

# APM-HDC-5400 SERIES USER'S GUIDE



# TABLE OF CONTENTS



## APM-HDC 5400 SERIES Fiber Optic Polishing Machine USER'S GUIDE

|                                                                   |           |
|-------------------------------------------------------------------|-----------|
| <b>Welcome .....</b>                                              | <b>2</b>  |
| <b>Overview.....</b>                                              | <b>2</b>  |
| <b>Getting Started.....</b>                                       | <b>3</b>  |
| Unpacking & Setup .....                                           | 3         |
| Precautions.....                                                  | 5         |
| <b>Parts and Functions .....</b>                                  | <b>6</b>  |
| Machine Diagram.....                                              | 6&8       |
| <b>Machine Setup .....</b>                                        | <b>10</b> |
| Initial Setup.....                                                | 10        |
| System Configuration .....                                        | 11        |
| Load Cell Calibration .....                                       | 12        |
| Process Variables Settings.....                                   | 14        |
| Transferring Process Variables.....                               | 16        |
| User Rights & Settings.....                                       | 21        |
| Maintenance Schedule.....                                         | 24        |
| Motor Speed Calibration.....                                      | 25        |
| Process Setup .....                                               | 26        |
| Inter-Machine Process Transfer .....                              | 31        |
| <b>Machine Operation .....</b>                                    | <b>33</b> |
| Polishing Fixture Installation .....                              | 33        |
| Polishing Pad and Film Placement .....                            | 34        |
| Power Up.....                                                     | 34        |
| Polishing Process Selection and Polishing Procedure.....          | 35        |
| Predefined Rework Start Step.....                                 | 38        |
| Step Pause Button.....                                            | 38        |
| Step Reset Button   Select Step   Cancel Polishing Process.....   | 39        |
| <b>Machine Shut Down .....</b>                                    | <b>39</b> |
| <b>Machine Maintenance .....</b>                                  | <b>39</b> |
| <b>Machine Alarms.....</b>                                        | <b>42</b> |
| <b>Micro-G®.....</b>                                              | <b>44</b> |
| Micro-G® Hardware Setup.....                                      | 44        |
| Micro-G® Process Setup.....                                       | 54        |
| DE2910 Process Inspection Videoscope Setup.....                   | 60        |
| <b>DE DataLink®.....</b>                                          | <b>66</b> |
| <b>Service &amp; Support &amp; Technical Specifications .....</b> | <b>71</b> |
| <b>Company Information .....</b>                                  | <b>72</b> |
| <b>Limited Warranty .....</b>                                     | <b>73</b> |



## Printing History

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# WELCOME

Congratulations on selecting the APM-HDC-5400, the premier fiber optic connector polishing machine.

This User's Guide will assist you in the setup, operation, and maintenance of the APM-HDC-5400 machine to maximize the use and life of this equipment.

## OVERVIEW

The APM-HDC-5400 is designed to address the need to efficiently polish a large volume of connectors while maintaining a consistent high level of quality.

The APM-HDC-5400 allows you to create processes through an easy-to-use touch-screen panel. The panel displays programmed settings for speed, time, pressure, polishing film used, lubricant type and pad durometer. Additional setting options include: language selection, ramp-up speed, ramp-up pressure, delayed pressure apply, speed ramp down, pressure ramp down, polishing fixture weight, maintenance intervals and polishing film counters. Optional accessories are also available which offer additional capability for special tasks such as Micro-G® bare fiber polishing and/or DE DataLink® process data collection. Operators need minimal training to follow the touch-screen prompts of this easy to use machine.

The number of processes that can be defined and stored within the APM-HDC-5400 machine is only limited by the amount of internal memory. Therefore hundreds of processes can be stored on a single machine. Additionally, the APM-HDC-5400 provides you with total flexibility in the number of steps you define within each of your polishing processes.

The APM-HDC-5400 provides the capability to store your processes in machine memory as well as on a USB storage device. A USB storage device can be used to back up your defined processes and to copy processes from one machine to another. This not only saves process setup time for each machine, but also ensures consistent process settings.

# GETTING STARTED

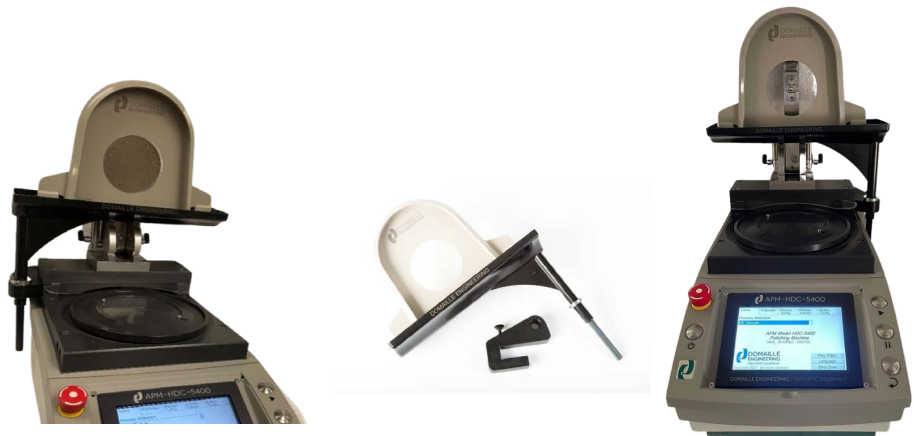
## Unpacking & Setup

NOTE: Due to the weight of the APM-HDC-5400, it is recommended that two people lift it from the shipping case.

1. Remove all loose components from the machine area in the shipping case.
2. Remove the plastic bag from around the Overarm to provide access to the Overarm.
3. Use the Overarm as a lifting handle by grabbing as close to the Overarm pivot point as possible.
  - a. 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.
  - b. Gently place the machine on a suitable, stable work surface.
4. Remove remaining plastic wrapping from machine and touchscreen panel.
5. Inspect the machine for any damage that may have occurred in shipping.
6. Remove the **BLUE** Koby Air Filter from the shipping case. Remove plastic cap from air supply fitting on the back of the machine. Connect plastic airline provided by pushing line firmly into fitting. Connect other end of airline to **BLACK** capped end of Koby Air Filter.
7. Using the proper air supply fittings, connect the **RED** capped end of 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: 90-120 pounds per square inch (6.2- 8.5 bar), clean, dry, oil-free air.
8. Connect Drain Hose provided to Drain Hose Fitting on back of machine. Route Drain Hose to a collection container below the bench.
9. In order to raise and lower the Overarm, you must release the Overarm locking mechanism. Press the illuminated Overarm Quick-Release button located at the front of the Loadcell Housing and lift up.

Releasing the Quick-Release button will allow the Overarm to lock in one of the three (3) fixed positions. Refer to "Initial Setup" instructions on page 10. Note: Air and power will need to be connected prior to doing this.

10. Remove the Drip Tray, Drip Tray Bracket and Splash Guard. The Drip Tray can be attached on either the right or left side of the machine. This diagram illustrates how the Drip Tray Bracket slides onto the back right or left corner of the machine (when facing machine). Place the bracket snug against the back corner and firmly tighten the bracket screw. Slide the Drip Tray rod into the bracket hole. Attach Splash Guard at desired position for the fixture with the Overarm in the up position.



## Precautions

For safe, effective operation of the APM-HDC-5400 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 and slurry to Platen area.
- Do not attempt to repair or service any components inside the APM-HDC-5400 machine. Contact Domaille Engineering, LLC if service is required.
- Use only the stylus provided or fingers when touching screen panel. Do not use hard objects.

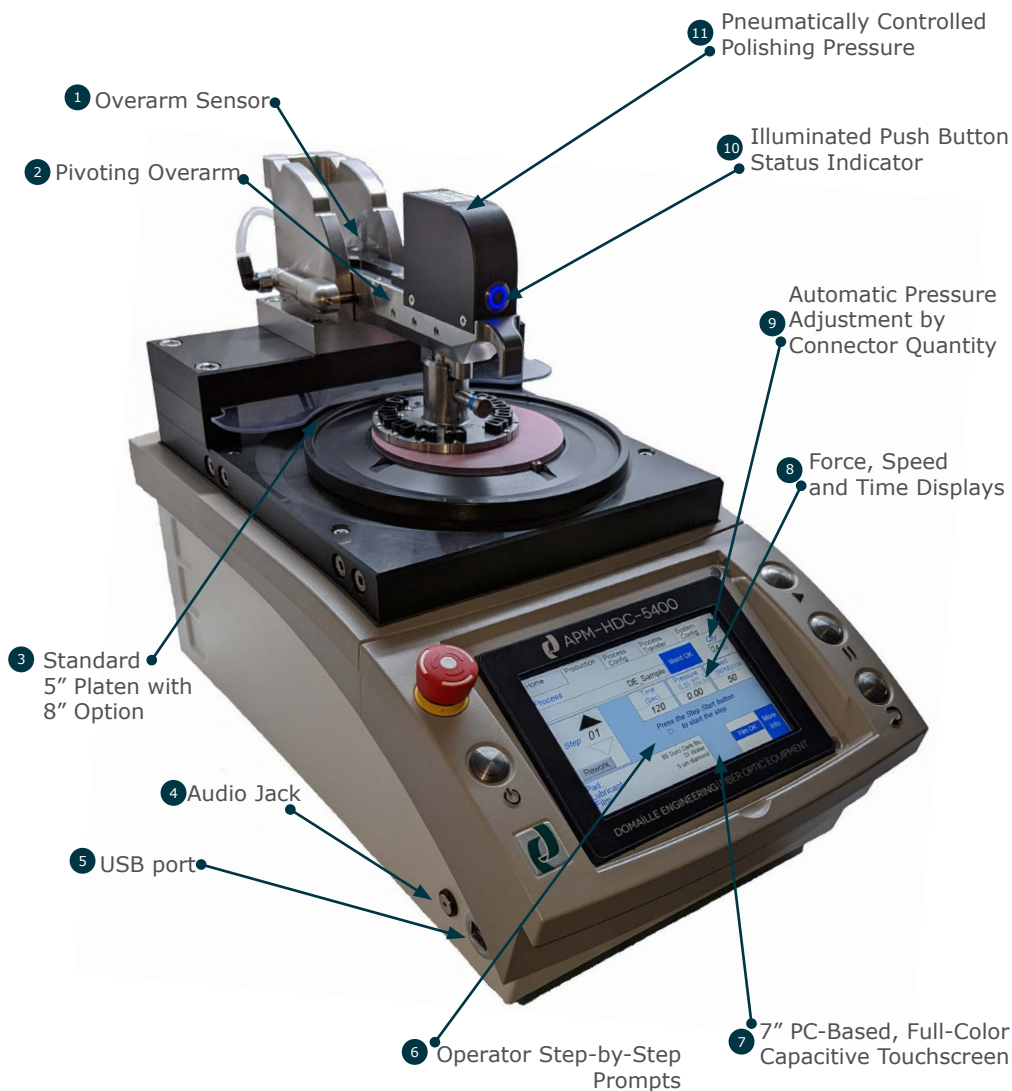


**WARNING:** Do not use an air hose on or around the Platen. This forces water and contaminants into the wear surfaces and mechanical drive unit, potentially causing machine failure.

**Damage caused by air hose use is not covered under warranty.**

# PARTS AND FUNCTIONS

## Machine Diagram

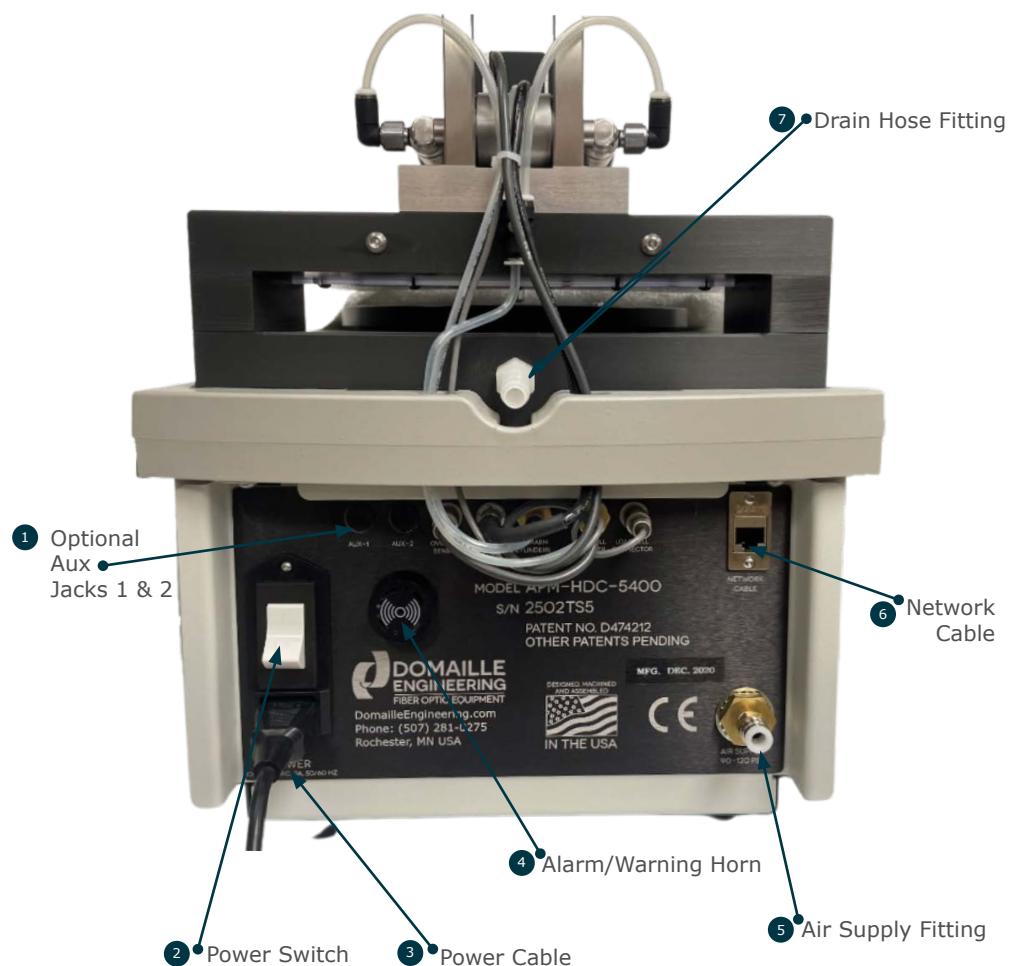




|    |                                                    |                                                                                                               |
|----|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| 1  | Overarm Sensor                                     | allows cycle start when arm is in the correct position                                                        |
| 2  | Pivoting Overarm                                   | provides easy cleaning of fixtures between steps and quick change of fixtures                                 |
| 3  | Standard 5" Platen with 8" Option                  | provides flexibility in fixture capacity and polishing film size                                              |
| 4  | Audio Jack                                         | used to connect speaker or headphone for listening to instructional videos                                    |
| 5  | USB Port (2)                                       | used for machine-to-machine process replication process back up, videos, and bar code scanning                |
| 6  | Operator Step-by-Step Prompts                      | for film, pad type, lubricant, and operator instructions                                                      |
| 7  | 7" PC-Based, Full-Color Capacitive Touchscreen     | programmable interface for defining and storing unlimited processes and for easy-to-use, error-free operation |
| 8  | Force, Speed and Time Displays                     | for feedback of process step-specific settings                                                                |
| 9  | Automatic Pressure Adjustment by Connector Quality | accounts for a varying number of connectors inserted in the polishing fixture                                 |
| 10 | Illuminated Push Button Status Indicator           | illuminated push button is used to control arm position and indicate machine status                           |
| 11 | Pneumatically Controlled Polishing Pressure        | provides consistent polishing force                                                                           |

