Name

Company Name

High-Speed Chip Placer

CP-7 Series

Training Text for Service Engineers

(Edition 4.0)

● Also refer to the latest technical report when using this manual for servicing.
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CP-7 Series

Training Text for Service Engineers

CP-732/733E
CP-742/743ME
CP-742/743E

FUJI® Machine Mfg. Co., Ltd.

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About This Manual

This manual contains machine adjustment information for service engineers. The manual content is intended for engineers familiar with the systems integrated within this machine.

Please read this manual carefully in order to ensure safe and efficient machine servicing.

Manual Structure

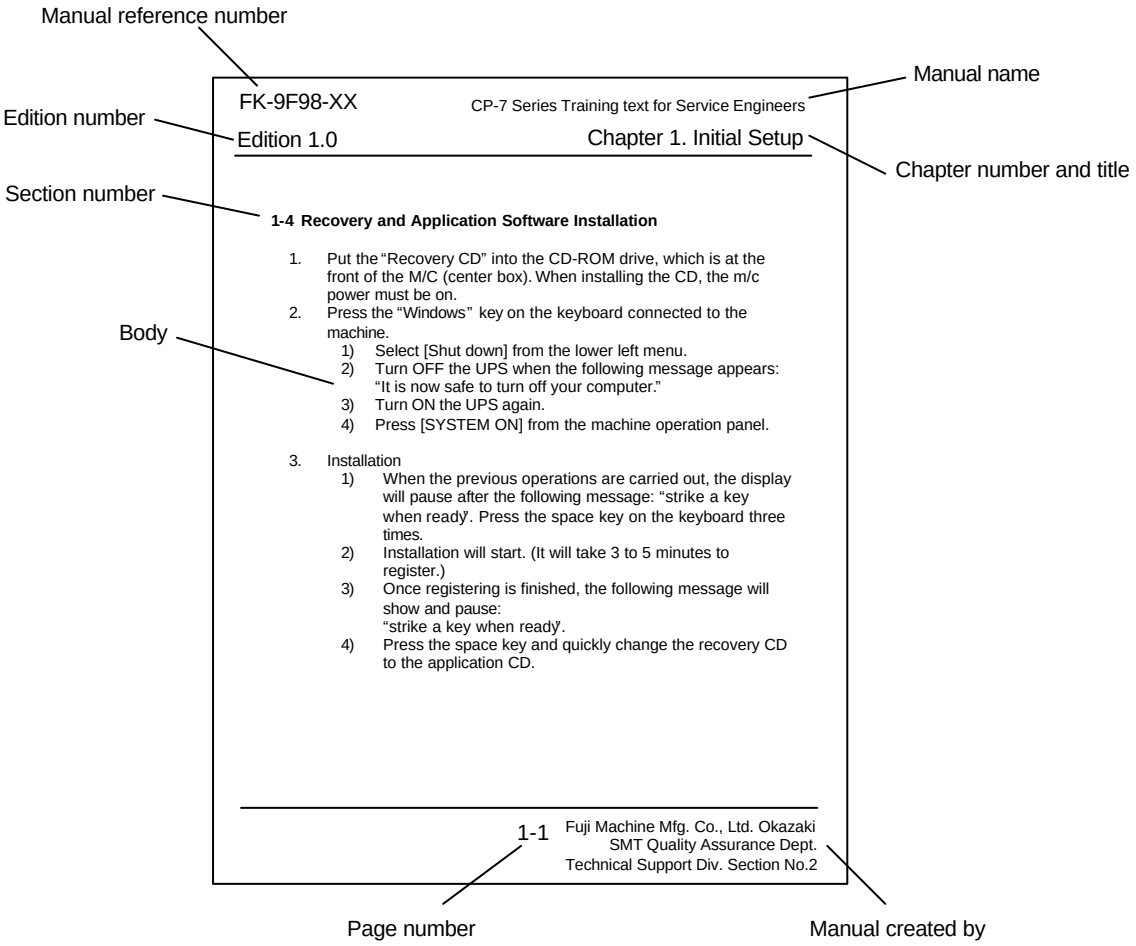
This manual consists of the following chapters and information:

Supplemental Information

1. PAM Operation Manual
2. BIOS Setting Manual
3. Servo Pack Parameter Listing
4. Servo Pack Error Code Listing

Page Layout

Each page indicates the chapter number and title, section number, body, manual name, page number and edition number.



Chapter number

The chapter number to which each section belongs is shown in the header on each page. The manual is made up of 12 chapters as detailed earlier in this section.

Section number and title

The title of each chapter is shown in the header on each page. Each part may contain one or more sections.

Section title

Each chapter may be divided into several sections. The section number is composed of the number of the chapter to which the section belongs, followed by a sequential number for each section.

Body

The information needed to understand the workings of the machine and how to perform adjustments is explained using text and illustrations.

Page number
A two digit hyphenated number appears in the footer on each page. The first digit of each page number indicates the chapter number and the second digit is the sequential page number within that chapter. Page 1-2, for example, indicates that this is the second page in the first chapter.

Manual name
The name of the manual that appears on the cover is also shown in the header on each page.

Edition number: The edition number is updated each time the manual is revised, with the number reflecting the scale of changes that were made.

Minor revision: Minor changes are reflected in the part of the edition number after the decimal point, for example, a change from edition 1.0 to 1.1. This change is made on the revised pages only, and these pages can be downloaded as required from the Okazaki web site.

Major revision: If major changes are made, the edition number is increased by one, for example, a change from edition 1.0 to 2.0. This change is made on all pages, including the cover.

Purpose of this Training

- To provide knowledge and practical training in the areas of calibration, adjustment and troubleshooting for the CP-7 Series machine.
- Carry out practical training for replacing and calibrating the various subsystems contained within the machine.
- Give practical exercises on how to adjust, calibrate and maintain the subsystems to enhance the overall efficiency of the machine.

Persons Qualified for This Training

Any agent level service engineers with experience in machine operation, maintenance will benefit from the information contained in this manual.

This manual was primarily made for “Agent” level service engineers.

Every effort has been made to make the contents of this manual as accurate as possible. If an error is found, please let us know the page, section number, plus a brief description of the error. Thank you in advance for your cooperation and assistance. Comments and opinions regarding this manual can be sent to: trgall@okazaki.fuji.co.jp

CP-7 Series Training Text for Service Engineers

Version History:

Edition 1.0 released: July 6, 2001
Edition 2.0 released: August 31, 2001
Edition 3.0 released: January 31, 2002
Edition 4.0 released:

Notes:

Contents - List of Current Pages

Chapter 3 X, Y, Z and D-axes Adjustment (continued)

Chapter 4 Station Adjustment…….…….. (Edition 4.0)

Chapter 5 Loader System Adjustment…… (Edition 4.0)

Chapter 6 Servo System Adjustment……..(Edition 4.0)

Chapter 7 Camera Adjustment…….(Edition 4.0)

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Supplemental Information

1. PAM Operation Manual

2. BIOS Setting Manual
   A: BIOS version 1.00.03 (V1.19 and earlier)
   B: BIOS version 1.00.04 (V1.20 and later)

3. Servo Amplifier Parameter Listing

4. Servo Pack Error Code Listing

Chapter 1
Initial Set-up

Chapter 1 Initial Set-up

1.1 Machine Leveling

Equipment: 0.02mm/1m track level

1. Level the machine by placing leveling blocks at the positions illustrated below.
2. Use bolts **A**, **B**, **E**, and **F**, for initial leveling.
3. Confirm leveling in the X and Y directions once all the bolts have been securely tightened.
4. Once the initial leveling is completed lock the remaining bolts shown in the relevant diagram below.

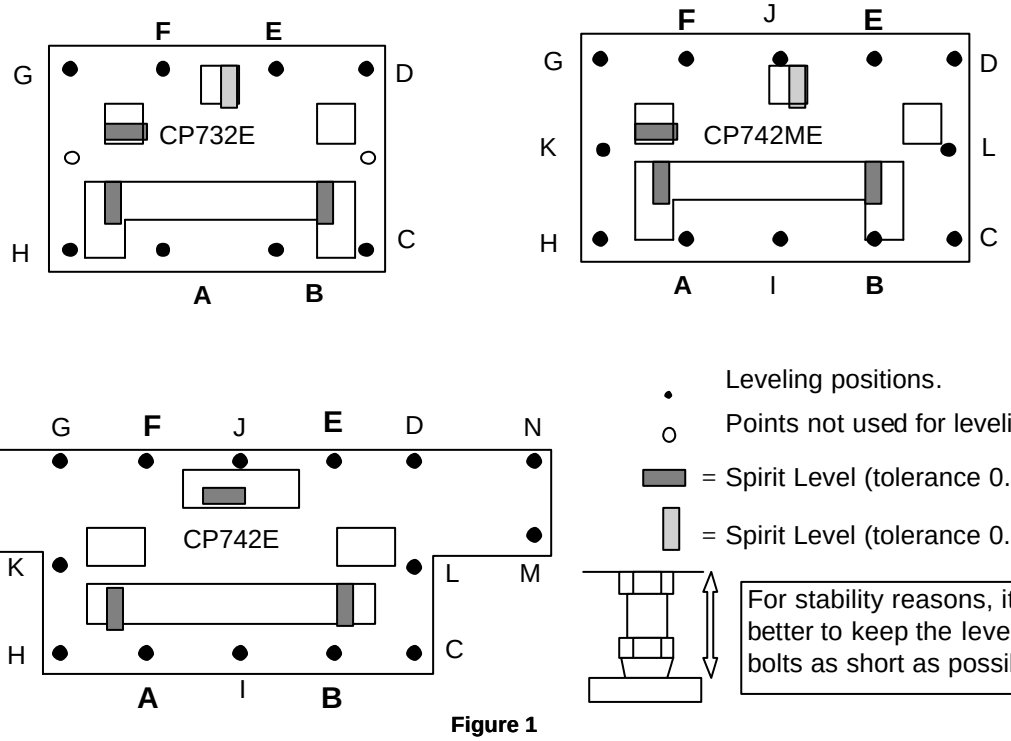

Figure 1

1.2 Machine Utilities

Refer to the CP-7 series Mechanical Reference Manual for information regarding the utility connections needed for this machine.

- Power
- Air
- Ethernet

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SMT Equipment Quality Assurance Dept.
Technical Support Div. Section No.2

1.3 Recovery and Application Software Installation

It will take a total of approximately 30 minutes to install the recovery and system software and re-establish communications with the host computer.

1. Put the "Recovery CD" into the CD-ROM drive, which is at the front of the M/C (center box). When installing the CD, the m/c power must be ON.

   The recovery disk contains the Windows NT Operating System.

2. Press the E-stop and Power OFF to shut the machine down.

   Note: If the machine display is locked up, Press the "Windows" key on the keyboard (connected to the machine) and select [Shut down] from the lower left menu.

3. Turn OFF the UPS when the following message appears:
   "It is now safe to turn off your computer."

4. Wait five seconds or so and then turn the UPS ON again.

5. Press [SYSTEM ON] from the machine operation panel.

6. When the machine begins to boot, the display will pause after the following message**:**
   "strike a key when ready". Press the space key on the keyboard three times and installation will begin. (It will take 3 to 5 minutes for registration)

7. Once registration is finished, the following message will appear on the screen:
   "strike a key when ready".

8. Press the space key once and quickly swap the recovery CD with the Fuji application CD.

9. The FUJI Installation software will start and the following message will show:
   "Does it install it?" Press the [Enter] key to enter "YES".

10. There will be a display to enter the Product ID. Copy the Product ID from the license "Certificate of Authenticity" and press [Enter]. (The "Certificate of Authenticity" can be found in a pocket located in one of the rear enclosures) A message will show to confirm the Product ID. Confirm that the correct ID was entered and then press [Enter].

11. Installation of the "Application CD" will start. (It will take about approx. 20 minutes for registration.)

12. When registration is completed, the following message will show:
    "Please remove the CD-ROM". Remove the CD from the CD-ROM drive and press [Enter]. The machine will automatically reboot. The procedure is completed if an error does not occur.

    Note:
    If the following message "strike a key when ready" **does not** appear and Windows NT starts, (even if the machine is rebooted after the "recovery CD" is put into the CD-ROM) the BIOS settings may be wrong. In this case, check all BIOS settings. (refer to the BIOS set-up manual located in the supplement section of this manual, or refer to the Fuji web-site to download the BIOS setting manual.)

1.4 Configuring the Machine Network Settings

After installation of the recovery and application software, it is necessary to set up the network settings at the machine. All setting data is cleared from the machine once the recovery disk has been used. Carry out the procedure below in order to establish communications with the host PC.

1. After the machine boots from recovery and application software installation, press the following commands to enter the network settings.

   [Maintenance] → [System] → [Network]

2. Enter the machine Nickname (Host), IP address and Subnet Mask.
   (This information should be provided by the network administrator at the user site.)

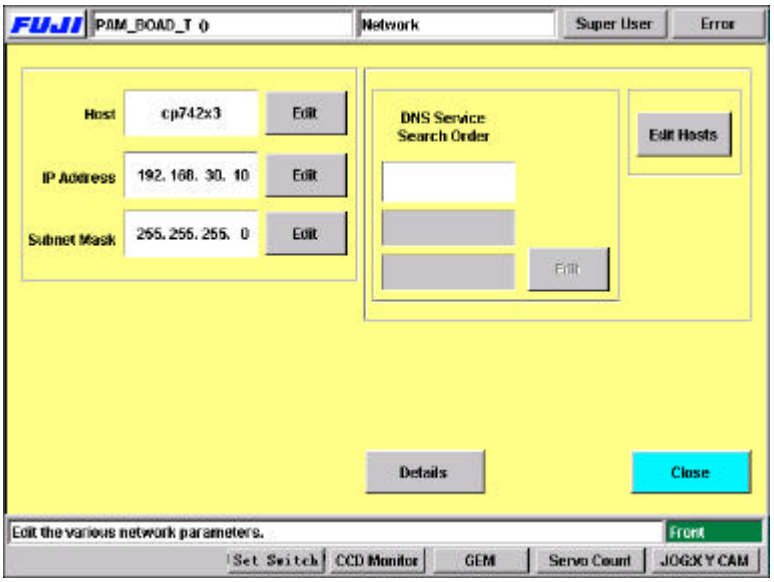

Figure 2

3. After setting the above, close the window and save the changes. It is now necessary to re-boot the machine in order for the data to be registered.

4. After the machine has been re-booted, transmit the appropriate proper and programs to the machine. After doing so, it will be necessary once again to re-boot the machine.

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Notes:

Chapter 2

Cam Box

Chapter 2 Cam Box Checks and Adjustments

2.1 Interference Check

1. With the cam angle at 0 degrees, check all stations for interference before turning the cam.

2. As a precaution, it is best not to connect the air supply before adjustment of step 2.8 as some stations may interfere if the air cylinders are not adjusted correctly.

3. Lower the vacuum switching brackets at stations 9 and 13 to ensure sufficient clearance when the cam is rotated.

4. Check for interference between the various sensors and their flags before rotating the cam. Pay special attention to station 1 and station 9 nozzle up & down detection sensors and flags located in the cam box. Also, check the station 1 waste tape cutter upper and lower limit detection sensors located (near the dump parts box) at station 13.

5. Secure the station 1 vacuum switching lever so that it does not interfere with the top surface of the mechanical valve.

2.2 Cam Box Check

1. Check for any dust, tools, or other foreign matter within the Cam box.

2. Perform an initial check of all bolts and connectors to ensure they are tight.

2.3 Securing the Motor Coupling and Mechanical Locks

1. Use a torque wrench to tighten the motor coupling and mechanical locks.

   A: Motor Coupling 32.3N.m

   B: Mechanical Lock (M4) 4.9N.m

   C: Mechanical Lock (M5) 8N.m

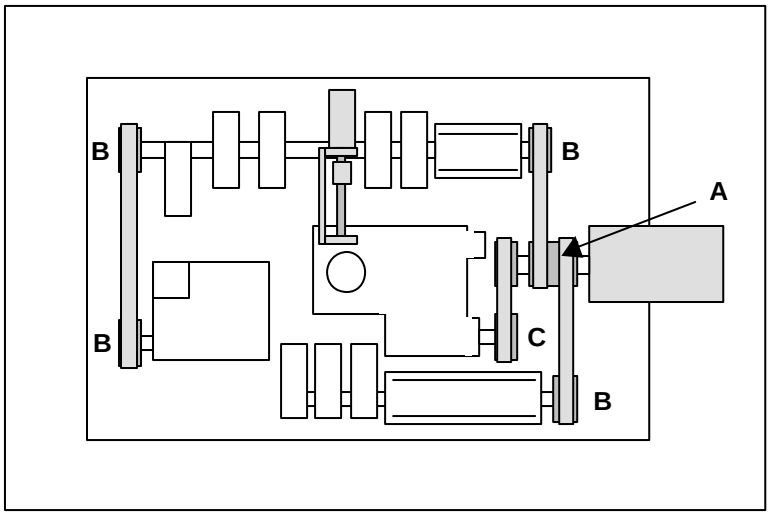

Figure 1

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2.4 Cam Lever and Solenoid Valve Layout

Cam Box cam levers and valve locations are illustrated here.

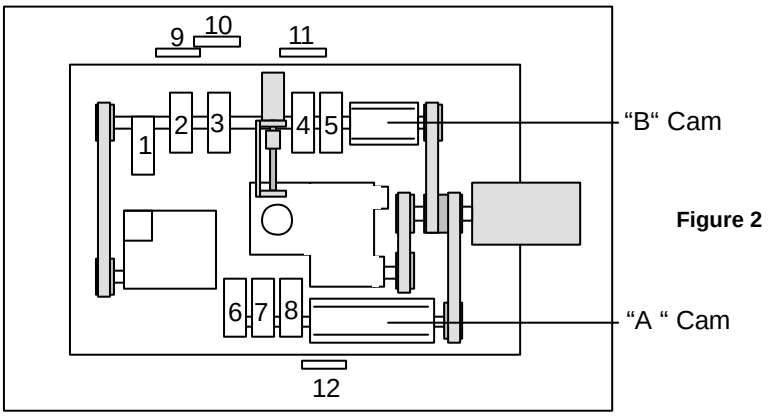


Figure 2

1. ST1 Cut	7. ST9 Up & Down Nozzle
2. ST14 Nozzle Change	8. ST8 Up & Down FQ
3. ST1 Fwd & Bwd Feeding jaw	9. 10SOL-7,8 ST14 Select Clutch
4. ST1 Up & Down Nozzle	10. 10SOL-3,4 ST1 Fwd & Bwd Feed Jaw
5. ST2 Up & Down PQ	11. 10SOL-1,2 ST1 Up & Down
6. ST10 Up & Down RQ	12. 10SOL-5,6 ST9 Up & Down

2.5 B-Cam Scale Angle Check (Timing Reference Point)

1. Set a dial indicator on the cam lever of the waste tape cutter (B-axis). Check that the maximum diameter (low point) of the cam is set to: 194 degrees: CP-732/733E, (190 degrees: CP-742/743(M)E)

Waste Tape Cutter

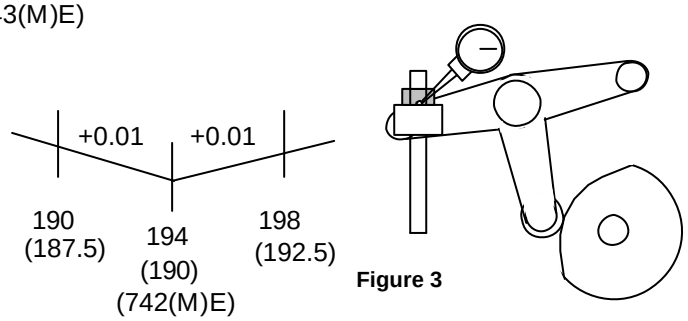


Figure 3

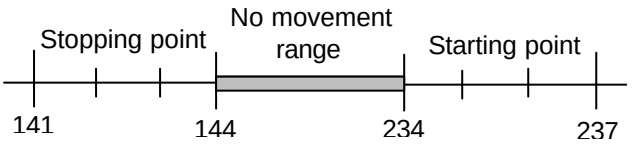
2. When measuring with the dial gauge, find the center point and move the cam lever 0.01mm as indicated above. If the setting is balanced, the readings should be as indicated. However, if not, move the angle scale so the readings are within range.

IMPORTANT!

The Cam B axis scale is the reference point for all timing within the Cam Box. Be sure this adjustment is carried out correctly. Otherwise, the machine timing will be adversely affected.

2.6 Cam-axis Synchronization (Using B-axis Scale)

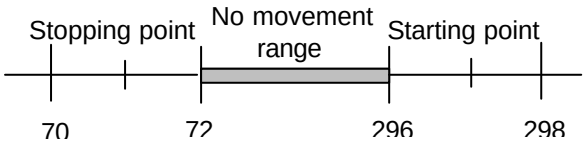
1. Set a dial gauge against the nozzle holder. When the nozzle index stops, the cam angle should be between 140 and 144 degrees. When starting to move, the cam angle should be between 234 and 238 degrees.



(Within 3 degrees on each side)

Figure 4

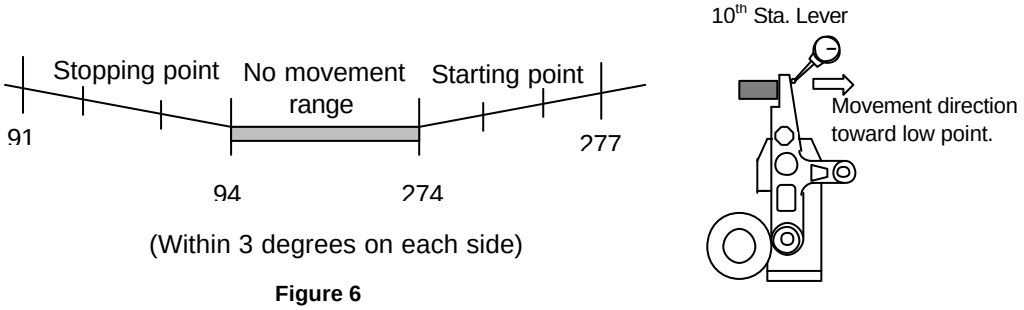
2. Set a dial indicator on the theta index helical gear. When the theta index stops, the cam angle should be between 70 and 72 degrees. When starting to move, the cam angle should be between 296 and 298 degrees.



(Within 2 degrees on each side)

Figure 5

3. Set a dial indicator on the RQ cam lever (Station 10). Make sure that when the cam lever is at the low point, the cam axis is between 94 and 274 degrees.



(Within 3 degrees on each side)

Figure 6

4. After checking the above, ensure the A-axis scale matches the B-axis reference scale.

Notes:

1. In all cases above, the maximum difference between the stopping and starting points should be within +/- 1 degree.

   Example: (fig. 4 above) If the nozzle index stops at 142 degrees, it should begin moving at 236 +/- 1 degree.

2. The exact timing of movement varies a little from machine to machine. (but still within tolerance). The main point is to ensure that the stopping and starting points are balanced.

2.7 Helical Gear Backlash Check

1. Check the backlash of the large helical gear using a dial indicator with shafts A, E, I, and M at station 9. (Cam at 180 degrees)

2. The backlash between the two helical gears should be within 0.02 to 0.06mm.

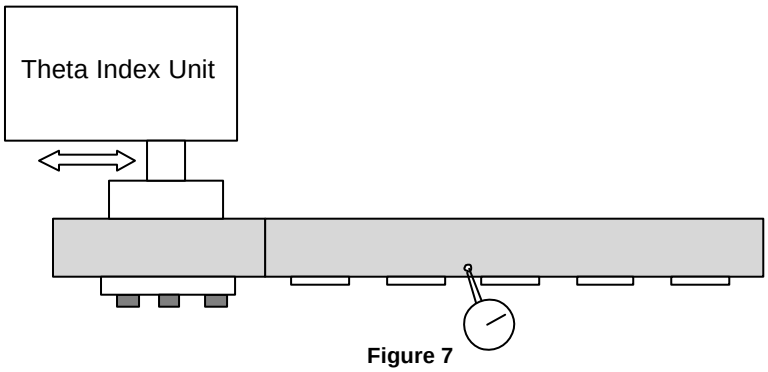


Figure 7

3. The backlash may be adjusted by moving the theta index unit to the right or left.

2.8 Cam Lever Stopper Adjustment

1. Turn the machine power OFF.

2. At 0 degrees, set the gap between the cam follower and cam as indicated below for Station 1 Nozzle up/down, Station 1 tape feed, Station 9 up/down and Station 14 nozzle change.

3. Manually, turn each station's solenoid valve OFF at zero degrees. (fig. 10)

> The solenoid valve should be OFF when setting the dial gauge, and ON when making adjustments. For the valve buttons: [Green = ON] [Orange = Off]

4. Set a dial gauge on the cam lever at the locations shown in fig 8 and measure the clearance according to the table below:

Station	Appropriate Value
Station 1 Station 9 Station 14 Station 1 Advance	0.02 to 0.06mm

5. When making adjustments, push the green button (on the valve) to turn the valve ON. Then, manually toggle the valve ON and OFF to check the clearance. As a rule, set the clearance as close to 0.02 as possible. (best condition)

Dial Gauge Measuring Points

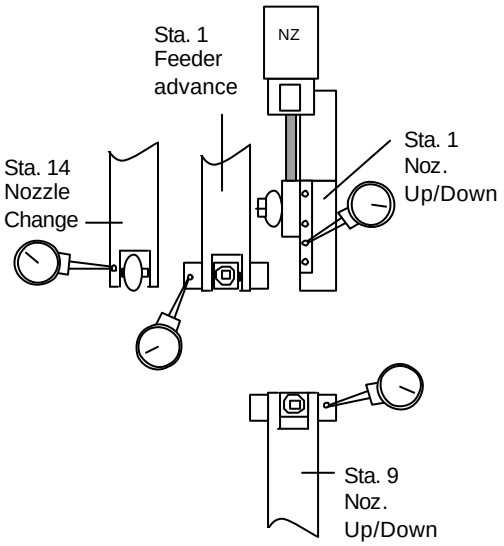


Figure 8

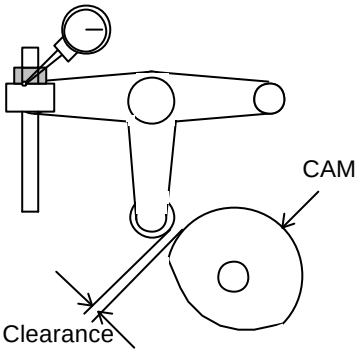


Figure 9

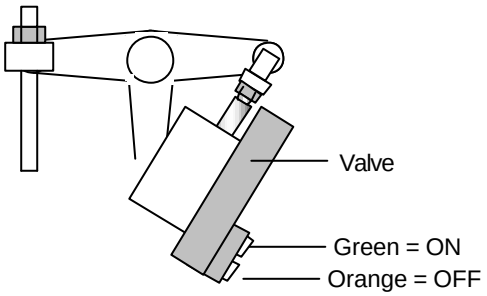


Figure 10

2.9 Cam-axis Timing Belt Tension Adjustment

Timing Belt Tensions in Cam box

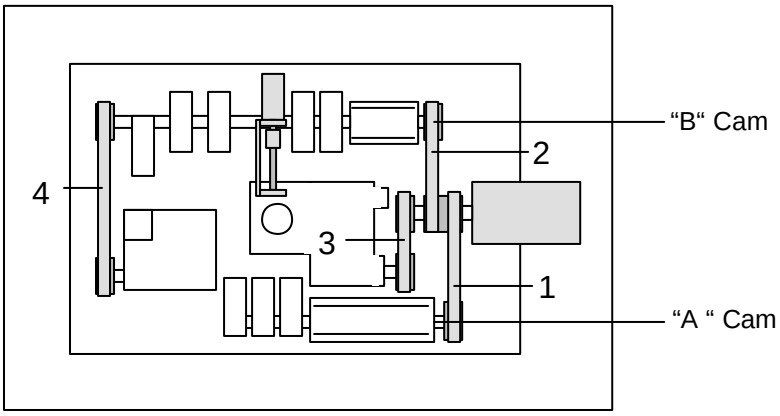


Figure 11

Axis	Appropriate value (Hz)
1 = Cam Axis A to Cam Motor	129.0 ± 5
2 = Cam Axis B to Cam Motor	99.5 ± 5
3 = Nozzle Index to Cam Motor	227.0 ± 5
4 = Cam Axis B to Theta Index	70.0 ± 5

2.10 Image Acquisition Timing Flag Adjustment

1. Adjust the two sensor flags “A” in fig 12, so that the two sensor LED’s turn ON when rotating the Cam forward to 197 degrees. (Tolerance: 197 ± 1 degree)

2. Adjust flag “B” so the sensor lamp turns ON when rotating the Cam angle forward to 340 degrees. (Tolerance: 340 ± 1 degree). Ensure the LED remains ON for the duration of time the flag is within the sensor.

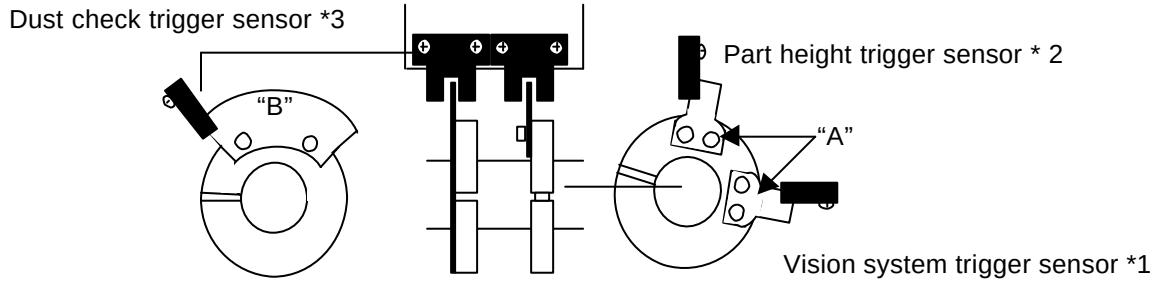


Figure 12

3. The three sensors mentioned above serve the following purposes.

   a. The vision system trigger sensor informs the VP card to take the component image at 197 degrees. (station 5)

   b. The part height trigger sensor informs the part height unit to take the component thickness (nozzle length) image at 197 degrees. (station 6)

   c. The dust check trigger sensor informs the part height unit when to check the windows for dust etc. (checks from 110 to 340 degrees). (station 6)

Note: The three sensors mentioned above are NOT connected to the I/O. To monitor the sensor operating conditions, check the LED’s at the following locations:

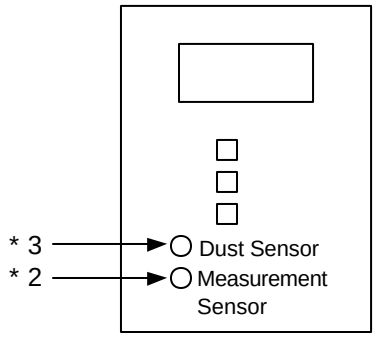


Figure 13

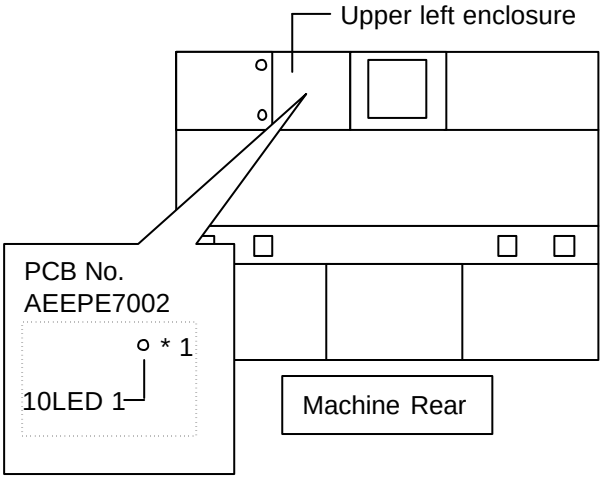


Figure 14

Note: In order to monitor the dust sensor signal, go to the I/O and temporarily turn Y042 OFF. Normally, this function is automatically controlled by the system software.

2.11 Cam Proper Setting (0.03deg/pulse)

Since zero setting is not required on the CP-7 Series machines, (absolute encoder system employed) a reference position called, “Origin Position Offset” is needed for tracking the cam motor position. Follow the procedure below in order to set the origin position offset for the cam motor under the following two conditions.

When the Cam Motor coupling has already been tightened:

1. With the machine power ON, press the Servo count tab at the bottom of the screen to display the servo pulse counts.
2. Turn the cam (using the cam handle) until the Cam pulse counts are within 0 +/– 6000 and set the cam angle to 0 degrees.
3. With the cam at 0 degrees and the pulse counts within the specified range, set this position into proper as follows:

   Press: [Maintenance] → [Calibration] → [Origin Pos Offset] → [CAM]

When the Cam Motor coupling has been released.

1. With the machine power ON, press the Servo count tab at the bottom of the screen to display the servo pulse counts.
2. Ensure the cam is set at 0 degrees.
3. Rotate the cam motor shaft until the Cam pulse counts are within 0 +/– 6000.
4. With the cam at 0 degrees and the pulse counts within the specified range, tighten the coupling to 33N.m
5. With the cam at 0 degrees and the pulse counts within the specified range, set this position into proper as follows:

   Press: [Maintenance] → [Calibration] → [Origin Pos Offset] → [CAM]

Notes:

Chapter 3

X, Y, Z and D-axes

CHAPTER 3 X, Y, Z and D-axis Adjustment

3.1 Interference Check

1. Confirm that the X and Y couplings are loosened and check for any interference by moving the axes through their full movement range manually.
2. Check that the sensors and sensor flags do not collide.
3. Check that the two D-axis pallet up and down cylinders are locked at their lower limit by I/O. (Y056 D1) (Y067 D2)
4. Check that the D-axis stoppers are retracted. (Y059 D1) (Y069 D2)

Note:
When the coupling is loose and the servo ON, vibration may occur. It is best to lower the gain level to 1/10 the original value when carrying out adjustments. When completed, remember to return the gain level to the original value. Check servo pack gain parameter: **PN100**

3.2 X Axis Adjustment and Proper Setting

Equipment Checklist:
1- 14 N.M torque wrench with 5mm attachment
1- Small size 5mm L-wrench with pipe
1- Small mirror
1- 3mm T-wrench

3.2.1 CP-742/743(M)E X-axis Adjustment and Proper Setting

1. Remove the minus OT sensor flag (right side) and check that the coupling is loose.
2. Set the X axis pulse count to 2500.
3. Push the X-axis against the + mechanical stopper. (right stopper facing machine) Fig. 1.
4. Temporarily half lock the coupling with a 5mm wrench and pipe.
5. Move the XY table away from the + mechanical stopper.
6. Lock the coupling with a 14N.m torque wrench.

Counter Value: 2500 pulses

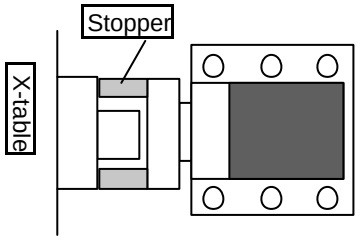


Figure 1

7. Return the XY table to the + mechanical stopper and record the pulse count at this position. It must be 2500 +/- 100 pulses.
8. Check the alignment of the OT sensor flags and OT sensors.
9. Set the – OT sensor so that it turns ON 2000 pulses back from the + mechanical stopper. It must be 500 +/- 100 pulses.
10. Move the X-axis back 500 pulses from where the – OT sensor turns ON and set the proper value. (Max Limit Position)

    Press: [Maintenance] → [Calibration] → [Travel Limits] → [Maximum Limit X]
11. Move the XY table to the **–** mechanical stopper and record the pulse count at this position. It must be – 278000 +/- 1000 pulses.

12. Set the + OT sensor so that it turns ON 2000 pulses back from the – mechanical stopper. It must be – 276000 +/- 1000 pulses.

13. Move the X-axis back 500 pulses from where the + OT sensor turns ON and set the proper value. (Min Limit Position)

    Press: [Maintenance] → [Calibration] → [Travel Limits] → [Minimum Limit X]

14. Table 1 lists the X axis proper and physical data reference values:

CP-742/743(M)E

X Axis Proper Item	Reference Value (0.002mm/pulse)
+ Mechanical stopper	2500 +/- 100
– OT sensor	500 +/- 100
Max Limit Position X	(– OT – 500) 0 +/-100
PCB Check Position X (left to right m/c)	– 190000
Loading Position XL IN	– 271000
Loading Position XL OUT	– 11250
Mark Read Position XC (left to right m/c)	– 231000
Placing Position X0 (left to right m/c)	– 270500
Minimum Limit Position X	(+ OT + 500) – 275500 +/- 1000
+ OT sensor	– 276000 +/- 1000
– Mechanical stopper	– 278000 +/- 1000

Table 1

15. Check sensor reaction by I/O

<I/O → Servo → IN>

SX009	X AXIS +OT (X Plus OT)
SX00A	X AXIS –OT (X Minus OT)

3.2.2 CP-732/733E X-axis Adjustment and Proper Setting

Equipment Checklist:
1- 7 N.m torque wrench with 4mm attachment
1- Small size 4mm L-wrench with pipe
1- Small mirror
1- 3mm T-wrench
1- 155mm spacer jig (Jig No.:DCPJ0710)

1. Remove the minus OT sensor flag (right side).
2. Check that the coupling is loose then set the X axis pulse count to – 75000 pulses.
3. Place the 155mm spacing jig (Fig.2) between the X-axis + mechanical stopper and the X-axis table. Tighten the coupling bolt with a 7N.m torque wrench.

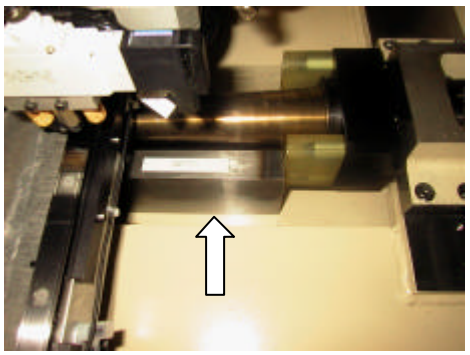


Figure 2

4. Return the XY table to the + mechanical stopper and record the pulse count at this position. It must be 2500 +/- 100 pulses.
5. Check the alignment of the OT sensor flags and OT sensors.
6. Set the – OT sensor so that it turns ON 2000 pulses back from the + mechanical stopper. It must be 500 +/- 100 pulses.
7. Move the X-axis back 500 pulses from where the – OT sensor turns ON and set the proper value. (Max Limit Position)

   Press: [Maintenance] → [Calibration] → [Travel Limits] → [Maximum Limit X]
8. Move the XY table to the – mechanical stopper and record the pulse count at this position. It must be – 227500 +/- 1000 pulses.
9. Set the + OT sensor so that it turns ON 2000 pulses back from the – mechanical stopper. It must be – 225500+/- 1000 pulses.
10. Move the X-axis back 500 pulses from where the + OT sensor turns ON and set the proper value. (Min Limit Position)

    Press: [Maintenance] → [Calibration] → [Travel Limits] → [Minimum Limit X]

11. Table 2 lists the X axis proper and physical data reference values:

CP-732/733E

X Axis Proper Item	Reference Value (0.002mm/pulse)
+ Mechanical stopper	2500 +/- 100
– OT sensor	500 +/- 100
Max Limit Position X	(– OT – 500) 0 +/-100
PCB Check Position X (left to right m/c)	– 190000
Loading Position XL IN	– 220500
Loading Position XL OUT	– 11250
Mark Read Position XC (left to right m/c)	– 180500
Placing Position X0 (left to right m/c)	– 222500
Minimum Limit Position X	(+ OT + 500) – 225000 +/- 1000
+ OT sensor	– 225500 +/- 1000
– Mechanical stopper	– 227500 +/- 1000

Table 2

12. Check sensor reaction by I/O

<I/O → Servo → IN>

SX009	X AXIS +OT (X Plus OT)
SX00A	X AXIS –OT (X Minus OT)

3.3 Y- Axis Adjustment and Proper Setting

Equipment Checklist:
1- 8 N.m torque wrench with 4mm attachment
1- Y-axis spacing jig (Jig. No.:DGPJ0161)
1- 3mm T-wrench
1- 4mm L-wrench and pipe

3.3.1 CP-742/743(M)E Y- axis Adjustment and Proper Setting

1. Check that the coupling is loose, then set the Y axis pulse counter at 110000 pulses.
2. Install the Y-axis spacer jig (225mm) (Fig.3) and pull the table against the jig.(Jig No.: DGPJ0161)

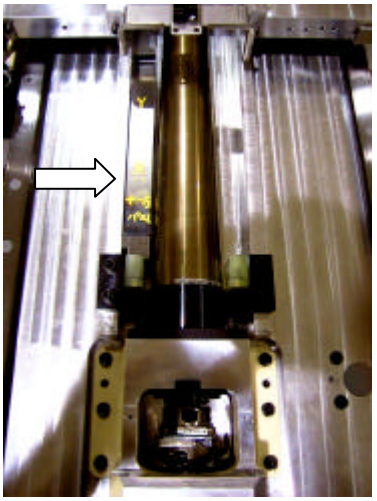


Figure 3

3. Make sure the coupling is in the center of the shaft and temporarily half lock it with a 4mm wrench and pipe.
4. Remove the jig.
5. Pull the Y-axis to the – mechanical stopper.
6. Record the Y pulse count at the **–** mechanical stopper. It must be close to –2500. If not, then offset the value and repeat the steps above.
7. Finally lock the coupling bolts with a 8N.m torque wrench.
8. Check the alignment of the OT sensor flags and OT sensors.
9. Set the – OT sensor so that it turns ON 2000 pulses away from the – mechanical stopper. It must be – 500 +/- 100 pulses.
10. Move the Y-axis 500 pulses away from the position where the – OT sensor turns ON and set the proper. (Min Limit Position)

    Press: [Maintenance] → [Calibration] → [Travel Limits] → [Minimum Limit Y]

11. Move the XY table to the + mechanical stopper and record the pulse count at this position. It must be 241500 +/- 1000 pulses.

12. Set the + OT sensor so that it turns ON 500 pulses back from the + mechanical stopper. It must be 241000 +/- 1000 pulses.

13. Move the Y-axis back 500 pulses from where the +OT sensor turns ON and set the proper value. (Max Limit Position)

    Press: [Maintenance] → [Calibration] → [Travel Limits] → [Maximum Limit Y]

14. Table 3 lists the Y-axis proper and physical data reference values:

CP-742/743(M)E

Y Axis Proper Item	Reference Value (0.002mm/pulse)
– Mechanical stopper	– 2500 +/- 100
– OT sensor	– 500 +/- 100
Minimum Limit Position Y	(– OT + 500) 0 +/- 100
Loading Position YL IN	2500
Loading Position YL OUT	2500
Mark Read Position YC	226000
PCB Check Position Y	205000
Placing Position Y0	238500
Max Limit Position Y	(+ OT – 500) 240500 +/- 1000
+ OT sensor	241000 +/- 1000
+ Mechanical stopper	241500 +/-1000

Table 3

15. Check sensor reaction by I/O

<I/O → Servo → IN>

SX011	Y AXIS +OT (Y plus OT)
SX012	Y AXIS –OT (Y minus OT)

3.3.2 CP-732/733E Y- axis Adjustment and Proper Setting

Equipment Checklist:
1- 3.4 N.m torque wrench with 4mm attachment
1- Y-axis spacing jig (Jig No:DCPJ0720)
1- 3mm T-wrench
1- 3mm L-wrench and pipe

1. Check that the coupling is loose, then set the Y axis pulse counter to 75000 pulses.
2. Pull the Y-axis up against the (155mm) (Fig. 4) Y-axis jig. (Jig No: DCPJ0720)
3. Make sure the coupling is in the center of the shaft and temporarily half lock it with 3mm wrench and pipe.
4. Remove the jig.
5. Pull the Y-axis to the – mechanical stopper.
6. Record the Y pulse count at the – mechanical stopper. It must be close to – 2500, if not then offset the value and repeat the steps above.
7. Finally, lock the coupling bolts with a 3.4N.m torque wrench.
8. Check the alignment of the OT sensor flags and OT sensors.
9. Set the – OT sensor so that it turns ON 2000 pulses away from the – mechanical stopper. It must be – 500 +/- 100 pulses.

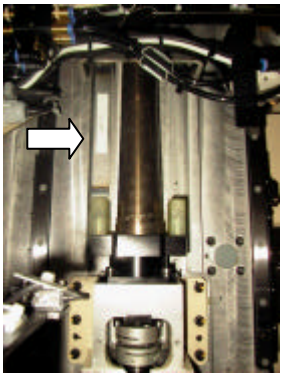


Figure 4

10. Move the Y-axis 500 pulses away from the position where the – OT sensor turns ON and set the proper. (Min Limit Position)

    Press: [Maintenance] → [Calibration] → [Travel Limits] → [Minimum Limit Y]

11. Move the XY table to the + mechanical stopper and record the pulse count at this position. It must be 195000 +/- 1000 pulses.
12. Set the + OT sensor so that it turns ON 2000 pulses back from the + mechanical stopper. It must be 193000 +/- 1000 pulses.
13. Move the Y-axis back 500 pulses from where the + OT sensor turns ON and set the proper value. (Max Limit Position)

    Press: [Maintenance] → [Calibration] → [Travel Limits] → [Maximum Limit Y]

14. Table 4 lists the Y-axis proper and physical data reference values:

CP-732/733E

Y Axis Proper Item	Reference Value (0.002mm/pulse)
– Mechanical stopper	– 2500 +/- 100
– OT sensor	– 500 +/- 100
Minimum Limit Position Y	(– OT + 500) 0 +/- 100
Loading Position YL IN	2500
Loading Position YL OUT	2500
Mark Read Position YC	175000
PCB Check Position Y	160000
Placing Position Y0	190000
Max Limit Position Y	(+ OT – 500) 192500 +/- 1000
+ OT sensor	193000 +/- 1000
+ Mechanical stopper	195000 +/-1000

Table 4

15. Check the sensor reaction by I/O.

<I/O → Servo → IN>

SX011	Y AXIS +OT (Y plus OT)
SX012	Y AXIS –OT (Y minus OT)

3.4 X and Y Axes Backlash Check

1. Place a (0.002mm) dial gauge against the X-axis of the XY table (Fig.5). Make sure the servo power is ON, push the XY table left and right by hand to check the amount of backlash. (Tolerance: 0.010mm.)

2. Check the Y axis in the same manner. Make sure the servo power is ON, push the XY table back and forth to check the amount of backlash. (Tolerance: 0.010mm.)

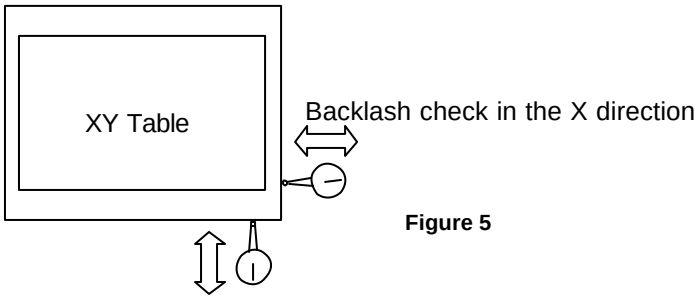


Figure 5

3. If the amount of backlash is out of tolerance, check the following 2 areas.

   a. Ball nut
   b. Ball screw bearings

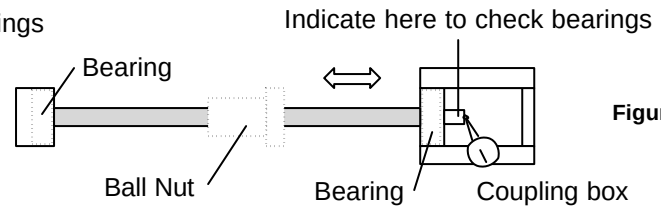


Figure 6

3.5 X/Y Table Squaring Check

Check the squaring of the X/Y table using the jig plate.
CP-732/733E (Jig No.: ADCPJ8301)
CP-742/743(M)E (Jig No. ADGPJ8060)

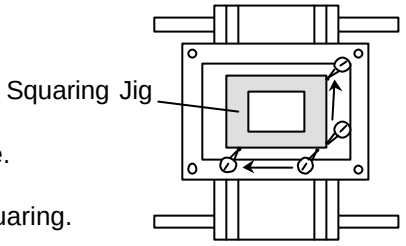


Figure 7

1. Align the jig in the Y direction to zero using a dial gauge.

2. Indicate the jig face in the X direction to check table squaring. (Tolerance: 0.015 / 239mm)

3.6 Reference and Adjustable Pin Alignment Check (CP-742/743(M)E)

Check the alignment and play of the tooling pins as follows.

1. The diagram below shows the tooling pin configuration for the CP-742/743(M)E.

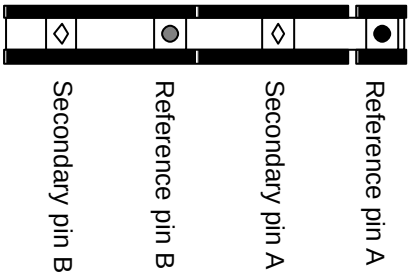


Figure 8

2. To check the alignment of the four pins, place a dial gauge (0.002mm) against reference pin A and set it to 0.

3. Inch the X/Y table in the X direction and measure the alignment of the three other pins in relation to reference pin A .

4. Measure at the points indicated in the tables below:

Secondary Pin A:

Measuring Point (mm)	Max	370	270	170	70	Reference pin A
Center Position						0
Backlash Value						

Center Position Tolerance: +/- 0.050mm. Backlash Tolerance: 0.040mm.

Reference Pin B:

Measuring Point (mm)	Max	370	270	170	70	Reference pin A
Center Position						0
Backlash Value						

Center Position Tolerance: +/- 0.020mm. Backlash Tolerance: 0.040mm.

Secondary Pin B:

Measuring Point (mm)	Max	370	270	170	70	Reference pin A
Center Position						0
Backlash Value						

Center Position Tolerance: +/- 0.050mm. Backlash Tolerance: 0.040mm.

(Note: There are no tooling pins on the CP-732/733E.)

Fuji Machine Mfg. Co., Ltd. Okazaki
SMT Equipment Quality Assurance Dept.
Technical Support Div. Section No.2

3.7 X0/Y0 Proper Measurement

X0/Y0 is the placing origin position. Follow the procedure below to carry out the adjustment.

Equipment Checklist:
1- X0/Y0 origin pin jig
1- X0/Y0 special dial gauge set up
1- 3mm L-wrench
1- Small mirror

3.7.1 X0/Y0 Proper Measurement for CP-742/743(M)E

1. Remove the main reference pin and spring then replace the holder.
2. Remove the first claw on the right side of the reference rail.
3. With the cam at 0 degrees, use the I/O to turn the 9th station place solenoid OFF. (Y034)
4. Remove holders: A, B & P and attach the X0/Y0 special dial gauge set up on shaft A.

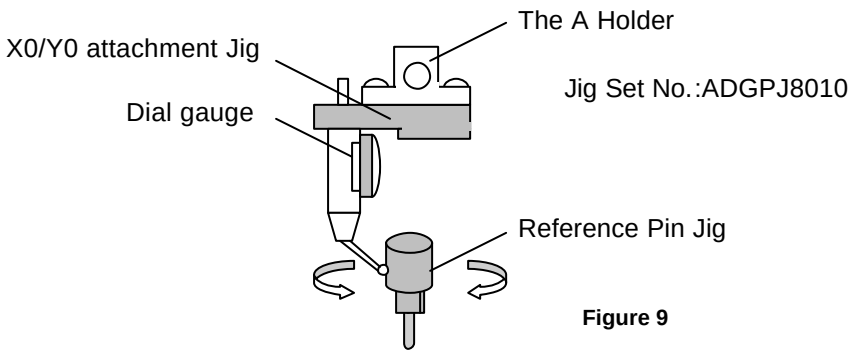


Figure 9

5. Insert the reference pin jig.
6. Measure with the cam angle at 180 degrees.
7. Press the emergency stop button so the machine goes to a servo down condition.
8. Make sure the Z- axis is at the lower limit.
9. Move the XY table manually until the reference pin jig meets the dial gauge on the A holder.
10. Move the table very carefully by hand until you find the point where the dial gauge is zero throughout the circumference of the reference pin jig. (Tolerance 0+/- 0.01mm)
11. When the position is established, enter it into proper as follows.

    Press: [Maintenance] → [Calibration] → [Placing Reference] → [X0/Y0] → [Set]

12. Finally, remember to remove the dial gauge and jig, but leave the reference pin out until after the next adjustment: 3.8 XY Table Level Check.

3.7.2 X0/Y0 Proper Measurement for CP-732/733E

Equipment Checklist:
1- X0/Y0 origin pin jig
1- X0/Y0 special dial gauge set up
1- 3mm L-wrench
1- Small mirror

1. Remove the first claw on the right side of the reference rail.
2. Install the pin holder jig on the reference rail. Make sure that it is pulled up against the right edge of the reference rail.
3. With the cam at 0 degrees use the I/O to turn the 9th station place solenoid OFF. (Y034)
4. Remove holders: A, B & P and attach the X0/Y0 special dial gauge set up on shaft A.

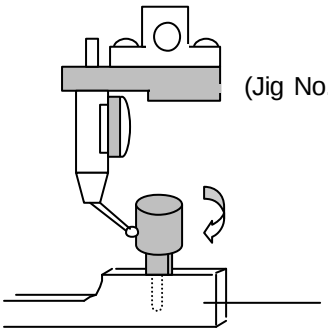


Figure 10

5. Insert the reference pin jig into the pin holder jig.
6. Measure with the cam angle at 180 degrees.
7. Press the emergency stop button so the machine goes to a servo down condition.
8. Make sure the Z- axis is at its lower limit.
9. Move the XY table manually until the reference pin jig meets the dial gauge on the A holder.
10. Move the table very carefully by hand until you find the point where the dial gauge is zero (or closest to zero) throughout the circumference of the reference pin jig.
11. When the position is established, enter it into proper as follows.

    Press: [Maintenance] → [Calibration] → [Placing Reference] → [X0/Y0] → [Set]

12. Finally, remember to remove the dial gauge and jig, but leave the reference pin out until after the next adjustment: 3.8 XY Table Level Check.

3.8 X/Y Table Leveling

Equipment Checklist
0.3mm feeler gauge
0.03mm feeler gauge
3mm L-wrench
Dial Gauge
Mini Minus Driver
4mm T-wrench
Calculator
2N.m torque wrench with 2.5mm attachment

3.8.1 (Part 1) Table Leveling

1. Loosen all of the XY table Pcb clamping claws with a 3mm wrench.

2. Loosen the sensor flag base and remove the sensor flag from the fixed rail. (Fig.11) (CP-742/743(M)E)

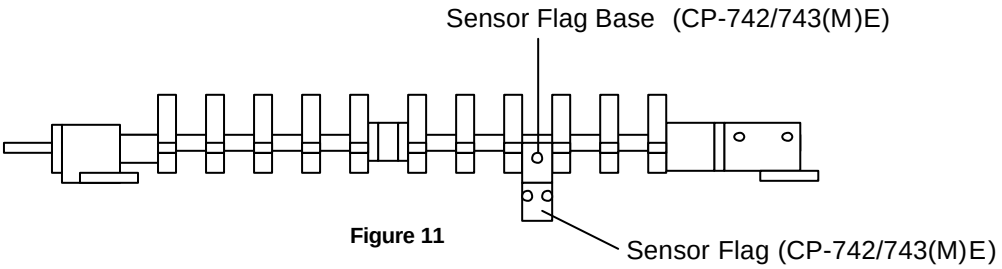
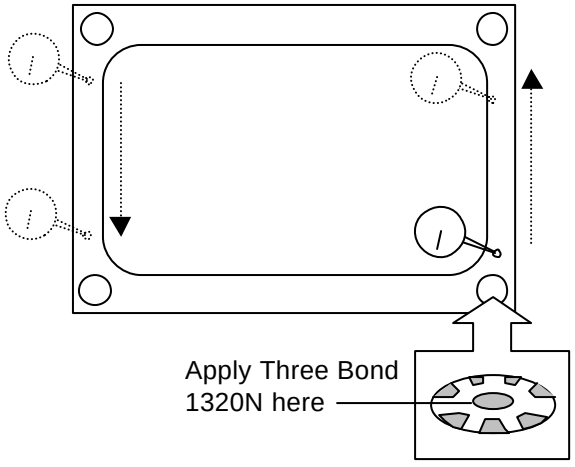


Figure 11

3. With the cam angle at 0 degrees, release the air and set the gap between the reference and adjustable rails at a position adequate for setting the dial gauge.

4. Reconnect the air and clamp the two rails.

5. (Initial Leveling) Level the table as illustrated below by loosening the four corner lock nuts and adjust the table flatness (at the points indicated) to be within 0.1mm. After completion, ensure the lock nuts are securely tightened. Then, apply Three Bond 1320N to the four lock nut locations as indicated in Fig.12.



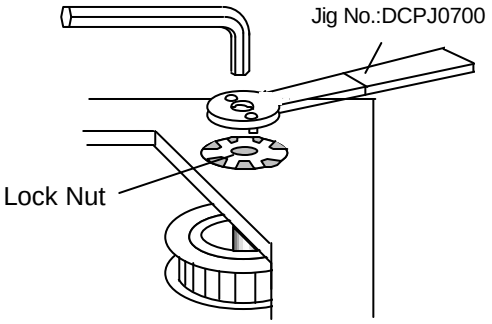


Figure 12

6. (Final leveling check) The reference point for measuring the table flatness is the far right claw on the adjustable rail, when it is 50mm from the fixed rail (indicated by a 0 in Fig.13). Measure the rail flatness at the nine points identified in Fig.13.
(Tolerance: +/- 0.15mm,)(within 0.1mm is best)

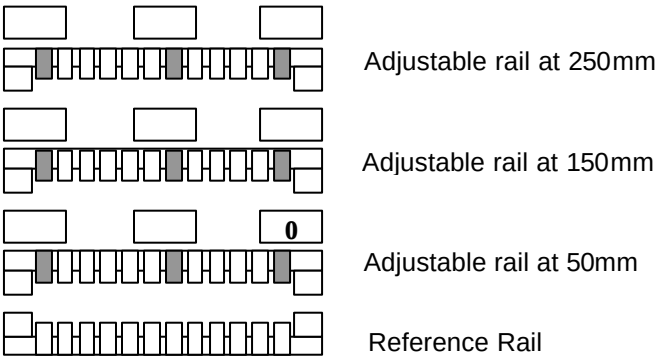


Figure 13

7. If the adjustable rail is not flat at the locations illustrated, it may be necessary to repeat step 5.

8. Once the adjustable rail flatness is within tolerance. Use the 0 position (Fig.14) as the reference to check the height between the adjustable and reference rails at the hi-lighted positions.

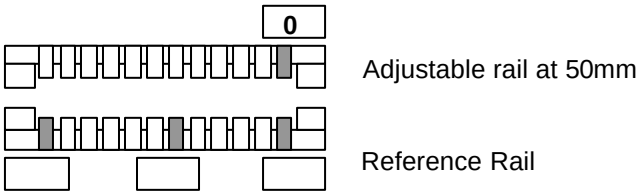


Figure 14

9. If the height of the reference rail is more than +/-0.1mm than that of the adjustable rail, (or the reference rail itself is uneven) adjust the reference rail height (flatness), by loosening the bolts indicated in Fig. 15 and adjust, using the bolts under both sides of the reference rail.

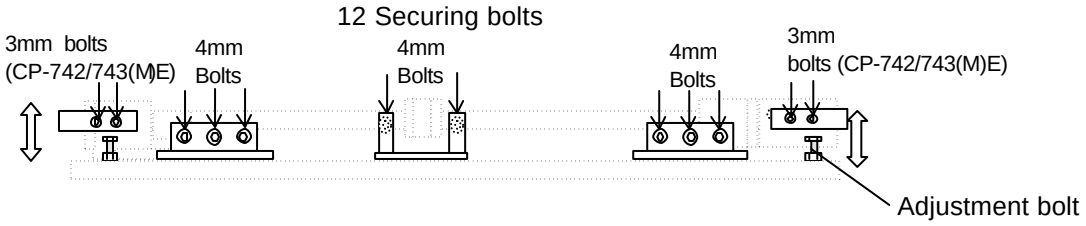


Figure 15

3.8.2 (Part 2) Reference and Adjustable Rail Alignment in the Y direction

1. The two rails should be aligned to within 0.1mm. (with the adjustable rail at the center of play)

2. Disconnect the air pressure to the machine and move the adjustable rail left and right to establish the center of play using a dial gauge.

3. Reattach the air with the adjustable rail at the center of play.

4. Align the reference rail to the adjustable rail (center of play) by loosening the bolts indicated in Fig.16.

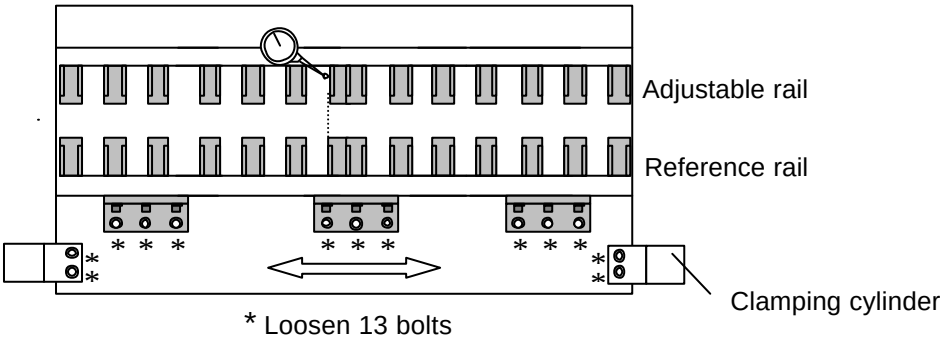


Figure 16

3.8.3 (Part 3) Origin Pin To Claw Position Adjustment (CP-742/743(M)E)

1. The distance from the origin pin to the claw should be between 3500 and 3600 pulses.

2. Install the origin pin and spring.

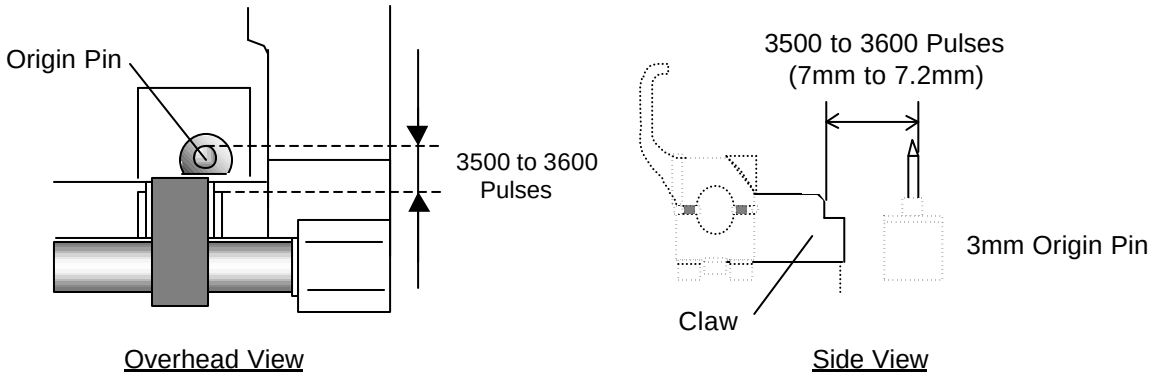


Figure 17

3. Using a dial gauge, set the distance from the pin to the claw, by moving the reference rail in the Y direction. (set the distance as close to 3510 pulses as possible)

Note: The CP-732/733E does not have tooling pins, so steps 1 to 3 do not apply. The rail is just centered in the bolt holes.

4. After the positioning has been completed in step 3, an alignment check of the reference rail in the X-direction is necessary. Carry out the alignment check as indicated in Fig 18. (Tolerance: within 0.1mm.)

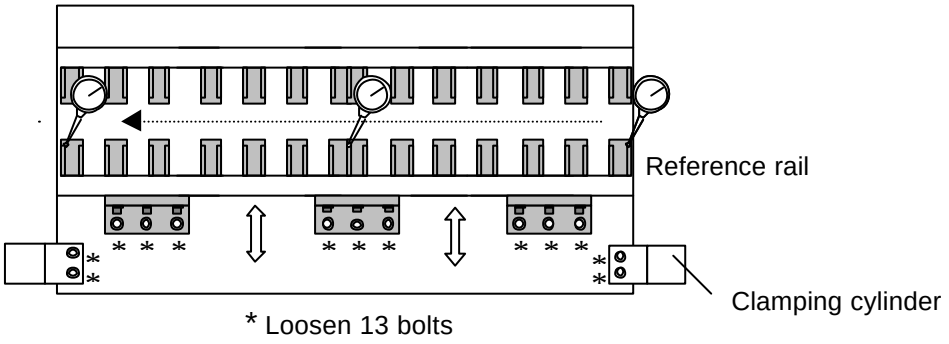


Figure 18

5. Check the following positions again, after completing step 4, to ensure they remain within tolerance.

   3-8.1 (Part 2) – Reference and Adjustable Rail Alignment in the Y direction

   3-8.1 (Part 3) – Origin Pin To Claw

3.8.4 (Part 4) Mechanical Lock Ring Adjustment (CP-742/743(M)E)

1. On the reference rail, check that the gap between the white plastic washer and the far right clamper bracket is less than 0.3mm. If not, loosen the mechanical lock and the bolts on the far right clamper bracket, then adjust the position of the clamp rod until the gap closes.

2. Check that the center base of the reference rail is pulled right up against the lip of the reference rail. Check that a 0.03mm feeler gauge cannot go into the gap between the two.

3. Confirm all of the claws on the reference rail are loose and then loosen the mechanical lock.

4. Lock the reference rail at its unclamped position.

5. With the reference rail unclamped, lock the four bolts in rotation with a 2N.m torque wrench.

6. For details of the location of various parts described above see Fig.19.

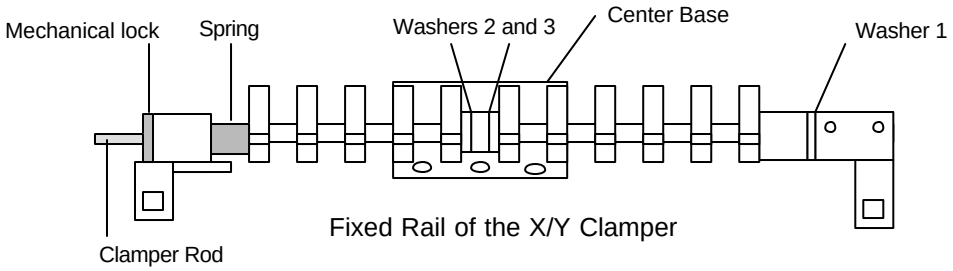


Figure 19

7. Finally clamp and unclamp the reference rail to check the clamping balance between the left and right clamping brackets. If there is an imbalance, repeat steps 3 to 5 above until a balance is achieved.

3.9 Z -axis Adjustment and Proper Setting

Equipment Checklist
1- 3mm L-wrench
1- 4mm T-wrench
1- Tension Meter
1- 1N.m torque wrench with 2mm attachment
1- 0.2mm feeler gauge
1- 2.5mm T-wrench

Note: The table must be level before making Z-axis adjustments.

1. Set the tension of the Z-axis timing belt as follows:

   CP-742/743(M)E = 64 +/- 2 Hz.

   CP-732/733E = 119 +/- 2 Hz.

   Measure the belt at a position where the span is the longest (front or back)

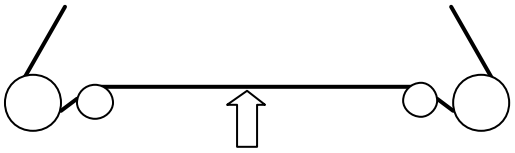


Figure 20

2. Remove the minus OT flag for the Z-axis.
3. Lower the servo pack gain value to 30. (Pn100) for CP-732/733E
4. Loosen the mechanical lock at the Z-axis drive pulley. (make sure the motor shaft turns freely)
5. Inch the Z servo count to – 900 pulses.
6. Lower the Z-axis table toward the (–) mechanical stopper and insert a 0.2mm feeler gauge between the stopper and base of the table. (stopper at upper left side of table)
7. Lock the four securing bolts for the mechanical lock with a 1N.m torque wrench.
8. Check that the pulse count is close to – 900 when using the 0.2mm gap gauge.
9. Attach the – OT flag with the pulse count at **–** 500 pulses.
10. To set the software travel limit, find the pulse count where the minus OT sensor just turns ON. Set the Z Min limit position as follows:

    Press: [Maintenance] → [Calibration] → [Travel Limits] → [Minimum Limit Z]

    Note: Set the Maximum limit after the loader adjustment has been completed.
    (Refer to the tables in step 13 for details)

11. Return the Z-axis servo pack gain value (Pn100) for CP-732/733E to 70.

12. Lift the Z-axis to the + mechanical stopper and ensure the pulse count is within the following range.

(CP-742/743(M)E) 24450 +/- 250 pulses

(CP-732/733E) 16850 to 17350 pulses

13. The following tables list the Z axis proper and physical data reference values:

CP-742/743(M)E

Z Axis Proper Item	Reference Value (0.002mm/pulse)
+ Mechanical stopper	24450 +/- 250
+ OT sensor ON	(ZL upper + 350) +/- 50
Max Limit Position Z	same as the + OT
Loading Position ZL IN	23100 to 23600
Loading Position ZL OUT	23100 to 23600
Middle Loading Position	(ZL lower – 14000) +/- 50
Upper Limit Sensor 1 ON	(Middle Loading Position – 125) +/- 50
Middle O.T sensor ON	(Z0 + 250) +/- 50
Z0	6000 +/- 500
Minimum Limit Position Z	same as the – OT
– OT sensor ON	– 500 +/- 50
– Mechanical stopper	– 1000 +/- 50

CP-732/733E

Z Axis Proper Item	Reference Value (0.002mm/pulse)
+ Mechanical stopper	16850 – 17350
+ OT sensor ON	(ZL upper + 300) +/- 50
Max Limit Position Z	same as the +OT
Loading Position ZL IN	15500 to 16250
Loading Position ZL OUT	15500 to 16250
Middle Loading Position	(ZL lower – 9250) +/- 50
Upper Limit Sensor 1 ON	(Middle Loading Position – 125) +/- 50
Middle OT sensor ON	(Z0 + 250) +/- 50
Z0	5000 +/- 500
Minimum Limit Position Z	same as the – OT
– OT sensor ON	– 500 +/- 50
– Mechanical stopper	– 1000 +/- 50

<I/O → Servo → IN>

SX019	Z axis + OT	(Z plus OT)
SX01A	Z axis – OT	(Z minus OT)

3.10 Main Conveyor PCB Clamping Claw Check and Adjustment

3.10.1 (Part 1) Claw Positioning Adjustment

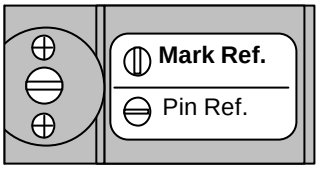


Figure 21

1. Check that the reference pin switch valve is set to “Mark Ref”. (Not needed for CP-732/733E)
2. Lock the rail-clamping claw at the closed position using the solenoid valve.
3. Check that all the individual claws are loose.
4. There is some play in the position of the rail-clamping claw center bracket, so check that this is set at the center of the play.
5. The next step is to lock all the individual claws. When these are locked, the clearance between the tip of the claw and the guide rail should be in the range of 0.03 to 0.10 mm. **(A)** Each claw should be locked using a 4N.m torque wrench. However, before proceeding to lock each claw, there are some other considerations to bear in mind. (See fig.22)

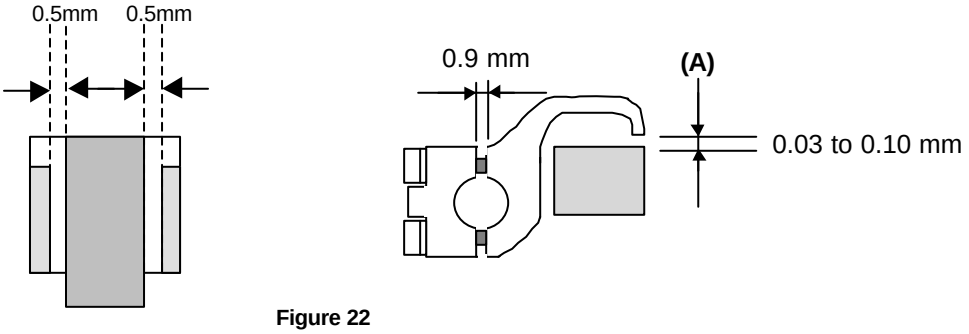


Figure 22

* Note that 0.5mm clearance on both sides is the ideal. However, this may be difficult to achieve. In such cases a rough balance between the two is acceptable.

6. Proceed to lock each claw making sure that the clearance values are within the ranges shown above. It may be useful to lock the two center claws and the two claws at both ends of the rail first, then proceed to lock the claws in between. Remember that clearance between the tip of the claw and the guide rail should be in the range 0.03 to 0.10 mm. The claw is attached to the rail by two 3mm bolts. Tightening the top bolt will increase the clearance, tightening the bottom bolt will decrease the clearance.

3.10.2 (Part 2) Claw Float Adjustment (for CP-742/743(M)E only)

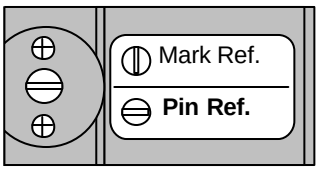


Figure 23

1. Set the reference pin switch valve to “Pin Ref”.
2. Place a 5mm thick PCB in the main conveyor clamper.
3. Activate but do not lock the adjustable rail clamping solenoid.
4. At this position, there should be 0.5mm clearance between the clamper claw tips and the PCB.

5. Use the adjusting bolt on the claw float cylinder to set the clearance at 0.5mm. Note that the clearance will vary slightly at different points on the clamper rail. Set the 0.5mm clearance at the narrowest point.

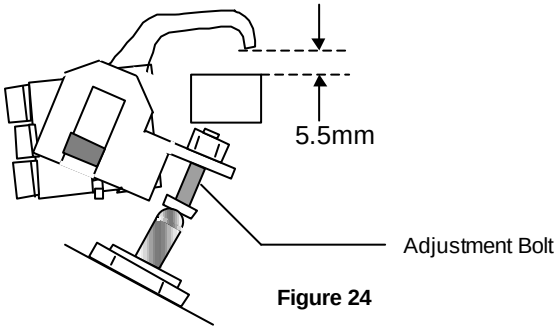


Figure 24

6. On the fixed rail side, set the position of the clamping claw float sensor flag so that the sensor LED is OFF when a 5mm thick PCB is clamped and ON when a 5.5mm PCB is clamped. Note that the clamping solenoid should be activated but not locked for this adjustment. I.e. In this case “clamped” means press the clamping solenoid once but do not lock it. Note: the sensor is Dark-On so when the LED is OFF the I/O input is ON, and vice versa. I/O: (X05A).

