CHAPTER 6
OPTIONS

Large Component Sequencer LCS

Page

1.1.4. Machine dimensions

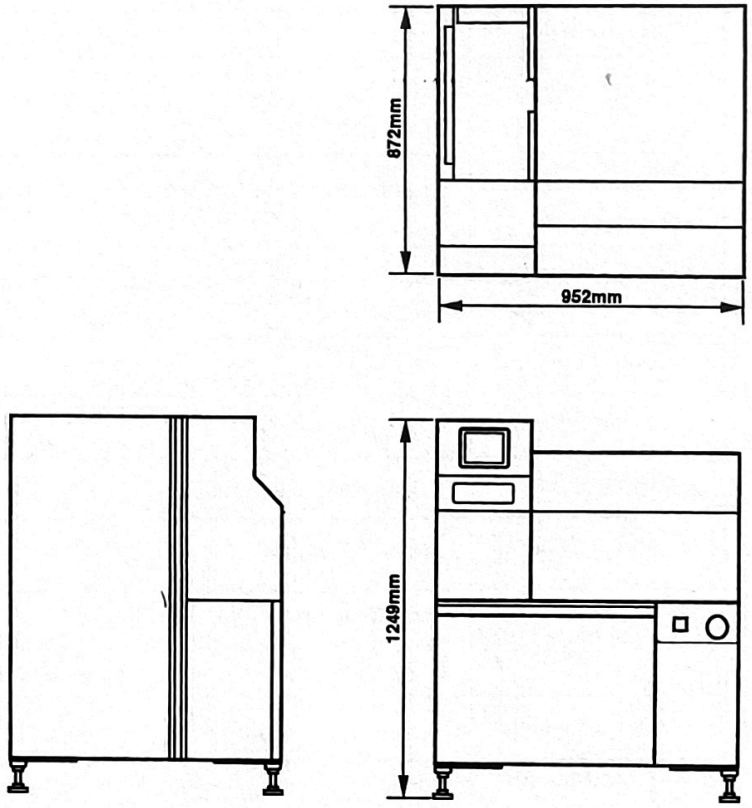


Fig. 1-3
Machine
Dimensions

1.1.3. Specifications

Item	Specification
Part Feeding	EIAJ 32mm, 32mm (Enbossed), 44mm Tape Feeder Tray size: 380 x 240mm
Component	Flat Modeled Part 7mm~ 32mm (including Lead)
No. of Component	Tray 16 (All in one removable rack container) Tape Feeders: 20 (with 8mm Tape)
Control System	PTP control
Driving System	DC Servo Motor
Control Axis	Simultaneously 3 Axis
Min. Increment	X, Y, Z 0.01mm
Data Input	* Manual Data Input, Teaching * By Personal Computer through Communication Port * By Main machine through Communication (RS232c)
Tray rack weight	approx 8 kg (16 trays)
LCS-Weight	300kg
Air Supply	5kg/cm^2 (Dry Air) 30Nl/min
Power Source	AC100V/ 110V/120V/200V/220V/240V ± 10% 60Hz, 2.5KVA
Others	ATray Rack Container + 16Pallets Interlock Switch for container door Warning Light (3 Lamps)
Environment	Temperature: 15 to 30°C Humidity: 35 to 90% (with no condensation) Atmosphere: Stable environment where equipment is sheltered from direct sunlight, wind, rain, and other elements.
Interlock	Opening the acrylic cover on the top of the machine or the door where the tray racks are housed initiates an interlock in order to protect the operator. When the interlock is applied, all axes come to a temporary halt. If the supplied air pressure drops below the value set with the air switch in the section where the air supply is connected, an interlock is applied in order to protect the machine and assure normal operation. Again, all axes come to a temporary halt.

1.1.2. Configuration

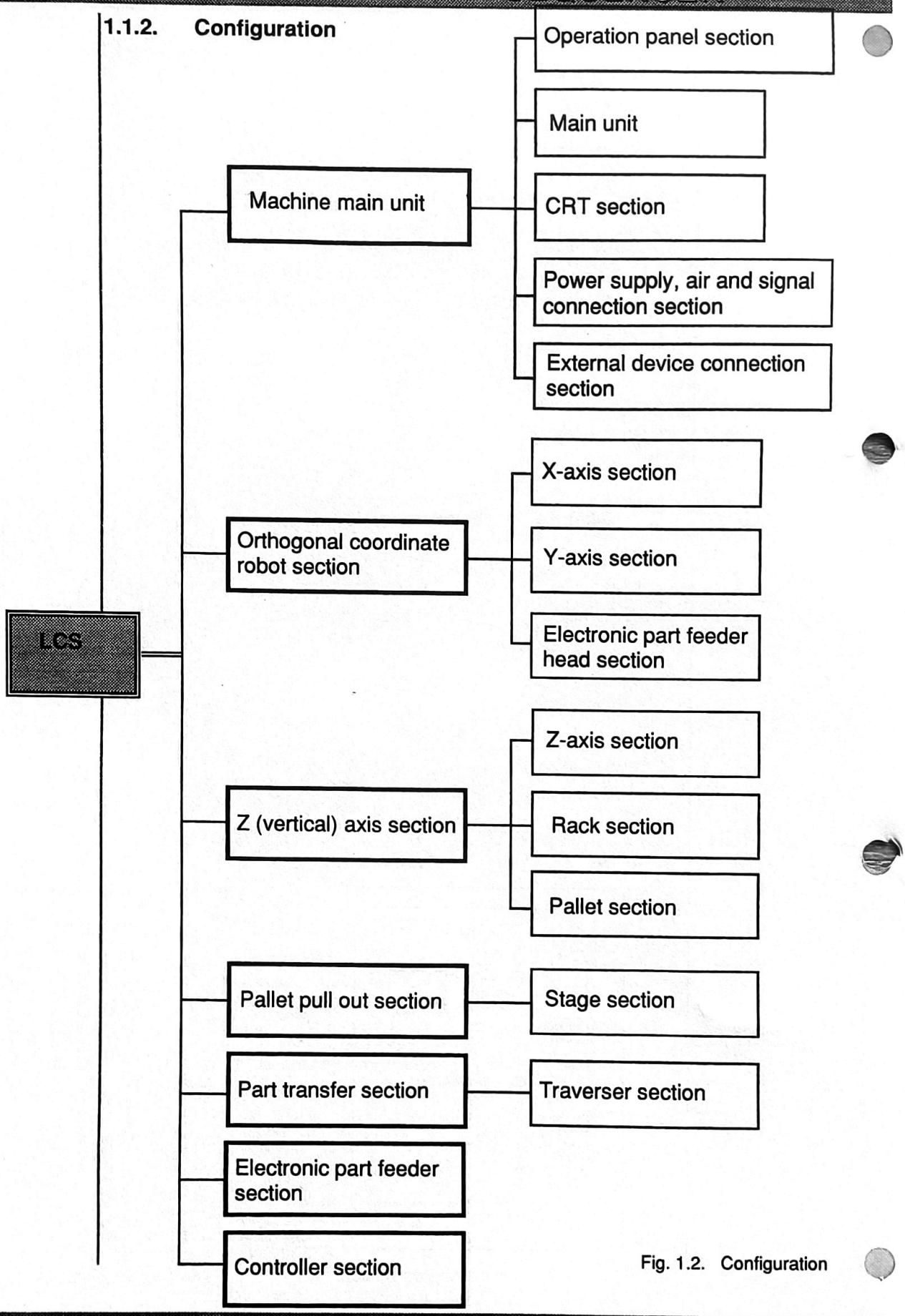


Fig. 1.2. Configuration

SECTION 1 Specifications

1.1. General Specifications

1.1.1. Overall configuration

This LCS is developed to work with the PHILIPS CSM mounters. Therefore, the surface mounter is called the main processing machine and the LCS is called a subprocessing machine.