# PARTS AND FUNCTIONS

## Machine Diagram



- |   |                    |                                                                       |
|---|--------------------|-----------------------------------------------------------------------|
| 1 | Aux Jacks 1 & 2    | auxiliary jacks are used for machine accessories such as Micro-G®     |
| 2 | Power Switch       | machine on or off                                                     |
| 3 | Power Cable        | main source of power to machine                                       |
| 4 | Alarm/Warning Horn | alarm/warning horn will sound when machine alarm/warning is present   |
| 5 | Air Supply Fitting | provides connection between polishing machine and facility air supply |
| 6 | Network Cable      | used for connection to DE DataLink® system                            |
| 7 | Drain Hose Fitting | provides path for excess liquid                                       |

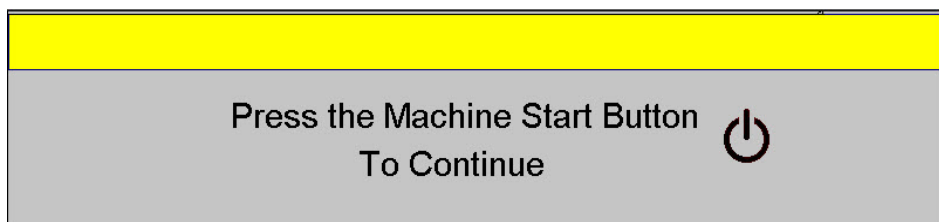
# MACHINE SETUP

## Initial Setup

Before operating the APM-HDC-5400, you must configure the system and define your processes.

Plug the power cord into the back of the machine and into a properly grounded outlet- 100-240 VAC, 50/60Hz. If your power cord is equipped with a GFCI, you MUST push the reset button on the plug to supply power to the machine.

1. Turn on power switch located at the back of the machine.
2. Lift screen cover (Note: screen cover should be down when machine is operating).
3. The touchscreen will default to the "Home" tab screen. If the **RED** emergency screen is displayed, reset by turning "Emergency Stop" button CLOCKWISE.
4. Press the language button to select desired language.
5. Press  "Machine Start" button.
6. After pressing  "Machine Start" button, the user can select a process as shown in Fig. 1.



***APM Model HDC-5400***  
***Polishing Machine***  
5400\_ V9.00      2500TS5



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## Process Selection

DE\_Sample ▼

**APM Model HDC-5400**  
**Polishing Machine**  
 5400\_ V9.00      2500TS5



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Fig. 1



## System Configuration

System Configuration allows you to set the following (Fig. 2):

1. Loadcell Calibration
2. Process Variable Settings
3. User Rights and Settings
4. Maintenance Schedule
5. Motor Speed Calibration

## Configuration

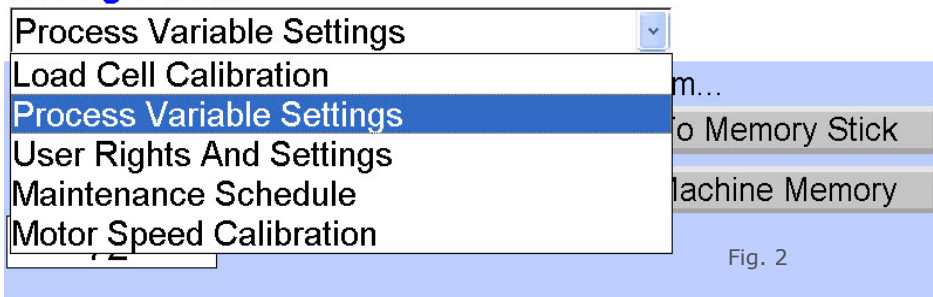


Fig. 2

Two (2) interface methods are available for entering system configuration data, (1) the touchscreen keypad, or (2) a Windows Microsoft Compatible USB keyboard. If using a keyboard, plug the USB connection into the port on either side of the machine AFTER the machine has powered up. Use the drop down menu under "Configuration" to select the desired configuration screen.

## Load Cell Calibration

The APM-HDC-5400 Polisher has been calibrated at Domaille Fiber Optic Equipment prior to shipment. Recalibration is not typically necessary during initial setup; however, machine calibration should be checked on a bi-weekly schedule. Recalibration and load cell verification of the machine can be preformed in two ways:

1. Using the automatic Domaille EZ-CAL USB Load Cell - P/N MK15300 (recommended).
2. Using an alternative external master loadcell.

When using the automatic Domaille EZ-CAL USB Load Cell, follow these steps:

1. Remove the polishing fixture from the Overarm and the rubber pad from the top of the Platen.
2. Clean top of Platen to remove any water, grit or dirt to ensure that the EZ-CAL USB Load Cell will be set on a clean, dry surface.
3. Place the EZ-CAL USB Load Cell on the Platen and center it under the Overarm plunger.

4. Plug the USB connector of the EZ-CAL Load Cell into the side USB port of the polishing machine.



5. Allow EZ-CAL Load Cell to warm up 15 minutes prior to starting.
6. On the touchscreen, select the "System Config" tab, then select "Load Cell Calibration" in the configuration dropdown box using the DOWN arrow as necessary (Fig. 3).
7. Select the "Auto Cal" button to begin the automatic calibration process or if the user is only verifying the calibration press the "Verify LC" button.

8. If calibrating the machine with the "Auto Cal", the machine will automatically run thru a number of steps and calibrate the machine on its own. This calibration can take anywhere from 30-60 seconds and when it is finished it will ask for the user to select "Accept" or "Cancel". Select the "Accept" button to finish the calibration process or "Cancel" to abort and run it again.
9. When unplugging the EZ-CAL USB load cell from the polishing machine, first transition to the HOME tab so the load cell is not taking readings. When the machine is on the HOME tab the load cell readings are halted making it safe to unplug the device.

When using an external master load cell follow these steps to calibrate the machine.

1. Remove the polishing fixture from the Overarm and the rubber pad from the top of the Platen.
2. Clean the top of the Platen to remove any water, grit, or dirt from the surface to ensure that the external master load cell will be set on a clean, dry surface.
3. Place the external master load cell on the Platen and center it under the Overarm plunger.
4. Allow external master load cell to warm up 15 minutes prior starting calibration.
5. On the touchscreen, select the "System Config" tab, then select "Load Cell Calibration" in the configuration drop down box using the DOWN arrow as necessary (Fig. 3).
6. Select the "Manual Cal" button to begin the calibration process.
7. Once step one of the manual calibration process starts, raise the Overarm just enough for the plunger to clear the master load cell and select the "Tare" button on the touchscreen checking to see if the master load cell reads 0 lbs. while doing this.



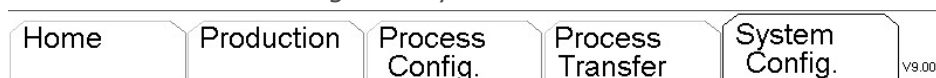
8. Once step two activates, lower the Overarm back down onto the master load cell and lock it into place by releasing the illuminated arm button. When ready select the "Apply Pressure" button on the touchscreen. Press the "Increase" and "Decrease" buttons on the screen until the master load cell reading matches the 24 lbs. of polishing machine load cell.



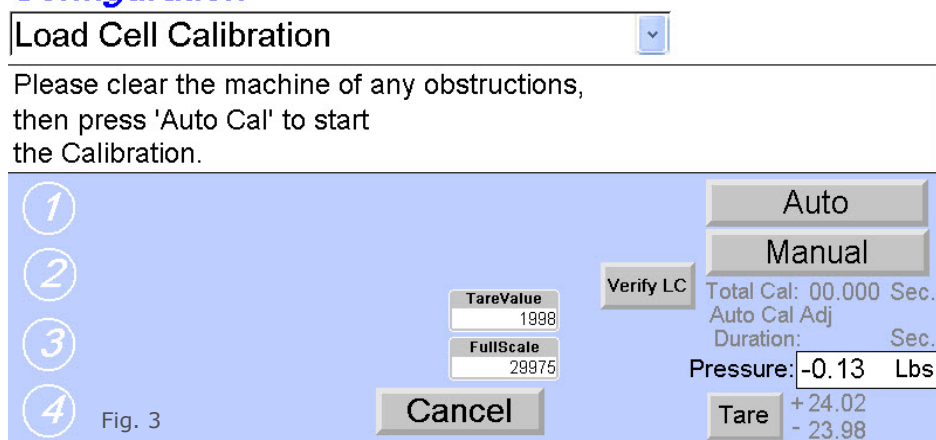
9. At this point, calibration is complete. Select the "Span" button on the touchscreen to SAVE the calibration to the machine.

NOTE 1: If you wish to cancel during the middle of calibration a "Cancel" button is displayed so you can exit the process without changing any settings.

NOTE 2: A "Default Calibration" button is available so the user can restore the machine calibration settings back to the factory calibration settings at anytime.



## Configuration



## Process Variable Setting

The APM-HDC-5400 allows you to define valid variables that can be used in the definition of your polishing processes. These variables include (1) a maximum quantity of connectors that can be polished at one time, (2) a list of polishing films, (3) a list of types of polishing pads, and (4) a list of lubricants that can be defined for polishing processes.

To MODIFY process variables, first select the "System Config" tab, then select "Process Variable Settings" in the "Configuration" box, using the DOWN arrow as necessary (Fig. 4).

### Maximum Quantity Setting:

This variable has been preset to 72 and is not modifiable at this time.



## Film Settings:

1. Select "Film" in the "Select Setting" box, using the DOWN arrow as necessary (Fig. 4).
2. Select the "New" button to access the keypad.
3. Type in a film name for your polishing process. The film name can be up to 26 characters in length.
4. Select "OK".
5. Repeat the above steps for all films used in all polishing processes.

To DELETE a film name, highlight the name, then select the "Delete" button.

## Pad Settings:

1. Select "Pad" in the "Select Setting" box, using the DOWN arrow as necessary.
2. Select the "New" button to access the keypad.
3. Type in a pad name for use in your polishing process. The pad name can be up to 26 characters in length.
4. Select "OK".
5. Repeat the above steps for all pad types used in all polishing processes.

To DELETE a pad name, highlight the name, then select the "Delete" button.

## Lubricant Settings:

1. Select "Lubricant", using the down arrow in the "Select Setting" box as necessary.
2. Select the "New" button to access the keypad.
3. Type in a lubricant name for use in your polishing process. The lubricant name can be up to 26 characters in length.
4. Select "OK".
5. Repeat the above steps for all lubricant types used in all polishing processes.

To DELETE a lubricant name, highlight the name, then select the "Delete" button.

## Transferring Process Variables

Once your variable settings have been established, they can be copied to a USB memory stick. This allows "Process Variable Data" to be transferred to other APM-HDC-5400 machines as well as providing backup and retrieval capability.

A USB memory stick has been included with the shipment of your APM-HDC-5400 with default process variables.

To SAVE process variable data to a USB:

1. Insert USB storage device into USB port on either side of the machine.
2. Select "System Config" tab, then select "Process Variable Settings".
3. Copy settings by selecting "Machine Memory to Memory Stick". You will be notified, if Process Variable Data already exists on the USB memory stick.

NOTE: If the USB memory stick already contains variable data, copying the "Machine Memory to Memory Stick" will overwrite the variable settings on the stick.

To load "Process Variable Data" from an already existing file on a USB storage device, use the following procedure:

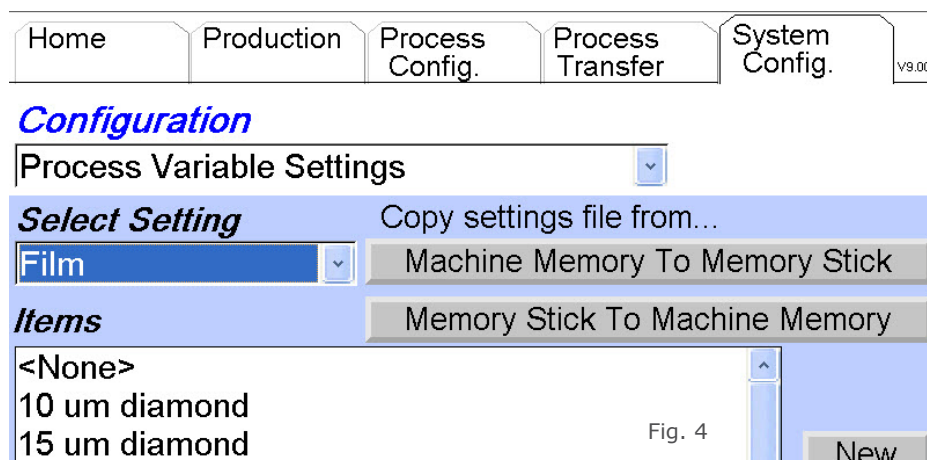


Fig. 4

1. Insert USB storage device into USB port on either side of the machine.
2. Select "System Config" tab, then select "Process Variable Settings".
3. Transfer settings by selecting "Memory Stick to Machine Memory" so that all your USB storage settings are contained in the machine memory.

## User Rights & Settings

The "User Rights & Settings" screen (Fig. 5) allows you to enable/disable thirteen (13) machine specific parameters, including:

- (1) Password
- (2) Air Sensor
- (3) Alarm Horn
- (4) Arm Sensor
- (5) AutoCal
- (6) DE-DataLink®
- (7) Display Kg
- (8) Film Counter
- (9) Quantity Adjust
- (10) Step Selection
- (11) Video
- (12) Warning Horn
- (13) Zero Speed

To **MODIFY** "User Rights & Settings", touch the "System Config" tab, then select "User Rights & Settings" in the "Configuration" box, using the **DOWN** arrow as necessary (Fig. 5).

