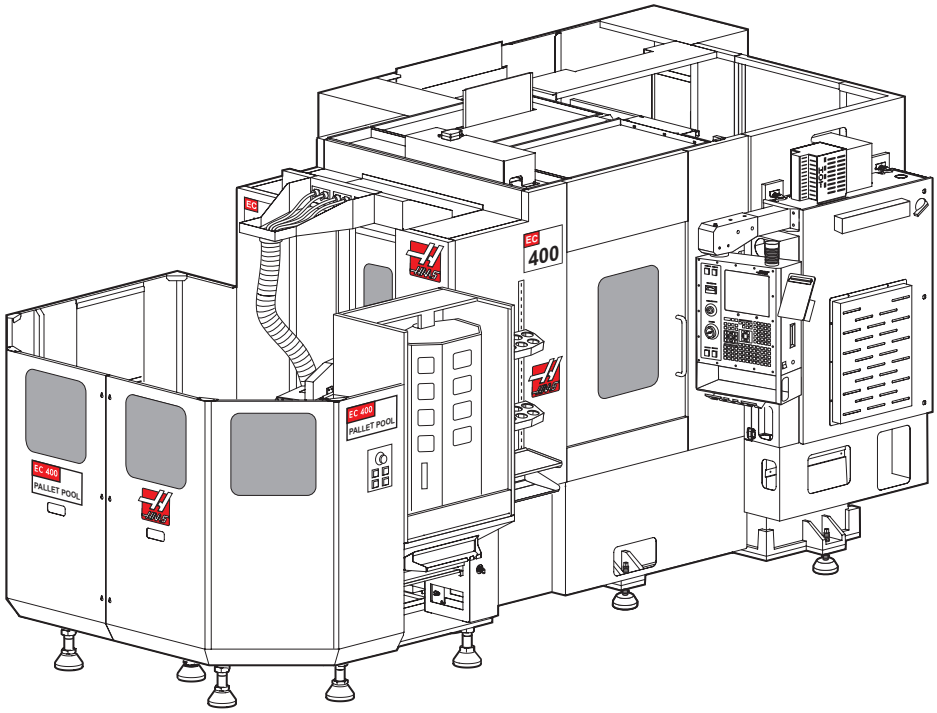
Pallet Pool
Operator's Addendum



Introduction

This pallet pool system allows 6 pallets to be prepared and then automatically loaded, one at a time, in the mill for machining. As the pallets are called to be machined, a pallet arm positions each pallet in the mill's load station. Then mill puts the pallet in the machining area at the next pallet change.

Haas pallet-scheduling software stages pallets as the machine calls them. This means that high priority parts can be scheduled more often.

The pallet arm will return completed pallets to a protected operator station for the unloading and loading of parts.

Installation

Overview
The Pallet Pool is installed at the same time as the mill.

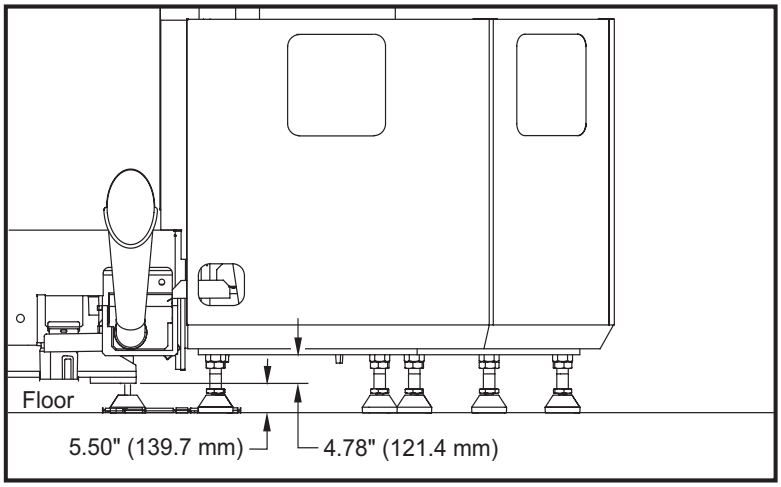
> **NOTE:** To ensure that the Pallet Pool does not become mis-aligned, it is recommended that the machine be anchored. Refer to Haas document ES0095 for anchoring instructions before installing the machine.

