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FEMTO-1100S Polishing Head

INSTRUCTION MANUAL

3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1-520-882-6598 Fax +1-520-882-6599 email: pace@metallographic.com Web: https://www.metallographic.com

Equipment Type:	Automatic Polishing Head Unit for NANO-S Polishing Bases
Model:	***FEMTO-1100S***
Speed:	0 – 300 rpm
Electrical Requirements:	110 / 220 Volts
Frequency:	50 / 60 Hz
Motor Power:	0.5 Hp (400 W) dynamic high torque servo motor
Manual Revision Date:	April 24, 2022

Please read this instruction manual carefully and follow all installation, operating and safety guidelines.

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WARRANTY

Terms and Conditions applying to all PACE Technologies Products

1. LIMITED WARRANTY AND DISCLAIMER:

PACE Technologies Products are warranted for two years from the purchase date to be free from defects in material and workmanship under correct use, normal operating conditions, and proper application. PACE Technologies obligation under this warranty shall be limited to the repair or exchange, at PACE Technologies option, of any PACE Technologies Product or part which proves to be defective as provided herein. PACE Technologies reserves the right to either inspect the product at Buyer's location or require it to be returned to the factory for inspection. Buyer is responsible for freight to and from factory on all warranty claims. The above warranty does not extend to goods damaged or subjected to accident, abuse or misuse after release from PACE Technologies warehouse, nor goods altered or repaired by anyone other than specifically authorized PACE Technologies representatives. PACE Technologies shall not in any way be responsible for the consequences of any alteration, modification or misuse unless previously approved in writing by an officer of PACE Technologies. Note: Corrosion is considered a maintenance issue and not a warranty issue.

PACE TECHNOLOGIES MAKES NO EXPRESS WARRANTIES OTHER THAN THOSE WHICH ARE SPECIFICALLY DESCRIBED HEREIN. Any description of the goods sold hereunder, including any reference to Buyer's specifications and any description in catalogs, circulars and other written material published by PACE Technologies, is the sole purpose of identifying such goods and shall not create an express warranty that the goods shall conform to such description.

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2. LIABILITY CAP:

PACE Technologies maximum aggregate liability for loss and damage arising under, resulting from or in connection with the supply or use of the Equipment and Consumables provided under this purchase, or from the performance or breach of any obligation (s) imposed hereunder, whether such liability arises from any one or more claims or actions for breach of contract, tort, (including negligence), delayed completion, warranty, indemnity, strict liability or otherwise, unless otherwise limited by the terms hereof, shall be limited to one hundred percent (100%) of the purchase price.

3. DELIVERY:

Customer assumes and shall bear the risk of all loss or damage to the Products from every cause whatsoever, whether or not insured, and title to such Products shall pass to Customer upon PACE Technologies delivery of the Products to the common carrier of Pace Technologies choice, or the carrier specified in writing by Customer, for shipment to Customer. Any claims for breakage, loss, delay, or damage shall be made to the carrier by the Customer and Pace Technologies will render customer reasonable assistance in prosecuting such claims.

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4. ACCEPTANCE:

Customer shall inspect the Products promptly upon receipt of delivery. Unless customer objects in writing within thirty (30) business days thereafter, customer shall be deemed to have accepted the Products. All claims for damages, errors, or shortage in Products delivered shall be made by Customer in writing within such five (5) business day period. Failure to make any claim timely shall constitute acceptance of the Products.

5. PAYMENT:

Customer agrees to provide timely payment for the Products in accordance with the terms of payment set forth on the reverse side hereof or in any proposal submitted herewith. If any payment is not paid on or before its due date, Customer shall pay interest on such late payment from the due date until paid at the lesser of 12% per annum or the maximum rate allowed by law.

6. DEFAULT:

If Buyer is in default (including, but not limited to, the failure by Buyer to pay all amounts due and payable to Seller) under the work or purchase order or any other agreement between Buyer and Seller, Buyer 's rights under the warranty shall be suspended during any period of such default and the original warranty period will not be extended beyond its original expiration date despite such suspension of warranty rights.

7. MISCELLANEOUS PROVISIONS:

This agreement has been made in and shall be governed by the laws of the State of Arizona. All disputes arising under or relating to the purchase of the equipment shall be brought and resolved solely and exclusively in the State of Arizona, Pima County. These terms and conditions and the description of the Products on the reverse side hereof or in any proposal submitted herewith constitute the entire agreement and understanding of the parties with respect to this sale and supersede all prior and contemporaneous agreements or understandings, inducements or representations, expressed or implied, written or oral, between the parties with respect hereto. Any term or provision of this Agreement may be amended, and any observance of any term of this Agreement may be waived, only by a writing signed by the party to be bounds. The waiver by a party of any breach shall not be deemed to constitute a waiver of any other breach. Should suit be brought on this Agreement, the prevailing party shall be entitled to recover its reasonable attorneys' fees and other costs of suit including costs and attorneys' fees incurred on appeal or in collection of any judgment., errors, or shortage in Products delivered shall be made by Customer in writing within such five (5) business day period. Failure to make any claim timely shall constitute acceptance of the Products.

8. RESTOCKING FEE:

All Returns are subject to a restocking charge equal to 15% (fifteen percent) of the Invoice, unless the Goods are proved to be non-conformed by PACE Technologies

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1.0 Product Description

1.1 General Description

The FEMTO-1100S is an automated polishing head compatible with the NANO-S series polishing units. When paired with a NANO-S polishing base the FEMTO can control both machines through one touch screen interface. The FEMTO also has the ability to store three separate speeds for both the NANO wheel and FEMTO head as well as three programmable time presets. A FEMTO is capable of both individual (FEMTO-1100S) and central (FEMTO 1500S) force polishing methods. The FEMTO-S machines are equipped with an auto locating mechanism. This allows the machine to be swung over the working wheel and fall into an exact set location repeatedly. This position is set at the factory but may be adjusted as needed. Auto locating has two set positions. One for grinding steps and another for polishing steps. This grinding position is located in such a way as to utilize the entire surface of the grinding paper. Polishing position is brought in further from the edge of the working wheel and restricts the samples from fraying the edges of the polishing cloths, extending their lifetime cycles.

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1.2 Technical Specifications

Electrical Specifications:	110 / 220 Volts (50 / 60 Hz)
Sample Holder Sizes:	1.00, 1.25, 1.50, 2.00 inch 25, 30, 40, 50mm (custom holder available)
Motor Power:	400W (0.5 Hp)
Sample Holder Speed:	0 - 300 rpm variable speed Programmable speed settings
Weight:	Approx. 40-lbs (18-kg)
Dimensions (W x H x D):	Approx. 9.5 x 14.5 x 22.5 inches (240 x 370 x 570mm)
Working Temperature:	32° - 100°F (0 – 40°C)
Shipping Temperature:	32° - 130°F (0 – 54°C)
Storage Temperature:	32° - 100°F (0 – 40°C)
Maximum Sample Diameter:	2.00in (50mm)
Required Utilities	Air - clean filter air with lubricator (recommended) Electrical - 110V or 220V, 50/60 Hz) Water/drain or RC-1000A recirculating filter/tank

EU Directives:	Machinery directive 2006/42/EC RoHS Directive 2011/65/EU
EU Harmonized Standards:	EN ISO 1200:2010 EN 61010-1:2010 EN 61326-1:2006

