2003 10/31・

UF3000

Maintenance Guide

(Summary)

TOKYO SEIMITSU Co., Ltd.

ACCRETECH

*Heidenhain linear scale

X,Y axis　monitor jig :PWT18　　No oscilloscope necessary

Z axis　　monitor jig:PWT17　　No oscilloscope necessary

To monitor linear scale waveform, Power off UF3000, and then connect PWT monitor jig, move the motor with hand.

X,Y axis:　OUTPUT voltage　０．８～１．２V range,

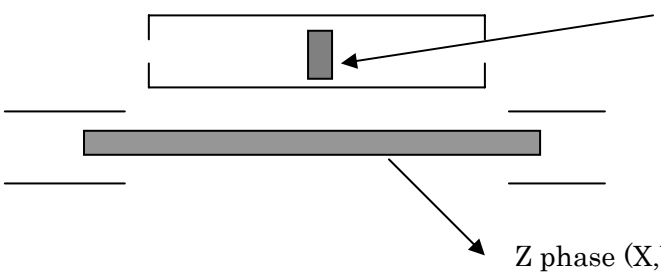
To optimize the output Voltage, Adjust the clearance between reading head and scale.

Z axis ;9～13μA

Head clearance X,Y=0.5mm　Z=0.75mm

Clearance adjustment; use special film

*Monitor display



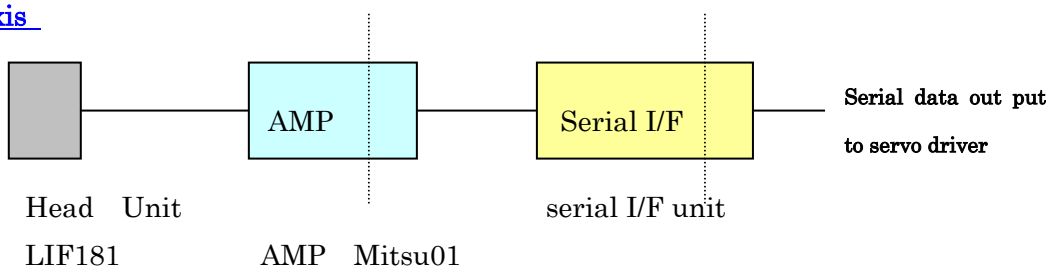
Phase adjustment; Head tiling

The X,Y Linear scale is 4micron pitch, divided signal into 40.

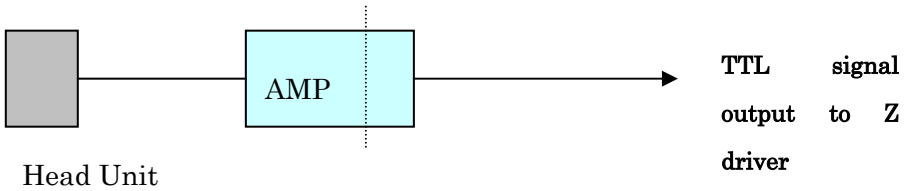
X,Y resolution 0.1μm、Input signal to servo driver CN2

Z resolution 0.5μm

*XY axis



*Z軸



To make the scale parallel, Set the scale to mechanical dead end position.

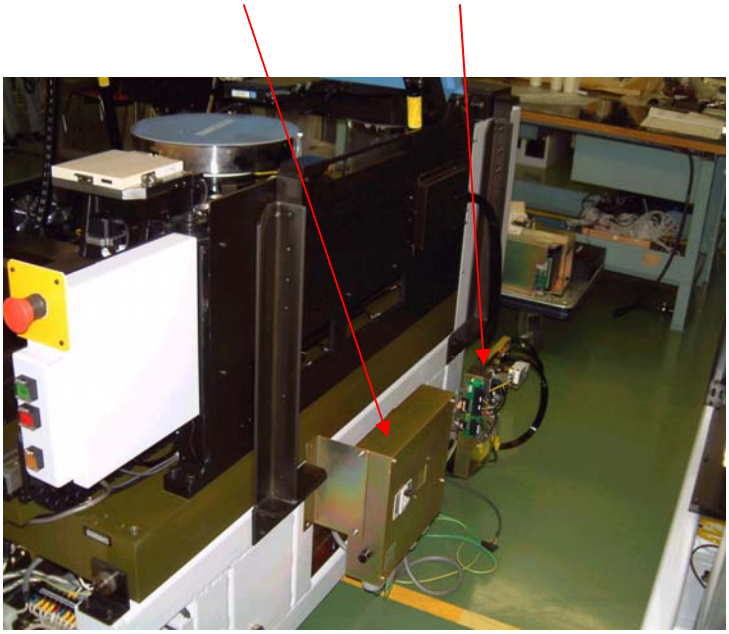
Head clearance and angle are adjustable. (Clearance X,Y 0.5mm, Z 0.75mm)

Z motor has no encorder, Z axis software original point is leaner scale Z phase.

