Base Locations Reference Guide

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for FLOware®Software as of version 2.9.1+

*for use with all **MAX Series & DS Series Dispensers***

prepared by GPD Global® Documentation Dept.

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Base Locations Reference Guide

For FLOware software **ver 2.9.1+**

These instructions are for use by qualified engineer or maintenance personnel when verifying or teaching base locations on a GPD Global dispense system.

Getting Started

The FLOware software uses base locations to identify where to position the gantry in relation to a place or piece of hardware within the work area. Each base location is a set of coordinate values (XY or XYZ) for an automatic adjustment (such as purge and refresh).

A base location is taught by jogging the gantry to the desired location. A list of all base locations displays during the base location selection process. Any or all base locations may be modified.

All base locations are initially established at the factory, however you may want to verify, alter, or set up base locations after some period of operations:
- to teach the location of a newly installed device,
- to change a location to increase process speed,
- to verify the current coordinates of an existing location, or
- to re-teach an existing location. For example, the camera calibration locations should be re- taught after adding a new calibration dot sticker to the calibration station.

To get started verifying or teaching base locations on a GPD Global dispenser, review the following guidelines:

- Teaching base locations requires moving or "jogging" the gantry to specific coordinates. You must be familiar with the operations, rules, and safety instructions for jogging the gantry. For details, refer to *Jog Operations* in the *Basic Operations* section of the *Dispenser Operator Guide*.

- Teaching the Z axis value of various base locations requires the use of the "Head Calibration Tool" included in the Setup & Leveling Kit (part no. 22110142) available from GPD Global. For details, refer to *Head Calibration Tool* in the *Routine Maintenance - Tools & Equipment* section of the *Dispenser Service Guide*.

- Use the instructions appropriate for what you intend to accomplish, either Teaching Base Locations (pg 2) or Verifying Base Locations (pg 6).

Teaching Base Locations

The following instructions can be used to teach a base location for a newly installed device or to re-teach or modify an existing location. Follow all instructions in the order presented.

Teaching a base location is a three-step process:

Step 1 - Backup Existing Base Location Values

Prior to teaching base locations, back up the existing location values to the current user's home directory (typically "/home/dispenser").

IMPORTANT: If the existing values are lost, ALL locations must be re-taught.			
IMPORTANT: Si les valeurs existantes sont perdues, TOUTES les positions doivent être reconfigurées..	*WICHTIG* Falls bestehende Werte verloren sind, muessen ALLE Positionen neu eingelernt werden.	*IMPORTANTE* In caso di perdita dei valori esistenti, devono venire reimpostate TUTTE le coordinate.	*IMPORTANTE* Si se pierden todos los datos existentes, es necesario volver a retocarlos todos.

To save current location values:

1. Verify that all safety shielding is closed.

2. Power on the machine per *Power On* in the *Basic Operations* section of the *Dispenser Operator Guide*.

3. Establish the necessary access level:
   a. From the main menu bar, click on Operations > Enter Password.
   b. Enter a password with authorization to the system access right for Configuration.

WARNING: Adhere strictly to procedures. Do not venture elsewhere in the FLOware® software or your warranty will be void and customer will be held completely responsible for any service call and/or repair costs resulting from "explorations".			
AVERTISSE-MENT: Respecter strictement les procédures. Ne pas aller ailleurs dans le logiciel FLOware® sinon la garantie sera annulée et le client sera tenu complètement responsable de tout appel au service des réparations et / ou coûts de réparation suite à de telles <<explorations>>.	*ACHTUNG* Halten Sie sich strickt an die Anweisungen. Gehen Sie nirgendwoanders in der FLOware® software oder die Garantie erlischt und der Kunde wird komplett fuer jeden Servicecall verantwortlich gemacht und die dadurch entstehenden Kosten fuer die Fa. "exlorations"	*AVVERTENZA* Seguite rigorosamente le procedure. Non uscite dal software FLOwareJ o la vostra garanzia non sarà più valida ed il cliente sarà ritenuto responsabile per tutte le richieste d'intervento e/o costi di riparazione che risulteranno da Aexplorations@.	*ADVERTENCIA* Ajustarse estrictamente a los procedimientos. No entrar en el software FLOware® o se perderá automáticamente la garantía, y a partir de entonces, todos los costes generados resultantes de ello correrán por cuente del usuario.

4. Perform the backup method listed below appropriate for the version of FLOware software currently installed on your dispenser:
    – To save the current base location values for **versions prior to 1.5**, use dbexport.
    – To save the current base location values for **version 1.5 and subsequent versions**, from the main menu bar click on Utilities > Backup > Data Only. For details, refer to *Routine Backups* in the *FLOware Software Guide*.

Step 2 - Teach Base Location Values

Teaching a base location is a matter of selecting the name of the location you wish to teach, jogging the gantry to the coordinates you want to establish for the selected name, and then clicking several on-screen buttons.

Some base locations also require the additional step of teaching the Z axis. When teaching the XY and Z coordinates for a base location is a two step process, first teach the XY coordinates using the camera over the desired location, and then teach the Z coordinate using the gantry (i.e., mount positions for valves and tools) at the desired location.

HINT: An ideal XY location minimizes **travel time**, being as close to the calibration station and processing action as feasible without physically interfering with the next board loading. An ideal Z location minimizes **descent time**, being as close to the work surface as feasible without physically interfering with the next board loading or components populating the board.

CAUTION: Be aware of the valve/tool descent capabilities for each of the multiple mount positions.			
ATTENTION: Prendre garde des capacités de descente des soupapes / outils pour chacune des multiples positions de montage.	*VORSICHT!* Beachten Sie die Moeglichkeit des Herabsinkens von Ventil/ Werkzeug aus jeder Montageposition.	*ATTENZIOINE* Tenete ben presenti le caratteristiche di discesa della valvola/tool per ognuna delle posizioni multiple di montaggio.	*PRECAUCIÓN* Tener en cuenta la capacidad de descenso del útil de la válvula, para cada una de las múltiples posiciones.

CAUTION: Always teach the XYZ location first and the Z ONLY location, if applicable, second.			
ATTENTION: Toujours configurer d'abord les positions XYZ et SEULEMENT en second, si nécessaire, la position Z.	*VORSICHT!* Lernen Sie IMMER die XYZ Positionen zuerst ein und die Z ONLY Position falls notwendig als zweite.	*ATTENZIOINE* Apprendete sempre prima le coordinate XYZ e in seguito, se applicabile, la SOLA coordinata dello Z.	*PRECAUCIÓN* Introducir siempre, primero, la localización XYZ, y después la localización de la "Z ONLY", si es aplicable.