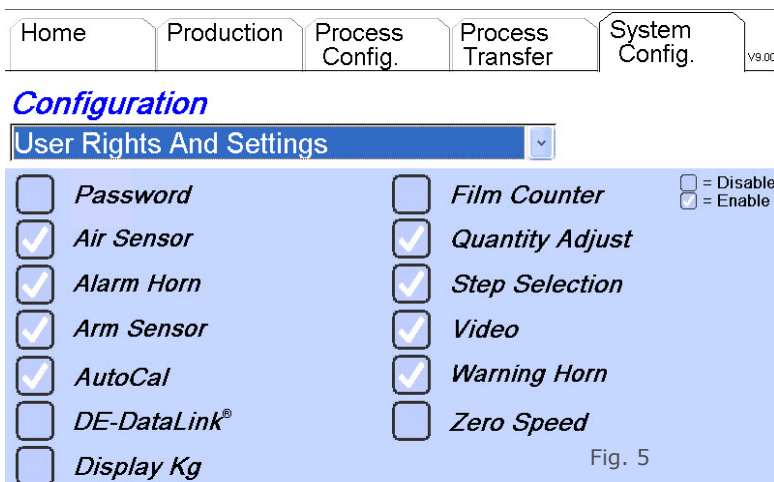


Fig. 5

## Password

A one (1) to four (4) digit password can be used to password protect the "Process Configuration", "Process Transfer" and "System Configuration" tabs. One password can be activated per machine.

When the "Password" box is unchecked, no password protection is in effect. To activate "Password Protection" and reset the password:

1. Touch "Password" box until large checkmark appears. Current password will be in the box to the right.
2. Touch the box with current password in it to access the keypad.
3. Type in a one (1) to four (4) character password.
4. Select "OK".

To DISABLE "Password Protection" touch "Password" box to uncheck the box.

## Air Sensor

The machine air pressure sensor can be enabled or disabled. This sensor constantly certifies that the machine has adequate air pressure to operate.

## Alarm Horn

The machine is equipped with a horn for signaling alarm conditions. Use this check box to enable or disable the alarm horn. Reference

“Machine Alarms” section for examples.

## Arm Sensor

The machine has a sensor that checks if the polishing arm is up or down. Use this check box to enable or disable this sensor.

## AutoCal

Checking the “AutoCal” box enables the “Auto” button on the load cell calibration configuration under “System Config”. When activated the user can use the Domaille EZ-CAL Load Cell to automatically calibrate the machine.

## DE DataLink®

Checking the “DE DataLink®” box allows for the use of the DE Data-Link® data collection system with the polisher. This is an accessory software and hardware package that can be added to the polisher for connecting the machine to a central database and control system. The user can collect real time polishing data and track process and polishing information with this system with minimal data entry. USB barcode scanners are also available with the system.

## Display Kg

Pressure can be displayed in either pounds (lbs.) or kilograms (kgs). Touch the “Display Kilograms” box to toggle between these units. A CHECKED box will display pressure in kilograms and an UNCHECKED box will display pressure in pounds.

## Film Counter

Checking the “Film Counter” box activates a film usage counter for each polishing step done on the polisher. After Film counting parameters are set up in the process config tab for the recipe, the machine will start to track the number of film runs that are done for each step and it will prompt the user to replace the film once the film use limit is reached (Fig. 10).

## Quantity Adjustment

Checking the “Quantity Adjustment” box allows the machine operator to change the quantity value on the “Production” tab (Fig. 13A). When this value changes, the APM-HDC-5400 adjusts the pressure in proportion to the original process pressure value to account for the

change in the number of connectors being polished. The polishing fixture weight is also figured into the equation.

For example, if the original process pressure is set at 1.00 lbs. with the default number of connectors for that process set at 12 with a polishing fixture weight of 0 lbs., and the operator only loads 8 connectors into the polishing fixture and sets the quantity value on the "Production" tab to 8, the pressure will automatically be adjusted to 0.67lbs. ( $0 + 1/12 * 8 = 0.67$  lbs.).

Once fixture weight is added, the quantity adjust will compensate but fixture weight will remain as part of the overall compensation as follows:

$$\text{Pressure per connector} = \frac{\text{fixture weight} + \text{total pressure}}{\text{connector quantity}}$$

Thus, adjusting quantity of connectors will maintain the same pressure per connector.

This pressure adjustment due to the change in the quantity value is maintained for one complete run of the process and then returns back to the original process definition setting. The change in quantity and pressure is noted by the **YELLOW** highlight of these values on the "Production" tab.

## Step Selection

Checking the "Step Selection" box allows the machine operator to start polishing at a step other than the first step in the process or to run process steps out of sequence. If the "Step Selection" box is unchecked, the program requires that all process steps be run sequentially.

## Video Selection

Checking the "Video" box enables a button on the home page that allows the user to play videos on the polisher. When activated the user can play the following video formats: MP4, AVI, and MOV. To get sound from the machine when playing the video plug in a speaker or headphone to the side audio jack.

## Warning Horn

The machine is equipped with a horn for signaling warning conditions. Use this check box to enable or disable the warning horn.

## Zero Speed

Checking the "Zero Speed" box allows the user to input a speed of zero for the platen in the recipe setup. This is often used to verify pressure of the machine and its load cell readings.

## Maintenance Schedule

The "Maintenance" screen (Fig. 6A and Fig. 6B) allows you to define specific maintenance parameters including Platen Grease, Clean Plunger and Mandrel, Loadcell Calibration, Replace Koby Filter, Replace Rubber Pad, Annual Maintenance, Replace Air Cleanse Filter, and EZ Check Wear Test Kit. This section is also used to reset values after set parameters are reached.

Home

Production

Process Config.

Process Transfer

System Config.

V9.01

Configuration

Page 1

Page 2

Maintenance File Transfer

Copy to USB

Maintenance Schedule

| Maintenance Schedule    |                       | Total Hours | 807     |
|-------------------------|-----------------------|-------------|---------|
| Task                    | Hour Interval (Accum) | Re-Set      |         |
| Platen Grease           | 40 0                  | Reset       |         |
| Clean Plunger & Mandrel | 40 0                  | Reset       |         |
| LoadCell Calibration    | 40 0                  | Reset       |         |
| Replace Koby Filter     | 320 0                 | Reset       |         |
| Replace Rubber Pad      | 320 0                 | Reset       |         |
| Annual Maintenance      | 2080 0                | Reset       | Fig. 6A |

### Platen Grease

The Platen Grease maintenance is tied to the numbers of hours the Platen is rotating. To set the Platen Grease maintenance interval:

1. Use a stylus to press the number located under "Hour Interval" tab. This will access the keypad for data entry.
2. Use the keypad to set hours of use before changing Platen Grease. The recommended interval is **40 hours**. This can be modified as needed.

## Clean Plunger & Mandrel

The Clean Plunger & Mandrel maintenance is tied to the number of hours the Platen is rotating. To set the Clean Plunger & Mandrel Maintenance interval:

1. Use a stylus to press the number located under "Hour Interval" tab. This will access the keypad for data entry.
2. Use the keypad to set hours of use before changing Platen Grease. The recommended interval is **40 hours**. This can be modified as needed.

## Load Cell Calibration

The Load Cell Calibration maintenance is tied to the number of hours the Platen is rotating. To set the Load Cell Calibration Maintenance interval:

1. Use a stylus to press the number located under "Hour Interval" tab. This will access the keypad for data entry.
2. Use the keypad to set hours of use before changing Platen Grease. The recommended interval is **40 hours**. This can be modified as needed.

## Replace Koby Filter

The Replace Koby Filter maintenance is tied to the number of hours the Platen is rotating. To set the Replace Koby Filter maintenance interval:

1. Use a stylus to press the number located under "Hour Interval" tab. This will access the keypad for data entry.
2. Use the keypad to set hours of use before replacing the Koby Filter. The recommended interval is **320 hours**. This can be modified as needed based on actual working conditions.

## Replace Rubber Pad

The Replace Rubber Pad maintenance schedule is tied to the number of hours the Platen is rotating. To set the Replace Rubber Pad maintenance interval:

1. Use a stylus to press the number located under "Hour Interval" tab. This will access the keypad for data entry.



- 2. Use the keypad to set hours of use before Replacing the Rubber Pad. The recommended interval is **320 hours**. This can be modified as needed based on actual working conditions.

Annual Maintenance

The Annual Maintenance is tied to the number of hours the platen is rotating. To set the Annual Maintenance interval:

- 1. Use a stylus to press the number located under "Hour Interval" tab. This will access the keypad for data entry.
- 2. Use the keypad to set hours of use before Replacing the Annual Maintenance. The recommended interval is **2080 hours**. This can be modified as needed based on actual working conditions.

Home

Production

Process Config.

Process Transfer

System Config.

V9.01

Configuration

Page 1

Page 2

Maintenance File Transfer

Copy to USB

Maintenance Schedule

| Maintenance Schedule   |                       | Total Hours | 807 |
|------------------------|-----------------------|-------------|-----|
| Task                   | Hour Interval (Accum) | Re-Set      |     |
| Air Cleanse Filter     | 320 0                 | Reset       |     |
| EZ Check Wear Test Kit | 320 0                 | Reset       |     |
| Enter new task         | Fig. 6B               |             |     |
| Enter new task         |                       |             |     |

Replace Air Cleanse Filter

The Replace Air Cleanse Filter maintenance schedule is tied to the number of hours the Platen is rotating. To set the Replace Air

Cleanse Filter maintenance interval:

- 1. Navigate to Page 2 of maintenance items.
- 2. Use a stylus to press the number located under "Hour Interval" tab. This will access the keypad for data entry.
- 3. Use the keypad to set hours of use before Replacing the Air Cleanse Filter. The recommended interval is **320 hours**. This can be modified as needed based on actual working conditions.

EZ Check Wear Test Kit

- 1. Use a stylus to press the number located under "Hour Interval" tab. This will access the keypad for data entry.

2. Use the keypad to set hours of use before using the EZ Check Wear Test Kit. The recommended interval is **320 hours**. This can be modified as needed based on actual working conditions.

## User Defined Maintenance Task

1. Use stylus to press the "Enter New Task", a pop up will ask you to enter task name up to 24 characters. Then press ok.
2. Use stylus to press the default hour value of 1 located under "Hour Interval" tab. This will access the keypad and allow for custom data entry.
3. Use keypad to set hours of use before using the new "User Defined Maintenance Task". Set as needed based on actual working conditions. Then press ok.

## To Clear User Defined Maintenance Task

1. Use stylus to press your current task, click "yes" in option. Clear text, then press ok.
2. "Enter New Task" is placed back in text area, hours are cleared and reset.

## To Reset a Maintenance Schedule

Once a maintenance task has reached its set interval, an alarm will display on the production screen. The "Maintenance OK" button will turn from **BLUE** to **RED**. The user will be able to continue polishing even if the maintenance is not reset. To reset the maintenance:

1. Go to "System Config" tab in the Menu system.
2. Select "Maintenance Schedule" from the "Configuration" drop down box.
3. All maintenance intervals needing to be reset will be highlighted in **RED**.
4. Perform the maintenance items.
5. With a stylus, PRESS the **RED** "Reset" tab.
6. The "Reset" tab will change from **RED** to **BLUE**. The hours accumulated (Accum) will revert to zero hours upon a successful reset.

## Maintenance File Transfer Button

The "Copy to USB" button on the Maintenance screen is used to copy the stored machine maintenance file to a USB stick. To use this feature first place a USB stick into either of the polishing machine USB ports and then select the button.

In the maintenance file, the machine will log the maintenance hours of the maintenance item when the "RESET" button for the item is pressed. This will give the user a log of how often each maintenance counter is being reset and taken care of. Example below:

| Date       | Time     | Machine_SN | RunTime | Reset Button        | Hour | Minute | Seconds |
|------------|----------|------------|---------|---------------------|------|--------|---------|
| 11/9/2020  | 15:23:23 | 1100TS4    | 190.5   | Annual Maintenance  | 0    | 1      | 28      |
| 11/9/2020  | 15:23:24 | 1100TS4    | 190.5   | Replace Rubber Pad  | 0    | 1      | 28      |
| 11/9/2020  | 15:23:25 | 1100TS4    | 190.5   | Replace Koby Filter | 0    | 1      | 28      |
| 11/9/2020  | 15:23:26 | 1100TS4    | 190.5   | Lubricate Lock Pins | 0    | 1      | 28      |
| 11/9/2020  | 15:23:27 | 1100TS4    | 190.5   | Fan Filter          | 2    | 12     | 29      |
| 11/9/2020  | 15:23:28 | 1100TS4    | 190.5   | Platen Grease       | 0    | 1      | 28      |
| 11/9/2020  | 15:24:12 | 1100TS4    | 190.5   | Air Cleanse Filter  | 0    | 1      | 28      |
| 11/23/2020 | 15:21:29 | 1100TS4    | 194.2   | Fan Filter          | 177  | 18     | 9       |

## Motor Speed Calibration

Motor Speed can be calibrated by clearing the machine of any obstructions and then pressing the "Enable Motor" button to start the calibration.

Home

Production

Process Config.

Process Transfer

System Config.

V9.00

**Configuration**

Motor Speed Calibration 

**Status:**

Please clear the machine of any obstructions, then press 'Enable Motor' to start the Calibration.

Enable Motor

Fig. 7

After selecting "Enable Motor", select the "Start Motor Calibration" button. This will activate the Platen to rotate at different speeds and calibrate the internal electronics. Once it is complete select the "Accept" button to save calibration or "Cancel" to not save calibration.

## Process Setup

The number of processes that can be defined and stored on the APM-HDC-5400 is only limited by the amount of internal memory. Hundreds of processes can be stored on a single machine. Additional processes can be stored on a USB memory stick, thus allowing an unlimited number of processes to be pre-defined and readily available for use (Fig. 8A and Fig. 8B).

To Define a Process:

1. Select the "Process Config" tab.
2. A new process can be setup in two ways.
  - a. Select the "New" button to define a process from scratch.
  - b. To begin with a copy of an existing process, select the process you want to copy using the DOWN arrow in the "Process" selection box to display a list of processes stored in machine memory. Select the desired process to copy and then touch the "Duplicate" button.
3. Enter a new process name as prompted. The process name can include up to 26 alphanumeric characters and WILL NOT allow spaces, dashes or punctuation. Select "OK".
4. Select the quantity (Qty) of connectors that will be polished for this process using the down arrow to display a valid range of numbers. If you have chosen to allow the machine operator to change the quantity on the "Production" tab (based on the number of connectors actually loaded into the fixture), the maximum connectors the operator can select is based on the number selected on this screen.

NOTE: Processes can only be deleted under the "Process Transfer" tab.

Rework: The "Rework" box allows an operator to restart the polishing process from a predefined point. The number selected is the step in the process where rework will begin. The "Rework" program will then execute this step plus all remaining steps. Upon completion, the program will return to step #1.

