

Using the Custom Pallet Database

The custom pallet database is built around the concepts used by Motionware Locations that specify a pallet. You must be familiar with Motionware Locations database before attempting to use the custom pallet database. See Chapter 5 in the **Motionware Users Guide** for information on using location databases.

A Motionware location that uses a pallet specifies a base location and a set of parameters that define the number of rows, columns, and layers and the spacing between each row column and layer. This enables multiple locations to be specified by a base location and computed offsets. This method requires that the spacing be uniform between each row, column or layer. The Custom Pallet database was created to handle multiple similar locations with non-uniform spacing. Each single 'location' within a Custom Pallet location record must have its offsets from the base location specified rather than computed. The offsets are called X and Y instead of row and column and are in the X and Y direction relative to the reference frame specified by the base location. There are currently no provisions for multiple layers in the Custom Pallet database.

The Custom Pallet Database also incorporates a graphical representation of each offset specified by the record. It is possible, using a separate graphics page, to turn off or on each individual offset location to control how the robot accesses locations.

There are a couple custom statements provided to access the custom pallet locations. `MOVE_CUSTOM_PAL` is used to move to a Custom Pallet location. This custom statement is comparable to the `MOVE` statement used with the Motionware Locations Database. `RESET_CSTPAL` is used to reset the access flags in a Custom Pallet location and is comparable to the Motionware `RESET_PALLET` statement. See the custom statements documentation for explanation on the use of these statements.

Editing Custom Pallet Locations

To access custom pallet location records:

EDIT => Custom Pallet

The following screen is displayed:

The screenshot displays the 'Custom Pallet Locations Database' interface. At the top, there is a menu bar with 'Go', 'Seek', 'Edit', and 'Help'. Below this, a header area shows the file name 'tray_carr_pk.4g', the current record '0 of 0', the device 'Robot_1', and the date/time '24-Mar-04 14:27'. A table of coordinates is shown with columns X, Y, Z, y, p, r and values 263.300, 257.027, -80.747, 83.336, 179.920, 141.763. Below the table, there are three rows of motion parameters: 'Location', 'Approach', and 'Depart'. Each row has fields for Line/Joint, Speed, Rot. Speed, in/sec, mm/sec, Coarse/Fine, Accel, Decel, and Prof. The 'Pallet' button is highlighted with a red circle and the number 1. Other buttons include 'Here', 'Strategies', 'Teach', 'Configuration', and 'Reference Frame'. The 'Reference Frame' section has radio buttons for 'World' and 'Named', and a text field containing 'tray_f'. There are also checkboxes for 'Keep if success' and 'Keep if error'. At the bottom, there are sections for 'Input Signals' and 'Output Signals'.

Figure 1 - Custom Pallet Database Editing Page

See Editing Locations on page 74 of the Motionware Users Guide for an explanation of the items on this page.

- 1 This PALLET button opens up a menu that allows editing of the individual pallet locations. See figure X-2

