not used.
18	Logic H	-	Out	This line is pulled up to +5V through 3.9 kΩ resistor.
35	+5V	-	Out	This line is pulled up to +5V through 1.0 kΩ resistor.
17	Chassis	-	-	Chassis GND.
16,33 19-30	GND	-	-	Signal GND.
15,34	NC	-	-	Not connected.

NOTE: *(*1) In/Out shows the direction of signal flow from the printer's point of view.*
NOTE: *If the signal is "LOW" and active state, the signal is marked with "*".*

1.3.2 Parallel Interface (Reverse channel)

- ☐ Transmission mode : IEEE 1284 nibble mode
- ☐ Adaptable connector : 57-30360 (Amphenol) or equivalent
- ☐ Synchronization : Refer to the IEEE-1284 specification
- ☐ Handshaking : Refer to the IEEE-1284 specification
- ☐ Signal Level : TTL compatible (IEEE-1284 level 1 device)
- ☐ Data transmission timing : Refer to the IEEE-1284 specification
- ☐ Extensibility request : The printer responds to the extensibility request in the affirmative, when the request is 00H or 04H, which mean;

  00H: Request nibble mode of reverse channel transfer
  04H: Request device ID in nibble mode of reverse channel transfer

- ☐ Device ID : The printer sends following device ID string when it is requested.

  ■ LQ-630

  When IEEE1284.4 is enabled,

```
[00H] [4EH]
MFG : EPSON;
CMD : ESCPL2, PRPXL24, BDC, D4;
MDL : LQ-630;
CLS : PRINTER;
DES : EPSON [SP] LQ-630;
```

  When IEEE1284.4 is disabled,

```
[00H] [4BH]
MFG : EPSON;
CMD : ESCPL2, PRPXL24, BDC;
MDL : LQ-630;
CLS : PRINTER;
DES : EPSON [SP] LQ-630;
```

  ■ LQ-630K

  When IEEE1284.4 is enabled,

```
[00H] [5BH]
MFG : EPSON;
CMD : ESCPL2K, PRPXL24, OKI5530SC, BDC, D4;
MDL : LQ-630K;
CLS : PRINTER;
DES : EPSON [SP] LQ-630K;
```

  When IEEE1284.4 is disabled,

```
[00H] [58H]
MFG : EPSON;
CMD : ESCPL2K, PRPXL24, OKI5530SC, BDC;
MDL : LQ-630K;
CLS : PRINTER;
DES : EPSON [SP] LQ-630K;
```

Table 1-25. Connector Pin Assignment and Signals

Pin No.	Signal name	Return GND Pin	In/Out*1	Function description
1	HostClk	19	In	Host clock signal.
2	DATA1	20	In	Parallel input data to the printer. bit 0: LSB
3	DATA2	21	In	bit 1
4	DATA3	22	In	bit 2
5	DATA4	23	In	bit 3
6	DATA5	24	In	bit 4
7	DATA6	25	In	bit 5
8	DATA7	26	In	bit 6
9	DATA8	27	In	bit 7: MSB
10	PtrClk	28	Out	Printer clock signal.
11	PtrBusy/ DataBit-3, 7	29	Out	Printer busy signal and reverse channel transfer data bit 3 or 7.
12	AckDataReq/ DataBit-2, 6	28	Out	Acknowledge data request signal and reverse channel transfer data bit 2 or 6.
13	Xflag/ DataBit-1, 5	28	Out	X-flag signal and reverse channel transfer data bit 1 or 5.
14	HostBusy	30	In	Host busy signal.
31	*INIT	30	In	Not used.
32	*DataAvail/ DataBit-0, 4	29	Out	Data available signal and reverse channel transfer data bit 0 or 4.
36	1284-Active	30	In	1284 active signal.
18	Logic-H	-	Out	This line is pulled up to +5V through 3.9 kΩ resistor.
35	+5V	-	Out	This line is pulled up to +5V through 1.0 kΩ resistor.
17	Chassis	-	-	Chassis GND.
16,33 19-30	GND	-	-	Signal GND.
15,34	NC	-	-	Not connected.

NOTE: *(*1) In/Out shows the direction of signal flow from the printer's point of view.*
NOTE: *If the signal is "LOW" and active state, the signal is marked with "*".*

1.3.3 USB interface

- ☐ Standard : based on
  "Universal Serial Bus Specifications Revision 1.1"
  "Universal Serial Bus Device Class Definition for Printing Devices Version 1.1"
- ☐ Bit rate : 12Mbps (Full Speed Device)
- ☐ Data encoding : NRZI
- ☐ Adaptable connector : USB Series B
- ☐ Recommended cable length : 2 meters

Table 1-26. Connector pin assignment and signals

Pin No.	Signal name	In/Out	Function description
1	VCC	-	Cable power. Maximum power consumption is 100mA
2	-Data	bi-directional	data
3	+Data	bi-directional	data, pull up to +3.3V via 1.5KΩ resistor
4	Ground	-	Cable ground

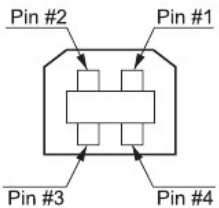


Figure 1-19. Connector pin assignment and signals

1.3.4 Interface Selection

The printer has 2 interfaces; the parallel interface and USB interface. These interfaces are selected manually by Default Setting or selected automatically.

- Manual selection

  One of 2 interfaces can be selected by Default Setting.

- Automatic selection

  The automatic interface selection is enabled by Default Setting. In this automatic interface selection mode, the printer is initialized to the idle state scanning which interface receives data when it is powered on. Then the interface that receives data first is selected. When the host stops data transfer and the printer is in stand-by state for the seconds specified by Default Setting, the printer is returned to the idle state. As long as the host sends data or the printer interface is busy state, the selected interface is let as it is.

- Interface state and interface selection

  When the parallel interface is not selected, the interface gets into a busy state. When the printer is initialized or returned to the idle state, the parallel interface got into a ready state. Caution that the interrupt signal such as a *INIT signal on the parallel interface is not effective while that interface is not selected.

1.3.5 Prevention Hosts from Data Transfer Timeout

Generally, hosts abandons data transfer to peripherals when a peripheral is in busy state for dozens of seconds continuously. To prevent hosts from this kind of timeout, the printer receives data very slowly, several bytes per minute, even if the printer is in busy state. This slowdown is started when the rest of the input buffer becomes several hundreds of bytes. At last, when the input buffer is full, the printer is in busy state continuously.

1.3.6 IEEE1284.4 protocol

The packet protocol described by IEEE1284.4 is supported on the parallel I/F. Two function modes of IEEE1284.4 protocol, "Off" & "Auto" are available, and one of them is selected according to the value of Default setting.(See 1.4.2.3 "Default Setting".)

NOTE: *Packet protocol option "Off" & "Auto" in Default setting mode are effective in not only parallel I/F but also USB I/F.*

NOTE: *In the case that data is printed from printer driver of Windows-based PC, select the packet protocol to "Auto".*

Auto : Communication is carried out in the conventional mode until a magic string (1284.4 synchronous commands) is received. By receiving a magic string, communication in IEEE1284.4 packet mode is started.

Off : Communication is carried out in the conventional mode.

NOTE: *The packet protocol of IEEE1284.4 allows a device to carry on multiple exchanges or conversations which contain data and/or control information with another device at the same time across a single point-to-point link. The protocol is not, however, a device control language. It does provide basic transport-level flow control and multiplexing services. The multiplexed logical channels are independent of each other and blocking of one has no effect on the others. The protocol operate over IEEE1284.*

1.4 Operation

1.4.1 Control Panel

3 switches and 3 LEDs are located on the panel as shown below.

<LQ-630>

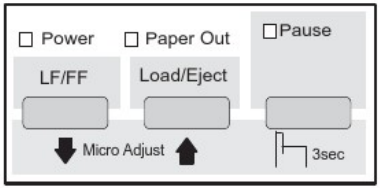


Figure 1-20. Control Panel <LQ-630>

<LQ-630K>

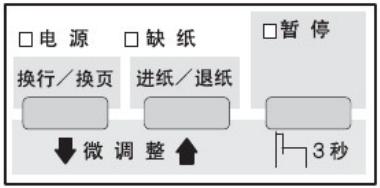


Figure 1-21. Control Panel <LQ-630K>

1.4.1.1 Switches

☐ Operation in normal mode
In normal mode, pressing panel switches executes following function:

Table 1-27. Operation in Normal Mode

Switch		Function
LQ-630	LQ-630K	
Pause	暂停	• Alternates printing and no-printing status. • Enables Micro Adjust function and Font selection, holding it down for 3 seconds.
Load / Eject	进纸／退纸	• Loads or ejects the paper. • Executes micro feed backward, when this function is enabled.
LF / FF	换行／换页	• Executes line feed, pressing it shortly. • Executes form feed, holding it down for a few seconds. • Executes micro feed backward, when this function is enabled.

☐ Operation at power on
Turning the printer on while pressing panel switches executes the function shown below:

NOTE: *Refer to **1.4.2.2** "Operation at Power-on" about each function.*

Table 1-28. Operation at Power On

Switch		Function	
LQ-630	LQ-630K	LQ-630	LQ-630K
Load / Eject	进纸／退纸	LQ self test	Hanzi self test
LF / FF	换行／换页	Draft self test	Copy mode
Load / Eject & Pause	进纸／退纸 & 暂停	Default setting	Default setting
Load / Eject & LF / FF	进纸／退纸 & 换行／换页	Data dump	Data dump

Table 1-28. Operation at Power On

Switch		Function	
LQ-630	LQ-630K	LQ-630	LQ-630K
Load / Eject & LF / FF & Pause	进纸／退纸 & 换行／换页 & 暂停	Clear EEPROM	Clear EEPROM
Load / Eject & LF / FF & Pause	**进纸／退纸 & 换行／换页 & 暂停**	**Clear EEPROM for Driving Line count for ribbon change timing**	**Clear EEPROM for Driving Line count for ribbon change timing**
Pause	暂停	Bi-d adjustment	Bi-d adjustment
LF / FF & Pause	**换行／换页 & 暂停**	**Panel lock out mode**	**Panel lock out mode**
Load / Eject & LF / FF	**进纸／退纸 & 换行／换页**	**Default setting for panel lock out mode**	**Default setting for panel lock out mode**
LF / FF & Pause	换行／换页 & 暂停	Quiet mode	Quiet mode
Load / Eject & Pause	**进纸／退纸 & 暂停**	**Simple default setting**	**Simple default setting**
The others		Not available	Not available

NOTE: *Bold weight means holding switches more than five seconds while turning on.*

☐ Operation in default setting mode
The switches are used in default setting mode as follows:

Table 1-29. Operation at Default Setting Mode

Switch		Function
LQ-630	LQ-630K	
LF / FF	换行／换页	Selects the Menu.
Load / Eject	进纸／退纸	Changes the setting.
The others		Not available

1.4.1.2 Indicators (LED)

This printer displays present conditions and errors on the indicators.

☐ Indication in normal mode

Table 1-30. LED Indicators

Printer status	LED		
	Power (电源)	Pause*1 (暂停*1)	Paper Out*2 (缺纸*2)
Pause	On	On	---
Paper out error	On	On	On
Release lever error	On	On	---
Paper eject warning	On	On	Blink
Head hot warning	On	Blink	---
Micro Adjust	On	Blink	---
Push the locked switch*3	On	Blink	Blink
Fatal error	Blink	Blink	Blink

NOTE: *(*1) Pause (Orange)*
- *It is on when the printer is paused, and it is off when the printer is not paused.*
- *It blinks when the Micro Adjust function is enabled or the printer is in the head hot status.*

NOTE: *(*2) Paper Out (Red)*
It is on when the printer is in the Paper out status, and it is off when the printer is out of this status.

NOTE: *(*3) Push the locked switch*
If panel lock out mode is "On", when the locked switch are pushed, Pause LED & Paper out LED lights flash simultaneously approx. 3 seconds.
At this time, buzzer does not sound.

1.4.1.3 Buzzer

The printer beeps to indicate several printer error status and failure operation. Printer status and the corresponding beeper sounds are as described in Table 1-31.

Table 1-31. Buzzer

Warning sign	Beeper sounds
Paper out error	❍ ❍ ❍
Paper feeding error	❍ ❍ ❍
Incomplete ejecting paper	❍ ❍ ❍
Release lever operation error	❍ ❍ ❍
Fatal error	● ● ● ● ●

NOTE: *(❍) Beeper sounds approx. 100ms and interval is approx.100ms.*
(●) Beeper sounds approx. 500ms and interval is approx.100ms.

1.4.2 Functions

1.4.2.1 Usual Operation

- ☐ Pause (暂停)
  - ■ This switch alternates printer activity between printing and non-printing.
  - ■ Holding it down over 3 seconds when the printer is in the stand by state, the Micro Adjust function is enabled. Pressing it again, this function is disabled.
- ☐ Load / Eject (进纸／退纸)
  - ■ Pressing it loads cut sheet or continuous paper when the printer is out of paper.
  - ■ Pressing it ejects cut sheet to the stacker or continuous paper to the paper park.
- ☐ LF / FF (换行／换页)
  - ■ Pressing it shortly executes line feed.
  - ■ Holding it down for a few seconds executes form feed when continuous paper is used, or ejects cut sheet to the stacker when cut sheet is used.
- ☐ Micro Adjust (微调整)
  - ■ Micro Adjust ↓ / ↑ switches is effective when the Micro Adjust function is enabled by Pause switch.
  - ■ Pressing the Micro Adjust ↓ / ↑ switches executes micro feed backward and forward by 0.141mm (1/180 inch).
  - ■ The TOF adjustment is enabled in the TOF position after loading, and the Tear-off adjustment is enabled in the Tear-off position.

1.4.2.2 Operation at Power-on

The following explains each function that becomes executable by operating switch at time of turning printer on. Refer to 1.4.1.1 "Switches" about operating method for each function.

- ☐ Self test
  Prints the self test pattern. To cancel it, make printer pause and turn off the power.
- ☐ Default setting
  Starts the default setting mode. (See 1.4.2.3 "Default Setting".)
- ☐ Data dump
  Starts the data dump mode, in which all the input data are printed as hexadecimal numbers and corresponding characters.
- ☐ Clear EEPROM
  Resets the printer to the standard factory setting, which is not always proper setting for each market demand.
  (That is to say, this function is for emergency.)

  Clear Area1 EEPROM data. (Refer to Chapter 7 "Appendix")
- ☐ Clear EEPROM for Driving Line count for ribbon change timing
  Resets the driving Line count for ribbon change timing.
- ☐ Bi-d adjustment
  Starts the Bi-d adjustment mode. (See 1.4.2.4 "Bi-d Adjustment".)
- ☐ Panel lock out mode
  Set or reset panel lock out mode. (See 1.4.2.5 "Panel lock out mode".)
- ☐ Default setting for panel lock out mode
  Starts the default setting for panel lock out mode.
  (See 1.4.2.6 "Default setting for panel lock out".)
- ☐ Demonstration
  Not available.

1.4.2.3 Default Setting

There are some parameters that can be changed by users and will be referred at the time of initialization of the printer.

- ☐ Setting Method <LQ-630>

1. Enters the Default setting mode.
   The method of selecting language for "Usage of this mode" is printed.
2. Select language for "Usage of this mode" by LF / FF button.
   LEDs show the language for "Usage of this mode" that is currently selected. The selection will be advanced one by one as the button is pressed and the On / Off / Blink / 2-Blink of those three LEDs will also be changed according to the selection.
3. Press Load / Eject button.
   The current setting and the "Usage of this mode" by selected language will be printed on the paper set in the paper path at that time.
4. Select menu by LF / FF button.
   LEDs show the menu which is selected at that time. The selection will be advanced one by one as the button is pressed and the combination of those three LEDs status of On / Off / Blink / 2-Blinks will be changed according to the selection.
5. Select setting value by Load / Eject button.
   LEDs show that menu's value by status of On / Off / Blink / 2-Blinks. That value can be changed by pressing Load / Eject button and the LEDs status of On / Off / Blink / 2-Blinks will be changed as the button is pressed.
6. When Load / Eject button is pressed, Printer memorize the last setting value.
7. Repeat (4) to (6)
   The other items can be changed in the same manner.
   The menu selection will return to the first menu after the last menu selection is over.
8. Turn the printer off.
   The setting is stored into non-volatile memory.

☐ Setting Method <LQ-630K>

1. Enters the Default setting mode.
   The current setting and the "Usage of this mode" will be printed on the paper set in the paper path at that time.
2. Select menu by 换行／换页 button.
   LEDs show the menu which is selected at that time. The selection will be advanced one by one as the button is pressed and the combination of those three LEDs status of On / Off / Blink / 2-Blinks will be changed according to the selection.
3. Select setting value by 进纸／退纸 button.
   LEDs show that menu's value by status of On / Off / Blink / 2-Blinks. That value can be changed by pressing Load / Eject button and the LEDs status of On / Off / Blink / 2-Blinks will be changed as the button is pressed.
4. When 进纸／退纸 button is pressed, Printer memorize the last setting value.
5. Repeat (2) to (4)
   The other items can be changed in the same manner.
   The menu selection will return to the first menu after the last menu selection is over.
6. Turn the printer off.
   The setting is stored into non-volatile memory.

☐ Setting Menu (Factory setting)

Table 1-32. Setting Menu

Item	Setting / value*1	
	LQ-630	LQ-630K
Page length for tractor	3inch, 3.5inch, 4inch, 5.5inch, 6inch, 7inch, 8inch, 8.5inch, **11inch**, 70/6inch, 12inch, 14inch, 17inch	3inch, 3.5inch, 4inch, 5.5inch, 6inch, 7inch, 8inch, 8.5inch, **11inch**, 70/6inch, 12inch, 14inch, 17inch
Skip over perforation	**OFF**, ON	**OFF**, ON
Auto tear off	**OFF**, ON	**OFF**, ON
Auto line feed	**OFF**, ON	**OFF**, ON
Print direction	**Bi-d.**, Uni-d., Auto	**Bi-d.**, Uni-d., Auto
Software	**ESC/P2**, IBM PPDS	**ESC/P-K**, IBM PPDS, OKI 5530SC
0 slash	**0**, Ø	**0**, Ø
High speed draft	OFF, **ON**	**OFF**, ON
Hanzi printing speed	---	**Normal**, High speed, Super speed
I/F mode	**Auto**, Parallel, USB	**Auto**, Parallel, USB
Auto I/F wait time	**10 seconds**, 30 seconds	**10 seconds**, 30 seconds
Parallel I/F bidirectional mode	OFF, **ON**	OFF, **ON**
Packet mode	**Auto**, OFF	**Auto**, OFF
Auto CR(IBM PPDS)*2, *3	**OFF**, ON	**OFF**, ON
A.G.M.(IBM PPDS)*2	**OFF**, ON	**OFF**, ON
Character table	<Standard version> Italic, **PC437**, PC850, PC860, PC863, PC865, PC861, BRASCII, Abicomp,Roman8, ISO Latin 1, PC858, ISO 8859-15	Italic, **PC437**, PC850, PC860, PC863, PC865, PC858
	<NLSP version> Italic, **PC437**, PC850, PC437 Greek, PC853, PC855, PC852, PC857, PC864,PC866, PC869, MAZOWIA, Code MJK, ISO 8859-7, ISO Latin 1T, Bulgaria, PC774, Estonia, ISO 8859-2, PC866 LAT., PC866UKR, PC APTEC, PC708, PC720, PCAR 864, PC860, PC865, PC861, PC863, BRASCII, Abicomp,Roman8, ISO Latin 1, PC858, ISO8859-15, PC771	

Table 1-32. Setting Menu

Item	Setting / value*1	
	LQ-630	LQ-630K
International character set for Italic table	**Italic U.S.A.**, Italic France, Italic Germany, Italic U.K., Italic Denmark 1, Italic Sweden, Italic Italy, Italic Spain 1	**Italic U.S.A.**, Italic France, Italic Germany, Italic U.K., Italic Denmark 1, Italic Sweden, Italic Italy, Italic Spain 1
Font	Draft, **Roman**, Sans serif, Courier, Prestige, Script, OCR-B, Orator, Orator-S, Script C, Roman T, Sans serif H	宋体, 黑体, Draft, Roman, Sans serif, OCR-B, Roman-T, Sans serif H
English character pitch	**10cpi**, 12cpi, 15cpi, 17cpi, 20cpi, Proportional	**10cpi**, 12cpi, 15cpi, 17cpi, 20cpi, Proportional
Hanzi pitch	---	**6.7cpi**, 5cpi, 6cpi, 7.5cpi
Manual feed wait time	0.5 seconds, **1 seconds**, 1.5 seconds, 2 seconds	0.5 seconds, **1 seconds**, 1.5 seconds, 2 seconds
Buzzer	OFF, **ON**	OFF, **ON**
Multipart forms with cut-paper tab binding	**OFF**, ON	**OFF**, ON

NOTE: *(*1) Settings with bold weight mean the standard factory settings.*
NOTE: *(*2) These settings are effective when IBM PPDS emulation is selected.*
NOTE: *(*3) These settings are effective when OKI 5530SC emulation is selected.*
<Characteristic of LQ-630K> Do not disclose to the public.

1.4.2.4 Bi-d Adjustment

Bi-d adjustment can be adjusted by users. By using this mode, the gap of lines; line for right printing direction and line for left printing direction can be adjusted. The setting value is stored in the EEPROM of the main control board and retained even after the power is turned off. Bi-d adjustment method is as follows.

1. Turning the printer on while pressing Pause switch.
   The guide to adjust Bi-d. alignment in this mode is printed and first alignment pattern is printed.
2. Select most closely aligned number by pressing LF / FF (↓) and Load / Eject (↑) switches.
   LEDs show the pattern number which is selected at that time. The selection is advanced one by one as the switch is pressed, and the combination of On/Off/ Blink of those three LEDs is also changed according to the selection.
3. Fix the selected number by pressing Pause switch.
   Selected number is fixed and next alignment pattern is printed.
4. Repeat (2) - (3) until finishing Bi-d. adjustment for LQ mode.
   Following adjustment is executed.
   1. Bi-d adjustment for draft mode
   2. Bi-d adjustment for Bit Image (ESC *26H) mode <LQ-630>
      Bi-d adjustment for Hanzi high speed mode <LQ-630K>
   3. Bi-d adjustment for LQ mode
5. Turn the printer off.
   The setting is stored into non-volatile memory.

1.4.2.5 Panel lock out mode

You can restrict the use of buttons on the control panel by using the panel lock out mode. In the basic setting, you can only use the Pause and Load / Eject functions, when panel lock out mode is on.

Turning the printer on while pressing LF / FF and Pause switch more than five seconds.

- ☐ When "On" is selected, beeps two times.
  You can only use the Pause and Load / Eject functions in the basic setting.

NOTE: *If you want to change individual function, See 1.4.2.6 "Default setting for panel lock out".*

- ☐ When "Off" is selected, beeps one time.
  You can use the all panel functions

NOTE: *The standard factory setting of panel lock out mode is "Off".*

1.4.2.6 Default setting for panel lock out

- ☐ Setting method
  The printer panel functions to be locked while the panel lock out mode can be changed by users.

1. Turning the printer on while pressing Load / Eject and LF / FF switch more than five seconds.
   Enters the Default setting for panel lock out mode.
   The guide to setting panel lock out functions this mode is printed and current setting is printed.
2. Select function by LF / FF button.
   LEDs show the function which is selected at that time. The selection will be advanced one by one as the button is pressed and the combination of those three LEDs status of On / Off / Blink / 2-Blinks will be changed according to the selection.
3. Select setting value by Load / Eject button.
   LEDs show that menu's value by status of On / Off / Blink / 2-Blinks. That value can be changed by pressing Load/Eject button and the LEDs status of On / Off / Blink / 2-Blinks will be changed as the button is pressed.
4. Turn the printer off.
   The setting is stored into non-volatile memory.

- ☐ Setting functions

Table 1-33. Setting functions

Item	Setting / value
Load function	**effective**, not effective (when panel lock out mode selected "On")
Eject function	**effective**, not effective (when panel lock out mode selected "On")
LF function	effective, **not effective** (when panel lock out mode selected "On")
FF function	effective, **not effective** (when panel lock out mode selected "On")
Micro Adjust function	effective, **not effective** (when panel lock out mode selected "On")
Pause function	**effective**, not effective (when panel lock out mode selected "On")

NOTE: *Settings with bold weight mean the standard factory settings.*
NOTE: *If "effective" is selected, the switch function is effective without being related to the setting of the panel lock out mode.*
NOTE: *If "not effective" is selected, the switch function is ineffective, in the case that the panel lock out mode selected "On".*

1.4.3 Initialization

☐ Hardware initialization

The initialization of this level is activated by power-on or cold reset command (remote RS command).

NOTE: *In case of "LQ-630K":*
The initialization of this level is activated by power-on.

This initialization is:

- to initialize the printer mechanism.
- to clear the all buffers of data.
- to cancel the download character definition.
- to execute Operator initialization.

☐ Operator Initialization

The initialization of this level is activated by -INIT signal (negative pulse) or SOFT RESET of USB I/F.

This initialization is:

- to clear the all buffers of data.
- to cancel the download character definition.
- to make the printer stand-by state, if no errors occur.
- to execute Software initialization.

☐ Software Initialization

The initialization of this level is activated by the control code ESC @.

This initialization is:

- to clear the unprinted data.
- to make the printer's setting defaults.

1.4.4 Errors

This printer goes to the error state when the following condition is detected, and changes ERROR signal to "LOW" and "BUSY" signal to "HIGH", and stops taking data. Also, the printer goes unprintable condition automatically.

☐ Paper out
When printer fails to load a sheet, it goes paper out error.

☐ Release lever error
When release lever position is wrong, it goes release lever error.

☐ Fatal errors
Carriage control error and Power supply voltage error.

1.4.5 Warnings

☐ Incomplete ejecting paper
When the sheet is remaining into the printer at eject, it goes incomplete ejecting paper warning.

1.5 Physical Specifications

- Dimensions : 386mm (W) x 306mm (D) x 185mm (H)
- Mass : Approx. 3.5kg
- Appearance : See the figure below.

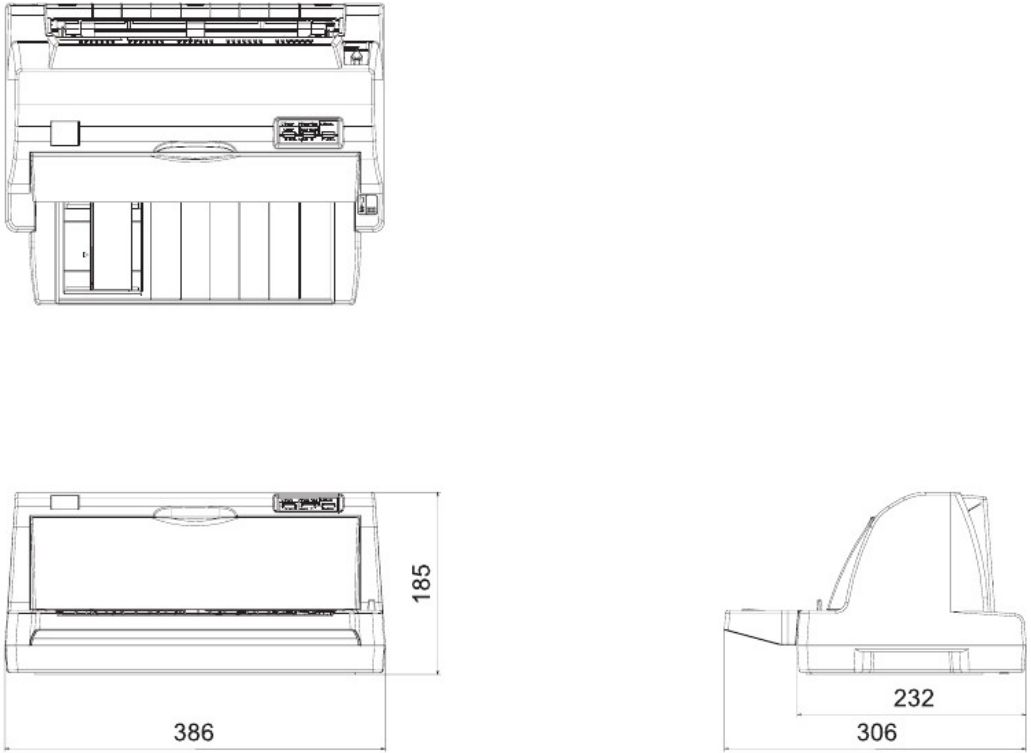


Figure 1-22. Appearance

CHAPTER

2

OPERATING PRINCIPLES

2.1 Overview

This chapter explains the operating principles of the LQ-630/LQ-630K. These principles are largely divided into two sections, "Printer Mechanism Operating Principles" and "Electrical Circuit Operating Principles."

2.1.1 Major Component

The main components of this printer are listed below.

- C480MAIN Board
- C480PSE Board
- Printer mechanism
- Housing

2.1.1.1 C480MAIN Board

The C480MAIN Board consists of components such as a 2-in-1 ASIC, PROM, Special Use PROM, DRAM, and EEPROM.
The control panel of the printer differs from previous models, since it is not set up as an independent mechanism. The control panel is part of the main board. In addition, the Rear PE Sensor is mounted directly onto the main board.

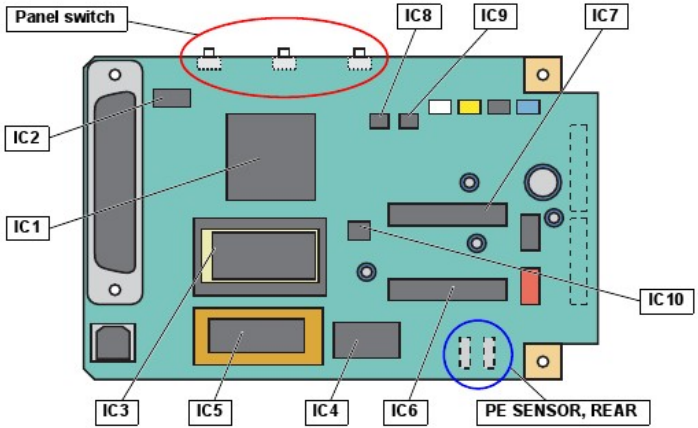


Figure 2-1. C480MAIN Component

Table 2-1. Function of the main components

Location	Elements
IC1	2 in 1 ASIC
IC2	Output Buffer IC
IC3	PROM
IC4	DRAM
IC5	PROM for customize program
IC6	CR Motor Drive IC
IC7	PF Motor Drive IC
IC8	Reset circuit
IC9	EEPROM
IC10	Regulator IC
-	Control Panel Switch
-	PE SENSOR, REAR

2.1.1.2 C480PSE Board

The C480PSE Board consists of a switching FET, transformer, fuse, input filter, +5V chopper circuit and head drivers.

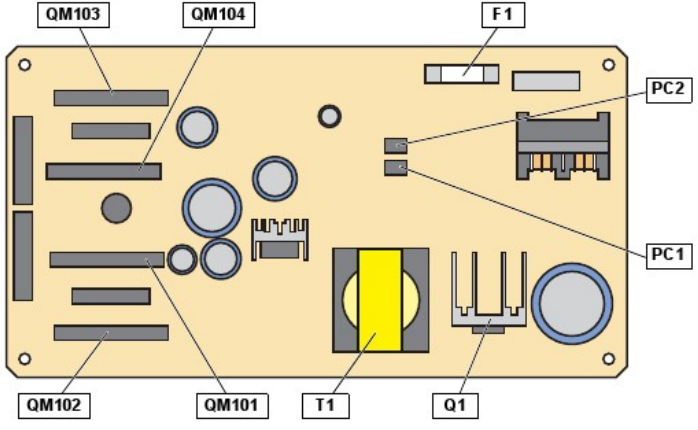


Figure 2-2. C480PSE Component

Table 2-2. Function of the main components

Location	Elements
F1	Fuse
Q1	Switching FET
QM101	Head Drive IC
QM102	Head Drive IC
QM103	Head Drive IC
QM104	Head Drive IC
T1	Transformer
PC1	Photo-coupler
PC2	Photo-coupler

2.1.1.3 Printer Mechanism

This unit consists of print head, carriage mechanism, paper feed mechanism, platen gap adjustment mechanism, ribbon feed mechanism and various sensors.

2.1.1.4 Housing

The housing of this printer consists of upper housing, lower housing, printer cover and sheet guide.
Refer to Chapter 1 "Exterior view of LQ-630/LQ-630K" about each part name.

2.2 Printer Mechanism Operation

This section describes the printer mechanism and explains how it works.

2.2.1 Printing Mechanism

The printing mechanism of this printer is composed of print head, ink ribbon and ribbon mask.
The print head is a 24-pin (12pins x 2 staggered) head for impact dot printing. (Refer to Chapter 1 "Printing Specifications")
The print head is composed of wire, wire resetting spring, actuating plate, actuating spring and driving coil. (Refer to Figure 2-4)

The Ink Ribbon Cartridge and Ribbon Mask Holder are combined on this printer. The Ribbon Mask is assembled onto the Ribbon Mask Holder, and it prevents the non-printing margins of the Ink Ribbon from touching the paper and placing unwanted ink on the printing surface.

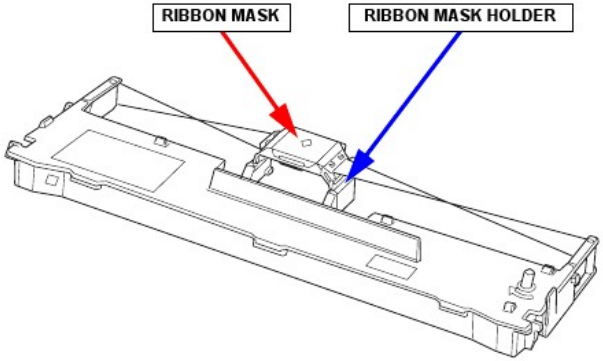


Figure 2-3. Ribbon Mask Holder

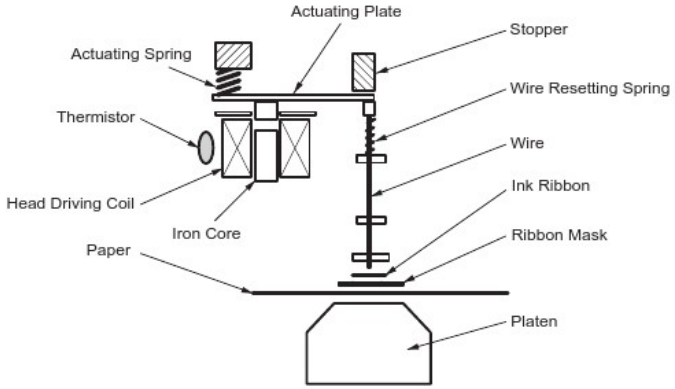


Figure 2-4. Print Head Operation Principles

1. A drive signal, transmitted from the control circuit to the PRINT HEAD drive circuit, is converted to the proper print head driving voltage, which energizes a corresponding coil. The energized coil then causes the iron core to become magnetized.
2. The magnetic force draws the actuating plate toward the core, and the dot wire, which is connected to the core, rushes toward the platen.
3. When the dot wire impacts the platen, a ribbon will be pressed against a paper and a dot will be printed.
4. When the driving voltage stops energizing the coil, the magnetic force vanishes from the iron core. The actuating plate returns to its original position (the position before coil was energized) with elasticity of platen and spring action. The dot wire also returns to its original position.

Printing occurs as each wire repeats the 4 operational steps.

The print head detects the head temperature by means of an internal thermistor.
The head temperature is converted to an electric signal by the thermistor and sent to the control circuit. The driving mode of the print head is switched according to the thickness of the paper and the head temperature. Burn loss and deterioration of dot wires in the print head is kept to a minimum when the temperature of the print head rises due to continuous printing, and print quality is maintained at a fixed level by the responsiveness of the wires when the surrounding temperature at the print head is remarkably low.
As a control, this function lowers the printing speed when the head temperature reaches a fixed value and it pauses printing until the temperature falls to a fixed value.