CE

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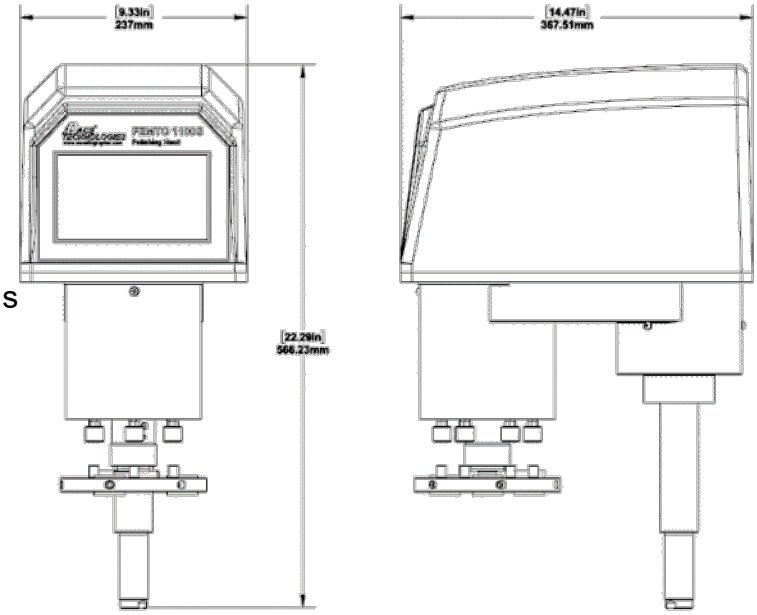
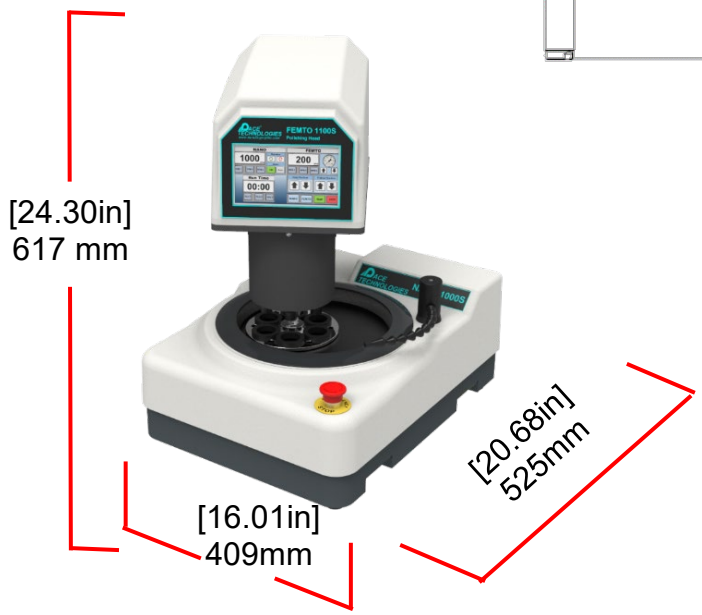
1.3 Basic Size Dimensions

Note: Installation of the NANO-FEMTO should take place on a sturdy flat surface with access to water, drain, and electrical connections



1.4 Features

- 7in touchscreen interface
- Auto positioning working wheel alignment
- Programmable rpm and timer buttons
- 0.5 Hp dynamic high torque servo motor
- User friendly, easy to use, intuitive control interface
- Individual force polishing



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2.0 Shipping, Unpacking, and Installation

2.1 Shipping

- The FEMTO-1100S comes pre-installed if ordered with a NANO-S polishing unit
- Ensure all parts are included when unpacking box
- If purchased as an upgrade to an existing NANO-S polishing unit, the FEMTO-1100S ships in a custom designed box.

2.2 Unpacking

- When moving box, lift from the bottom.
- It is recommended a minimum of two people assist when moving an object exceeding 40-lbs.

Caution: Heavy equipment. Take care to avoid bodily injury.

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2.3 Installation

- The NANO-FEMTO should be placed on a stable flat surface with access to water, drain and electrical connections.
- After air, water, drain and electrical connections are established the system is ready for operation by activating the main power switch.
- The FEMTO will come preinstalled on the NANO base unit if purchased together. Plug in the power and communication cables to the backs of the machines.

2.3.1 Installing on NANO-S Base Unit

- If the FEMTO-1100S is purchased as an upgrade for a NANO-S polishing unit, it must be installed. Follow the below steps:
    1. Move the NANO unit to a sturdy “workstation” with the ability to access the bottom of the unit
    2. Remove rear cover of NANO-S unit
    3. Unplug all connections for the Screen Post
    4. Remove Screen Post and set aside
    5. Align the FEMTO with the same hole that the screen post was removed from and drop it into place. The head will sit inside a slotted channel on the spacer of the NANO
    6. Ensure the FEMTO post does not rotate (the post should be stationary while the head itself is movable). If you are unable to rotate the shaft with your hand it should be seated properly
    7. From the bottom of the unit, use the supplied socket head bolt to secure the post. Torque down on the bolt using the supplied allen set
    8. Return NANO-FEMTO to desired location
    9. Plug in power and communication cables to the backs of the units
    10. Follow Steps in section 4.3 to set position and head height

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3.0 Safety Guidelines

3.1 Warning Sign:

! A large explanation point is used to point out special safety features on the machine.

3.2 Safety Precautions

! Careful attention to this instruction manual and the recommended safety guidelines is essential for the safe operation of the FEMTO-1100S

! Proper operator training is required for operation of the FEMTO-1100S. Any unauthorized mechanical or electrical modifications made to the FEMTO-1100S, as well as improper operation, voids all warranty claims. All service issues need to be reported to the manufacturer or supplier

! Operate unit as specified in this manual

! Disconnect from power before opening unit

! Do not rest anything on the working wheel or sample holders

! Ensure that the air slots on the back panel remain unobstructed

! Turn off water when machine is not in use

! Hold all samples securely (using two hands is recommended) when FEMTO unit is not being used to prepare samples

3.3 Emergency Statement

The FEMTO-1100S had been designed to fit the mounted samples in the diameter of the sample holder. **DO NOT GRIND OR POLISH** oversized or misfit samples. Always follow proper operational guidelines and avoid contact with moving parts, lubricants, and abrasives. Seek immediate medical care for cutting injuries.

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3.4 Safety Test

! Important: The following safety check of the emergency stop button is **required** to verify that the NANO-FEMTO is functioning properly and is ready to use.

Test: 1). Activate main power switch to turn on machine.
2). Start the motor.
3). Depress emergency stop button.

Correct Response: The machine immediately powers down.

Malfunction: Machine does not lose power.

Corrective Measure: If the system fails to lose power, disconnect the power supply cord and call a service technician before continuing use.

Emergency Stop Button

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4.0 Start-up and Operation

4.1 General

The FEMTO-1100S is an automatic polishing head for the NANO-S line of PACE Technologies' metallographic equipment line. The FEMTO must be paired with a NANO-S polishing base to utilize its functionality. A ZETA-2000 abrasive dispenser can be used in conjunction with the FEMTO and NANO machines

