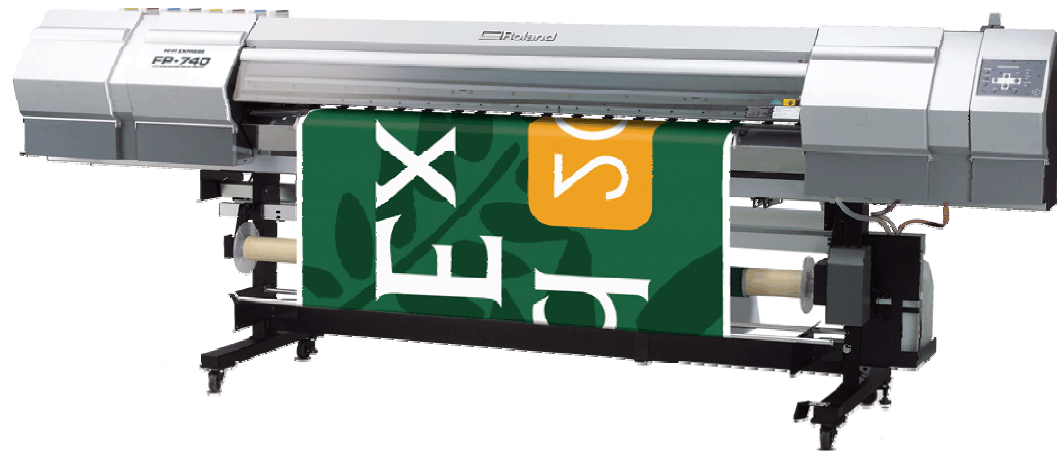




# *Service Guide Book*

## FP-740



Revision\_1.00\_Oct 10<sup>th</sup>, 2006

**Roland DG Corporation**



## **Contents...**

- 1. Product Information**
- 2. Ink**
- 3. Printing Theory**
- 4. Others**
- 5. Consumables**

# ***Revision Record***

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<b>Revision No.</b>	<b>Date</b>	<b>Description of changes</b>
1.00	2006.10.10	First Edition

# 1. Product Information

## **HI-FI EXPRESS** **FP-740** DYE SUBLIMATION INKJET PRINTER



- Hi-Fi EXPRESS, FP-740
- Dye Sublimation Printer
  - For Textile Printing dedicated (Print Only)
- 8 print heads staggered layout
- 74 inch printer
- New Control Panel



- Sub Tank Ink System
- TU unit bundled
- Ethernet [100 Base-TX / 10 Base-T]
- Roland Sublimation SBL Ink 200cc cartridge
- Max. Loadable Media Weight : 20kg
- Max. Loadable Media Width : 710 ~ 1879mm
- Max. Printable Width: 1869mm
- Dimension (w/stand): 3539(W)x758(D)x1307(H)mm
- Weight: 267kg

## 2. Ink

- **Roland's 200cc SBL Ink (4 colors only)**

- SBL-BK
- SBL-CY
- SBL-MG
- SBL-YE

CJ-CL (as Cleaning Liquid)

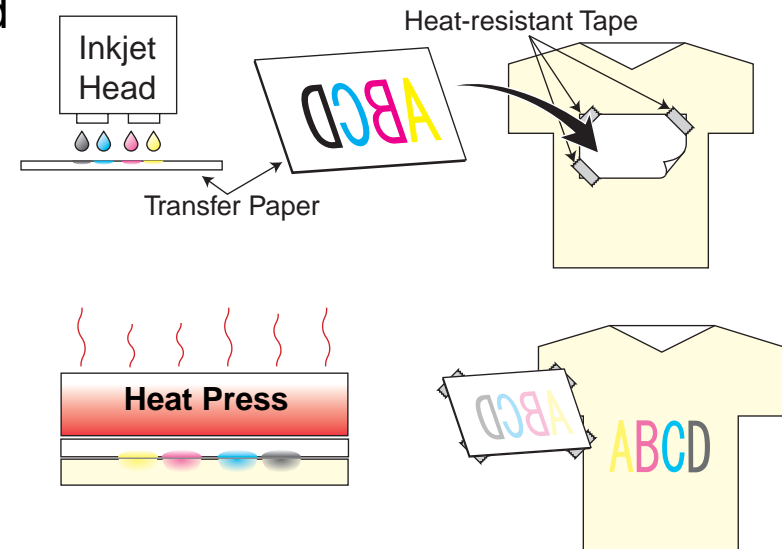
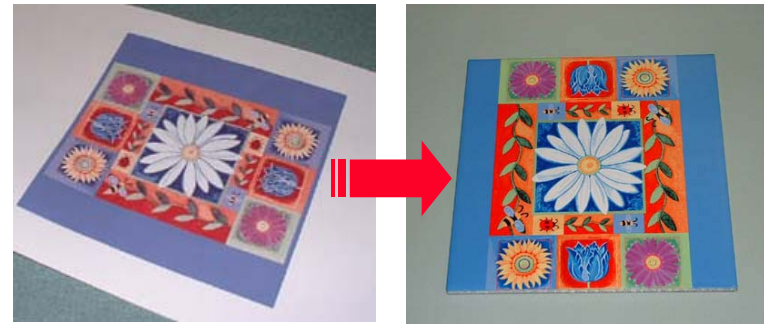
- **Cartridge Insertion**

- CMYK x 2 = 8 cartridges  
(2 cartridges for 1 color)



## ● What's Sublimation

- Ink itself is transferred to a destination
  - ◆ Transfer Paper
    - Print result on transfer paper will not be reflected on destination. Dots expand and get considerably vivid and brighter color.
  - ◆ Mirroring the job image
- Heat Press machine required
  - ◆ Heat Press Machine to sublimate with heat and pressure.
    - Heat temp./ Pressure / Time vary up to paper.



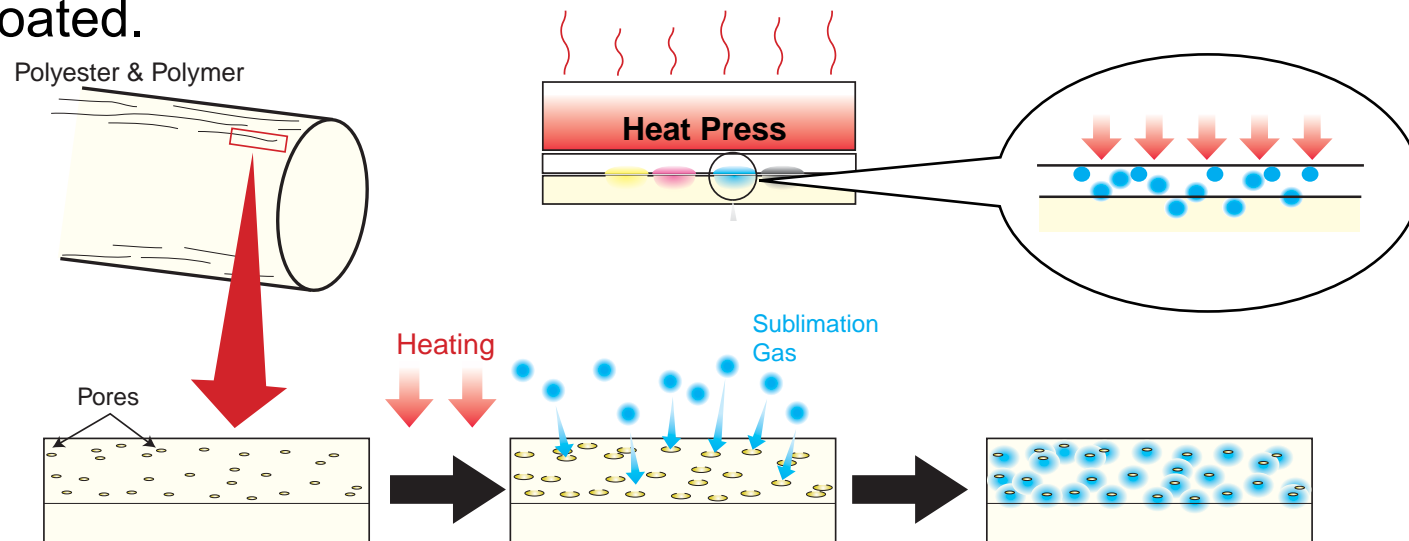
- **What we call “Sublimation Ink”**

<b>Destination material</b>	<b>Category</b>	<b>Feature</b>
<b>Polyester-fiber Fabric</b>	<b>Disperse dye ink</b>	Oil-soluble, Good dispersion, Hydrogen bonded
Cotton	Reactive dye ink	Water-soluble, Covalently-bonded
Wool / Silk	Acid dye ink (chromotrope)	Water-soluble, Ion-bonded



## ● Disperse dye (sublimation)

- Only for materials with polymer coated
  - ◆ Sublimation ink can evaporate by heat and pressure into gas directly. Then, enters from pores of polymer by heat and goes inside the fiber and be sealed by polymer coating. Destination should have polymer pores to accept ink.
  - ◆ 100% cotton or natural materials required to be polymer coated.