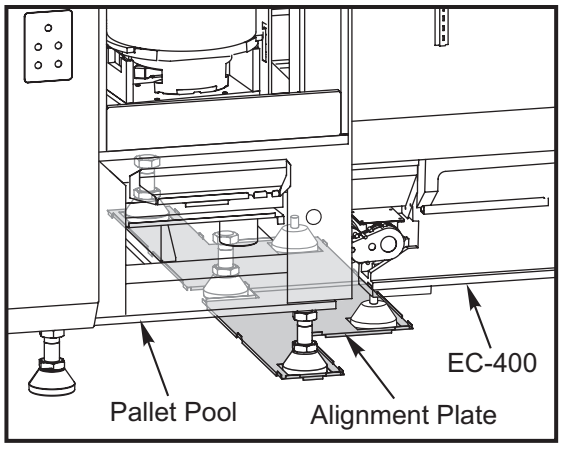
An alignment plate is used to correctly position the Pallet Pool with the load station of the mill.

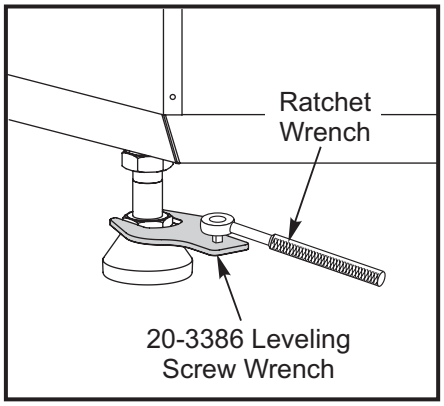
IMPORTANT: This alignment plate must be positioned between the leveling screws and pads of the mill before the leveling process begins.

Although the pallets were aligned before the pallet pool was shipped, it is recommended that you verify that all pallet positions are properly aligned upon installation. However, the emphasis for setup is on the Ready Position, which is the only position that usually changes from the time the machine was initially assembled and tested. The load station position should be verified, as a position change here will affect placement on all of the other shelves. The following buttons on the control are helpful to set up the pallet pool:

F1 – return the pallet in the lifter to an open shelf
F3 – put the load station pallet (shelf A) to an open shelf
F4 – bring the selected pallet to the load station
End – lift and lower the pallet pool lifter mechanism
Part Zero Set – set rotator or slider coordinate to current position







Refer to the section "Pallet Pool Shelf Positions" for information on jogging the Pallet Pool slider/lifter.

NOTE: A 3/4" drive, 3/4" socket is recommended for adjusting the slider/rotator during installation.

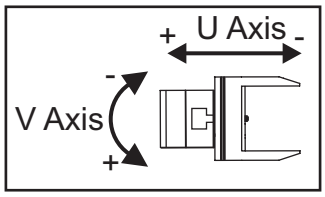
1. Install and level the mill in accordance with instructions in the Reference manual. Be sure to install the alignment plate before leveling the machine and ensure machine height is set correctly (see figure above).

2. Remove the shipping bracket and all packing material from the Pallet Pool. Do not place any of the pallets in the pallet pool at this time.

3. Move the Pallet Pool into position over the leveling pads in the alignment plate.

4. Install the cables and air supply to the mill. The Pallet Pool gets its air supply and electrical power solely from the mill. The cables from the Pallet Pool are secured to existing plugs or cables on the mill in two places. The first is at the top on the mill. Attach the Pallet Pool cable carrier support to the top of the mill. Attach the cables from the Pallet Pool to the cables from the mill. The second is the right front skirt of the mill. Cables from the Pallet Pool are plugged into the interface on the mill front skirt.

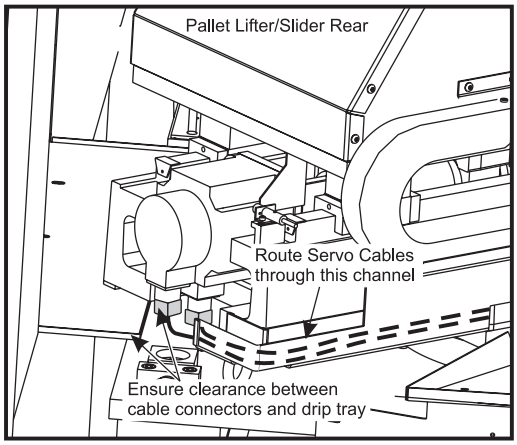
Air to the load station is plumbed from the front skirt of the mill to the Pallet Pool load station. This is for the load station air gun.



