![Haas Automation, Inc. logo]

Haas Automation, Inc.

Pallet Pool

Next Generation Control
Operator's Manual Supplement
96-8253
Revision A
November 2019
English
Original Instructions

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LIMITED WARRANTY CERTIFICATE

Haas Automation, Inc.

Covering Haas Automation, Inc. CNC Equipment

Effective September 1, 2010

Haas Automation Inc. ("Haas" or "Manufacturer") provides a limited warranty on all new mills, turning centers, and rotary machines (collectively, "CNC Machines") and their components (except those listed below under Limits and Exclusions of Warranty) ("Components") that are manufactured by Haas and sold by Haas or its authorized distributors as set forth in this Certificate. The warranty set forth in this Certificate is a limited warranty, it is the only warranty by Manufacturer, and is subject to the terms and conditions of this Certificate.

Limited Warranty Coverage

Each CNC Machine and its Components (collectively, "Haas Products") are warranted by Manufacturer against defects in material and workmanship. This warranty is provided only to an end-user of the CNC Machine (a "Customer"). The period of this limited warranty is one (1) year. The warranty period commences on the date the CNC Machine is installed at the Customer's facility. Customer may purchase an extension of the warranty period from an authorized Haas distributor (a "Warranty Extension"), any time during the first year of ownership.

Repair or Replacement Only

Manufacturer's sole liability, and Customer's exclusive remedy under this warranty, with respect to any and all Haas products, shall be limited to repairing or replacing, at the discretion of the Manufacturer, the defective Haas product.

Disclaimer of Warranty

This warranty is Manufacturer's sole and exclusive warranty, and is in lieu of all other warranties of whatever kind or nature, express or implied, written or oral, including, but not limited to, any implied warranty of merchantability, implied warranty of fitness for a particular purpose, or other warranty of quality or performance or noninfringement. All such other warranties of whatever kind are hereby disclaimed by Manufacturer and waived by Customer.

Limits and Exclusions of Warranty

Components subject to wear during normal use and over time, including, but not limited to, paint, window finish and condition, light bulbs, seals, wipers, gaskets, chip removal system (e.g., augers, chip chutes), belts, filters, door rollers, tool changer fingers, etc., are excluded from this warranty. Manufacturer's specified maintenance procedures must be adhered to and recorded in order to maintain this warranty. This warranty is void if Manufacturer determines that (i) any Haas Product was subjected to mishandling, misuse, abuse, neglect, accident, improper installation, improper maintenance, improper storage, or improper operation or application, including the use of improper coolants or other fluids, (ii) any Haas Product was improperly repaired or serviced by Customer, an unauthorized service technician, or other unauthorized person, (iii) Customer or any person makes or attempts to make any modification to any Haas Product without the prior written authorization of Manufacturer, and/or (iv) any Haas Product was used for any non-commercial use (such as personal or household use). This warranty does not cover damage or defect due to an external influence or matters beyond the reasonable control of Manufacturer, including, but not limited to, theft, vandalism, fire, weather condition (such as rain, flood, wind, lightning, or earthquake), or acts of war or terrorism.

Without limiting the generality of any of the exclusions or limitations described in this Certificate, this warranty does not include any warranty that any Haas Product will meet any person's production specifications or other requirements, or that operation of any Haas Product will be uninterrupted or error-free. Manufacturer assumes no responsibility with respect to the use of any Haas Product by any person, and Manufacturer shall not incur any liability to any person for any failure in design, production, operation, performance, or otherwise of any Haas Product, other than repair or replacement of same as set forth in the warranty above.