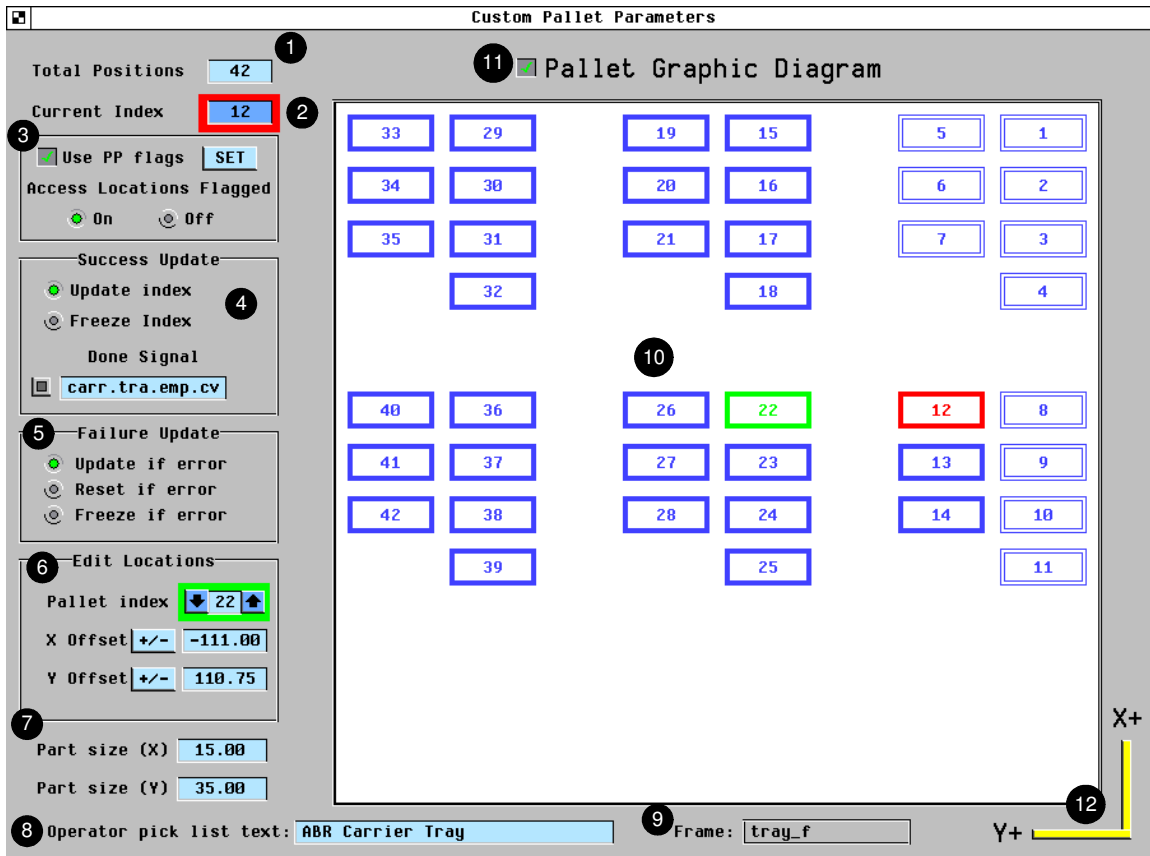


Figure 2 - Custom Pallet Parameters Editing Page

- 1 This is the total number of offset positions for the current Custom Pallet record. A maximum of 50 offset positions are allowed.
- 2 This box shows the current index for the Custom Pallet location. This is the offset location that the robot will access next if it is not using the part present flags to control access to locations. The current index location will be shown in RED on the graphic view.
- 3 A check mark in the **Use PP flags** box will cause the robot to access individual offset locations based on the part present flags. The robot can access locations that are flagged **ON** or **OFF** based on the radio button selection. Offset locations flagged **ON** will be indicated by a bold outline in the graphical view. Locations flagged **OFF** will have a light outline in the graphical view. The **SET** button opens a page that allows editing of the part present flags. (See figure X-3)
- 4 If **Update Index** is selected the current index will be automatically updated when the robot successfully accesses this custom pallet location. If **Freeze Index** is selected the current index will not be updated. The **Done Signal** specifies an AIM variable that points to a signal to be turned on when there are no more offset locations to be accessed.

5 The failure update group of radio buttons control what happens to the index if an error occurs while accessing this location. If **Update if Error** is selected the current index will be updated to the next offset location and the part present flag will be updated as if the location completed normally. If **Reset if Error** is selected, the current index will be reset to 1 and the part present flags will all be reset. If **Freeze if Error** is selected, no changes will be made to the index or part present flags

6 The **Pallet Index** selects which individual offset location is currently selected for editing. The Currently selected offset location is shown in green in the graphical view. The selection can be changed using the up / down arrows, directly entering the number in the field, or by clicking on the offset location in the graphical view. Once a location is selected, its X and Y offsets are shown and may be edited by typing the value into the appropriate box. The graphics will be immediately updated to indicate the new position. The +/- buttons effect all X or Y offsets simultaneously (all offsets must be in the same direction from the base location). Pallet index #1 is the base location and by definition should have zero X and Y offsets.

7 **The Part Size (X) and Part Size (Y)** are only used to properly scale the graphic image and have no bearing on the functionality of the Custom Pallet location. The values are in millimeters and only need to be approximate values. Incorrect values may cause the parts to overlap in the graphical view. (If the parts are sized correctly and still overlap in the graphic view, the individual location offsets may be incorrect)

8 The **Operator Pick List Text** specifies the long text to be displayed when selecting a record for part present flags editing (see figure X-4)

9 The **Frame** displays the reference frame that the base location is relative to. It is shown here only for convenience. The reference frame may be edited on the main page (see figure X-1)

10 This is the graphical representation of the individual offset locations. If part present flags are used, the locations with 'parts' will have bold outlines and the locations without 'parts' will have lighter outlines. Part present flags cannot be edited on this page. The location currently selected for editing will be green. Clicking on an individual offset location will select that location for editing (see item 6)

11 If the **Pallet Graphic Diagram** has a check in the box, the graphics will be displayed. Removing the check will keep the graphics from being displayed.

12 The yellow frame graphic is static and is shown to represent the positive X and Y directions. The frame graphic origin has no meaning, the base location is the 'origin' and all offsets are relative to the base location (index #1)

Using the Part Present flags option

The part present flags option allows the robot to selectively access custom pallet locations based on the part present flags. This was designed with a pick and place operation in mind. If the robot is picking parts using the custom pallet location, it should access locations that are flagged ON indicating there is a part at the location. After accessing the location (picking the part) the robot will set the part present flag to OFF to indicate there is no longer a part available. If the custom pallet location is used to place parts, the robot should access locations that are flagged OFF indicating there is no part there yet. After accessing the location (placing a part) the robot will set the part present flag to ON. If the part present flags option is used, the robot automatically scans (starting at index 1 instead of the current index) to find the first offset location whose part present flag indicates it should be accessed.

Using the part present flags, it is possible to randomly turn off or on any of the part present flags for selective robot access. An extra menu page is provided for this purpose. The menu page can be accessed by clicking the SET button (see figure x-2 item #3) or a custom menu button can be created that points to the menu page **opr_pallet** in the menu file **cstpal.mnu**. This page is shown in figure 3.