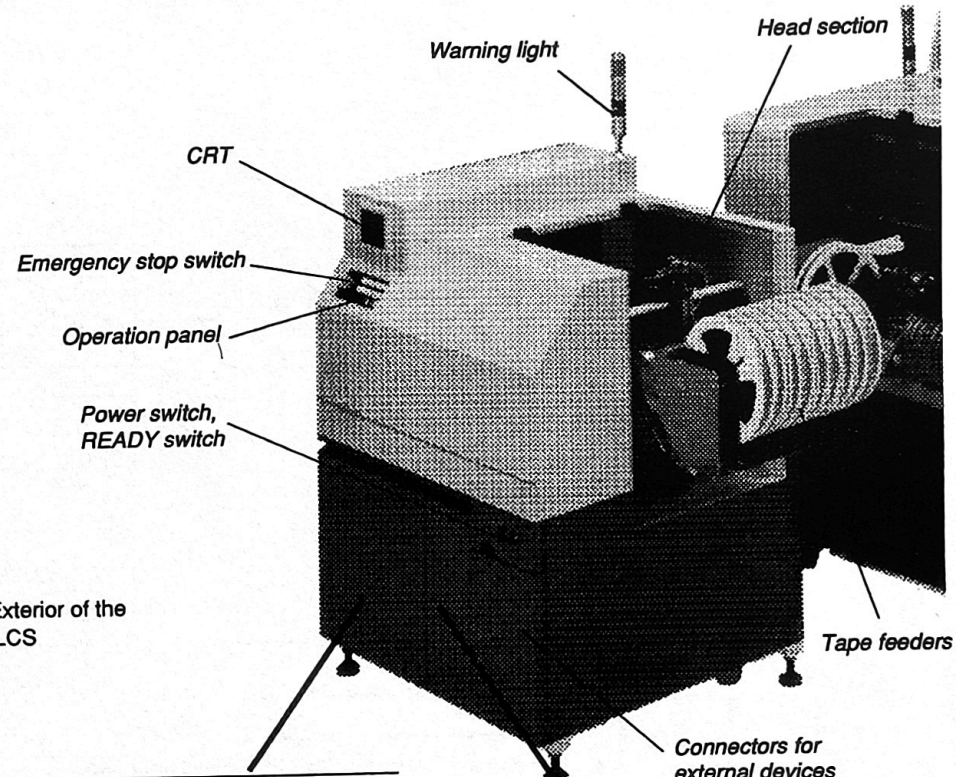
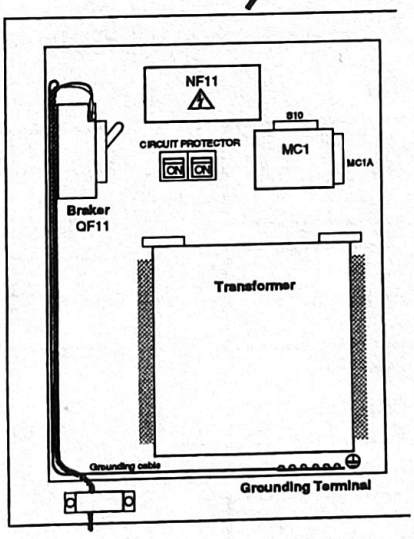
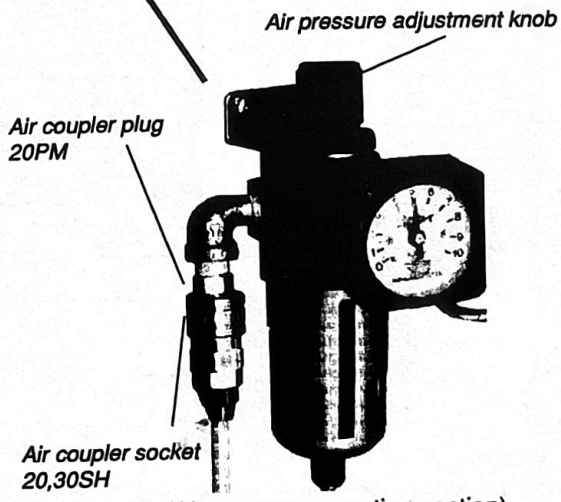


Fig. 1-1
Exterior of the
LCS



(Power supply connection section)



(Air source connection section)

1.1.5. Supply head and traverser pad / applicable electronic components

There are two types of pickup pads, as shown below: the supply head pickup pad and the traverser pickup pad. The size of electronic component which can be picked up and placed on the PCB depends on the type of pad used. In addition, the pad used on the head side should be the same size as that used on the traverser side.

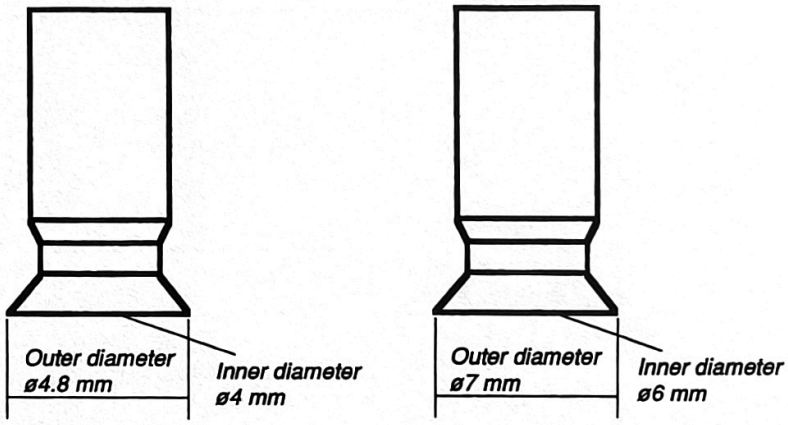


Fig. 1-4 PickupPad

Type	PAD1	PAD2	Feed configuration
SOP	8pin~40pin	20pin~40pin	Tape feeder
QFP	44pin~100pin	44pin~160pin	Tray
PLCC	20pin~52pin	20pin~84pin	Tape feeder

Table 1-1 Applicable Electronic Components

NOTE

1. **Electronic components effective with PAD1 are molded parts (flat parts) with a width of 5 mm or more.**
2. **Electronic components effective with PAD2 are molded parts (flat parts) with a width of 7 mm or more.**
3. **When the equipment is shipped from the factory, PAD1 is attached as a standard feature.**

1.2.3. System Outline

The key operation unit, CRT display unit, mounter head I/O unit, PCB transport I/O unit, and other peripheral equipment are altered through the RCH40SP controller.