NANO-2000S & FEMTO-1100S

NANO-1000S & FEMTO-1500S

ZETA-2000

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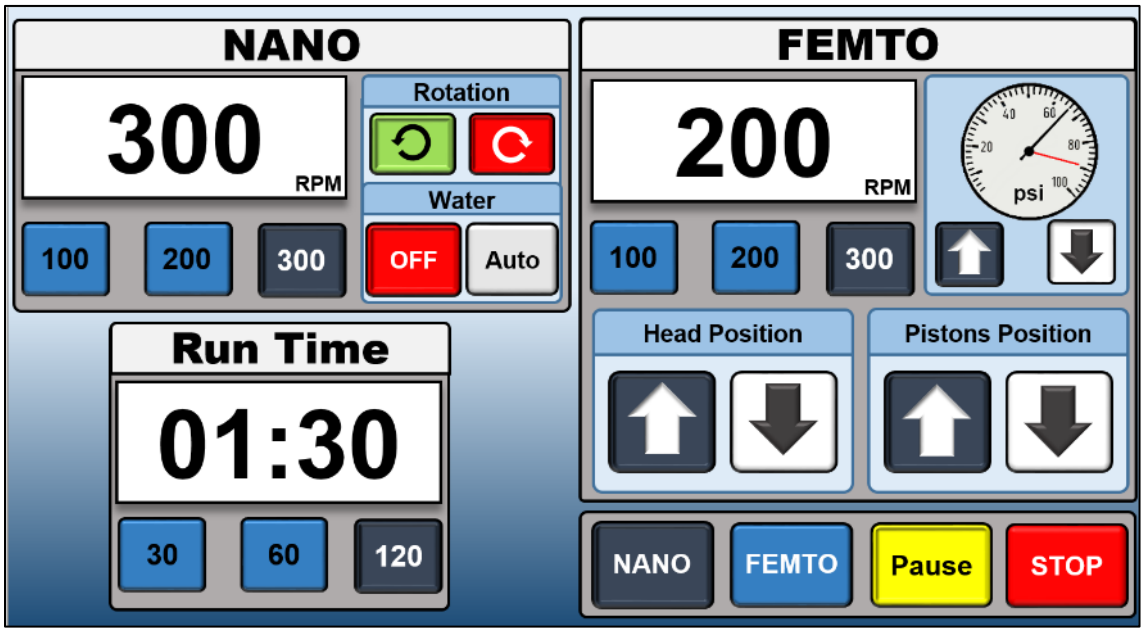
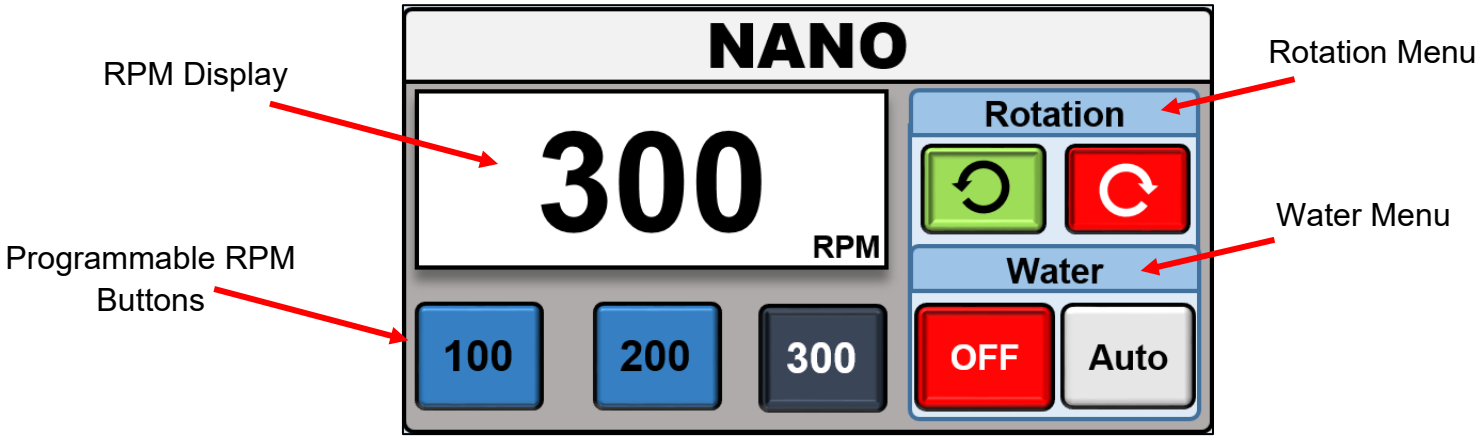
4.2 Screen Interface



Main Screen Interface

The FEMTO-1100S interface is split into four sections. Each section is described below. Some buttons have multiple functions activated with either a long press or a short press.

4.2.1 NANO Menu



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RPM Display:

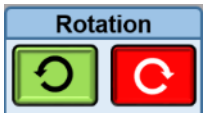
Long press: Display a keypad to manually type in a desired RPM value. Does not save to any programmed key

Programmable RPM Buttons:

Short Press: Changes or sets the rpm of the NANO working wheel and displays it on the RPM Display

Long Press: Program mode- brings up a screen to select a desired rpm to program the button to. This is how to set and save the short press functions of these buttons.

Rotation Menu:

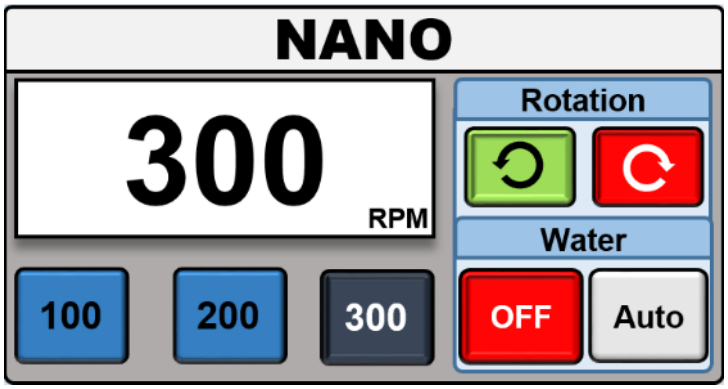


Direction Buttons: Short Press: Change direction of rotation for the NANO working wheel

Water Menu:

On/Off Button: Short Press: Turns the water on or off manually

AUTO: Short Press: Toggles the water faucet to turn on automatically when the NANO starts running. When highlighted the machine is in AUTO mode.



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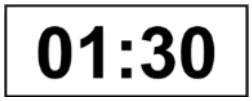
4.2.2 Run Time Menu

Timer Display:

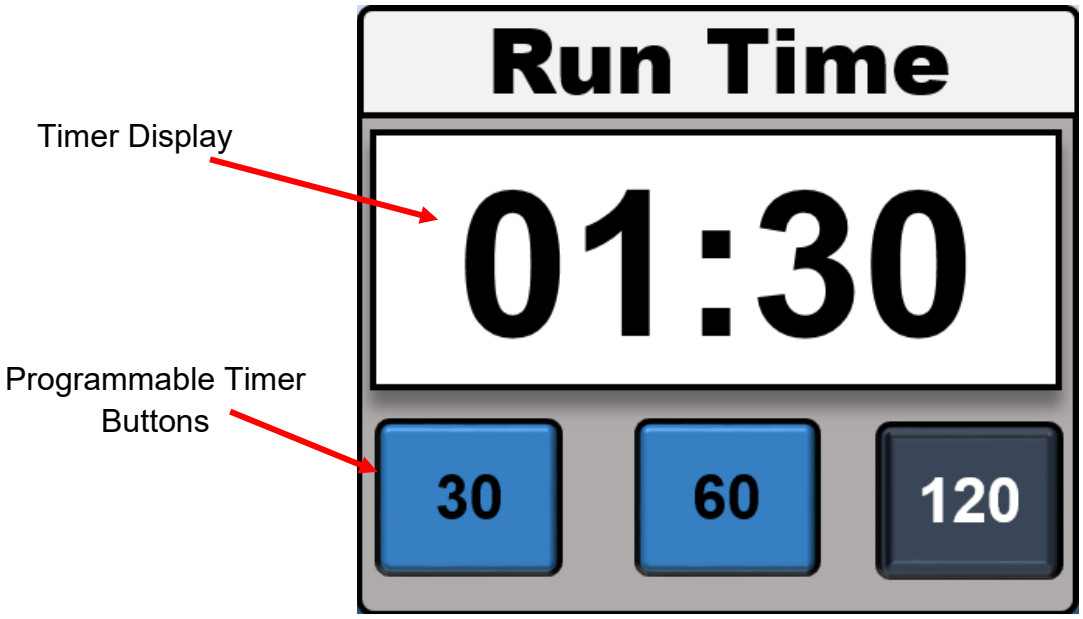


Long press: Display a keypad to manually type in a desired time value. Does not save to any programmed key

Programmable Timer Buttons:

Short Press: Sets the runtime of the NANO-FEMTO. Pressing while the machine is running will add on additional time to the timer equal to the set value.

Long Press: Program mode- brings up a screen to select a desired time to program the button to. This is how to set and save the short press functions of these buttons.



