DOMAILLE ENGINEERING

FIBER OPTIC EQUIPMENT

APM-HDC-5320 SERIES

USER'S GUIDE

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APM-HDC
5320 SERIES
Fiber Optic Polishing Machine
USER'S GUIDE

Printing History

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WELCOME

Congratulations on selecting the APM-HDC-5320, the premier fiber optic connector polishing machine.

This User's Guide will assist you in the setup, operation, and maintenance of the APM-HDC-5320 machine to maximize the use and life of this equipment.

OVERVIEW

The APM-HDC-5320 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-5320 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, delay pressure apply, speed ramp down, pressure ramp down, polishing fixture weight, maintenance intervals and polishing film counters. Operators need minimal training to follow the touch-screen prompts of your programmed processes.

The number of processes that can be defined and stored within the APM-HDC-5320 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-5320 provides you with total flexibility in the number of steps you define within each of your polishing processes.

The APM-HDC-5320 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-5320, 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 Black Overarm Quick-Release button located at the front of the Overarm and lift up.

Releasing the Quick-Release button will allow the Overarm to lock in one of the three (3) fixed positions.

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-5320 Polishing Machine, please observe the following:

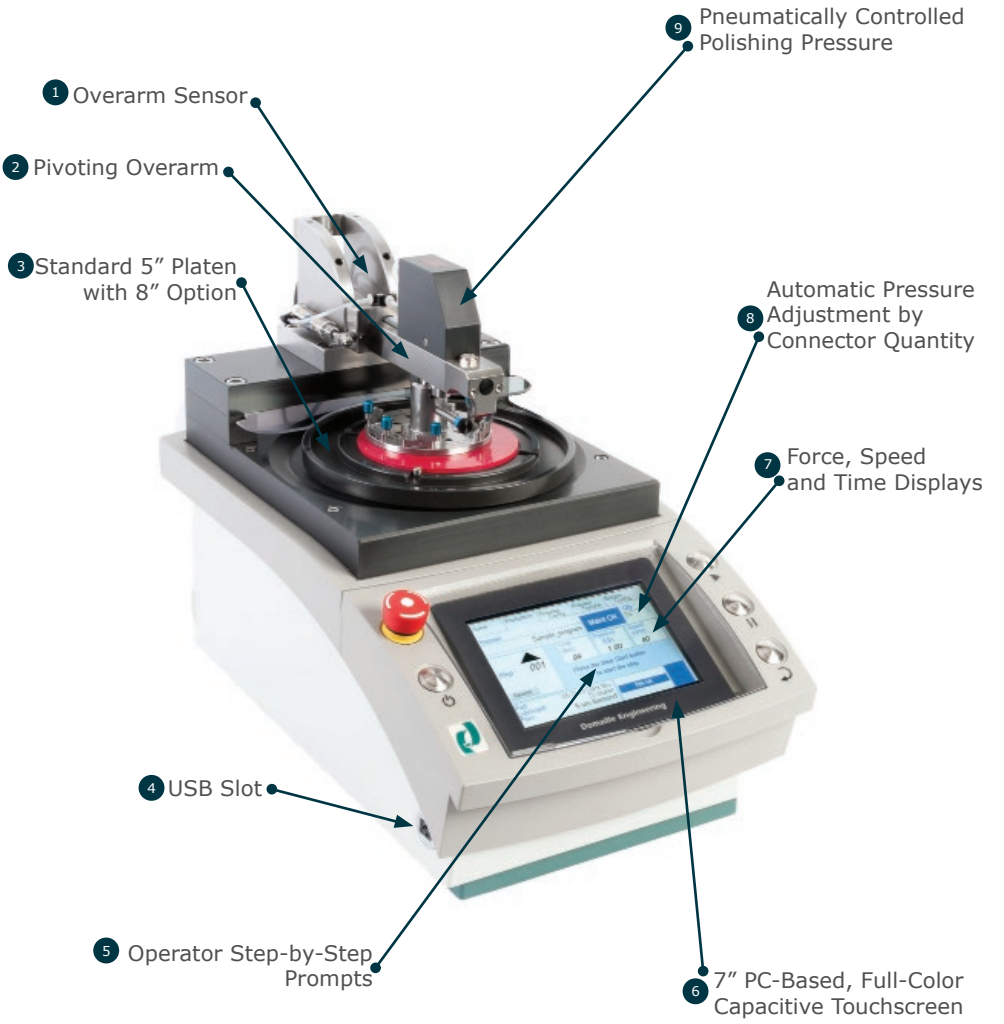
- Keep hands, jewelry, hair and loose clothing away from the rotating Platen while the machine is in operation.
- Keep all surfaces of the machine clean at all times. Confine water and slurry to Platen area.
- Do not attempt to repair or service any components inside the APM-HDC-5320 machine. Contact 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 hoses 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

