Domaille Engineering LLC

APM Model HDC-5000 Optical Fiber Polishing Machine

User's Guide

Domaille Engineering, LLC
7100 Dresser Drive NE
Rochester, MN 55906
Phone 507.281.0275 • Fax 507.281.5694
www.DomailleEngineering.com

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Welcome

Congratulations on selecting the APM HDC-5000, the premier in fiber optic connector polishing machines. Although Domaille Engineering's entire HDC line of polishing machines is designed for accuracy and efficiency, the APM HDC-5000 incorporates additional enhancements and features not otherwise available on the market today.

This user's guide is being provided so all the features available on the APM HDC-5000 are clearly referenced, your machine can be set up effectively to optimize your operation, and you can properly maintain your APM HDC-5000 so it continues to perform optimally for years to come.

Overview

The polished end of a connector determines the quality of light transmission through fiber optic cable. Being able to efficiently polish a large volume of connectors while maintaining a consistent high level of quality (yield) is critical.

To achieve consistent throughput and yield, the APM HDC-5000 allows you to program your processes by an easy-to-use touch-screen panel. The new touch-screen panel displays your programmed settings for speed, time and pressure, and also prompts the operator for film, pad and lubricant needed for each step of the process. Operators need minimal training to follow the touch-screen prompts of your programmed processes.

With the APM HDC-5000, your processes are no longer limited to three or four steps. The HDC-5000 provides you with flexibility in the number of steps your processes are comprised of to best fit the needs of your operation.

The APM HDC-5000 allows you the capability to store your processes on the machine as well as on a memory card. The type 2 memory card provided is a backup tool, storing all the various processes you use as well as providing both import and export capability. Your processes and configuration details can be simply downloaded to other APM HDC-5000s to ensure consistency among your operation as well as save time in setting up each individual machine.

Unpacking & Setup

NOTE: Due to the weight of the APM HDC-5000, it is recommended that two people lift it from the shipping case.

- Setup will require scissors.
- Remove all loose components from machine area in shipping case.
- Using a scissors, slit the plastic bag from around the Overarm to provide access to the Overarm.
- Use the Overarm as a lifting handle by grabbing as close to the Overarm pivot as possible.
- Lift the machine straight up while firmly holding the case down on the outside edges. If the machine is lifted at an angle, it will cause binding in the case.
- Gently place the machine on a suitable work surface.
- Remove remaining plastic wrapping from machine and touch screen.
- Inspect the machine for any damage that may have occurred in shipping.
- Remove the blue Koby Air Filter from the shipping case.
- Remove plastic cap from air supply fitting on back of machine. Connect plastic air line provided by pushing line firmly into fitting. Connect other end of air line to black capped end of Koby Air Filter.
- Using the proper air supply fittings, connect the red capped end of the Koby Air Filter into your compressed air system. The inlet of the Koby Air Filter is ¼" NPT pipe thread. The compressed air requirements are: 80-120 pounds per square inch, clean, dry, oil-free air.
- Remove Cable Management bracket located in side compartment of shipping case. Remove the two thumb screws on back of machine. Attach Cable Management bracket sliding the base tabs into the slots provided on the machine. Reattach screws to secure.
- Remove Drain Hose from plastic wrapping and secure to Drain Hose Fitting on back of machine.
- Remove foam placed under Overarm shaft by raising the Overarm to the vertical position and locking in place.
- **In order to raise & lower the Overarm, it is necessary to release the Overarm Locking Mechanism. This is accomplished by pressing the Overarm Quick-Release Button. Release the button to allow Overarm to lock in one of three fixed positions. Refer to these instructions for future Overarm positioning.**