(1) RCH40SP Block Diagram

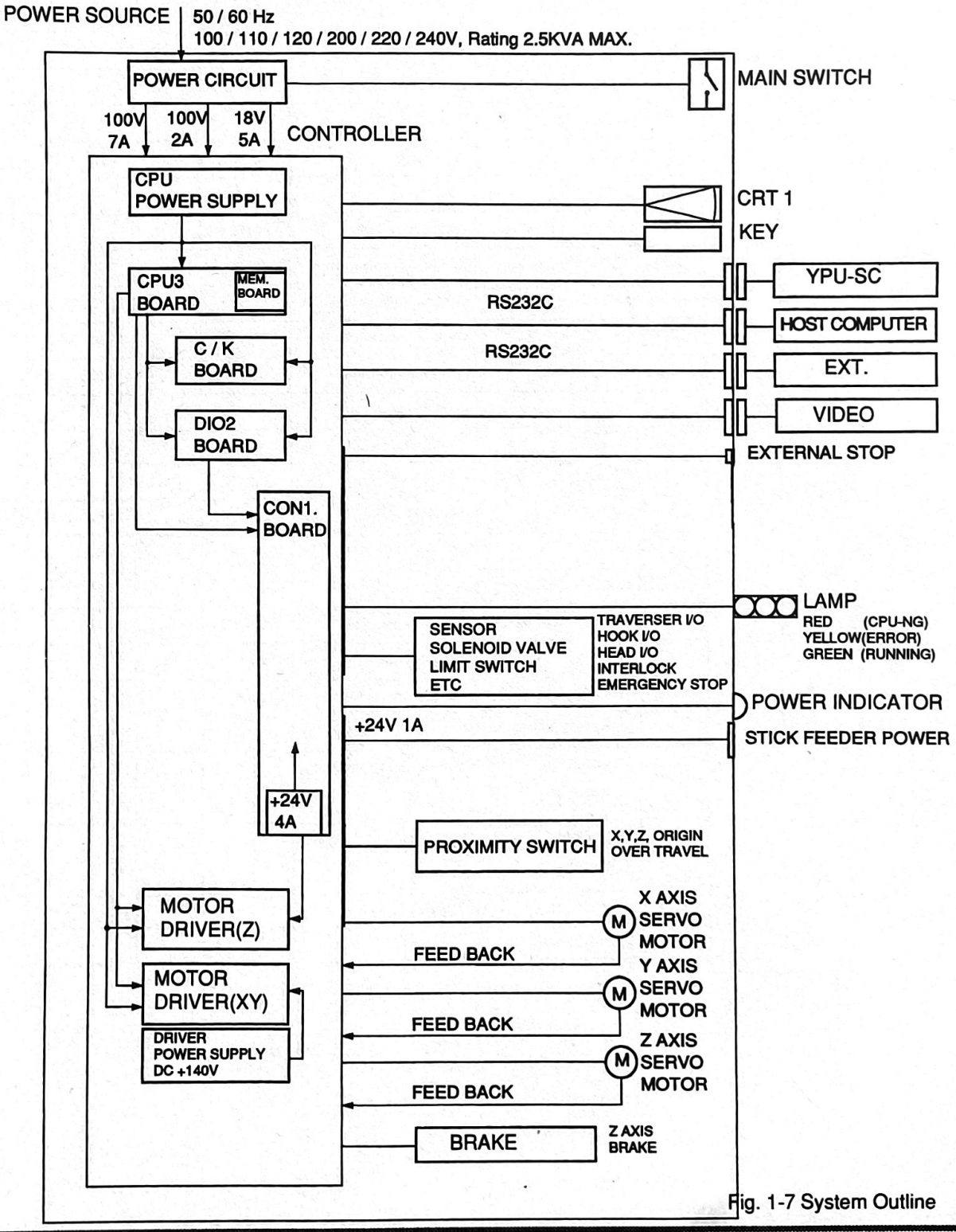


Fig. 1-7 System Outline

1.2.2. Power Supply Connections

Open the power supply box on the left side of the mounter rear panel, and with a cable of 2.0 mm² or more, connect the single-phase 100V/110V/120V/200V/220V/240V, 50/60 Hz to the breaker (QF11) through the crimp terminal (M5). When using 100/110/120V, however, if the power supply cable is to be drawn tight, always use a 3.5 mm² cable. Always connect a grounding wire to the crimp terminal (M4).

WARNING!!

When connecting the power supply, always check the power supply specifications first. ALSO consult first the Philips service centre when changing the input voltage.

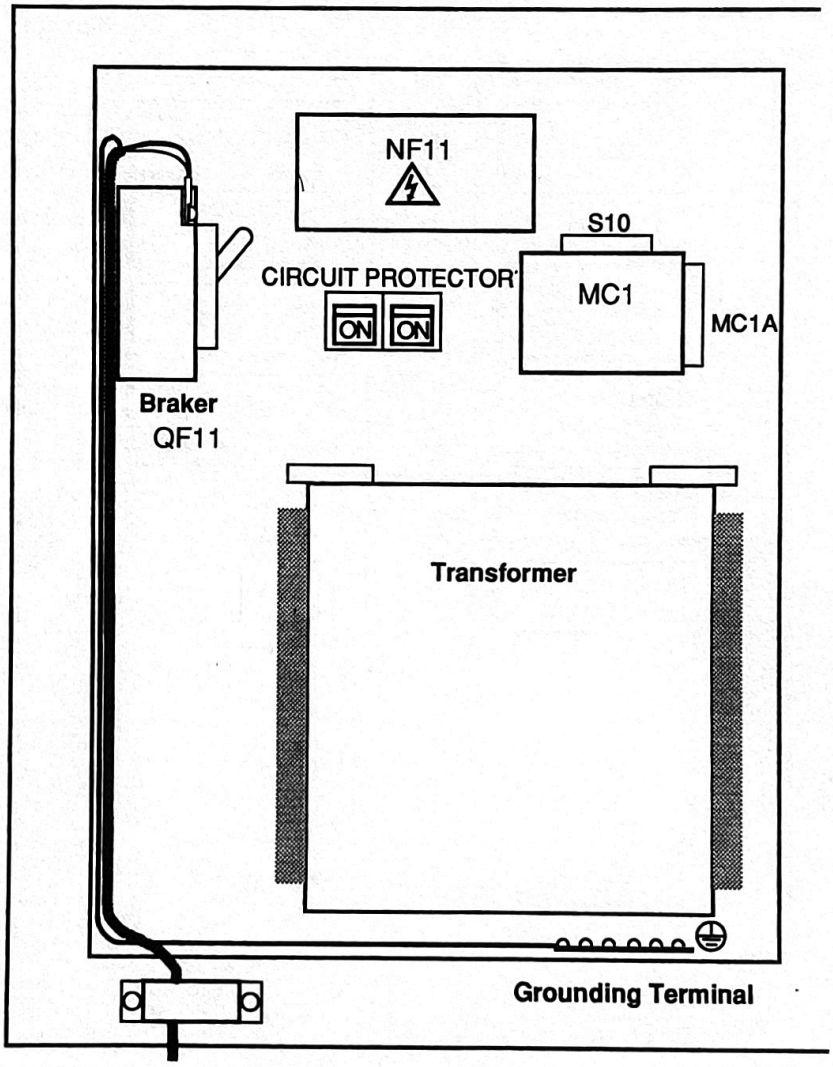


Fig. 1-6 Power Supply Connections

1.2. Electrical Specifications

The electrical control system of this unit is an application system designed for application and optimization of surface mounting work. The optimization function applies to all mechanisms, electrical units, and software.

1.2.1. Configuration

RCH40SP (LCS) System Configuration Diagram

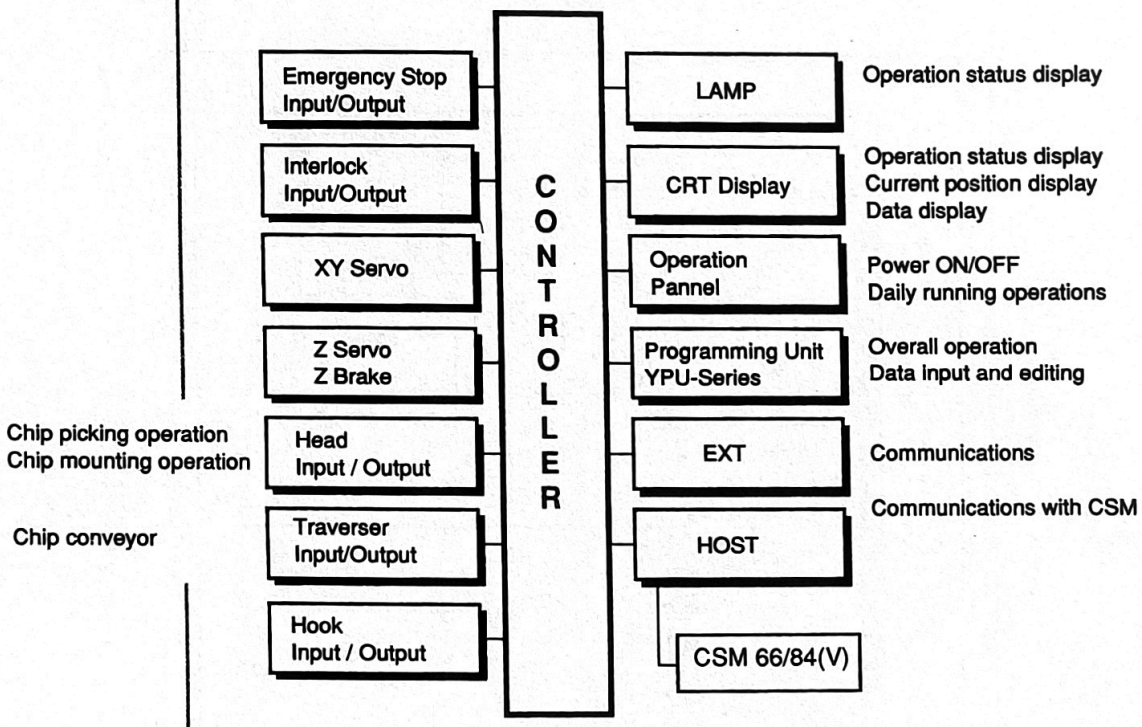
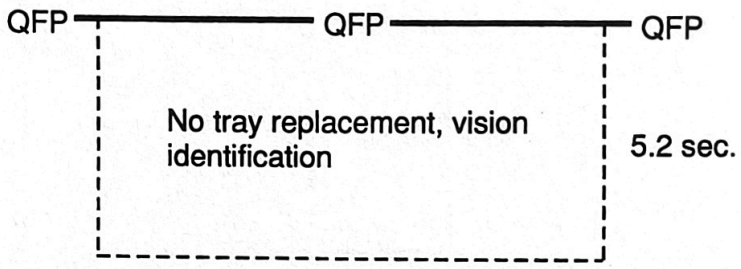