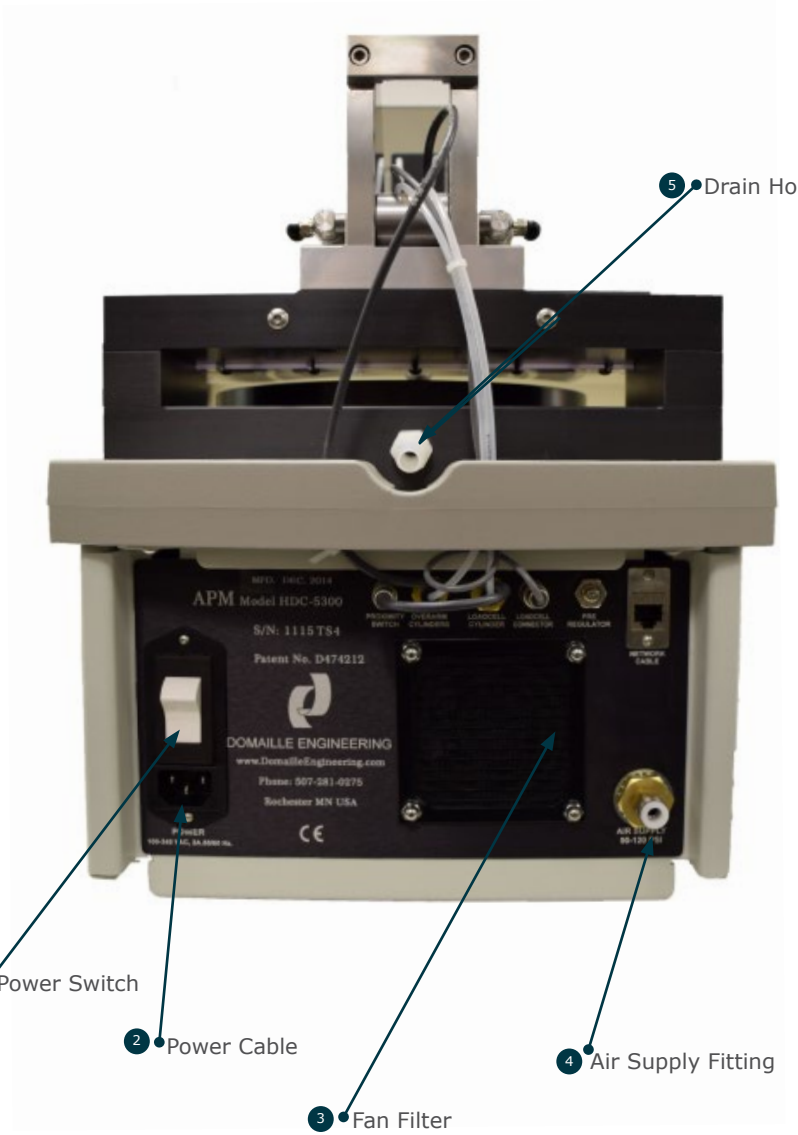
Machine Diagram



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	USB Slot	used for machine-to-machine process replication process back up, videos, and bar code scanning
5	Operator Step-by-Step Prompts	for film, pad type, lubricant, and operator instructions
6	7” PC-Based, Full-Color Capacitive Touchscreen	programmable interface for defining and storing unlimited processes and for easy-to-use, error-free operation
7	Force, Speed and Time Displays	for feedback of process step-specific settings
8	Automatic Pressure Adjustment by Connector Quality	accounts for a varying number of connectors inserted in the polishing fixture
9	Pneumatically Controlled Polishing Pressure	provides consistent polishing force

PARTS AND FUNCTIONS

Machine Diagram



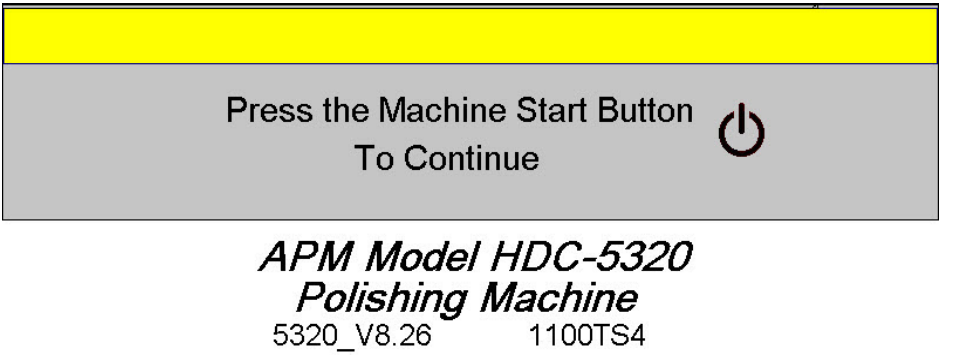
1	Power Switch	machine on or off
2	Power Cable	main source of power to machine
3	Fan Filter	collects large particulates such as dust from production. Please see "Machine Maintenance" for monthly cleaning requirement
4	Air Supply Fitting	provides connection between polishing machine and facility air supply
5	Drain Hose Fitting	provides path for excess liquid

Initial Setup

Before operating the APM-HDC-5320, 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 showin in Fig. 1.