Defining Steps within a Process:

Index tab “A” page 1 allows you to define Time, Speed, Platen Direction, Speed Ramp Up, Pressure, Pressure Ramp Up, and Auto Start for each step in the process. Press the long down arrow on the far right to navigate to index tab “A” page 2. This page allows you to define a Delay Pressure Apply, Speed Ramp Down, Pressure Ramp Down, Polisher Fixture Weight, Polisher Recipe Op Code and End Step Warnings.

Index tab “B” allows you to select Pad, Lubricant, Film, and Step Notes for each step. Press the long down arrow on the far right to navigate to index tab “B”, page 2. This page allows you to define a Film Change Interval and AbraSave+™ parameters.

Home

Production

Process Config.

Process Transfer

System Config.

08:40:56  
01/20/2022  
V9.01

Process

New

Duplicate

Qty

Rework

DE\_Sample123

Step

Copy

Paste

New

Delete

A

B

C

1

Time

(Sec):

120

2

Platen

Default

Speed

(RPM):

20

3

Speed Ramp Up

(Sec):

1

4

Pressure

(Lb):

1.00

Pressure Ramp Up

(Sec):

1

Auto Start this Step:

Fig. 8A

Not used in Step 1!

1. Select tab “A” (Fig. 8A).
2. Select the “Time” box to access the keypad. Enter the number of seconds to run this step. Select “OK”.

3. Select the "Speed" box to access the keypad. Enter the platen RPM's desired in this step. Select "OK".
4. Select the platen direction arrow button  to change the platen rotation direction for the step.
5. Select the "Speed Ramp Up (Sec)" box to access the keypad. This feature will "slow start" the Platen. Enter the number of seconds desired to ramp from zero RPM to the final programmed speed. The maximum value is 60 seconds. Select "OK".
6. Select the "Pressure" box to access the keypad. Enter the pressure in pounds or kilograms, depending on the unit selected in "System Config" tab and displayed in the box. Select "OK".
7. Select "Pressure Ramp Up" box to access the keypad. This feature will "slow start" the pressure. Enter the number of seconds desired to ramp from zero pressure to the programmed pressure. The maximum value is 60 seconds. Select "OK".
8. Use the "Auto Start" feature to automatically start the step or manually start the step. This can be used when the process dictates multiple process parameters are used for the same film.

Home
Production
Process Config.
Process Transfer
System Config. 08:41:33  
01/20/2022  
v9.01

*Process*
New
Duplicate
*Qty*
*Rework*

DE\_Sample
12
3

| Step | Copy                     | Paste                           | New | Delete | A       | B    | C |
|------|--------------------------|---------------------------------|-----|--------|---------|------|---|
| 1    | Delay Pressure Apply     | (Sec):                          |     |        |         | 5    |   |
| 2    | Speed Ramp Dn            | (Sec):                          |     |        |         | 5    |   |
| 3    | Pressure Ramp Dn         | (Sec):                          |     |        |         | 8    |   |
| 4    | Polishing Fixture Weight | (Lb):                           |     |        |         | 0.00 |   |
|      | Polish Recipe OpCode:    |                                 |     |        |         | 300  |   |
|      | Step End Warning         | <input type="checkbox"/> (Sec): |     |        | Fig. 8B | 0    |   |

Tab "A", Page 2 (Fig. 8B):

1. Touch the "Delay Pressure Apply" to access the keypad. Enter the number of seconds to delay after the platen starts before applying pressure to the fixture. Select "OK".
2. Touch the "Speed Ramp Dn" to access the keypad. This feature will slowly ramp the Platen speed down at the end of the process



5. Select "Step Notes" box to access the key pad. The text box is used to convey process information to the users. Enter in any pertinent information as needed. Select "OK".

Home Production **Process Config.** Process Transfer System Config. V9.01

*Process* New Duplicate *Qty* *Rework*

\_dja-test [v] 24 [v] 1 [v]

| Step | Copy | Paste | New | Delete | A | B | C |
|------|------|-------|-----|--------|---|---|---|
| 1    |      |       |     |        |   | 1 |   |
| 2    |      |       |     |        |   |   |   |
| 3    |      |       |     |        |   |   |   |
| 4    |      |       |     |        |   |   |   |

Fig. 10

#### Tab "B", Page 2:

1. Select "Film Change Interval" box to access the keypad. Enter the numeric value for the number of cycles the film is used for that polishing step. The APM-HDC-5400 will track the number of uses of the film and send an alarm message when the film needs to be reset. The maximum numeric input for the film change interval is 99. Select "OK".
2. Use the AbraSave+™ features for creating processes that vary polishing time by film run. The user can set the cycles and time parameters to define this varying time processes.

The parameters under tab "C" are used for Micro-G® processes. If the Micro-G® electrical hardware is installed it will be accessible, otherwise it will be grayed out. See the Micro-G® section at the end of this manual for more information.

Select "New" or "Copy" in the "Step Definition" area to define the next step. Repeat the above instructions for all steps in a process. See "Copy" function below to begin a new step based on a previously defined step within the same process up to 20 steps.

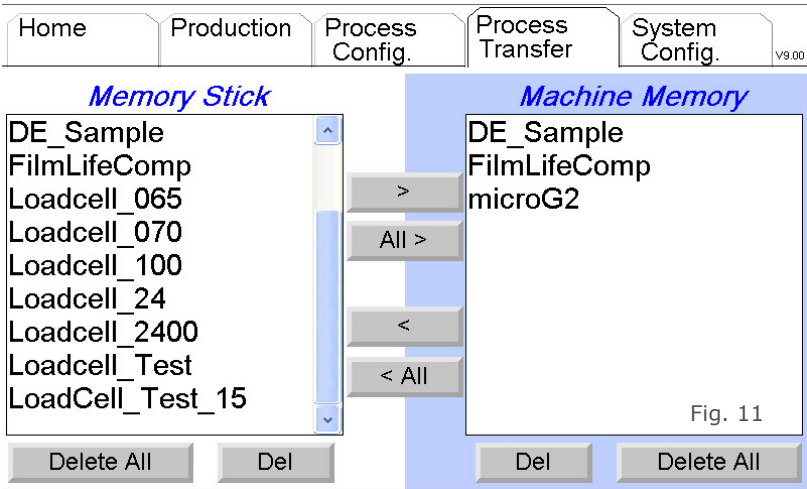
**Testing During Process Setup:** To test a process step while in "Process Config" mode, select the step and select the "Step Start" ► button. This allows you to run and test an individual step without having to access the process under the "Production" tab.



# Inter-Machine Process Transfer

The APM-HDC-5400 is equipped with a USB data storage slot. This feature allows machine-stored processes to be copied onto a USB data storage device, thus allowing duplication of process definitions across multiple APM-HDC-5400 machines. This feature significantly reduces multiple machine set up time and assures consistency in the definition of polishing processes.

The “Process Transfer” feature can also be used as a backup and retrieval tool.



## Copy From Machine Memory to a USB Memory Stick:

1. Insert a USB memory stick into the USB port on either side of the machine.
2. Select “Process Transfer” tab
3. Highlight the process name on the “Machine Memory” list that you want to copy to the memory stick.
4. Select the “<” button to copy to the USB memory stick. All processes in Machine Memory column can be copied to the USB Memory Stick column by selecting the “<All” button.

## Copy From a USB Memory Stick to Machine Memory:

1. Insert a USB memory stick into the USB port on either side of the machine.
2. Select "Process Transfer" tab.
3. Highlight the process name on the "Memory Stick" list that you want to copy to the Machine Memory.
4. Touch the ">" button to copy to the Machine Memory list.

All processes on the USB Memory Stick column can be copied to the Machine Memory column by selecting the ">All" button.

NOTE: To COPY "Process Variable Settings" refer to the "System Configuration" selection in this guide. The "Process Variables Settings" reside in a separate file.

## Deleting Processes

Processes in Machine Memory and/or residing on a USB memory stick can be deleted on the "Process Transfer" screen.

To delete processes in Machine Memory:

1. Select "Process Transfer" tab.
2. Highlight the name of the process in the "Machine Memory" list that you want to delete.
3. Select "Del" button under "Machine Memory" list.
4. Select "Yes" button when prompted to delete.

To DELETE all of the processes in Machine Memory, select the "Delete All" button under "Machine Memory" list and then select "Yes" when prompted.

To delete processes on a USB memory stick:

1. Select "Process Transfer" tab.
2. Highlight the name of the process in the "Machine Stick" list that you want to delete.
3. Select "Del" button under "Machine Stick" list.
4. Select "Yes" button when prompted to delete.

To DELETE all of the processes on a USB memory stick, select the "Delete All" button under "Memory Stick" list and then select "Yes" when prompted.

## MACHINE OPERATION

### Polishing Fixture Installation



**WARNING:** This procedure should **NOT** be performed when a cycle is running or the Platen is moving.

To install a polishing fixture on the overarm mandrel follow these steps:

1. Raise the overarm to the full vertical position, locking the overarm in place (see unpacking & setup instructions, for raising the overarm. NOTE: You must have the compressed air hose connected to the back of the machine to raise and lower overarm).
2. Ensure the overarm shaft and fixture bore are clean before proceeding. Wipe with IPA, cloth, and cotton swabs if dirty.
3. With a "Fixture Retaining Screw" or "Spring Clamp" on the fixture, attach the fixture to the overarm. The screw allows the fixture to slide on the shaft without falling off.
4. Lower and lock the overarm into the full horizontal position by pushing and holding the "Quick Release" button while holding the fixture up against the anti-rotational keys. Release the button as you slowly lower the fixture onto the Platen. This technique should be used whenever moving the overarm with a fixture in place to protect both the fixture and the Platen.



**WARNING:** The overarm should be handled with extreme care. Never drop or abuse the overarm as the load cell may be damaged. Misuse is not covered under the normal machine warranty.

## Polishing Pad and Film Placement

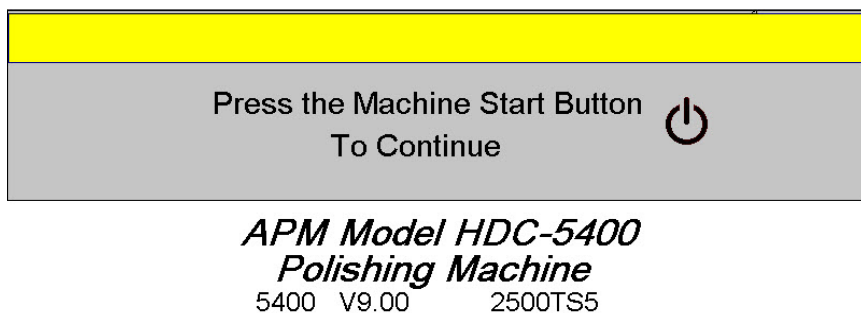
Polishing films must be placed on rubber pads, glass or ceramic plates.

To place polishing film:

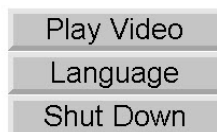
1. Raise the overarm (see unpacking & setup instructions, for raising the overarm. NOTE: You must have compressed air connected to raise and lower overarm).
2. Place a polishing pad or a plate on the Platen. Ensure the locking pins on the Platen are lined up with the notches on the pad/plate.
3. Place the polishing film on the rubber pad, glass or ceramic plate by following the manufacturer's recommendation regarding film application.
4. Lower the overarm to the full horizontal position. See section titled "Polishing Fixture Installation", step 4, for instructions on lowering the overarm.

## Power Up

If the machine has not been powered up, check that the following steps have been completed:



Copyright 2021 All rights reserved Fig. 12A



1. Plug the power cord into the back of the machine and into a properly grounded outlet, 100-240VAC 50/60Hz. If your power cord is equipped with a GFCI Style plug, you MUST push the "Reset" button on the plug to supply power to the machine.
2. Turn on power switch located at the back of the machine.
3. Lift screen cover. (Note: screen cover should be down when machine is operating.)
4. The touchscreen should default to the "Home" tab screen (Fig. 12A). If the **RED** "Emergency" screen is displayed, reset by turning the "Emergency Stop" button CLOCKWISE.
5. Select desired language using "Language" button on the bottom right of the Home Tab (Fig. 12B).
6. Press  "Machine Start" Button.

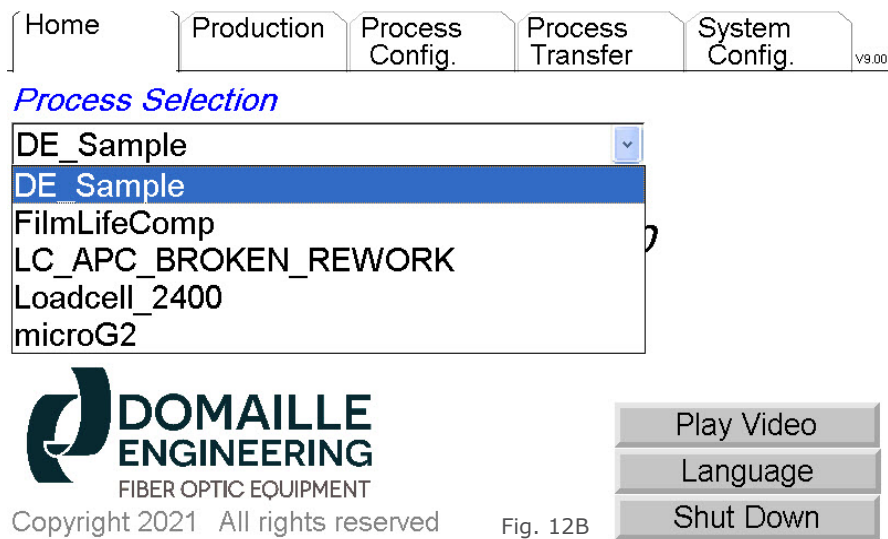


Fig. 12B

## Polishing Process Selection and Polishing Procedure

1. On the "Home" tab, select the desired polishing process definition by touching the DOWN arrow in the "Process Selection" box and then touching the desired process (Fig. 12B).
2. Select "Production" tab (Fig. 13A).

|      |            |                 |                  |                |       |
|------|------------|-----------------|------------------|----------------|-------|
| Home | Production | Process Config. | Process Transfer | System Config. | V9.00 |
|------|------------|-----------------|------------------|----------------|-------|

Process

DE\_Sample

Maint OK

Qty  
12 ▾

Step 01

Rework

|               |                                                   |                   |
|---------------|---------------------------------------------------|-------------------|
| Time<br>(Sec) | Pressure<br>(Lb) <small>Apply 5 Delay Sec</small> | Speed<br>(RPM)ccw |
| 120           | 0.00                                              | 33                |

Press the Step Start button  
▶ to start the step.