*UF3000 transportation; Undocking Loader unit

When shipping UF3000, Undocking between main body and loader unit.

Undocking : Loader power unit, air unit stick to main body.



Disconnect OCR cable, CCD camera cable, power cable between main body and loader.

Disconnect loader air and vacuum hose

Take off the power cable from loader power terminal (4P).

Disconnect ARCnet(CN1) cable, DC12V(J1 or TB5-2,3) cable from loader CPU.

Disconnect alarm pole connectorCN150.

*Setup　　Install power unit and air unit .

* Base plate 3 fixed screws and 2 support screws

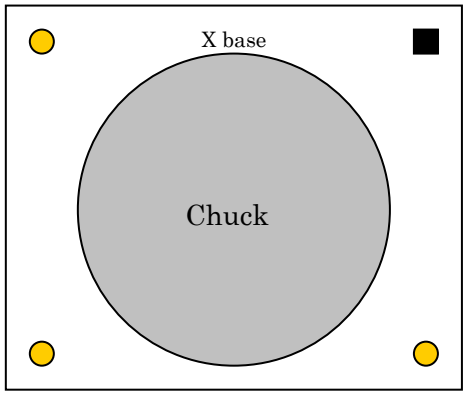
（It is **not** necessary to make base plate screw spacer up side down when setting up UF3000.）

The two support screws are located at rear side of base plate.

Make these screw floating, do not press base plate.

*Chuck planarity

● Height adjustable spacer　　■ Fixed spacer



To adjust chuck level, Use left side two screws, At first make the right front spacer loose .

After height adjustment completed, tight the right front screw.

When tightening 3 adjustment screws, do not make the Z-axis plate distorted.

Distortion makes Z-axis accuracy worse

Chuck level spec; Room temperature to 100 degree: 10um

Temperature 100 to 150degree: 15um

*Theta axis

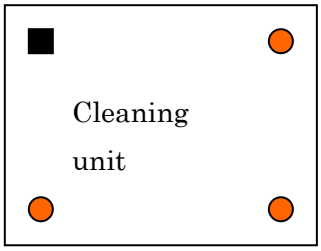
Use Cam follower

***X,Y Lead screw**

Lead 4mm

***F axis**

Cleaning unit level



● Height adjustable spacer

■ Fix height spacer

Level Spec: within 10um surface of cleaning base. (Cleaning surface 15um)

Mechanical design improvement: E2 cameras position no change even cleaning pad level adjusted.

＜caution＞When tightening 3 adjustment screws, do not make the base plate distorted.

***Z-axis**

7 screws for chuck installation (Two screws prevent from chuck rotation.)

Tighten those screws with 7-kgf.cm torque.

＜adjustment point ＞

To make chuck fixed screw tight, follow the procedure.

1:Clean Z-axis surface and ceramic cap.

2:Tight 5 screws (5 screws are sharp pointed, and shorter one) with 7kgf.cm torque.

At the same time, stick chuck and Z-axis together.

3:Tight 2 screws (two screws are cramping and prevent chuck from rotation) with 7kgf.cm torque.

< Caution>

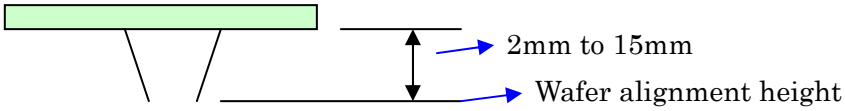
UF3000 chuck weight is approximately 10.6kg, when replacing chuck, pay attention to chuck 3 pin not to bend.

And, to avoid 3 pins damage, Two person must hold the chuck

.

*E1 camera

E1 camera moves 20mm up and down.（13mm stroke use for software,　and apply to probe needle height **2～１５mm**）



E1 camera wafer alignment position is as same height as needle tip position.

E1 camera has cylinder lock mechanism, It make E1 stable and prevent E1 from vibration.

LED lighting and LED beam built in E1 (no lamp house)

E1 beam is for E1, E2 camera calibration.

Equipment position adjustment(including E1 beam calibration)

Following procedure is outline of equipment position adjustment

(Refer PSG manual for further information)

***E1 camera position adjustment**

All axes format SW available on calibration menu.

Close head stage before calibration, E1 camera may move because of one standoff.

Calibration procedure is as same as Uf300A.

To update calibration data, exit menu and enter calibration menu.

***Displacement sensor position adjustment**

It is not necessary to close head plate, Adjustment procedure is as same as UF300A.