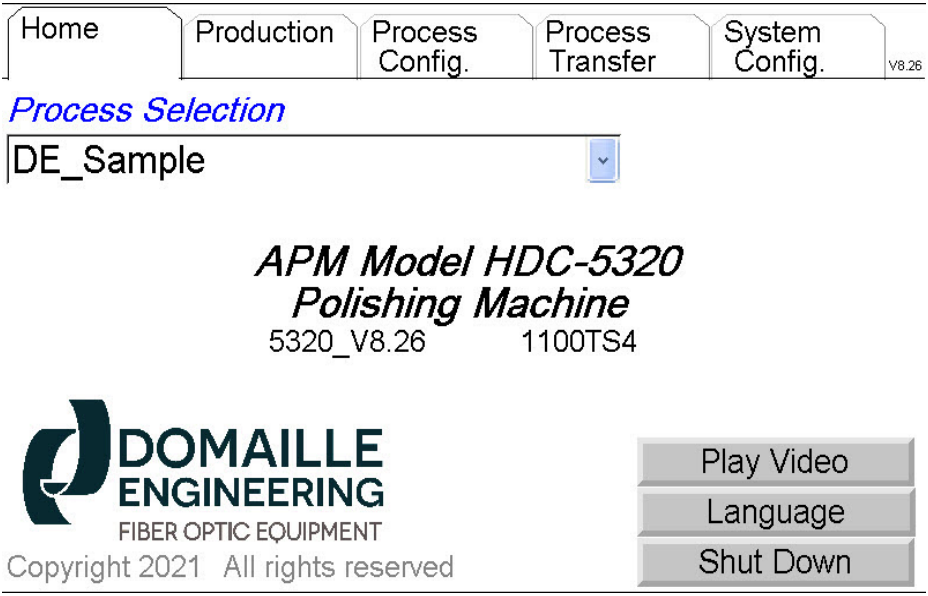


Fig. 1

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

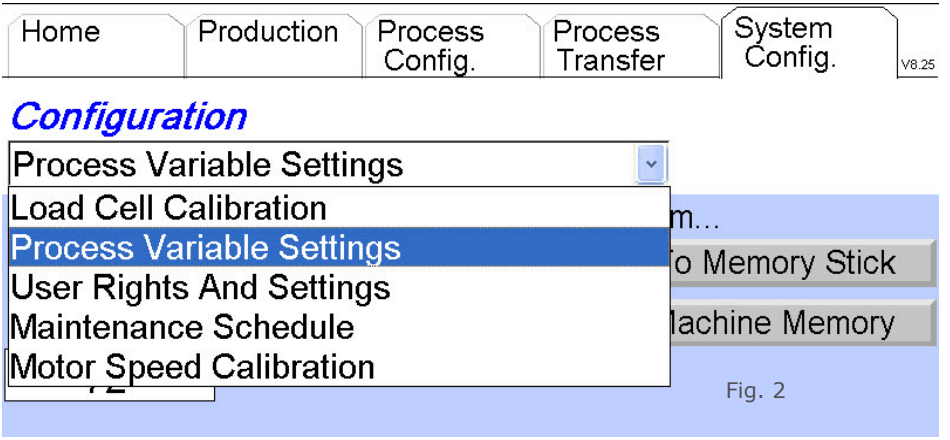


Fig. 2

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 the left side of the machine AFTER the machine has powered up. Use the drop down menu under "Configuration" to select the desired configuration screen.

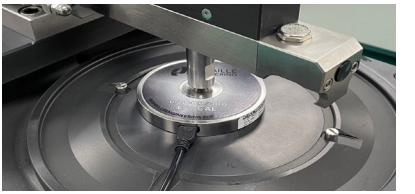
Polisher Load Cell Calibration

The APM-HDC-5320 Polisher has been calibrated at Domaille Fiber Optic Equipment prior to shipment. Recalibration is not typically necessary; however machine calibration should be checked on a bi-weekly schedule. Recalibration and loadcell verification of the machine can be preformed two ways:

1. Using the automatic Domaille EZ-CAL USB Load Cell - PN MK15300 (recommended).
2. Using an external loadcell of the user's choice.

When using the automatic 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.



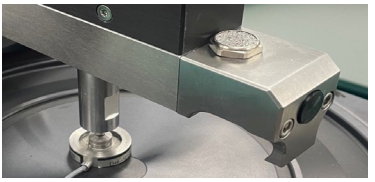
3. Place the EZ-CAL USB Load Cell on the Platen and center it under the Overarm plunger.
4. Plug the USB connector of the EZ-CAL Load Cell into the side USB port of the polishing machine.

5. Allow EZ-CAL Load Cell 15 minutes of warm up before starting calibration.
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.

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 15 minute of warm up before 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 loadccell 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 black arm button. When ready select the "Apply Pressure" button on the touchscreen until the master load cell reading matches the 20 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.

NOTE 3: 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.

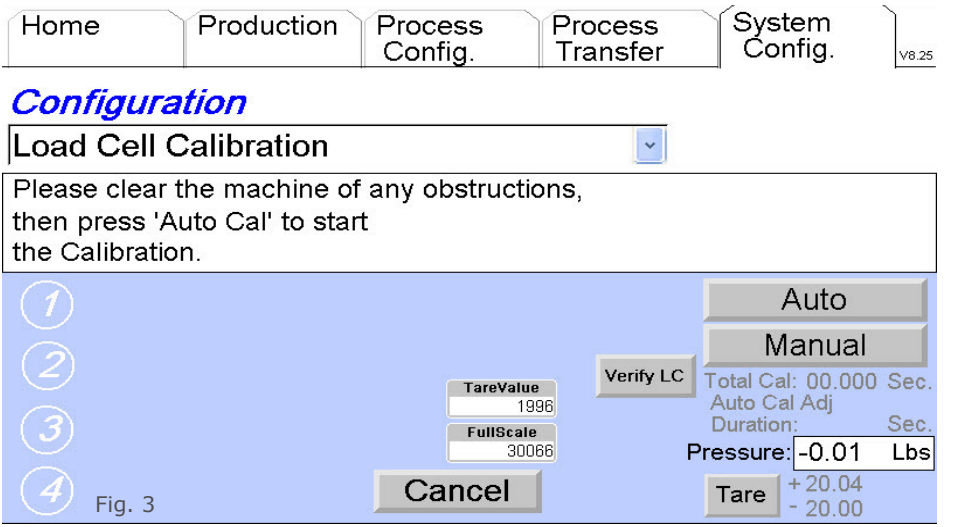


Fig. 3

Process Variables: Setting & Copying/Backup Procedures

The APM-HDC-5320 allows you to define valid variables that can be used in the definition of your polishing processes. These variables include (1) a list of polishing films, (2) a list of types of polishing pads, (3) a list of lubricants that can be defined for polishing processes, and (4) a maximum quantity of connectors that can be polished at one time.

The maximum quantity of connectors (Max. Quantity) setting is displayed, but not modifiable at this time.

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.

Maximum Quantity Setting:

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

Film Settings:

1. Select “Film” in the “Selecting Setting” box, using the DOWN arrow as necessary (Fig. 4).
2. Select the “New” button to access the keypad, and add a new film type.
3. Type in a film name for your polishing process. The film name can be up to 16 characters in length.
4. Select “OK”.
5. Repeat the above 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, and add a new pad type.
3. Type in a pad name for use in your polishing process. The pad name can be up to 16 characters in length.
4. Select “OK”.
5. Repeat the above 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, and add a new lubricant type.
3. Type in a lubricant name for use in your polishing process. The lubricant name can be up to 16 characters in length.
4. Select “OK.”
5. Repeat the above for all lubricant types used in all polishing processes.

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

Transfering 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-5320 machines as well as providing backup and retrieval capability.

A USB memory stick has been included with the shipment of your APM-HDC-5320.