Pallet Lifter/Slider Axes

5. Power on the mill and Zero return all axes. This will zero all the mill axes and zero the Pallet Pool slider and rotator axes (U and V axes, respectively). Watch the Pallet Pool rotator to be sure that it does not hit any parts of the Pallet Pool or mill. If it does, then the height of the Pallet Pool relative to the mill must be adjusted.

NOTE: The Pallet Pool Drip Tray (shown in the following illustration) that is placed between the Pallet Pool and the mill leaves little room for cabling. When installed, manually rotate the Pallet Lifter/Slider to ensure nothing catches on the Pallet Pool Drip Tray. **Pay particular attention to the U-axis (Slider Motor) motor cable.** Any contact between the Pallet Pool Drip Tray and the cable or connector can cause the connector to be pulled out, causing severe damage to the servo motor.

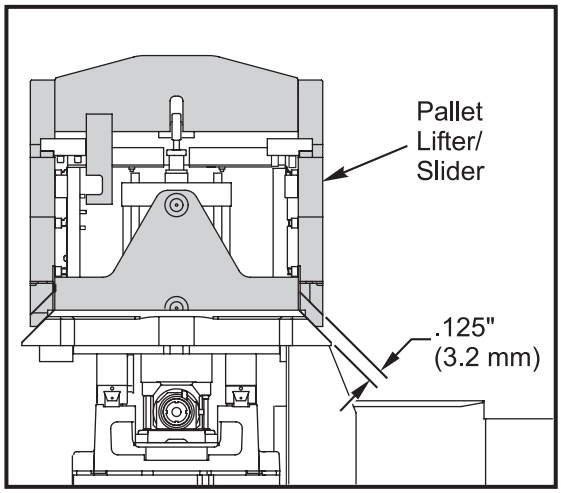


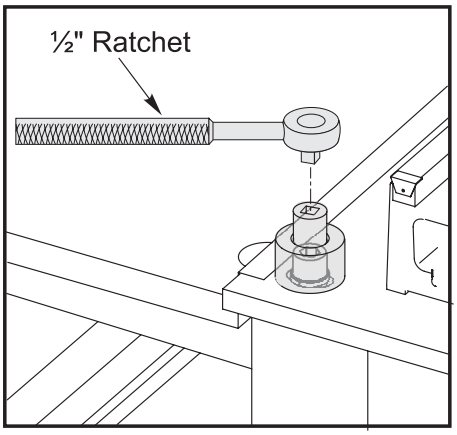
Pallet Pool Drip Tray

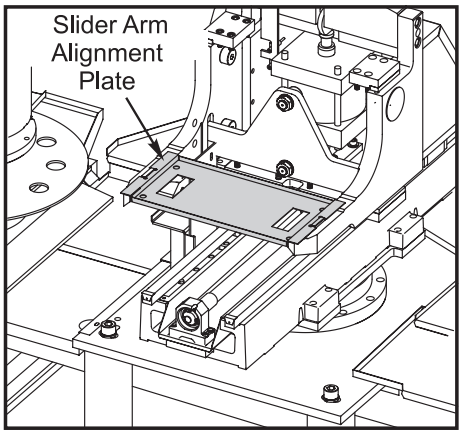
6. Use the Pallet Schedule Table (PST) to clear the “pallets” from the shelves. This step will reset the Pallet Pool so that it is easier to load the pallets at the end of this section. To clear the pallets, go to the Pallet Schedule Table on the control (PST, press Curnt Comds, then page up to the correct screen), move the cursor to the Shelf column for pallet number 1. Press Space, then Alter. Repeat for the other five pallet shelves.

7. Handle jog the lifter to the mill H-frame to check the clearance. (See “Pallet Pool Shelf Positions” in the Programming section of this addendum for description of shelf positions.) Change the parameter bit "Invis Axis" for the U and V axes to “visible”. To do this, set the Invis Axis bit of parameters 354 (U-axis) and 390 (V-axis) to 0 (zero). Jog V-axis first to the rotator coordinate for shelf G. Then jog the U-axis to the slider coordinate for shelf G.

Verify the slider arms are parallel to the H-frame and centered on the H-frame. Use slider arm alignment plate 25-7566 to align the slider arms to the H-frame by actuating the slider to lift up (pressing the End key), jogging the U-axis towards H-frame and lowering slider over the H-frame. An even 1/8" gap between the H-frame and the slider arms is important.