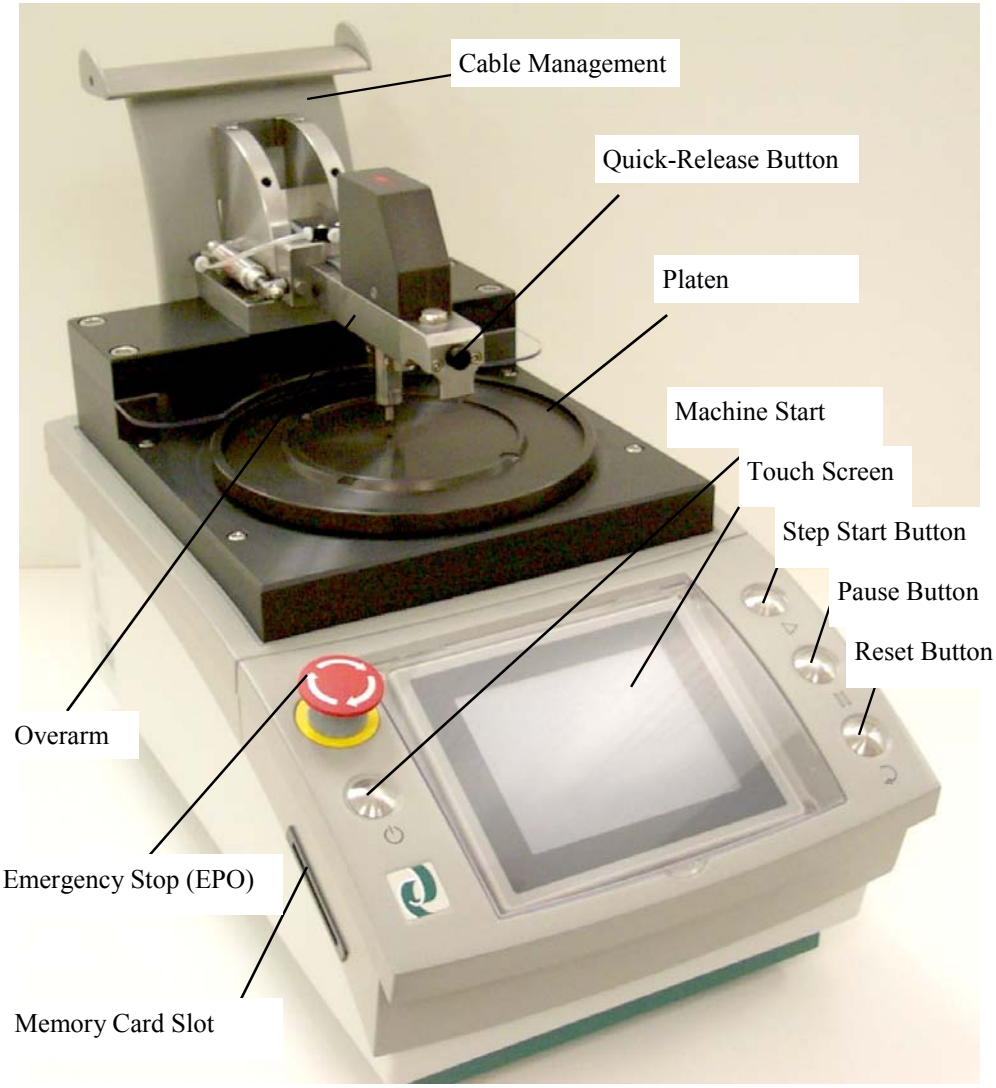
Product Specifications

Machine Height: (with drip tray):	17 1/4 inches
Machine Width:	12 inches
Overall Width (with drip tray):	14 1/2 inches
Machine Depth:	21 1/2 inches
Power Requirements:	5 amps; 100-240V; 50/60 Hz.
Air Requirements:	80—120 psi clean, dry air
Machine Weight:	70 lbs.
Shipping Weight:	120 lbs.

The APM is capable of operating between air temperatures of 41ºF and 104ºF (5ºC and 40ºC).

Noise emitted by the APM is less than 70.0dBA.

Both USA and European Standard power cords sets are available from Domaille Engineering. Please contact our office should you need an additional set.


Cable Management
Quick-Release Button
Platen
Machine Start
Touch Screen
Step Start Button
Pause Button
Reset Button
Overarm
Emergency Stop (EPO)
Memory Card Slot

Power Switch

Air Supply Fitting

Precautions

For safe, effective operation of the APM-5000 Polishing Machine, please observe the following:

- Keep hands, jewelry, hair and loose clothing away from the rotating platen while the machine is in operation.
- Keep all surfaces of the machine clean at all times. Confine water/slurry to platen area.
- **WARNING: Do not use an air hose on or around the platen.** This forces water and contaminants into the wear surfaces and mechanical drive unit, potentially causing ma chine failure.
- Do not attempt to repair or service any components inside the APM HDC- 5000. Contact Domaille Engineering, LLC for service.
- Use of the touch screen should be with the provided stylus or operator's fingers. Do not use sharp objects in operating the touch screen.

Touch Screen Setup

Before operating the APM HDC-5000, configuration of both the overall system and the processes need to be set up.

Plug the power cord into the back of the machine and into a properly grounded outlet—100-240V/AC 50/60Hz. You MUST push the reset button on the front of the plug to supply power to the machine.