Sensor heights automatically move to E1 camera position while calibrating displacement sensor.

***ITV (E1) camera adjustment** (Cognex 8100 for image processing board)

Set microscope mode, Load wafer and interrupt after alignment. Then enter calibration menu.

Pixel size LO, HI.　Rotation center(auto),Low　Hi magnification change error(manually)、

***ITV (E2) camera adjustment**

Use E1 reticule for E2 camera calibration.

Pixel size (Hi and low), Low　Hi magnification change error(manually)、

***Reticule position adjustment**

Enter E2 camera position adjustment menu, use F axis reticule position adjustment SW.

***Beam position adjustment**

Calibration for the beam built in E1 camera.

Enter the menu, Focus E1 camera to chuck surface.

Focus beam spot on chuck surface.

E1 light turned off and press ENT.

This is X, Y, Z position deviation data from image center.

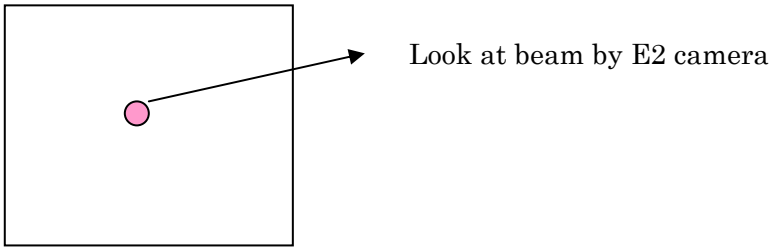
*E2 camera position adjustment

E2 camera move under E1 beam ,beam light ON、E2 focus the beam,

Turn off E2 light, press ENT

Probe mark position accuracy is within 2 ～3 μm from the pad center .

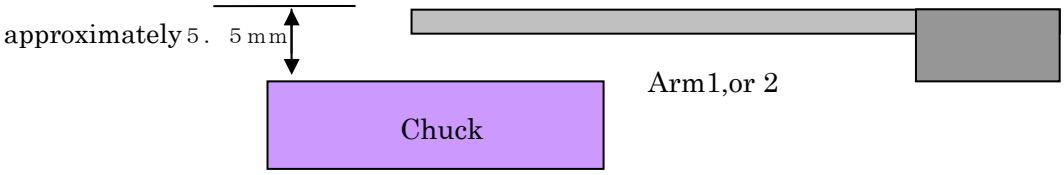
F data accuracy is 10 to 20um error(over 10 to 20 um)



*Docking with loader unit

Main body levering first then adjusts Loader docking pin height to the main body.

There are two Docking screw in front and rear.



Arm level can be adjusted by loader level pad.

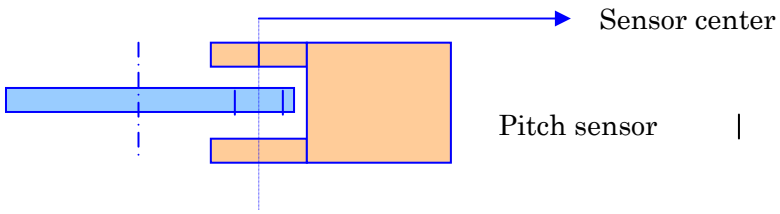
When shipping Uf3000 to customer, basically undocking main body and loader.

*Loader robot vacuum sensor

Put wafer on arm, or sub chuck, Vacuum presser indicates more than –80kpa as solenoid valve turned on.

*ALP2 load port opener motor pitch sensor

Check the sensor and the disk alignment, causing the motor out of control.



Electrical outline

*Power module

Supply 5, 12, –12, 24, 48, 72V

*Fuse

Ｆ１：power control

Ｆ２：power module

Ｆ３：２４，４８，７２Ｖ (drive)

Ｆ４：transformer

Ｆ５：Heat up

Ｆ６，Ｆ７spear

*DAKT board control power ON, OFF.

*Add circuit breaker between servo driver and transformer.

*Breaker OFF is not necessary, after pressing emergency bottom

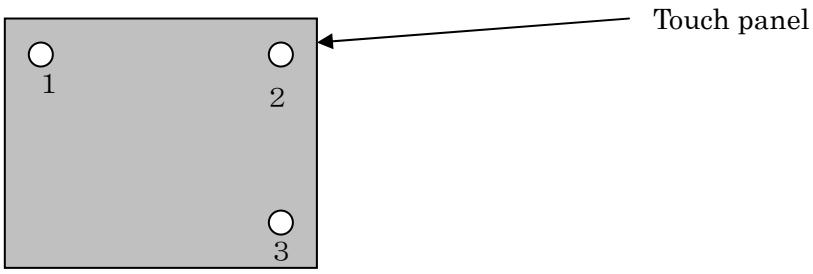
*100V to 200V power modification; same as UF3000A, replace fuse breaker, and modify transformer jumper cable.