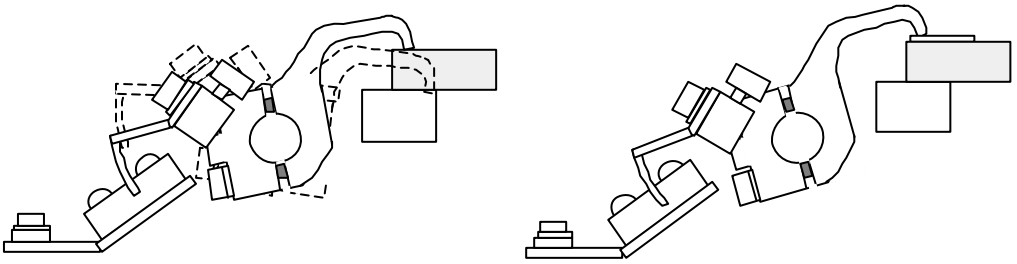


Figure 25

3.10.3 (Part Three) Clamping Cylinder Sensor Adjustment (for all CP7 Series)

1. Check that PCBs in the range of 0.4mm to 5.0mm can be clamped smoothly.

2. There are three clamping cylinders and two sensors on each cylinder. On each cylinder, the upper sensor is the CLAMP CHECK sensor, and the lower sensor is the UNCLAMP CHECK sensor.

3. For the UNCLAMP CHECK sensors, open the rail to its unclamp limit. At this position find the point where the sensor LED turns ON then move it 0.5mm further toward the ON direction.

4. Set the CLAMP CHECK sensors so they are ON when a 5.5mm board is clamped and OFF when a 6.5mm board is clamped. Note that the clamping solenoid should be activated but not locked for this adjustment. I.e. In this case “clamped” means press the clamping solenoid once but do not lock it.

5. Finally confirm that the CLAMP CHECK SENSORS are ON when the clamper rail is clamped with no PCB in place.

6. Clamping Cylinder Sensor locations in the I/O:

<I/0 → Standard →IN>

IN	X05F	XY-TABLE PANEL CLAMP CHECK	(FIXED RAIL RIGHT)
	X060	XY-TABLE PANEL CLAMP CHECK	(ADJUSTABLE RAIL RIGHT)
	X061	XY-TABLE PANEL UNCLAMP CHECK	(FIXED RAIL RIGHT)
	X062	XY-TABLE PANEL UNCLAMP CHECK	(ADJUSTABLE RAIL RIGHT)
	X063	XY-TABLE PANEL CLAMP CHECK	(FIXED RAIL LEFT)
	X064	XY-TABLE PANEL UNCLAMP CHECK	(FIXED RAIL LEFT)
OUT	Y043	XY-TABLE PANEL CLAMP	(FIXED RAIL)
	Y044	XY-TABLE UNPANEL CLAMP	(FIXED RAIL)
	Y045	XY-TABLE PANEL CLAMP	(ADJUSTABLE RAIL)
	Y046	XY-TABLE UNPANEL CLAMP	(ADJUSTABLE RAIL)

3.11 Back-up Pin Interference Prevention Sensor Adjustment

1. Adjust the bracket and volume pot for the Back-up Pin Interference Prevention sensor so the sensor reacts when the adjustable rail is within 5mm from the back-up pins and blocks.

2. Check the sensor reaction using the I/O.

<I/0 → Standard → IN>

X07B	Back Up Pin Check

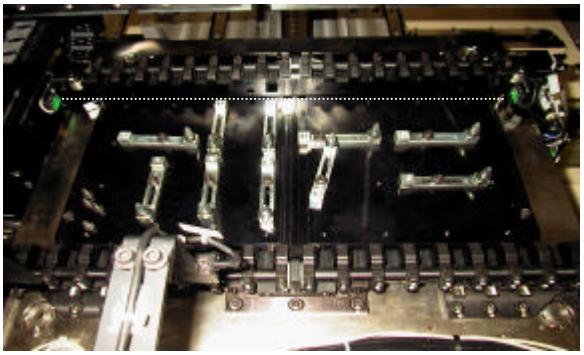


Figure 26

3.12 D-axis Adjustment and Proper Setting

3.12.1 D-axis Adjustment and Proper setting for CP-742/743(M)E and CP-732/733E

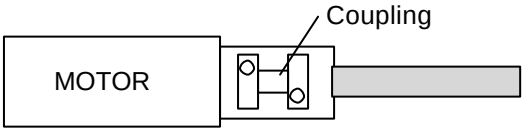


Figure 27

1. Use the I/O to set the D1 and D2 tables as follows:

<I/0 → Standard → OUT>

Y057	D1 PALLET DOWN	Y059	D1 STOPPER UNCLAMP
Y067	D2 PALLET DOWN	Y069	D2 STOPPER UNCLAMP

2. To allow access to the D1 coupling, manually move the D2 table towards the center of the D-axis.
3. Check that the coupling is free to move and is centered between the motor and ball screw shafts.

   Note: Be careful when handling the coupling as some edges may be sharp!
4. Remove the minus OT brackets for D1 and D2.

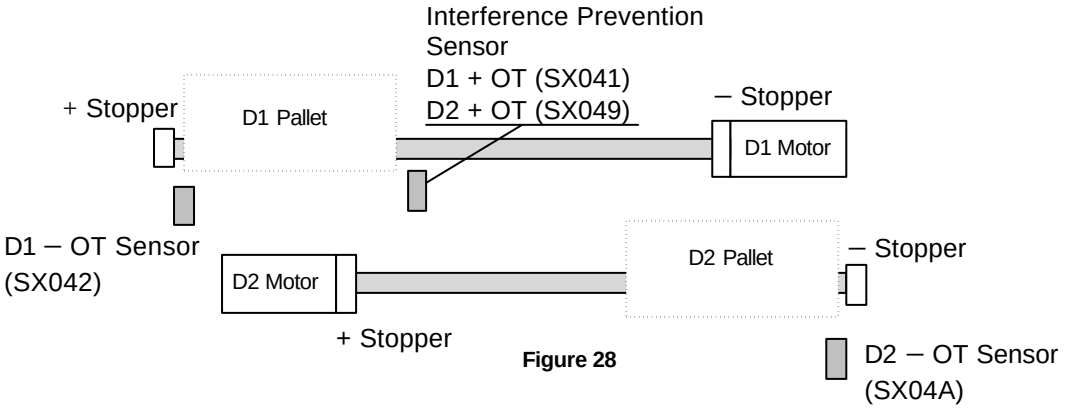


Figure 28

5. Manually turn the ball screw and set the D1 pulse count to 5000 pulses. (D2: Minus 5000)
6. Pull D1 against the + mechanical stopper. (D2 against the – mechanical stopper)
7. Half lock the two visible coupling bolts, one on each side of the coupling.
8. Move D1/D2 away from their mechanical stoppers.
9. Lock the four 5mm bolts in rotation with an 8.3N.m torque wrench (CP-742/743(M)E).
   For CP-732/733E, use an 8.3N.m torque wrench for the 4mm bolts and a 4N.m torque wrench for the 3mm bolts.

   Be careful to ensure that the coupling is locked equally at all 4 points, i.e. the gaps in the coupling should be roughly equal.
10. Set the – OT (D1 / D2) sensors 3500 pulses back from their respective mechanical stoppers. Check that the OT sensor flag is in the center of the sensor.

11. Move the D1-axis back 500 pulses from where the − OT sensor turns ON and set the proper value. (Maximum Limit D1)

    Press: [Maintenance] → [Calibration] → [Travel Limits] → [Maximum Limit D1]

    To set the Min travel limit for (D2), Move the D2-axis back 500 pulses from where the − OT sensor turns ON and set the proper value. (Minimum Limit D2)

    Press: [Maintenance] → [Calibration] → [Travel Limits] → [Minimum Limit D2]

12. The following tables list the D axis proper and physical data reference values:

CP-742/743ME

D Axis Proper Item (D1)	Reference Value (0.002mm/pulse)
+ Mechanical Stopper	5000 +/- 50
− OT Sensor ON	1500 +/- 50
Max Limit Position D1	1000 +/- 50
D1 Original Position	0 +/- 1000
Pick up position T1	(− 670700)
Minimum Limit Position D1	− 673500 +/- 1000
+ OT Sensor ON	− 674000 +/- 1000
− Mechanical Stopper	− 677500 +/- 1000

D Axis Proper Item (D2)	Reference Value (0.002mm/pulse)
− Mechanical Stopper	− 5000 +/- 50
− OT Sensor ON	− 1500 +/- 50
Min Limit Position D2	– 1000 +/- 50
D2 Original Position	0 +/- 1000
Pick up position T2	(351300)
Max Limit Position D2	673500 +/- 1000
+ OT Sensor ON	674000 +/- 1000
+ Mechanical Stopper	677500 +/- 1000

CP-732/733E

D Axis Proper Item (D1)	Reference Value (0.002mm/pulse)
+ Mechanical Stopper	5000 +/- 50
− OT Sensor ON	1500 +/- 50
Max Limit Position D1	1000 +/- 50
D1 Original Position	0 +/- 1000
Pick up position T1	(-504700)
Minimum Limit Position D1	− 507000 +/- 1000
+ OT Sensor ON	− 507500 +/- 1000
− Mechanical Stopper	− 508500 +/- 1000

CP-732/733E

D Axis Proper Item (D2)	Reference Value (0.002mm/pulse)
– Mechanical Stopper	– 5000 +/- 50
– OT Sensor ON	– 1500 +/- 50
Min Limit Position D2	– 1000 +/- 50
D2 Original Position	0 +/- 1000
Pick up position T2	(264300)
Max Limit Position D2	507000 +/- 1000
+ OT Sensor ON	507500 +/- 1000
+ Mechanical Stopper	508500 +/- 1000

3.12.2 CP-742/743E Supplementary Procedure

The method of locking the coupling is slightly different on the CP-742/743E and is described below. For the basic procedure, please refer to section 3.12.1.

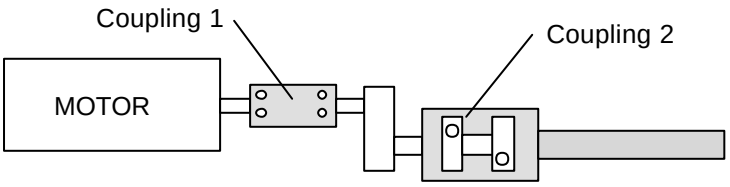


Figure 29

1. Ensure that the D table is against the mechanical stopper.
2. Lock the two right hand bolts of Coupling 1 with an 8.3N.m torque wrench and long 5mm attachment.
3. Lock the two left hand bolts of Coupling 2 with a 67.6N.m torque wrench and 10mm attachment.
4. Lock the two left hand bolts of coupling 1 with an 8.3N.m torque wrench and long 5mm attachment.
5. Rotate Coupling 2 by hand until the pulse count is 5000 pulses (D1). – 5000 pulses (D2).
6. Turn the servo ON.
7. Finally, Lock the two right hand bolts of Coupling 2 with a 67.7N.m torque wrench and 10mm attachment.

8. The following table lists the D axis proper and physical data reference values:

CP-742/743E

D Axis Proper Item (D1)	Reference Value (0.002mm/pulse)
+ Mechanical Stopper	5000 +/- 50
– OT Sensor ON	1500 +/- 50
Max Limit Position D1	1000 +/- 50
D1 Original Position	0 +/- 1000
Pick up position T1	(–1150700)
Minimum Limit Position D1	– 1153500 +/- 1000
+ OT Sensor ON	– 1154000 +/- 1000
– Mechanical Stopper	– 1157500 +/-1000

CP-742/743E

D Axis Proper Item (D2)	Reference Value (0.002mm/pulse)
– Mechanical Stopper	– 5000 +/- 50
– OT Sensor ON	– 1500 +/- 50
Min Limit Position D2	– 1000 +/- 50
D2 Original Position	0 +/- 1000
Pick up position T2	(591300)
Max Limit Position D2	1153500 +/- 1000
+ OT Sensor ON	1154000 +/- 1000
+ Mechanical Stopper	1157500 +/- 1000

3.12.3 D-axis Pallet and Interference Prevention Sensor Adjustment

Note: Whenever moving the D table up and down, the D axis servo count must be at or very close to zero. It is very important that the D table is positioned correctly in relation to the lifter. If not, a crash may occur. Also, check that the lifters are at their lower limit whenever moving the D tables along the D-Axis.

(Part 1) - Speed Controller Setting (all CP7 Series)

1. Move the D tables toward the center of the D axis; well away from the D original position.

2. Temporarily set the lifter UP and lifter Down flow controls:

	CP-742/743(M)E	CP-732/733E
UP	6 x from fully closed	4.5 x from fully closed
DOWN	3.5 x from fully closed	5 x from fully closed

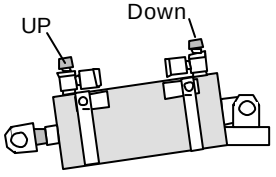


Figure 30

3. Set the 4 PCU Unit Clamp and Unclamp flow controls, 5 x from fully closed then lock.

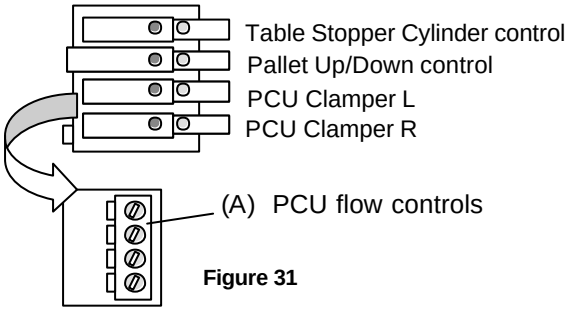


Figure 31

4. Set the D cam cylinder cushioning adjustment screws, 2 x from fully closed, then lock.

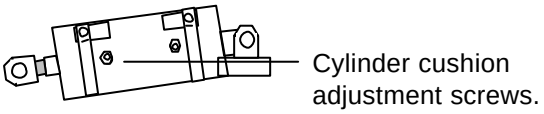


Figure 32

5. Set the D cam cylinder Upper and Lower Limit Check sensors 0.5mm toward the ON position.

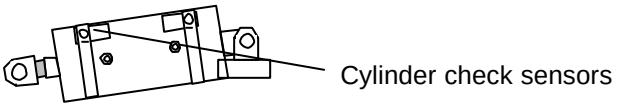


Figure 33

6. Set the D table notch stopper flow controls 3 x from fully closed then lock.

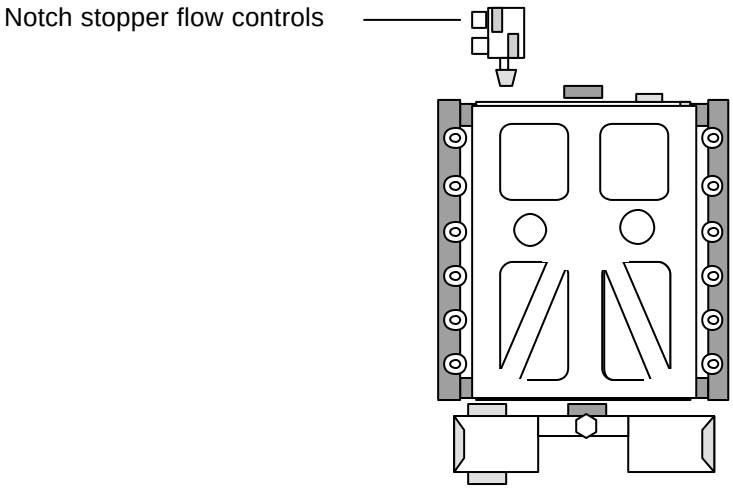


Figure 34

(Part 2) – Interference Prevention Sensor Adjustment (CP-742/743(M)E)

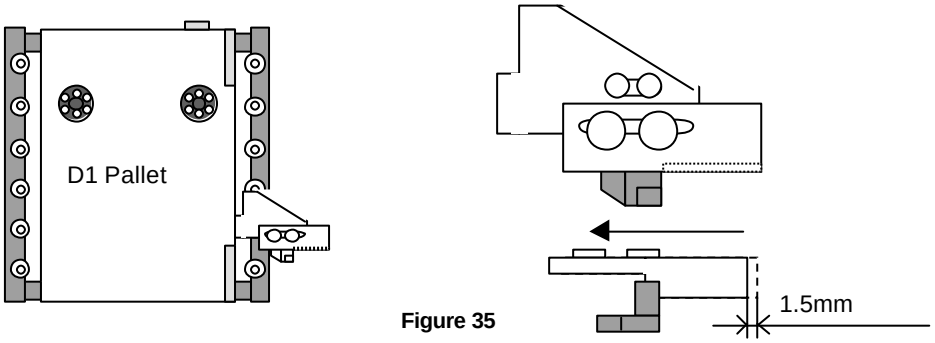


Figure 35

1. Check the motion of the interference prevention sensor bracket. Apply grease if necessary

2. Adjust the bracket so that the sensor LED turns ON when pushing the bracket to the left **1.5mm**.

3. Check that the pitch between the last feeder slot (D1) and the first feeder slot (D2) is (72mm, CP-742/743 Series) (59mm, CP-732/733 Series) when the sensor activates. (See the diagram below). Make sure the bracket does not collide with the mechanical stopper. Use the I/O to check the exact position where the interference prevention sensor activates: D1(SX041), D2 (SX049)

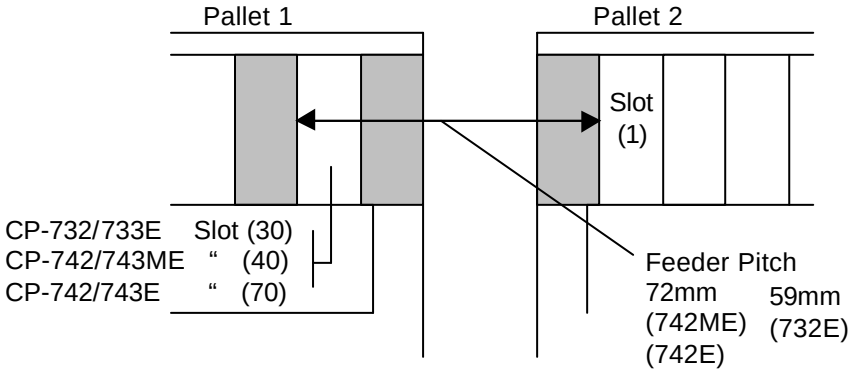


Figure 36

4. Carry out the following procedure to set the software travel limits for D1 and D2. (CP-742/743(M)E)

   4.1 Move D2 to the escape position. (0 pulses)

   4.2 Push D1 towards D2 until the interference sensor just turns ON (D1: SX041) and record the pulse count for D1.

   4.3 Move D1, 500 pulses away from the sensor ON position and set the travel limit as follows:

   Press: [Maintenance] → [Calibration] → [Travel Limits] → [Minimum Limit D1]

   4.4 Move D1 to the escape position (0 pulses)

   4.5 Push D2 towards D1 until the interference sensor just turns ON (D2: SX049) and record the pulse count for D2.

   4.6 Move D2, 500 pulses away from the sensor ON position and set the travel limit as follows:

   Press: [Maintenance] → [Calibration] → [Travel Limits] → [Maximum Limit D2]

Interference Prevention Sensor Adjustment (CP-732/733E)

1. Check the motion of the interference prevention sensor bracket. Apply grease if necessary.

2. Adjust the bracket so that the sensor LED turns ON when pushing the bracket to the left **1.5mm**.

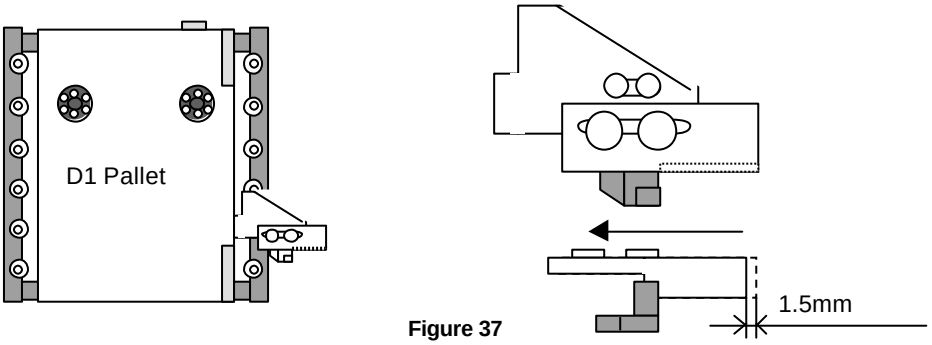


Figure 37

3. Set D2 at the escape position. (0 pulses) Move D1 to the minus mechanical stopper and record the D1 pulse count. (The interference prevention sensor should be ON.) (D1:X041)

4. Move D1 back until the interference prevention sensor just turns OFF. The sensor should turn OFF 1000 +/-500 pulses from the minus mechanical stopper.

5. Move D1, 500 pulses away from the sensor ON position and set the travel limit as follows:

   Press: [Maintenance] → [Calibration] → [Travel Limits] → [Minimum Limit D1]

6. Set D1 at the escape position. (0 pulses) Move D2 to the plus mechanical stopper and record the D2 pulse count. (The interference prevention sensor should be ON.) (D2:X049)

7. Move D2 back until the interference sensor just turns OFF. The sensor should turn OFF 1000 +/-500 pulses from the plus mechanical stopper.

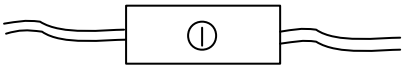
8. Move D2, 500 pulses away from the sensor ON position and set the travel limit as follows:

   Press: [Maintenance] → [Calibration] → [Travel Limits] → [Maximum Limit D2]

(Part 3) – Pallet Adjustment (CP-742/743(M)E & CP-732/733E)

Note: For details on the exact location of the sensors described below, please refer to the CP7 series “Mechanical Reference” manual .

1. Set the height of the PCU Unit, and dock it with the D-axis.
2. Clamp the PCU to the D-axis.
3. Confirm that the PCU SET CHECK sensor is ON. If not, adjust the sensor volume pot so the sensor turns ON. I/O: D1 (X08B), D2 (X0A1).



4. Set the two PCU CLAMP sensors 2mm toward the position they turn ON.
5. Set the two UNCLAMP sensors 0.5mm toward the position they turn ON.

<I/O → Standard → IN>

(X082)	D1 PCU CLAMP CHECK 1
(X083)	D1 PCU UNCLAMP CHECK 1
(X084)	D1 PCU CLAMP CHECK 2
(X085)	D1 PCU UNCLAMP CHECK 2
(X098)	D2 PCU CLAMP CHECK 1
(X099)	D2 PCU UNCLAMP CHECK 1
(X09A)	D2 PCU CLAMP CHECK 2
(X09B)	D2 PCU UNCLAMP CHECK 2

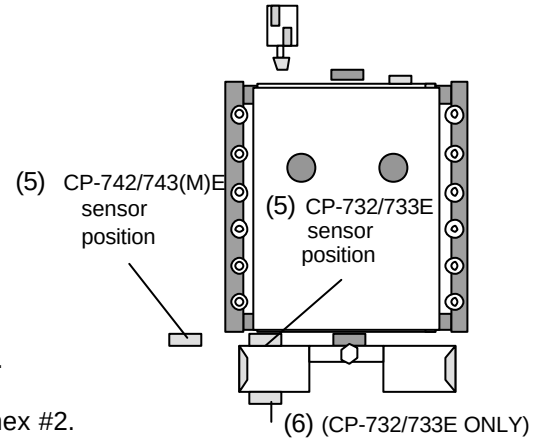


Figure 38

6. Unclamp the PCU Unit and disengage it from the D axis.
7. Grease up the lifter mechanism cams with Daphne Eponex #2.
8. Confirm the lifter is at the lower limit.
9. Bring the D-table to 0 pulses; (the D original position)
10. Press the emergency stop button and ensure the servo power is down.
11. At this point, raise the D-table. Check the lifter up and down speed and make slight adjustments to the flow controls until the motion of the lifter is smooth. (lock the flow controls)
12. With the D table at its upper limit, set the PALLET PASS CHECK (5) sensor volume to half. I/O: D1 (X08A), D2 (X0A0). (Sensor (6) is only used on CP-732. No adjustment required)
13. From the pallet forward-limit position, retract the pallet 1.0mm and adjust the position of the pallet pass check sensor so that it turns ON at this point. (volume set at 1.5 scales)
14. Lower and then raise the D-table and confirm that the PALLET PASS CHECK sensor condition is still okay. (Ensure that it does not turn ON when the pallet is at the forward limit.)
15. With the D-table at the upper limit, clamp the PCU in place.
16. Pull out the pallet and lock it onto the PCU Unit. Then, grease up the bottom section of the D-table with AFC grease at the hi-lighted areas in Fig.39 on the following page.

**Apply AFC grease to the locations hi-lighted (Fig. 39) on the D-table base.

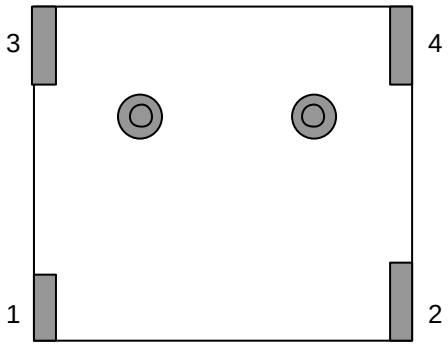


Figure 39

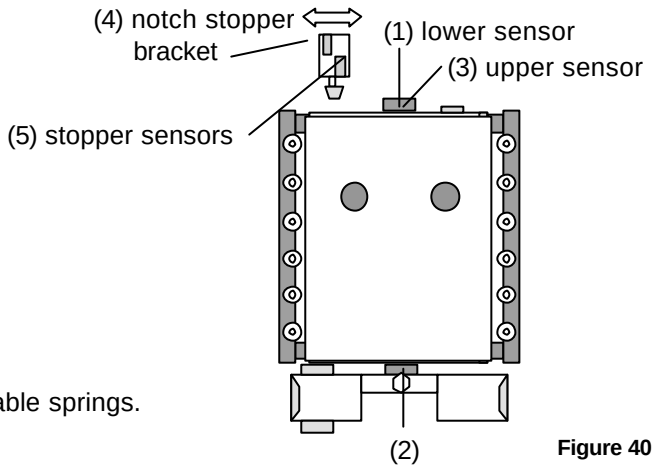


Figure 40

17. Apply Daphne Eponex #2 to the four D-table springs.
18. Replace the pallet.
19. Adjust the pallet sensors (1 at upper limit, 2 at lower limit) mounting bracket in the forward/back directions until the gap between the sensor and dog surface is 1mm.
20. Place two 0.6mm spacers at positions 1 and 2 shown in fig. 39. (CP732/733 ONLY)
21. Lower the table.
22. Set the front side PALLET SETTING CHECK (2) sensor so that it turns OFF with the 0.6mm spacers in place and ON with 0.4mm spacers in place. I/0: D1 (X088), D2 (X09E) (CP732/733 ONLY)
23. Place 0.6mm spacers at positions 3 and 4 shown in fig. 39, then set the back PALLET SETTING CHECK (1) sensor so that it turns OFF with the 0.6mm spacers in place and ON with 0.4mm spacers in place. I/O: D1 (X087), D2 (X09D).
24. Remember to check the PALLET ARRIVE CHECK sensor (3). Check that it is ON when the D-table is at the upper limit. I/O: D1 (X086), D2 (X09C)
25. For the D-axis notch stopper adjustment (4), Make sure the D pulse count is zero pulses. Move the stopper bracket so the piston aligns with the center of the notch in the D- table.
26. Set the TABLE STOPPER LOCK CHECK and UNLOCK CHECK sensors (5) 0.5mm toward the position they turn ON.

<I/O → Standard → IN>

X080	D1 TABLE STOPPER LOCK CHECK
X081	D1 TABLE STOPPER UNLOCK CHECK
X096	D2 TABLE STOPPER LOCK CHECK
X097	D2 TABLE STOPPER UNLOCK CHECK

3.13 D-axis Pallet Flatness Measurement

1. Flatness of the top plates on the pallets is important to maintain consistent pick up. Set up two dial gauges as pictured and indicate the top surface of the feeder plate at the positions illustrated in Fig.41. (Tolerance: within 0.10mm)

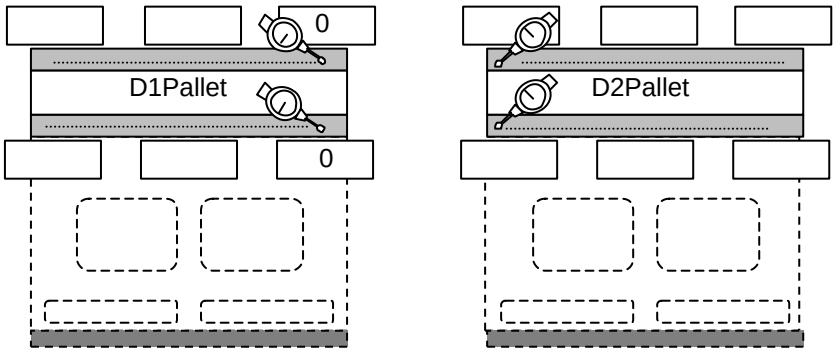


Figure 41

2. If the flatness measurement is out of tolerance, ensure that there are no components caught between the D-axis base plate and pallet. (if problems persist, replace the pallet)

3. Set a dial gauge and block on the machine base and check the flatness from A to B. (Tolerance: within 0.05mm)

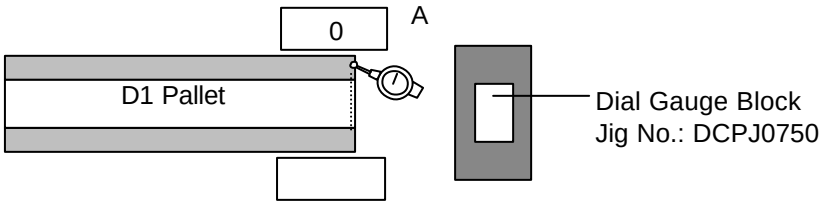


Figure 42

4. Install the feeder height jig at the second and next to last feeder slots on each pallet. Check the flatness of the D1 and D2 pallets. (4 points in total) (Tolerance: within 0.05mm)

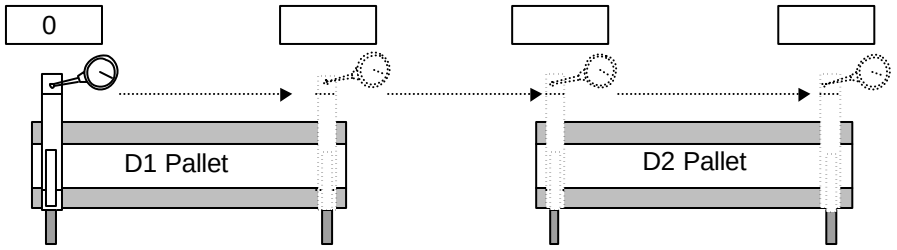
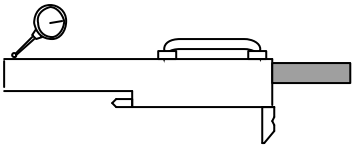


Figure 43

Feeder Height Jig

Jig No.: Z5413AWPJ9270



3.14 Cam Box Positioning Check

1. Attach the positioning jig onto the "A" shaft. Set the cam at 0 and turn the Pick-up valve ON. (Y031)
2. Position the A shaft at station 1 and set the cam to 170 degrees.
3. Install the cam box alignment jig on the pallet. (Tolerance: 0 to + 0.05mm)
4. Check the cam box position at slots:

   3 & 28 of D1 & D2 (CP-732/733E)

   3 & 38 of D1 & D2 (CP-742ME)

   3 & 68 of D1 & D2 (CP-742E)

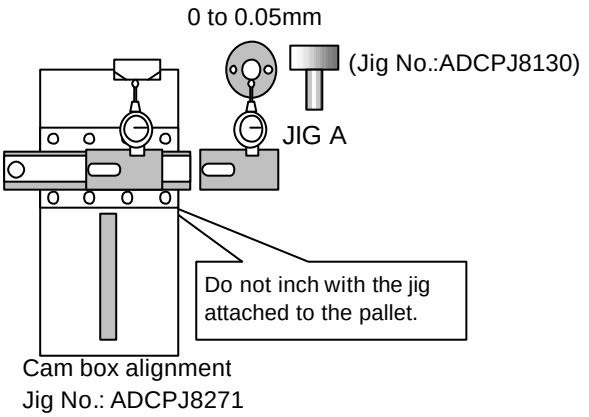


Figure 44

3.15 Pick-up Position Calibration

1. Attach the positioning jig onto the A Shaft. (Jig No.:ADCPJ8130)
2. Set the "Pick up Position" jig on the D1/D2 table at slot No.1. (Jig No.:ADCCPJ8251)
3. Turn the Pick-up valve ON (Y031) and set the cam to 170 degrees at Sta. 1.
4. Balance the dial gauge on both sides of the positioning jig in the X-direction. When the gauge is balanced on each side, this becomes pick up position D1/D2.

   Press: [Maintenance] → [Calibration] → [Pick Up Reference] → [D1/D2] → [Set]

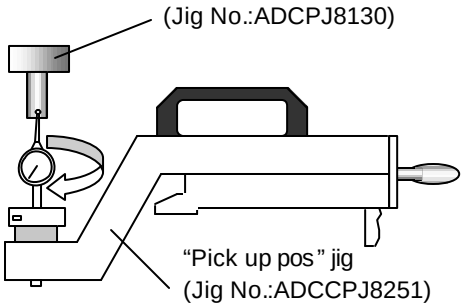


Figure 45

3.16 Shaft Measurement Check

The following steps explain how to check various items on the nozzle shafts. These measurements are required when carrying out adjustments in Chapter 4.

1. Set the Cam angle to 0 degrees.

2. Turn the 9th station place solenoid ON. (Y035)

3. Using shaft A as the zero reference, measure the height of the shaft flange (1) for all the shafts A to P. Measure with the cam at 180 degrees. Push down on the flange slightly with a finger so the position of the shaft remains consistent.
   (Tolerance: < 0.05mm)

   Measure both ends of the shaft flange to ensure it is flat; the difference between the two ends of the flange should be 0.01mm or less.

4. Use spool A as the reference and measure the height of spools A to P. Note that the height of the spool should be measured when it is at the upper limit (2). Measure at 180 degrees. Push down on the flange slightly with a finger so the position of the shafts remains consistent.
   (Tolerance: < 0.15mm)

5. Measure the stroke of the 10th station. (at 200 degrees) Put the dial gauge on the under side underside of the clutch (3). Find the lowest shaft (the shaft that pushes down the least) and set the stroke for this shaft within the range of 0.3 to 0.35mm. Note that 0.31mm is the ideal value. Also be aware that when rotating the shaft the stroke amount will change; set the stroke where the clutch underside is lowest. When rotating the shaft the fluctuation in the stroke amount should be less than 0.05mm.

6. As mentioned above, the stroke of the lowest shaft should be within the range of 0.3 to 0.35mm. The stroke of all the other shafts must be within the range 0.3 (Min) to 0.45mm.(Max)

7. Measure the position spool valves A to P (4) in the X- direction. Tolerance: within 0.1mm. If out of range, loosen the two screws on the valve and reposition. (Torque = 0.8N.m)

8. For the adjustments that follow in Chapter 4, it is necessary to identify the following three shafts:

   1. Finding the low shaft.

   2. Establishing the mid shaft. (Average deflection)

   3. Finding the shaft with the low spool valve.

   4. Finding the shaft with the highest spool. (used for station 13 adjustment)

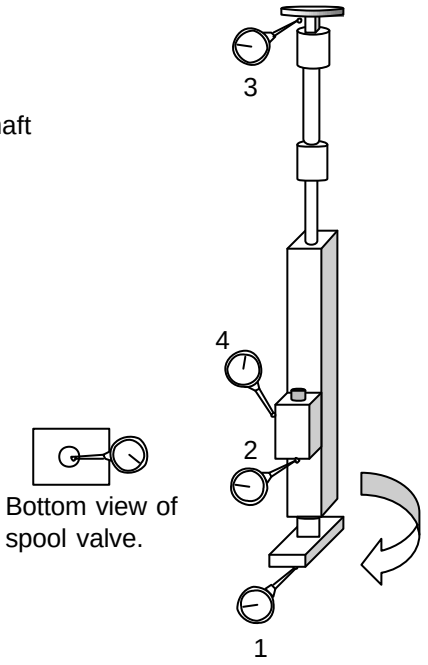


Figure 46

3.17 Slider Height Adjustment for ST1, ST9

To set the slider height, it will be necessary to remove a shaft assembly. Choose either the G or O shaft for removal, as these are the only two points open enough to make the measurements.

1. Move the shaft to be removed near ST9 and set the cam angle to 0 degrees. Place a 7mm spanner at position A and remove the 2.5mm socket hex bolt from the top of the clutch.

2. Remove the four retainers for the linear guide and disconnect the vacuum hose. Remove the shaft assembly from the index unit.

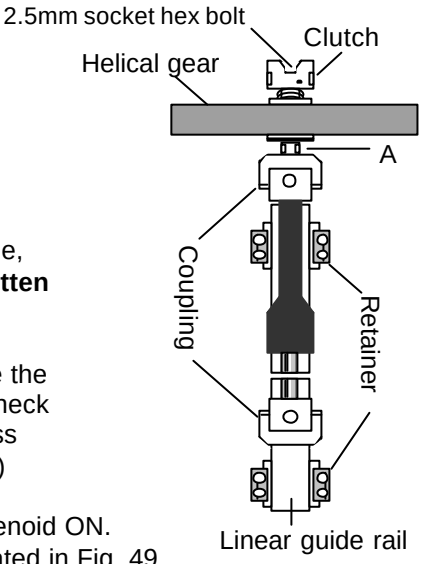


Figure 47

3.17.1 Adjusting the slider height

Note: The following procedure for CP-7 series machines is the same, **(except for the 9th station on CP-742/743(M)E which is written in step 3.17.2.)**

1. With the Placing and Pick-up valves OFF, move the opening where the shaft was removed to Station 9 and set the cam at 180 degrees. Check the flatness of the slider surface as indicated in Fig. 48. (the flatness should be zero) Follow the same procedure for Station 1. (Pick-up)

2. For station 9, turn the cam to zero degrees and turn the placing solenoid ON. Measure the slider height in relation to the cylindrical cam as illustrated in Fig. 49.

   Adjust the height of the slider for Station 9 by adjusting the 9th station rod in the Cam Box. After adjustment, rotate the cam a few times and return to check the value again. Once complete, ensure the lock nut is securely tightened on the 9th station rod.

3. For station 1, turn the cam to zero degrees, turn the Pick-up solenoid ON and make sure the NZ axis is set at the minus mechanical stopper. Measure the slider height in relation to the cylindrical cam as illustrated in Fig. 49.

   Adjust the height of the slider for Station 1 by adjusting the bolts shown in Figure 50. After the adjustment rotate the cam a few times and return to check the value again. Once complete, ensure the lock nut is securely tightened on the 1st station slider bracket.
   (Use Loctite # 262 when securing the nut)

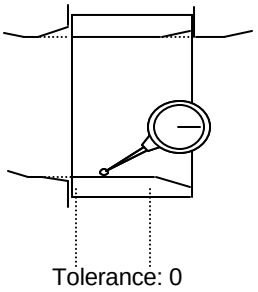


Figure 48

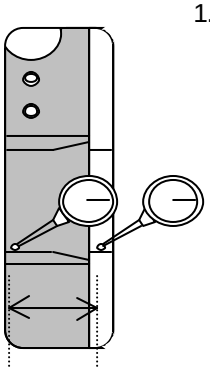
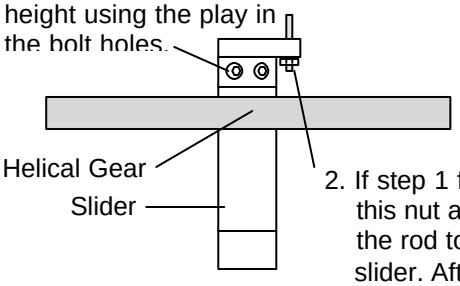


Figure 49

1. Loosen the two bolts here and try to adjust the slider height using the play in the bolt holes.



2. If step 1 fails, loosen this nut and turn the rod to adjust the slider. After completion, ensure the nut is securely tightened.

Figure 50

3.17.2 Adjusting the 9th station slider for CP-742/743(M)E

1. Remove shaft G or O to gain access to the 9th station slider.
2. Turn the cam to 0 degrees and turn the placing solenoid valve ON. (Y035)
3. Adjust the slider height, so the leading edge top surface between the cylindrical cam and slider is smooth to the touch. See Fig. 51.

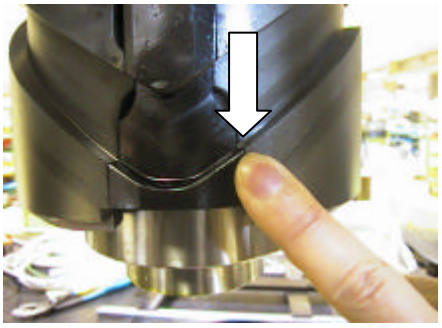


Figure 51

4. Adjust the height using the 9th station adjustment rod in the cam box. After completion, rotate the index and return to check the position. If OK, then make sure the lock nut is tight on the rod.

3.18 Reattaching the Shaft Assembly

When the slider height adjustment has been completed, reattach the shaft in the reverse order removed.

1. Tighten the retainer installation bolts (M4 x 12) using a torque wrench:

   Torque value: 1.96N.m (20Kgf/cm)

2. Using the bar jig (at station 9), re-install the shaft assembly (with the cam at 180 degrees) and align the holder and clutch so the alignment jig inserts smoothly between the holder and the clutch. (there should be NO resistance) It is important for all shafts and clutches to be aligned properly in order to avoid problems later on.

3.19 Placing Height Z0 Calibration

Carry out the procedure listed below to set the Placing Origin height. (Z0)

NOTE: Calibrate only after adjusting the ST9 slider height.

1. Turn the ST9 solenoid valve ON at 0 degrees.

   Y035 PLACE SOL ENGAGED

2. After the Z- axis adjustment is completed, clamp the jig plate (fig. 52) in the middle of the table, and install the nozzle jig in the A holder.

3. Manually move the jig under the ST9, placing point.

4. Set the cam angle at 180 degrees to lower the nozzle jig. Manually raise the Z-axis so that the nozzle jig is in contact with a feeler gauge jig (-0.3mm). The Z-axis servo counter at this time is Z0.

   Target: CP-732/733E (5000 +/-500 pulses)

   Target: CP-742/743(M)E (6000 +/-500 pulses)

5. Calibrate "Z0" on the reference side, adjustable side and center of the jig plate. The deviation between each measuring point should be within 50 pulses of each other.

6. Enter the average value (of the three measurement points) to the proper as follows:

   Press: [Maintenance] → [Calibration] → [Placing Reference] → [Z0] → [Set]

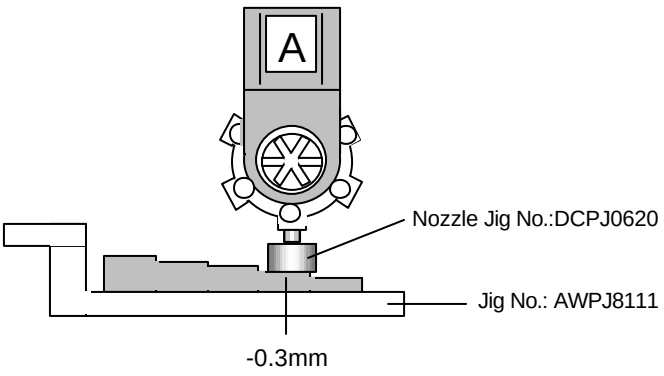
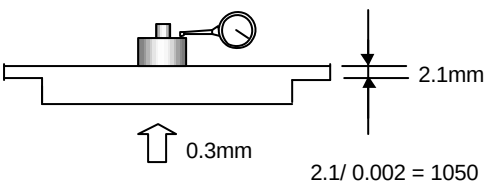


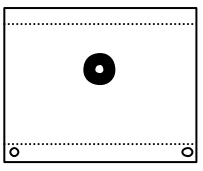
Figure 52

IMPORTANT!!

The placing height calibration is critically important to ensuring stable placement. If not adjusted correctly, damage to components may occur (due to shock from nozzle) or placing accuracy will not be at optimum levels. Be sure to use care when making adjustments in this area.

7. Alternatively, clamp the XC/YC calibration plate in the center of the table. Raise the Z-axis until the dial gauge deflects 0.3mm. The proper value will be the servo pulse count with the gauge deflected 0.3, plus 1050 (thickness of the jig plate). This procedure works well resulting in basically the same value as obtained using the procedure in steps 1 to 6.





Jig No.: AJPJ0062

Figure 53

Notes:

Chapter 4

Station Adjustment

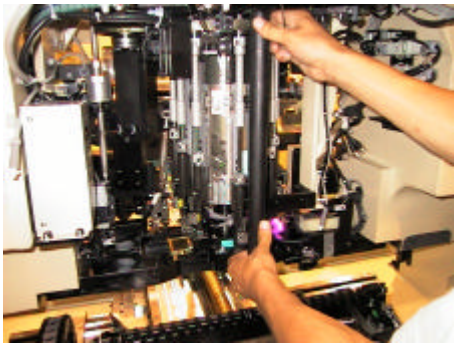
Chapter 4 Station Adjustment

4.1 Shaft Assembly Adjustment

1. With the cam at 0 degrees, turn the 9th station placing solenoid valve OFF. (Y034)

2. Make sure that there is a nozzle holder on shaft A.

3. Check the alignment of the holder and clutch at 180 degrees. Use the jig indicated in Fig.1.



Jig No. CP-732/733E: DCPJ0431
CP-742/743(M)E: DGPJ0020.

Figure 1

4. If the holder and clutch are not aligned correctly, use a 7mm spanner at position A in the diagram below; and a 2.5mm L-wrench at position B, to loosen the shaft assembly and realign them.

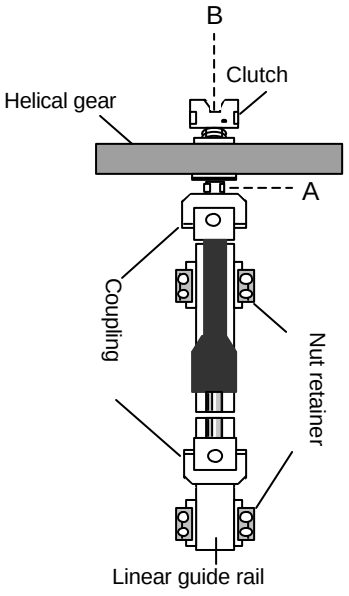


Figure 2

5. When the clutch and holder on the shaft assembly are correctly aligned, there should be no resistance with the jig.

6. Finally, in preparation for the adjustments that follow, remove the holder from shaft A.

4.2 PQ, FQ, and RQ Stroke Adjustment

1. Adjustments should be performed with the servo power OFF.

2. Use the low shaft (identified in section 3.16) to set the stroke of stations 2, 8, and 10.

3. With the cam at 200 degrees, clutch (1), and the low shaft clutch (2) should be engaged.

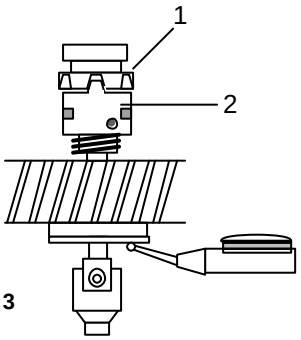


Figure 3

4. Set the stroke in the range of 0.30 to 0.35mm, (0.31mm is the ideal value). Note that the stroke value will change when rotating the shaft; set the stroke at the point where the shaft descends the least. When rotating the shaft, the stroke should not fluctuate by more than 0.05mm.

4.3 3rd Station Origin Position and Stroke Adjustment

1. This adjustment should be performed with the servo power OFF.

2. Move the low shaft to the 3rd station at 200 degrees.

3. Engage and align the 3rd station clutch (1) with the low shaft, by adjusting the position of bracket (2):

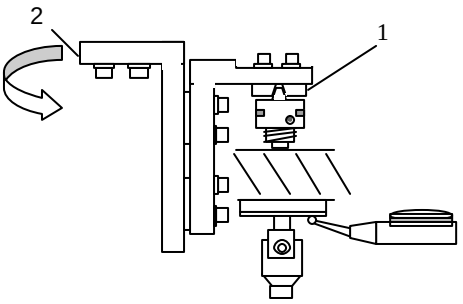


Figure 4

4. To check that the clutch and low shaft are properly aligned, rotate the shaft, and measure the difference in stroke when the shaft is at 0, 90, 180, and 270 degrees. Tolerance is 0.030mm.

5. Once the clutch is aligned within tolerance, proceed to set the 3rd station stroke.

6. Set the length of the third station rod, (located in the cam box at the rear of the machine), to minimum. (See figure 5 below)

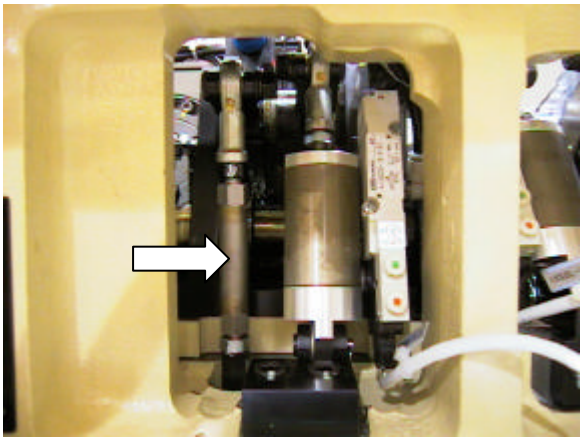


Figure 5

7. With the cam at 200 degrees, set the 3rd station stroke within a range of 0.30 to 0.35mm, (0.31mm is the ideal value). Set the stroke by turning the stroke-adjusting rod, (located at the rear of the machine next to the PQ motor). (See figure 6 below)

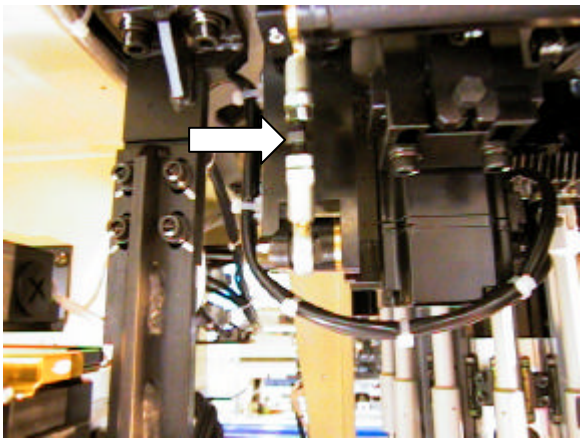


Figure 6

8. When setting the stroke, ensure that the adjustment nut (at the tip of the arrow in Fig.6), is in the center of the stroke-adjusting rod.

9. Once the stroke adjustment is completed, place the 3rd station origin jig, or the common jig, on shaft A.

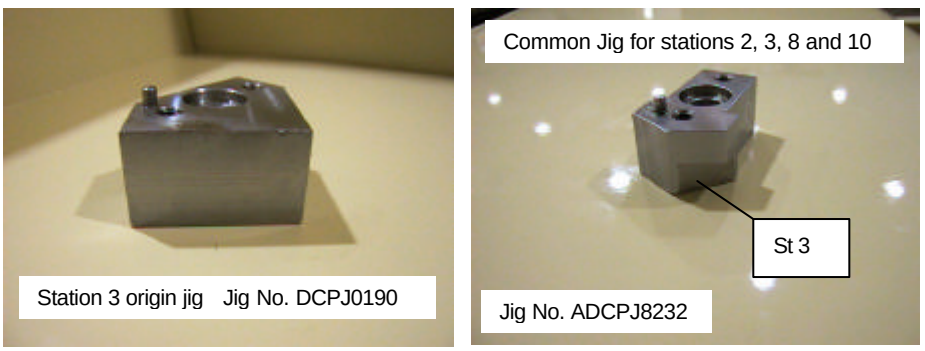


Figure 7

10. Taking care to ensure that the jig does not interfere with the adjacent shafts, bring shaft A to the 3rd station at 200 degrees.

11. Loosen the two 5.5mm hex bolts above the third station clutch (Fig. 8).

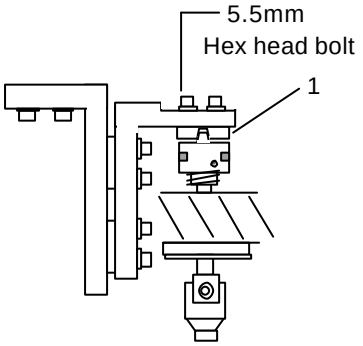


Figure 8

12. Rotate the position of the clutch (1) until the 3rd station origin jig is parallel to the D axis. Use a dial gauge on the D axis to measure the surface of the jig. (Tolerance: 0 +/- 0.01mm)

13. Having locked the two 5.5mm hex bolts, and secured the clutch angle, double check that the jig is still parallel to the D axis. Do this by rotating the jig past the 4th station, then back beyond the 3rd station, and finally forward to mesh once again with the 3rd station at 200 degrees

4.4 Head A Check Sensor Adjustment

1. Adjust the position of the sensor bracket so that the head "A" sensor turns OFF between 318 to 320 degrees.

2. Note that the target clearance between the sensor and the helical gear is > 0.5mm.

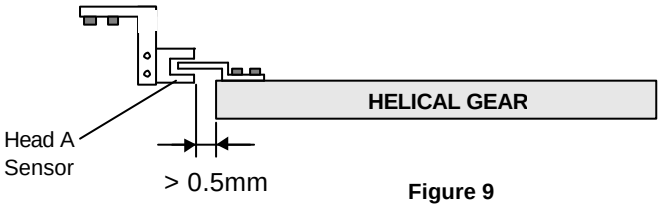


Figure 9

3. Check the sensor reaction in I/O.

<I/O → Standard → IN>

X04F	ST 11 HEAD A CHECK

4.5 PQ, FQ, RQ-axes Timing Belt Tension

Equipment Checklist:
1- 5mm T-wrench
1- 5mm L-wrench
1- 8mm spanner
1- Tension Meter

1. Use a tension meter to measure the tension of the 2nd, 8th and 10th station timing belts. The target values are shown below:

Station 2	PQ	220 +/- 5 Hz
Station 8	FQ	242 +/- 5 Hz
Station 10	RQ	214 +/- 5 Hz

4.6 PQ, FQ, RQ-axes Proper Data Setting (0.05 deg/pulse)

1. Note that this adjustment should be performed with the servo power OFF.

2. Before setting proper data, the tension of the timing belts must be set.

3. Use the jigs below to measure the origin positions of PQ, FQ and RQ. The common jig is suitable for measuring the origin positions of all three axes.

Figure 10

4. Confirm that the ”A “ shaft assembly is properly aligned, then place the relevant jig on shaft A.

5. The origin position of each station should be measured at 200 degrees. When rotating the cam with a jig attached, ensure the jig does not interfere with neighboring shafts.

6. Use a dial gauge on the X or D axis to find the origin position of PQ, FQ & RQ. The origin position proper data should be within 0 +/- 500 pulses. At first, rotate the axis to zero pulses and then align with the jig.

7. Once the origin position is established, input the proper data by performing the following commands:

   Press: [Maintenance] → [Calibration] → [Origin Pos Offset] → [PQ], [FQ], or [RQ] → [Set].

8. Finally, receive the proper data to the host.

4.7 10th Station Origin Position Sensor Adjustment

1. Select a shaft with an average stroke amount (mid-shaft).

2. Set a gap of 5mm between the nozzle origin sensor and the clutch head by moving the fiber sensor in or out.

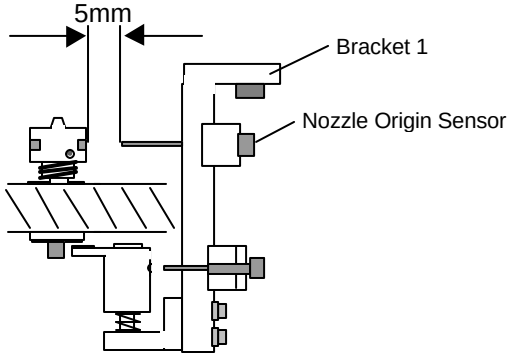
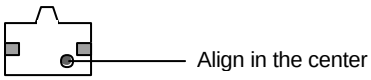


Figure 11

3. Set the RQ pulse count to the RQ Original Position as measured in step 4.6.

4. Engage the mid-shaft with the 10th station at 200 degrees.

5. Align the fiber sensor beam in the center of the nozzle origin hole by adjusting bracket 1.



6. Set the sensor amp to D-ON.

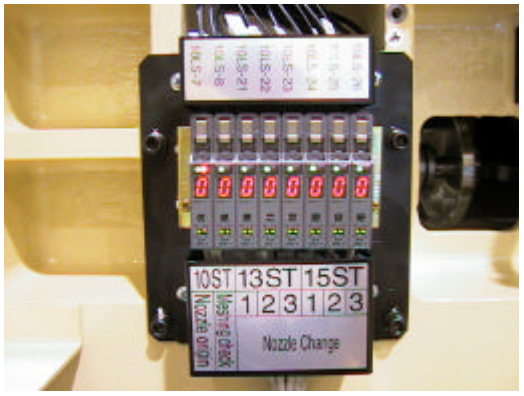


Figure 12

7. Set the mode switch to SET.

8. Press the tuning button once when the beam is in the center of the nozzle origin hole.

9. Rotate the shaft until the beam is away from the hole and focused on the clutch itself. Press the tuning button one more time and set the mode switch to run.

10. Check to confirm that the amplifier reads 0 when the beam is focused on the center of the hole and 9 when focused elsewhere on the clutch.

11. Confirm sensor operation using the I/O:

<I/O → Standard → IN>

X039	ST10 NOZZLE CLUTCH ORIGIN POS.

4.8 10th Station Clutch Engagement Check Sensor

1. Set the clearance between the fiber sensor and the meshing check block to 1mm.

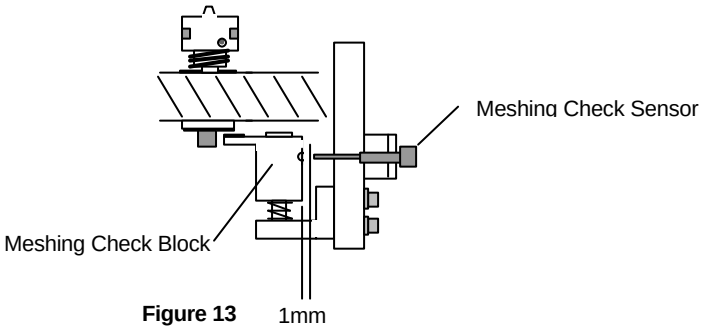
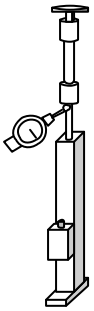


Figure 13

2. Set a dial gauge on the low-shaft as illustrated in the diagram below:



3. Set the clearance between the clutch underside (when it is properly engaged) and the meshing check block to 0.2mm by adjusting bolts “A” shown in figure 14 below. Measure the clearance by depressing the shaft until you feel it make contact with the meshing check block.

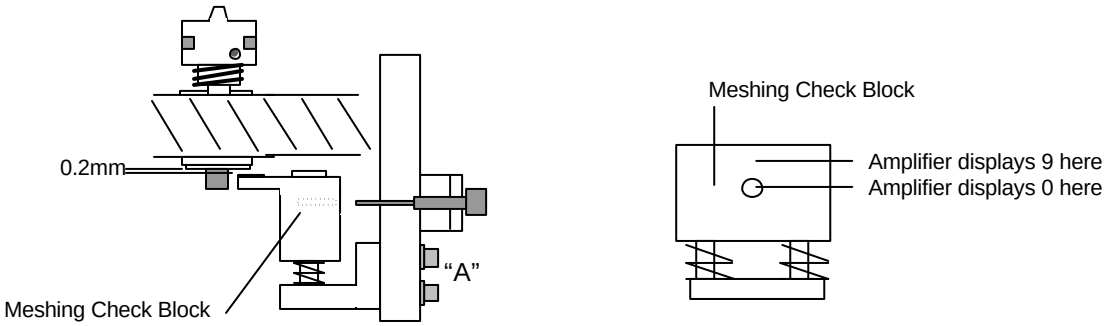


Figure 14

4. Adjust the fiber sensor bracket so that the sensor aligns with the through hole in the meshing check block.

5. Set the sensor amplifier to L-ON and set the mode switch to SET.

6. Make sure the shaft is correctly engaged, then press the tuning button once; (at this point the beam is centered in the hole).

7. Disengage the shaft from the 10th station clutch so that the top of the shaft and the station clutch are not aligned. Press the tuning button one more time; (at this point the beam is focused above the hole).

8. Set the amplifier mode switch to RUN.

9. Confirm for all shafts that the amplifier display reads 0 when the clutch is correctly engaged at 200 degrees, and 9 when the clutch is NOT correctly engaged.

   Note: In some cases, it may be necessary to keep re-tuning the sensor amplifier until you get results of 0 and 9 for all shafts. If these results cannot be achieved, the clearance between the clutch underside and the meshing check block may not be enough, or the optical fiber connections to the amplifier may need trimming with a fiber cutter.

10. Confirm sensor operation using the I/O:

<I/O → Standard → IN>

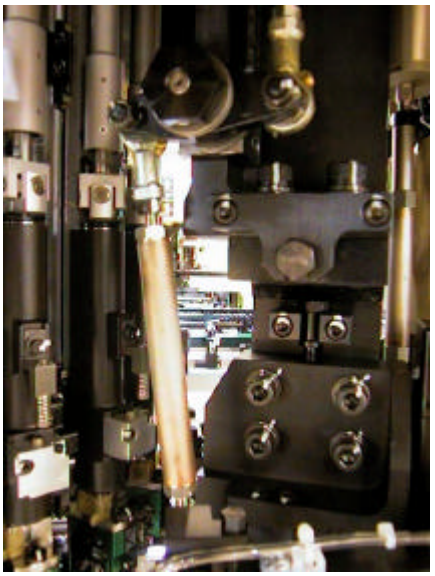
X03A	ST10 NOZZLE CLUTCH ENGAGEMENT CHECK

4.9 Nozzle Changer Adjustment

Follow the procedure below in order to adjust the Nozzle Change Mechanism Correctly.
There are several items for adjustment.

4.9.1 Alignment
4.9.2 Gear Backlash
4.9.3 Stroke
4.9.4 NC origin proper data

4.9.1 Nozzle Changer Alignment Adjustment



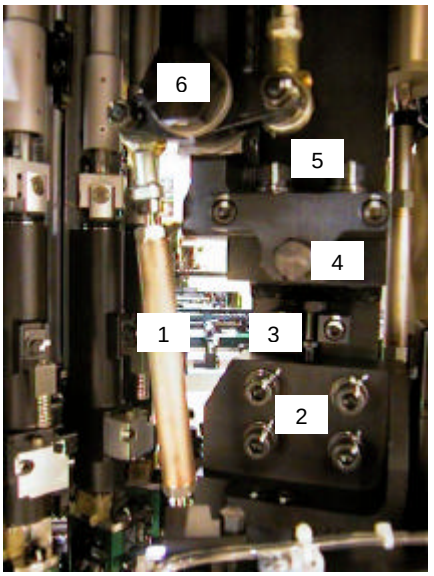


Figure 15

Item 1 = Stroke adjusting rod

Item 2 = UP/DOWN positioning bolts

Item 3 = Height adjusting bolt

Item 4 = Fwd/Bwd adjusting bolt

Item 5 = Fwd/Bwd positioning bolts

Item 6 = N.C intersection lever

1. At 0 degrees, disconnect the air supply to the machine.
2. Remove the cover from the nozzle change drive gears.
3. Turn the 14th station nozzle changer solenoid OFF at 0 degrees. (Y036)
4. Move shaft A to the 15th station and install the alignment jig.
5. Carefully rotate the jig into the 14th station and set the cam at 200 degrees.

Caution: because the jig spans two shafts, never rotate the cam outside of stations 14 and 15.

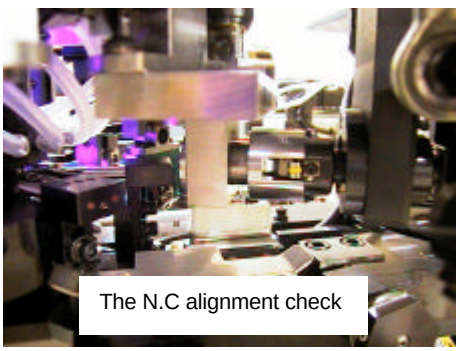


Figure 16

6. Confirm that the N.C axis fits smoothly into the jig. If not, adjust by loosening the up/down and forward/backward positioning bolts and utilizing the adjustment bolts.

7. Confirm that the N.C intersection lever shown in figure 15 (item 6) is horizontal when the cam is at 0 degrees. Adjust otherwise.

4.9.2 Nozzle Changer Gear Backlash Adjustment

1. Confirm that the two gears where the motor intersects the NC axis are aligned correctly. Then lock the 4 small set screws (there are two on each gear):

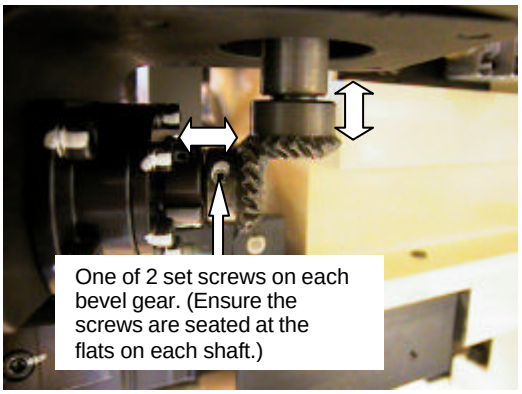


Figure 17

2. Turn the servo ON.

3. Place a dial gauge on the lower of the two gears (see figure 18 below) and measure the backlash of the gear at four points: 0, 90, 180 and 270 degrees. The backlash should be in the range 0.03 to 0.13mm. If the backlash is not in range, realign the two gears as described in step 1.

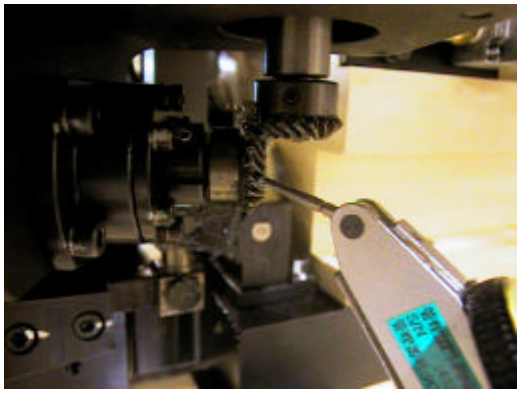


Figure 18

4.9.3 Nozzle Changer Stroke Adjustment

1. Turn the servo OFF and attach a nozzle holder to shaft A.

2. Set the 10th station RQ to its original position and rotate the A-shaft through the 10th station to make sure the nozzle holder is aligned correctly.

3. Rotate the “A “ shaft with holder attached to the 13th station at 0 degrees.

4. Turn ON the 14th station, nozzle changer solenoid valve by I/O: [I/O] → [Standard] → [OUT] → Y037 ST14 NOZ CHANGE SOLENOID ENGAGED.

5. Rotate the A-shaft towards the 14th station and just before the nozzle changer clutch engages with the nozzle holder (at around 130 degrees) place a dial gauge on the nozzle holder as shown in figure 19 on the following page.

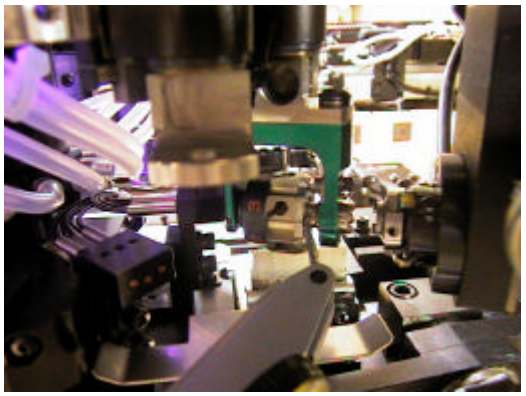
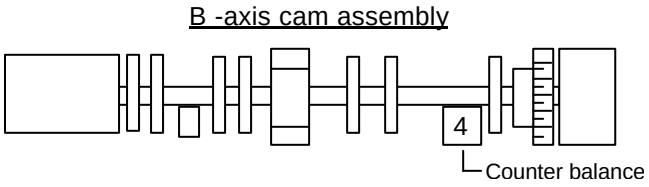


Figure 19

6. To check the stroke, the cam needs to be set at a specific angle. Due to recent changes of the B-cam assembly, the cam angle depends on the type of B-cam assembly. To identify which type, look at the markings on the side of the B-axis counter balance lobe.

   If the marking is “3 or 4”, the cam angle should be set to 141 degrees and the stroke amount should be within 0.01 to 0.05mm. (“3 or 4” identifies the old type B-axis assembly)

   If the marking is “x”, the cam angle should be 146 degrees and the stroke amount should be within 0.01 to 0.05mm. (“X” indicates the newer type B-axis assembly)



CP742(M)E/732E = 141 degrees

CP743(M)E/733E = 146 degrees
Or
Check the marking on the B-cam as indicated in step 6.

7. If not within range, loosen the two bolts of the stroke adjustment rod (item 1 in figure 15) and turn the rod to change the stroke amount.

8. Once the stroke is set within range, lock the two bolts and recheck the stroke.

4.9.4 Nozzle Change Origin Position Calibration

1. Set a shaft at the RQ origin position and move it to station 13 at 0 degrees. (This action will align the nozzle holder to the correct position for nozzle changing)

2. Rotate the NC motor to around zero pulses. Rotate the rotor until it is horizontal. When the rotor is horizontal, the pulse count must be within 0 +/- 1800.

3. Turn the 14th Station solenoid valve ON. (Y037) and slowly rotate the cam to 141 degrees (CP742(M)E/732E) or 146 degrees (CP743(M)E/733E) to engage the NC clutch rotor with the nozzle holder clutch at station 14 while holding the clutch horizontal.

4. Move the cam-axis to a position where the clutch starts to engage and where the backlash decreases for the NC clutch rotation.

5. When the lower gear is rotated in the above situation, the counter will vary due to the backlash. Take the center value and set it as the NC Origin Position.

   Note: The proper data can be either plus or minus. However, make sure that the value does not exceed +/- 1800 pulses.

   Press: [Maintenance] → [Calibration] → [Origin Position Offset] → [NC]

4.10 Nozzle Type Check Sensor Adjustment at the 13th and 15th Stations

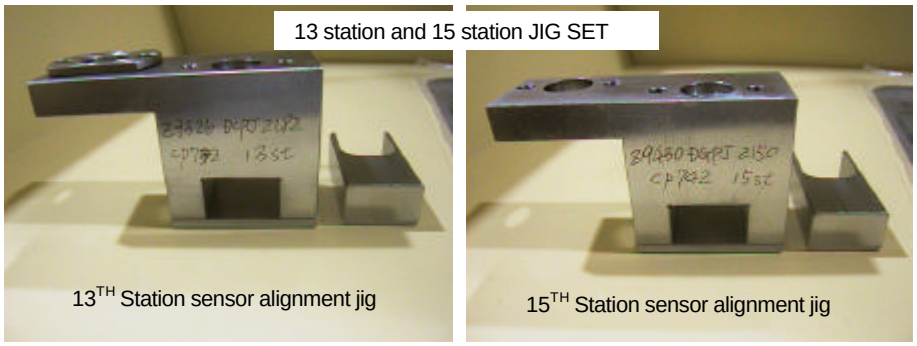


Figure 20

CP-732/733E Jig No. ADGPJ8050
CP-742/743(M)E Jig No. ADCPJ8030

1. Remove the 13th station reject parts brush, as this will interfere with the jigs.

2. Move the cam to 200 degrees. Install the above jigs in turn and check/adjust the alignment of the 13th and 15th stations by sliding the "sliding jig" into the sensor holder brackets.
Caution – the jigs span two shafts so never rotate the cam when they are in place.

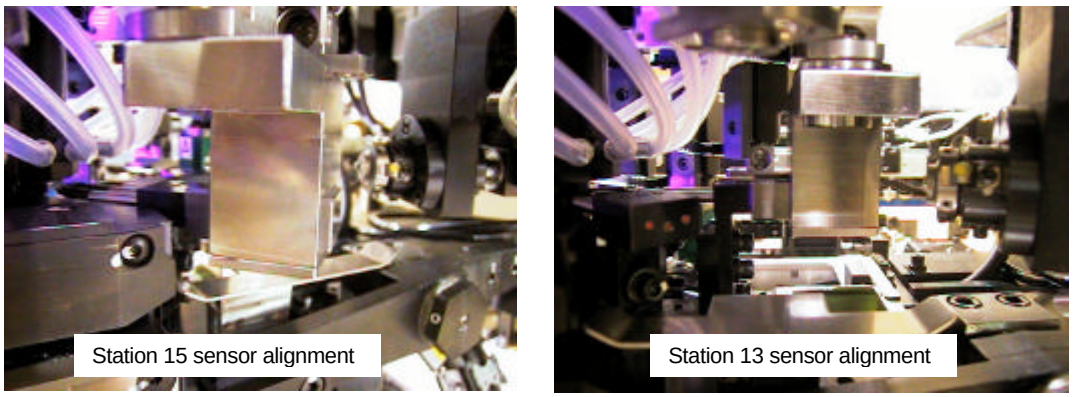


Figure 21

3. Once alignment is achieved, put the fiber sensors to their forward limit and lock the set screw for each sensor.

4. Put a holder on shaft A and align it at the 10th station RQ original position.

5. Set the six sensor amplifiers to L-ON.

6. Set the mode switch of the six sensor amplifiers to SET.

7. Set the nozzle holder to the number 2 nozzle.

8. Move the nozzle holder on shaft A to the 13th station and 15th station in turn. For each station ensure that the cam angle is at 200 degrees and the nozzle holder in place, then press the tuning button once.

9. Next, set the nozzle holder to the number 6 nozzle.

10. Move the nozzle holder on shaft A to the 13th station and 15th station in turn. For each station ensure that the cam is at 200 degrees and the nozzle holder in place, then press the tuning button one more time.