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4.2.3 FEMTO Menu

RPM Display:

Long Press: Displays a keypad to manually type in a desired rpm. Does not save to any programed key

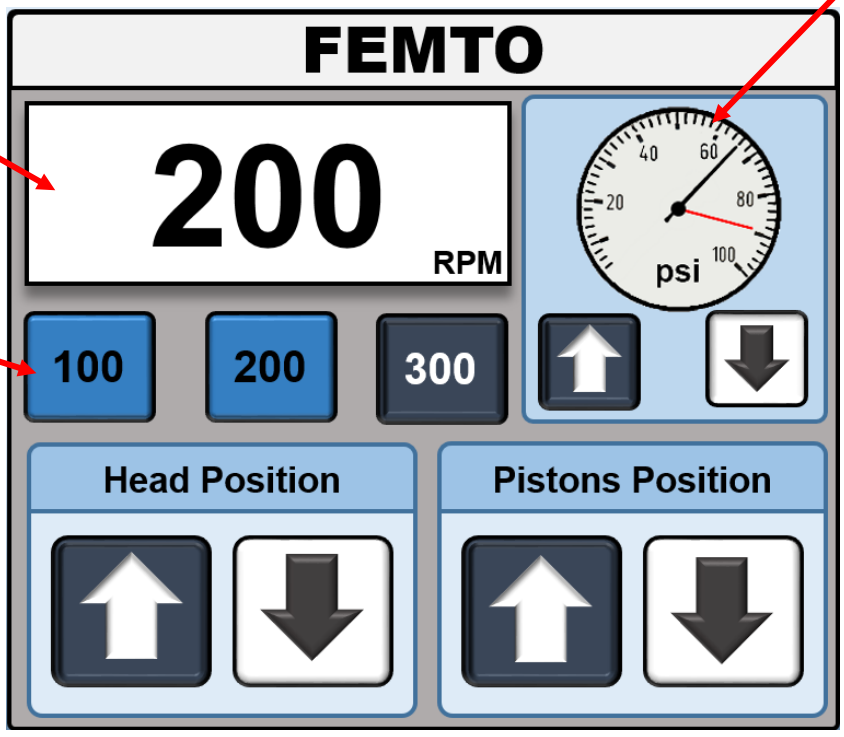
Programmable RPM Buttons:

Short Press: Changes or sets the rpm of the FEMTO sample holder

Long Press: Program mode- brings up a screen to select a desired rpm to program the button. This is how to set and save the short press functions of these buttons

RPM Display

Programmable RPM Buttons



Feature Note: Black arm indicates current set pressure. Red arm indicates max pressure from the incoming line

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4.2.4 FEMTO Menu (Cont.)

Pressure Gauge:

Displays total true air pressure that will be applied to the pistons on the FEMTO rotating head. The black line is the pressure the machine is currently set at. The red line is the max pressure from the incoming direct air line.

Up/Down Arrows:

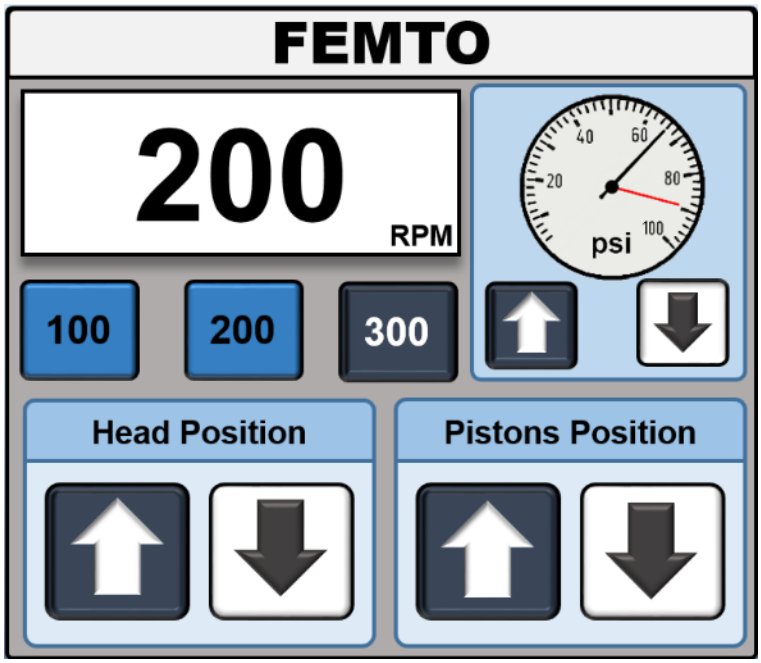
Short Press: Adjusts the air pressure regulator up or down. When large decreasing adjustments in pressure are applied it may take a moment for the gauge to show true readout

Head Position- Up/Down Arrows:

Short Press: Changes the vertical position of the FEMTO head

Piston Position- Up/Down Arrows:

Short Press: Manually actuates the pistons on the FEMTO rotating head



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4.2.5 Operation Buttons:

NANO:

Short Press: Toggles the NANO machine to start when the Start/Stop buttons is pressed

FEMTO:

Short Press: Toggles the FEMTO machine to start when the Start/Stop buttons is pressed. DO NOT start the FEMTO machine until the FEMTO head is fully lowered.

Pause:

Short Press: Pauses the machine(s) and stalls the timer. Resuming the machine will continue countdown from where it left off

Start/Stop:

Short Press: Start and stops the machine(s) and resets the timer. Resuming the machine will continue countdown from the starting time previously selected

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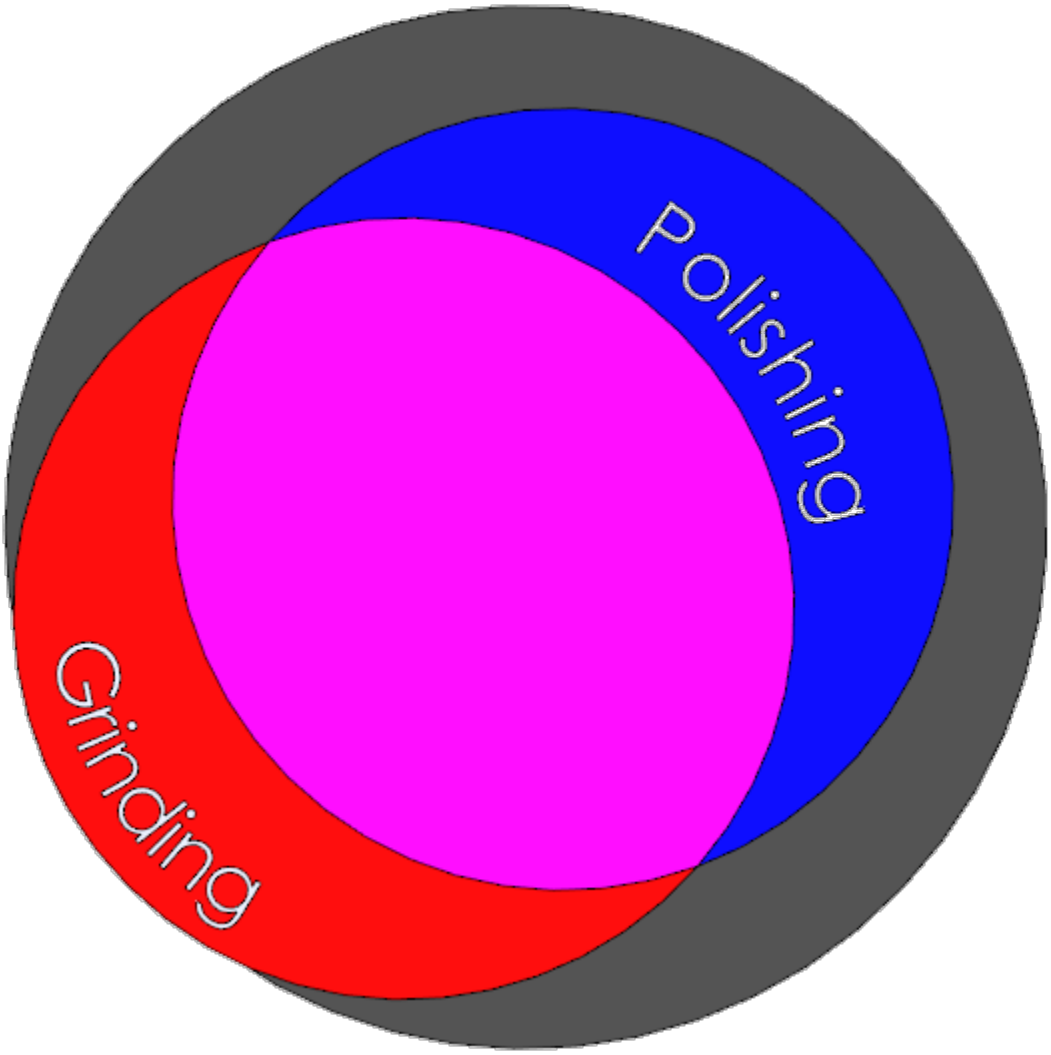
4.3 Auto-Positioning

