

CSM 84VZ VANE HEAD & ANE STATION

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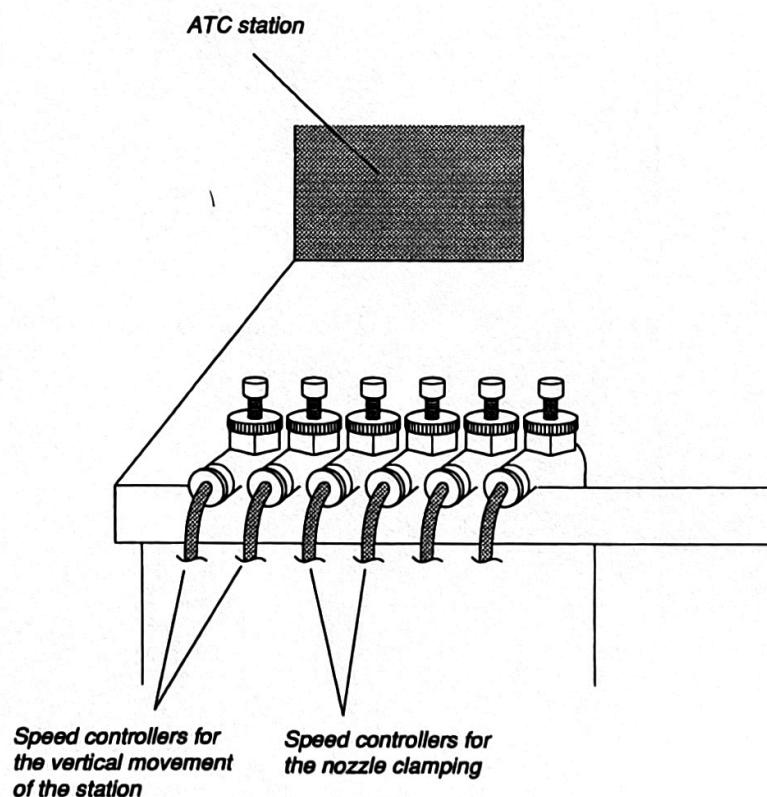
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3.3.7. Adjusting the speed controllers for the vertical movement of the station and the nozzle clamping.

Using the speed controller shown in Fig. 3-9, adjust the speed at which the station unit moves vertically, and the speed at which the nozzle clamping plates open and close. The various speed controllers are located at the left side, on the back of the machine. Adjustment is easier if the Utility program "SPEEDCON" is used in conjunction with the speed controllers. The following shows a guide for adjusting these speeds.

"First adjust the speed until the unit moves all the way to the end of the stroke and starts back without stopping. "

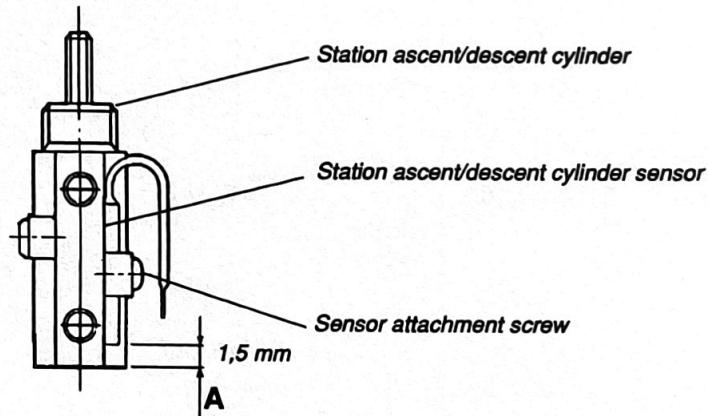
Fig. 3-9
Speed
controllers for
the vertical
movement of
the station
and the
nozzle
clamping



CSM 84VZ VANE HEAD & ANE STATION**3.3.5. Position of the station ascent/descent sensor**

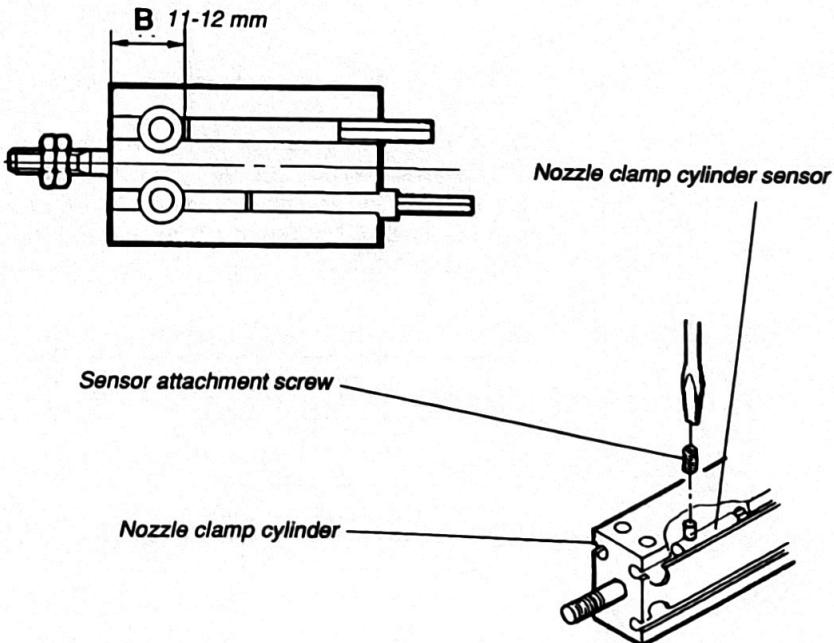
The station ascent/descent sensor determines whether the station is currently ascending or descending. Check whether the value shown at A in Fig. 3-7 reads approximately 1.5 mm. Loosen the sensor attachment screw securing the sensor in position and adjust the position.

