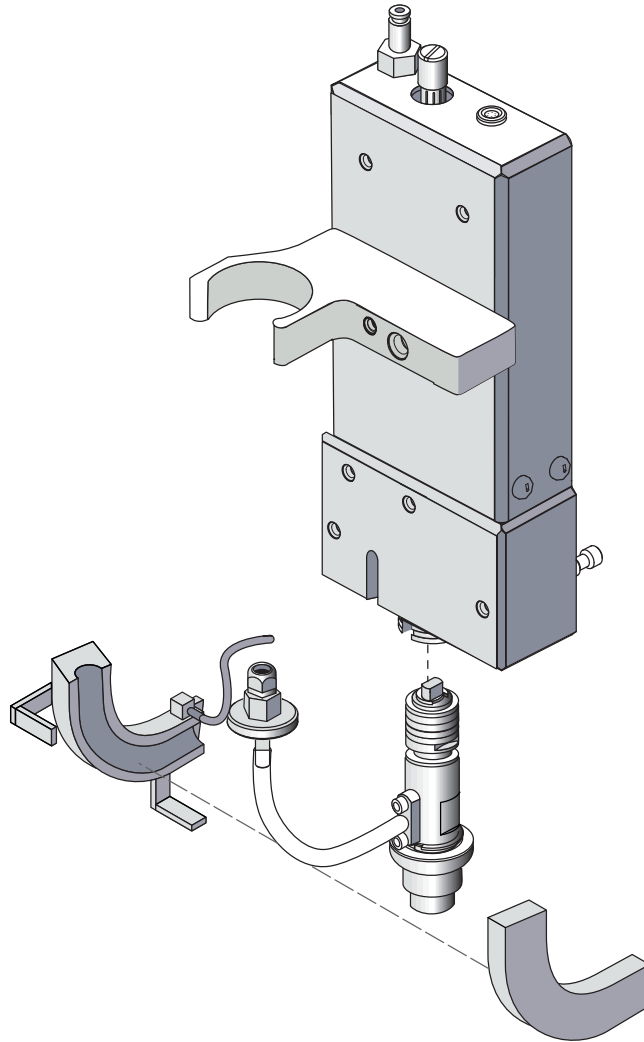


CAMALOT

620 Series

Heated Line Dispense Unit

Xyflex and XyflexPro Applications



Speedline Technologies

A COOKSON ELECTRONICS COMPANY

145 Ward Hill Avenue, Haverhill, MA 01835, U.S.A.
Phone (978) 373-3742 - FAX (978) 521-2105

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Heated Line Dispense Unit

Overview

Introduction

The heated line dispense unit is a precision device used primarily for dispensing liquid and semiliquid materials. It is used primarily for encapsulation and underfill dispensing applications.

Most information is common to both Xyflex and XyflexPro systems. When the procedures differ they will be identified.



Attention

When performing any software procedure in this section, the command word **“Select”** refers to a single click of the left trackball button on a menu item, button, checkbox, field or pull-down list.



Attention

When removing or installing syringes from the dispense unit, support the gantry so as to prevent needle damage or breakage.

In this Section

This section contains the following topics.

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Basic Operation

Description

The line dispense unit consists of a removable assembly which is mounted on the dispense head. The assembly housing contains the drive mechanism and a dispensing cartridge. An archimedes type leadscrew inside the cartridge delivers material through a needle attached to the cartridge. Rotation of the leadscrew is by way of a motor driven spline/gear arrangement. Air pressure is applied to the material supply syringe or cartridge to assure a constant flow of material to the leadscrew.

Dispense Sequence

When a programmed dispense instruction is received from the process program, the head is driven to the exact X/Y dispense coordinate. The needle is lowered down to the surface by the head. Air pressure is used to lower the cartridge and rotation of the leadscrew is commanded as specified by the process program. The amount of material dispensed is based on the duration of leadscrew rotation which is determined by the dispense command parameters. Upon completion of the required dispense, the leadscrew stops, the needle is raised, and delivery will stop.

Factors Affecting Dispensing

Several factors determine how accurately and reliably materials will be dispensed:

- Needle selection and needle gap relative to dispensing application and material.
- Air pressure on syringe. Correct air pressure setting.
- Cleanliness of the cartridge and dispense unit sleeve.

Tips for Dispensing Material

Most materials dispensed from a line unit require 20 to 40 PSI at the supply syringe or cartridge to keep the dispense unit full. The valve does not otherwise rely on air pressure to dispense consistently. When the motor is activated, the rotary motion of the high-speed leadscrew mechanically displaces the material.

- If too little air pressure is applied to a higher viscosity material, voids will occur on the leadscrew and at the needle tip.
- If too much air pressure is applied, it could force material through the leadscrew and cause it to back up in the needle hub.
- The given volume of material which can possibly be expelled depends on the needle gauge and leadscrew.

Installation And Setup

Overview

Introduction

This section contains procedures for mounting and establishing software settings for the dispense unit.

Piston Lift Adjustment

Introduction

Prior to installation, the piston lift must be adjusted. This adjustment is used to establish the exact point of contact between the ball end of the leadscrew and the needle seat. The actual piston lift distance is measured from this point.



Attention

All piston lift adjustments must be performed with dispense unit off the machine. Perform adjustments with dispense unit in hand.

Procedure

Refer to Figure 1.

1. Remove the needle and needle nut from the cartridge.
2. Push the sleeve up to expose the piston lift adjustment screw.