Table 2-3. PRINT HEAD Specification

Category	Specification
Print Method	Impact dot matrix
Number of pin wires	24-pin (12x2 staggered)
Wire diameter	ø0.20mm
Print head life	200 million strokes/wire
Weight	95g ±10%
Coil direct current resistance	39.3 ± 2.7Ω (at 25°C)
Response Frequency	Normal Mode : Less than 1430Hz (LQ, Bitimage 180dpi, Raster graphics 180dpi, Hanzi) : Less than 1350Hz (except the above) Copy Mode : Less than 1080Hz
Drive Voltage	42 ± 2.1VDC
Environmental condition	Temperature : 5 ~ 55°C Humidity : 10 ~ 85% (no condensation)
Print drive method	Constant voltage drive method

2.2.2 Carriage Mechanism

Carriage Mechanism consists of the carriage movement mechanism and carriage home position detection mechanism.

☐ Carriage Movement Mechanism

The Figure 2-5 shows carriage mechanism. The top of the carriage is supported by the GUIDE, CR, and downside is by the SHAFT, CR, GUIDE.

A part of the timing belt is attached to the carriage assy, which is moved right and left along the SHAFT, CR, GUIDE by the rotation of the carriage motor (CR MOTOR). The TIMING BELT is pre-pressed by the spring and adjust the elastic motion of the belt which is caused by temperature changes, and keep a fixed belt tension.

The carriage home position sensor (HP SENSOR) uses mechanical contact method and is located on the left edge of the mechanism. Home position is detected when the flag on the back of the Carriage Assy touches the HP SENSOR. The carriage home position control performs open loop control after the HP SENSOR detects standard position. After the location is determined for the carriage to move by the printing data, the control circuit calculates the pulse of the motor phase corresponding to the distance to move, and outputs that information to the motor. Therefore, the mis-location is detected when the home signal is detected during printing or initialization and the printer goes to the error state.

Also, the moving speed of the carriage is controlled by carriage motor drive frequency according to the printing data.

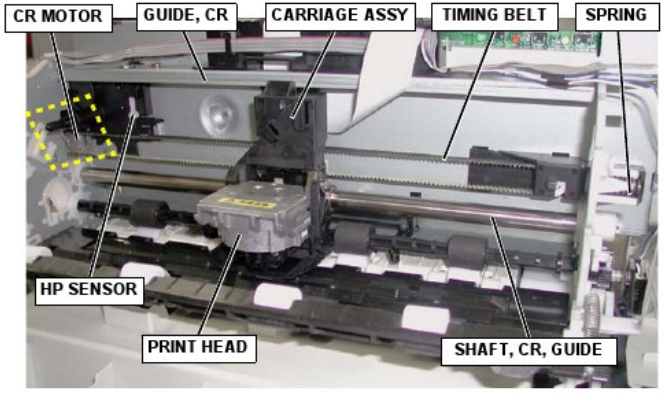


Figure 2-5. Carriage Mechanism

Table 2-4. HP SENSOR Specification

Category	Specification
Method	Mechanical contact method
Voltage	5VDC ± 5%
Switch Mode	Open : Inside HP Close : Outside HP

Table 2-5. CR MOTOR Specification

Category	Specification
Type	2 phase, 200-pole, HB-type stepping motor
Coil Resistance	3.8Ω ± 10% (at 25°C/phase)
Drive Voltage	42VDC ± 5%
Drive Pitch	Minimum resolution: 0.212mm (1/120inch) (2-2 phase 1 pulse)
Drive Method	Bi-polar constant current drive 2-2 phase, 1-2 phase, W1-2 phase

2.2.3 PG (Platen Gap) Adjustment Mechanism

Platen gap adjustment on this printer can be done manually with an adjustment lever to correspond to the paper thickness.
The CR Guide Shaft is installed off center in the left and right bushings. Because of this construction, when the Adjust Lever linked to the Right Bushing is moved upward or downward, the Carriage connected to the CR Guide Shaft moves toward or away from the Platen, adjusting the platen gap. The LQ-630 has 7 platen gap width settings, and the LQ-630K has 9 width settings. The set position is detected by the PG Sensor above the adjust lever. If the adjust lever position is at adjust lever position 2 or higher, printing speed will be reduced to Copy Mode from Print Mode to protect the print head.
See Table 2-6 to note the relationship between platen gap and printing speed.

Table 2-6. Platen Gap and Printing Speed

Paper type		Paper thickness	Adjust lever position		PG sensor	Printing speed
			LQ-630	LQ-630K		
Cut paper		0.065	0	0	Closed	Normal
		0.1	0	0	Closed	Normal
		0.14	1	1	Closed	Normal
Continuous paper		0.065	0	0	Closed	Normal
		0.09	0	0	Closed	Normal
Copy paper	1 original + 1 copy	~0.18	1	1	Closed	Normal
	1 original + 2 copies	~0.25	2	2	Open	Copy
	1 original + 3 copies	~0.34	3	3	Open	Copy
	1 original + 4 copies	~0.39	5	5	Open	Copy
	1 original + 5 copies	~0.46	Not applicable	6	Open	Copy
	1 original + 6 copies	~0.53	Not applicable	7	Open	Copy
Label		0.16/0.19	2	2	Open	Copy

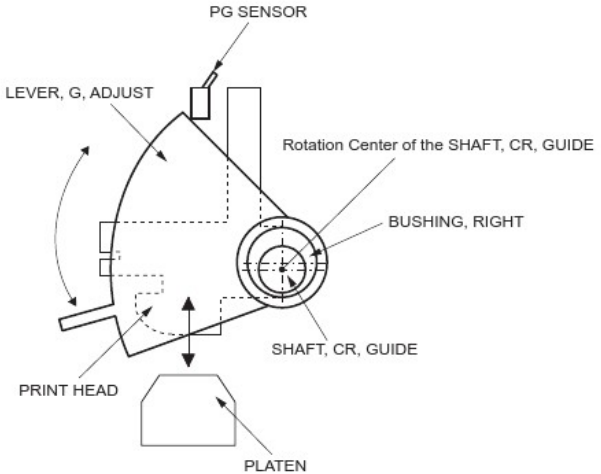


Figure 2-6. Platen Gap Adjustment Mechanism

Table 2-7. PG SENSOR Specification

Category	Specification
Method	Mechanical contact method
Voltage	5VDC ± 5%

2.2.4 Ribbon Feed Mechanism

The Ribbon Feed Mechanism consists of the Planet Gear, Combination Gear and the Ratchet, RD inside the rack installed at the left side of the mechanism unit.
The Ribbon Feed Mechanism of this printer is driven by the CR Motor. When the CR Motor rotates to the right (clockwise) or to the left (counterclockwise), the CR Motor Pinion turns the Combination Gear. The revolutions are passed to the Ratchet, RD by the gear train. The Ratchet, RD revolutions turn the Ribbon Feed Roller inside the ribbon cartridge, feeding the ribbon. Because the gears are connected to the Planet Gear, regardless of the direction of the CR Motor rotation, the rotation of the ribbon drive gears is always in the clockwise direction.

Table 2-8. CR MOTOR Rotation and Torque Transmission

Rotational direction	Torque transmission
Clockwise	CR MOTOR → COMBINATION GEAR, 8.5, 20 → LEVER ASSY, PLANET → COMBINATION GEAR, 8.5, 19 → RATCHET, RD → RIBBON FEED ROLLER (Refer to Figure 2-7. "Ribbon Feed Mechanism 1".)
Counter-Clockwise	CR MOTOR → COMBINATION GEAR, 8.5, 20 → LEVER ASSY, PLANET → SPUR GEAR, 9.5 → COMBINATION GEAR, 8.5, 19 → RATCHET, RD → RIBBON FEED ROLLER (Refer to Figure 2-8. "Ribbon Feed Mechanism 2".)

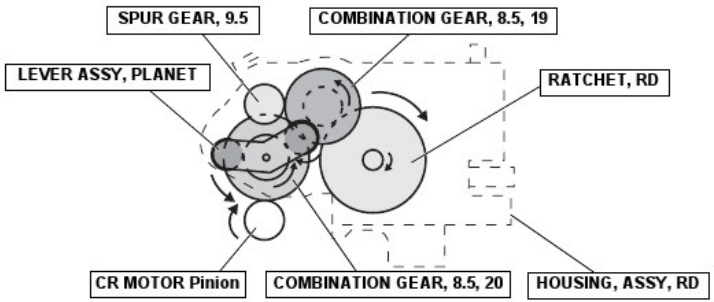


Figure 2-7. Ribbon Feed Mechanism 1

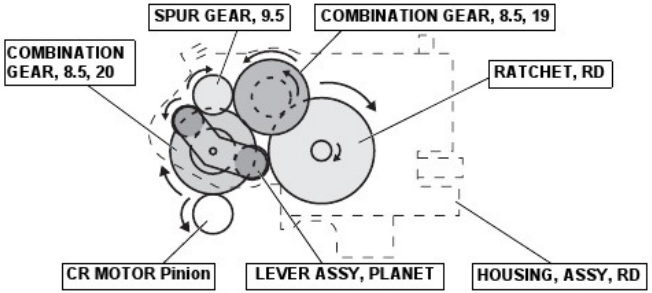


Figure 2-8. Ribbon Feed Mechanism 2

The Ribbon Break Spring, installed at the ribbon feed opening inside the cartridge case, maintains proper tension by not allowing too much ribbon to feed out and sag.

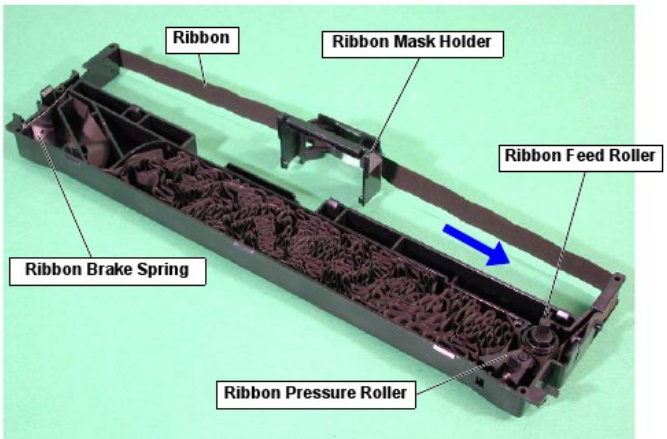


Figure 2-9. Ink Ribbon Cartridge

2.2.5 Paper Feed Mechanism

The paper feed mechanism of this printer consists of the paper feed roller, paper eject roller, PF MOTOR, tractor unit, PE SENSOR (FRONT), PE SENSOR (REAR), and paper change mechanism. This printer performs paper feed by moving the paper horizontally.

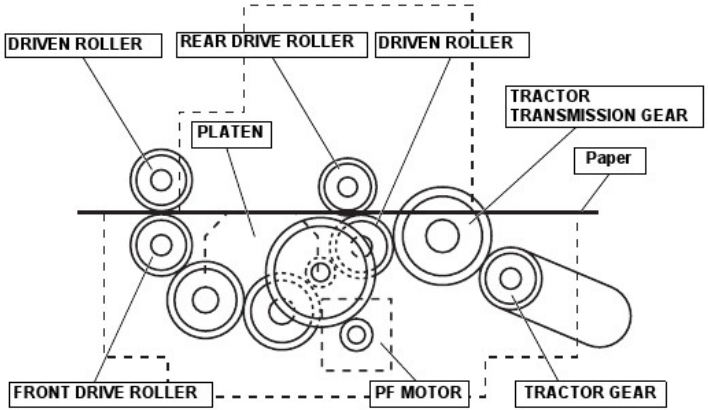


Figure 2-10. Paper Feed Mechanism

2.2.5.1 Paper Feed Mechanism

The Paper Feed Mechanism has a Friction Feed Mode and a Push Tractor Feed Mode. The paper is supported and fed between the pair of the Driven Roller and Front Drive Roller and between the pair of the Rear Drive Roller and Driven Roller. The two paper conveyance modes available after that point will be explained. The Release Lever allows switching of the conveyance mode.

☐ Friction Feed Mode

The chart below shows the flow of drive force with the Friction Feed Mode. Also see Figure 2-12 for reference.

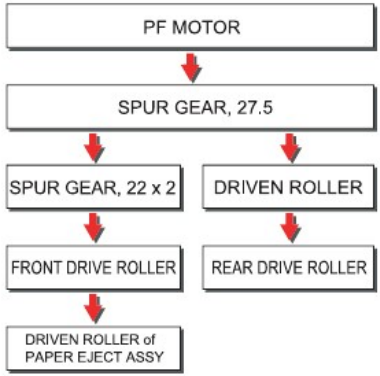


Figure 2-11. Flow of Drive Force (Friction Feed)

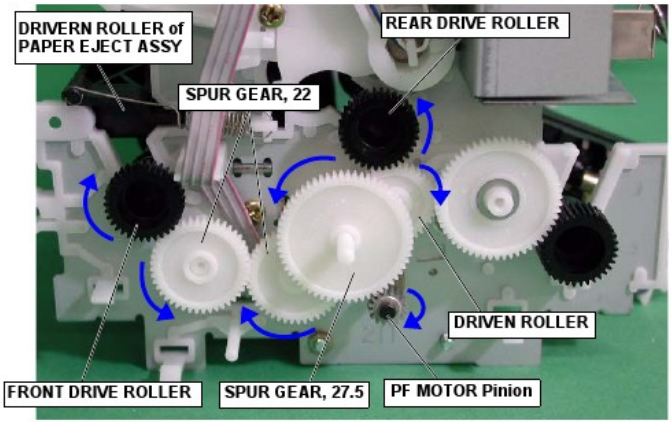


Figure 2-12. Paper Feed Mechanism (Friction Feed)

☐ Push Tractor Feed Mode

The chart below shows the flow of drive force with the Push Tractor Feed Mode. Also see Figure 2-14 for reference.

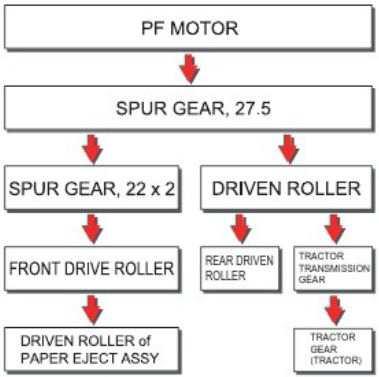


Figure 2-13. Flow of Drive Force (Tractor Feed)

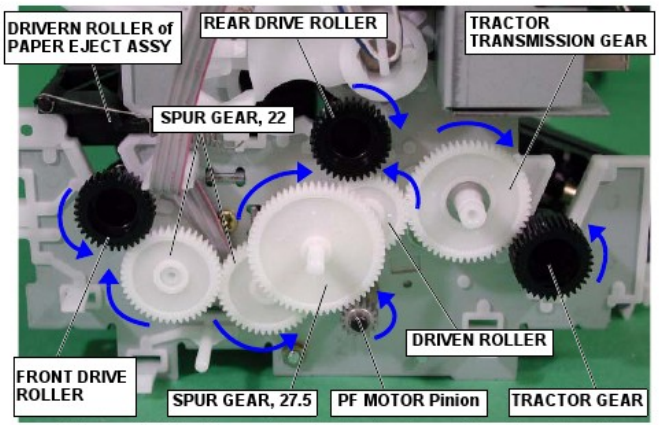


Figure 2-14. Paper Feed Mechanism (Tractor Feed)

Table 2-9. PF MOTOR Specification

Category	Specification
Type	2-phase 96 poles HB-type Stepping Motor
Coil Resistance	12Ω ± 10% (at 25 °C, per phase)
Drive Voltage	42VDC ± 5%
Drive Pitch	Minimum resolution: 0.0706mm (1/360inch) (2-2 phase 1 pulse)
Drive Method	Bi-polar constant current drive 1-2, 2-2 phase

2.2.5.2 Paper Feed Sensor Mechanism

Paper feed sensor mechanism consists of PE SENSOR, FRONT and PE SENSOR, REAR.
The function of this mechanism is to feedback information about monitoring front paper edge and rear paper edge, and to control paper feed. The sensor's reading operation is constantly performed. The timing to feedback the red signals is necessarily selected by CPU according to the operation of PF MOTOR and CR MOTOR. The table below shows specification of the sensors and their functions.

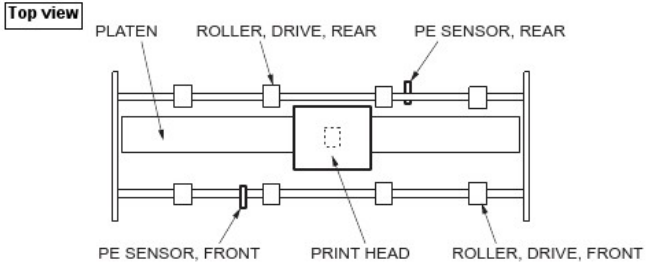


Figure 2-15. Paper Feed Sensor Mechanism

Table 2-10. Sensor Function and Operation

Sensors	Operation	Function
PE SENSOR (FRONT/REAR)	Detects top and bottom margin	Determines top and bottom margin
	Detects if there is any paper or not	Detects paper out after checking paper loading and ejecting.

Table 2-11. PE (Paper End) SENSOR, FRONT Specification

Category	Specification
Method	Mechanical contact method
Voltage	0.6~1.0mA, 5VDC ± 5%
Switch Mode	Paper inserted : Open No paper inserted : Close

Table 2-12. PE (Paper End) SENSOR, REAR Specification

Category	Specification
Method	Electro-optical transducer method (Thru-beam type photo microsensor)
Voltage	5VDC ± 5%
Switch Mode	Paper inserted : Hi (Light blocked) No paper inserted : Low (Light passes)

2.2.5.3 Paper Change Mechanism

The paper change mechanism of this printer consists of the Release Lever, Tractor Transmission Gear, and the Release Sensor. By manually setting the Release Lever, the paper conveyance method can be switched between Friction Feed Mode and Push Tractor Feed Mode.
By moving the Release Lever forward or backward, the Tractor Transmission Gear and Driven Roller engage or disengage. This transfers drive force from the PF Motor to the Tractor, or it removes the drive force when disengaging. The Release Sensor moves forward or backward with the motion of the Release Lever, and the control circuit detects the paper feed mode by the condition of the Release Lever Sensor.

The diagram below shows the workings of the mechanism.

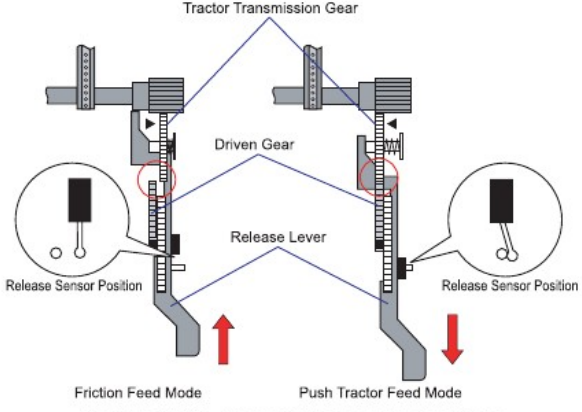


Figure 2-16. Paper Change Mechanism

The following table shows about the release lever position and the available paper.

Table 2-13. Release Lever Position and Available Paper

Release Lever Position	Paper Feed Method	Feeder	Media Type				
			Cut Sheet		Label	Continuous paper	
			Single Sheet	Multi Part		Single Sheet	Multi Part
Friction	Friction Feed (Front)	—	O	O	O	×	×
Tractor	Push Tractor Feed (Rear)	Tractor (Rear)	×	×	O	O	O

NOTE: *(O) Available*
(×) Not applicable

Table 2-14. RELEASE LEVER SENSOR Specification

Category	Specification
Method	Mechanical contact method
Voltage	5VDC ± 5%
Switch Mode	Friction : Close Tractor : Open

2.3 Electric Circuit Operating Principles

The electric circuit of this product consists of the following circuits.

Main circuit board : C480 MAIN
Power supply board : C480 PSE

The following figure shows the situation of connection.

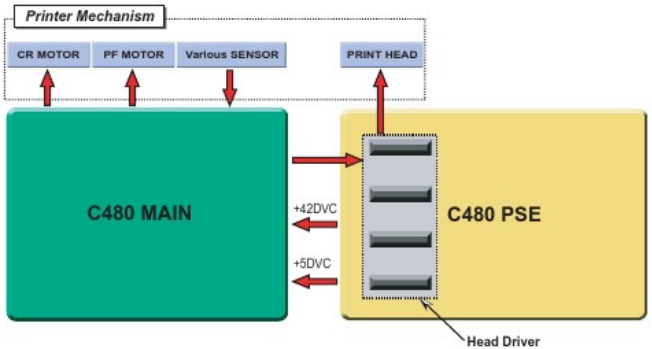


Figure 2-17. Situation of Connection

2.3.1 C480PSE Power Supply Circuit

The power supply part of this printer consists of AC cable and power supply board. The power supply board provides DC current, which is necessary for the printer mechanism and control circuit.
The head drivers for the printer are also mounted on the power supply board.

Table 2-15. Power Supply Board

Board	Input voltage	Input frequency range	Fuse F1 Rating
C480PSE	220-240VAC	47-63Hz	T 1.25AH, 250V

The power supply board has two power outputs for use by various control circuits and drive mechanisms. The table below shows the output voltages and applications for the two DC output supply voltages.

Table 2-16. Output Voltages and Application

Output voltage	Range of the output voltage	Rated output current	Range of output current	Applications
+42VDC	39.9 ~ 44.1VDC	0.6A	0 ~ 1.9A	• Print head drive • CR motor drive • PF motor drive
+5VDC	4.75 ~ 5.25VDC	0.3A	0 ~ 0.3A	• Logic line* • Various Sensor • Operation panel LEDs

NOTE: *(*)Core voltage of ASIC, PROM and DRAM is 3.3V and it is generated by the regulator IC on the MAIN board from +5VDC.*

The power supply circuit consists of the line filter circuit, ZC-RCC (Zero-Cross Ringing Choke Converter) switching circuit, economy driving circuit, print head driver and 5V chopper regulator IC. The AC voltage is first input to the line filter circuit for higher harmonics absorption, then input to the switching circuit and transformed to +42VDC. +5VDC is generated from +42VDC by the regulator IC. The over current / voltage protection circuit is also designed on the board. The economy driving circuit returns counter voltage to the +42VDC circuit.

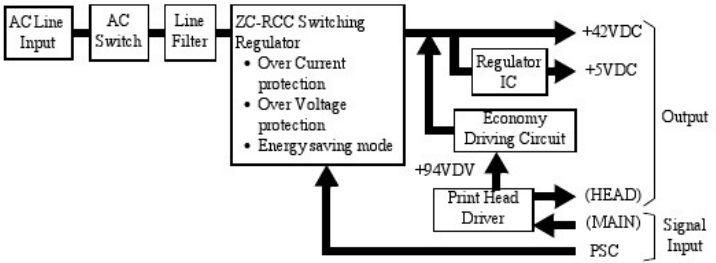


Figure 2-18. Power Supply Circuit Block Diagram

2.3.2 C480MAIN Board Circuit

The C480MAIN Board holds the control circuits for the printer. The board consists of several IC chips and drivers. In addition, this board has the following characteristics.

1. The Control Panel is integrated into this board.
2. The Rear Paper-End Sensor is directly mounted onto this board.
3. An empty slot is installed for use with custom size programs.

The table below shows the location and function of each element.

Table 2-17. Main ICs and Functions

Elements	Location	Function
2 in 1 ASIC	IC1	E01A33AA CPU • 8KB built-in RAM • Internal doubler operation by PLL (Outside clock 24MHz/Inside clock 48MHz) • Programmable timer, PWM timer circuit • iDMA (DTC), (HSDMA) circuit • Input splitter control circuit • A/D converter (10bit, 8ch) • BCU circuit for chip select, DRAM direct I/F G/A • G/A decode unit • CPU and Data-Bus integration • Bit manipulation unit • Clock unit • I/O control unit Switch input port Sensor input function LED port Energy saving control port Serial EEPROM (94C46) control Reset control output port

Table 2-17. Main ICs and Functions

Elements	Location	Function
2 in 1 ASIC	IC1	• Parallel interface unit • USB interface unit • Input buffer control unit • CR/PF motor unit • Head control unit
PROM	IC3	OTPROM for 32MB mask ROM exchange • Program • CG
Special Use PROM	IC5	8/16Mbit, OTPROM • Program for customization
DRAM	IC4	4Mbit, 2CAS method DRAM • Various buffer, work area
EEPROM	IC9	AT93C46-872 • Stores default values and various parameters
RESET IC	IC8	M62030 • 2-in-1 ASIC reset and VH power OFF detection
Output buffer IC	IC2	SN74LS06
CR MOTOR Drive	IC6	A3972SB
PF MOTOR Drive	IC7	A3972SB
Regulator IC	IC10	+3.3V generation by +5V step down

☐ C480MAIN Board

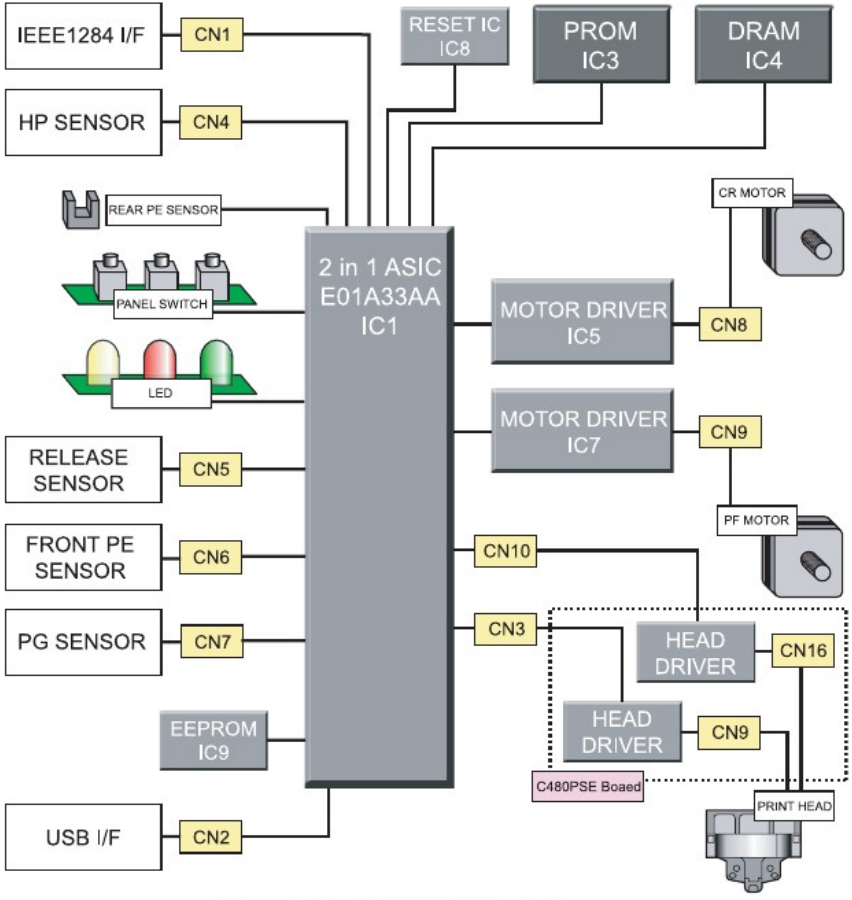


Figure 2-19. C480MAIN Block Diagram

CHAPTER

3

TROUBLESHOOTING

3.1 Troubleshooting Overview

With SIDM, the factors of an operation problem may lead in several directions, making an exact determination of the cause difficult. This chapter presents steps to help find the primary causes of failures and operating problems based on indications that appear when the trouble occurs and on steps to make repairs efficiently. Before continuing with the troubleshooting explanations of this chapter, see how problem situations are separated by type. Check the flowchart at Figure 3-1 to determine which chart to consult.

CAUTION

- **When disassembly/assembly of the printer is necessary during troubleshooting, see Chapter 4 "Disassembly and Assembly". Pay special attention to Cautions and Warnings when disassembling/ assembling.**
- **When disassembling/assembling the printer during troubleshooting, be sure to perform recommended adjustments and maintenance. See Chapter 5 "Adjustment" and Chapter 6 "Maintenance".**

The following table shows equipment that will be needed during troubleshooting.

Table 3-1. Troubleshooting Equipment

Name	Specifications
Thickness gauge	0.40mm, 0.44mm
Oscilloscope	50MHz or higher recommended
Multimeter	Digital multimeter recommended

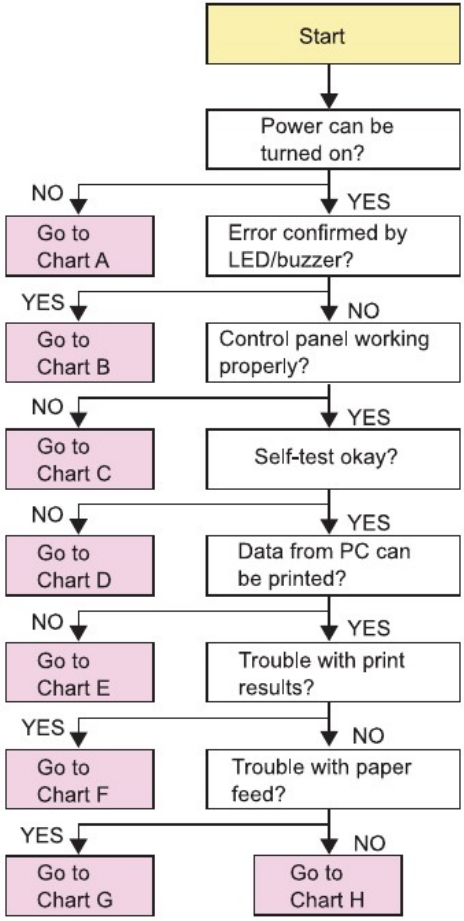


Figure 3-1. Troubleshooting Preparation Flow

3.2 Troubleshooting

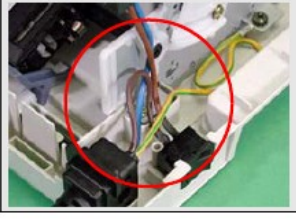
This chapter section explains troubleshooting for each of the trouble classifications presented in Figure 3-1, "Troubleshooting Preparation Flow".

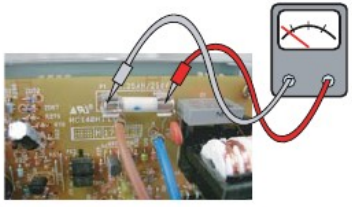
3.2.1 Chart A

This section applies when the unit will not initialize properly after power is turned on and when the control panel LED will not light. Troubleshoot by following the steps below.

CAUTION

- **Exercise caution to prevent electric shocks when confirming operation of the power supply board when power is on.**
- **Touching a metal component of any other mechanism with one hand while also touching the surface of the heat sink on the power supply board with the other hand can result in electric shock. Exercise caution.**

Step	Checkpoint	Corrective Action
1	Measure the voltage at the electrical outlet to determine if the voltage being provided to the power supply is within specifications.	Adjust power so that it is within specifications.
2	Are there any places that appear to be damaged on the power supply board or on the harness of the board? Specially check the following points. • Check for damage to the harness caused by the screwdriver when the screw fastening the mechanical unit to the lower housing was installed. 	Replace power supply board.

Step	Checkpoint	Corrective Action
3	Check for a blown fuse (F1) on the power supply board by measuring resistance with a multimeter. 	1. Replace fuse (F1). Repair is complete if printer will operate normally without blowing the fuse again. 2. If fuse blows again, replace power supply board. Repair is complete if printer will operate normally. 3. If fuse blows again after replacement of the power supply board, go to Step 4.
4	Is correct output voltage coming from the power supply board? Check the output voltage at the 5V and 42V circuits of the power supply board.	1. Replace power supply board. 2. If the printer will not operate normally after replacing the power supply board, replace main board. 3. If the printer will not operate normally after replacing the main board, replace main board and power supply board at the same time. 4. If the printer will not operate normally after replacing the main board and the power supply board at the same time, replace mechanical unit.

3.2.2 Chart B

This section describes trouble areas indicated by display of LED/buzzer error messages (self-diagnosis) and explains corresponding repairs. Troubleshoot by referring to the table below.

NOTE: ● : *Buzzer sounds for approx. 100ms.*
O : *Buzzer sounds for approx. 500ms.*

Printer Status	LED			Buzzer	Situation	Error Cause	Corrective Action
	Power	Pause	Paper Out				
Paper Out Error	On	On	On	●●●	Always	Paper not set in position.	Set paper in position.
					When loading paper by tractor feed	Rear PE sensor is not functioning, so paper is not detected even when supplied.	1. Check rear PE sensor lever for broken tip. Replace if broken. 2. Check rear PE sensor lever for broken flag. Replace if broken. 3. Check area around rear PE sensor at back of main board for paper fragments/objects. If fragments/objects are present, remove them. * If procedures above do not solve problem, follow steps below. 1. Replace main board. 2. Replace mechanical unit.

Printer Status	LED			Buzzer	Situation	Error Cause	Corrective Action
	Power	Pause	Paper Out				
Release Lever Error	On	On	---	●●●	Paper is set.	The set paper and the release lever set position do not match.	Set the release lever to match the paper load method.
					When loading paper by tractor feed	The release lever sensor is not functioning, so even if the lever is set to tractor feed the setting is not detected.	1. Check release lever sensor for broken tip. Replace if broken. 2. Check release lever sensor for proper operation. (See P. 75 "Sensors") Replace sensor if malfunctioning.
					When loading paper	The set paper and the release lever set position do not match.	Set the release lever to match the paper load method.
					When loading paper by single sheet feeder	Connector CN5 is disconnected from the main board so tractor feed is being detected.	Connect connector (yellow) to CN5 on main board.
						The connector between the release lever sensor and the main board has a faulty wire, preventing the release lever sensor for working, and so tractor feed is being detected.	Check harness for faulty wire by measuring resistance with a multimeter. Replace harness if it has a faulty wire.
						Malfunctioning of release lever sensor is preventing sensor functioning, so tractor feed is being detected.	Check release lever sensor for proper operation. (See P. 75 "Sensors") Replace sensor if malfunctioning.

Printer Status	LED			Buzzer	Situation	Error Cause	Corrective Action
	Power	Pause	Paper Out				
Paper Eject Warning	On	On	Blink	●●●	When loading paper	PF motor is malfunctioning or there is a problem with the PF motor drive assembly, so paper cannot be supplied normally.	1. Visually check for paper fragments/ objects in drive assembly of PF motor. If fragments/objects are present, remove them.  2. Check for disconnection of connector CN9 on main board. Connect if disconnected. 3. Check for normal PF motor by measuring PF motor coil resistance. Replace PF motor if abnormal. (See P. 75 "Motors")
					When ejecting paper	Paper is left inside printer without paper eject being completed.	1. Remove paper left in printer. 2. Press Load/Eject switch to trigger paper eject operation in printer.
						Paper fragments/objects are caught in front or rear PE sensor area, so paper is being detected as set.	1. Remove fragments/objects. 2. Press Load/Eject switch to trigger paper eject operation in printer.
Head Hot Warning	On	Blink	---	---	During printing	Head temperature exceeded 118°C during printing, so printing was paused.	Resume printing after head temperature decreases.

Printer Status	LED			Buzzer	Situation	Error Cause	Corrective Action
	Power	Pause	Paper Out				
Fatal error	Blink	Blink	Blink	○○○ ○○	When power is on	Carriage Control Error One of the following causes is not allowing proper detection of home position. • HP sensor connector is disconnected. • HP sensor harness has a faulty wire. • HP sensor has failed. • The carriage back flag that contacts HP sensor is broken.	Turn power Off and check following items. • Check for disconnection of HP sensor connector and connector CN4 on main board. Connect if disconnected. • Check harness for faulty wire by measuring resistance with multimeter. Replace harness if it has a faulty wire. • Check HP sensor for proper operation. (See P. 75 "Sensors") Replace sensor if malfunctioning. • Check for broken flag on carriage back. Replace carriage unit if broken.
						Carriage Control Error • Head FFC is disconnected. • Head FFC has faulty wire.	• Check for disconnection of head and head FFC. Connect if disconnected. • Check for disconnection of connectors CN9, CN16 on main board. Connect if disconnected. • Check for cut or broken head FFC. Replace if damaged.
						Power supply voltage error Power supply voltage is abnormal.	See Chart A.