Fig. 3-7
Position of the
station
Ascent/Descent
sensor

**3.3.6. Position of the nozzle clamp sensor**

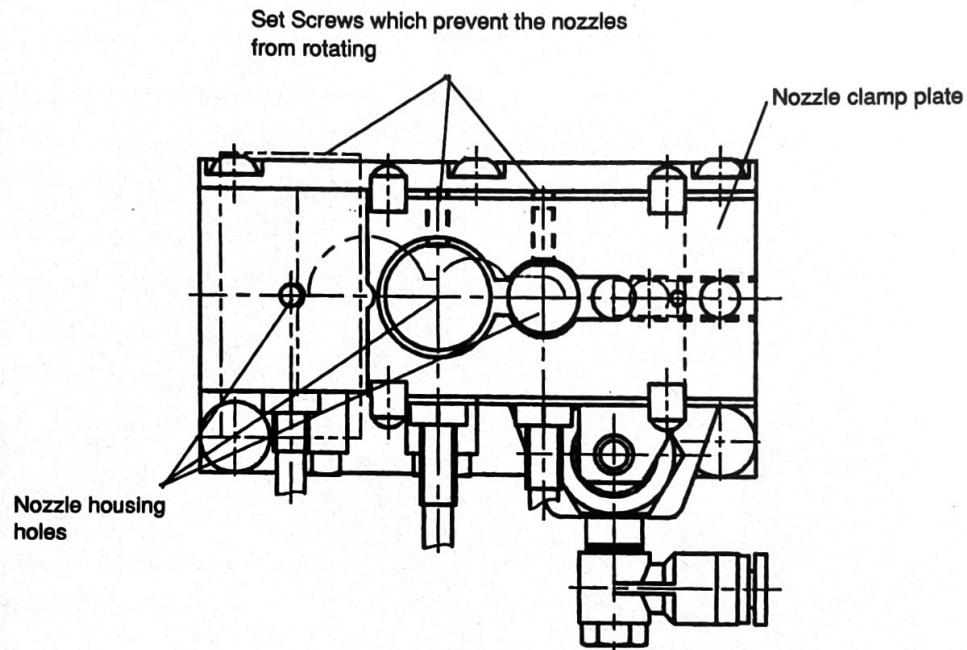
The nozzle clamp sensor determines whether the nozzle is currently clamped or unclamped. Check whether the value shown at B in Fig. 3-8 reads 11-12 mm. Loosen the sensor attachment screw and adjust the position.

Fig. 3-8
Position of the
nozzle clamp
sensor



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Fig. 3-6
Position of the
nozzle clamp plate



3.3.3. Position of the set screws which prevent the nozzles from rotating

As shown in Fig. 3-6, each nozzle has a set screw which prevents it from rotating. If this set screw is poorly positioned, the nozzle will not be able to fit into the station, or may rotate during automatic operation, resulting in a "Nozzle Clamp Error" occurring. Fit the nozzle into the station and turn the set screw until it presses against the nozzle. Then turn it back by 1/4 to 1/3 of a turn, and leave it in that position. A screw lock agent should be applied to the set screws to keep them secured in position.

3.3.4. Position of the nozzle recognition sensor

The nozzle recognition sensor detects whether or not there is a nozzle in the nozzle housing area of the ANE station. Check whether a red LED lights when there is a nozzle in the station and goes out when there is no nozzle. If the red LED goes out even for a second when the nozzle is shaken inside the station, this must be considered as a defect.

No.	Adjustment Procedure
1	Insert the nozzle into its housing area in the ANE station.
2	Loosen the nut shown in Fig. 3-6. Rotate the cylindrical sensor and move it to the position where the red LED lights.
3	Move the nozzle forward and backward, left and right and make sure that the red LED does not go out.
4	Tighten the nut shown in Fig. 3-6 (approx. 15 kgf/cm).

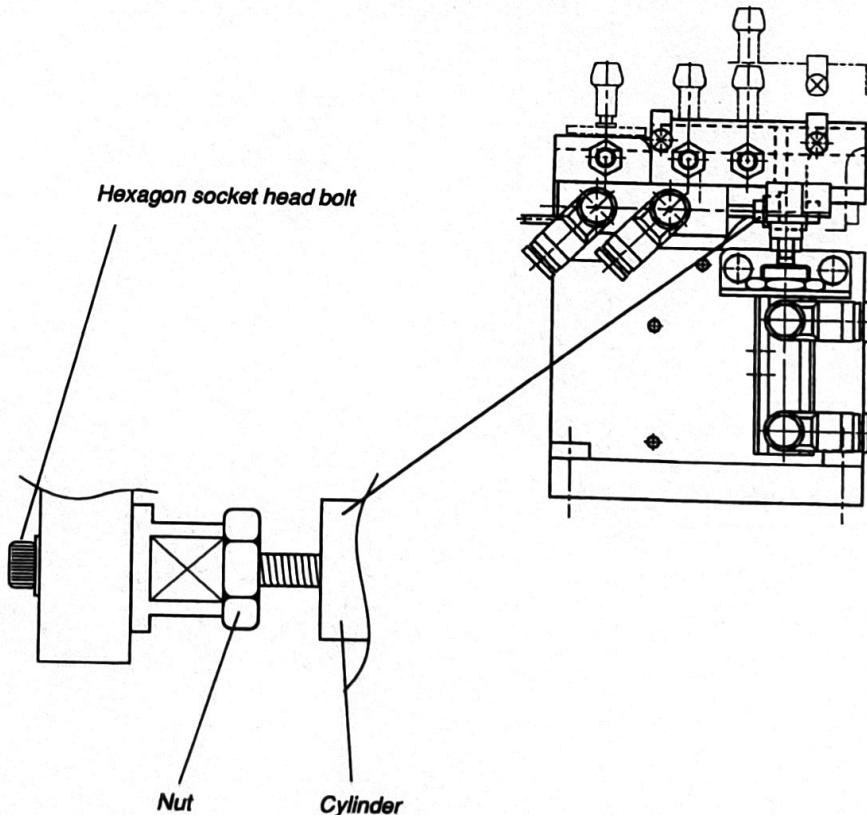
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3.3.2. Position of the nozzle clamp plate

Check whether the plate securing (clamping) the nozzle is properly positioned in relation to the nozzle housing position.