Teach a Base Location

To teach a base location:

1. From the main menu bar, click on Configuration > Base Locations. The Check/Set Base Locations window displays. The normal multi-tasking capability of the system is unavailable while the Check/Set Base Locations window is open.
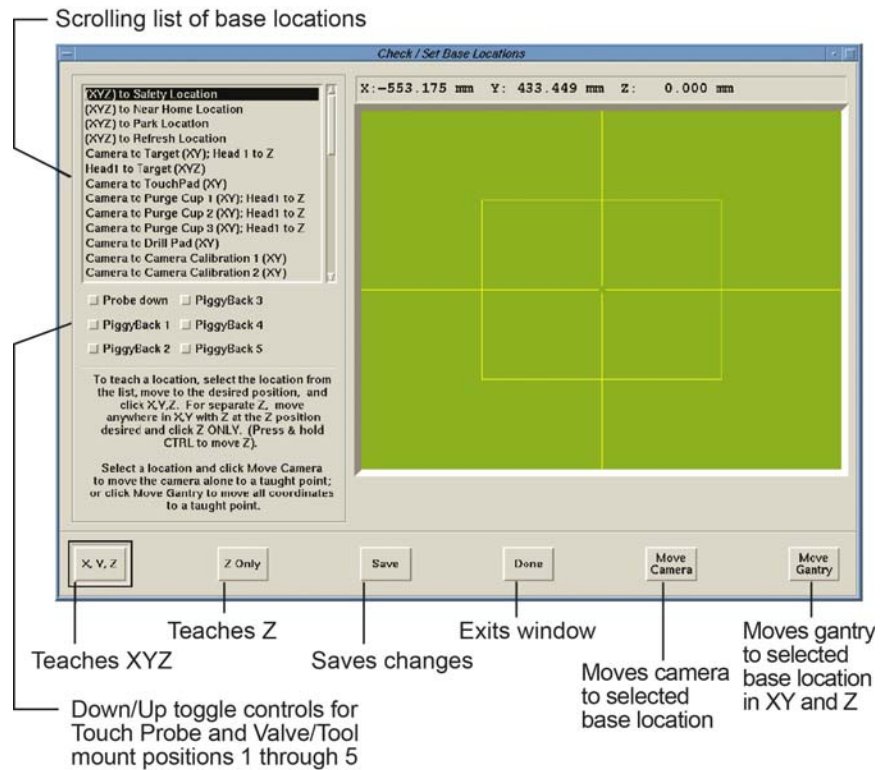
2. Select a location from the scrolling list of base locations in the Check/Set Base Locations window.

CAUTION: Always teach the following three locations in the order listed below BEFORE teaching any other locations or else unpredictable and potentially damaging Z axis moves may occur. Teach in order: #1 - (XYZ) to Safety Location, #2 - Camera to Target (XY); Head1 to Z, #3 - Head 1 to Target (XYZ).

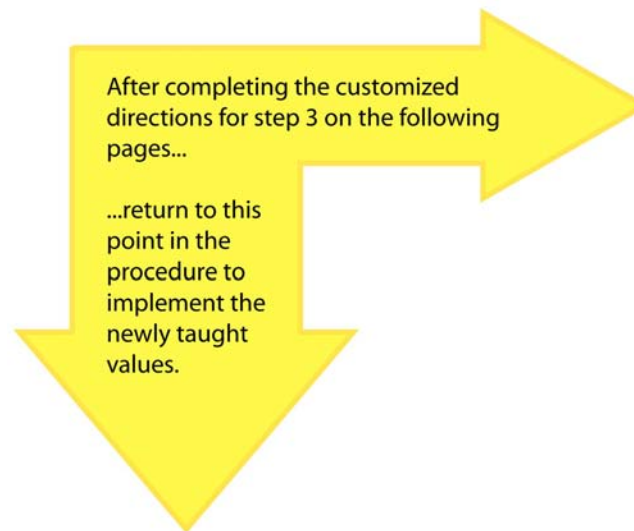| *ATTENTION:*	*VORSICHT!*	*ATTENZIOINE*	*PRECAUCIÓN*
Toujours configurer les trois positions suivantes dans l'ordre énuméré ci-dessous AVANT de configurer toutes autres positions pour éviter un déplacement de l'axe Z imprévisible et potentielle-ment endommageant. Configurer dans l'ordre: #1 - (XYZ) to Safety Location, #2 - Camera to Target (XY); Head1 to Z, #3 - Head 1 to Target (XYZ).	Lernen Sie IMMER die folgenden drei Positionen in der aufgefuehrten Reihenfolge ein VOR Jeder anderen Position anson-sten kann nicht vorherseh-barer moeglicher Schaden durch Z Achsen Bewegung entstehen. Reihenfolge: #1 - (XYZ) to Safety Location, #2 - Camera to Target (XY); Head1 to Z, #3 - Head 1 to Target (XYZ).	Apprendete sempre le tre coordinate seguenti nell'ordine qui riportato PRIMA di apprendere le altre, diversamente possono verificarsi spostamenti imprevedibili e potenzial-mente dannosi dell'asse Z. Nell'ordine: #1 - (XYZ) to Safety Location, #2 - Camera to Target (XY); Head1 to Z, #3 - Head 1 to Target (XYZ).	ANTES de introducir cualquier otra, intordu-cir, siempre, las tres localizaciones siguien-tes, en el orden listado abajo. En caso contrario se pueden produ-cir daños en el movimiento del eje Z. Introducir en el orden, #1 - (XYZ) to Safety Location, #2 - Camera to Target (XY); Head1 to Z, #3 - Head 1 to Target (XYZ).

NOTE: The above cautionary information pertains only to a "starting from scratch" type of situation such as an initial machine setup when all base locations must be taught. After the initial teaching of all base locations is complete, any one or combination of base locations, ***except the second and third mentioned in the CAUTION above***, can be re- taught.

3. Teach the initial coordinates by following the special instructions listed in Details About Each Base Location (pg 9) for the selected location.

    For example, suppose you selected "(XYZ) to Refresh Location" in the preceding step. First find the special instructions for "(XYZ) to Refresh Location" in Details About Each Base Location (pg 9) and then jog the gantry or camera to the location indicated in the special instructions.

After completing the customized directions for step 3 on the following pages...

...return to this point in the procedure to implement the newly taught values.

4. Click SAVE on the Check/Set Base Locations window to save the newly taught values, or to cancel, exit the Check/Set Base Locations window without clicking SAVE.

5. Repeat Step 1 through Step 4 for each base location that requires attention. If this is an initial setup, all base locations must be taught.

6. Click the DONE button on the Check/Set Base Locations window.

Step 3 - Boot the System

Boot the system so all the changes you've made will take affect. Refer to the *Boot the System* in the *System Management - Troubleshooting* section of the *FLOware Software Guide* for details.

Verifying Base Locations

The current coordinates of any existing base location may be verified, i.e., base locations must have been taught before verification is applicable. Verifying a base location is a three step process:

1 - Back up existing base location values;
2 - Select the desired base location; and
3 - Verify coordinates of the selected location.

To verify the current position of a base location, follow all instructions in the order presented:

1. Prior to verifying base locations, make a backup of the existing location values to the current user's home directory (typically "/home/dispenser"). Perform the backup method listed below appropriate for the version of FLOware software currently installed on your dispenser:
    – To save current base location values for FLOware **versions prior to 1.5**, use dbexport.
    – To save current base location values for FLOware **version 1.5 and subsequent versions**, from the main menu bar click on Utilities > Backup > Data Only. For details, refer to *Routine Backups* in the *FLOware Software Guide*.

IMPORTANT: If the existing values are lost, ALL locations must be re-taught.			
IMPORTANT: Si les valeurs existantes sont perdues, TOUTES les positions doivent être reconfigurées.	*WICHTIG* Falls bestehende Werte verloren sind, muessen ALLE Positionen neu eingelernt werden.	*IMPORTANTE* In caso di perdita dei valori esistenti, devono venire reimpostate TUTTE le coordinate.	*IMPORTANTE* Si se pierden todos los datos existentes, es necesario volver a retocarlos todos.

2. When the backup is complete, select the desired base location from the Check/Set Base Locations window. For details on how to open the proper windows and select a location, refer to .

3. With the desired base location selected (highlighted), click on the Move Camera button to move the camera to the defined location with the Z axis up and out of the way; or click on the Move Gantry button to move the gantry (including Z axis) to the defined location.

Base Location Detail

This section provides the required teaching instructions unique to each base location.

NOTE: The following data is applicable to and effective as of **version 2.9.1** of the FLOware control software.