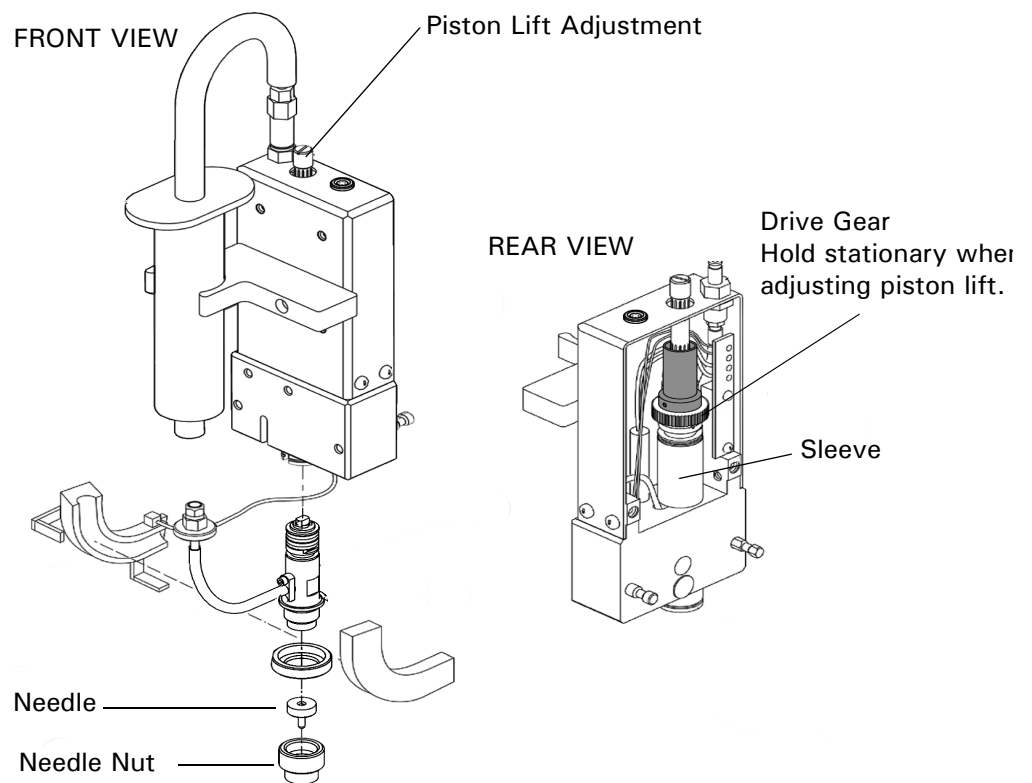


Figure 1



Attention

When turning the piston lift adjustment screw, the drive gear must be held firmly in place to prevent movement.

3. While holding the drive gear, turn the piston lift adjustment screw counterclockwise 5 turns to raise the ball end of the leadscrew beyond its point of contact with the needle seat.
 4. Assemble the needle and needle nut onto the cartridge.
 5. Turn the piston lift adjustment screw clockwise until it stops. The ball end of leadscrew should contact the needle seat. This is the zero position.
-

**Attention**

One click of the piston lift adjustment is equal to 0.001 inch of lift.

6. Turn the piston lift adjustment counterclockwise, to set the desired lift for dispensing process.
-

Installing A Material Supply Syringe

Procedure

Refer to Figure 2.



Attention

Removal of the dispense unit is recommended to prevent damage to the needle.

1. Install a syringe adapter onto a supply syringe.
2. Twist the syringe onto the LuerLock fitting on the feed tube.
Do not overtighten.
3. Be sure the feed tube assembly and cartridge can move up and down freely.
4. Attach the quick-disconnect fitting to the fitting on the top of the dispense unit housing.

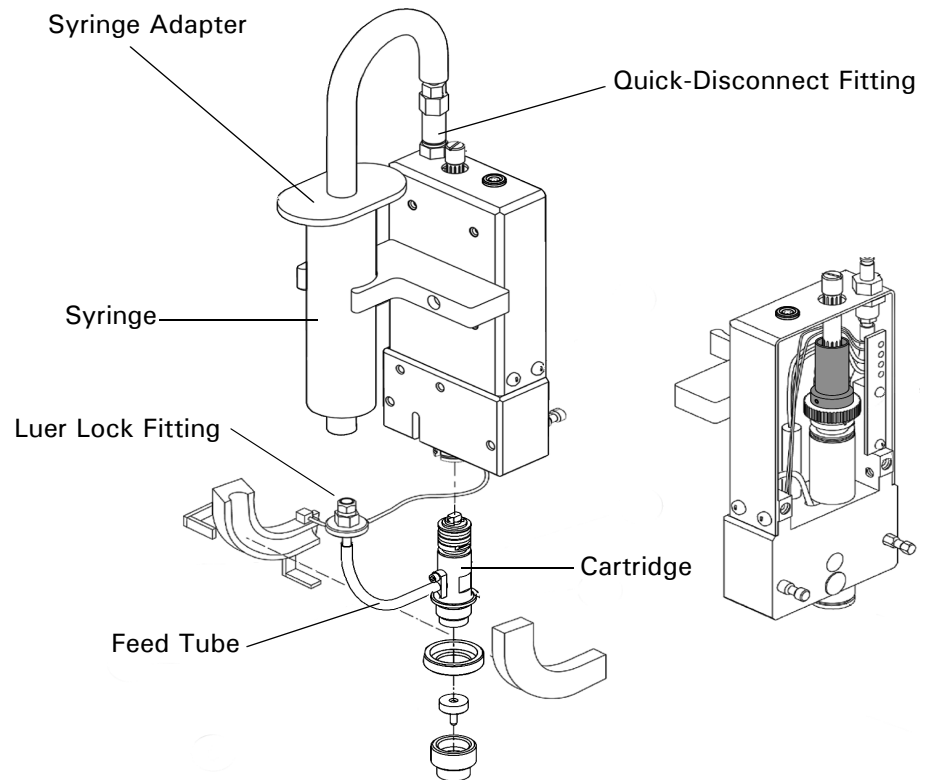


Figure 2

Mounting The Dispense Unit


Procedure

Install the dispense unit onto the dispense head as follows:



Attention

The safety door(s) must be closed and locked prior to installation or removal of the dispense head. This allows the axes to move to their proper position for mounting or removing the dispense unit.

1. If necessary, close safety door(s).
2. Select **Maintenance > Change Syringe** or select the **Change Syringe** tool bar icon from the **Machine** screen. 

A head selection box appears. See Figure 3.



Figure 3

3. Select the head to which you will mount the dispense unit.
4. Select the **Next >** button.
A series of screen notes and a purge checkbox appears. See Figure 4.
5. Open the safety door.
6. Push the sleeve on the dispense unit all the way up.
This allows for proper installation of the dispense unit.