3.2.3 Chart C

This section applies when control panel does not operate properly due to problems such as LED display malfunctioning or printer non-response to operational controls. Troubleshoot by referring to the table below.

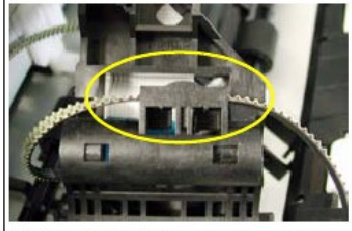
Step	Checkpoint	Corrective Action
1	1. Turn on power without setting paper. 2. Press Load/Eject switch. Does LED display "Paper Out Error"?	Measure power supply board output voltage. Replace power supply board if abnormal.
2	Check for proper assembly of panel section on the housing.	Reassemble panel section properly.
3	Allow all printer functions to operate by activating switches one by one while watching the LED display.	• Replace main board. • If panel will not operate properly after replacement of main board, replace mechanical unit.

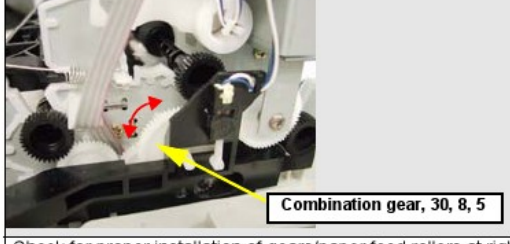
3.2.4 Chart D

This section applies when printer does not perform operations properly. Troubleshoot by referring to the table below.

NOTE: *Information in this section covers paper load and self-test. For problems with printing results and improper paper feed, see Charts F, G and H.*

Problem	Situation	Checkpoint	Corrective Action
Carriage does not operate properly.	CR motor turns, but carriage does not move or does not move smoothly.	Check for paper fragments/objects caught in pinion of CR motor.	Remove fragments/objects.
		• CR motor pinion is damaged. Move the timing belt left and right by hand, checking for CR motor pinion linkage and turning.	Replace CR motor.
		Visually check for paper fragments/objects caught in driven pulley.	Remove fragments/objects.
		• Driven pulley is damaged. Move the timing belt left and right by hand, checking for following pulley linkage and turning.	Replace driven pulley.

Problem	Situation	Checkpoint	Corrective Action
Carriage does not move smoothly.	CR motor turns, but carriage does not move or does not move smoothly.	• Timing belt is not properly installed on carriage unit. Move the timing belt left and right by hand, checking for carriage linkage and turning.	Install timing belt properly on carriage unit. 
		Check that ridges of timing belt are not chipped off.	Replace timing belt.
		Check that carriage guide shaft is not dry.	Lubricate carriage guide shaft after cleaning. (See Chapter 6 "Maintenance")
		Visually check for proper installation of driven pulley in driven pulley holder.  OK  NG	Reassemble driven pulley ASSY properly.
	CR motor does not turn.	Check for disconnection of connector CN8 on main board.	Connect connector CN8 on main board.
		Check for normal CR motor by measuring CR motor coil resistance. (See P. 75 "Motors")	Replace CR motor. * If CR motor is shorted, the driver circuit may also be shorted, so check them both at the same time. Replace the Main board if there is an abnormality. (See P. 75 "Print Head Driver")

Problem	Situation	Checkpoint	Corrective Action
Carriage is out of order	When power is turned on or when operating normally, carriage is out of order.	Check HP sensor for broken tip.	Replace HP sensor.
		Check for broken carriage back flag that contacts HP sensor.	Replace carriage unit.
		Check for normal HP sensor. (See P. 75 "Sensors")	Replace HP sensor.
		Check amount of resistance present when CR motor is turned by hand. Check for normal CR motor by measuring CR motor coil resistance. (See P. 75 "Motors")	Replace CR motor.
Paper cannot be loaded	Paper cannot be loaded by friction feed.	Check front PE sensor for broken tip.	Replace front PE sensor.
		Check for paper fragments/objects caught on front PE sensor.	Remove fragments/objects.
	Print operation works but paper does not feed.	Check for paper fragments/objects caught paper path.	Remove fragments/objects.
	PF motor does not turn or rotation is abnormal.	Check for normal PF motor by measuring PF motor coil resistance. (See P. 75 "Motors")	Replace PF motor. * If PF motor is not working, "Paper Eject Warning" will appear when loading paper.
	Paper feed roller does not turn normally.	Check for paper fragments/objects caught in PF motor drive train.	Remove fragments/objects.
		Drive gears are damaged or worn. Check for smooth rotation of all drive gears by manually turning "Combination Gear 30, 8, 5".  	Replace damaged/worn parts.
		Check for proper installation of gears/paper feed rollers at right frame.	Assembly gears/rollers properly.

3.2.5 Chart E

This section applies when self-test is successful but printing does not operate properly for data sent from PC. Troubleshoot by referring to the table below.

Step	Checkpoint	Corrective Action	
		Yes	No
1	Execute self-test. Was self-test normal?	Go to Step 2.	Go to Chart D.
2	Is the port for the printer driver set properly?	Go to Step 3.	Set the port properly.
3	Use control panel to enter Default Settings Mode and check the interface setting. Is setting on "Automatic"?	Go to Step 4.	Select "Automatic" setting.
4	Replace the interface cable and try printing data from printer again. Is printing normal?	Troubleshooting is finished.	Replace main board.
5	After replacing main board, try printing data from printer again. Is printing normal?	Troubleshooting is finished.	Replace power supply board.

3.2.6 Chart F

This section applies when quality problems occur with print results. Troubleshoot by referring to the table below.

Dot Missing			
A single dot will not print in a certain place.			
Step	**Checkpoint**	**Corrective Action**	
		Yes	**No**
1	Visually check for broken head wire. Are head wires normal?	Go to Step 2.	Replace print head.
2	Check for normal print head by measuring head coil resistance. (See P. 74 "Print Head") Is print head normal?	Go to Step 3.	Replace print head.
3	Check for cut or broken head FFC. Is head FFC normal?	Go to Step 4.	Replace head FFC.
4	Replace power supply board and try printing again. Is printing normal?	Troubleshooting is finished.	Go to Step 5.
5	Replace main board and try printing again. Is printing normal?	Troubleshooting is finished.	Replace mechanical unit.

Blurred Printing

- Characters are blurred.
- Characters are faint.
- Character density is not consistent.

Step	Checkpoint	Corrective Action	
		Yes	No
1	Set PG adjust lever to correct position and try printing again. Is printing normal?	Troubleshooting is finished.	Go to Step 2.
2	Move PG adjust lever up/down, checking for up/down movement of linked print head. Print head moves normally?	Go to Step 3.	• Check for proper assembly of PG adjust lever and right bushing. Assembly properly if not correct. • Check for damage on PG adjust lever and right bushing. Replace if damaged.
3	Remove ribbon cartridge. Check for proper advancing of ribbon when ribbon advance knob is turned. Ribbon advances normally?	Go to Step 4.	Replace ribbon cartridge.
4	Visually check RD ratchet gear for damage. Is gear damaged?	Replace RD ASSY.	Go to Step 5.
5	Check for clockwise rotation of linked RD ratchet by moving timing belt left/right by hand. Is rotation normal?	Go to Step 6.	Replace RD ASSY.
6	Execute PG/Parallelism adjustment and try printing again. (See Chapter 5 "Adjustment") Is printing normal?	Troubleshooting is finished.	Go to Step 7.
7	Check for normal print head by measuring head coil resistance. (See P. 74 "Print Head") Is print head normal?	Go to Step 8.	Replace print head.
8	Replace power supply board and try printing again. Is printing normal?	Troubleshooting is finished.	Go to Step 9.
9	Replace main board and try printing again. Is printing normal?	Troubleshooting is finished.	Replace mechanical unit.

Dirty Print Surface			
Ink smudges appear in print area.			
Step	**Checkpoint**	**Corrective Action**	
		Yes	**No**
1	Check the following items for the ribbon mask. 1. Is ribbon mask dirty? 2. Is ribbon mask hole broken?	Replace ribbon cartridge.	Go to Step 2.
2	Set PG adjust lever to correct position and try printing again. Is printing normal?	Troubleshooting is finished.	Go to Step 3.
3	Execute PG/Parallelism adjustment and try printing again. (See Chapter 5 "Adjustment") Is printing normal?	Troubleshooting is finished.	Replace ribbon cartridge.

Printing Slip 1			
Printing slips in secondary scan direction (carriage movement direction).			
Step	**Checkpoint**	**Corrective Action**	
		Yes	**No**
1	Execute Bi-d adjustment and try printing again. Is printing normal?	Troubleshooting is finished.	Go to Step 2.
2	Does carriage move smoothly?	Go to Step 3.	1. Check that timing belt is properly installed on carriage. 2. Check that ridges of timing belt are not chipped off. 3. Check that driven pulley is properly installed in driven pulley holder. 4. Lubricate carriage guide axle after cleaning. (See Chapter 6 "Maintenance")
3	Check for normal CR motor by measuring CR motor coil resistance. (See P. 75 "Motors") Is CR motor normal?	Go to Step 4.	Replace CR motor.

4	Check for normal print head by measuring head coil resistance. (See P. 74 "Print Head") Is print head normal?	Go to Step 5.	Replace print head.
5	Replace power supply board and try printing again. Is printing normal?	Troubleshooting is finished.	Go to Step 6.
6	Replace main board and try printing again. Is printing normal?	Troubleshooting is finished.	Replace mechanical unit.

Printing Slip 2

- Printing slips in primary scan direction (paper feeding direction).
- Print start position slips.

Step	Checkpoint	Corrective Action	
		Yes	No
1	Check for paper fragments/objects caught paper transport route. Are fragments/objects caught?	Remove fragments/objects.	Go to Step 2.
2	Check for broken ribbon mask. Is ribbon mask normal?	Go to Step 2.	Replace ribbon cartridge.
3	Turn "Combination Gear 30, 8, 5" by hand, checking all drive gears and rollers for smooth rotation. (See P. 66) Is all rotation normal?	Go to Step 4.	Identify damaged parts that hinder roller rotation or determine presence of foreign objects. Replace damaged parts or remove foreign objects.
4	Check for normal front PE sensor. (See P. 75 "Sensors") Is front PE sensor normal?	Go to Step 5.	Replace front PE sensor.
5	Visually check for damaged rear PE sensor lever. Is lever damaged?	Replace rear PE sensor lever.	Go to Step 6.
6	Execute PG/Parallelism adjustment and try printing again. (See Chapter 5 "Adjustment") Is printing normal?	Troubleshooting is finished.	Go to Step 7.
7	Replace main board and try printing again. Is printing normal?	Troubleshooting is finished.	Go to Step 8.
8	Replace power supply board and try printing again. Is printing normal?	Troubleshooting is finished.	Replace mechanical unit.

3.2.7 Chart G

This section applies to paper supply problems such as paper jams. Troubleshoot by referring to the table below.

Problem	Checkpoint	Corrective Action
Paper cannot be loaded	---	See Chart D
Paper cannot feed properly due to problem such as jam or skew	Check that paper characteristics are within specifications.	Use paper within specifications.
	Check that paper is flat and not deformed or damp.	Set new paper that is not curled or damp.
	Check for paper fragments/objects caught paper transport route. Specially examine these areas. 1. Paper eject ASSY 2. Front/Rear paper feed rollers 3. Gap between print head and platen	Remove fragment/objects and clean paper transport route.
	Check for dislocated paper eject ASSY roller.	Reinstall roller into paper eject ASSY or replace paper eject ASSY.
	Visually check for front/rear paper feed rollers for wear.	Replace paper feed rollers.
	Check for proper operation of paper feed rollers and tractor. Set release lever to match paper load method and turn "Combination Gear 30, 8, 5" by hand, checking for proper operation of paper feed rollers and tractor. (See P. 66)	Identify damaged parts that hinder operation of paper feed rollers tractor or determine presence of foreign objects. Replace damaged parts or remove foreign objects. * Follow steps below if unable to identify problems with above procedure. 1. Replace paper feed rollers 2. Replace eject ASSY 3. Replace tractor unit 4. Replace all gears on right frame 5. Replace mechanical unit
	Check for correct platen gap by measuring gap. Measure the platen gap with a thickness gauge to check for platen gap that is within the range shown below. For measurement method, see Chapter 5 "Adjustment". • 0.40mm Passes through • 0.44mm Does not pass through	Execute PG/Parallelism adjustment. (See Chapter 5 "Adjustment")

3.2.8 Chart H

This section applies when there are unusual noises or ribbon advancing problems. Troubleshoot by referring to the table below.

Problem	Checkpoint	Corrective Action
Unusual noises	Check for paper fragments/objects caught in gears at right frame, and check for damage to gears. Check for smooth rotation of all drive gears and rollers by turning "Combination Gear 30, 8, 5" by hand. (See P. 66)	Identify damaged parts that hinder roller rotation or determine presence of foreign objects.
	Check for dry surface on CR guide shaft.	Lubricate CR guide shaft after cleaning. (See Chapter 6 "Maintenance")
	Check for correct platen gap by measuring gap. Measure the platen gap with a thickness gauge to check for platen gap that is within the range shown below. For measurement method, see Chapter 5 "Adjustment". • 0.40mm Passes through • 0.44mm Does not pass through	Execute PG/Parallelism adjustment. (See Chapter 5 "Adjustment")
	Check that screws which is fixing the frames ("FRAME ASSY, CR", "FRAME ASSY, LEFT" and "FRAME ASSY, RIGHT") and motors ("CR MOTOR" and "PF MOTOR") have not slipped.	Tighten screws to specified torque. (See Chapter 4 "Disassembly and Assembly")
	* If above steps do not correct problem, replace mechanical unit.	
Ribbon advancement abnormal	Remove ribbon cartridge and check for smooth advancement by turning ribbon advance knob.	Replace ribbon cartridge.
	Visually check RD ratchet gear for damage.	Replace RD ASSY.
	Check for clockwise rotation of linked RD ratchet by moving timing belt left/right by hand.	Replace RD ASSY.
	Check for correct platen gap by measuring gap. Measure the platen gap with a thickness gauge to check for platen gap that is within the range shown below. For measurement method, see Chapter 5 "Adjustment". • 0.40mm Passes through • 0.44mm Does not pass through	Execute PG/Parallelism adjustment. (See Chapter 5 "Adjustment")

3.3 Troubleshooting Information

This section provides information for easily determining good parts from faulty parts by checking motor coil resistance and transistor conductivity with a multimeter.

3.3.1 Print Head

- ☐ Check Method

  Turn printer power off and remove print head. Set multimeter to resistance measurement mode or diode check mode.
  Contact each pin with one multimeter probe while contacting the COMMON pin with other multimeter probe (The COMMON pins can be connected anywhere.).

- ☐ Meter Value

  39.3 ± 2.7Ω (at 25°C)

- ☐ Pin Numbers

  See Figure 3-2.

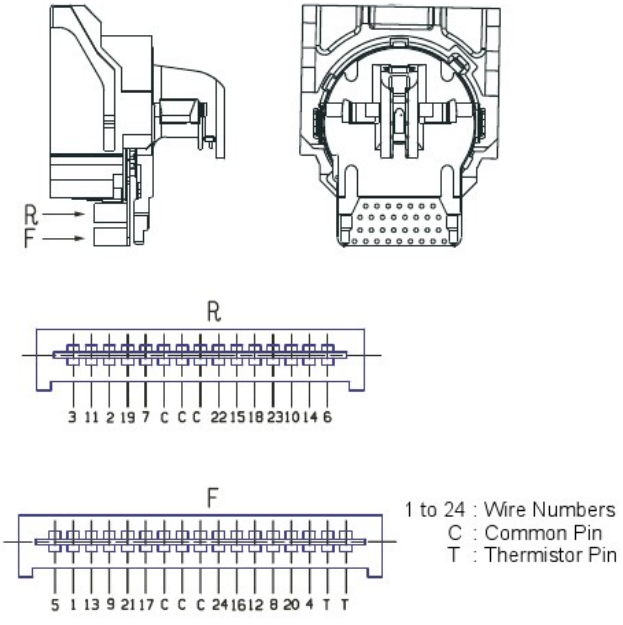


Figure 3-2. Print Head Pin Wiring

3.3.2 Sensors

☐ Check Method

Turn printer power off and remove sensor. Set multimeter to resistance measurement mode or diode check mode.

Table 3-2. Sensor Check Points

Sensor Connector No.	Check Method	Normal Value
CN4 (HP Sensor)	Contact Pin 1 with one multimeter probe and contact Pin 2 with other multimeter probe, then switch the sensor actuator.	Changes between open/short.
CN5 (Release Lever Sensor)	Contact Pin 1 with one multimeter probe and contact Pin 2 with other multimeter probe, then switch the sensor actuator.	Changes between open/short.
CN6 (Front PE Sensor)	Contact Pin 1 with one multimeter probe and contact Pin 2 with other multimeter probe, then switch the sensor actuator.	Changes between open/short.
CN7 (PG Sensor)	Contact Pin 1 with one multimeter probe and contact Pin 2 with other multimeter probe, then switch the sensor actuator.	Changes between open/short.

3.3.3 Motors

☐ Check Method

Turn printer power off and remove motor. Set multimeter to resistance measurement mode or diode check mode.

Table 3-3. Motor Check Points

Connector No.	Test Pin No.	Check Method	Normal Value
CN8 (CR Motor)	1, 2, 3, 4	Contact Pin 1 with one multimeter probe and contact Pin 3 with other multimeter probe. Contact Pin 2 with one multimeter probe and contact Pin 4 with other multimeter probe.	3.8Ω ±10% (at 25°C for single phase)
CN9 (PF Motor)	1, 2, 3, 4	Contact Pin 1 with one multimeter probe and contact Pin 3 with other meter probe. Contact Pin 2 with one multimeter probe and contact Pin 4 with other meter probe.	12Ω ±10% (at 25°C for single phase)

3.3.4 Print Head Driver

☐ Check Method

Turn printer power off. Set multimeter to resistance measurement mode or diode check mode.

1. Check conductivity by contacting Pin 8 with multimeter negative probe and contacting Pin 1, 5, 6, 10, 11, 15 with multimeter positive probe.
2. Check for no conductivity by contacting Pin 8 with multimeter positive probe and contacting Pin 1, 5, 6, 10, 11, 15 with multimeter negative probe.
3. Check for no conductivity between Pin 8 and Pin 2, 4, 7, 9, 12, 14.

☐ Transistor numbers

QM101, QM102, QM103, QM104

3.4 Appendix

3.4.1 Repair of Main Board

TBD

CHAPTER

4

DISASSEMBLY AND ASSEMBLY

4.1 Overview

This section describes procedures for disassembling the main components of EPSON LQ-630/LQ-630K.

Except where indicated separately, all procedures for re-assembling the disassembled assemblies and components should be carried out by following the disassembly procedures in reverse.

- WARNING
  Sections which may result in injury or risk to life if proper care is not taken are indicated by a "**WARNING**" symbol.
- CAUTION
  Sections where particular care should be taken beforehand during disassembly or assembly are indicated by a "**CAUTION**" symbol.
- CHECK POINT
  Tips designed to assist with disassembly are indicated by a "**CHECK POINT**" symbol.
- RE-ASSEMBLY
  If the assembly procedure differs from the reverse of the disassembly procedure, the steps which are different are indicated by a "**RE-ASSEMBLY**" symbol.
- ADJUSTMENT
  Furthermore, if adjustment is required as a result of disassembly, the adjustment steps are indicated by an "**ADJUSTMENT**" symbol.

If disassembly of assemblies or components which are not mentioned in this chapter are required, please refer to the exploded diagram in Chapter 7 "Appendix".

Be sure to read the "Precautions for Disassembling the Printer" before starting any disassembly procedures.

4.1.1 Precautions for Disassembling the Printer

See the precautions below when disassembling and assembling EPSON LQ-630/LQ-630K.

- **Before starting disassembly and re-assembly work, make sure that the power cable is disconnected from the wall outlet. However, if tasks such as voltage measurement need to be carried out, take care to avoid electric shocks. The procedures given in this manual should be followed closely.**
- **Be careful with the print head when you handle it, as it may be very hot just after the printing.**
- **Leave the printer for five minutes or more after disconnecting the AC cable, to completely discharge high electric charge remains in the electrolyte capacitor on the power supply board.**
- **Do not touch the heat sink, attached to the switching FET (Q1) on the power supply board, just after power off as it may be very hot.**
- **Be sure to wear gloves when disassembling or assembling any parts of the scanner in order to avoid injury from cuts.**
- **In order to protect sensitive microprocessors and circuitry, use static discharge equipment, such as anti-static wrist straps, when accessing internal components.**
- **If any tone or oil gets onto skin or clothing, wipe it immediately with a dry cloth, and then rinse the affected part with water.**

CAUTION

- **Use only the specified tools when carrying out disassembly, assembly and adjustments.**
- **Screws should always be tightened to the specified tightening torques.**
- **Use only specified lubricants and adhesives with the printer. (Refer to Chapter 6 "Maintenance".)**
- **Be sure to perform any specified adjustments when disassembling the printer. (Refer to Chapter 5 "Adjustment".)**

4.1.2 Tools

In order to avoid damaging the printer, make sure that you use only the specified tools.

Table 4-1. Recommended Tools

Name	EPSON Part No.
Phillips Screwdriver No.2	B743800200
Standard Screwdriver	B743000100
Box Driver (5.5mm diagonal)	B741700100
Thickness gauge set	B776702201
Round-nosed pliers	B740400100
Nippers	B740600100
Tweezers	B741000100

NOTE: *All tools are available in the market.*

Table 4-2. Devices Required for Repair Work

Device	Required Specifications
Multi meter	---
Oscilloscope	50MHz

NOTE: *The oscilloscope is only required by a qualified technician carrying out component repair.*

4.1.3 Service Check After Repair

After completing repair of the product, use the check list shown below, to verify status of repaired product and all the repair work performed before returning the product to the users. This list can be used as a record of all service work performed with the product.

Table 4-3. Repair Status Check List

Category	Component	Item to Check	Status	
Printer Mechanism	Print head	Are all wires print properly?	☐ Checked, OK	☐ Not necessary
	Carriage Mechanism	Does the carriage move smoothly? • Noisy? • Any dirt or excessive oil?	☐ Checked, OK	☐ Not necessary
		Is the Carriage motor at the normal temperature? (Not too hot?)	☐ Checked, OK	☐ Not necessary
	Paper Feed Mechanism	Is paper advance smoothly? • Noisy? • Paper is jamming?	☐ Checked, OK	☐ Not necessary
		Is the paper-feed motor at the normal temperature? (Not too hot?)	☐ Checked, OK	☐ Not necessary
	Paper Path	Are all types of paper advance smoothly?	☐ Checked, OK	☐ Not necessary
		Is the tractor feeding paper smoothly?	☐ Checked, OK	☐ Not necessary
		Are all paper paths clear of an obstructions?	☐ Checked, OK	☐ Not necessary
		Is the platen free of damage?	☐ Checked, OK	☐ Not necessary
	Ribbon Mask	Is the ribbon mask free of damage?	☐ Checked, OK	☐ Not necessary
Operation	Self-Test	Was the self-test printing successful?	☐ Checked, OK	☐ Not necessary
	On-line Test	Was the on-line printing successful?	☐ Checked, OK	☐ Not necessary
Adjustment	Platen-Gap	Is the gap adjusted correctly? PG =	☐ Checked, OK	☐ Not necessary
	Bi-D Alignment	Is the bi-directional alignment made properly?	☐ Checked, OK	☐ Not necessary
ROM	Version	Latest version? Version =	☐ Checked, OK	☐ Not necessary
Packing	Ribbon Cartridge	Has the ribbon cartridge been removed from the printer?	☐ Checked, OK	☐ Not necessary
	Attachments	Have all relevant attachments been packed together with the printer?	☐ Checked, OK	☐ Not necessary

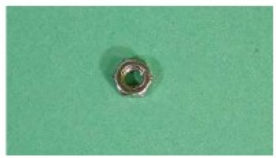
4.1.4 Specifications for Screws

The table below lists the abbreviations used in this manual for small parts, such as screws and washers.

Table 4-4. List of Screw Types

No.	Abbreviation	Appearance
1	(No.1) C.P.B-Tite 3x14	
2	(No.2) C.B.B-Tite 3x12	
3	(No.3) C.B.S-Tite 3x6	
4	(No.4) C.B.S-Tite 3x16	

Table 4-4. List of Screw Types

No.	Abbreviation	Appearance
5	(No.5) C.B. (O) 4x8	
6	(No.6) C.C.P-Tite 3x8	
7	(No.7) C.B.B-Tite 3x6	
8	(No.8) C.B.S-Tite (P2) 3x10	
9	(No.9) HEXAGON NUT M3	

4.2 Printer Disassembly and Assembly

This section describes procedures for disassembling the main components of the printer. Since re-assembling the printer can be done by simply performing the disassembly procedures in reverse order, this chapter does not describe the assembly procedures. If necessary, special notes on re-assembling or adjusting a component are given at the end of each procedure.

CAUTION

Make sure to remove the sheet guide from the printer before disassembly.

Directions used in this section are defined as shown in the figure below.

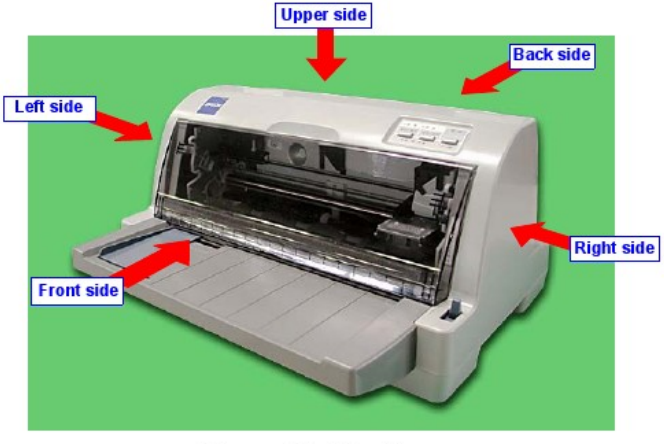


Figure 4-1. Directions

The following flowchart shows the disassembly procedure as a series of steps. Refer to the page numbers indicated in the flowchart for details on the disassembly procedure for each unit.

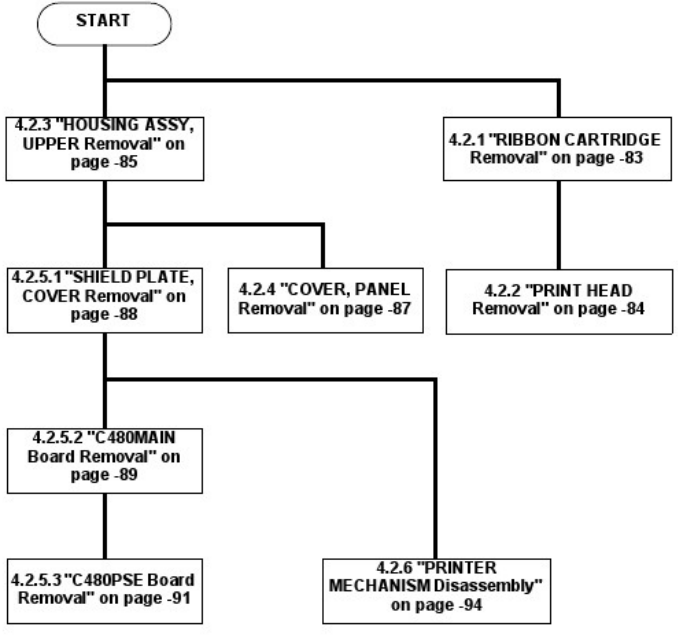


Figure 4-2. Disassembly Flowchart (Main component)

4.2.1 RIBBON CARTRIDGE Removal

1. Open the COVER ASSY, PRINTER.
2. Move the PRINT HEAD to the right of the printer.
3. Place fingers on the center PAPER EJECT ASSY knob and slide it toward the front of the printer, and lean the PAPER EJECT ASSY over toward the front.

Figure 4-3. Lean the PAPER EJECT ASSY Over Toward the Front

4. Move the PRINT HEAD to the center of the printer.
5. Use thumb and forefinger to grasp the left and right sides of the RIBBON MASK HOLDER while pulling it forward. Release the left and right hooks securing the RIBBON MASK HOLDER to the PRINT HEAD.

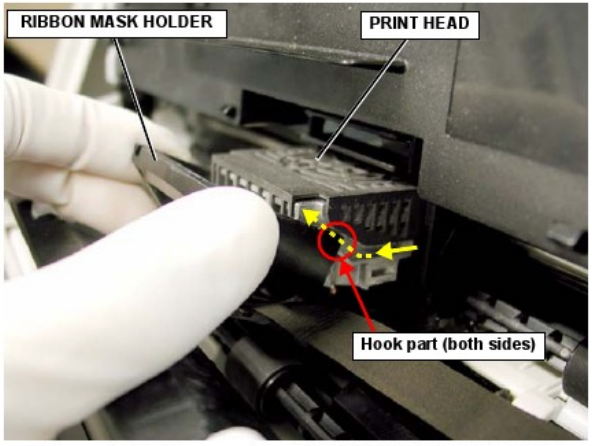


Figure 4-4. Remove the RIBBON MASK HOLDER

6. Slide the 2 hooks of the RIBBON MASK HOLDER toward the front through the channels in the PRINT HEAD and remove the RIBBON MASK HOLDER. (Refer to Figure 4-4.)
7. Pull the RIBBON CARTRIDGE toward the front of the printer and remove it from the printer body.

When installing the RIBBON MASK HOLDER onto the PRINT HEAD, slide the 2 hooks on the RIBBON MASK HOLDER through the slots on the PRINT HEAD and push them in until push them in until they click into place.

4.2.2 PRINT HEAD Removal

1. Remove the RIBBON CARTRIDGE. (See 4.2.1 "RIBBON CARTRIDGE Removal".)
2. Release the left and right dowels on the COVER ASSY, PRINTER by pushing them in the directions shown by the arrows, and then remove the COVER ASSY, PRINTER from the HOUSING ASSY, UPPER.

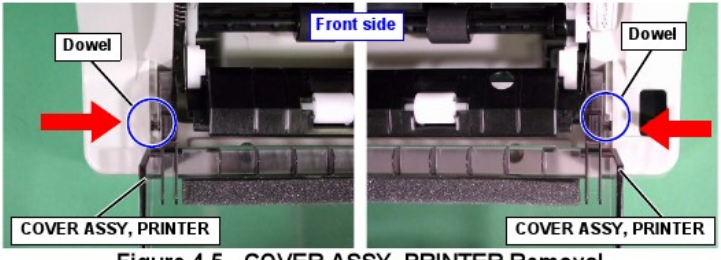


Figure 4-5. COVER ASSY, PRINTER Removal

3. Facing the printer, slide the PRINT HEAD to the right end.

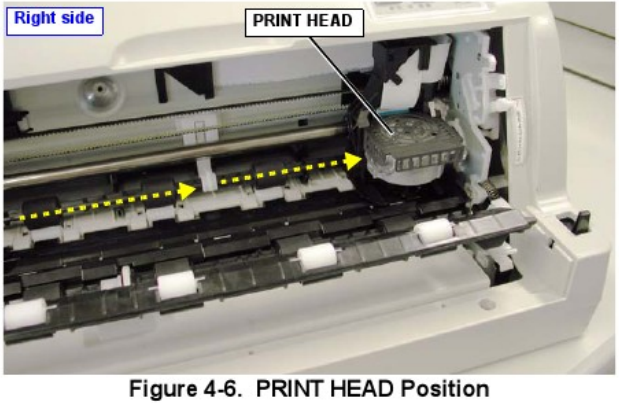


Figure 4-6. PRINT HEAD Position

4. Raise the PAPER EJECT ASSY a little upwards and hold it. (Refer to Figure 4-7.)

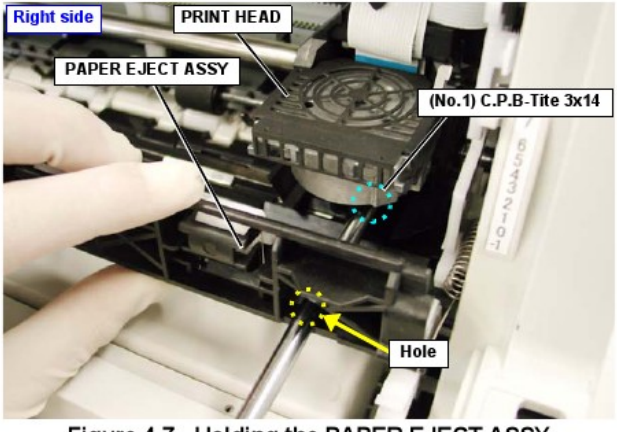


Figure 4-7. Holding the PAPER EJECT ASSY

5. Fit a screwdriver through the hole in the right end of the PAPER EJECT ASSY and remove the screw (No.1) C.P.B-Tite 3x14 (0.58-0.78Nm) securing the PRINT HEAD to the CARRIAGE ASSY. (Refer to Figure 4-7.)
6. Slide the PRINT HEAD toward the front and remove it from CARRIAGE ASSY.

7. Remove 2 CABLE, HEAD from the PRINT HEAD.

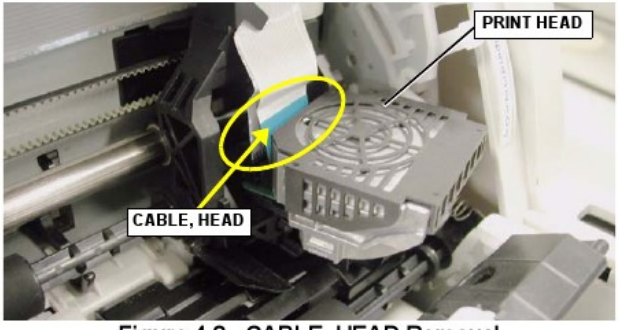
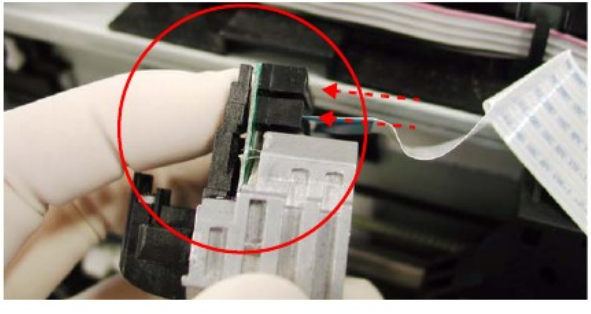


Figure 4-8. CABLE, HEAD Removal

CAUTION

When inserting CABLE, HEAD to the PRINT HEAD, support a connection part with a finger from the bottom. (See the below figure.)



ADJUSTMENT REQUIRED

With the PRINT HEAD removed, be sure to perform PG/ Parallelism adjustment and Bi-D adjustment. (Refer to Chapter 5 "Adjustment".)

4.2.3 HOUSING ASSY, UPPER Removal

1. Remove the RIBBON CARTRIDGE. (See 4.2.1 "RIBBON CARTRIDGE Removal".)
2. Return the PAPER EJECT ASSY to its former position from its swung forward position.
3. Remove the COVER ASSY, PRINTER from the HOUSING ASSY, UPPER. (Then perform step 2 described at 4.2.2 PRINT HEAD Removal.)
4. Remove 2 screws (No.2) C.B.B-Tite 3x12 (0.68-0.88Nm) securing the HOUSING ASSY, UPPER to the HOUSING ASSY, LOWER.