- Turn on power switch located at the back of the machine.
- Lift screen cover. (Note: screen cover should be down when machine is operating.)
- The touch screen should default to the home tab screen. If the red emergency screen is displayed, reset by turning the Emergency Stop button clockwise.
- Press Machine Start button. 

System Configuration

System Configuration allows the setup of load cell calibration, set up of process variables, and user rights/settings.

Note: Either the screen keypad or a Windows CE USB keyboard can be used to key in the variable setup within Sytem Configuration. If using a keyboard, plug the USB connection into the port at the back of the machine AFTER the machine and program has powered up.

Process Variable Settings: To set up and modify the dialog boxes for your processes, set up the following:

- Max Quantity has been set to default at 36 for you and will not need further adjustment.
- Select Film. Touch the "new" button to access keypad and type in each film name you plan to use in your processes, followed by selecting "OK". The Film setting allows up to 32 characters in length. To delete a Film name, highlight the name, then touch the "Delete" button.
- Select Pad. Touch the "new" button to access keypad and enter the pads your processes require, followed by selecting "OK". The Pad setting allows up to 16 characters in length. To delete a Pad name, highlight the name, then touch the "Delete" button.
- Select Lubricant. Touch the "new" button to access keypad and enter the lubricants your processes require, followed by selecting "OK". The Lubricant setting allows up to 16 characters in length. To delete a Lubricant name, highlight the name, then touch the "Delete" button.
- Once your variable settings have been established, they can be copied to the memory card. This storage device allows for data to be transferred to other machines as well as provides backup and retrieval capability.
- Insert memory card firmly into card slot on left side of machine cabinet.
- Copy setting files by selecting **machine memory to memory card**, following the messages provided on the touch screen.
- NOTE: If your memory card already contains variable settings, copying the machine memory to memory card will overwrite the variable settings on the card. To save card settings that are not also residing on the machine:
    1. Copy **memory card to machine memory** so all your settings are contained on the machine.
    2. Add any additional settings needed.
    3. Copy from **machine memory to memory card**.

User Rights & Settings: To set up or modify each setting as follows:

- Pounds or kilograms: Customize the display of pressure to either pounds or kilograms as needed.
- Password: Up to a four digit password can be used to password protect the Process Configuration, Process Transfer, and System Configuration tabs. One password can be activated per machine.
- Enable Quantity Adjustment: Checking this box allows the operator to change the quantity of connectors while in the Production tab. By changing the quantity value, the machine adjusts the pressure in proportion to the original process value. This pressure adjustment defaults for one complete run of the process and then defaults to the original settings. The change in quantity and pressure is noted by the yellow highlight of these values.
- Enable Step Selection: Checking this box allows the operator to start at a step other than the first step or run steps out of sequence. If the Enable Step Selection box remains unchecked, the machine requires that all steps be run sequentially.
- Load Cell Calibration: Calibration of the APM HDC-5000 is conducted at the factory using a master load cell. Recalibration is not normally necessary. If you wish to recalibrate the machine to your own master load cell, complete through the following steps:

  1. Remove the fixture from the Overarm and the pad from the top of the platen.
  2. Clean top of platen to remove any water, grit or dirt that could get under the master load cell.
  3. Place the master load cell on the platen and center it under the Overarm plunger.
  4. On the touch screen select the System Config. tab, thenselect Load Cell Calibration.
  5. Raise Overam just enough for plunger to clear master load cell then press the Tare button on the touch screen, checking to see if master load cell meter is at 0.
  6. Lower overarm onto master, release lock button and press Apply Pressure button to apply a test pressure of 10.00 pounds.
  7. Press the Increase or Decrease button until the master load cell meter reads 10.00 pounds or matches the pressure readout on the touch screen.
  8. Recalibration is complete. Press the Span button to save the calibration.

If you wish to cancel the calibration at any time, press the Cancel button.

A Default Calibration button appears if the factory calibration has been changed. Pressing this button will reload factory calibration.