IMPORTANT: Be aware of and observe all safety and cautionary notices noted on the previous pages of this Base Locations addenda as you use the following procedures.

- Physical Location of Base Locations (pg 8)
- Details About Each Base Location (pg 9)

Physical Location of Base Locations

Many base locations are physically located on the calibration station. Various other base locations relate to other optional dispenser devices.

SUGGESTION: If your dispenser is not equipped with the hardware related to a particular base location, GPD Global suggests teaching the base location anyway, substituting the "(XYZ) to Refresh Location" value for the unknowable value.

For example, if your dispenser is not equipped with a stamp well device, teach the "Camera to Stamp Well (XY), then Head1 to Z" base location using the same coordinates used to teach the "(XYZ) to Refresh Location."

Figure 1: Some of the physical locations used to teach various base locations
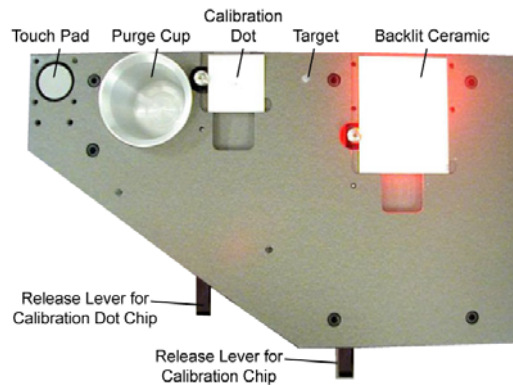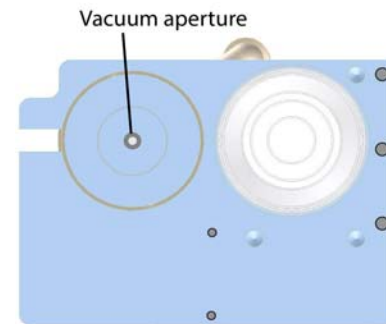
Calibration Station - Compact model
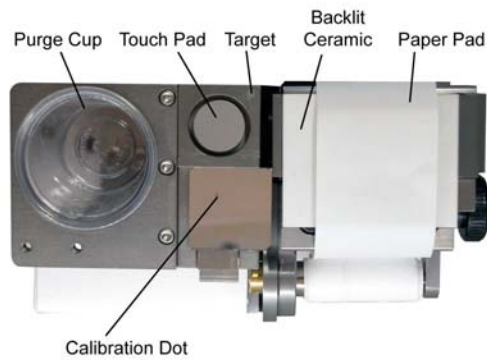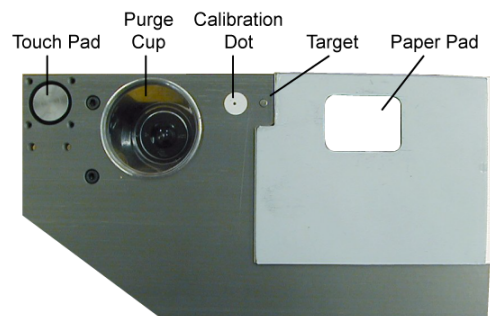

Nozzle Cleaner

Calibration Station - Backlit Ceramic model

Vacuum Nozzle Cleaner

Calibration Station - Legacy Paper model

Details About Each Base Location

This section lists the purpose for each base location and the unique instructions for each base location needed to teach its coordinates.

IMPORTANT: The instructions listed here are both referenced by and coordinated with the complete procedure entitled Teach a Base Location (pg 4).

(XYZ) to Safety Location

NOTE: "(XYZ) to Safety Location" is the default height at which the gantry travels. In many instances, the gantry will move up or down to this position before traveling; for example, after completing needle cleaning.

3. Define the location to which the gantry moves when it is not processing:

    a. Jog the gantry to a convenient, safe, out-of-the-way location in the work area, normally between the boards or at the rear of the machine. Jog the Z coordinate high enough to clear ANY and ALL obstructions. This action teaches (XYZ) together (the Z coordinate is significant but it is not necessary to teach it separately in all cases).

    b. Click the XYZ button on the Check/Set Base Locations window.

    c. Return to Step 4 (pg 5).

(XYZ) to Near Home Location

3. Define the location to which the gantry moves when the GO HOME icon is clicked:

    a. Jog the gantry to a convenient, safe, out-of-the-way location in the work area, normally between the boards or at the rear of the machine. This action teaches (XYZ) together (the Z coordinate is not currently used).

    b. Click the XYZ button on the Check/Set Base Locations window.

    c. Return to Step 4 (pg 5).

(XYZ) to Park Location

NOTE: In addition to being the "park location", the gantry also moves to this base location if "ParkBetweenBoards" is enabled in the configuration file.

3. Define the location at the park pad to which the needle moves so needle material drip stops when the MOUNT button is clicked.

    a. Jog the needle so it is relatively centered over the park pad (normally located on the conveyor rails).

       NOTE: If the Park Location is not present, teach at the Safety Location. Jog the needle(s) downward until the park pad plunger collapses slightly. If the park pad(s) is not present, teach at the Safety Location.

    b. Click the XYZ button on the Check/Set Base Locations window.

    c. Return to Step 4 (pg 5).

(XYZ) to Refresh Location

3. Define the position to which the gantry moves when the REFRESH icon is clicked or when the program asks for new valves/tools, material, etc.

   a. Jog the gantry to the front of the machine (for convenient access to valves, needles, and material). This action teaches (XYZ) together (the Z coordinate is not currently used).
   b. Click the XYZ button on the Check/Set Base Locations window.
   c. Return to Step 4 (pg 5).

Camera to Target (XY); Head1 to Z

3. Define the "Target" location used to define the XY offset between the camera and heads/tools.

   a. Teach (XY) first: jog the camera over the target so it is relatively centered over the target.

> **CAUTION:** The same location must be used consistently as the "Target" throughout the procedure of teaching base locations or damage to the machine may result. A steel pin is provided on the calibration station as a Target, however, any location with a Z coordinate at the touch pad can be used wherever "Target" is mentioned - as long as you use it consistently!

ATTENTION:	*VORSICHT!*	*ATTENZIOINE*	*PRECAUCIÓN*
La même position doit être uniformément utilisée en tant que << cible >> tout au long de la procédure de configuration des positions de base sinon la machine pourrait être endommagée. Une pointe d'acier est fournie au poste de calibrage comme cible, cependant, toute position avec une coordonnée Z au dispositif de pointage tactile peut être utilisée chaque fois que << cible >> est mentionné - pourvu que ce soit fait de façon constante!	Waehrend des Einlernens der Basis Positionen muss durchgehend das selbe "Ziel" benutzt werden, anderweitig kann Schaden an der Maschine entstehen. Es gibt einen Stahlstift an der Kalibrierstation dafuer. Aber es kann auch jede andere Position mit Z Koordinate auf dem Touchpad benutzt werden, wenn ein "Ziel" gefordert wird - solange sie immer wieder benutzt wird.	E'necessario usare regolarmente la stessa coordinata come A Target@ per tutto il corso dell'apprendimento delle posizioni di base, diversamente può verificarsi un danno alla macchina. Viene fornito un perno in acciaio che costituisce il Target sulla stazione di calibrazione, comunque si può usare qualsiasi coordinata che tenga conto dello Z sul sensore di altezza, posto che poi la si usi regolarmente.	Siempre se ha de utilizar la misma referencia para las sucesivas localizaciones. En caso contrario se pueden producir errores en la máquina. Se suministra un pincho de acero, con la máquina, para que sirva de referencia, no obstante, se puede utilizar cualquier otro punto con coordenada Z, siempre y cuando, este, se utilice de forma repetitiva.!

   b. Click the XYZ button on the Check/Set Base Locations window.
   c. Teach (Z) next: Mount the Head Calibration Tool [for details, refer to *Head Calibration Tool* in the *Routine Maintenance - Tools & Equipment* section of the *Dispenser Service Guide*] in Head 1 to emulate a valve and then jog Head 1 to the target.
   d. Click the Z ONLY button on the Check/Set Base Locations window.
   e. Return to Step 4 (pg 5).