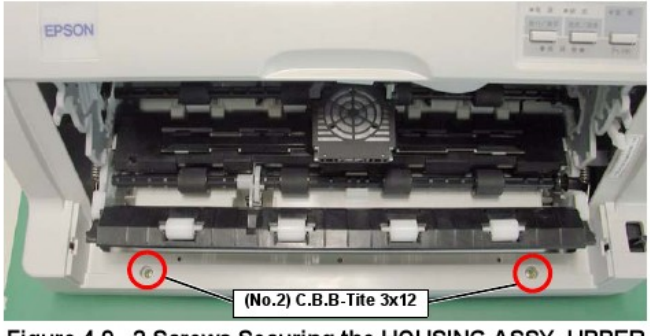


Figure 4-9. 2 Screws Securing the HOUSING ASSY, UPPER

5. Use a tool such as tweezers to release the 3 hooks securing the bottom back of the HOUSING ASSY, UPPER to the HOUSING ASSY, LOWER.

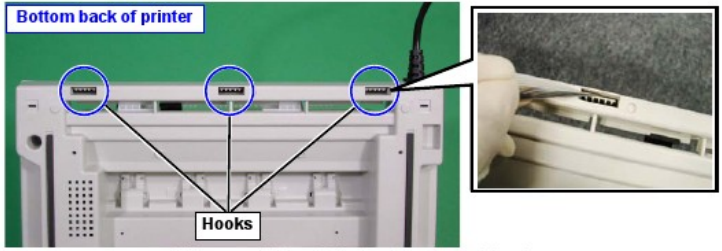


Figure 4-10. Printer Bottom Hooks

6. Remove the HOUSING ASSY, UPPER.

CAUTION

When removing the HOUSING ASSY, UPPER, be careful of interference from the PARALLEL I/F cable securing hooks. (Refer to Figure 4-11, "PARALLEL I/F Cable Hooks".)

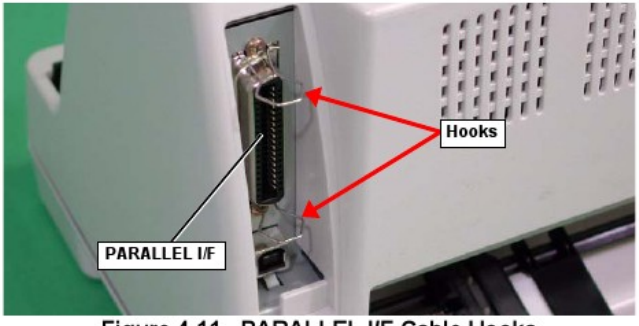


Figure 4-11. PARALLEL I/F Cable Hooks

Reassembly

- **Reassemble the HOUSING ASSY, UPPER with the locks of the TRACTOR ASSY released. (Refer to Figure 4-12, "TRACTOR ASSY Lock Release".)**
- **When reassembling the HOUSING ASSY, UPPER into the slots in the HOUSING ASSY, LOWER, push the hook in until the click into place. (Refer to Figure 4-13, "Reassembly the HOUSING ASSY, UPPER".)**

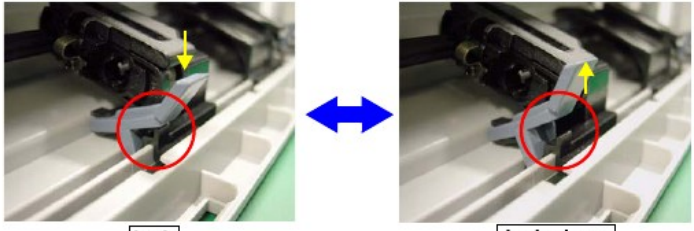


Figure 4-12. TRACTOR ASSY Lock Release

Figure 4-13. Reassembly the HOUSING ASSY, UPPER

4.2.4 COVER, PANEL Removal

1. Remove the HOUSING ASSY, UPPER. (See 4.2.3 "HOUSING ASSY, UPPER Removal".)
2. While lifting the COVER, PANEL a little upwards at the location shown by the arrow, slide it toward the back of the printer. Release the 4 hooks securing the COVER, PANEL to the HOUSING ASSY, UPPER and remove the panel.

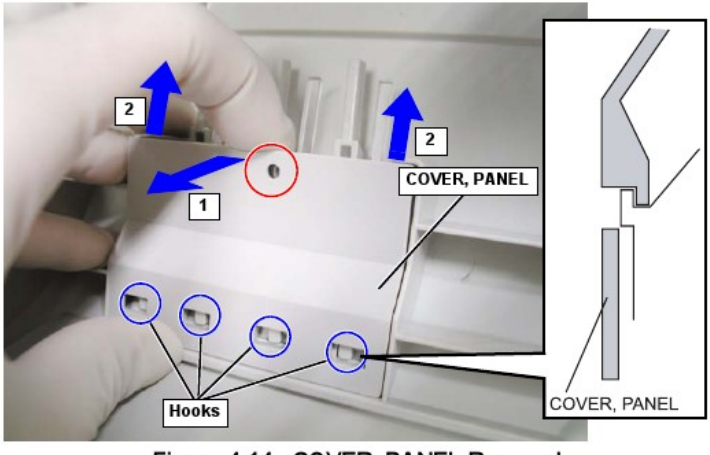


Figure 4-14. COVER, PANEL Removal

4.2.5 Electrical Circuit Board Removal

4.2.5.1 SHIELD PLATE, COVER Removal

1. Remove the HOUSING ASSY, UPPER. (See 4.2.3 "HOUSING ASSY, UPPER Removal".)
2. Remove 5 screws (No.3) C.B.S-Tite 3x6 (0.78-0.98Nm) securing the SHIELD PLATE, COVER to the printer body. (Refer to Figure 4-15 and Figure 4-16.)

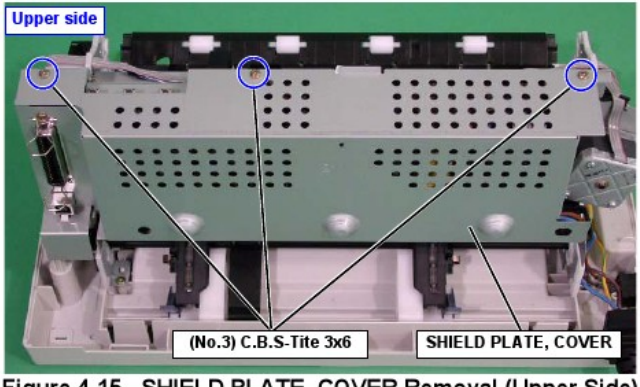


Figure 4-15. SHIELD PLATE, COVER Removal (Upper Side)

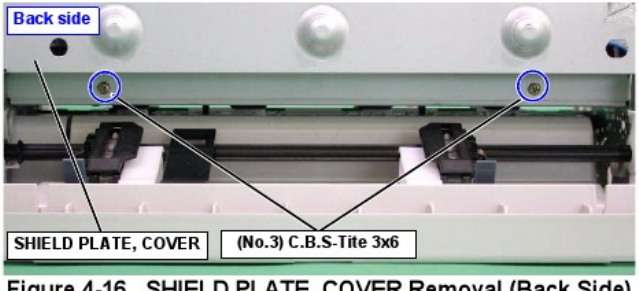


Figure 4-16. SHIELD PLATE, COVER Removal (Back Side)

3. Remove the 2 screws (No.4) C.B.S-Tite 3x16 (0.78-0.98Nm) of the PARALLEL I/F cable connector that secure the SHIELD PLATE, COVER to the printer body.

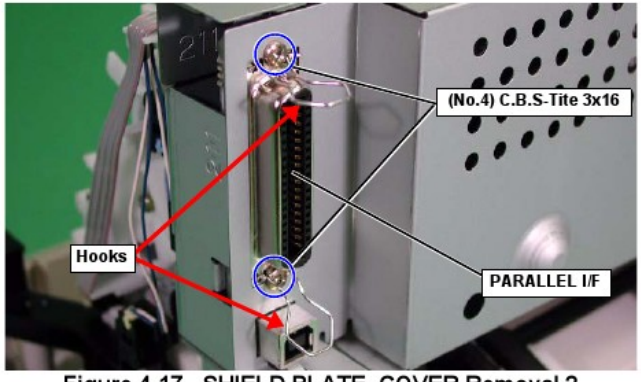


Figure 4-17. SHIELD PLATE, COVER Removal 2

4. Remove the SHIELD PLATE, COVER.

CAUTION

- **The edge of the SHIELD PLATE, COVER has burrings on it, so be careful of them when handling the SHIELD PLATE, COVER.**
- **When removing the SHIELD PLATE, COVER, be careful of interference from the PARALLEL I/F cable securing hooks. (Refer to Figure 4-17, "SHIELD PLATE, COVER Removal 2".)**

Reassembly

- **When installing SHIELD PLATE, COVER, use the position shown in the figure to set alignment with printer. (Refer to Figure 4-18, "Reassembly the SHIELD PLATE, COVER".)**
- **When reassembling the SHIELD PLATE, COVER, be careful of interference from the PARALLEL I/F cable securing hooks. (Refer to Figure 4-17, "SHIELD PLATE, COVER Removal 2".)**

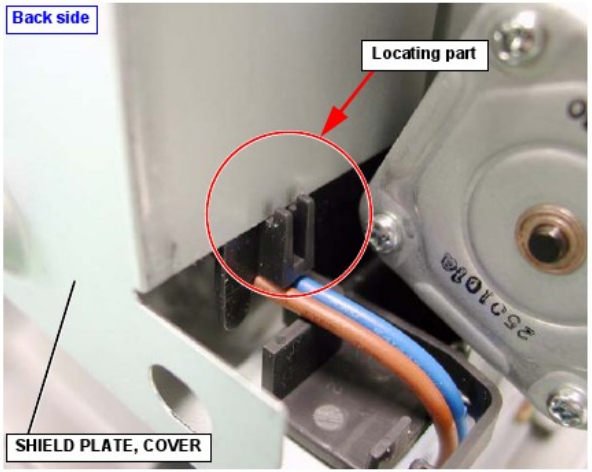


Figure 4-18. Reassembly the SHIELD PLATE, COVER

4.2.5.2 C480MAIN Board Removal

1. Remove the SHIELD PLATE, COVER. (See 4.2.5.1 "SHIELD PLATE, COVER Removal".)
2. Remove the following connectors from the C480MAIN Board.

CN4 (White, 2pin)	: HP SENSOR
CN5 (Yellow, 2pin)	: RELEASE LEVER SENSOR
CN6 (Black, 2pin)	: PE SENSOR, FRONT
CN7 (Blue, 2pin)	: PG SENSOR
CN8 (Red, 4pin)	: CR MOTOR
CN9 (Black, 4pin)	: PF MOTOR

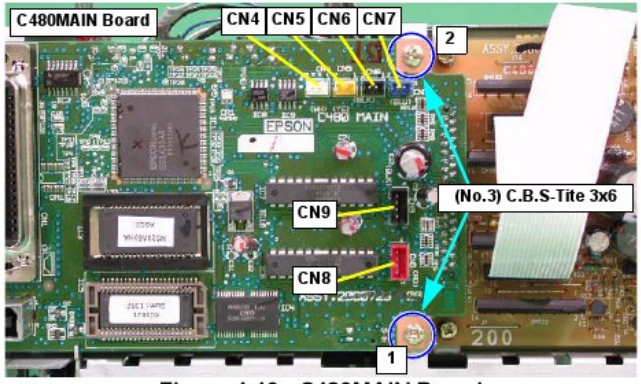


Figure 4-19. C480MAIN Board

3. While supporting the C480MAIN Board with your hand, remove the 2 screws (No.3) C.B.S-Tite 3x6 (0.59-0.79Nm) securing the board to the FRAME ASSY, CR using the order shown Figure 4-19. (Starting with lower screw.) (Refer to Figure 4-19.)

CAUTION

When removing the screws securing the C480MAIN Board to the FRAME ASSY, CR, support the board by hand to prevent it from dropping and remove the lower screw first. (Refer to Figure 4-19, "C480MAIN Board".)

4. While holding the C480MAIN Board at the positions shown by the arrows, disconnect the combination connector that secures it to the C480PSE Board and remove the board.

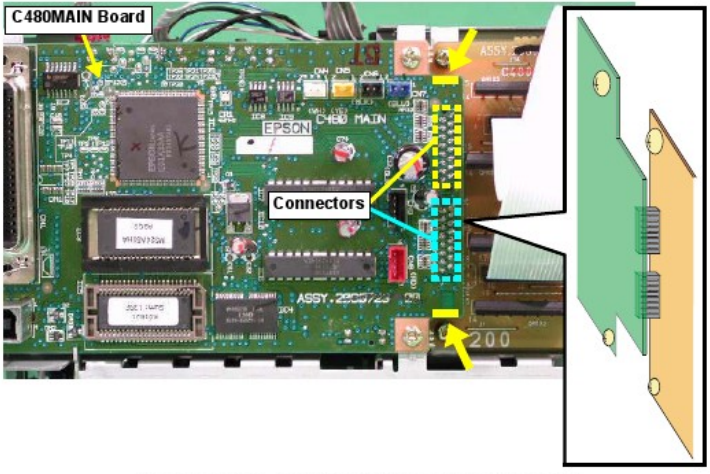


Figure 4-20. C480MAIN Board Removal 2

CAUTION

When removing the C480MAIN Board, hold the board with your hand at the places shown by the arrows in Figure 4-20. While slowly pulling the board forward (the back of the printer), separate the C480MAIN Board from the combination connector. (Refer to Figure 4-20, "C480MAIN Board Removal 2".)

Reassembly

When reassembling the C480MAIN Board, be sure to first remove the C480PSE Board and connect the combination connector between the C480MAIN Board and the C480PSE Board. (Refer to 4.2.5.3 "C480PSE Board Removal".) Then install the two boards together, starting from the upper side screw. (Refer to Figure 4-27, "Screw Installation Order".)

ADJUSTMENT REQUIRED

When replacing the C480MAIN Board, be sure to write in the USB serial number and perform Bi-D adjustment. (Refer to Chapter 5 "Adjustment".)

4.2.5.3 C480PSE Board Removal

1. Remove the C480MAIN Board. (See 4.2.5.2 "C480MAIN Board Removal".)
2. Remove the AC SOCKET (POWER CABLE ASSY on LQ-630K) from the HOUSING ASSY, LOWER.
3. While lightly retracting the securing tabs of the POWER SWITCH inside the HOUSING ASSY, LOWER, push the switch outward to remove it.

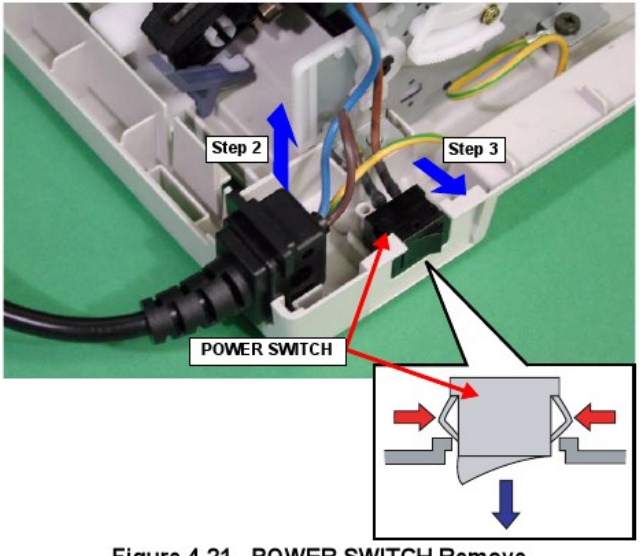


Figure 4-21. POWER SWITCH Remove

When reassembling the AC SOCKET (LQ-630), be careful of the installation direction. If the socket is installed in the wrong direction, the load on the AC CABLE will cause damage. (Refer to Figure 4-22, "AC SOCKET Installation Direction <LQ-630>".)

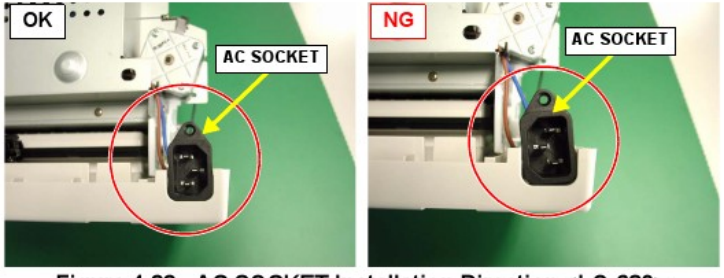


Figure 4-22. AC SOCKET Installation Direction <LQ-630>

4. Remove 1 screw (No.5) C.B. (O) 4x8 (0.98-1.18Nm) securing the GROUNDING WIRE to the HOUSING ASSY, LOWER.

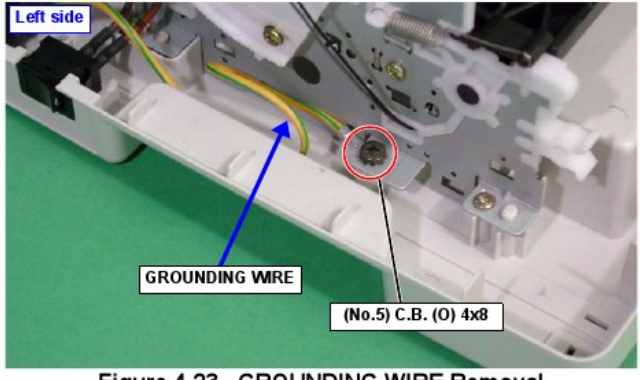


Figure 4-23. GROUNDING WIRE Removal

5. Remove 2 CABLE, HEAD (CN9, CN16) connected to the C480PSE Board.

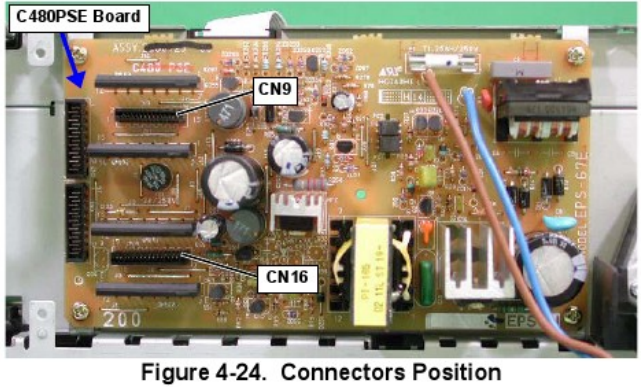


Figure 4-24. Connectors Position

6. Free the AC CABLE from the HOLDER AC CABLE.

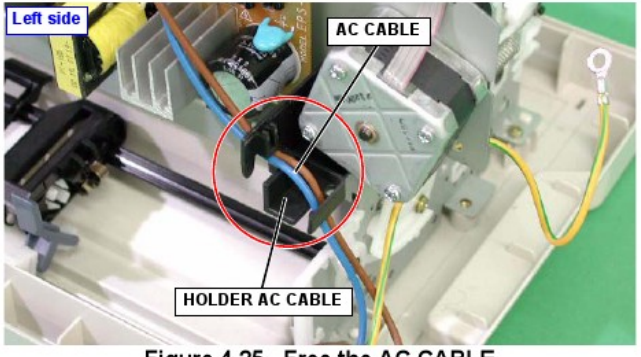


Figure 4-25. Free the AC CABLE

7. While supporting the C480PSE Board with your hand, remove the 4 screws (No.3) C.B.S-Tite 3x6 (0.59-0.79Nm) securing the board to the FRAME ASSY, CR using the order shown below. (Starting with lower screw.)

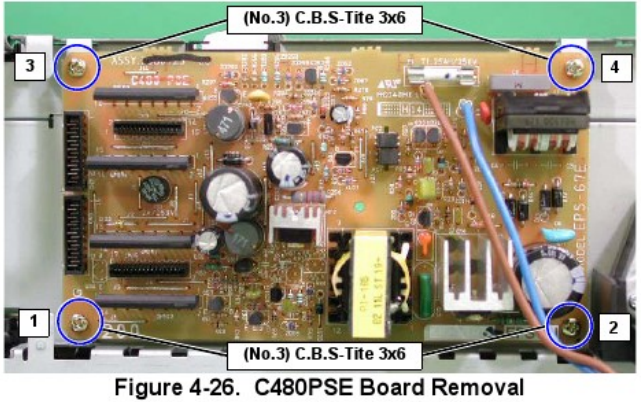


Figure 4-26. C480PSE Board Removal

When removing the screws securing the C480PSE Board to the FRAME ASSY, CR, support the C480PSE Board with your hand while removing the screws and start with the lower side screws.
When the screws are removed from the upper side, the PSE Board can bend the board to the breaking point.
(Refer to Figure 4-26, "C480PSE Board Removal".)

8. Remove the C480PSE Board from the printer body.

When reassembling the C480PSE Board, be sure to join the C480PSE Board and C480MAIN Board with the connector, then install the boards together following the screw installation order as shown below.
(Refer to Figure 4-27, "Screw Installation Order".)

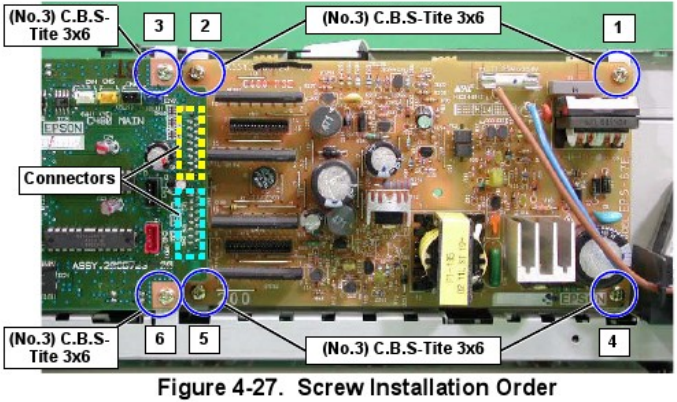


Figure 4-27. Screw Installation Order

4.2.6 PRINTER MECHANISM Disassembly

This section explains the disassembling procedure of the printer mechanism. The disassembling procedure is shown in the flowchart below.

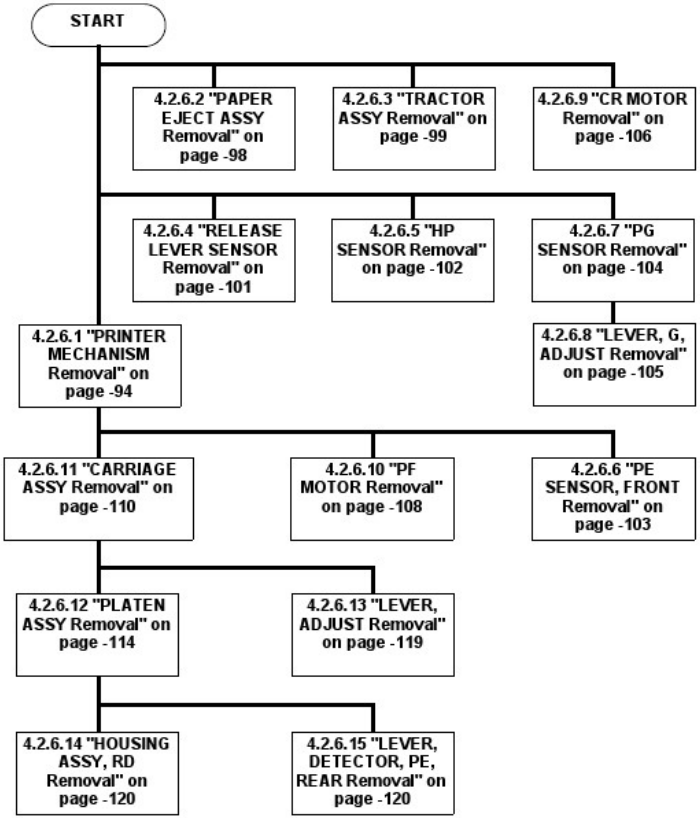


Figure 4-28. Disassembly Flowchart (PRINTER MECHANISM)

4.2.6.1 PRINTER MECHANISM Removal

1. Remove the SHIELD PLATE, COVER. (See 4.2.5.1 "SHIELD PLATE, COVER Removal".)
2. Remove the POWER SWITCH and AC SOCKET (POWER CABLE ASSY on LQ-630K). (Then perform step 2 to step 4 described at 4.2.5.3 C480PSE Board Removal.)
3. Slide TRACTOR ASSY, LEFT and TRACTOR ASSY, RIGHT to the outside ends of the printer.

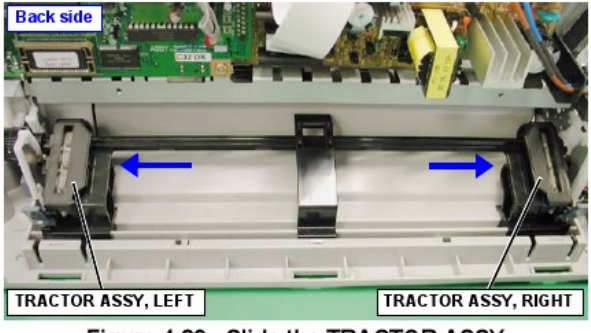


Figure 4-29. Slide the TRACTOR ASSY

4. While pulling the HOUSING ASSY, LOWER location shown below in the direction of the arrow (Refer to Figure 4-30), lift the back part of the TRACTOR ASSY and then release it from the HOUSING ASSY, LOWER connector.

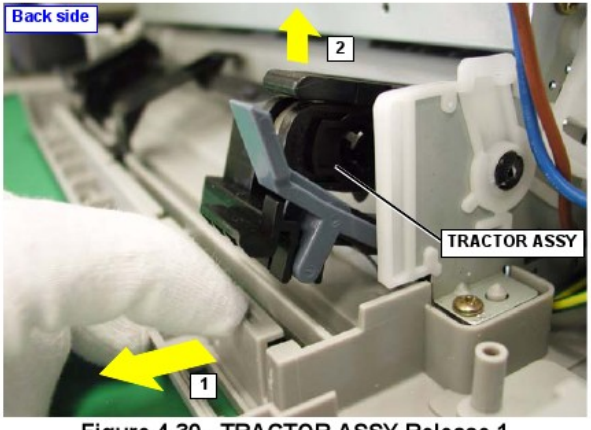


Figure 4-30. TRACTOR ASSY Release 1

5. Move the PAPER SUPPORT, TR to the center of the printer.

6. While pulling the HOUSING ASSY, LOWER location shown below toward the printer back (direction of arrow 1), push the PAPER SUPPORT, TR toward the printer front (direction of arrow 2) to slightly bend SHAFT, TR. At this time, lift the rear side of the PAPER SUPPORT, TR (direction of arrow 3) to detach it from the fastening section of the HOUSING ASSY, LOWER.

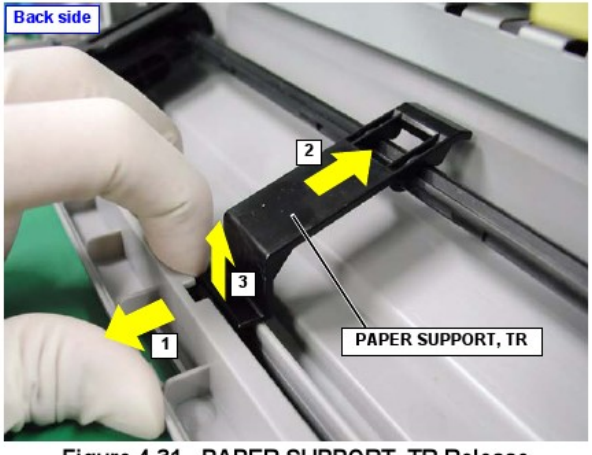


Figure 4-31. PAPER SUPPORT, TR Release

7. Slide the PAPER EJECT ASSY toward the front of the printer, then lean it over toward the front. (Refer to 4.2.1 "RIBBON CARTRIDGE Removal".)

8. Remove 4 screws (No.2) C.B.B-Tite 3x12 (0.68-0.89Nm) securing the PRINTER MECHANISM to the HOUSING ASSY, LOWER.

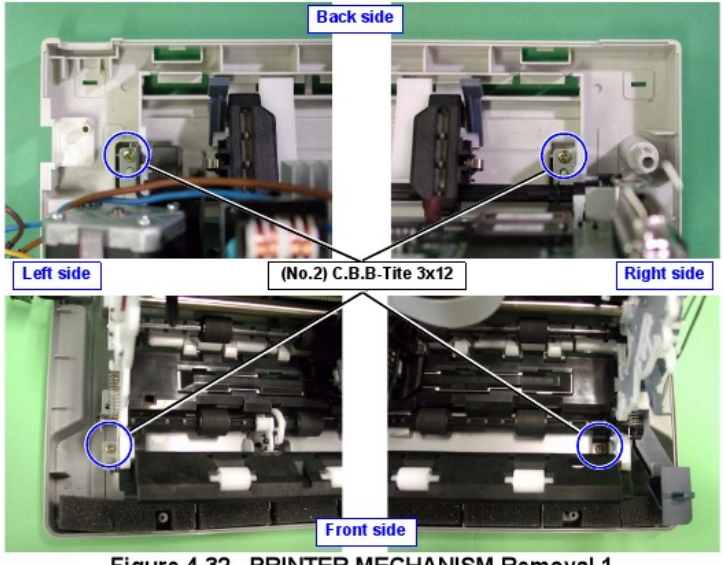


Figure 4-32. PRINTER MECHANISM Removal 1

CAUTION

When removing the screw as shown below, be sure to remove the POWER SWITCH and AC SOCKET (POWER CABLE ASSY on LQ-630K) in a way that will not damage the AC CABLE with the screwdriver. (Refer to Figure 4-33, "PRINTER MECHANISM Removal 2".)

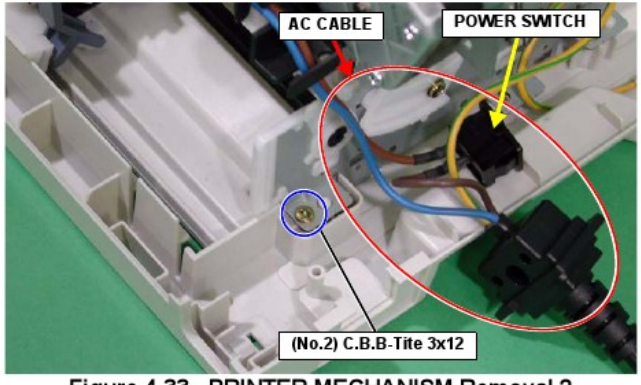


Figure 4-33. PRINTER MECHANISM Removal 2

9. Remove the PRINTER MECHANISM from the HOUSING ASSY, LOWER.

CAUTION

When placing the PRINTER MECHANISM on the workbench after removal, the TRACTOR ASSY will move freely so support it with your hand and set the unit down carefully. (Refer to Figure 4-34, "TRACTOR ASSY".)

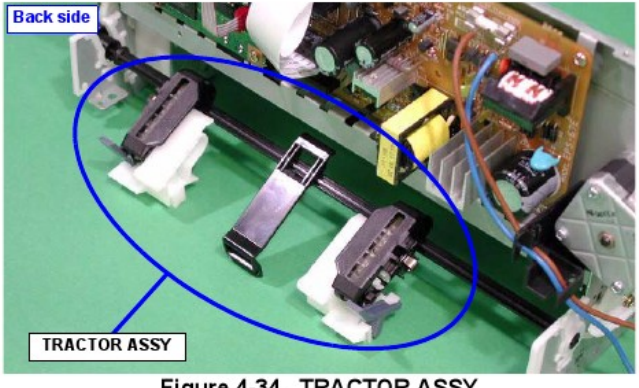


Figure 4-34. TRACTOR ASSY

Reassembly

When reassembling the PRINTER MECHANISM to the HOUSING ASSY, LOWER, align the HOLDER, DETECTOR, PE, FRONT with the slot in the HOUSING ASSY, LOWER. (Refer to Figure 4-35, "Reassembly the PRINTER MECHANISM".)

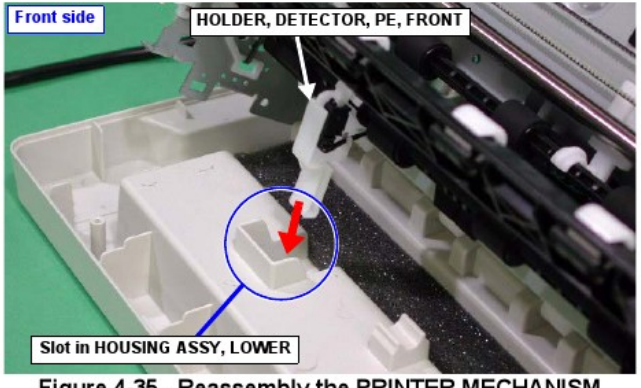


Figure 4-35. Reassembly the PRINTER MECHANISM

ADJUSTMENT REQUIRED

With the PRINTER MECHANISM removed, be sure to perform PG/Parallelism adjustment and Bi-D adjustment. (Refer to Chapter 5 "Adjustment".)

4.2.6.2 PAPER EJECT ASSY Removal

1. Remove the HOUSING ASSY, UPPER. (See 4.2.3 "HOUSING ASSY, UPPER Removal".)
2. Use tweezers to release left and right EXTENSION SPRING 1.54 from the hooks of FRAME ASSY, LEFT/RIGHT by pulling springs toward back of printer.

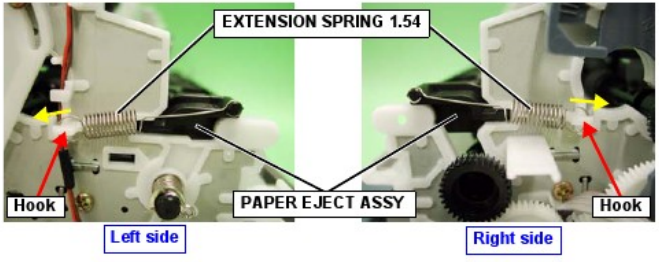


Figure 4-36. EXTENSION SPRING 1.54 Removal

3. Remove left and right side EXTENSION SPRING 1.54 from the PAPER EJECT ASSY.
4. Slide the PAPER EJECT ASSY to the front of the printer and lean it over toward the front. (Refer to 4.2.1 "RIBBON CARTRIDGE Removal".)
5. Spread the FRAME ASSY, LEFT and FRAME ASSY, RIGHT to the outer sides, release the PAPER EJECT ASSY left and right dowels from the frame, and remove the PAPER EJECT ASSY.

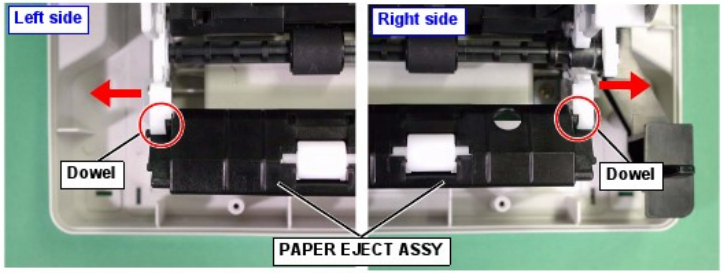
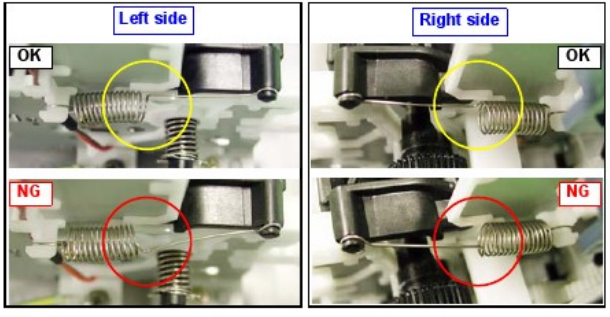


Figure 4-37. PAPER EJECT ASSY Removal

Reassembly

- **Install PAPER EJECT ASSY before installing left and right EXTENSION SPRING 1.54, and secure the hooks of FRAME ASSY, LEFT and FRAME ASSY, RIGHT while pulling on EXTENSION SPRING 1.54 with tweezers. (Refer to Figure 4-36, "EXTENSION SPRING 1.54 Removal".)**
- **Left/Right EXTENSION SPRING 1.54 has specified installation orientation. See the diagram below and install springs with correct orientation.**



4.2.6.3 TRACTOR ASSY Removal

1. Remove the SHIELD PLATE, COVER. (See 4.2.5.1 "SHIELD PLATE, COVER Removal".)
2. Release the TRACTOR ASSY from the HOUSING ASSY, LOWER connector. (Then perform step 3 and step 4 described at 4.2.6.1 PRINTER MECHANISM Removal.)
3. Remove 1 screw (No.7) C.B.B-Tite 3x6 (0.39-0.58Nm) securing the SUPPORT PLATE, FRAME, RIGHT to the right side of the printer, then remove the SUPPORT PLATE, FRAME, RIGHT.