Pad:

Lubricant:

Film:

Fig. 13A

65 Duro Dark Blu  
DI Water  
5 um diamond

Film OK

More Info

- In the lower section of the screen, refer to the Pad, Lubricant, and Film boxes for pre-defined variables for this process. Place the specified pad and film on the Platen. See section titled "Polishing Pad and Film Placement", for instructions on placing the pad and film on Platen.
- Pressing the **BLUE** "More Info" box in the lower right corner will access a screen with more detail of the polishing process including the ramping parameters Fig. 13B). Press the "Return To Production Screen" button to toggle back to the "Production Data" screen.

|                        |  |          |                             |
|------------------------|--|----------|-----------------------------|
| Current Step Settings: |  | Step: 01 | Return To Production Screen |
|------------------------|--|----------|-----------------------------|

|                                                                |                                 |       |                                         |
|----------------------------------------------------------------|---------------------------------|-------|-----------------------------------------|
| Time                                                           | (Sec):                          | 120   |                                         |
| Platen                                                         | Default                         | Speed | (RPM): 20                               |
| Speed Ramp Up                                                  | (Sec):                          | 1     | Fixture Weight<br>(Lb): 0.00<br>QTY: 12 |
| Pressure                                                       | (Lb):                           | 1.00  |                                         |
| Pressure Ramp Up                                               | (Sec):                          | 1     | SetPoint<br>(Lb): 1.00                  |
| Delay Pressure Apply                                           | (Sec):                          | 5     |                                         |
| Speed Ramp Dn                                                  | (Sec):                          | 5     | Connector<br>(Lb): 0.08                 |
| Pressure Ramp Dn                                               | (Sec):                          | 8     |                                         |
| Step End Warning                                               | <input type="checkbox"/> (Sec): | 0     |                                         |
| Film Change Interval                                           |                                 | 20    |                                         |
| AbraSave+                                                      | (Cycle): 0 (Sec): 0             |       |                                         |
| Step Notes: This is a sample program for demo use only. Step 1 |                                 |       |                                         |

Fig. 13B

5. Ensure the proper polishing fixture has been installed and that connectors have been properly seated. See section titled “Polishing Fixture Installation”, for instructions.
6. Press the “Step Start”  button to begin polishing.
7. When the step has completed, the screen will indicate Pad, Lubricant, and Film Types to use, as well as Time, Speed, and Pressure for the next step in the process. The operator should use the indicated Pad, Film, and Lubrication for the next step in the process.
8. F.C.I. is Film Change Interval. When enabled (see section titled “System Config” for enable instructions), the numeric value to the right is the programmed interval for this process step. The F.C.I. count is the actual number of times the current step film has been used. The film usage will be highlighted in **BLUE** with “Film OK” until the F.C.I. count matches the F.C.I. limit. If AbraSave+™ is being used, time adjustment parameters will be displayed in the time display box as well.

▲

Step 01

▼

Rework

| Time                                                    | Pressure | Speed    |
|---------------------------------------------------------|----------|----------|
| <small>Time Set</small> (Sec) <small>Time Added</small> | (Lb)     | (RPM)ccw |
| 5 5 0                                                   | 1.00     | 20       |

Press the Step Start button  to start the step.

Pad:

Lubricant:

Film:

FCl: 0 of 3

65 Duro Dark Blu

DI Water

10 um diamond

AbraSave+ Cycle: 0 of 2 Time: 5

Film Use

Film OK

More Info

9. When the F.C.I. count reaches the programmed F.C.I. interval, the box will change to flashing **RED** with "Change Film". **THIS WILL STOP THE MACHINE FROM POLISHING THE NEXT STEP.** After changing the polishing film, press the **BLUE** "Reset" button directly below the "Change Film." This will reset the F.C.I. count to zero, change to **BLUE** "Film OK" and allow the machine to polish the next step.
10. The **BLUE** "Maint. OK" box will change to a **RED** "Need Maint." when the programmed maintenance values are reached. **THIS WILL NOT STOP THE MACHINE FROM POLISHING THE NEXT STEP.**
11. After performing the required maintenance, reset the scheduled maintenance by pressing the "System Config" tab at the top of the screen. Select "Maintenance Schedule" from the drop down box. Press the **RED** "Reset" button. This will reset the (Accum) to "0" and on production screen it will change from **RED** "Maint. needed" to **BLUE** "Maint. OK."
12. Repeat steps 6 and 7 until the final step has been completed.
13. When the final step is complete, the screen will reset back to the first step in the process.

## Predefined Rework Start Step

If rework is required after the polishing process is complete, press the "Rework" button in the "Step box." The polishing process will automatically take you to the predefined rework start step and continue through each step until the final step in the process is complete. Upon completion, the program will return to step #1.

## Step Pause Button

If there is a need to stop the process mid-step, press the "Step Pause"  button on the right side of the front panel. This will temporarily release the pressure, stop the rotation of the Platen, and pause the time.

To restart the step at the exact point it was paused, press the "Step Start"  button.



## Step Reset Button

While a process step is running or while the machine is paused mid-step, the "Step Reset"  button can be pressed to cancel the timer and return to the step's original time value. You can now restart the step by pressing the "Step Start" button.

## Select Step

The Up and Down arrows positioned above and below the step number in the "Step Box" allow the operator to run any step in the process at any time. Refer to "Machine Setup/System Configuration/User Rights & Settings/Enable Step" selections.

## Cancel Polishing Process

To cancel a polishing process and select another, press the "Home" tab to return to the "Process Selection" box. From the "Home" tab you can now select another process or shut down the machine.

# MACHINE SHUT DOWN

The following procedure should be used to shut down the APM-HDC-5400.



**WARNING:** Using the power off switch before using this shut down procedure may result in loss of data.

To Shut Down the Machine:

1. Select the "Home" tab.
2. In the lower right corner of the "Home" tab, press the "Shut Down" button.
3. Press the "Yes" button when prompted.
4. Turn off the power using the power off switch on the back of the machine.

# MACHINE MAINTENANCE

Proper care and handling of the polishing fixtures and APM-HDC-5400 machine is critical to maintain polishing accuracy. If the machine or polishing fixtures are damaged in any way, contact Domaille Engineering for advice or repair.

***There are no user serviceable parts inside the machine cabinet. Do not remove the sealed screws. Evidence of tapering will void warranty.***

Daily or More Often as Required

## Polishing Fixtures

Although polishing fixtures manufactured by Domaille Engineering are made of stainless steel, all traces of water and slurry should be removed after each step in the polishing process. This will ensure that the next step in the process is not contaminated by elements in the previous process. Failure to do so may result in build up and/or rusting of critical areas.

## Polishing Machine

1. Clean the top of Platen, Overarm Top Plate, Overarm Rest Pad and bottom of Overarm with a non-abrasive cloth with IPA and/or Cotton swabs as needed. ***The accuracy of this machine is dependent on keeping these areas clean.***
2. Clean all residue, water and slurry from the top of the entire machine and from the touchscreen panel cover. ***Do not contaminate the touchscreen area.***



***WARNING: Do not use an air hose on or around the Platen. This forces water and contaminates into the wear surfaces and the mechanical drive unit, potentially causing machine failure. Damage caused by air hose use is not covered under warranty.***

Monthly

***Disconnect the polishing machine from the power source before doing any maintenance work.***

## Polishing Machine Platen

The Platen should be removed and greased at least once a month. If the machine is heavily used, more frequent greasing is required.

## To Maintain Platen:

1. 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 the Platen as the Platen and Wear Ring under the Platen may be damaged.**

2. Clean all of the old grease and contaminates from the bottom of the Platen and from the Wear Ring, including screw holes. Clean both Platen and Wear Ring with alcohol and a clean, lint-free tissue or cloth to remove any trace of grease. Cotton swabs may be used to remove grease inside the Wear Ring screw holes.

***Do not grease the Platen bearings. They are pre-lubricated and sealed; therefore, lubrication is not required.***

3. Wipe any grit off the o-rings and the eccentric guide, apply a drop of light oil on each o-ring. This will help protect and lubricate the o-rings, making it easier to replace the Platen.
4. Fill the holes in the Wear Ring with grease. Put a small bead of grease on the Wear Ring between the holes. Use the Platen grease (PM12649) supplied with APM-HDC-5400 machine, call Domaille Engineering Fiber Optic Equipment at 507.281.0275, or email [DE-Info@DomailleCompanies.com](mailto:DE-Info@DomailleCompanies.com) for purchasing information.
5. Reinstall Platen by lining up the eccentric arms to a point in the same direction as shown in Figure 14. By moving to eye level with the Platen area of the machine, place the Platen on top of the pins in the eccentric arms.
6. Line up the pins with the holes in the bearings in the bottom of the Platen. When pins are all lined up, the Platen will slide on the pins about 1/2 way. Push straight down to seat the Platen on the Wear Ring. Verify the Platen is level before turning on the machine. When fitted properly, no light will be visible between the Platen and the Wear Ring.

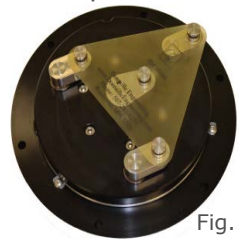
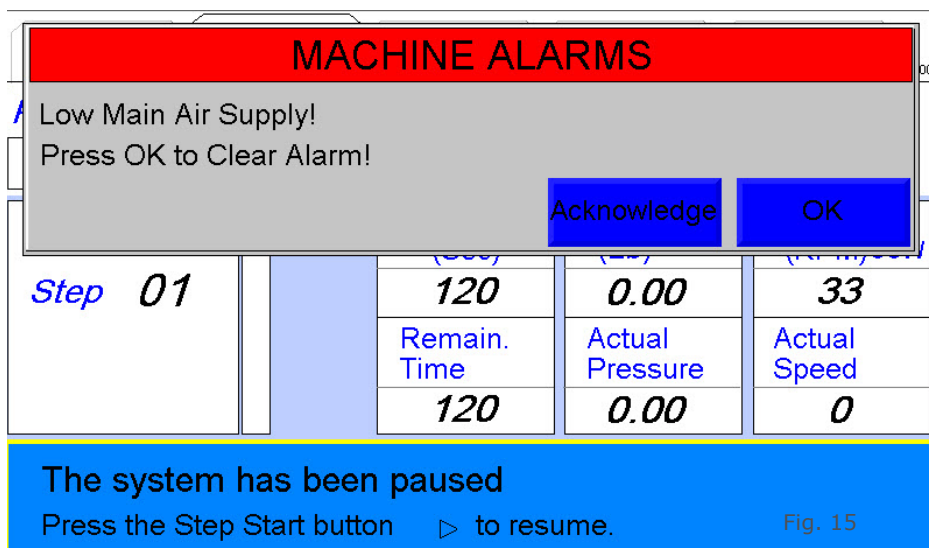


Fig. 14

# MACHINE ALARMS

Alarms will be triggered on the polishing machine when problems are present. The alarm will come in as a pop-up screen as shown below with various messages describing the problem. If the horn is enabled the user will hear an audible alarm as well. Pressing the "Acknowledge" button will silence the horn.



A list of some of the more common alarms that can occur are as follows:

| ALARM MESSAGE                    | CAUSE                                                                                                                                                                          |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 Polishing Arm needs to be down | sensor on polishing machine arm is not detecting that the polishing arm is down or Overarm Pad has not been cleaned prior to user trying to start machine to applying pressure |
| 2 Low Main Air Supply            | machine air pressure monitor is not sensing the correct amount of air pressure on the incoming air pressure supply line                                                        |
| 3 Fixture Pressure too low       | pressure detected by the polishing machine load cell varies on the low side by more than the allowed tolerance from the set point                                              |

## ALARM MESSAGE

## CAUSE

|    |                                                                                                                                                  |                                                                                                                                                                 |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4  | Fixture Pressure too high                                                                                                                        | pressure detected by the polishing machine load cell varies on the high side by more than the allowed tolerance from the set point                              |
| 5  | Motor speed too slow                                                                                                                             | platen speed detected by the polishing machine varies on the low side by more than the allowed tolerance from the set point                                     |
| 6  | Motor speed too fast                                                                                                                             | platen speed detected by the polishing machine varies on the high side by more than the allowed tolerance from the set point                                    |
| 7  | Lost Communication with DataLink, Check DataLink and Network                                                                                     | if the DE DataLink® system is enabled in "User Rights and Settings" and the polishing machine loses its ethernet connection to the system the alarm will appear |
| 8  | A motor alarm has occurred. Check machine for obstructions. If fault persists, consult the User's Manual, Press the OK button to clear the fault | if the motor driver electronics for the polishing machine platen has a fault due to excessive loads or bad connections the motor alarm will appear              |
| 9  | Motor Speed Calibration required                                                                                                                 | Micro-G® Control box needs to be on its Production screen                                                                                                       |
| 10 | Micro-G® Control Box NOT on Production                                                                                                           | when reloading QP+ program, sometimes this value gets cleared, Re-run Motor Calibration                                                                         |
| 11 | Lost Communication with Micro-G® Control Box, Check Control Box and Network                                                                      | if the Micro-G® system is enabled in "User Rights and Settings" and the polishing machine loses its ethernet connection to the system the alarm will appear     |
| 12 | Load Cell Calibration required                                                                                                                   | when reloading QP+ program, sometimes this value gets cleared, Re-run Load Cell Calibration                                                                     |

## Micro-G® Polishing Accessory

The Micro-G® Polishing accessory is a precision fixture lift mechanism that can be added to the APM-HDC-5400 polisher and provide true “zero pressure” polishing. True “zero pressure” polishing is defined as polishing with no downward force including the elimination of the previous always present gravitational pressure of the polishing fixture weight. With true zero pressure polishing and fixture to platen positional control at the micron level, the user has added capability to polish to a specific length on very fragile unsupported bare fibers.

In combination with the DE2910 OptiSpec Process Inspection Videoscope, this hardware provides capability of polishing bare fiber in a high production setting. It is fully workable with legacy polishing fixtures or newer more specifically designed fixtures can be used. Other uses for the system that some find beneficial are the integration of light automated pressure steps to de-nub sharp edges before the rough polishing steps, light pressure rework steps on near finished product to remove very light scratches, normal polishing at pressures between 0 and 0.4lbs, and the system can be used for fixture positioning in fully automated systems.

The accessory hardware is easily integrated with the APM-HDC-5400 polishing machine either at the factory when the initial order is placed or can be added by the end user any time thereafter in the field.

## Micro-G® Hardware Setup

Setup instructions to install the Micro-G® Head Assembly on an APM-HDC-5400 Polishing Machine.