11. Finally, set the sensor amplifiers from SET to RUN.

12. Check that the sensors react correctly when the nozzle holder is set to the positions shown in the following table:

	Sensor 1	Sensor 2	Sensor 3
Nozzle No. 1	8 ~ 9 (ON)	0 ~ 1 (OFF)	0 ~ 1 (OFF)
Nozzle No. 2	0 ~ 1 (OFF)	8 ~ 9 (ON)	0 ~ 1 (OFF)
Nozzle No. 3	0 ~ 1 (OFF)	0 ~ 1 (OFF)	8 ~ 9 (ON)
Nozzle No. 4	8 ~ 9 (ON)	8 ~ 9 (ON)	0 ~ 1 (OFF)
Nozzle No. 5	0 ~ 1 (OFF)	8 ~ 9 (ON)	8 ~ 9 (ON)
Nozzle No. 6	8 ~ 9 (ON)	0 ~ 1 (OFF)	8 ~ 9 (ON)

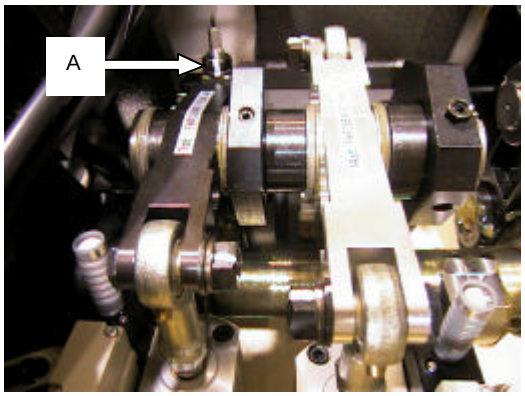
<I/O → Standard → IN>

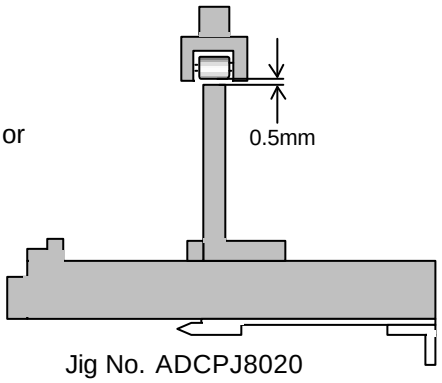
Sta. 13	X03E	Nozzle Type Check 1	X03F	Nozzle Type Check 2
Sta. 15	X048	Nozzle Type Check 1	X049	Nozzle Type Check 2
Sta. 13	X040	Nozzle Type Check 3		
Sta. 15	X04A	Nozzle Type Check 3		

4.11 Station 1 Tape Feed Adjustment

1. Set the cam angle to 0 degrees, turn the station 1 tape feed solenoid valve ON. (Y033)

2. Move the jig to the parts pick-up position. Adjust the clearance between the roller and the lever to 0.5mm. To adjust loosen bolt “A” in the cam box, see figure 22 below, and then use a small spanner to adjust the rod up or down.





Jig No. ADCPJ8020

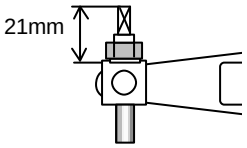
Figure 22

<I/O → Standard → OUT>

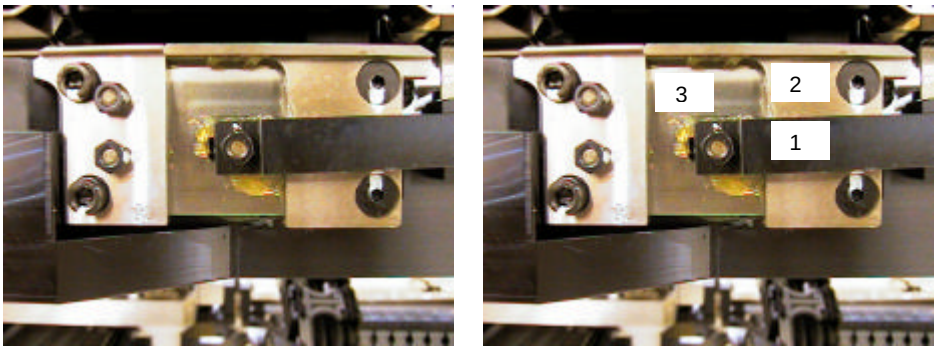
Y033	ST1 TAPE FEED SOL ENGAGED

4.12 Station 1 Waste Tape Cutter Adjustment

1. Set the cutter rod length in the cam box to 21mm.



2. Use a feeler gauge to check that there is more than 0.2mm clearance between the cutter lever and guard:



Item 1 = Cutter Lever

Item 2 = Guard

Item 3 = Cutter Tooth

Figure 23

3. Check that the tape cutter does not protrude from the guard at 0 degrees.

4. Check that the tape cutter rises up until (190 degrees, CP-742/743(M)E) (194 degrees, CP-732/733E) and descends afterwards.

5. Check that the tape cutter is level with the bottom of the guard (or protrudes by less than 0.5mm from the bottom of the guard) at 0 degrees.

6. Use a tape feeder to confirm that the tape cutter can actually cut the tape on a feeder.

4.13 Station 13 Parts Reject Mechanism Adjustment

1. Remove the 13th station valve switch bracket and check the clearance at the top and bottom of the LM guide. Tolerance: > 0.5mm.

2. Loosen the 4 mounting bolts at the base of the 13th station bracket.

3. Rotate the shaft with the Highest valve (measured in 3.16) to station 12 and install the unit alignment jig over the valve. Reattach the valve switch bracket, leaving the bolts slightly loose.

4. Carefully, rotate the shaft into station 13 at 190 degrees (CP-742/743(M)E), (194 degrees CP-732/733E) and align the valve lever and jig by moving the mounting bracket.

5. After positioning the valve switch bracket inside the jig hole, tighten the 4 mounting bolts at the base of the 13th station.

6. The clearance between the cam follower and drive lever should be 0.2mm or more. If less than 0.2mm, loosen the mounting bracket for the cutter assembly and move slightly to set the proper clearance.

7. Loosen the height adjusting bolts and use a feeler gauge to set the gap shown in figure 24 to 0.3mm. Use the height adjustment bolt to set the gap.

8. Set the flow controller as follows: For rough adjustment of the flow controller, set 4 turns from fully closed. For fine adjustment, set the shaft with the **highest** valve at station 13 and set the cam as described in step 4. [Turn ON (I/O Y03A)] Using a manometer, set the air pressure to 52+/-3mmHg. (7.0+/-0.5 kPa)

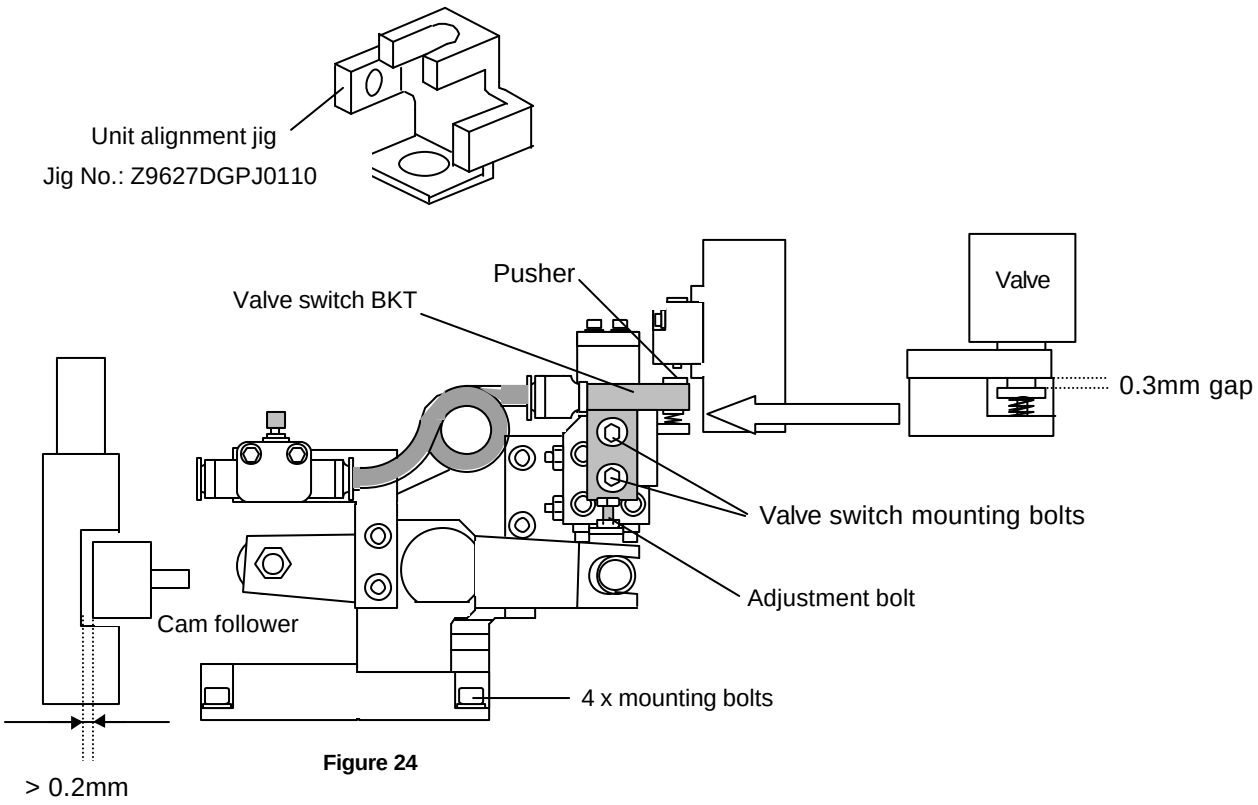
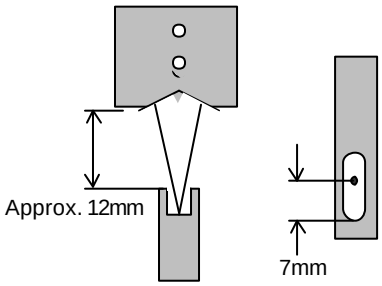


Figure 24

4.14 Station 1 Tape-End Detection Sensor Adjustment

1. Set the tape end detection feeder jig at slot No.1 (Pallet No. 1). (Jig No.:Z9526ADCPJ8550)

2. Move the device table to the pick up position “PICK UP POS. T1” (This is calibrated in section 3.15)



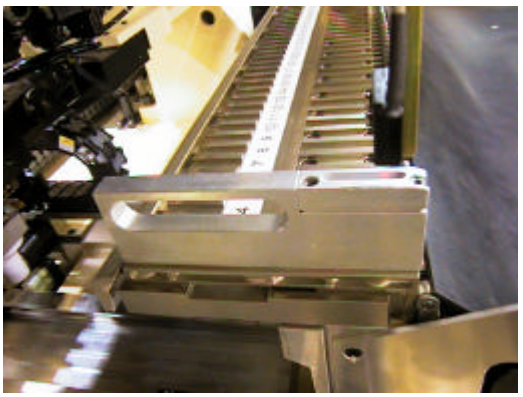


Figure 25

3. Adjust the clearance between the top of the jig and the bottom surface of the sensor to 12mm. Adjust the bracket so that the horizontal direction of the light beam is at the center, and 7mm away from the end of the oval hole.

<Setting the amplifier>

1. Set the switches on the amplifier as follows:

   Output switch; D-ON, Timer switch; OFF, Sensitivity switch; Fine.

2. Turn the ”LOCK” protect switch OFF.

3. With the sensor beam centered in the slot, press the “SET” button for more than 3 seconds. (Release the set button a couple of seconds after the yellow LED begins flashing.)

4. Set the “LOCK” protect switch back to lock and confirm sensor reaction by I/O.

<I/O → Standard → IN>

X03D	TAPE END CHECK (Tape end detection)

4.15 Feeder UP/Down Sensor Adjustment

1. For this adjustment, use Jig No.: ADCPJ8020 illustrated in figure 26.

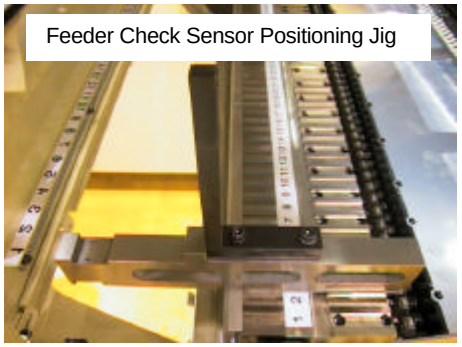


Figure 26

2. The jigs pictured in figure 27 are needed for sensor positioning adjustment.

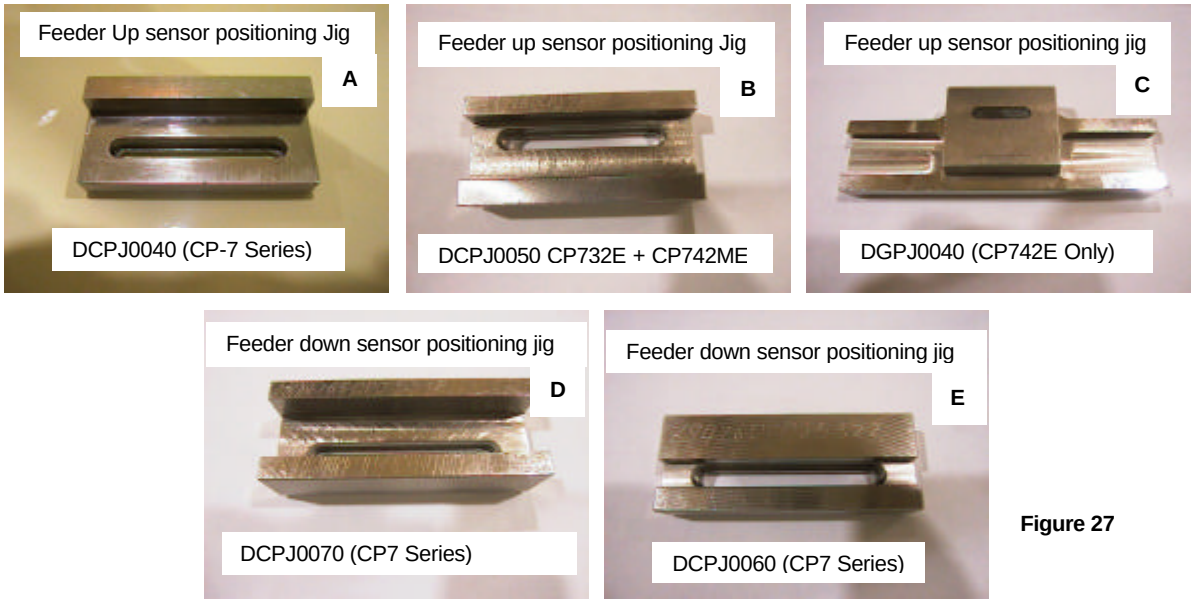


Figure 27

3. Refer to figure 28 below and the text that follows to determine which jig should be used for which sensor:

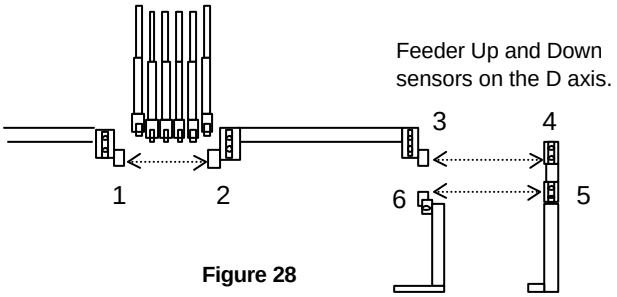
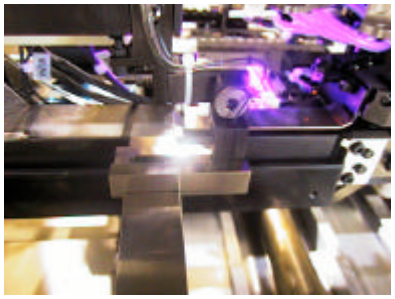


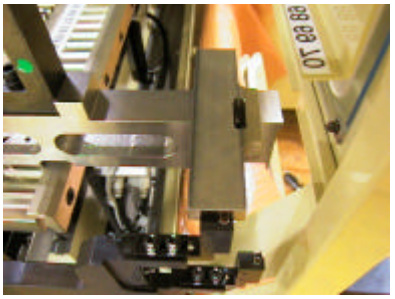
Figure 28

Jig A should be used for sensors 1,2, and 3.
Jig B should be used for sensor 4 (CP-732/733E and CP-742ME)
Jig C should be used for sensor 4 (CP-742/743E only)
Jig D should be used for sensor 5.
Jig E should be used for sensor 6.

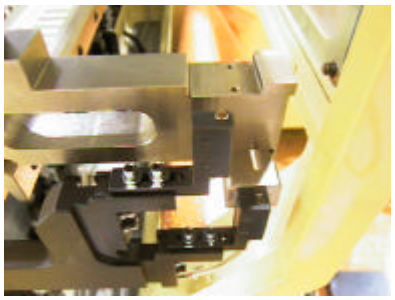
4. The various adjustments are pictured in figure 29 below:



Alignment of sensors 1, 2, and 3



Alignment of sensor 4 (CP742/743E Only)


Alignment of sensor 5

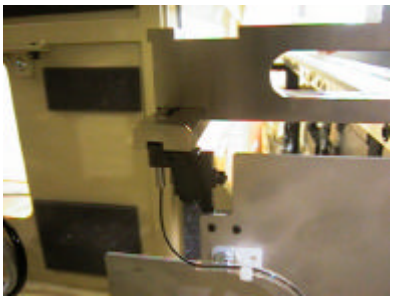

Alignment of sensor 6

Figure 29

5. Confirm sensor reaction by I/O.

<I/O → Standard → IN>

X042	TAPE LEAF CHECK	(Tape guide lift check)
X043	D1 FEEDER CHECK UP	(D1-axis feeder lift check – upper)
X044	D1 FEEDER CHECK DOWN	(D1-axis feeder lift check – lower)
X054	D2 FEEDER CHECK UP	(D2-axis feeder lift check – upper)
X055	D2 FEEDER CHECK DOWN	(D2-axis feeder lift check – lower)

6. Set the Amplifier as follows:

Note: To unlock or lock the sensor amplifier, press the up or down key simultaneously with the mode key for more than 3 sec.

a. Set the output switch to “L-ON”.

b. Press the mode key for more than 3 seconds → Turbo → select the “super” LED (by using the up/down arrows) → Press the mode key once quickly → DLY (make sure the “super” LED is ON) → Press the mode key once quickly → set to 200P by using the up/down keys. Adjustment complete.

Note: There is never a need to press the SET button. Pressing the set button will change the internal mode of the sensor amp.

4.16 Station 1 N times feeding Adjustments

4.16.1 Retract End Sensor Adjustment

1. With the cam at 0 degrees, turn ON the station 1 feeding solenoid valve. (Y033 TAPE FEED SOL ENGAGED)

2. Rotate the cam axis and adjust the sensor bracket so that the sensor turns OFF when the flag is 0.5mm lower than the upper limit. Use a dial gauge to check.

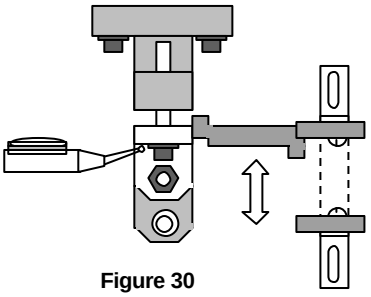


Figure 30

3. Check sensor reaction by I/O.

<I/O → Standard → I/O>

X03C	FEEDING RETRACT LIMIT

4.16.2 Forward End Sensor Adjustment

1. Move the feeding lever to the forward limit (the cam angle should be around 200 degrees) and rotate the cam angle so that the flag ascends 0.5mm from the forward end sensor. Use a dial gauge to check. Adjust the sensor bracket so that the sensor turns OFF at this position.

2. Check sensor reaction by I/O.

<I/O → Standard → IN>

X03B	FEEDING FORWARD LIMIT

4.16.3 Speed Controller Adjustment

1. Fully open the speed controllers for the upper lower ends of the feed cylinder.

4.17 Station 1 N times Cutter Adjustment

1. At 0 degrees, turn the tape feeder solenoid valve OFF. (Y032) Set the dial gauge at the cam angle where the flag starts descending from the upward position.

2. Rotate the cam axis and check the position where the flag descends 0.5mm from the upper limit using a dial gauge. Adjust the sensor bracket so that the sensor turns OFF at this position.

   * The flag descends when the movable cutter raises. When the upper end sensor turns ON, the movable cutter descends. Check the I/O as follows:

<I/O → Standard → IN>

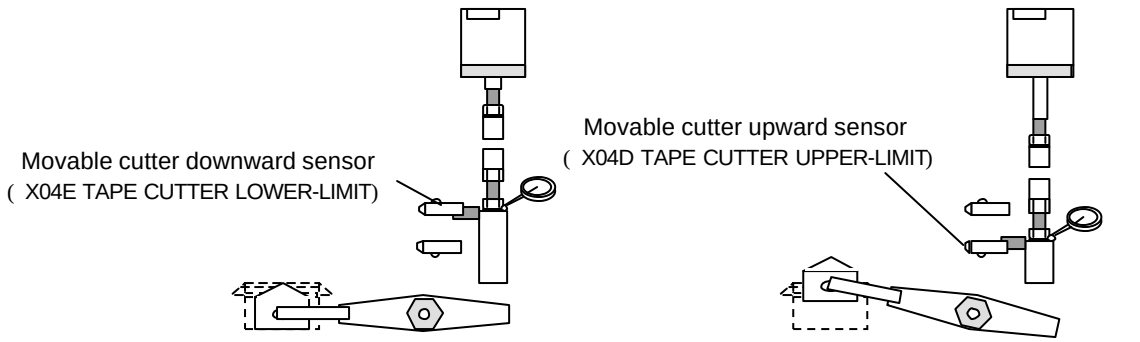
X04E	TAPE CUTTER LOWER LIMIT

3. Analogous to the above, when the movable cutter is at the upper limit (cam angle 190 degrees), rotate the cam axis and check the position where the flag ascends 0.5mm from the lower limit by a dial gauge. Adjust the sensor bracket so that the sensor turns OFF at this position.

   *When the flag descends the lower sensor turns ON and the movable cutter raises. Check the I/O as follows:

<I/O → Standard → IN>

X04D	TAPE CUTTER UPPER LIMIT



<Moveable cutter lowered position>

<Moveable cutter raised position>

Figure 31

4. Set the cam at 0 degrees. Run the cutter for N times by I/O (Y03E n TAPE CUT), and perform the sensor input and operation check.

   *Speed controller volume: Both up & down flow controls are set to fully open.

   Note: Carry out the solenoid valve operation for the N times cutter at 0 degrees.

4.18 Station 13 Brush Height Adjustment for Parts Rejection

1. Set a nozzle in the holder and move it to station 13. Adjust the brush height so that the tip of the nozzle jig enters the top surface of the brush by 0.5 to 1.0mm.

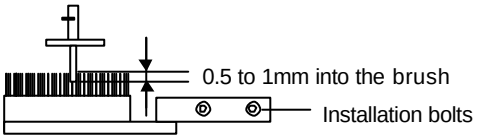


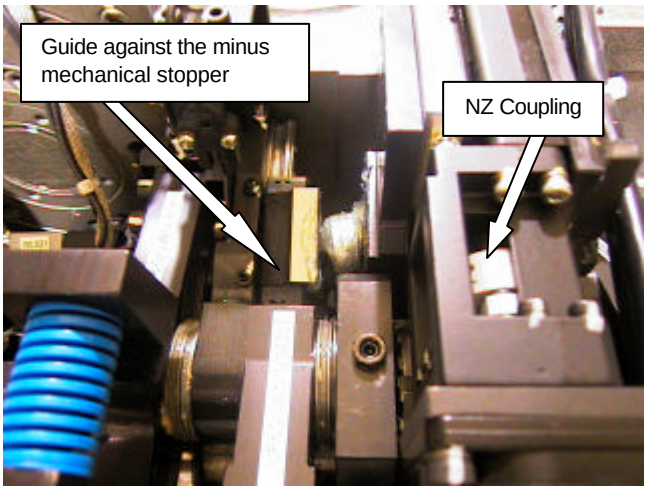
Figure 32

4.19 Nozzle Holder Installation

1. Install the nozzle filters on all the shafts.
2. Check the motion of the shafts and then install the holders on all the nozzle shafts.
3. Check the alignment of holder and jig by following the procedure outlined in step 4.1 at the beginning of this chapter.

4.20 ST1 NZ Adjustment & Proper Measurement

1. Loosen the coupling for the NZ-axis motor and move the guide to the minus mechanical stopper. (figure 33)



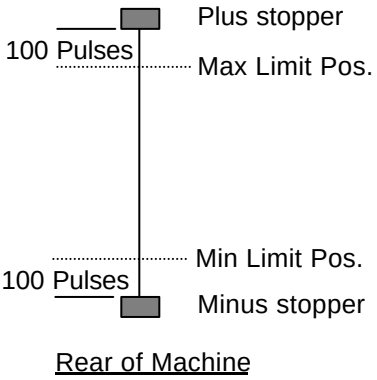


Figure 33

2. Set the counter value to zero and tighten the coupling. (Torque setting: 0.8Nm)
3. Set the NZ travel limits as follows:

   (Maximum Limit = 100 pulses from the + stopper)
   Press: [Maintenance] → [Calibration] → [Travel Limits] →[Maximum Limit NZ]

   (Minimum Limit = 100 pulses from the – stopper)
   Press: [Maintenance] → [Calibration] → [Travel Limits] →[Minimum Limit NZ]

NZ-axis servo counter chart 0.002mm / Pulse	Standard (Reference)
+ Mechanical stopper	12770 ± 1000
Max Limit Pos NZ	12670 ± 500
Pickup Pos NZ	4000 ± 1000
Min Limit Pos NZ	100 ± 50
– Mechanical stopper	0 ± 50

4.21 ST1 NZ Pick-Up Position Adjustment

1. Set the cam to 0 degrees and turn ON the ST1 nozzle UP/DOWN solenoid valve. (Y031)

2. Place the 1st nozzle height calibration jig on the D-axis pallet and install the nozzle jig at nozzle holder No.1. Set the cam angle at 170 degrees and move the NZ-axis manually so the nozzle jig descends until the pick up height is 0.65mm (at this condition the dial gauge should read 0).

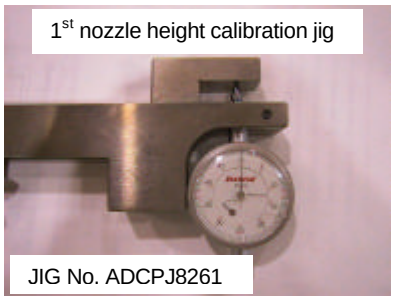


Figure 34

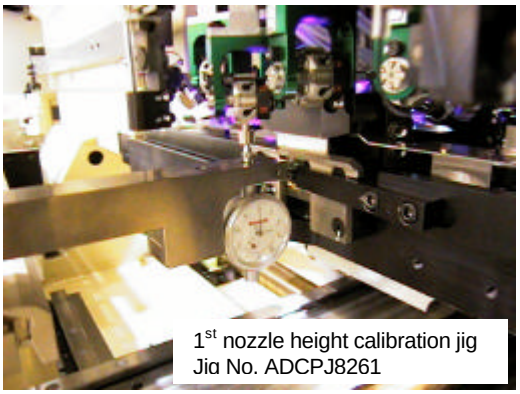


Figure 35

IMPORTANT!!

The pick-up height calibration is critically important to ensuring stable pick-up. If not adjusted correctly, damage to components may occur (due to shock from nozzle) or pick-up rates will not be at optimum levels. Be sure to use care when making adjustments in this area.

3. Calibrate the NZ-axis servo counter value for all shafts (A through P) and record the value.

4. Calculate the average value for all shafts and set as the : PICK UP POS NZ.

   Press: [Maintenance] → [Calibration] → [Pick Up Reference] → [NZ Original Pos.] → [Set]

   *Measurements should be carried out at device locations (2 & 29, CP-732/733E), (2 & 39, CP- 742/743ME), (2 & 69, CP-742/743E) on both pallets.

   Target Value: 0.65 ± 0.05mm

4.22 Station 9 Mechanical Valve Adjustment Check

1. Remove the spool valve from shaft “A “and install the valve alignment jig.

Note:
Place the dial gauge on the right side of the “Low Valve” and set to 0. Remove the valve and install the alignment jig at the same position the valve was located. All valves should be within 0.1mm of each other. Refer to Sec. 3.16, page 3-32 step 6.

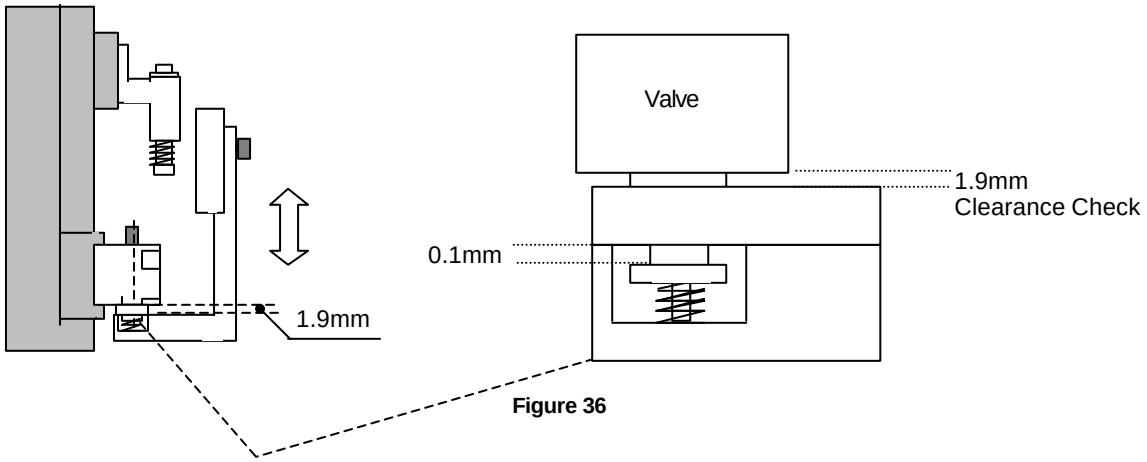
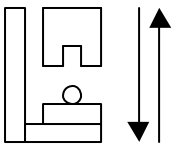


Figure 36

2. With the cam at 0 degrees turn the 9th station place solenoid OFF. (Y034)
3. Disconnect the air.
4. Move the cam angle to 180 degrees.
5. Loosen the forward and backward positioning bolts for the 9th station bracket.
6. Adjust the 9th station bracket so that the small round bracket notch goes directly into the jig hole. You can check if it is properly inserted by moving the bracket. If it is completely inside, the bracket will not move.



Side View

7. Once finished, remove the jig and reconnect the air at 0 degrees.
8. Turn the 9th station place solenoid ON (Y035) and install the spool valve on shaft A. Ensure the spool valve is in the same position as the spool valve on the B shaft. (use the X-axis pulse counter with the cam at 180 degrees and measure using a dial gauge.

9. Next, bring the shaft with the lowest spool to the 9th station at 180 degrees.

10. Set the gap between the spool and bracket to 0.1mm using a feeler gauge (see figure 36 above).

11. Set the flow controller as follows: For the rough adjustment of the flow controller, set 5 turns from fully closed. For fine adjustment, set the cam at 180 degrees with the **highest** valve at station 9. Turn ON (I/O: Y03A Air Blow) Using a manometer, set the air pressure to 113+/-3mmHg. (15.0+/-0.5 kPa)

4.23 Station 1 Mechanical Valve Adjustment

1. Adjust all shafts so that the gap between the spring pin BKT (1) top surface and support BKT top surface is 2.3mm. (A) Note: all spring pin heights should be within 0.1mm of each other.

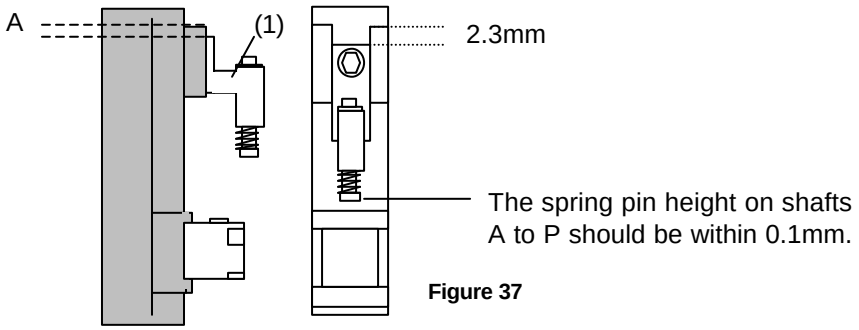


Figure 37

2. Set the mechanical valve switch lever alignment as follows:

   a. Adjust the clearance between the spring pin bracket and lever bracket using a 12mm spacer jig. (figure 38). (Jig. No. ADCPJ8150)

   b. Align the vacuum switching lever and mechanical valve as illustrated with the cam at 170 degrees. (figure 39).

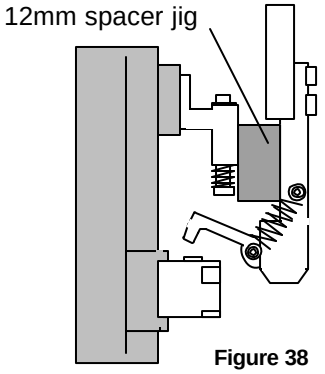


Figure 38

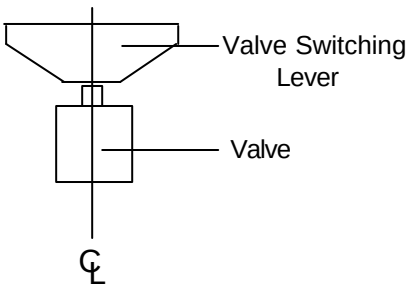


Figure 39

c. Align bracket (1) parallel to the D-axis by adjusting the bracket as shown in fig. 40. (Tol: < 0.1mm)

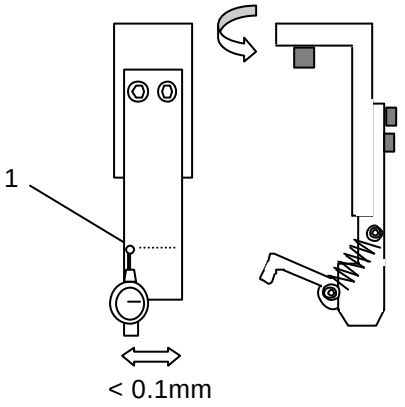


Figure 40

3. Turn the station 1 pick up solenoid valve OFF (Y031) and move the reference shaft (the shaft with the lowest spool position) to station 1 and set the cam to 170 degrees.

4. Adjust the lever BKT (2) so the clearance between the spring pin and lever becomes 0.6mm.

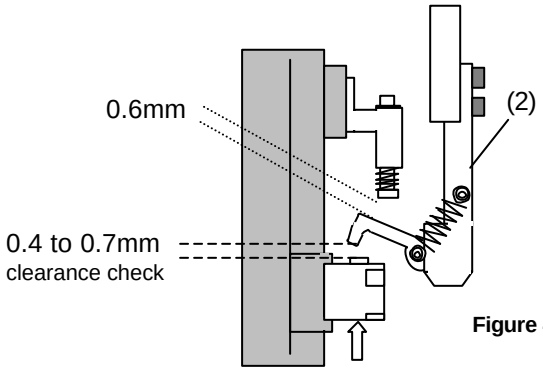


Figure 41

<Station 1 mechanical valve adjustment check>

Check the following after station 1 mechanical valve adjustment

1. With the cam at zero degrees, turn the pick up solenoid valve ON. (Y031)

2. Set the NZ to its minimum stroke: 9mm (pick up pos. NZ-2619 pulses) and set the cam angle to 170 degrees. Check that the spring type pin (1) is pushed up slightly.

[Note]: Confirm that there is no interference when the NZ-axis is moved through it's full stroke.

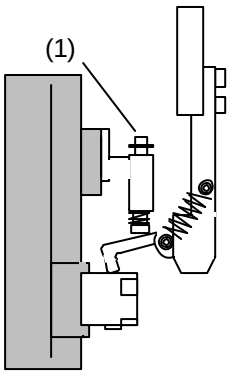


Figure 42

4.24 Station 2 Large Parts Check Sensor Adjustment

1. Set the A shaft at station 2 and set the cam to 200 degrees.
2. Install a 0.7 nozzle and align the brackets so the emitter / receiver and 8mm nozzle disk align.
3. Next, position the emitting and receiving sensors so the beam is aligned with the center of the nozzle.
4. By adjusting the brackets, set the height of the emitter and receiver so the light beam passes 0.7 to 0.8mm below the jig.

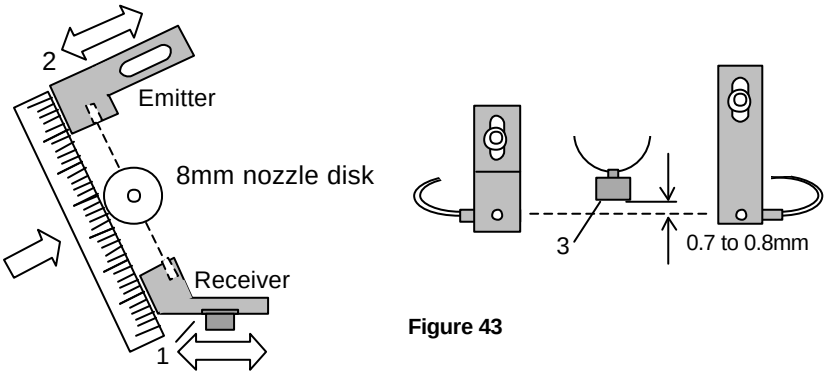


Figure 43

5. Set the Amplifier as follows:

   a. Set the output switch to “D-ON”.

   b. Press the mode key for more than 3 seconds→ Turbo → select the “super” LED (by using the up/down arrows) → Press the mode key once quickly → DLY (make sure the “super” LED is ON) → Press the mode key once quickly → set to 200P by using the up/down keys. Adjustment complete.

   Note: There is never a need to press the SET button. Pressing the set button will result in changing the mode of the sensor amp.

<I/O → Standard → IN>

X036	ST2 Large Parts Check

4.25 Stations 1 & 9 Upward and Downward End Sensor Adjustment

1. At 0 degrees, turn ON the solenoid valve for Stations 1 & 9 nozzle up/down.

2. For Stations 1& 9 Up End sensor adjustment, set the cam at 0 degrees. Set a dial indicator at the tip of the cam lever. Adjust the sensor bracket so that the upper limit sensor turns OFF when the lever descends 0.30 to 0.40mm.

3. For the Station 9 Down End sensor adjustment, set the cam at 180 degrees. Set the dial gauge at the tip of the cam lever. Adjust the downward end sensor to turn OFF when the lever ascends 0.30 to 0.40mm.

4. Confirm sensor reaction by I/O.

<I/O → Standard → IN>

X030	ST1 NOZZLE UPPER LIMIT CHECK
X032	ST9 NOZZLE UPPER LIMIT CHECK
X033	ST9 NOZZLE LOWER LIMIT CHECK

Note: For further information and illustrations on this procedure, refer to the CP-7 series Mechanical Reference Manual.

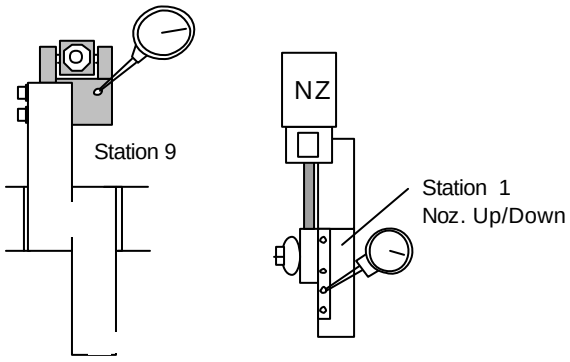


Figure 46

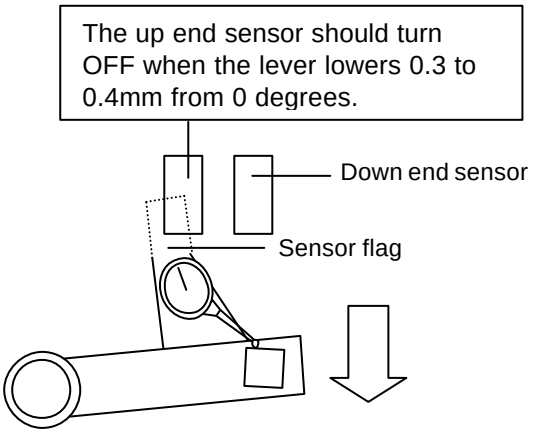


Figure 48

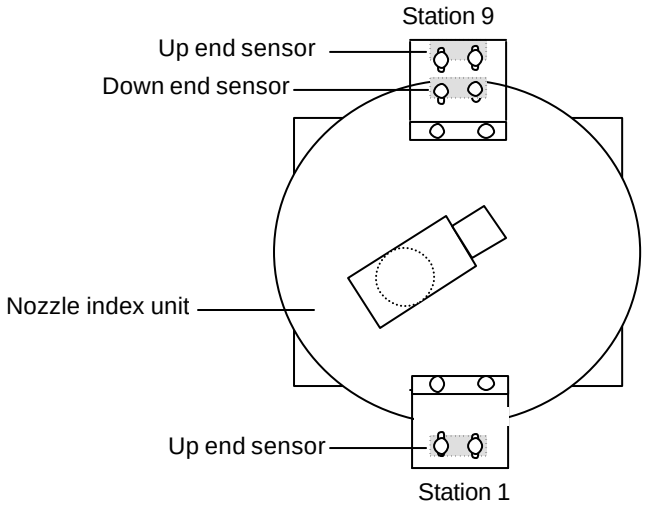


Figure 47

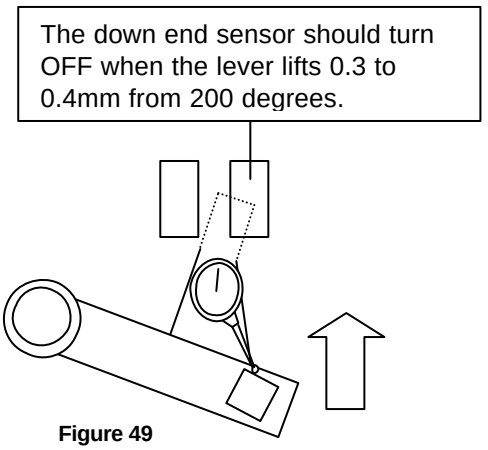


Figure 49

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Notes:

Chapter 5
Loader System

Chapter 5 Loader and Conveyor Adjustment

5.1 Air Leakage Check

1. Check the cylinder tubing and operation by activating the loader solenoid valves manually.
2. Ensure all air tubing is tight and free of air leaks.

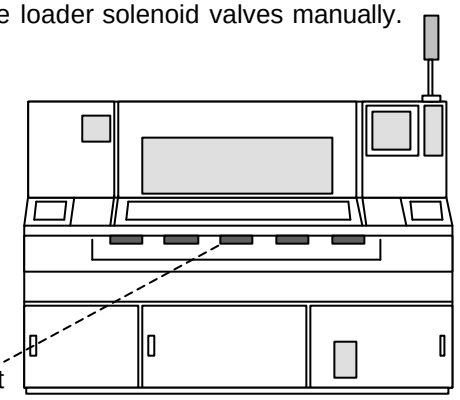
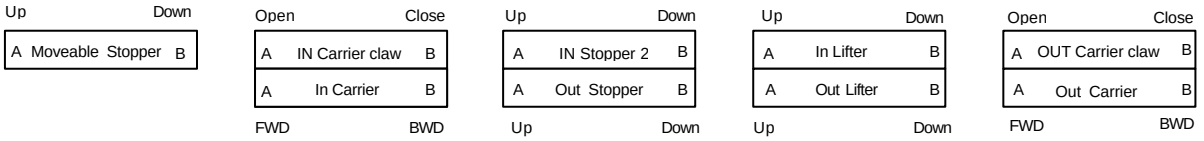


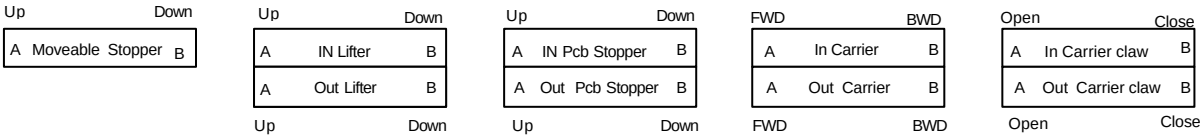
Figure 1

5.2 Loader Solenoid Valve Arrangement

CP-742/743(M)E Loader System Solenoid Valve Arrangement



CP-732/733E Loader System Solenoid Valve Arrangement



5.3 Carrier Claw and Pin Check

1. Ensure all carrier claws are straight and aligned.
2. Ensure the pin is centered above the cutout in the claw.
3. The pin should be positioned approximately 0.2mm above the claw cutout.
4. Ensure the pins move smoothly in and out.

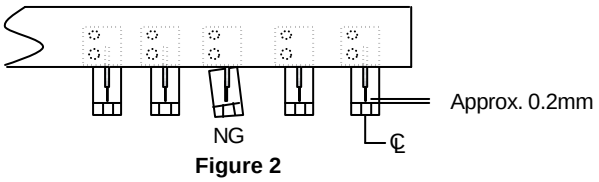


Figure 2

5. If it is necessary to remove the carrier assembly, remove only the two screws at each arrow location.

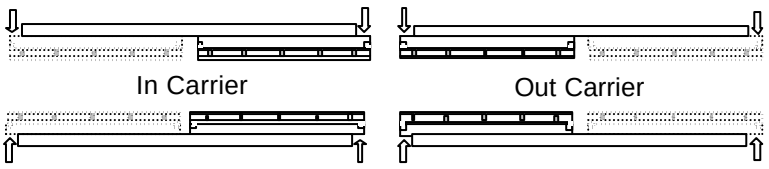


Figure 3

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5.4 Carrier Unit Stroke Check

1. Lock both the IN & OUT carriers at their forward ends and check the stroke as indicated in Fig. 4
2. Adjusting the forward end shock absorber on the rod-less cylinder sets the carrier stroke. (Fig.5)
3. **IMPORTANT:** After completion, ensure there is a 21.5mm gap between the two carriers. Otherwise, interference with the main table will result in damage to the machine.

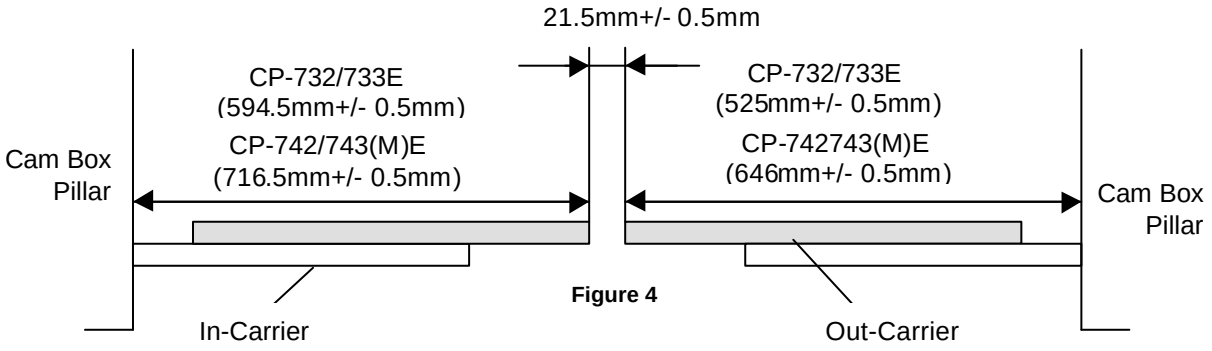

Figure 4

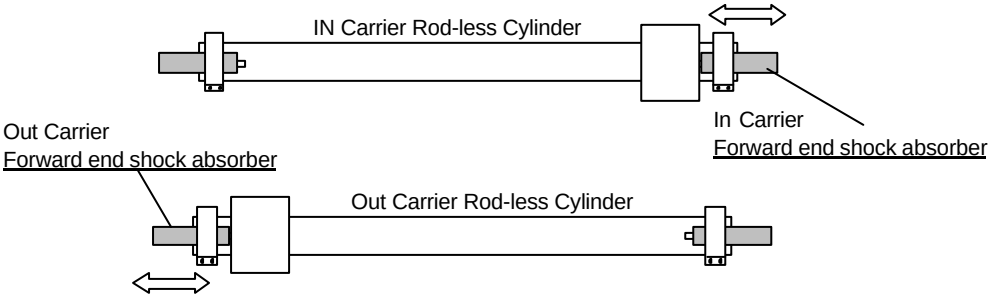

Figure 5

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5.5 Rod-less Cylinder Stroke Check

1. Check the stroke of the IN and OUT carrier rod-less cylinders as indicated in the following table and Fig. 6.

2. Set the stroke by adjusting the backward end shock absorber on the rod-less cylinder.

CP-742/743(M)E	IN carrier (Upper side)	651.0 mm
CP-742/743(M)E	OUT carrier (Lower side)	600.5 mm
CP-732/733E	IN carrier (Upper side)	530.0 mm
CP-732/733E	OUT carrier (Lower side)	478.5 mm

Note: Check the stroke after locking the IN & OUT carrier at their forward ends.

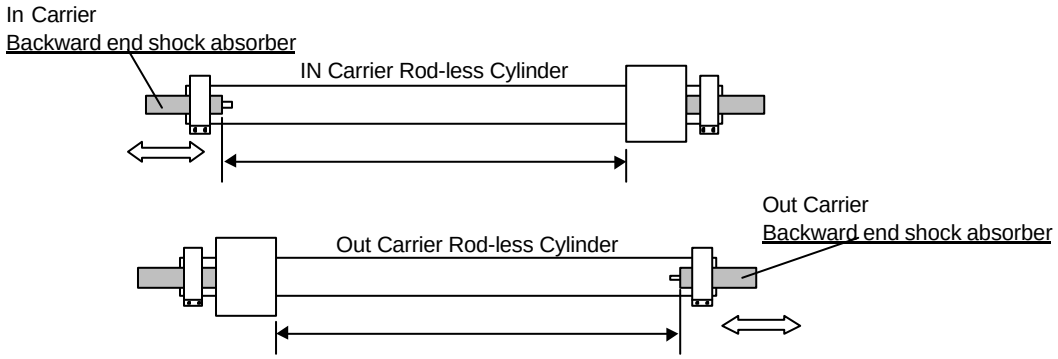

Figure 6

5.6 Conveyor Assembly Accuracy Check

1. Confirm that the Pcb guide plates (2.5mm) are aligned with the upper surface of the conveyors.

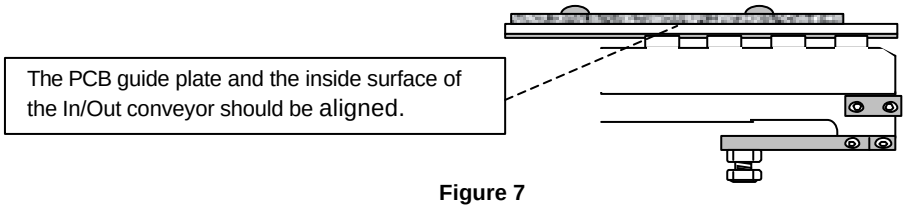

Figure 7

2. Confirm that the conveyor width change unit and stopper unit move smoothly by hand.

3. Check whether the lifter plate is bent or scratched.

4. Check the maximum, minimum width and the entrance/exit of the IN & OUT conveyor.

5. The difference between the IN and OUT conveyor widths must be within 0.2mm. Change the connecting chain if the value is out of tolerance.

5.7 Carrier Accuracy Check

1. Set a dial indicator on the XY Table. Check the parallelism and height of the reference and adjustable side LM guides at the positions indicated in Fig. 8.

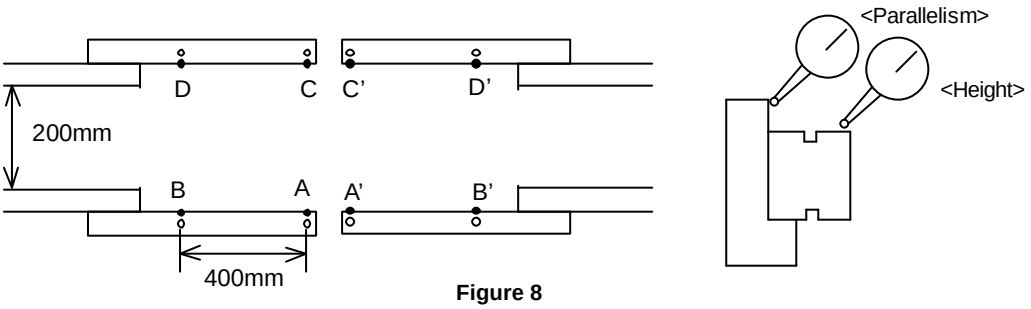

Figure 8

<Parallelism> should be less than +/-0.10mm (from the zero reference position)

A	B
0	

A'	B'
0	

A	A'
0	

C	D
0	

C'	D'
0	

C	C'
0	

<Height> should be less than +/-0.20mm (from the zero reference position)
A-A', C-C' should be less than 0.15mm)

A	B
0	

A'	B'
0	

A	A'
0	

C	D
0	

C'	D'
0	

C	C'
0	

5.8 Joint Plate Alignment

Joint plates mounted on the In/Out carriers, engage with the main table moveable rail when Z is lifted to the Z Load position. (Keeping the carriers and main table moveable rail aligned)

1. Check the position of the IN & OUT carrier width adjustment joint. The standard joint spacer is 0.5mm. The spacer thickness can be changed in order to align the 4 joint plates.
   Spacer thickness must be within 0.5mm+/-0.2mm. (0.3mm to 0.7mm)

2. Move the carrier to the forward end and set a dial gauge on the main table. Move the X-axis to check the parallelism of each joint.

3. Target parallelism of the 4 joints must be within 0.1mm.

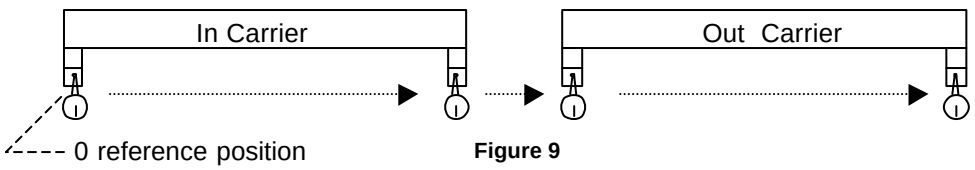

Figure 9

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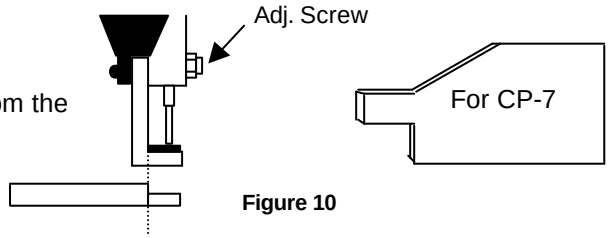
5.9 Carrier Claw Position Adjustment

1. Fix both the IN and OUT carriers at the forward end. Check if there is any play in the X-direction.

2. Check the claw tilt and pitch. There should be 0.2mm clearance between the retaining pin and claw.

3. Close the claw on the reference side. Using the jig below, adjust the set-screws so the conveyor rail aligns with the inner face of the carrier claw. After adjustment, tighten all screw nuts.

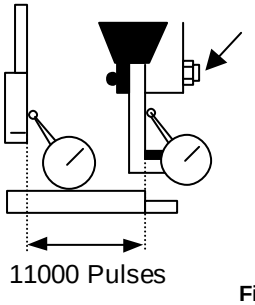
View looking in from the exit conveyor



(Jig No.:Z5413WPJ0132)

Figure 10

4. For the secondary rail carrier claw adjustment, set a dial gauge on the joint plate and write down the Y pulse count at this position. Then, move to the inside surface of the carrier claw. Calculate the total pulse count between these two positions. Turn the adjustment screw accordingly to set the distance between the joint plate and claw to 11000 pulses. Then, lock the 4 set-screw nuts.



NOTE:
Set to 10950 Pulses for the out carrier.

Figure 11

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Technical Support Div. Section No.2

5.10 In / Out Loading Position (Y– axis)

1. Move the X- Axis to –11250 pulses for the Out Loading position. (-220500 In Loading pos.) (CP-732/733E)

2. Move the X- Axis to –11250 pulses for the Out Loading position. (-271000 In Loading pos.) (CP-742/743(M)E)

3. Move the IN&OUT Carrier to the forward end positions manually. Remove the PCB stoppers from the IN/OUT conveyors and the clamping claws on the left and right sides of the fixed rail on the Main Table.

4. Manually raise the Z-axis until the claw and conveyor heights are the same. Slowly move the Y-Axis to a position where the IN/Out conveyor reference side surface aligns with the main table carrier claw reference surface. (Use a dial gauge for alignment)

5. Take the lower value of the IN/Out readings and subtract 25 pulses.(allows clearance for the PCB) The servo counter value at this position becomes YL IN/Out.

   Notes:
   1. Both YL-IN & YL-Out, are input to proper as the same value.
   2. If the difference between the IN and Out pulse counts is more than 200, re-check the alignment of the fixed rail on the main table. The fixed rail alignment should be within 0.1 mm

6. Enter the data to proper as follows:

   Press: [Maintenance] → [Calibration] → [Loading Position] → [XL/YL IN / Out] → [Set]

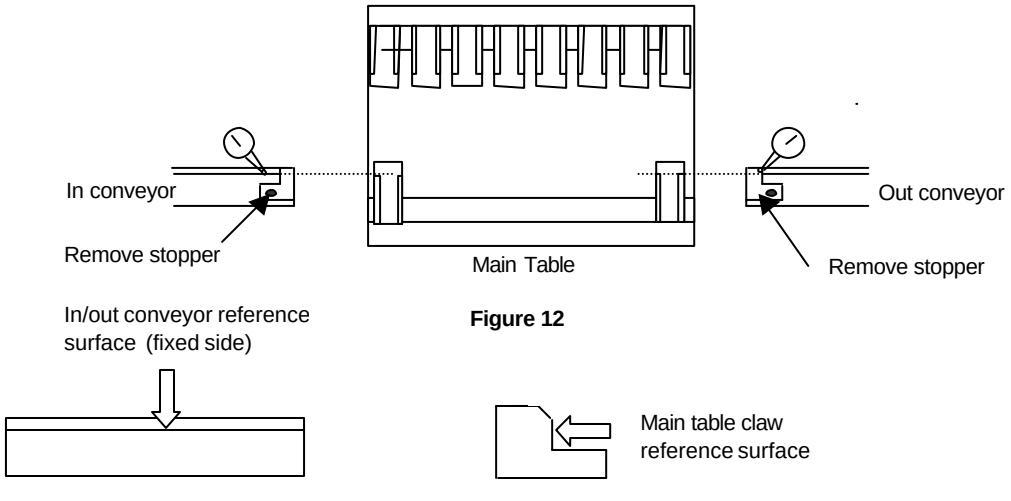

Figure 12

5.11 In/Out Loading Position (X– axis)

1. Close the carrier claw and advance the OUT carrier to the forward end.

2. Move the X-axis to where the servo counter indicates – 11250 pulses, and the Y-axis to the loading position, YL_OUT.

3. Press the emergency stop switch. Manually, move the Z-axis up to engage with the secondary rail. Adjust the X-axis position so the table and rail engage evenly.

   Note 1: The carrier claw should not interfere with the guide rail.
   Note 2: The secondary side rail engaging brackets should be aligned in the groove of the adjustable rail on the main table.

4. Move the X-axis cautiously so that the right and left clearance between the carrier claw and the guide rail becomes uniform on the fixed rail side. (Fig. 13)

   The main table and carrier claws should be balanced throughout the length of the rail.

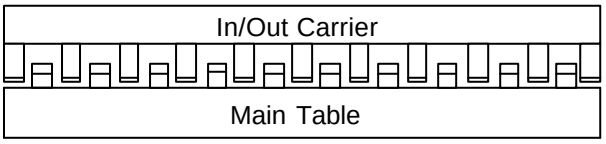

Figure 13

5. The servo counter for the X-axis at this time is “XL_OUT”.

6. To save the data use the following commands:

   [Maintenance] → [Calibration] → [Loading Position] → [XL/YL In / Out] → [Set]

   (Make sure the Y-axis is at the Y load position when saving the data.)

7. If the moveable rail alignment is not balanced, loosen the screws on the linear guide rail bracket, (used to change the carrier width) and align the adjustable side to the reference side. (Fig. 14)

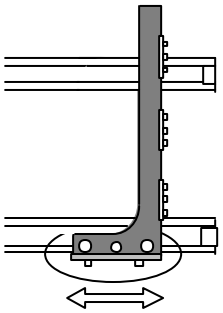

Figure 14

Loosen these five screws in order to move the secondary rail back and forth for alignment.

8. Calibrate “XL_IN” in the same manner. (Around –220500 pulses CP-732/733E)
   (Around –271000 pulses CP-742/743(M)E)

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5.12 In/Out Loading Position (Z– axis)

1. Clamp a board on the main conveyor and move the table to the OUT loading position.

2. Manually, advance the OUT carrier to the forward end and open the carrier claws.

3. Raise the Z-axis manually to a position where the PCB can be clamped by the carrier claws. (If the claw interferes with the PCB, open the carrier claws and raise the Z-axis a little more.)

4. Open the main conveyor clamp by I/O.

   <I/O → Standard → IN>

Y043	X Y - Table Panel CLAMP
Y044	X Y - Table Panel UNCLAMP

5. Lower the Z-axis just until it is clear from the PCB held by the carrier.

6. Set a dial indicator on the PCB close to the carrier claw on the reference side. Manually raise the Z-axis again until the PCB lifts 0.5mm. Note the servo counter of the Z-axis.

7. Check the servo counter at a position close to the carrier claw on the secondary side. Compare the two counter values. The higher value is called ZL_OUT. As for ZL-IN, calibrate the IN loading position in the same manner.

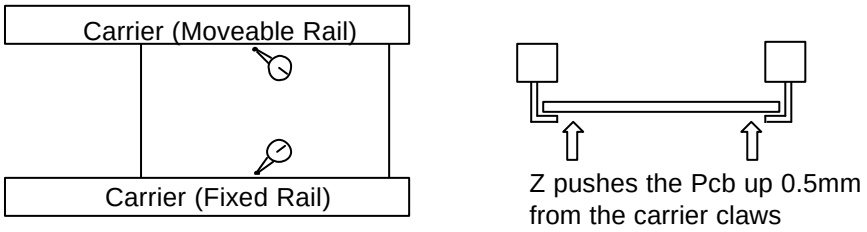

Figure 15

8. When the Z load position has been determined, set the Z axis at the servo count position and enter it into proper by using the following commands:

   Press: [Maintenance] → [Calibration] → [Loading Position] → [ZL In/Out] → [Set]

   Note:
   The highest value for both the IN and Out Z loading positions is referred to as ZL upper.
   The lowest value for both the IN and Out Z loading positions is referred to as ZL lower.

   ZL upper and lower pulse counts are used as references for setting sensor positions in the next section.

5.13 Z-axis Mechanical Valve Adjustment

1. Adjust the mechanical valve and dog for the moveable rail locking cylinders as follows.

   The moveable rail on the main table should lock when the Z-axis is positioned at;

   [ZL lower – 650 +/- 50 pulses.]

2. If out of range, move the dog up or down until the rail clamps within the specified range.

3. After adjustment, make sure the pneumatic swich lever has 1 to 2mm of play. Too much pressure on the lever will result in damage to the pneumatic switch.

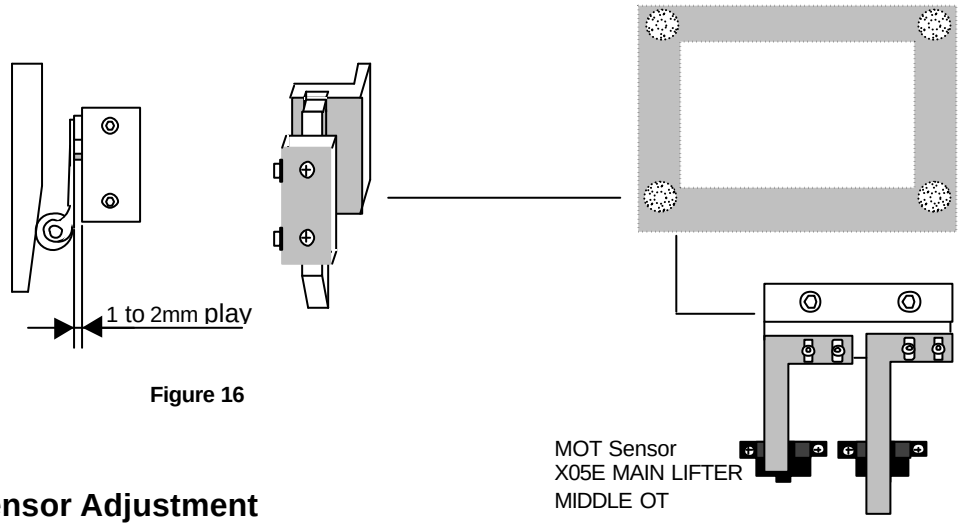

Figure 16

5.14 Z-axis Sensor Adjustment

1. Set the middle overtravel sensor flag at [Z0 + 250 ± 50pls.]

2. Calculate the Middle Loading Position as follows:

   CP-732/733E [ML= ZL Lower – 9250 ± 50pls.]
   Note: this is a proper data item for the Middle Load Pos.

   CP-742/743(M)E [ML= ZL Lower – 14000 ± 50pls.]
   Note: this is a proper data item for the Middle Load Pos.

3. To set the proper data for the Middle Loading Position, Press: [Maintenance] → [Calibration] → [Loading Position] → [Middle Loading Position] → [Set]

4. Set the upper end sensor limit flag at: [ML - 125 ± 50pls.]

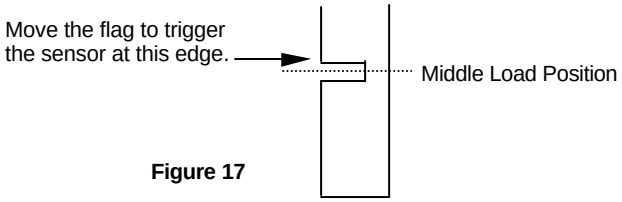

Figure 17

5. Ensure the flags are centered within the sensors after adjustment.

5.15 Loading Position Check Sensor Adjustment

1. At both the IN and OUT loading positions, adjust the bracket so that the loading position check sensor fiber optic light beam is centered over the silver area of the dog when the XY-table is at each loading position. [IN/OUT]

2. Set the clearance between the sensor and the dog to 11.5mm.

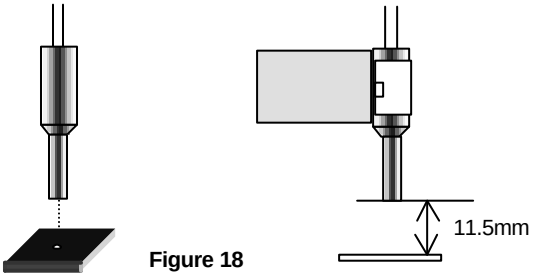

Figure 18

<I/O → Standard → IN>

X0BF	XY-Table In Loading Position Check
X0DA	XY-Table Out Loading Position Check

3. Set the In/Out loading position check sensor amps as follows:

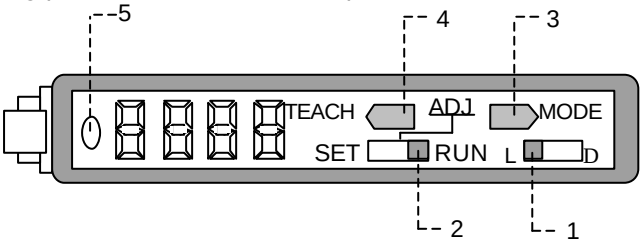

Figure 19

a. The amp should always be set to "L_ON" (1)

b. Set switch (2) to SET → Press the MODE key for 3 sec. → Press the TEACH key 3X to display → F-H5 → Set switch (2) back to RUN.

c. Set the display to "**light amount**" by using the mode button (3). (Press the [MODE] key for 2 seconds and the display will change between "**light amount**" → Percentage → "Analogue")

d. Write down the "light amount", when the table is moved 0.5mm (250 pulses) in the X-direction from the IN-loading position. <Example> When XL is – 220500 pulses: use the values that are displayed at – 220250 pulses and – 220750 pulses.

e. Move the X-axis back to the XL position. Calibrate the light amount when the table is moved +/-0.5mm (250 pulses) in the Y-direction. <Example> When YL is 2500 pulses: use the values at 2250 and 2750 pulses.

f. Choose the largest light amount value from steps 4 & 5. (Displayed on the amp)

g. Set switch (2) to "ADJ", then set the largest light amount by using the [MODE] and [TEACH] buttons (4). The [Mode] button increases the value. The [Teach] button decreases the value. (This sets the threshold level for the sensor amp) Values above the threshold level, (Sensor ON), Values (Sensor OFF)

h. Set switch (2) to "RUN".

i. Move the X, Y-axes to the loading position by inching and check that the sensor turns ON.(LED 5 turns on) Next, move the table more than 0.5mm (250 pulses) and check that the sensor turns OFF.

j. Leave the display on "light amount".

5.16 Moveable Rail Engagement Check Sensor Adjustment

1. Ensure the silver stickers on the main table are clean.
2. Ensure the sensor lenses are clean and free of obstructions.
3. Set the main table at either the IN or Out loading position.
4. Manually, raise the Z– axis to engage with either the IN or OUT carrier.
   (Check that the sensor beam is centered on the silver sticker)
   (If not centered, use the adjusting bolts to center the sensor heads accordingly)

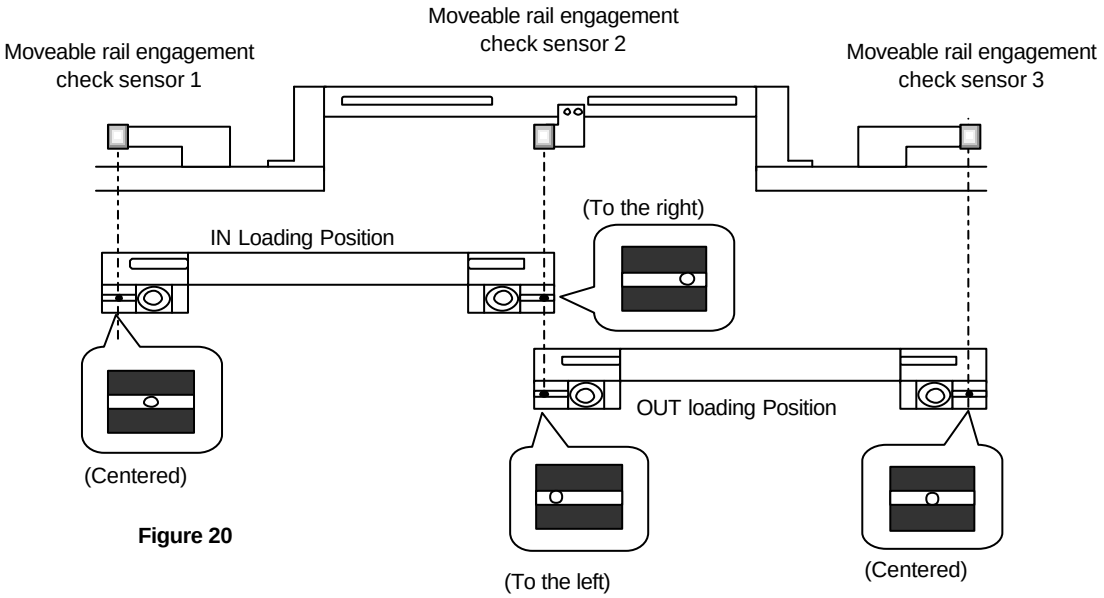

Figure 20

5. Set the main table at the Z origin position (Z0) at either the IN or OUT loading position.
6. To unlock the sensor, press the up & mode keys simultaneously for more than 3 seconds.

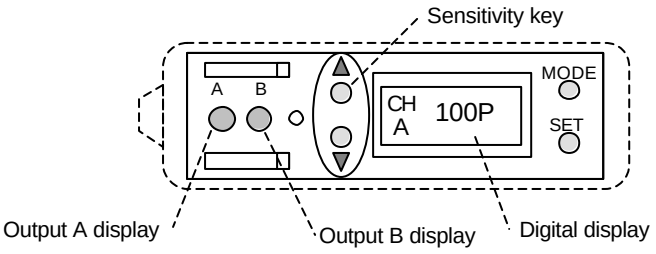

Figure 21

7. Set the sensor to the “A” mode by pressing the mode and up keys quickly.
8. Set the sensor to 110P via the up/down keys, when the beam is centered over the silver sticker. (110P indicates a percentage)
9. Jog the table in the Y- direction to find both edges of the silver sticker. (Record the pulse count at each edge.) The sensor display will change from Red to Green. (Red = ON, Green = OFF)

10. Divide the total pulse count found in step 8, by half. The result should be around the center of the silver sticker and close to the YL pulse count. (Check the YL proper data) If not, adjust the sensor head position accordingly. (Balance is the key point)

11. Set the Z- axis at the minus stopper. Set the sensor to the B mode, by pressing the mode and up keys quickly. Using the “B” mode, set the sensor sensitivity to 100P.

12. Return to the “A” mode and check the sensor performance while raising and lowering the main table. If problems exist, repeat the procedure outlined above.

13. Lock the sensor settings by pressing both the up and mode keys simultaneously for more than 3 seconds.

<I/O → Standard → IN>

X0C0	Adjusting Rail Engagement Check IN
X0DB	Adjusting Rail Engagement Check OUT
X0DC	Adjusting Rail Engagement Check Center

5.17 IN and OUT Conveyor PCB Lifter Adjustment

1. Ensure the distance between the top of the cylinder and the tip of the rod bolt is set as illustrated.

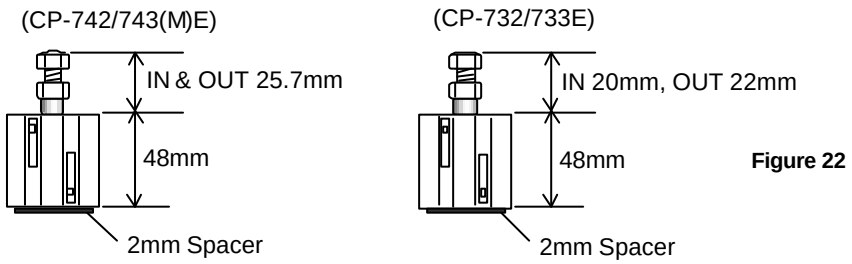

Figure 22

2. Lower the PCB lifter for the IN/OUT conveyor and adjust the lifter plate (after loosening the mounting screws) to align with the center of the conveyor belt.

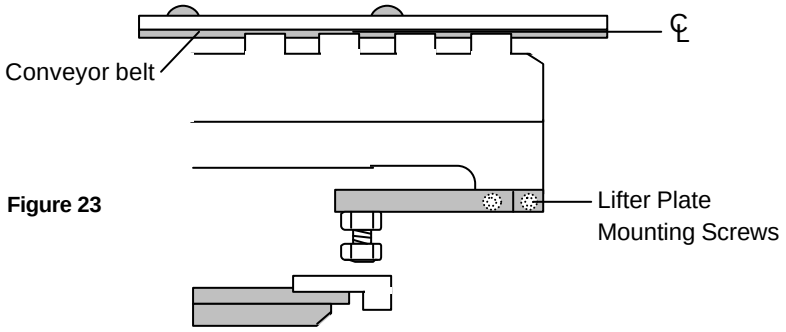

Figure 23

3. Move the IN and OUT carriers to the backward end position. Loosen the lifter plate mounting screws and adjust so the clearance between the carrier claws and lifter plate is uniform.