- **Applications by Roland's SBL ink**

- Light weight
- High durability to sunlight and washing



**Apparel**



**Textile**



**Flag**

- Cartridge

- IC Chip

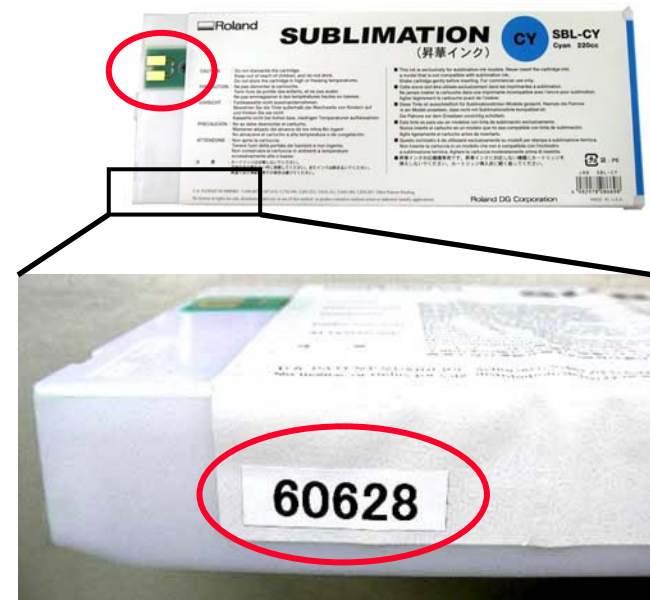
- ◆ Ink Type , Color
    - Consumed Ink quantity
    - Lot Number
    - Available Ink quantity
    - Used time
    - Number of insertion
    - Error flag
    - Empty flag

Can be checked by printing History Report.

- Storage Life

- 2 years

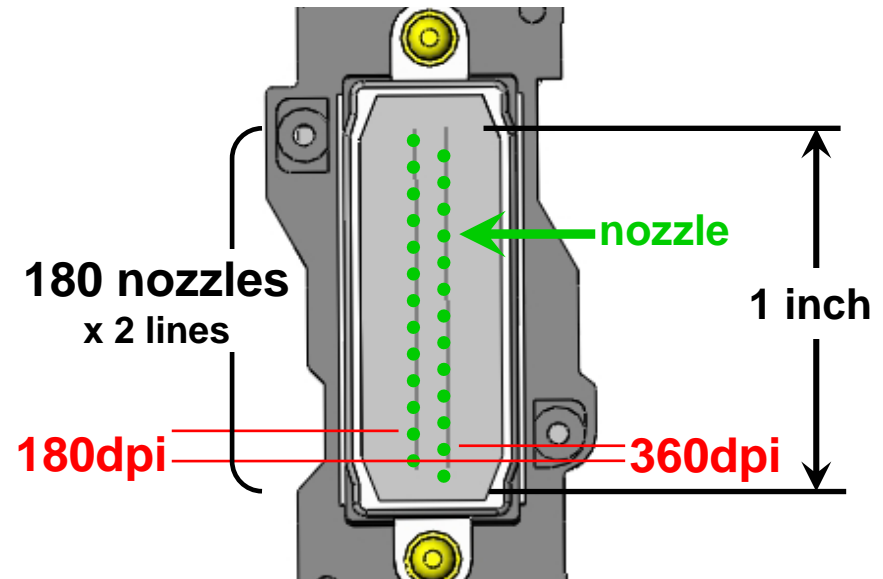
- ◆ Date of packing can be checked on its label.
      - Figure sample means “packed on 2006 June 28<sup>th</sup>.”



# 3. Printing Theory

- **Head (the same as PRO2 series)**  
[#22805470 ASSY,HEAD INKJET SOL SJ-540]\*

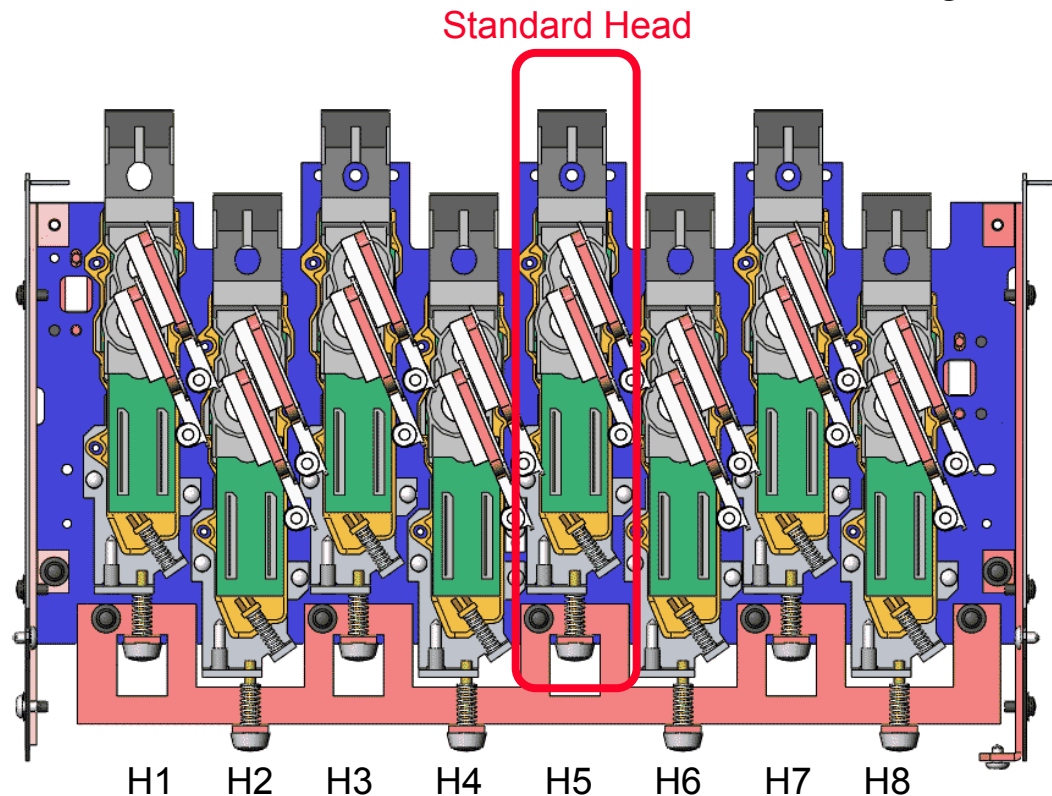
- Type: Piezo Inkjet Head
- 8 Heads / Machine
- 1 Color / 2 Heads
- 180 nozzles / line
- Nozzle Pitch : 360dpi



\*Print Heads at our factory default are for water-based ones. [HEAD, INKJET FJ-540-2].

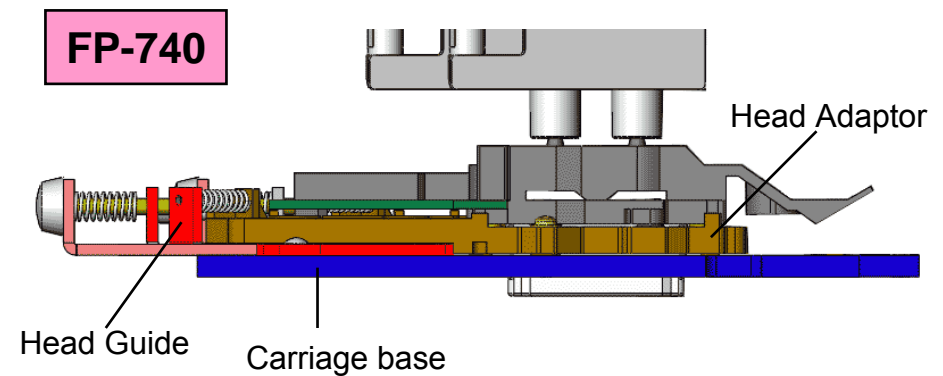
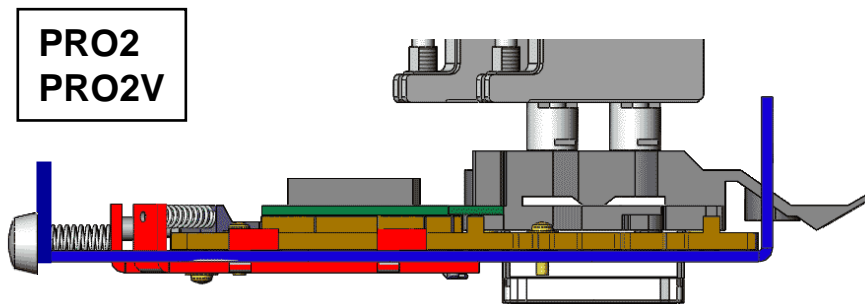
- **Print Carriage**

- 8 print heads staggered layout
  - ◆ The Standard Head is located at H5 as Magenta.



- **Head Fixing**

- **CARRIAGE BASE** (blue) is 2mm thicker.
- ◆ **HEAD GUIDE** (red) is on the Carriage Base.
- ◆ **HEAD ADAPTOR** (khaki) to accept Head Guide underneath and Print Head over.



## ● Head Fixing

Fixing positions by screws have changed.

### □ 2 Types

#### ◆ Screw free Head Guide

3 screws for fixing the whole head.