Limitation of Liability and Damages

Manufacturer will not be liable to Customer or any other person for any compensatory, incidental, consequential, punitive, special, or other damage or claim, whether in an action in contract, tort, or other legal or equitable theory, arising out of or related to any Haas product, other products or services provided by Manufacturer or an authorized distributor, service technician, or other authorized representative of Manufacturer (collectively, "authorized representative"), or the failure of parts or products made by using any Haas Product, even if Manufacturer or any authorized representative has been advised of the possibility of such damages, which damage or claim includes, but is not limited to, loss of profits, lost data, lost products, loss of revenue, loss of use, cost of down time, business good will, any damage to equipment, premises, or other property of any person, and any damage that may be caused by a malfunction of any Haas product. All such damages and claims are disclaimed by Manufacturer and waived by Customer. Manufacturer's sole liability, and Customer's exclusive remedy, for damages and claims for any cause whatsoever shall be limited to repair or replacement, at the discretion of Manufacturer, of the defective Haas Product as provided in this warranty.

Customer has accepted the limitations and restrictions set forth in this Certificate, including, but not limited to, the restriction on its right to recover damages, as part of its bargain with Manufacturer or its Authorized Representative. Customer realizes and acknowledges that the price of the Haas Products would be higher if Manufacturer were required to be responsible for damages and claims beyond the scope of this warranty.

Entire Agreement

This Certificate supersedes any and all other agreements, promises, representations, or warranties, either oral or in writing, between the parties or by Manufacturer with respect to subject matter of this Certificate, and contains all of the covenants and agreements between the parties or by Manufacturer with respect to such subject matter. Manufacturer hereby expressly rejects any other agreements, promises, representations, or warranties, either oral or in writing, that are in addition to or inconsistent with any term or condition of this Certificate. No term or condition set forth in this Certificate may be modified or amended, unless by a written agreement signed by both Manufacturer and Customer. Notwithstanding the foregoing, Manufacturer will honor a Warranty Extension only to the extent that it extends the applicable warranty period.

Transferability

This warranty is transferable from the original Customer to another party if the CNC Machine is sold via private sale before the end of the warranty period, provided that written notice thereof is provided to Manufacturer and this warranty is not void at the time of transfer. The transferee of this warranty will be subject to all terms and conditions of this Certificate.

Miscellaneous

This warranty shall be governed by the laws of the State of California without application of rules on conflicts of laws. Any and all disputes arising from this warranty shall be resolved in a court of competent jurisdiction located in Ventura County, Los Angeles County, or Orange County, California. Any term or provision of this Certificate that is invalid or unenforceable in any situation in any jurisdiction shall not affect the validity or enforceability of the remaining terms and provisions hereof, or the validity or enforceability of the offending term or provision in any other situation or in any other jurisdiction.

Customer Feedback

If you have concerns or questions regarding this Operator's Manual, please contact us on our website, www.HaasCNC.com. Use the "Contact Us" link and send your comments to the Customer Advocate.

Join Haas owners online and be a part of the greater CNC community at these sites:

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Customer Satisfaction Policy

Dear Haas Customer,

Your complete satisfaction and goodwill are of the utmost importance to both Haas Automation, Inc. and the Haas distributor (HFO) where you purchased your equipment. Normally, your HFO will rapidly resolve any concerns you have about your sales transaction or the operation of your equipment.

However, if your concerns are not resolved to your complete satisfaction, and you have discussed your concerns with a member of the HFO's management, the General Manager, or the HFO's owner directly, please do the following:

Contact Haas Automation's Customer Service Advocate at 805-988-6980. So that we may resolve your concerns as quickly as possible, please have the following information available when you call:

- Your company name, address, and phone number
- The machine model and serial number
- The HFO name, and the name of your latest contact at the HFO
- The nature of your concern

If you wish to write Haas Automation, please use this address:

Haas Automation, Inc. U.S.A.
2800 Sturgis Road
Oxnard CA 93030
Att: Customer Satisfaction Manager
email: customerservice@HaasCNC.com

Once you contact the Haas Automation Customer Service Center, we will make every effort to work directly with you and your HFO to quickly resolve your concerns. At Haas Automation, we know that a good Customer-Distributor-Manufacturer relationship will help ensure continued success for all concerned.