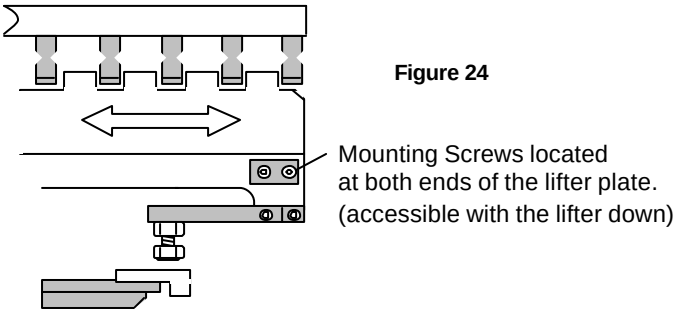

Figure 24

4. To set the lifter height, place a board on the In conveyor, open the carrier claws, raise the lifter, close the carrier claws and lower the lifter. (The Pcb is now held by the carrier)

5. Raise the lifter when the carrier claw clamps the board.
Set a dial gauge on the board as illustrated (two gauges are recommended) Since the dial gauge cannot normally read 1.2mm, use a 1mm feeler gauge when setting up the dial gauge before raising the lifter. (Set 1 end first, then the other)

When the lifter is raised, the dial gauge should read 0.2mm +/-0.1mm. If out of tolerance, adjust the four bolts as indicated.

After adjustment, the lifter should raise the Pcb off the carrier claws by 1.2mm.

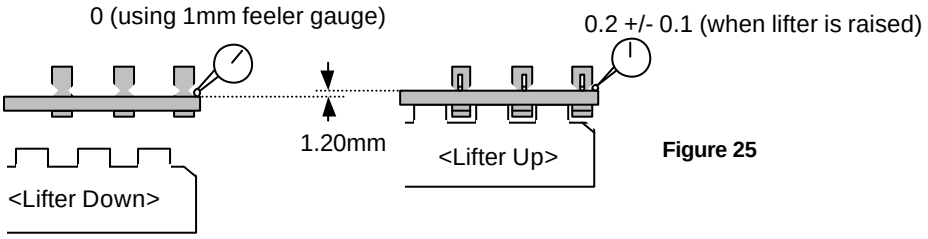

Figure 25

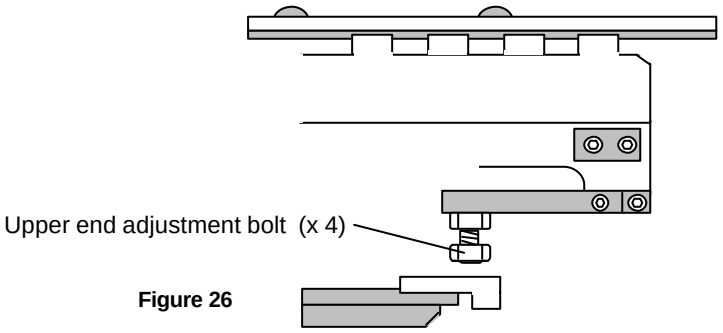

Figure 26

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6. For the lifter cylinder sensors, turn both the up and down end sensors ON first. Set the sensors at a position 0.5mm further in towards the ON position.

<I/O → Standard → IN>

X0B5	In-Lifter Upper limit Check	X0D0	Out-Lifter Upper Limit Check
X0B6	In-Lifter Lower Limit Check	X0D1	Out-Lifter Lower Limit Check

5.18 Loader System Sensor Positions

1. Refer to Fig. 27 for sensor locations along the loader system.

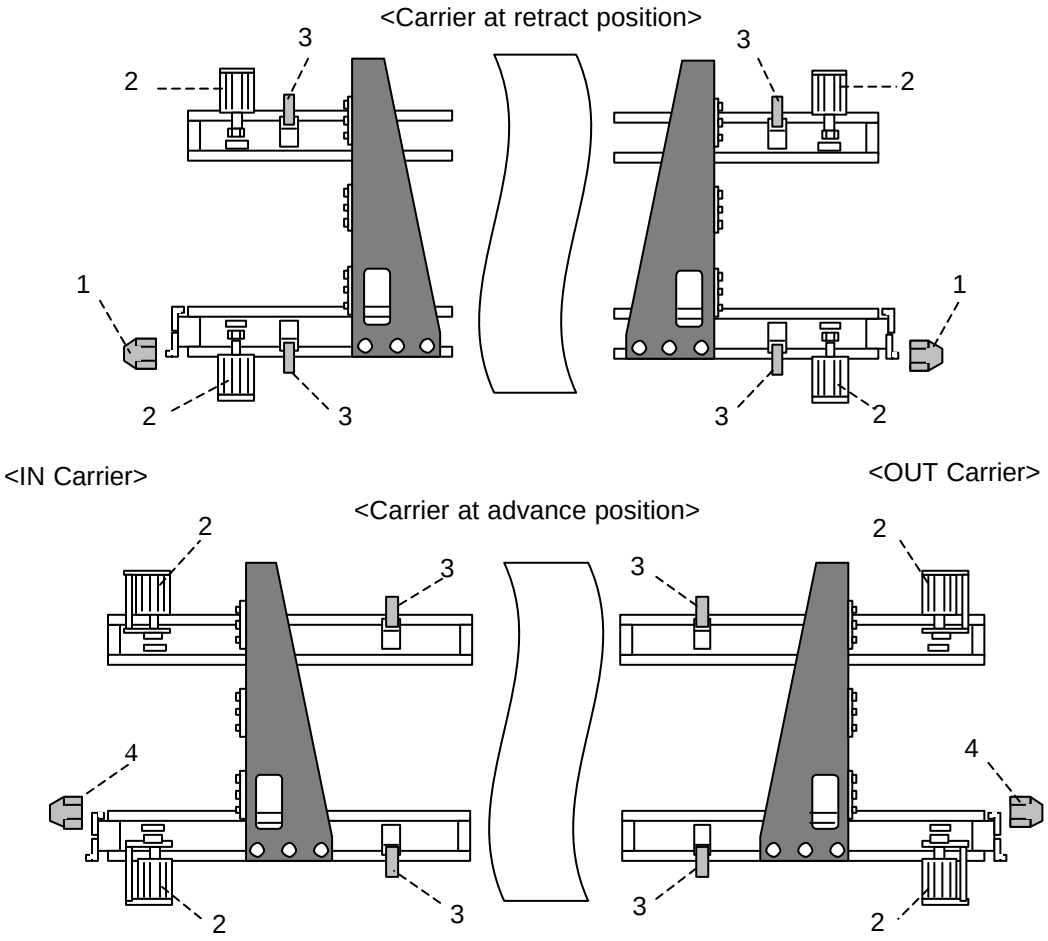


Figure 27

<Carrier Sensors>

1. Carrier retract end sensor	3.Carrier claw close- end sensor
2. Carrier claw open-end sensor	4. Carrier advance end sensor

5.19 Advance / Retract End Sensor Adjustment

1. Adjust the Advance and Retract End sensor height so the clearance between the top of the sensor and dog is 1mm.

2. Align the center of the sensor with the dog in the X and Y directions.

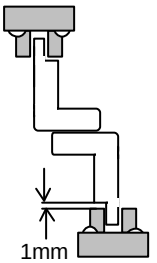


Figure 28

<I/O → Standard → IN>

X0B3	In-carrier Forward Limit Check	X0CE	Out-carrier Forward Limit Check
X0B4	In-carrier Retract Limit Check	X0CF	Out-carrier Retract Limit Check

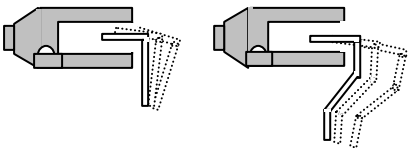
5.20 Claw Closed-End Sensor Adjustment

1. Close the carrier claws to turn the sensor ON. Move the sensor 1mm toward the ON position and secure.

2. Align the center of the sensor with the dog in the X- direction.

   As for the height, be careful to avoid any interference with the flag and sensor when opening and closing the carrier claws.

Figure 29



<I/O → Standard → IN>

X0B7	In-carrier Retract Limit Clamp Check (Fixed Rail)
X0B8	In-carrier Retract Limit Clamp Check (Adjustable Rail)
X0B9	In-carrier Forward Limit Clamp Check (Fixed Rail)
X0BA	In-carrier Forward Limit Clamp Check (Adjustable Rail)
X0D2	Out-carrier Retract Limit Clamp Check (Fixed Rail)
X0D3	Out-carrier Retract Limit Clamp Check (Adjustable Rail)
X0D4	Out-carrier Forward Limit Clamp Check (Fixed Rail)
X0D5	Out-carrier Forward Limit Clamp Check (Adjustable Rail)

5.21 Claw Open -End Sensor Adjustment

1. Set the carrier at the retract position.
2. Set the length of the cylinder rod to 9mm. (Retract position only)
3. Align the cylinder bolt with the center of the Open-Close lever.
4. Open the carrier claws. Find the edge of the sensor ON position and move the sensor 0.5mm in the ON direction and secure.

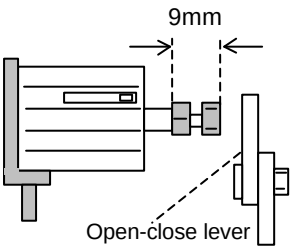
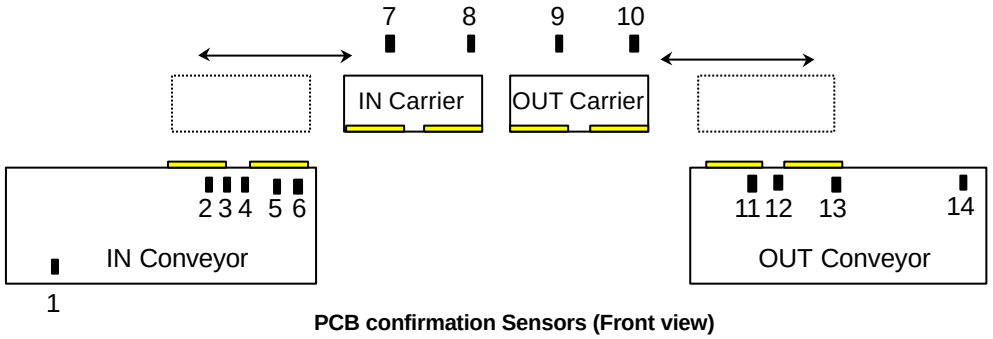


Figure 30

<I/O → Standard → IN>

X0BB	In-carrier Retract Limit Unclamp Check (Fixed Rail)
X0BC	In-carrier Retract Limit Unclamp Check (Adjustable Rail)
X0BD	In-carrier Forward Limit Unclamp Check (Fixed Rail)
X0BE	In-carrier Forward Limit Unclamp Check (Adjustable Rail)
X0D6	Out-carrier Retract Limit Unclamp Check (Fixed Rail)
X0D7	Out-carrier Retract Limit Unclamp Check (Adjustable Rail)
X0D8	Out-carrier Forward Limit Unclamp Check (Fixed Rail)
X0D9	Out-carrier Forward Limit Unclamp Check (Adjustable Rail)

5.22 PCB Check Sensor Arrangement



PCB confirmation Sensors (Front view)

Figure 40

PCB Check Sensor location and function

1. Prevents boards that are longer than the M/C specification from being processed.

2. IN 2 Speed Reduction Check Sensor
   2nd PCB speed reduction

3. IN 2 Arrival Check Sensor
   2nd PCB IN Conveyor arrival check.

4. IN PCB Clearance Check Sensor
   Checks the clearance between the 1st and 2nd PCB's.

5. IN 1 Speed Reduction Check Sensor
   1st PCB speed reduction

6. IN 1 Arrival Check Sensor
   1st PCB IN Conveyor arrival check.

7. IN Carrier 2 Detection Check Sensor
   Detects the 2nd PCB on the IN carrier when the IN carrier arrives at the forward end.

8. IN Carrier 1 Detection Check Sensor
   Detects the 1st PCB on the IN carrier when the IN carrier arrives at the forward end.

9. OUT Carrier 2 Detection Check Sensor
   Detects the 2nd PCB on the OUT carrier when the OUT carrier arrives at the forward end.

10. OUT Carrier 1 Detection Check Sensor
    Detects the 1st PCB on the OUT carrier when the OUT carrier arrives at the forward end.

11. OUT 2 Arrival Check
    Detects when the 2nd PCB arrives at the OUT conveyor.

12. OUT PCB Clearance Check Sensor
    Checks the clearance between the 1st and 2nd PCB's.

13. OUT 1 Arrival Check Sensor
    Checks when the 1st PCB arrives at the OUT Conveyor.

14. Out Conveyor Arrival check Sensor
    Checks for PCB's on the out conveyor. (ready to move to next stage)

<I/O → Standard → IN>

	Sensor Location	
X0A9		IN-CONVEYOR MID-STOPPER UPPER LIMIT CHECK
X0AA		IN-CONVEYOR MID-STOPPER LOWER LIMIT CHECK
X0AB	(5)	IN-CONVEYOR 1 SPEED DECELERATION POINT
X0AC	(6)	IN-CONVEYOR 1 PANEL ARRIVAL CHECK
X0AD	(2)	IN-CONVEYOR 2 SPEED DECELERATION POINT
X0AE	(3)	IN-CONVEYOR 2 PANEL ARRIVAL CHECK
X0AF	(4)	PANEL INTERVAL BETWEEN IN-CONVEYOR 1 AND 2
X0B0	(1)	IN-CONVEYOR PANEL IN
X0B1	(8)	IN-CARRIER FORWARD LIMIT PANEL CHECK (1)
X0B2	(7)	IN-CARRIER FORWARD LIMIT PANEL CHECK (2)
X0C4		OUT-CONVEYOR MID-STOPPER UPPER LIMIT CHECK
X0C5		OUT-CONVEYOR MID-STOPPER LOWER LIMIT CHECK
X0C5	(13)	OUT-CONVEYOR 1 PANEL ARRIVAL CHECK
X0C9	(11)	OUT-CONVEYOR 2 PANEL ARRIVAL CHECK
X0CA	(12)	PANEL INTERVAL BETWEEN OUT-CONVEYOR 1and 2
X0CB	(14)	OUT-CONVEYOR UNLOADER PANEL ARRIVAL CHECK
X0CC	(10)	OUT-CARRIER FORWARD LIMIT PANEL CHECK (1)
X0CD	(9)	OUT-CARRIER FORWARD LIMIT PANEL CHECK (2)

5.23 PCB Stopper and Check Sensor Adjustment

<<IN Conveyor (Fixed) Stopper Installation>>

Install the stoppers and adjust the sensors for 2-PCB-loading, using the maximum length board: (CP-732/733E: 170MM) (CP-742/743(M)E: 220MM)

Install the stoppers only after the X, Y, and Z, axes, “Loading Position” has been calibrated.

1. With the first PCB stoppers from the In conveyor removed, move the XY table to the IN loading position. **(DO NOT raise the Z-axis)** The 1st PCB moveable stopper should be down. (Turn On “Y079” to lower the 1st PCB stopper)

2. Turn ON “Y044”, (Main clamp open), and position the maximum length board (for 2 PCB’s) on the reference and secondary pins. Turn ON “Y043” (Main clamp close), and clamp the PCB.

3. Turn ON “Y072”, (In carrier close) , “Y074”, (In carrier advance) ,and “Y073”, (In carrier open). Manually raise the Z to the IN loading position.

4. Turn ON “Y072” (In carrier close), and “Y044”(Main clamp open), and lower Z to the “Z0” position. (The PCB should now be clamped on the carrier.)

5. Turn ON “Y075”(In carrier retract), “Y076” (In lifter up), and “Y073” (In carrier open), “Y077” (In lifter down), “Y072” (In carrier close), and “Y074” (In carrier advance). (the PCB is now loaded at the correct position on the IN conveyor.) See Fig. 41.

6. Set the first PCB stoppers against the leading edge of the PCB. (be careful not to move the board)

7. Loosen the sensor positioning bolt for the first PCB check sensor and position the sensor 5mm from the leading edge of the first PCB. See Fig. 42.

8. Set the IN PCB clearance check sensor switch to “D_ON”, and both the arrival and speed reduction sensor switches to “L_ON”.

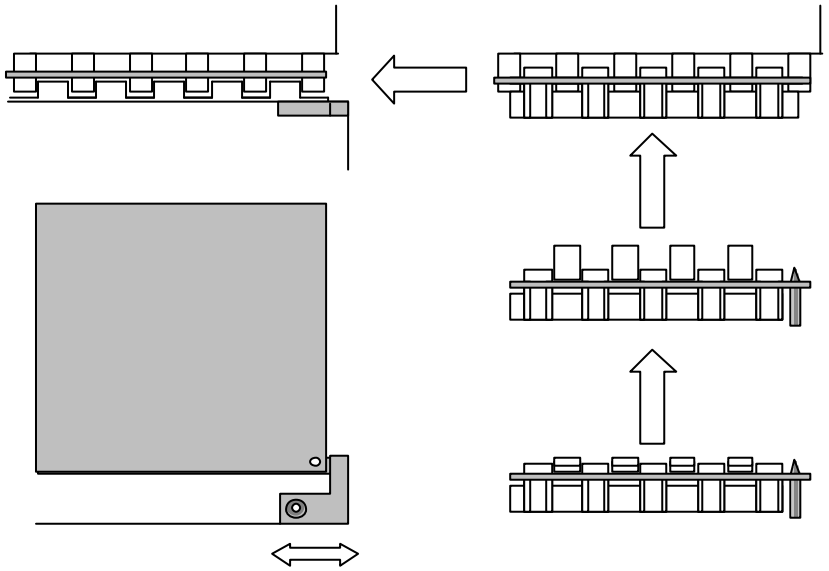
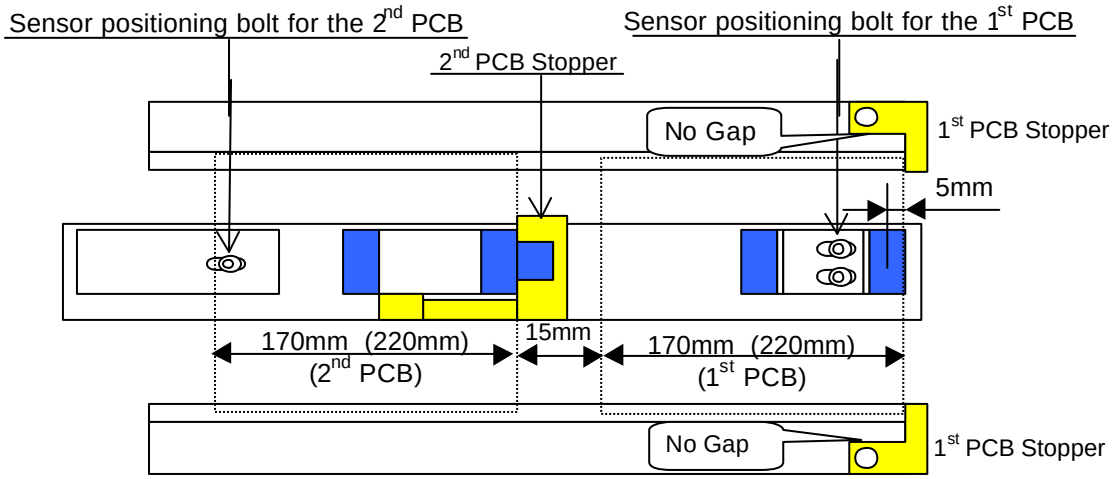


Figure 41



Stopper and Sensor Positioning for the IN conveyor.

Figure 42

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<<IN Carrier Sensor Adjustment>>

1. Load two PCBs on the IN carrier. “X0B1” (In carrier 1 detection check), “X0B2” (IN carrier 2 detection check) shall come ON when “Y074”, (In carrier advance) is ON. Adjust the sensor position 5mm from the leading edge of each board. Ensure that the sensor switch is set to “L_ON”. And make sure that the volume is at MAX position.

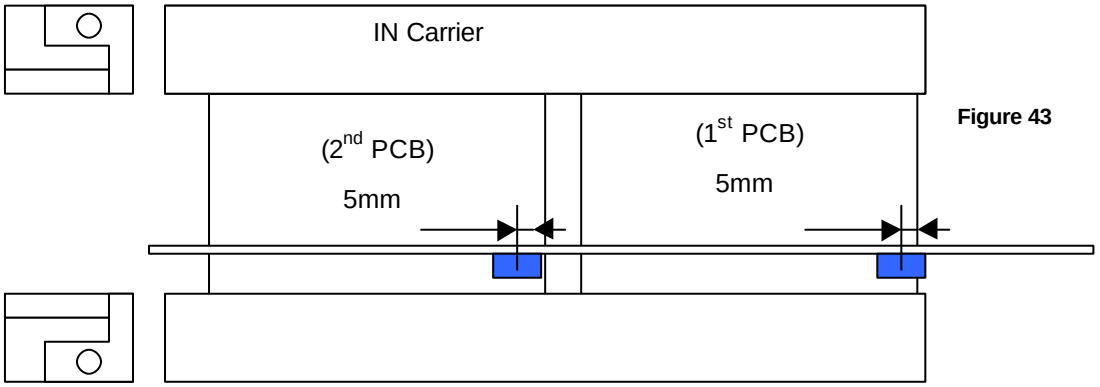

Figure 43

Sensor Positioning for the IN Carrier

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<<OUT Carrier Sensor Adjustment>>

Adjust the sensors for the OUT carrier as follows:

1. Load 2 PCBs on the IN carrier. Advance the carrier to the forward end position. (Continued from the IN carrier adjustment.). Move the XY table to the IN loading position. (Do NOT raise the Z-axis.)

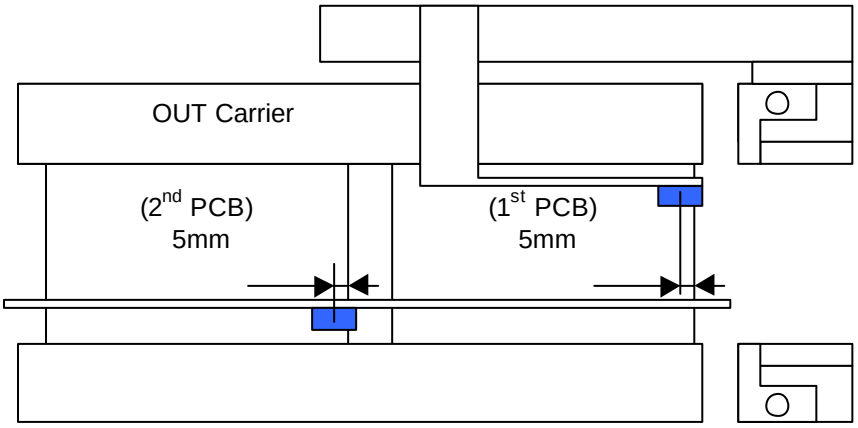
2. Turn ON I/O, "Y044" (Main clamp open). Raise Z to the IN loading position.

3. Turn ON "Y043" (Main clamp close) and "Y073",(IN carrier open). Lower the Z-axis to the "Z0" position to load 2 PCBs onto the XY table. Then, move the main table to the unloading position.

4. Turn ON "Y082" (Out carrier close), "Y084" (Out carrier advance), and "Y083"(Out carrier open) and raise the Z-axis raise to the ZL out position.

5. Turn ON "Y082"(Out carrier close) and "Y082" (Main clamp open). Lower Z to set to the same condition as when the 2 PCBs were loaded on the IN carrier.

6. Adjust the sensor position so that "X0CC" (Out carrier 1 detection check), and "X0CD" (Out carrier 2 detection check) are set 5mm from the leading edge of each Pcb. Set the sensor switch to "L_ON". And make sure that the volume is at MAX position.



Sensor Positioning for the Out Carrier

Figure 44

<<OUT Conveyor>>

Refer to the Fig. 45 for PCB stopper and sensor positioning.

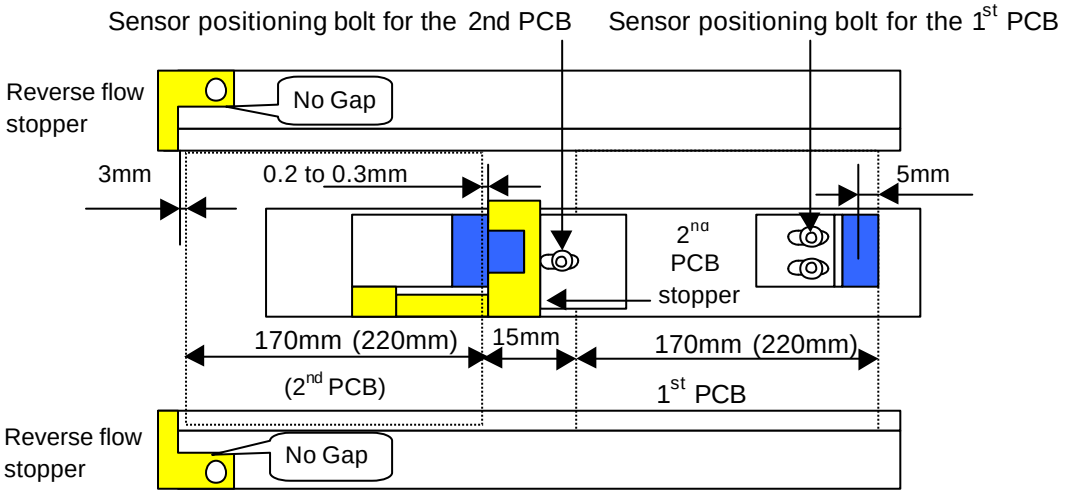


Figure 45

Stopper and Sensor Positioning for the Out conveyor

1. Remove the stoppers on the out conveyor. Load 2 PCBs on the OUT carrier. (Continued from the OUT carrier adjustment.) Turn ON "Y085" (Out carrier retract), "Y086" (Out lifter up), "Y083", (Out carrier open), "Y087" (Out lifter down), "Y082"(Out carrier close), and "Y084", (Out carrier advance), to load the PCB on the OUT conveyor.

2. Loosen the sensor positioning bolt for the 1st PCB and set the sensor beam 5mm from the leading edge of the first PCB.

3. Check that the PCB stopper is positioned 3mm from the trailing edge of the second PCB.

4. Set the switch for the OUT PCB clearance check sensor to "D_ON", and both the arrival and speed reduction sensors to "L_ON".

5.24 Positioning-Scale Adjustment for the IN and OUT Middle Stoppers

1. Set the clearance between the scale and arrow to 0.5mm for both the IN and OUT conveyors. Confirm that the stopper can move between 50mm and 170mm. (220mm for CP-742/743(M)E)

(Make sure that scale does not interfere with the arrow at that time.)

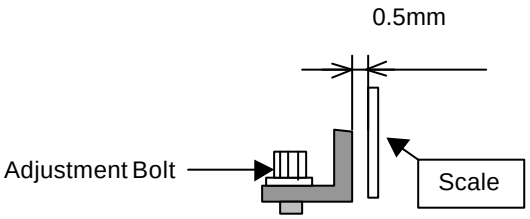


Figure 46

2. Using the appropriate board length against the first stopper, contact the middle stopper with the 15mm spacing jig. The scale should indicate "**170**" at this point. (220mm for CP-742/743(M)E)
   If out of alignment, loosen the two screws on the scale and slide the scale into position. (Alternatively, set a gap of 15mm between the two boards using a vernier.)

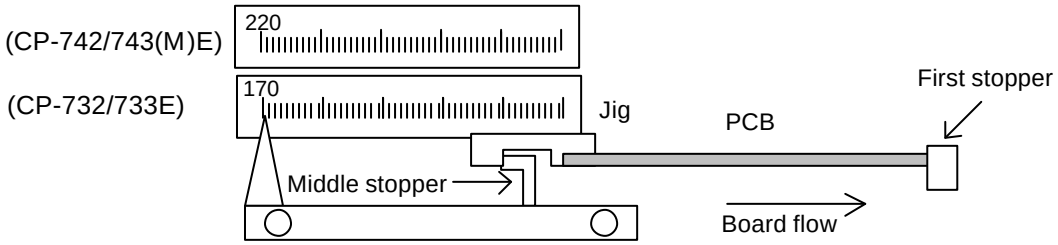


Figure 47

3. To position the middle stopper, place a 170mm (220mm) board on the OUT conveyor. Insert the 15mm positioning jig to make contact with the middle stopper. The scale should indicate "**170**" at this point. (220mm for CP-742/743(M)E) If out of alignment, loosen the two screws on the scale and slide the scale into position.

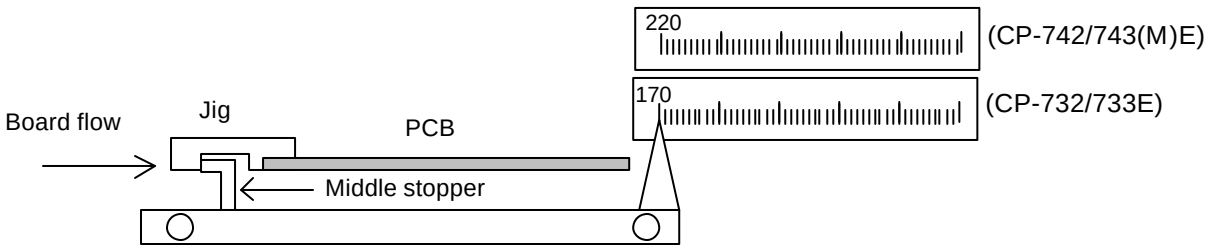


Figure 48

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5.25 2nd PCB Confirmation Sensor Positioning

1. Position the 2ND Pcb confirmation sensor beam 2mm away from the trailing edge of the maximum length board.

2. Confirm that carrier does not interfere with the sensor bracket when the conveyor width is set to minimum.

Note: The purpose of this sensor is to protect against the loading of PCBs longer than those described in the machine specifications.

<I/O → STANDARD → IN>

X0B0	IN CONVEYOR PANEL IN CHECK

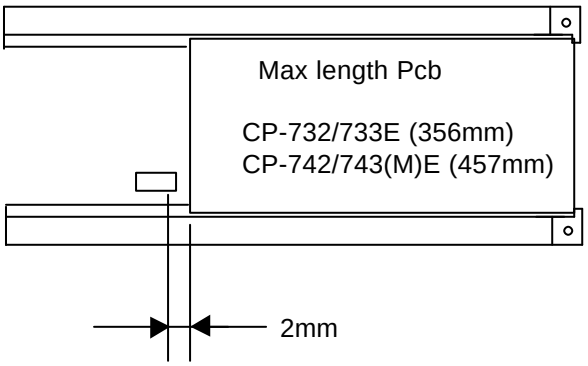

Figure 49

5.26 Loader Cylinder Adjustment

Adjustment of Cylinder Controller

1. Press [Maintenance] → [Loader Cylinder Adjustment] to enter the cylinder adjustment command.
2. Select the item number of the cylinder, which is going to be adjusted or calibrated.
3. Press [Times], and enter "10".
4. Pressing [START] will activate "Waiting for START button". Press [START] to calibrate.
   Results of the 10 movements Max (ms) and Min (ms) will be displayed after the calibration. Adjust the cylinder controller so that the results are within the appropriate ranges shown below.
   * As for the Carrier and XY table open/close time, check the total time for clamping & unclamping.

***CP-732/733E**

Calibration Item No.	Time (ms)	Flow Control Position
1.In-Lifter Up/Down	1500 ± 50	0.5 rev. from fully closed.
2.In-Carrier Clamper Advanced Limit (Fixed side)	Less than 300	No flow control
3.In-Carrier Clamper Advanced Limit (Adjustable side)		
4.In-Carrier Clamper Retract Limit(Fixed side)		
5.In-Carrier Clamper Retract Limit (Adjustable side)		
6.In-Carrier Return	3000 ± 150	(See Page 5 -28)
7.In-Carrier Loading	Fill in the measurement result	
8.Main Clamper (Fixed side)	Less than 300	6 rev. from fully closed
9.Out-Lifter Up/Down	1500 ± 50	0.5 rev. from fully closed.
10.Out-Carrier Clamper Advanced Limit (Fixed side)	Less than 300	No flow control
11.Out-Carrier Clamper Advanced Limit (Adjustable side)		
12.Out-Carrier Clamper Retract Limit (Fixed side)		
13.Out-Carrier Clamper Retract Limit (Adjustable side)		
14.Out-Carrier Return	3000 ± 150	(See Page 5 -28)
15.Out-Carrier Loading	Fill in the measurement Result	
16.Main Clamper (Adjustable side)	Less than 300 135±10	6 rev. from fully closed

***CP-742/743(M)E**

Calibration Item No.	Time (ms)	Flow Controls (Ref.)
1.In-Lifter Up/Down	1500 ± 50	0.5 rev. from fully closed.
2.In-Carrier Clamper Advanced Limit (Fixed side)	Less than 280	No flow control
3.In-Carrier Clamper Advanced Limit (Adjustable side)		
4.In-Carrier Clamper Retract Limit(Fixed side)		
5.In-Carrier Clamper Retract Limit (Adjustable side)		
6.In-Carrier Return	3500 ± 150	(See Page 5 -28)
7.In-Carrier Loading	Fill in the measurement result	
8.Main Clamper (Fixed side)	Less than 280 (135 ± 10)	6 rev. from fully closed
9.Out-Lifter Up/Down	1500 ± 50	0.5 rev. from fully closed.
10.Out-Carrier Clamper Advanced Limit (Fixed side)	Less than 280	No flow control
11.Out-Carrier Clamper Advanced Limit (Adjustable side)		
12.Out-Carrier Clamper Retract Limit (Fixed side)		
13.Out-Carrier Clamper Retract Limit (Adjustable side)		
14.Out-Carrier Return	3500 ± 150	(See Page 5 -28)
15.Out-Carrier Loading	Fill in the measurement Result	
16.Main Clamper (Adjustable side)	Less than 280 135±10	6 rev. from fully closed

Note: Regarding the adjustment for the main clamper closed time on the reference and movable sides, adjust the slower main clamper to 135±10.

*When the value is out of tolerance for items without flow controls, check the pneumatic tubing for kinks and plastic ties which are too tight.

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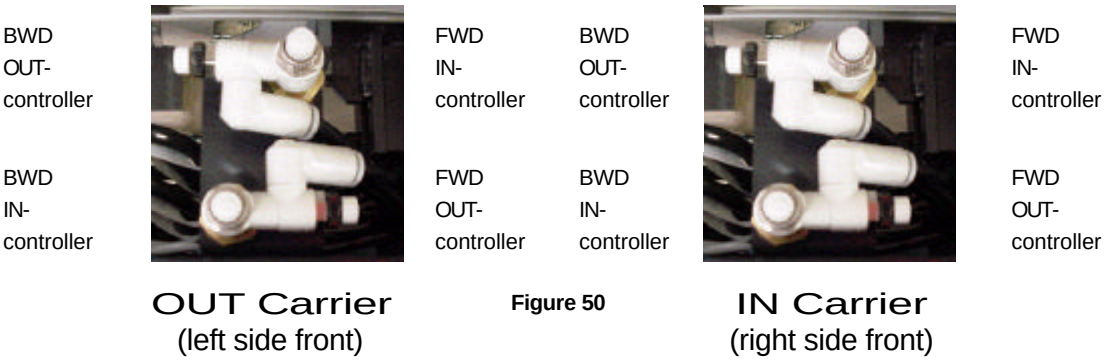
[Adjustment of item "6. IN_C MOVE 14. OUT_C MOVE"]



OUT Carrier
(left side front)

Figure 50

IN Carrier
(right side front)

1. Fully open the OUT controller. Adjust the IN side speed controller so that the calibration times reaches 2000 +/- 150 (ms) for CP-732/733E / CP-742/743(M)E)

2. Adjust the OUT controller so that the calibration time reaches 3000 +/- 150(ms) for CP-732/733E and 3500 +/- 150 (ms) for CP-742/743(M)E.

3. Press the E-stop while the carrier is moving forward and backward. Move the carrier again and check if the moving speed is within the specified time limits.

4. To adjust the cushions of the rod-less cylinder, Turn the adjustment screw 3 revolutions away from the fully closed position.

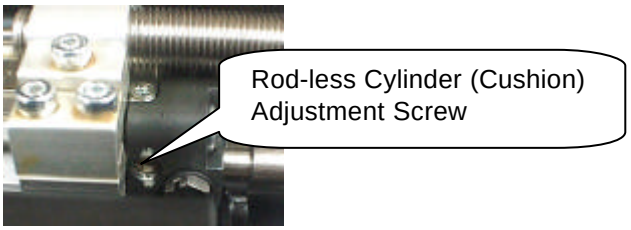


Figure 51

[Note]: When using Vacuum Back Up Pins, the loading time is calculated as:

[Loading time measurement value] + 0.72.

(A 360ms software timer is used for timing the vacuum ON/OFF cycle.

Chapter 6

Servo Adjustment

Chapter 6 Servo Pack Zero Adjustment and Gain / Motion Check

6.1 Servo Pack Parameter Check

Refer to the servo parameter table (located in the information pocket in each m/c) and check that all servo pack parameters match the parameter table. If changes are made for some reason to the servo pack parameters, the M/C must be rebooted in order to register the change.

6.2 Servo Pack Zeroing Adjustment

1. Press the [System on] button to boot the M/C. The following display will appear. (Fig.1)

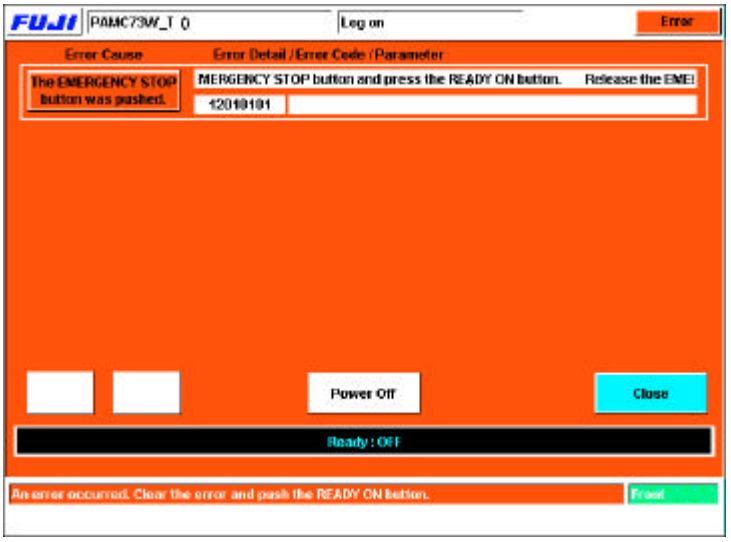


Figure 1

2. Release the emergency stop button and press [Ready ON] to reset the M/C emergency stop condition. Enter the appropriate password and the display will change to Fig.2. Check that the cam angle is at 0 degrees and carry out the following commands:

   Press: [Position] and specify D-axis escape by pressing the [D1-axis], [D2-axis] button then press [Start] to carry out D-axis escape.

   *Carry out Part rejection by pressing [Part Rejection] → [Start].

   *Move the XY-table by using [Panel Loader] → [Move to Unloading Position]→[Start].

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3. Next, press [Maintenance] (Fig.2)→ [I/O check] (Fig.3) to enter the I/O.

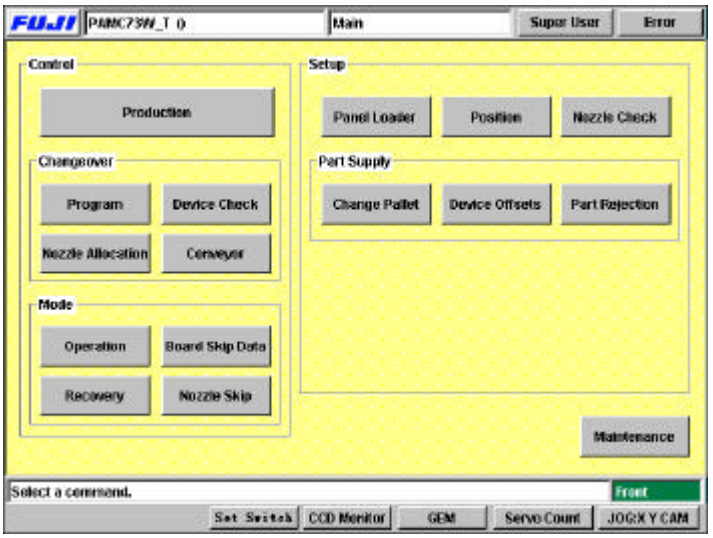

Figure 2

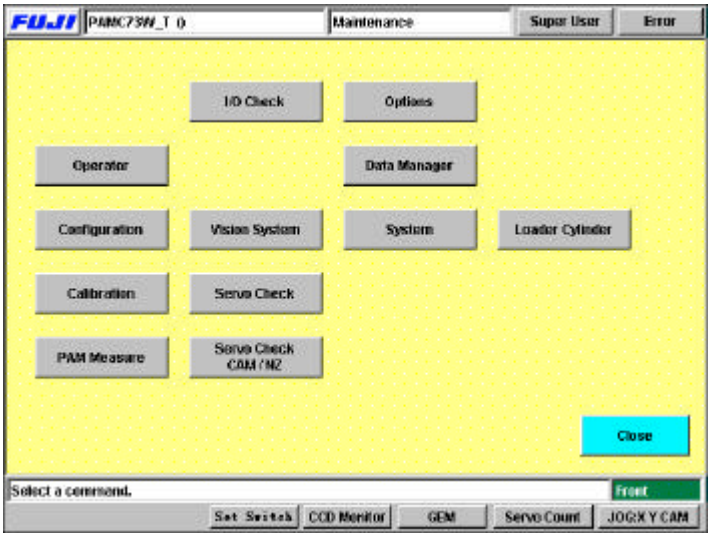

Figure 3

4. Set the I/O status as listed below. This will ensure there will be no interference when performing the procedures in this section.
   [Note]: *Always carry out I/O operation with the cam at 0 degrees.*

<Standard I/O> Output signal (■ = ON, □ = OFF)

■ Y030 ST1 PICKUP SOL DISENGAGED
□ Y031 ST1 PICKUP SOL ENGAGED
■ Y032 ST1 TAPE FEED SOL DISENGAGED
□ Y033 ST1 TAPE FEED SOL ENGAGED
■ Y034 ST9 PLACE SOL DISENGAGED
□ Y035 ST9 PLACE SOL ENGAGED
■ Y036 ST14 NOZZLE CHANGE SOL DISENGAGED
□ Y037 ST14 NOZZLE CHANGE SOL ENGAGED
■ Y043 MAIN-LIFTER CLAMP
□ Y044 MAIN-LIFTER UNCLAMP
□ Y058 D1 TABLE STOPPER CLAMP
■ Y059 D1 TABLE STOPPER UNCLAMP
□ Y068 D2 TABLE STOPPER CLAMP
■ Y069 D2 TABLE STOPPER UNCLAMP

<Standard I/O> Input signal (■ = ON, □ = OFF)

■ X07F D1 CAM CYLINDER LOWER LIMIT CHECK
■ X081 D1 TABLE STOPPER CAM CYLINDER LOWER LIMIT CHECK
■ X095 D2 CAM CYLINDER LOWER LIMIT CHECK
■ X097 D2 TABLE STOPPER CAM CYLINDER LOWER LIMIT CHECK

6.3 Servo Pack Zero Setting Operation

Servo Pack zero setting is performed in two stages (Auto and Manual). Follow the procedure below carefully. This procedure is done to set the zero stability point of the servo pack.
Note: Carry out the adjustment for each axis in the same manner.

Auto Zero Setting

1. **Press the M/C emergency button** to turn the servo power OFF. Auto zeroing must be done with the E-Stop pressed.

2. Press [MODE/SET] (on the Servo Pack control panel) → to display <Fn000> → Press the [▲] key 9 times to Display <Fn009> → Press [DATA/SHIFT] for more than 1 second. → Display <rEF_0> → Press [Mode/Set] for more than 1 second. → <done> will display for 1 second and return to <rEF_0> → Press [DATA/SHIFT] for more than 1 second. → The display will return to <Fn009> → Press [MODE/SET] 3 times to display < bb>. The procedure for auto zero setting is now complete. (Note: Carry out the adjustment for each axis in the same manner.)

Manual Zero Setting

1. Return to Fig.3 and press **[Servo Check]** to enter the servo check command.

2. After the display changes to Fig.4, select the axis to be adjusted from **[Select Tuning Axis].** Press again to cancel if necessary.

[Note]: Select only one axis from [Select Tuning Axis] at a time.

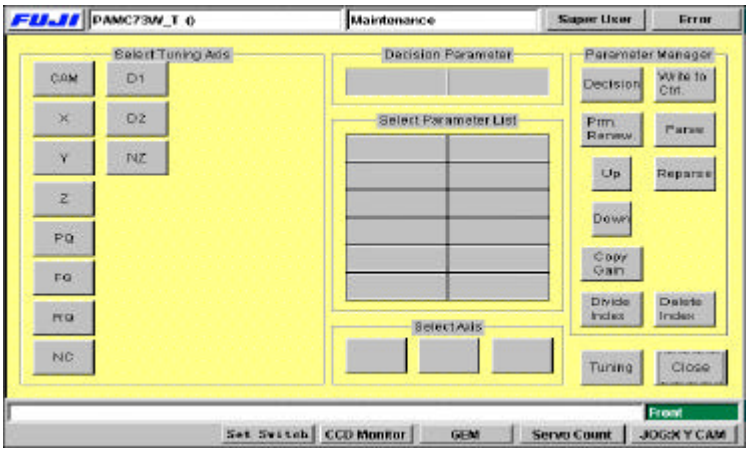

Figure 4

3. Press **[Tuning]** and the display will change to Fig.5.

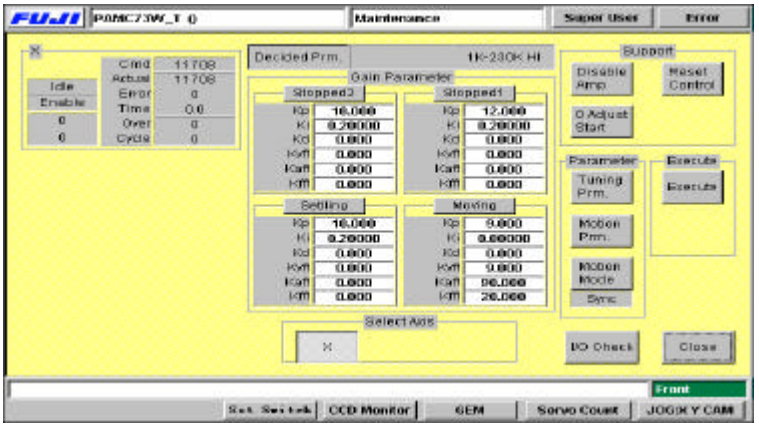

Figure 5

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4. **Release the emergency stop button**, press **[Ready ON]** to turn the servo power ON.

5. Press **[0 Adjust Start]** (fig. 5) and the M/C **[Start]** button will begin to blink.
When the [Start] button is pressed, servo pack zero setting will start. If the counter value in **[Actual]** (fig. 5) is not stable, carry out the adjustment as follows so that the value remains relatively constant.

   Press [MODE/SET] → Display <Fn000> → Press the ▲ key 10 times to display <Fn00A> → Press [DATA/SHIFT] more than 1 second. → < SPd> → Press [DATA/SHIFT] (less than 1 second) → Display <Speed Command Offset>

   Press the ▲ ▼ keys, in order to stabilize the servo counter value. [see "Actual" on the screen] → when the counter value stabilizes, press [DATA/SHIFT] (for less than 1 second.) → to display < SPd> → Press [DATA/SHIFT] for more than 1 second. (Data will be recorded). → Return to <Fn00A>. → Press the emergency button to turn the servo OFF. → Press the [MODE/SET] button 3 times to display < bb>.

   Manual zero setting is now complete.

6. Carry out adjustment for each axis in the same manner.

   [Note]: Always push the emergency button when stopping zero adjustment.

6.4 Servo Pack Gain and Motion Check

Cautions to be observed during the Gain and Motion Check

1. Check that each axis fits into the time and overshoot amount.
2. The parameter for each axis, the value to enter into [Start] [End], the traverse time, and the overshoot amount is listed in the gain test adjustment table.
3. Basically, parameters (Pn100, 101, 401) are fixed. If the motion value is not in range, check again after idling. If problems persist contact Fuji for further instructions.

Check that the conditions are met for each axis as described below

[C-axis]

1. The I/O is set as described on page 6-2.
2. In [Start], enter the counter value when the cam is at 0 degrees (present position). In [End], enter “Start value + 12000”. The counter value for the current position shows next to Actual on the left side of the display.

[X, Y-axes]

1. The main table is moved to the unloading position.
2. The cam angle is 0 degrees
3. The Z-axis is lowered, and the main lifter is clamped.
4. Check both parameters listed on the Gain Test table for the X, & Y-axes.

[Z-axis]

1. The main lifter is clamped.

[PQ, FQ, RQ, NC-axes]

1. Use the Parts Rejection command and make sure the shafts are all facing the correct direction. After checking the [Rot100] parameter at a cam angle of 180 degrees, check the [Rev] parameter at cam angle 0 degrees. When adjusting [Rot100], make sure that the clutch is properly engaged with the shaft.

[D1, D2-axes]

1. Make sure both Device pallets are retracted
2. The D-axis pallet is lowered
3. The cam angle is at 0 degrees
4. The D-axis stoppers are both retracted.
5. Check both parameters listed on the Gain Test table for the D-axes.

[NZ-axis]

1. Check at a cam angle of 0 degrees.

6.5 Servo Pack Gain and Motion Check Procedure

[Note]: Select only one axis at a time from the "Select Tuning Axis" field.

1) When an axis is selected (Fig.4), each parameter for the axis will be displayed on the **"Select Parameter List".** The parameter from the "Select Parameter List" can be changed by pressing the [UP] and [DOWN] keys in the "Parameter Manager".

   First, press the intended parameter and then press **[Decision]** from the "Parameter Manager". The parameter selected in the "Decision parameter" will be displayed.

   When **[Tuning]** is pressed, axis operation can be carried out by the parameter displayed as the "Decision Parameter".

2) Each time the **[Tuning Prm.]** from "Parameter" is selected, the display switches between Fig.5 and fig.6. Each time **[Motion Prm.]** is pressed, the display changes between Fig.7 and Fig.8. Each time **[Motion Mode]** is pressed, the display under the button changes between "Sync", "Interp", "Unsync", "Timer" one by one. **The set value is always set to "Sync**",

   [Caution]: Do not change the [Move Parameter] and [Gain Parameter] in Fig.5 and Fig.6.

3) After **[Motion1 Prm.]** is pressed in Fig.7, values can be entered into **[Start], [End].** Enter the values for [Start] and [End] according to the gain test adjustment table.

   Carry out the same procedure for Fig.8 **[Motion2 Prm.].** Press and enter the values for [Cycle], and [Timer]. **Enter 1 for [Cycle mode] and 500 for [Interval timer].**

   The machine [Start] button will blink after **[Execute]** is pressed. After **[Start]** is pressed, the axis will begin to move. Press [Cycle stop] to stop movement.

   During movement, the amount of traverse time (ms) and overshoot (pulse) are displayed in "Time" and "Over". Check that the values fit within the values shown in the gain test adjustment table.

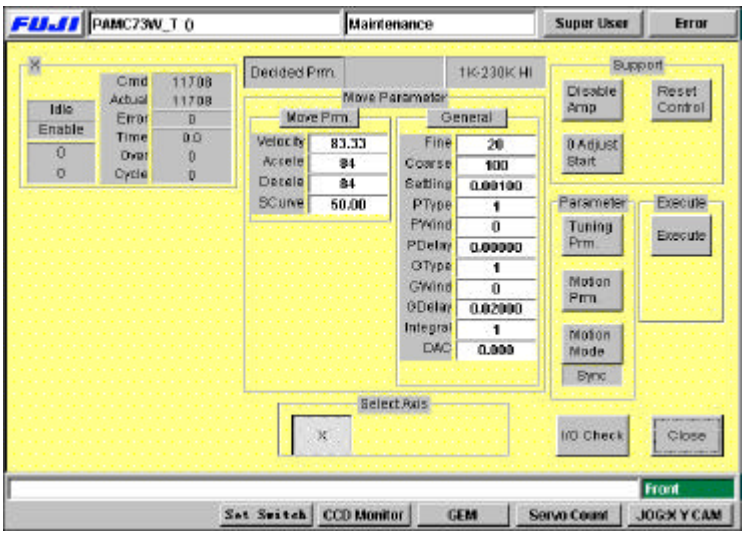

Figure 6

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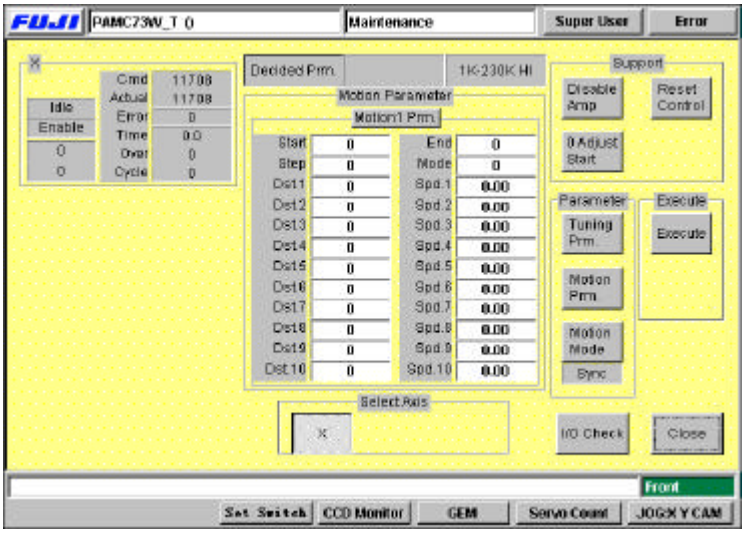

Figure 7

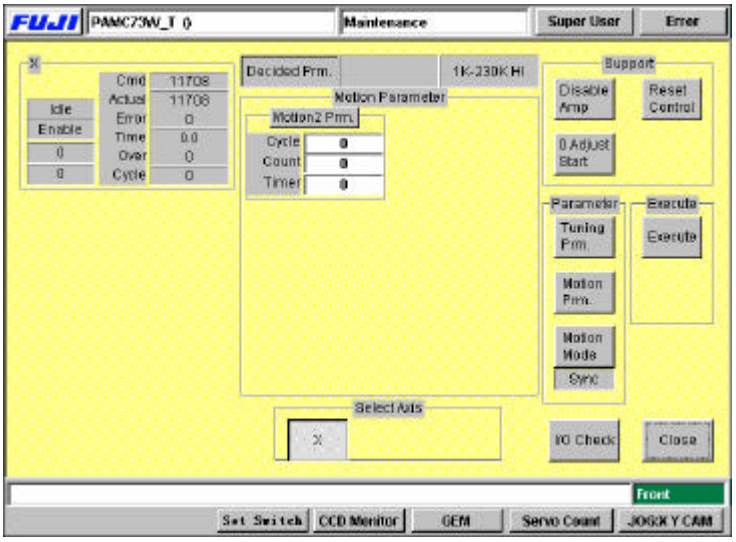

Figure 8

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Gain Test Table
*CP-732/3E

Note: This table applies to application versions **T1.00a & higher**

Axis	Parameter	Adj. condition	Value entered		Traverse time (ms)	Overshoot (pulse)
			Start	End		
C	Auto		Current counter value	Start value +12000	137.0 to 140.0	40 to 50
X	6K-230K UHi	Cam @ 0	10000	17100	46.0 to 49.0	0 to 10
	IK-230K MID		10000	13000	46.0 to 49.0	0 to 10
Y	5K-197.5K UHI	Cam @ 0	10000	17100	46.0 to 49.0	0 to 10
	500-197.5K MID		10000	13000	46.0 to 49.0	0 to 10
Z	Auto	Cam @ 0	1000	1595	46.0 to 49.0	0 to 5
PQ	ROTATION 100	Cam @180	Current counter value	Start value +3600	34.5 to 37.5	0 to 10
FQ	0.4K-1.3K ROT 100	Cam @180	Current counter value	Start value +1300	30.5 to 33.5	0 to 10
	RETURN	Cam @ 0	Current counter value	Start value +450	12.5 to 15.5	0 to 10
RQ	ROTATION 100	Cam @180	Current counter value	Start value +3600	34.5 to 37.5	0 to 10
	RETURN	Cam @ 0	Current counter value	Start value +450	12.5 to 15.5	0 to 10
NC	ROTATION	Cam @180	Current counter value	Start value +1200	12.0 to 15.0	0 to 10
	RETURN	Cam @ 0	Current counter value	Start value +1200	25.0 to 28.0	0 to 10
D1	5K-9K STD L	Cam @ 0 & Empty table	0	8250	77.0 to 80.0	0 to 10
	WEIGHT MEAS		0	3000	54.0 to 57.0	0 to 10
D2	5K-9K STD L	Cam @ 0 & Empty table	0	8250	77.0 to 80.0	0 to 10
	WEIGHT MEAS		0	3000	54.0 to 57.0	0 to 10
NZ	Auto	Cam @ 0	4000	10750	46.0 to 49.0	0 to10

Enter 1 in [Cycle Mode] and 500 in [Timer] for all Axes.

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Gain Test Table
*CP-742/3ME, CP-742/3E

Note: This table applies to application versions **T1.00a & higher**

Axis	Parameter	Adj. condition	Value entered		Traverse time (ms)	Overshoot (pulse)
			Start	End		
C	Auto		Current counter value	Start value +12000	139.0 to 142.0	33 to 44
X	6K -10K UHi	Cam @ 0	10000	17100	46.0 to 49.0	0 to 10
	2K-4K MID		10000	13000	46.0 to 49.0	0 to 10
Y	6K-17K UHi	Cam @ 0	10000	17100	46.0 to 49.0	0 to 10
	2K-10K MID		10000	13000	45.0 to 48.0	0 to 10
Z	250lnf AUTO	Cam @ 0	1000	1595	46.0 to 49.0	0 to 5
PQ	ROTATION 100	Cam @180	Current counter value	Start value +3600	34.5 to 37.5	0 to 10
FQ	0.4-1.3K ROT 100	Cam @180	Current counter value	Start value +1300	30.5 to 33.5	0 to 10
	RETURN	Cam @ 0	Current counter value	Start value +450	12.5 to 15.5	0 to 10
RQ	ROTATION 100	Cam @180	Current counter value	Start value +3600	34.5 to 37.5	0 to 10
	RETURN	Cam @ 0	Current counter value	Start value +450	12.5 to 15.5	0 to 10
NC	ROTATION	Cam @180	Current counter value	Start value +1200	12.0 to 15.0	0 to10
	RETURN	Cam @ 0	Current counter value	Start value +1200	25.0 to 28.0	0 to 10
NZ	Auto	Cam @ 0	4000	10750	46.0 to 49.0	0 to 10

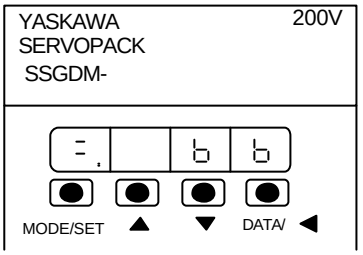
CP-742/3ME • CP-742/3E

D1	5K-9K STD L	Cam @ 0 & Empty table	0	8250	77.0 to 80.0	0 to 10
	WEIGHT MEAS		0	3000	54.0 to 57.0	0 to 10
D2	5K-9K STD L	Cam @ 0 & Empty table	0	8250	77.0 to 80.0	0 to 10
	WEIGHT MEAS		0	3000	55.0 to 58.0	0 to 10

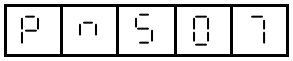
Enter 1 in [Cycle Mode] and 500 in [Timer] for all Axes.

Using the Servo Pack Panel Operator

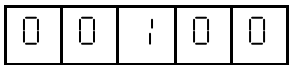
1. By pressing the MODE/SET key, select the constant setting mode.



2. Press the UP or DOWN key to set the User constant No. (for instance, Pn507)

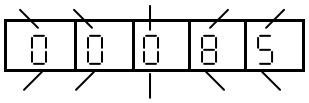


3. Press the DATA/SHIFT key for more than 1 second. The present user constant data, which is set in step 2 will be displayed. “00100”

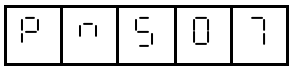


4. Press the UP or DOWN key to change the data. “00085” The display gradually changes by pressing the down key.

5. Press the DATA/SHIFT key more than 1 second. The display flashes and the data will be stored.



6. Press the DATA/SHIFT key more than one second. The display goes back to the User constant No.



Now, the user constant Pn507 is changed from 100 to 85. To change the data, repeat steps # 2 to # 6. **Note:** To move one place to the left, Press the DATA/SHIFT key for less than 1 second.

KEY	NAME	FUNCTION
▲	Up Key	• Press this key to display User setting or setting values. • To increase a value, press the Up key. • To decrease a value, press the Down key. • Press UP&DOWN at the same time to reset servo alarms.
▼	Down Key	
MODE/SET	Mode/Set Key	• Press this key to switch ”condition mode”, “supplement function execution mode” “constant setting mode” and “monitoring mode”.
DATA/ ◀	Data/Shift Key	• Press this key to display user settings and setting values. • In the constant setting mode, use this key to change the value (flashing no.) or to set data.

Fuji Machine Mfg. Co., Ltd. Okazaki
SMT Equipment Quality Assurance Dept.
Technical Support Div. Section No.2

Chapter 7
Camera Adjustment

Chapter 7 Camera Adjustment

Parts Cameras

Two CCD cameras are mounted on the machine for inspection of the parts picked at the first station. The raw image is captured by the cameras and compared with part data to ensure that the part's dimensions are within specified tolerances.

Problems that arise from an incorrectly adjusted camera include displaced parts, high error rates, and skewed parts. Some other examples of possible reasons for re-calibration are:

- Lens replacement
- Camera replacement

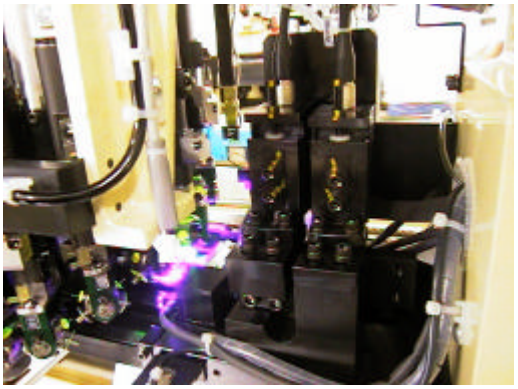


Figure 1

7.1 Parts Camera removal

1. With the machine power OFF, remove the video cables from the cameras.

2. Remove the cameras from the machine.

3. Remove the four mounting bolts from the right hand side of the bracket and carefully remove the cameras. (The four bolts within the rectangle in figure 2). When replacing the camera, the torque value for tightening these bolts is 0.98N.m. (10Kgf/cm)

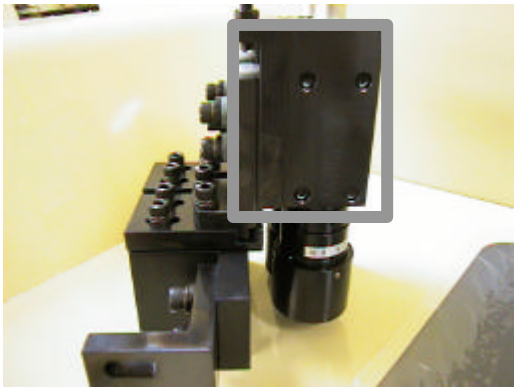


Figure 2

4. Remove the lens assembly by unscrewing it from the CCD module (figure 3).

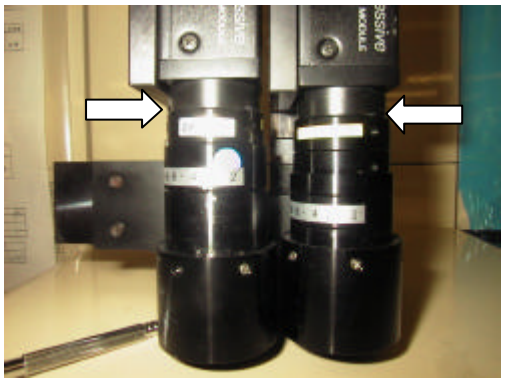


Figure 3

5. When installing the lens unit, apply a small amount of Loctite 425 to the threads and use a 3.92Nm ("C-Type)" torque wrench to secure the lens unit.

7.2 Camera Settings

1. Make the following amplifier and aperture settings prior to returning the cameras to the machine:

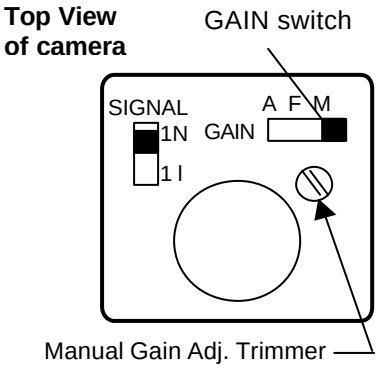


Figure 4

Camera	Aperture
Wide	2
Narrow	2.8

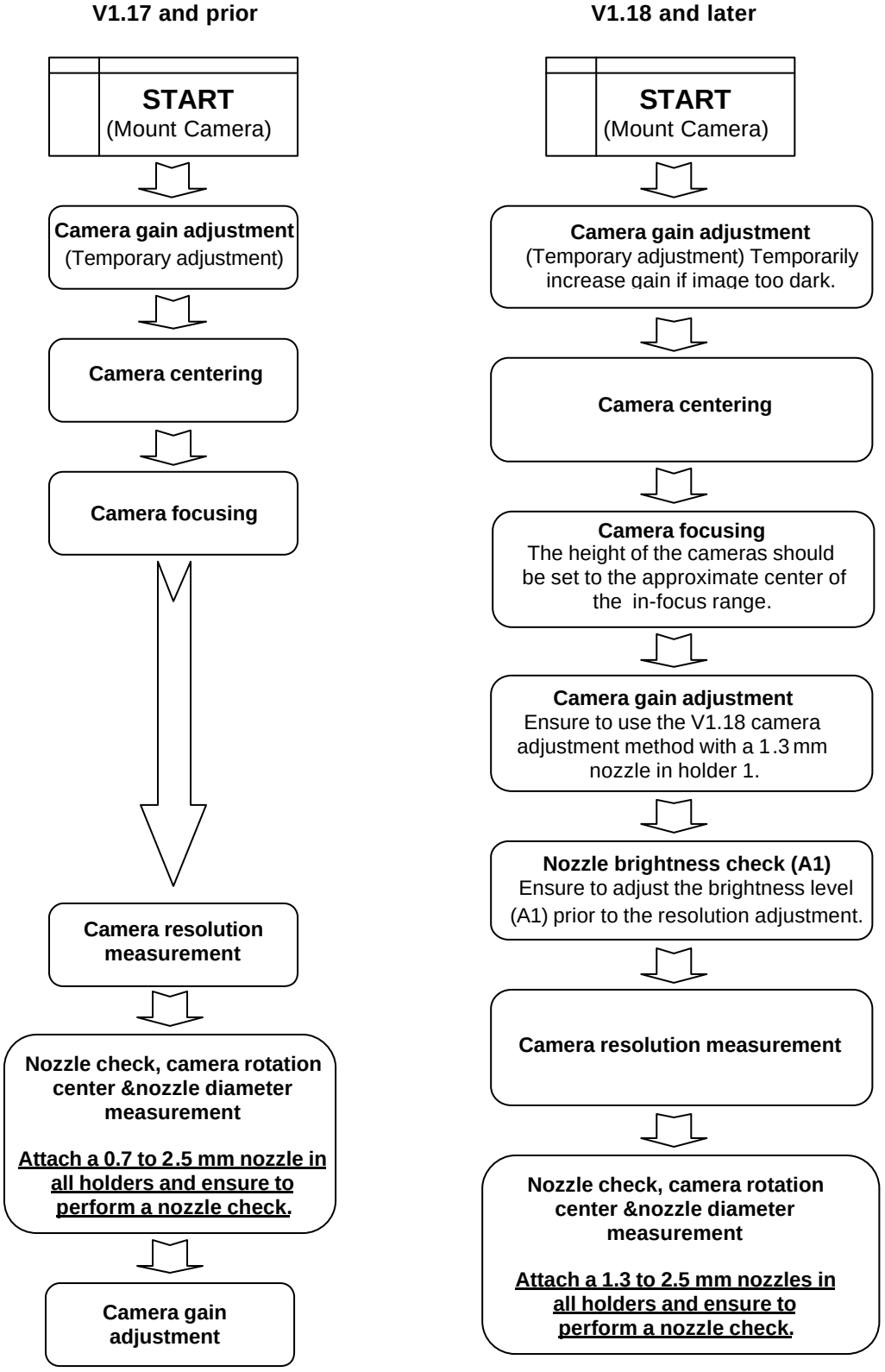
2. Install the lens assembly to the new CCD module, and then remount the camera and lens unit to the camera bracket.

3. Install the cameras in the machine.

4. Ensuring that the power supply to the machine is OFF, reconnect the video cables to the cameras.

7.3 Camera Set-up Procedure

Firmware version V1.18 features a new brightness adjustment function. Use of this function requires a change in the camera adjustment procedure in order to perform resolution measurements at the appropriate brightness. Refer to the following diagram for the correct order of adjustment.



7.4 Temporary Gain Adjustment

1. Temporarily adjust the camera gain (using the manual gain adjustment trimmer on top of the camera body) if the nozzle image appears too dark on the monitor.

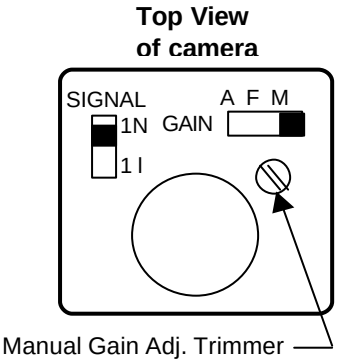


Figure 4A

7.5 Camera Centering

1. Move a straight 0.7mm nozzle to the 5th station and set at 200 degrees.

2. View the raw image of the nozzle as follows:

   [Press the CCD Monitor tab at the bottom of the screen] → [Select the Wide or Narrow camera]

3. The CCD monitor will appear on the screen. Press [SCALE] to display the crosshairs.

4. Remove the mounting bracket (item 2 in figure 5) securing the camera assembly to the right hand inner side of the cam box. It will not be possible to perform camera adjustments without removing this bracket.

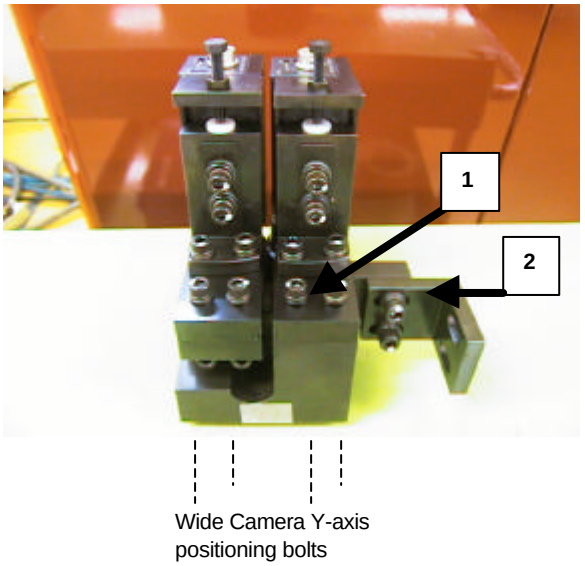


Figure 5

5. To align the Wide Camera nozzle image to the crosshairs in the Y-direction, loosen the four bolts on the underside of the camera assembly and adjust the position of the assembly accordingly (see figure 6). Once the adjustment is complete tighten the bolts with the required amount of torque (13N.m).

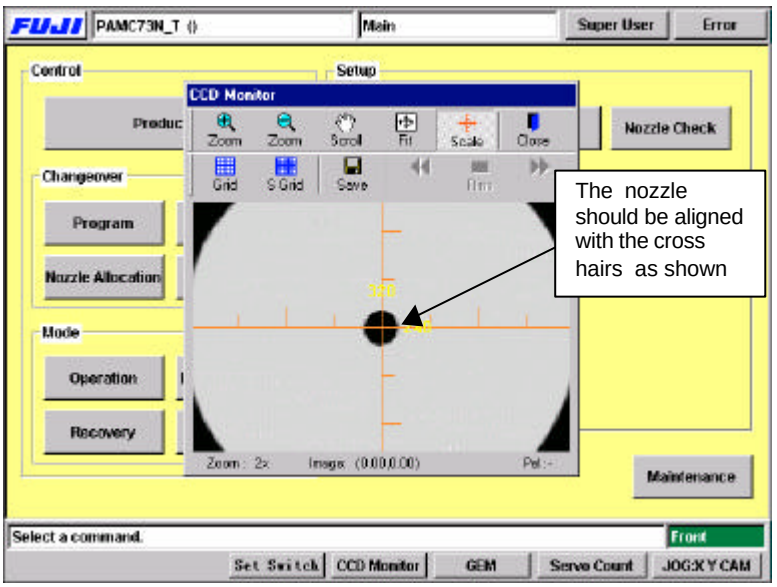


Figure 6

6. To align the Wide Camera nozzle image to the crosshairs in the X-direction, loosen the X-axis positioning bolts (Item 1 in figure 5) and adjust the position of the camera accordingly. Once the adjustment is complete tighten the bolts with the required amount of torque (8N.m).

7. As the narrow camera bracket is attached to the wide camera bracket, it is necessary to adjust the wide camera bracket first when adjusting both cameras. Performing narrow camera adjustments first will necessitate the adjustment being performed twice.

8. To adjust the narrow camera in the Y-direction, loosen the Y-axis positioning bolts (Item 1 in figure 7) and adjust the camera position accordingly. Once the adjustment is complete, tighten the bolts with the required amount of torque (13N.m).

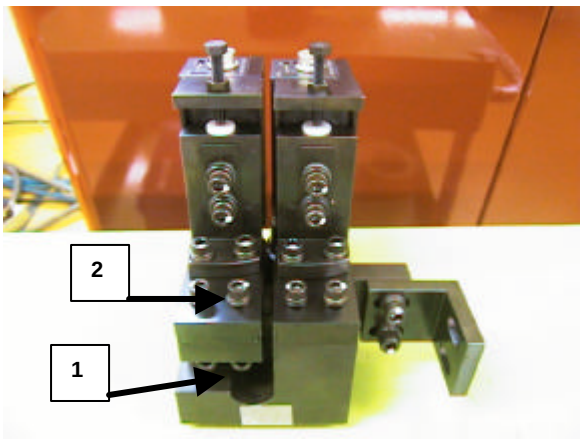


Figure 7

9. To adjust the narrow camera in the X-direction, loosen the X-axis positioning bolts (Item 2 in figure 7) and adjust the camera position accordingly. Once the adjustment is complete tighten the bolts with the required amount of torque (8N.m).