1. Remove the Micro-G® Head Assembly components from the packaging.

Parts List includes the following:

- a. Micro-G® Head
- b. 5/64” or 2mm Hex L-Wrench
- c. 3/32” Hex L-Wrench
- d. 9/64” Hex L-Wrench
- e. (4) #5-40 X 3/4” Cap Head Screws

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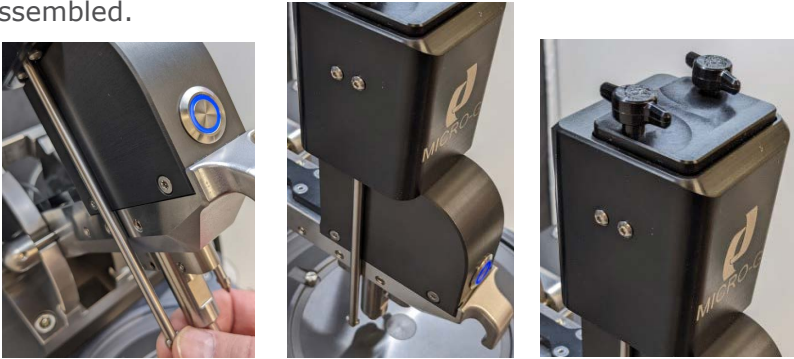




6. Reinstall the Micro-G® Head onto the Mounting Plate with the four M3 X 8mm Button Head Screws with the 5/64" or 2mm Hex L-Wrench. Lift overarm up to the next lock position to easily place in the screws.



7. Reinstall the Fixture Latching Rods through the Mounting Plate and up into the Micro-G® Head. Secure with the mated Thumb Screw, do not over tighten. The cross pin on the Latching Rod should be parallel to the arm on the head of the Thumb Screw when assembled.



8. Attach the Cable Tie Mount to the side of the Polishing Machine Overarm with the #10-32 X 3/8 Button Head Screw using the 9/64" Hex L-Wrench. Route cable between side support and latch pin cylinder air line. Secure the cable coming from the head with the cable tie leaving slack to prevent pulling when the Polishers Overarm is raised & lowered.





9. Plug cables into the back of the polishing machine connectors. The 5-pin cable goes into AUX-1 connector and 7-pin cable goes into AUX-2 connector. There is a RED dot on the top side of cable connector to match the RED dot on AUX connectors to orient the connectors to align the pins correctly.



10. Load a Micro-G® compatible Polishing Fixture and secure with the standard Fixture Screw. Rotate the Thumb Screws clockwise so the cross pins on the Fixture Latching Rods goes in the Latch Ring on the Polishing Fixture. Hold the Polishing Fixture up and push down on the Thumb Screw to engage the cross pin. Rotate the Thumb Screws a quarter turn clockwise to latch. Always rotate the Thumb Screws clockwise when latching or unlatching to prevent the screws from unthreading from the Latching Rod.



11. When using non-Micro-G® Polishing Fixture, a Retro-Fit Collar Assembly Kit (MG1010) is required to be installed onto the Polishing Fixture.



12. Remove Thumb Screw & Latching Rod from Retro-Fit Collar Assembly by turning Rods 90 Degree.



13. Install Retro-Fit Collar onto Fixture Post.
  - a. Remove the Retractable Fixture Screw. Push in while turning screw out. A little dab of lock-tight was used to hold in place.



- b. Place Collar onto Fixture Post and Reinstall Retractable Fixture Screw. Push in on screw while turning in.



- c. With the supplied 3/32" Hex L-Wrench turn set screw in until set screw is seated onto the Fixture Post. This will ensure the collar is seated properly onto the Post. Then tighten set screw to 48 in/oz (0.339 Newton Meter).



- d. Test fit the Fixture onto Polisher Mandrel. If the fixture is tight on the Mandrel, loosen the set screw until the fixture fits without any binding and keeping set screw tight against the Fixture Post.

#### 14. Install Thumb Screws and Latching Rods.

- a. Remove the existing Thumb Screws and Latching Rods from the Micro-G® Head. Keep the Thumb Screw & Latching Rod together as a matched set. Place mated Thumb Screw onto Latching Rod for safe keeping.



- b. Remove Thumb Screws from the top of the Fixture Latching Rods from kit. Keep the Thumb Screw & Latching Rod together as a matched set. The cross pin on the Latching Rod should be parallel to the arms on the head of the Thumb Screw when assembled.



- c. Install the Fixture Latching Rods through the Mounting Plate and up into the Micro-G® Head. Secure with the mated Thumb Screw, do not over tighten. The cross pin on the Latching Rod should be parallel to the arm on the head of the Thumb Screw when assembled.



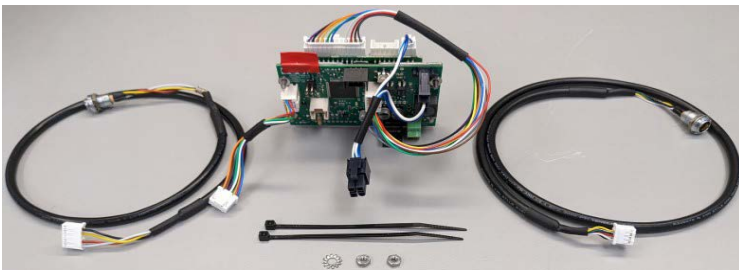
15. Load a Polishing Fixture with Retro-Fit Collar and secure with the standard Fixture Screw. Rotate the Thumb Screws clockwise so the cross pins on the Fixture Latching Rods goes in the Latch Ring on the Polishing Fixture. Hold the Polishing Fixture up and push down on the Thumb Screw to engage the cross pin. Rotate the Thumb Screws a quarter turn clockwise to latch. Always rotate the Thumb Screws clockwise when latching or unlatching to prevent the screws from unthreading from the Latching Rod.



## Micro-G® Electrical Hardware Setup

Setup instructions to install the Micro-G® Electrical Assembly on an APM-HDC-5400 Polishing Machine.

1. Remove the Micro-G® Electrical Assembly components from the packaging.
  - a. Micro-G® Controller/Stepper Driver Board
  - b. AUX-1 stepper motor cable, 5 pin connector
  - c. AUX-2 position/home sensor cable, 7 pin connector
  - d. (2) #4-40 nuts
  - e. #8 external star washer
  - f. Two Cable Tie



## 2. Install cables and Controller/Stepper Driver into polisher machine.

- a. Power down polisher and unplug cord
- b. Turn off main air and remove main air line
- c. Disconnect air lines and cables behind polisher machine
- d. Remove front panel screws with a T15H driver



- e. Remove USB cables on both sides



- f. Loosen 2 Phillips screws on electrical tray



- g. Disconnect air lines and cables on back panel of polishing machine and pull up and out of the holes from the machine

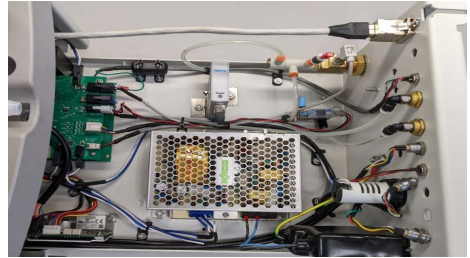




- h. Loosen 2 8x32 screws in behind machine with 3/32 Hex L-Wrench



- i. Partially pull electrical tray out



- j. Route cables along the side



- k. Remove plugs for AUX-1 and AUX-2 on back panel.



- l. Remove outer nut on both cables



- m. Place position/home sensor cable, 7 pin connector into back panel marked AUX-2



- n. Place stepper motor cable, 5 pin connector into back panel marked AUX-1

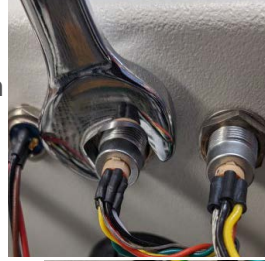
- o. With both cables in back panel, install nuts on both cables. The nut needs to be flush with connector



- p. Before tightening the nut inside of cabinet, check that the "RED" dot on the connectors is facing upwards. Rotate as necessary.



- q. Tighten nut on the backside of connector from inside of the cabinet with 7/16 open end wrench. Make sure that the RED dot is still facing up.



- r. Secure both cables with the cable tie to the Cable Tie Mount



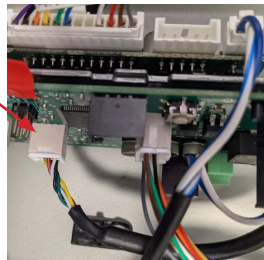
- s. Install one of the two 4-40 nuts onto the stud from kit. Then install external star washer onto the stud. Note: this has paint removed around the stud.



- t. Place the Controller/Stepper Driver Board inside cabinet and install the 4-40 nut. Tighten down both nuts with 1/4" socket or nut-driver



- u. Install 8 pin connector, position/home sensor cable into controller board.

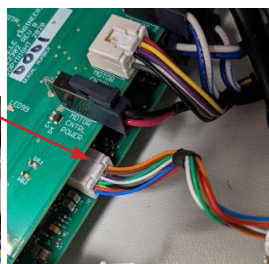


- v. Install 5 pin connector, stepper motor cable into controller board.



w. Install 10 pin connector to the bottom I/O board of Polisher.

x. Install 4 pin connector, power cable into the top I/O board of polisher.



y. Push tray in tight and reverse the order from above to put everything back together starting at "h".

## Micro-G® Operational Background

Once the hardware setup is complete the system is ready to be used. A general idea of how the Micro-G® functions is needed for the user to fully understand the parameters behind a Micro-G® process.

The Micro-G® head attaches to the polishing fixture and has a micro-stepping drive mechanism integrated so the user can control the polishing fixture position with respect to the polishing platen position at micron level accuracy. Thus, it is important to understand the protrusion length of the object to be polished from the bottom surface of the polishing fixture before moving forward with a process. By knowing the protrusion length of the object for polishing the user can determine how much movement is needed to put the object in contact with the polishing film. Imaging setup using the DE2910 Opti-Spec Video Scope allows the user easy methods to determine fiber positions.

The equipment software will position the fixture to a "Home" position upon power up of the equipment. This is used as a starting point for referencing the highest up position of the polishing fixture. There is approximately 3500 microns (3.5mm) of space between the fixture and the polishing surface when the system is in the "Home" position. Space between will vary based on the pad thickness.

After "Home" reference is established, the user will define positional fixture movements down from "Home" towards the polishing platen. Thus, if the object to be polished protrudes 300 microns below the polishing fixture, an additional 2700 microns of downward movement by the fixture are needed to put the object to be polished in contact with the polishing film.

The various parameters of the Micro-G® recipe give the user controls over how the fixture will move downward towards the polishing film.

NOTE: If the user wants to use the machine as a “length setting” apparatus for pre-setting the object protrusion before polishing that is an option as well.

## Micro-G® Process Setup

Once the hardware setup is complete the system is ready to be used. The recipe setup and process creation interface are very similar to what is found when setting up a normal polishing process (as described in previous sections of this manual.) To define a Micro-G® process:

1. Select the “Process Config” tab.
2. Create the new process in one of two ways:
  - a. Select the “New” button to define a process from scratch.
  - b. Select the “Duplicate” button to duplicate an existing process (similar to the way normal processes are duplicated).
3. Enter the new process name as prompted. The process name can include up to 26 alphanumeric characters and WILL NOT allow spaces, dashes, or punctuation. Select “OK” when the name is completed.
4. Select the quantity (Qty) of connectors that will be polished for this process using the down arrow to display a valid range of numbers.
5. Select the Rework step associated with this step by choosing a rework step number under the Rework drop down.
6. Select tab “C.” The parameters under tab “C” are used to define the Micro-G® step Enable, Initial Production Move, Feed Rate, Step Move, # of Moves, and Dwell Time. Press the down arrow on the far right of the screen to navigate to index tab C - Page 2. Page 2 parameters are used to define Final Dwell Time, Production Film Gap, Load Fibers Enable/Disable, Load Position, and Film Gap after Load.



- 7. To start creating the new step, navigate to tab index C page 1 and touch the Micro-G® Enable check box. You must check this box to include this Micro-G® step in the recipe. If this step is to be temporarily skipped the user can de-select the check box and the step will not be executed.
- 8. Touch the "Production Initial Move (um)" to access the keyboard. Enter a value in microns that the polishing fixture will move down at the beginning of the step. If the user is starting from "Home" with a known fiber protrusion length this move should be larger to bring the unpolished fiber in proximity of the polishing film. If starting from a "Load Fiber" film gap position this value will be smaller because less movement is needed to get in proximity of the polishing film.
- 9. Touch the "Feed Rate (um/Sec)" to access the keyboard. Enter a speed value in microns/second that the fixture will move down towards the film during repeated move steps.
- 10.Touch the "Step Move (um)" to access the keyboard. Enter a distance value in microns that the fixture will move down towards the film during repeated move steps.
- 11.Touch the "Number of Moves" to access the keyboard. Enter a numeric value defining the number of times the fixture will move down towards the film during repeated move steps.
- 12.Touch the "Dwell Time (sec)" to access the keyboard. Enter a time value in seconds defining the time the fixture will rest between moves during repeated move steps. This is the time the object is being polished before being pushed down harder into the polishing media.

Home

Production

Process Config.

Process Transfer

System Config.

V9.01

Process

New

Duplicate

Qty

Rework

microG2

12

1

Step

Copy

Paste

New

Delete

A

B

C

|   |                         |                                     |
|---|-------------------------|-------------------------------------|
| 1 | Micro-G®Enable          | <input checked="" type="checkbox"/> |
| 2 | Feed Rate (µm/Sec):     | 10                                  |
|   | Step Move (µm):         | 10                                  |
|   | # of Moves              | 5                                   |
|   | Dwell Time (Sec):       | 5                                   |
|   | Final Dwell Time (Sec): | 5                                   |

13. Navigate to tab index C page 2 by pressing the down arrow at the far right of the process config screen.
14. Touch the "Final Dwell Time (sec)" to access the keyboard. Enter a time value in seconds defining the final amount of time the fixture will rest when all the repeated move steps are complete. This is the final amount of time the object is being polished before being completely polished.
15. Touch the "Production Film Gap" to access the keyboard. Enter a distance value in microns defining the distance the fixture will move up after the process step is complete. If additional polishing steps are needed after this step the film gap should be a minimum of 50 microns above the polishing film so when the arm is raised up for polishing film change and then re-lowered the object will not strike the polishing media.
16. Touch the "Load Fibers" checkbox to enable/disable the load fibers functionality of the machine. This function is used to move the polishing fixture down towards the polishing film so it can be used as a protrusion setting apparatus.
17. Touch the "Load Position (um)" to access the load position setup screen. This screen allows the user to move/jog the fixture position to the ideal position desired for loading bare fibers during the step. Once the position is set and the user exits the screen a positional value in microns will be stored.

|      |            |                 |                  |                |       |
|------|------------|-----------------|------------------|----------------|-------|
| Home | Production | Process Config. | Process Transfer | System Config. | v9.00 |
|------|------------|-----------------|------------------|----------------|-------|

### Fiber Load Position

This will setup the Fiber Load Position. Enter a value in Load Position then Exit. Or enter a value in "Move Distance" then press "Move DN" button to go to a desired position. Or use Jog-DN/Jog-UP to move the fixture to the position needed for the correct fiber length. Then press "UPDATE" button to update Load Position value then moves Back Home.