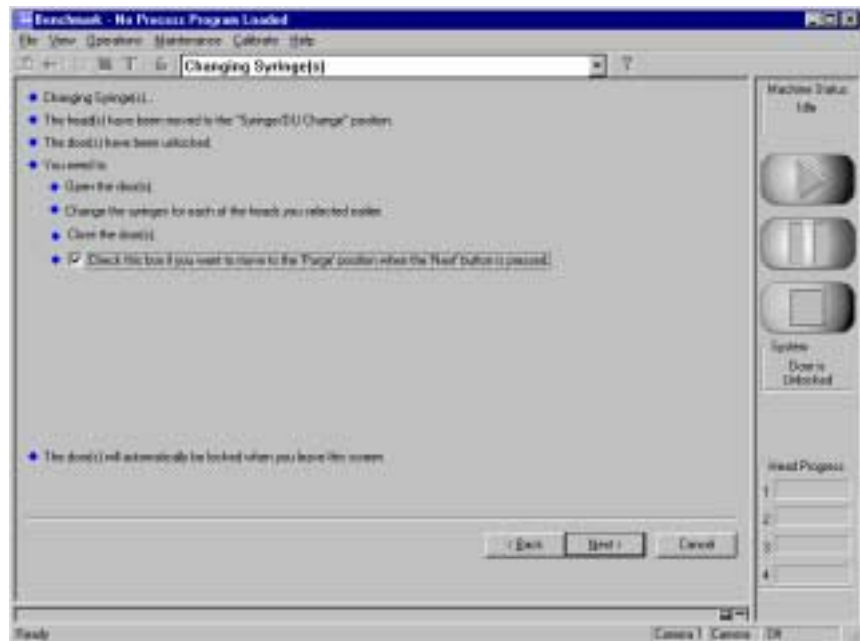


Figure 4

7. The open side of the circlip at the top of the sleeve should face the dispense unit housing. See Figure 5.
8. Carefully position the dispense unit so that two locating pins align with the holes in the dispense head.
The U-shaped yoke on head and the matching groove on sleeve of dispense unit should be properly aligned with each other. See Figure 5.
9. Press the dispense unit straight back against the head.
The U-shaped yoke on head will automatically engage with matching groove on the sleeve of the dispense unit.
10. Push down the lever on the left side of the head until a distinct click is heard.
The click indicates that the dispense unit is securely engaged.
11. Install/Reinstall the supply syringe.
12. Click on the **Purge** checkbox if you want to purge the DU.
If the box is checked the head is moved to the purge position when the **Next** button is selected in step 13.
13. Select the **Next** button.

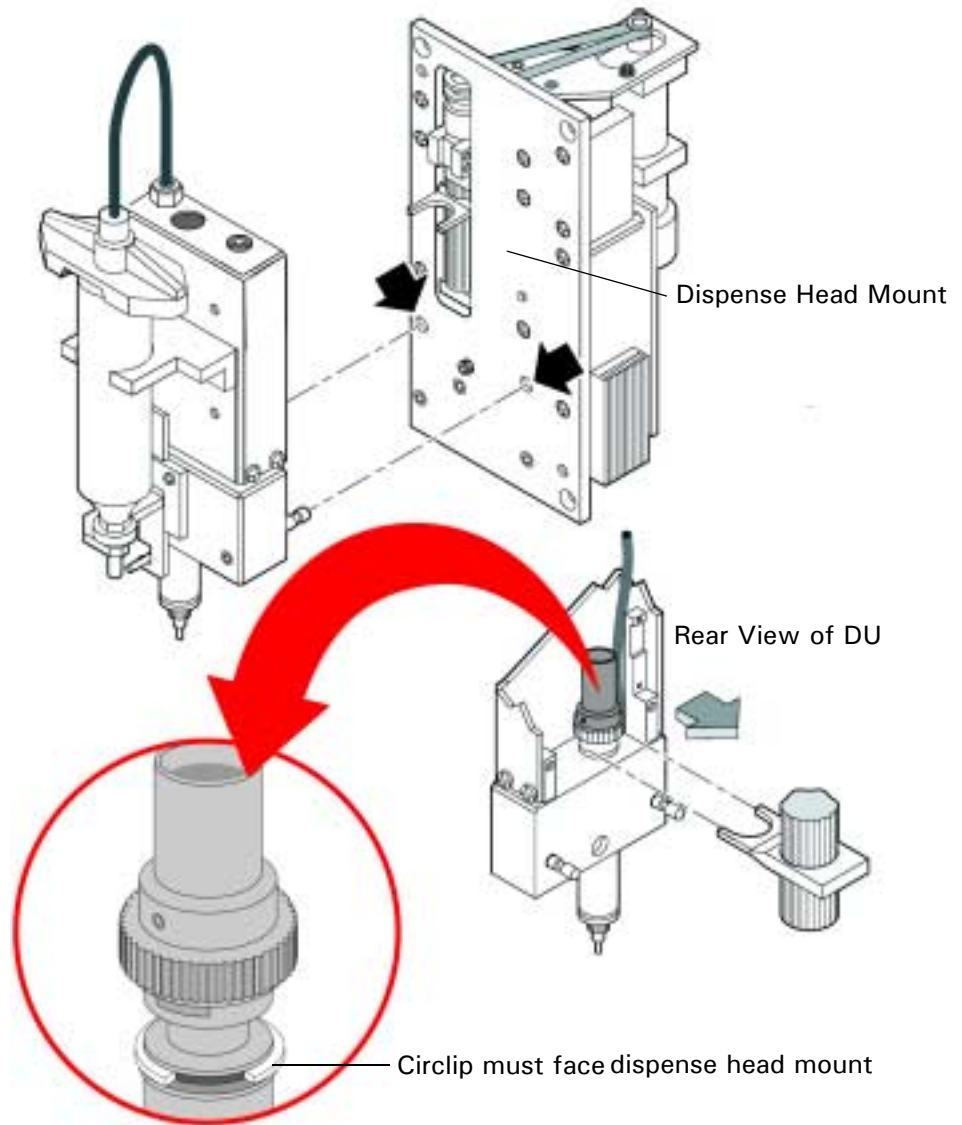


Figure 5

Purging The Dispense Unit

Introduction

The dispense unit is normally purged when a new syringe is installed or to expel aged material.



Attention

The amount of air pressure on the syringe depends on the material to be dispensed.

Procedure

Purge the dispense unit as follows:

1. Turn air adjustment knob until air pressure on gauge is about 15 PSI.



Pressurized Device

The Purge Off button can be selected at any time to stop the purging process.

2. Select **Maintenance > Change Syringe** or select the **Change Syringe** tool bar icon from the **Machine** screen.



3. If you are operating a **XyflexPro Dual Head** or a **Xyflex**, select the dispense unit **Head** to be purged from the list.
4. Select the **Next** button.

The **Purge Needle** screen appears. See Figure 6.