Head 1 to Target (XYZ)

The "(XYZ) to Refresh Location" should be taught for any unused heads (valve/tool mount positions) to prevent inadvertent damage.

3. Define the "Target" location used to define the XY offset between the camera and heads/tools.

   a. From the scrolling list of Base Locations, click on Head n to Target (XYZ).
   b. Jog the gantry's Z axis upward to its upper limit.

CAUTION: Gantry must be raised to prevent damage to the machine during the next step.			
ATTENTION: Le chevalet doit être levé pour éviter l'endommagement de la machine lors de la prochaine étape.	**VORSICHT!** Der Kopf muss Oben sein um Maschinenschaden auszuschliessen.	**ATTENZIOINE** Il gruppo testa deve essere sollevato per evitare danni alla macchina durante la fase successiva.	**PRECAUCIÓN** Para realizar los siguientes pasos, el eje ha de ser elevado, para así, prevenir daños en la máquina.

   c. Jog the gantry to an accessible location.
   d. Mount the Head Calibration Tool in head position n. For details, refer to *Head Calibration Tool* in the *Routine Maintenance - Tools & Equipment* section of the *Dispenser Service Guide.*
   e. Teach the XY and Z positions:

   i. Jog the gantry in the XY and Z axes until the Head Calibration Tool is centered on the "Target".

CAUTION: The same location must be used consistently as the "Target" throughout the procedure of teaching base locations or damage to the machine may result. A steel pin is provided on the calibration station as a Target, however, any location with a Z coordinate at the touch pad can be used wherever "Target" is mentioned - as long as you use it consistently!			
ATTENTION: La même position doit être uniformément utilisée en tant que << cible >> tout au long de la procédure de configuration des positions de base sinon la machine pourrait être endommagée. Une pointe d'acier est fournie au poste de calibrage comme cible, cependant, toute position avec une coordonnée Z au dispositif de pointage tactile peut être utilisée chaque fois que << cible >> est mentionné - pourvu que ce soit fait de façon constante!	**VORSICHT!** Waehrend des Einlernens der Basis Positionen muss durchgehend das selbe "Ziel" benutzt werden, anderweitig kann Schaden an der Maschine entstehen. Es gibt einen Stahlstift an der Kalibrierstation dafuer. Aber es kann auch jede andere Position mit Z Koordinate auf dem Touchpad benutzt werden, wenn ein "Ziel" gefordert wird - solange sie immer wieder benutzt wird.	**ATTENZIOINE** E'necessario usare regolarmente la stessa coordinata come A Target@ per tutto il corso dell'apprendimento delle posizioni di base, diversamente può verificarsi un danno alla macchina. Viene fornito un perno in acciaio che costituisce il Target sulla stazione di calibrazione, comunque si può usare qualsiasi coordinata che tenga conto dello Z sul sensore di altezza, posto che poi la si usi regolarmente.	**PRECAUCIÓN** Siempre se ha de utilizar la misma referencia para las sucesivas localizaciones. En caso contrario se pueden producir errores en la máquina. Se suministra un pincho de acero, con la máquina, para que sirva de referencia, no obstante, se puede utilizar cualquier otro punto con coordenada Z, siempre y cuando, este, se utilice de forma repetitiva.!

       ii. Click on PiggyBack n (PiggyBack toggle boxes are located below scrolling Base Locations list). The Head Calibration Tool descends.
       iii. Click on PiggyBack n again. The calibration tool retracts.

4. Save the new values:

    a.   Click the XYZ button on the Check/Set Base Locations window.
    b.   Click the SAVE button on the Check/Set Base Locations window.

5. Jog the gantry to a safe elevation.
6. Remove the Head Calibration Tool.
7. Return to [Step 5 (pg 5)](#).

Camera to Touchpad (XY)

3. Define the location at the touch pad to which the gantry moves during the valve and tool calibration sequence:

    a.   Jog the camera so it is centered over the touch pad (located on the calibration station). This action teaches (XYZ) together (the Z coordinate is not currently used).
    b.   Click the XYZ button on the Check/Set Base Locations window.
    c.   Return to [Step 4 (pg 5)](#).

Camera to Purge Cup 1 (XY); Head1 to Z
Camera to Purge Cup 2 (XY); Head1 to Z
Camera to Purge Cup 3 (XY); Head1 to Z

Purge cup n is the position for head n. This makes a different purge position available for each of three heads to prevent needle tip contamination from previously purged materials. When only a single head will be using the purge cup, teach the purge location directly over the center of the purge cup.

3. Define the location over the purge cup to which a head moves during the purge phase of a valve calibration sequence.

    NOTE: If Purge Cup n is not present, teach at the Safety Location.

    a.   Teach (XY) first: Jog the camera so it is relatively centered, left to right, over the purge cup (on the calibration station) and positioned front to back over the back third of the cup - far enough over the cup to catch dribbles, but not so far forward that the gantry runs into its forward limit.
    b.   Click the XYZ button on the Check/Set Base Locations window.
    c.   Teach (Z) next: Mount the Head Calibration Tool (refer to *Head Calibration Tool* in the *Routine Maintenance - Tools & Equipment* section of the *Dispenser Service Guide*) in Head 1 to emulate a valve and then jog Head 1 to the desired dispense elevation over the cup.
    d.   Click the Z ONLY button on the Check/Set Base Locations window.
    e.   Return to [Step 4 (pg 5)](#).

Camera to Drill Pad (XY)

Follow the directions below that apply to the type of device (drill pad or backlit calibration station) installed on your dispenser. If neither the Drill Pad or Backlit Calibration Station are present, teach this base location at the Safety Location.

Backlit Calibration Station

3. If a backlit calibration station is present, define the location at the backlit calibration station to which a head moves during the valve calibration sequence.

    a. Turn on the lighting I/O for the backlit calibration station; this I/O is located in the vision section of the ioView window.
    b. Jog the camera so it is relatively centered over the backlit area (located on the backlit calibration station). This action teaches (XYZ) together (the Z coordinate is not currently used).
    c. Click the XYZ button on the Check/Set Base Locations window.
    d. Return to <u>Step 4 (pg 5)</u>.

Drill Pad

3. If a drill pad is present, define the location at the drill pad to which a head moves during the drill phase of a tool calibration sequence.

    a. Jog the camera to the approximate center of the drill chip (located on the calibration station). This action teaches (XYZ) together (the Z coordinate is not currently used). Hint: Use a pencil to place a dot on the chip before teaching this point.
    b. Click the XYZ button on the Check/Set Base Locations window.
   c. Return to <u>Step 4 (pg 5)</u>.

Camera to Camera Calibration A1 (XY)
Camera to Camera Calibration B1 (XY)
Camera to Camera Calibration C1 (XY)

Follow the directions below that apply to the type of camera lens [Non-Zoom Camera Lens (pg 15) or Zoom Camera Lens (pg 17)] installed on your dispenser.