International:

Haas Automation, Europe
Mercuriusstraat 28, B-1930
Zaventem, Belgium
email: customerservice@HaasCNC.com

Haas Automation, Asia
No. 96 Yi Wei Road 67,
Waigaoqiao FTZ
Shanghai 200131 P.R.C.
email: customerservice@HaasCNC.com

Declaration of Conformity

Product: Mill (Vertical and Horizontal)*

*Including all options factory- or field-installed by a certified Haas Factory Outlet (HFO)

Manufactured By: Haas Automation, Inc.

                    2800 Sturgis Road, Oxnard, CA 93030

                    805-278-1800

We declare, in sole responsibility, that the above-listed products, to which this declaration refers, comply with the regulations as outlined in the CE directive for Machining Centers:

- Machinery Directive 2006/42/EC
- Electromagnetic Compatibility Directive 2014/30/EU
- Additional Standards:
    - EN 60204-1:2006/A1:2009
    - EN 614-1:2006+A1:2009
    - EN 894-1:1997+A1:2008
    - CEN 13849-1:2015

RoHS2: COMPLIANT (2011/65/EU) by Exemption per producer documentation.

Exempt by:

- a) Large scale stationary industrial tool.
- b) Lead as an alloying element in steel, aluminum, and copper.
- c) Cadmium and its compounds in electrical contacts.

Person authorized to compile technical file:

Jens Thing

Address:

Haas Automation Europe
Mercuriusstraat 28
B-1930 Zaventem
Belgium

USA: Haas Automation certifies this machine to be in compliance with the OSHA and ANSI design and manufacturing standards listed below. Operation of this machine will be compliant with the below-listed standards only as long as the owner and operator continue to follow the operation, maintenance, and training requirements of these standards.

- *OSHA 1910.212 - General Requirements for All Machines*
- *ANSI B11.5-1983 (R1994) Drilling, Milling, and Boring Machines*
- *ANSI B11.19-2010 Performance Criteria for Safeguarding*
- *ANSI B11.23-2002 Safety Requirements for Machining Centers and Automatic Numerically Controlled Milling, Drilling, and Boring Machines*
- *ANSI B11.TR3-2000 Risk Assessment and Risk Reduction - A Guideline to Estimate, Evaluate, and Reduce Risks Associated with Machine Tools*

CANADA: As the original equipment manufacturer, we declare that the listed products comply with regulations as outlined in the Pre-Start Health and Safety Reviews Section 7 of Regulation 851 of the Occupational Health and Safety Act Regulations for Industrial Establishments for machine guarding provisions and standards.

Further, this document satisfies the notice-in-writing provision for exemption from Pre-Start inspection for the listed machinery as outlined in the Ontario Health and Safety Guidelines, PSR Guidelines dated November 2016. The PSR Guidelines allow that notice in writing from the original equipment manufacturer declaring conformity to applicable standards is acceptable for the exemption from Pre-Start Health and Safety Review.

ETL LISTED
CONFORMS TO
NFPA STD 79
ANSI/UL STD 508
UL SUBJECT 2011
CERTIFIED TO
CAN/CSA STD C22.2 N O.73
Intertek
9700845

All Haas CNC machine tools carry the ETL Listed mark, certifying that they conform to the NFPA 79 Electrical Standard for Industrial Machinery and the Canadian equivalent, CAN/CSA C22.2 No. 73. The ETL Listed and cETL Listed marks are awarded to products that have successfully undergone testing by Intertek Testing Services (ITS), an alternative to Underwriters' Laboratories.

ISO 9001:2015
CERTIFIED

Haas Automation has been assessed for conformance with the provisions set forth by ISO 9001: 2015. Scope of Registration: Design and Manufacture of CNC Machines Tools and Accessories, Sheet Metal Fabrication. The conditions for maintaining this certificate of registration are set forth in ISA's Registration Policies 5.1. This registration is granted subject to the organization maintaining compliance to the noted stardard. The validity of this certificate is dependent upon ongoing surveillance audits.

Original Instructions

User's Operator Manual and other Online Resources

This manual is the operation and programming manual that applies to all Haas Mills.