There are Circuit protectors on the board, **LED** turned ON as it blown off.

The power control red LED turned on if the fan motor become malfunction.

＊LCD display

Back light life: 50000H.



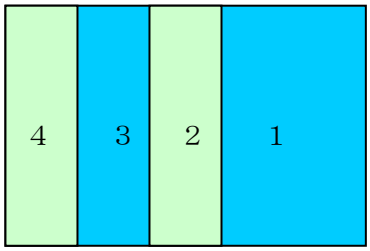
Press 1,2,3. on LCD panel, adjustment menu available.

(Brightness, Contrast, Position adjustment.)

＊PC rack

Using Ethernet between PC and VME rack communication.

PC Rack



1 ：CPU　　2 ：connector　3 ：LAN　4 ：Cognex 8100

Built in 20G HDD, FDD and MO

＊VME rack

SLT1: CPU(power PC)

SIO2: For heat up control

SIO3: Cognex related data with PC

SLT6: Cap sensor board

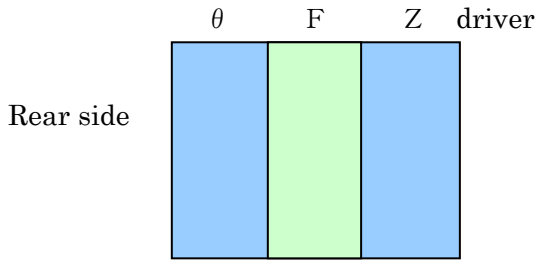
SLT8: position board(motor control using SSCnet)

SLT10:DAKT board(ARCnet, internal printer, 3serial port)

E1 up/down motor and motor brake circuit is included in ANMIO board

X, Y, Z, F, θ axis are controlled by SSCnet.

Driver layout



SSCnet Terminal connected on theta driver, Theta axis is last driver unit of SSCnet.

Z,F,θ driver parameter are already set.

However X,Y axis parameter down load from CPU during initializing.

NODE number set by rotary SW; X=0,Y=1,Z=2,F=4,θ=3

X, Y driver display **D1,D2,**as it running normally.

＊Cognex8100 ：　**No CPU in Cognex board, Using PC CPU.(Cost cut down)**

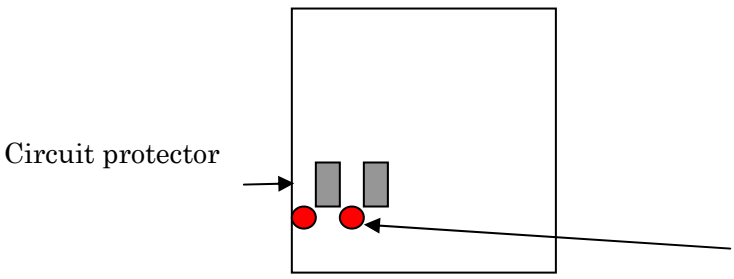
＊X,Y motor: Encorder has Z phase signal using for Original point, Encorder is absolute type and serial output to servo driver.

＊F,θ encorder: A,B,Z phase signal(pulse output)

＊F,θ motor ：3 phase coil, star type coil, 3 lines.

＊Z motor ：3 phase, 6 lines, No encorder(Original point is leaner scale Z phase).

＊X,Y leaner scale connector board （ It is located right rear corner on base plate）



LED

Linear Head 12V power **circuit protector**

Limit sensor **circuit protector**, and on off control cricket

LED: turn on if **circuit protector** blown off.

＊X Y axis servo in-position signal monitor （Use PC）

To monitor in-position and position deviation, Install Melservo software into PC, and connect RS232C cable to PC and driver.

CH1　Control Pulse(out put)

CH2　remaining pulse(position deviation)

Trigger: use control pulse

To take signal into PC, Press record bottom.

Parameter NO６２　　１３１１　linear scale control mode

１３１０　encorder mode(disable leaner scale)

Monitor on PC display

To check the linear scale output signal : Feedback ratio data change as moving linear head.

To check the motor encorder output signal; Feed back pulse accumulation change as moving linear head.

*Oscilloscope can be use ,adapter board required

Servo driver parameter is under this file.　**D¥prober¥sys¥machine¥drv prm.dat**

***Tester I/F**（The I/F between Tester I/F module and VME is ARCnet）

1：TTL　I/F board (first board)（Jumpers SW for electrical isolation）

2:CPU, GPIB, RS232C board(2nd board)：ARCnet port on this board

3:category,XY coordinator board (Jumpers SW for electrical isolation)

TTL pulse (Hi or Lo active) setting: set from touch panel, Setting data down load to I/F board after power on the machine.