The FEMTO is equipped with an auto locating positioning feature. This feature ensures proper utilization and breakdown of grinding papers; it also extends the lifetime of polishing cloths. The FEMTO head is swung over the working wheel of the NANO polishing machine. Once dropped, it auto corrects and drops into the set location. Auto positioning removes the non-repeatability of standard polishing heads. In return, it extends the life of polishing pads and ensures the full breakdown of abrasive paper.



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Setting Positions: The FEMTO comes from the factory with recommended grinding and polishing positions. If this needs to be changed follow the below steps:

Set Head Height:

1. Loosen the allen on the height adjustment locking collar
2. Adjust up/down to desired location
3. Lock the collar again
4. Check height of head. Sample holder should be about 1/8th to 1/4th inches off the working wheel
5. Repeat above steps until sample holder is 1/8th to 1/4th inches from the working wheel

Set Grinding and Polishing Positions: After height adjustment, loosen the position lock and swing the head back and forth. The head will stop in two positions. The left most position is the Grinding location. The right most position is the Polishing position. The grinding position should align as shown in the below image. To align the Grinding position, do the following:

1. Loosen the height adjustment collar and position adjustment lock
2. Rotate the locking collar slightly (large rotations have a big impact on head positioning)
3. Tighten locking collar only
4. Drop head and check location of Grinding position (left most position)
5. Adjust until in recommended or desired location

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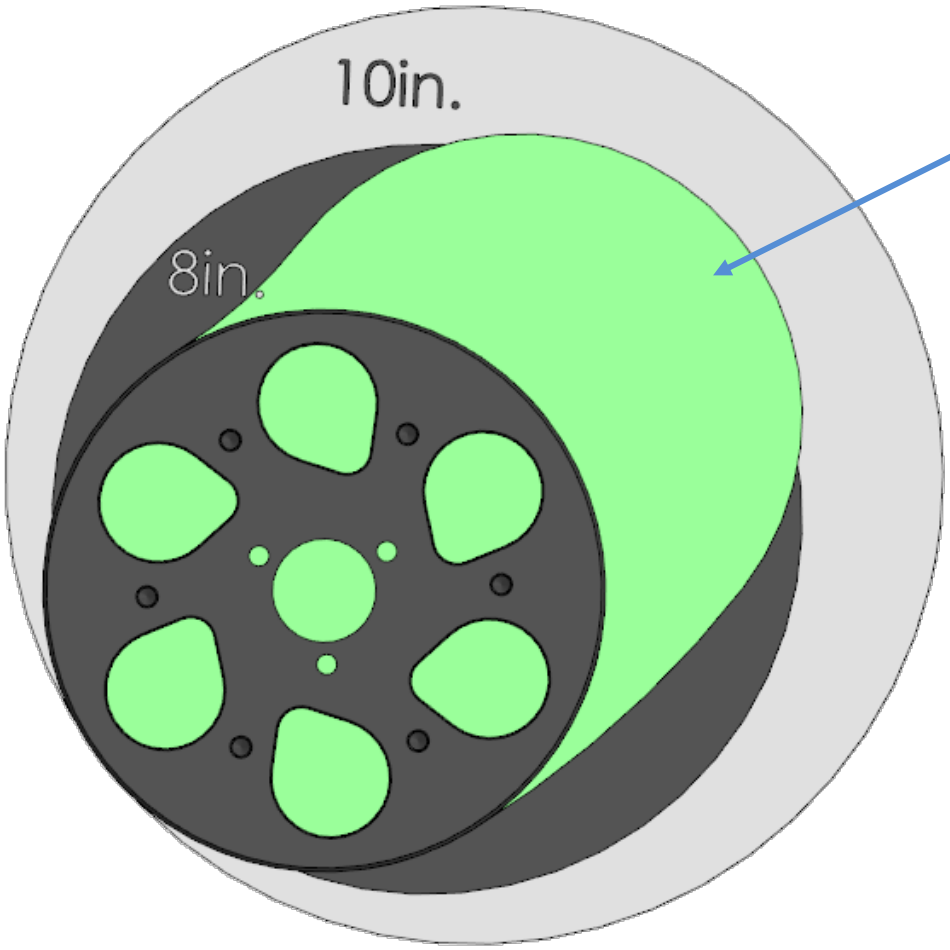
How to Use Auto-Positioning:

1. Lower FEMTO head
2. Loosen the position locking handle
3. Rotate the FEMTO head to desired location:
    a. Grinding- left most position
    b. Polishing- right most position
4. Tighten the position locking knob
5. The head will now adjust to the set position
6. If the head does not drop fully, the FEMTO head was positioned too far from the acceptable location. Try swinging the head closer to the set position. Use the below reference image:



Feature Note: Green Area is the allowable drop zone for the Auto-Position feature. If simply located near the center of the wheel, the FEMTO should fall into place.

A 10in wheel has the same drop zone, it is just offset to one side

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5.0 Maintenance

The FEMTO is a low maintenance machine, but there are some checks that should be done according to the following schedule:

Daily: Check the level of the pegs attached to the pistons on the rotating assembly. If they are loose, tighten the locking nut with a 10mm wrench

Weekly: Clean the screen and cover with a wet cloth. Do not use chemicals on the cover or screen as this can lead to damage

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6.0 Trouble Shooting

Follow the steps outlined to assist with troubleshooting issues. If all possible solutions do not fix the issue, contact a PACE representative for further assistance: (Tel. +1 520-882-6599, email: pace@metallographic.com)

Issue	Solution
FEMTO Head is not powering on	A. Check back connection for proper power connection to NANO B. Check if power switch is illuminated 1. If not illuminated check if fuse is blown. Replace if needed 2. Machine should power on after replacement C. Ensure E-Stop is not activated
FEMTO air adjustment not functioning/ adjusting	A. Ensure incoming air is connected B. If connected ensure air pressure is being sent through line. Check air compressor status C. If air gauge is showing pressure but not increasing the machine will not be able to adjust higher due to the limit of the incoming air
FEMTO and NANO is powered on but one or both but not starting when pressing start	A. Ensure the FEMTO and or NANO button(s) are toggled on the main screen. The machine buttons need to be selected for the machine(s) to run
FEMTO is rotating in a non-fluid motion	A. RPM is set too low. RPMs below 50 result in poor motor performance
NANO screen functions are displaying as “0s”	A. Ensure the NANO communication cable is connected properly

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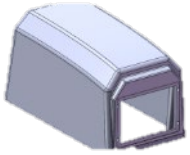
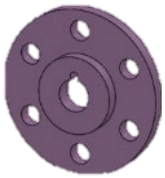
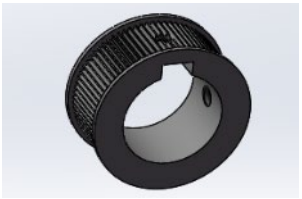
7.0 Spare Parts