No.	Adjustment Procedure
1	Remove all of the nozzles on the ANE station.
2	Loosen the nut shown in Fig. 3-5. Turn the hexagon socket head bolt with a hexagon wrench to change the position of the nozzle clamp plate.
3	As shown in Fig. 3-6, adjust the position of the nozzle clamp plate until the centers of the three holes in the nozzle clamp plate appear to be lined up evenly with the three holes where the nozzles are housed.
4	Tighten the nut shown in Fig. 3-5.
5	Slide the nozzle clamp plate a number of times and check for gouging. Then, without clamping the nozzles, take each of the nozzles and see if it can be pulled out and pushed in smoothly by hand. With the nozzles clamped, make sure each nozzle is tightly secured.

Fig. 3-5
Section where
nozzle clamp
position is
adjusted



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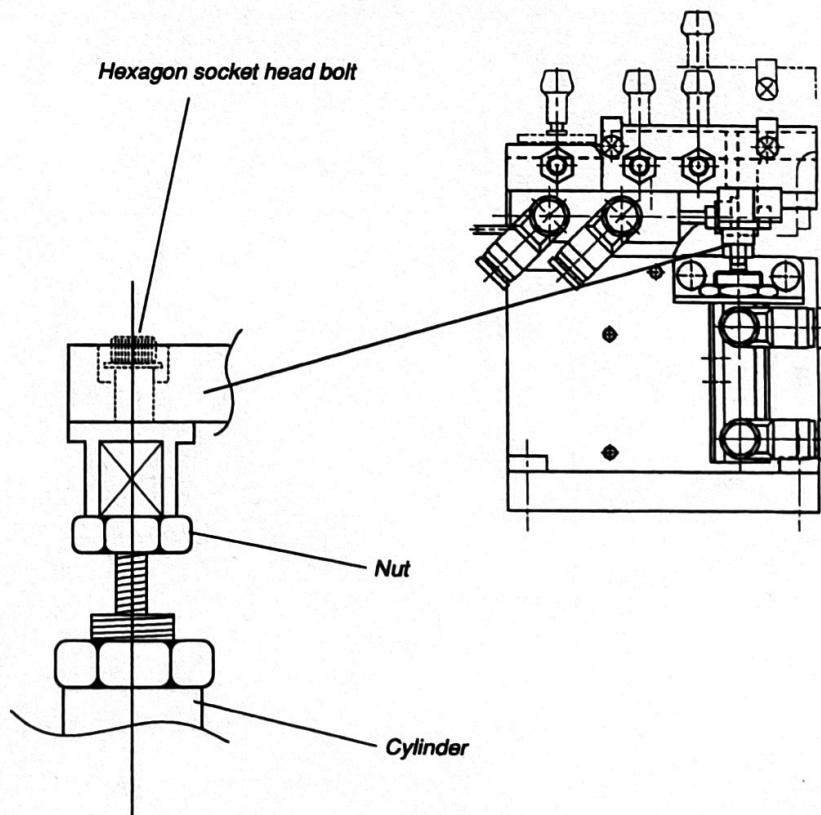
3.3. Adjustments of the ANE Nozzle Station

3.3.1. Height of the ANE station

The height of the (V)ANE-head and station in relation to each other is very important, when nozzles are being exchanged automatically.

No.	Adjustment Procedure
1	Move the (V)ANE head to the point on the ANE station where the automatic nozzle exchange is to take place.
2	Raise the station and lower the head nozzle.
3	Loosen the nut indicated in Fig. 3-4. Turn the hexagon socket head bolt with a hexagon wrench to change the height of the station.
4	Adjust the height of the stopper until the mechanical stopper ring of the (V)ANE-head, shown in Fig. 1-2, arrives at (comes in contact with) the stopper.
5	Secure the nut shown in Fig. 3-4.
6	Raise and lower the (V)ANE-head nozzle several times, and make sure it moves correctly.

Fig. 3-4
Section where
ANE station
height is
adjusted



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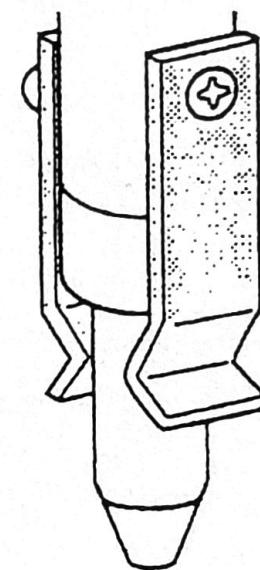


Figure 3-2 Shaft Nozzle

Plate Springs at left and right are positioned against the slanted section of the nozzle in order to prevent the nozzle to rotate are move up and down when the head is moving up and down or rotating.