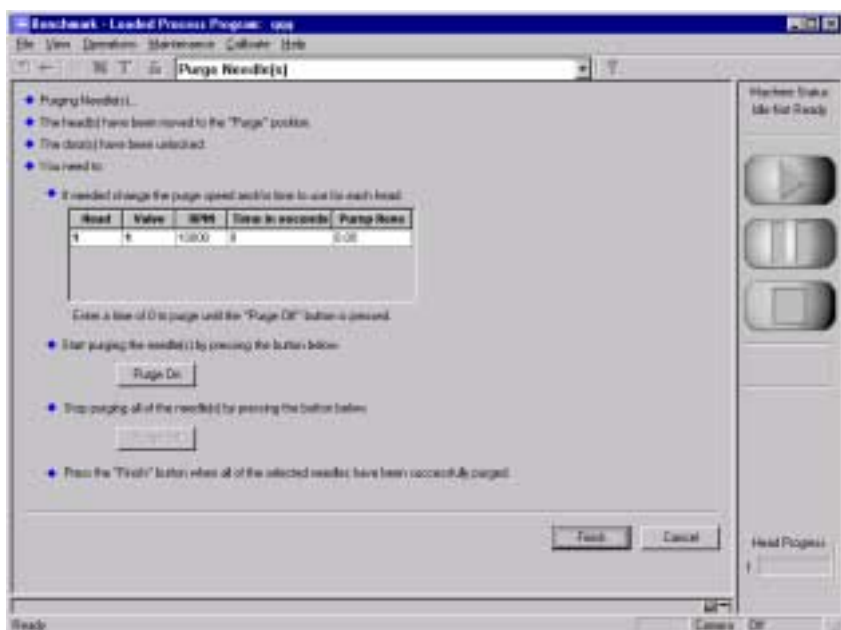


Figure 6

5. Specify a value in the **RPM** column.
6. If desired specify the number of seconds in the **Time** column.
If the **Time** column value is set to zero, the purge cycle will continue as long as the **Purge On** button is selected.
7. Place a rag or a wipe under the needle, select the **Purge On** button.
You can halt the purge process at any time by selecting the **Purge Off** button.
8. Wipe the needle clean as the **Purge Off** button is selected.
Material flow should stop immediately.
9. If material continues to bleed from the needle:
 - a. Decrease the air pressure.
 - b. Let air pressure stabilize for about 30 seconds.
 - c. Repeat steps 7 and 8 until acceptable material flow is achieved.
10. Select the **Finish** button.
A message screen appears (Figure 7), advising you to close the safety door(s).
11. Close the safety doors to continue.

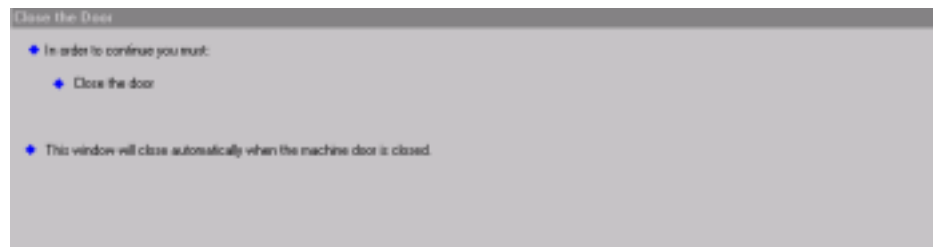


Figure 7

Heater Controls

Introduction

Temperature control for the dispense unit heaters is provided by temperature controllers. The dispense unit heat is set using system software.

Temperature Control Button

The power for all the temperature controllers is turned ON and OFF by placing the pointing arrow on the control button on the **Machine** screen. The location is shown in Figure 8 (Xyflex) and Figure 9 (XyflexPro).

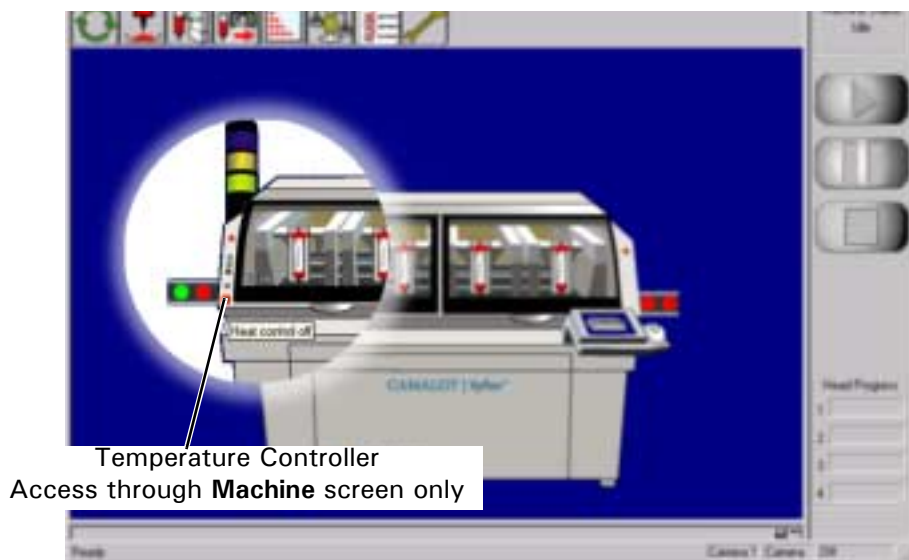


Figure 8

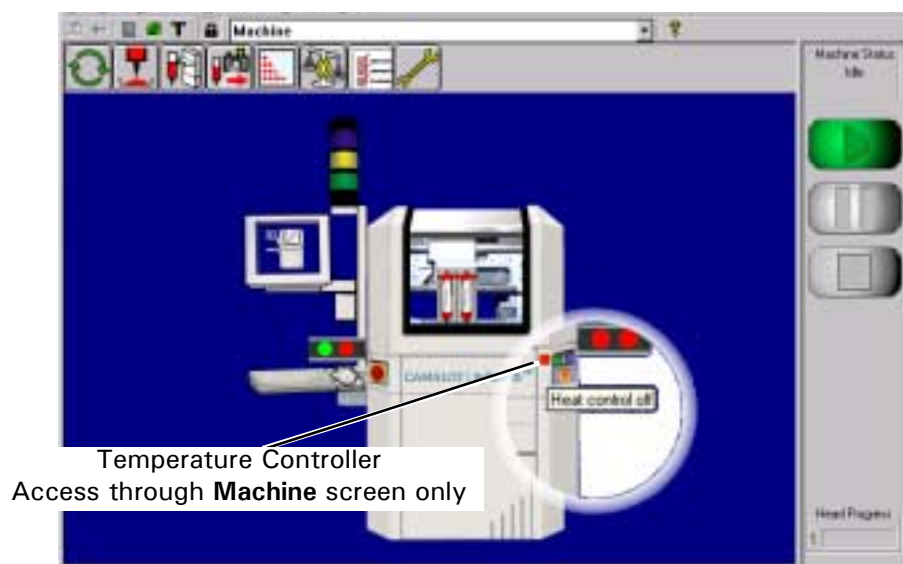


Figure 9

The color of the **TEMP CONTROLLER** button indicates an **ON** (Green) or **OFF** (Red) condition. To turn the temperature controller on or off, place the pointing arrow on the **TEMP CONTROLLER** button and click the left trackball button. The button will change color to indicate the new condition.

Setting Dispense Unit Temperature

Set each dispense unit temperature control as follows:

1. Select **View > Configuration** and select the **Temperature** tab from the **Machine** screen.
A screen appears with various temperature related controls. See Figure 10.