Fig. 1-5 System Configuration Diagram

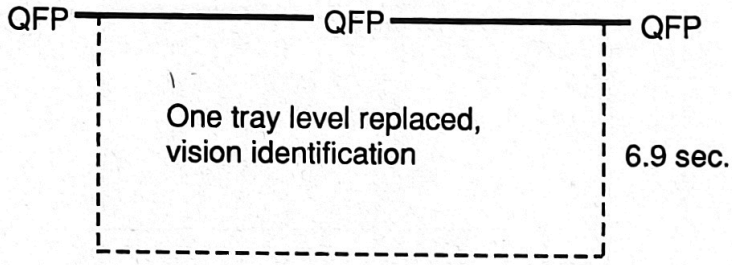
1.1.6. CYCLE TIME

Here cycle time means the time until the CSM mounts the part sent by the LCS.

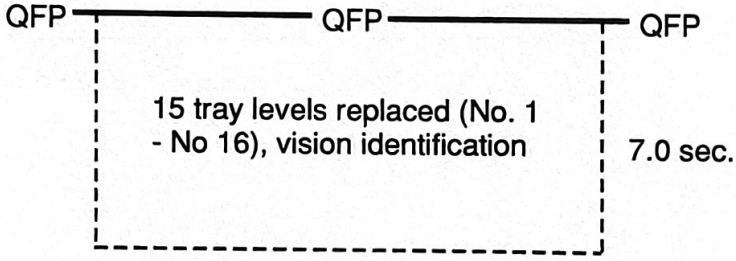
Example 1



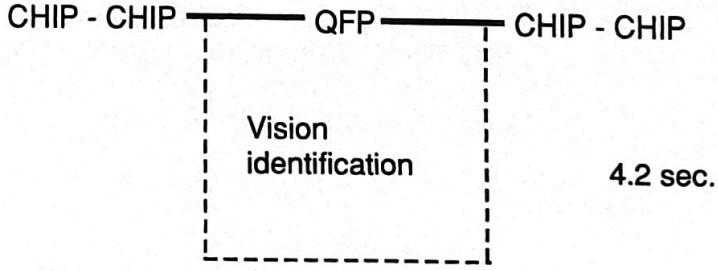
Example 2



Example 3



Example 4



SECTION 2 INSTALLATION

2.1. CONNECTIONS

Installing or connecting a LCS to a CSM must be carried out by trained CSM service engineers. Use the following procedure to connect the CSM to the LCS

2.1.1. TRAVERSER SECTION INSTALLATION

This LCS is delivered with the traverser section removed, so it has to be installed.

1) Temporarily place the traverser unit about where it belongs in the LCS with 4-M6 screws.
2) Using two M4 screws, fasten the guides for the air hoses and harnesses connected to the traverser section.
3) Tighten the 4xM6 screws firmly after adjusting the traverser on the correct place in the CSM (see 2-1-2).
4) Connect air hoses and harnesses

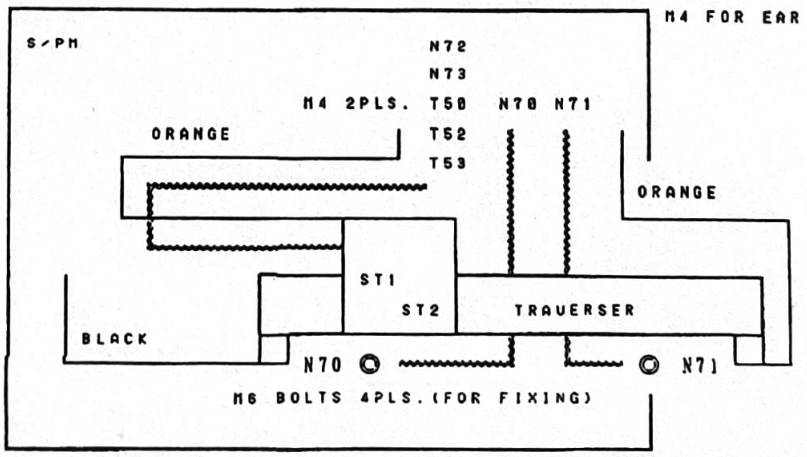
Air hoses

ø6 black ->	to the traverser cylinder return side speed controller
ø6 orange ->	to the traverser cylinder joint (cylinder out side speed controller)
ø6 orange ->	air hose and harness guide inlet joint

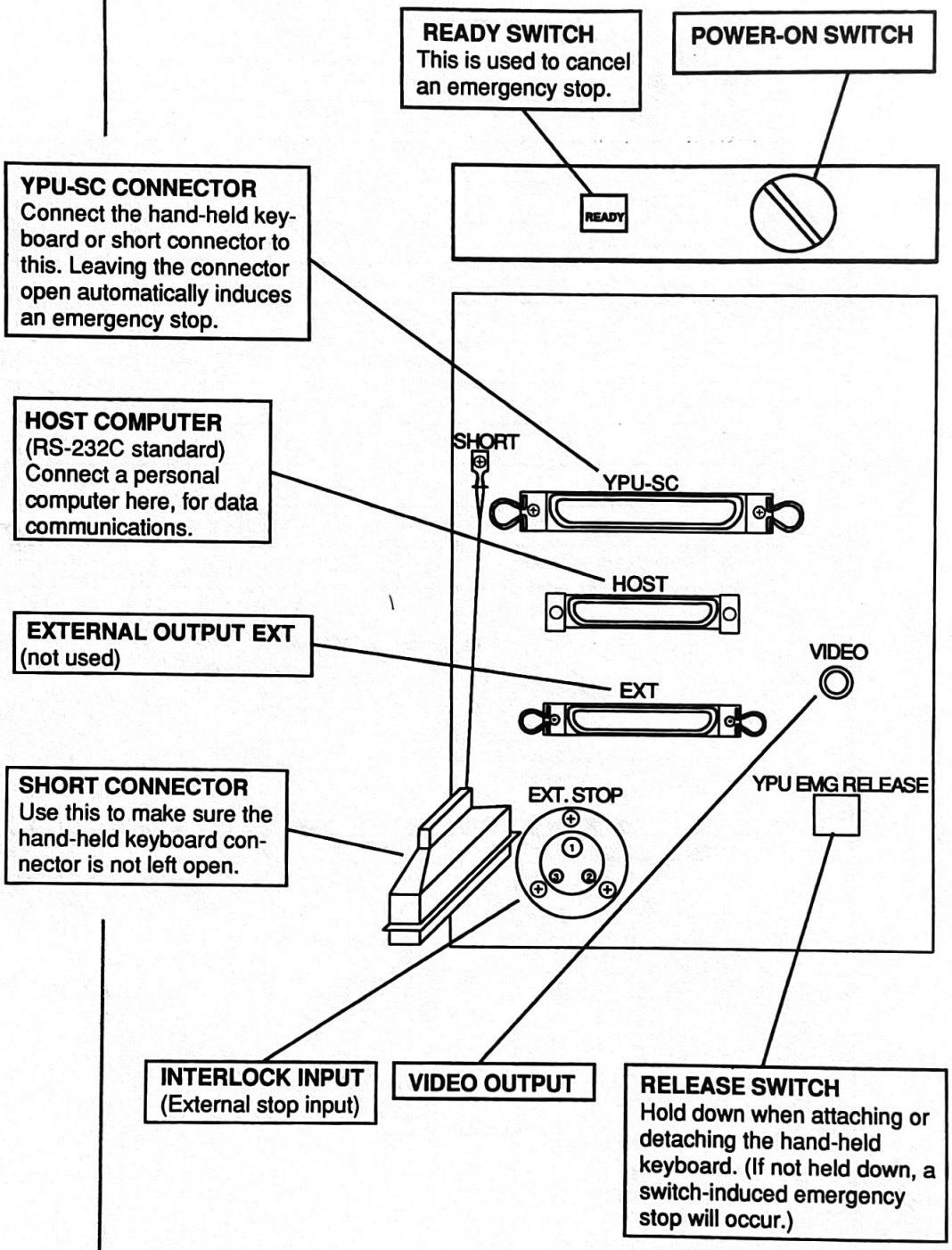
Harnesses

N70 T50 N71 T52 N72 T53	The connectors for the other end are stored in the duct at rear of the Z-axis section.