Process Setup

- Select the Process Configuration tab. Select "new" and name the process. To save time in setup, select "Duplicate" to copy from an existing process, then edit as needed. The process name can include up to 16 alphanumeric characters and will not allow spaces, dashes and punctuation.
- Select quantity of connectors this process will include. The use of "Qty" will always refer to the number of connectors.
- Under tab "A", select time, speed, and pressure for Step 1.
- Time is set by selecting the time box and entering the number of seconds.
- Select the speed box and enter the rpms needed.
- Select the pressure box. Note that pressure can be measured in either kilograms or pounds, which is set up in the System Configuration tab.
- Step Notes can be added to assist an engineer in referencing specific details regarding steps.
- Select tab "B" to reference pad, lubricant and film for each step of the process. Tab B is not a requirement for operation, but will document the appropriate products to be used in the process.
- It is recommended that most products be added in the System Configuration area prior to process building; however, to add a product to the drop down screen while building the steps:

  Select System Configuration

  Select Process Variable Settings in the drop down box

  Select appropriate variable in settings drop down

  Select new and enter the new name

  Return to the Process Configuration tab

  Add the newly added process variable that is now in the drop down box

- Set up remaining steps by selecting "new", then following the instructions for Step 1.
- **Copy Function:** To save time when setting up similar steps, select the step to be copied, select copy, select step which will precede the new step, then "paste".
- **Delete:** Use Delete button to delete steps when necessary.
- **Rework:** Select rework button once steps have been established for the process. The number selected will be the step the process will return to if rework is needed during production. The rework program will execute all remaining steps to complete the process.

Process Transfer

The memory card is a storage device which allows data to be transferred to other machines as well as providing backup and retrieval capability.

Processes can be established on the APM HDC-5000 in a lab environment, stored on a memory card which can be easily uploaded to other HDC-5000s, minimizing set up time and assuring consistency in operation.

To copy from machine memory to the memory card:

1. Insert memory card into slot located on the left side of the machine cabinet.
2. Select Process Transfer tab.
3. Highlight and copy process listed under Machine Memory to Memory Card by pressing the arrow "(<)". All processes can be copied over by selecting the "< ALL" button.

To copy processes stored on the memory card to the machine memory:

1. Insert memory card into slot located on the left side of the machine cabinet.
2. Select Process Transfer tab.
3. Highlight the process listed under Memory Card and copy to Machine Memory by pressing the arrow "(>)". All processes can be copied over by selecting the ">All" button.

To delete processes no longer needed on the Memory Card or Memory Card, highlight the process and press "Delete". "Delete All" will erase all the processes from the card.

To copy variable settings, refer to the System Configuration instructions in this guide. The variable settings resides in a separate file on the memory card.

Polishing Fixture Installation

- **This process should not be performed when a cycle is running.**
- To install a polishing fixture on the Overarm shaft, raise the Overarm to the vertical position, locking Overarm in place.
- Insure Overarm shaft and fixture bore are clean before proceeding.
- With Fixture Retaining screw facing upward, place fixture on the shaft and slide it up onto the keys.
- Tighten Fixture Retaining screw on the fixture. The screw allows the fixture to slide on the shaft without falling off.
- Lower and lock the Overarm in horizontal position by placing the index finger on the Overarm handle, the thumb on the release button with the middle finger supporting the fixture screw as you move the Overarm. This grip should be used whenever moving the Overarm with a fixture in place, to protect both the fixture and the platen.
- Drape cables extending from fixture over Cable Management bracket.

Polishing Accessories

- The APM HDC-5000 operates when polishing with abrasive films placed upon rubber pads, glass or ceramic plates.
- To install a pad or plate, raise Overarm, place polishing pad or plate on the platen. Place the appropriate polishing film on the pad following manufacturer recommendations regarding adhesive backing.
- Lower arm to the horizontal position with right hand, while lifting up on Fixture Retaining screw (when fixture is in place) with the left hand. Release button and gently lower fixture onto platen.

Machine Operation

- Plug the power cord into the back of the machine and a properly grounded outlet, 100-240V/AC 50/60 Hz. You MUST push the reset button on the front of the plug to supply power to the machine.
- Turn on power switch located at the back of the machine.
- The touch screen should default to the home tab screen. If the red emergency screen is displayed, reset by turning the Emergency Stop button (EPO)  clockwise to disengage.

- Press Machine Start button.
- At Home tab, select process from drop down box.
- Select Production tab. Refer to the pad, film and lubricant specified on the lower portion of the screen and set up as indicated.
- **Step Start Button:** Press the Step Start button to begin each step.
- When step has completed, the screen will refresh to indicate next process step along with required pad, lubricant and film.
- After the final step has completed, the screen will reset back to the beginning of the process.
- If rework on a particular process is needed, press the rework process button. The process will automatically take you to the appropriate starting point necessary for the rework process to be performed.
- If issues arise requiring a change in process steps, quantity or materials, refer to the instructions included in Process Setup and System Configuration.
- **Pause Button:** If there is a need to stop the step temporarily releasing the pressure and stopping the rotation, press the Pause Button.
- **Reset Button**: Press the Reset button to reset the timer to the step's original value. Press Step Start to rerun the step.
- To shut down machine, select Home tab, select, "Shut Down" button on lower right hand corner and select "Yes" to prompt.