Non-Zoom Camera Lens

3. Define the first camera calibration point of the calibration dot as the location to which the camera moves during the automatic vision calibration sequence. All three base locations (A1, B1, and C1) should be taught at the same dot.

     a. Jog the camera over the calibration dot (located on the calibration station) so the corner of the box in the video window is aligned to display over the calibration dot per the rules shown here for A1:
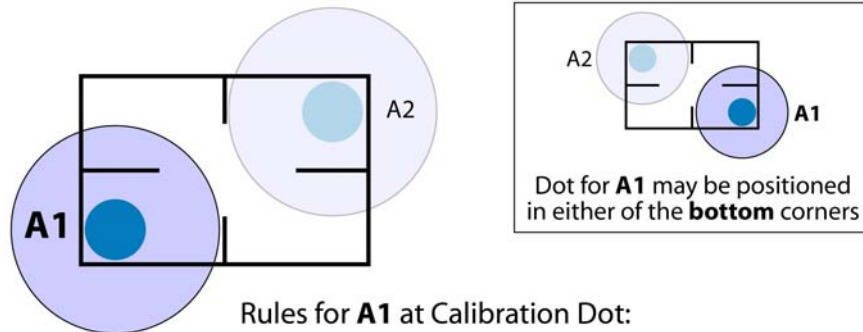
Rules for **A1** at Calibration Dot:
* Dot must be positioned completely inside box
* Dot must NOT touch box edges
* Dot must be in the corner diagonally opposite A2 dot
* Dot should be as far apart from A2 dot as possible
* Dots for A1 and A2 do NOT have to be symetrically placed

Either of the bottom corners may be used as long as the diagonally opposite corner is used when teaching the "Camera to Camera Calibration A2 (XY)" location.

NOTE: For best results, the location taught must be **as far apart as possible** from the location taught for "Camera to Camera Calibration A2 (XY)".

     b. Jog the Z axis upward to its upper limit.
     c. Click the XYZ button on the Check/Set Base Locations window.
     d. Click SAVE on the Check/Set Base Locations window to save the newly taught values.

4. Define the second camera calibration point of the calibration dot as the location to which the camera moves during the automatic vision calibration sequence. All three base locations (A2, B2, and C2) should be taught at the same dot.

    a.   Jog the camera over the calibration dot so the corner of the box in the video window is aligned to display over the calibration dot per the rules shown here for A2 - in the diagonally opposite corner from the one used when you taught the "Camera to Camera Calibration A1 (XY)" location.

Rules for **A2** at Calibration Dot:
* Dot must be positioned completely inside box
* Dot must NOT touch box edges
* Dot must be in the corner diagonally opposite A2 dot
* Dot should be as far apart from A1 dot as possible
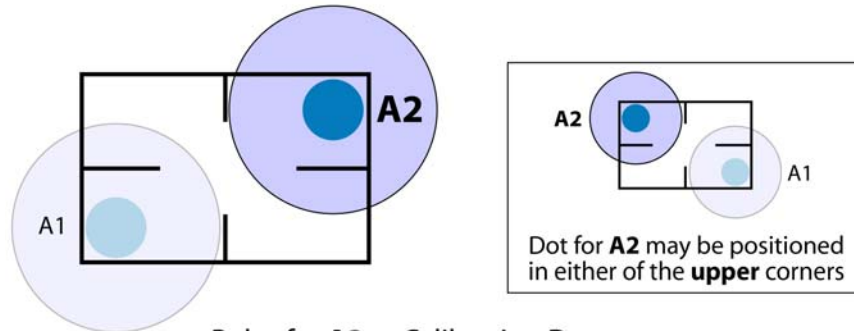* Dots for A1 and A2 do NOT have to be symetrically placed

    NOTE: For best results, the location taught must be **as far apart as possible** from the location taught for "Camera to Camera Calibration A1 (XY)".

    b.   Jog the Z axis upward to its upper limit.

5. Save the new values:

    a.   Click the XYZ button on the Check/Set Base Locations window.
    b.   Click the SAVE button on the Check/Set Base Locations window.

6. Repeat steps 3 and 4 to teach B1 and B2, then repeat them again to teach C1 and C2.

7. Return to .

Zoom Camera Lens

A Precision Glass Calibration Chip is required when teaching base locations for a ClearVu Vision (Optem) programmable zoom focus lens.If a ClearVu Vision (Optem) programmable zoom focus lens is present, the need for re-calibration when the zoom changes requires that these base locations (A1, B1, and C1 along with A2, B2, and C2) each define one of the three different sizes of calibration dots provided by the precision glass chip.
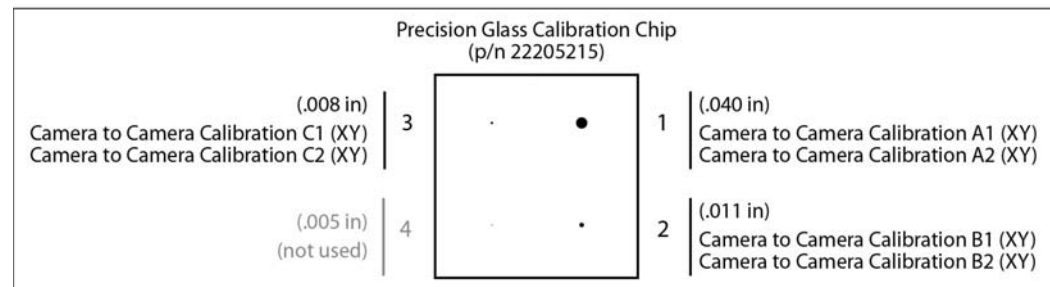
During a program run, the dot necessary for the current focal conditions will be automatically selected based on the percent of zoom needed (this correlation is established with camera calibration zoom fields in the dispenser configuration file).

Each base location correlates to a different portion of the zoom range for the programmable zoom lens. Your zoom range values may vary from the following default settings due to process optimization:

A1 & A2 = 0% to 30%
B1 & B2 = 31% to 70%
C1 & C2 = 71% to 100%

3. Define the first camera calibration point of the calibration dot as the location to which the camera moves during the automatic vision calibration sequence:

    a. Verify that a Precision Glass Calibration Chip (p/n 22205215) is in place on the calibration station.
    b. Close the Check/Set Base Locations window and open a Jog window.
    c. Zoom to a value near the upper end of the maximum zoom range. For example, assuming the default zoom ranges, zoom to a value of:

        29 to teach A1
        69 to teach B1
        90 to teach C1

    d. Close the Jog window, reopen the Check/Set Base Locations window, and relocate this base location "Camera to Camera Calibration A1 (XY)" (or B1 or C1).

e. Jog the camera over the appropriate calibration dot (if teaching A2, jog to the larg-
    est dot; inversely, if teaching C1, jog to the smallest dot) so the corner of the box
    in the video window is aligned to display over the calibration dot similar to the
    example shown below.
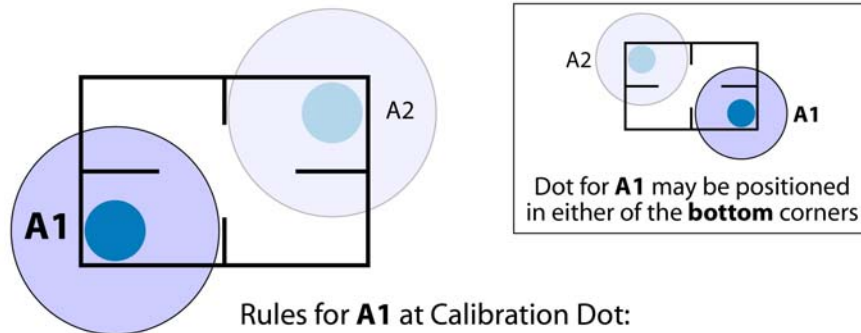
Dot for **A1** may be positioned
in either of the **bottom** corners