5) Ground the LCS. (Connect the ground to the stand above the duct at the rear of the vertical axis section.)



1.2.5. Connections



Connection and data flow between CSM and LCS

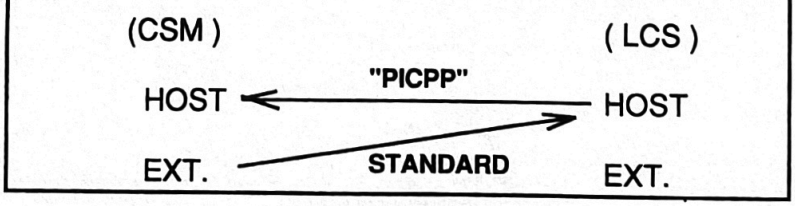


Fig. 1-8 Connections

(2) Output

DO port	Description	Function	Condition	Remark	ID
DO02	ALARM	Red lamp	Relay		T02
DO03	CAUTION	Yellow lamp	Relay		T03
DO05	RUN	Green lamp, Hour meter	Relay	S/M DI77	T05
DO07	BUZZER	Buzzer	Tr		—
DO20	HEAD1 DOWN	Head 1 descent	Tr		T20
DO24	HEAD1 VAC.	Head 1 vacuum	Tr		T24
DO35	SIGNAL	Communication output	Relay	S/M DI74	T35
DO36	SIGNAL	Communication output	Relay	S/M DI75	T36
DO37	SIGNAL	Communication output	Relay	S/M DI76	T37
DO45	HOOK	Hook forward, backward	Tr		T45
DO50	TRAVERSER	Traverser forward, backward	Tr		T50
DO52	COMPONENT VACUUM 1	Traverser station 1 vacuum	Tr		T52
DO53	COMPONENT VACUUM 2	Traverser station 2 vacuum	Tr		T53

Table 1-3 DO Signals

NOTE

Port numbers not listed in Tables 1-2 or 1-3 have spacers for both DI and DO, and cannot be used.

1.2.4. Input / Output

(1) Input

The I/O signals inside the machine are described in table 1-2, 1-3.

DI port	Description	Function	Condition	CRT	Remark	ID
—	2ND.LMT	2nd limit over	OPEN			OT
DI14	XORG	X axis origin limit	OPEN	1	Servo motor	XORG
DI15	YORG	Y axis origin limit	OPEN	1	Servo motor	YORG
DI16	ZORG	Z axis origin limit	OPEN	1	Servo motor	ZORG
DI17	RORG	R axis origin limit				RORG
DI20	HLT	Emergency stop	OPEN	1	SW.	N20
DI21	INTERLOCK	Hold	OPEN	1		N21
DI30	HEAD1 LS LOWER	Head 1 lower limit	OPEN	0		N30
DI34	HEAD1 PS	Head 1 vacuum switch	CLOSE	1		N34
DI40	SIGNAL	Communication input	CLOSE	1	S/MDO41	N40
DI41	SIGNAL	Communication input	CLOSE	1	S/MDO43	N41
DI42	SIGNAL	Communication input	CLOSE	1	S/MDO45	N42
DI43	SIGNAL	Communication input	OPEN	0	S/MDO47	N43
DI44	SIGNAL	Communication input	CLOSE	1	S/MDO56	N44
DI45	SIGNAL	Communication input	CLOSE	1	S/MDO57	N45
DI46	SIGNAL	Communication input	CLOSE	1	S/MDO02A	N46
DI47	SIGNAL	Communication input	OPEN	0	S/MDO05	N47
DI65	HOOK FORWARD LS	Hook forward limit	CLOSE	1		N65
DI66	HOOKBACKWARD LS	Hook backward limit	CLOSE	1		N66
DI67	LS TRAY	Tray recognition	OPEN	0		N67
DI70	TRAVERSER FOWARD LS	Traverser forward limit	CLOSE	1		N70
DI71	TRAVERSER BACKWARD LS	Traverser backward limit	CLOSE	1		N71
DI72	COMPONENT VACUUM1 PS	Traverser station1 vacuum	CLOSE	1		N72
DI73	COMPONENT VACUUM2 PS	Traverser station2 vacuum	CLOSE	1		N73

Table 1-2 DI Signals

(2) Contents of "Explanation 1" to "Explanation 9"

The following describes the contents of the notes "Explanation 1" to "Explanation 9" found in Fig. 2-4.

—Explanation 1—

1) Using "PICPP"

On the "RUNNING" screen, set "UTILITY" for "RUN MODE 1", and "NORMAL" for "RUN MODE 2". Press the RUN key, select "PICPP", and run the program.

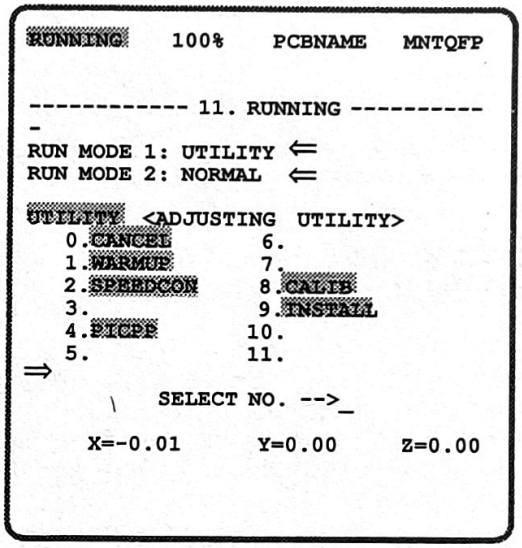


Fig. 2-5 UTILITY Screen

On the Main Menu screen, select the following:
1. RUNNING → F6. NEXT → RUN MODE 1: UTILITY, and then press the RUN key.

NOTE

For information on the contents of utility programs, please refer to the chapter 3 of this manual.

2) Automatic running

The following page shows a flowchart of LCS operations. When the mounter enters the automatic running mode, the LCS also enters an automatic operation mode. In order to reduce the number of errors which occur, however, the LCS should always be set in automatic mode first, and then the mounter switched to automatic operation.

2.2. Operation Method

(1) Table of operation menu screens

The operation menu screens for the LCS are configured as shown in Fig. 2-4.

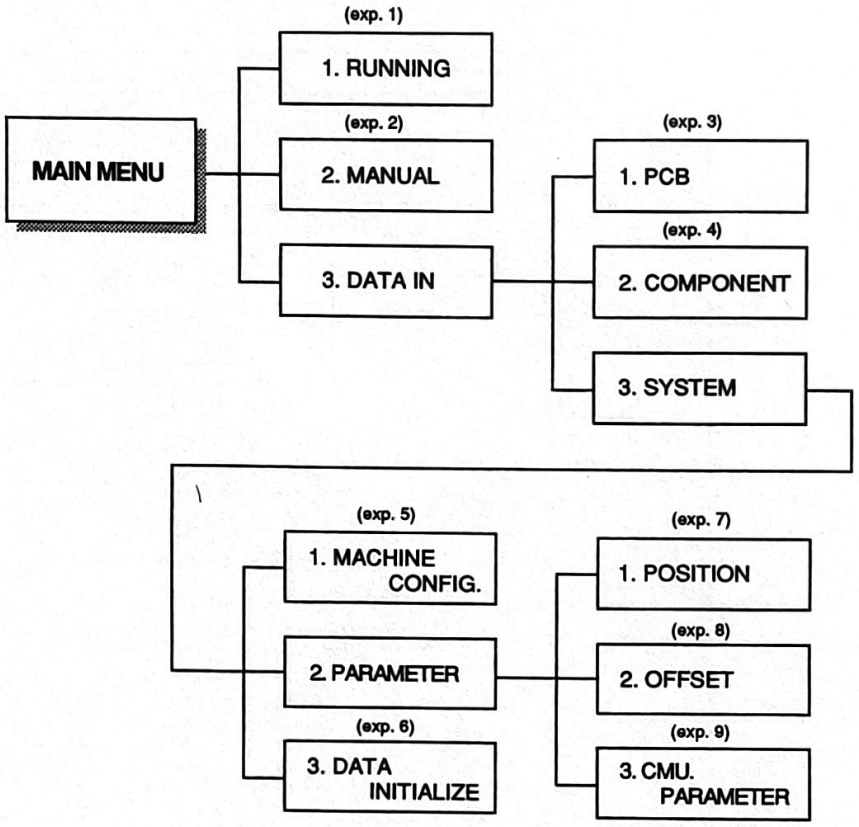


Fig. 2-4 Operation menu screens

The data which must be created by the user will serve as the data for the electronic components to be supplied to the mounter (tray size, type of feeder, etc.). Using the utility program "PICPP", create the data for the electronic components. Data created with "PICPP" is automatically sent to the mounter.