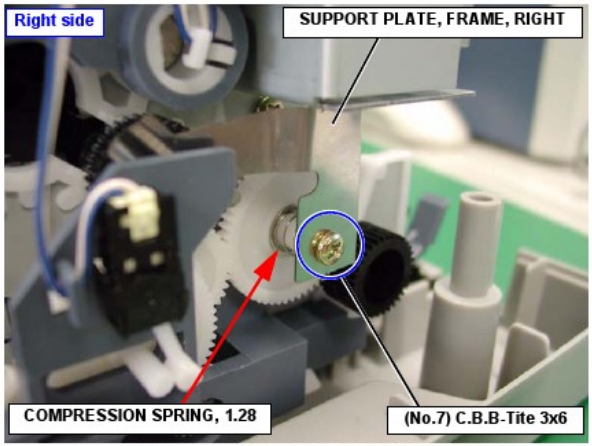


Figure 4-38. SUPPORT PLATE, FRAME, RIGHT Removal

CAUTION

When removing SUPPORT PLATE, FRAME, RIGHT, be careful not to lose COMPRESSION SPRING 1.28. (Refer to Figure 4-38, "SUPPORT PLATE, FRAME, RIGHT Removal".)

4. Remove COMPRESSION SPRING 1.28, SPUR GEAR 27.5 and PLAIN WASHER from the printer body.

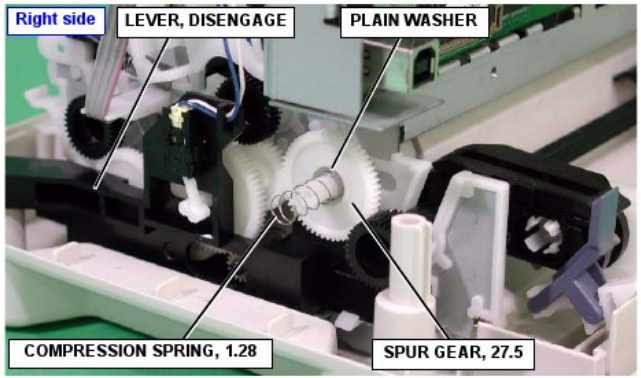


Figure 4-39. SPUR GEAR, 27.5 Removal

5. While using tweezers to lower the hook securing the SHAFT, TR to the FRAME ASSY, RIGHT, slide the SHAFT, TR to the left side as seen from the back of the printer, and release it from the hook.

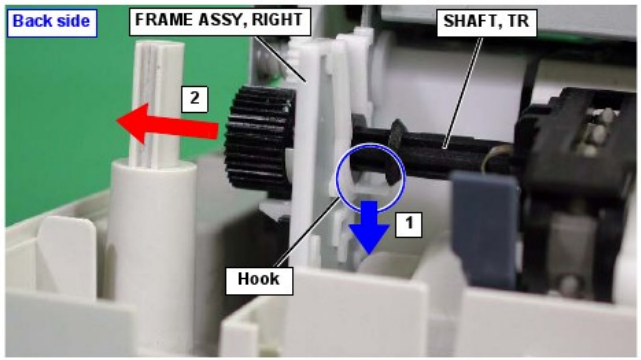


Figure 4-40. 1 Hook Securing the SHAFT, TR

6. Slide the SHAFT, TR to the left as seen from the back of the printer, remove it from the FRAME ASSY, LEFT and then remove it upwards through the channel in the FRAME ASSY, RIGHT.

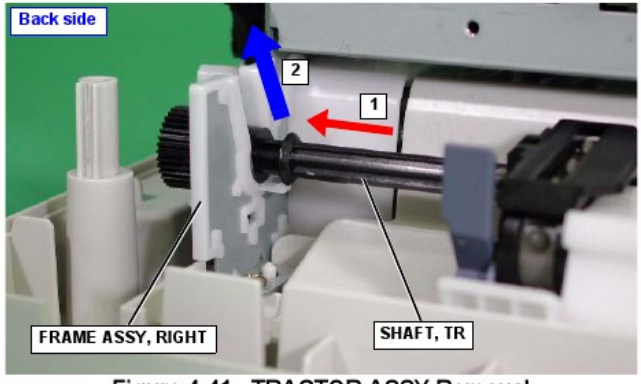
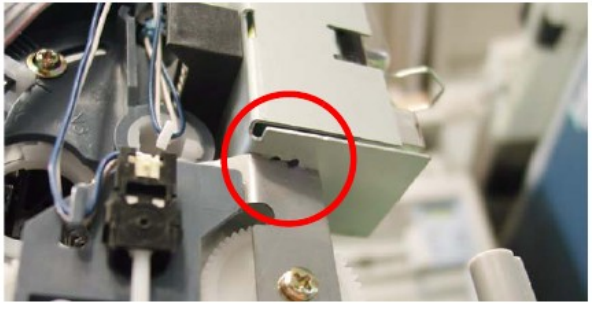


Figure 4-41. TRACTOR ASSY Removal

Reassembly

- **When installing SPUR GEAR, 27.5, set the LEVER, DISENGAGE in the Tractor Feed direction. (See Figure 4-39)**
- **When installing SUPPORT PLATE, FRAME, RIGHT, insert the alignment pin of the SUPPORT PLATE, FRAME, RIGHT into the alignment hole of the printer frame.**



4.2.6.4 RELEASE LEVER SENSOR Removal

1. Remove the HOUSING ASSY, UPPER. (See 4.2.3 "HOUSING ASSY, UPPER Removal".)
2. Use tweezers to release 2 hooks securing the RELEASE LEVER SENSOR to the LEVER, DISENGAGE, then remove the RELEASE LEVER SENSOR from the LEVER, DISENGAGE. (Refer to Figure 4-42.)
3. Free the harness from the hook of the LEVER, DISENGAGE. (Refer to Figure 4-42.)
4. Disconnect the connector (Yellow) from the RELEASE LEVER SENSOR. (Refer to Figure 4-42.)

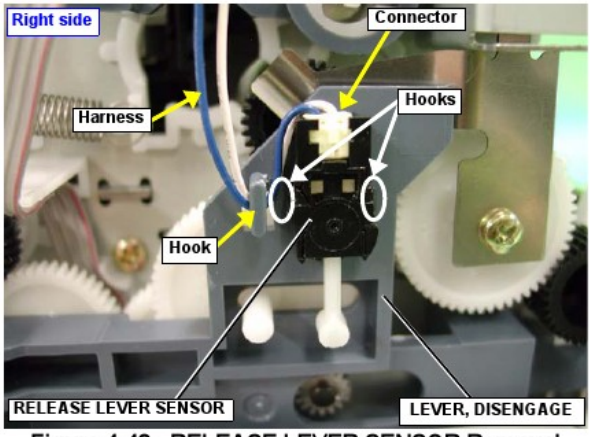
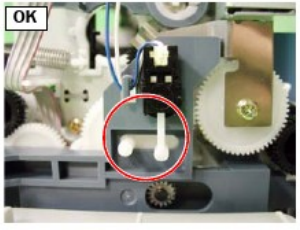
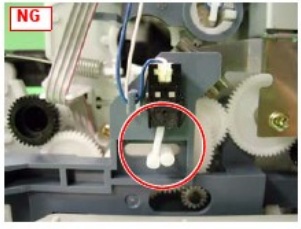


Figure 4-42. RELEASE LEVER SENSOR Removal

Slide the LEVER, DISENGAGE toward the rear (set in Friction Feed) when reassembling the RELEASE LEVER SENSOR. Refer to below figures.





4.2.6.5 HP SENSOR Removal

1. Remove the HOUSING ASSY, UPPER. (See 4.2.3 "HOUSING ASSY, UPPER Removal".)
2. Disconnect the connector (White) from the HP SENSOR.
3. While releasing the hook securing the HOUSING ASSY, RD to the FRAME ASSY, CR by pulling it forward, slide it in the clockwise direction. (Refer to Figure 4-43.)
4. Release and remove 2 hooks securing the HP SENSOR to the HOUSING ASSY, RD. (Refer to Figure 4-44.)

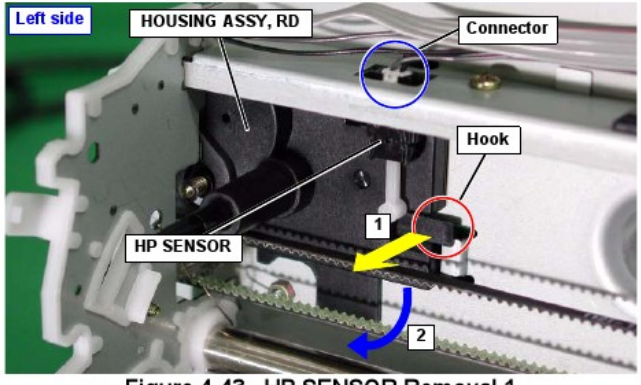


Figure 4-43. HP SENSOR Removal 1

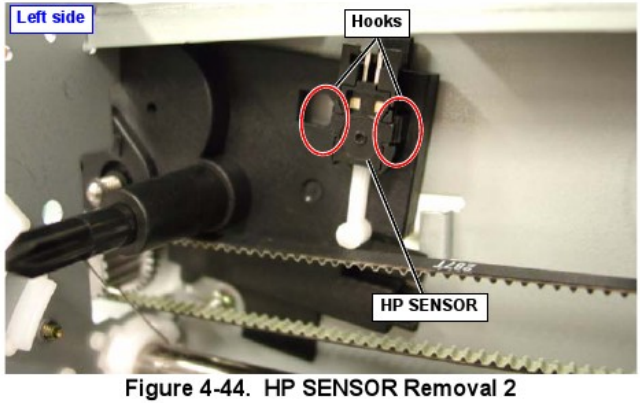


Figure 4-44. HP SENSOR Removal 2

4.2.6.6 PE SENSOR, FRONT Removal

1. Remove the PRINTER MECHANISM. (See 4.2.6.1 "PRINTER MECHANISM Removal".)
2. Use tweezers to release and remove 2 hooks securing the PE SENSOR, FRONT to the HOLDER, DETECTOR, PE, FRONT. (Refer to Figure 4-45.)
3. Free the harness from the hook of the HOLDER, DETECTOR, PE, FRONT. (Refer to Figure 4-46.)
4. Disconnect the connector (Black) from the PE SENSOR, FRONT. (Refer to Figure 4-46.)

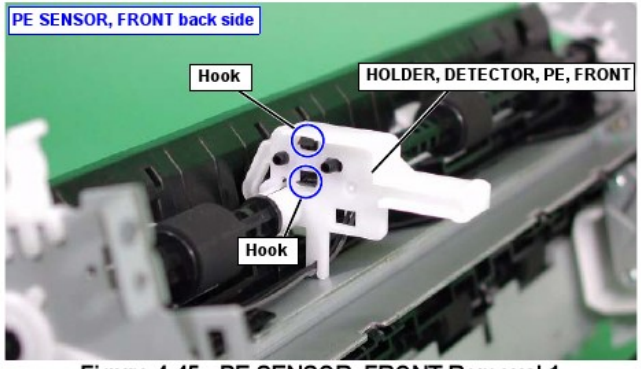


Figure 4-45. PE SENSOR, FRONT Removal 1

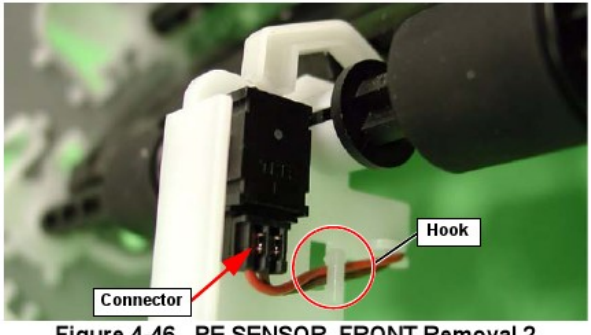


Figure 4-46. PE SENSOR, FRONT Removal 2

4.2.6.7 PG SENSOR Removal

1. Remove the HOUSING ASSY, UPPER. (See 4.2.3 "HOUSING ASSY, UPPER Removal".)
2. To make removal of the PG SENSOR easier, release the PF MOTOR harness from the hooks as shown below and move it away from the PG SENSOR.

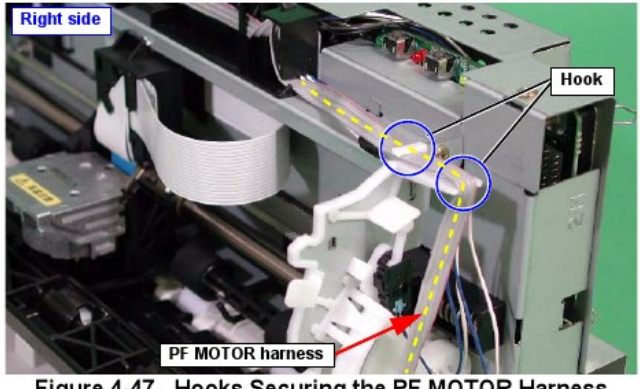


Figure 4-47. Hooks Securing the PF MOTOR Harness

3. Release and remove 2 hooks securing the PE SENSOR to the LEVER, G, ADJUST.

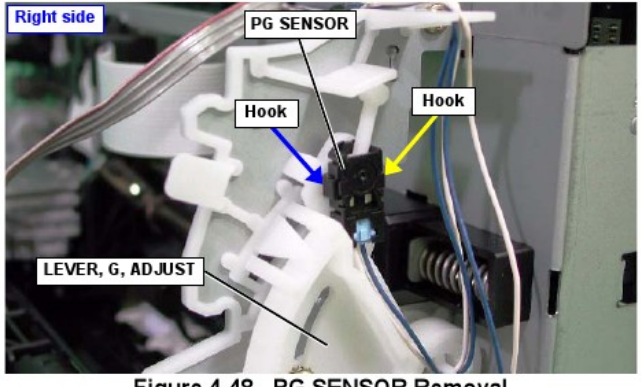
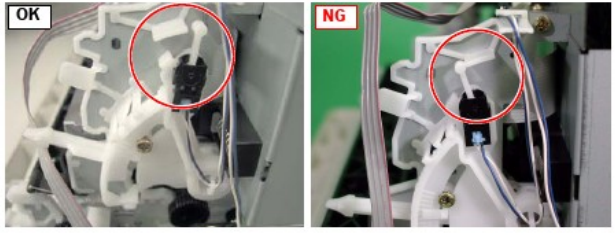


Figure 4-48. PG SENSOR Removal

4. Disconnect the connector (Blue) from the PG SENSOR.

When reassembling the PG SENSOR onto the LEVER, G, ADJUST, be careful about the position of the PG SENSOR. Refer to below figures.



4.2.6.8 LEVER, G, ADJUST Removal

1. Remove the PG SENSOR. (See 4.2.6.7 "PG SENSOR Removal".)
2. Free the PG SPENSOR harness from the hook of the LEVER, G, ADJUST. (Refer to Figure 4-49.)
3. Remove the screw (No.6) C.C.P-Tite 3x8 (0.28-0.48Nm) securing the LEVER, G, ADJUST to the BUSHING RIGHT. (Refer to Figure 4-49.)
4. Slide the BUSHING RIGHT so that it aligns with the lower hole on the LEVER, G, ADJUST. Then release and remove 3 hooks securing the LEVER, G, ADJUST to the FRAME ASSY, RIGHT. (Refer to Figure 4-50.)

With the LEVER, G, ADJUST removed, be sure to perform PG/Parallelism adjustment. (Refer to Chapter 5 "Adjustment".)

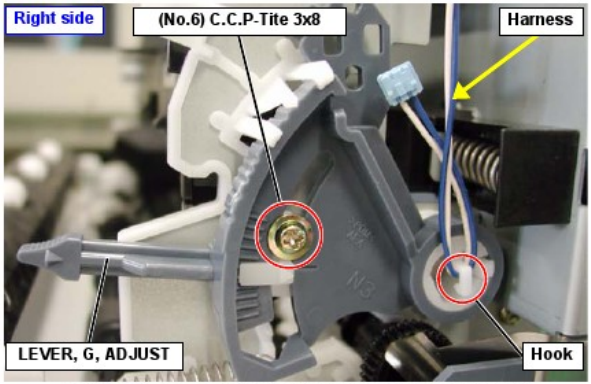


Figure 4-49. LEVER, G, ADJUST Removal 1

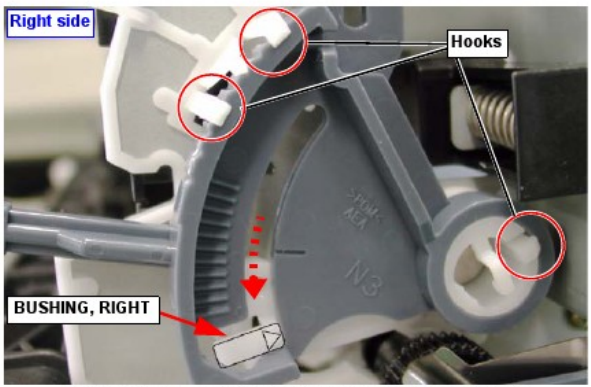


Figure 4-50. LEVER, G, ADJUST Removal 2

4.2.6.9 CR MOTOR Removal

1. Remove the SHIELD PLATE, COVER. (See 4.2.5.1 "SHIELD PLATE, COVER Removal".)
2. Free the harness from the hooks as shown below.
   CR MOTOR harness
   RELEASE LEVER SENSOR harness
   PG SENSOR harness
   When using tweezers to remove COMPRESSION SPRING 24.78, position the tweezers so that they will not interfere with the harness.

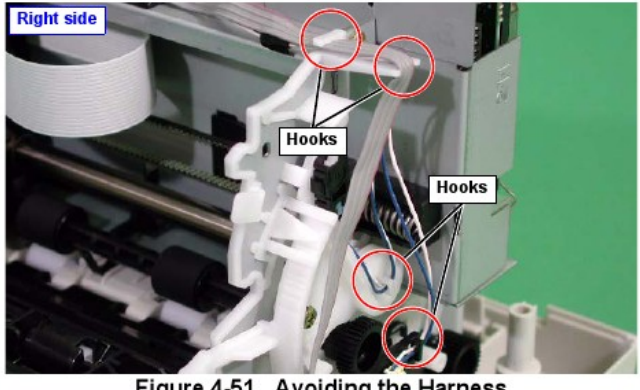


Figure 4-51. Avoiding the Harness

3. Use tweezers to remove COMPRESSION SPRING 24.78, releasing the tension on the TIMING BELT.

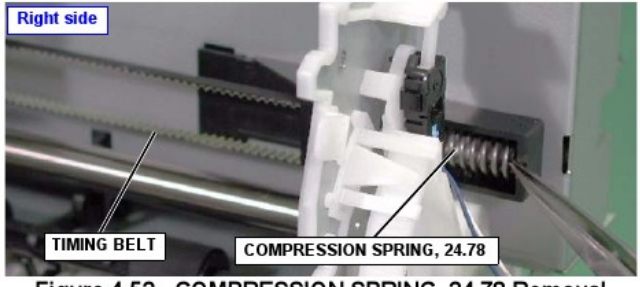


Figure 4-52. COMPRESSION SPRING, 24.78 Removal

CAUTION
Be careful not to lose COMPRESSION SPRING 24.78 when removing it. (Refer to Figure 4-52, "COMPRESSION SPRING, 24.78 Removal".)

4. Remove the TIMING BELT from the CR MOTOR pinion gear.

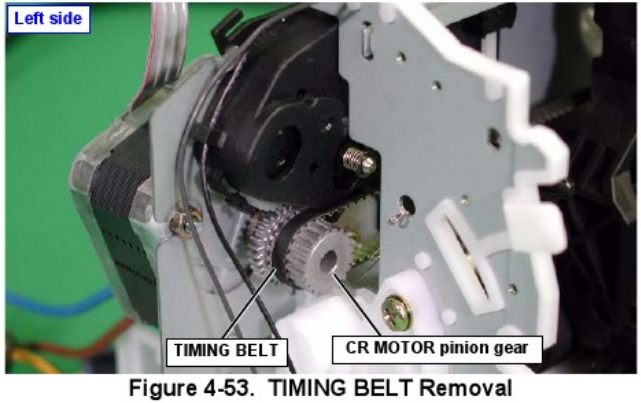


Figure 4-53. TIMING BELT Removal

5. Disconnect the connector from CN8 (Red) on the C480MAIN Board. (Refer to Figure 4-19, "C480MAIN Board")
6. Release the CR MOTOR harness from 5 hooks as shown below.

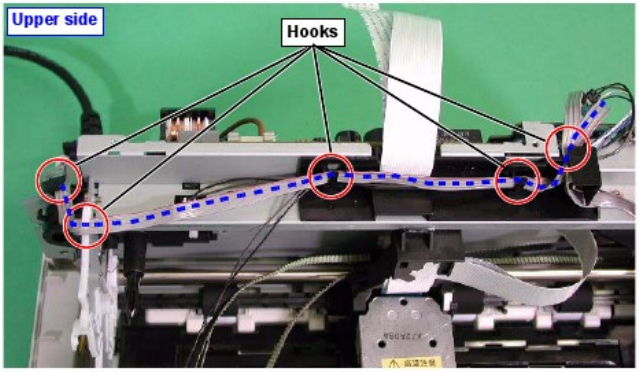


Figure 4-54. 5 Hooks Securing the Harness

7. Remove 2 each (No.9) HEXAGON NUT M3 (0.49-0.68Nm) securing the CR MOTOR to the FRAME ASSY, CR.

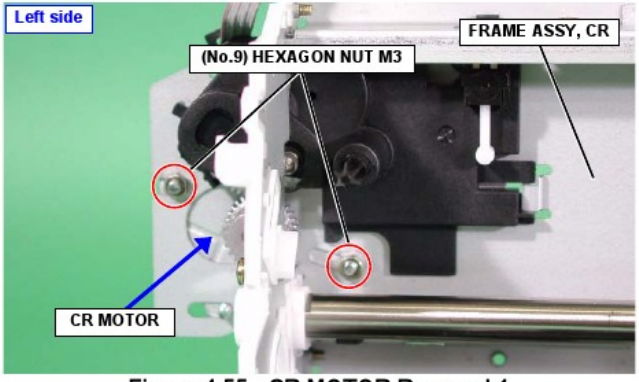


Figure 4-55. CR MOTOR Removal 1

8. Push the CR MOTOR toward the back of the printer, release its dowel from the position alignment hole, then remove the motor by sliding it to the left side, as seen from the back of the printer.

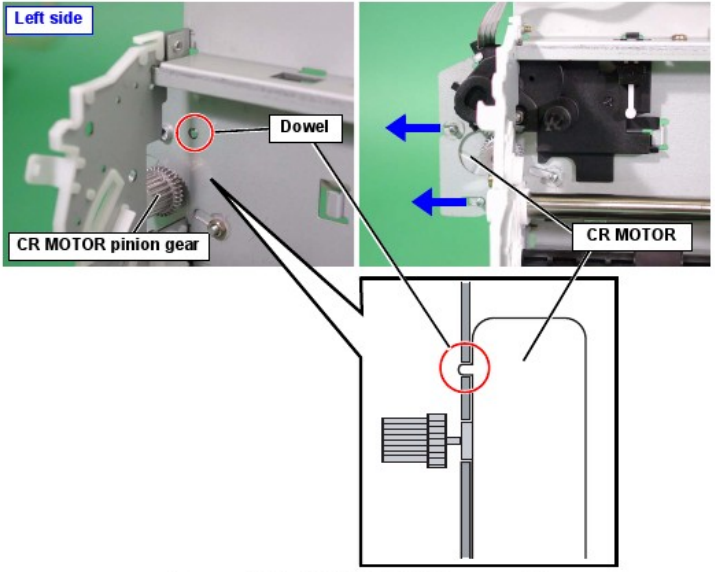


Figure 4-56. CR MOTOR Removal 2

When reassembling the CR MOTOR, set the dowel firmly into the position alignment hole. (Refer to Figure 4-57, "Reassembly the CR MOTOR".)

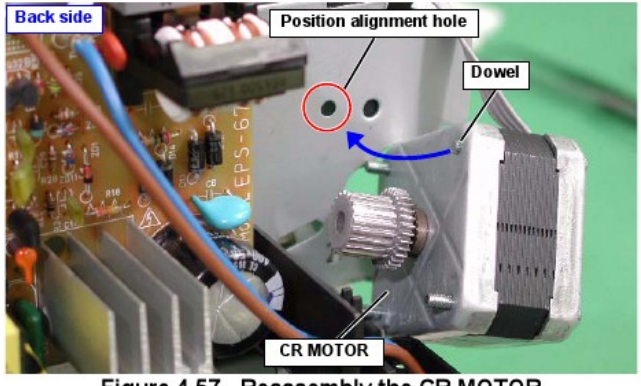


Figure 4-57. Reassembly the CR MOTOR

With the CR MOTOR removed, be sure to perform Bi-D adjustment. (Refer to Chapter 5 "Adjustment".)

4.2.6.10 PF MOTOR Removal

1. Remove the PRINTER MECHANISM. (See 4.2.6.1 "PRINTER MECHANISM Removal".)
2. Remove the RELEASE LEVER SENSOR. (See 4.2.6.4 "RELEASE LEVER SENSOR Removal".)
3. Remove the SUPPORT PLATE, FRAME, RIGHT from the printer body. (Then perform step 3 described at 4.2.6.3 TRACTOR ASSY Removal.)
4. Remove COMPRESSION SPRING 1.28 and SPUR GEAR 27.5 and PLAIN WASHER from the printer body. (Then perform step 4 described at 4.2.6.3 TRACTOR ASSY Removal.)
5. As seen from the right side of the printer, slide the LEVER, DISENGAGE to the right (set in Friction Feed), then release and remove 4 hooks securing the LEVER, DISENGAGE to the FRAME ASSY, RIGHT.

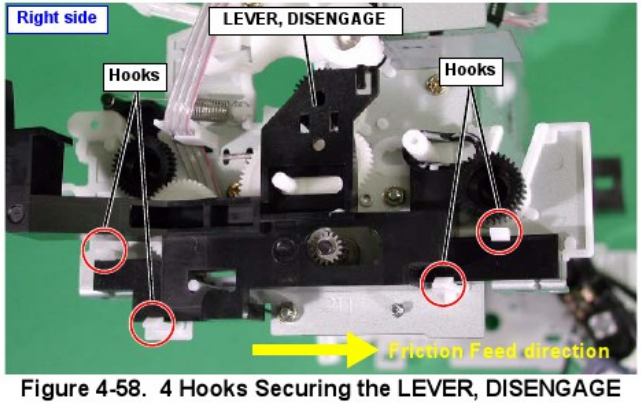


Figure 4-58. 4 Hooks Securing the LEVER, DISENGAGE

When reassembling the LEVER, DISENGAGE onto the FRAME ASSY, RIGHT, install it so that the shaft will be in the Friction Feed position, not interfering with the LEVER, DISENGAGE, as shown in Figure 4-59.

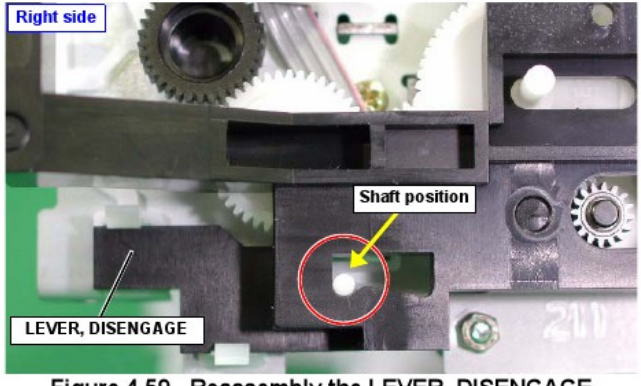


Figure 4-59. Reassembly the LEVER, DISENGAGE

6. Disconnect the connector from CN9 (Black) on the C480MAIN Board. (Refer to Figure 4-19, "C480MAIN Board")

7. Release the PF MOTOR harness from the HOLDER, CABLE, HEAD and the 4 hooks securing it to the FRAME ASSY, RIGHT.

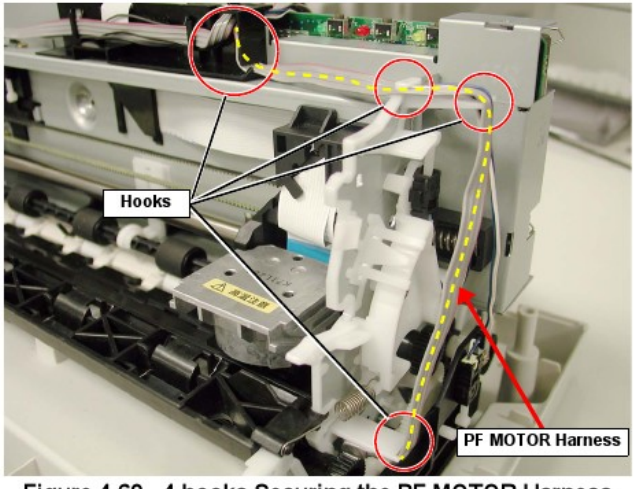


Figure 4-60. 4 hooks Securing the PF MOTOR Harness

8. Remove the 4 gears as shown below.

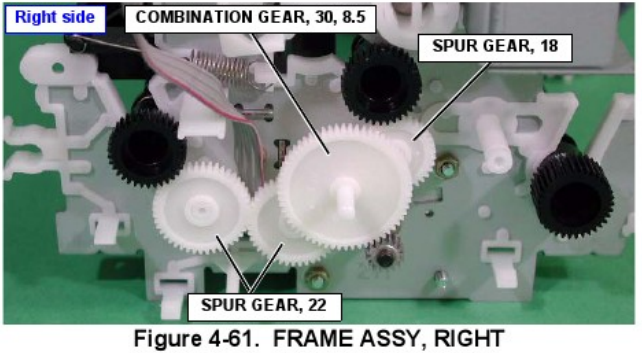


Figure 4-61. FRAME ASSY, RIGHT

9. Free the PF MOTOR harness from the hooks of the FRAME ASSY, RIGHT.

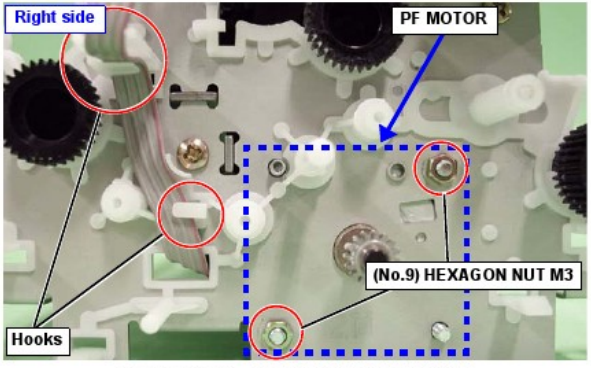


Figure 4-62. PF MOTOR Removal

10. Remove 2 each (No.9) HEXAGON NUT M3 (0.49-0.68Nm) securing the PF MOTOR to the FRAME ASSY, RIGHT. Then remove the PF MOTOR. (Refer to Figure 4-62.)

Reassembly

When reassembling the PF MOTOR, securely fasten the hooks so that the PF MOTOR harness will not contact the gears. (Refer to Figure 4-62, "PF MOTOR Removal".)

4.2.6.11 CARRIAGE ASSY Removal

1. Remove the PRINT HEAD. (See 4.2.2 "PRINT HEAD Removal".)
2. Remove the PRINTER MECHANISM. (See 4.2.6.1 "PRINTER MECHANISM Removal".)
3. Release the TIMING BELT tension. (Then perform step 2 to step 4 described at 4.2.6.9 CR MOTOR Removal.)
4. Remove the LEVER, G, ADJUST. (See 4.2.6.8 "LEVER, G, ADJUST Removal".)
5. Rotate the BUSHING, RIGHT upwards.

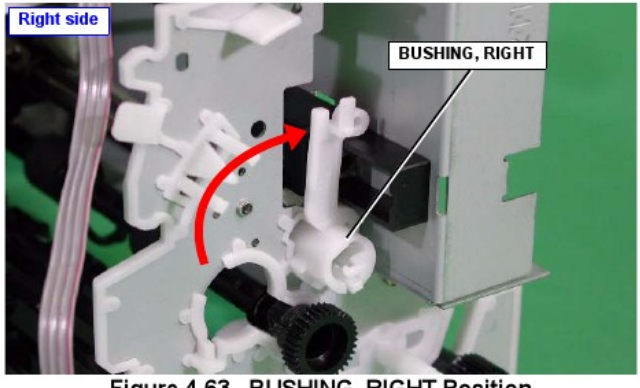


Figure 4-63. BUSHING, RIGHT Position

6. Grasp the GROUNDING, WIRE, SHAFT, CR with tweezers, then release the hook to the FRAME ASSY, LEFT and remove it.

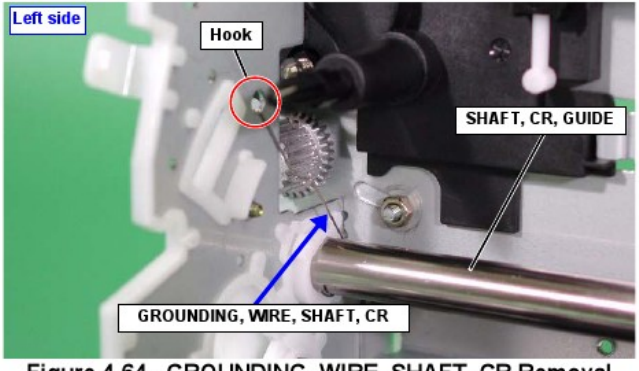


Figure 4-64. GROUNDING, WIRE, SHAFT, CR Removal

7. Slide the SHAFT, CR, GUIDE to the right as seen from the front of the printer, then remove it from the BUSHING, LEFT.

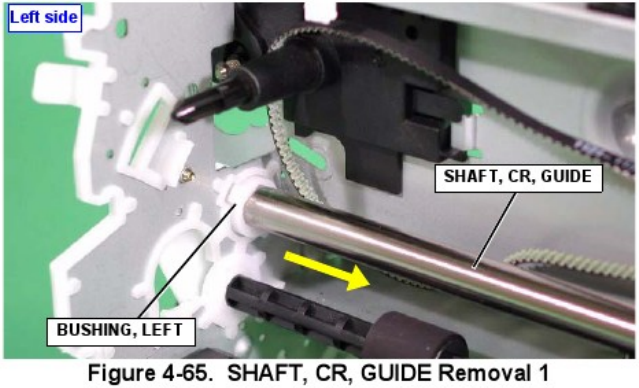


Figure 4-65. SHAFT, CR, GUIDE Removal 1

8. Slide the SHAFT, CR, GUIDE with the BUSHING, RIGHT to the right as seen from the front of the printer, then remove it from the CARRIAGE ASSY.

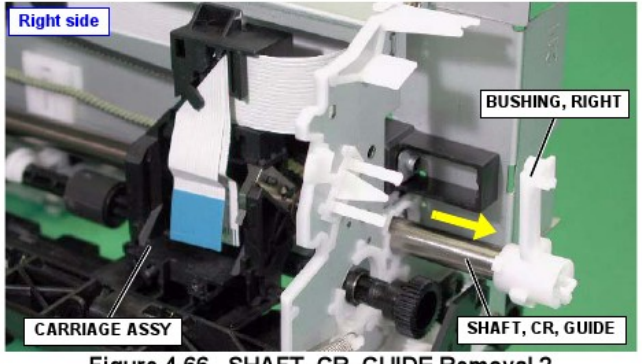


Figure 4-66. SHAFT, CR, GUIDE Removal 2

9. As seen from the front of the printer, slide the PULLEY, DRIVEN, ASSY to the left, and remove it from the FRAME ASSY, CR.