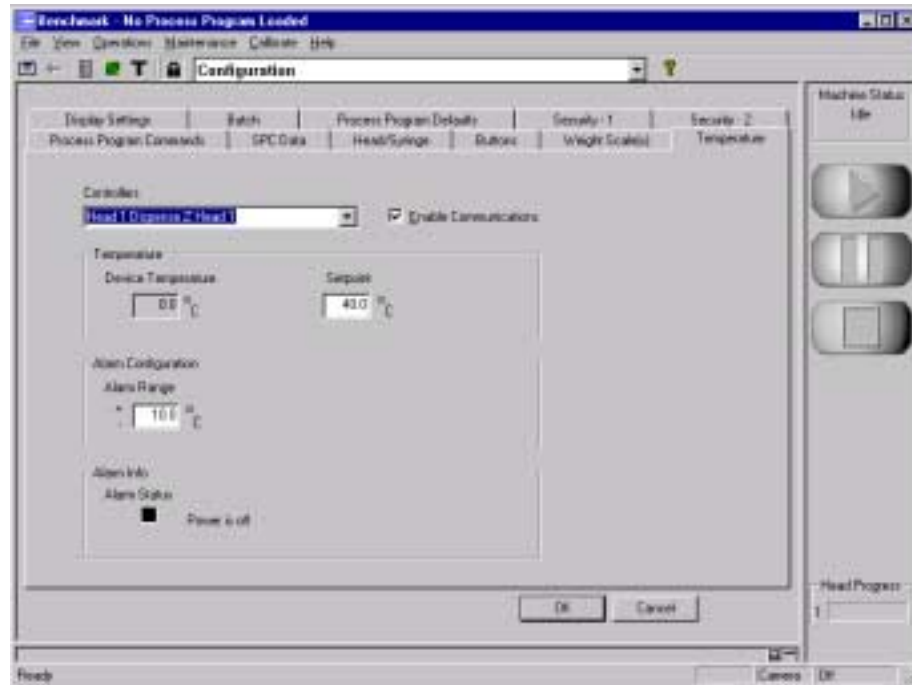


Figure 10

2. Select the appropriate heat (dispense unit) controller from the **Controllers** drop down list.
3. Check the **Enable Communications** box to activate the controller for the device listed in the Controllers field.
If the box is unchecked, the device is **disabled**.
4. Select the **Setpoint** field, and enter the desired temperature (up to 50° C Maximum).
5. Select the **Alarm Range** field, enter the desired deviation from the setpoint to alert the operator when there is an alarm condition.
6. Select the **OK** button.
If the **Cancel** button is selected the process aborts.

Alarm Info Box

The **Alarm Info** box displays a color coded box along with a condition of the device (heated Dispense Unit or Chuck) displayed in the Controllers field. The following is a chart indicating a Color Display and Message indicating what caused the Alarm Condition.

Color Display	Message
Black	Controller disabled
Black	Power is off
Black	Communication failure
Black	Communication failure: Alarm needs to be cleared
Green	In temperature range
Yellow	Ramping up to operating temperature
Red	Out of temperature range
Red	Out of temperature range: Alarm needs to be cleared

To clear an alarm condition refer to Chapter titled - **Alarms and Troubleshooting** in the System Manual.

Setting Syringe Low Limit Switch

Introduction

The Syringe Low Level Limit Switch is used to set the point at which a low material alarm is activated.

Procedure

Set syringe low limit sensing as follows:

1. Select **View > Configuration** and select the **Head/Syringe** tab from the **Machine** screen.
A screen appears with various related controls and settings. See Figure 11.

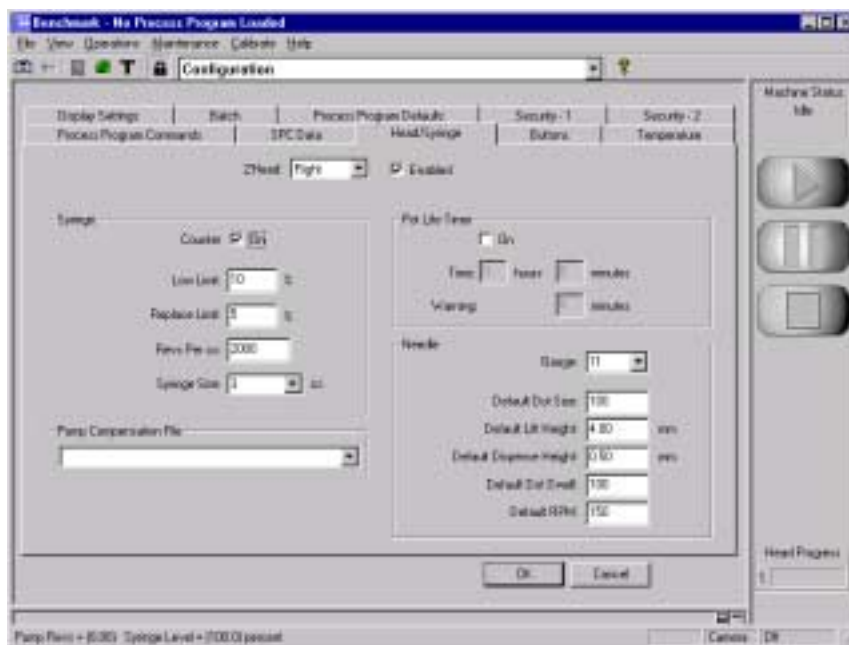


Figure 11

2. Select the desired head from the **ZHead** drop down list.
3. Select the **Enabled** check box to activate the **Syringe Counter** and/or the **Pot Life Timer** for the head selected above.
4. Select the **On** check box in the **Syringe Counter** group.
5. Click into the **Low Limit** field and enter a percentage (%). This value establishes the activation point for the low limit alarm.
6. Select the **Replace Limit** field and enter a percentage (%). This value establishes the quantity of dispensing material required to continue operation. When the amount of remaining material drops below this point, all dispensing stops and the head automatically moves to the syringe position.
7. Select the **Revs Per cc** field and enter the amount of revolutions that the Z-axis motor will need to turn, to empty 1cc of material. The system software has a default setting of 2000 Revs Per cc.



Attention

The **Pump Revs** and **Syringe Level** are displayed on the lower left hand corner of the screen. This is used to calculate the amount of material dispensed. As the user, you need to monitor the amount of material remaining at your Low Limit and Replace Limit and then adjust the Revs Per cc.

8. The desired Low Limit is 10 percent (%).
Decrease the Revs Per cc. to increase the percentage.
Increase the Revs. Per cc to decrease the percentage.
 9. Select the desired syringe size in the **Syringe Size** drop down list.
 10. Select the **OK** button.
If the **Cancel** button is selected the process aborts.
-

Preventive Maintenance

Overview

Introduction

This section contains maintenance procedures required to assure reliable operation of the dispense unit.

Removing The Dispense Unit

Procedure

Remove the dispense unit from the dispense head as follows:



Attention

The safety door(s) must be closed and locked prior to installation or removal of the dispense unit. This allows the axes to move to their proper position for mounting or removing the dispense unit.