NOTE

"COMPONENT" data created using "PICPP" is stored in the "COMPONENT" file on the CSM side. Only one unit of data can be entered for one pin number, so be careful not to let data overlap.

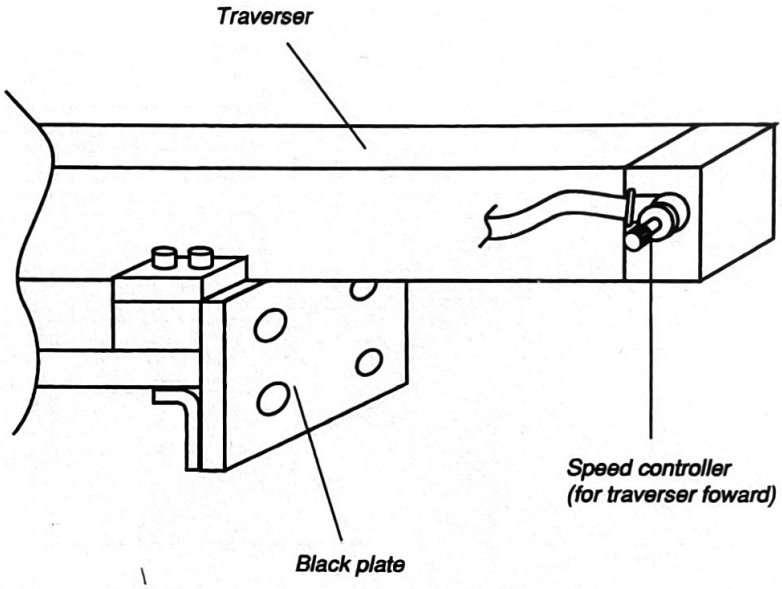


Fig. 2-2 Black plate of traverser section

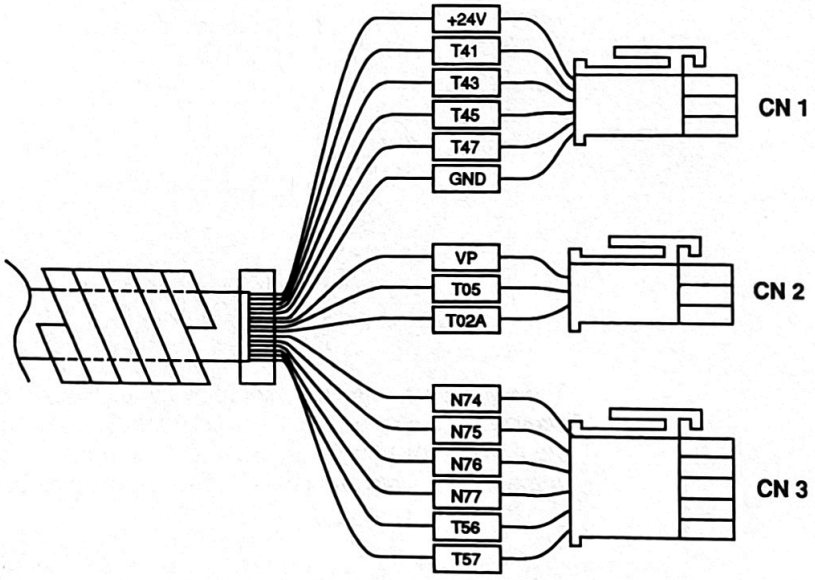


Fig. 2-3 Signal cable connector

2.1.2. Connecting the CMS Unit to the LCS

The LCS is connected to the CSM using the following procedure.

No.	Adjustment Method
1	First, install the CSM main unit.
2	Move the LCS to the back of the CSM. Then move the station section of the traverser so it is positioned as shown in Fig. 2-1, between the fixed camera and the fixed centering unit.
3	Move the traverser so the black plate at its tip (Fig. 2-2) comes in contact with the CSM stand, and adjust the position of the traverser so it appears to be perpendicular to the CSM conveyor.
4	Make sure none of the parts of the traverser interfere with the CSM configuration, and that all air tubes and electrical wires are safely out of the way.
5	Raise the levelling bolt (foot) of the LCS to make the feeder horizontal. It is a good idea to use a level when doing this. The height at which the feeder is positioned is appropriate if the tip of the vision head nozzle presses into the station pickup pad by about 1 mm when the vision head of the CSM is lowered.
6	The LCS has a signal cable connector like that shown in Fig. 2-3 coming from it. Connect this to the connector with internal threads on the right rear of the CSM. After making the connection, fit the connector and harness into the duct on the CSM main unit.
7	Turn on the air and power supplies to the LCS.

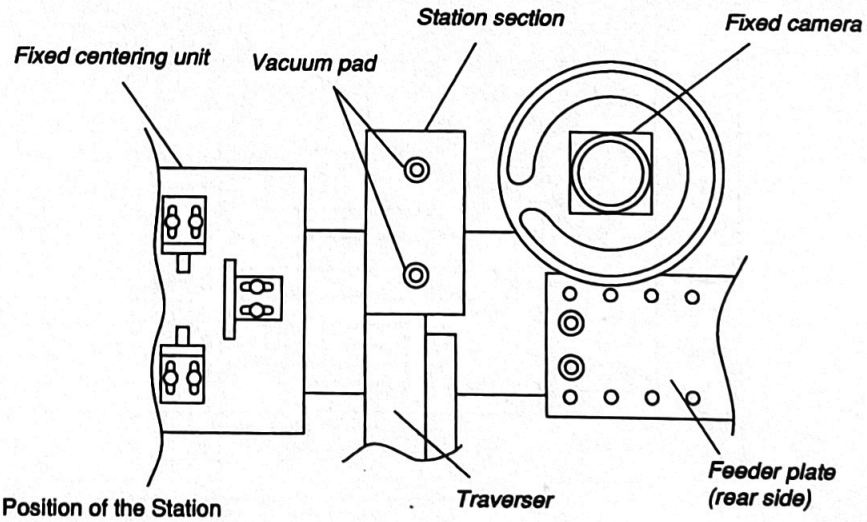


Fig. 2-1 Position of the Station

SECTION 3 MAINTENANCE

3.1. Mechanical Sections

3.1.1. Lubrication and Cleaning

1) X-Y-Z axes

NO.	Inspection Location and Method	Interval
1	Is there dirt or grime adhering to the ballscrews of the X, Y, and Z axes? After removing the dirt with tweezers, wipe the axes with a soft cloth to remove any remaining grime.	Once every 2 weeks
2	Do the ball screws of the X, Y, and Z axes need grease? Replenish the grease, using the accessory grease gun. The specified grease is Alania 2 .	Once every 2 weeks
3	Is there dirt or grime adhering to the guide rails of the X, Y, and Z axes? After removing the dirt with tweezers, wipe the rails with a soft cloth to remove any remaining grime.	Once every 2 weeks
4	Do the guide rails of the X, Y, and Z axes need grease? Replenish the grease, using the accessory grease gun. The specified grease is Alania 2	Once every 2 weeks
5	Is oil clogged up in the air regulator of the air source? Drain the oil through the drain cock in the bottom of the air regulator	Once every 2 weeks

2) Heads

Check if the pads are contaminated. Inspect the pads once a day. If any dirt or grease is found, wipe the outside of the pad clean with a cloth or sponge. Use an air gun to clean the inside of the pads.