An English language version of this manual is supplied to all customers and is marked **"Original Instructions"**.

For many other areas of the world, there is a translation of this manual marked **"Translation of Original Instructions"**.

This manual contains an unsigned version of the EU required **"Declaration Of Conformity"**. European customers are provided a signed English version of the Declaration of Conformity with Model Name and Serial Number.

Besides this manual, there is a tremendous amount of additional information online at: www.haascnc.com under the Service section.

Both this manual and the translations of this manual are available online for machines up to approximately 15 years old.

The CNC control of your machine also contains all of this manual in many languages and can be found by pressing the **[HELP]** button.

Many machine models come with manual supplement that is also available online.

All machine options also have additional information online.

Maintenance and service information is available online.

The online **"Installation Guide"** contains information and check list for Air & Electrical requirements, Optional Mist Extractor, Shipping Dimensions, weight, Lifting Instructions, foundation and placement, etc.

Guidance on proper coolant and Coolant Maintenance is located in the Operators Manual and Online.

Air and Pneumatic diagrams are located on the inside of the lubrication panel door and CNC control door.

Lubrication, grease, oil and hydraulic fluid types are listed on a decal on the machine's lubrication panel.

How to Use This Manual

To get the maximum benefit of your new Haas machine, read this manual thoroughly and refer to it often. The content of this manual is also available on your machine control under the HELP function.

IMPORTANT: Before you operate the machine, read and understand the Operator's Manual Safety chapter.

Declaration of Warnings

Throughout this manual, important statements are set off from the main text with an icon and an associated signal word: "Danger," "Warning," "Caution," or "Note." The icon and signal word indicate the severity of the condition or situation. Be sure to read these statements and take special care to follow the instructions.

Description	Example
Danger means that there is a condition or situation that **will cause death or severe injury** if you do not follow the instructions given.	*DANGER: No step. Risk of electrocution, bodily injury, or machine damage. Do not climb or stand on this area.*
Warning means that there is a condition or situation that **will cause moderate injury** if you do not follow the instructions given.	*WARNING: Never put your hands between the tool changer and the spindle head.*
Caution means that **minor injury or machine damage could occur** if you do not follow the instructions given. You may also have to start a procedure over if you do not follow the instructions in a caution statement.	*CAUTION: Power down the machine before you do maintenance tasks.*
Note means that the text gives **additional information, clarification, or helpful hints.**	*NOTE: Follow these guidelines if the machine is equipped with the optional extended Z-clearance table.*

Text Conventions Used in this Manual

Description	Text Example
Code Block text gives program examples.	`G00 G90 G54 X0. Y0.;`
A **Control Button Reference** gives the name of a control key or button that you are to press.	Press **[CYCLE START]**.
A **File Path** describes a sequence of file system directories.	*Service > Documents and Software >...*
A **Mode Reference** describes a machine mode.	MDI
A **Screen Element** describes an object on the machine's display that you interact with.	Select the **SYSTEM** tab.
System Output describes text that the machine control displays in response to your actions.	`PROGRAM END`
User Input describes text that you should enter into the machine control.	`G04 P1.;`
Variable n indicates a range of non-negative integers from 0 to 9.	`Dnn` represents `D00` through `D99`.