Rules for **A1** at Calibration Dot:
* Dot must be positioned completely inside box
* Dot must NOT touch box edges
* Dot must be in the corner diagonally opposite A2 dot
* Dot should be as far apart from A2 dot as possible
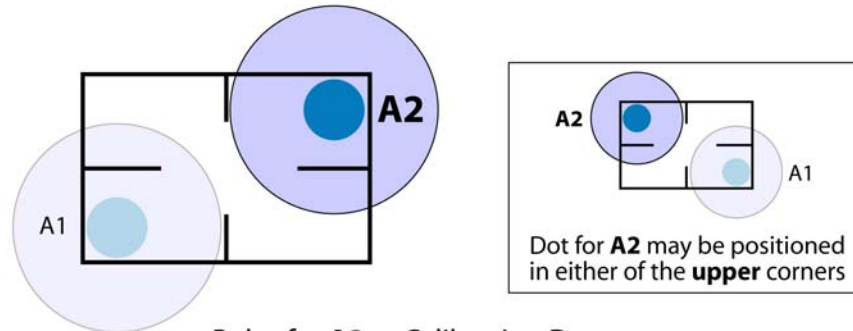* Dots for A1 and A2 do NOT have to be symetrically placed

Either of the bottom corners of the box may be used as long as the diagonally oppo-
site corner is used when teaching the A2, B2, or C2 location.

NOTE: For best results, the location taught must be **as far apart as possibl**e from the
location to be taught for "Camera to Camera Calibration A2 (XY)".

~ continued ~

4. Define the second camera calibration point of the calibration dot as the location to which the camera moves during the automatic vision calibration sequence.

    a.   From the scrolling list of Base Locations, click on "Camera to Camera Calibration A2 (XY)" (or B2 or C2).

    b.   Jog the camera over the calibration dot used in step 3.e.

        Position the camera over the dot so a corner of the box in the video window is aligned to display over the calibration dot as shown below, in the diagonally opposite corner used to teach the "Camera to Camera Calibration A1 (XY)" (or B1 or C1) location.

Rules for **A2** at Calibration Dot:
* Dot must be positioned completely inside box
* Dot must NOT touch box edges
* Dot must be in the corner diagonally opposite A2 dot
* Dot should be as far apart from A1 dot as possible
* Dots for A1 and A2 do NOT have to be symetrically placed

    NOTE: For best results, the location taught must be **as far apart as possible** from the location taught for "Camera to Camera Calibration A1 (XY)" (or B1 or C1).

5. Save the new values:

    a.   Click the XYZ button on the Check/Set Base Locations window.

    b.   Click the SAVE button on the Check/Set Base Locations window.

6. Repeat steps 3 through 5 to teach B1 and B2, then repeat them again to teach C1 and C2.

7. Return to .

Camera to Camera Calibration A2 (XY)
Camera to Camera Calibration B2 (XY)
Camera to Camera Calibration C2 (XY)

The steps for teaching these second camera base locations are integrated into the instructions for teaching the first camera base locations (A1, B1, C1).

Camera to Paper Pad (XY)

Follow the directions below that apply to the type of device (paper pad on backlit calibration station or drill pad) installed on your dispenser. If neither the Drill Pad or Backlit Calibration Station are present, teach this base location at the Safety Location.

Backlit Calibration Station

3. If a backlit calibration station is present, define the location at the backlit calibration station to which a head moves during the valve calibration sequence.

   a. Turn on the lighting I/O for the backlit calibration station; this I/O is located in the vision section of the ioView window.
   b. Jog the camera so it is relatively centered over the backlit area (located on the backlit calibration station). This action teaches (XYZ) together (the Z coordinate is not currently used).
   c. Click the XYZ button on the Check/Set Base Locations window.
   d. Return to Step 4 (pg 5).

Drill Pad

3. If a drill pad is present, define the location at the drill pad to which a head moves during the drill phase of a tool calibration sequence.

   a. Jog the camera to the approximate center of the drill chip (located on the calibration station). This action teaches (XYZ) together (the Z coordinate is not currently used). Hint: Use a pencil to place a dot on the chip before teaching this point.
   b. Click the XYZ button on the Check/Set Base Locations window.
   c. Return to Step 4 (pg 5).

Camera to Work Area Origin (XY)

3. Define the location at which a board to be processed will be positioned:

   a. Jog the camera to the desired board origin location, wherever the lower right hand corner (or the lower left hand corner if the machine has a right-to-left conveyor) of your boards will be located. This action teaches (XYZ) together (the Z coordinate is not currently used).
   b. Click the XYZ button on the Check/Set Base Locations window.
   c. Return to Step 4 (pg 5).

Touch Probe to Target (XYZ)

3. Define the XY offset between the camera and heads/tools:

    a.   From the scrolling list of Base Locations, click on Touch Probe to Target (XYZ).

    b.   Jog the gantry's Z axis upward to its upper limit.

CAUTION: Gantry must be raised to prevent damage to the machine during the next step.			
ATTENTION: Le chevalet doit être levé pour éviter l'endommagement de la machine lors de la prochaine étape.	*VORSICHT!* Der Kopf muss Oben sein um Maschinenschaden auszusschliessen.	*ATTENZIOINE* Il gruppo testa deve essere sollevato per evitare danni alla macchina durante la fase successiva.	*PRECAUCIÓN* Para realizar los siguientes pasos, el eje ha de ser elevado, para así, prevenir daños en la máquina.

    c.   Click on Probe down (located with the PiggyBack toggle boxes below the scrolling Base Locations list). The touch probe descends.

    d.   Jog the gantry in the XY axes until the touch probe tip is centered over the "Target." Then jog the gantry in the Z axis until the touch probe sensor changes state - the red light on the touch probe sensor will turn on.

CAUTION: The same location must be used consistently as the "Target" throughout the procedure of teaching base locations or damage to the machine may result. A steel pin is provided on the calibration station as a Target, however, any location with a Z coordinate at the touch pad can be used wherever "Target" is mentioned - as long as you use it consistently!			
ATTENTION: La même position doit être uniformément utilisée en tant que << cible >> tout au long de la procédure de configuration des positions de base sinon la machine pourrait être endommagée. Une pointe d'acier est fournie au poste de calibrage comme cible, cependant, toute position avec une coordonnée Z au dispositif de pointage tactile peut être utilisée chaque fois que << cible >> est mentionné - pourvu que ce soit fait de façon constante!	*VORSICHT!* Waehrend des Einlernens der Basis Positionen muss durchgehend das selbe "Ziel" benutzt werden, anderweitig kann Schaden an der Maschine entstehen. Es gibt einen Stahlstift an der Kalibrierstation dafuer. Aber es kann auch jede andere Position mit Z Koordinate auf dem Touchpad benutzt werden, wenn ein "Ziel" gefordert wird - solange sie immer wieder benutzt wird.	*ATTENZIOINE* E'necessario usare regolarmente la stessa coordinata come A Target@ per tutto il corso dell'apprendimento delle posizioni di base, diversamento può verificarsi un danno alla macchina. Viene fornito un perno in acciaio che costituisce il Target sulla stazione di calibrazione, comunque si può usare qualsiasi coordinata che tenga conto dello Z sul sensore di altezza, posto che poi la si usi regolarmente.	*PRECAUCIÓN* Siempre se ha de utilizar la misma referencia para las sucesivas localizaciones. En caso contrario se pueden producir errores en la máquina. Se suministra un pincho de acero, con la máquina, para que sirva de referencia, no obstante, se puede utilizar cualquier otro punto con coordenada Z, siempre y cuando, este, se utilice de forma repetitiva.!