To SAVE process variable data to a USB:

1. Insert USB storage device into USB slot on the lower left 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 prompted, 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:

1. Insert USB storage devicde into USB slot on lower left side of the machine.

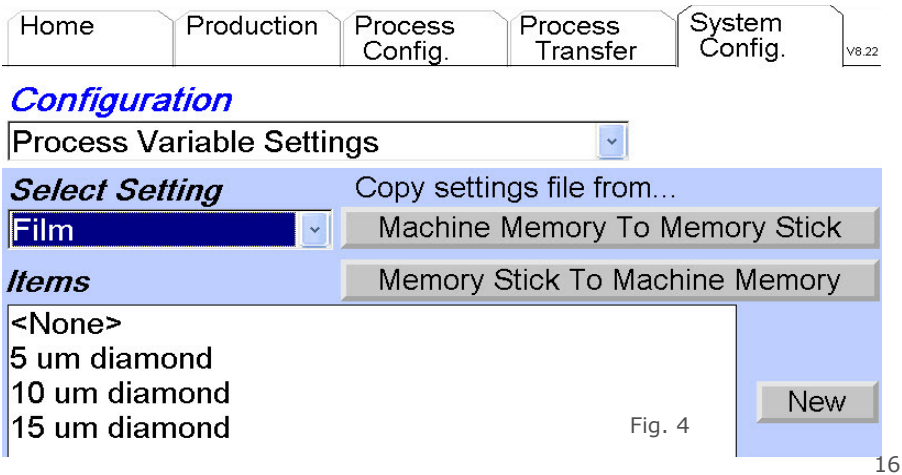


Fig. 4

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 define ten (10) machine specific parameters, including:

(1) a password

(2) enablement of connector quantity adjustment by the operator

(3) enablement of process step selection by the operator

(4) enablement of Micro-G® polishing accessory

(5) enablement of video playback

(6) enablement of auto calibration

(7) enablement of DE DataLink® sysetm

(8) enable film count

(9) display of pressure in pounds or kilograms

(10) zero speed

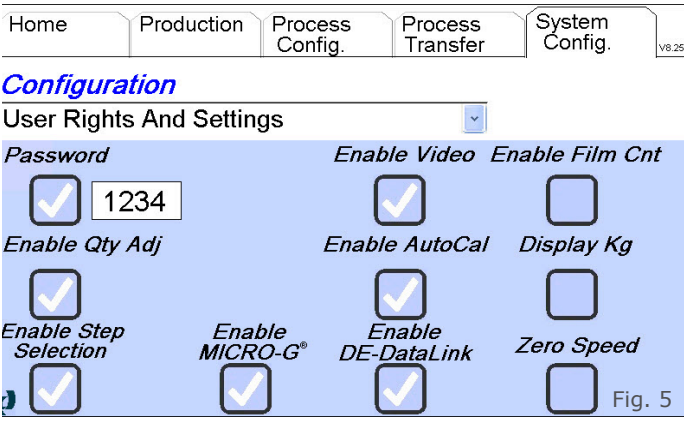


Fig. 5

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).

Password Setting

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.

Enable Quantity Adjustment

Checking the "Enable Qty Adj" box allows the machine operator to change the quantity value on the "Production" tab screen. When this value changes, the APM-HDC-5320 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 screen 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:

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

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 screen.

Select the “Enable Qty Adj” box to enable and disable this function.

Enable Step Selection

Checking the “Enable 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 “Enable Step Selection” box is unchecked, the program requires that all process steps be run sequentially.

Select the “Enable Step Selection” box to enable and disable this function.

Enable Micro-G®Selection

Checking the “Enable Micro-G®” box allows for the use of the Micro-G® bare fiber polishing system with the polisher. This is an accessory item that can be added to the polisher for doing precision polishing of bare fiber, creating ferrules with repeatable exacting lengths or for very light polishing at pressures under 0.4lbs.

Enable Video Selection

Checking the “Enable 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.

Enable Auto Cal Selection

Checking the “Enable Auto Cal” box enables a 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.

Enable DE DataLink® Selection

Checking the “Enable DE DataLink®” box allows for the use of the DE DataLink® 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.

Enable Film Cnt Selection

Checking the "Enable Film Cnt" 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.

Pounds or Kilograms

Pressure can be displayed in either pounds (lb) or kilograms (kg). 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.

Enable Zero Speed Selection

Checking the "Enable 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. 6) allows you to define specific maintenance parameters including Platen Grease, Fan Filter, Lubricate Lock Pins, Replace Koby Filter, Replace Rubber Pad, Replace Air Cleanse Filter, and Annual Maintenance. This section is also used to reset values after set parameters are reached.

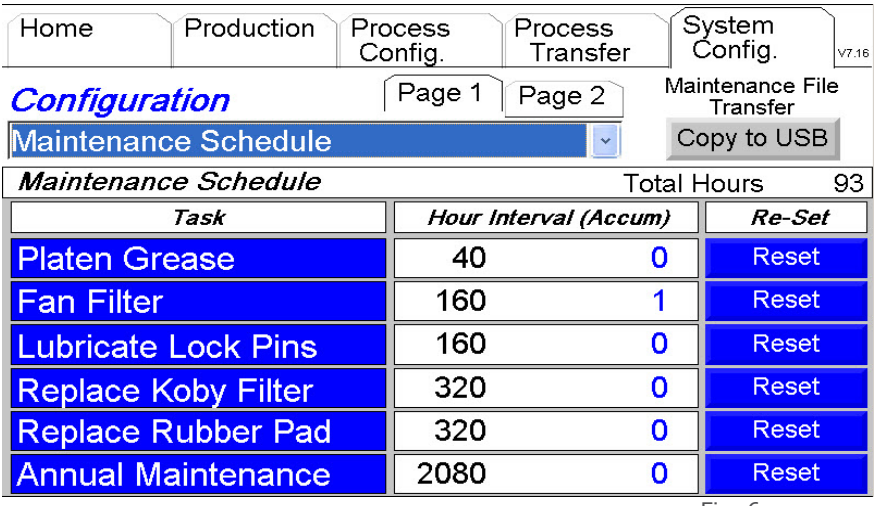


Fig. 6

Setting Platen Grease Maintenance Schedule

The Platen Grease maintenance is tied to the amount 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 key pad for data entry.
2. Use the key pad to set hours of use before changing Platen Grease. The recommended interval is **40 hours**. This can be modified as needed.