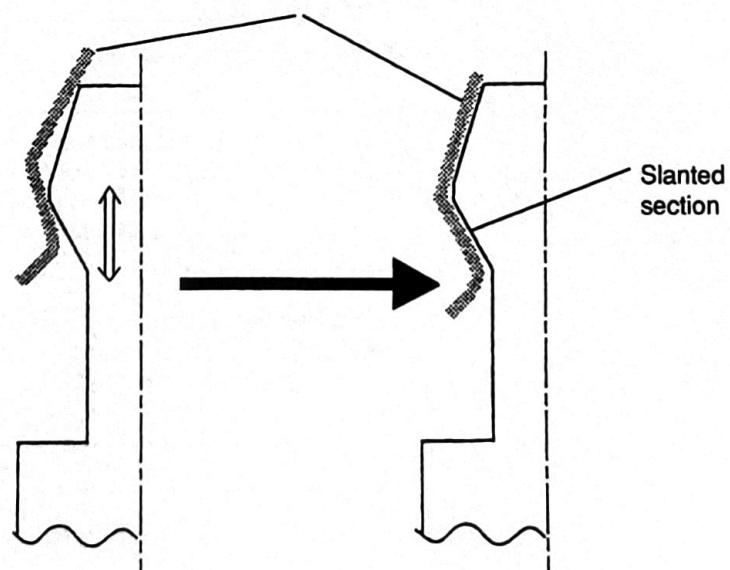


Figure 3-3 Plate spring attachment positions

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3.2.3. Adjustments: Nozzles**3.2.3.1. Nozzle Station Position**

Make sure that the position of nozzle 1, 2 and 3 are correctly teached. Refer to section 2.2.2. or chapter 3 of this manual.

3.2.3.2. Replacing Nozzles or Nozzle Plate Springs

Nozzles may be replaced in the following occasions:-

- **VANE head nozzles**
Check whether any signs of wear are visible in the area where the (V)ANE head shaft and nozzle fit together. If there are any signs of wear or damage, replace the nozzle.
- **VANE head plate springs**
Check the plate springs holding the nozzle in position to see if they are weakened or worn out, or if there are any signs of damage.

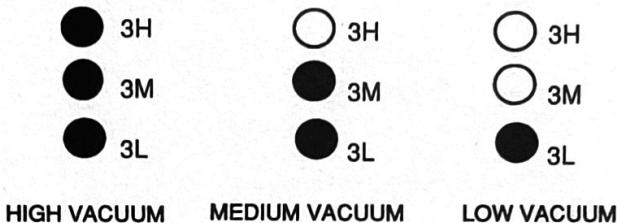
Replace ment of nozzles (follow step 1 and 5), and nozzle plate springs (follow step 1 through 5) is\done on the following way:-

No.	Replacement Procedure
1	Pull the (old) nozzle off of the VANE head.
2	The plate spring is held in place, as shown in Fig. 3-2, by a M2 screw. Remove the M2 screw from the plate spring which has to be replaced.
3	Have a new plate spring ready. Attach the plate spring to the shaft nozzle.
4	The plate spring should press on the sloping surface on top of the width across flats ofthe nozzle, to prevent looseness as the nozzle moves up and down. If it is positioned correctly, the new plate spring(s) should be attached in the position as is shown in figure 3-2.
5	Pull the (new) nozzle out and push it in a few times to see if excessive force is required to move it. Also check for looseness or rattling when the nozzle moves up and down or rotates.

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3.2.2.2. Suction pressure sensor

The suction pressure generated when picking up parts differs depending on the type of electronic part and the inner diameter of the nozzle. Using a nozzle which is the appropriate size for the electronic parts actually being mounted, pick up the part and check which LEDs light.



The correct vacuum sense level must be entered in the DATA IN - COMPONENT - [Select Component] menu. The parameter that must be filled in is *CHECK LEVEL* (refer also to Chapter 3 of the Operating manual).

3.2.2.3. Adjust component picking height

An incorrect setting of the picking height of the component may cause picking errors.

- Select menu DATA IN - COMPONENT - [Select Component number]
- Select parameter *Z POSITION* and adjust the parameter to a correct value.

NOTES:**Example:**

Z-Offset = -20.35 and still 1mm is needed to pick the component. Then Z-Position will be -20.35 - 1 = -21.35mm

If picking fails, because the component is located lower than the HEAD.3 Z OFFSET position can reach, then measure the distance, by hand that should be added extra to the Z-Offset value in order to reach the top of the component. The Z-Position value will then be: Z-Offset - Extra Distance.

Important: The lowest position that Head 3 can reach in manual mode is the value defined in the HEAD.3 Z-OFFSET parameter. This means that when a component should be picked on a position lower than this coordinate, it cannot be checked manually, but only in running mode. If you do want to check it in manual mode, then this can be done by changing the HEAD3 Z-OFFSET parameter to the new parameter that will be entered in Z-POSITION (first write down the current unchanged value of the HEAD3 Z-OFFSET parameter), try in manual mode if this succeeds. If the nozzle can reach the component, then enter this value into Z-POSITION and change the HEAD3 Z-OFFSET value back to the original value. Remember that the HEAD3 Z-OFFSET value is the value on which the nozzle of head 3 just touches the surface of the PCB.

For the HEAD3 Z-OFFSET parameter, refer to section 3.2.1.1.

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3.2. Adjustments**3.2.1. Adjustments: Mounting****3.2.1.1. Head 3 Z-Offset adjustments**

- a) Select from the Main Menu the *Manual* option.
- b) Select page 7 (move forward and backward through the pages by means of function keys <F5> and <F6>)
- c) Use function key <F1> (=H3DOWN) to lower and higher the nozzle (activate Z-servo system).

NOTE:

Pressing <F1> for about 1 second will allow both the push-rods and the nozzle to descent and ascent. Pressing <F1> for just a short moment will only activate the push rods.

- d) When the nozzle is at its lowest position, it should just touch the topside of the PCB. When this is not the case, then:
 - Check the position of the PCB on the conveyor. There must be no deflection or looseness or too much warp.
 - Select menu DATA IN - SYSTEM - PARAMETER - OFFSET and set the offset value for the *HEAD.3 Z* parameter to such a value that the nozzle just touches the topside of the PCB (refer also to section 2.2.4.)

3.2.1.2. Component mounting height adjustments

If a the component height is defined wrong, it could be that the component is not mounted correctly.

- a) Select menu DATA IN - COMPONENT - [Number of the wrong mounted component]
- b) Select parameter *COMP. HEIGHT*. Adjust to a such a value, that the component will be mounted correctly. (Refer also to section 2.2.6.)