7.6 Focus Adjustments

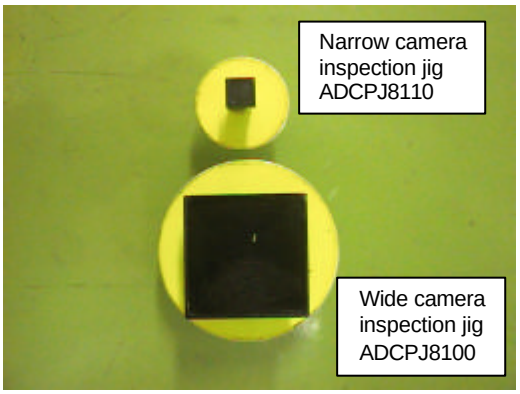


Figure 8

1. Before proceeding to set the focus, ensure the cameras (nozzle image) are centered.
2. Place the wide camera inspection jig on head A and bring it to the 5th station at 200 degrees.
3. Display the wide camera monitor using the following commands:

   [Press the CCD Monitor tab at the bottom of the screen] → [Select the Wide or Narrow camera]

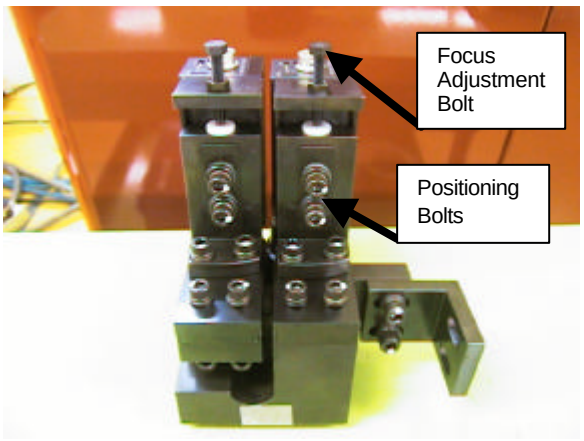


Figure 9

4. Adjust the focus of the wide camera by loosening the two positioning bolts and use the focus adjustment bolt to raise or lower the camera (see figure 9).
5. The camera is focused when the monitor shows a clear, sharp image of the wide camera inspection jig.
6. Once the adjustment is complete, tighten the bolts with the required amount of torque (8N.m).
7. Having adjusted the wide camera focus, repeat the procedure for the narrow camera, using the narrow camera inspection jig.
8. When both adjustments are finished set the gap between the lens cover and the prism box to 0.5mm.

7.7 Camera Brightness Gain Adjustment

1. Insert a clean 1.3mm nozzle in holder A, (nozzle position 1) and set the holder at station 9 at 0 degrees. Ensure the reflective sticker is properly flattened down.

2. Press: [Maintenance] → [Calibration] → [Parts Camera Resolution] to display the Part Camera Gain Adjustment command. (Figure 10)

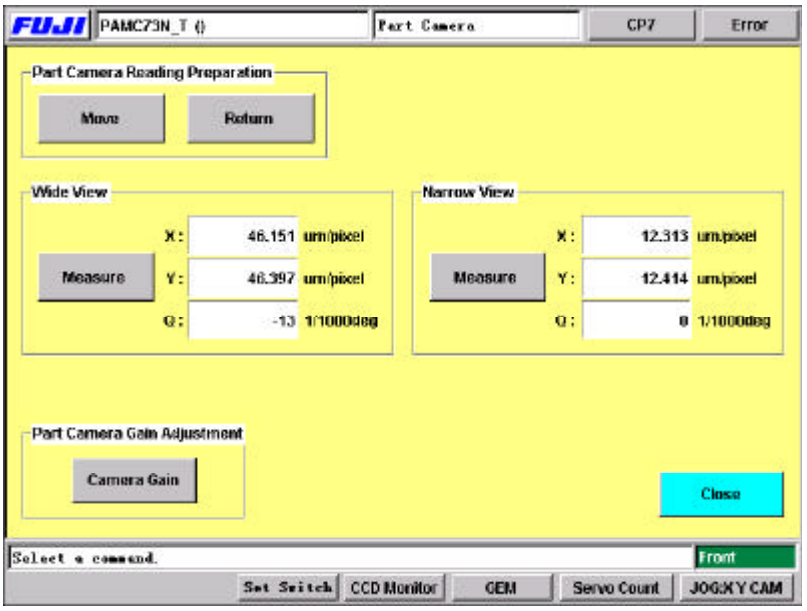


FIGURE 10

3. Press: [Move] → [Start] to bring the nozzle into station 5 at 200 degrees. When the nozzle reaches station 5, press the E-Stop to prevent accidental injury while making the adjustment.

4. Press the Camera Gain button to display Figure 11.

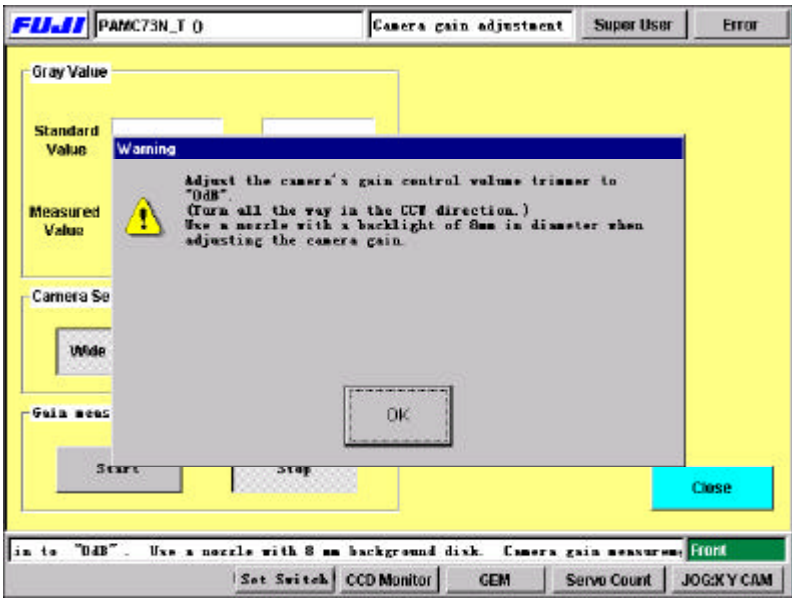


FIGURE 11

5. As shown in Figure 11, a dialog box appears which indicates to turn the camera gain trimmer all the way in the CCW direction. After doing so, press: [OK].

6. Select the camera to be adjusted and press the Start button. Adjust the camera gain trimmer so the measured value matches the standard value displayed. (+/- 5.00) When completed, press the stop button. (Figure 12) Carry out the same procedure for both cameras. (Wide and Narrow)

   Note: Initially when the start button is pressed, a dialog box will appear briefly indicating not to adjust the camera trimmer. After this dialog box disappears, it is OK to adjust the camera gain trimmer.

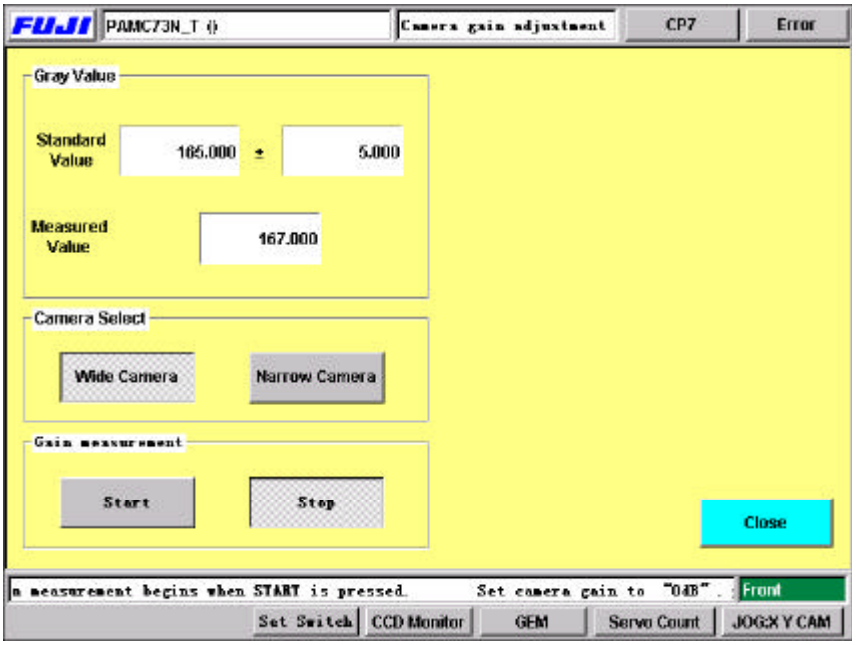


FIGURE 12

7. Note: The above procedure only needs to be carried out once. However, this adjustment must be repeated, if the camera gain trimmers are moved.

   For further information, check the Fuji web-site for a supplement entittled “CP-7-Series: Adjusting the Camera Gain”. Document No.: U0121-1.0E.

7.8 Nozzle Check (Temporary measurement)

1. After the camera gain adjustment, it is necessary to perform a nozzle check so the machine can take a brightness level for the A1 nozzle reflective seal. Primarily, the A1 nozzle brightness needs to be measured before the resolution can be measured. Otherwise, the vision system will not be able to see the resolution jig.

   Press: [Nozzle Check] → [Nozzle Size] or [Nozzle Bend] → Holder 1 → Enter → Start.

   The brightness for the A1 nozzle must be measured in order to carry out the resolution measurement performed in the next step. It is not necessary to install the other nozzles in B1 to P1. A1 is the only nozzle position required at this time.

7.9 Wide / Narrow Camera Skew and Resolution Adjustment

1. The camera skew adjustment is performed in order to align the camera with the X- and the Y- axes. This is vital for determining accurate angular compensation at station 8 (FQ).

2. The camera resolution indicates the size of a pixel in the X and the Y direction. If the camera resolution lies outside the specified range, the dimensions of the component inspected will not match the data contained in the part data, and a vision processing error will occur.

3. With the cam at 0 degrees, install the “cam lever spring lock jig” at station 8 in the cam box, as shown in figure 13.

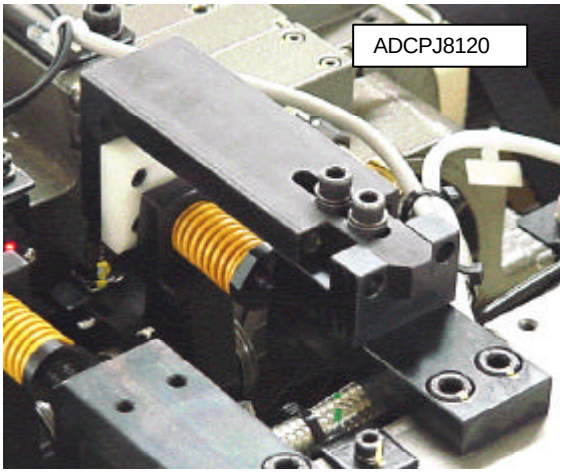


Figure 13

4. Turn the pick up solenoid OFF, (Y032) with the cam at 0 degrees.

5. Put the wide camera inspection jig on Head A, nozzle No.1.

6. Inch the jig to the 9th station and set at 200 degrees.

7. Remove the back up plates and attach the “XY Slide (magnet stand)” to the XY table, see Figure 14:

Figure 14

8. Set the dial gauge stand on the magnet stand and set the dial gauge tip to the horizontal flat edge of the jig, see figure 15:

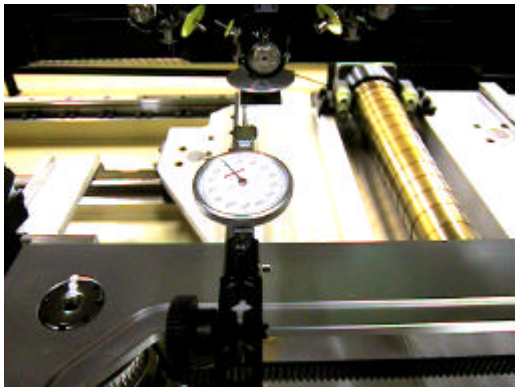


Figure 15

9. Set the X-axis inching speed to 1% and then inch the dial gauge tip from right to left across the horizontal flat edge of the jig. Rotate the shaft until the dial gauge shows that the jig is parallel to the X-axis. (Tol: 0 +/- 0.01mm)

10. Remove the dial gauge and inch the C-axis until the angle is 0 degrees and the jig is half way between the 9th and 10th stations.

11. To automatically send the jig to the 5th station, use the following commands:

    [MAINTENANCE] → [CALIBRATION] → [PARTS CAMERA RESOLUTION] → [MOVE] → START

12. To perform the measurement procedure press [MEASURE] → START.

13. The camera skew and resolution should be in the tolerances shown below:

Delta Q (skew)	0 +/- 50 (1/1000 deg.)
Wide camera resolution X	43.17 to 47.72 um/pixel
Wide camera resolution Y	43.40 to 47.96 um/pixel

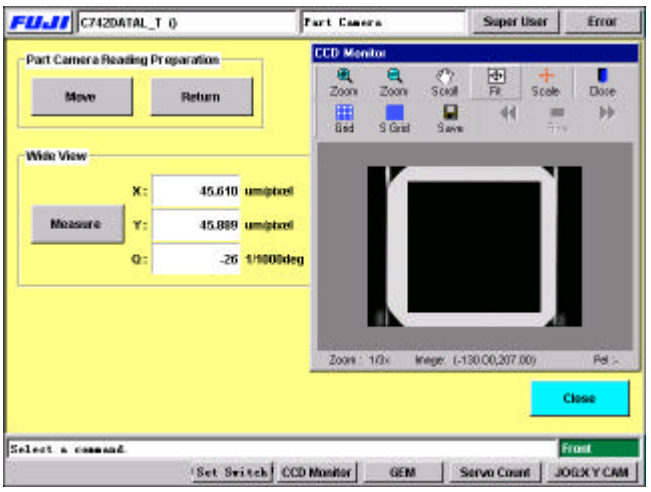


Figure 16

14. If the resolution is out of range, loosen the lens cover and adjust the camera height. Afterwards, reset the gap between the lens cover and the prism box to 0.5mm.

15. To adjust Delta Q, loosen the delta Q positioning bolts (see figure 15) and use a 2.5mm allen wrench to turn the eccentric bolt in order to achieve a target value of: 0 +/- 50 (1/1000 deg.)

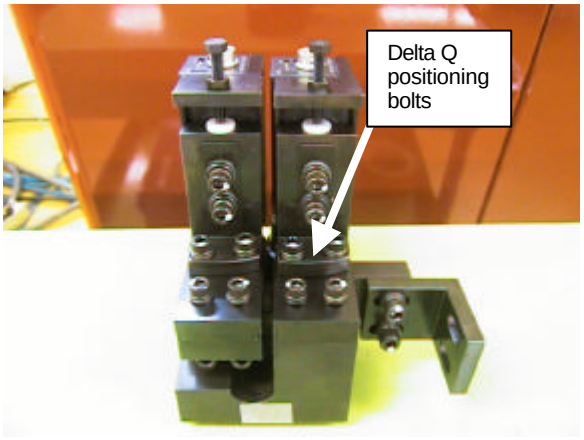


Figure 17

16. Once the delta Q is set within tolerance:0 +/- 50 (1/1000 deg.) lock the delta Q positioning bolts with an 8N.m torque wrench. After locking the bolts confirm that the delta Q value is still within tolerance.

17. Having finished the wide camera skew and resolution adjustment, repeat the procedure for the narrow camera. Remember to use the narrow camera inspection jig and set the skew and resolution values within the tolerances shown below:

Delta Q (skew)	0 +/- 50 (1/1000 deg.)
Narrow Camera Resolution X	11.81 to 13.06 um/pixel
Narrow Camera Resolution Y	11.88 to 13.13 um/pixel

18. Once the calibration procedure has been completed for both cameras, press [BACK] → START, and the shaft will return to its original position.

19. With the cam at 0 degrees, remove the “cam lever spring lock jig” from the 8th station in the cam box.

20. Remove the inspection jig from the No.1 slot of head A and replace any nozzles that have been removed.

21. Place 1.3 to 2.5 mm nozzles in all holder locations and perform a nozzle center check in order to update the “Base Nozzle” proper data.

    Note: In order to register the BASE nozzle proper data, it is necessary to install 1.3 to 2.5 mm nozzles in all (96) holder locations. This operation only needs to be done once. If the camera position has been changed, it will be necessary to repeat the center measurement.

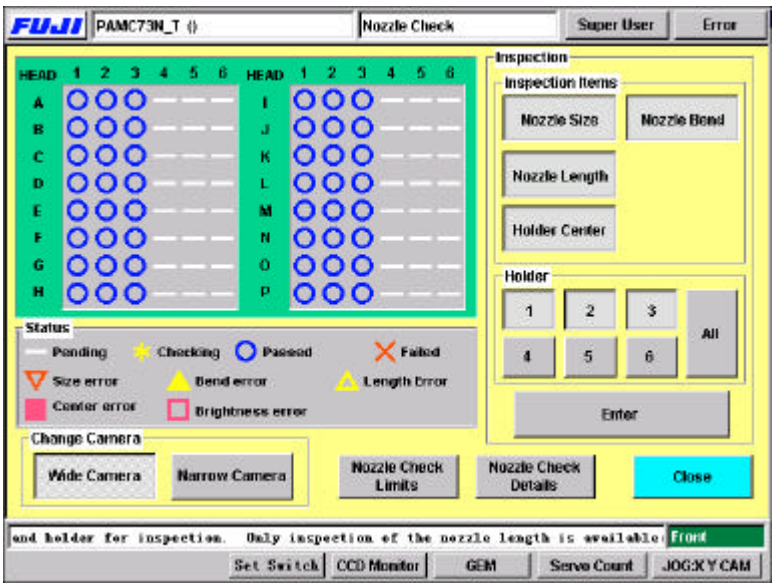


Figure 18

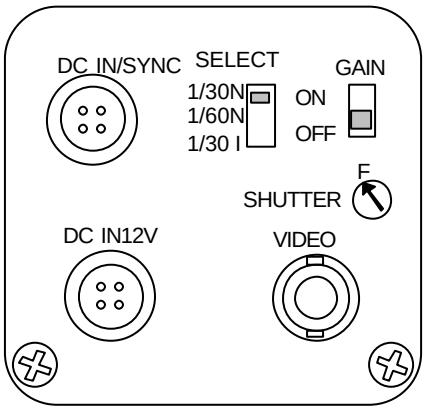
22. Receive the new proper data to the host.

Mark Camera Adjustments

7.10 Focus Adjustment

Note that before adjusting the mark camera the X0/Y0 and the Z0 adjustments must already be completed, and the proper data input into the machine.

1. Set the switches at the rear of the amplifier as shown in figure 19:



SELECT SWITCH	1/30N
GAIN SWITCH	OFF
SHUTTER SWITCH	F

Figure 19

2. In the case of the CP732/733E attach the tooling pin jig (ADCPJ8090) to the reference side of the main conveyor.

3. Clamp the fiducial jig plate in the main conveyor clamper. Make sure that the two tooling pins fit smoothly into the two holes on the fiducial jig plate. See figure 20:

   Note: For CP-732/733, use the tooling pin jig described in Sec. 3.7.2.

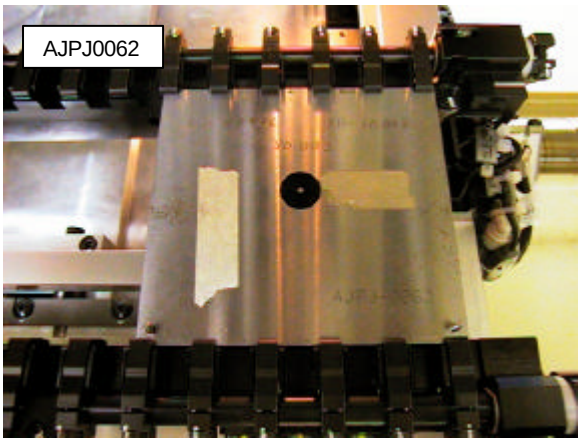


Figure 20

4. Move the fiducial jig plate to the mark read position using the following commands:

   [MAINTENANCE] → [CALIBRATION] → [MARK CAMERA RESOLUTION] → [MOVE] → START

   A message will display asking if X0/Y0 and Z0 has been completed. Press: [Yes]

   The X, Y, and Z- axes will now move to their respective read positions.

5. Loosen the two height positioning bolts and adjust the focus by raising or lowering the height of the camera. (see figure 21)

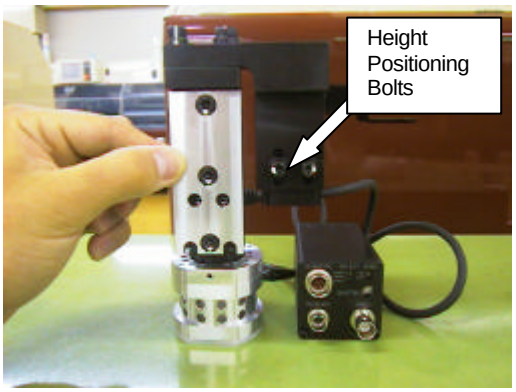


Figure 21

6. The focus is set when the black circle and silver dot in the center of the mark camera jig are in clear, sharp focus.

7.11 Mark Camera Resolution, Skew, and XC/ YC Calibration

1. Move each axis to its respective read position using the following commands:

   [MAINTENANCE] → [CALIBRATION] → [MARK CAMERA RESOLUTION] → [MOVE] → START

2. Inch the XY-table and center the cross hairs on the jig plate center circle.

3. Execute the following commands to simultaneously measure camera resolution, mark read position (XC/YC), and camera skew:

   [CALIBRATION] → START.

4. Ensure that the values for camera resolution are within the following range:

X	17.92 to 19.81 um/pixel
Y	18.02 to 19.91 um/pixel

   If outside the prescribed range, loosen the focus adjustment bolts and adjust the height of the camera. Re-measure the resolution and repeat until the values fall within range.

5. To adjust the camera angle, loosen the fixing bolt (item 1 in figure 22) holding the camera in position. Rotate the 3mm eccentric bolt (item 2 in figure 22) while re-measuring until the value for Delta Q comes to zero. Tolerance: 0 +/- 50 (1/1000 deg.). There is no need to touch the pivot (Item 3 in figure 22).

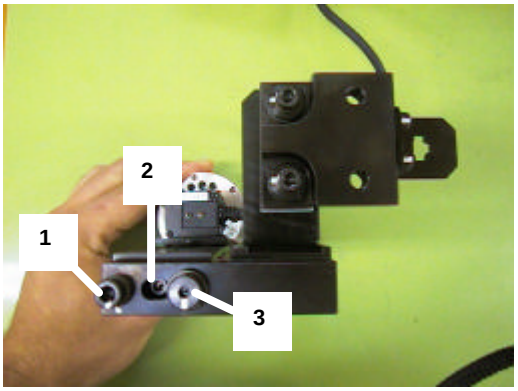


Figure 22

6. Once the value for delta Q is within tolerance, tighten the fixing bolt and then confirm that it is still within tolerance.

7. Receive the new proper data to the host.

Notes:

Chapter 8

Placing Accuracy Measurement

Chapter 8 Placing Accuracy Measurement

This chapter provides information on how to carry out PAM measurement on the CP-7 Series machines. Basically, there are two options to select from when running PAM.

The most common option allows for the entire PAM function to be carried out at the machine. Refer to “Supplemental Information” (at the back of this manual) for details on the procedure for running PAM entirely at the machine. Or, refer to the Fuji web-site to download the PAM operation manual. (Fuji Software Upgrade Report Appendix 01079A2)

The second option has the machine place the PAM chips and then measure the positions on a DT machine. This procedure is outlined below.

8.1 PAM Calibration

PAM Calibration

[Parts]	PAM 3216
[PCB]	PAM BOARD-1
[Feeder]	PAM TD8 x 4
[Program]	PAMC73N, PAMC73W

1. Install 1.3 diameter nozzles in nozzle position No.1.
2. Carry out nozzle center measurement.(Ensure the “A1” nozzle is included in the center test as this is a reference for all other center measurements.)

   Press: [Nozzle Check] → [Select inspection items: Nozzle size, length, center and bend] → [ALL] → [Enter] → [Start].
3. Set the recovery mode to [Error Pass]
4. Set the Cam Speed at 80% and start placement from Holder A using the [Narrow] camera.

   After the 80% PAM placements are within tolerance, (by setting the 80% placing offset proper data) set the cam speed to 100% and repeat the process for 100% placing offset proper data)
5. After placement, check the placing accuracy on a DT-651. (see tolerance values on page 8-2)
6. If the average deviation for each nozzle (1/1000mm) is over +/-100, calibrate X0/Y0 and Xc/Yc again. If the average deviation for each nozzle (1/1000mm) is within 100, transfer the resultant offset data to the relevant ”Placing Offset” proper data field. *(It is not necessary to offset △Q.)
7. If the value “Avg.dQ” (1/1000mm) is over +/-200, check the parallelism of stations 3 and 8 again.
8. If the parallelism of station 3 is not within tolerance (0.01mm), re-adjust accordingly.

   If station 8 (FQ) is out of tolerance, correct the proper data “FQ Origin Position”.
9. Turn off the machine power once, and then carry out PAM again.
10. If the calibration result exceeds the tolerance, input the compensation value to the placing offset field (in proper data) and carry out PAM until all values are within tolerance. (Tolerance: +/- 0.066mm 3 Sigma specification)

11. If the data from PAM is within tolerance, use the [Wide] camera and check the placements to ensure they are within tolerance.

12. Finally, copy the X/Y Placing offset proper data from nozzle No.1 and paste at nozzle positions: 2,3,4,5,6.

PAM Tolerance Values

? X ?Y	≤+/– 15 (1/1000mm)
? Q	≤+/– 200 (1/1000Deg.)
3 sig. X/Y	≤ 49 (1/1000mm)
3 sig. Q	≤ 990 (1/1000Deg.)
6 sig. X/Y	≤ 98 (1/1000mm)
6 sig. Q	≤ 1980 (1/1000Deg.)
X/Y Max	≤ +/– 60 (1/1000mm)
X/Y Min	≤ +/– 60 (1/1000mm)

(Minimum allowable CPK value = 1.333)

Note 1: The above figures represent tolerances for new machines. Due to many factors, it may be difficult to achieve the same results with older equipment.

Note2: When running machine PAM, refer to the PAM Operation Manual in the "Supplemental Information" at the back of this manual.

Chapter 9

Miscellaneous Adjustments

Chapter 9 Miscellaneous Adjustments

9.1 Backup pin Adjustment

1. Set the height of the Backup pins as specified below.

<Required Jigs>

CP732/733E Backup pin Jig	(Jig No. DCPJ0650)
CP742/743(M)E Backup pin Jig	(Jig No. DGPJ0450)
CP732/733E Vacuum backup pin Jig	(Jig No. DCPJ0661)
CP742/743(M)E Vacuum backup pin Jig	(Jig No. DGPJ0460)

Adjust the CP7 Series backup pin height using the appropriate jig.

CP-732/733E Backup pin	26+/-0.05mm
CP-742/743(M)E Backup pin	37+/-0.05mm
CP-732/733E Vacuum backup pin	29+/-0.05mm
CP-742/743(M)E Vacuum backup pin	37+/-0.05mm

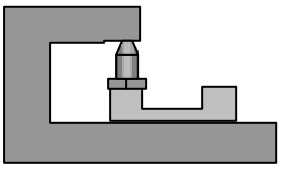


Figure 1

Clamp the Fuji096 PCB to the table. Check for any gaps between the bottom surface of the PCB and the top of the pin.

Note: Check the backup pin height close to the reference and movable rails. (The middle part of the board may be warped.)

9.2 Air / Vacuum Pressure Sensor Calibration

There are two air pressure sensors located at the rear left side of the machine.

The left sensor monitors the positive pressure (compressed air) flowing to the machine
The right sensor monitors the vacuum pressure when the nozzle vacuum is turned on.

9.2.1 Positive Pressure Sensor Parameter setting

Set the parameters for the Positive Pressure Sensor (left) as follows:

1. Unlock the sensor by pressing the **A+△** keys simultaneously.
2. Set to **PA** (Press and hold the circular arrow.)
   (Note: step 2 is not required when using pressure sensor type: AP-40Z**A**)
3. Set to **F-4**. (Press the circular arrow once.)
4. Set to **no**. (Press the circular arrow once.)
5. Set to **2.5**. (Press the circular arrow once.)
6. **2-C** (Press the circular arrow once.)
7. **H; 0.60** (Press the circular arrow twice.)
8. **L; 0.40** (Press the circular arrow once.)
9. **P; 0.00** (Press the circular arrow once.)
10. Press the circular arrow once.
11. Lock the sensor (LOC) by pressing the **A +△** keys simultaneously.

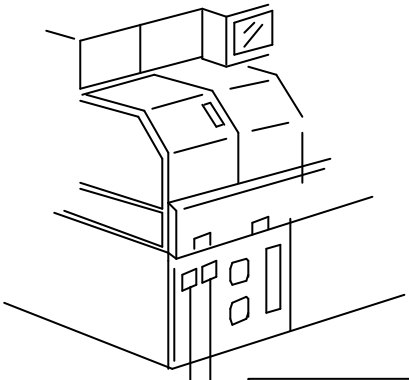


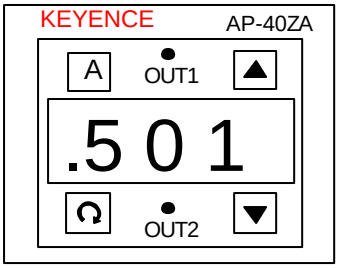
Figure 2

9.2.2 Negative Pressure Sensor Parameter setting

Apart from steps 7 and 8 above, all other settings are the same as listed for the positive pressure sensor.

Substitute the H and L values at steps 7 and 8 as follows:

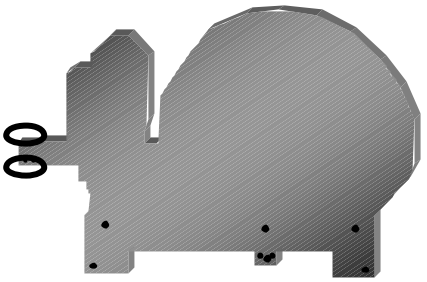
H: -101.3
L: - 40.0



Close up view of the sensor display panel

Figure 3

9.3 D-axis Cover Installation



Install the 2 D-axis covers as follows:

1. After installation, verify that there is no interference between the pallet cover and the 6 sensors as indicated in Fig. 4.

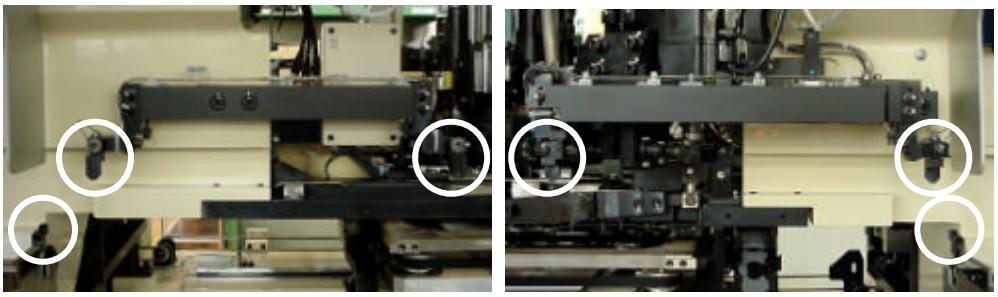
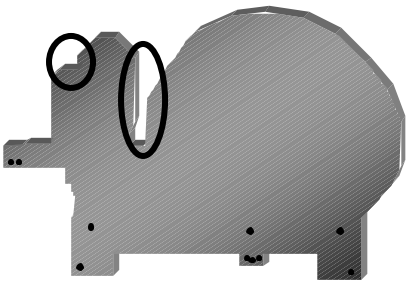


Figure 4

2. Inch the D-axis to move the pallet cover near the 1st station.

   Note: Verify that there is no interference between the Pallet cover, Tape End sensor and the N times feeding bracket as indicated in Fig.5.



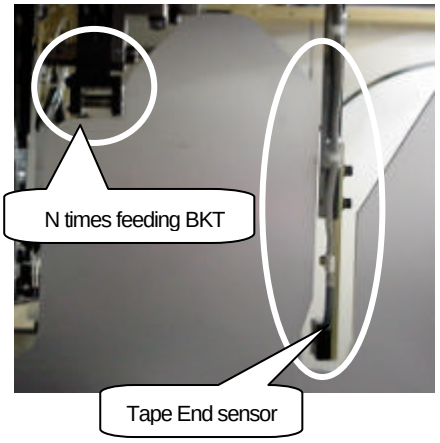


Figure 5

3. Park the D-axis pallets, align the D-axis pallet cover and D-axis escape position aluminum plate as indicated in Fig.6.

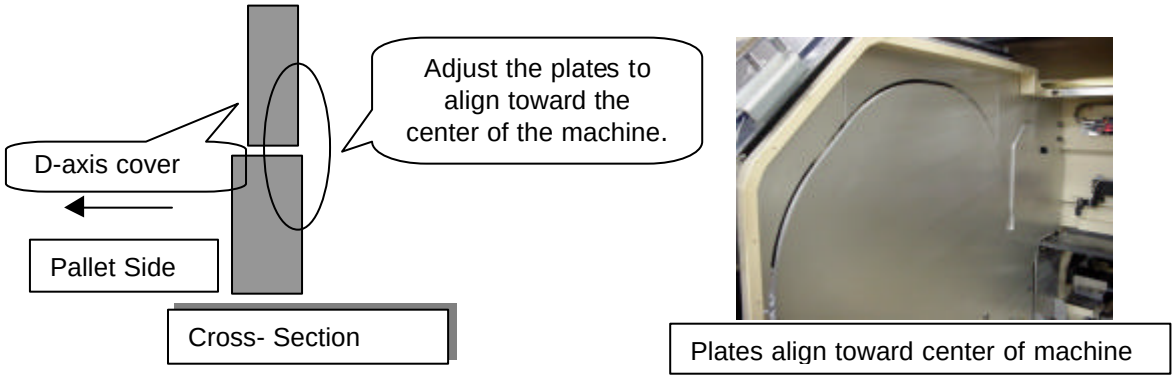


Figure 6

4. Install as spacer jig on the D-axis, and adjust as indicated in Fig.7.

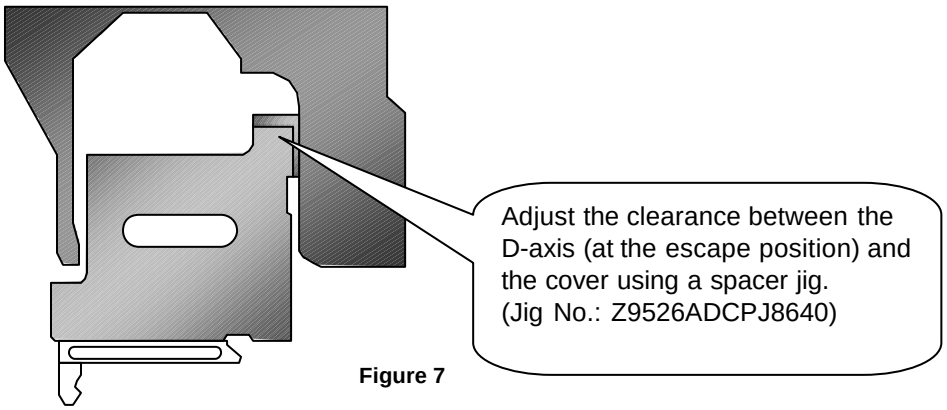


Figure 7

5. After adjustment, move the D-axis and verify that nothing interferes with the D-axis pallet covers.

9.4 PCB Set Check Sensor Adjustment (CP-742/743(M)E)

1. Adjust the sensor BKT so that the light axis comes to the center of the reference pin and secondary pin block hole.

2. Set the sensor so it turns OFF when both the reference and adjustable pins move down 1.0 to 1.5mm.

3. As for the adjustable pin, the sensor should react at maximum, mid and minimum pitches. Make sure that the green LED is always ON.

4. Check the sensor reaction in I/O

< I/O → Standard I/O → IN>

X059	PCB SET OK

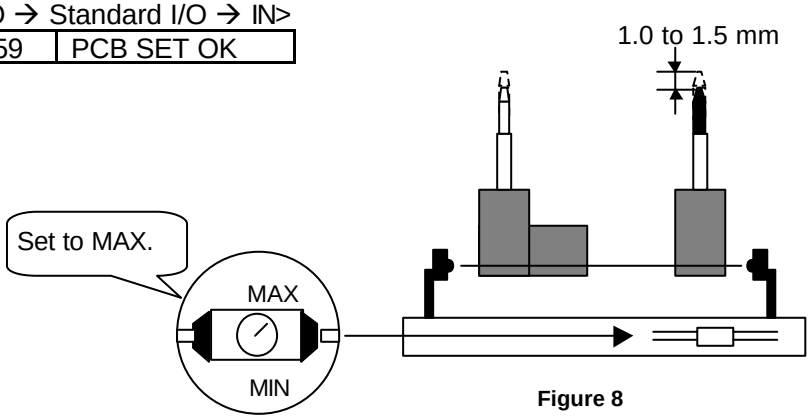


Figure 8

9.5 Oil Pressure Sensor Amp Adjustment

Follow the directions below to set the sensor amp operating parameters:

1. Press and hold the “A” key and Up arrow (?)simultaneously to unlock the amp. (UNL)
2. Press and hold the setting key for 3 sec and set the pressure display to **AP6**.
3. Press the setting key to set the display to **F-4**.
4. Press the setting key to set the display to **con**.
5. Press the setting key twice to display **H**.
6. Press the up/down to set the high value to **H 0.40**.
7. Press the setting key twice to display **L** .
8. Press the up/down to set the low value to **L 0.20.**
9. Press the setting key to display **P 000.**
10. Press the setting key to view the current pressure value.
11. Press and hold the “A” key and Up arrow (?) simultaneously to lock the amp. (LOC)

Notes:

Chapter 10

Optional Equipment Adjustment

Chapter 10 Options

Parts Thickness Confirmation Sensor Adjustment

The parts thickness sensor is an option designed to provide more reliable placement by measuring the parts thickness and nozzle length to determine the level of abrasion on the nozzle tips plus check the part pick-up condition.

By periodically measuring the nozzle length, any nozzle abrasion can be reflected in the pick-up height data, and any nozzles exceeding a specified level of abrasion can be automatically skipped, with nozzle exchange guidance issued to the operator.

By measuring the thickness of parts held on the nozzles, the results are fed back to the pick-up height for consistency of pressure on the parts at pick-up. Any parts exceeding the specified tolerance will cause an error and are automatically skipped. This feature is particularly effective in the monitoring of the pick-up status of microchips such as 0603's (in. 0201's) for slanted and "tombstone" pick-ups.

The parts thickness confirmation sensor system is comprised of the following parts.

- Controller Unit (# 1)
- Sensor Head (# 2)
- Compatible m/c control software version (V1.17 or later).

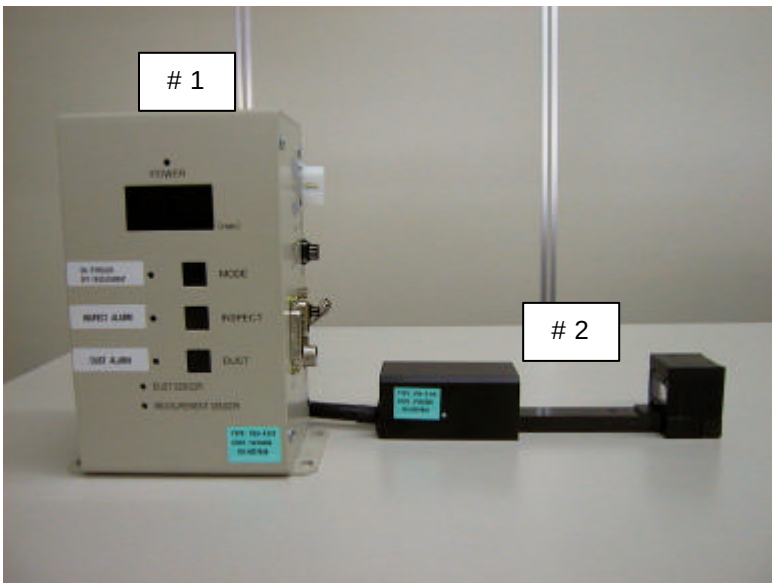


Figure 1

10.1.1 Machine Setting

To enable the “Parts Height” check function, enter the following commands:

Press: Maintenance → Configuration → Parts Height → Used

Note: When re- installing the system software, the default setting is automatically set to Not Used. Therefore, be sure to set to Used after installing the system software.

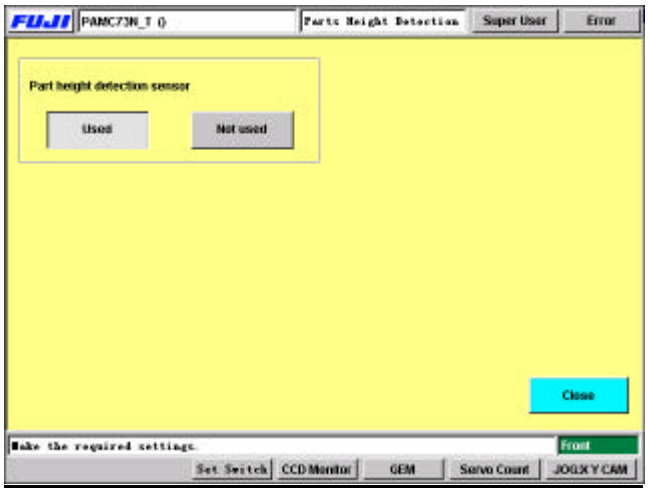


Figure 2

10.1.2 Sensor Head Alignment

Follow the procedure below in order to align the nozzle and sensor head appropriately.

1. Connect a portable TV monitor to the output jack on the right side of the controller unit.
2. Place the ”A” shaft at the 6th station [parts thickness confirmation sensor] with a 0.7mm nozzle and set the cam angle to 197 degrees.
3. To display the nozzle image on the monitor, press: [MODE](LED ON) on the sensor amplifier. Loosen the 5 mounting bolts (Fig.3) for the sensor head (under the cutter plate) and adjust so the nozzle appears at the left side center of the monitor. (Fig.4)
4. Tighten the mounting bolts using a 3.9Nm torque wrench.
5. Press [MODE] once more → [INSPECT], the crosshairs will appear on the display, check the nozzle center position. Repeat step 3 if the nozzle image is not centered properly.

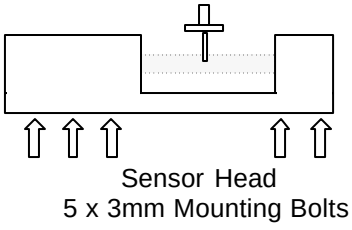


Figure 3

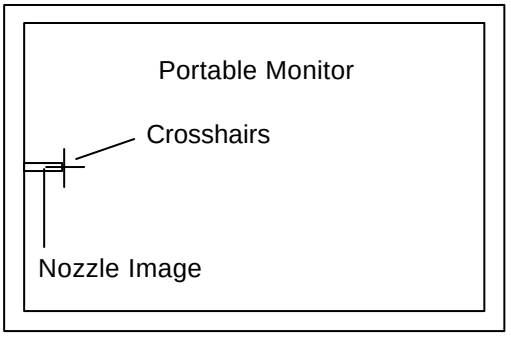


Figure 4

10.1.3 Sensor Amplifier Output Voltage Adjustment

Follow the procedure below in order to set the Nozzle Length Unit amplifier control voltages.

1. Connect the keyboard to the machine. (connect only when the m/c power is OFF)

2. Press the [Windows key] on the keyboard and go to the voltage adjustment display by selecting, [AxisADCViewer] (Fig 5) → [Axis 0] (Fig.6 #1) → [select ±10V] (Fig.6 #2) → [VOLT] (Fig.6 #3)

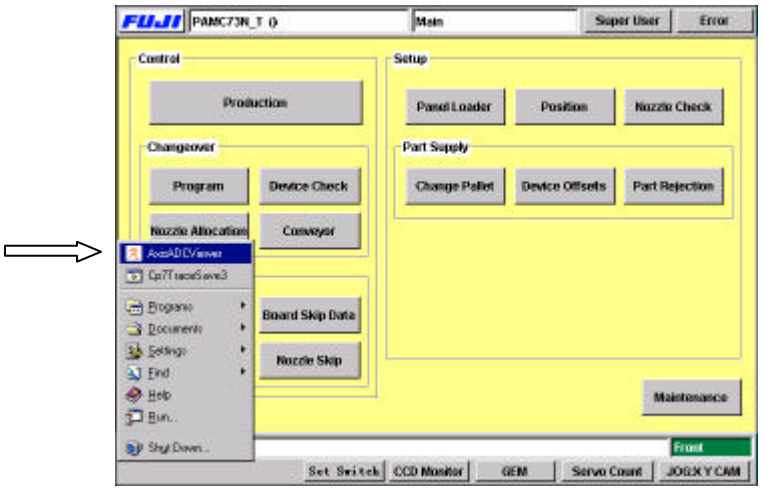


Figure 5

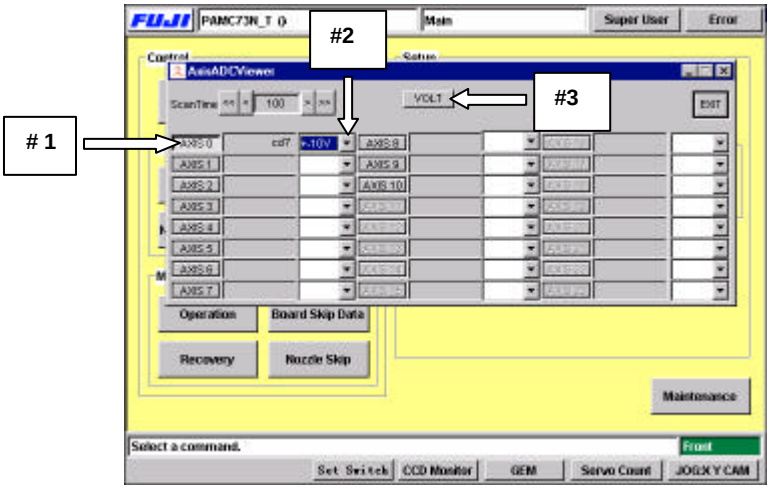


Figure 6

3. At 0 degrees, press the [DUST] button on the amplifier. If the display indicates "---", the sensor windows are probably dusty or soiled etc.. Ensure the sensor windows are clean by wiping them thoroughly with a dry lint free cloth. Press [DUST] again to display the counter.

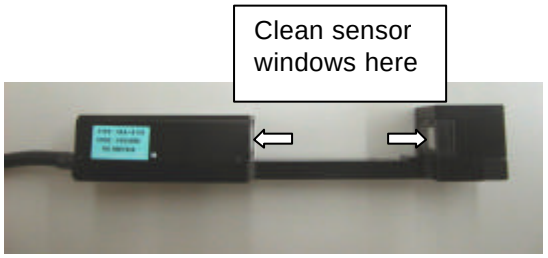


Figure 7

4. Press [INSPECT] to measure.
Check that the amplifier displays **"000"** (The DUST LED will be ON at this time)
On the main display, the measurement results are displayed "about 1.03V" ("Axis 0"), adjust the **Offset Volume** pot on the amplifier so the "Axis 0" voltage reading is between **0.950 to 1.050V**.

5. At a cam angle of 197 degrees, block the sensor completely, then press [INSPECT].
Verify that the amplifier displays **"8.00"**. If **"8.00"** does not appear, then the sensor is not completely blocked.

The measurement results will display at "about 8.97V". ("Axis 0" voltage reading)

Adjust the **Gain Volume** on the amp so the "Axis 0" voltage reading is between **8.950 to 9.050V**.

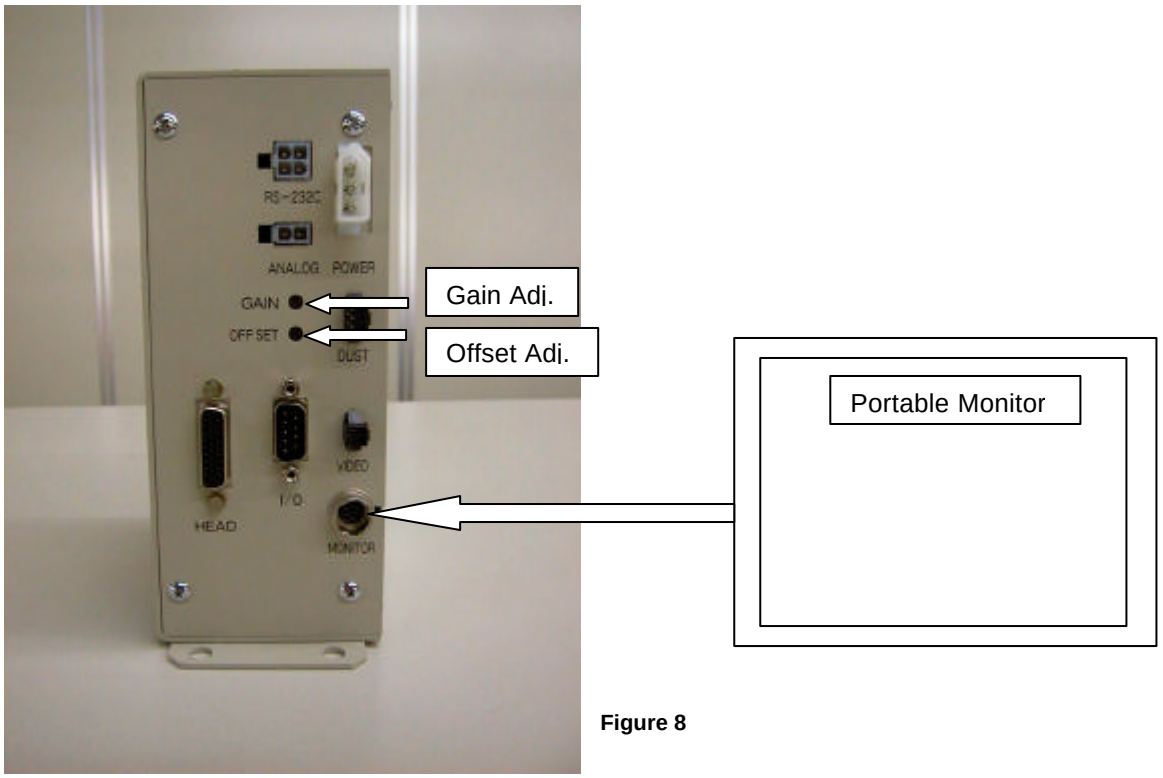


Figure 8

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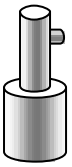
6. Remove the blockage at the sensor and return the cam angle to 0 degrees.
   Press [INSPECT] again to check that the voltage value is less than 1.5V.

7. Press [EXIT].

8. Move Holder A to station 9.5 at 0 degrees and install the nozzle reference jig.



Nozzle Reference Jig
(Jig No.: DCPJ0620)

Figure 9

9. For automatic measuring of the nozzle jig height, Press: [Maintenance] → [Calibration] → [Part Nozzle Reference] → [Start].

10. Check that the measurement results are within 1.00 ± 0.3 (**0.7 to 1.3)**
    * Verify that the displayed amplifier value and the measurement results on the display are the same value.

11. Press: [CLOSE] on the display. A message appears to save proper data, press [YES].

10.1.4 How to avoid problems while adjusting the voltage

1. Do not press the buttons on the unit while the [MODE] LED is flashing (when the raw image is displayed). Press [MODE], and the LED will turn OFF.

2. The [DUST] LED indicates an abnormal condition. Press [DUST] at cam angle 0 degrees and the LED will turn OFF.

10.1.5 Amplifier SW and LED functions

[MODE] Switches the monitor output display.
LED ON: Raw Image LED OFF: Memory Image

[INSPECT] Press when issuing measurement commands.
(Measurement should be carried out at 0 degrees)

[DUST] Press this button when registering the black image.(sensor blocked)
(Registered at 0 degrees) The LED will turn ON if an error occurs.

10.2 Vacuum Backup Pin Adjustment

1. Verify that the electrical modification is completed and the Z-axis table, backup pins and backup plate are arranged for vacuum type backup pins.

2. Adjust the positive pressure timer speed controller 3 revolutions from the fully closed position.

3. Adjust the positive pressure speed controller to 1/4 from the fully closed position.
   Turn ON I/O (Y022) with a board clamped on the XY table. If there is a lot of noise from the vacuum generator when the vacuum is OFF, adjust the controller to where the noise is minimal.

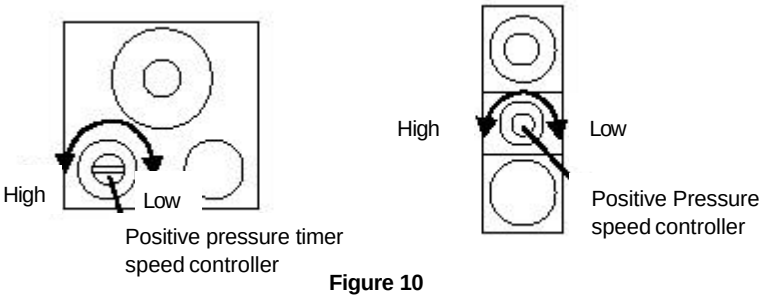


Figure 10

4. To enable the vacuum backup pin function, follow the command path below:

   Press: [Maintenance] → [Configuration] → [Basic] → [Special Configuration Data] → [Vacuum Backup Function] → ON

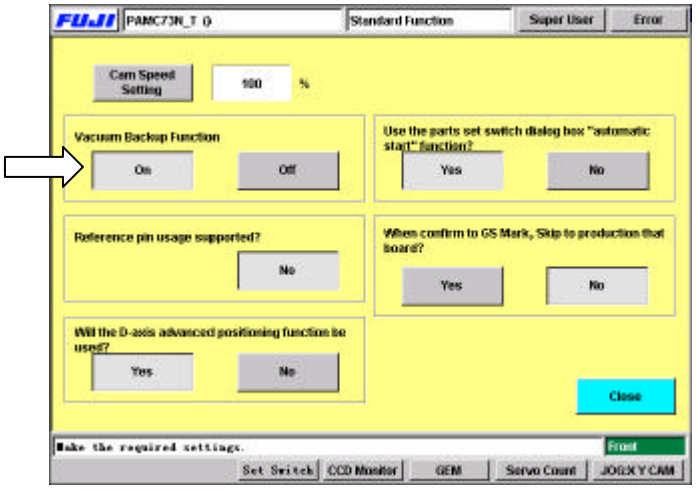


Figure 11

Note: When re- installing the system software, the default setting is set to Not Used.
Therefore, be sure to set to Used after installing the system software.

Chapter 11

Absolute Encoder Recovery Procedure

Chapter 11 Absolute Encoder Recovery Procedure

Use the following procedure if one of the following errors appears at the servo pack:

(A. 81 ERROR)
An A. 81 error will occur if the encoder cable (feedback signal) is disconnected for any reason.
In this case, the motor's rotational data is lost and the servo pack must be reset.

Example:

a. servo pack replacement
b. encoder cable replacement
c. servo motor replacement

(A. CC ERROR)
An A. CC error will occur if the servo pack parameter, Pn-205 is inadvertently changed.
(A. CC indicates that the servo motor multi-turn limit data has been changed)
For the X-, Y-, D-, Z-, NZ- axes. The standard Pn-205 value = 65535.
For the C- axis, the standard Pn-205 value = 1.
(For the PQ-, FQ-, RQ-, NC- axes, this error does not apply. The Pn-205 value = 0.)
NOTE: in any case, always refer to the servo parameter check sheet for verification.

Follow the instructions below in order to reset the servo pack error condition. This method enables servo pack resetting without having to loosen the coupling for repositioning. (important time saver)

1. Before resetting the servo pack (clearing the error) move the axis (for which the error occurred) against the mechanical stopper as indicated: (Y-, Z-, NZ-: minus stopper) (X-, plus stopper) (D1-, plus stopper) (D2-, minus stopper) (Re-measuring the proper is not necessary)

   Note 1: For the D-axes (CP-732/733E, CP-742/743ME) check the pulse count at the stopper and move the table 10000 pulses away from the stopper. (For CP-742/743E, push the table against the stopper) Then, reset the servo pack.

   Note2: NC-, PQ-, FQ-, RQ-, do not require any special positioning. Just reset the alarm and measure the associated proper using the jig. (For the C- axis, refer to the following charts.)

2. ***Clearing A.81 (A.C 9) errors:***
   With the E-stop pressed, the display on the servo pack will read: < A. 81> → press the [Mode Set] key to display <Fn000> → press the [UP] key to display <Fn008> → press the [DATA SHIFT] key for more than one second → the display will read <PGCL1> → press the [UP] key four times to display <PGCL5> → press the [MODE SET] key and <done> will blink for one second → press the [DATA SHIFT] key for more than one second to display <Fn008> → return to < A. 81> by pressing the [MODE SET] key. Next, reboot the machine. (The error is canceled and <. bb> will appear at the servo pack) (PGCL refers to Pulse Generator Clear)

3. ***Clearing A.CC errors:***
   With the E-stop pressed, the display on the servo pack will read: < A. CC> → press the [Mode Set] key to display <Fn000> → press the [UP] key to display <Fn013> → press the [DATA SHIFT] key for more than one second → the display will read <PGSET> → press the [MODE SET] key and <done> will blink for one second → press the [DATA SHIFT] key for more than one second to return the display to <A. CC> → return to < . bb> by pressing the [MODE SET] key. Next, reboot the machine. (The error is canceled and <. bb> will display at the servo pack)

4. With the intended axis against it's appropriate mechanical stopper, check that the pulse count at the stopper falls within the ranges specified in Chapter 3.

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CP-732/733E

Axis	Condition		Fn008(Fn013)setting position (Counter value of calibration) If the value is in range, then OK.	Reference setting position
C	CAM Original Pos. in the Proper *1	1to 6,000 pulses	1 to 6,000 pulses	Cam angle 0 degrees
		6,001 to 12,000 pulses	6,001 to 12,000 pulses	Cam angle 180 degrees
X			1 to 10,000 pulses	+ M/S [2,500+/-50]
Y			– 1 to – 10,000 pulses	– M/S [– 2,500 +/- 50]
Z			– 1 to – 3,000 pulses	– M/S [–1,000+/- 50]
PQ			Any position	
FQ			Any position	
RQ			Any position	
NC			Any position	
D1			– 1 to – 10,000 pulses	20mm from + M/S (10000 pulses from stopper)
D2			1 to 10,000 pulses	20mm from – M/S (10000 pulses from stopper)
NZ			– 1 to – 3,000 pulses	Push [0+/-50] from the – M/S

*1) When the CAM original Pos. is at minus position (eq.– 500pulse), calculation is 12,000 + Original Pos.(12,000+ (– 500) =11,500). Use the 11,500 to find the setting position.

CP-742/743ME

Axis	Condition		Fn008(Fn013) setting position If the value is in the range, then OK.	Reference setting position
C	CAM Original Pos. in the Proper *1	1 to 6,000 pulses	1 to 6,000 pulses	Cam angle 0 degrees
		6,001 to 12,000 pulses	6,001 to 12,000 pulses	Cam angle 180 degrees
X			1 to 12,500 pulses	+ M/S [2,500+/-50]
Y			– 1 to – 12,500 pulses	– M/S [– 2,500 +/- 50]
Z			– 1 to – 3,000 pulses	– M/S [– 1,000+/- 50]
PQ			Any position	
FQ			Any position	
RQ			Any position	
NC			Any position	
D1			– 1 to – 10,000 pulses	20mm from + M/S (10000 pulses from stopper)
D2			1 to 10,000 pulses	20mm from – M/S (10000 pulses from stopper)
NZ			– 1 to – 3,000 pulses	Push [0+/-50] from the – M/S

*1) When the CAM original Pos. is at minus position (eq.– 500pulse), calculation is 12,000 + Original Pos.(12,000+ (– 500) =11,500). Use the 11,500 to find the setting position.

CP-742/743E

Axis	Condition		Fn008(Fn013) setting position If the value is in range, then OK.	Reference setting position
C	CAM Original Pos. in the Proper *1	1to 6,000 pulses	1 to 6,000 pulses	Cam angle 0 degrees
		6,001 to 12,000 pulses	6,001 to 12,000 pulses	Cam angle 180 degrees
X			1 to 12,500 pulses	+ M/S [2,500+/-50]
Y			– 1 to – 12,500 pulses	– M/S [– 2,500 +/- 50]
Z			– 1 to – 3,000 pulses	– M/S [– 1,000+/- 50]
PQ			Any position	
FQ			Any position	
RQ			Any position	
NC			Any position	
D1			1 to 8,000 pulses	+ M/S [5000+/-50]
D2			– 1 to – 8,000 pulses	– M/S [– 5000 +/- 50]
NZ			– 1 to –3,000 pulses	Push [0+/- 50] from – M/S

*1) When the CAM original Pos. is at minus position (eq.– 500pulse), calculation is 12,000 + Original Pos.(12,000+ (– 500) =11,500). Use the 11,500 to find the setting position.

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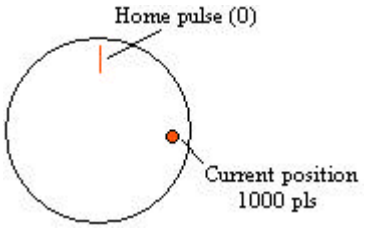
Technical Support Div. Section No.2

Absolute Encoders

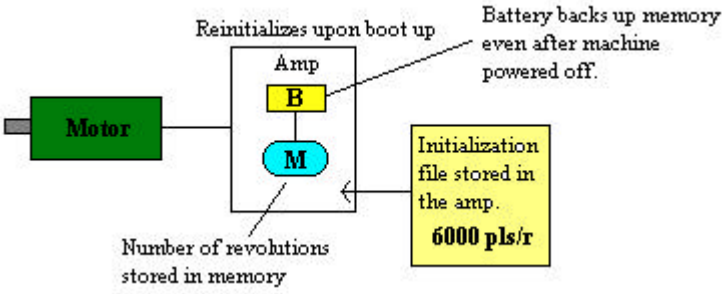
Incremental encoders

Let's imagine that the resolution of the X-axis motor is 6000 pls., i.e. for every one revolution of the motor, 6000 pulse are emitted. After each resolution is complete, that information is stored in the amp's memory. For example, the motor moves from the zero pulse position to the 25,000 pulse position. This is equivalent to 4 full revolutions and another 1000 pulses. While the machine power is on, we always know the motor position, because we measured the zero position upon booting up the machine. Once the machine power is turned off, however, we lose that initial zero position, and when we turn on the machine power again, the only thing the machine can remember is the 1000 pulses as it is the number of pulses from the home pulse.



Absolute Encoders

Absolute encoders are similar in the method they use to count pulses, however, even after rebooting, they still remember their absolute position. As each rotation of the motor is made, this information is stored in the amp's memory, e.g. 1 rev., or two revs.
In the above case, the motor travels 4 revolutions, and a further 1000 pulses. An initialization file, stored inside the amp contains motor resolution info.(this is programmed at the factory or by Yasukawa). After rebooting the motor, the amp reinitializes, reading the initialization file to multiply the number contained in that file with the number of revolutions stored in the amp's memory. The other 1000 pulses can be ascertained using the same method as the incremental encoders, i.e. reading the motor's current position.



Motors utilizing absolute encoders themselves are not any cheaper than those with incremental encoders, however, their use eliminates the need for zero set sensor, dog, wire, pcb etc., thus lowering costs.

Supplemental Information

Supplement 1

PAM Operation Manual

Model :	CP-742E	(Control software)	
Version :	V1.17	(Current version: V1.16)	May 14, 2001

The following pages are the document *PAM Operation Manual* which is a supplement to the *Fuji Software Upgrade Report 01080.*

PAM Operation Manual

May 14, 2001

FUJI® Machine Mfg.Co.,Ltd.

http://www.fuji.co.jp/

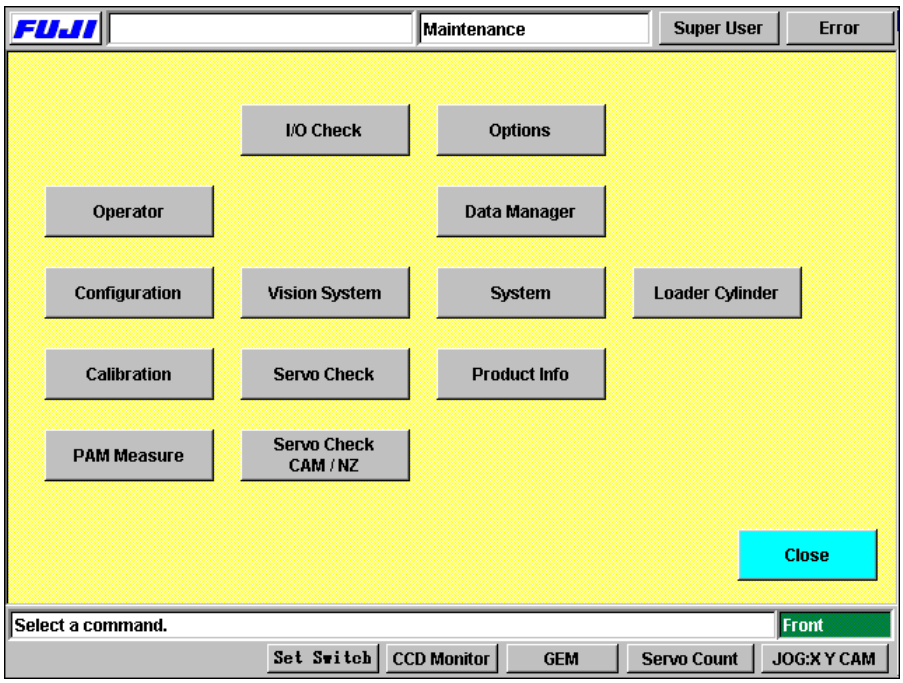
1. Overview

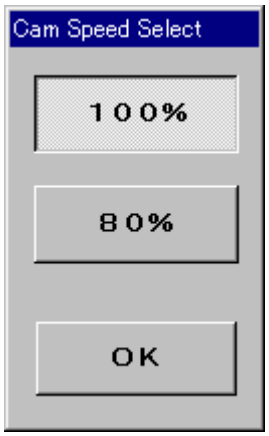
This document describes the operation of the Placement Accuracy Measurement (PAM) software for the CP-742E.

Note: The layout of some of the operation screens may differ from the actual screens at the machine.

2. Getting Started

Press [Maintenance] - [PAM Measure] to display the [Cam Speed Select] dialog box.

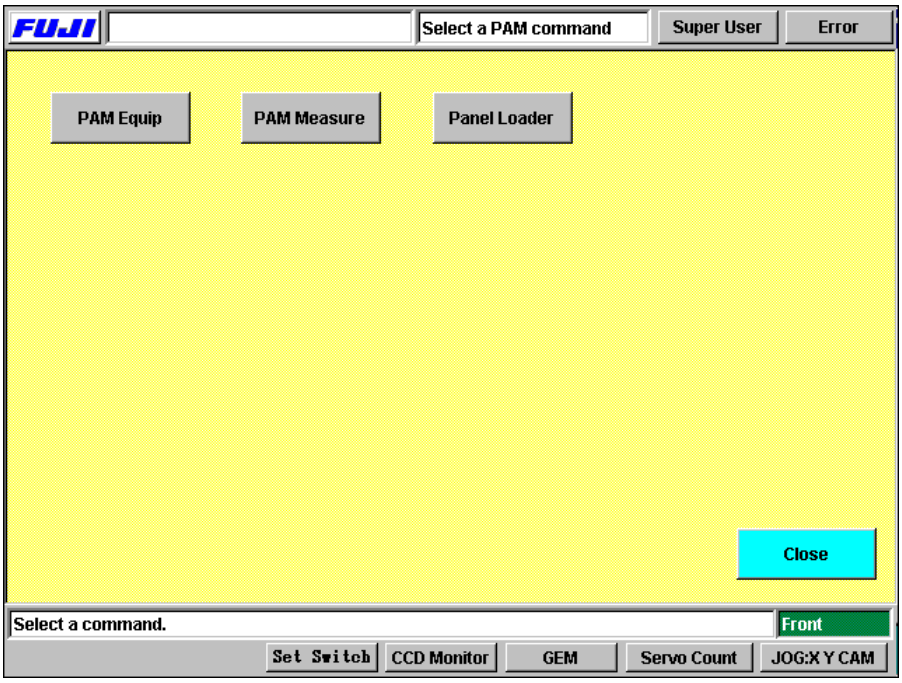




Select a cam speed and then press [OK] to enter the PAM commands section.

3. Operating the PAM Functions

When the PAM commands screen displays, the following commands are available, [PAM Equip], [PAM Measure] and [Panel Loader].



PAM command screen.

3.1 Entering and Exiting PAM Mode

The PAM mode is enabled when you select [PAM Measure] at the [Maintenance] command screen. Return to the [Maintenance] screen by pressing [Close].

3.2 Placing the PAM Parts

The [PAM Equip] command is used to place the PAM parts so the accuracy of placement can be measured. Select this command and start automatic operation to carry out placement.

The following procedural restrictions must be observed when carrying out PAM placement.

1. The first placement sequence must be carried out using head A.
2. The operator must set the recovery mode to Error Pass before starting PAM placement. Any parts causing a parts out, pick-up miss or inspection error will be skipped (i.e., not placed).
3. The loading and unloading of panels is carried out by the operator using the loader commands.
4. If an emergency stop occurs during the placement of parts, placement starts again from the first sequence (when operation is restarted). Use the loader commands to unload the current panel before restarting operation.

3.3 Measuring the Accuracy of Placement

The [PAM Measure] command is used to measure the accuracy of placement, when the placement of PAM parts is complete. The loader commands must be used to load and unloaded the panels. Ensure measurement is carried out with the XY-table at its lower limit.

3.4 Loading and Unloading Panels

The [Panel Loader] command is used to load and unload panels.

3.5 Carrying Out PAM at the Machine

The following procedures are for the measurement of placement accuracy, and updating of the machine data.

3.5.1 Carrying Out PAM With the Cam Speed at 80% and Updating the Machine Data

1. From the main screen, press [Maintenance] - [PAM Measure], and then set the cam speed to 80%.
2. Select [PAM Equip] and START to carry out the placement of the PAM parts.
3. Press [PAM Measure] and START to carry out measurement of the placement accuracy.
4. Press [Renewal] to update the machine data.

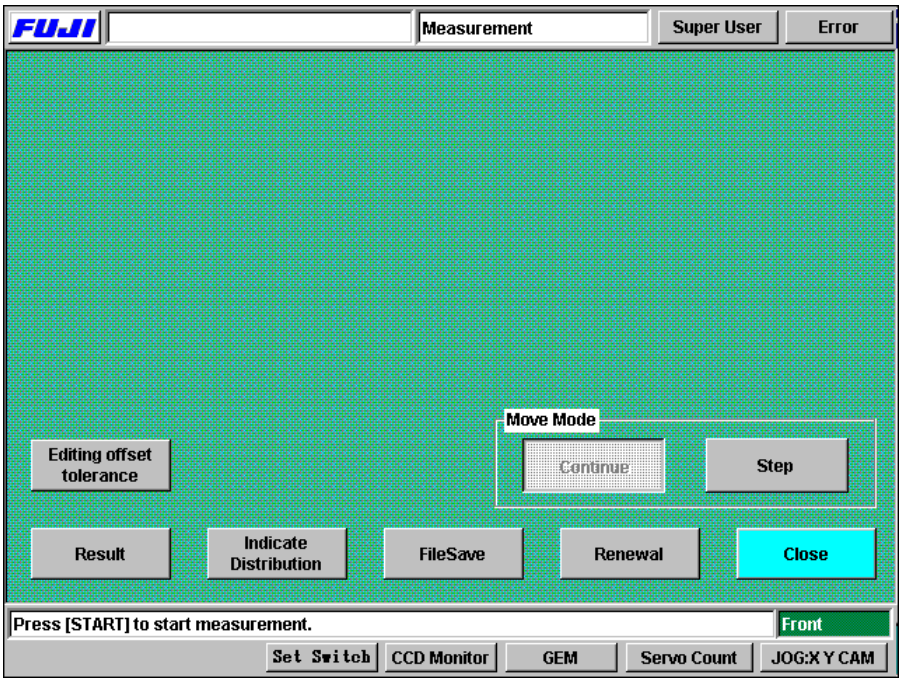
3.5.2 Carrying Out PAM With the Cam Speed at 100% and Updating the Machine Data

1. From the main screen, press [Maintenance] - [PAM Measure], and then set the cam speed to 80%.
2. Select [PAM Equip] and START to carry out the placement of the PAM parts.
3. Press [PAM Measure] and START to carry out measurement of the placement accuracy.
4. Press [Renewal] to update the machine data.

Note: Make sure that the program selected is suitable for production at a cam speed of 100%.

4. Measuring the PAM Placement

Press [Maintenance] - [PAM Measure] - [PAM Measure] - [100%/80%] - [OK] - [PAM Measure] to display the following screen and enable the START button. Press START to begin the measurement. The vision monitor displays during the measurement.



PAM placement measurement screen.

4.1 Move Mode

Measurement can be carried out in Continue or Step mode.

4.2 Result

The deviation results for the measurement of PAM part placement are given for each sequence as 3σ, 6σ, Max., Min., Cp and Cpk.

4.3 Indicate Distribution

The distribution diagrams of the measurement results display.

4.4 File Save

The results are saved as a file.
The results files are saved at “¥Fuji¥User¥Data” in order with the names “Pam001.Dat” to “Pam005.Dat”. The format of the files is described later in this document.

4.5 Renewal

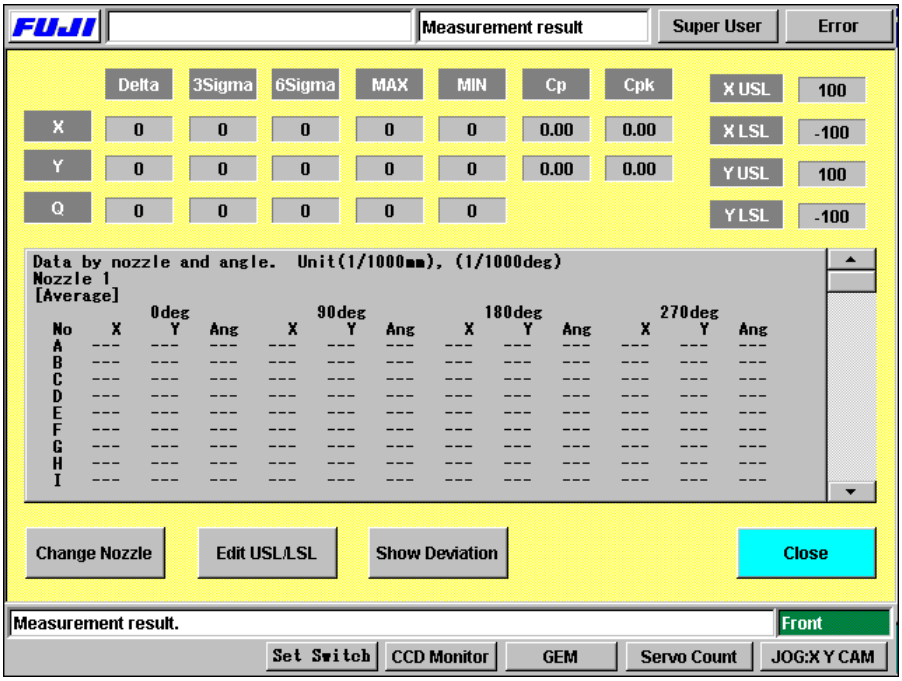
The results are used to update the machine data placement offset items.

4.6 Editing Offset Tolerances

The offset tolerances can be edited.