Mechanical Components		
FMS-001	FEMTO Cover	
FMS-M-001	Cylindrical Piston Backing Plate	
FMS-M-002	Rotating Assembly Shaft	
FMS-M-003	Piston Cylinder	
FMS-M-004	Motor Gear	

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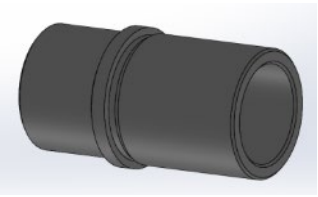
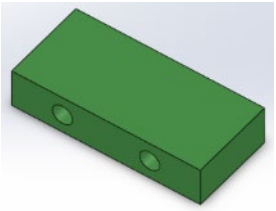
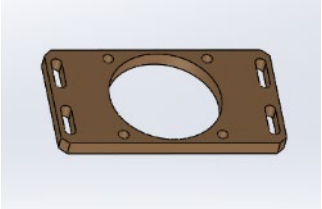
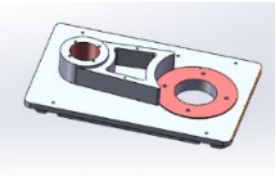
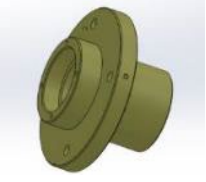
FMS-M-005	Head Gear	
FMS-M-006	Cylinder mold	
FMS-M-007	Motor Mounting Block	
FMS-M-008	Motor Holder	
FMS-M-009	Base Casting	
FMS-M-010	Base Flange	

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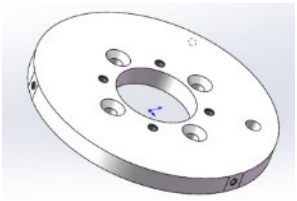
FMS-M-011	Housing Top Cover Plate	
FMS-M-012	Height Adjustment Collar (Part One)	
FMS-M-013	Holder	
FMS-M-014	Rotary Sleeve	
FMS-M-015	Regulating Sleeve	
FMS-M-016	Height Adjustment Collar (Part Two)	

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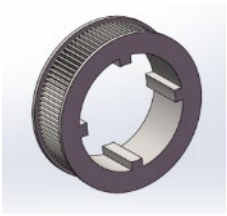
FMS-M-017	Air Regulator Gear	
FMS-M-018	12V motor synchronous wheel	

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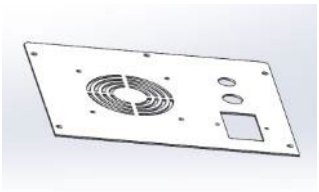
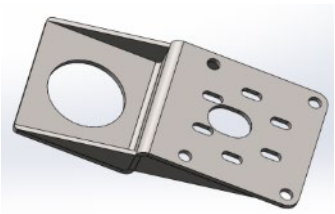
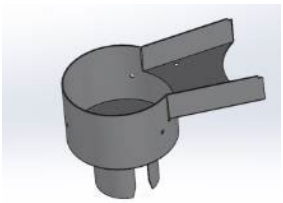
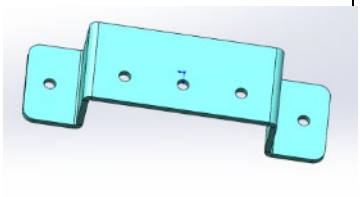
Sheet Metal Parts

FMS-F-001	Back Panel	
FMS-F-002	Bracket 1	
FMS-F-003	Locking Collar Guard	
FMS-F-004	Front Panel	
FMS-F-005	Solenoid Bracket	

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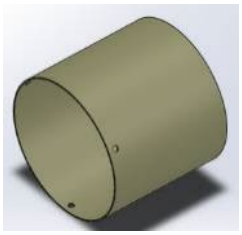
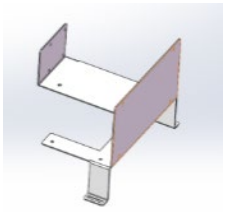
FMS-F-006	Piston Rod Housing	
FMS-F-007	Motor Driver, /Power supply Bracket	

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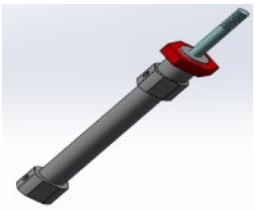
Standard Parts

FMS-002	Cylinder， ISB12*42 2, 42mm	
FMS-AC12	M24*1.5 Round nut	
FMS-AC13	M24 Locking washer	
FMS-AC15	Shaft jump ring ,ID 30mm	
BB-30-55	Bearing 6006（¢55x¢30x13）	

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KEY-6-6-20	Flat key 6*6*20	
KEY-6-6-6.5	Flat key 6*6*6.5	
FMS-B-001	3M belt (3M-350，15W)	
FMS-B-002	3M belt (3M-183，15W)	
FMS-AC01	Piston block of post-actuator	
FMS-AC02	White wearing ring of post-actuator	

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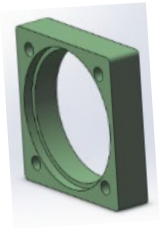
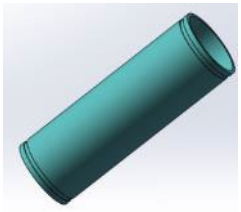
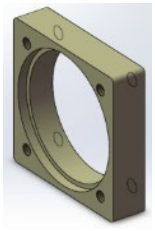
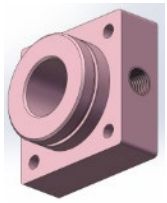
FMS-AC03	Flange of post-actuator	
FMS-AC04	Sleeve of post-actuator	
FMS-AC05	Flange of post-actuator	
FMS-AC06	End cap of post-actuator	
FMS-AC07	Surface bearing	
FMS-AC08	O-ring of post-actuator	

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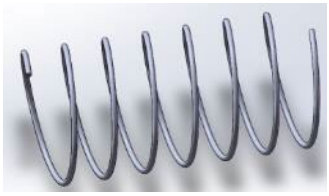
FMS-AC09	Jump ring of post-actuator	
FMS-AC10	Steel ring ID￠53*￠3	
FMS-AC11	Spring（T:3.2，ID 40.5，L:125，10 circles）	
FMS-003	M6 Adjustable handle, Screw length15	
PTC-M5-E-M-4MM	M5-￠4quick plug	
PTC-T-4MM	T style ￠4 three-way quick plug	

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PTC-1/4-M-6MM	1/4 - ¢6 quick plug（）	
PTC-AT-6MM	∅6 Septum fast plug	
PTC-Y-6MM	Y style ∅6 Three-way quick plug	
PTC-1/8-E-M-6MM	1/8- Elbow ∅6 quick plug	
PTC-1/8-E-M-4MM	1/8- Elbow ∅4 quick plug	
PTC-1/8-F-6MM	1/8-∅6 quick plug	

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PTC-AV-1/8-M-6MM	1/8-¢6quick plug adjust valve	
FMS-004	1/8 Spring silencer	
FMS-005	1/8 set screw	
PTC-1/4-M-6MM-SMCKSL06-02S	1/4-¢ 6quick plug	
TUBE-4MM	¢4 tube	
TUBE-6MM	¢6 tube	

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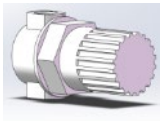
AR-001	Air regulator	
FMS-006	Locking Collar Piston	
FMS-007	Locking Mechanism Pin	