4. Save the new values:

    a.   Click the XYZ button on the Check/Set Base Locations window.

    b.   Click the SAVE button on the Check/Set Base Locations window.

5. Click on Probe down (located with the PiggyBack toggle boxes below the scrolling Base Locations list). The touch probe retracts.

6. Jog the gantry upward to a safe elevation.

7. If using the Low Z Limit option, perform the following steps.

> *NOTE*: This step may be performed now or after ALL locations have been taught and verified.

  a.   Jog the Z axis to a location slightly lower than just below the lowest possible board surface location (i.e., the thinnest board to be used). The additional distance below the board provides a slight tolerance for board bowing.
  b.   Exit the Check/Set Base Locations window.
  c.   Click on Configuration > Option Settings. The Option Settings window displays.
  d.   In the General section of the Option Settings window, select Low Z Limit and then click OK.
  e.   Reopen the Check/Set Base Locations window.
  f.   Return to .

Head 2 to Target (XYZ)
Head 3 to Target (XYZ)
Head 4 to Target (XYZ)
Head 5 to Target (XYZ)

3. Define the "Target" location to which Head n will move during the valve and tool calibration sequence:

  a.   From the scrolling list of Base Locations, click on Head n to Target (XYZ).

> *NOTE*: If Head n is not present, teach at the Safety Location.

> *NOTE*: The "(XYZ) to Refresh Location" should be taught for any unused heads (valve/tool mount positions) to prevent inadvertent damage.

  b.   Jog the gantry's Z axis upward to its upper limit.

CAUTION: Gantry must be raised to prevent damage to the machine during the next step.			
ATTENTION: Le chevalet doit être levé pour éviter l'endommagement de la machine lors de la prochaine étape.	*VORSICHT!* Der Kopf muss Oben sein um Maschinen-schaden auszus-chliessen.	*ATTENZIOINE* Il gruppo testa deve essere sollevato per evi-tare danni alla macchina durante la fase succes-siva.	*PRECAUCIÓN* Para realizar los sigui-entes pasos, el eje ha de ser elevado, para así, prevenir daños en la máquina.

  c.   Jog the gantry to an accessible location.
  d.   Mount the Head Calibration Tool in head position n. For details, refer to *Head Calibration Tool* in the *Routine Maintenance - Tools & Equipment* section of the *Dispenser Service Guide.*
  e.   Teach the XY and Z positions:

  i. Jog the gantry in the XY and Z axes until the Head Calibration Tool is centered on the "Target."

CAUTION: The same location must be used consistently as the "Target" throughout the procedure of teaching base locations or damage to the machine may result. A steel pin is provided on the calibration station as a Target, however, any location with a Z coordinate at the touch pad can be used wherever "Target" is mentioned - as long as you use it consistently!

ATTENTION:	**VORSICHT!**	**ATTENZIOINE**	**PRECAUCIÓN**
La même position doit être uniformément utilisée en tant que << cible >> tout au long de la procédure de configuration des positions de base sinon la machine pourrait être endommagée. Une pointe d'acier est fournie au poste de calibrage comme cible, cependant, toute position avec une coordonnée Z au dispositif de pointage tactile peut être utilisée chaque fois que << cible >> est mentionné - pourvu que ce soit fait de façon constante!	Waehrend des Einlernens der Basis Positionen muss durchgehend das selbe "Ziel" benutzt werden, anderweitig kann Schaden an der Maschine entstehen. Es gibt einen Stahlstift an der Kalibrierstation dafuer. Aber es kann auch jede andere Position mit Z Koordinate auf dem Touchpad benutzt werden, wenn ein "Ziel" gefordert wird - solange sie immer wieder benutzt wird.	E'necessario usare regolarmente la stessa coordinata come A Target@ per tutto il corso dell'apprendimento delle posizioni di base, diversamento può verificarsi un danno alla macchina. Viene fornito un perno in acciaio che costituisce il Target sulla stazione di calibrazione, comunque si può usare qualsiasi coordinata che tenga conto dello Z sul sensore di altezza, posto che poi la si usi regolarmente.	Siempre se ha de utilizar la misma referencia para las sucesivas localizaciones. En caso contrario se pueden producir errores en la máquina. Se suministra un pincho de acero, con la máquina, para que sirva de referencia, no obstante, se puede utilizar cualquier otro punto con coordenada Z, siempre y cuando, este, se utilice de forma repetitiva.!

ii. Click on PiggyBack n (PiggyBack toggle boxes are located below the scrolling Base Locations list). The Head Calibration Tool descends.

iii. Click on PiggyBack n (PiggyBack toggle boxes are located below the scrolling Base Locations list). The calibration tool retracts.

4. Save the new values:

   a.   Click the XYZ button on the Check/Set Base Locations window.
   b.   Click the SAVE button on the Check/Set Base Locations window.

5. Jog the gantry to a safe elevation.

6. Remove the Head Calibration Tool.

7. Return to <u>Step 4 (pg 5)</u>.

Camera to Standoff Calibration (XY)

3. Define the Standoff Calibration location to which Head n moves during the valve and tool calibration sequence.

    a.   Jog the camera so it is relatively centered over the Standoff Calibration location (on the calibration station).

        NOTE: If the Standoff Calibration option is not present, teach at the Safety Location.

    b.   Click the XYZ button on the Check/Set Base Locations window.

4. Return to .

Camera to Scale1 (XY); Head1 to Z
Camera to Scale2 (XY); Head 1to Z
Camera to Scale3 (XY); Head 1 to Z

Scale n is the position for head n. This makes a different weigh position available for each of three heads to prevent needle tip contamination from previously weighed materials.

3. Define Purpose: To define the Precision Scale location to which Head n moves during weighing processes.

    a.   Teach (XY) first: Jog the camera so it is relatively centered over the scale.

        NOTE: If Scale n is not present, teach at the Safety Location.

    b.   Click the XYZ button on the Check/Set Base Locations window.
    c.   Teach (Z) next: Mount the Head Calibration Tool (for details, refer to *Head Calibration Tool* in the *Routine Maintenance - Tools & Equipment* section of the *Dispenser Service Guide*) in Head n to emulate a valve and then jog Head 1 to the desired elevation at the scale.
    d.   Click the Z ONLY button on the Check/Set Base Locations window.

4. Return to .

Camera to NeedleClean1 (XY); Head1 to Z
Camera to NeedleClean2 (XY); Head1 to Z
Camera to NeedleClean3 (XY); Head1 to Z
Camera to NeedleClean4 (XY); Head1 to Z
Camera to NeedleClean5 (XY); Head1 to Z
Camera to NeedleClean6 (XY); Head1 to Z

Follow the directions below that apply to the type of cleaner installed on your dispenser. If Needle Cleaner n is not present, teach at the Safety Location.

- Grip Type Cleaners (pg 25)
- Nozzle Type Cleaners (pg 26)
- Vacuum Nozzle Type Cleaners (pg 26)
- Brush Type Cleaners (pg 27)
- Scale-integrated Needle Cleaners (pg 27)

Grip Type Cleaners

Follow the procedure detailed in the *Teaching Cleaning Path* section of the *Needle Cleaner Setup* procedure located in the *Configuration* section of *Using FLOware Software* in the *FLOware Software Guide*.

Cleaning Path Concepts
- A cleaning path can be taught for up to three heads. This is configurable to meet specific needs.