For the "WAITING PNT XY" coordinates, teach the center position of the temporary stand reserved for emergency use, shown on the stage in Fig. 3-6. This is the position in which the pickup head waits when it is in standby status. It also serves as the position in which electronic components are substituted when an error occurs.

For the "TEMP STA. 1 XY" and "TEMP STA. 2 XY" coordinates, input the positions of the two pickup pads for the traverser station section, by teaching them. Head 1 is used for teaching. The position of the pickup pad for the mounter is entered for "TEMP STA. 1 XY", and the position of the pickup pad for the LCS is entered for "TEMP STA. 2 XY". If the data entered for the positions is off, correct it.

The values for the coordinates of "PALLET Z#1" to "PALLET Z#16" indicate the values for the Z axis when one of the 16 tray pallets is drawn out from the rack. If these values are off, too much force may be applied when the hook catches on a pallet and pulls it out from the tray rack, and this could result in the pallet being damaged. First, move the Z axis up and down, and align the position of the No. 1 pallet with the position of the hook which pulls out the pallet. Turn off the air supply and draw out the hook by hand, to check that it is not twisted. If the hook is all right, input the value for the Z axis at that point in the "PALLET Z#1" parameter. For the values for "PALLET Z#2" and the rest of the parameters, add 20 mm to each subsequent value and input it.

—Explanation 8—
There are no operations on the "2. OFFSET" screen which are carried out by the user.

—Explanation 9—
On the "3. CMU PARAMETER" screen, changes can be made to the settings (data bit, baud rate, etc.) used for communications with a personal computer and other operations.

(3) Teaching "TEMP STA. 1 XY" and "TEMP STA. 2 XY" on the mounter
In the coordinates for "TEMP STA. 1 XY" and "TEMP STA. 2 XY", use teaching to input the positions of the two pickup pads for the traverser station section. The vision head is used for teaching. The position of the pickup pad for the CSM is entered for "TEMP STA. 1 XY", and the position of the pickup pad for the LCS is entered for "TEMP STA. 2 XY". If the data entered for the positions is off, correct it.

NOTE

TEACH TEMP STA.1xy and TEMP STA.2xy after adjusting the station height.

```
DATA IN   50%
SYSTEM    PARAMETER   POSITION
-------------------------------
+SOFT LIMIT  XY  : 584.66  561.45
             R   : 800.00
-SOFT LIMIT  XY  : -36.04  -35.55
             R   : -31.08
      .              .
      .              .
      .              .
TEMP. STA. 1 XY  : 320.66  488.55 <=
TEMP. STA. 2 XY  : 318.59  550.61 <=
      .              .
      .              .
      .              .
```

MAIN MENU Screen
→3.DATAIN→3.SYSTEM
→2.PARAMETER
→1.POSITION

Fig. 2-8 POSITION Screen

—Explanation 5—

The "1. MACHINE CONFIG." screen is shown below. When "PICPP" is executed, "CMU MODE" is set to "OFFLINE" (this changes automatically when "PICPP" is run). Normally, during automatic operation, this parameter is set to "ONLINE".

```
DATA IN
SYSTEM      MACHINE CONFIG.

CMU MODE     : ONLINE, OFFLINE
HEAD1 SPEC. : STANDARD          ⇐
```

Fig. 2-6 MACHINE CONFIG. Screen

MAIN MENU Screen → 3.DATA IN → 3.SYSTEM → 1.MACHINE CONFIG.

—Explanation 6—

On the "3. DATA INITIALIZE" screen, all memory data can be cleared. Watch the screen messages carefully when doing this.

—Explanation 7—

The "1. POSITION" screen is shown below.

```
DATA IN   50%
SYSTEM    PARAMETER   POSITION

+SOFT LIMIT  XY  : 376.42 462.60
             Z   : 292.92
-SOFT LIMIT  XY  : -13.58  -0.41
             Z   : -31.08
WAITING PNT  XY  : 224.76 300.48 ⇐
             Z   : -29.08
DUMPING PNT  XY  : 298.68 397.26
FRONT FDR.DATUM  : 90
DATUM        XY  : 364.57 165.79
TEMP. STA. 1 XY  : 233.00 422.08 ⇐
TEMP. STA. 2 XY  : 234.01 372.39 ⇐
PALLET Z#1       :  -8.08  ⇐
       Z#2       :  11.92
       Z#3       :  31.92
     .                 .
     .                 .
     .                 .
       Z#15      : 271.92
       Z#16      : 291.92

 TEACH UNIT  HEAD 1

 X=-0.01      Y=0.00      Z=0.00
F1   F2    F3    F4    F5   F6
   SIG.1 SIG.2 SIG.3 BACK  FWD
```

Fig. 2-7 POSITION Screen (LCS)

MAIN MENU Screen → 3.DATA IN → 3.SYSTEM → 2.PARAMETER → 1.POSITION

Set a tray rack in position.
↓
Turn on the air and mains power to the LCS.
↓
Execute a return to the origin point on the LCS (F5 key).
↓
On the "RUNNING" screen of the LCS, set "AUTO" for "RUN MODE 1" and "NORMAL" for "RUN MODE 2", and press the RUN key to initiate automatic operation.
↓
Set the CSM in the automatic operation mode.
↓
Send the data from the CSM to the LCS.
↓
Production begins.
↓
When production has ended, press the STOP key to bring the equipment to a halt, and turn off the power and air supplies.


DANGER

WHEN SETTING TRAY RACKS ON THE LCS, ALWAYS TURN OFF THE POWER FIRST, OR PRESS THE EMERGENCY STOP BUTTON.


WARNING

Make sure tray racks are set firmly in place. If they are not locked correctly in the tray rack, they may be damaged during operation.
When setting trays on the tray rack, make sure they are set firmly in the specified position. If a tray is jutting out from the tray rack, it could be damaged during operation.

—Explanation 2—
On the "2. MANUAL" screen, each of the units (traverser, racks, etc.) can be operated manually, as well as the X, Y, and Z axes. This is used to check the movements of the various units.

—Explanation 3—
There are no operations on the "1. PCB" screen which are carried out by the user. During automatic operation, PCB names are sent from the CSM side.

—Explanation 4—
There are no operations on the "2. COMPONENT" screen which are carried out by the user. All of the data for electronic components supplied by the LCS is created using the "PICPP" program. During automatic operation, "COMPONENT" data is sent from the CSM side.


DANGER

IN MANUAL MODE, TO SUPPORT TEACHING FACILITIES, THE Z-AXIS CAN BE OPERATED WHILE A TRAY IS STILL IN THE WORKING AREA. ALSO THE Z-AXIS CAN BE OPERATED WHILE A TRAY IS HALFWAY THE RACK AND STAGE SECTION.

THEREFORE: MAKE SURE, WHEN OPERATING THE HOOK, THAT THE Z-AXIS IS ON THE CORRECT POSITION TO BUT BACK A TRAY INTO OR TO REMOVE A TRAY OUT OF THE RACK. INCORRECT HANDLING OF TRAYS AND Z-AXIS MOVEMENT MAY CAUSE DAMAGE TO THE SYSTEM. AND, WHEN OPERATING THE Z-AXIS, IT MUST BE MADE SURE THAT NO OBSTAKELS PREVENT THIS MOVEMENT (E.G. TRAY NOT FULLY IN THE RACK)


WARNING

3.2. Traverser Adjustment

1) Adjusting the height of the station (pickup pads)
If there is too much difference in height between the position of the station head descent end and the top surface of the station (pickup pad), it will be difficult to hand electronic components across properly. If this happens, turn the M4 bolt shown in Fig. 3-1, for fine adjustment of the station height. Adjustment is done after loosening the M4 nut. As a guide when adjusting the height, the tip of the vision head nozzle should press into the station pickup pad by about 1 mm. Also, the station is designed to be at the height indicated by A and B in Fig. 3-1 (A = 22 mm, B = 20.5 mm).