1. If necessary, close the safety door(s).
2. Select **Maintenance > Change Syringe** or select the **Change Syringe** tool bar icon from the **Machine** screen.



A head selection box appears. See Figure 12.



Figure 12

3. Select the **head** from which the dispense unit will be removed.
4. Select the **Next >** button.
A series of screen notes appears. See Figure 13.
5. Open the safety door.
6. Lift up the lever that secures the dispense unit to the head. The lever is located on the left-hand side of the head.

7. Carefully pull the dispense unit straight out.



Attention

If you wish to continue dispensing on other heads you must close and lock the safety door(s). No X, Y or Z motion will occur with the safety door(s) unlocked.

8. Close the safety door(s).

9. Select the **Next** button.

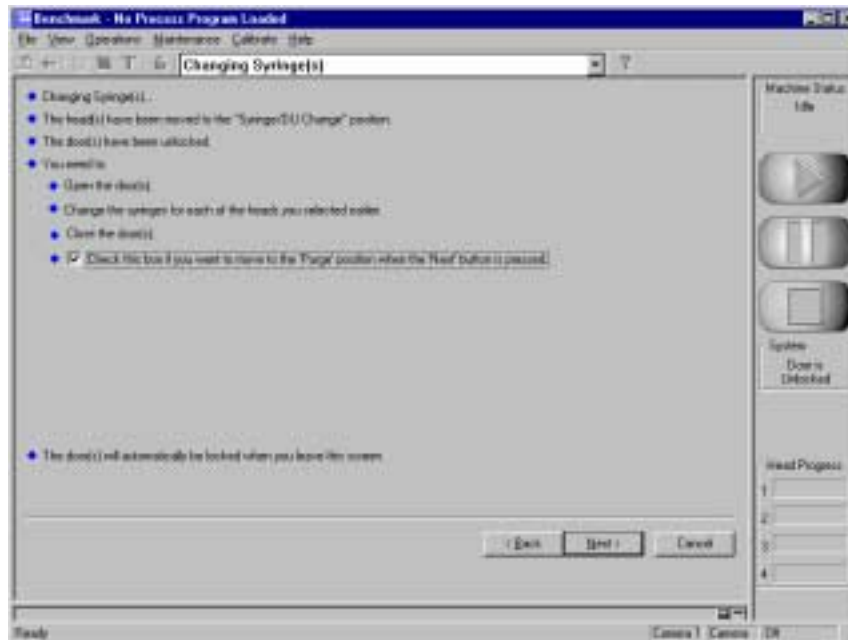


Figure 13

Removal And Disassembly Of Cartridge And Sleeve

Introduction

Many parts of the dispense unit cartridge are continuously exposed to dispensing materials. The cartridge must be cleaned and inspected daily to ensure reliable operation. In order to service the cartridge it must be removed from the dispense unit and disassembled. The following procedures are used to remove and disassemble the cartridge.

Cartridge Removal

Refer to Figure 14.

1. Disconnect the air hose at the quick-disconnect fitting on the dispense unit.
2. Unscrew the syringe and remove it from LuerLock fitting on the feed tube assembly.
3. Unclip the spring clip that holds the manifold halves together.

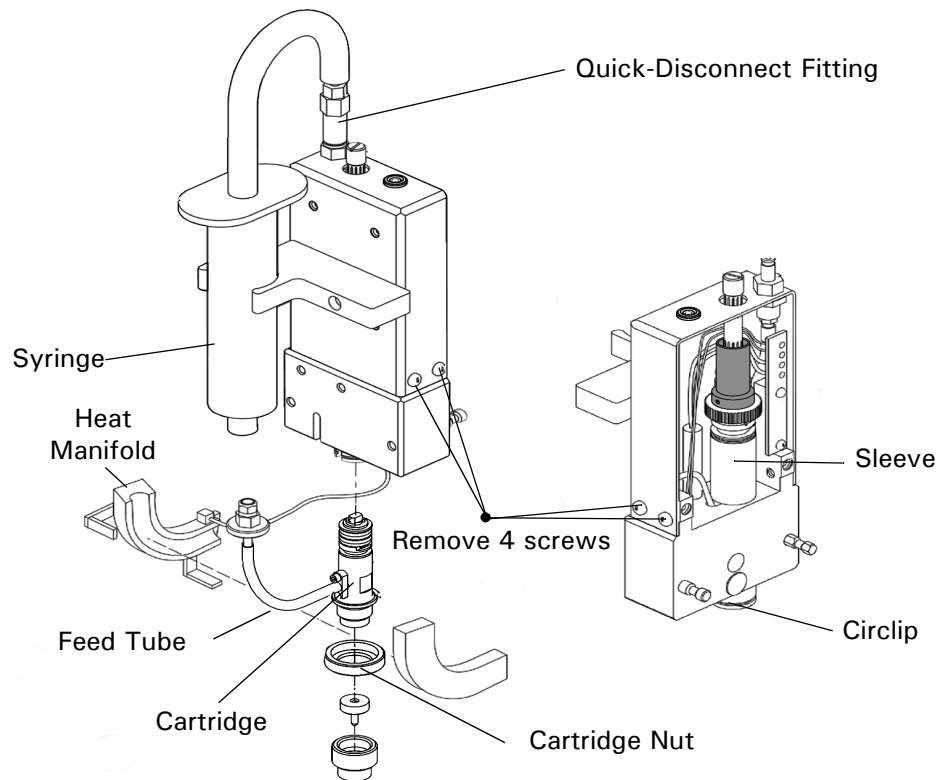


Figure 14

4. Remove the cartridge nut and needle.
5. Remove the screw that secures the cable clamp to the inside cover.
6. Remove the four screws that secure the metal cover to base of the unit.
7. Remove the circlip from the bottom of the sleeve.

8. Slide the cartridge and feed tube assembly down and out of the sleeve.
9. Slide the sleeve up and out of the housing.

Cartridge Disassembly

Refer to Figure 15.

1. Remove the cartridge assembly from the sleeve.
2. Remove two screws (10) and separate the feed tube (9).
3. Remove the needle nut (11) and needle from cartridge body (13).
4. Remove cartridge nut (12) and pull the leadscrew (6) from the cartridge body.

Note:
O-ring (7) is used only on models equipped with shallow or ultra shallow cut leadscrew.