Load Position (μm):
330

Backlash Distance  
0 μ

Distance to Film Surface.  
3000 μ

Enter Home to Film Surface.  
3000 μ

Move Speed  
200 μ/S

Move Distance  
100 μ

Move DN

Jog Speed  
200 μ/S

JOG-DN

Current Fixture Position  
0 μ

Home ●

StepperAccum 0 IntDrv

EXIT

18. Touch the "Film Gap after Load (um)" to access the keyboard.  
Enter a distance value in microns defining the distance the fixture will move up after the load fiber protrusion setting step is complete. The film gap should be a minimum of 50 microns above the polishing film after fiber load so when the platen starts to move the object will not be in contact with the polishing media and possibly break.

|      |            |                 |                  |                |       |
|------|------------|-----------------|------------------|----------------|-------|
| Home | Production | Process Config. | Process Transfer | System Config. | V9.01 |
|------|------------|-----------------|------------------|----------------|-------|

**Process**    New    Duplicate    Qty    Rework

microG2    12    1

| Step | Copy                          | Paste | New | Delete | A                                   | B | C |
|------|-------------------------------|-------|-----|--------|-------------------------------------|---|---|
| 1    | Production Initial Move (μm): |       |     |        | 350                                 |   |   |
| 2    | Production Film Gap (μm):     |       |     |        | 50                                  |   |   |
|      | Load Fibers:                  |       |     |        | <input checked="" type="checkbox"/> |   |   |
|      | Load Position (μm):           |       |     |        | 330                                 |   |   |
|      | Film Gap after Load (μm):     |       |     |        | 50                                  |   |   |
|      | Process Setup                 |       |     |        | Setup                               |   |   |

19. Touch the "Process Setup" to access the process setup screen.  
This screen allows the user to move/jog the fixture position to check the position/clearance desired for a polishing process during the step.

|      |            |                 |                  |                |       |
|------|------------|-----------------|------------------|----------------|-------|
| Home | Production | Process Config. | Process Transfer | System Config. | V9.00 |
|------|------------|-----------------|------------------|----------------|-------|

**MG Process Setup**  
This will move the Fixture Position.

|                           |        |                 |     |               |     |                       |
|---------------------------|--------|-----------------|-----|---------------|-----|-----------------------|
| Home to Film μ            | 3000   | Move Speed μ/s  | 200 | Jog Speed μ/s | 200 | Home SW               |
| Distance to Film Surface. | 3000 μ | Move DN         |     | JOG-DN        |     | Home                  |
| Current Fixture Position  | 0 μ    | Move Distance μ | 100 |               |     | StepperAccum 0 IntDrv |

**EXIT**

After setting up Micro-G® specific parameters for the process the user should setup the normal parameters of the process using tab A (page 1 and 2) and tab B (page 1 and 2).

After setting up a Micro-G® process the user can exit and save the process by selecting the “Home” tab. Once at the “Home” tab the user can select the Micro-G® process by using the dropdown menu as was done with normal production processes.

## Micro-G® Production

The steps to get the production process started for Micro-G® are very similar to normal polishing. See the section on MACHINE OPERATION earlier in this manual to get started.

Once the Micro-G® process has been setup and selected and the machine is ready to polish navigate to the “Production” tab to start.

|      |            |                 |                  |                |       |
|------|------------|-----------------|------------------|----------------|-------|
| Home | Production | Process Config. | Process Transfer | System Config. | V9.00 |
|------|------------|-----------------|------------------|----------------|-------|

**Process**

Load Fiber

Home SW

Home

**Qty**

12

Step

01

Rework

Pot FB Position

0 μ

Current Position

0 μ

Distance to Pad Surface

3000 μ

| Load Posi | Dwell (Sec) | # of Moves | Time (Sec) | Pressure (Lb) | Speed (RPM) CCW |
|-----------|-------------|------------|------------|---------------|-----------------|
| 330       | 5           | 5          | 49         | 0.50          | 20              |

**Press the Load Fiber button to move to load position.**

**Pad:**  
**Lubricant:**  
**Film:**

<None>

<None>

<None>

Film OK

Maint OK

More Info

This screen will provide status for the user during the Micro-G® process step. The status indicator fields will continually update the user with position information, # of repeat moves remaining, time in the dwells, and the normal parameters like platen speed and plunger pressure.

There is also a “Home” button on this screen which allows the user to redo the “Home” sequence and establish a new reference position for the positional system. The green “Home” box gives the user an indication of when the “Home” sensor is on or off.

When in production, the polishing machine will prompt the user as to what is happening, and which buttons need to be pressed during the polishing process.

Pressing the BLUE "More Info" box in the lower right corner will access a screen with more detail of the polishing process including Micro-G® parameters. Press the "Return to Production" button to toggle back to the "Production Data" screen.

When in production, the polishing machine will prompt the user as to what is happening and which buttons need to be pressed during the polishing process.

| Current Step Settings: <i>Step:01</i>                                                                                 |                     |      | Return To Production Screen |
|-----------------------------------------------------------------------------------------------------------------------|---------------------|------|-----------------------------|
| Time                                                                                                                  | (Sec):              | 49   | Micro-G Screen              |
| Platen <small>Default</small>  Speed | (RPM):              | 20   |                             |
| Speed Ramp Up                                                                                                         | (Sec):              | 0    | Fixture Weight (Lb): 0.00   |
| Pressure                                                                                                              | (Lb):               | 0.50 |                             |
| Pressure Ramp Up                                                                                                      | (Sec):              | 0    | QTY: 12                     |
| Delay Pressure Apply                                                                                                  | (Sec):              | 0    |                             |
| Speed Ramp Dn                                                                                                         | (Sec):              | 0    | SetPoint (Lb): 0.50         |
| Pressure Ramp Dn                                                                                                      | (Sec):              | 0    |                             |
| Step End Warning <input type="checkbox"/>                                                                             | (Sec):              | 0    | Connector (Lb): 0.04        |
| Film Change Interval                                                                                                  |                     | 1    |                             |
| AbraSave+                                                                                                             | (Cycle): 0 (Sec): 0 |      |                             |
| Step Notes:                                                                                                           |                     |      |                             |
| Step Notes:                                                                                                           |                     |      |                             |

| Current MG Step Settings: <i>Step:01</i> |                                     |     | Return To Production Screen |
|------------------------------------------|-------------------------------------|-----|-----------------------------|
| Micro-G Enable                           | <input checked="" type="checkbox"/> |     | Previous Screen             |
| Production Intial Move                   | (μm):                               | 350 |                             |
| Feed Rate                                | (μm/Sec):                           | 10  |                             |
| Step Move                                | (μm):                               | 10  |                             |
| # of Moves                               |                                     | 5   |                             |
| Dwell Time                               | (Sec):                              | 5   |                             |
| Final Dwell                              | (Sec):                              | 5   |                             |
| Production Film Gap                      | (μm):                               | 50  |                             |
| Load Fibers:                             | <input checked="" type="checkbox"/> |     |                             |
| Load Position                            | (μm):                               | 330 |                             |
| Film Gap after Load                      | (μm):                               | 50  |                             |
|                                          |                                     |     |                             |
|                                          |                                     |     |                             |

# DE2910 Process Inspection Videoscope Setup

When using the DE2910 system with an APM-HDC-5400 polisher, the user must setup the equipment as follows before starting:



## 1. Install Camera to clamp assembly.

- a. Loosen clamp ring on slide rail. **Note:** Do not loosen screw all the way, there is a small washer in between the clamp face preventing it from crushing the camera when tighten.



- b. Slide camera into clamp assembly with the labeling and hole are facing up.



- c. Position camera so that the edge of the camera is equal all the way around the clamp.

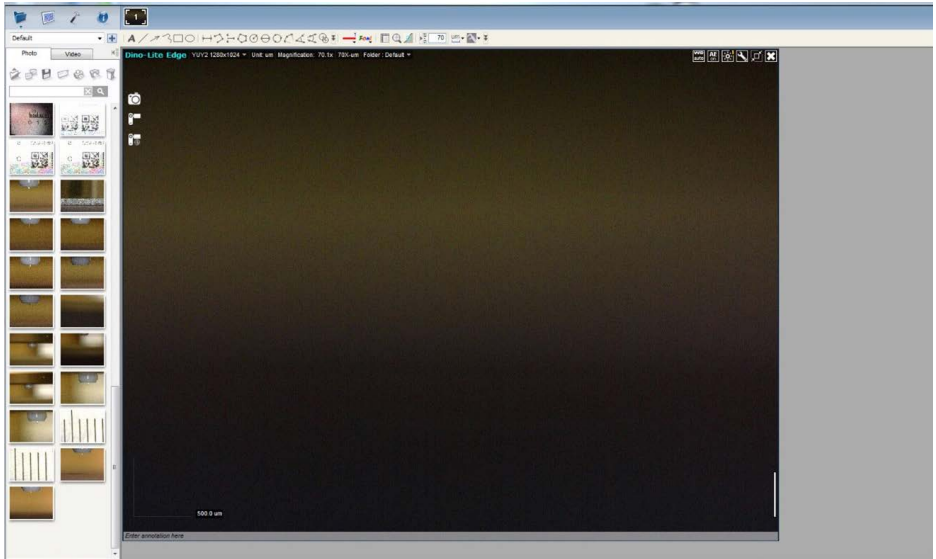




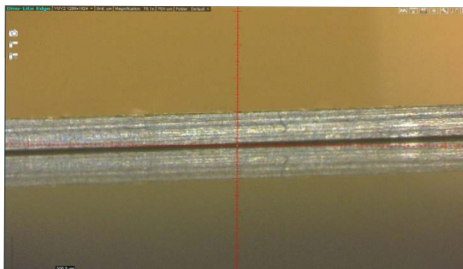
- d. Snug the screw to tighten down the camera.



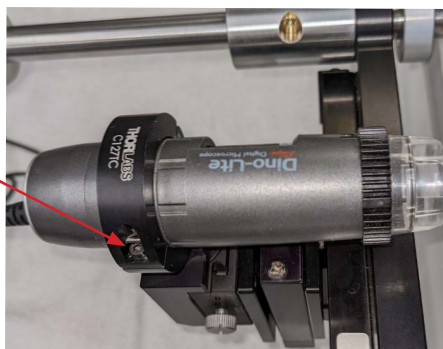
2. Install the software Dino-Lite DinoCapture 2.0 that is supplied on a CD onto a laptop computer. This will load all drivers needed.
3. Connect the camera to the laptop computer with the attached USB cable from camera. Let the laptop computer find the camera hardware to load correct driver for the camera.
4. Click on the DinoCapture 2.0 icon  software will load, and it will find the camera and pop-up a video screen for that camera. User Manual is in the Help section of the Menu Bar.



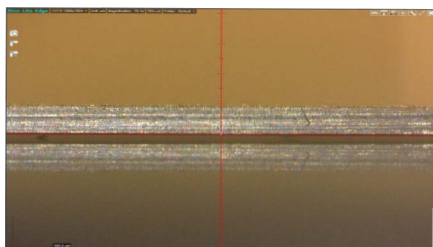
1. Align Camera to fixture:
  - a. Check camera for alignment with fixture.



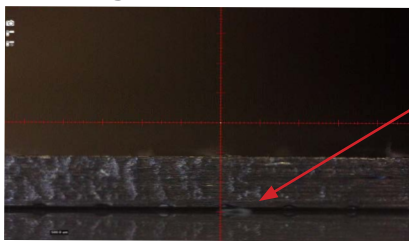
- b. Loosen clamp screw and rotate camera until it's aligned with glass plate.



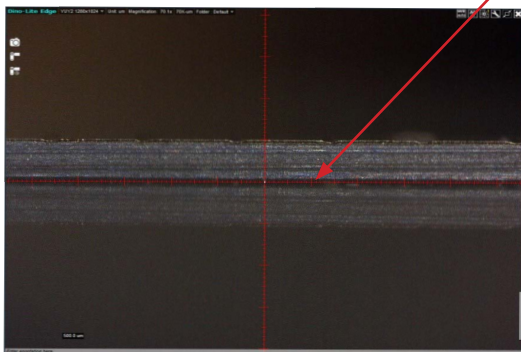
- c. Camera is now aligned with fixture.



- d. Adjust the height of the camera to the edge of plate and ruler.

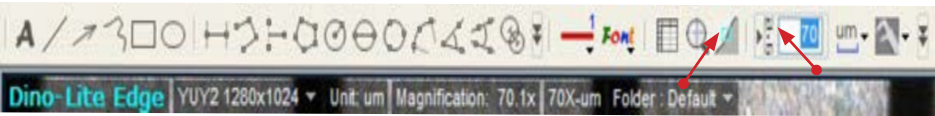


- e. Adjust the camera up or down to move the plate to center the "crosshair" of the screen with the thumb screw on the Z stage.





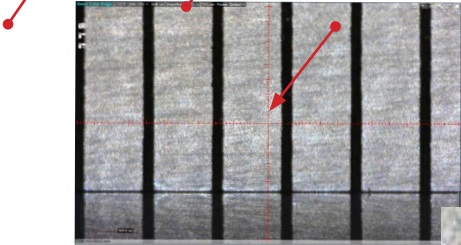
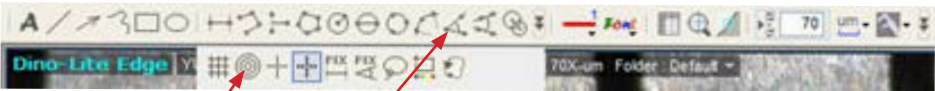
- Adjust the camera zoom to 70x and set the DinoCapture 2.0 to 70x in the ToolBar and set units to um in the dropdown next to zoom settings.



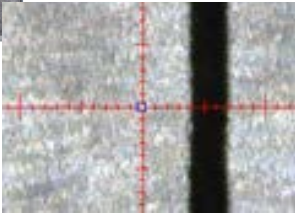
- Next place a glass plate on a polishing machine being used with MICRO-G®. Then place the supplied ruler on end on the plate.  
**Hint:** Place a small block to hold the ruler on up-right. Move the camera to locate the edge of the glass plate and ruler.



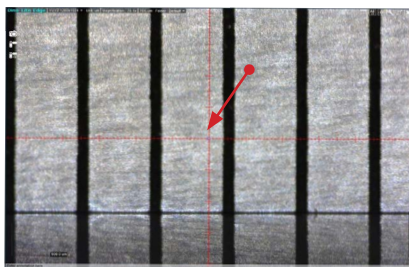
- Add Crosshair with markings.