Contents

# Chapter 1: **Pallet Pool Introduction**

1.1   **Pallet Pool - Introduction**

The pallet pool system allows six pallets (EC-400) or eight pallets (UMC-100PP) 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 Pallet-Ready Position. Then mill puts the pallet in the machining area at the next pallet change.
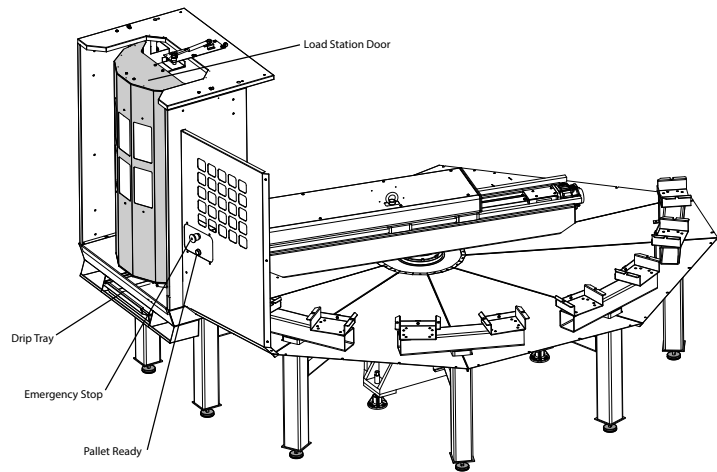
Haas pallet-scheduling software stages pallets as the machine calls them. This means that high priority parts can be scheduled more often.
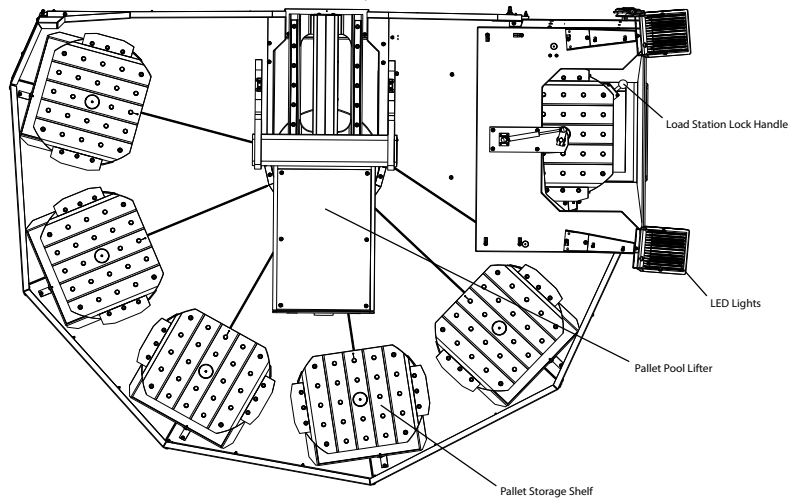
F1.1:   EC-400 Pallet Pool - Side View
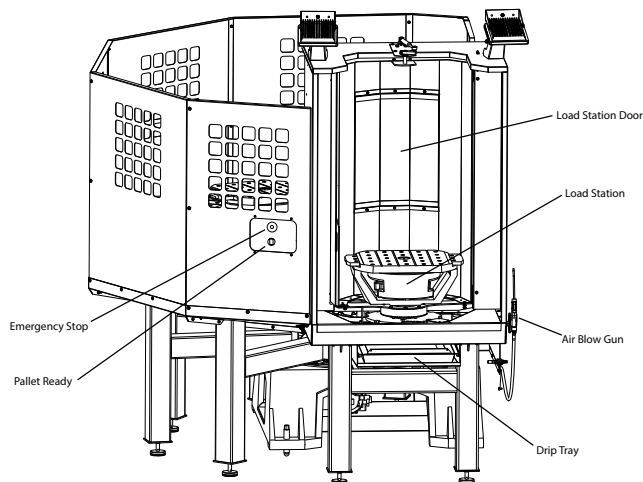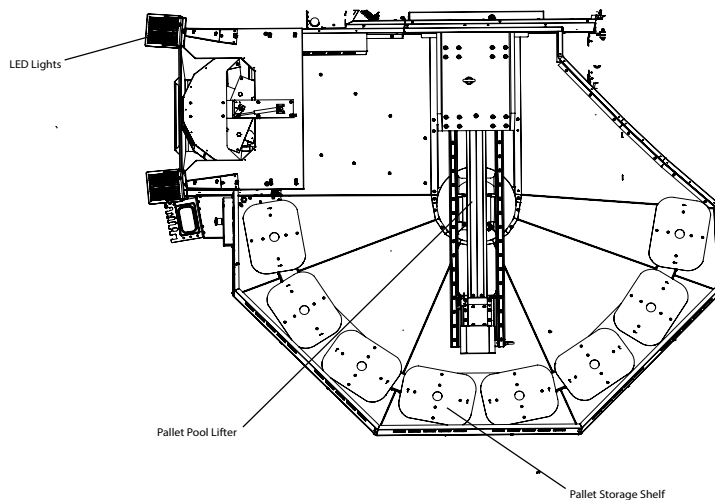