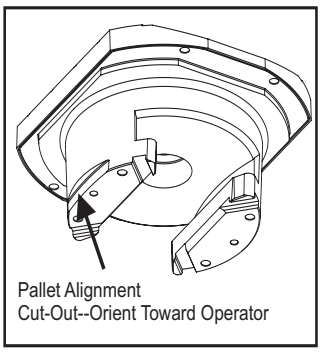


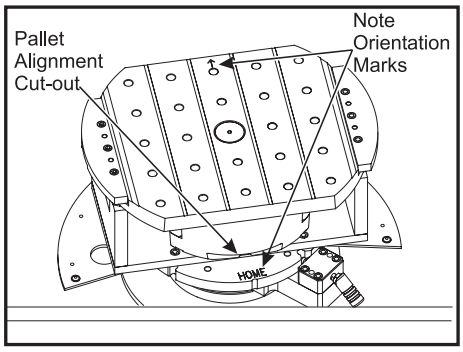


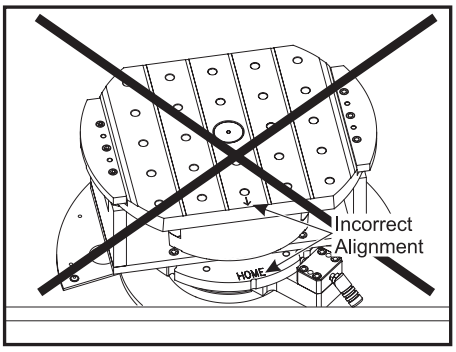
If adjustment is necessary, use a pair of pallet jacks to lift the pallet pool at the end where it connects to the machine. This will leave a rear corner on the floor, providing a pivot point by which to adjust the pallet pool positioning.

If the lifter is not centered and/or the lifter arms are not aligned parallel to the shelves the Pallet Pool may need to be re-aligned. Start back at step 3.

8. Use a hoist to place a pallet on the load station. Be sure the load station is in the Home position. The holes on the bottom of the pallet must settle over the four pins on the load station, and the pallet alignment cut-out must be oriented toward the operator and the engraved "HOME".







CAUTION! An incorrectly oriented pallet will not clamp properly when loaded into the mill by the pallet changer. A pallet with a tall fixture may topple into the machining area.

WARNING!

Close the load station door. There is no protection against jogging the lifter assembly into the sheet metal and damaging the door when the invisible axis is overridden.

9. Jog the Pallet Pool slider to the load station by first jogging the slider to the zero position (home), then jogging the rotator to the V-axis coordinate for shelf A. Next jog the slider to the U-axis coordinate for shelf A (see the Pallet Pool Shelf section). Visually verify that the tabs in the lifter arms will engage the slots in the pallet lift flanges. Press the End button to raise the lifter to pick up the pallet. Verify that the two tabs on the lifter arms fit into the two slots on the bottom of the pallet lift flanges. If the tabs do not fit smoothly into the slots, change the U- and V-axis shelf coordinates to align the lifter with the pallet. Repeat this step until the lifter smoothly picks up the pallet; leave the lifter in the up position.

10. Manually jog the pallet from the load station to the ready station (shelf G). (Note that the lifter should still be up with the pallet on it.) To do this, jog the slider to zero position, then the rotator to the shelf G rotary coordinate, then the slider axis to the shelf G coordinate.

11. Check alignment of pallet position with H-frame, **before** lowering the pallet. Jog the slider and the rotator as necessary. When the pins and holes are aligned, press the "End" button on the control panel to lower the pallet to the ready position. If necessary, lift the pallet again and jog the positions until the pallet raises and lowers smoothly. Record the position of the U and V axes from the "Position" screen (press the "Posit" button and use the Page up/down arrows). If the positions are different from the original shelf G coordinates, update the Pallet Pool Shelf Offsets table. See ”Pallet Pool Shelf Positions” section on how to set shelf positions. Leave the lifter **up**, after the alignment is done.

12. Verify alignment by returning the pallet to the load station. To do this, go to the Pallet Schedule Table. Move the cursor in the PST to the Shelf column for pallet number 1. Enter "I", press "Alter", then press F1 to automatically return the pallet to the load station. Note that if the pallet is lifted up, it is in the "I" position.

13. Manually verify the rotator and slider coordinates of the shelves. For each shelf (B through F) jog the slider to zero, then jog the rotator to the next pallet angle coordinate, then jog the slider to the shelf coordinate (look up the coordinates as in step 11). Verify that the shelf is spaced evenly between the lifter arms.