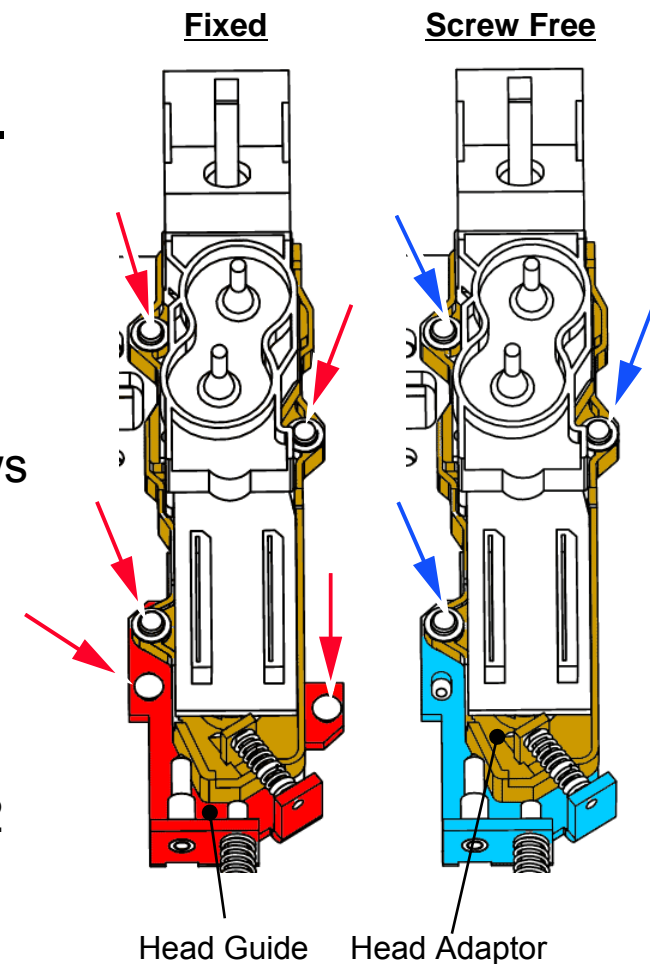
#### ◆ Fixed Head Guide

5 screws for fixing Head Guide by 2 screws and Head Adaptor by 3 screws.

### □ Carriage Base has changed accordingly.

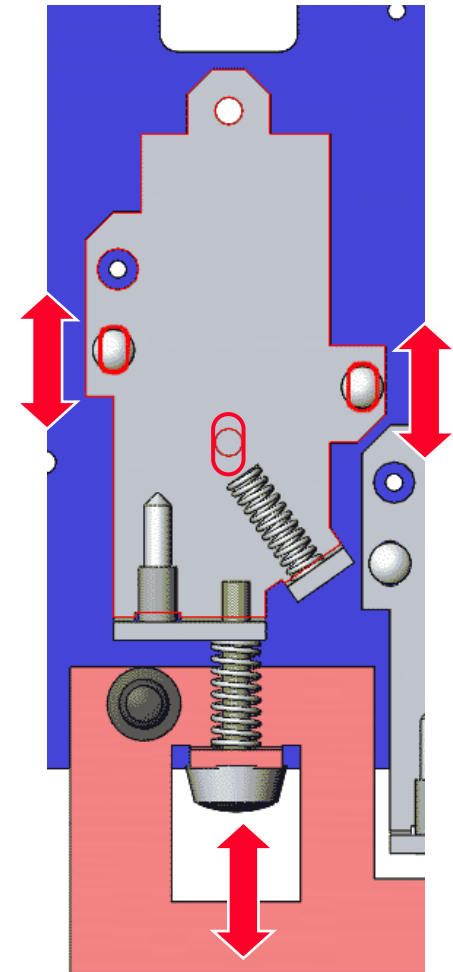
◆ 3 tapped holes to accept the head.

◆ 5 tapped holes to accept Head Guide by 2 holes and Head Adaptor by 3 holes.



## ● Head Adjustment 1

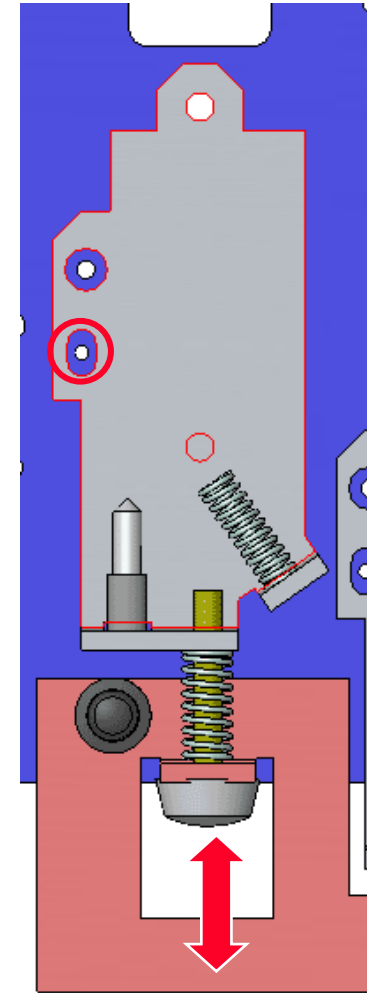
- For the Head Guide fixed by 2 screws.
  - ◆ For Vertical Adjustment, loosen the 2 screws besides the 3 screws for Head Adaptor.
  - ◆ 2 screws are fixed with slot holes so that the Head Guide can move back and forth when a screw was loosened.





## ● Head Adjustment 2

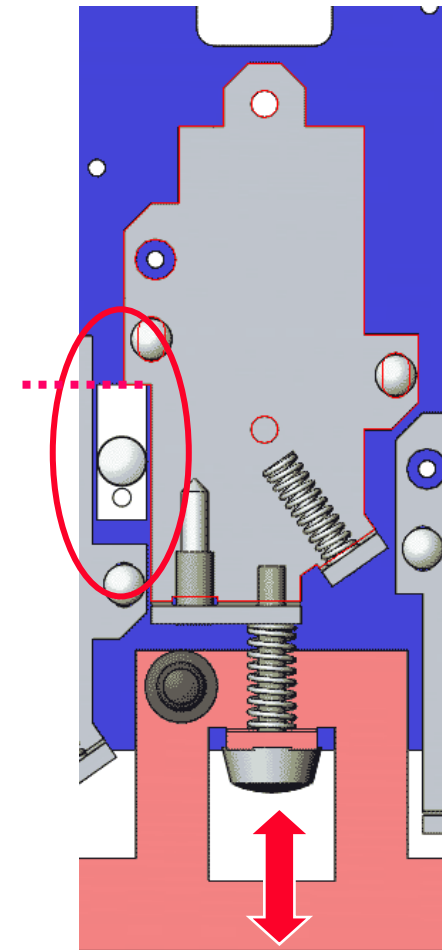
- For the Head Guide screw free.
  - ◆ Once you loosened the 3 screws for fixing the Head Adaptor, the Head and Head Guide can get free.
  - ◆ Carry out Vertical Adjustment by pointing the slot hole at non-tapped hole of the Carriage Base at its center.



- **Stopper for Standard Head**

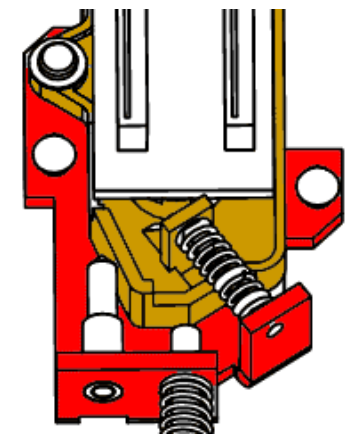
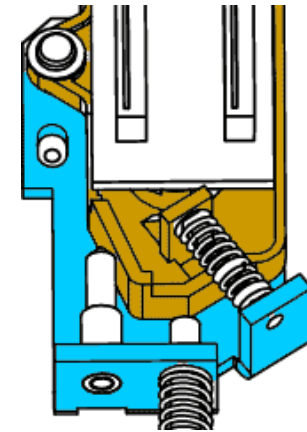
- Head Guide Stopper

- ◆ Head Guide for standard head is fixed by the Stopper with screw blocking vertical movement.
- ◆ For convenience, the Standard Head can be adjusted to another head once the Stopper was taken out.
  - This Stopper is for our factory use only, in order to set the basis position to align the other heads. No longer necessary if once you take it out.



## ● Head Guide and Carriage Base

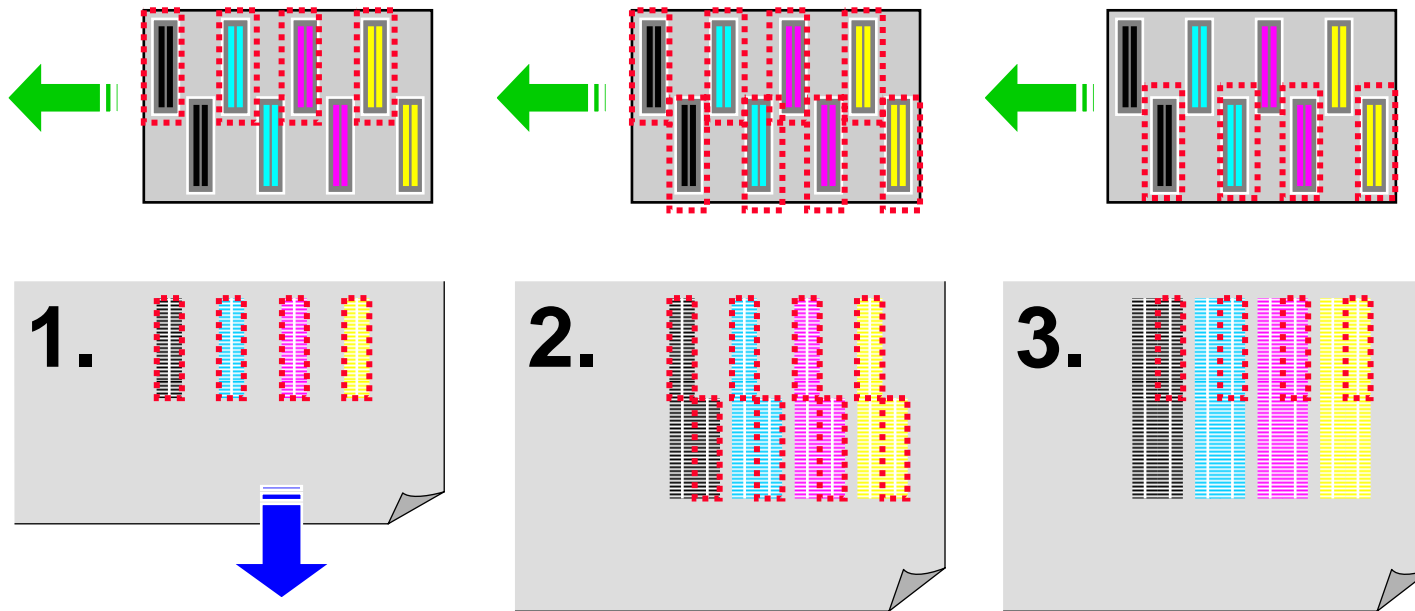
- 1000000298 : GUIDE,HEAD AL FP-740  
1000000308 : BASE,CARRIAGE AL FP-740
  - ◆ YU80100 ~ 108
  - YU90109 ~ 119
  - YU90123 ~ 127
  - YU90142 ~ 145
  - ◆ ZU80100 ~ 101
  