Setting Fan Filter Maintenance Schedule

The Fan Filter maintenance is tied to the amount of hours the machine is powered on. To set the Fan Filter maintenance interval:

1. Use a stylus to press the number located under "Hour Interval" tab. This will access the key pad for data entry.
2. Use the key pad to set hours of use before cleaning the Fan Filter. The recommended interval is **160 hours**. This can be modified as needed based on actual working conditions.

Setting Lubricate Lock Pins Maintenance Schedule

The Lubricate Lock Pins maintenance is tied to the amount of hours the Platen is rotating. To set the Lubricate Lock Pins maintenance interval:

1. Use a stylus to press the number located under "Hour Interval" tab. This will access the key pad for data entry.
2. Use the key pad to set hours of use before lubricating the Lock Pins. The recommended interval is **160 hours**. This can be modified as needed based on actual working conditions.

Setting Replace Koby Filter Maintenance Schedule

The Replace Koby Filter maintenance is tied to the amount 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 key pad for data entry.

2. Use the key pad 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.

Setting Replace Rubber Pad Maintenance Schedule

The Replace Rubber Pad maintenance schedule is tied to the amount 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 key pad for data entry.
2. Use the key pad 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.

Setting Replace Air Cleanse Filter Maintenance Schedule

The Replace Air Cleanse Filter maintenance schedule is tied to the amount 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 key pad for data entry.
3. Use the key pad 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.

Setting Annual Maintenance schedule

The Annual Maintenance is tied to the amount 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 key pad for data entry.
2. Use the key pad 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.

To Reset a Maintenance Schedule

Once a maintenance task has reached it set interval, an alarm will appear on 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 the polishing machine USB slot 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
1/6/2021	13:59:51	1100TS4	197.3	Platen Grease	0	35	51
1/6/2021	13:59:52	1100TS4	197.3	Fan Filter	1	54	58
1/6/2021	13:59:53	1100TS4	197.3	Lubricate Lock Pins	0	35	51
1/6/2021	13:59:54	1100TS4	197.3	Replace Koby Filter	0	35	51

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.

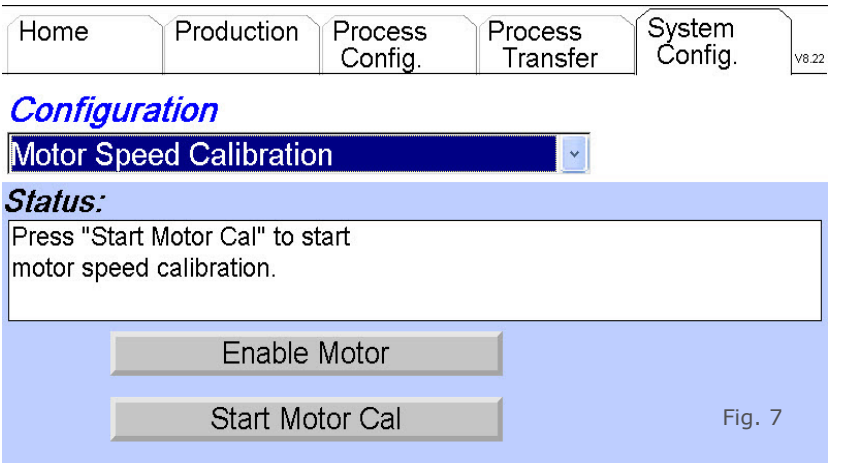


Fig. 7

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.

Process Setup

The number of processes that can be defined and stored on the APM-HDC-5320 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.

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 16 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" screen (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.

Defining Steps within a Process:

Index tab "A" allows you to define Time, Speed, Speed Ramp Up, Pressure and Pressure Ramp Up for each step in the process. Index tab "B" allows you to select Pad, Lubricant, Film, Film Change Interval and Step Notes for each step. Index tab "C" allows you to define a delay pressure apply, speed ramps down pressure polisher fixture weight, and polisher recipe Op Code.

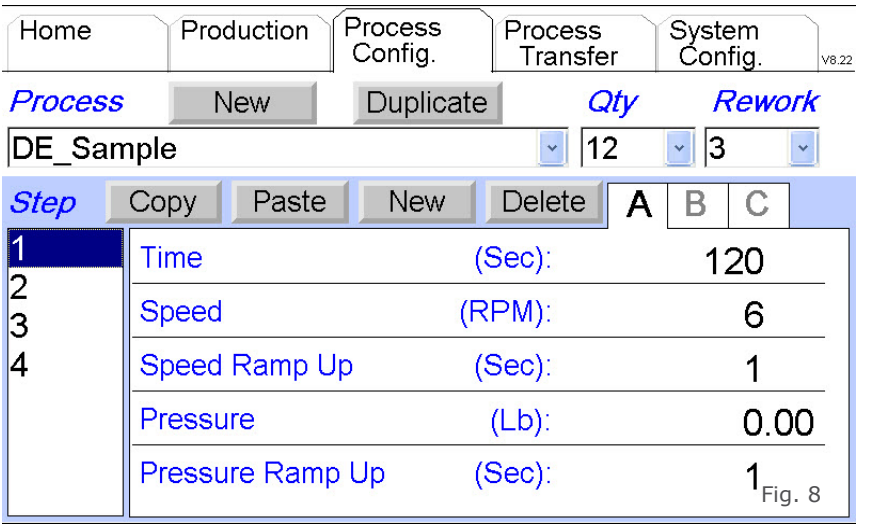


Fig. 8

1. Select tab "A" (Fig. 8).
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 RPM's desired in this step. Select "OK".

4. 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".
5. Select the "Pressure" box to access the keypad. Enter the pressure in pounds or kilograms, depending on the unit selected in "System Config." and displayed in the box. Select "OK".
6. 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 programmed pressure. The maximum value is 60 seconds. Select "OK".