5. Displaying the Measurement Results

Press [Maintenance] - [PAM Measure] - [100%/80%] - [OK] - [PAM Measure] - [Result] to display the following screen. The results for all the measurements display (Avg., 3σ, 6σ, Max., Min., Cp, Cpk).



Measurement results screen.

5.1 Change Nozzle

The nozzle display can be changed.

5.2 Edit USL/LSL

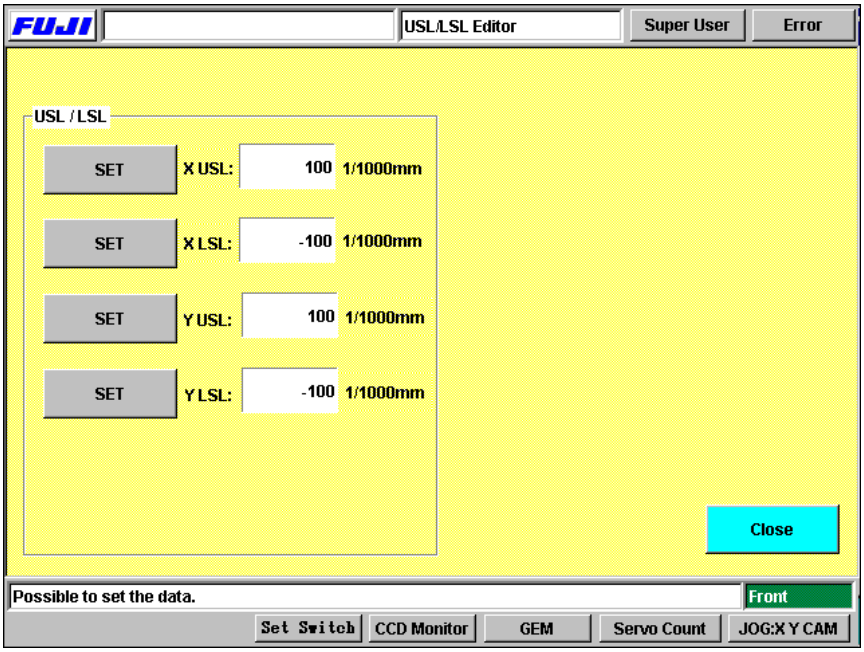
The data (USL, LSL) can be set for the calculation of Cp and Cpk.

5.3 Show Deviation

The measurement results for each sequence are displayed.

6. Editing USL and LSL

Press [Maintenance] - [PAM Measure] - [100%/80%] - [OK] - [PAM Measure] - [Result] - [Edit USL/LSL] to display the following screen.



Editing screen for USL/LSL.

6.1 Set

Press [Set] to the left of the item to be edited, and input the setting using the numerical keypad.

6.2 Cp and Cpk Calculation Functions

The functions to calculate Cp and Cpk are as follows.

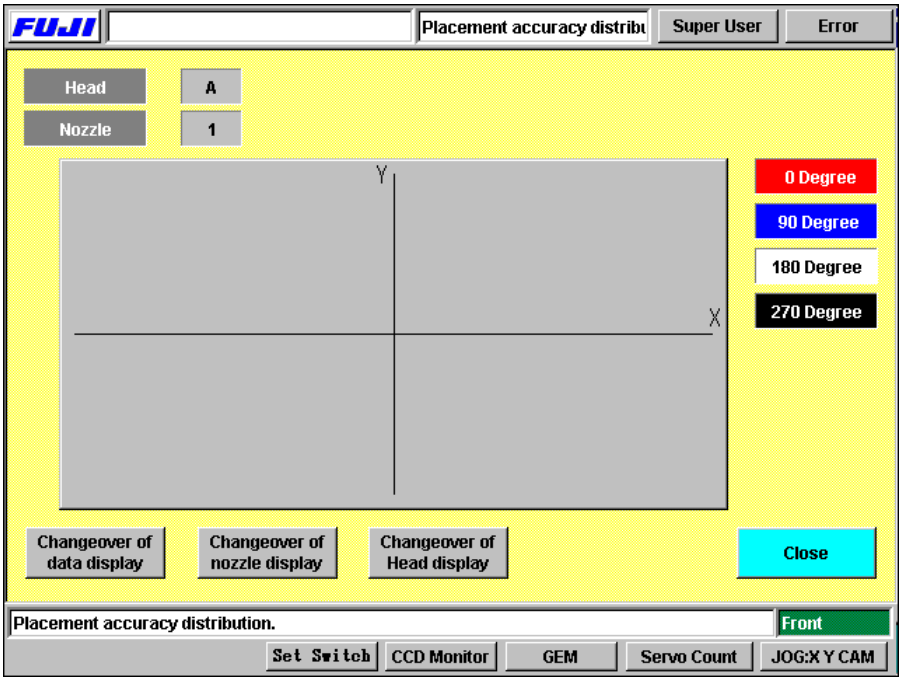
$$Cp = \left(\frac{USL - LSL}{6 \times \sigma} \right)$$

$$Cpk = Cp \times \left(1 - \frac{\left| \frac{USL + LSL}{2} - Ave \right|}{\frac{USL - LSL}{2}} \right)$$

Ave:	Average amount of misalignment
σ:	Standard deviation
USL:	Upper limit
LSL:	Lower limit

7. Displaying the Distribution

Press [Maintenance] - [PAM Measure] - [100%/80%] - [OK] - [PAM Measure] - [Result] - [Indicate Distribution] to display the following screen. A measurement results diagram for each nozzle can be displayed.



Placement distribution screen.

7.1 Changeover of Data Display

The display can be switched to the standard distribution display.

7.2 Changeover of Nozzle Display

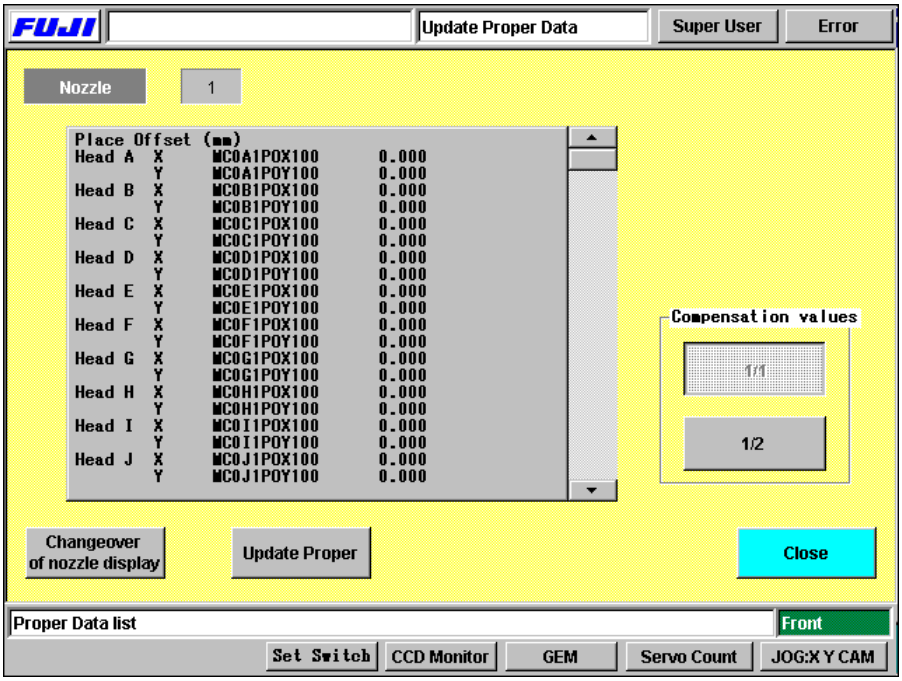
The nozzle display can be switched.

7.3 Changeover of Head Display

The placing head display can be switched.

8. Updating the Machine Data

Press [Maintenance] - [PAM Measure] - [100%/80%] - [OK] - [PAM Measure] - [Renewal] to display the following screen. The measurement results can be fed back to the machine data.



Machine data update screen.

8.1 Changeover of Nozzle Display

Press this button to toggle through the nozzles (1 to 6). The necessary data for each nozzle is also displayed as each change of nozzle is made.

8.2 Update Proper

The measurement results can be fed back to the machine data. Depending on the level of compensation, the measurement results can be used in full (1/1) or as a half (1/2).

8.3 1/1

Press this button to feed the measurement results back to the machine data as they are.

8.4 1/2

Press this button to feed 0.5 of the measurement results back to the machine data.

8.5 Machine Data Format

The format at a cam speed of 80% is detailed below.

Head A	X	MC0A1POX	-10.000
↑	↑	↑	↑
Head	Axes	CCIMF name	Machine data

CCIMF names for other nozzles display as shown below.

MCO [A – P] [1 – 6] PO [X,Y]

A – P: Head A – P

1 – 6: Nozzle 1 – 6

X, Y: Axes

The format at a cam speed of 100% is detailed below.

Head A	X	MC0A1POX100	-10.000
↑	↑	↑	↑
Head	Axes	CCIMF name	Machine data

CCIMF names for other nozzles display as shown below.

MCO [A – P] [1 – 6] PO [X,Y] 100

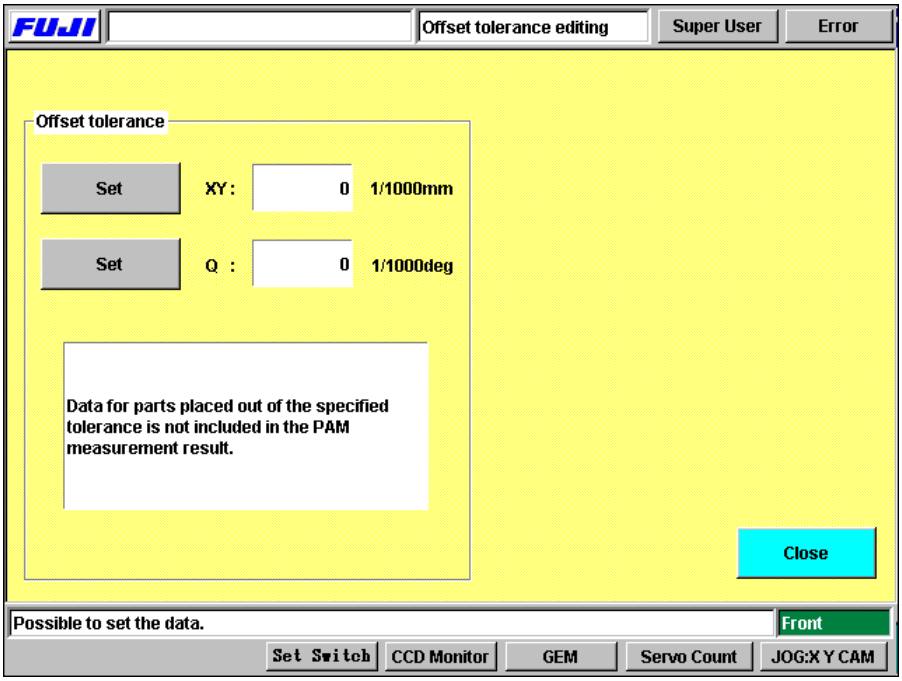
A – P: Head A – P

1 – 6: Nozzle 1 – 6

X, Y: Axes

9. Editing the Offset Tolerances

Press [Maintenance] - [PAM Measure] - [100%/80%] - [OK] - [PAM Measure] - [Setting offset tolerance] to display the following screen. The offset tolerances can be set at this screen.



Offset tolerance settings screen.

9.1 Set

Press [Set] to the left of the item to be edited, and input the setting using the numerical keypad.

9.2 Offset Tolerances

PAM parts which are found to be outside these tolerances when they are inspected during the PAM placement measurement are treated as error data.
Parts which fall within the range indicated by the following function are regarded as valid. Parts outside this range are treated as errors.

- Offset tolerance < Inspection result < + Offset tolerance

10. Production Program Settings

In order to use the [PAM Equip] and [PAM Measure] commands, the nozzle name (GNANAM) used in the production program must be set at the part data special nozzle name (PENNZN). By making this setting, the parts are only placed using the specified nozzle.

```
"UNIT","NOZZLE"
 "BLOCK","CP732+"
        "GNANN","GNANAM"
        1,"R08-007"
        2,"R08-010"
        3,"R08-013" ← This nozzle must be set in part data.
        4,"R16-018"
        5,"R16-025"
        6,"R08-004"
```

```
"UNIT","PARTS"

                Omitted

  "ELEMENT","VISION-"
        "PTPVICVT",10
        "PENVILIT",0
        "PTPVILCA",0
        "PTPVILB",0
        "AUTOHEIGHTCHK",1
        "PARTHEIGHTTOL",0
        "PTPVIPL",0
  "ELEMENT","ENVDT"
        "LEVEL1","CP732ENVDT-"
        "PENNMI",1.3
        "PENNMA",1.3
        "PENNZN","R08-013" ← For PAM placement and measurement.
        "PENBLM",9

                Omitted
```

11. Saved Files

The files are saved when the [File Save] command is selected at the PAM measurement commands screen. The files have the following format.

```
PAMNEW_512_CP7.PGO  [100%]
Panel SeqNo Mode     X         Y         Q    (1/1000mm,1/1000degree)
P1 N     1      F    -113      -396
P1 N     2      F     -65      -324
P1 N     3      D     162       -63       148
P1 N     4      D     143        86       408
P1 N     5      D     138        13       285
P1 N     6      D     175       -26       486
P1 N     7      D     156       -10       372
P1 N     8      D     157       -62       545
P1 N     9      D     198       -34       -57
P1 N    10      D      67       -14      -357
P1 N    11      D     104       -52       444
P1 N    12      D     190       -34        19
P1 N    13      D     221        46       361
P1 N    14      D     129       -16       -41
P1 N    15      D     131       -17       191
P1 N    16      D      90       -24        53
P1 N    17      D     145        -7       450
P1 N    18      D     153       -69       390
P1 N    19      D     152       -25        -3
P1 N    20      D     130        69       769
P1 N    21      D     156        27       295
P1 N    22      D     206       -22       228
P1 N    23      D     177         1       768
P1 N    24      D     156       -50       525
P1 N    25      D     192       -10      -133
 X USL    Y USL (1/1000mm)
   100      100
 X LSL    Y LSL (1/1000mm)
  -100     -100
All data.  X(1/1000mm) Y(1/1000mm) Ang(1/1000deg)
     X        Y        Ang
     4       -5       187
3sigmaX 3sigmaY 3sigmaAng
   333      330      918
6sigmaX 6sigmaY 6sigmaAng
   666      660     1836
dXmax    dYmax    dAng max
   231      206     1164
```

dXmin dYmin dAng min

-218 -228 -693

CpX CpY

8.33 -40.00

CpkX CpkY

8.00 -38.00

Data by nozzle and angle. Unit(1/1000mm)?(1/1000deg)

Nozzle 1

[Average]

	0deg			90deg			180deg			270deg		
No	X	Y	Ang	X	Y	Ang	X	Y	Ang	X	Y	Ang
A	160	-29	175	-24	-168	99	-146	14	142	33	157	211
B	117	75	514	102	-102	236	-103	-80	342	-92	90	213
C	157	30	334	35	-170	34	-168	-41	263	-36	157	314
D	205	-30	195	-21	-210	247	-197	17	364	35	193	322
E	173	-8	537	-1	-180	162	-164	-8	469	5	171	173
F	159	-64	317	-60	-162	232	-143	63	360	65	141	278
G	186	-4	72	-6	-179	306	-164	-15	2	18	161	-29
H	80	6	75	19	-87	117	-97	-20	-1	-21	81	279
I	97	-40	156	-39	-91	44	-87	44	482	50	88	-23
J	183	-2	103	-3	-192	32	-170	-5	206	11	175	4
K	218	38	119	42	-212	101	-205	-51	271	-38	197	199
L	134	-1	56	5	-142	117	-118	2	121	16	134	81
M	148	-11	101	-11	-138	283	-124	-1	191	6	121	-301
N	91	-17	-9	-8	-97	33	-89	2	-17	24	82	103
O	155	3	368	16	-134	277	-139	-7	405	0	124	10
P	144	-46	307	-39	-154	268	-147	40	304	52	133	230

[3 sigma]

	0deg			90deg			180deg			270deg		
No	X	Y	Ang	X	Y	Ang	X	Y	Ang	X	Y	Ang
A	477	99	612	78	504	555	441	63	465	105	468	648
B	354	228	1659	306	315	954	315	246	1110	279	276	759
C	471	96	1020	105	510	405	504	135	807	114	468	1260
D	612	99	1263	78	627	894	588	63	1137	108	573	1056
E	516	36	1641	33	540	549	492	42	1665	27	510	1035
F	474	195	1173	189	486	816	429	195	1149	198	423	948
G	552	60	675	57	537	969	489	57	441	72	483	639
H	240	60	1149	78	267	1086	291	78	444	90	246	927
I	291	126	651	123	273	543	264	138	1491	150	264	393
J	546	39	570	18	573	291	510	36	699	42	519	390
K	648	120	594	132	636	621	615	159	936	123	588	699
L	399	30	444	45	426	561	360	42	603	72	402	567
M	441	45	552	60	417	1026	375	21	708	33	360	975
N	270	63	951	51	291	858	270	36	1119	87	246	930
O	462	27	1161	60	402	1074	420	45	1368	30	369	429
P	429	144	969	123	462	828	441	123	978	162	396	765

[6 sigma]

	0deg			90deg			180deg			270deg		
No	X	Y	Ang	X	Y	Ang	X	Y	Ang	X	Y	Ang
A	954	198	1224	156	1008	1110	882	126	930	210	936	1296
B	708	456	3318	612	630	1908	630	492	2220	558	552	1518
C	942	192	2040	210	1020	810	1008	270	1614	228	936	2520
D	1224	198	2526	156	1254	1788	1176	126	2274	216	1146	2112
E	1032	72	3282	66	1080	1098	984	84	3330	54	1020	2070
F	948	390	2346	378	972	1632	858	390	2298	396	846	1896
G	1104	120	1350	114	1074	1938	978	114	882	144	966	1278
H	480	120	2298	156	534	2172	582	156	888	180	492	1854
I	582	252	1302	246	546	1086	528	276	2982	300	528	786
J	1092	78	1140	36	1146	582	1020	72	1398	84	1038	780
K	1296	240	1188	264	1272	1242	1230	318	1872	246	1176	1398
L	798	60	888	90	852	1122	720	84	1206	144	804	1134
M	882	90	1104	120	834	2052	750	42	1416	66	720	1950
N	540	126	1902	102	582	1716	540	72	2238	174	492	1860
O	924	54	2322	120	804	2148	840	90	2736	60	738	858
P	858	288	1938	246	924	1656	882	246	1956	324	792	1530

[Maximum]

	0deg			90deg			180deg			270deg		
No	X	Y	Ang	X	Y	Ang	X	Y	Ang	X	Y	Ang
A	175	-14	351	-4	-158	251	-135	34	299	46	167	282
B	143	97	769	127	-77	532	-72	-60	610	-71	126	363
C	176	52	459	44	-150	258	-160	-23	360	-22	166	791
D	231	-13	486	5	-201	539	-186	32	507	52	206	583
E	190	1	768	14	-162	278	-148	6	1164	21	189	721
F	171	-49	656	-29	-147	408	-128	82	485	85	159	504
G	198	27	533	17	-159	511	-145	0	159	51	188	152
H	92	54	873	44	-71	823	-88	3	271	21	100	472
I	109	-26	444	-18	-86	282	-81	59	701	63	100	148
J	190	7	410	4	-180	189	-159	5	352	21	188	164
K	230	58	361	60	-193	417	-188	-35	496	-17	204	330
L	153	10	249	26	-126	397	-79	27	342	45	147	425
M	158	7	287	10	-120	594	-117	6	461	23	129	-135
N	105	-2	477	12	-85	412	-75	21	709	49	95	489
O	176	14	600	45	-119	470	-117	11	747	21	131	278
P	160	-29	496	-29	-140	348	-134	51	538	83	141	421

[Minimum]

	0deg			90deg			180deg			270deg		
No	X	Y	Ang	X	Y	Ang	X	Y	Ang	X	Y	Ang
A	148	-63	-3	-32	-179	-216	-176	-11	76	11	146	131
B	79	55	117	67	-154	-141	-127	-114	119	-118	64	14
C	138	13	203	27	-187	-217	-180	-78	174	-51	148	-115
D	175	-50	-693	-39	-223	-28	-208	0	112	15	185	69
E	156	-28	372	-18	-199	44	-180	-22	133	-3	156	-91

F	139	-84	-20	-90	-173	26	-154	34	102	51	129	65
G	173	-34	-165	-25	-189	206	-176	-32	-248	-9	138	-534
H	67	-14	-357	-11	-105	-417	-108	-46	-198	-46	64	47
I	86	-58	-19	-52	-96	-230	-102	19	327	30	75	-302
J	174	-34	-149	-8	-208	-50	-186	-23	-25	0	167	-284
K	212	20	-212	17	-228	-134	-218	-64	17	-58	194	-19
L	122	-16	-157	-14	-156	-88	-141	-26	-171	-14	120	-169
M	131	-25	-236	-32	-157	34	-133	-13	5	-5	114	-577
N	83	-33	-404	-31	-115	-342	-100	-21	-600	3	68	-411
O	131	-10	215	-4	-144	-233	-159	-25	-10	-14	114	-196
P	108	-69	129	-58	-171	148	-165	22	135	32	117	55

[Average by nozzle]

No	X	Y	Ang
A	5	-6	157
B	5	-4	326
C	-2	-5	236
D	5	-7	282
E	3	-6	335
F	5	-5	297
G	8	-9	88
H	-4	-5	117
I	5	0	165
J	5	-6	86
K	4	-7	172
L	9	-1	94
M	4	-7	68
N	4	-7	27
O	7	-3	265
P	2	-6	277

Data below this point omitted

Supplement 2

BIOS Setting Manual

PFS-150 BIOS Setting Manual (BIOS version 1.00.03)

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S0102-1.0E

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Revision History

#0	Apr. 12, 2000	First Edition (BIOS Ver. 1.00.01)
#1	Apr. 18, 2000	BIOS Ver. 1.00.02 supported
#2	May 18, 2000	Reference to silicon disk added
#3	Aug. 2, 2000	BIOS Ver. 1.00.03 supported
#4	Oct. 23, 2000	FDD boot disabling setting added

Contents

1 About BIOS Settings (BIOS version 1.00.03)

[Explanations of Terms Used]

Term	Explanation
Menu	The main BIOS setting items are divided into 6 major menus. In PFS-150 BIOS version 1.00.02, these menus are: “Main”, “Advanced”, “Power”, “BIOS”, “Boot”, and “Exit”. Use the [←][→] left/right keys to switch between these major menus.
Sub-Menu	Sub-menus contain detailed setting items within the major menus shown above. A triangular mark displays to the left of items for which a sub-menu exists. To access a sub-menu, move the cursor to the desired line and press [Enter].

[Key Operation]

[←][→]	Used to switch between the 6 major menus (“Main”, “Advanced”, “Power”, “BIOS”, “Boot”, and “Exit”).
[↑][↓]	Used to select items within a menu.
[+][-]	Used to change the settings. On English-language keyboards, the [SHIFT] + [=] keys are used instead of the [+] key.
[SPACE] key	Used to change the settings (alternative to the [+][-] keys). Each time the [SPACE] key is pressed, the setting value changes in sequence.
[Esc] key	Used to return to a major menu from a sub-menu. If pressed at a major menu, the “Exit” menu displays.
Numerical keys	Used to enter numerical values.
[Enter]	Used to access the sub-menu setting screen of an item with a triangular mark displayed to its left.
[Tab]	Used to set the date and time. With the date or time selected, the cursor moves as follows each time [Tab] is pressed: Month —> Day —> Year; Hour —> Minute —> Second.

[Setting Procedure]

When the machine power is turned on, the following message displays at the bottom left of the screen: “Press [F2] to enter SETUP.” If [F2] is pressed at this time, the message display changes to “Entering SETUP...”.
After completing a memory check, the BIOS setting screen displays.
Although the settings shown in the figures on the following pages are generally used, there are cases where different settings are required. In such cases, specify the settings in accordance with the supplemental explanation which appears beneath the figure.

2 Main Menu

The Main menu configuration is shown in Fig. 1.1 below.

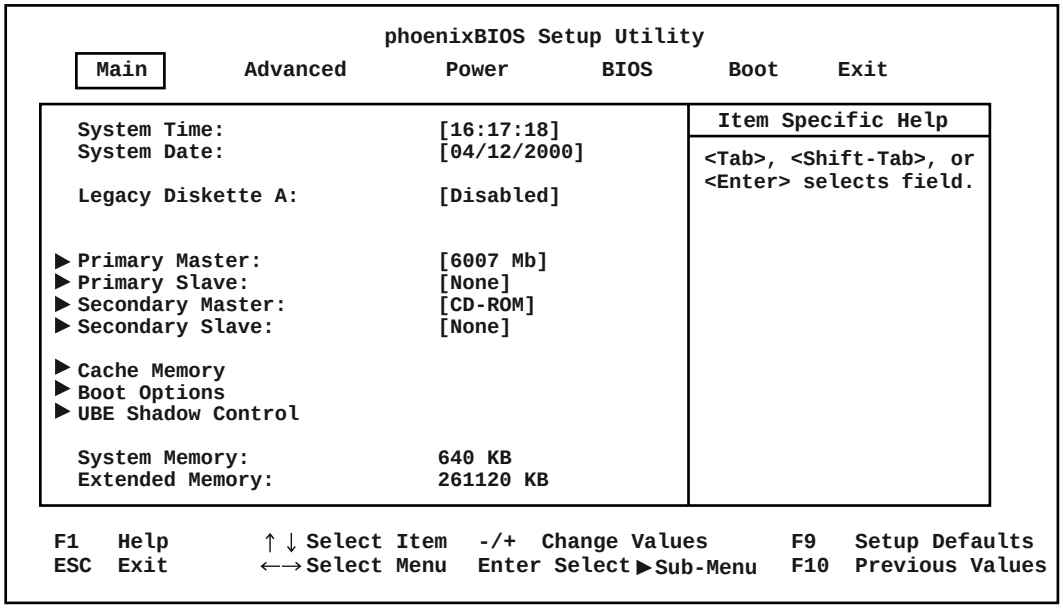

Fig.1.1 Main Menu

As a rule, the settings shown in the above figure should be used. Different settings may be used, however, for the “System Time”, “System Date”, “Legacy Diskette A:”, and “Primary Master” items. These items should be set as described below.

“System Time” and “System Date”

Enter the current date and time. The time displays in a 24-hour format as Hour : Minute : Second, and the date displays as Month / Day / Year. With the time or date selected, the cursor can be moved as follows each time [Tab] is pressed: Hour —> Minute —> Second; Month —> Day —> Year.

“Legacy Diskette A:”

Set as follows:
When the machine has a floppy disk drive: “1.44/1.25MB 3 1/2”
When the machine has no floppy disk drive: “Disabled”
Use the [+][-] keys or the [SPACE] key to change the settings.

“Primary Master”,“Primary Slave”,“Secondary Master”,and“Secondary Slave”

Sub-menu settings display at each of these items. To access the sub-menus (described in sections 2.1 to 2.4 below), select the desired item then press [Enter].

2.1 "Primary Master" Sub-Menu

The settings screen shown below in Fig.1.2 displays when "Primary Master" is selected at the Fig.1.1 screen, and [Enter] is pressed. Specify the settings as shown below.

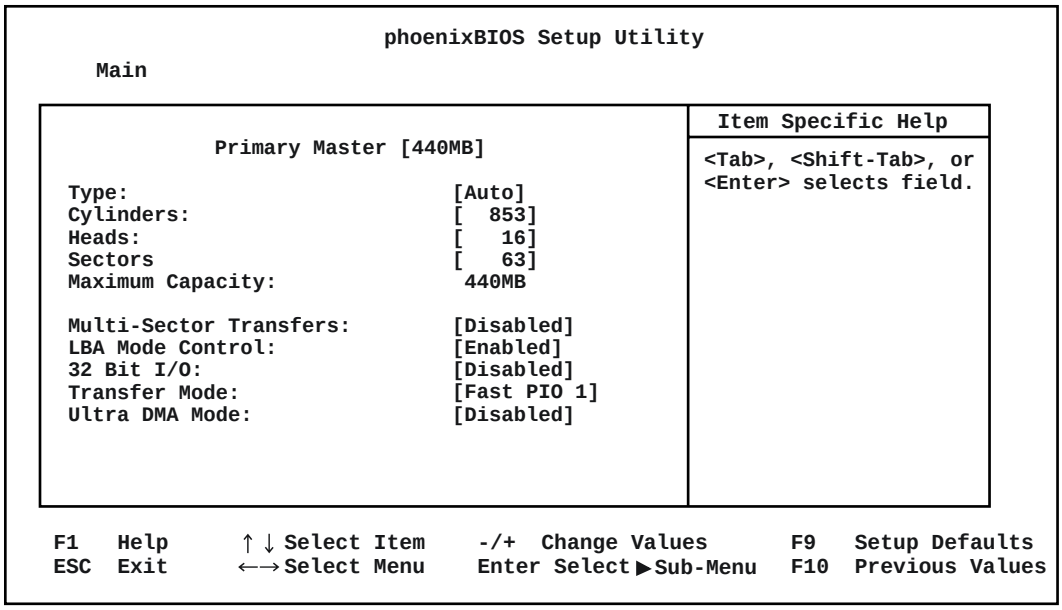

Fig.1.2 "Primary Master" Sub-Menu

Use the [+][-] keys or the [SPACE] key to change the settings. Press [Esc] to return to the Main menu.

[Important]

Hard disk and silicon disk settings are specified at this "Primary Master" sub-menu. Two identical PFS-150 systems may have different values at "Cylinders", "Heads" and "Sectors" and different settings at "Multi-Sector Transfers", "LBA Mode Control", "Transfer Mode" and "Ultra DMA Mode" depending on changes in their hard disk capacities.
When the "Type" setting is specified as "Auto", the BIOS automatically checks the hard disk at power on, and specifies the appropriate "Cylinders", "Heads", and "Sectors" settings based on the hard disk condition, and these settings cannot be changed.
A capacity value shown in brackets after the "Primary Master" heading ("[440MB]" in Fig.1.2 above) indicates that the hard disk has been automatically checked in this manner. "[None]" displays if the automatic hard disk check has not occurred. (If "[None]" displays, check the connections then restart the system.)

2.2 "Primary Slave" Sub-Menu

The settings screen shown below in Fig.1.3 displays when "Primary Slave" is selected at the Fig.1.1 screen, and [Enter] is pressed. Specify the settings as shown below.

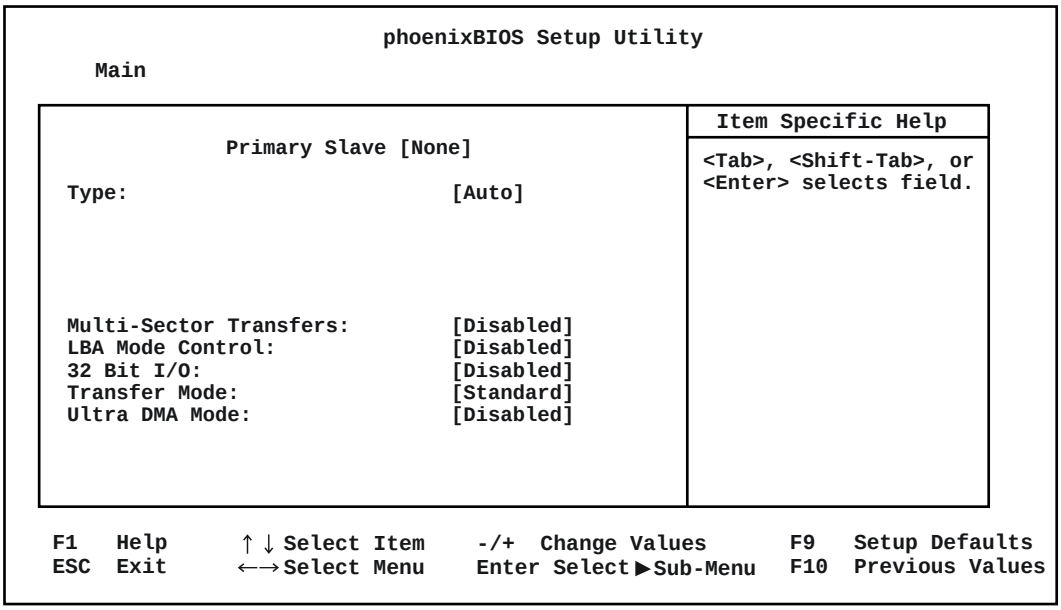

Fig.1.3 "Primary Slave" Sub-Menu

Use the [+][-] keys or the [SPACE] key to change the settings. Press [Esc] to return to the Main menu.

2.3 "Secondary Master" Sub-Menu

The settings screen shown below in Fig.1.4 displays when "Secondary Master" is selected at the Fig.1.1 screen, and [Enter] is pressed. Specify the settings as shown below.

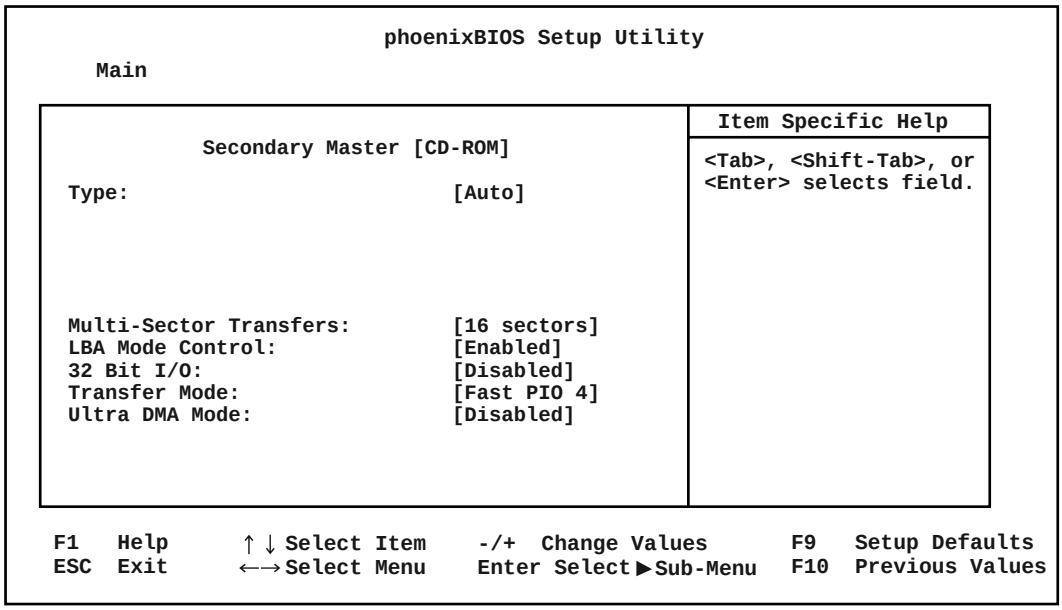

Fig.1.4 "Secondary Master" Sub-Menu

Use the [+][-] keys or the [SPACE] key to change the settings. Press [Esc] to return to the Main menu.

[Important]

CD-ROM drive settings are specified at this "Secondary Master" sub-menu. If connected correctly, and if the "Type" setting is specified as "Auto", the BIOS automatically checks the CD-ROM drive at power on.
If this automatic check has occurred, "[CD-ROM]" displays after the "Secondary Master" heading as shown in Fig.1.4 above. "[None]" displays if the automatic check has not occurred. (If "[None]" displays, check the connections then restart the system.)

2.4 "Secondary Slave" Sub-Menu

The settings screen shown below in Fig.1.5 displays when "Secondary Slave" is selected at the Fig.1.1 screen, and [Enter] is pressed. Specify the settings as shown below.

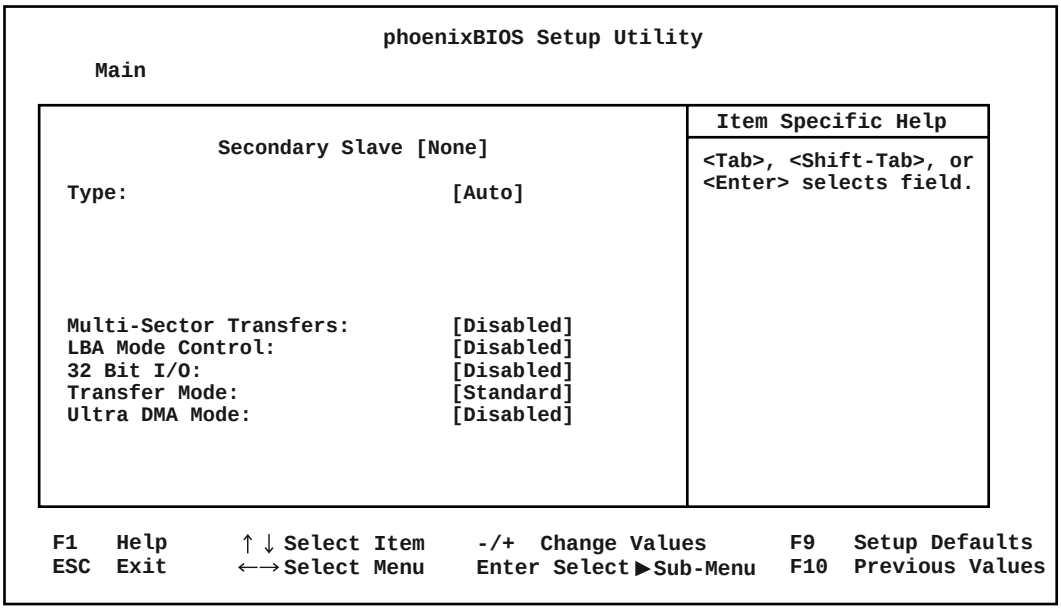

Fig.1.5 "Secondary Slave" Sub-Menu

Use the [+][-] keys or the [SPACE] key to change the settings. Press [Esc] to return to the Main menu.

2.5 "Cache Memory" Sub-Menu

The settings screen shown below in Fig.1.6 displays when "Cache Memory" is selected at the Fig.1.1 screen, and [Enter] is pressed. Specify the settings as shown in the figure below.

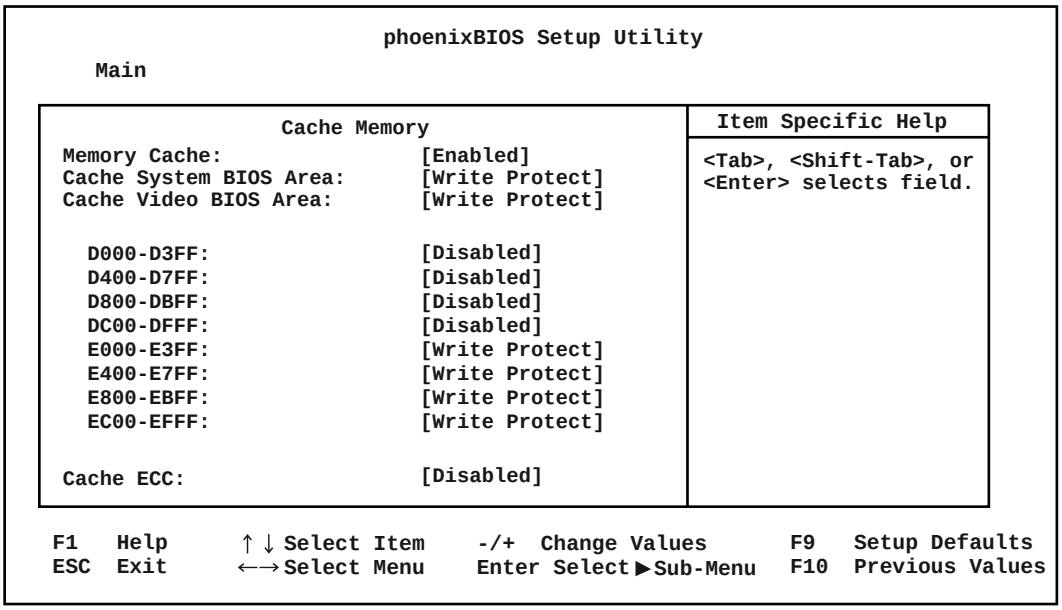

Fig.1.6 "Cache Memory" Sub-Menu

Use the [+][-] keys or the [SPACE] key to change the settings. Press [Esc] to return to the Main menu.

2.6 "Boot Options" Sub-Menu

The settings screen shown below in Fig.1.7 displays when "Boot Options" is selected at the Fig.1.1 screen, and [Enter] is pressed. Specify the settings as shown below.

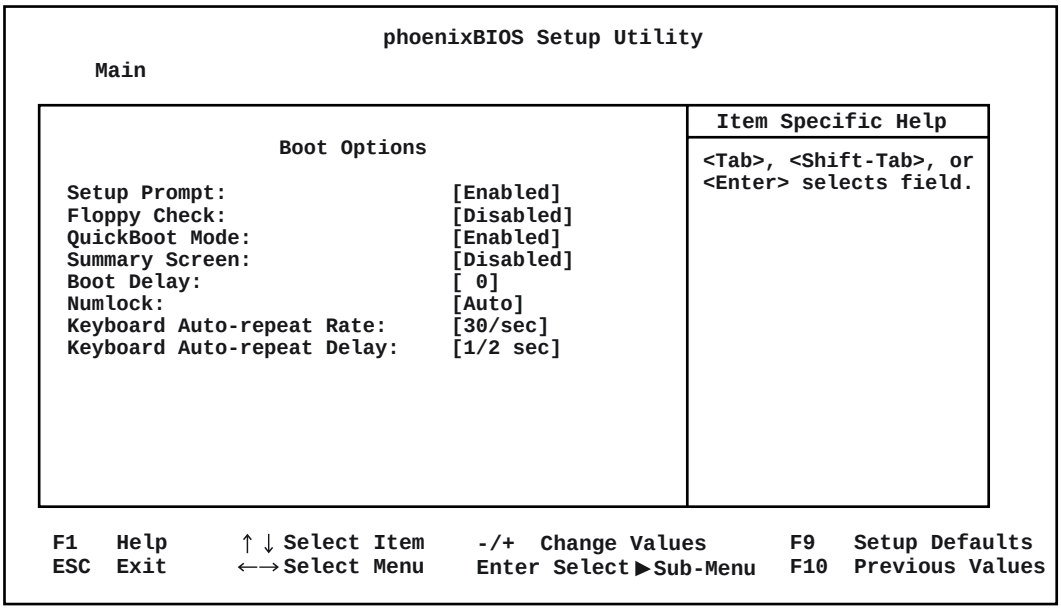

Fig.1.7 "Boot Options" Sub-Menu

Use the [+][-] keys or the [SPACE] key to change the settings. Press [Esc] to return to the Main menu.

If the machine has a floppy disk drive, set the "Floppy Check" item to "Enabled".

2.7 "UBE Shadow Control" Sub-Menu

The settings screen shown below in Fig.1.8 displays when "UBE Shadow Control" is selected at the Fig.1.1 screen, and [Enter] is pressed. Specify the settings as shown below.

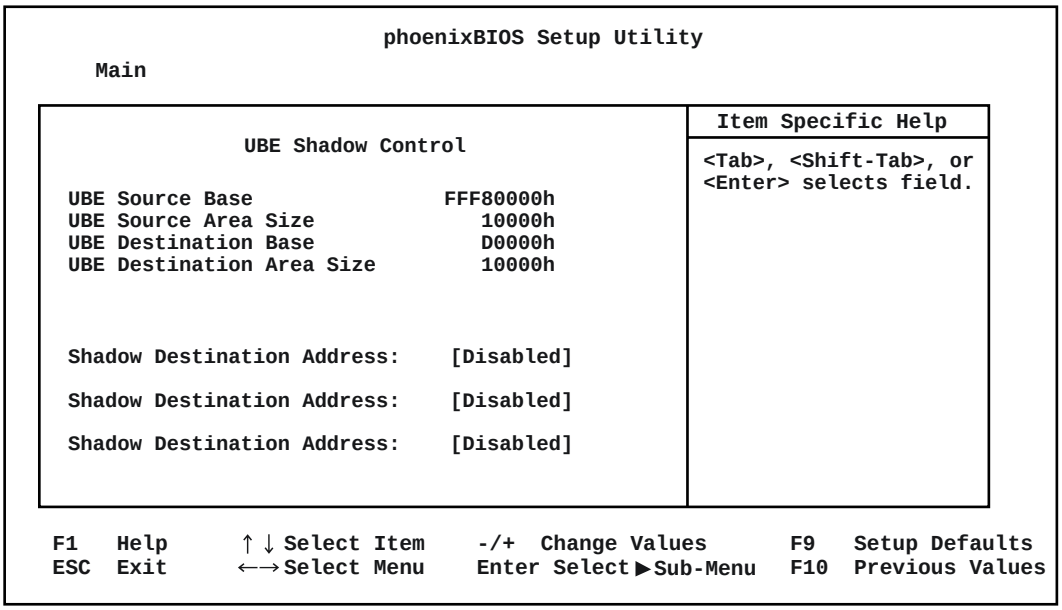

Fig.1.8 "UBE Shadow Control" Sub-Menu

Use the [+][-] keys or the [SPACE] key to change the settings. Press [Esc] to return to the Main menu.

3 Advanced Menu

Set the "Advanced" menu settings as shown below in Fig.2.1.
Because the "Reset Configuration Data" is reset to "No" after each BIOS setting operation, it must be set to "Yes" each time the BIOS setting screen is entered.

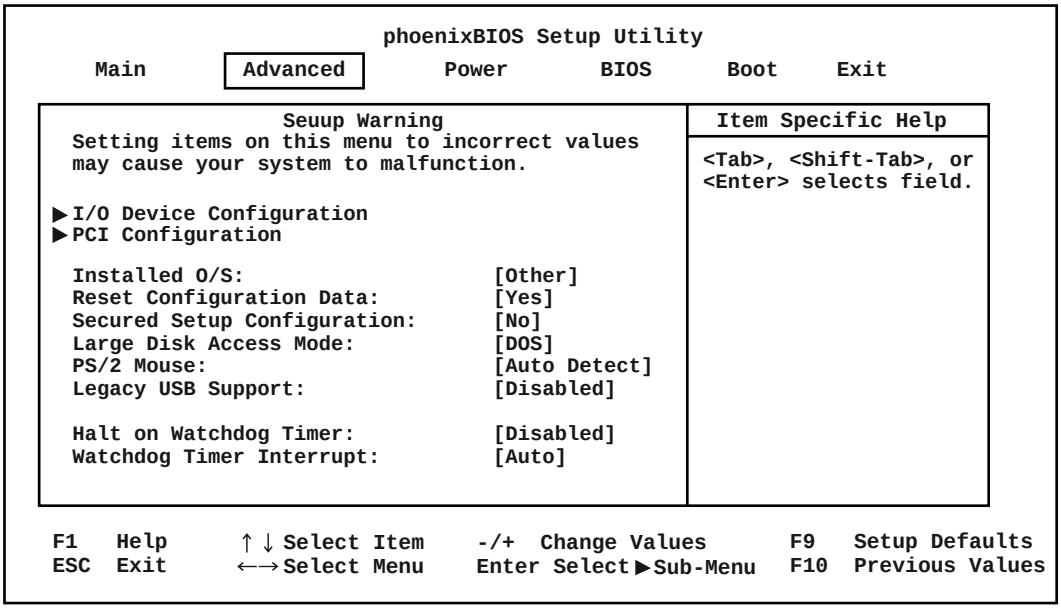

Fig.2.1 Advanced Menu

3.1 "I/O Device Configuration" Sub-Menu

The settings screen shown below in Fig.2.2 displays when "I/O Device Configuration" is selected at the Fig.2.1 screen, and [Enter] is pressed. Specify the settings as shown below.

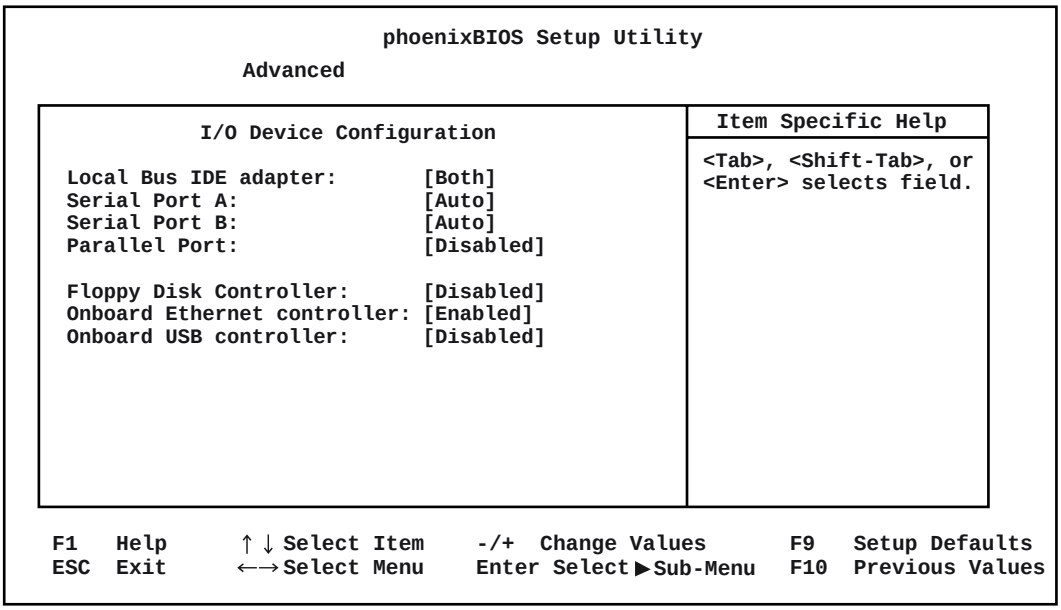

Fig.2.2 "I/O Device Configuration" Sub-Menu

Use the [+][-] keys or the [SPACE] key to change the settings. Press [Esc] to return to the Main menu.

If the machine has a floppy disk drive, set the "Floppy disk controller" item to "Enabled". If not, set it to "Disabled".

3.2 "PCI Configuration" Sub-Menu

The settings screen shown below in Fig.2.3 displays when "PCI Configuration" is selected at the Fig.2.1 screen, and [Enter] is pressed. Specify the settings as shown below.

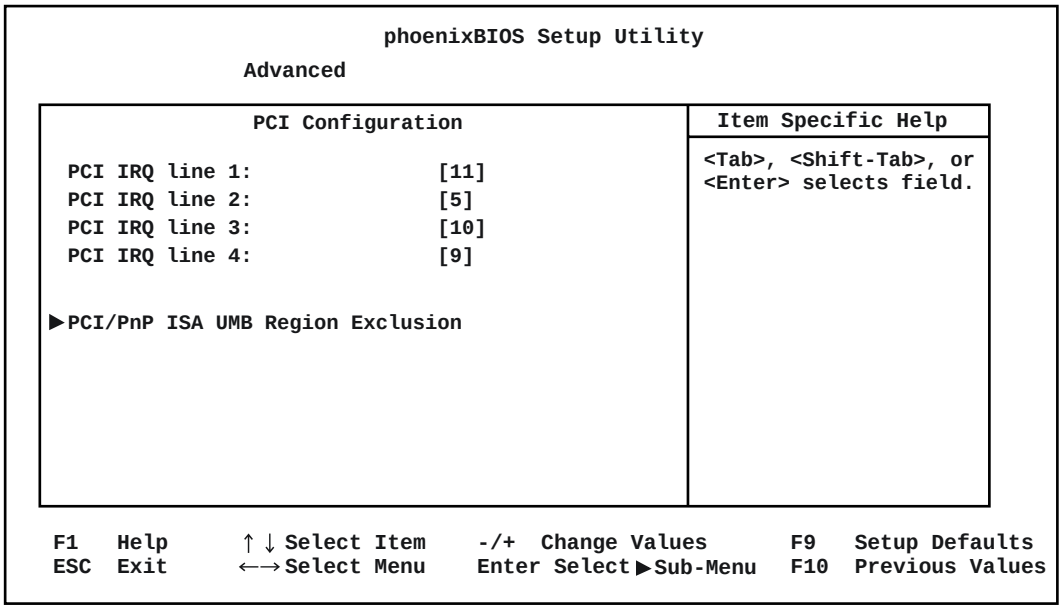

Fig.2.3 "PCI Configuration" Sub-Menu

Use the [+][-] keys or the [SPACE] key to change the settings. Press [Esc] to return to the Main menu.

3.2.1 "PCI/PNP ISA USB Region Exclusion" Sub-Menu

The settings screen shown below in Fig.2.4 displays when "PCI/PNP ISA USB Region Exclusion" is selected at the Fig.3.2 screen, and [Enter] is pressed. Specify the settings as shown below.

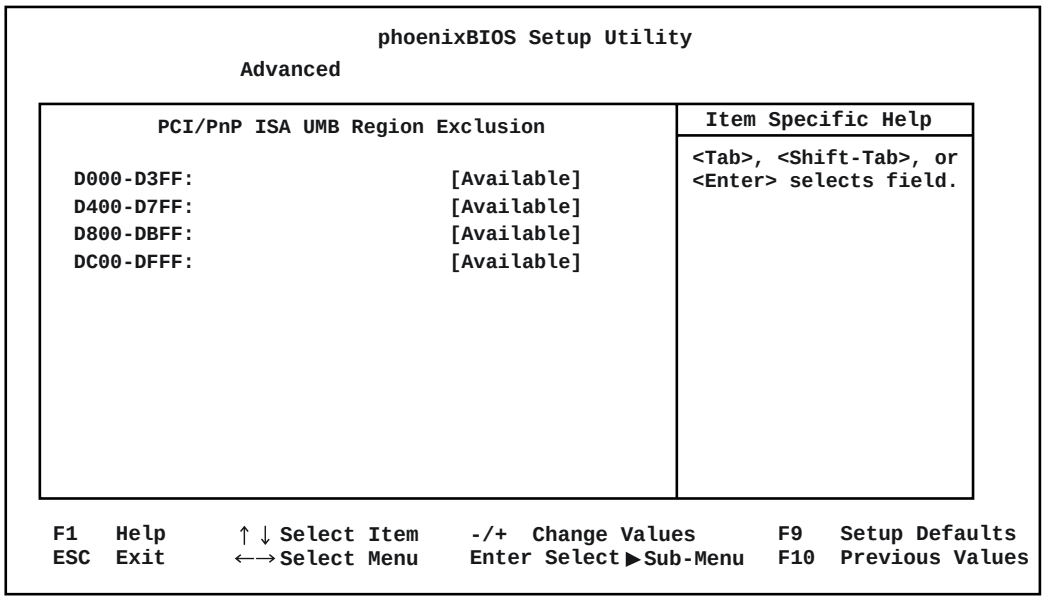

Fig.2.4 "PCI/PNP ISA USB Region Exclusion" Sub-Menu

After settings have been specified, press [Esc] to return to the "PCI Configuration" menu. (Press [Esc] again to return to the Advanced menu.)

4 Power Menu

Specify the Power menu settings shown below in Fig.3. Use the [+][-] keys or the [SPACE] key to change the settings to those shown in Fig.3.

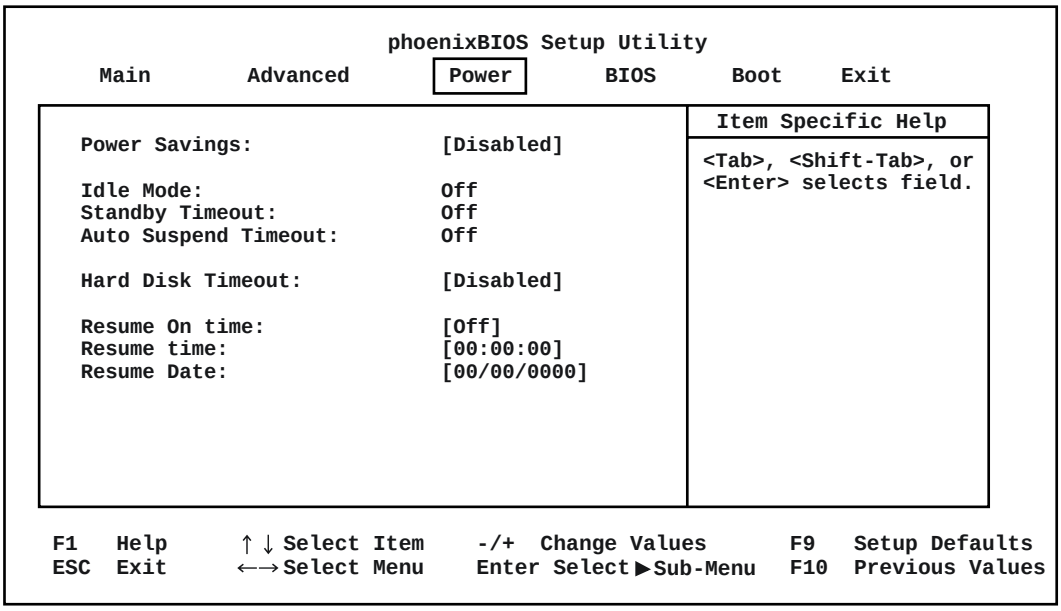

Fig.3 Power Menu

5 BIOS Menu

The BIOS menu contains the information shown below in Fig.4. These settings cannot be changed.

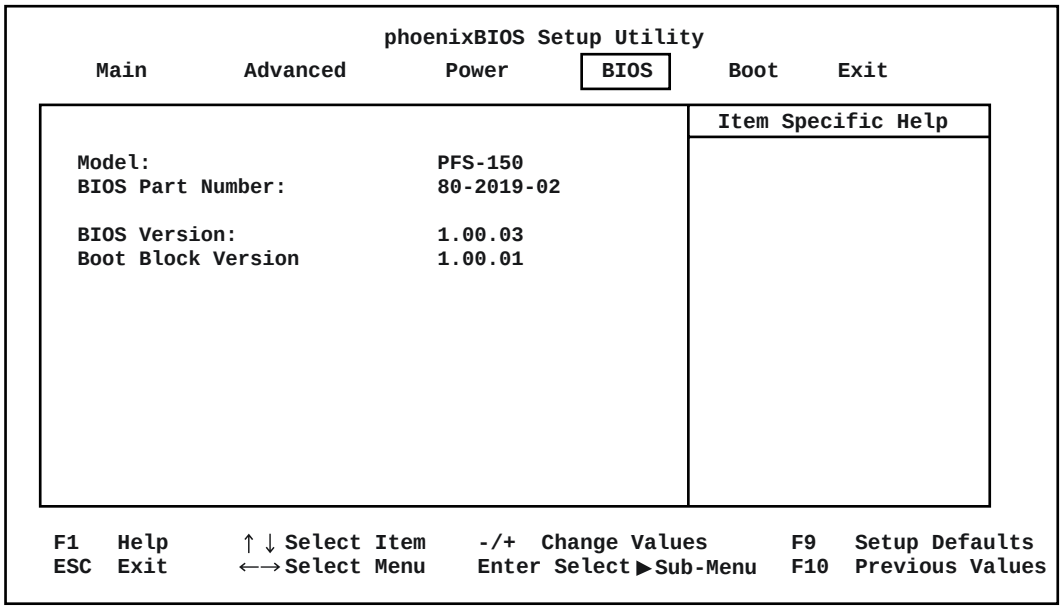

Fig.4 BIOS menu

6 Boot Menu

Use the [+][-] keys to change the Boot menu settings to those shown below in Fig.5. Press the [+] key to switch a selected item with the item above it, or press the [-] key to switch a selected item with the item below it.

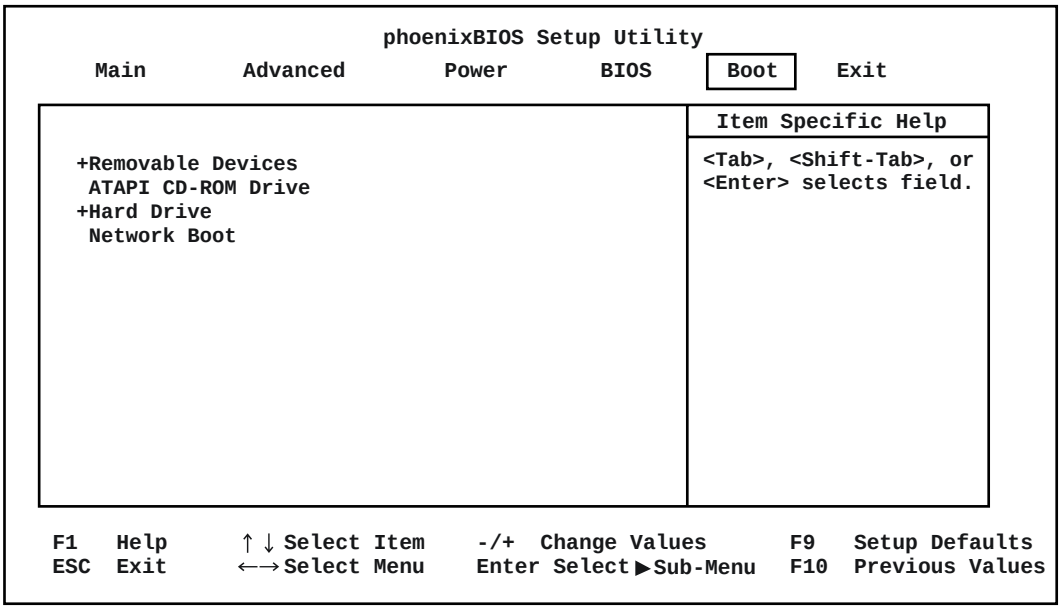

Fig.5.1 Boot Menu

When the system is equipped with a floppy disk drive, carry out the following:

To disable the system to be booted from the floppy disk, use the [+][-] keys to select Removable Devices and press the [1] key with [Shift] pressed. An exclamation point (!) is displayed at the head of Removable Devices as shown below.

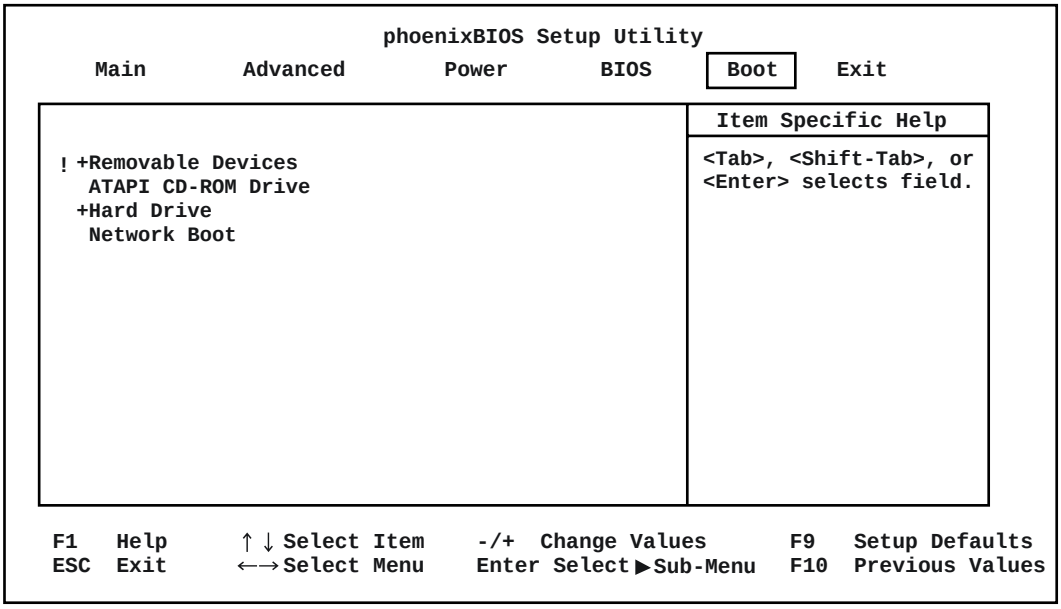

Fig.5.2 Boot Menu

7 Exit Menu

The Exit menu screen is shown below in Fig.6.1.

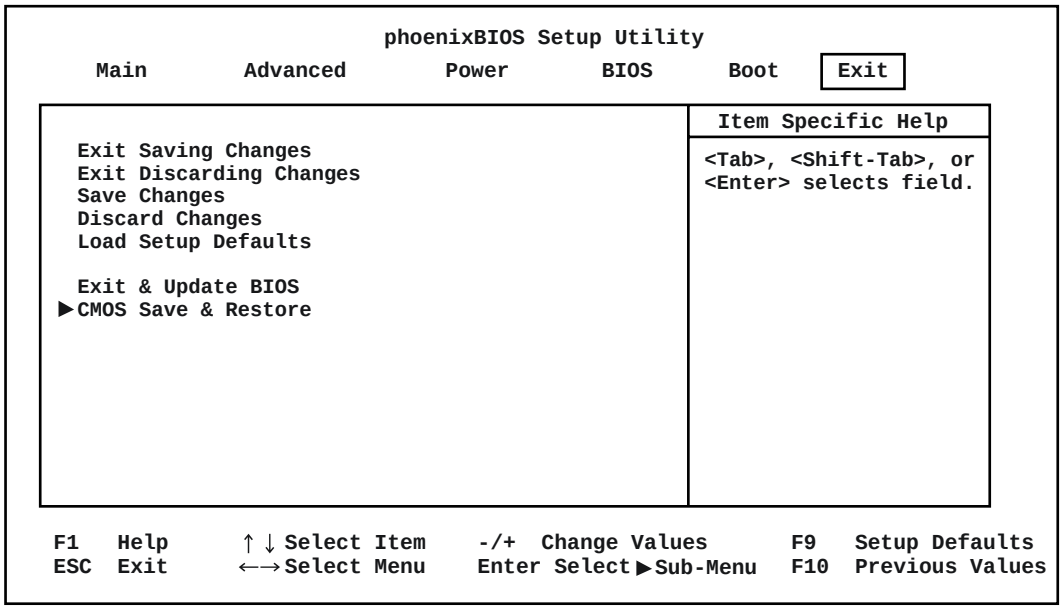

Fig.6.1 Exit Menu

7.1 "CMOS Save & Restore" Sub-Menu

The settings screen shown below in Fig.6.2 displays when "CMOS Save & Restore" is selected at the Fig.6.1 screen, and [Enter] is pressed. Specify the settings as shown below.

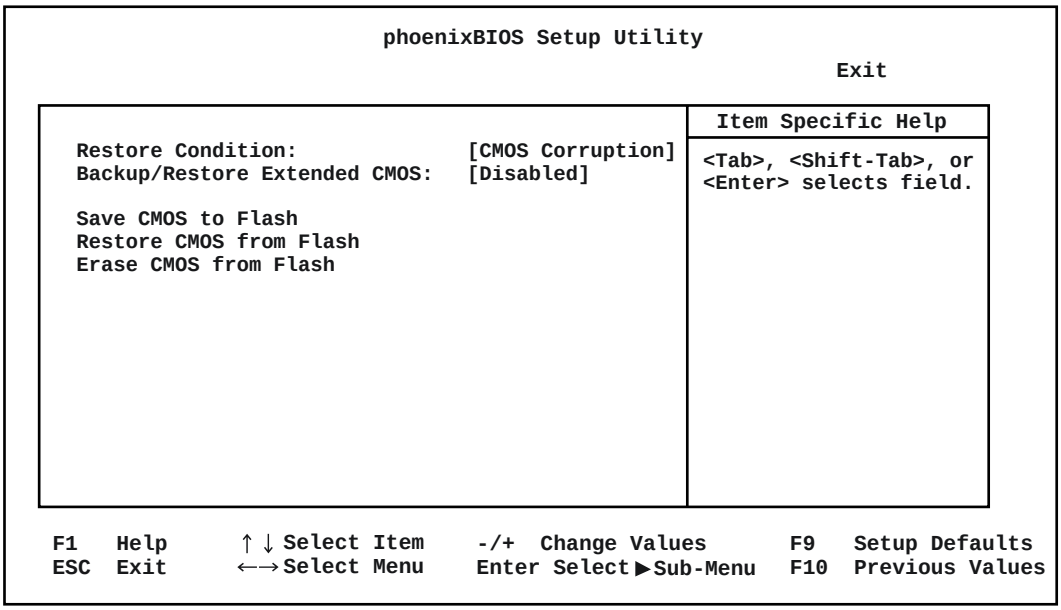

Fig.6.2 "CMOS Save & Restore" Sub-Menu

After the settings at the Fig.6.2 screen are completed, press [Esc] to return to the Exit menu.

After specifying all settings from the "Main" to "Boot" menus, select "Exit Saving Changes" at the Fig.6.1 screen, then press [Enter].
A message then displays inquiring if changes are to be saved. Select "Yes" at that time, then press [Enter] again.

Fuji Rep News *No. 01302*

Machine type : CP-7-series December 18, 2001

Subject : CP-7 BIOS version upgrade for V1.20 and later.

<Description>

On CP-7-series machines with V1.20 or later installed, the BIOS version on the CPU board is being automatically updated as a countermeasure to the trouble described below.
After the upgrade the BIOS version will read "1.00.04".

The bug that has made the BIOS upgrade necessary is described below.
During operation, a blue screen error with the following error code occurs.

STOP: 0x0000009C (0x00000030, 0x00000002, 0x00000001, 0x80003CBA)
(Note: The values noted in parenthesis above will change depending on the machine condition at the time of the error.)

This trouble always occurs under the above noted error code (STOP: 0x0000009C).

When the application CD is installed, the current BIOS version is automatically detected and if it is a version prior to "1.00.04", the BIOS is automatically updated during installation.
Once the BIOS has been updated, the automatic update will not otherwise be executed during installation unless a new BIOS version is issued.
In addition, if for some reason the application version is downgraded this BIOS version is still compatible so the BIOS related settings do not need to be changed.

Cautionary points

This notification applies only to the CPU (Type PFS-150) used on CP-7-series machines. In conjunction with this BIOS update, the BIOS settings screen viewing method has also changed.

Note: Please refer to the Field Engineers Document entitled "PFS-150 BIOS Setting Manual (BIOS version 1.00.04)" (S0102-2.0E) for details.

This document should be used as a reference alongside existing BIOS settings manuals when servicing CP-7-series machines.

Terminology

BIOS: This is short for "Basic Input Output System.
The BIOS is stored in ROM (Flash Memory) on the CPU board and is the software used to initiate the machine startup after the power to the machine is turned on.

PFS-150 BIOS Setting Manual (BIOS version 1.00.04)

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December 18, 2001

S0102-2.0E

FUJI*® *Machine Mfg.Co.,Ltd.

Contents

1 About BIOS Settings (BIOS version 1.00.04)

[Explanations of Terms Used]

Term	Explanation
Menu	The main BIOS setting items are divided into 6 major menus. In PFS-150 BIOS version 1.00.04, these menus are: “Main”, “Advanced”, “Power”, “BIOS”, “Boot”, and “Exit”. Use the left/right (←/→) keys to switch between these major menus.
Sub-Menu	Sub-menus contain detailed setting items within the major menus shown above. A triangular mark displays to the left of items for which a sub-menu exists. To access a sub-menu, move the cursor to the desired line and press [Enter].

[Key Operation]

[←][→]	Used to switch between the 6 major menus (“Main”, “Advanced”, “Power”, “BIOS”, “Boot”, and “Exit”).
[↑][↓]	Used to select items within a menu.
[+][-]	Used to change the settings. On English-language keyboards, the [SHIFT] + [=] keys are used instead of the [+] key.
[SPACE] key	Used to change the settings (alternative to the [+][-] keys). Each time the [SPACE] key is pressed, the setting value changes in sequence.
[Esc] key	Used to return to a major menu from a sub-menu. If pressed at a major menu, the “Exit” menu displays.
Numerical keys	Used to enter numerical values.
[Enter]	Used to access the sub-menu setting screen of an item with a triangular mark displayed to its left.
[Tab]	Used to set the date and time. With the date or time selected, the cursor moves as follows each time [Tab] is pressed: Month —> Day —> Year; Hour —> Minute —> Second.

[Setting Procedure]

When the machine power is turned on, the following message displays at the bottom left of the screen: “Press [F2] to enter SETUP.” If [F2] is pressed at this time, the message display changes to “Entering SETUP...”.
After completing a memory check, the BIOS setting screen displays.
Although the settings shown in the figures on the following pages are generally used, there are cases where different settings are required. In such cases, specify the settings in accordance with the supplemental explanation which appears beneath the figure.

2 Main Menu

The Main menu configuration is shown in Fig. 1.1 below.

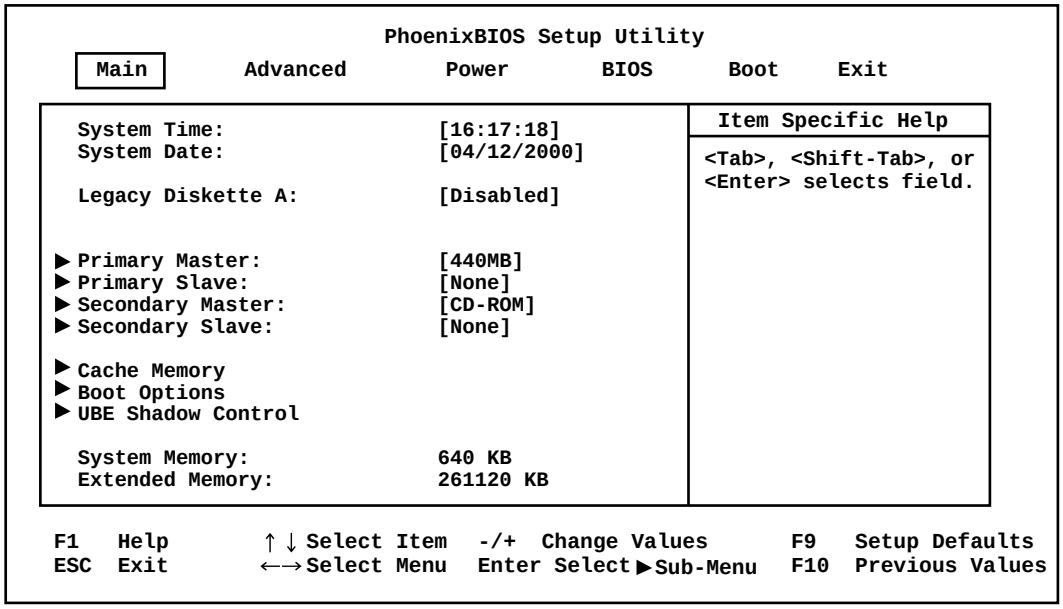

Fig.1.1 Main Menu

As a rule, the settings shown in the above figure should be used. Different settings may be used, however, for the “System Time”, “System Date”, “Legacy Diskette A:”, and “Primary Master” items. These items should be set as described below.

“System Time” and “System Date”

Enter the current date and time. The time displays in a 24-hour format as Hour : Minute : Second, and the date displays as Month / Day / Year. With the time or date selected, the cursor can be moved as follows each time [Tab] is pressed: Hour —> Minute —> Second; Month —> Day —> Year.

“Legacy Diskette A:”

Set as follows:
When the machine has a floppy disk drive: “1.44/1.25MB 3 1/2”
When the machine has no floppy disk drive: “Disabled”
Use the [+][-] keys or the [SPACE] key to change the settings.

“Primary Master”,“Primary Slave”,“Secondary Master”,and“Secondary Slave”

Sub-menu settings display at each of these items. To access the sub-menus (described in sections 2.1 to 2.4 below), select the desired item then press [Enter].