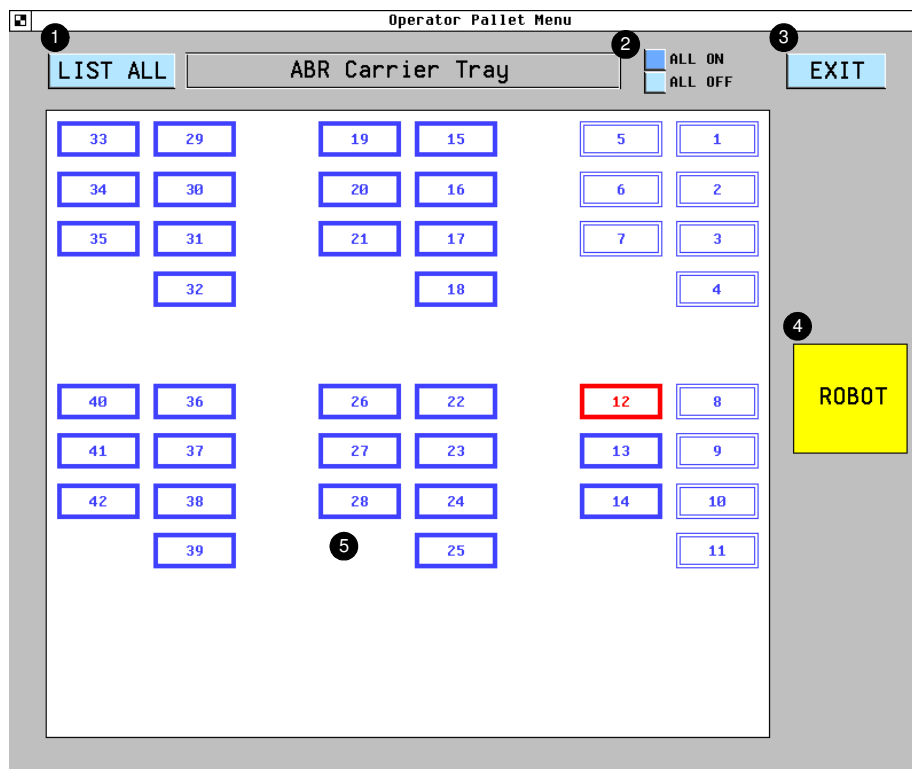
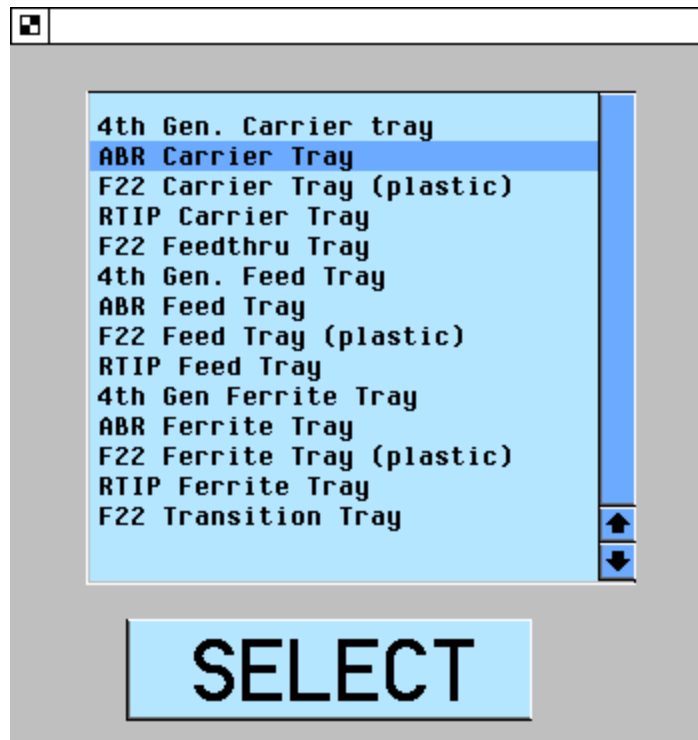


Figure 3 - Operator Pallet Menu

1 Clicking the **LIST ALL** button will display a list of the records in the Custom Pallet database. The actual record names are replaced by long text (see item # 8 in Figure 2) to make it easier for the operators to select the appropriate record.



Highlight the desired Custom Pallet location and click the **SELECT** button to select that record for editing

- ② The **ALL ON** button sets all part present flags for the current record to ON. The **ALL OFF** button sets all part present flags for the current record to OFF.
- ③ The **EXIT** button exits the part present flags editing page.
- ④ The yellow box labeled **ROBOT** indicates the robot's position relative to the parts tray that is represented by the Custom Pallet location. *NOTE: This item is NOT part of the Custom Pallet Plug-in and was added for a specific customer. The opr_pallet menu page has been modified to include this graphic.*
- ⑤ Clicking on individual locations in this graphic area will toggle the part present flag for that location. If it is on it will turn off, if it is off it will turn on. Locations with part present flags set to ON will be indicated by a bold outline.