NOTE:

When a value of 0.00 is defined here, then the mounting height is the value which is defined in the Head 3 Z Offset parameter, as is described in section 3.2.1.1. This value must be corrected first if mounting fails when this value is set to 0.00.

3.2.2. Adjustments: Picking**3.2.2.1. Trays and Feeders**

For the component, make sure that the tray and feeder settings are set correctly. If trays are not securely fixed in position, or are slanted, parts may not be picked up correctly because of false air suction. Feeders must be set correctly into the feeder bar. Incorrect installation of feeders may result in pick errors and in worst case; an incorrect installed feeder can cause heads to crash into the feeder.

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SECTION 3

MAINTENANCE AND REPAIR

3.1. Maintenance and Inspection

3.1.1. Mechanical sections

- Is there sufficient oil for the shaft spline of the (V)ANE head?
→ Add No. 1 or No. 2 machine oil. (Once every two weeks)
- Is there any foreign matter such as dust, grime, or chips adhering to the shaft spline of the precision head?
→ Remove it using tweezers or your fingers, and add oil. (Once every two weeks)
- Is there any water or oil adhering to the air passages inside the nozzles, shaft nozzles, or shaft splines of the (V)ANE head?
→ Clean the parts. (Once a week)
- Is there sufficient oil for the slide guide of the ANE station?
→ Add No. 1 or No. 2 machine oil. (Once every two weeks)
- Is there any foreign matter such as dust, grime, or chips adhering to the slide guide of the ANE station?
→ Remove it using tweezers or your fingers, and add oil. (Once every two weeks)

3.1.2. Electrical sections

Check the movements of each of the actuators (electromagnetic valves) and sensors. Use the function keys (F1 to F6) of the CSM to do this.

1) Actuators

Page	FKey	CRT Display	Movement	DO Port	Identifier
4	F3	DO(36)	No. 3 head backlight	DO36	T36
7	F1	H3DOWN	No. 3 head descends	DO40	T40
	F2	H3VAC	No. 3 head picks part	DO44	T44
8	F3	NZL(1)	Nozzle clamps	DO52	T52
	F4	NST.UP	Station ascends/descends	DO53	T53

2) Sensors

Role	DI Status	Contact Point	DI Port	Identifier
Nozzle clamps	Clamp 0	a	D56	N56
Station ascends	Ascend 0	a	D57	N57
No. 3 head descends	Descend 0	b	D60	N60
Nozzle 1 identifier exists	Exists 0	b	D70	N70
Nozzle 2 identifier exists	Exists 0	b	D71	N71
Nozzle 3 identifier exists	Exists 0	b	D72	N72

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2.2.7. Mount Data: Select correct nozzle (step 7)

1. Select menu DATA IN - PCB - MOUNT
2. Select any mount line that uses head 3 (defined on the second screen page). For head 3, select the correct nozzle. The nozzle is defined in the column named 'NOZZLE'.

Nozzle 1 = Medium

Nozzle 2 = Large

Nozzle 3 = Small

NO.	PARTS	HEAD	NOZZLE	SKIP?	FIDU.
<input checked="" type="checkbox"/>	5	3	2	NO	NOT USE
1					
2					
3					
4					
5					
6					
7					
8					
9					

XXX : DATA FROM BLOK ORG
X=0.00 Y=0.00 Z=0.00

F1 F2 F3 F4 F5 F6

2.2.8. Define Mount Timer Check (step 8)

1. Select menu DATA IN - SYSTEM - PARAMETER - TIMER
2. Select parameter *MOUNT CHECK* and *AFTER MOUNT*. Immediately after picking and placing a part, the (V)ANE head performs a mounting check. A small amount of time must be reserved so that the check can be carried out properly. With tall parts, in particular, make sure the value set allows enough time for the check. A value of 0.05 is appropriate for these timers.

DATA IN	SYSTEM PARAMETER TIMER
SET-PIN UP	: 0.10
SET-PLATE UP	: 0.50
MOUNT CHECK	: 0.05
AFTER MOUNT	: 0.05

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**Exp.= Comp. Height = 4.25mm
Z-Offset = -20.35mm**

**Mounting height= -20.35 +
4.25 = -16.10mm
(=Z-Offset + Comp. Height)**

NOTE:**2.2.5. Define component mounting height (step 5)**

1. Select menu DATA IN - COMPONENT - [Select Component Number]
 2. Select the Parameter *COMP. HEIGHT*. This coordinate specifies the height of the vision head when the component is mounted. This value must be taken from original component catalogues.
- Mounting height = 1) HEAD.3 Z-OFFSET, when COMP.HEIGHT is 0.00
2) HEAD.3 Z-OFFSET + COMP. HEIGHT, when COMP. HEIGHT is any value greater than 0 (zero).

When this value is set to 0.00 (default), the mounting value which will be used is the value defined in the Z-Offset parameter of Head 3 in the DATA IN - SYSTEM - PARAMETER - OFFSET menu (refer to 2.2.3.). The component Height will then not be taken into consideration.

DATA IN		COMP. NO. 2
COMPONENT		
TEACHING UNIT	: CAMERA	
XY POSITION	: 11.71 38.85	
Z POSITION	: 0.00	
.	.	
.	.	
.	.	
COMP. HEIGHT	: 0.00	

**2.2.6. Define Use of Push Rod (step 6)**

1. Select menu DATA IN - COMPONENT - [Select Component Number]
2. Select parameter *PUSH ROD*. This option is displayed only when in the DATA IN - COMPONENT screen, for the specific component, the feeder type *TRAY FEEDER* is selected. It is not necessary to use the push rod when a component is picked from a tray. In this case, this option can be set to *NOT USE*. To save cycle time, the option *NOT USE* is preferred

DATA IN		COMP. NO. 2
COMPONENT		
TEACHING UNIT	: CAMERA	
XY POSITION	: 11.71 38.85	
Z POSITION	: 0.00	
.	.	
.	.	
.	.	
PUSH ROD	: NOT USE , USE	



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2.2.3. Define correct Z-Axis Offset (step 3)

1. Select menu DATA IN - SYSTEM - PARAMETER - OFFSET
2. Select correct offset value for the Z-Axis on Head 3. This offset value is the point where the underside of the nozzle and the surface of the PCB first come in contact. Normally, this value will be between -20.00 mm and -21.00 mm.