- 1000000292 : GUIDE,HEAD AL2 FP-740  
1000002191 : BASE,CARRIAGE AL2 FP-740
  - ◆ ZU80102 ~ later



Two different ways of Head Adjustment described in Service Note with subject serial numbers.

## ● Test Print

- Head Carriage moves three times to check all nozzles.

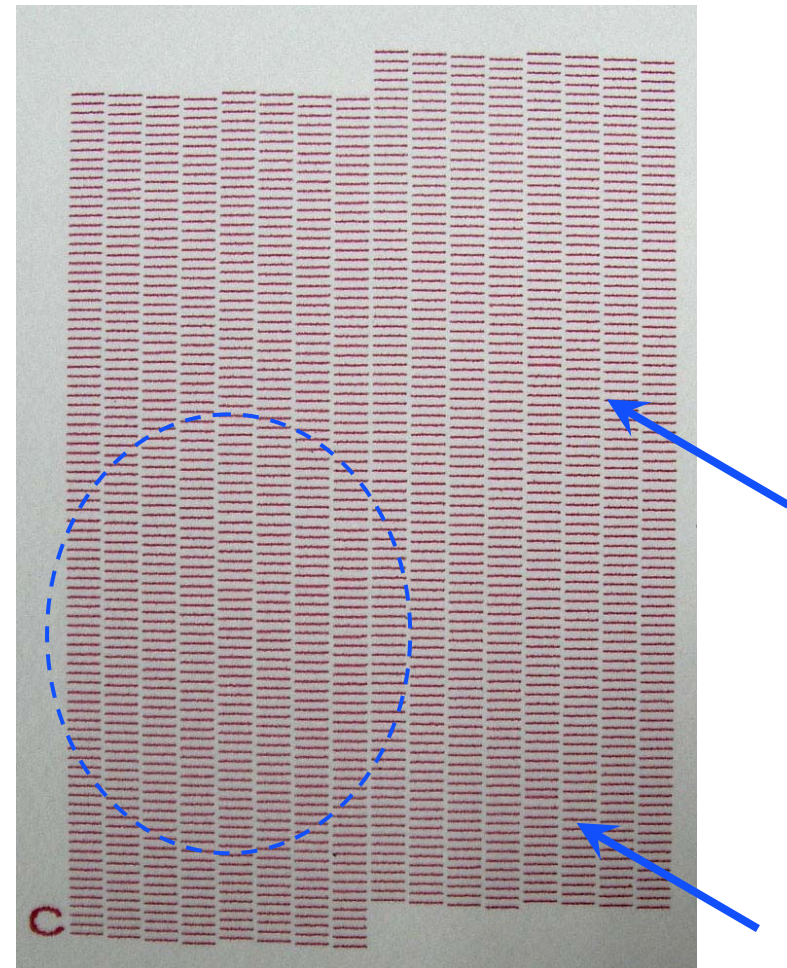


Due to the characteristics of SBL ink, **diagonally-fired dots** may cause. Explain that the result after transferring will not affect so much by diagonally-fired dots.

## ● Test Print

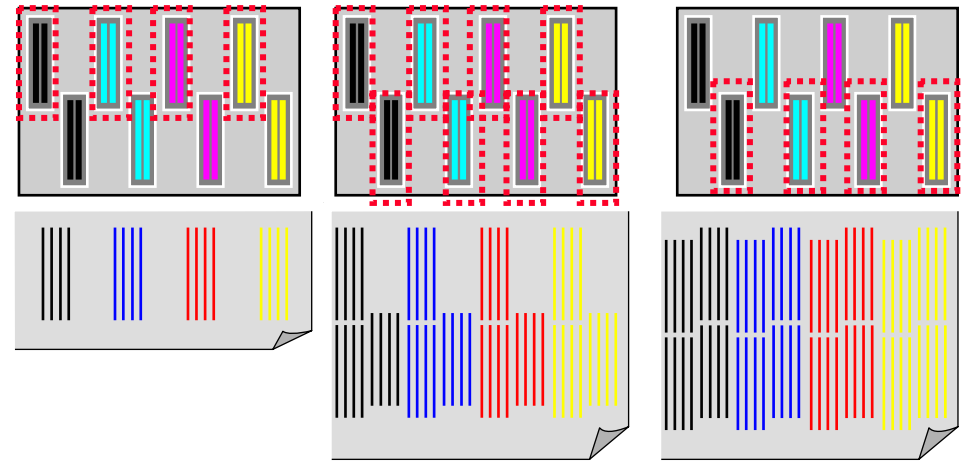
### □ Sample

- ◆ Diagonally-fired dots can be seen everywhere in Test Print pattern. They are **not removable**. However, the result will not be affected so much by these dots.



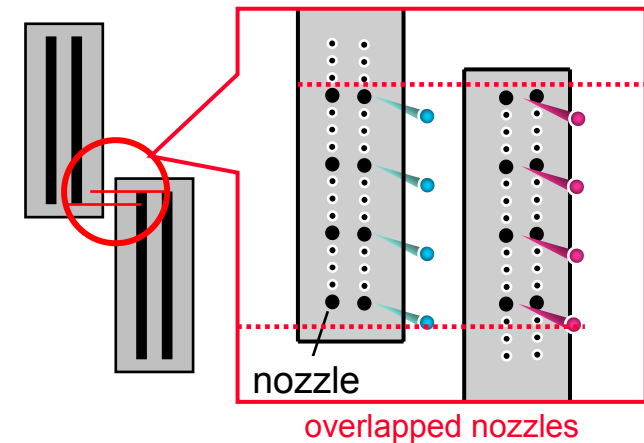
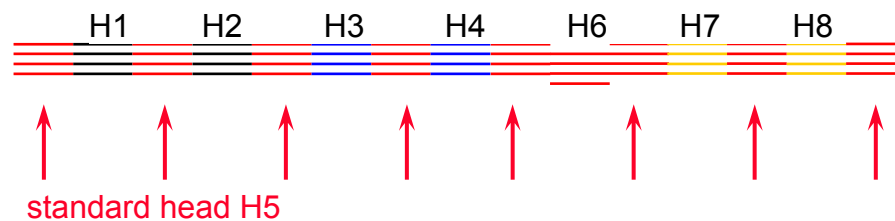
- **BIAS**

- Test pattern will be printed alike Test Print



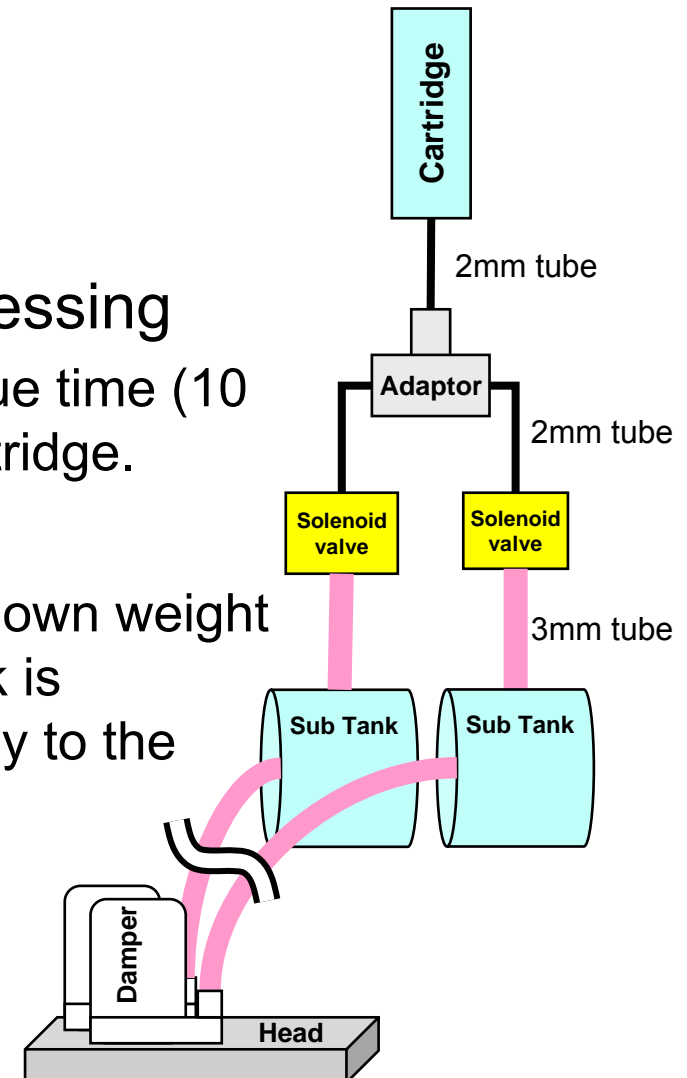
- **Vertical**

- 13 nozzles overlapped between the front one and the rear one.
  - ◆ Overlapped 4 nozzles out of 13 should be aligned with the standard head.