Hitachi Version RS323C: Change jumper SW setting , The RS232C connector is option.

To monitor TTL signal by oscilloscope: Use special monitor board

***APC UNIT (controlled through ARCnet)**

APC unit connected through

VME rack　-- VEZT board (card cramp)　-- ASTIO board (Tray unit)

Each board has Circuit protector and monitor LED.

APC board and HF board is same model, But software in CPU is different, so those board are not exchangeable.

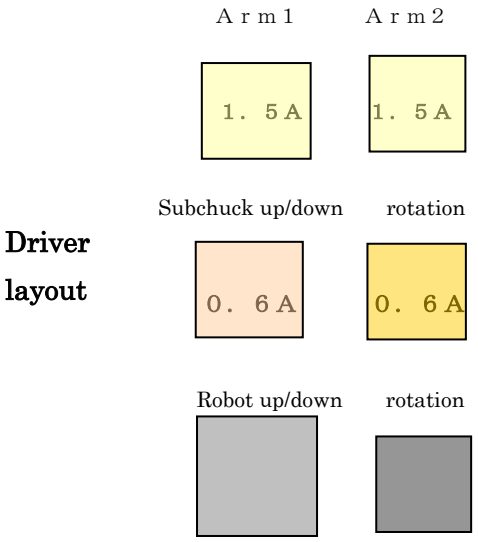
*Alarm pole

LED lamp life: 20000 hour, 20mA(current consumption)

Buzzer: sound volume control trimmer built in,

*Loader Unit

Connection: Using ARCnet, connected through VME rack to loader CPU.



Arm1and Arm2 driver is exchangeable.

Subchuck up/down and rotation are not exchangeable. Step ratio is different.

*Loader power supply (rear side of loader)

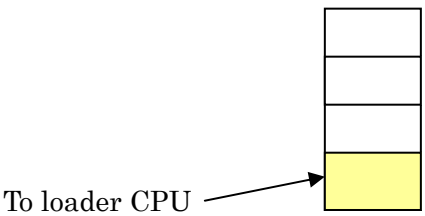
２４Ｖ　２PCs

４８Ｖ　1PC

*Loadport (ALP2)

Using Serial I/F between loader CPU and ALP2.

Load port RS232C



*ＵＦ３０００ＡＭＤＳ（optimize index accuracy)

Standard version software included AMDS software.

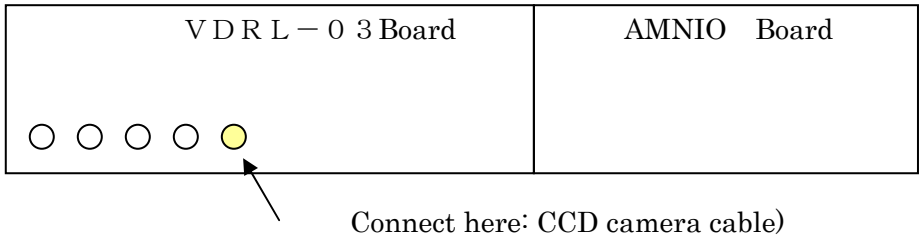
AMDS Switch appear on display after key in PASSWARD 'A09EAGLE' and initializing the prober.

Finish **right angle adjustment** under E1 camera at first.

Setup AMDS camera at probe position.

CCD camera cable is different from UF200 type.

CCD camera connect to VDRL-03 board



Connect here: CCD camera cable)

Setting parameter

Microscope mode (disable auto needle alignment)

Network option: off

Maximum die number (250000); set standard number.

Right angle under E1 camera (ID 9046) new ID number

Right angle under probe card (room temp ID9047、hi temp1;9061, hi temp2;9066, hi temp3;9071, hi temp4 9076, lo temp1 9081, lo temp2 ;9086)

Y axis boundary 410mm (ID9028)

Change Temperature of Hi (Lo) temperature correction data (Temperature range setting**)**

ID 9055,56,57,58,59,60

High temperature correction data number (how many correct table at Hi temp)**(9053)**

Low temperature correction data number (how many correct table at Lo temp) **(9054)**

AMDS measurement mode

Room temperature mode: perform AMDS according to Device parameter

Room and hi temperature mode: room temp, Hi temp, Hi temp ,continuously

Delay after chuck moving: 500msec to 1500msec

Clearance=0 (automatically set 0 under AMDS mode)

AMSD operation

Wafer load -- focus -- pixel measurement – data in – start AMDS

Copy result data; during AMDS taking place, it is possible to make copy the finished result using **utility**.