WARNING!

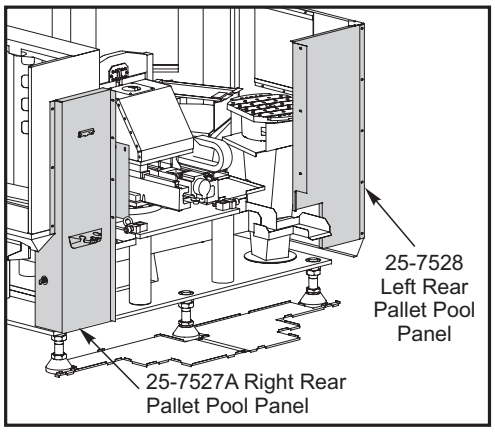
The slider axis must be jogged to the zero position before rotator is jogged to the next shelf or the shelves and lifter can be damaged.

14. Change the Invis Axis parameter bits (Parameter 354 and 390) back to 1 once the alignment is complete.

15. Load the second pallet into the load station (use a hoist to lift the pallet). Remember to have the pallet alignment cut-out toward the operator. In the Shelf column of the PST, move the cursor to the correct pallet number, enter “A”, and press Alter. Press F3 to automatically move the load station pallet to the next shelf. As the pallet is moved, verify that there are no interference problems. Repeat this step until the pallets (up to six) are in the Pallet Pool.

16. Check that each shelf contains the expected pallet. Be sure the pallets on each shelf agree with what the PST has. Update the shelf letters in the Shelf column as necessary.

17. Install the rear pallet pool panels and connect the mill front panel enclosure securely with the BHCS.

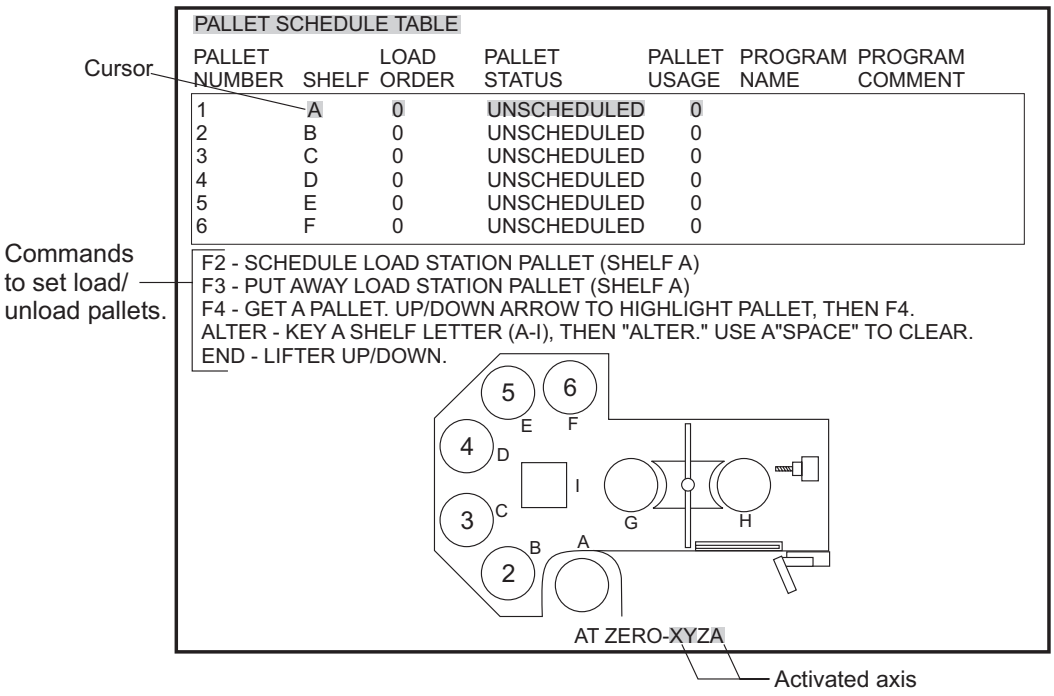


Programming

The CNC control tracks the pallets as they move from their shelf, to the ready position, to the machining area and then back. The Pallet Schedule Table (PST) is found within the Current Commands pages. To access, press the Current Commands button and then use the Page Up/Down button to scroll through the screens. The PST screen contains information to assist the operator in loading/unloading pallets and allows the operator to specify part programs and pallet processing sequences.