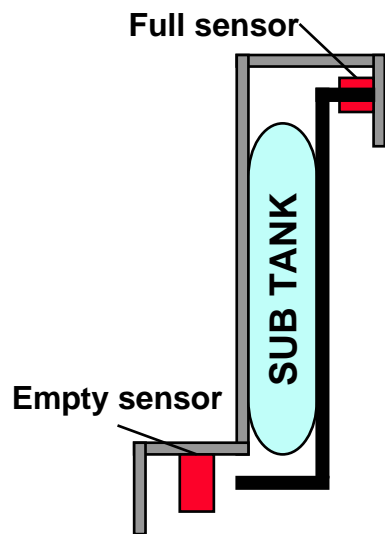
## ● Ink System

- Sub Tank System built-in
  - ◆ One cartridge for one print head.
- Cartridge replaceable during processing
  - ◆ Two Sub tanks can hold ink for the due time (10 minutes) for replacing with a new cartridge.
- Ink delivery
  - ◆ Ink falls down into the sub tank by its own weight with gravity. After passing a valve, ink is delivered by 3mm tube and all the way to the damper.



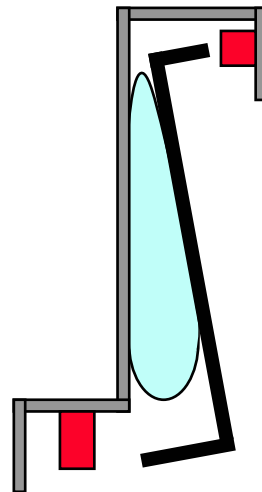
## ● Ink System – Sub Tank

- A Sub tank is capable of 60cc
  - ◆ 20sec takes ink for 2.24cc



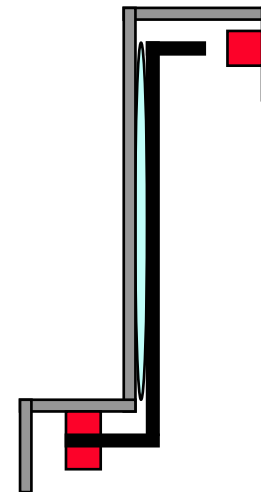
Full sensor blocked.  
Sub tank is full.  
Valve closes.

Sub tank : 45 ~ 60cc

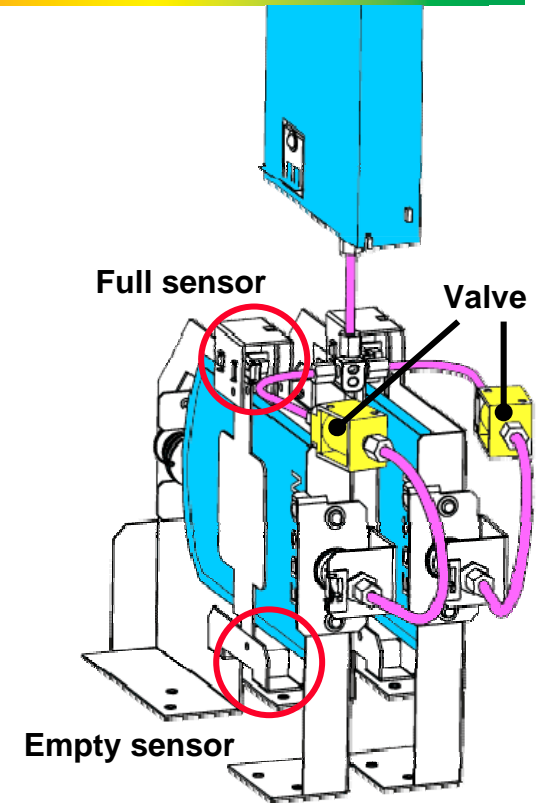


Full sensor released.  
A valve opens for 20  
seconds interval to take  
ink from the cartridge.

0.112cc/sec per 1 valve



Empty sensor blocked.  
Printing stops.

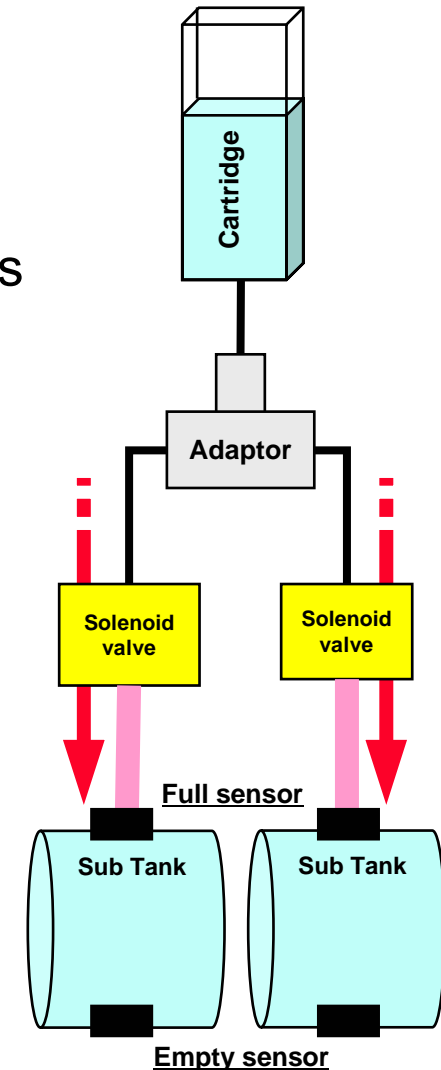




## ● Ink Detection by Ink System

- Ink remaining amount is detected by the Solenoid valve.
  - ◆ Ink used amount is calculated from the seconds for opening Solenoid valve multiplied by ink flowing rate.
    - This amount will be subtracted from default 200cc, then shown as [INK REMAINING].
  - ◆ Ink flowing rate differs depending on the ink amount in cartridge, or conditions, cartridge.
    - Calculation method [Shots count x picoliter] is not applied.

Ink Remaining Amount is approximate which differs from actual amount.

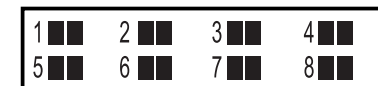
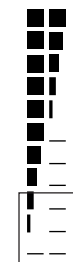
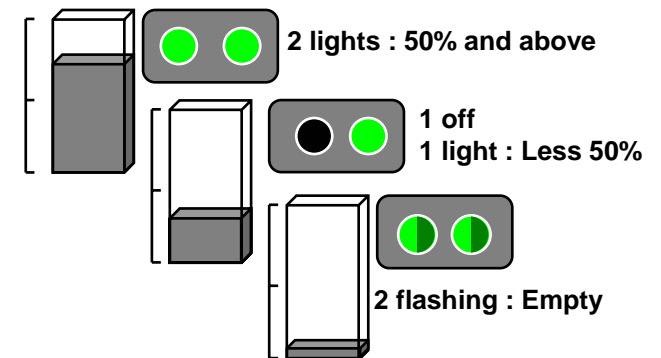
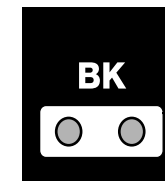


## ● Ink Detection by Ink System

- Every slot has LED for ink remaining
  - ◆ When in empty, replace with a new cartridge in 10 minutes\* approximately.

*\*It varies up to printing condition.*

- LED links with the machine
  - ◆ [INK REMAINING] in User's Menu is shown and calculated from ink detection by ink system.
  - ◆ Total 11 levels on machine's LCD. At minimum 3 levels, it starts flashing.
- LED / LCD for Empty detecting
  - ◆ Cartridge tab detects LED flashing and LCD.



- **Ink Empty Mode**

- [CONT.] / [STOP]

- ◆ **[STOP]** : When a printing job tries to start and if a cartridge was empty, it does not start printing.  
Beeps requiring a new cartridge insertion.
    - ◆ **[CONT.]** : When a printing job tries to start, even if a cartridge was empty, it goes using ink in Sub tank.

- Ink Cartridge Empty while printing

- ◆ Printing does NOT stop in either of [STOP] or [CONT.].
      - Until the Empty Sensor of Sub tank hits, it keeps on printing a job.
      - Once the Empty Sensor of Sub tank hits, printing stops.

- **Fill Ink**

- **16 cartridges (2 sets) required** to start actual job printing.
  - ◆ The first set of cartridges (8pcs) will be used up in order to fill the Heads, Dampers, Tubes and Sub Tanks.
- **Replace all 8 cartridges** after Fill Ink.
  - Do not keep on using those cartridges once used for Fill Ink.**
  - ◆ Incorrect amount of ink remaining (used) on IC chip.
  - ◆ All ink in a cartridge will be consumed. But, some cartridges may not detect empty due to empty tab conditions.