Side View

F1.2: UMC-1000 Pallet Pool - Side View

Side View

F1.3: EC-400 Pallet Pool - Top View

Top Down View

F1.4:   UMC-1000 Pallet Pool - Top View

LED Lights

Pallet Pool Lifter

Pallet Storage Shelf

Top Down View

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

Chapter 2: **Pallet Pool Installation**

2.1   EC-400 Pallet Pool - Installation

The EC-400 Pool installation procedure is located on the website click on the following link: EC-400 Pallet Pool - Installation. You can also scan the code below with your mobile device to go directly to the procedure.

2.2   UMC-1000 Pallet Pool - Installation

The UMC -1000 Pool installation procedure is located on the website click on the following link: UMC Pallet Pool - Installation. You can also scan the code below with your mobile device to go directly to the procedure.

Chapter 3: **Pallet Pool Operation**

3.1 **Pallet Pool - Operation**

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 use the cursor arrows to navigate to Devices, then Pallet Schedule Table.

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.

F3.1: Pallet Pool - Load Station Home Position
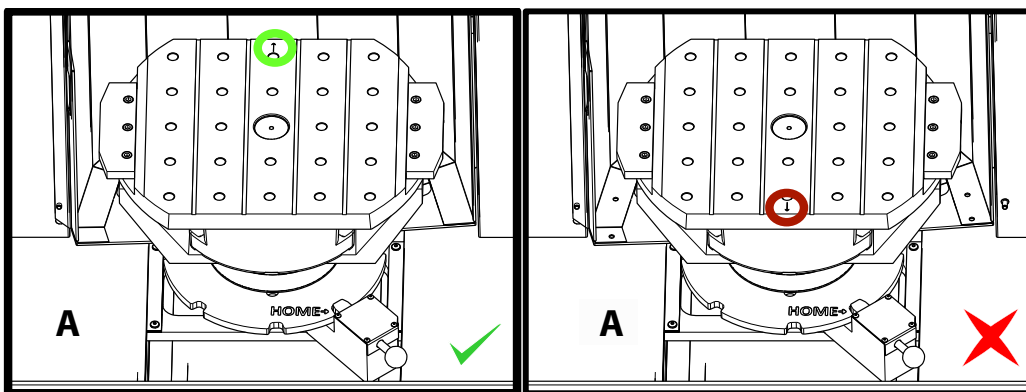
Pallets are loaded into the pallet pool on Load Station A in the reverse orientation as loading on a standard pallet changer machine. On a pallet pool the locating arrow on the pallet must point away from the operator as illustrated. Once the pallet is loaded in the Load Station A press **[F3]** while on the PST to put the Load Station pallet away.

Changing pallets with the Pallet Pool is done using the PST. Highlight a pallet shelf and press **[ALTER]** to load the pallet and associated program. Run all the scheduled pallets by pressing **[INSERT]**. The program should have a M199 at the end of it to load the next schedule pallet and associated program when in Pallet Scheduler Mode. If running in MEMORY mode the M199 behaves like an M30. The load order of the pallets is determined by the "Load Order" column in the PST. If you don't wish to use Pallet Scheduler Mode to process your pallets you can still use the M50 Px command to load a specific pallet from inside your program.

To run the machine through all the scheduled pallets in Pallet Scheduler Mode call the first pallet into the machine. Press **INSERT** from the PST page. This will cause the M199 at the end of the program to behave like an M50 + M99. At the end of the program it will retrieve the next scheduled pallet and continue to run until all scheduled pallets are completed.

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 so that the lifter has access to the load station pallet.