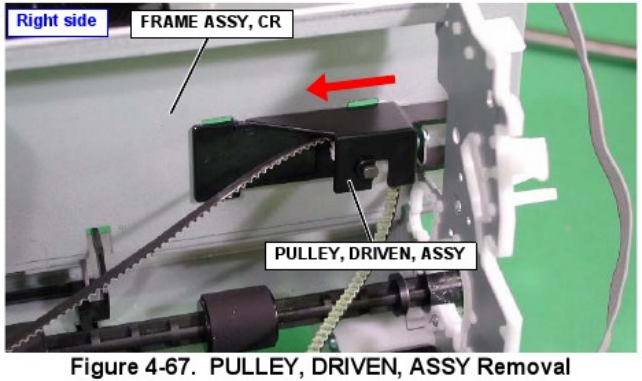


Figure 4-67. PULLEY, DRIVEN, ASSY Removal

10. Slide the SHAFT, PULLEY, DRIVEN through the channel in the HOLDER, PULLEY, DRIVEN and remove it with the PULLEY, DRIVEN. Then remove the TIMING BELT from the PULLEY, DRIVEN, ASSY.

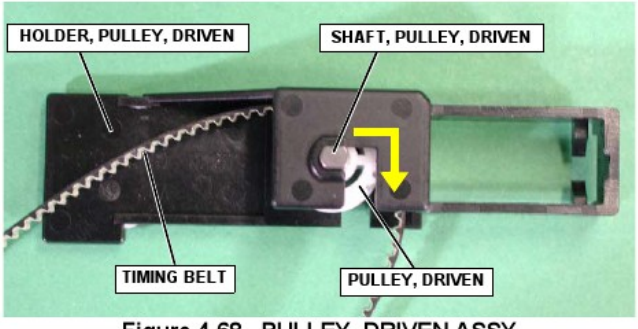


Figure 4-68. PULLEY, DRIVEN ASSY

When assembling the PULLEY, DRIVEN, ASSY, be careful of the SHAFT, PULLEY, DRIVEN installation direction and assemble the TIMING BELT along with it. (Refer to Figure 4-69, "PULLEY, DRIVEN Installation Direction".)

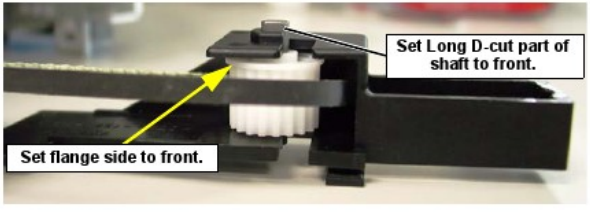


Figure 4-69. PULLEY, DRIVEN Installation Direction

11. Release the CABLE, HEAD from the 2 hooks of the CARRIAGE ASSY.

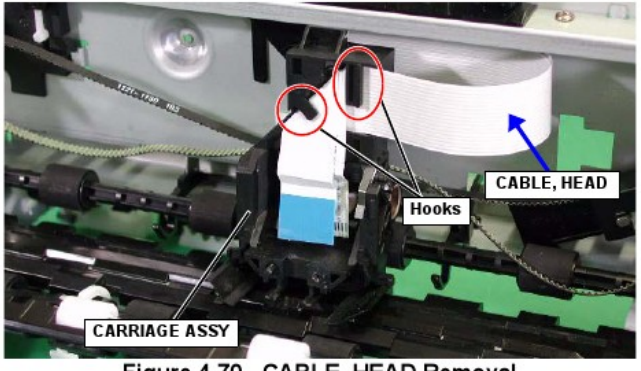


Figure 4-70. CABLE, HEAD Removal

12. Remove the CARRIAGE ASSY along with the TIMING BELT.

CAUTION

When the CARRIAGE ASSY is removed, the OIL PAD may be came off from the CARRIAGE ASSY. In this case, install the OIL PAD onto the CARRIAGE ASSY as explained below. (Refer to Figure 4-71, "OIL PAD Position".)

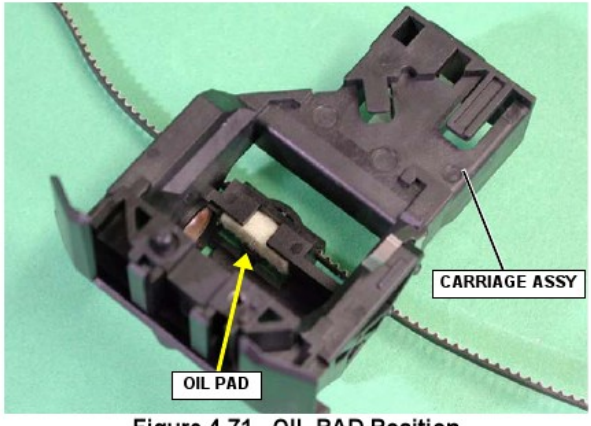


Figure 4-71. OIL PAD Position

Reassembly

When installing the CARRIAGE ASSY into the printer body, make sure the SLIDER, CR, REAR fits properly to the GUIDE, CR. (Refer to Figure 4-72, "Reassembly the CARRIAGE ASSY".)

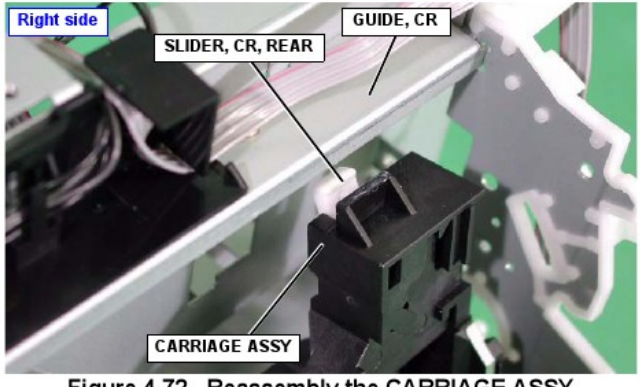


Figure 4-72. Reassembly the CARRIAGE ASSY

ADJUSTMENT REQUIRED

With the CARRIAGE ASSY removed, be sure to perform the PG/Parallelism adjustment and Bi-D adjustment. (Refer to Chapter 5 "Adjustment".)

4.2.6.12 PLATEN ASSY Removal

1. Remove the PAPER EJECT ASSY. (See 4.2.6.2 "PAPER EJECT ASSY Removal".)
2. Remove the C480MAIN Board. (See 4.2.5.2 "C480MAIN Board Removal".)
3. Remove the C480PSE Board. (See 4.2.5.3 "C480PSE Board Removal".)
4. Remove the TRACTOR ASSY. (See 4.2.6.3 "TRACTOR ASSY Removal".)
5. Remove the CARRIAGE ASSY. (See 4.2.6.11 "CARRIAGE ASSY Removal".)
6. Perform step 2 to step 8 described at 4.2.6.10 PF MOTOR Removal.
7. Release the harness from the hooks of the HOLDER, CABLE, HEAD and the FRAME ASSY, LEFT. (See Figure 4-73. "Release the harness".)
8. Disconnect the connector (White) from the HP SENSOR. (See Figure 4-73. "Release the harness".)

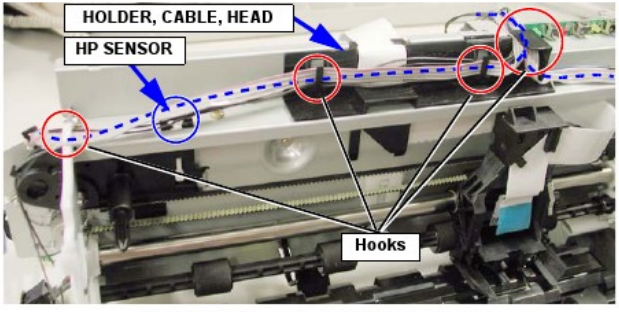


Figure 4-73. Release the harness

9. Release the dowel securing the HOLDER, CABLE, HEAD to the printer body by pulling it forward, then remove the part upwards.

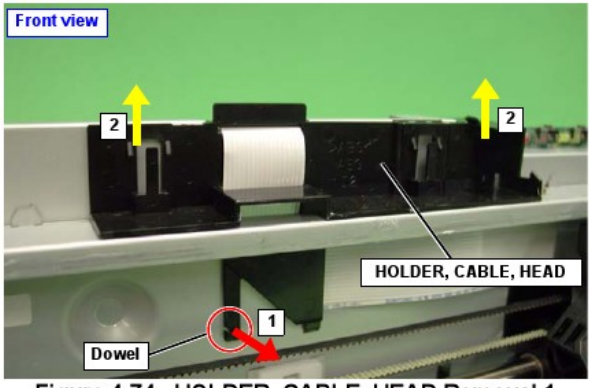


Figure 4-74. HOLDER, CABLE, HEAD Removal 1

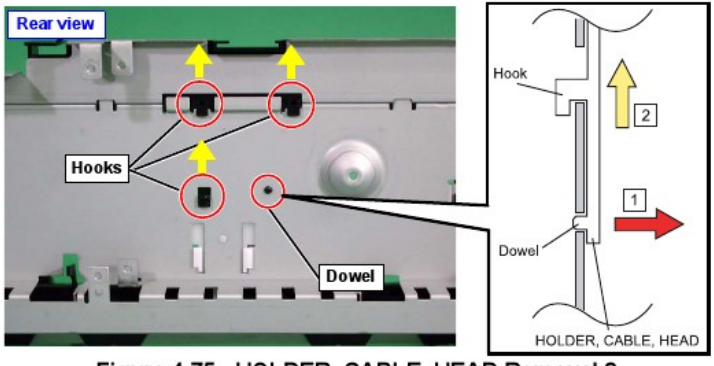


Figure 4-75. HOLDER, CABLE, HEAD Removal 2

10. Remove 2 screws (No.3) C.B.S-Tite 3x6 (0.78-0.98Nm) securing the GUIDE, CR to the FRAME ASSY, CR.

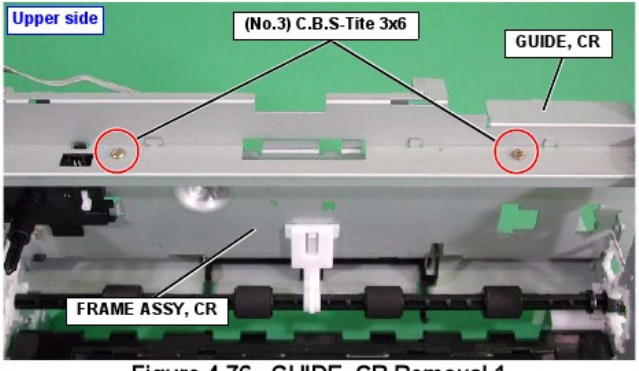


Figure 4-76. GUIDE, CR Removal 1

11. As shown below, remove 2 screws each (No.3) C.B.S-Tite 3x6 (0.78-0.98Nm) from the FRAME ASSY, LEFT and FRAME ASSY, RIGHT. (Total of 4 screws.)

Figure 4-77. GUIDE, CR Removal 2

12. While spreading the FRAME ASSY, LEFT and FRAME ASSY, RIGHT in the directions shown by the arrows, remove the GUIDE, CR upwards.

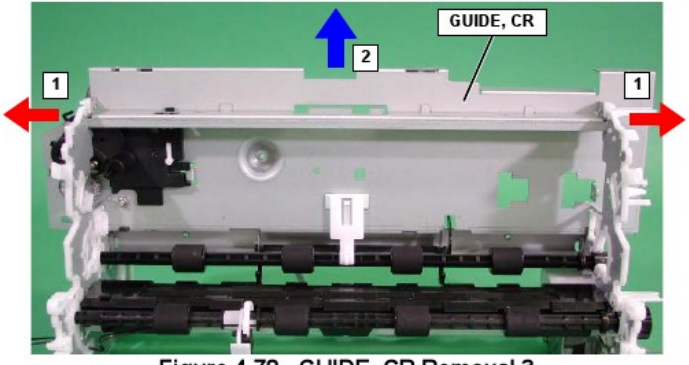


Figure 4-78. GUIDE, CR Removal 3

When reassembling the GUIDE, CR onto the FRAME ASSY, CR, firmly set the tabs of the FRAME ASSY, CR into the holes on the GUIDE, CR. (Refer to Figure 4-79, "Reassembly the GUIDE, CR".)

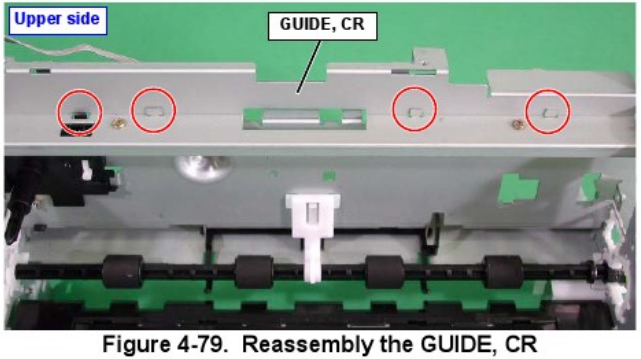


Figure 4-79. Reassembly the GUIDE, CR

13. Pull the hooks securing the HOLDER, ROLLER, DRIVE, REAR to the FRAME ASSY, CR towards the front, and while releasing the dowels remove the HOLDER, ROLLER, DRIVE, REAR by sliding it upwards.

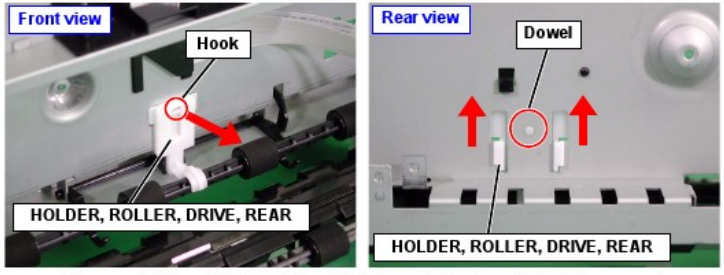


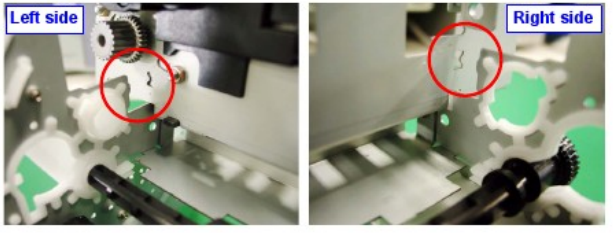
Figure 4-80. HOLDER, ROLLER, DRIVE, REAR Removal

14. Remove the FRAME ASSY, CR to the back of the printer.

Figure 4-81. FRAME ASSY, CR Removal

Reassembly

When installing the FRAME ASSY, CR, align the protrusions on the FRAME ASSY, LEFT/RIGHT with the H-shaped holes in the FRAME ASSY, CR.



15. Remove the SPRING-PIN, then remove the SPRING and the RING.

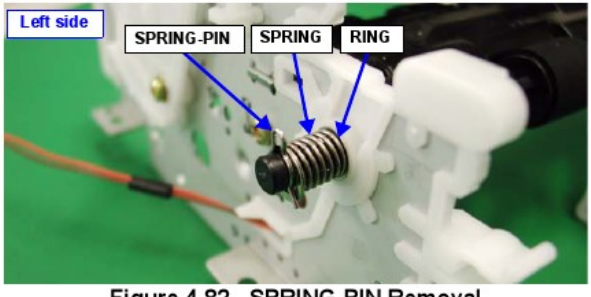


Figure 4-82. SPRING-PIN Removal

16. Remove the PE SENSOR, FRONT. (See 4.2.6.6 "PE SENSOR, FRONT Removal".)
17. Free the harness from the hook of the HOLDER, DETECTOR, PE, FRONT and the hook of the PLATEN ASSY.

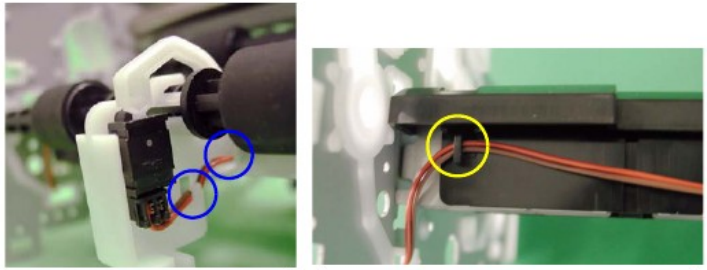


Figure 4-83. Hooks securing the PE SENSOR, FRONT harness

18. While using tweezers to lower the hook securing the ROLLER, DRIVE, FRONT to the FRAME ASSY, RIGHT, slide the ROLLER, DRIVE, FRONT to the right side as seen from the front of the printer, and release it from the hook and remove it from the FRAME ASSY, LEFT. (See Figure 4-84. "ROLLER, DRIVE Removal".)

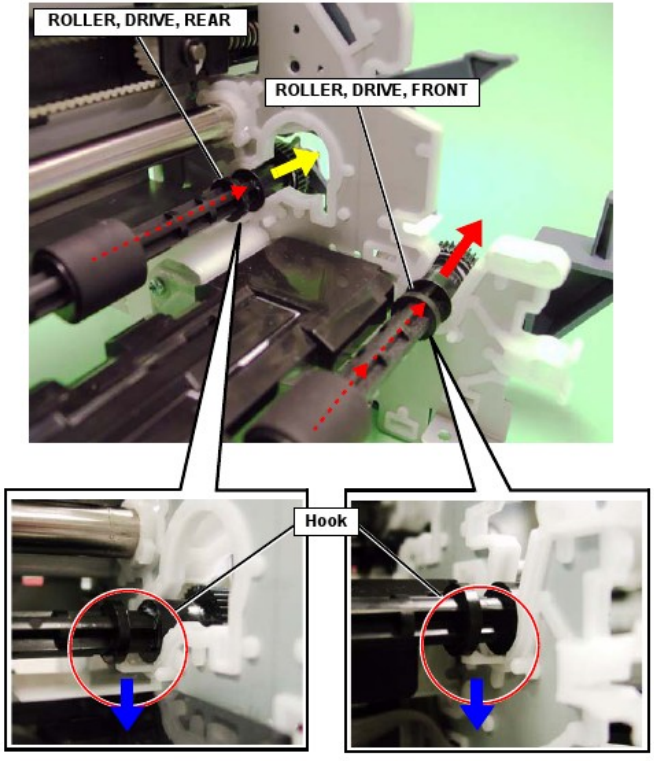


Figure 4-84. ROLLER, DRIVE Removal

19. Remove the ROLLER, DRIVE, FRONT upwards through the channel in the FRAME ASSY, RIGHT. (See Figure 4-84. "ROLLER, DRIVE Removal".)
20. While using tweezers to lower the hook securing the ROLLER, DRIVE, REAR to the FRAME ASSY, RIGHT, slide the ROLLER, DRIVE, REAR to the right side as seen from the front of the printer, and release it from the hook and remove it from the FRAME ASSY, LEFT. (See Figure 4-84. "ROLLER, DRIVE Removal".)
21. Remove the ROLLER, DRIVE, REAR upwards through the channel in the FRAME ASSY, RIGHT. (See Figure 4-84. "ROLLER, DRIVE Removal".)
22. Remove 2 screws (No.3) C.B.S-Tite 3x6 (0.78-0.98Nm) securing the PAPER GUIDE ASSY to the FRAME ASSY, LEFT/RIGHT. Then remove the PAPER GUIDE ASSY.

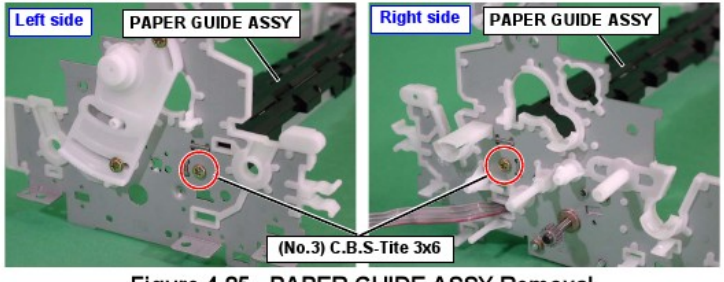


Figure 4-85. PAPER GUIDE ASSY Removal

23. Release 7 hooks securing the PLATEN ASSY to the PAPER GUIDE ASSY, then remove the PLATEN ASSY.

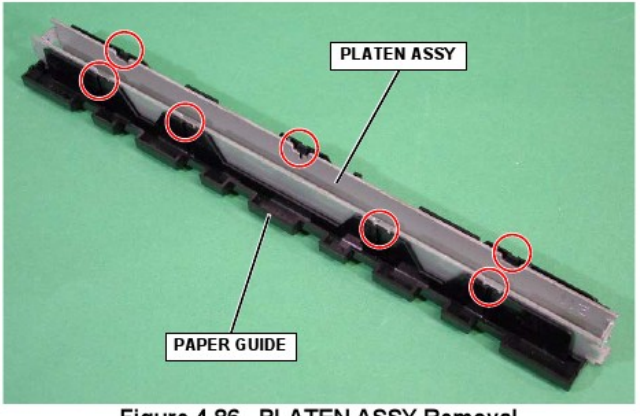


Figure 4-86. PLATEN ASSY Removal

Reassembly

When installing the PAPER GUIDE ASSY into the FRAME ASSY, LEFT/RIGHT, align the protrusions on the PAPER GUIDE ASSY with the H-shaped holes in the FRAME ASSY, LEFT/RIGHT. (Refer to Figure 4-87, "Reassembly the PAPER GUIDE ASSY".)

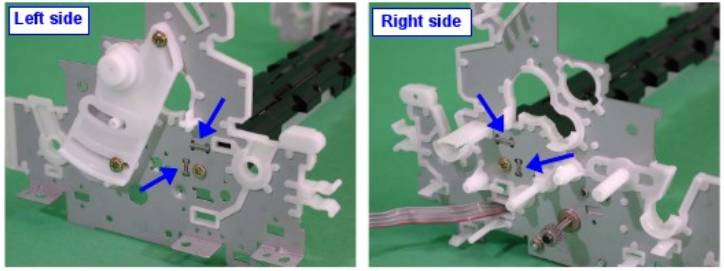


Figure 4-87. Reassembly the PAPER GUIDE ASSY

ADJUSTMENT REQUIRED

With the PLATEN ASSY removed, be sure to perform the PG/Parallelism adjustment and Bi-D adjustment. (Refer to Chapter 5 "Adjustment")

4.2.6.13 LEVER, ADJUST Removal

CAUTION

When removing the LEVER, ADJUST, memorize the existing adjustment position. At the time of reassembly, set the position to its previous location, then adjust the parallel angle. (Refer to Figure 4-88, "LEVER, ADJUST Removal".)

1. Remove the HOUSING ASSY, UPPER. (See 4.2.3 "HOUSING ASSY, UPPER Removal".)
2. Remove 2 screws (No.8) C.B.S-Tite (P2) 3x10 (0.59-0.78Nm) securing the LEVER, ADJUST to the FRAME ASSY, LEFT.

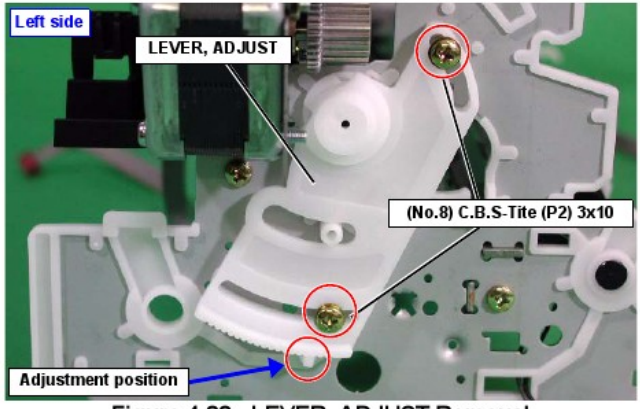


Figure 4-88. LEVER, ADJUST Removal

3. Pull the LEVER, ADJUST to the left side as seen from the front of the printer and remove it.

ADJUSTMENT REQUIRED

With the LEVER, ADJUST removed, be sure to perform the PG/Parallelism adjustment. (Refer to Chapter 5 "Adjustment")

4.2.6.14 HOUSING ASSY, RD Removal

1. Remove the FRAME ASSY, CR. (Then perform step 1 to step 15 described at 4.2.6.12 PLATEN ASSY Removal.)
2. While releasing the hook securing the HOUSING ASSY, RD to the FRAME ASSY, CR by pulling it forwards, slide it in the clockwise direction and remove it.

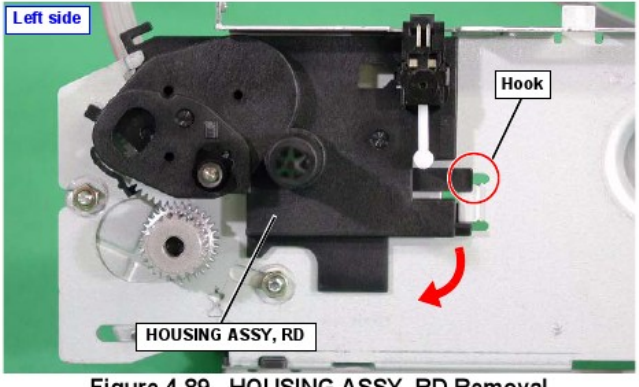


Figure 4-89. HOUSING ASSY, RD Removal

4.2.6.15 LEVER, DETECTOR, PE, REAR Removal

1. Remove the FRAME ASSY, CR. (Then perform step 1 to step 14 described at 4.2.6.12 PLATEN ASSY Removal.)
2. Bend the center of the LEVER, DETECTOR, PE, REAR toward the front, release the left side dowel from the FRAME ASSY, CR as seen from the front of the printer, and remove the LEVER, DETECTOR, PE, REAR.

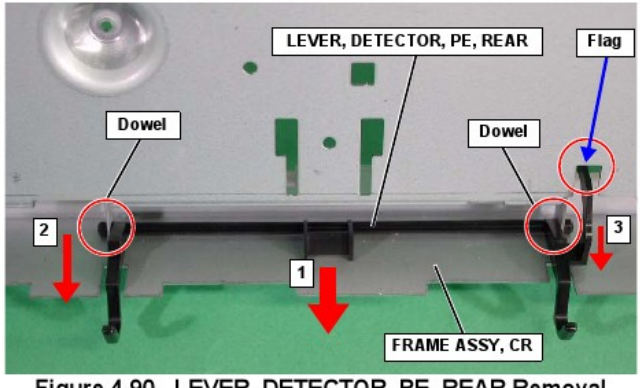


Figure 4-90. LEVER, DETECTOR, PE, REAR Removal

CAUTION

When removing the LEVER, DETECTOR, PE, REAR, be careful not to damage the flag used by the PE SENSOR, REAR. (Refer to Figure 4-90, "LEVER, DETECTOR, PE, REAR Removal".)

CHAPTER

5

ADJUSTMENT

5.1 Overview

This chapter gives explanations for adjustments that are necessary after disassembly/assembly of the printer or after replacing parts.

5.1.1 Adjustments Classified by Replacement Part

Table 5-1 shows replacement parts and adjustments necessary after replacement.
Perform corresponding adjustment when one of the following parts is replaced or removed during repair/maintenance.

NOTE: *PG Adjustment and CR Shaft Parallelism Adjustment are performed at the same time with this printer.*

Table 5-1. Adjustments

Disassembly/Assembly Item	Adjustments and Order	Reference
Print head removal/replacement	1. PG/CR Shaft Parallelism Adjustment	P. 123, Section 5.2
	2. Bi-d Adjustment	P. 130, Section 5.4
Main Board Replacement	1. Bi-d Adjustment	P. 130, Section 5.4
	2. USB Serial Number Writing	P. 134, Section 5.5
Mechanical Unit Replacement	1. PG/CR Shaft Parallelism Adjustment	P. 123, Section 5.2
	2. Bi-d Adjustment	P. 130, Section 5.4
CR Motor Removal/ Replacement	1. Bi-d Adjustment	P. 130, Section 5.4
Carriage Unit Removal/ Replacement	1. PG/CR Shaft Parallelism Adjustment	P. 123, Section 5.2
	2. Bi-d Adjustment	P. 130, Section 5.4

Table 5-1. Adjustments

Disassembly/Assembly Item	Adjustments and Order	Reference
Timing Belt Removal/ Replacement	1. PG/CR Shaft Parallelism Adjustment	P. 123, Section 5.2
	2. Bi-d Adjustment	P. 130, Section 5.4
Platen Removal/Replacement	1. PG/CR Shaft Parallelism Adjustment	P. 123, Section 5.2
	2. Bi-d Adjustment	P. 130, Section 5.4

5.1.2 Tools

Table 5-2 shows special tools that are needed for performing adjustments.

Table 5-2. Tools

Adjustment	Tool	Specification
PG/CR Shaft Parallelism Adjustment	Thickness gauge	0.40mm, 0.44mm
• Bi-d Adjustment • USB Serial Number Writing	Adjustment Program	C480A0*W

NOTE: *"*" shows Adjustment Program version number. Count starts with "0".*

5.2 PG Adjustment/CR Shaft Parallelism Adjustment

This section explains steps for PG Adjustment and CR Shaft Parallelism Adjustment. On this printer, PG Adjustment and CR Shaft Parallelism Adjustment are performed at the same time.

1. Remove Ribbon Cartridge and Upper Housing. (See Chapter 4 "Disassembly and Assembly")
2. Set PG Adjust Lever to "0".

NOTE: *"0" position is second step from bottom → Move lever to lowest position and raise up one step to "0". (The highest groove of the PG Adjust Lever is shown in the diagram below. See Figure 5-1.)*

3. Loosen PG Adjust Lever set screw.

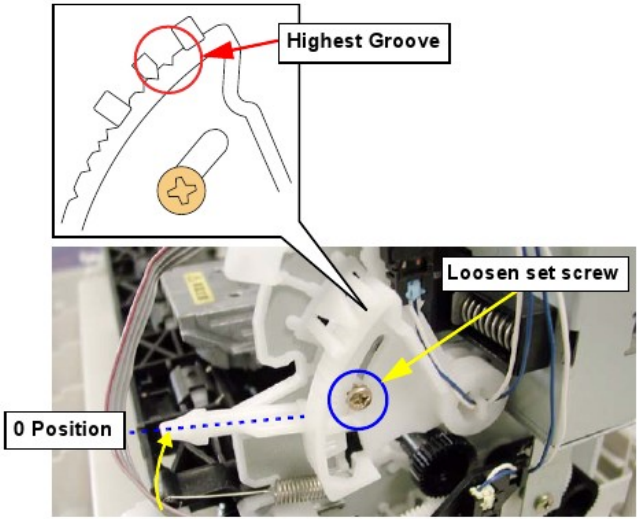


Figure 5-1. PG Adjust Lever

4. Loosen 2 set screws securing the Parallelism Adjustment Gear.

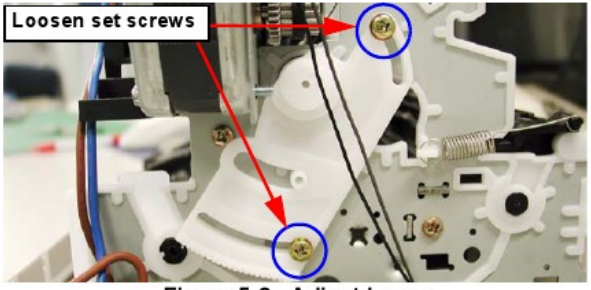


Figure 5-2. Adjust Lever

5. Tilt printer on its side as shown in the figure below.

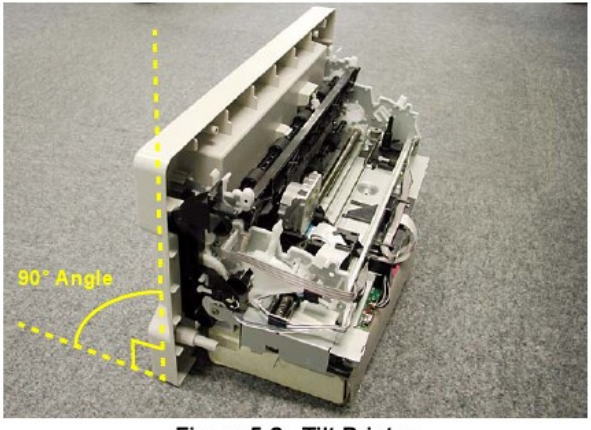


Figure 5-3. Tilt Printer

6. Slide Print head to right end as seen from printer front.

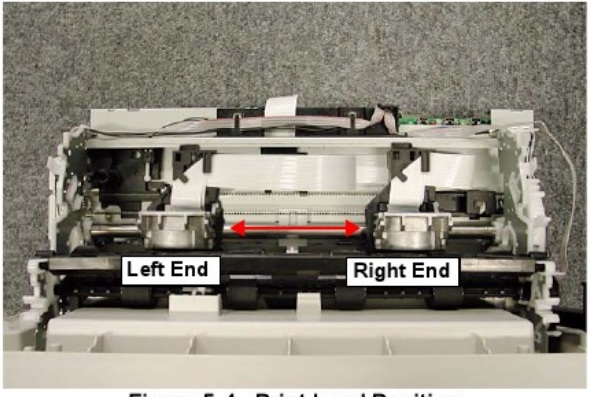


Figure 5-4. Print head Position

7. Insert thickness gauge vertically between print head and platen. Support the PG Adjust Lever by hand and secure the lever. Move the right bushing up/down to adjust the platen gap. See table below for adjustment range.

Thickness Gauge (mm)	Adjustment Standard
0.40	Passes through
0.44	Does not pass through

NOTE: *Be careful about letting thickness gauge fall.*

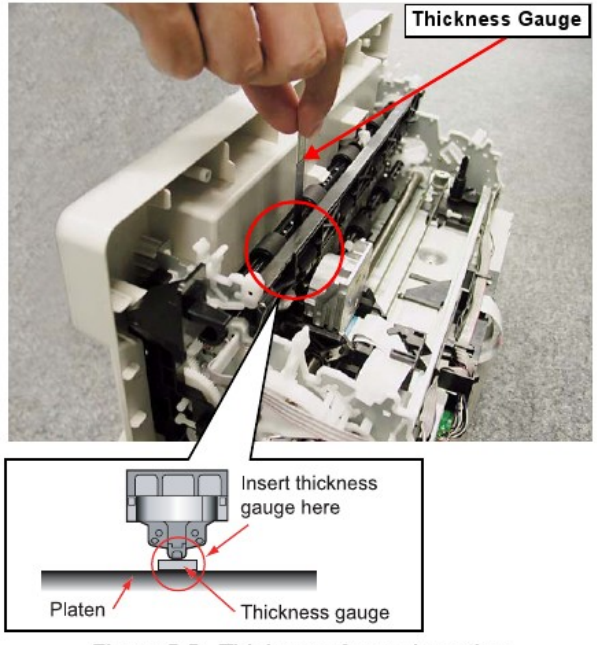


Figure 5-5. Thickness Gauge Insertion

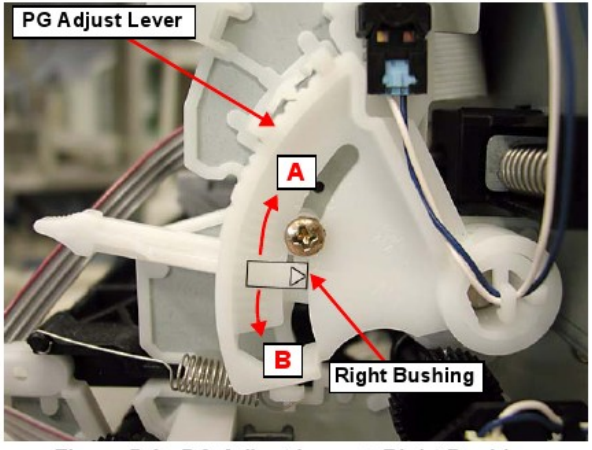


Figure 5-6. PG Adjust Lever + Right Bushing

Table 5-3. Bushing Movement and Platen Gap

Bushing Slide Direction	Platen Gap
A	Becomes Wider
B	Becomes Narrower

8. Tighten the screw to fix the right bushing to the PG Adjust Lever.

9. Slide Print head to left end as seen from printer front. (See Figure 5-4.)
10. Insert thickness gauge vertically between Print head and Platen. Adjust Platen gap. (See Figure 5-5.)
    Adjust platen gap by moving Adjust Lever forward/rearward.
    See table below for adjustment range.