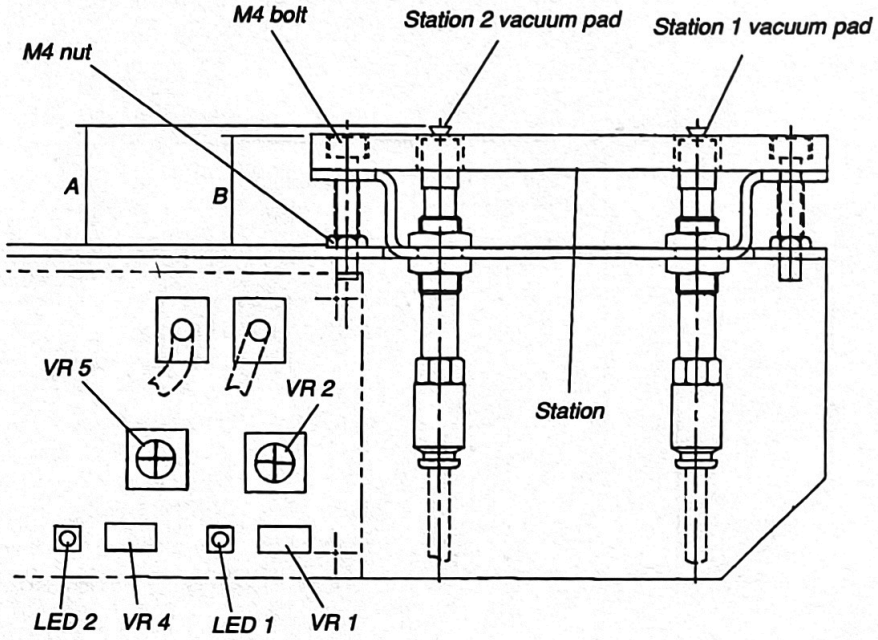


Fig. 3-1 STATION Section

2) Adjusting the pickup sensor
When the station pickup pad picks up an electronic component, the LED of the pickup sensor is supposed to light. With an electronic component being picked up, turn the fine-adjustment knob to a position where the LED lights. If the LED cannot be made to light by using the fine-adjustment knob alone, set the fine-adjustment knob to its center position and then turn the rough-adjustment knob until the LED lights (Fig. 3-1).

Fine-adjustment knob for station 1 pickup pad — VR1 (LED1)
Rough-adjustment knob for station 1 pickup pad — VR2 (LED1)
Fine-adjustment knob for station 2 pickup pad — VR4 (LED2)
Rough-adjustment knob for station 2 pickup pad — VR5 (LED2)

(5) Vibration

Most of the time, the cause of unusual noise can be checked with the steps listed in section (4).
If unusual vibration causes the overall machine to shake, check the following items.

A—Are the four adjustment bolts supporting the machine loose?
B—Is the floor sturdy and supportive?

(6) Preparation before starting operation

Every morning, or whenever 5 hours or more have passed since the machine was operated, move the heads up and down, move the traverser and hook backwards and forwards, and move the X and Y axes by manual action. Then run the warmup program to initiate a dry run for about 10 minutes before starting production.

3.1.4. Unusual noise

1) X-Y sections

Turn off the power.

Touch the head holder with your finger, and move it slowly in the X axis direction. If the holder is pushed too hard, the impact may push the head slightly out of position.

While pressing on it with your hand, check for the following abnormalities:

A—Does the movement suddenly become heavy and resistant?

Under normal conditions there is a slight amount of variation in movement, but if it feels exceptionally heavy, the bearings may be broken, or foreign matter may be gumming up moving sections.

B—A regular knocking or clanking sound is audible.

There is something wrong with the nuts of the ball screw, the bearings at either end of the ball screw, or the rolling sections of the linear bearings.

C—The unit moves too easily, with a rattling sound, with very little pressure applied.

The screws in coupling sections are loose.

Press and pull the X axis arm in the Y axis direction and inspect it in the same way.

Check whether there is suddenly loud noise during automatic operation, or whether you can hear any unaccustomed sounds. Loose screws are the most common cause of unusual sounds, so if anything sounds out of the ordinary, start by checking the screws.

2) Traverser

Move the traverser with the MANUAL key, and check whether it moves smoothly, with no unusual noise.

3) Hook

Move the hook with the MANUAL key, and check whether it moves smoothly, with no unusual noise.

4) Head

Move the head with the MANUAL key, and check whether it moves smoothly, with no unusual noise.

3.1.2. Wear and deformation

NO.	Inspection Location and Method	Interval
1	The head moves most strenuously inside this machine, so that there is a strong possibility of parts wearing down and becoming deformed. For this reason, small parts such as the screw heads of bolts and nuts should be inspected for looseness, bending, and breaking. Tighten any loose parts and replace deformed parts.	Once a month
2	Do the pads of the heads show evidence of deformation, scratches, or cracking? If so, replace the pads.	Once a day
3	Do the pads on the stations show evidence of deformation, scratches, or cracking? If so, replace the pads.	Once a day

3.1.3. Pneumatic equipment

1) Air supply pressure
The air pressure should be checked every day, before starting work, to make sure it is at least 5 kg / cm².

2) Before starting and ending work every day, piping should be checked for scratches, bending, joints that are out of position, and air leaks. If any air leaks are found, they should be taken care of right away (re-do the piping or replace the parts).

(2) Error Messages

NO.	Error Message	Meaning	Solution
1	REMOVE PARTS ON TRAY	Remove part on traverser station.	1. Replace or re-adjust vacuum sensor of traverser station. 2. Remove part from traverser station. 3. Clean and check picking pad of traverser station. 4. Check function of vacuum generator for head on the LCS side.
2	COMP. DISCARDING ERR	Head at the LCS was not able to discard part correctly.	1. Replace or re-adjust vacuum sensor of head on the LCS. 2. Replace vacuum generator for head on the LCS side. 3. Clean nozzle of head on the LCS.
3	PICK UP ERR FAILED TO FIND COMP.	Specified no. of attempts were made to pick up part but did not succeed.	1. Replenish parts on tray, or use tray with parts on it. 2. Replace vacuum generator for head at the LCS. 3. Re-adjust or replace vacuum sensor of head on the LCS.
4	MOUNT ERR FAILED TO MOUNT COMP.	Head at the LCS was not able to set part on traverser station.	1. Re-adjust or replace vacuum sensor of head on the LCS.

3.4. Messages and Error Messages for the LCS.

(1) Messages

NO.	Message	Meaning
1	INITIALIZE	Data being checked and initialized.
2	ROM1=ROM-OOPP-055	ROM1 version display
3	PAUSE → WAITING SM	System is waiting until mounter starts up
4	WAITING NEXT PCB	System is waiting for next PCB to enter mounter.
5	RETRY	Error has occurred and retry is being executed.
6	PLS. RECOVER	Error has occurred. Take steps to correct he displayed cause and press ERR CLEAR → RUN.
7	COMPLETED	Supply of parts has finished.
8	MOUNT	Parts are being supplied.
9	MOUNT DATA PARTS PALLET	Parts supply work data no. No. of part being supplied No. of pallet being used

3.3. Electrical Sections

When inspecting the machine, observe the following:

WARNING!!

1) **When inspecting without moving the X-Y-Z axis, always make sure the main switch and the switch on the external wiring panel are turned off first.**
2) **Do not touch the controller for at least 5 seconds after the power supply to the main switch has been turned off.**
3) **When moving the robot and inspecting, stay well out of the movement range of the LCS.**

Check the movements of the actuators and sensors. Use the function keys (F1 toF6) of the LCS to do this.

1) Actuators

Page	F Key	CRT Display	Movement	DO Port	Identifier
2	F1 F3	H DOWN H VAC	Head descends Head picks up part	DO20 DO24	T20 T24
3	F3	HOOK	Hook moves forward/backward	DO45	T45
4	F1 F3 F4	T FWD VAC1 VAC2	Traverser moves forward/backward Station 1 picks up part Station 2 picks up part	DO50 DO52 DO53	T50 T52 T53

Table 3-1 Checking Actuator Movements

2) Sensors

Role	DI Status	Contact Point	DI Port	Identifier
Head descent end	Descend 0	b	DI30	N30
Head picks up part	Picking 1	a	DI34	N34
Hook advance end	Advance 1	a	DI65	N65
Hook retreat end	Retreat 1	a	DI66	N66
Traverser advance end	Advance 1	a	DI70	N70
Traverser retreat end	Retreat 1	a	DI71	N71
Traverser station 1 picks up part	Picking 1	a	DI72	N72
Traverser station 2 picks up part	Picking 1	a	DI73	N73

Table 3-2 Checking Sensor Movements