3.1.1   Pallet Schedule Table

F3.2:   Pallet Schedule Table - Display
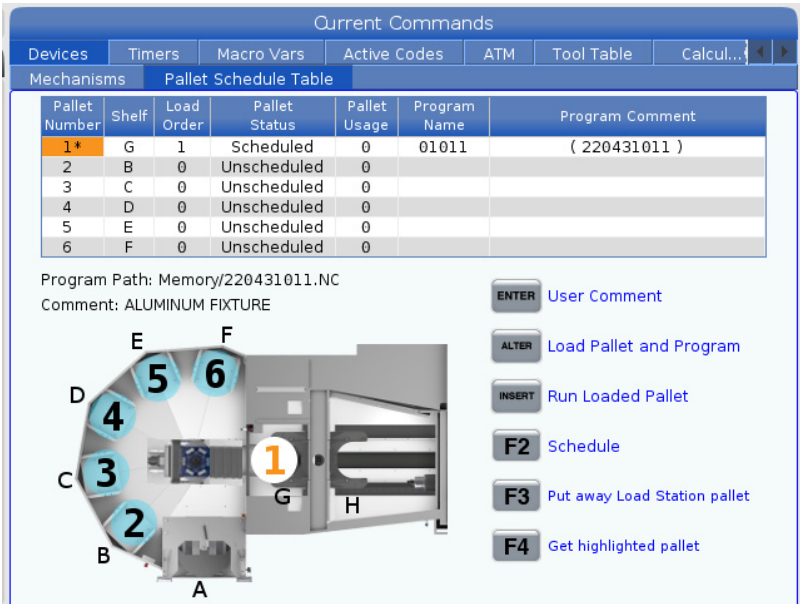
The Pallet Schedule Table incorporates a number of features to help the user with their routine.

Load Order and Pallet Status: These two features work together to show which pallet is currently in the machining area. Enter a number for the load order and press **[ENTER]** on the Pallet Status field to select the pallet status. The choices are: 0: Unscheduled, 1: Scheduled, 2: Missing and 3: Completed.

Comment: To add a user comment to a pallet, highlight the pallet number field and press **[ENTER]**. A box will appear, type in the desired comment and press **[ENTER]**.

Pallet Usage: This feature gives the number of times the specific pallet has been loaded into the machining area. Press **[ORIGIN]** button to clear the value.

Program Number: This detail shows which program number has been assigned to the pallet. To select a program, highlight the Program Name field then press **[ENTER]** and navigate to the program.

Program Comment: This area displays the comments that are written in the part program. This can only be changed by editing the comments in the program.

Command Prompts:

[ENTER] The function changes depending where the highlighter is located. It is used to enter a user comment, set a value in the field and to view options for the field.

[ALTER] Load Pallet and Program. This will load the selected pallet into the machine and call the assigned program to memory.

[INSERT] Run loaded program. This will start the machine running in Pallet Scheduler Mode. The machine will continue to run all scheduled pallets in the PST until they are completed. For more information on Pallet Scheduler Mode refer to M199 Pallet / Part Load or Program Endin the M-code section.

[F2]Schedule Load Station pallet. This will set the status of the Load Station pallet to Scheduled.

[F3] Put away Load Station pallet. This will return the Load Station pallet to the pallet pool.

[F4] Get highlighted pallet. This will bring the selected pallet to the Load Station.

3.1.2   Pallet Pool M-Codes

The following are the M-codes used by the pallet pool.

M46 Qn Pmm Jump to Line

Jump to line mm in the current program if pallet n is loaded, otherwise go to the next block.

M48 Validate That The Current Program is Appropriate for Loaded Pallet

Checks in the Pallet Schedule Table that the current program is assigned to the loaded pallet. If the current program is not in the list or the loaded pallet is incorrect for the program, an alarm is generated. `M48` can be in a program listed in the PST, but never in a subroutine of the PST program. An alarm will occur if `M48` is incorrectly nested.