2.1 “Primary Master” Sub-Menu

The settings screen shown below in Fig.1.2 displays when “Primary Master” is selected at the Fig.1.1 screen, and [Enter] is pressed. Specify the settings as shown below.

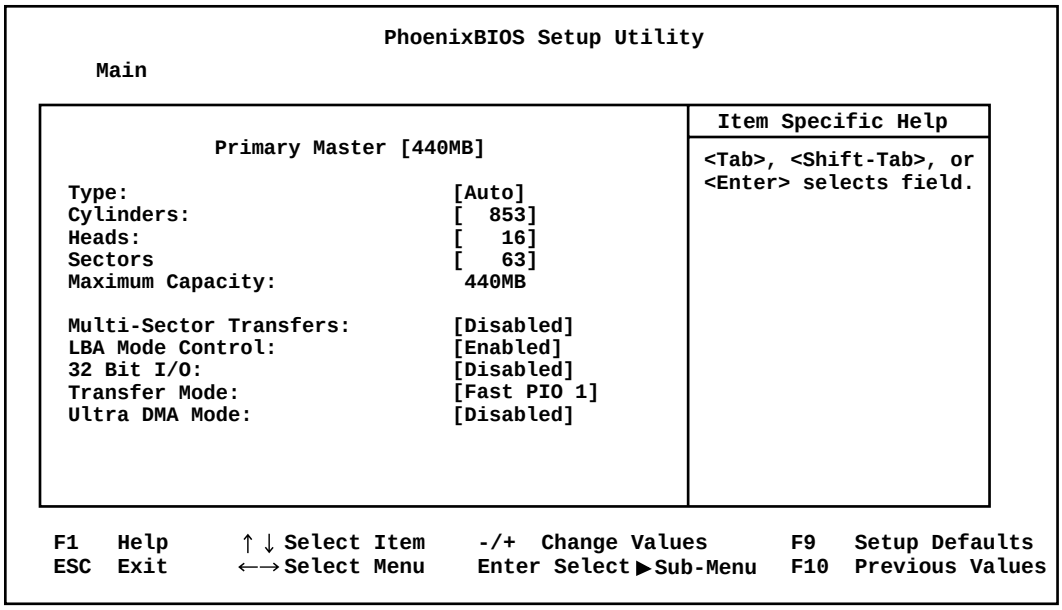

Fig.1.2 “Primary Master” Sub-Menu

Use the [+][-] keys or the [SPACE] key to change the settings. Press [Esc] to return to the Main menu.

[Important]

Hard disk and silicon disk settings are specified at this “Primary Master” sub-menu. Two identical PFS-150 systems may have different values at “Cylinders”, “Heads” and “Sectors” and different settings at “Multi-Sector Transfers”, “LBA Mode Control”, “Transfer Mode” and “Ultra DMA Mode” depending on changes in their hard disk capacities.
When the “Type” setting is specified as “Auto”, the BIOS automatically checks the hard disk at power on, and specifies the appropriate “Cylinders”, “Heads”, and “Sectors” settings based on the hard disk condition, and these settings cannot be changed.
A capacity value shown in brackets after the “Primary Master” heading (“[440MB]” in Fig.1.2 above) indicates that the hard disk has been automatically checked in this manner. “[None]” displays if the automatic hard disk check has not occurred. (If “[None]” displays, check the connections then restart the system.)

2.2 “Primary Slave” Sub-Menu

The settings screen shown below in Fig.1.3 displays when “Primary Slave” is selected at the Fig.1.1 screen, and [Enter] is pressed. Specify the settings as shown below.

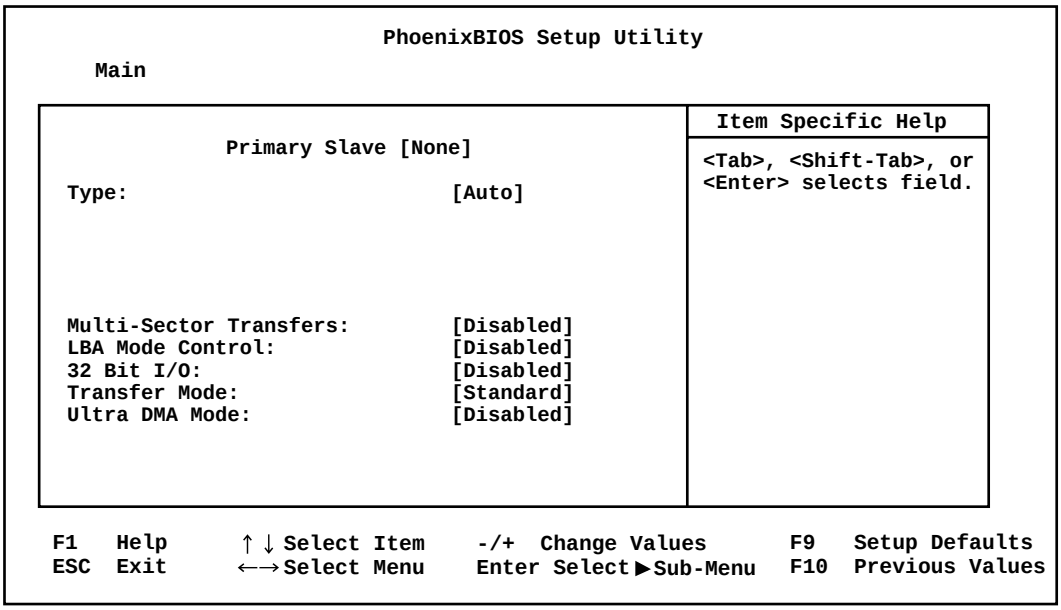

Fig.1.3 “Primary Slave” Sub-Menu

Use the [+][-] keys or the [SPACE] key to change the settings. Press [Esc] to return to the Main menu.

2.3 “Secondary Master” Sub-Menu

The settings screen shown below in Fig.1.4 displays when “Secondary Master” is selected at the Fig.1.1 screen, and [Enter] is pressed. Specify the settings as shown below.

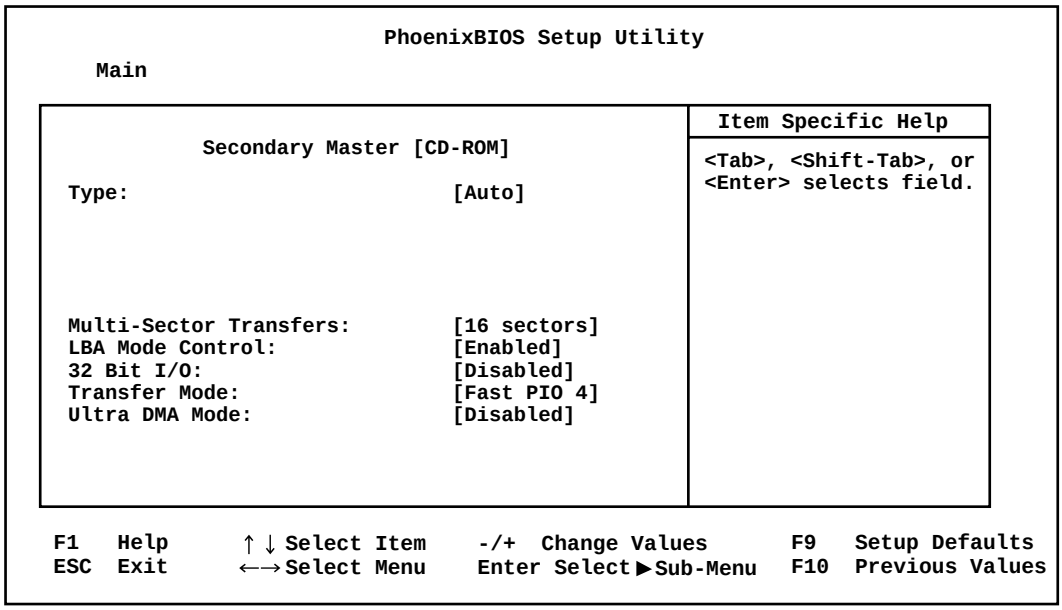

Fig.1.4 “Secondary Master” Sub-Menu

Use the [+][-] keys or the [SPACE] key to change the settings. Press [Esc] to return to the Main menu.

[Important]

CD-ROM drive settings are specified at this “Secondary Master” sub-menu. If connected correctly, and if the “Type” setting is specified as “Auto”, the BIOS automatically checks the CD-ROM drive at power on.
If this automatic check has occurred, “[CD-ROM]” displays after the “Secondary Master” heading as shown in Fig.1.4 above. “[None]” displays if the automatic check has not occurred. (If “[None]” displays, check the connections then restart the system.)

2.4 "Secondary Slave" Sub-Menu

The settings screen shown below in Fig.1.5 displays when "Secondary Slave" is selected at the Fig.1.1 screen, and [Enter] is pressed. Specify the settings as shown below.

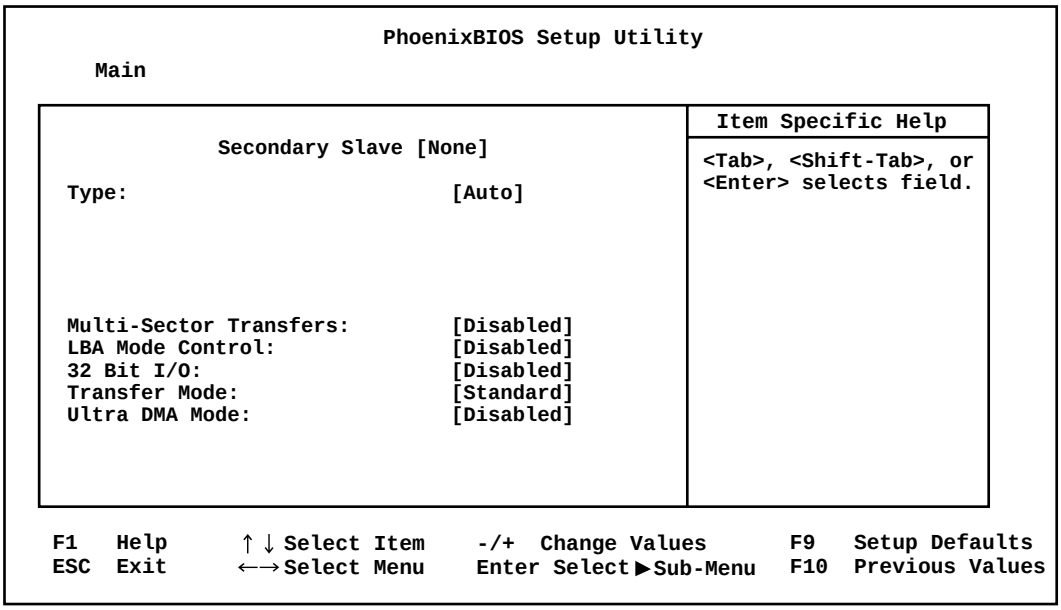

Fig.1.5 "Secondary Slave" Sub-Menu

Use the [+][-] keys or the [SPACE] key to change the settings. Press [Esc] to return to the Main menu.

2.5 "Cache Memory" Sub-Menu

The settings screen shown below in Fig.1.6 displays when "Cache Memory" is selected at the Fig.1.1 screen, and [Enter] is pressed. Specify the settings as shown in the figure below.

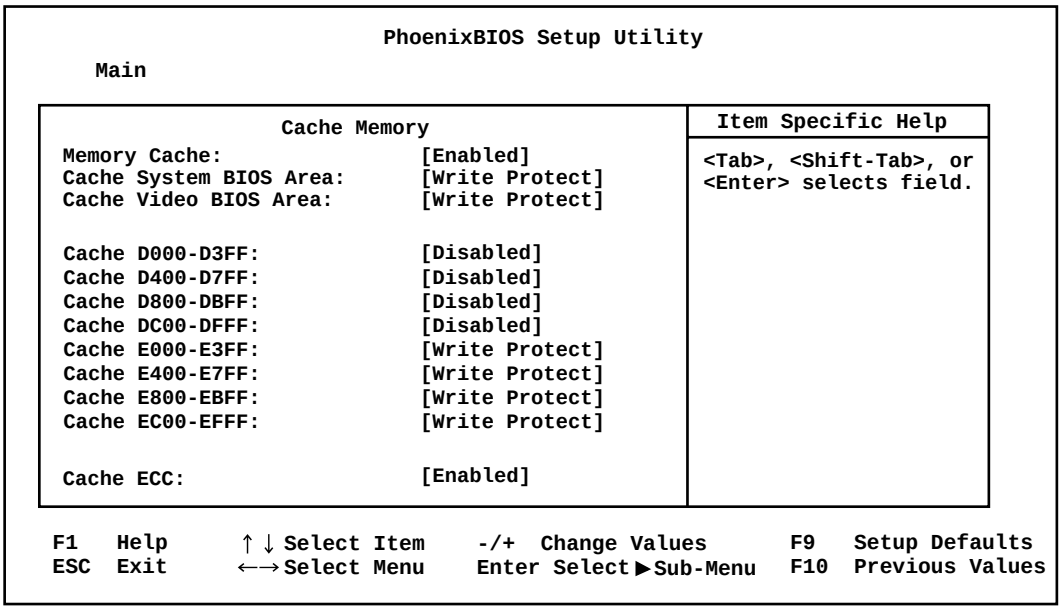

Fig.1.6 "Cache Memory" Sub-Menu

Use the [+][-] keys or the [SPACE] key to change the settings. Press [Esc] to return to the Main menu.

2.6 “Boot Options” Sub-Menu

The settings screen shown below in Fig.1.7 displays when “Boot Options” is selected at the Fig.1.1 screen, and [Enter] is pressed. Specify the settings as shown below.

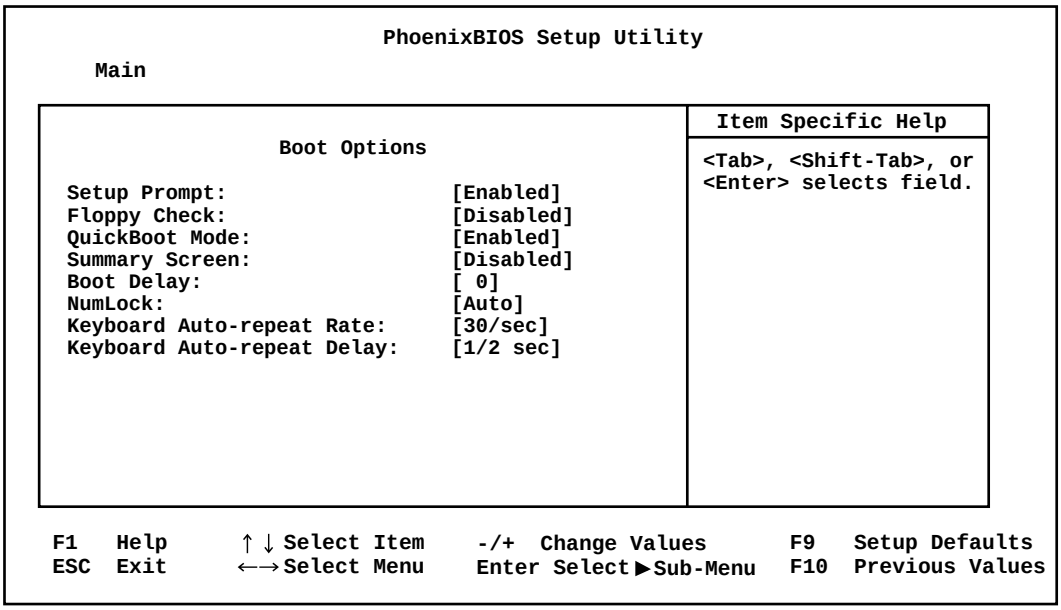

Fig.1.7 “Boot Options” Sub-Menu

Use the [+][-] keys or the [SPACE] key to change the settings. Press [Esc] to return to the Main menu.

If the machine has a floppy disk drive, set the “Floppy Check” item to “Enabled”.

2.7 "UBE Shadow Control" Sub-Menu

The settings screen shown below in Fig.1.8 displays when "UBE Shadow Control" is selected at the Fig.1.1 screen, and [Enter] is pressed. Specify the settings as shown below.

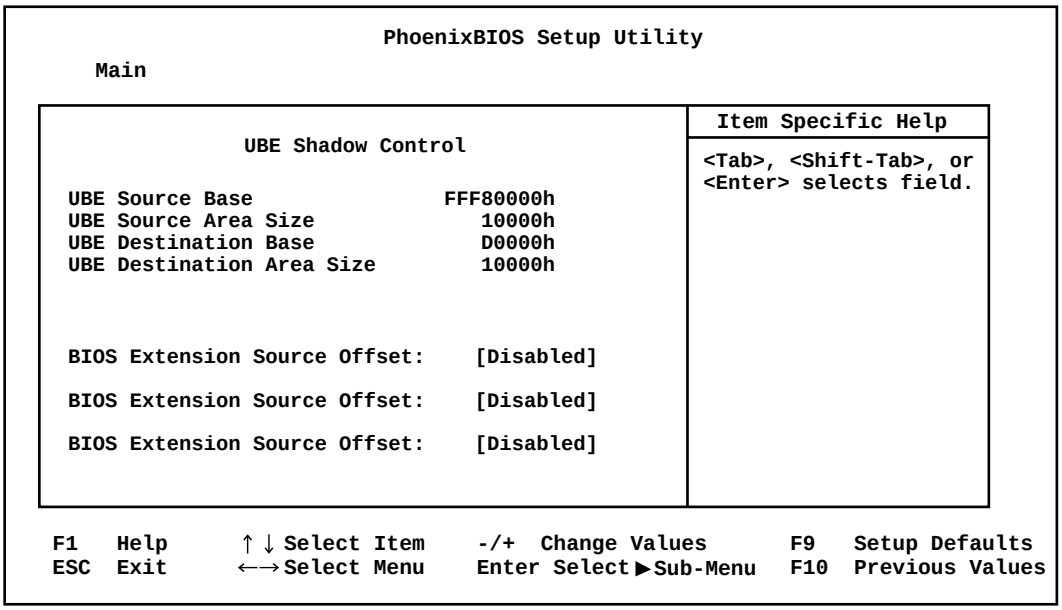

Fig.1.8 "UBE Shadow Control" Sub-Menu

Use the [+][-] keys or the [SPACE] key to change the settings. Press [Esc] to return to the Main menu.

3 Advanced Menu

Set the “Advanced” menu settings as shown below in Fig.2.1.
Because the “Reset Configuration Data” is reset to “No” after each BIOS setting operation, it must be set to “Yes” each time the BIOS setting screen is entered.

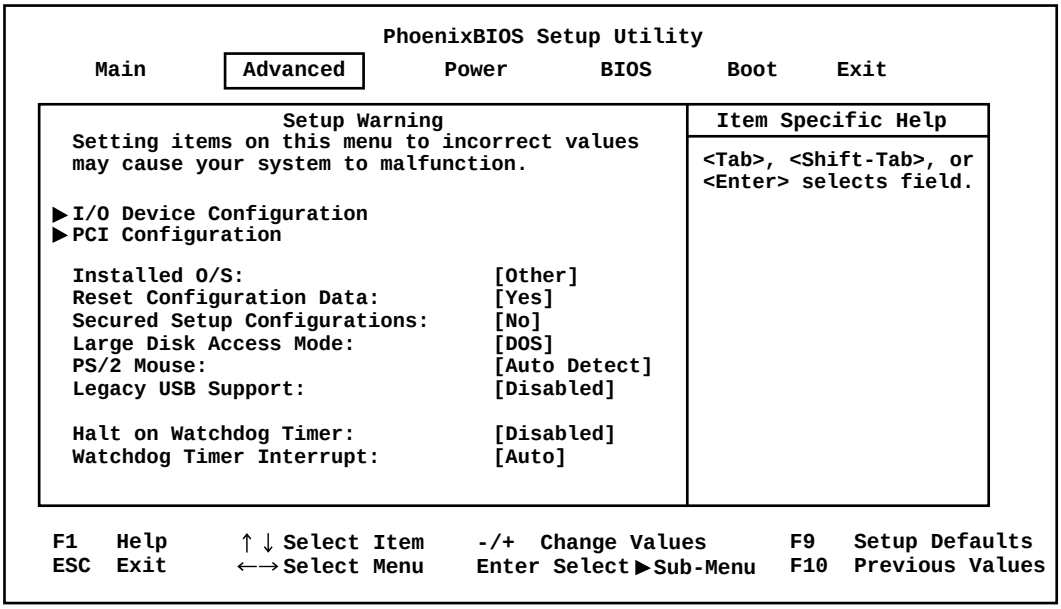

Fig.2.1 Advanced Menu

3.1 "I/O Device Configuration" Sub-Menu

The settings screen shown below in Fig.2.2 displays when "I/O Device Configuration" is selected at the Fig.2.1 screen, and [Enter] is pressed. Specify the settings as shown below.

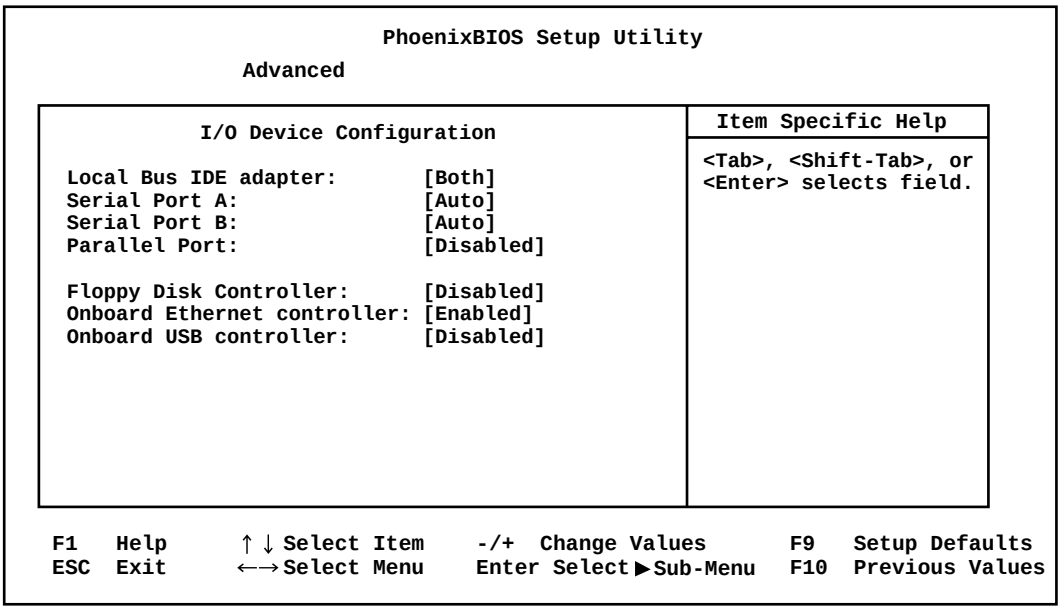

Fig.2.2 "I/O Device Configuration" Sub-Menu

Use the [+][-] keys or the [SPACE] key to change the settings. Press [Esc] to return to the Main menu.

If the machine has a floppy disk drive, set the "Floppy disk controller" item to "Enabled". If not, set it to "Disabled".

3.2 "PCI Configuration" Sub-Menu

The settings screen shown below in Fig.2.3 displays when "PCI Configuration" is selected at the Fig.2.1 screen, and [Enter] is pressed. Specify the settings as shown below.

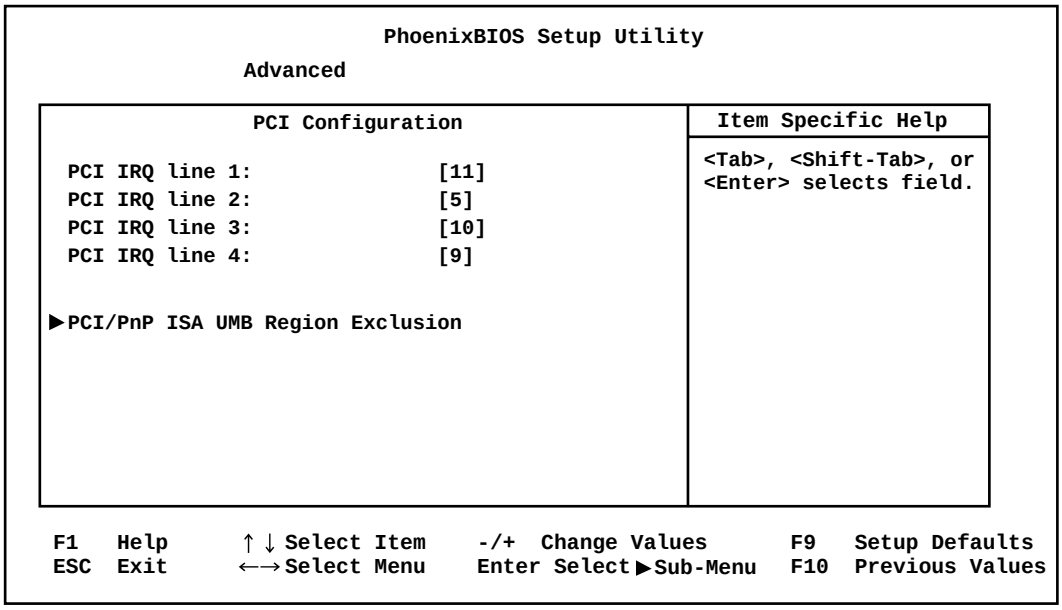

Fig.2.3 "PCI Configuration" Sub-Menu

Use the [+][-] keys or the [SPACE] key to change the settings. Press [Esc] to return to the Main menu.

3.2.1 "PCI/PNP ISA USB Region Exclusion" Sub-Menu

The settings screen shown below in Fig.2.4 displays when "PCI/PNP ISA USB Region Exclusion" is selected at the Fig.3.2 screen, and [Enter] is pressed. Specify the settings as shown below.

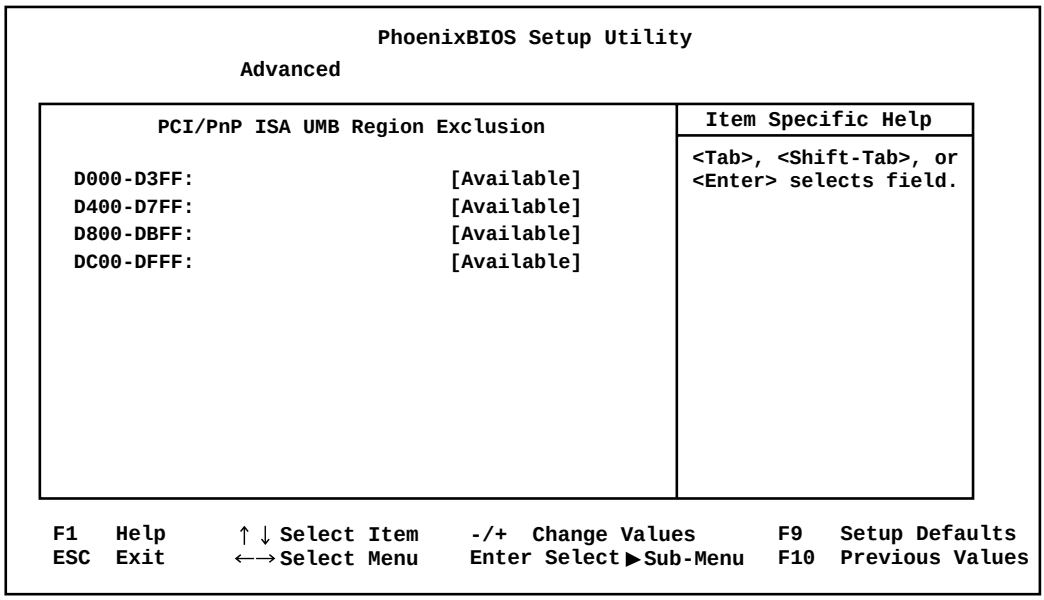

Fig.2.4 "PCI/PNP ISA USB Region Exclusion" Sub-Menu

After settings have been specified, press [Esc] to return to the "PCI Configuration" menu. (Press [Esc] again to return to the Advanced menu.)

4 Power Menu

Specify the Power menu settings shown below in Fig.3. Use the [+][-] keys or the [SPACE] key to change the settings to those shown in Fig.3.

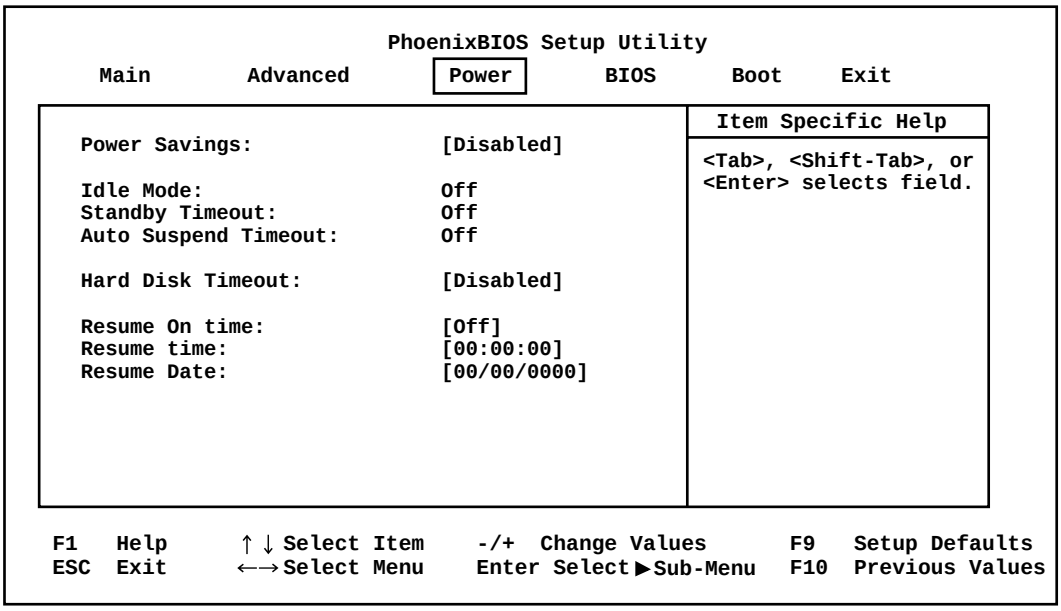

Fig.3 Power Menu

5 BIOS Menu

The BIOS menu contains the information shown below in Fig.4. These settings cannot be changed.

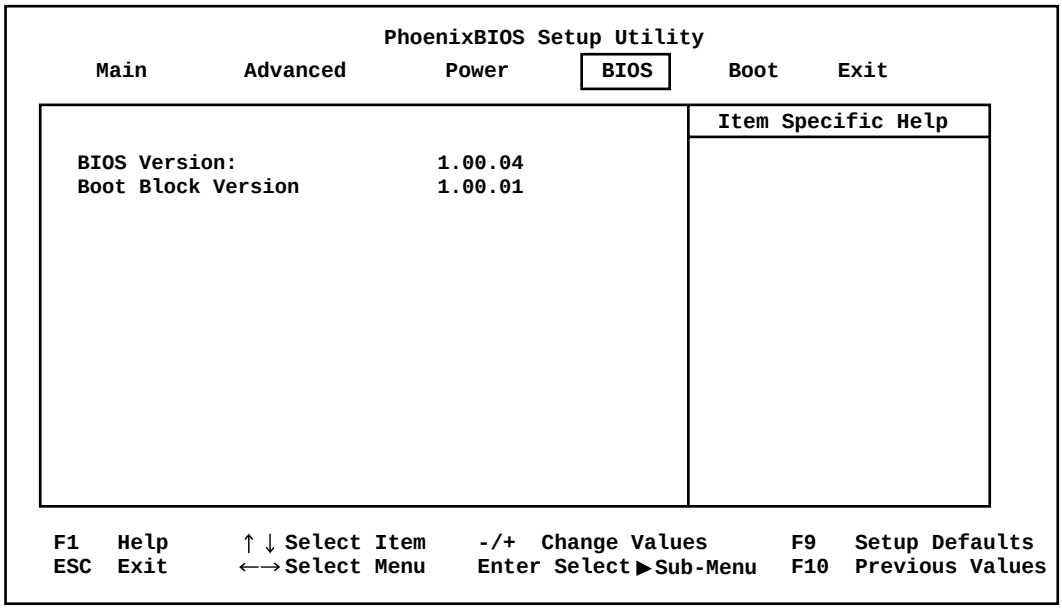

Fig.4 BIOS menu

6 Boot Menu

Use the [+][-] keys to change the Boot menu settings to those shown below in Fig.5. Press the [+] key to switch a selected item with the item above it, or press the [-] key to switch a selected item with the item below it.

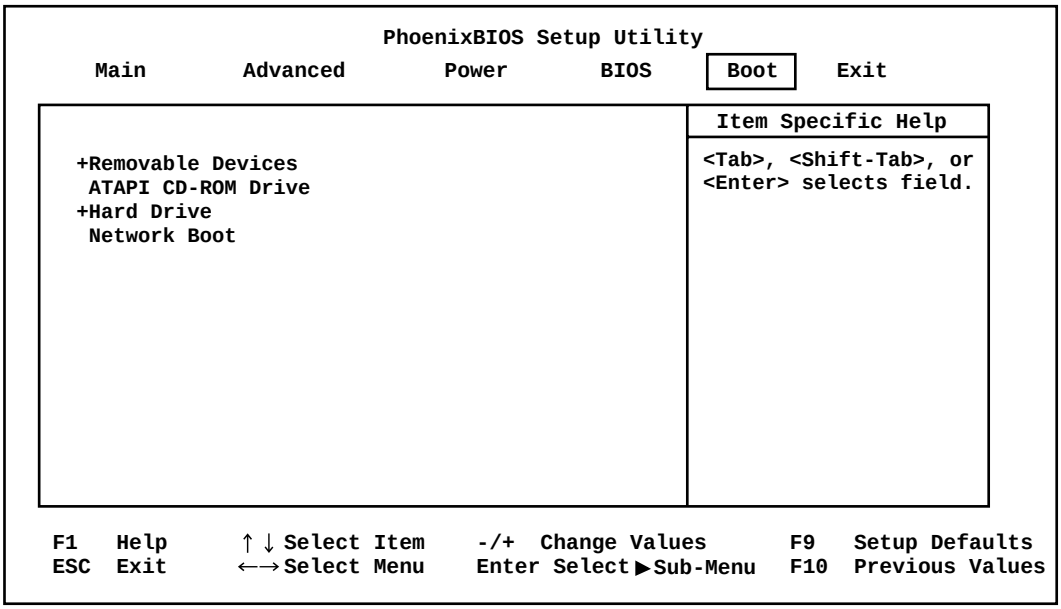

Fig.5.1 Boot Menu

When the system is equipped with a floppy disk drive, carry out the following:

To disable the system to be booted from the floppy disk, use the [+][-] keys to select Removable Devices and press the [1] key with [Shift] pressed. An exclamation point (!) is displayed at the head of Removable Devices as shown below.

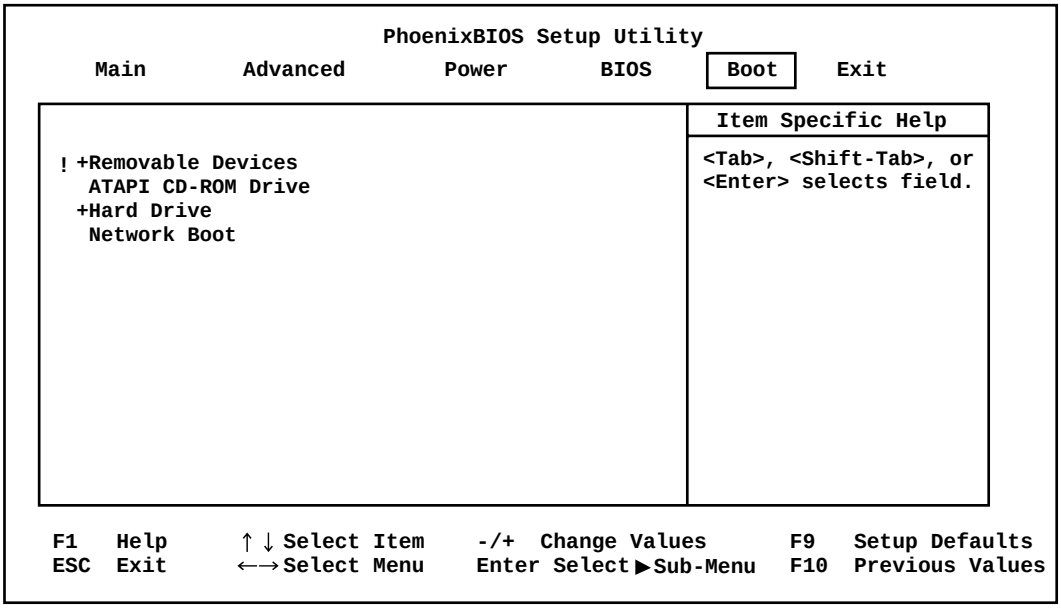

Fig.5.2 Boot Menu

7 Exit Menu

The Exit menu screen is shown below in Fig.6.1.

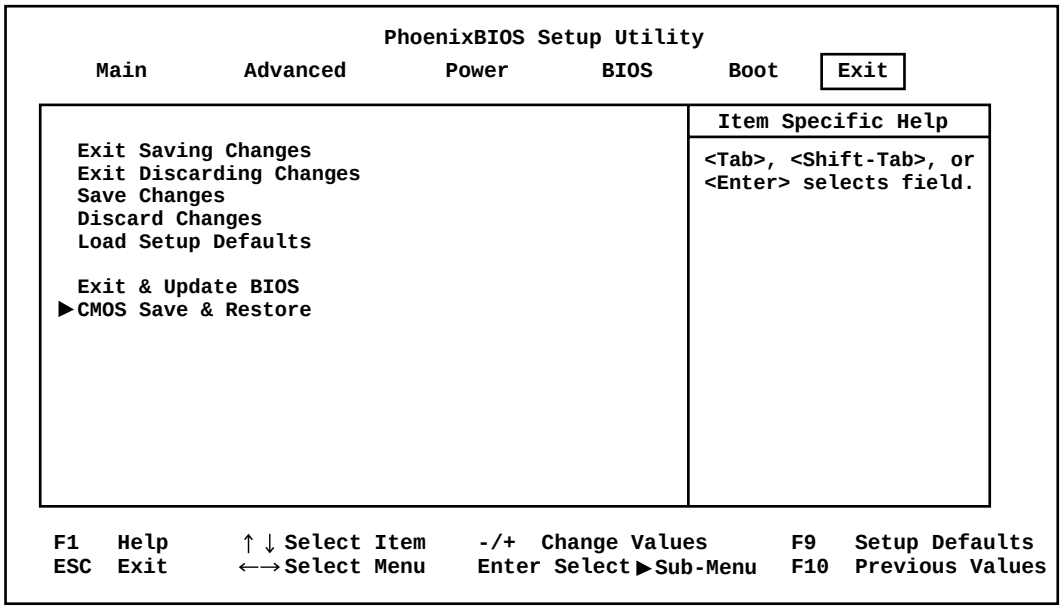

Fig.6.1 Exit Menu

7.1 "CMOS Save & Restore" Sub-Menu

The settings screen shown below in Fig.6.2 displays when "CMOS Save & Restore" is selected at the Fig.6.1 screen, and [Enter] is pressed. Specify the settings as shown below.

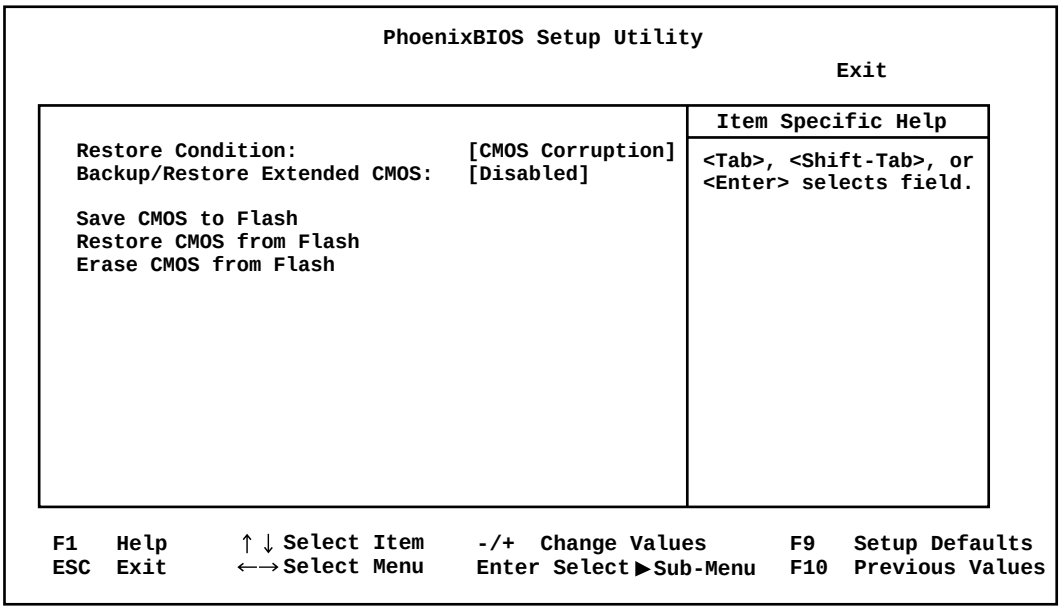

Fig.6.2 "CMOS Save & Restore" Sub-Menu

After the settings at the Fig.6.2 screen are completed, press [Esc] to return to the Exit menu.

After specifying all settings from the "Main" to "Boot" menus, select "Exit Saving Changes" at the Fig.6.1 screen, then press [Enter].
A message then displays inquiring if changes are to be saved. Select "Yes" at that time, then press [Enter] again.

Supplement 3

Servo Pack Parameter Listing

CP732E SERVO AMP. PARAMETER

Standard Parameter Sheet of Machine

2000/9/18
Vol.5
No.1

SOFTWARE.ver T1.10f~

X- No. User Name.

Axis					
Parameter No	Default	C	X	Y	Z
Pn 000	0000	0000	0001	0001	0001
Pn 001	0000	0000	0000	0000	0000
Pn 002	0000	0000	0000	0000	0000
Pn 003	0002	0002	0002	0002	0002
Pn 004	0000	0000	0000	0000	0000
Pn 005	0000	0000	0000	0000	0000
Pn 100	40	50	80	100	70
Pn 101	2000	1000	8000	10000	1000
Pn 102	40	40	40	40	40
Pn 103	0	666	139	146	977
Pn 104	40	40	40	40	40
Pn 105	2000	2000	2000	2000	2000
Pn 106	40	40	40	40	40
Pn 107	0	0	0	0	0
Pn 108	7	7	7	7	7
Pn 109	0	0	0	0	0
Pn 10A	0	0	0	0	0
Pn 10B	0000	0000	0000	0000	0000
Pn 10C	200	200	200	200	200
Pn 10D	0	0	0	0	0
Pn 10E	0	0	0	0	0
Pn 10F	0	0	0	0	0
Pn 110	0010	0012	0012	0012	0012
Pn 111	100	100	100	100	100
Pn 112	100	100	100	100	100
Pn 113	1000	1000	1000	1000	1000
Pn 114	200	200	200	200	200
Pn 115	32	32	32	32	32
Pn 116	16	16	16	16	16
Pn 117	100	100	100	100	100
Pn 118	100	100	100	100	100
Pn 119	50	50	50	50	50
Pn 11A	1000	1000	1000	1000	1000
Pn 11B	50	50	50	50	50
Pn 11C	70	70	70	70	70
Pn 11D	100	100	100	100	100
Pn 11D	100	100	100	100	100

Axis					
Parameter No	Default	C	X	Y	Z
Pn 11E	100	100	100	100	100
Pn 11F	0	0	0	0	0
Pn 120	0	0	0	0	0
Pn 121	50	50	50	50	50
Pn 122	0	0	0	0	0
Pn 123	0	0	0	0	0
Pn 124	0	100	0	0	0
Pn 200	0000	0000	0000	0000	0000
Pn 201	16384	1500	2500	2500	750
Pn 202	4	4	4	4	4
Pn 203	1	1	1	1	1
Pn 204	0	0	0	0	0
Pn 205	65535	1	65535	65535	65535
Pn 206	16384	16384	16384	16384	16384
Pn 207	0000	0000	0000	0000	0000
Pn 208	0	0	0	0	0
Pn 300	600	600	600	600	600
Pn 301	100	100	100	100	100
Pn 302	200	200	200	200	200
Pn 303	300	300	300	300	300
Pn 304	500	500	500	500	500
Pn 305	0	0	0	0	0
Pn 306	0	0	0	0	0
Pn 307	40	0	0	0	0
Pn 308	0	0	0	0	0
Pn 400	30	30	30	30	30
Pn 401	100	150	40	50	60
Pn 402	800	800	800	800	800
Pn 403	800	800	800	800	800
Pn 404	100	100	100	100	100
Pn 405	100	100	100	100	100
Pn 406	800	800	800	800	800
Pn 407	10000	10000	10000	10000	10000
Pn 408	0000	0000	0001	0000	0000
Pn 409	2000	2000	850	2000	2000
Pn 500	7	7	7	7	7
Pn 500	7	7	7	7	7

Axis					
Parameter No	Default	C	X	Y	Z
Pn 501	10	10	10	10	10
Pn 502	20	20	20	20	20
Pn 503	10	10	10	10	10
Pn 504	7	7	7	7	7
Pn 505	1024	1024	1024	1024	1024
Pn 506	0	0	0	0	0
Pn 507	100	100	100	100	100
Pn 508	50	50	50	50	50
Pn 509	20	20	20	20	20
Pn 50A	2100	8101	8100	8100	8100
Pn 50B	6543	6548	6548	6548	6548
Pn 50C	8888	8888	8888	8888	8888
Pn 50D	8888	8C88	8888	8888	8888
Pn 50E	3211	3211	3211	3211	3211
Pn 50F	0000	0000	0000	0000	0000
Pn 510	0000	0000	0000	0000	0000
Pn 511	8888	8888	8888	8888	8888
Pn 512	0000	0000	0000	0000	0000
Pn 600	0	22	60	40	0
Pn 601	0	0	0	0	0

CP732E SERVO AMP. PARAMETER

Standard Parameter Sheet of Machine

2000/9/18
Vol.5
No.2

SOFTWARE.ver T1.10f~

X- No. User Name.

Axis							
Parameter No	Default	PQ	FQ	RQ	NC	D	NZ
Pn 000	0000	0000	0000	0000	0001	0000	0001
Pn 001	0000	0000	0000	0000	0000	0000	0000
Pn 002	0000	0000	0000	0000	0000	0000	0000
Pn 003	0002	0002	0002	0002	0002	0002	0002
Pn 004	0000	0000	0000	0000	0000	0000	0000
Pn 005	0000	0000	0000	0000	0000	0000	0000
Pn 100	40	170	170	170	130	40	100
Pn 101	2000	1000	1000	1000	1000	15000	1000
Pn 102	40	40	40	40	40	40	40
Pn 103	0	620	620	620	150	350	155
Pn 104	40	40	40	40	40	40	40
Pn 105	2000	2000	2000	2000	2000	2000	2000
Pn 106	40	40	40	40	40	40	40
Pn 107	0	0	0	0	0	0	0
Pn 108	7	7	7	7	7	7	7
Pn 109	0	0	0	0	0	0	0
Pn 10A	0	0	0	0	0	0	0
Pn 10B	0000	0000	0000	0000	0000	0000	0000
Pn 10C	200	200	200	200	200	200	200
Pn 10D	0	0	0	0	0	0	0
Pn 10E	0	0	0	0	0	0	0
Pn 10F	0	0	0	0	0	0	0
Pn 110	0010	0012	0012	0012	0012	0012	0012
Pn 111	100	100	100	100	100	100	100
Pn 112	100	100	100	100	100	100	100
Pn 113	1000	1000	1000	1000	1000	1000	1000
Pn 114	200	200	200	200	200	200	200
Pn 115	32	32	32	32	32	32	32
Pn 116	16	16	16	16	16	16	16
Pn 117	100	100	100	100	100	100	100
Pn 118	100	100	100	100	100	100	100
Pn 119	50	50	50	50	50	50	50
Pn 11A	1000	1000	1000	1000	1000	1000	1000
Pn 11B	50	50	50	50	50	50	50
Pn 11C	70	70	70	70	70	70	70
Pn 11D	100	100	100	100	100	100	100

Axis							
Parameter No	Default	PQ	FQ	RQ	NC	D	NZ
Pn 11E	100	100	100	100	100	100	100
Pn 11F	0	0	0	0	0	0	0
Pn 120	0	0	0	0	0	0	0
Pn 121	50	50	50	50	50	50	50
Pn 122	0	0	0	0	0	0	0
Pn 123	0	0	0	0	0	0	0
Pn 124	0	0	0	0	0	0	0
Pn 200	0000	0000	0000	0000	0000	0000	0000
Pn 201	16384	1800	1800	1800	1800	2500	750
Pn 202	4	4	4	4	4	4	4
Pn 203	1	1	1	1	1	1	1
Pn 204	0	0	0	0	0	0	0
Pn 205	65535	0	0	0	0	65535	65535
Pn 206	16384	16384	16384	16384	16384	16384	16384
Pn 207	0000	0000	0000	0000	0000	0000	0000
Pn 208	0	0	0	0	0	0	0
Pn 300	600	600	600	600	600	600	600
Pn 301	100	100	100	100	100	100	100
Pn 302	200	200	200	200	200	200	200
Pn 303	300	300	300	300	300	300	300
Pn 304	500	500	500	500	500	500	500
Pn 305	0	0	0	0	0	0	0
Pn 306	0	0	0	0	0	0	0
Pn 307	40	0	0	0	0	0	0
Pn 308	0	0	0	0	0	0	0
Pn 400	30	30	30	30	30	30	30
Pn 401	100	50	50	50	50	350	50
Pn 402	800	800	800	800	800	800	800
Pn 403	800	800	800	800	800	800	800
Pn 404	100	100	100	100	100	100	100
Pn 405	100	100	100	100	100	100	100
Pn 406	800	800	800	800	800	800	800
Pn 407	10000	10000	10000	10000	10000	10000	10000
Pn 408	0000	0000	0000	0000	0000	0000	0000
Pn 409	2000	2000	2000	2000	2000	2000	2000
Pn 500	7	7	7	7	7	7	7

Axis							
Parameter No	Default	PQ	FQ	RQ	NC	D	NZ
Pn 501	10	10	10	10	10	10	10
Pn 502	20	20	20	20	20	20	20
Pn 503	10	10	10	10	10	10	10
Pn 504	7	7	7	7	7	7	7
Pn 505	1024	1024	1024	1024	1024	1024	1024
Pn 506	0	0	0	0	0	0	0
Pn 507	100	100	100	100	100	100	100
Pn 508	50	50	50	50	50	50	50
Pn 509	20	20	20	20	20	20	20
Pn 50A	2100	8100	8100	8100	8100	8100	8100
Pn 50B	6543	6548	6548	6548	6548	6548	6548
Pn 50C	8888	8888	8888	8888	8888	8888	8888
Pn 50D	8888	8888	8888	8888	8888	8888	8888
Pn 50E	3211	3211	3211	3211	3211	3211	3211
Pn 50F	0000	0000	0000	0000	0000	0000	0000
Pn 510	0000	0000	0000	0000	0000	0000	0000
Pn 511	8888	8888	8888	8888	8888	8888	8888
Pn 512	0000	0000	0000	0000	0000	0000	0000
Pn 600	0	0	0	0	0	0	0
Pn 601	0	0	0	0	0	0	0

CP742ME SERVO AMP. PARAMETER

Vol.2
No.1

Standard Parameter Sheet of Machine

SOFTWARE.ver V1.10~

X- No. User Name.

Axis					
Parameter No	Default	C	X	Y	Z
Pn 000	0000	0000	0001	0001	0001
Pn 001	0000	0000	0000	0000	0000
Pn 002	0000	0000	0000	0000	0000
Pn 003	0002	0002	0002	0002	0002
Pn 004	0000	0000	0000	0000	0000
Pn 005	0000	0000	0000	0000	0000
Pn 100	40	50	90	80	30
Pn 101	2000	1000	10000	10000	1000
Pn 102	40	40	40	40	40
Pn 103	0	666	164	248	977
Pn 104	40	40	40	40	40
Pn 105	2000	2000	2000	2000	2000
Pn 106	40	40	40	40	40
Pn 107	0	0	0	0	0
Pn 108	7	7	7	7	7
Pn 109	0	0	0	0	0
Pn 10A	0	0	0	0	0
Pn 10B	0000	0000	0000	0000	0000
Pn 10C	200	200	200	200	200
Pn 10D	0	0	0	0	0
Pn 10E	0	0	0	0	0
Pn 10F	0	0	0	0	0
Pn 110	0010	0012	0012	0012	0012
Pn 111	100	100	100	100	100
Pn 112	100	100	100	100	100
Pn 113	1000	1000	1000	1000	1000
Pn 114	200	200	200	200	200
Pn 115	32	32	32	32	32
Pn 116	16	16	16	16	16
Pn 117	100	100	100	100	100
Pn 118	100	100	100	100	100
Pn 119	50	50	50	50	50
Pn 11A	1000	1000	1000	1000	1000
Pn 11B	50	50	50	50	50
Pn 11C	70	70	70	70	70
Pn 11D	100	100	100	100	100

Axis					
Parameter No	Default	C	X	Y	Z
Pn 11E	100	100	100	100	100
Pn 11F	0	0	0	0	0
Pn 120	0	0	0	0	0
Pn 121	50	50	50	50	50
Pn 122	0	0	0	0	0
Pn 123	0	0	0	0	0
Pn 124	0	100	0	0	0
Pn 200	0000	0000	0000	0000	0000
Pn 201	16384	1500	3125	3125	750
Pn 202	4	4	4	4	4
Pn 203	1	1	1	1	1
Pn 204	0	0	0	0	0
Pn 205	65535	1	65535	65535	65535
Pn 206	16384	16384	16384	16384	16384
Pn 207	0000	0000	0000	0000	0000
Pn 208	0	0	0	0	0
Pn 300	600	600	600	600	600
Pn 301	100	100	100	100	100
Pn 302	200	200	200	200	200
Pn 303	300	300	300	300	300
Pn 304	500	500	500	500	500
Pn 305	0	0	0	0	0
Pn 306	0	0	0	0	0
Pn 307	40	0	0	0	0
Pn 308	0	0	0	0	0
Pn 400	30	30	30	30	30
Pn 401	100	150	40	40	70
Pn 402	800	800	800	800	800
Pn 403	800	800	800	800	800
Pn 404	100	100	100	100	100
Pn 405	100	100	100	100	100
Pn 406	800	800	800	800	800
Pn 407	10000	10000	10000	10000	10000
Pn 408	0000	0000	0001	0001	0000
Pn 409	2000	2000	850	900	2000
Pn 500	7	7	7	7	7

Axis					
Parameter No	Default	C	X	Y	Z
Pn 501	10	10	10	10	10
Pn 502	20	20	20	20	20
Pn 503	10	10	10	10	10
Pn 504	7	7	7	7	7
Pn 505	1024	1024	1024	1024	1024
Pn 506	0	0	0	0	0
Pn 507	100	100	100	100	100
Pn 508	50	50	50	50	50
Pn 509	20	20	20	20	20
Pn 50A	2100	8101	8100	8100	8100
Pn 50B	6543	6548	6548	6548	6548
Pn 50C	8888	8888	8888	8888	8888
Pn 50D	8888	8C88	8888	8888	8888
Pn 50E	3211	3211	3211	3211	3211
Pn 50F	0000	0000	0000	0000	0000
Pn 510	0000	0000	0000	0000	0000
Pn 511	8888	8888	8888	8888	8888
Pn 512	0000	0000	0000	0000	0000
Pn 600	0	22	44	0	0
Pn 601	0	0	0	0	0

CP742ME SERVO AMP. PARAMETER

Vol.2
No.2

Standard Parameter Sheet of Machine

SOFTWARE.ver V1.10~

X- No. User Name.

Axis							
Parameter No	Default	PQ	FQ	RQ	NC	D	NZ
Pn 000	0000	0000	0000	0000	0001	0000	0001
Pn 001	0000	0000	0000	0000	0000	0000	0000
Pn 002	0000	0000	0000	0000	0000	0000	0000
Pn 003	0002	0002	0002	0002	0002	0002	0002
Pn 004	0000	0000	0000	0000	0000	0000	0000
Pn 005	0000	0000	0000	0000	0000	0000	0000
Pn 100	40	170	170	170	130	40	100
Pn 101	2000	1000	1000	1000	1000	5000	1000
Pn 102	40	40	40	40	40	40	40
Pn 103	0	620	620	620	150	230	155
Pn 104	40	40	40	40	40	40	40
Pn 105	2000	2000	2000	2000	2000	2000	2000
Pn 106	40	40	40	40	40	40	40
Pn 107	0	0	0	0	0	0	0
Pn 108	7	7	7	7	7	7	7
Pn 109	0	0	0	0	0	0	0
Pn 10A	0	0	0	0	0	0	0
Pn 10B	0000	0000	0000	0000	0000	0000	0000
Pn 10C	200	200	200	200	200	200	200
Pn 10D	0	0	0	0	0	0	0
Pn 10E	0	0	0	0	0	0	0
Pn 10F	0	0	0	0	0	0	0
Pn 110	0010	0012	0012	0012	0012	0012	0012
Pn 111	100	100	100	100	100	100	100
Pn 112	100	100	100	100	100	100	100
Pn 113	1000	1000	1000	1000	1000	1000	1000
Pn 114	200	200	200	200	200	200	200
Pn 115	32	32	32	32	32	32	32
Pn 116	16	16	16	16	16	16	16
Pn 117	100	100	100	100	100	100	100
Pn 118	100	100	100	100	100	100	100
Pn 119	50	50	50	50	50	50	50
Pn 11A	1000	1000	1000	1000	1000	1000	1000
Pn 11B	50	50	50	50	50	50	50
Pn 11C	70	70	70	70	70	70	70
Pn 11D	100	100	100	100	100	100	100

Axis							
Parameter No	Default	PQ	FQ	RQ	NC	D	NZ
Pn 11E	100	100	100	100	100	100	100
Pn 11F	0	0	0	0	0	0	0
Pn 120	0	0	0	0	0	0	0
Pn 121	50	50	50	50	50	50	50
Pn 122	0	0	0	0	0	0	0
Pn 123	0	0	0	0	0	0	0
Pn 124	0	0	0	0	0	0	0
Pn 200	0000	0000	0000	0000	0000	0000	0000
Pn 201	16384	1800	1800	1800	1800	2500	750
Pn 202	4	4	4	4	4	4	4
Pn 203	1	1	1	1	1	1	1
Pn 204	0	0	0	0	0	0	0
Pn 205	65535	0	0	0	0	65535	65535
Pn 206	16384	16384	16384	16384	16384	16384	16384
Pn 207	0000	0000	0000	0000	0000	0000	0000
Pn 208	0	0	0	0	0	0	0
Pn 300	600	600	600	600	600	600	600
Pn 301	100	100	100	100	100	100	100
Pn 302	200	200	200	200	200	200	200
Pn 303	300	300	300	300	300	300	300
Pn 304	500	500	500	500	500	500	500
Pn 305	0	0	0	0	0	0	0
Pn 306	0	0	0	0	0	0	0
Pn 307	40	0	0	0	0	0	0
Pn 308	0	0	0	0	0	0	0
Pn 400	30	30	30	30	30	30	30
Pn 401	100	50	50	50	50	200	50
Pn 402	800	800	800	800	800	800	800
Pn 403	800	800	800	800	800	800	800
Pn 404	100	100	100	100	100	100	100
Pn 405	100	100	100	100	100	100	100
Pn 406	800	800	800	800	800	800	800
Pn 407	10000	10000	10000	10000	10000	10000	10000
Pn 408	0000	0000	0000	0000	0000	0001	0000
Pn 409	2000	2000	2000	2000	2000	700	2000
Pn 500	7	7	7	7	7	7	7

Axis							
Parameter No	Default	PQ	FQ	RQ	NC	D	NZ
Pn 501	10	10	10	10	10	10	10
Pn 502	20	20	20	20	20	20	20
Pn 503	10	10	10	10	10	10	10
Pn 504	7	7	7	7	7	7	7
Pn 505	1024	1024	1024	1024	1024	1024	1024
Pn 506	0	0	0	0	0	0	0
Pn 507	100	100	100	100	100	100	100
Pn 508	50	50	50	50	50	50	50
Pn 509	20	20	20	20	20	20	20
Pn 50A	2100	8100	8100	8100	8100	8100	8100
Pn 50B	6543	6548	6548	6548	6548	6548	6548
Pn 50C	8888	8888	8888	8888	8888	8888	8888
Pn 50D	8888	8888	8888	8888	8888	8888	8888
Pn 50E	3211	3211	3211	3211	3211	3211	3211
Pn 50F	0000	0000	0000	0000	0000	0000	0000
Pn 510	0000	0000	0000	0000	0000	0000	0000
Pn 511	8888	8888	8888	8888	8888	8888	8888
Pn 512	0000	0000	0000	0000	0000	0000	0000
Pn 600	0	0	0	0	0	0	0
Pn 601	0	0	0	0	0	0	0

CP742E SERVO AMP. PARAMETER

Standard Parameter Sheet of Machine

Vol.3
No.1

SOFTWARE.ver V1.10~

X- No. User Name.

Axis					
Parameter No	Default	C	X	Y	Z
Pn 000	0000	0000	0001	0001	0001
Pn 001	0000	0000	0000	0000	0000
Pn 002	0000	0000	0000	0000	0000
Pn 003	0002	0002	0002	0002	0002
Pn 004	0000	0000	0000	0000	0000
Pn 005	0000	0000	0000	0000	0000
Pn 100	40	50	90	80	30
Pn 101	2000	1000	10000	10000	1000
Pn 102	40	40	40	40	40
Pn 103	0	666	164	248	977
Pn 104	40	40	40	40	40
Pn 105	2000	2000	2000	2000	2000
Pn 106	40	40	40	40	40
Pn 107	0	0	0	0	0
Pn 108	7	7	7	7	7
Pn 109	0	0	0	0	0
Pn 10A	0	0	0	0	0
Pn 10B	0000	0000	0000	0000	0000
Pn 10C	200	200	200	200	200
Pn 10D	0	0	0	0	0
Pn 10E	0	0	0	0	0
Pn 10F	0	0	0	0	0
Pn 110	0010	0012	0012	0012	0012
Pn 111	100	100	100	100	100
Pn 112	100	100	100	100	100
Pn 113	1000	1000	1000	1000	1000
Pn 114	200	200	200	200	200
Pn 115	32	32	32	32	32
Pn 116	16	16	16	16	16
Pn 117	100	100	100	100	100
Pn 118	100	100	100	100	100
Pn 119	50	50	50	50	50
Pn 11A	1000	1000	1000	1000	1000
Pn 11B	50	50	50	50	50
Pn 11C	70	70	70	70	70
Pn 11D	100	100	100	100	100

Axis					
Parameter No	Default	C	X	Y	Z
Pn 11E	100	100	100	100	100
Pn 11F	0	0	0	0	0
Pn 120	0	0	0	0	0
Pn 121	50	50	50	50	50
Pn 122	0	0	0	0	0
Pn 123	0	0	0	0	0
Pn 124	0	100	0	0	0
Pn 200	0000	0000	0000	0000	0000
Pn 201	16384	1500	3125	3125	750
Pn 202	4	4	4	4	4
Pn 203	1	1	1	1	1
Pn 204	0	0	0	0	0
Pn 205	65535	1	65535	65535	65535
Pn 206	16384	16384	16384	16384	16384
Pn 207	0000	0000	0000	0000	0000
Pn 208	0	0	0	0	0
Pn 300	600	600	600	600	600
Pn 301	100	100	100	100	100
Pn 302	200	200	200	200	200
Pn 303	300	300	300	300	300
Pn 304	500	500	500	500	500
Pn 305	0	0	0	0	0
Pn 306	0	0	0	0	0
Pn 307	40	0	0	0	0
Pn 308	0	0	0	0	0
Pn 400	30	30	30	30	30
Pn 401	100	150	40	40	70
Pn 402	800	800	800	800	800
Pn 403	800	800	800	800	800
Pn 404	100	100	100	100	100
Pn 405	100	100	100	100	100
Pn 406	800	800	800	800	800
Pn 407	10000	10000	10000	10000	10000
Pn 408	0000	0000	0001	0001	0000
Pn 409	2000	2000	850	900	2000
Pn 500	7	7	7	7	7

Axis					
Parameter No	Default	C	X	Y	Z
Pn 501	10	10	10	10	10
Pn 502	20	20	20	20	20
Pn 503	10	10	10	10	10
Pn 504	7	7	7	7	7
Pn 505	1024	1024	1024	1024	1024
Pn 506	0	0	0	0	0
Pn 507	100	100	100	100	100
Pn 508	50	50	50	50	50
Pn 509	20	20	20	20	20
Pn 50A	2100	8101	8100	8100	8100
Pn 50B	6543	6548	6548	6548	6548
Pn 50C	8888	8888	8888	8888	8888
Pn 50D	8888	8C88	8888	8888	8888
Pn 50E	3211	3211	3211	3211	3211
Pn 50F	0000	0000	0000	0000	0000
Pn 510	0000	0000	0000	0000	0000
Pn 511	8888	8888	8888	8888	8888
Pn 512	0000	0000	0000	0000	0000
Pn 600	0	22	44	0	0
Pn 601	0	0	0	0	0

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CP742E SERVO AMP. PARAMETER

Vol.3
No.2

Standard Parameter Sheet of Machine

SOFTWARE.ver V1.10~

X- No. User Name.

Axis							
Parameter No	Default	PQ	FQ	RQ	NC	D	NZ
Pn 000	0000	0000	0000	0000	0001	0001	0001
Pn 001	0000	0000	0000	0000	0000	0000	0000
Pn 002	0000	0000	0000	0000	0000	0000	0000
Pn 003	0002	0002	0002	0002	0002	0002	0002
Pn 004	0000	0000	0000	0000	0000	0000	0000
Pn 005	0000	0000	0000	0000	0000	0000	0000
Pn 100	40	170	170	170	130	60	100
Pn 101	2000	1000	1000	1000	1000	1000	1000
Pn 102	40	40	40	40	40	40	40
Pn 103	0	620	620	620	150	230	155
Pn 104	40	40	40	40	40	30	40
Pn 105	2000	2000	2000	2000	2000	2000	2000
Pn 106	40	40	40	40	40	40	40
Pn 107	0	0	0	0	0	0	0
Pn 108	7	7	7	7	7	7	7
Pn 109	0	0	0	0	0	0	0
Pn 10A	0	0	0	0	0	0	0
Pn 10B	0000	0000	0000	0000	0000	0000	0000
Pn 10C	200	200	200	200	200	200	200
Pn 10D	0	0	0	0	0	0	0
Pn 10E	0	0	0	0	0	0	0
Pn 10F	0	0	0	0	0	0	0
Pn 110	0010	0012	0012	0012	0012	0012	0012
Pn 111	100	100	100	100	100	100	100
Pn 112	100	100	100	100	100	100	100
Pn 113	1000	1000	1000	1000	1000	1000	1000
Pn 114	200	200	200	200	200	200	200
Pn 115	32	32	32	32	32	32	32
Pn 116	16	16	16	16	16	16	16
Pn 117	100	100	100	100	100	100	100
Pn 118	100	100	100	100	100	100	100
Pn 119	50	50	50	50	50	50	50
Pn 11A	1000	1000	1000	1000	1000	1000	1000
Pn 11B	50	50	50	50	50	50	50
Pn 11C	70	70	70	70	70	70	70
Pn 11D	100	100	100	100	100	100	100

Axis							
Parameter No	Default	PQ	FQ	RQ	NC	D	NZ
Pn 11E	100	100	100	100	100	100	100
Pn 11F	0	0	0	0	0	0	0
Pn 120	0	0	0	0	0	0	0
Pn 121	50	50	50	50	50	50	50
Pn 122	0	0	0	0	0	0	0
Pn 123	0	0	0	0	0	0	0
Pn 124	0	0	0	0	0	50	0
Pn 200	0000	0000	0000	0000	0000	0000	0000
Pn 201	16384	1800	1800	1800	1800	2000	750
Pn 202	4	4	4	4	4	4	4
Pn 203	1	1	1	1	1	1	1
Pn 204	0	0	0	0	0	0	0
Pn 205	65535	0	0	0	0	65535	65535
Pn 206	16384	16384	16384	16384	16384	16384	16384
Pn 207	0000	0000	0000	0000	0000	0000	0000
Pn 208	0	0	0	0	0	0	0
Pn 300	600	600	600	600	600	600	600
Pn 301	100	100	100	100	100	100	100
Pn 302	200	200	200	200	200	200	200
Pn 303	300	300	300	300	300	300	300
Pn 304	500	500	500	500	500	500	500
Pn 305	0	0	0	0	0	0	0
Pn 306	0	0	0	0	0	0	0
Pn 307	40	0	0	0	0	0	0
Pn 308	0	0	0	0	0	0	0
Pn 400	30	30	30	30	30	30	30
Pn 401	100	50	50	50	50	150	50
Pn 402	800	800	800	800	800	800	800
Pn 403	800	800	800	800	800	800	800
Pn 404	100	100	100	100	100	100	100
Pn 405	100	100	100	100	100	100	100
Pn 406	800	800	800	800	800	800	800
Pn 407	10000	10000	10000	10000	10000	10000	10000
Pn 408	0000	0000	0000	0000	0000	0000	0000
Pn 409	2000	2000	2000	2000	2000	2000	2000
Pn 500	7	7	7	7	7	7	7

Axis							
Parameter No	Default	PQ	FQ	RQ	NC	D	NZ
Pn 501	10	10	10	10	10	10	10
Pn 502	20	20	20	20	20	20	20
Pn 503	10	10	10	10	10	10	10
Pn 504	7	7	7	7	7	7	7
Pn 505	1024	1024	1024	1024	1024	1024	1024
Pn 506	0	0	0	0	0	0	0
Pn 507	100	100	100	100	100	100	100
Pn 508	50	50	50	50	50	50	50
Pn 509	20	20	20	20	20	20	20
Pn 50A	2100	8100	8100	8100	8100	8101	8100
Pn 50B	6543	6548	6548	6548	6548	6548	6548
Pn 50C	8888	8888	8888	8888	8888	8888	8888
Pn 50D	8888	8888	8888	8888	8888	8C88	8888
Pn 50E	3211	3211	3211	3211	3211	3211	3211
Pn 50F	0000	0000	0000	0000	0000	0000	0000
Pn 510	0000	0000	0000	0000	0000	0000	0000
Pn 511	8888	8888	8888	8888	8888	8888	8888
Pn 512	0000	0000	0000	0000	0000	0000	0000
Pn 600	0	0	0	0	0	22	0
Pn 601	0	0	0	0	0	0	0

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CP733E SERVO AMP. PARAMETER

Vol.1
No.1

Standard Parameter Sheet of Machine

SOFTWARE.ver V1.00 ~

X- No. User Name.

Axis					
Parameter No	Default	C	X	Y	Z
Pn 000	0000	0000	0001	0001	0001
Pn 001	0000	0000	0000	0000	0000
Pn 002	0000	0000	0000	0000	0000
Pn 003	0002	0002	0002	0002	0002
Pn 004	0000	0000	0000	0000	0000
Pn 005	0000	0000	0000	0000	0000
Pn 100	40	50	80	100	70
Pn 101	2000	1000	8000	10000	1000
Pn 102	40	40	40	40	40
Pn 103	0	666	139	146	977
Pn 104	40	40	40	40	40
Pn 105	2000	2000	2000	2000	2000
Pn 106	40	40	40	40	40
Pn 107	0	0	0	0	0
Pn 108	7	7	7	7	7
Pn 109	0	0	0	0	0
Pn 10A	0	0	0	0	0
Pn 10B	0000	0000	0000	0000	0000
Pn 10C	200	200	200	200	200
Pn 10D	0	0	0	0	0
Pn 10E	0	0	0	0	0
Pn 10F	0	0	0	0	0
Pn 110	0010	0012	0012	0012	0012
Pn 111	100	100	100	100	100
Pn 112	100	100	100	100	100
Pn 113	1000	1000	1000	1000	1000
Pn 114	200	200	200	200	200
Pn 115	32	32	32	32	32
Pn 116	16	16	16	16	16
Pn 117	100	100	100	100	100
Pn 118	100	100	100	100	100
Pn 119	50	50	50	50	50
Pn 11A	1000	1000	1000	1000	1000
Pn 11B	50	50	50	50	50
Pn 11C	70	70	70	70	70
Pn 11D	100	100	100	100	100

Axis					
Parameter No	Default	C	X	Y	Z
Pn 11E	100	100	100	100	100
Pn 11F	0	0	0	0	0
Pn 120	0	0	0	0	0
Pn 121	50	50	50	50	50
Pn 122	0	0	0	0	0
Pn 123	0	0	0	0	0
Pn 124	0	100	0	0	0
Pn 200	0000	0000	0000	0000	0000
Pn 201	16384	1500	2500	2500	750
Pn 202	4	4	4	4	4
Pn 203	1	1	1	1	1
Pn 204	0	0	0	0	0
Pn 205	65535	1	65535	65535	65535
Pn 206	16384	16384	16384	16384	16384
Pn 207	0000	0000	0000	0000	0000
Pn 208	0	0	0	0	0
Pn 300	600	600	600	600	600
Pn 301	100	100	100	100	100
Pn 302	200	200	200	200	200
Pn 303	300	300	300	300	300
Pn 304	500	500	500	500	500
Pn 305	0	0	0	0	0
Pn 306	0	0	0	0	0
Pn 307	40	0	0	0	0
Pn 308	0	0	0	0	0
Pn 400	30	30	30	30	30
Pn 401	100	150	40	50	60
Pn 402	800	800	800	800	800
Pn 403	800	800	800	800	800
Pn 404	100	100	100	100	100
Pn 405	100	100	100	100	100
Pn 406	800	800	800	800	800
Pn 407	10000	10000	10000	10000	10000
Pn 408	0000	0000	0001	0000	0000
Pn 409	2000	2000	850	2000	2000
Pn 500	7	7	7	7	7

Axis					
Parameter No	Default	C	X	Y	Z
Pn 501	10	10	10	10	10
Pn 502	20	20	20	20	20
Pn 503	10	10	10	10	10
Pn 504	7	7	7	7	7
Pn 505	1024	1024	1024	1024	1024
Pn 506	0	0	0	0	0
Pn 507	100	100	100	100	100
Pn 508	50	50	50	50	50
Pn 509	20	20	20	20	20
Pn 50A	2100	8101	8100	8100	8100
Pn 50B	6543	6548	6548	6548	6548
Pn 50C	8888	8888	8888	8888	8888
Pn 50D	8888	8C88	8888	8888	8888
Pn 50E	3211	3211	3211	3211	3211
Pn 50F	0000	0000	0000	0000	0000
Pn 510	0000	0000	0000	0000	0000
Pn 511	8888	8888	8888	8888	8888
Pn 512	0000	0000	0000	0000	0000
Pn 600	0	22	60	40	0
Pn 601	0	0	0	0	0

CP733E SERVO AMP. PARAMETER

Vol.1
No.2

Standard Parameter Sheet of Machine

SOFTWARE.ver V1.00 ~

X- No. User Name.