DATA IN			
SYSTEM	SYSTEM	PARAMETER	OFFSET
CAMERA		: 0.00	0.00
•		•	
•		•	
•		•	
HEAD.3 XY		: 1.09	-68.69
Z		: -20.35	
R		: -1.90	

⇐

2.2.4. Define component picking height (step 4)

1. Select menu DATA IN - COMPONENT - [Select Component number]
2. Select the Parameter *Z Position*. This coordinate is when the position at which the underside of the nozzle comes in contact with the surface of the component in the feeder or in the tray.

NOTE:

When this value is set to 0.00 (default), the value which will be used is the value defined in the Z-Offset parameter of Head 3 in the DATA IN - SYSTEM - PARAMETER - OFFSET menu (refer to 2.2.3.).

DATA IN		COMP. NO. 2
COMPONENT		
TEACHING UNIT	:	CAMERA
XY POSITION	:	11.71 38.85
Z POSITION	:	0.00
•		•
•		•
•		•

⇐

Picking coordinates =

- 1) HEAD.3 Z-Offset, if Z-Position is 0.00, or
- 2) Z-Position, when Z-position is any value other than 0.00.

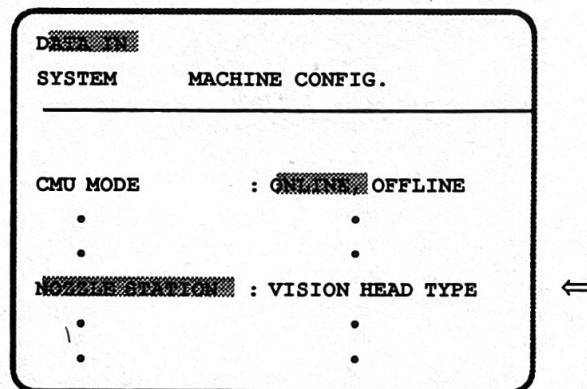
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2.2. Automatic Exchange of Nozzles

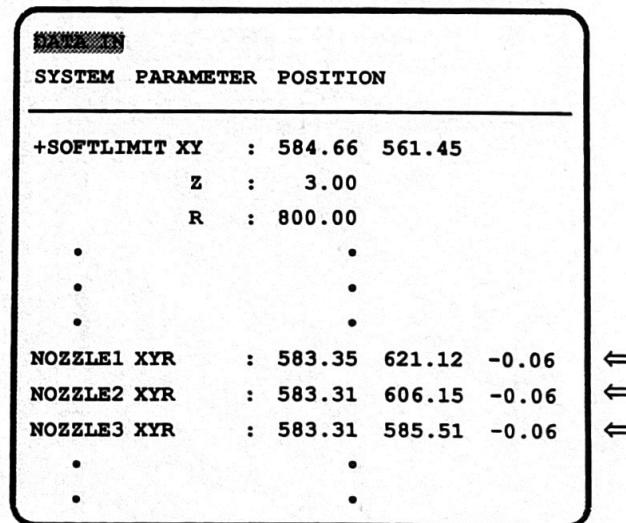
By setting the data to the values shown in the table below, the nozzles of the precision head can be exchanged automatically, using the ANE station.

2.2.1. Define Nozzle Station (step 1)

1. Select menu DATA IN - SYSTEM - MACHINE CONFIG.
2. Select the parameter NOZZLE STATION and set this option to *VISION HEAD TYPE*

**2.2.2. Define Nozzle Station Position (step 2)**

1. Select Menu DATA IN - SYSTEM - PARAMETER - POSITION
2. Teach the positions for nozzle 1, 2 and 3.



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SECTION 2

OPERATION AND HANDLING

2.1. Manual Exchange of Nozzles

The nozzles can be exchanged manually.

Work Content	Checking/Reference
<ol style="list-style-type: none"> 1. The nozzle can be removed by pulling it downwards. 2. When attaching a different nozzle, first set the rotation angle of the R axis to 0°. (Use the R+ and R- keys, or initiate a Return to Origin.) 3. With the nozzle shown in Fig. 2-1 oriented so that the width across the flats is facing front and rear, insert it into the shaft nozzle. When it is inserted all the way, it will be secured in position by a plate spring. 	<ul style="list-style-type: none"> • Apply light pressure on the nozzle in the vertical, front/back and left/right directions, and make sure it is securely held, with no looseness or rattling.