### **Ink Consumption at Fill Ink**

**1671cc (208.8cc\* for one cartridge) \*Referential**

- **Fill Ink – sequence**

1. Strong negative pressure

- ◆ All ink lines were tested at factory. To remove this test liquid entirely, pumps rotates with capped to vacuum it out.  
Sub tank will be strongly vacuumed.

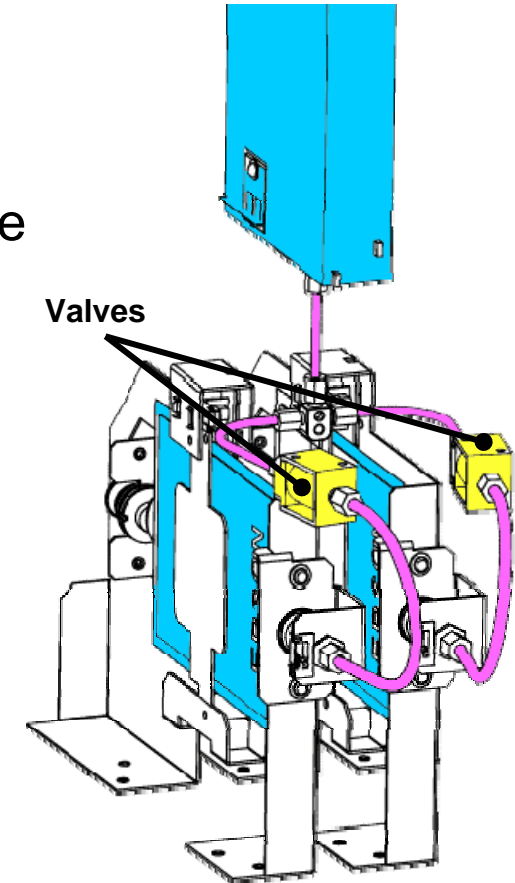
2. Valve opens

- ◆ Ink flowing rate accelerated than usual.
  - This leads wrong calculation on IC chip.

3. Flushing and Cleanings

- ◆ For stable discharging dots, flushing and normal cleaning will perform.

It takes about **30 minutes** totally.



## Printing Theory\_Ink Consumption by sequence

### ● Ink Consumption by sequence

	Range for pulling ink	Ink consumption per 2 heads	Total ink consumption
<b>Head Wash</b>	Cartridge outlet – Sub tank – Tube – Head After the same sequence of Pump Up, 8pcs CJ-CL for pumping up and vacuum sub tanks for 3 times. CJ-CL cartridge will be used up.	735.52 cc (including CJ-CL draining)	2942 cc
<b>Pump Up</b>	Cartridge outlet – Sub tank – Tube – Head	336.90 cc	1348 cc
<b>Powerful Cleaning*</b>	Sub tank outlet – Tube – Head	137.02 cc	548 cc
<b>Medium Cleaning</b>	Damper – Head	10.04 cc	40.16 cc
<b>Normal Cleaning</b>	Head	2.28 cc	9.16 cc

**The amounts shown here are all referential.**

#### \* **Powerful Cleaning:**

Before starting Powerful Cleaning, the machine will check if the Full sensor of Sub tank is on. Powerful Cleaning can start only if the Full sensor is on, no matter if the cartridge is empty or not. If the Full sensor gets off while in powerful cleaning, the machine starts beeping but the cleaning process can be completed using the efficient ink in Sub tanks.

- **Roland VersaWorks**

- Version 2.0 and above required
- Selectable Media profiles
  - ◆ Generic Quick Dry Paper
  - ◆ Generic High Transfer Yield Paper

- ◆ Tested Media:

<http://www.coldenhove.com/>

- Jetcol High Speed [as Generic Quick Dry Paper]
  - » Referential calibration value : -0.10
- Jetcol HTR-3000 [as Generic High Transfer Yield Paper]
  - » Referential calibration value : -0.10

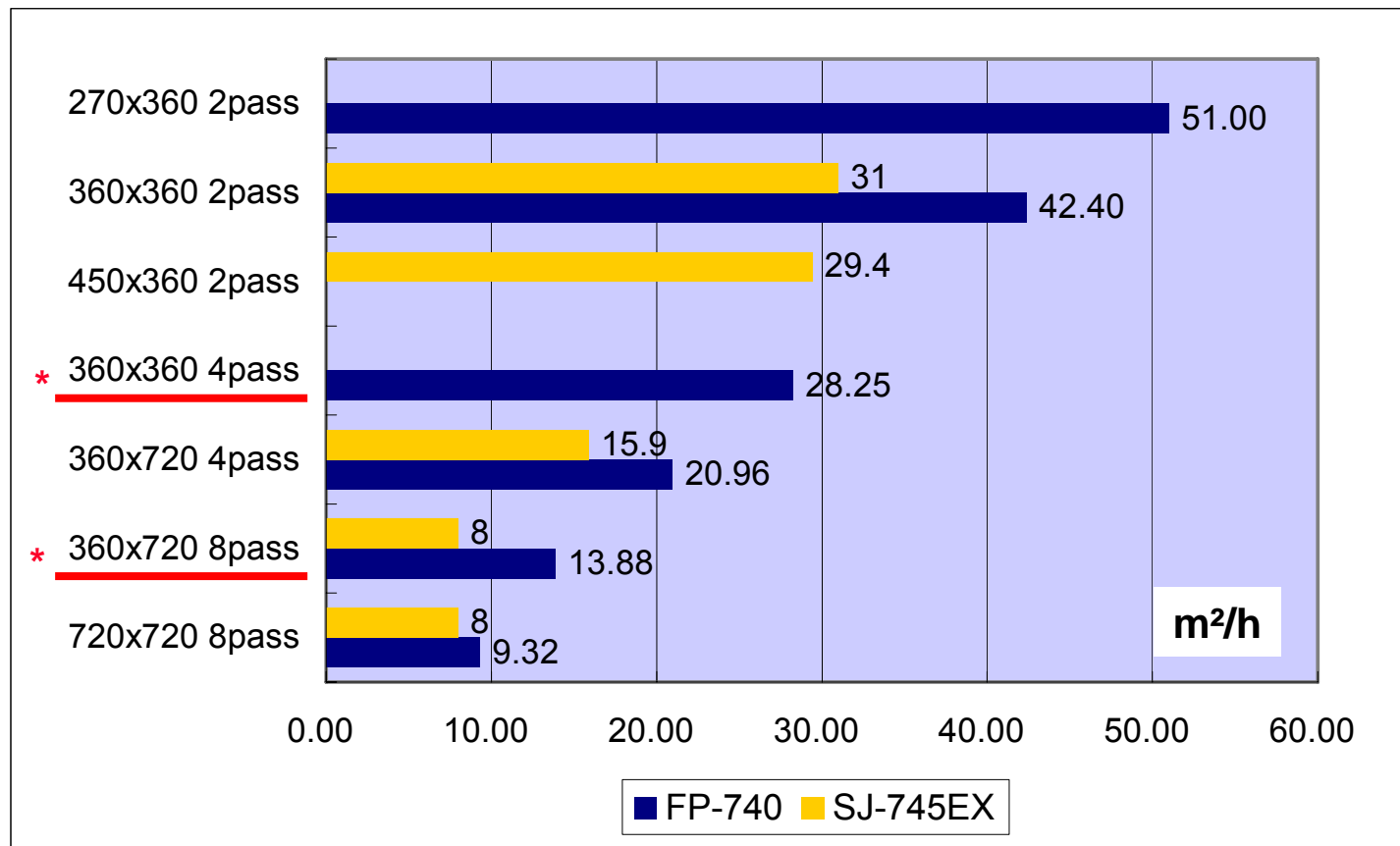
Media profiles are created by measuring colors on textile after transferring.

## ● Print Mode and Print Speed

Media	Print Mode	Resolution	Pass	Direction	Head Speed	Print Speed
Generic Quick Dry Paper	High Quality	720 x 720 dpi	8	Bi	650 mm/sec	9.32 m <sup>2</sup> /h
	Standard	360 x 720 dpi	4	Bi	725 mm/sec	20.96 m <sup>2</sup> /h
	High Speed	360 x 360 dpi	2	Bi	900 mm/sec	42.4 m <sup>2</sup> /h
		270 x 360 dpi	2	Bi	1000 mm/sec	51 m <sup>2</sup> /h
Generic High Transfer Yield Paper	High Quality	720 x 720 dpi	8	Bi	650 mm/sec	9.32 m <sup>2</sup> /h
	Standard	360 x 720 dpi	4	Bi	725 mm/sec	20.96 m <sup>2</sup> /h
	High Speed	360 x 360 dpi	2	Bi	900 mm/sec	42.4 m <sup>2</sup> /h
		270 x 360 dpi	2	Bi	1000 mm/sec	51 m <sup>2</sup> /h



- **Print Speed comparison**



\* Available only when a profile was newly created by Roland VersaWorks, selecting W-PASS mode.