Axis							
Parameter No	Default	PQ	FQ	RQ	NC	D	NZ
Pn 000	0000	0000	0000	0000	0001	0000	0001
Pn 001	0000	0000	0000	0000	0000	0000	0000
Pn 002	0000	0000	0000	0000	0000	0000	0000
Pn 003	0002	0002	0002	0002	0002	0002	0002
Pn 004	0000	0000	0000	0000	0000	0000	0000
Pn 005	0000	0000	0000	0000	0000	0000	0000
Pn 100	40	170	170	170	130	40	100
Pn 101	2000	1000	1000	1000	1000	2000	1000
Pn 102	40	40	40	40	40	40	40
Pn 103	0	620	620	620	150	350	155
Pn 104	40	40	40	40	40	30	40
Pn 105	2000	2000	2000	2000	2000	2000	2000
Pn 106	40	40	40	40	40	40	40
Pn 107	0	0	0	0	0	0	0
Pn 108	7	7	7	7	7	7	7
Pn 109	0	0	0	0	0	0	0
Pn 10A	0	0	0	0	0	0	0
Pn 10B	0000	0000	0000	0000	0000	0000	0000
Pn 10C	200	200	200	200	200	200	200
Pn 10D	0	0	0	0	0	0	0
Pn 10E	0	0	0	0	0	0	0
Pn 10F	0	0	0	0	0	0	0
Pn 110	0010	0012	0012	0012	0012	0012	0012
Pn 111	100	100	100	100	100	100	100
Pn 112	100	100	100	100	100	100	100
Pn 113	1000	1000	1000	1000	1000	1000	1000
Pn 114	200	200	200	200	200	200	200
Pn 115	32	32	32	32	32	32	32
Pn 116	16	16	16	16	16	16	16
Pn 117	100	100	100	100	100	100	100
Pn 118	100	100	100	100	100	100	100
Pn 119	50	50	50	50	50	50	50
Pn 11A	1000	1000	1000	1000	1000	1000	1000
Pn 11B	50	50	50	50	50	50	50
Pn 11C	70	70	70	70	70	70	70
Pn 11D	100	100	100	100	100	100	100

Axis							
Parameter No	Default	PQ	FQ	RQ	NC	D	NZ
Pn 11E	100	100	100	100	100	100	100
Pn 11F	0	0	0	0	0	0	0
Pn 120	0	0	0	0	0	0	0
Pn 121	50	50	50	50	50	50	50
Pn 122	0	0	0	0	0	0	0
Pn 123	0	0	0	0	0	0	0
Pn 124	0	0	0	0	0	50	0
Pn 200	0000	0000	0000	0000	0000	0000	0000
Pn 201	16384	1800	1800	1800	1800	2500	750
Pn 202	4	4	4	4	4	4	4
Pn 203	1	1	1	1	1	1	1
Pn 204	0	0	0	0	0	0	0
Pn 205	65535	0	0	0	0	65535	65535
Pn 206	16384	16384	16384	16384	16384	16384	16384
Pn 207	0000	0000	0000	0000	0000	0000	0000
Pn 208	0	0	0	0	0	0	0
Pn 300	600	600	600	600	600	600	600
Pn 301	100	100	100	100	100	100	100
Pn 302	200	200	200	200	200	200	200
Pn 303	300	300	300	300	300	300	300
Pn 304	500	500	500	500	500	500	500
Pn 305	0	0	0	0	0	0	0
Pn 306	0	0	0	0	0	0	0
Pn 307	40	0	0	0	0	0	0
Pn 308	0	0	0	0	0	0	0
Pn 400	30	30	30	30	30	30	30
Pn 401	100	50	50	50	50	200	50
Pn 402	800	800	800	800	800	800	800
Pn 403	800	800	800	800	800	800	800
Pn 404	100	100	100	100	100	100	100
Pn 405	100	100	100	100	100	100	100
Pn 406	800	800	800	800	800	800	800
Pn 407	10000	10000	10000	10000	10000	10000	10000
Pn 408	0000	0000	0000	0000	0000	0001	0000
Pn 409	2000	2000	2000	2000	2000	900	2000
Pn 500	7	7	7	7	7	7	7

Axis							
Parameter No	Default	PQ	FQ	RQ	NC	D	NZ
Pn 501	10	10	10	10	10	10	10
Pn 502	20	20	20	20	20	20	20
Pn 503	10	10	10	10	10	10	10
Pn 504	7	7	7	7	7	7	7
Pn 505	1024	1024	1024	1024	1024	1024	1024
Pn 506	0	0	0	0	0	0	0
Pn 507	100	100	100	100	100	100	100
Pn 508	50	50	50	50	50	50	50
Pn 509	20	20	20	20	20	20	20
Pn 50A	2100	8100	8100	8100	8100	8101	8100
Pn 50B	6543	6548	6548	6548	6548	6548	6548
Pn 50C	8888	8888	8888	8888	8888	8888	8888
Pn 50D	8888	8888	8888	8888	8888	8C88	8888
Pn 50E	3211	3211	3211	3211	3211	3211	3211
Pn 50F	0000	0000	0000	0000	0000	0000	0000
Pn 510	0000	0000	0000	0000	0000	0000	0000
Pn 511	8888	8888	8888	8888	8888	8888	8888
Pn 512	0000	0000	0000	0000	0000	0000	0000
Pn 600	0	0	0	0	0	0	0
Pn 601	0	0	0	0	0	0	0

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Vol.1
No.1

Standard Parameter Sheet of Machine

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X- No. User Name.

Axis					
Parameter No	Default	C	X	Y	Z
Pn 000	0000	0000	0001	0001	0001
Pn 001	0000	0000	0000	0000	0000
Pn 002	0000	0000	0000	0000	0000
Pn 003	0002	0002	0002	0002	0002
Pn 004	0000	0000	0000	0000	0000
Pn 005	0000	0000	0000	0000	0000
Pn 100	40	50	90	80	30
Pn 101	2000	1000	10000	10000	1000
Pn 102	40	40	40	40	40
Pn 103	0	666	164	248	977
Pn 104	40	40	40	40	40
Pn 105	2000	2000	2000	2000	2000
Pn 106	40	40	40	40	40
Pn 107	0	0	0	0	0
Pn 108	7	7	7	7	7
Pn 109	0	0	0	0	0
Pn 10A	0	0	0	0	0
Pn 10B	0000	0000	0000	0000	0000
Pn 10C	200	200	200	200	200
Pn 10D	0	0	0	0	0
Pn 10E	0	0	0	0	0
Pn 10F	0	0	0	0	0
Pn 110	0010	0012	0012	0012	0012
Pn 111	100	100	100	100	100
Pn 112	100	100	100	100	100
Pn 113	1000	1000	1000	1000	1000
Pn 114	200	200	200	200	200
Pn 115	32	32	32	32	32
Pn 116	16	16	16	16	16
Pn 117	100	100	100	100	100
Pn 118	100	100	100	100	100
Pn 119	50	50	50	50	50
Pn 11A	1000	1000	1000	1000	1000
Pn 11B	50	50	50	50	50
Pn 11C	70	70	70	70	70
Pn 11D	100	100	100	100	100

Axis					
Parameter No	Default	C	X	Y	Z
Pn 11E	100	100	100	100	100
Pn 11F	0	0	0	0	0
Pn 120	0	0	0	0	0
Pn 121	50	50	50	50	50
Pn 122	0	0	0	0	0
Pn 123	0	0	0	0	0
Pn 124	0	100	0	0	0
Pn 200	0000	0000	0000	0000	0000
Pn 201	16384	1500	3125	3125	750
Pn 202	4	4	4	4	4
Pn 203	1	1	1	1	1
Pn 204	0	0	0	0	0
Pn 205	65535	1	65535	65535	65535
Pn 206	16384	16384	16384	16384	16384
Pn 207	0000	0000	0000	0000	0000
Pn 208	0	0	0	0	0
Pn 300	600	600	600	600	600
Pn 301	100	100	100	100	100
Pn 302	200	200	200	200	200
Pn 303	300	300	300	300	300
Pn 304	500	500	500	500	500
Pn 305	0	0	0	0	0
Pn 306	0	0	0	0	0
Pn 307	40	0	0	0	0
Pn 308	0	0	0	0	0
Pn 400	30	30	30	30	30
Pn 401	100	150	40	40	70
Pn 402	800	800	800	800	800
Pn 403	800	800	800	800	800
Pn 404	100	100	100	100	100
Pn 405	100	100	100	100	100
Pn 406	800	800	800	800	800
Pn 407	10000	10000	10000	10000	10000
Pn 408	0000	0000	0001	0001	0000
Pn 409	2000	2000	850	900	2000
Pn 500	7	7	7	7	7

Axis					
Parameter No	Default	C	X	Y	Z
Pn 501	10	10	10	10	10
Pn 502	20	20	20	20	20
Pn 503	10	10	10	10	10
Pn 504	7	7	7	7	7
Pn 505	1024	1024	1024	1024	1024
Pn 506	0	0	0	0	0
Pn 507	100	100	100	100	100
Pn 508	50	50	50	50	50
Pn 509	20	20	20	20	20
Pn 50A	2100	8101	8100	8100	8100
Pn 50B	6543	6548	6548	6548	6548
Pn 50C	8888	8888	8888	8888	8888
Pn 50D	8888	8C88	8888	8888	8888
Pn 50E	3211	3211	3211	3211	3211
Pn 50F	0000	0000	0000	0000	0000
Pn 510	0000	0000	0000	0000	0000
Pn 511	8888	8888	8888	8888	8888
Pn 512	0000	0000	0000	0000	0000
Pn 600	0	22	44	0	0
Pn 601	0	0	0	0	0

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No.2

Standard Parameter Sheet of Machine

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X- No. User Name.

Axis							
Parameter No	Default	PQ	FQ	RQ	NC	D	NZ
Pn 000	0000	0000	0000	0000	0001	0000	0001
Pn 001	0000	0000	0000	0000	0000	0000	0000
Pn 002	0000	0000	0000	0000	0000	0000	0000
Pn 003	0002	0002	0002	0002	0002	0002	0002
Pn 004	0000	0000	0000	0000	0000	0000	0000
Pn 005	0000	0000	0000	0000	0000	0000	0000
Pn 100	40	170	170	170	130	40	100
Pn 101	2000	1000	1000	1000	1000	5000	1000
Pn 102	40	40	40	40	40	40	40
Pn 103	0	620	620	620	150	230	155
Pn 104	40	40	40	40	40	40	40
Pn 105	2000	2000	2000	2000	2000	2000	2000
Pn 106	40	40	40	40	40	40	40
Pn 107	0	0	0	0	0	0	0
Pn 108	7	7	7	7	7	7	7
Pn 109	0	0	0	0	0	0	0
Pn 10A	0	0	0	0	0	0	0
Pn 10B	0000	0000	0000	0000	0000	0000	0000
Pn 10C	200	200	200	200	200	200	200
Pn 10D	0	0	0	0	0	0	0
Pn 10E	0	0	0	0	0	0	0
Pn 10F	0	0	0	0	0	0	0
Pn 110	0010	0012	0012	0012	0012	0012	0012
Pn 111	100	100	100	100	100	100	100
Pn 112	100	100	100	100	100	100	100
Pn 113	1000	1000	1000	1000	1000	1000	1000
Pn 114	200	200	200	200	200	200	200
Pn 115	32	32	32	32	32	32	32
Pn 116	16	16	16	16	16	16	16
Pn 117	100	100	100	100	100	100	100
Pn 118	100	100	100	100	100	100	100
Pn 119	50	50	50	50	50	50	50
Pn 11A	1000	1000	1000	1000	1000	1000	1000
Pn 11B	50	50	50	50	50	50	50
Pn 11C	70	70	70	70	70	70	70
Pn 11D	100	100	100	100	100	100	100

Axis							
Parameter No	Default	PQ	FQ	RQ	NC	D	NZ
Pn 11E	100	100	100	100	100	100	100
Pn 11F	0	0	0	0	0	0	0
Pn 120	0	0	0	0	0	0	0
Pn 121	50	50	50	50	50	50	50
Pn 122	0	0	0	0	0	0	0
Pn 123	0	0	0	0	0	0	0
Pn 124	0	0	0	0	0	0	0
Pn 200	0000	0000	0000	0000	0000	0000	0000
Pn 201	16384	1800	1800	1800	1800	2500	750
Pn 202	4	4	4	4	4	4	4
Pn 203	1	1	1	1	1	1	1
Pn 204	0	0	0	0	0	0	0
Pn 205	65535	0	0	0	0	65535	65535
Pn 206	16384	16384	16384	16384	16384	16384	16384
Pn 207	0000	0000	0000	0000	0000	0000	0000
Pn 208	0	0	0	0	0	0	0
Pn 300	600	600	600	600	600	600	600
Pn 301	100	100	100	100	100	100	100
Pn 302	200	200	200	200	200	200	200
Pn 303	300	300	300	300	300	300	300
Pn 304	500	500	500	500	500	500	500
Pn 305	0	0	0	0	0	0	0
Pn 306	0	0	0	0	0	0	0
Pn 307	40	0	0	0	0	0	0
Pn 308	0	0	0	0	0	0	0
Pn 400	30	30	30	30	30	30	30
Pn 401	100	50	50	50	50	200	50
Pn 402	800	800	800	800	800	800	800
Pn 403	800	800	800	800	800	800	800
Pn 404	100	100	100	100	100	100	100
Pn 405	100	100	100	100	100	100	100
Pn 406	800	800	800	800	800	800	800
Pn 407	10000	10000	10000	10000	10000	10000	10000
Pn 408	0000	0000	0000	0000	0000	0001	0000
Pn 409	2000	2000	2000	2000	2000	700	2000
Pn 500	7	7	7	7	7	7	7

Axis							
Parameter No	Default	PQ	FQ	RQ	NC	D	NZ
Pn 501	10	10	10	10	10	10	10
Pn 502	20	20	20	20	20	20	20
Pn 503	10	10	10	10	10	10	10
Pn 504	7	7	7	7	7	7	7
Pn 505	1024	1024	1024	1024	1024	1024	1024
Pn 506	0	0	0	0	0	0	0
Pn 507	100	100	100	100	100	100	100
Pn 508	50	50	50	50	50	50	50
Pn 509	20	20	20	20	20	20	20
Pn 50A	2100	8100	8100	8100	8100	8100	8100
Pn 50B	6543	6548	6548	6548	6548	6548	6548
Pn 50C	8888	8888	8888	8888	8888	8888	8888
Pn 50D	8888	8888	8888	8888	8888	8888	8888
Pn 50E	3211	3211	3211	3211	3211	3211	3211
Pn 50F	0000	0000	0000	0000	0000	0000	0000
Pn 510	0000	0000	0000	0000	0000	0000	0000
Pn 511	8888	8888	8888	8888	8888	8888	8888
Pn 512	0000	0000	0000	0000	0000	0000	0000
Pn 600	0	0	0	0	0	0	0
Pn 601	0	0	0	0	0	0	0

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Vol.1
No.1

Standard Parameter Sheet of Machine

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X- No. User Name.

Axis					
Parameter No	Default	C	X	Y	Z
Pn 000	0000	0000	0001	0001	0001
Pn 001	0000	0000	0000	0000	0000
Pn 002	0000	0000	0000	0000	0000
Pn 003	0002	0002	0002	0002	0002
Pn 004	0000	0000	0000	0000	0000
Pn 005	0000	0000	0000	0000	0000
Pn 100	40	50	90	80	30
Pn 101	2000	1000	10000	10000	1000
Pn 102	40	40	40	40	40
Pn 103	0	666	164	248	977
Pn 104	40	40	40	40	40
Pn 105	2000	2000	2000	2000	2000
Pn 106	40	40	40	40	40
Pn 107	0	0	0	0	0
Pn 108	7	7	7	7	7
Pn 109	0	0	0	0	0
Pn 10A	0	0	0	0	0
Pn 10B	0000	0000	0000	0000	0000
Pn 10C	200	200	200	200	200
Pn 10D	0	0	0	0	0
Pn 10E	0	0	0	0	0
Pn 10F	0	0	0	0	0
Pn 110	0010	0012	0012	0012	0012
Pn 111	100	100	100	100	100
Pn 112	100	100	100	100	100
Pn 113	1000	1000	1000	1000	1000
Pn 114	200	200	200	200	200
Pn 115	32	32	32	32	32
Pn 116	16	16	16	16	16
Pn 117	100	100	100	100	100
Pn 118	100	100	100	100	100
Pn 119	50	50	50	50	50
Pn 11A	1000	1000	1000	1000	1000
Pn 11B	50	50	50	50	50
Pn 11C	70	70	70	70	70
Pn 11D	100	100	100	100	100

Axis					
Parameter No	Default	C	X	Y	Z
Pn 11E	100	100	100	100	100
Pn 11F	0	0	0	0	0
Pn 120	0	0	0	0	0
Pn 121	50	50	50	50	50
Pn 122	0	0	0	0	0
Pn 123	0	0	0	0	0
Pn 124	0	100	0	0	0
Pn 200	0000	0000	0000	0000	0000
Pn 201	16384	1500	3125	3125	750
Pn 202	4	4	4	4	4
Pn 203	1	1	1	1	1
Pn 204	0	0	0	0	0
Pn 205	65535	1	65535	65535	65535
Pn 206	16384	16384	16384	16384	16384
Pn 207	0000	0000	0000	0000	0000
Pn 208	0	0	0	0	0
Pn 300	600	600	600	600	600
Pn 301	100	100	100	100	100
Pn 302	200	200	200	200	200
Pn 303	300	300	300	300	300
Pn 304	500	500	500	500	500
Pn 305	0	0	0	0	0
Pn 306	0	0	0	0	0
Pn 307	40	0	0	0	0
Pn 308	0	0	0	0	0
Pn 400	30	30	30	30	30
Pn 401	100	150	40	40	70
Pn 402	800	800	800	800	800
Pn 403	800	800	800	800	800
Pn 404	100	100	100	100	100
Pn 405	100	100	100	100	100
Pn 406	800	800	800	800	800
Pn 407	10000	10000	10000	10000	10000
Pn 408	0000	0000	0001	0001	0000
Pn 409	2000	2000	850	900	2000
Pn 500	7	7	7	7	7

Axis					
Parameter No	Default	C	X	Y	Z
Pn 501	10	10	10	10	10
Pn 502	20	20	20	20	20
Pn 503	10	10	10	10	10
Pn 504	7	7	7	7	7
Pn 505	1024	1024	1024	1024	1024
Pn 506	0	0	0	0	0
Pn 507	100	100	100	100	100
Pn 508	50	50	50	50	50
Pn 509	20	20	20	20	20
Pn 50A	2100	8101	8100	8100	8100
Pn 50B	6543	6548	6548	6548	6548
Pn 50C	8888	8888	8888	8888	8888
Pn 50D	8888	8C88	8888	8888	8888
Pn 50E	3211	3211	3211	3211	3211
Pn 50F	0000	0000	0000	0000	0000
Pn 510	0000	0000	0000	0000	0000
Pn 511	8888	8888	8888	8888	8888
Pn 512	0000	0000	0000	0000	0000
Pn 600	0	22	44	0	0
Pn 601	0	0	0	0	0

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Vol.1
No.2

Standard Parameter Sheet of Machine

SOFTWARE.ver V1.00 ~

X- No. User Name.

Axis							
Parameter No	Default	PQ	FQ	RQ	NC	D	NZ
Pn 000	0000	0000	0000	0000	0001	0001	0001
Pn 001	0000	0000	0000	0000	0000	0000	0000
Pn 002	0000	0000	0000	0000	0000	0000	0000
Pn 003	0002	0002	0002	0002	0002	0002	0002
Pn 004	0000	0000	0000	0000	0000	0000	0000
Pn 005	0000	0000	0000	0000	0000	0000	0000
Pn 100	40	170	170	170	130	60	100
Pn 101	2000	1000	1000	1000	1000	1000	1000
Pn 102	40	40	40	40	40	40	40
Pn 103	0	620	620	620	150	230	155
Pn 104	40	40	40	40	40	30	40
Pn 105	2000	2000	2000	2000	2000	2000	2000
Pn 106	40	40	40	40	40	40	40
Pn 107	0	0	0	0	0	0	0
Pn 108	7	7	7	7	7	7	7
Pn 109	0	0	0	0	0	0	0
Pn 10A	0	0	0	0	0	0	0
Pn 10B	0000	0000	0000	0000	0000	0000	0000
Pn 10C	200	200	200	200	200	200	200
Pn 10D	0	0	0	0	0	0	0
Pn 10E	0	0	0	0	0	0	0
Pn 10F	0	0	0	0	0	0	0
Pn 110	0010	0012	0012	0012	0012	0012	0012
Pn 111	100	100	100	100	100	100	100
Pn 112	100	100	100	100	100	100	100
Pn 113	1000	1000	1000	1000	1000	1000	1000
Pn 114	200	200	200	200	200	200	200
Pn 115	32	32	32	32	32	32	32
Pn 116	16	16	16	16	16	16	16
Pn 117	100	100	100	100	100	100	100
Pn 118	100	100	100	100	100	100	100
Pn 119	50	50	50	50	50	50	50
Pn 11A	1000	1000	1000	1000	1000	1000	1000
Pn 11B	50	50	50	50	50	50	50
Pn 11C	70	70	70	70	70	70	70
Pn 11D	100	100	100	100	100	100	100

Axis							
Parameter No	Default	PQ	FQ	RQ	NC	D	NZ
Pn 11E	100	100	100	100	100	100	100
Pn 11F	0	0	0	0	0	0	0
Pn 120	0	0	0	0	0	0	0
Pn 121	50	50	50	50	50	50	50
Pn 122	0	0	0	0	0	0	0
Pn 123	0	0	0	0	0	0	0
Pn 124	0	0	0	0	0	50	0
Pn 200	0000	0000	0000	0000	0000	0000	0000
Pn 201	16384	1800	1800	1800	1800	2000	750
Pn 202	4	4	4	4	4	4	4
Pn 203	1	1	1	1	1	1	1
Pn 204	0	0	0	0	0	0	0
Pn 205	65535	0	0	0	0	65535	65535
Pn 206	16384	16384	16384	16384	16384	16384	16384
Pn 207	0000	0000	0000	0000	0000	0000	0000
Pn 208	0	0	0	0	0	0	0
Pn 300	600	600	600	600	600	600	600
Pn 301	100	100	100	100	100	100	100
Pn 302	200	200	200	200	200	200	200
Pn 303	300	300	300	300	300	300	300
Pn 304	500	500	500	500	500	500	500
Pn 305	0	0	0	0	0	0	0
Pn 306	0	0	0	0	0	0	0
Pn 307	40	0	0	0	0	0	0
Pn 308	0	0	0	0	0	0	0
Pn 400	30	30	30	30	30	30	30
Pn 401	100	50	50	50	50	150	50
Pn 402	800	800	800	800	800	800	800
Pn 403	800	800	800	800	800	800	800
Pn 404	100	100	100	100	100	100	100
Pn 405	100	100	100	100	100	100	100
Pn 406	800	800	800	800	800	800	800
Pn 407	10000	10000	10000	10000	10000	10000	10000
Pn 408	0000	0000	0000	0000	0000	0000	0000
Pn 409	2000	2000	2000	2000	2000	2000	2000
Pn 500	7	7	7	7	7	7	7

Axis							
Parameter No	Default	PQ	FQ	RQ	NC	D	NZ
Pn 501	10	10	10	10	10	10	10
Pn 502	20	20	20	20	20	20	20
Pn 503	10	10	10	10	10	10	10
Pn 504	7	7	7	7	7	7	7
Pn 505	1024	1024	1024	1024	1024	1024	1024
Pn 506	0	0	0	0	0	0	0
Pn 507	100	100	100	100	100	100	100
Pn 508	50	50	50	50	50	50	50
Pn 509	20	20	20	20	20	20	20
Pn 50A	2100	8100	8100	8100	8100	8101	8100
Pn 50B	6543	6548	6548	6548	6548	6548	6548
Pn 50C	8888	8888	8888	8888	8888	8888	8888
Pn 50D	8888	8888	8888	8888	8888	8C88	8888
Pn 50E	3211	3211	3211	3211	3211	3211	3211
Pn 50F	0000	0000	0000	0000	0000	0000	0000
Pn 510	0000	0000	0000	0000	0000	0000	0000
Pn 511	8888	8888	8888	8888	8888	8888	8888
Pn 512	0000	0000	0000	0000	0000	0000	0000
Pn 600	0	0	0	0	0	22	0
Pn 601	0	0	0	0	0	0	0

Supplement 4

Servo Pack Error Code Listing

Fuji Machine Mfg. Co., Ltd.

YASKAWA

SGDM Servodriver Troubleshooting

YASKAWA ELECTRIC CORPORATION
MOTIONCONTROL SYSTEMS
SYSTEM DESIGN SECTION 1

Appr.	Check.	Draw.

1. Feature of SGDM Servopack

For Analog Voltage Reference Input and Reference Pulse Input

Applicable motor：**SGM∗H**

For 30 W to 15kW

For UL standard and CE marking（Applies to Low Voltage Reference and EMC Directive）

2. Alarm Output

The following table shows the alarm indications of SGDM Servopack.

Alarm Indications	Alarm Name
A.02	Parameter Breakdown
A.03	Main Circuit Encoder Error
A.04	Parameter Setting Error
A.05	Combination Error
A.10	Overcurrent or Heat Sink Overheated
A.30	Regenerative Error Detected
A.32	Regenerative Overload
A.40	Overvoltage
A.41	Undervoltage
A.51	Overspeed
A.71	Overload for Instantaneous Maximum Load
A.72	Overload for Continuous Maximum Load
A.73	Dynamic Brake Overload
A.74	Overload of Surge Current Limit Resistor
A.7A	Heat Sink Overheated
A.81	Absolute Encoder Backup Error
A.82	Encoder Checksum Error
A.83	Encoder Battery Error
A.84	Encoder Data Error
A.85	Encoder Overspeed
A.86	Encoder Overheated
A.b1	Reference Speed Input Read Error
A.b2	Reference Torque Input Read Error
A.bF	System Alarm
A.C1	Servo Overrun Detected
A.C8	Absolute Encoder Clear Error and Multi-turn Limit Setting Error
A.C9	Encoder Communications Error
A.CA	Encoder Parameter Error
A.Cb	Encoder Echoback Error
A.CC	Multi-turn Limit Disagreement
A.d0	Position Error Pulse Overflow
A.F1	Power Line Open Phase
CPF00	Digital Operator Transmission Error
CPF01	
A.--	Normal
A.91	Overload
A.92	Regenerative Overload

Alarm	Alarm Name	Status	Cause	Check Item	Remedy
A.02	Parameter Breakdown (Parameter check sum of E^{2}PROM is calculated by initialization. Sum value is not 0.) * Check at power ON.	•Occurs at power ON.	•Servopack power supply malfunctions. •Power is turned OFF while parameter is being written in to E^{2}PROM. •Number of write-in times of E^{2}PROM is excessive. •Servopack defective.	•Does AC power supply sometimes provide 30V to 60V? •Is the power supply turned OFF while the parameter setting is being changed? •Is the power supply turned OFF while an alarm is being written? (It rarely happens.) •Is the setting changed at every scan by master controller? •Is E^{2}PROM, gate alley or CPU defective?	•Restore the power supply and initialize the parameters with Fn005. •Re-input the parameter after initializing parameter with Fn005. •Re-input the parameter after initializing parameter with Fn005. •Change the software of master controller or replace the Servopack. •Replace the Servopack.
A.03	Main Circuit Detector Error (No detector for 6kW)	•Occurs at power ON or during operation	•Servopack power supply malfunctions. •Servopack defective.	•Does AC power supply sometimes provide 30V to 60V? •Is gate alley or LSI for detection defective?	•Restore the AC power supply. •Replace the Servopack.
A.04	Parameter Setting Error (Setting Range Exceeded) *Check at power ON	•Occurs at power ON.	•An out-of-range parameter is set. •Servopack defective.	•Is a wrong parameter loaded? •Is the parameter factory setting value wrong? → Is it the wrong product? (An abnormal value is rejected by digital operator.) •Is any of E^{2}PROM or CPU defective?	•Return to the factory setting. Replace if the error still occurs. •Replace the Servopack. •Replace the Servopack.
A.05	Combination Error (The range of Servomotor capacities that can be combined has been exceeded.) Error occurs in case of (1) or (2). (1) 1/4 ≧ motor/ Servopack (2) 4 ≦ motor/ Servopack * Check at power ON.	•Occurs at power ON.	•Servopack capacity does not match motor capacity. •Encoder parameters have not been written in properly. •Servopack defective.	•Check the combination of Servopack capacity and motor capacity. •Check that the encoder parameters have been written properly. •Servopack defective if nothing is wrong in the above checking.	•Match the Servopack capacity to the motor capacity. •Replace the motor. •Replace the Servopack.
A.10	Overcurrent (Main circuit current exceeds the specified value.) Delayed turning OFF : Approx. 10 μ sec or Heat Sink Overheat (Heat sink overheat exceeds specified value.)	•Occurs at control power ON.	•Servopack detects overcurrent by mistake. •Servopack detects heat sink overheat by mistake. •Failure in electronic overload thermal relay forced reset for overload alarm	•Overcurrent detection circuit failure or malfunction •Servopack board defective or improper connection of the board and thermo-switch •Operation recovered by turning OFF the power and resetting the overload alarm too frequently?	•Replace the Servopack. •Replace the Servopack. •Change the alarm resetting method.
		•Overcurrent occurs at main power ON or during motor operation.	•Grounding •Grounding in motor or motor cable wiring •Grounding in main circuit wiring in Servopack. •Shortcircuit in load •Load shortcircuit in motor or motor cable •Load shortcircuit in main circuit in Servopack •Shortcircuit in arm •Arm shortcircuit: Incorrect IGBT ignition between P and N surge •Arm shortcircuit: Incorrect IGBT ignition by incorrect signal •Arm shortcircuit: Incorrect IGBT ignition by insufficient reverse bias •Arm shortcircuit: in IGBTs •DB circuit defective by excessive load inertia •DB circuit defective by excessive number of revolutions •DB circuit defective by excessive frequency of use of DB •Failure in electronic overload thermal relay forced reset for overload alarm	•Use a tester to check between Servopack phases U, V and W and the ground. •Improper connection between phases U, V and W and ground, shortcircuit between phases or incorrect ground wiring •DB circuit or regenerative circuit resistor or wiring grounding •Use a tester to check between Servopack phases U, V and W. •Use a tester to check between phases U, V and W. •DB malfunction (relay, triac, thyristor) or contamination of foreign matters •Use a tester to check IGBT is not shortcircuited. •Excessive surge between P and N •Imperfect connector contact between CT and board or CT/drive-coupler defective. •Parts defective in reverse bias circuit •Destruction by failure in IGBT alone or improper regenerative circuit wiring •Check the specifications if the load inertia is within the specified value. •Check that the number of revolutions is within the specified value. •Check the specifications if DB is used as frequently as specified. •Operation recovered by turning OFF the power and resetting the overload alarm too frequently?	•Remove the motor leads and check in which side grounding has occurred. •Replace the motor or manually correct the motor cable to eliminate grounding. •Replace the Servopack. •Remove the motor leads and check in which side grounding has occurred. •Replace the motor or manually correct the motor cable to eliminate grounding. •Replace the Servopack. •Replace the Servopack. •Replace the Servopack. •Replace the Servopack. •Replace the Servopack. •Replace the Servopack. •Replace the Servopack. •Replace the Servopack.
		•Heat sink overheat occurs at main power ON or motor operation.	•Excessive load ratio •Servopack ambient temperature exceeds 55°C. •Servopack defective.	•Check the main load or regenerative processing capacity is not exceeded. •Check how the Servopack is mounted (direction, clearance with other devices). (Check that the Servopack does not have any influence of heat discharge from the storage panel or heating from peripheral devices.) •Check that the Servopack fan is operating. •Servopack board defective.	•Recheck the load system. •Reduce the Servopack ambient temperature to 55°C or less. •Replace the Servopack. •Replace the Servopack.
A.30	Regenerative Error Detected (Regenerative transistor turns ON for 400 msec at power ON.)	•Occurs at control power ON.	•Servopack detects the error improperly.	•Detecting circuit defective.	•Replace the Servopack.
		•Occurs at main power ON.	•Wiring to regenerative resistor defective. •Servopack defective.	•Check the wiring to regenerative resistor. •Servopack defective. (Regenerative resistor, detecting section defective.)	•Check the regenerative value and correct the wiring. •Replace the Servopack.
		•Occurs at normal operation.	•Incorrect regenerative resistor wiring •Regenerative resistor disconnected. •Servopack defective.	•Check that wiring to the regenerative resistor is proper. •Check the regenerative resistance value. •Servopack defective. (Regenerative resistor, detecting section defective.)	•Manually correct the wiring of the external regenerative resistor. •Replace the external regenerative resistor. •Replace the Servopack.
A.32	Regenerative overload	•Occurs at control power ON.	•Servopack detects the alarm improperly.	•Detecting circuit defective.	•Replace the Servopack.

Alarm	Alarm Name	Status	Cause	Check Item	Remedy
	"Detected when BGOLsum value exceeds regenerative resistor capacity (W) x2 x100 sec."	•Occurs at normal operation (regenerative resistor temperature rise is large.)	•Load GD^2 duty exceeds regenerative capability. (Pay attention to regeneration of minus load [UP/DOWN axes].)	•Load GD^2 must be at most 5 times as large as the motor GD^2. Is the motor rotating longer for the operation cycle?	•Re-select the operation conditions or regenerative resistor.
		•Occurs at normal operation (regenerative resistor temperature rise is small.)	•Parameter Pn600 set value is not correct when a regenerative resistor is mounted externally. •Servopack defective.	•Check that parameter Pn600 set value is correct. •Servopack defective. (Regenerative resistor, detecting section defective.)	•Set parameter Pn600 correctly. •Replace the Servopack.
		•Occurs at motor deceleration.	•Excessive operational duty	•Re-check the load inertia, number of revolutions or duty.	•Recheck the operation conditions.
A.40	Overvoltage (Detection starts 200ms after turning on the main power for 5.0kW or less and 660ms for 6.0kW or more. Detected when the voltage between main circuit P and N is approx. 420V or more [variation 395 to 430V])	•Occurs at control power ON.	•Servopack detects the error improperly.	•Servopack voltage detecting circuit defective.	•Replace the Servopack.
		•Occurs at main power ON.	•Excessive power supply voltage •Servopack detects the error improperly. •Servopack defective.	•Check AC power supply voltage. (Pay attention to different power supply applied.) •Servopack detecting circuit defective. •Servopack power section (rectifier diode) defective.	•Set the AC power supply voltage to a value in the normal setting range. •Replace the Servopack. •Replace the Servopack.
		•Occurs at normal operation.	•Power supply variation is large and power supply voltage is excessive. •Excessive regenerative voltage •Servopack detects the error improperly. •Servopack defective.	•Check the AC power supply voltage. (Is there excessive voltage variation?) •Check that the load inertia is not excessive or that the number of revolutions is not excessive. (Check the load inertia or minus load specifications.) •Servopack detecting section defective. •Servopack power section (rectifier diode) defective.	•Set the AC power supply voltage to a value in the normal setting range. •Recheck the load inertia and operation conditions. •Replace the Servopack. •Replace the Servopack.
		•Occurs at motor deceleration.	•Excessive regenerative voltage	•Check that the load inertia is not excessive or that the number of revolutions is not excessive.	•Re-check the load inertia or operation conditions.
A.41	Undervoltage Detection starts 660ms after turning on the main power, and detected when the voltage between main circuit P and N is approx. 170V or less [variation 160 to 177V])	•Occurs at control power ON.	•Servopack detects the error improperly.	•Servopack voltage detecting circuit defective.	•Replace the Servopack.
		•Occurs at main power ON.	•Power supply voltage is excessively small. •Servopack fuse blown. •Servopack in-rush current limit resistor is disconnected. •Servopack detects the error improperly. •Servopack defective.	•Check the AC power supply voltage. (Pay attention to different power supply applied.) •Check that the Servopack fuse is not blown. •Also check the power supply voltage when the in-rush current limit resistor is disconnected. •Servopack detecting section defective. •Servopack power section (rectifier diode) defective.	•Set the AC power supply voltage to a value in the normal setting range. •Replace the Servopack. •Replace the Servopack. (Confirm power supply voltage.) •Replace the Servopack. •Replace the Servopack.
		•Occurs at normal operation.	•Power supply variation is large and power supply is reduced. •A momentary power failure occurs at high output. •Voltage is reduced at shortcircuit at the motor side. •Voltage is reduced at shortcircuit at the Servopack side. •Servopack detects the error improperly. •Servopack defective.	•Check the AC power supply voltage. (Is there large voltage drop?) •Check that a momentary power failure has not occurred. •Check for shortcircuit in the motor or motor wiring. •DB circuit malfunction (relay, triac, thyristor) •Servopack detecting section defective. •Servopack power section (rectifier diode) defective.	•Set the AC power supply voltage to a value in the normal setting range. •Re-start the operation by resetting the alarm. •Correct shortcircuit at the motor side. •Replace the Servopack. •Replace the Servopack. •Replace the Servopack.
A.51	Overspeed (Speed > max. r/min for 2ms or more at servo ON.)	•Occurs at control power ON.	•Servopack defective.	•Overspeed detecting circuit defective.	•Replace the Servopack.
		•Occurs at servo ON.	•Incorrect motor wiring •Incorrect encoder wiring •Malfunction by noise on the encoder wiring •Servopack defective.	•Check that the motor rotating direction is correct (phases U, V and W wiring). •Servopack defective if nothing is wrong in the above check.	•Manually correct the motor wiring. •Manually correct the encoder wiring. •Provide some noise preventive measures for the encoder wiring. •Replace the Servopack.
		•Occurs when motor starts running or at high-speed rotation.	•Incorrect motor wiring •Incorrect encoder wiring •Malfunction by noise on the encoder wiring •Excessive input such as position/speed reference, etc. •Incorrect reference input gain setting •Servopack defective.	•Check that the motor rotating direction is correct (phase U, V and W wiring). •Check the input values such as position/speed reference, etc. •Check the set value of parameter (reference input gain). •Servopack defective if nothing is wrong in the above check.	•Manually correct the motor wiring. •Manually correct the encoder wiring. •Provide some noise preventive measures for the encoder wiring. •Reduce the reference values. •Change the reference input gain value. •Replace the Servopack.
A.71	Overload for Instantaneous Maximum Load "Detected when Olsum (integral value is OL level 2 or more". To clear Olsum (integral value), the value must be 100% or less for several seconds.	•Occurs at control power ON.	•Servopack defective.	•Servopack control board defective.	•Replace the Servopack.
		•Occurs at servo ON.	•Incorrect motor wiring (imperfect wiring or connection) •Incorrect encoder wiring (imperfect wiring or connection) •Servopack defective.	•Check that the connnection is correct and that the motor wiring does not have an open phase. •Servopack defective. (IGBT failure, etc.)	•Manually correct the motor wiring. •Manually correct the encoder wiring. •Replace the Servopack.
		•Occurs when the motor did not rotate by reference input.	•Incorrect motor wiring (imperfect wiring or connection) •Incorrect encoder wiring (imperfect wiring or connection) •Load exceeds rated load. •Servopack defective.	•Check that the connnection is correct and that the motor wiring does not have an open phase. •Check the motor current. •Servopack defective. (IGBT failure, etc.)	•Manually correct the motor wiring. •Manually correct the encoder wiring. •Re-examine the load specifications and motor capacity. •Replace the Servopack.
		•Occurs at normal operation.	•Load exceeds rated load. •Temperature in the Servopack storage panel is too high. •Duty cycle exceeds the specified value. •OL alarm is detected improperly immediately after the power supply is turned OFF to reset the alarm. •Servopack defective.	•Check the motor current. •Check that temperature in the Servopack storage panel does not exceed 55°C. •Check that the duty cycle is within the specified value. •Does the motor run immediately after the power supply is turned OFF to reset the OL alarm? •Servopack defective. (IGBT failure, etc.)	•Re-examine the load specifications and motor capacity. •Reduce the temperature in the panel. •Set the duty cycle to a value within specified setting range. •Use the reset PB (electronic overload thermal relay) to reset an OL alarm. •Replace the Servopack.
A.72	Overload for Continuous Maximum Load	•Occurs at control power ON.	•Servopack defective.	•Servopack control board defective.	•Replace the Servopack.

	"Detected when Olsum (integral value is OL level 1 or more". To clear Olsum (integral value), the value must be 100% or less for several seconds.	•Occurs at servo ON.	•Incorrect motor wiring (imperfect wiring or connection) •Incorrect encoder wiring (imperfect wiring or connection) •Servopack defective.	•Check that the connection is correct and that the motor wiring does not have open-phase. •Servopack defective. (IGBT failure, etc.)	•Manually correct the motor wiring. •Manually correct the encoder wiring. •Replace the Servopack.
		•Occurs when the motor did not rotate by reference input.	•Incorrect motor wiring (imperfect wiring or connection) •Incorrect encoder wiring (imperfect wiring or connection) •Load exceeds the rated load. •Servopack defective.	•Check that the connection is correct and that the motor wiring does not have open-phase. •Check the motor current. •Servopack defective. (IGBT failure, etc.)	•Manually correct the motor wiring. •Manually correct the encoder wiring. •Re-examine the load specifications and motor capacity. •Replace the Servopack.
		•Occurs at normal operation.	•Load exceeds the rated load. •Temperature in the Servopack storage panel is too high. •Duty cycle exceeds the specified value. •OL alarm is detected improperly immediately after the power supply is turned OFF to reset the alarm. •Servopack defective.	•Check the motor current. •Check that temperature in the Servopack storage panel does not exceed 55°C. •Check that the duty cycle is within the specified value. •Does the motor run immediately after the power supply is turned OFF to reset the OL alarm? •Servopack defective. (IGBT failure, etc.)	•Re-examine the load specifications and motor capacity. •Reduce the temperature in the panel. •Set the duty cycle to a value within specified setting range. •Use the reset PB (electronic overload thermal relay) to reset an OL alarm. •Replace the Servopack.
A.73	Dynamic Brake Overload "Detected when DBOLsum value exceeds dynamic brake resistor capacity (W) x 2 x500 sec.	•Occurs at control power ON.	•Servopack defective.	•Servopack control board defective.	•Replace the Servopack.
		•Occurs at other than servo OFF during motor operation.	•Servopack defective.	Servopack control board defective.	•Replace the Servopack.
		•Occurs at servo OFF during motor operation.	•Regenerative energy at DB stop exceeds the capacity of the dynamic brake resistor. •Servopack defective.	•Check that the product of the square of rotational speed and the combined inertia of motor and load exceeds the capacity of the dynamic brake resistor. •Servopack control board defective.	•Re-examine the load specifications. [(1) Lower the rotational speed.] [(2) Lower the load inertia.] [(3)Minimize the use of the dynamic brake.] •Replace the Servopack.
A.74	Overload of in-rush Current Limit Resistor "Detected when RSOLsum value is obtained by ON/OFF 10 times per 2 minutes."	•Occurs at control power ON.	•Servopack defective.	•Servopack control board defective.	•Replace the Servopack.
		•Occurs at other than main circuit power supply ON/OFF.	•Servopack defective.	•Servopack control board defective.	•Replace the Servopack.
		•Occurs at main circuit power supply ON/OFF.	•The allowable frequency of in-rush current limit resistor at power ON/OFF is exceeded. •Servopack defective.	•Check that the allowable frequency of in-rush current limit resistor (5 times/min) is not exceeded. •Servopack control board defective.	•Reduce the main circuit power supply ON/OFF frequency to 5 times/min. •Replace the Servopack.
A.7A	Heat Sink Overheated (Servopack heat sink temperature exceeds 95°C.)	•Occurs at control power ON.	•Servopack detects the error improperly. •Failure in electronic overload thermal relay forced reset for overload alarm	•Servopack board defective or improper connection of the board and thermo-switch •Does the motor run immediately after the power supply is turned OFF to reset the OL alarm?	•Replace the Servopack. •Change the alarm resetting method.
		•Heat sink overheat occurs at power ON or during motor operation.	•Load ratio is excessive. •Ambient temperature of the Servopack exceeds 55°C. •Servopack defective.	•Check that the main load or regenerative capacity is not exceeded. •Check how the Servopack is mounted (direction, clearance with other peripheral devices). (Check that the Servopack has no influence of heat discharge from the storage panel or heating from peripheral devices.) •Check that the Servopack fan is operating. •Servopack board defective.	•Re-check the load system. •Reduce the ambient temperature of the Servopack to 55°C or less. •Replace the Servopack. •Replace the Servopack.
A.81	Absolute Encoder Backup Error (ABS data received from the encoder is erroneous - alarm 0A: data lost.)	•Occurs at power ON. (Pn002.2 = 1)	•Servopack defective when the encoder is used as incremental encoder.	•Servopack board defective.	•Replace the Servopack.
		•Occurs at power ON. (Pn002.2 = 0) When used as absolute encoder	•Turn ON the power supply to the absolute encoder for the first time. •Both PG power supply (+5V) from the Servopack and the battery power supply are failed. •Absolute encoder defective. •Servopack defective.	•Check that the absolute encoder has been set up. •Check that the power is supplied to the encoder side. •Encoder defective at alarm occurrence even by setting up the absolute encoder again. •Servopack defective if nothing is wrong in the above check.	•Set up the encoder. •Set up the encoder after restoring the power supply to the encoder (by replacing the battery, etc.). •Replace the encoder. •Replace the Servopack.
A.82	Encoder Checksum Error (ABS data received from the encoder is erroneous - alarm 0B: memory error).	•Occurs at power ON or during operation.	•Failure found in encoder memory check. •Servopack defective.	•Encoder defective. (encoder self-diagnosis) •Servopack defective if nothing is wrong in the above check.	•Set up the encoder. Replace the motor if the alarm occurs frequently. •Replace the Servopack.
		•Occurs when SEN signal turns ON.	•Failure found in encoder memory check.	•Absolute encoder defective (encoder self--diagnosis).	•Set up the encoder. Replace the motor if the alarm occurs frequently.
A.83	Absolute Encoder Battery Error (ABS data received from the encoder is erroneous - alarm 0D: battery error).	•Occurs at power ON. (Pn002.2 = 1)	•Servopack defective when the encoder is used as incremental encoder.	•Servopack board defective.	•Replace the Servopack.
		•Occurs at power ON. (Pn002.2 = 0) When used as absolute encoder * Check at power ON.	•Imperfect connection or disconnection of battery •Battery voltage is reduced to the specified value (2.7 V) or less. •Servopack defective.	•Check that the battery is connected correctly. •Check that the battery voltage is not reduced to 2.8 V or less. •Servopack defective if nothing is wrong in the above check.	•Connect the battery properly. •Replace the battery and turn ON the encoder power supply again. •Replace the Servopack.
A.84	Encoder Data Error (ABS data received from the encoder is erroneous - alarm 0H: absolute data error).	•Occurs at power ON.	•Sensor in the encoder reads the data improperly. •Servopack defective.	•Encoder malfunctions. •Servopack defective if nothing is wrong in the above check.	•Turn ON the encoder power supply again. Replace the motor if the alarm occurs frequently. •Replace the Servopack.
		•Occurs during operation.	•Encoder malfunctions by external noise. •Encoder malfunctions. (Sensor in the encoder reads the data improperly.) •Servopack defective.	•Check the encoder wiring. (Separate the wiring from the power cable, and provide some measures for grounding.) •Encoder malfunctions. •Servopack board defective.	•Correct the wiring processing around the encoder. •Replace the motor if the alarm occurs frequently. •Replace the Servopack.
A.85	Encoder Overspeed (ABS data received from the encoder is erroneous - alarm 0P: more than 200	•Occurs at power ON.	•Number of revolutions is excessive at encoder power ON. •Servopack defective.	•Check the number of revolutions exceeds 200 r/min at encoder power ON. •Servopack board defective.	•Turn ON the power supply at 200 r/min or less. •Replace the Servopack.
		•Occurs during operation.	•Servopack defective.	•Servopack board defective.	•Replace the Servopack.

Alarm	Alarm Name	Status	Cause	Check Item	Remedy
	r/min at power ON).	* Checks when SEN signal is ON.			
A.86	Encoder Overheated (ABS data received from the encoder is erroneous. "Detected at approx. 90°C±10°C.	•Occurs at power ON.	•Encoder defective. •Servopack defective.	•Encoder malfunctions internally. •Servopack board defective.	•Replace the motor. •Replace the Servopack.
		•Occurs during operation.	•Encoder temperature exceeds the specified value. •Encoder defective. •Servopack defective.	•Temperature where the motor is installed is too high. •Motor runs with the load exceeding the rating. •Encoder temperature detecting section defective. •Servopack board defective.	•Reduce the temperature of the motor installed environment to 40°C or less. •Reduce the motor load to a value within the rating. •Replace the motor. •Replace the Servopack.
A.b1	Reference Speed Input Read Error (No speed reference read completion flag outputs.)	•Occurs at control power ON.	•Servopack defective.	•Servopack board defective (around A/D converter).	•Replace the Servopack.
		•Occurs during operation.	•Malfunction in reference read-in input section •Failure in reference input read-in section	•Malfunction in reference input read-in section •Servopack board defective (A/D, etc.).	•Reset the alarm and re-start operation. •Replace the Servopack.
A.b2	Reference Torque Input Read Error (No torque reference read completion flag outputs.)	•Occurs at control power ON.	•Servopack defective.	•Servopack board defective (around A/D converter).	•Replace the Servopack.
		•Occurs during operation.	•Malfunction in reference read-in input section •Failure in reference input read-in section	•Malfunction in reference input read-in section •Servopack board defective (A/D, etc.).	•Reset the alarm and re-start operation. •Replace the Servopack.
A.bF	System Alarm (Program error) •Software operation time over •Stack overflow •Micro program error	•Occurs at control power ON.	•Servopack defective.	•Servopack board defective.	•Replace the Servopack.
		•Occurs during operation	•Error in programming •Servopack defective.	•New Y specification (new version software), standard, or substandard product? •Servopack board defective (Is clock 48 MHz?) •Servopack board defective (Is JL-046 a 6-MHz output?)	•For new Y specification product, investigation of operation time is required. •Replace the Servopack.
A.C1	Servo Overrun (Number of revolutions exceeds 500 r/min and becomes 1000 r/min or more in 640 msec. Motor is accelerating with torque reference exceeding the overrun detection level. * Check the first operaiton after servo ON.	•Occurs at any other than Pn50A.1 = 7 and at power ON. •Occurs at Pn50A.1= 7 and at power ON. Or occurs at servo ON or reference input.	•Servopack defective. •Incorrect motor wiring •Incorrect encoder wiring •Encoder defective. •Servopack defective.	•Servopack board defective. •Check the motor wiring or connector inserted status at the motor side. •Check the encoder wiring and the connector inserted status at the encoder side. •Encoder defective. •Servopack defective if nothing is wrong in the above check.	•Replace the Servopack. •Manually correct the motor wiring. •Manually correct the encoder wiring. •Replace the encoder. •Replace the Servopack.
A.C8	Absolute Encoder Clear Error and Multiturn Limit Setting Error * Check multiturn reset at processing.	•Occurs at power ON.	•Encoder defective. •Servopack defective.	•Encoder internal malfunction •Servopack board defective.	•Replace the motor. •Replace the Servopack.
		•Occurs at encoder alarm reset.	•Encoder defective. •Servopack defective.	•Encoder internal malfunction •Servopack board defective.	•Replace the motor. •Replace the Servopack.
A.C9	Encoder Communications Error	•Occurs at power ON. Or occurs during operation.	•Encoder wiring incorrect or poor connection •Encoder cable specifications differs and noise gets on the cable. •Encoder cable distance is too long and noise gets on the cable. •Damaged encoder cable becomes easy to be •Excessive noise trouble to the encoder cable •FG is unstable because of influence from devices installed at the motor side (such as welder, etc.) •Noise makes Servopack pulses counted incorrectly. •Trouble by excessive vibration or shock to the encoder •Encoder defective. •Servopack defective.	•Check the encoder wiring or connector insertion at the encoder side. •The wiring distance is up to 20 m with twisted pair or twisted pair batch shield, core line 0.12 mm, stranded wire. •Noise gets on phase C because of the damaged encoder cable and insulation cover. •Check if encoder cable is bundled with or too close to large current cable. •Check that grounding to the welders at the motor side is made correctly. •Check that no noise is on the signal line from the encoder •Check that the motor is installed correctly (mounting face accuracy, mounting, shifted core) and that the machine does not vibrate. . •Encoder defective. •Servopack defective if nothing is wrong in the above checking.	•Manually correct the encoder wiring. •Make the encoder cable conform to the specifications. •Set the encoder distance to a value within the specified range. •Manually correct the encoder cable construction. •No surge is applied to the encoder, but to the construction. •Remove grounding from the devices to stop flowing to FG at the PG side. •Ground wiring must ensure no surge to the encoder. •Reduce machine vibration or correct motor installation. •Replace the motor. •Replace the Servopack.
A.CA	Encoder Parameter Error * Check at power ON.	•Occurs at power ON.	•Encoder defective. •Servopack defective.	•Encoder internal malfunction •Servopack board defective.	•Replace the motor. •Replace the Servopack.
		•Occurs during operation.	•Encoder defective. •Servopack defective.	•Encoder internal malfunction •Servopack board defective.	•Replace the motor. •Replace the Servopack.
A.Cb	Encoder Echoback Error * Check at power ON.	•Occurs at power ON. Or occurs during operation.	•Encoder wiring incorrect or poor connection •Encoder cable specifications differs and noise gets on the cable. •Encoder cable distance is too long and noise gets on the cable. •Damaged encoder cable becomes easy to be •Excessive noise trouble to the encoder cable •FG is unstable because of influence from devices installed at the motor side (such as welder, etc.) •Noise makes Servopack pulses counted incorrectly. •Trouble by excessive vibration or shock to the encoder •Encoder defective. •Servopack defective.	•Check the encoder wiring or connector insertion at the encoder side. •The wiring distance is up to 20 m with twisted pair or twisted pair batch shield, core line 0.12 mm, stranded wire. •Noise gets on phase C because of the damaged encoder cable and insulation cover. •Check if encoder cable is bundled with or too close to large current cable. •Check that grounding to the welders at the motor side is made correctly. •Noise on the signal line from the encoder •Check that the motor is installed correctly (mounting face accuracy, mounting, shifted core) and that machine does not vibrate. •Encoder defective. •Servopack defective if nothing is wrong in the above check.	•Manually correct the encoder wiring. •Make the encoder cable conform to the specifications. •Set the encoder distance to a value within the specified range. •Manually correct the encoder cable construction. •Ground wiring must ensure no surge to the encoder. •Remove grounding from the devices to stop flowing to FG at the PG side. •Provide some noise preventive measures for the encoder wiring. •Reduce machine vibration or correct motor installation. •Replace the motor. •Replace the Servopack.

A.CC	Multiturn Limit Disagreement * Check at power ON. * SGDM-□DA only	•Occurs at power ON.	•Servopack parameter is wrong. •The multiturn limit has not been set in the encoder.	•Check parameter Pn205. •A.CC occurs even if the Pn205 setting is correct.	•Correct the Pn205 setting (0 to 65535). •Execute the multiturn limit setting change Fn013 when the alarm occurs.
		•Occurs during operation	•Servopack defective.	•Servopack board defective.	•Replace the Servopack.
A.d0	Position Error Pulse Overflow (Position error exceeds the user constant overflow level Pn505 setting at main power ON.)	•Occurs at control power ON.	•parameter Pn505 value is 0. •Servopack detects the alarm incorrectly.	•Check the parameter (overflow: Pn505). •Servopack detecting section defective.	•Set parameter Pn505 to any value other than 0. •Replace the Servopack.
		•Occurs at high-speed rotation.	•Imperfect motor wiring •Imperfect encoder wiring •Servopack defective.	•Check that the motor U, V and W wiring is correct. •Servopack board defective.	•Manually correct the motor wiring. •Manually correct the encoder wiring. •Replace the Servopack.
		•Occurs with position reference and without motor rotation.	•Imperfect motor wiring •Servopack defective.	•Check that the motor U, V and W wiring is correct. •Servopack defective if nothing is wrong in the above check.	•Manually correct the motor wiring. •Replace the Servopack.
		•Occurs when a long reference is input although operation is normal.	•Incorrect Servopack gain adjustment •Reference speed exceeds the speed limit. •Frequency of position reference pulse is too high. •Load capacity is too large.	•Check speed LG (Pn100) and position LG (Pn102). •Check V-REF input voltage and parameter (Pn300). •Check the frequency of position reference pulse. •Check the load specifications (torque, inertia) and motor specifications.	•Increase speed LG (Pn100) and position LG (Pn102). •Reduce the refefence speed to the speed limit or less. •Adjust the position reference pulse frequency. •Re-check the load or motor capacity.
A.F1	Power Line Open Phase (Undervoltage lasts 1 sec or more in one of phases R, S and T at the main power	•Occurs at control power ON.	•Servopack defective.	•Servopack defective.	•Replace the Servopack.
		•Occurs at main power ON.	•3-phase power supply is not connected. •3-phase power supply is imbalanced. •Servopack defective.	•Check the power supply voltage. •Check the power supply voltage. •Servopack defective.	•Manually correct the power supply wiring. •Correct the power supply imbalance. (Try to exchange the phases.) •Replace the Servopack.
		•Occurs at motor drive.	•3-phase power supply wiring incorrect. •3-phase power supply is imbalanced. •Servopack defective.	•Check the power supply voltage. •Check the power supply voltage. •Servopack defective.	•Manually correct the power supply wiring. •Correct the power supply imbalance. •Replace the Servopack.
CPF00	Digital Operator Transmission Error 1 Transmission disabled at all within 5 seconds after digital operator power supply is turned ON.	•Occurs at power ON when the digital operator is connected. Or occurs when the digital operator is connected after power ON. (Whether transmission is established is determined by checking the data code of the signal that is sent every approx. 100 msec from the Servo-pack. If the data code is normal, transmission is established.)	•Imperfect connection between the digital operator and Servopack •External noise to the digital operator or cable. •Digital operator defective.	•Incorrect cable or connection between the digital operator and Servopack •Check that the digital operator cable is not close to the noise generating devices or cables. •Is the digital operator put on a noise generating device? •Digital operator control section or alarm detecting section defective.	•Insert the connector again or replace the cable. •Separate the cable from noise generating devices or cables. •Separate the digital operator from the noise generating device. •Replace the digital operator.
CPF01	Transmission Error 2 Transmission disabled after transmission is established once.		•Servopack defective.	•Servopack defective. (CPU, gate alley defective.)	•Replace the Servopack.

Warning	Warning Name	Status	Cause	Check Items	Remedy
A.91	Overload Warning before overload (A71 or A72) Occurs at (1) or (2). (1) Reaches 20% of A71 (OL level 2). (2) Reaches 20% of A72 (OL level 1).	•Occurs at control power ON.	•Servopack defective.	•Servopack control board defective.	•Replace the Servopack.
		•Occurs at servo ON.	•Incorrect motor wiring (imperfect wiring or connection) •Incorrect encoder wiring (imperfect wiring or connection) •Servopack defective.	•Check that the motor wiring does not have open-phase or the connection is correct. •Servopack defective. (IGBT failure, etc.)	•Manually correct the motor wiring. •Manually correct the encoder wiring. •Replace the Servopack.
		•Occurs with reference input without motor rotation.	•Incorrect motor wiring (imperfect wiring or connection) •Incorrect encoder wiring (imperfect wiring or connection) •Load exceeds rated load. •Servopack defective.	•Check that the motor wiring does not have open-phase or the connection is correct. •Check the motor current. •Servopack defective. (IGBT failure, etc.)	•Manually correct the motor wiring. •Manually correct the encoder wiring. •Re-examine the load specifications and motor capacity. •Replace the Servopack.
		•Occurs at normal operation.	•Load exceeds rated load. •Temperature in the Servopack storage panel is too high. •Duty cycle exceeds the specified value. •OL alarm is detected improperly immediately after the power supply is turned OFF to reset the alarm. •Servopack defective.	•Check the motor current. •Check that temperature in the Servopack storage panel does not exceed 55°C. •Check that the duty cycle is within the specified value. •Does the motor run immediately after the power supply is turned OFF to reset the OL alarm? •Servopack defective. (IGBT failure, etc.)	•Re-examine the load specifications and motor capacity. •Reduce the temperature in the panel. •Set the duty cycle to a value within specified setting range. •Use the reset PB (electronic overload thermal relay) to reset an OL alarm. •Replace the Servopack.
A.92	Regenerative Over-load "Warning when 50% or more of regenerative over-load A32 (regene-rative resistor capacity [W] ×2) lasts for 100 sec or more."	•Occurs at control power ON.	•Servopack detects the alarm improperly.	•Detecting circuit defective.	•Replace the Servopack.
		•Occurs at normal operation (regenerative resistor temperature rise is high.)	•Load GD^2 duty exceeds regenerative capability. (Pay attention to regeneration of minus load [UP/DOWN axes].)	•Load GD^2 must be at most 5 times as large as the motor GD^2. Is the motor rotating longer for the operation cycle.	•Re-select the operation conditions or regenerative resistor.
		•Occurs at normal operation (regenerative resistor temperature rise is slight.)	•Parameter Pn600 set value is not correct when a regenerative resistor is mounted externally. •Servopack defective.	•Check that parameter Pn600 set value is correct. •Servopack defective. (Regenerative resistor, detecting section defective.)	•Set parameter Pn600 correctly. •Replace the Servopack.
		•Occurs at motor deceleration.	•Excessive operational duty	•Re-check the load inertia, number of revolutions or duty.	•Recheck the operation conditions.

AC Servopack SGDM-□□AD□ Check List for Troubleshooting

Failure	Conditions at Occurrence	Cause	Check Item	Remedy

Motor does not rotate.	Input signal selection Pn50A setting: Servo ON at "L (low)"	•Power supply is not turned ON. •Main power supply is not turned ON. •Improper I/O (connector CN1) wiring or disconnection •Speed/position references are not entered. •Improper settings of input signal selections Pn50A to Pn50D •Encoder used differs from the user setting. •Servo ON signal is off when the servo is on.	•Is the input power ON indicator lamp lit in the status display mode. •Is the main power ON indicator lamp lit in the status display mode? •Check the connector CN1mounted status and the wiring. •Check the input pins. •Check the settings of input signal selections Pn50A to Pn50D. •Check parameter Pn002.2 bit. (Note 1: ABS is used as incremental encoder.) •BASEBLOCK unlit and RUN lit in status monitoring mode?	•Turn ON the power supply. •Turn ON the main power supply. •Correct the wiring of connector CN1. •Input correctly speed/position references. •Correct the settings of input signal selections Pn50A to Pn50D. •Correct the encoder setting. •Correct the parameter setting or ServoON signal.
	Input signal selection Pn50A.2 setting: P control at "L (low")	•Incorrect P-CON input function setting •SEN signal is off when SEN signal is used (ABS) •{Speed/Torque Control} mode: Incorrect speed reference input •{Speed/TorqueControl} mode: Incorrect torque reference input •{Position Control} mode: Incorrect position pulse input	•Check the parameter Pn001.1. •SEN signal is set to "ON"? (Un-05 bit 20 = 1 or 1 CN-4.2) •Check between V-REF and SG and if the control method agrees with the input. •Check between V-REF and SG and if the control method agrees with the input. •Check Pn200.0 reference pulse form and PULS/SIGN signals.	•Correct the parameter Pn001.1. •Correct the parameter setting or SEN signal. •Correct the control method parameter setting or the input. •Correct the control method parameter setting or the input. •Correct the control method parameter setting or the input.
	Input signal selection Pn50A.3 setting: Overtravel at "H (high)"	•Error counter clear signal remains ON. •Overtravel signal is received. •Servopack defective	•Check the clear input (1CN-14 and 15). •Check OT signal. •Servopack board defective	•Turn off the clear signal. •Change the parameter setting or reset the overtravel signal. •Replace the Servopack.
Motor operates only momentarily.		•Motor wiring is incorrect. •Encoder wiring is incorrect.	•Check the motor wiring. •Check the encoder wiring.	•Correct the motor wiring. •Correct the encoder wiring.
Motor rotates without any reference.	By setting control method selection Pn000.1 → Speed, torque	•{Speed/torque] mode: Speed reference input incorrect. •{Speed/torque] mode: Torque reference input incorrect. •There is an offset in speed reference.	•Check if the control method coincides with the input between V-REF and SG. •Check if the control method coincides with the input between V-REF and SG. •Servopack adjustment incorrect.	•Correct the control method parameter setting or input. •Correct the control method parameter setting or input. •Adjust the Servopack offset.
	By setting control method selection Pn000.1 → Position	•{Position Control} mode: Incorrect reference pulse input •Servopack defective.	•Check Pn200.0 reference pulse form and PULS/SIGN signal •Servopack board defective.	•Correct the control method parameter setting or the input. •Replace the Servopack.
Dynamic brake does not operate.	•During operation	•Parameter setting incorrect. •Dynamic brake resistor disconnected. •Dynamic brake drive circuit defective.	•Check parameter setting Pn001.0. •Is inertia, number of revolutions or frequency of dynamic brake use excessive? •Dynamic brake circuit parts defective.	•Correct the parameter setting. •Replace the Servopack and re-check the load system. •Replace the Servopack.
Motor vibrates. Noise occurs from the motor. 1. Noise or vibration occurs if the relation of the response capability in the three feedback systems does not satisfy the following conditions: Position loop responce capability < speed loop responce current loop responce capability 2. Speed reference is unstable if either position loop gain or speed loop gain is adjusted. Increasing both gains makes the machine system oscillate, which indicates the gains cannot be increased. 3. Position loop gain cannot be increased more than the characteristic frequency of the machine system. A mechanism with low rigidity has low characteristic frequency. 4. The guideline of the gain settings is described in the user's manual. (The following outlines the guideline.) a: High-rigidity machine (ball screw directly coupled machines: mounters, bonders, high-accurate machine tools) b: Medium-rigidity machines (speed reducers + ball screws ball screw directly coupled machines of long size) c: Low-rigidity machines (timing belt drives, chain drives, machines with harmonic gears, etc.) Example a: Position Loop Pn102(1/s) 50 to 70; Speed Loop Pn100(Hz) 50 to 70; Speed L Integral Time Constant Pn101(ms) 5 to 20 b: 30 to 50; 30 to 50; 10 to 40 c: 10 to 20; 10 to 20; 50 to 120 * At ON-line auto-tuning: Select by machine rigidity setting Fn001 Servo system loop gain increases when machine rigidity setting is large. (Excessively high gain causes vibration.) *When ON-line auto-tuning not used: Set the inertia ratio data to Pn103 set value = (motor axis conversion inertia / motor rotor inertia) x 100 (%)	•Vibration or noise during operation	•Input signal line specifications differs and noise gets on the line. •Input signal line distance is too long and noise gets on the line. •Encoder cable specifications differs and noise gets on the cable. •Encoder cable distance is too long and noise gets on the cable. •Damaged encoder cable becomes easy to be •Excessive noise trouble to the encoder cable •FG is unstable because of influence from devices installed at the motor side (such as welder, etc.) •Noise makes Servopack pulses counted incorrectly. •Trouble by excessive vibration or shock to the encoder •Encoder defective. •Speed loop gain Pn100 setting is too high. •Position loop gain Pn102 setting is too high. •Speed loop integral time constant Pn101 setting is not correct. •At auto-tuning: Machine rigidity setting is not correct. •When auto-tuning not used: Inertia ratio data is not correct.	•The wiring distance is up to 3 m with twisted pair or twisted pair batch shield, core line 0.12 mm, tinning annealed copper stranded wire. •The wiring distance is up to 20 m with twisted pair or twisted pair batch shield, core line 0.12 mm, stranded wire. •Noise gets on phase C because of the damaged encoder cable and insulation cover. •Check the encoder cable is bundled with or too closed to large current cable. •Check that grounding to the welders at the motor side is made correctly. •Check that there no noise is on the signal line. •Check that the machine does not vibrate or the motor is installed correctly (mounting face accuracy, mounting, shifted core). •Encoder defective. •Factory setting Kv = 40 Hz Refer to gain adjustment in the user's manual and examine. •Factory setting: Kp = 40 Refer to gain adjustment in the user's manual and examine. •Factory setting: Ti = 2000 Refer to gain adjustment in the user's manual and examine. •Re-check the selection of machine rigidity setting Fn001. •Check inertia ratio data Pn103.	•Make the signal line conform to the specifications. •Set the input signal line distance to a value within the specified range. •Make the encoder cable conform to the specifications. •Set the encoder distance to a value within the specified range. •Manually correct the encoder cable construction. •Ground wiring must ensure no surge to the encoder. •Remove grounding from the devices to stop flowing to FG at the PG side. •Provide some noise preventive actions for the encoder wiring. •Reduce machine vibration or correct motor installation. •Replace the motor. •Correct speed loop gain Pn001 setting. •Correct position loop gain Pn102 setting. •Correct the setting of speed loop integral time constant Pn101. •Correct the selection of machine rigidity setting Fn001. •Correct inertia ratio data Pn103.
Number of revolutions over-shoots excessively at start and stop.	(Speed reference becomes vibratile when the position loop responce capability is larger than the speed loop response capability.) (Increasing the time constant makes the responce capability worse. However, in case of large load inertia or when a vibration element is contained in the machine system, the time constant must be increased to prevent the machine from being vibratile.)	•Speed loop gain Pn100 setting is too high. •Position loop gain Pn102 setting is too high. •Speed loop integral time constant Pn101 setting is not correct. •At auto-tuning: Machine rigidity setting is not correct. •When auto-tuning not used: Inertia ratio data is not correct.	•Factory setting Kv = 40 Hz Refer to gain adjustment in the user's manual and examine. •Factory setting: Kp = 40 Refer to gain adjustment in the user's manual and examine. •Factory setting: Ti = 2000 Refer to gain adjustment in the user's manual and examine. •Re-check the selection of machine rigidity setting Fn001. •Check inertia ratio data Pn103.	•Correct speed loop gain Pn100 setting. •Correct position loop gain Pn102 setting. •Correct the setting of speed loop integral time constant Pn101. •Correct the selection of machine rigidity setting Fn001. •Correct inertia ratio data Pn103. •Use the mode switch function.

ABS Position Shift Error (The position to turn OFF the power stored in the master controller memory is shifted from the position supply for the next operation.		•Encoder cable specifications differs and noise gets on the cable. •Encoder cable distance is too long and noise gets on the cable. •Damaged encoder cable becomes easy to be •Excessive noise trouble to the encoder cable •FG is unstable because of influence from devices installed at the motor side (such as welder, etc.) •Noise makes Servopack pulses counted incorrectly. •Trouble by excessive vibration or shock to the encoder •Encoder defective. •Servopack defective. •Host controller multiturn data reading error	•The wiring distance is up to 20 m with twisted pair or twisted pair batch shield, core line 0.12 mm, stranded wire. •Noise gets on phase C because of the damaged encoder cable and insulation cover. •Check the encoder cable is bundled with or too closed to large current cable. •Check that grounding to the welders at the motor side is made correctly. •Check that there no noise is on the signal line. •Check that the machine does not vibrate or the motor is installed correctly (mounting face accuracy, mounting, shifted core). •Encoder defective. (Pulse does not change.) •Multiturn data is not output from the Servopack. •Check the error detector at host controller •The data (parity) check is executed at host controller? •Noise interference to signal cable between Servopack and host controller	•Be sure encoder cable conforms to the specifications. •Set the encoder distance to a value within the specified range. •Manually correct the encoder cable construction. •Ground wiring must ensure no surge to the encoder. •Remove grounding from the devices to stop flowing to FG at the PG side. •Provide some noise preventive measures for the encoder wiring. •Reduce machine vibration or correct motor installation. •Replace the motor. •Replace the Servopack. •Correct the error detector of host controller. •Execute parity check for multiturn data. •Noise interference when no parity check is executed (as the above.)
Overtravel (OT) (The zone specified by the master controller is exceeded.)	•OT signal failure	•Overtravel signal is input. (P-OT (CN-42) or N-OT (CN-43) is "H".) •Overtravel signal malfunctions. (P-OT or N-OT signal sometimes changes?)	•Is voltage of the input signal external power supply (+24 V) correct? •Is the operation status of the overtravel limit switch correct? •Is the wiring to the overtravel limit SW correct? •Does voltage of the input signal external power supply (+24 V) vary? •Is the overtravel limit switch operation stable? •How is the overtravel limit switch wiring (damages on the leads, loose screws, etc.)	•Correct the external +24-V power supply. •Correct the overtravel limit switch status. •Manually correct the wiring to the overtravel limit switch. •Remove the variation of the external +24-V power supply. •Stabilize the overtravel limit switch operation •Manually correct the wiring to the overtravel limit switch.
	•Incorrect input signal selection (OT signal)	•Incorrect P-OT signal selection •Incorrect motor stop method selection •Incorrect overtravel position	•Check P-OT signal selection Pn50A.3. •Check N-OT signal selection Pn50B.0. •Is coasting stop selected at servo OFF? •Is coasting selected at torque control? •OT position is shorter for the coasting amount.	•Correct P-OT signal selection Pn50A.3. •Correct N-OT signal selection Pn50B.0. •Examine Pn001.0 and Pn001.1. •Examine Pn001.0 and Pn001.1. •Correct the OT position.
	•OT by shifted position	•Encoder cable specifications differs and noise gets on the cable. •Encoder cable distance is too long and noise gets on the cable. •Damaged encoder cable becomes easy to be •Excessive noise trouble to the encoder cable •FG is unstable because of influence from devices installed at the motor side (such as welder, etc.) •Noise makes Servopack pulses counted incorrectly. •Trouble by excessive vibration or shock to the encoder •Encoder defective. •Servopack defective.	•The wiring distance is up to 20 m with twisted pair or twisted pair batch shield, core line 0.12 mm, stranded wire. •Noise gets on phase C because of the damaged encoder cable and insulation cover. •Check the encoder cable is bundled with or too closed to large current cable. •Check that grounding to the welders at the motor side is made correctly. •Check that there no noise is on the signal line. •Check that the machine does not vibrate or the motor is installed correctly (mounting face accuracy, mounting, shifted core). •Encoder defective. •Servopack defective.	•Make the encoder cable conform to the specifications. •Set the encoder distance to a value within the specified range. •Manually correct the encoder cable construction. •Ground wiring must ensure no surge to the encoder. •Remove grounding from the devices to stop flowing to FG at the PG side. •Provide some noise preventive actions for the encoder wiring. •Reduce machine vibration or correct motor installation. •Replace the motor. •Replace the Servopack.
Position is shifted. (Position shifts but no alarm occurs.)	•Motor is mounted incorrectly on the machine. •Reference command from the master controller is not correct. •Encoder defective. (Does not operate at all.)	•Machine is coupled incorrectly with the motor. •Encoder cable specifications differs and noise gets on the cable. •Encoder cable distance is too long and noise gets on the cable. •Encoder defective. (Pulse does not change.)	•Is the coupling section of the machine and motor shifted? The wiring distance is up to 3 m with twisted pair or twisted pair batch shield, core line 0.12 •Encoder defective. (Pulse does not change.)	•Correct the coupling of the machine and motor. •Make the signal line conform to the specifications. •Set the input signal line distance to a value within the specified range. •Replace the motor.