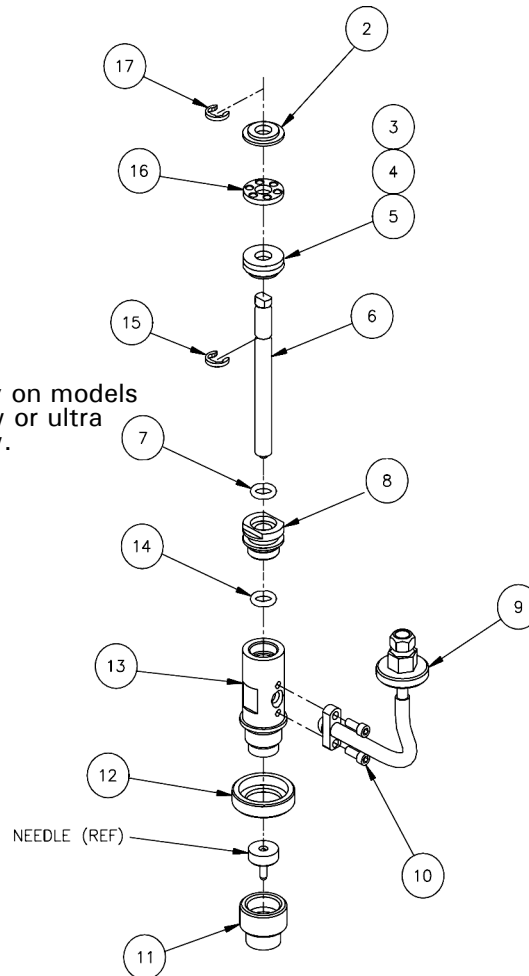


Figure 15

5. Using the two wrenches (provided in support kit), loosen and remove the cartridge nut (8) from the cartridge housing (13). One wrench is used on the flat of the cartridge housing (13): the other used is on the nut (8).
6. Remove the O-ring (7) from the cartridge nut (8), if so equipped, using the pick from the support kit.
7. Remove the O-ring (14) from inside the top of the cartridge and discard.
8. Place all parts aside for cleaning.

Cleaning

Cartridge Cleaning

Refer to Figure 15 unless otherwise specified.

Cotton swabs, pipe cleaners and lint free wipes immersed in cleaning solvent, are recommended for cleaning. Parts should be cleaned thoroughly. Any material which is allowed to remain on the parts of the cartridge will likely harden and affect the reliability and accuracy of the dispense unit.



Chemical Hazard

Be sure to use only solvents recommended by the material manufacturer for cleaning. Ensure that applicable material safety data sheet warnings are observed.



Attention

The cartridge is constructed of precision parts which have highly machined surfaces. Use care to make sure that parts are not lost or scratched during cleaning.

1. Use pipe cleaners immersed in solvent, to clean the inside surfaces of the feed tube, and LuerLock fitting (9).
2. Repeat step 1 using a fresh pipe cleaner each time, until all material has been removed.
The parts are considered clean when a fresh pipe cleaner can be drawn through the feed tube and remain clean.
3. Use a dry pipe cleaner to finish cleaning.
4. Use cotton swabs or wipes immersed in solvent to clean the inside of the cartridge body (13), and all the remaining parts of the cartridge.
5. The needle should be cleaned using thin wire and cotton swabs.

Cleaning Sleeve and Housing

Use a lint free cloth and alcohol (Ethanol or Isopropyl) to clean these parts.



Chemical Hazard

Consult MSDS (Material Safety Data Sheet) sheet for hazards listing.

1. Clean the bore in the dispense unit thoroughly.
2. Clean the outer surface of the sleeve and wipe dry.
3. Lube the outer surface of the sleeve with Rheo lube (provided in support kit).

Reassembly Of The Cartridge And Sleeve

Introduction

Refer to Figure 16.



Attention

DieMakers grease (provided in support kit) is the only lubricant approved for lubrication of the cartridge and leadscrew assembly.
Do not substitute any other lubricant.

Cartridge Assembly Procedure

1. Dispense a small quantity DieMakers grease onto a clean surface.
2. Press a new O-ring (7), if so equipped, into the top of the cartridge nut (8).
3. Apply grease to the leadscrew shank above the auger.
4. Apply grease to a new O-ring (14) and slide the O-ring onto the leadscrew up to the E-Ring.
5. Apply grease to the cartridge nut (8) on all mating faces and threads.

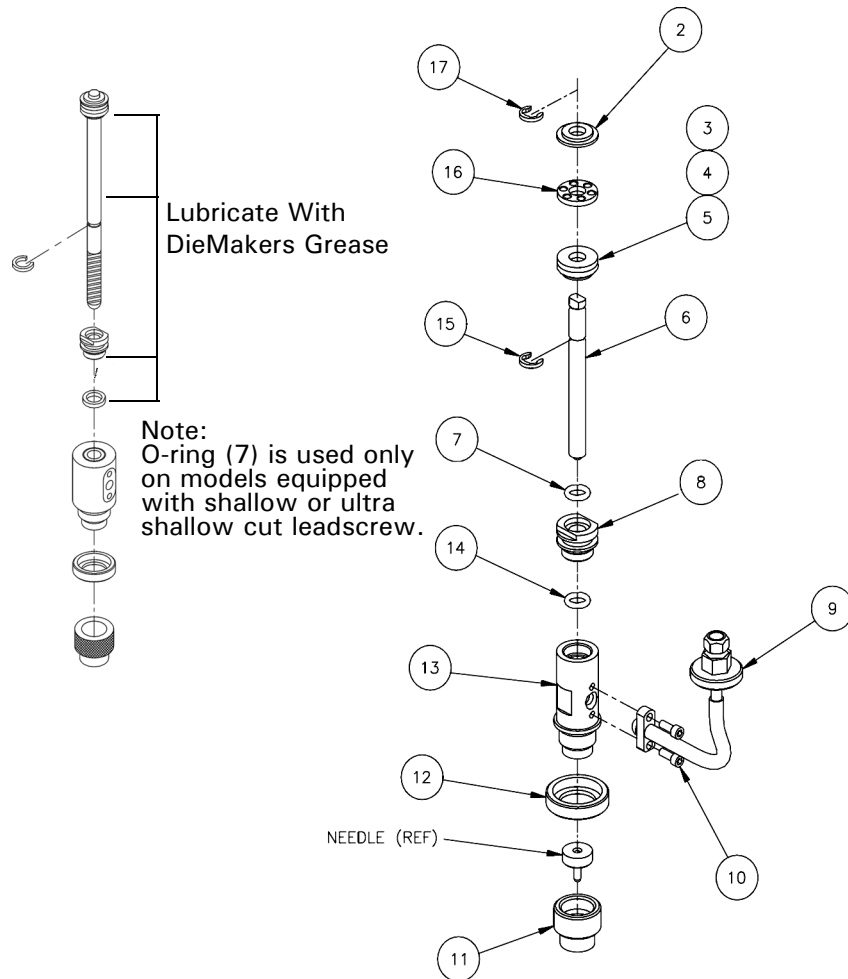


Figure 16

6. Slide the cartridge nut onto the leadscrew up to the E-ring.
7. Insert the leadscrew into the cartridge body (13).
8. Thread the cartridge nut into the cartridge body.
9. Use two wrenches (provided in the support kit) to tighten the cartridge nut. The wrenches are used on the flats of the cartridge nut and cartridge body.
10. Install the feed tube onto the cartridge body (13) and secure with screws (10). Tighten the screws evenly to ensure proper seating of the feed tube.