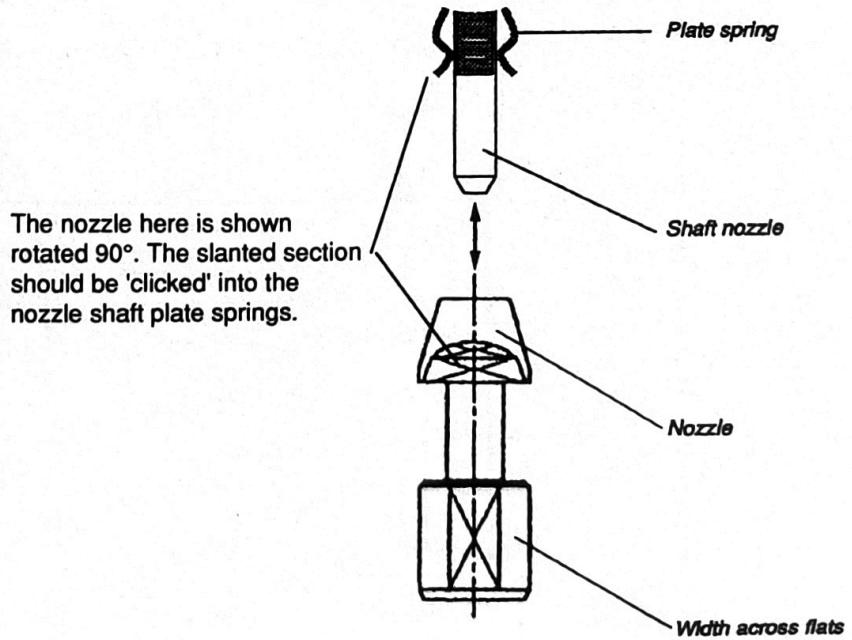


Fig. 2-1 Manual Exchange of Nozzles

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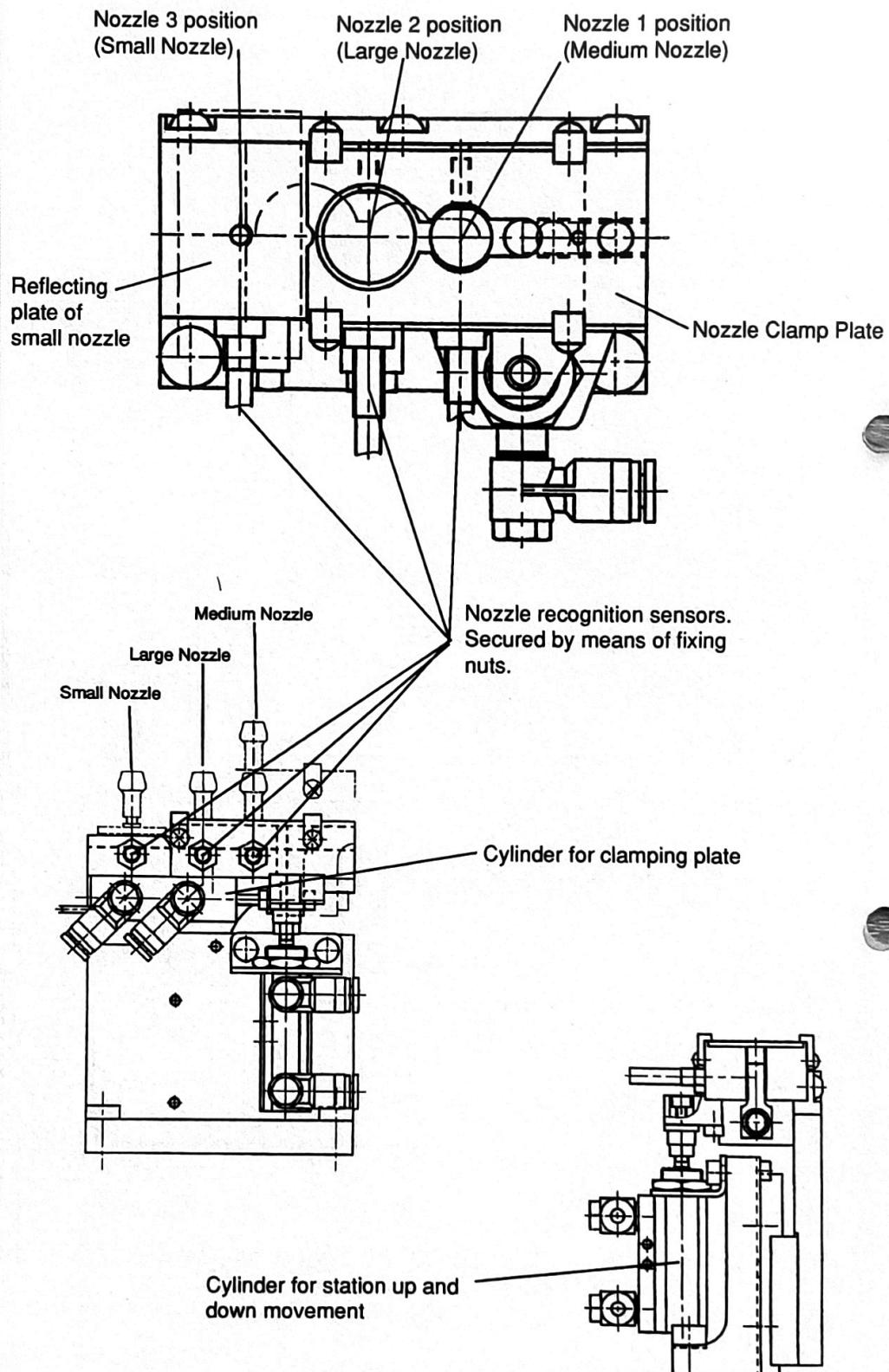


Fig. 1-3 Exterior of the ANE Station

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1.2. Exterior and Names of Parts