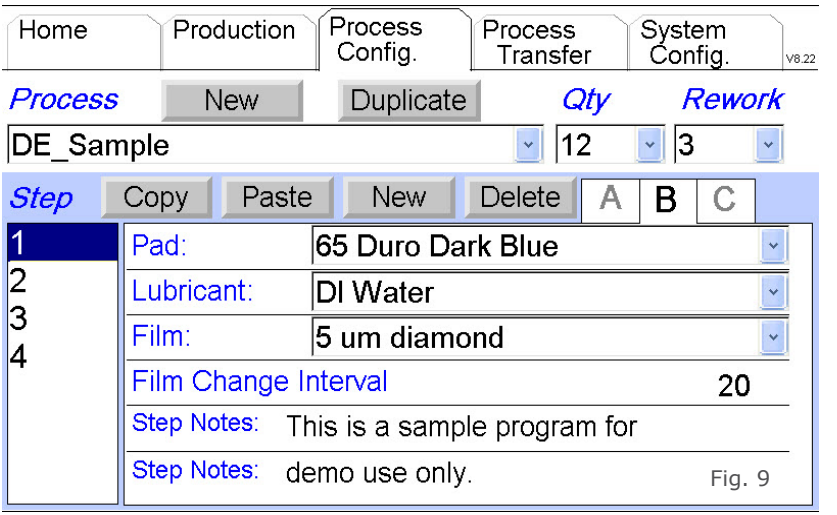


Fig. 9

1. Select tab "B" (Fig. 9). The parameters under tab "B" are used to communicate to the operator the pad, lubricant, film, film change interval and step notes.
2. Select the "Pad" **DOWN** arrow. Select the desired pad for this step in the process.
3. Select the "Lubricant" **DOWN** arrow. Select the desired lubricant for this step in the process.
4. Select the "Film" **DOWN** arrow. Select the desired film for this step in the process.
5. 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-5320 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".

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

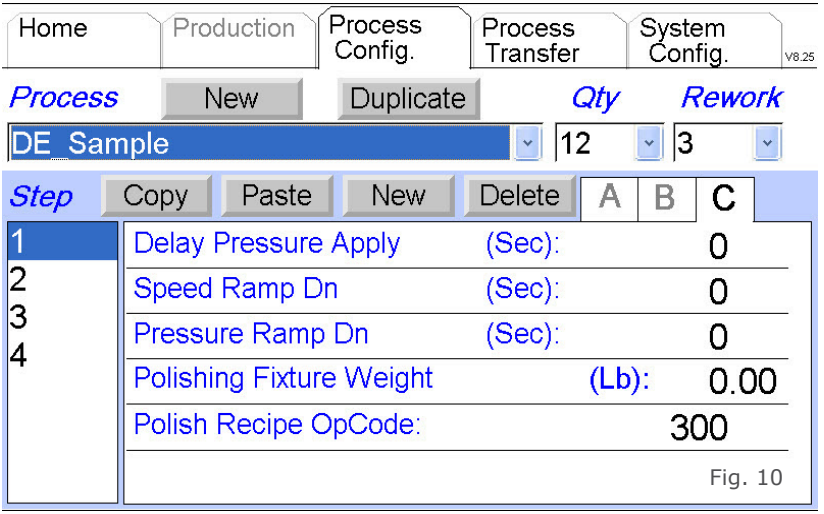


Fig. 10

1. Select tab “C” (Fig. 10). The parameters under tab “C” are used to define a delayed pressure apply in seconds, speed ramp down, pressure ramp down, polisher fixture weight, and polisher recipe Op Code.
2. 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”.
3. Touch the “Speed Ramp Down” to access the keypad. This feature will slowly ramp the platen speed down at the end of the process step. Enter the number of seconds desired for the ramp down between maximum speed and the stopping of the platen. Select “OK”.
4. Touch the “Pressure Ramp Down” to access the keypad. This feature will slowly ramp the pressure down at the end of the process step. Enter the number of seconds desired for the ramp down between maximum pressure and no pressure at the end of the process step. Select “OK”.
5. Touch the “Polishing Fixture Weight” to access the keypad. Enter the weight of the polishing fixture to be used during the Qty adjust pressure adjust function on the production screen.
6. Touch the “Polish Recipe OpCode” to access the keypad. Enter the operation code to be assigned to the polisher and recipe for use with the DE DataLink® data collection system.

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.

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.

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.

Inter-Machine Process Transfer

The APM-HDC-5320 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-5320 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.

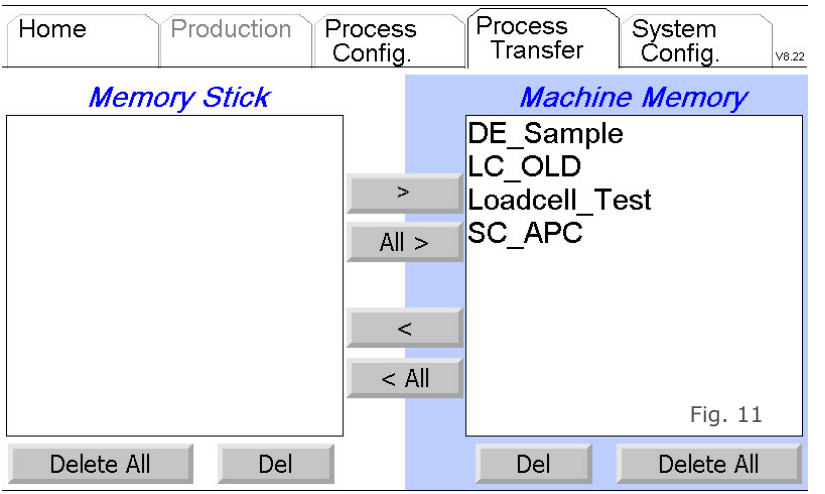


Fig. 11

Copy From Machine Memory to a USB Memory Stick:

1. Insert a USB memory stick into the USB slot.
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 slot on the lower front left 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 o the USB Memory Stick column can be copied to the Machine Memory column by selecting the ">All" button.