Sleeve Assembly Procedure

See Figure 17.

1. Insert the sleeve assembly into the bore of the dispense unit. Be sure the sleeve moves freely in the housing.
2. Install the circlip at the bottom of the sleeve so that its open end lines up with the slot in the sleeve.
3. Slide the cartridge nut over the bottom of the cartridge.
4. Assemble the needle nut and needle onto the cartridge body.
5. Apply DieMakers grease to the O-rings at top of leadscrew.



Attention

When pushing the cartridge into the bore of the sleeve, the flats at the top of the leadscrew must be aligned with the D-bushing inside the sleeve.

6. Align the top of the leadscrew with the D-Bushing inside the sleeve and push the cartridge assembly into the sleeve.

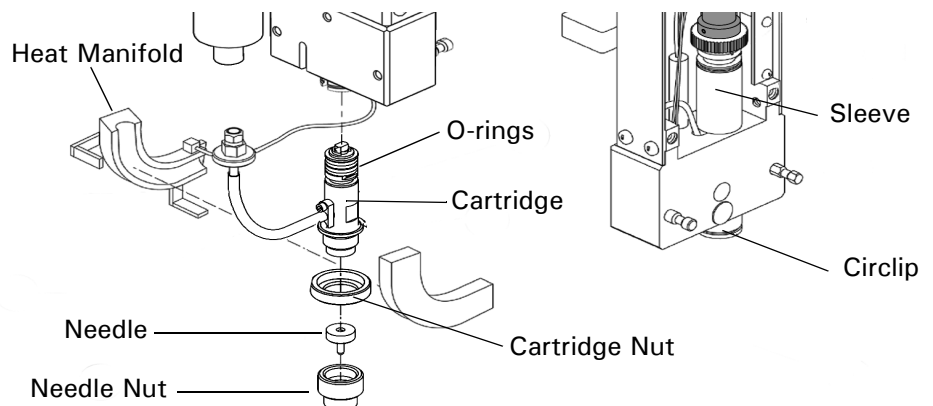


Figure 17

7. Assemble the line unit clamp as shown in Figure 18.
 - a. The slotted end of the clamp fits over the yoke of the sleeve, just below the gear.
 - b. The hollow end of the wing nut fits over the needle.

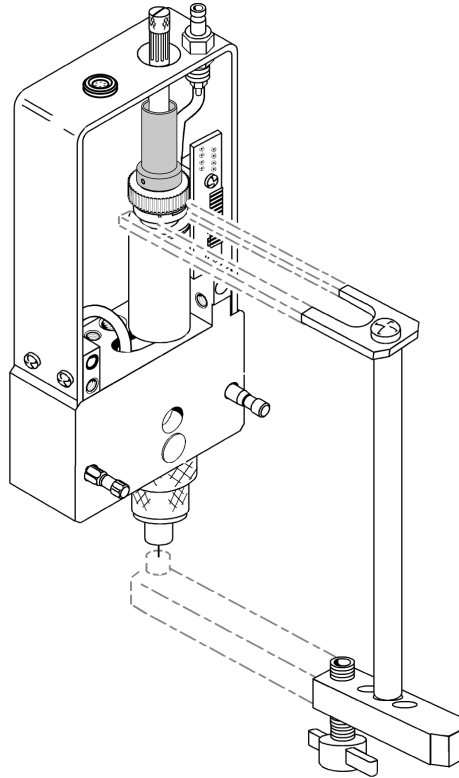
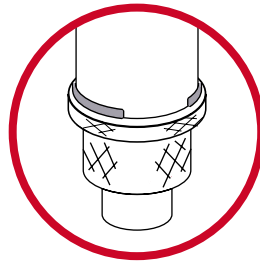


Figure 18

8. Tighten the wing nut until slight pressure is felt.
9. Turn the gear or lift height adjustment screw until the slot of the D-bushing engages with flats at the top of the leadscrew.
10. Tighten the cartridge nut at the bottom of the sleeve.
Correct alignment of the cartridge and needle nuts are shown in Figure 19.
11. Loosen the wing nut on the line unit clamp until the clamp can be removed from the unit.
12. Hold the dispense unit vertical and make sure that the cartridge slides up and down smoothly.
13. Assemble the sheet metal cover onto the housing and secure with four screws.
14. Replace the cable clamp inside the housing and secure to the inside cover.
15. Position the heat manifold halves around the feed tube and secure with the spring clips.



Correct- Cartridge nut against Circlip and knurled needle nut seated. No exposed threads.



Incorrect - Cartridge nut not seated against Circlip. Exposed threads.



Incorrect - Knurled needle nut not seated. Exposed threads.

Figure 19

Spare Parts And Support Information

Support Kit And Spare Parts

Support Kit

A support kit is provided and consists of:

- Special tools which facilitate assembly and disassembly of the dispense unit
 - Spare parts that are required for preventive maintenance
 - Recommended lubricants used during cleaning
 - Cotton swabs and pipe cleaners used during cleaning
 - Hose adapters
-

Spare Parts

Speedline Camalot provides an “As-Built” document package.

The package includes:

- This document
- A set of assembly drawings and schematics (where applicable)
- Spare parts lists
- A complete list of support kit contents

If you are missing any of the above items, please contact the Speedline Camalot Technical Publications department (see below) for replacements.

Technical Support

Getting Support

Speedline Technologies provides a 24 hour customer support line that is available 365 days a year. Support technicians are available to assist you in setting up, operating and maintaining your pump. They can also troubleshoot any problems that may occur, assist you in obtaining replacement parts, and arrange for training on your Camalot equipment. To contact customer support, dial **1-800-737-8110** and **follow the prompts**.

Technical Publications

Every effort has been made to provide accurate and up-to-date information regarding your Camalot dispense unit. You may contact Speedline Technical Publications via E-mail to address any errors or discrepancies within this document. The E-mail address is campubs@speedline.cookson.com You may also contact us by phone @ 1-978-521-7337

Needle Matrix

Introduction

The table in Figure 20 lists the various needle sizes that are available for the 620 series line dispense units.

Needle Gauge	Part Number	ID In/mm
28	20902	.007/.18
27	20901	.008/.20
25	19436	.010/.25
23	19434	.013/.33
22	19433	.016/.41
21	19432	.020/.51
20	19362	.023/.58
18	19364	.033/.84
17	19365	.042/1.07
16	19366	.047/1.19
15	19367	.054/1.37
14	19168	.063/1.60
13	19368	.071/1.80
12	19369	.085/2.16
11	19171	.094/2.39

Figure 20