AMDS result: Automatically save to HDD , **D: ¥prober¥amds¥C-01-1-1.dat～**

sys¥machine¥prober_x.cal sys¥machine¥prober_y.cal room temp underE1

sys¥machine¥center_x.cal sys¥machine¥ prober _y.cal room temp under probe card

sys¥machine¥hitempx1.cal sys¥machine¥hitempy1.cal; Hi temp1 index error correct table

sys¥machine¥hitempx2.cal sys¥machine¥hitempy2.cal; Hi temp2 error index correct table

sys¥machine¥hitempx3.cal sys¥machine¥hitempy3.cal; Hi temp3error index correct table

sys¥machine¥lotempx1.cal sys¥machine¥lotempy1.cal; Lo temp1 error index correct table

sys¥machine¥hitempx 1 .ang, sys¥machine¥hitempy 1 .ang; Hi temp1 straightness error correct table

sys¥machine¥hitempx 2 .ang, sys¥machine¥hitempy 2 .ang; Hi temp2 straightness error correct table

sys¥machine¥hitempx 3 .ang, sys¥machine¥hitempy 3 .ang; Hi temp3 straightness error correct table

sys¥machine¥lotempx1.ang sys¥machine¥lotempy1.ang; Lo temp1 straightness error correct table

Flow Of AMDS (Perform Room to hight temperature continuously)

1-1 room temp 1st trial

1-2 room temp 2nd trial

1-3 room temp 3rd trial

2-1 room temp :Perform AMDS using 1-3 data NG →

OK 3-1

1 － 1 Hi temp 1st trial ← OK 4-1

1 － 2 Hi temp 2nd trial Finish Fail

1 － 3 Hi temp 3rd trial

2-1 Hi temp :Perform AMDS using 1-3 data NG → 2 － 1

OK 3 － 1

1 － 1 HI,HI temp ← OK 4 － 1

1 － 2 Finish Fail

1 － 3

Perform automatically according parameter setting.

<Caution>

During performing AMDS

Do not open device parameter, AMDS setting chuck temperature may change to device parameter temperature.

*Index error correction at various temperatures

High temperature correction data number (how many correct table at Hi temp)**(9053)**

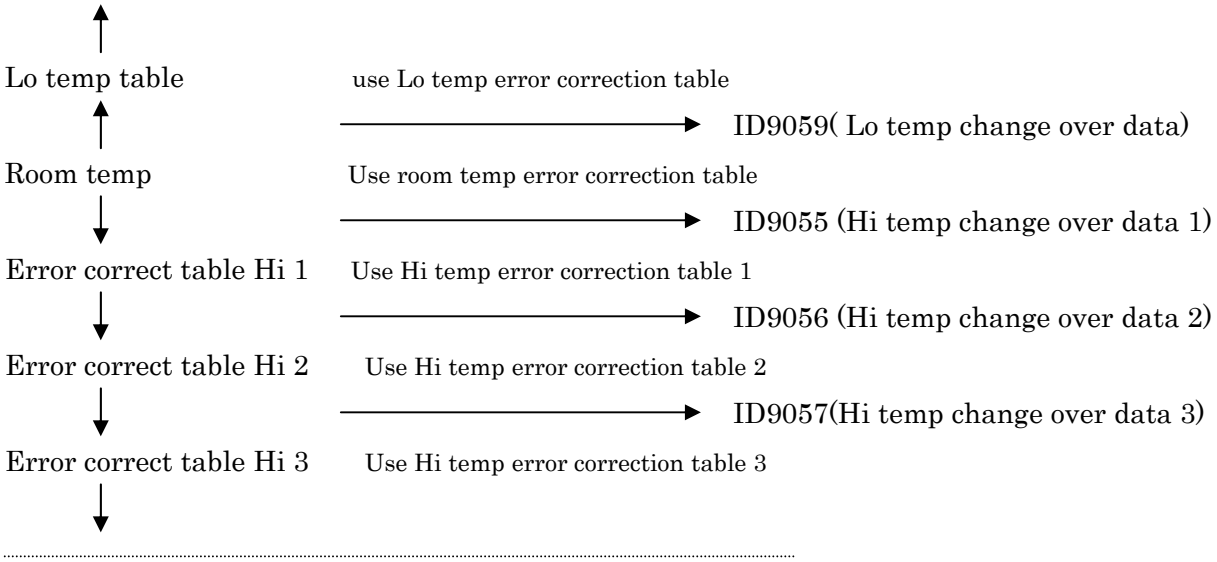
Low temperature correction data number (how many correct table at Lo temp) **(9054)**

Usually Hi temperature 3 tables

Lo temperature 1 table

X, Y index error correction

E1 camera (error correct table under E1 camera)



*New device creation

New device (no pad data in device data)

Wafer load, measured chuck profile simultaneously (12point)

↓

Registration wafer alignment model

↓

Pad registration

↓

Needle alignment

↓

Control Map creation

↓

Wafer unload(soft sequence problem)

↓

Lot finish

Device with pad data

Wafers set, wafer sensing, and press start

↓

Needle alignment

↓ E1 height move to needle chip position.E2 check E1 beam position.