M50 Pallet Change Sequence

*`P` - Pallet number

*indicates optional

This M-code is used to call a pallet change sequence. An `M50` with a `P` command will call a specific pallet. `M50 P3` will change to pallet 3, commonly used with Pallet Pool machines. Refer to the Pallet Changer section of the manual.

M199 Pallet / Part Load or Program End

`M199` takes the place of an `M30` or `M99` at the end of a program. When running in Memory or MDI mode, pressing `Cycle Start` to run the program, the `M199` will behave the same as an `M30`. It will stop and rewind the program back to the beginning. While running in Pallet Change mode, pressing `INSERT` while on the Pallet Schedule Table to run a program, the `M199` behaves the same as an `M50` + `M99`. It will end the program, get the next scheduled pallet and associated program, then continue to run until all scheduled pallets are completed.

3.1.3   Pallet Pool/Changer Recovery

If the Pallet Pool or Pallet Changer cycles get interrupted you must enter **[RECOVER]** mode to correct or complete the cycle.

Press the **[RECOVER]** button and press 2 for Pallet Changer. The recovery page will display the input and output values.

F3.3:   Pallet Changer Recovery Display: APC Functions [1], Pallet Pool Functions [2], APC status [3], Pallet Pool Status [4], Message Box [5].

Command Prompts:

[F1] APC Up. This will lift the pallet changer H-Frame if the pallet is not clamped.

[F2] Unclamp. This will unclamp the pallet in the machine from the receiver.

[F3] Air Blast. This will activate the air blast under the pallet to remove any chips or debris.

[F4] Attempt Auto Recovery. This will attempt to automatically correct or complete the pallet changer or pallet pool operation.

[ALTER] Raise Pallet Lifter. This will lift the pallet pool lifter assembly.

[INSERT] Return Pallet Slide Home. This will return the lifter to its home position.

[UNDO] Pallet Pool Slide to Shelf. This will slide the pallet pool lifter to the selected shelf location. Example: Press **[A]** then **[UNDO]** to slide the lifter to shelf position A.

[DELETE] Pallet Pool Rotate to Shelf. This will rotate the pallet pool lifter to the selected shelf location. Example: Press **[A]** then **[DELETE]** to rotate the lifter to shelf position A.

[ORIGIN] Attempt Auto Recovery. This will attempt to automatically correct or complete the pallet pool operation.

[+Z] Select Pallet Slide Axis. This will select the PS axis in handle jog mode.

[-Z] Select Pallet Rotate Axis. This will select the PR axis in handle jog mode.

[Q] Ext to Pallet Schedule Table. This will take you out of the recovery mode and put you into the pallet schedule table screen.

3.1.4   382 - Disable Pallet Changer

This setting enables/disables the pallet changer on the machine. Machine requires to be in **[E-STOP]** before you can change this setting, after the change you need to cycle the power before the setting can take effect.

If machine has APC and PP (EC400 with a Pallet Pool), setting options are:

- `None` - Nothing is disabled.
- `Pallet Pool:` - Disables only the Pallet Pool.
- `All` - Disables the Pallet Pool and APC.

If machine only has an APC (EC400 without a Pallet Pool), setting options are:

- `None` - Nothing is disabled.
- `All` - Disables the APC.

If machine only has a Pallet Pool (UMC1000 with a Pallet Pool), setting options are:

- `None` - Nothing is disabled.
- `Pallet Pool:` - Disables the pallet pool.

Chapter 4: **Pallet Pool Maintenance**

4.1   Pallet Pool - Maintenance Schedule

Keep your Pallet Pool running at peak performance while avoiding unplanned downtime. A maintenance program allows you to manage your schedule rather than getting caught with untimely surprises. This page shows the recommended maintenance intervals.

Maintenance Item	Interval
Grease the axis linear guides and ballscrew.	Six Months
Check the door operation.	Six Months
Change the oil on the HPU.	Three Years

5.1 More Information Online

For updated and supplemental information, including tips, tricks, maintenance procedures, and more, visit the Haas Service page at www.HaasCNC.com. You can also scan the code below with your mobile device to go directly to the Haas Service page:

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