Thickness Gauge (mm)	Adjustment Standard
0.40	Passes through
0.44	Does not pass through

NOTE: *Be careful about letting thickness gauge fall.*

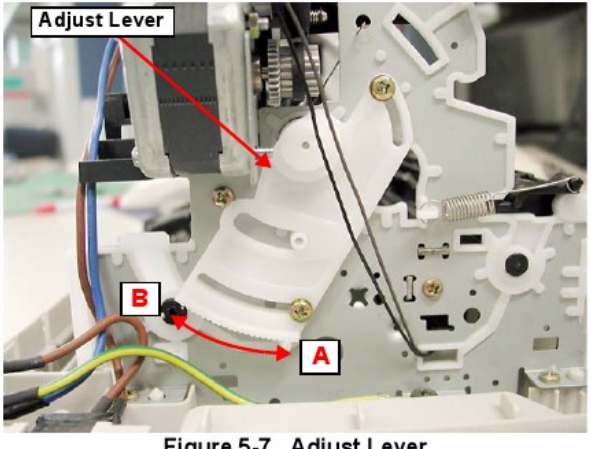


Figure 5-7. Adjust Lever

Table 5-4. Adjust Lever Movement and Platen Gap

Adjust Lever Slide Direction	Platen Gap
A	Becomes Wider
B	Becomes Narrower

11. Tighten the screw to fix the Adjust Lever to the Left Frame.
12. Slide print head to right side as seen from printer front, then measure platen gap.
    If gap is within adjustment standards, adjustment is complete. If gap is outside standards, repeat adjustment starting from Step 3.

5.3 Adjustment Program

Use the Adjustment Program to do the adjustments below.

- Bi-d Adjustment
- USB Serial Number Entry

The following explains setup operations that are necessary before actually using the Adjustment Program and performing operations.

5.3.1 Preparation

- PC:
  Windows 98 SP1 (SP1 installed version) or Windows 98 SE (Second Edition) must be used as the base OS.

CAUTION

If an OS other than those listed above is used, the program may not work properly.

- Interface Cable:
  Parallel Cable or USB Cable
- Adjustment Program:
  [C480A0*W.exe] file

NOTE: *"*" shows Adjustment Program version number. Count starts with "0".*

5.3.2 Adjustment Program Installation

1. Copy Adjustment Program [C480A0*W.exe] to a folder of your choice, then double-click the program icon.
2. The screen for selecting the installation folder will appear. Click [OK] and the installation program will start.

Figure 5-8. Adjustment Program Installation Screen

3. When installation is complete, the shortcut icon [C480A0*W] will appear in [C:\WINDOWS\Start Menu\Program\Program for Production].

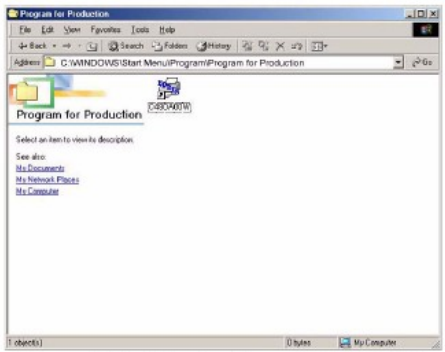


Figure 5-9. Shortcut icon [C480A0*W]

5.3.3 Starting Adjustment Program

1. On the PC monitor, select [Start] ⇒ [Program] ⇒ [Program for Production] ⇒ [TBD]. The [START-UP MENU] will appear.

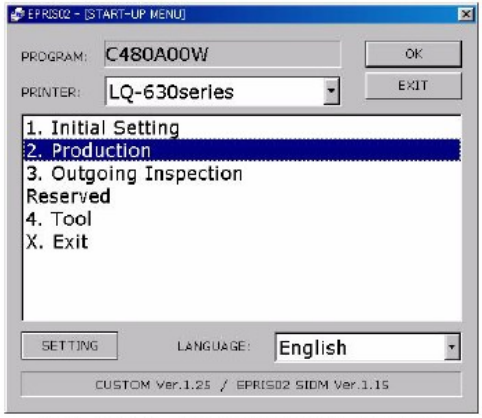


Figure 5-10. [START-UP MENU] Screen

5.3.4 Setting Parallel Cable/USB Cable

This setting selects parallel cable or USB cable for use with the Adjustment Program.

1. Start Adjustment Program.
   (See 5.3.3 "Starting Adjustment Program".)
2. Click [SETTING] on the [START-UP MENU] screen. The [Setting] screen will appear.

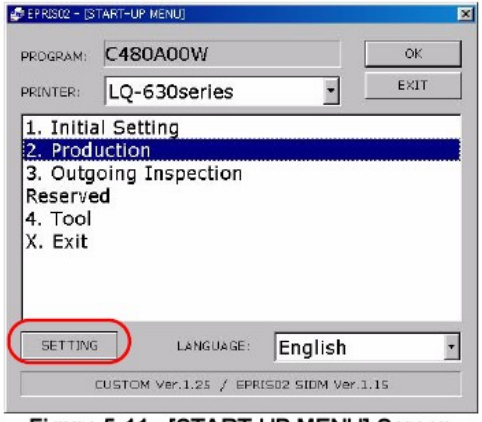


Figure 5-11. [START-UP MENU] Screen

3. Confirm that [Interface 1] is selected as the setting item at the left side of the [Setting] screen.
   Use the pulldown menu for [Interface] of [Initial Setting/Tool Menu] at the right side of the [Setting] screen to set the type of cable connecting the printer and PC. (LPT (parallel) or USB.)

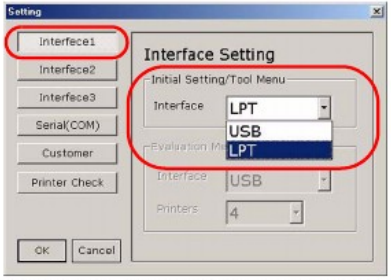


Figure 5-12. Cable Setting [Interface 1]

4. Select [Interface 2] from the items at the left side of the [Settings] screen.

- ☐ When using USB:
  Check all [Production Interface] boxes.
- ☐ When using LPT (parallel):
  Uncheck all [Production Interface] boxes.

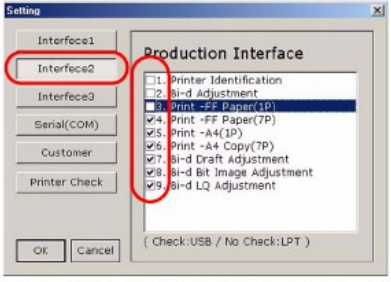


Figure 5-13. Cable Setting [Interface 2]

5. Select [Interface 3] from the items at the left side of the [Settings] screen.

- ☐ When using USB:
  Check all [Outgoing Interface] boxes.
- ☐ When using LPT (parallel):
  Uncheck all [Outgoing Interface] boxes.

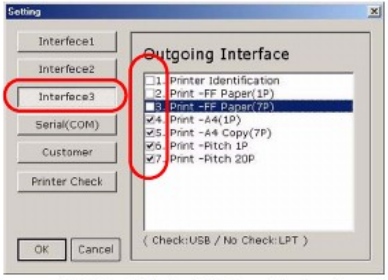


Figure 5-14. Cable Setting [Interface 3]

6. Click [OK]. Cable setting is complete and display will return to [START-UP MENU] screen.

5.4 Bi-d Adjustment

This section explains the Bi-d (bi-directional printing position) adjustment method. This adjustment can be made from either the Adjustment Program or the control panel. Each adjustment method is explained below.

5.4.1 Bi-d Adjustment Using Adjustment Program

1. Set continuous feed paper and turn printer power On.
2. Start Adjustment Program. (See 5.3.3 "Starting Adjustment Program".)
3. Select [2. Production] from [START-UP MENU] screen and click [OK]. (See Figure 5-11.)
4. Select a custormer in the Customer field of the [Configuration] screen. Enter [999] in the [Belt Name] field and click [NEXT].

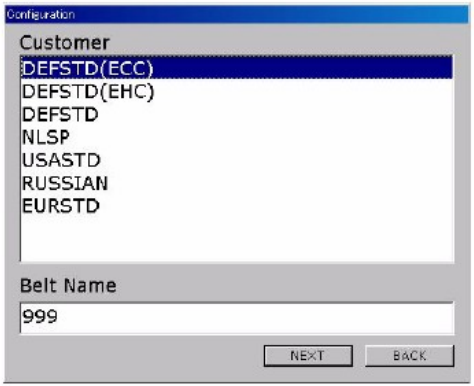


Figure 5-15. Selecting Forwarding Destination/Belt Name

5. If the following screen appears, click [NEXT].

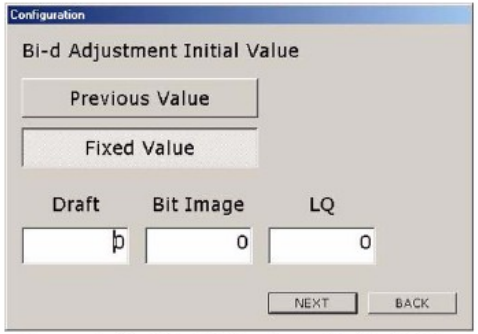


Figure 5-16. Bi-d Adjustment Initial Value

6. Confirm printer communications by double-clicking [1. Printer Identification] inside [Production MENU].
   After the program confirms communications readiness, [1. Printer Identification] letters will turn red and [Program Status] at right side of screen becomes [IDLE]. At this time, the USB serial number is also entered automatically.

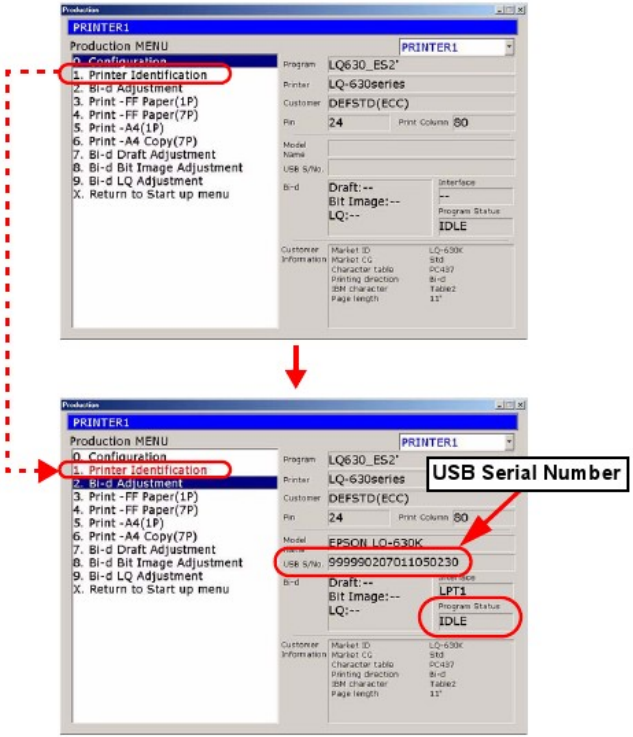


Figure 5-17. Production MENU

7. Double-click [3. Bi-d Adjustment] in the [Production MENU], and the screen shown below will appear.

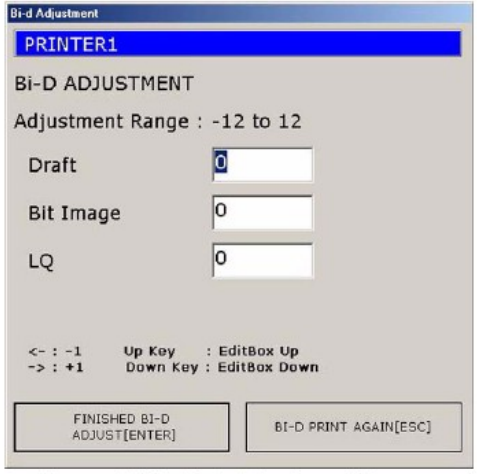


Figure 5-18. Bi-d Adjustment Screen

8. Click [BI-D PRINT AGAIN (ESC)] at the bottom right of the [Bi-d Adjustment] screen. The condition for the Bi-d settings of each of the current print modes will be printed.

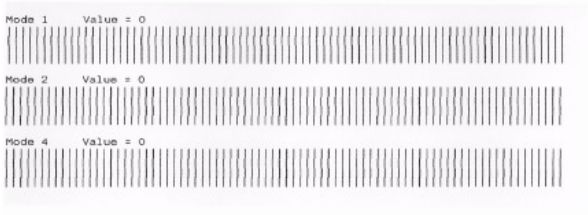


Figure 5-19. Bi-d Adjustment Printing Pattern

9. Check the first line and second line of the printed patterns. If slip width of the first line and second line is similar to the range shown below, follow the flow of Figure 5-21 to make adjustments.

- ☐ Mode 0 a = 0.25mm or less
- ☐ Mode 1 a = 0.25mm or less
- ☐ Mode 4 a = 0.10mm or less

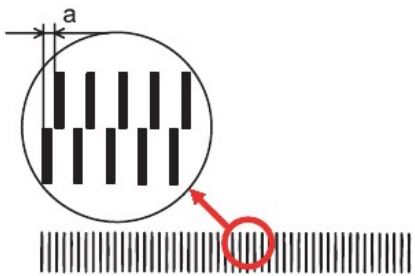


Figure 5-20. Bi-d Adjustment Range

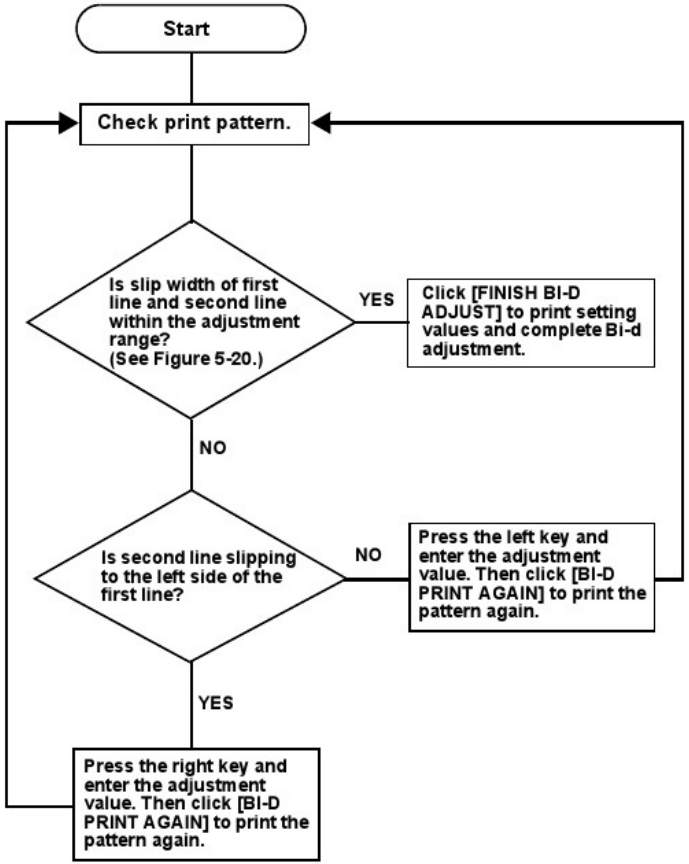
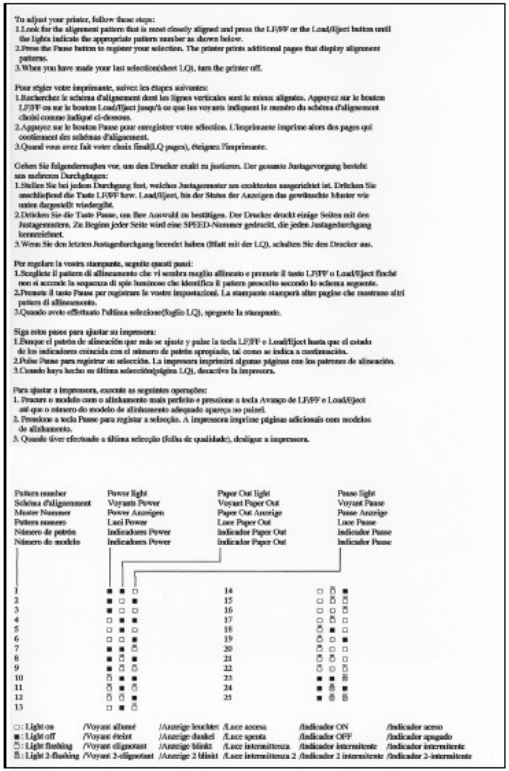


Figure 5-21. Bi-d Adjustment flow

5.4.2 Bi-d Adjustment Using Control Panel

1. Turn printer power On while pressing Pause switch.
2. Set continuous paper or A4 paper in printer.
3. An explanation of the setting method and Adjustment Pattern 1 will be printed.



To adjust your printer, follow these steps:
1.Look for the alignment pattern that is most closely aligned and press the LF/FF or the Load/Eject button until the lights indicate the appropriate pattern number as shown below.
2.Press the Pause button to register your selection. The printer prints additional pages that display alignment patterns.
3.When you have made your last selection(sheet LQ), turn the printer off.

Pour régler votre imprimante, suivez les étapes suivantes:
1.Rechercher le schéma d'alignement dont les lignes verticales sont le mieux alignées. Appuyez sur le bouton LF/FF ou sur le bouton Load/Eject jusqu'à ce que les voyants indiquent le numéro du schéma d'alignement choisi comme indiqué ci-dessous.
2.Appuyez sur le bouton Pause pour enregistrer votre sélection. L'imprimante imprime alors des pages qui contiennent des schémas d'alignement.
3.Quand vous avez fait votre choix final(LQ pages), éteignez l'imprimante.

Gehen Sie folgendermaßen vor, um den Drucker exakt zu justieren. Der gesamte Justagevorgang besteht aus mehreren Durchgängen:
1.Stellen Sie bei jedem Durchgang fest, welches Justagemuster am exaktesten ausgerichtet ist. Drücken Sie anschließend die Taste LF/FF bzw. Load/Eject, bis der Status der Anzeigen das gewünschte Muster wie unten dargestellt wiedergibt.
2.Drücken Sie die Taste Pause, um Ihre Auswahl zu bestätigen. Der Drucker druckt einige Seiten mit den Justagemustern. Zu Beginn jeder Seite wird eine SPEED-Nummer gedruckt, die jeden Justagedurchgang kennzeichnet.
3.Wenn Sie den letzten Justagedurchgang beendet haben (Blatt mit der LQ), schalten Sie den Drucker aus.

Per regolare la vostra stampante, seguite questi passi:
1.Scegliete il pattern di allineamento che vi sembra meglio allineato e premete il tasto LF/FF o Load/Eject finché non si accende la sequenza di spie luminose che identifica il pattern prescelto secondo lo schema seguente.
2.Premete il tasto Pause per registrare le vostre impostazioni. La stampante stamperà altre pagine che mostrano altri pattern di allineamento.
3.Quando avete effettuato l'ultima selezione(foglio LQ), spegnete la stampante.

Siga estos pasos para ajustar su impresora:
1.Busque el patrón de alineación que más se ajuste y pulse la tecla LF/FF o Load/Eject hasta que el estado de los indicadores coincida con el número de patrón apropiado, tal como se indica a continuación.
2.Pulse Pause para registrar su selección. La impresora imprimirá algunas páginas con los patrones de alineación.
3.Cuando haya hecho su última selección(página LQ), desactive la impresora.

Para ajustar a impressora, execute as seguintes operações:
1. Procure o modelo com o alinhamento mais perfeito e pressione a tecla Avanço de LF/FF e Load/Eject até que o número do modelo de alinhamento adequado apareça no painel.
2. Pressione a tecla Pause para registar a seleção. A impressora imprime páginas adicionais com modelos de alinhamento.
3. Quando tiver efectuado a última selecção (folha de qualidade), desligue a impressora.

Pattern number / Schéma d'alignement / Muster Nummer / Pattern numero / Número de patrón / Número do modelo
Power light / Voyant Power / Power Anzeigen / Luci Power / Indicadores Power / Indicadores Power
Paper Out light / Voyant Paper Out / Paper Out Anzeige / Luce Paper Out / Indicador Paper Out / Indicador Paper Out
Pause light / Voyant Pause / Pause Anzeige / Luce Pause / Indicador Pause / Indicador Pause

1	■ ■ □		14	□ ⍁ ■	
2	■ □ ■		15	□ ⍁ ⍁	
3	■ □ □		16	□ □ ⍁	
4	□ ■ ■		17	□ ⍁ □	
5	□ ■ □		18	⍁ ■ □	
6	□ □ ■		19	⍁ □ ■	
7	■ ■ ⍁		20	⍁ □ □	
8	■ ⍁ ■		21	⍁ ⍁ □	
9	■ ⍁ ⍁		22	⍁ □ ⍁	
10	⍁ ■ ■		23	■ ■ ⍁	
11	⍁ ■ ⍁		24	■ ⍁ ■	
12	⍁ ⍁ ■		25	■ ⍁ ⍁	
13	□ ■ ⍁				

□ : Light on / Voyant allumé / Anzeige leuchtet / Luce accesa / Indicador ON / Indicador aceso
■ : Light off / Voyant éteint / Anzeige dunkel / Luce spenta / Indicador OFF / Indicador apagado
⍁ : Light flashing / Voyant clignotant / Anzeige blinkt / Luce intermittenza / Indicador intermitente / Indicador intermitente
⍁ : Light 2-flashing / Voyant 2-clignotant / Anzeige 2 blinkt / Luce intermittenza 2 / Indicador 2 intermitente / Indicador 2-intermitente

Figure 5-22. "Setting Method Explanation" Printing Sample

4. Look for the most vertically complete pattern number from among the adjustment patterns that were printed.
5. After checking the test sheet printed in Step 3 and the LED, use the Load/Eject switch or the LF/FF switch to select the pattern number found at Step 4.
6. Press the Pause switch to set the pattern number selected in Step 5. After the print pattern is set, Adjustment Pattern 2 will be printed.
7. Repeat Steps 4 to 6 until Adjustment Pattern 3 is completed.
8. Turn printer power Off to set the adjusted conditions in memory. Adjustment is complete.

5.5 USB Serial Number Writing

1. Perform Steps 1 to 6 of 5.4.1 "Bi-d Adjustment Using Adjustment Program".
2. Set A4 paper in printer.
3. Print the print sample shown below by double-clicking [5. Print-A4 (1P)] inside [Production Menu].

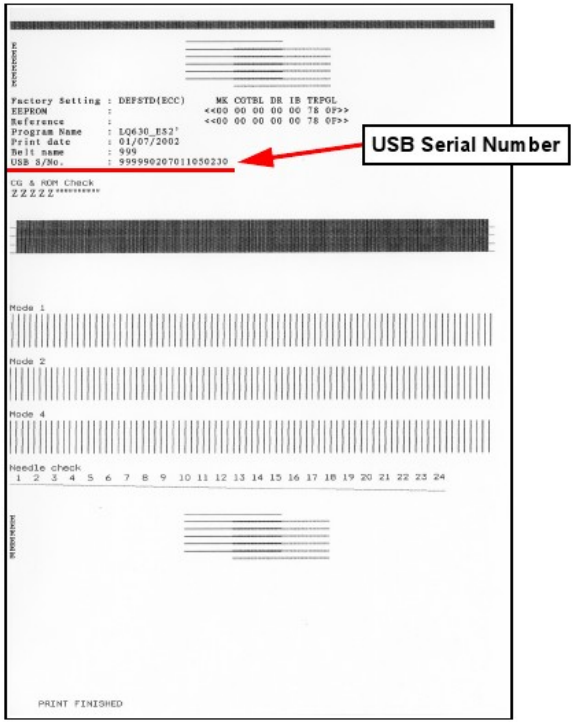


Figure 5-23. [Print-A4 (1P)] Print Sample

4. Confirm that the printed USB serial number (USB S/No.) and the [USB S/No.] at the center right of the [Production Menu] screen are the same.

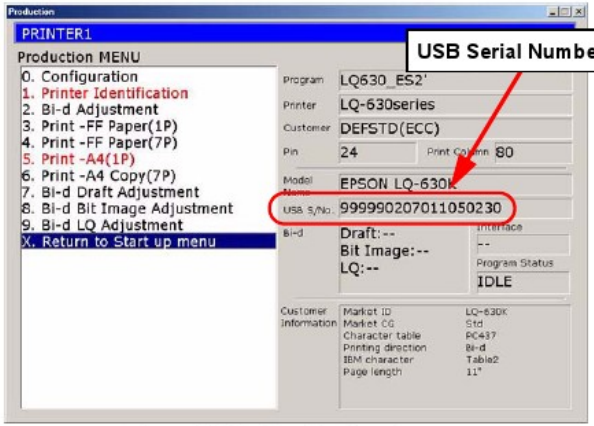


Figure 5-24. Production Screen

5. Turn printer power Off to enter the USB serial number. USB serial number writing is complete.

CHAPTER

6

MAINTENANCE

6.1 Maintenance

Appropriate maintenance is necessary to keep the printer in the best condition and prevent from troubles.

6.1.1 Cleaning

Cleaning the outer case consists of wiping off dirt using neutral detergent or diluted alcohol. It is also essential to vacuum dust and debris that has accumulated in the printer when necessary.

- **When performing the maintenance, remove the AC cable from the AC socket.**
- **The printer head will be very hot immediately after printing. Do not touch this part at such times.**

- **Never apply thinner, trichloroethylene, or ketone-based solvents to any plastic or rubber parts. These substances may cause plastic or rubber parts to degenerate or become deformed.**
- **Use only the lubricant or adhesive which have been recommended for this printer.**

6.1.2 Lubrication

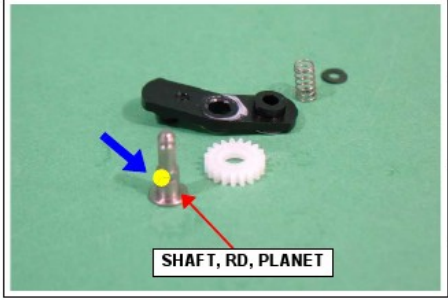
This section describes the lubrication points of this printer. Refer to the following figures for the type and quantity of lubricant to be used at each lubrication point. Lubrication has a substantial effect on the printer condition and durability. In particular, lubricating at low temperature needs special care. EPSON has collected technical information and conducted a wide range of tests using different types of lubricant in order to determine what types of lubricant can be used with this printer. The results of these tests are contained in the following table.

Table 6-1. Lubricants to be Applied

Type	Product name	Amount	Manufacturer	Part code
Grease	G-26	40g	EPSON	B702600001
Grease	G-64	40g	EPSON	123224200
Oil	O-14	40cc	EPSON	1049820

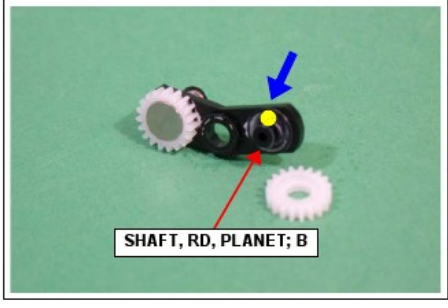
Lubrication should always be carried out when reassembling the printer.

☐ Refer to the following figures for lubrication points.



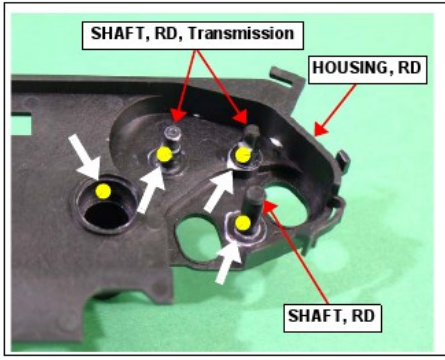
<Lubrication Position> SHAFT, RD, PLANET
<Lubrication Type> G-64
<Lubrication Amount> 1/2 grain of rice
<Note>

Figure 6-1. LEVER ASSY, PLANET 1



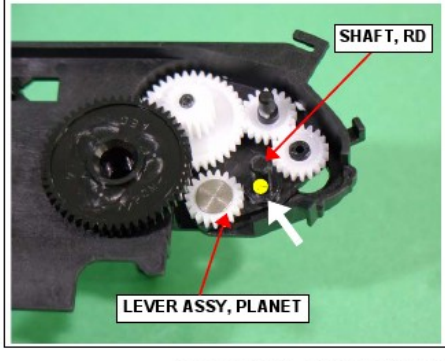
<Lubrication Position> SHAFT, RD, PLANET; B
<Lubrication Type> G-64
<Lubrication Amount> 1/2 grain of rice
<Note>

Figure 6-2. LEVER ASSY, PLANET 2



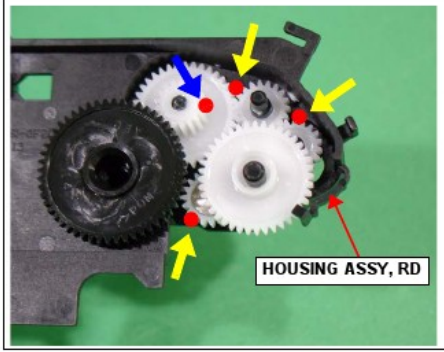
<Lubrication Position> 3 shafts and 1 hole of the HOUSING, RD
<Lubrication Type> G-64
<Lubrication Amount> 1 grain of rice
<Note>

Figure 6-3. HOUSING ASSY, RD 1



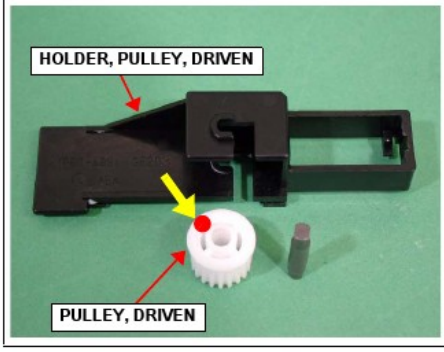
<Lubrication Position> SHAFT, RD
<Lubrication Type> G-64
<Lubrication Amount> 1 grain of rice
<Note> After inserting LEVER ASSY, PLANET into SHAFT, RD, lubricate the parts.

Figure 6-4. HOUSING ASSY, RD 2



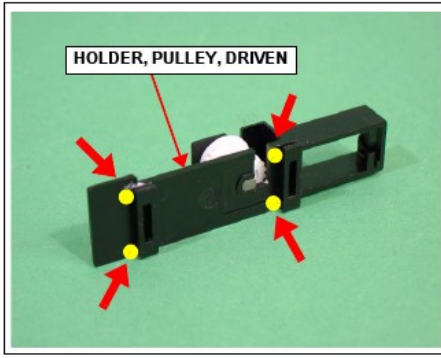
<Lubrication Position> The teeth of gears at the HOUSING ASSY, RD
<Lubrication Type> G-64
<Lubrication Amount> 1 grain of rice
<Note>

Figure 6-5. HOUSING ASSY, RD 3



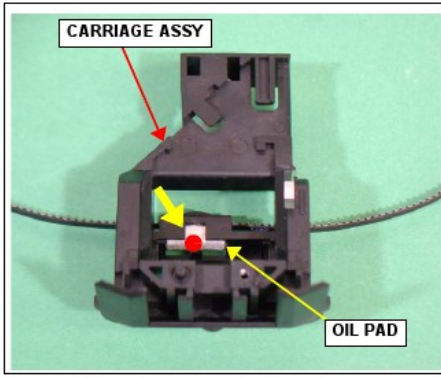
<Lubrication Position> The flange of the PULLEY, DRIVEN
<Lubrication Type> G-26
<Lubrication Amount> 1 grain of rice
<Note> Lubricate the parts using a cotton bud.

Figure 6-6. PULLEY, DRIVEN



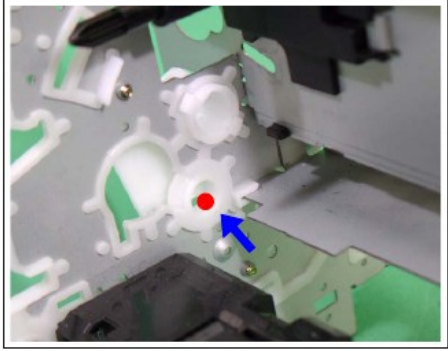
<Lubrication Position> 4 places on the HOLDER, PULLEY, DRIVEN
<Lubrication Type> G-26
<Lubrication Amount> 1 grain of rice
<Note>

Figure 6-7. HOLDER, PULLEY, DRIVEN



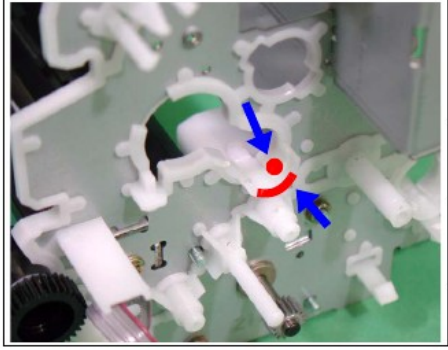
<Lubrication Position> The OIL PAD on the contacting surface area with SHAFT, CR, GUIDE
<Lubrication Type> O-14
<Lubrication Amount> 0.2 ± 0.02cc
<Note> 1. Set the oil dispenser 0.2 ± 0.02cc. 2. Lubricate O-14 on the OIL PAD.