Measured chuck profile (12point)

↓ Check beam position by E1camera (check every wafer, correct needle position sift error at hi and low temperature)

Wafer load

↓

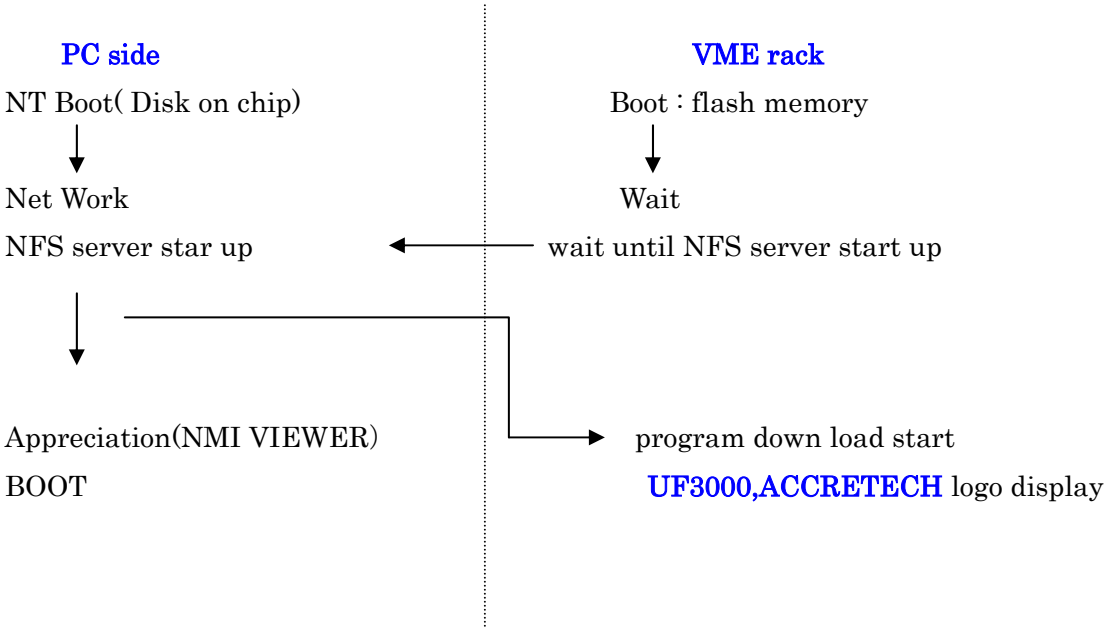
Wafer alignment

↓

Contact check

*Soft ware outline

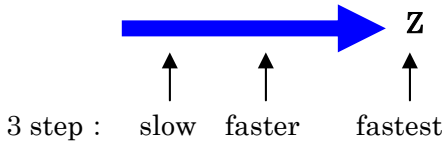
Booting



NMI VIEWER; software for KEY, DISPLAY, REMOTE

*JOYSTICK / Z, theta SW

Single and multi mode available, moving speed controllable.



*X, Y straightness error correct

7.5mm pitch straightness error correct table at various temperature

This table is made automatically after performing AMDS.

*LOG data(1 week log data save into HDD)

Main body log; D : ￥prober￥log (MMDD×××. DAT)

PC log; D : ￥p c ￥Log (MMI Viewer の LOG)

To copy log data to FD, or MD. Assign time and date.

Log data

Main

PC

Both (Main + PC)