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 shaft follow these steps:

1. Raise the Overarm to the full vertical position, locking the Overarm in place(see unpacking & setup instructions, step 9, 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 over arm should be handled with extreme care. Never drop of abuse the over arm 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, step 9 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 positon. See section titled "Polishing Fixture Installation", step 4, for instructions on lowering the Overarm.

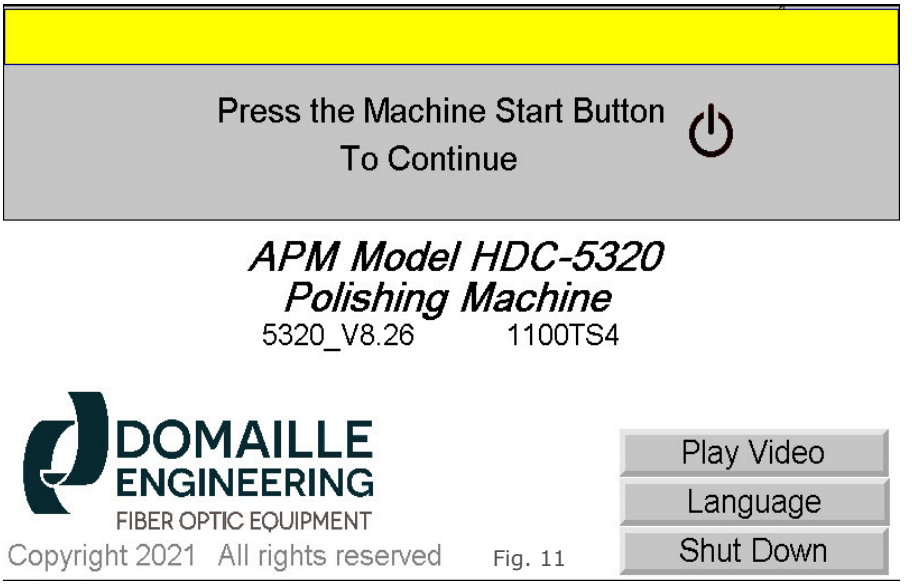
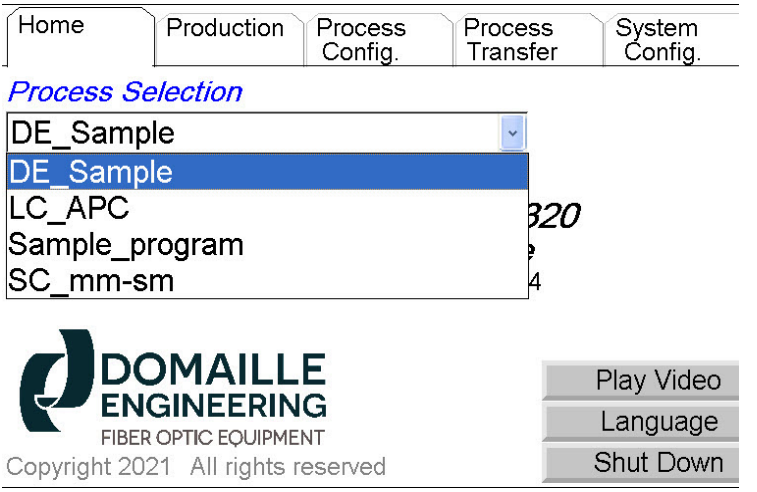


Fig. 11



Power Up

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

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.)

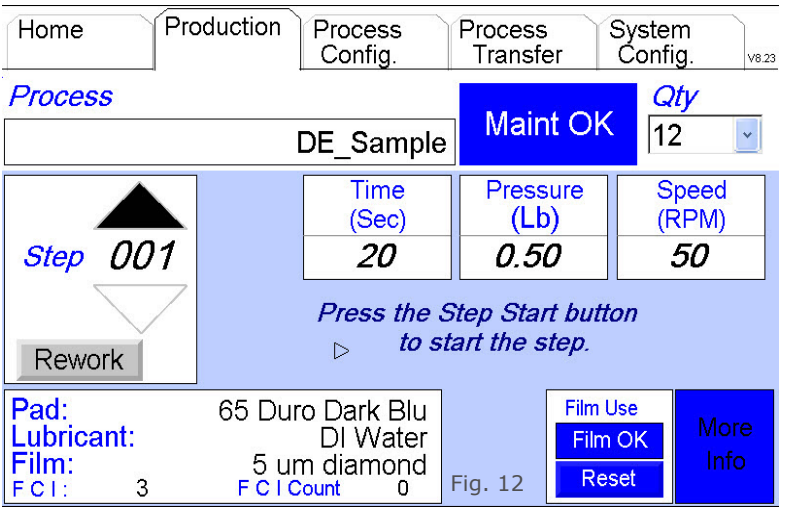


Fig. 12

4. The touchscreen should default to the "Home" tab screen. If the **RED** "Emergency" screen is displayed, reset by turning the "Emergency Stop" button CLOCKWISE.
5. Select desired language.
6. Press "Machine Start" Button.

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.
2. Select "Production" tab.
3. 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.
4. Pressing the **BLUE** "More Info" box in the lower right corner will access Pressure Ramp Time (Sec), Pressure Ramp Remaining (Sec), Speed Ramp Time (Sec), Speed Ramp Remaining (Sec) and Step Notes. Press the "Return to Production" screen tab to toggle back to the "Production Data" screen.
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 a, or the step has completed, the screen will load pad, lubricant, and film data, as well as time, speed, and pressure for the next step in the process. Load indicated pad and film and use lubricant as indicated for the next step in the process.
8. F.C.I. is Film Change Interval. When enabled (see section titled "System Config." for 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.

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 POLSIHING THE NEXT STEP**. After changing the polishing film, press the **BLUE** "Reset" 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 change the (Accum) screen 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 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

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" screen 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-5320.