● Ink Consumption



Media	High Speed (270x360dpi)	High Speed (360x360dpi)	Standard (360x720dpi)	High Quality (720x720dpi)
Generic Quick Dry Paper	2.70 cc	2.59 cc	2.88 cc	2.93 cc
Generic High Transfer Yield Paper	2.56 cc	2.33 cc	2.53 cc	2.53 cc

Conditions: Roland VersaWorks, Data: ISO N5A, Size: A0 (as 1m<sup>2</sup>), FULL WIDTH





Media	High Speed (270x360dpi)	High Speed (360x360dpi)	Standard (360x720dpi)	High Quality (720x720dpi)
Generic Quick Dry Paper	5.68 cc	5.24 cc	5.92 cc	5.88 cc
Generic High Transfer Yield Paper	4.95 cc	4.76 cc	4.94 cc	5.37 cc

Conditions : Roland VersaWorks, Data: ISO N2A, Size: A0 (as 1m<sup>2</sup>), FULL WIDTH

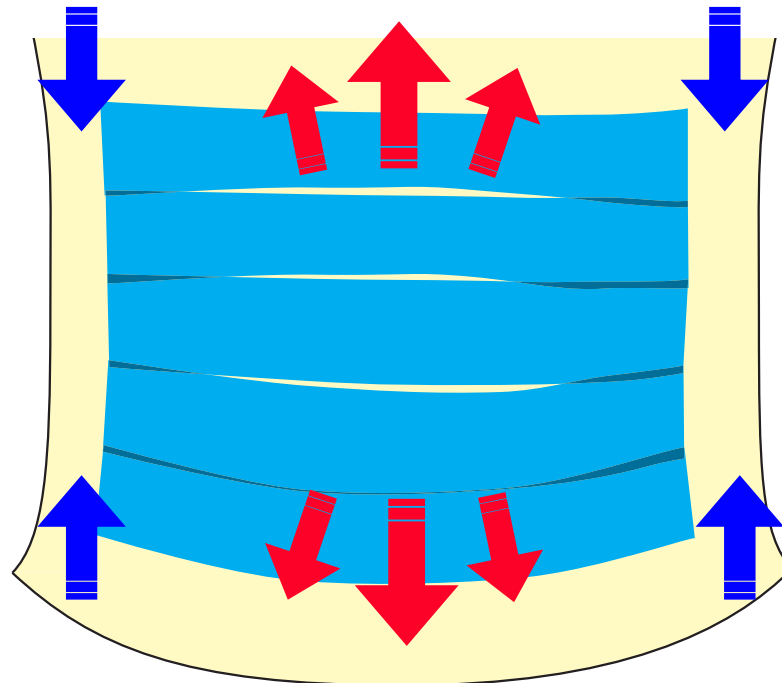
## ● Actual Operation

- How frequent the cartridges should be replaced.
  - ◆ Jetcol High Speed / HTR-3000 : 1620mm x 120M (95g/m<sup>2</sup>) = 194.4m<sup>2</sup>

	High Speed 270x360dpi 51.00 m <sup>2</sup> /h	High Speed 360x360dpi 42.40 m <sup>2</sup> /h	Standard 360x720dpi 20.96 m <sup>2</sup> /h	High Quality 720x720dpi 9.32 m <sup>2</sup> /h
 <p>2.63cc/m<sup>2</sup> 608.36m<sup>2</sup> by 8 cartridges</p>	11.92 hours	14.34 hours	29.02 hours	65.27 hours
 <p>5.34cc/m<sup>2</sup> 299.62m<sup>2</sup> by 8 cartridges</p>	5.87 hours	7.06 hours	14.29 hours	32.14 hours

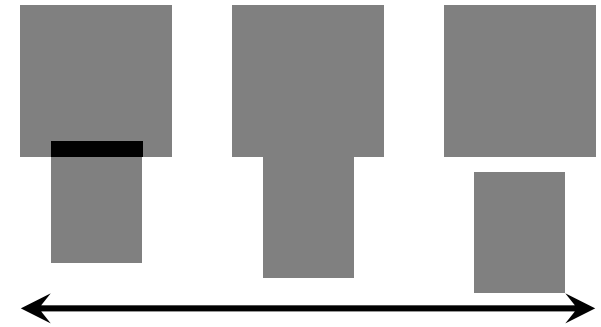
- **Transfer paper**

- Paper has strong tendency to shrink or expand, subject to your use environment with humidity and temperature.
  - ◆ At both edges area, tends to shrink. At center area, tends to expand.



- **Printing result on paper**

- Calibration adjustment may not work effectively.
  - ◆ By referential calibration value, overlapping of bands may appear. In that case, increase the calibration value positive.
- Set the head height [HIGH] accordingly.
  - ◆ The media surface with dotted ink tends to warp or wrinkle even on the platen of the printer depending on ink density or print mode.



- **Printing paper**

- Paper Chips on cutter guide

- ◆ Paper media tends to make many paper chips rather than PVC media. Clean them out periodically.
      - If they are left and the machine kept printing, the separating knife may get stuck while in separating paper by SHEET CUT.
      - Jammed paper is hard to release, because the jammed paper gets stronger by wrinkling its fiber.



- **Printing paper**

- **End Caps** for media setup instead of normal flange.

- ◆ If the rolled paper media was roughly rolled, its side edge would not be straight. In that case, media's edge may be pushed hard onto the flange's washer, that may cause tearing.

Parts #1000001584 : FLANGE,GUIDE 3 XC-540

**Depending on the media's rolling condition,  
change the original flanges to End Caps which were included.**



- **Printing paper**

- Vacuum Power for media fixing

- ◆ Printer, Menu

- **[AUTO]** :

- Automatically adjusted to the optimal level for the media width.

- **[0~100%]** :

- Set as required power by %.

- ◆ Roland VersaWorks, Printer Controls menu

- **[Strong]** :

- Stronger suction power than the optimal level for the media width.

- **[Normal]** :

- Automatically adjusted to the optimal level for the media width.  
(Same as Printer's [AUTO])



- **Take-up Paper**

- Long running take-up

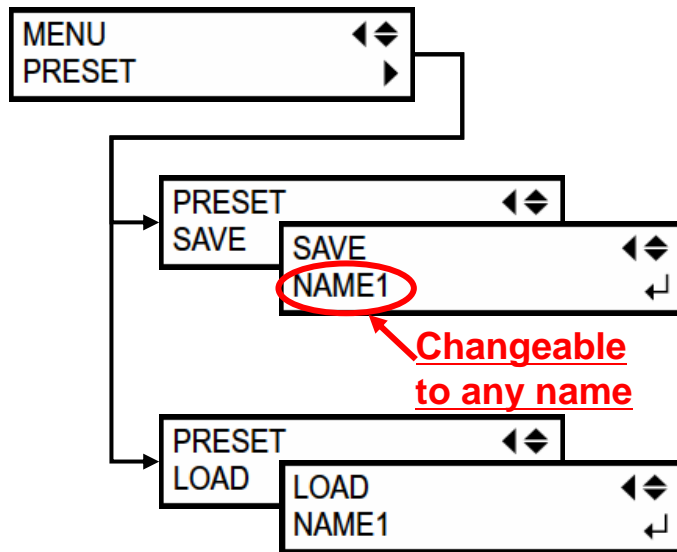
- ◆ Due to the paper's springy characteristics, the paper can be rolled up properly stabilizing its direction of rolling by itself.



# 4. Others

## ● PRESET Menu

- For frequent-use media, preset menu to save optimal settings of each functions with arbitrary name.
- 8 presets can be stored.

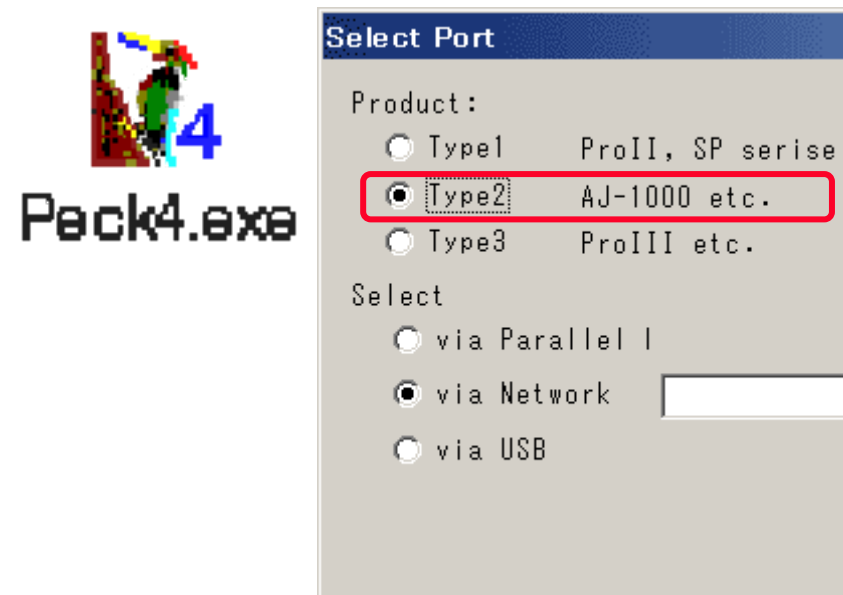
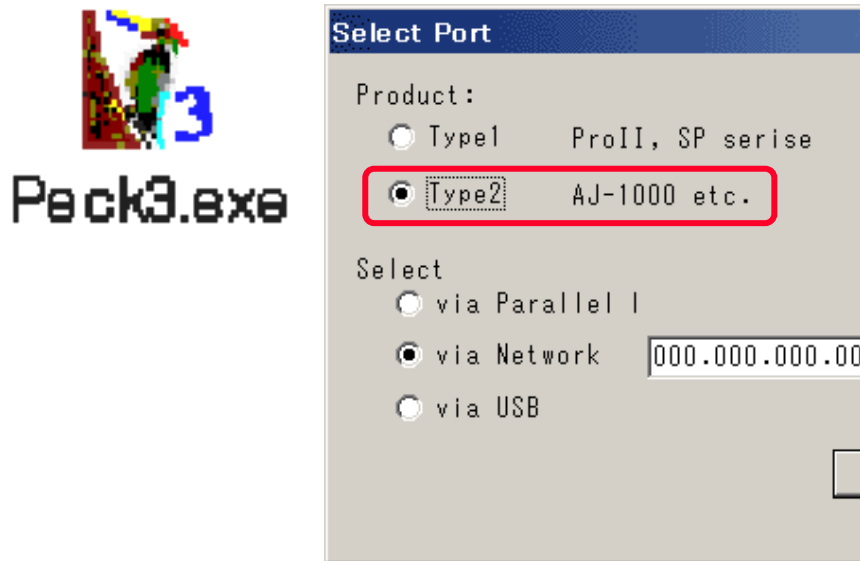