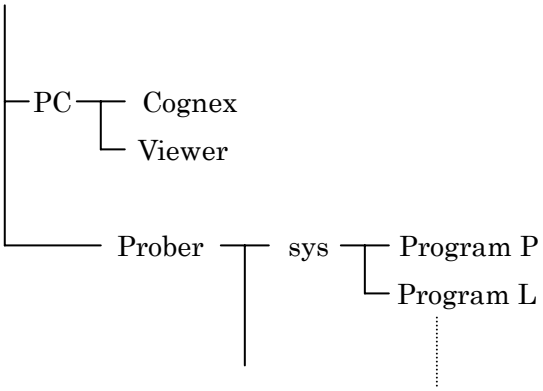
Loader log

Tester i/f log

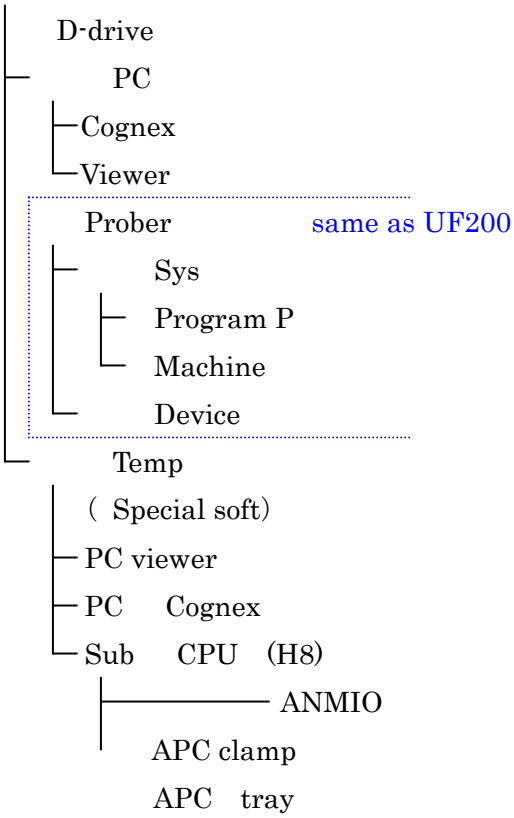
Each Log data divided into 400Kb,allow copying FD.

***Software configuration**

MO/FD



HDD



***Operating system of PC**

NT4.0 Embedded (Disk on chip)

Embedded --- Light version of Windows NT 4.0

Software update.

To updating software, you can use file copy. However follow instruction on display. And do not power off or reset the machine.

Sometime fail to update new software on ARCnet board.

Loader CPU, load port CPU, Tester CPU are using 'Hitachi **SH2** CPU'

CPU for APC, AMNIO; Hitachi **H8**

This CPU (SH2, H8) software is downloaded from Main CPU.

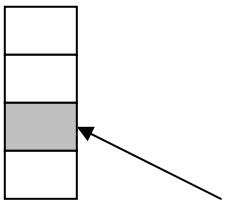
Servo driver parameter is under this file. **D¥prober¥sys¥machine¥drv prm.dat**

Loader data is under this file. **D¥prober¥sys¥machine¥loader.dat**

*How to get LOG data（use CCT WIN）

Loadport

RS232C



LOG: connect monitor cable here

Useful command

MIXLOG 100: internal controls log (max 100 line)

COMLOG: Communication log between main CPU and loader.

TASKLOG: Normal log (error, result of action prober)

I: In put port condition

OA: OUTPUT port condition

REFMPF: condition of memory

*AMNIO, APC clamp, and tray log

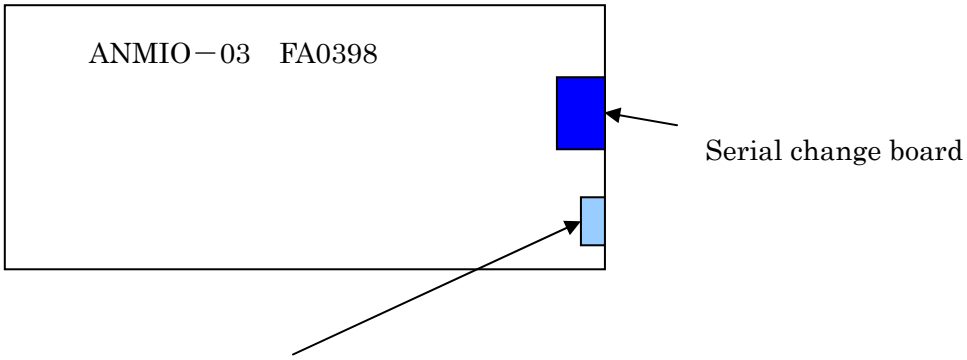
Power OFF, and Connect serial change board (SRCG3-01 FA0342)

No memories backup, so recreate error and get LOG data.

H: help command list display

AMNIO; to get log data,

Change Dip SW setting



Change DIP SW setting the lowest SW set **ON**: LOG data out put

（usually set OFF: otherwise communication speed become slow）

(APC board always output log data)

***Loader CPU LOG**

Connect RS232C 2nd port from bottom. (This board memory backs up by condenser)

send **LOGON** command at first

Main command

TASKLOG

MIXLOG

LPCOM

IODATA

GETSENS

etc

***TTL I/F board LOG**

Command

REFOUT　TTL each line HI,LO signal status display

MLOG　　GPIB,TTL internal information (before and after sending signal)

END