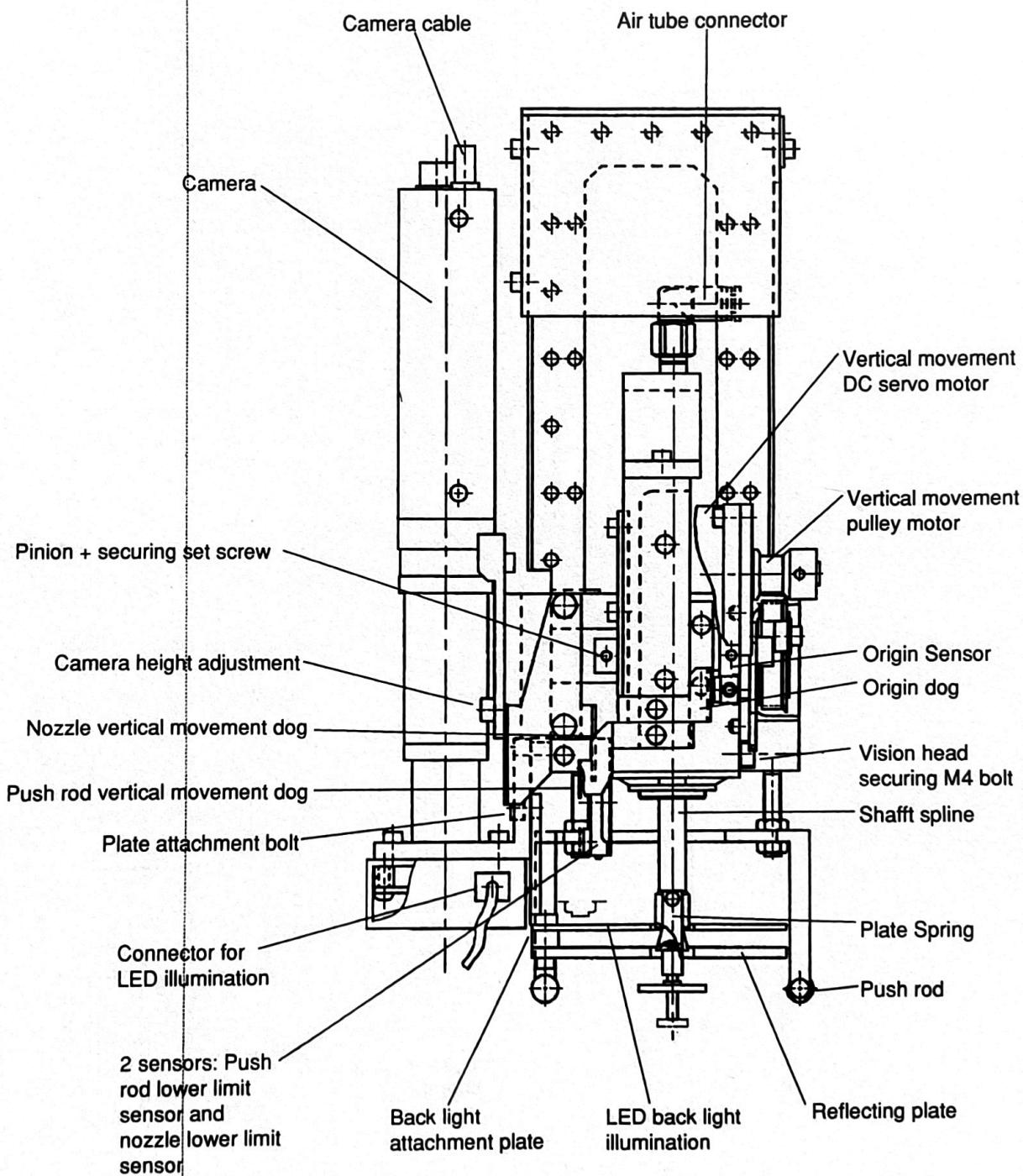


Fig. 1-2 Exterior of the (V)ANE- Head

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- (3) Mounting accuracy of the precision head
±0.1 mm (PCB, fiducial + fixed centering unit)
- (4) Pickup capability
Pickup is possible from any unit other than the 8 mm and 12 mm Mechanical Drive Feeders.
- (5) Size of electronic parts that can be picked up (ordinary QFP and PLCC parts)
 - No. 1 nozzle (Middle): 12 to 30 mm²
 - No. 2 nozzle (Large): 18 to 54 mm²
 - No. 3 nozzle (Small): 3 to 16 mm², 18mm longitudinal, 16mm transverse, except the PLCC 16mm

By combining a precision head, a fixed centering unit and a fiducial, the following types of electronic parts can be mounted:

Square chips (3 sq. mm or larger)
Aluminum electrolytic capacitors (4.3 x 4.3 to 6.6 x 6.6 mm)
SOPs (6-pin to 28-pin)
PLCCs (maximum outer diameter size 45 mm², minimum pitch of 0.8 mm)
QFPs (maximum outer diameter size 45 mm², minimum pitch of 0.8 mm)

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SECTION 1

SPECIFICATIONS

1.1. Features

Using the ANE station, nozzles on the precision VANE head can be exchanged automatically. The VANE head is equipped with a PCB recognition camera, LED illumination and a reflecting plate.

In order to have the nozzles changed automatically at the ANE-nozzle station, it is required that the VANE head is mounted on head position no. 3. With this head position it is possible to reach the ANE-nozzle station.

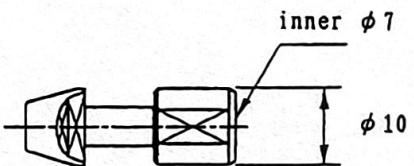
1.1.1. Nozzle Exchange Time

The nozzle exchange time is approximately 2.5 seconds

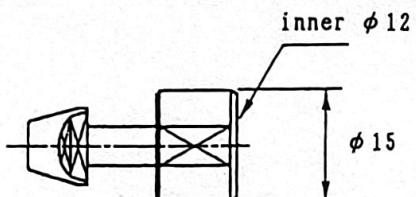
1.1.2. Types of nozzles

The types of nozzles supported are shown in Figure 1-1.

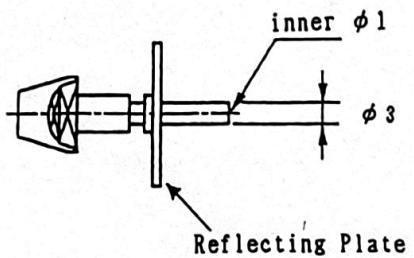
1) Large nozzle (nozzle number 2 on ANE station)



2) Small Nozzle (nozzle number 3 on ANE Station)



3) Medium Nozzle (nozzle number 1 on ANE station)



Note: For nozzle station positions, refer to figure 1-3

Fig. 1-1 Types of Nozzles

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OPERATION & SERVICE MANUAL

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