Changing pallets with the Pallet Pool is done in the same way as the standard mill, by using the M50 command. The load order of the pallets is then determined by the "Load Order" column in the PST. To call a specific pallet within a program, append a P command to the M50; for example, to call pallet 3 enter M50P3.

The Pallet Pool has a sub panel next to the load station, with an Emergency stop button for safety, and a Part Ready button. The Part Ready button is used to signal the lifter that the pallet in the load station is prepared and ready to enter the Pallet Pool. The load station door must be rotated closed for safety and so that the lifter has access to the load station pallet.



The pallet pool feature provides additional operator keyboard inputs.

1. The F2 key (like the LOAD READY button) schedules the Load Station pallet. The pallet may move into the pool if its priority was set to one by the F2 key. The sent pallet is moved from the Load Station to the next available shelf or the Ready Position (the H-frame position on the outside of the EC).

2. F3 is pressed to send the Load Station pallet into the pool without scheduling it. This feature is useful to move the pallet out of the way so the next pallet can move directly to the load station.

3. The F4 button retrieves the highlighted pallet and moves it to the Load Station. The F4 button operates on the pallet that is highlighted in the PST. If there is a pallet in the load station, it will be moved first.

4. The F1 button will return a pallet on the slider to a shelf if pallet shuttling is interrupted by an alarm. To use the F1 button, all alarms must be cleared. The F1 button is only operational when there is a pallet in the lifter.

Pallet Pool Recovery

In the case of an Emergency stop, it is only necessary to clear the alarms in order to continue running. The next Pallet Pool operation will reset the Pallet Pool or a message will display with instructions on how to reset the Pallet Pool.

If there is a power outage, power up the mill, clear the alarms, press Zero Return, followed by All Axes or Power Up Restart. Zero Return safely recovers the Pallet Pool. Be sure that the pallets on the PST screen match the pallets on the shelves. If the pallets do not match, manually correct the positions of the pallets, by changing the shelf letter in the PST.

Pallet Pool Shelf Positions

The load station, the ready position, and the shelves in the pallet pool each have two coordinates, one for the U-axis (slider) an one for the V-axis (rotator). The coordinates are stored in a table accessible from the PST. To access the table from the PST, either the U- or V-axis must be visible. To do this, press the "Param" button and scroll to either Parameter 354 or 390. If necessary, turn Setting 7 Off, by pressing the "Setting" button and scrolling to Setting 7. Set the Invis Axis bit of Parameter 354 and 390 to zero (0). Use the arrow buttons to move the PST cursor to the "Shelf" column header. Press F1 and the Pallet Pool Shelf Offsets Table will appear at the bottom of the screen.

The offsets are in pairs, labeled by shelf letter (A through G). The shelf letters in the Pallet Shelf Offsets Table correspond to the shelf letters on the displayed Pallet Pool graphic and to the shelf letters in the PST ("Shelf" column). The first column is the slider coordinate (inches or millimeters), the second column is the rotator coordinate (degrees). The reference position (axis zero) for the rotator axis is between shelves D and E. All coordinates have negative values.

New coordinates can be entered by either of two methods. The first method is to enter the axis coordinate, and then press the Enter button. The second method is to jog the rotator and the slider to the shelf position and press the Part Zero button. When the button is pressed, the current axis position will be entered automatically. Note that only the highlighted coordinate is changed. To change both coordinates, highlight the other coordinate and press the Part Zero button again. For either method, use the arrow buttons or the jog handle to scroll the Pallet Shelf Offsets Table cursor to the coordinate that needs to be changed.

Go back to the parameter page and setting pages and return parameter bit Invis Axis (Parameter 354 or 390) to 1 and, if necessary, change Setting 7 to On.

Macro Variables

The following system (macro) variables are available for the pallet changer. These correspond to the column of the pallet schedule table. These variable are generally read-only. Pallet priority (#7501 - #7504) and pallet status (#7601 - #7604) are read-write during some conditions, but read-only for others. For example, both are read-only while the pallet is loaded. Note that these variables are maintained in memory during power off.

VARIABLES USAGE
#3028 Number of pallet loaded on receiver
#7501-#7504 Pallet priority
#7601-#7604 Pallet status
#7701-#7704 Part program numbers assigned to pallets
#7801-#7804 Pallet usage count