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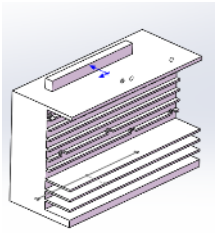
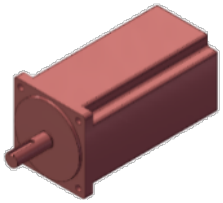
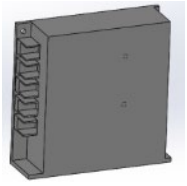
Electrical Components

80MM-FAN	80mm Fan	
POW-F-SWITCH	ON/OFF Power Switch	
MD-110220-SVO	Servo Motor Controller	
MOT-SVO-750	Servo Motor- 400W	
PS-24V-LRS75-24	24V power supply	

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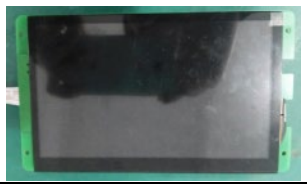
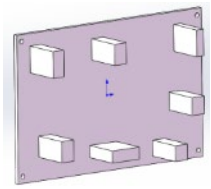
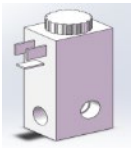
SRN-T-7IN	7inch touch screen	
PCB-FMS	FEMTO PCB	
FMS-E-001	Pneumatic Solenoid Valve	
FMS-E-002	Throttle Valve	
MOT-12VDC	Air Regulator Motor	

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FEMTOS-Wire	Wire Harness	
FMS-1100-T	FEMTO-1100S Template	

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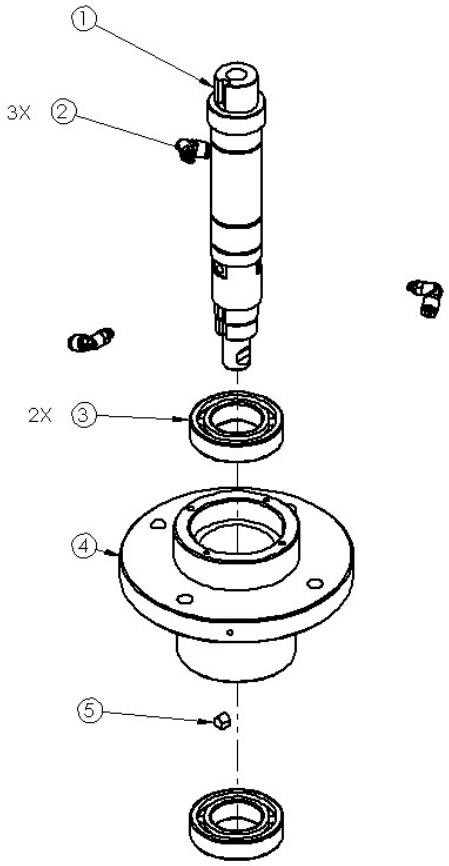
8.0 Mechanical Drawings

ROTATATING BEARING ASSEMBLY

1. DO NOT OVER TIGHTEN ITEM 3X ②. TREADS WILL BREAK EASILY



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	FMS-M-002	FEMTO-1100S shaft	1
2	PTC-M5-E-M-4MM	FEMTO-1100S M5-¢ 4quick plug	3
3	BB-30-55	FEMTO-1100S Bearing 6006 (¢ 55x¢ 30x13)	2
4	FMS-M-010	Base flang	1
5	KEY-6-6-6.5	FEMTO-1100S Flat key 6*6*6.5	1

FEMTO-1100S Assembly

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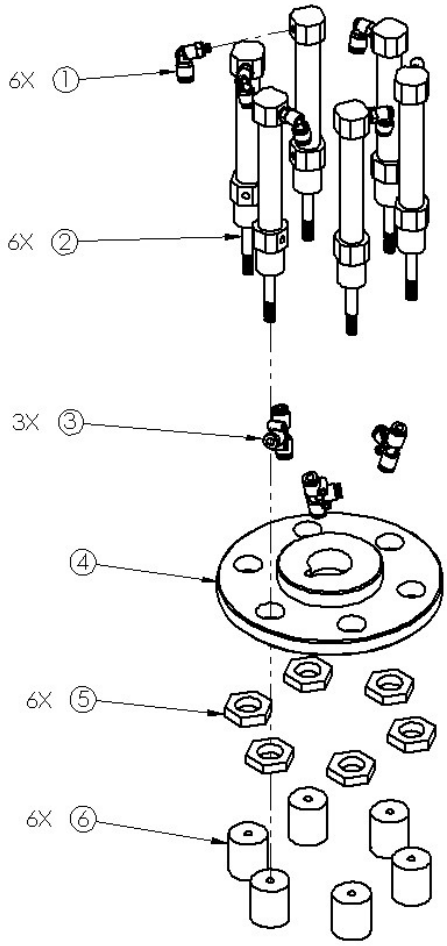
ROTATATING BEARING ASSEMBLY

1. ENSURE ITEM 6X ② IS FASTENED WELL WITH ITEM 6X ⑤
2. THE PUSH TO CONNECT FITTINGS (ITEM 6X ①) SHOULD NOT POINT OUTWARDS. THEY NEED TO STAY SLIGHTLY ON THE INSIDE TO PREVENT RUBBING WITH THE COVER ONCE IT IS INSTALLED
3. ITEM 3X ③ IS USED DURING AIR HOSE CONNECTING



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	PTC-M5-E-M-4MM	FEMTO-1100S M5- ¢ 4quick plug	6
2	FMS-002	FEMTO-1100S Cylinder, ISB12*42 2, 42mm	6
3	PTC-T-4MM	FEMTO-1100S T style ¢ 4 three way quick plug	3
4	FMS-M-001	cylindrical piston backing plate	1
5	STOCK	Piston Nut	6
6	FM-AL-BOOT	FEMTO Aluminum Boot	6

FEMTO-1100S Assembly

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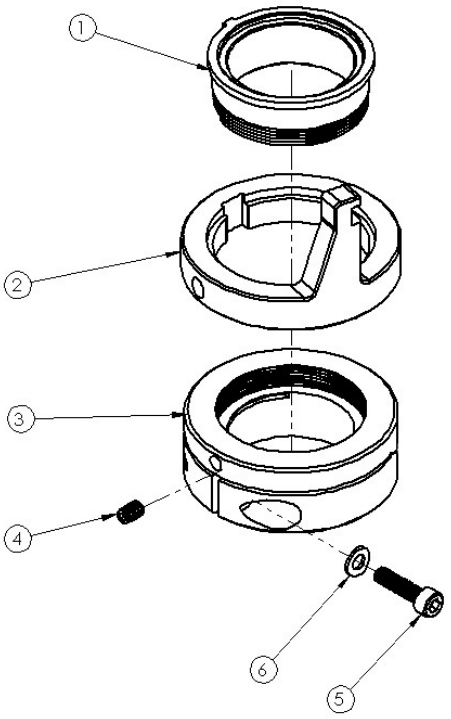
HEIGHT ADJUSTMENT COLLAR

1. USE ITEM (1) TO CONNECT ITEM (2) TO ITEM (3). THREAD ON ITEM(1) UNTIL ITEM (2) IS SECURED IN PLACE. SCREW IN (4) TO LOCK ITEM (1) IN PLACE AND STOP IT FROM ROTATING FURTHER
2. USE A HARDNED STEEL BOLT FOR ITEM (5)
3. A SMALL AMOUNT OF GREASE SHOULD BE USED ON THE TOUCHING SURFACES BETWENE ITEMS (2) AND (3)



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	FMS-M-016	Hieght Adjustment Collar 2	1
2	FMS-M-015	FEMTO-1100S regulating sleeve	1
3	FMS-M-012	FEMTO-1100S Height adjustment collar 1	1
4	STOCK	M5 0.8X10MM	1
5	STOCK	Hardened SteelAllen Head Bolt M5 0.8x20mm	1
6	STOCK	M5 Flat Washer	1