  > Head 1 uses cleaning points 1 and 2 - (default)
  > Head 2 uses cleaning points 3 and 4 - (default)
  > Head 3 uses cleaning points 5 and 6 - (default)

- All or part of the length of the grip jaw can be used for a cleaning path.
- The start position of a cleaning path (cleaning point 1, 3, or 5) should be taught between the grip jaws and, typically, at an end of the needle cleaner. The corresponding Z coordinate should be taught at an elevation where the needle wipe is to occur. If the needle to be cleaned is a short length, it is critical to teach a Z height that will not damage the touch probe when needle cleaning occurs.
- The end position of a cleaning path (cleaning point 2, 4, or 6) should be taught, typically, at the opposite end of the grip jaws with the corresponding Z coordinate taught at an elevation clear of the grip jaws.

Nozzle Type Cleaners

Follow the procedure detailed in the *Teaching Cleaning Path* section of the *Needle Cleaner Setup* procedure located in the *Configuration* section of *Using FLOware Software* in the *FLOware Software Guide*.

Cleaning Path Concepts
• A cleaning path can be taught for up to three heads. This is configurable to meet specific needs.

> Head 1 uses cleaning points 1 and 2 - (default)
> Head 2 uses cleaning points 3 and 4 - (default)
> Head 3 uses cleaning points 5 and 6 - (default)

• All or part of the length of the nozzle clean pad can be used for a cleaning path.
• The start position of a cleaning path (cleaning point 1, 3, or 5) should be taught, typically, at the end of the nozzle clean pad.
• The end position of a cleaning path (cleaning point 2, 4, or 6) should be taught, typically, at the opposite end of the nozzle clean pad.
• No elevation change occurs between the start and end points, i.e., train the Z position in contact with the pad at both positions (Z value will not change).
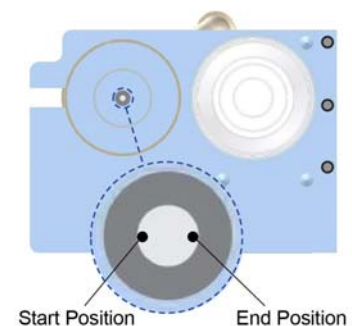

Vacuum Nozzle Type Cleaners

Follow the procedure detailed in the Teaching Cleaning Path section of the Needle Cleaner Setup procedure located in the Configuration section of Using FLOware Software in the FLOware Software Guide.

Cleaning Path Concepts
• A cleaning path can be taught for up to three heads. This is configurable to meet specific needs.

> Head 1 uses cleaning points 1 and 2 - (default)
> Head 2 uses cleaning points 3 and 4 - (default)
> Head 3 uses cleaning points 5 and 6 - (default)

• The width of the vacuum nozzle aperture is typically used for the cleaning path.
• The start position of a cleaning path (cleaning point 1, 3, or 5) should be taught, typically, at the inside edge of the vacuum nozzle aperture.
• The end position of a cleaning path (cleaning point 2, 4, or 6) should be taught, typically, at the opposite inside edge of the vacuum nozzle aperture.
• Elevation change occurs between the start and end positions: train the Z position approximately 0.25 mm above the start position, and approximately 0.05 mm below the end position.

Brush Type Cleaners

Follow the procedure detailed in the *Teaching Cleaning Path* section of the *Needle Cleaner Setup* procedure located in the *Configuration* section of *Using FLOware Software* in the *FLOware Software Guide*.

For any additional information on how to use these base locations when the dispenser is configured for a brush cleaner, contact GPD Global Service Dept.

Scale-integrated Needle Cleaners

Follow the procedure detailed in the *Teaching Cleaning Path* section of the *Needle Cleaner Setup* procedure located in the *Configuration* section of *Using FLOware Software* in the *FLOware Software Guide*.

Cleaning Path Concepts
- Cleaning point 4 should be taught at the starting edge of the brushes with the corresponding Z coordinate taught at the dispense elevation.
- leaning point 5 should be taught at the opposite end of the brush with the corresponding Z coordinate taught at an elevation clear of the brushes.
- If the machine also has a grip-type needle cleaner, cleaning points 1, 2, and 3 can be taught at the grip-type cleaner.

(XYZ) to SpecialLocation1
(XYZ) to SpecialLocation2
(XYZ) to SpecialLocation3

3. Define the special location to which Head n moves. Special locations apply to points on the table (independent of the board) not elsewhere defined.

NOTE: The safety location should be taught for any unused "(XYZ) to SpecialLocation n" location to prevent inadvertent damage.

    a. Jog the gantry to a convenient, safe, out-of-the-way location in the work area, normally between the boards or at the rear of the machine.
    b. Click the XYZ button on the Check/Set Base Locations window.

4. Return to .

Camera to SyringeFill (XY); Head1 to Z

3. Define the fill station location to which Head n moves during syringe fill operations:

NOTE: If the Syringe Fill is not present, teach at the Safety Location.

    a. Teach (XY) first: Jog the camera so it is centered over the fill station.
    b. Click the XYZ button on the Check/Set Base Locations window.
    c. Teach (Z) next: Mount the Head Calibration Tool (for details, refer to *Head Calibration Tool* in the *Routine Maintenance - Tools & Equipment* section of the *Dispenser Service Guide*) in Head n to emulate a valve and then jog Head n to the desired elevation at the fill station.
    d. Click the Z ONLY button on the Check/Set Base Locations window.

4. Return to .

Camera to RejectLocation (XY); Head1 to Z

3. Define the drop off location to which Head n moves for components rejected in a pick-and-place operation.

    a. Mount the Head Calibration Tool (for details, refer to *Head Calibration Tool* in the *Routine Maintenance - Tools & Equipment* section of the *Dispenser Service Guide*) in Head n to emulate a valve.
    b. Jog Head n so that the tip of the Head Calibration Tool is at the desired reject position and elevation. This action teaches (XYZ) together (the Z coordinate is not currently used).
    c. Click the XYZ button on the Check/Set Base Locations window.
    d. Click the Z ONLY button on the Check/Set Base Locations window.

4. Return to .

Camera to StampWell (XY); Head1 to Z

3. Define the stamp well location to which Head n moves during stamping operations.

   NOTE: If the Stamp Well is not present, teach at the Safety Location.

   a. Teach (XY) first: Jog the camera so it is centered over the stamp well.
   b. Click the XYZ button on the Check/Set Base Locations window.
   c. Teach (Z) next: Mount the Head Calibration Tool (for details, refer to Head Calibration Tool in the Tools & Equipment section of Routine Maintenance) in Head n to emulate a valve.
   d. Jog Head n to the desired elevation at the stamp well.

4. Return to Step 4 (pg 5).

Camera to Fixed Camera (XY); Head to Z

3. Define the location of a fixed, upward-looking camera:

   a. If the machine has a fixed, upward-looking camera, align the downward-looking camera with the cross hairs on the lens cap of the upward-looking camera. If there is no fixed camera, teach at the Safety Location.
   b. Click the XYZ button on the Check/Set Base Locations window.
   c. Teach (Z) next: Position the downward-looking camera in the exact Z-axis location needed during the program run and then click the Z ONLY button on the Check/Set Base locations window.
   d. Click the Z ONLY button on the Check/Set Base Locations window.

4. Return to Step 4 (pg 5).

Camera3 to Target (XY)

This base location should only be available if your dispenser is configured for a third camera. If this is the case, contact GPD Global for special instructions.

NOTE: If there is no third camera present on the gantry but the base location is listed, teach it at the Safety location.

Camera to Tilt Calibration L/F (XY)
Camera to Tilt Calibration R/F (XY)
Camera to Tilt Calibration R/R (XY)
Camera to Tilt Calibration L/R (XY)

These base locations are only available if your dispenser is configured for a tilt fixture. If this is the case, contact GPD Global Service Dept for special instructions.