Figure 6-8. OIL PAD



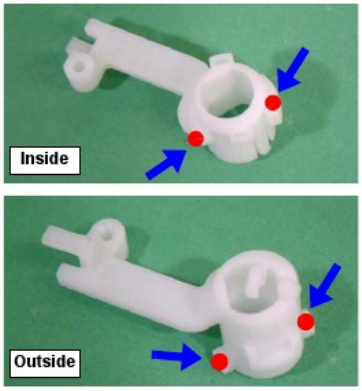
<Lubrication Position> The bushing hole of the FRAME ASSY, LEFT
<Lubrication Type> G-26
<Lubrication Amount> 1 grain of rice
<Note>

Figure 6-9. FRAME ASSY, LEFT



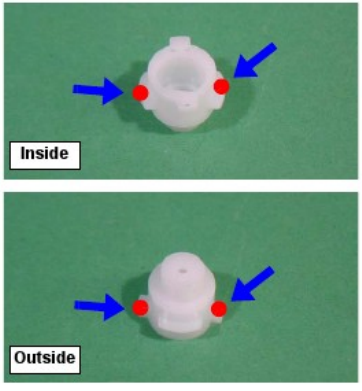
<Lubrication Position> The bushing hole and edge surface of the FRAME ASSY, RIGHT
<Lubrication Type> G-26
<Lubrication Amount> 1 grain of rice
<Note>

Figure 6-10. FRAME ASSY, RIGHT



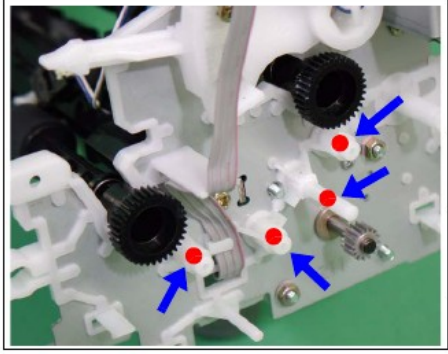
<Lubrication Position> 4 places on the slot surface of the BUSHING, RIGHT
<Lubrication Type> G-26
<Lubrication Amount> 1/2 grain of rice
<Note>

Figure 6-11. BUSHING, RIGHT



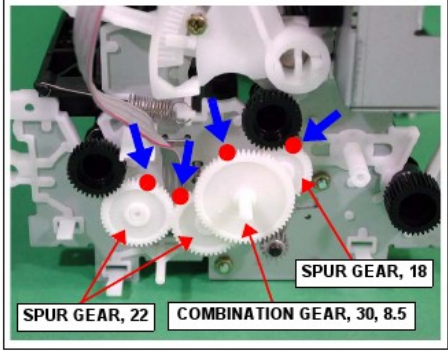
<Lubrication Position> 4 places on the slot surface of the BUSHING, LEFT
<Lubrication Type> G-26
<Lubrication Amount> 1/2 grain of rice
<Note>

Figure 6-12. BUSHING, LEFT



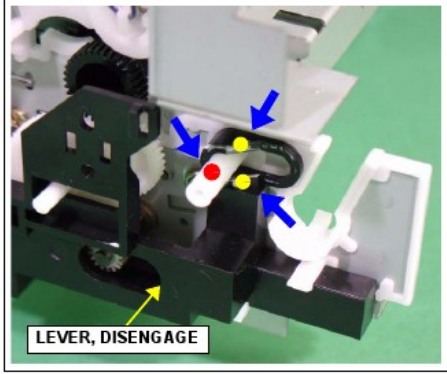
<Lubrication Position>
4 shafts of the FRAME ASSY, RIGHT
<Lubrication Type>
G-26
<Lubrication Amount>
1 grain of rice
<Note>

Figure 6-13. Shafts of the FRAME ASSY, RIGHT



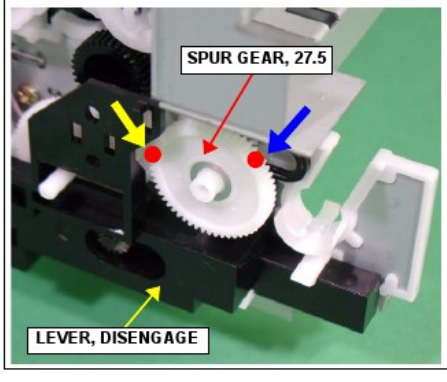
<Lubrication Position>
The teeth of the gears at the FRAME ASSY, RIGHT
<Lubrication Type>
G-26
<Lubrication Amount>
1 grain of rice
<Note>

Figure 6-14. Teeth of the Gears at the FRAME ASSY, RIGHT



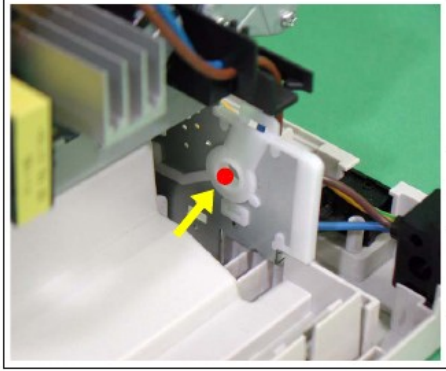
<Lubrication Position>
The LEVER, DISENGAGE and the shaft of the FRAME ASSY, RIGHT
<Lubrication Type>
G-26
<Lubrication Amount>
1 grain of rice
<Note>

Figure 6-15. LEVER, DISENGAGE



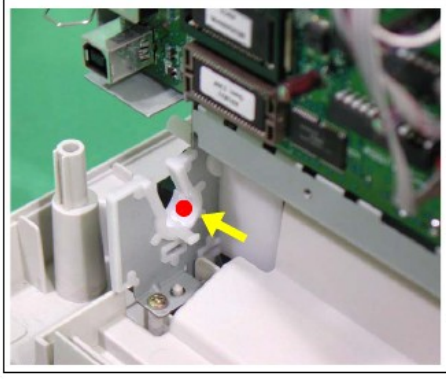
<Lubrication Position>
The teeth of the SPUR GEAR, 27.5
<Lubrication Type>
G-26
<Lubrication Amount>
1 grain of rice
<Note>

Figure 6-16. SPUR GEAR, 27.5



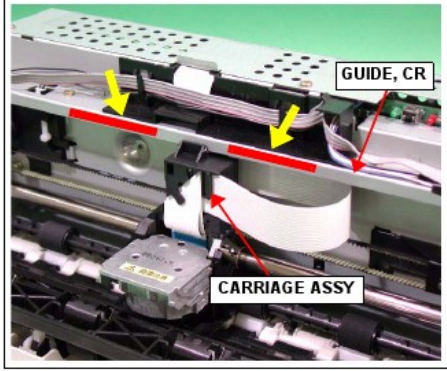
<Lubrication Position> The guide hole of the TRACTOR ASSY at the FRAME ASSY, LEFT
<Lubrication Type> G-26
<Lubrication Amount> 1 grain of rice
<Note>

Figure 6-17. Guide Hole of the TRACTOR ASSY at the FRAME ASSY, LEFT



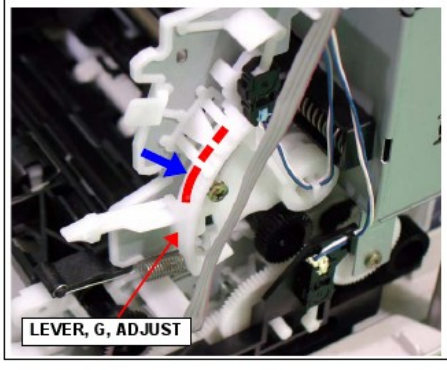
<Lubrication Position> The guide hole of the TRACTOR ASSY at the FRAME ASSY, RIGHT
<Lubrication Type> G-26
<Lubrication Amount> 1 grain of rice
<Note>

Figure 6-18. Guide Hole of the TRACTOR ASSY at the FRAME ASSY, RIGHT



<Lubrication Position> 2 places where GUIDE, CR contacts the CARRIAGE ASSY.
<Lubrication Type> G-26
<Lubrication Amount> 40mm x 2 places
<Note> Lubricate parts after moving CARRIAGE ASSY to center.

Figure 6-19. GUIDE, CR



<Lubrication Position> The teeth of the LEVER, G, ADJUST
<Lubrication Type> G-26
<Lubrication Amount> 20mm x 1 place
<Note>

Figure 6-20. LEVER, G, ADJUST

CHAPTER

7

APPENDIX

7.1 Connector Summary

7.1.1 Major Component Unit

The figure below illustrates how the primary components are connected.

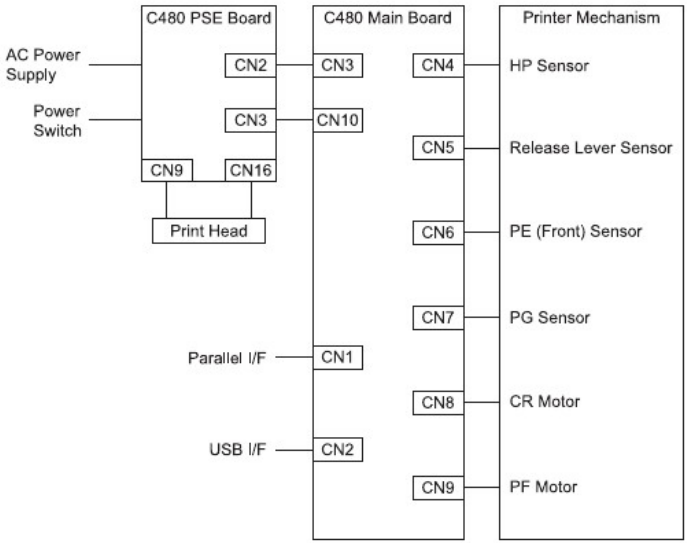


Figure 7-1. Cable Connections

7.1.2 Pin Assignments

Table 7-1. Connector Summary

Board	Connector No.	Description	Pins
C480MAIN Board	CN1	Parallel I/F (Refer to Chapter 1 for pin alignment)	36
	CN2	USB I/F (Refer to Chapter 1 for pin alignment)	9
	CN3	Power Board C480PSE	16
	CN4	HP Sensor	2
	CN5	Relase lever sensor	2
	CN6	PE (Front) Sensor	2
	CN7	PG sensor	2
	CN8	CR Motor	4
	CN9	PF Motor	4
	CN10	Power Board C480PSE	16
C480PSE Board	CN2	Main Board C480MAIN	16
	CN3	Main Board C480MAIN	16
	CN9	Print head (Front)	15
	CN16	Print head (Rear)	17

Table 7-2. C480MAIN Board Connector Pin Assignments - CN3

Pin	I/O	Signal Name	Function
1	O	HD3	Head data 3
2	O	HD11	Head data 11
3	O	HD19	Head data 19
4	O	HD15	Head data 15
5	O	HD23	Head data 23
6	O	HD14	Head data 14
7	O	HD6	Head data 6
8	O	HD10	Head data 10
9	O	HD18	Head data 18
10	O	HD22	Head data 22

Table 7-2. C480MAIN Board Connector Pin Assignments - CN3

Pin	I/O	Signal Name	Function
11	O	HD7	Head data 7
12	O	HD2	Head data 2
13	-	+42V	+42VDC
14	-	+42V	+42VDC
15	O	PSC	Power save control
16	-	+5V	+5VDC

Table 7-3. C480MAIN Board Connector Pin Assignments - CN4

Pin	I/O	Signal Name	Function
1	I	HP	Carriage home position sensor signal
2	-	GND	Signal ground

Table 7-4. C480MAIN Board Connector Pin Assignments - CN5

Pin	I/O	Signal Name	Function
1	I	Disengage	Release lever position sensor signal
2	-	GND	Signal ground

Table 7-5. C480MAIN Board Connector Pin Assignments - CN6

Pin	I/O	Signal Name	Function
1	I	PEF	Front paper end sensor signal
2	-	GND	Signal ground

Table 7-6. C480MAIN Board Connector Pin Assignments - CN7

Pin	I/O	Signal Name	Function
1	I	PG	Platen gap (copy mode) sensor signal
2	-	GND	Signal ground

Table 7-7. C480MAIN Board Connector Pin Assignments - CN8

Pin	I/O	Signal Name	Function
1	O	CRA	Carriage motor phase A
2	O	CR_A	Carriage motor phase _A
3	O	CRB	Carriage motor phase B
4	O	CR_B	Carriage motor phase _A

Table 7-8. C480MAIN Board Connector Pin Assignments - CN9

Pin	I/O	Signal Name	Function
1	O	PFA	Paper feed motor phase A
2	O	PF_A	Paper feed motor phase _A
3	O	PFB	Paper feed motor phase B
4	O	PF_B	Paper feed motor phase _B

Table 7-9. C480MAIN Board Connector Pin Assignments - CN10

Pin	I/O	Signal Name	Function
1	-	GND	Signal ground
2	-	GND	Signal ground
3	O	HD5	Head data 5
4	O	HD13	Head data 13
5	O	HD21	Head data 21
6	O	HD16	Head data 16
7	O	HD8	Head data 8
8	O	HD4	Head data 4
9	-	+3.3V	+3.3VDC
10	I	TH	Thermistor
11	O	HD20	Head data 20
12	O	HD12	Head data 12
13	O	HD24	Head data 24
14	O	HD17	Head data 17
15	O	HD9	Head data9
16	O	HD1	Head data 1

Table 7-10. C480PSE Board Connector Pin Assignments - CN2

Pin	I/O	Signal Name	Function
1	I	HD3	Head data 3
2	I	HD11	Head data 11
3	I	HD19	Head data 19
4	I	HD15	Head data 15
5	I	HD23	Head data 23
6	I	HD14	Head data 14
7	I	HD6	Head data 6
8	I	HD10	Head data 10
9	I	HD18	Head data 18
10	I	HD22	Head data 22
11	I	HD7	Head data 7
12	I	HD2	Head data 2
13	-	+42V, 0.6A	+42VDC, 0.6A
14	-	+42V	+42VDC
15	I	PSC	Power save control
16	-	+5V, 0.3A	+5VDC, 0.3A

Table 7-11. C480PSE Board Connector Pin Assignments - CN3

Pin	I/O	Signal Name	Function
1	-	GND	Signal ground
2	-	GND	Signal ground
3	I	HD5	Head data 5
4	I	HD13	Head data 13
5	I	HD21	Head data 21
6	I	HD16	Head data 16
7	I	HD8	Head data 8
8	I	HD4	Head data 4
9	-	+3.3VDC	+3.3VDC
10	O	TH	Thermistor
11	I	HD20	Head data 20
12	I	HD12	Head data 12
13	I	HD24	Head data 24
14	I	HD17	Head data 17
15	I	HD9	Head data 9
16	I	HD1	Head data 1

Table 7-12. C480PSE Board Connector Pin Assignments-CN9

Pin	I/O	Signal Name	Function
1	O	HD6	Head data 6
2	O	HD14	Head data 14
3	O	HD10	Head data 10
4	O	HD23	Head data 23
5	O	HD18	Head data 18
6	O	HD15	Head data 15
7	O	HD22	Head data 22
8	-	HDCOM	Common (+42VDC)
9	-	HDCOM	Common (+42VDC)
10	-	HDCOM	Common (+42VDC)
11	O	HD7	Head data 7
12	O	HD19	Head data 19
13	O	HD2	Head data 2
14	O	HD11	Head data 11
15	O	HD3	Head data 3

Table 7-13. C480PSE Board Connector Pin Assignments-CN16

Pin	I/O	Signal Name	Function
1	O	HD5	Head data 5
2	O	HD1	Head data 1
3	O	HD13	Head data 13
4	O	HD9	Head data 9
5	O	HD21	Head data 21
6	O	HD17	Head data 17
7	-	HDCOM	Common (+42VDC)
8	-	HDCOM	Common (+42VDC)
9	-	HDCOM	Common (+42VDC)
10	O	HD24	Head data 24
11	O	HD16	Head data 16
12	O	HD12	Head data 12
13	O	HD8	Head data 8
14	O	HD20	Head data 20
15	O	HD4	Head data 4
16	I	TH2	Thermistor 2
17	I	TH1	Thermistor 1

7.2 EEPROM Address Map

This section provides the EEPROM address map. (This address map shows LQ-630 information.)

NOTE: *The data of two or more bytes are assigned in such way as lower byte to lower address, higher byte to higher address.*

NOTE: *(*1) These data are fixed by each printer hardware in the factory. These data should not be changed afterwards.*

Table 7-14. EEPROM Address Map

Address	Data	Data format	Q-pit data	Default (Factory Setting)
Area 0	(Backup Area)			
00H-03H	(reserved)		0000H	0000H
04H-07H	Driving Line count for ribbon change timing	0 to 0FFFFFFFFH (minutes) See Remote spec TLcmd	00000000H	00000000H
08H-0BH	Driving Hour	0 to 0FFFFFFFFH (minutes) See Remote spec TLcmd	00000000H	00000000H
0CH-0FH	Driving Line count	0 to 0FFFFFFFFH (count) See Remote spec TLcmd	00000000H	00000000H
10H	Starting Year	0 to 99 (the last two figures of Anno Domini) See Remote spec SDcmd	00H	00H
11H	Starting Month	1 to 12 See Remote spec SDcmd	00H	00H
12H	Starting Data	1 to 31 See Remote spec SDcmd	00H	00H
13H	Backup flags	b0 : Tear Off state b1 to b7 : (reserved)	00H	00H
14H,15H	Paper edge length		0000H	0000H
16H-1FH	(reserved)		00H	00H
Area1				
20H,21H	Page length for tractor	1 to 22x360 by 0.0706mm (1/360 inch), 0000H : 279.4mm (11 inch: same as default)	0000H	0000H
22H,23H	Page langth for manual insertion	1 to 22x360 by 0.0706mm (1/360 inch), 0000H: 558.8mm (22 inch: same as default)	0000H	0000H
24H,25H	TOF adjustment value for tractor	-60 to 360 (4.2 mm to 8.5 mm+25.4mm (1 inch), by 0.0706mm (1/360 inch))	0000H (8.5mm)	0000H (8.5mm)
26H,27H	TOF adjustment value for manual insertion	-60 to 360 (4.2 mm to 8.5 mm+25.4mm (1 inch), by 0.0706mm (1/360 inch))	0000H (8.5mm)	0000H (8.5mm)
28H,29H	Bottom margin for tractor	1 to 22x360 by 0.0706mm (1/360 inch), 0000H : 279.4mm (11 inch: same as default)	0000H	0000H
2AH,2BH	TOF Minimum value	-120 to -60, 0 : -60 (4.2mm) In case that it is big than -60, a value considers as -60.	0000H	0000H
2CH,2DH	Tear-off adjustment value	-128 to +127 (-25.4mm (-1 inch) to 25.4mm (1 inch), by 0.0706mm (1/360 inch))	0000H	0000H

Table 7-14. EEPROM Address Map

Address	Data	Data format	Q-pit data	Default (Factory Setting)
2EH,2FH	Paper width for jointing sheets of continous multi parts forms mode2	4 to 9x360 by 0.0706mm (1/360 inch), 0000H : Don' t use Jointing sheets of continous multi parts forms mode2	0000H	0000H
30H,31H	Character table selection	0: PC 437 1: PC 850 2: PC 860 3: PC 863 4: PC 865 5: PC 861 6: BRASCII 7: Abicomp 8: ISO Latin 1 9: Roman 8 10: PC 437Greek 11: PC 852 12: PC 853 13: PC 855 14: PC 857 15: PC 864 16: PC 866 17: PC 869 18: ISO Latin 1T 19: ISO 8859-7 20: MAZOWIA 21: Code MJK 22: Bulgaria 23: Estonia 24: PC 774 25: ISO 8859-2 26: PC 866 LAT 27: PC 866 UKR 28: Hebrew7 29: Hebrew8 30: PC 862 31: PCAPTEC 32: PC 708 33: PC 720 34: PCAR864 35: PC 858 36:I SO 8859-15 37: PC 771 40: Italic U.S.A. 41: Italic France 42: Italic Germany I 43: Italic U.K. 44: Italic Denmark 45: Italic Sweden 46: Italic Italy 47: Italic Spain	0000H	0000H (PC437)
32H	Font selection	0: Roman 1: Draft 2: Sans Serif 3: Courier 4: Prestige 5: Script 6: OCR-B 7: Orator 8: Orator-S 9: Script C 10: Roman T 11: Sans Serif H	00H (Roman)	00H (Roman)
33H	Pitch selection	0: 10cpi 1: 12cpi 2: 15cpi 3: 17cpi 4: 20cpi 5: Proportional	00H (10cpi)	00H (10cpi)
34H, 35H	(reserved)		0000H	0000H
36H, 37H	(reserved)		0000H	0000H

Table 7-14. EEPROM Address Map

Address	Data	Data format			Q-pit data	Default (Factory Setting)
38H	Auto line feed Auto tear off Skip over perforation High speed draft --- Panel lock out --- ---	b0: Auto line feed b1: Auto tear off b2: Skip over perforation b3: High speed draft b4: (reserved) b5: Panel lock out b6: (reserved) b7: (reserved)	0: Off 0: Off 0: Off 0: Off 0: Off	1: On 1: On 1: On 1: On 1: On	00H	00H
39H	Software 0 slash Buzzer --- Auto CR A.G.M. --- ---	b0: Software b1: 0 slash b2: Buzzer b3: (reserved) b4: Auto CR(IBM) b5: A.G.M.(IBM) b6: (reserved) b7: (reserved)	0: ESC/P2 0: Off 0: On 0: Off 0: Off	1: IBM PPDS 1: On 1: Off 1: On 1: On	00H	00H
3AH	(reserved)				00H	00H
3BH	(reserved)				00H	00H
3CH,3DH	Additional character table	Additional character table No., 0000H: not add (same as default)			0000H	0000H
3EH, 3FH	(reserved)				0000H	0000H
40H	Print direction setting	0: Bi-d.	1: Uni-d.	2: Auto	00H (Bi-d.)	00H (Bi-d.)
41H	Panel lock out pattern 1	b0: Load function b1: Eject function b2: LF function b3: FF function b4: (reserved) b5: (reserved) b6: Micro Adjust function b7: (reserved)	0: Off 0: Off 0: On 0: On 0: On	1: On 1: On 1: Off 1: Off 1: Off	00H	00H

Table 7-14. EEPROM Address Map

Address	Data	Data format			Q-pit data	Default (Factory Setting)
42H	Panel lock out pattern 2	b0: (reserved) b1: (reserved) b2: Pause function b3: (reserved) b4: (reserved) b5: (reserved) b6: (reserved) b7: (reserved)	0: Off	1: On	00H	00H
43H	Manual feed wait time	3 to 30 (by 0.1 sec.), 00H : 1 sec. (same as default)			00H (1 sec.)	00H (1 sec.)
44H	Tear-off wait time	3 to 30 (by 0.1 sec.), 00H : 3 sec. (same as default)			00H (3 sec.)	00H (3 sec.)
45H	I/F mode selection	0: Auto I/F selection 1: Parallel I/F 2: USB I/F			00H (Auto)	00H (Auto)
46H	Auto I/F wait time setting	10: 10 sec. 30: 30 sec. 00: 10 sec. (same as default)			00H (10 sec.)	00H (10 sec.)
47H	Input Buffer	0: On (32Kbyte) 1: Off (1 byte)			00H (On)	00H (On)
48H	Packet mode for Parallel I/F (IEEE 1284.4)	0: Auto 1: On 2: Off			00H (Auto)	00H (Auto)
49H	Packet mode for USB I/F (IEEE 1284.4)	0: Same as Packet mode for Parallel I/F 1: Auto (for test) 2: On (for test) 3: Off (for test)			00H (Same as 48H)	00H (Same as 48H)
4AH	Parallel I/F bidirectional mode	b0: Parallel I/F bidirectional mode b1-b7: (reserved)	0: On	1: Off	00H	00H
4BH	*ACK timing data	Refer to I/F timing dada			00H	00H
4CH	*ACK timing data (complement of 4BH)				00H	FEH
4DH	(reserved)				00H	00H
4EH,4FH	(reserved)				0000H	0000H
50H	Copy mode Energy save mode ---	b0: copy mode b1: Energy save mode b2-b7: (reserved)	0: Off 0: On	1: On 1: Off	00H	00H

Table 7-14. EEPROM Address Map

Address	Data	Data format	Q-pit data	Default (Factory Setting)
51H	Leveling curly paper Centering paper feed Jointing sheets of continous multi parts forms mode1 Manual insertion eject direction Manual insertion eject method Manual insertion method --- ---	b0: Leveling curly paper 0: On 1: Off b1: Centering paper feed 0: Off 1: On b2: Jointing sheets of continous multi parts forms mode1 0: Off 1: On b3: Manual insertion eject direction 0: Front 1: Rear b4: Manual insertion eject method 0: Eject 1: Remain b5: Use RPE for manual insertion 0: Yes 1: No b6: (reserved) b7: (reserved)	00H	00H
52H	Cut sheets paper feed pitch adjustment	0: not adjust (same as default) ±1: every 59.76mm (847/360 inch) paper feed ±2: every 29.84mm (423/360 inch) paper feed ±3: every 19.89mm (282/360 inch) paper feed ±4: every 14.95mm (212/360 inch) paper feed ±5: every 11.99mm (170/360 inch) paper feed ±6: every 9.94mm (141/360 inch) paper feed ±7: every 8.53mm (121/360 inch) paper feed ±8: every 7.47mm (106/360 inch) paper feed ±9: every 6.63mm (94/360 inch) paper feed ±10: every 5.99mm (85/360 inch) paper feed	00H	00H
53H	(reserved)		00H	00H
Area 2				
54H-56H	ASub-number for customization	00H to 09H	000000H (Standard)	000000H (Standard)
57H	(reserved)		00H	00H
58H	(reserved)		00H	00H
59H	Market CG	0: Standard version 1: NLSP version	00H	00H
5AH	IBM character table	0: Table2 1: Table1	00H	00H
5BH	Fatal Error		00H	00H
5CH, 6DH	USB ID		(*1)	(*1)
6EH-6FH	(reserved)		0000H	0000H
Area 3				
70H	Vp adjustment value		(*1)	(*1)
71H	Vp adjustment value (complement of 70H)		(*1)	(*1)

Table 7-14. EEPROM Address Map

Address	Data	Data format	Q-pit data	Default (Factory Setting)
72H	Bi-d adjustment value for high speed draft / draft mode	-12 to +12 by 0.0353mm (1/720 inch)	00H	(*1)
73H	Bi-d adjustment value for bitimage (ESC*26H) mode	-12 to +12 by 0.0353mm (1/720 inch)	00H	(*1)
74H	Bi-d adjustment value for LQ mode	-12 to +12 by 0.0353mm (1/720 inch)	00H	(*1)
75H-7BH	(reserved)		00H	00H
7CH	RPE adjustment (Rear)	-128 to +127 by 0.0706mm (1/360 inch)	00H	(*1)
7DH	RPE adjustment (Front)	-128 to +127 by 0.0706mm (1/360 inch)	00H	(*1)
7EH,7FH	(reserved)		00H	00H

7.3 Exploded Diagrams

☐ Exploded Diagrams

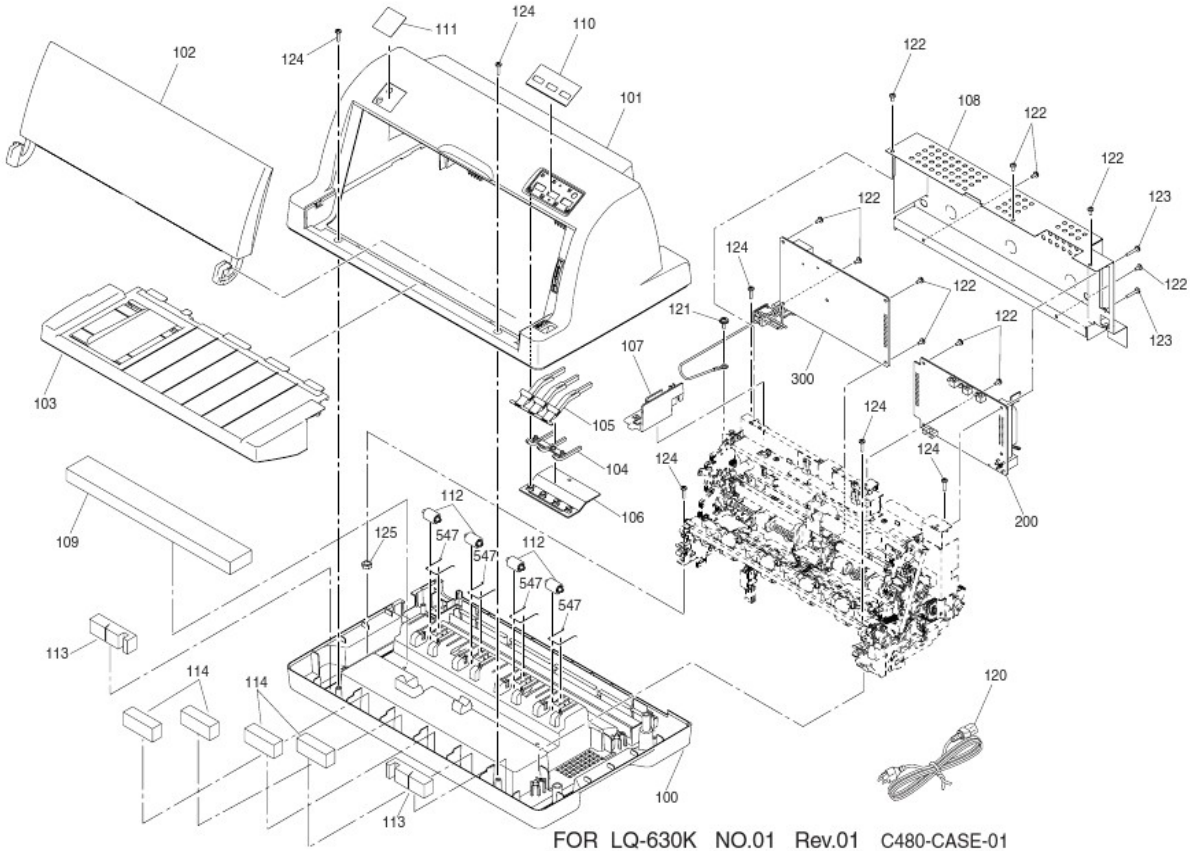


Figure 7-2. Exploded Diagram 1

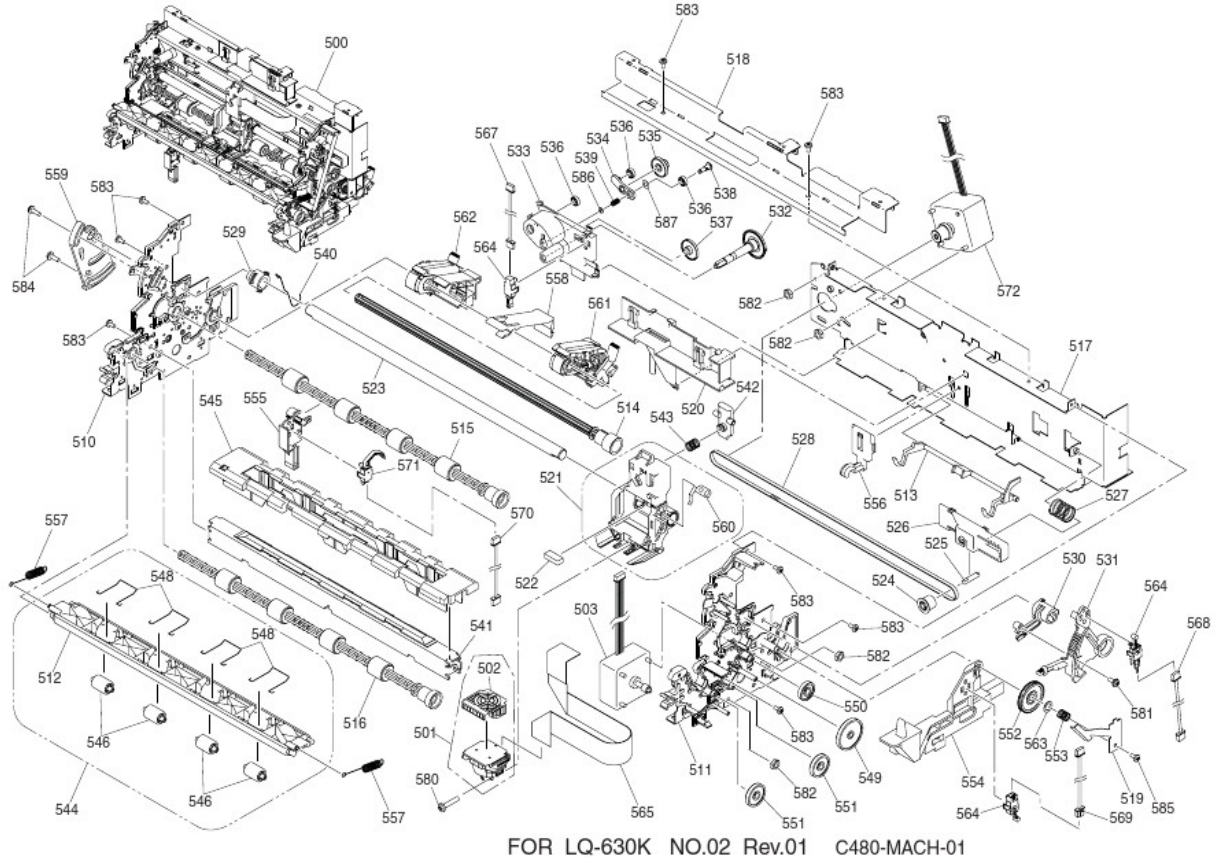


Figure 7-3. Exploded Diagram 2

7.4 Parts List

The following table shows parts name of this product. Refer to the exploded diagrams for parts' number.

Table 7-15. Parts List

Number	Parts List
100	HOUSING, ASSY. LOWER
101	HOUSING ASSY., UPPER
102	COVER, PRINTER, ASSY.
103	SHEET GUIDE ASSY.
104	OPTICAL TUBE
105	BOTTON, PANEL
106	COVER, PANEL
107	HOLDER, AC, CABLE
108	SHIELD PLATE, COVER
109	SOUND ABSORBER, A
110	SHEET, PANEL
111	LOGO PLATE
112	ROLLER, DRIVEN
113	SOUND ABSORBER; E
114	SOUND ABSORBER; D
121	C.B. (O) SCREW 4X8 F/ZG (B045800115)
122	C.B.S. SCREW (B300204211)
123	C.B.S. SCREW (B300204711)
124	C.B.P-TITE SCREW, 3X12, F/ZN
125	HEXAGON NUT (B070200411)
547	SPRING, DRIVEN, REAR
200	BOARD ASSY., MAIN
500	PRINTER MECHANISM (ASP), M-5Y10-100
501	PRINT HEAD, D823V1
502	COVER, HEAT SINK
503	MOTOR ASSY., PF
510	FRAME ASSY., LEFT

Table 7-15. Parts List

Number	Parts List
511	FRAME ASSY., RIGHT
512	FRAME, ROLLER DRIVEN, FRONT
513	LEVER, DETECTOR, PE, REAR
514	SHAFT, TR
515	ROLLER, DRIVE, REAR
516	ROLLER, DRIVE, FRONT
517	FRAME, CR
518	GUIDE, CR
519	SUPPORT PLATE, FRAME, RIGHT
520	HOLDER, CABLE, HEAD
521	CARRIAGE ASSY.
522	OIL PAD
523	SHAFT, CR, GUIDE
524	PULLEY, DRIVEN
525	SHAFT, PULLEY, DRIVEN
526	HOLDER, PULLEY, DRIVEN
527	COMPRESSION SPRING, 24.78
528	TIMING BELT
529	BUSHING, LEFT
530	BUSHING, RIGHT
531	LEVER, G, ADJUST
532	RATCHET, RD
533	HOUSING, RD
534	LEVER, PLANET
535	COMBINATION GEAR, 8.5, 20
536	SPUR GEAR, 9.5
537	COMBINATION GEAR, 8.5, 19
538	SHAFT, RD, PLANET; B
539	COMPRESSION SPRING, 1.90
540	GROUNDING WIRE, SHAFT, CR
541	PLATEN ASSY.
542	SLIDER, CR, REAR

Table 7-15. Parts List

Number	Parts List
543	COMPRESSION SPRING, 0.98
544	PAPER EJECT ASSY.
545	PAPER GUIDE
546	ROLLER, DRIVEN
548	SPRING, DRIVEN, FRONT
549	COMBINATION GEAR, 30, 8.5
550	SPUR GEAR, 18
551	SPUR GEAR, 22
552	SPUR GEAR, 27.5
553	COMPRESSION SPRING, 1.28
554	LEVER, DISENGAGE
555	HOLDER, DETECTOR, PE, FRONT
556	HOLDER, ROLLER, DRIVE, REAR
557	EXTENSION SPRING, 1.54
558	PAPER SUPPORT, TR
559	LEVER, ADJUST
560	GROUNDING PLATE, HEAD
561	TRACTOR ASSY., RIGHT
562	TRACTOR ASSY., LEFT
563	PLAIN WASHER, 6.5X0.5X10, S/Na
564	DETECTOR, LEAF, B2
565	CABLE, HEAD
567	HARNESS, HP
568	HARNESS, PG
569	HARNESS, DISENGAGE
570	HARNESS, PE, FRONT
571	DETECTOR, PE, FRONT
572	MOTOR ASSY., CR
580	C.P.B SCREW (B310104611)
581	C.B.B-TITE (O) SCREW, 3X8, F/ZN
582	HEXAGON NUT, NORMAL, M3
583	C.B.S. SCREW (B300204211)

Table 7-15. Parts List

Number	Parts List
584	C.B.S.(P) SCREW (B303104411)
585	C.B.P-TITE SCREW, 3X6, F/ZN
586	CUT WASHER (F334101070)
587	PLANE WASHER (B100167090)
120	POWER CABLE,GB31303SA
300	BOARD ASSY., POWER SUPPLY

7.5 Electric Circuit Schematics

- C480MAIN Board (See page 158)
- C480PSE Board (See page 159)