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" screen, press the "Shut Down" button.
3. Press the "Yes" button when prompted.
4. Turn off the power using the power off switch.

MACHINE MAINTENANCE

Proper care and handling of the polishing fixtures and APM-HDC-5320 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.

Polishing Machine

1. Clean the top of Platen, Overarm Top Plate, Overarm Rest Pad and bottom of Overarm with a non-abrasave cloth wih 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 top of entire machine and from touchscreen panel cover. ***Do not contaminate touchscreen area.*** Failure to do so may result in build up and/or rusting of critical areas.

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 Fan Filter

Inspect the Fan Filter on the back of machine. Use a vacuum to clean or remove the filter and clean with compressed air.

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. 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 (PMI2649) supplied with APM-HDC-5320 machine, call Domaille Engineering Fiber Optic Equipment at 507.281.0275, or email 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 13. By moving to eye level with the Platen area of machine, place the Platen on top of the pins in the eccentric arms.

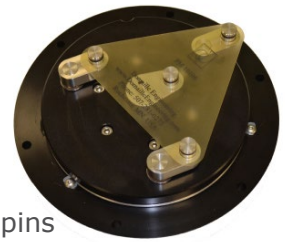


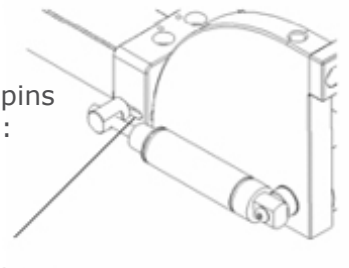
Fig. 13

6. Line up the pins with the holes in the bearings in the bottom of the Platen. When pins are all lined up, Platen will slide on the pins about ½ 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.

Polishing Machine Overarm Lock Pins

Lock Pins are located on either side of the Overarm near the support bracket. These pins lock the Overarm in one of three positions: vertical, horizontal, or at 45-degrees.

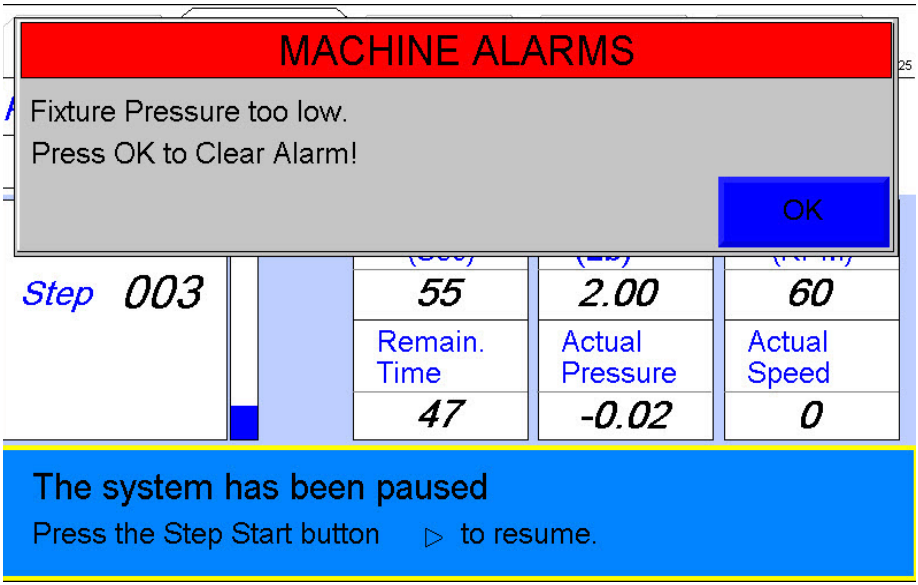
Using light machine oil, lubricate the Lock Pins on both sides of the Overarm, placing a drop in each slot as shown in diagram.



Right Side View

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.



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 prior to user trying to start machine to applying pressure
2	Low Main Air Supply!	machine air prssure 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 to fast	platen speed detected by the plishing 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 occured. Check machine for obstructions. If fault persist, 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	when reloading QP+ program, sometimes this value gets cleared. Re-run Motor Calibration!
10	Micro-G Control Box NOT on Production Screen	Micro-G Control box needs to be on its Production screen
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 connectin to the systme the alarm will appear
12	Load Cell Calibration required	when reloading QP+ program, sometimes this value gets cleared. Re-run Load-Cell Calibration!

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:	0-20 lbs Force (0.2-9.1 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.

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.

CE NOTICE (EUROPEAN UNION)

Statement of Conformity: Based on test results using appropriate standards, the Domaille APM 5300 and APM 5320 polishers are in conformity with:

Electromagnetic Compatibility Directive 2004/108/EC
Machine Directive 2006/42/EC
Low Voltage Directive 2014/35/CE
ROHS Directive 2011/54/CE

EMC Test Standard:
EMC Directive 2004/108/EC

- EN 61000-6-4:2007 + A1:2011
- EN 61000-6-1:2007
  - EN 61000-4-2:2009
  - EN 61000-4-3:2006 + Amendments A1:2008 + A2:2010
  - EN 61000-4-4:2004 + Corrigendum AC:2006 + A1:2010
  - EN 61000-4-5:2006
  - EN 61000-4-6:2009
  - EN 61000-4-8:2010
  - EN 61000-4-11 Second Edition:2004
- EN 61000-3-2:2006 + Amendments A1:2009 + A2:2009
- EN 61000-3-3:2013

Safety:
IEC 60204-1 (FIFTH EDITION) + A1:2009
EN 60204-1:2006 +A1:2009

Year of CE Marking: 2014

EU representative:
Fiber Optic Center, Erwin Gelderblom,
Lopikerhof 42871 PV Schoonhoven Netherlands

Tests performed by:

EMC test report 1	TUV	NC1407751.1
EMC test report 2	TUV	NC1407751.2
EMC test report 3	TUV	NC1407751.3
Safety test report	TUV	092—1101099-100

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-5320 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.

As a part of Domaille Family of Companies, a precision manufacturer with distinguished accuracy of products and services, 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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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.

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