Machine Maintenance

Gentle handling of the polishing fixtures and machine is critical to maintain polishing accuracy. If the platen or polishing fixture are damaged in any way, contact Domaille Engineering, LLC for repair.

There are no user serviceable parts inside the case. Do not remove sealed screws. Evidence of tampering will void warranty.

Daily or more often as required:

- The polishing fixtures are made of stainless steel; however, it is recommended that all traces of water and slurry be removed after each use.

- Clean top of platen, Overarm top plate, Overarm rest pad and bottom of Overarm. **The accuracy of this machine is dependent on keeping these areas clean.** Clean all residue, water and slurry from entire top of machine and from front control panel. Do not contaminate touch screen area.
- **WARNING: Do not use an air hose on or around the platen. This forces water and contaminates into the wear surfaces and mechanical drive unit, potentially causing possible machine failure.**

Monthly:

Fan Filter:

- Inspect Fan Filter on back of machine. Clean by vacuuming or remove and clean with compressed air.

Platen:

- Disconnect from power source before servicing platen. The platen should be removed and greased at least once a month. If the machine is heavily used, more frequent greasing is required.
- The platen can be removed by placing your fingers around the underside of the platen. Gently break the seal between the platen and the machine. Pull straight up.
- Do not use any tools (pry bars, screwdrivers, etc.) to remove platen as the platen and plastic wear ring under the platen may be damaged.
- After the platen is removed, clean all of the old grease and contaminants from the bottom of the platen and from the plastic wear ring. Clean both platen and wear ring with alcohol and a clean, lint-free tissue or cloth to remove any remaining grease.
- Do not grease the platen bearings. They are pre-lubricated and sealed; therefore, lubrication is not required.
- Wipe any grit off the O-rings and apply a drop of light oil on each O-ring. This helps protect and lubricate the O-rings, making it easier to replace the platen.
- Fill holes in wear ring with grease and put a small bead of grease, on wear ring, between holes. Use Super Lube from Synco Chemical Corporation, www.super-lube.com.

- Reinstall platen by lining up the eccentric arms to point in the same direction as shown below. Move to eye level with the platen area, lowering the platen until the pin of each eccentric arm is nested in the holes of the platen.

- Line up pins with holes in bearings in bottom of platen. When pins are lined up, platen will slide on pins about ½ way.
- Push straight down to seat platen on wear ring. Verify that platen is level before operating. When fitted properly, no light will be visible between the platen and wear ring.

Lock Pins:

- Using a light machine oil, clean and lubricate lock pins on both sides of the Overarm placing a drop in each slot..

Service & Support

Domaille Engineering, LLC is an ultra-precision manufacturer distinguished by the accuracy of our products and services. One of our critical goals is to provide excellent customer service. Please contact us for service, support or input on how we can improve our service to you.

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LIMITED WARRANTY

Domaille Engineering, LLC ("Domaille") products are warranted by Domaille to be free from defects in workmanship and materials for a period of one-year from the original purchase date. This warranty covers defects in materials or workmanship only and does not include damage due to abuse, misuse, problems with electrical power, problems with compressed air supply, servicing not authorized by Domaille, failure to properly care for and maintain the products, or normal wear and tear. In addition, use of parts, components, or accessories not supplied or approved by Domaille will void this warranty.

Domaille's sole liability arising from any use of its products and this warranty is limited to repair or, at Domaille's sole discretion, replacement of defective products or defective component parts thereof. To request warranty service, you must contact Domaille at 7100 Dresser Dr. N.E., Rochester, MN 55906, USA. If warranty service is required, Domaille will issue a Return Material Authorization Number (RMA#). You must ship the products back to Domaille in their original or equivalent packaging, pre-pay shipping charges, and insure the shipment or accept the risk of loss or damage during shipment. Along with your RMA # include your name, telephone number, return address, proof of original purchase date, and a description of the claimed defect. If shipping the APM HDC-5000 for warranty repair, back up process data to the memory card, referring to User's Guide for process transfer instructions. Remove and retain memory card, as Domaille will not accept liability for lost data. If the defect is covered by this limited warranty, Domaille will repair or replace (at its option) the product or the defective component part(s) and ship them freight prepaid to an address in the continental U.S. Shipments to locations outside of the U.S. that are not the original shipped to location will be made freight collect or will be shipped to the original shipped to location, at the discretion of Domaille.

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