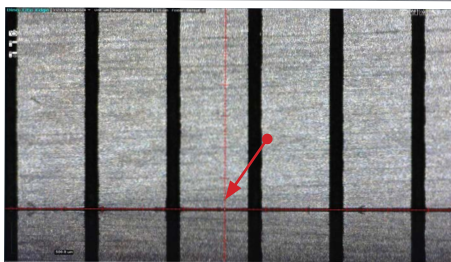
- Click on the intersection of the crosshairs to move the crosshair to any location on the screen.



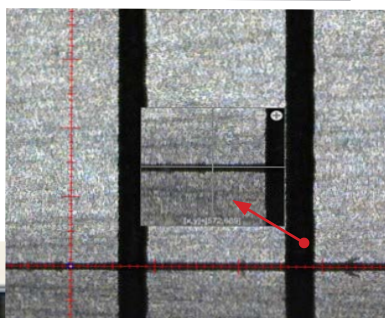
9. Click on the crosshair origin and move it down to the top edge of the glass plate and bottom of the ruler.



10. After moving the crosshair down, click the crosshair again to release it from moving.



11. Click on the zoom button to add a zoom window, this is helpful for fine adjustments, also the keyboard arrow keys work to move the crosshair.



12. Brightness of the camera light can be adjusted from the DinoCapture 2.0 software.



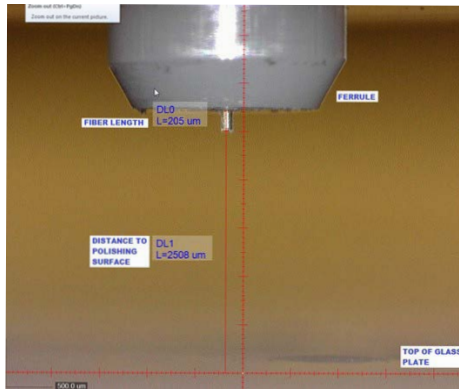
13. Camera adjustments can also be done.



## Polishing bare fiber using the Micro-G® System

To polish fiber using the Micro-G® system follow these steps.

1. Load fibers into the bare fiber adaptors and insert them into the polishing fixture on the APM-HDC-5400 series machine. Be careful that the protrusion of the fiber from the ferrule end face is less than 250 microns when loading.
2. After all fibers are loaded into the bare fiber adaptors and adaptors have been inserted into the polishing fixture, inspect the fiber protrusion using the DE2910 Videoscope.



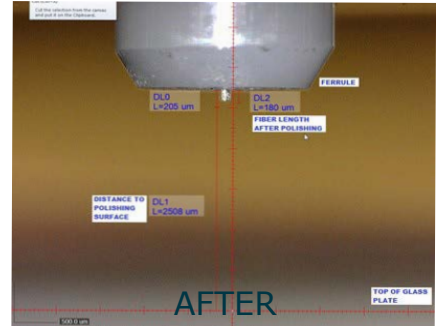
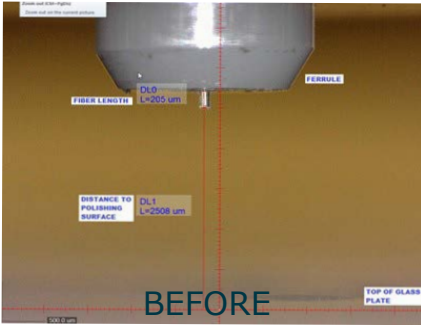
3. While inspecting the fibers look for the fiber with the longest protrusion and measure its length using the DE2910 Videoscope software.
4. Measure the distance between the tip of the longest protruding fiber and the glass plate surface using the DE2910 Videoscope.
5. Determine how much removal is desired on the fibers (for Step 1) and enter the correct parameters into the MICRO-G® recipe under step 1.

For example: fiber is 250 microns long and distance to the glass plate is 2000 microns.

Parameters for 200 microns of removal could be as follows:

Initial move: 1950 microns  
Feed Speed: 50 microns/sec  
Step Move: 5 microns  
Dwell Time: 10 seconds  
# Of moves: 50  
Final Dwell: 30 seconds

6. Once parameters are set on the MICRO-G® control panel setup the recipe on the APM-HDC -5400 polishing machine. In this example, set the platen speed to 50 rpm and the pressure to 2 lbs.
7. Press the PLAY button on the polisher to start.
8. Watch the polishing process using the DE2910 Videoscope.



## DE DATALINK®

### DE DataLink® Accessory

The DE DataLink® accessory brings smart factory technology to your fingertips with remote monitoring of the entire Domaille Engineering Fiber Optic Equipment production line. This data collection and control platform can connect directly to the APM-HDC-5400 polisher thru a rear local network ethernet connection port.



Once connected the machine now has the capability to send all real time process and user data to a remote central database. That can be polishing parameter data such as what fixture is in use or what recipe is being run, or it can be user data such as what operator is running the machine and how many loads of parts have been polished. This accessory is essential for tracking the productivity and quality of the polishing operations being run on the machine.

## DE DataLink® Setup

Setup instructions to get started using the DE DataLink® data collection system with the APM-HDC-5400 Polishing Machine.

1. Connect the polishing machine to the DE DataLink® network by plugging the ethernet port on the back of the machine into an ethernet switch that is connected to the DE DataLink® control IPC.
2. Start the DE DataLink® software on the DE DataLink® IPC.
3. On the APM-HDC-5400 polisher, navigate to the "System Config" tab and select "User Rights and Settings" in the drop-down menu.
4. Once on the "User Rights and Settings" screen select the DE DataLink® check box to enable the system.

## DE DataLink® Operations

There are multiple ways to use the DE DataLink® system with the polisher. It is the end-user's decision to determine what data needs to be collected and how they want to utilize the data collection capabilities of the equipment. All data collection features are optional to maintain flexibility for the wide variety of needs that are encountered. The section to follow will outline all the data collection features available for use.

1. Navigate to the "Home" tab after the DE DataLink® has been enabled and you will see a field is now available for the operator to enter his or her name or ID# in the machine. This data field will be transferred to the database once it is entered into the machine. By pressing the field a keyboard will appear allowing the name to be changed by keyboard or by barcode scanner. USB barcode scanners are available and can be connected via the USB slots on the sides of the polishing machine.

|      |            |                 |                  |                |     |
|------|------------|-----------------|------------------|----------------|-----|
| Home | Production | Process Config. | Process Transfer | System Config. | v9. |
|------|------------|-----------------|------------------|----------------|-----|

*Process Selection* **Operator ID**

DE\_Sample Henry

**APM Model HDC-5400**  
**Polishing Machine**  
 5400\_ V9.00      2500TS5



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Play Video

Language

Shut Down

|      |            |                 |                  |                |       |
|------|------------|-----------------|------------------|----------------|-------|
| Home | Production | Process Config. | Process Transfer | System Config. | v9.00 |
|------|------------|-----------------|------------------|----------------|-------|

*Process* BATCH ID: Enter Work Order *Qty*

LOAD ID DE\_Sample Maint OK 12 v

|                                                                                                                                                                     |                                                                                                                                                      |                                                                                                                                                                                           |                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br><span style="font-size: 2em; font-weight: bold;">Step 01</span><br><br><span style="background-color: #ccc; padding: 5px; display: inline-block;">Rework</span> | <div style="border: 1px solid black; padding: 5px;">Time (Sec)</div> <div style="border: 1px solid black; padding: 5px; font-size: 1.5em;">120</div> | <div style="border: 1px solid black; padding: 5px;">Pressure (Lb) <small>Apply 5 Delay Sec</small></div> <div style="border: 1px solid black; padding: 5px; font-size: 1.5em;">0.00</div> | <div style="border: 1px solid black; padding: 5px;">Speed (RPM)ccw</div> <div style="border: 1px solid black; padding: 5px; font-size: 1.5em;">33</div> |
| <p><i>Press the Step Start button to start the step.</i></p>                                                                                                        |                                                                                                                                                      |                                                                                                                                                                                           |                                                                                                                                                         |
| Pad:<br>Lubricant:<br>Film:                                                                                                                                         | 65 Duro Dark Blu<br>DI Water<br>5 um diamond                                                                                                         | <div style="background-color: #008080; color: white; padding: 10px; display: inline-block;">Setup Load</div>                                                                              | <div style="background-color: blue; color: white; padding: 10px; display: inline-block;">Film OK</div>                                                  |
|                                                                                                                                                                     |                                                                                                                                                      | <div style="background-color: blue; color: white; padding: 10px; display: inline-block;">More Info</div>                                                                                  |                                                                                                                                                         |

2. Navigate to the "Production" tab next and multiple data collection fields are now available here. The first to discuss is the green button called "Setup Load." Press this button to setup a batch ID, Load ID, record polishing fixture serial number, and if desired record individual serial numbers for each fiber optic cable or connector being polished.

- a. After pressing "Setup Load" the user is prompted to scan or enter the polishing FIXTURE barcode. The fixtures can be barcoded if desired. Barcodes are applied to the fixtures on the central hub so they can be easily scanned during production.





b. After entering the polishing fixture barcode, the user is prompted to scan or enter the Batch ID. The Batch ID is intended to be a unique code that will identify a batch of parts running thru the polishing machine. The batch size is totally user defined by the end-user and can be one load, 10 loads, 100 loads, etc.



c. After entering the Batch ID, the configure load screen will appear. This screen allows for the user to enter unique serialization data for every connector in the polishing fixture load. Also, this screen auto-generates a unique polishing load ID that is tied to the Batch ID so the user can determine time, date, etc. information on this load of polished parts.

d. On the configure load screen, the user can “Add Batch”es to the load, can scan individual cables using the “Scan Cable” button, and can alter quantity info by pressing individual lines in the tables. When all data is correctly entered for the load the user should press “Send Data” to push the data to the DE DataLink® system.

### Configure Load

02/22/2021 14:17:58

OFC0100010010-10,12

| Part Number       | Type | # of Ports | S/N   |
|-------------------|------|------------|-------|
| 00000PF-LCDX-12SS | DLC  | 12         | NNN15 |

**LOAD ID**

202102221417122500TS5NNN15

**SCAN FIXTURE**

00000PF-LCDX-12SSDLC12NNN15

|       |
|-------|
| 01,NA |
| 02,NA |
| 03,NA |
| 04,NA |
| 05,NA |
| 06,NA |
| 07,NA |
| 08,NA |
| 09,NA |
| 10,NA |

Cancel

Scan Cable

Add Batch

Send Data

e. Back on the “Production” tab the last field that can be populated for data tracking is the serial number info for the pad and film lots. To enter serial numbers for each press the word “Pad” or the word “Film” and a keyboard/barcode scan field will appear allowing for data entry.

Home

Production

Process Config.

Process Transfer

System Config.

Process

**BATCH ID:** OFC0100010010-10  
**LOAD ID:** 202102221431402500TS5NNN15

Qty

DE\_Sample

Maint OK

12 ▼

Step

01

Rework

|               |                                                   |                   |
|---------------|---------------------------------------------------|-------------------|
| Time<br>(Sec) | Pressure<br>(Lb) <small>Apply 5 Delay Sec</small> | Speed<br>(RPM)ccw |
| 120           | 0.00                                              | 33                |

Press the Step Start button  
▶ to start the step.

**Pad:** serial\_num  
**Lubricant:**  
**Film:** serial\_num

65 Duro Dark Blu  
 DI Water  
 5 um diamond

Setup  
Load

Film OK

More  
Info



## Technical Specifications

|                                 |                                         |
|---------------------------------|-----------------------------------------|
| Machine Height:                 | 23.00 inches (438 mm)                   |
| Machine Width:                  | 12.00 inches (305 mm)                   |
| Overall Width (with Drip tray): | 14.50 inches (368 mm)                   |
| Machine Depth:                  | 21.50 inches (546 mm)                   |
| Power Requirements:             | 2 amps; 100-240VAC; 50/60 Hz.           |
| Air Requirements:               | 90-120 psi clean, dry air (6.2-8.3 bar) |
| Machine Weight:                 | 70 lbs (31.75 kg)                       |
| Shipping Weight:                | 100 lbs (45.3 kg)                       |
| Speed Range:                    | 20-200 rpm                              |
| Pressure Range:                 | 0-24 lbs Force (0.2-10.9 kg)            |
| Temperature Range:              | 41°F-104°F (5°C-40°C)                   |
| Maximum Altitude                | 6000 feet above sea level (1828M)       |
| Maximum Humidity                | 20-85% non-condensing                   |
| Noise Emission level            | Less than 70.0dBA                       |

When maintenance is required beyond the steps documented in this manual, service must be done by a qualified Domaille Engineering technician. There are no user serviceable parts inside the cabinet case. Do not remove sealed screws. Evidence of tampering will void the warranty. For assistance, contact Domaille Engineering Fiber Optic Equipment, LLC USA at [DE-EquipmentService@DomailleCompanies.com](mailto:DE-EquipmentService@DomailleCompanies.com).

USA (type B), UK (type G), China (type I) and European (type E) standard power cords sets are available from Domaille Engineering. Please contact our office if an additional set is needed.

For applications where machine is being used in a wet environment use a GFCI cord.

For European installations, please ensure outlet being used is equipped with a GFCI cord or GFCI circuit.

## COMPANY INFORMATION:

Domaille Engineering's Fiber Optic Equipment divisions, mission is to provide customers with the highest quality solution through the innovative use of technology, allowing customers to gain a competitive edge. Our core competencies in engineering and precision manufacturing provide OEM's and fiber optic customers effective and cost-efficient solutions.

From our world-renowned polishing machine, patented fixtures, laser cleavers, curing ovens to our microscopes - Domaille Engineering Fiber Optic Equipment provides the highest yields and throughput in the industry.

Domaille's APM-HDC-5400 polishing machine interface allows a user to program a soft ramp of pressure and speed. This feature along with accurate force, speed, and time enables customers to consistently meet the most demanding fiber optic polishing specifications.

Our patented AbraSave® fixture line utilizes Unique Path Technology reducing polishing time and film costs. This technology delivers the most consistent fiber protrusion resulting in the best polishing.

Domaille Engineering proudly offers OptiSpec®, our fiber optic microscopes product line. OptiSpec® provides customers high quality fiber optic inspection capabilities for both production and laboratory settings.

Learn more about these products, Universal Cure Oven and Air Cleanse System, and more at [DomailleEngineering.com](http://DomailleEngineering.com).

At Domaille Engineering, our critical goal 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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Phone: 507.281.0275  
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[DE-Info@DomailleCompanies.com](mailto:DE-Info@DomailleCompanies.com)  
[DE-EquipmentService@DomailleCompanies.com](mailto:DE-EquipmentService@DomailleCompanies.com)

# 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 Service Authorization Form (SAF#). 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 SAF # include your name, telephone number, return address, proof of original purchase date, and a description of the claimed defect. 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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Patent No. D474212



NETWO  
CABLE

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