### Items can be grouped

- SHEET TYPE
- SHEET WIDTH
- SHEET POS.
- ADJUST BI-DIR
- CALIBRATION
- SCAN INTERVAL
- VACUUM POWER
- FULL WIDTH S
- SIDE MARGIN

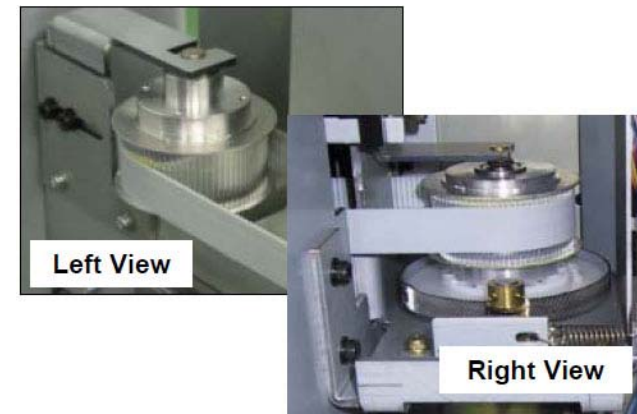
- **Peck.exe**

- Peck3 or Peck4 (upward compatible)
- Select Port, [Type 2 : AJ-1000 etc.]



- **Belt Drive Unit**

- The same Scan Motor, Drive Pulley, Idle Pulley are installed as SJ-1045.

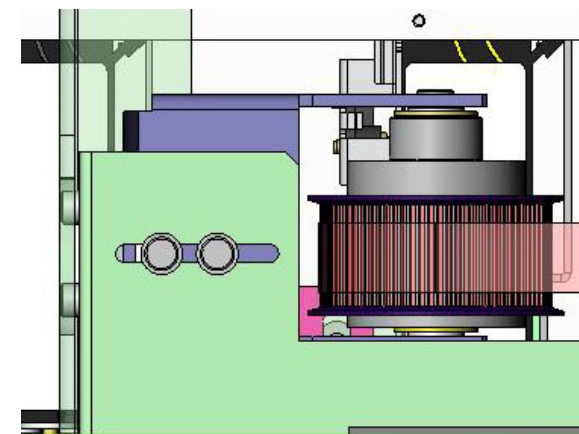


- **Ink Tube**

- 3mm dia. Ink Tube is used from output of Sub Tank, as same as SJ-1045.

- **Ink Damper**

- Same Damper as SJ-1045 to accept 3mm dia ink tube.



Belt position adjustable at idle pulley

- **Pumps and Motors**

- 8 heads need 4 pumps & motors.
  - ◆ Wiper unit and Cap tops are also staggered layout.

- **Media Clamps**

- Magnetic media clamps
  - ◆ You can set up media clamps front. Magnet of media clamp can be fixed on the platen.

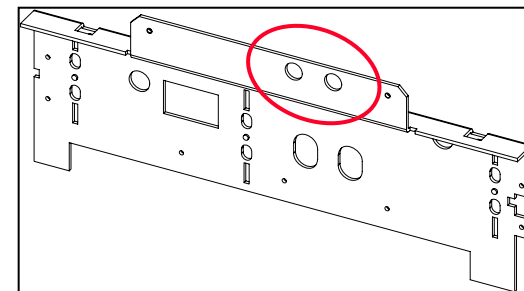
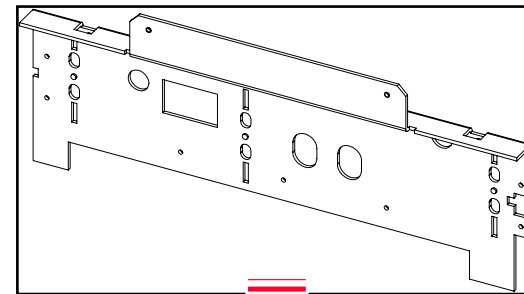
- **Sub Power**

- 15 seconds to be turned OFF
  - ◆ For communication with Ink System, it takes longer seconds than current other models.



## ● Carriage Belt Replacement

- Two methods to replace Carriage Belt.
  - ◆ Detailed step is described in Service Note Section 3.
- 1000000303 : FRAME, CARRIAGE UD FP-740
  - ◆ ZU80100 ~ 101, ZU90102 ~ 126  
ZV00127 ~ 135
  - ◆ YU80100 ~ 108, YU90109 ~ 119,  
YU90123 ~ 127, YU90142 ~ 145
- Shape changed (same parts#)
  - ◆ ZU80102 ~ later



## ● Carriage Belt Replacement

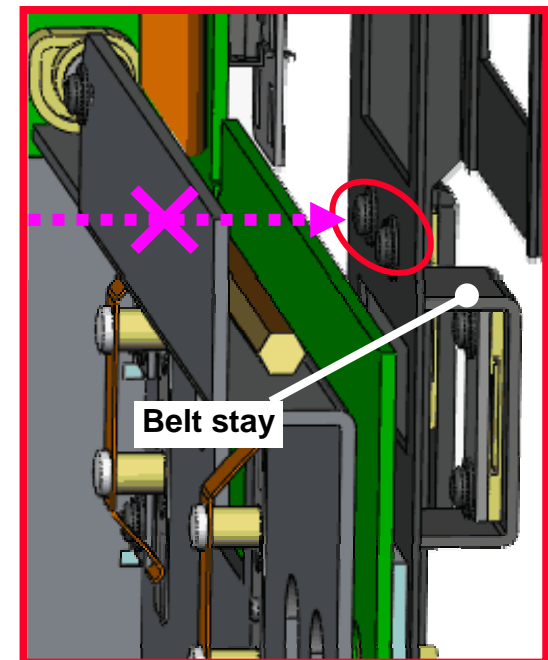
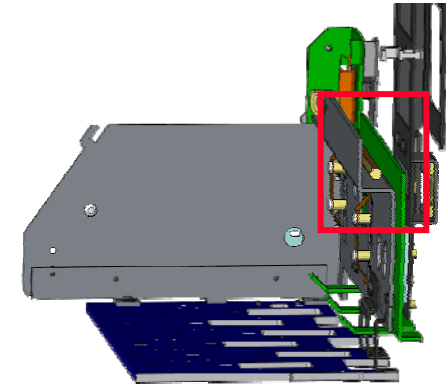
For the old type, screw driver cannot access to the screws fixing belt and print carriage.

1. Detach the whole Print Carriage unit.
  - Head height mechanism will be preserved.

**Be careful of the 6 screws to be removed.**

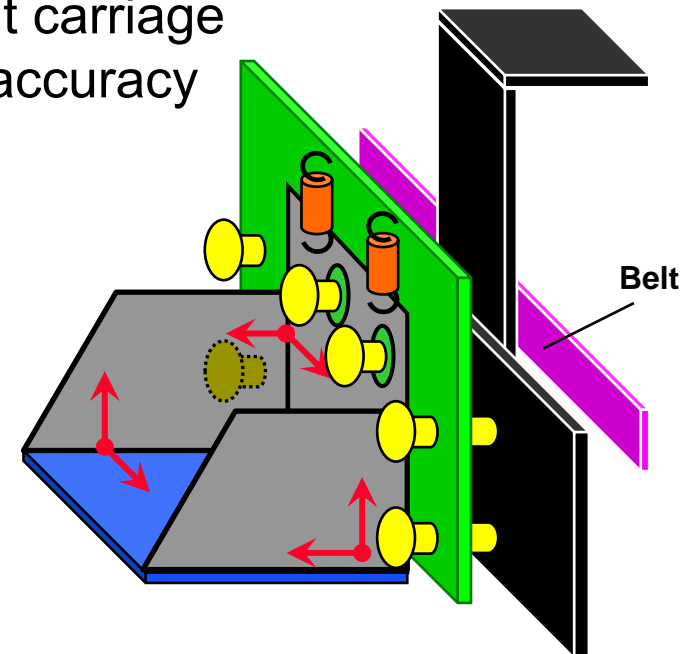
If any other screws were removed, the print carriage lose its accuracy which leads you a fatal problem in printing quality. You cannot fix this fatal problem.

2. Remove the screws of belt stay to release the belt.




- **Print Carriage unit**

- Print Carriage unit is kept right angle with accuracy at our factory.
  - ◆ Head height adjustment is controlled within the unit from the green plate.
  - ◆ By removing the 6 yellow screws, print carriage unit can be taken off with keeping its accuracy in assembling.





# 5. Consumables



Description	Parts Number	Replacement Cycle
Head	22805470	6 billions shots
Wiper	11379105	6 months or Wiping: 3000 times / Rubbing : 100 times
Cap Top	12809448	24 months
Scan Motor	6700049030	1,500h
Ink Tube	22805508	2,000h
Flushing Sponge	1000000415	24 months
Wipe Pad	22635115	12 months
Battery	15009101	24 months