FEMTO-1100S Assembly

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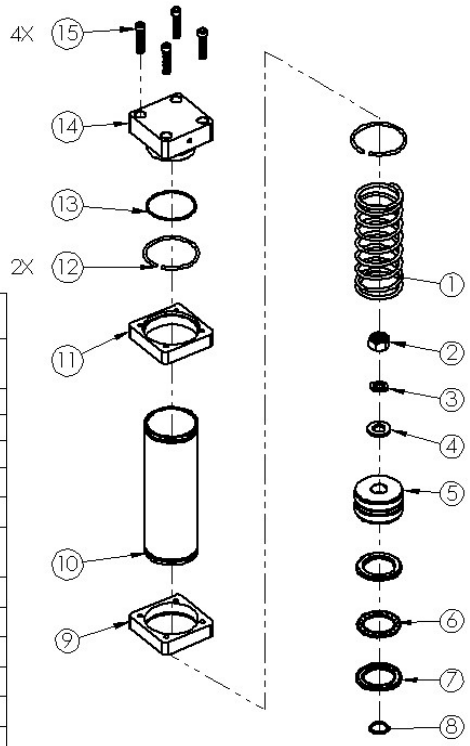
POST ACTUATOR

1. ITEM ② SECURES TO THE TOP OF THE FEMTO POST



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	FMS-AC11	FEMTO-1100S Spring(T:3.2, ID 40.5, L:125, 10 circles)	1
2	STOCK	Hex Nut (19mm) M12 x 1.75 x 9.75mm	1
3	STOCK	M12 LOCK WASHER	1
4	STOCK	M12 WASHER	1
5	FMS-AC01	FEMTO-1100S Piston block of post-actuator	1
6	FMS-AC07	FEMTO-1100S Surface bearing	1
7	STOCK	FEMTO 1100 Bushing Washer and Bearing Race	2
8	FMS-AC08	FEMTO-1100S O-ring of post-actuator	1
9	FMS-AC03	FEMTO-1100S Flange of post-actuator	1
10	FMS-AC04	FEMTO-1100S Sleeve of post-actuator	1
11	FMS-AC05	FEMTO-1100S Flange of post-actuator	1
12	FMS-AC09	FEMTO-1100S Jump ring of post-actuator	2
13	FMS-AC02	FEMTO-1100S White wearing ring of post-actuator	1
14	FMS-AC06	FEMTO-1100S End cap of post-actuator	1
15	STOCK	Allen Bolt (5mm Allen) 6mm x 1.0 x 30	4

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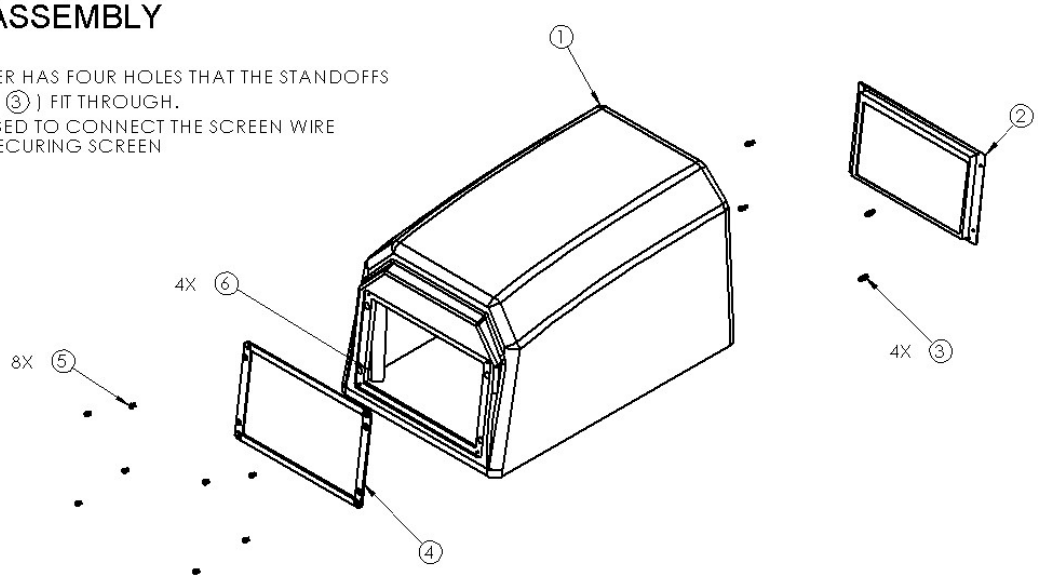
COVER ASSEMBLY

1. THE COVER HAS FOUR HOLES THAT THE STANDOFFS (ITEM 4X ③) FIT THROUGH.
2. IT IS ADVISED TO CONNECT THE SCREEN WIRE BEFORE SECURING SCREEN



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	FMS-001	FEMTO-1100S FRP COVER	1
2	SRN-T-7IN	7inch touch screen	1
3	STOCK	M3x7mm Brass Standoff	4
4	FMS-F-004	FEMTO-1100S Front panel	1
5	STOCK	Flat Head M3 0.5x6mm	8
6	STOCK	M3 Hex Nut	4

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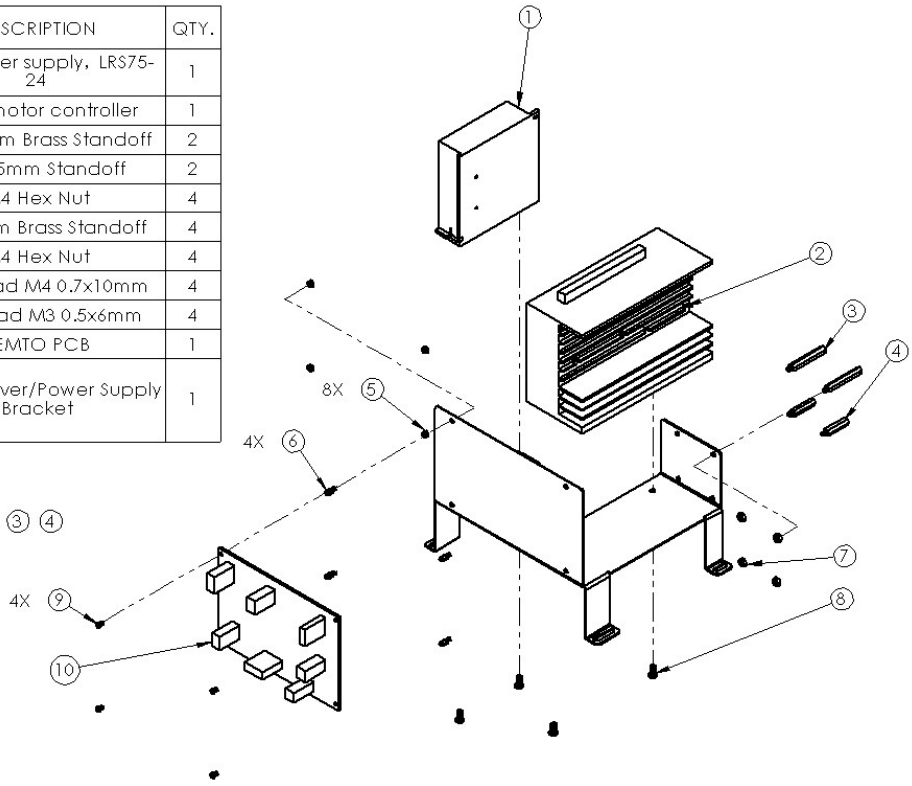
MOTOR CONTROLLER

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	PS-24V-LRS75-24	24V power supply, LRS75-24	1
2	MD-110220-SVO	servo motor controller	1
3	STOCK	M4x40mm Brass Standoff	2
4	STOCK	M4x25mm Standoff	2
5	STOCK	M4 Hex Nut	4
6	STOCK	M3x7mm Brass Standoff	4
7	STOCK	M4 Hex Nut	4
8	STOCK	Pan Head M4 0.7x10mm	4
9	STOCK	Flat Head M3 0.5x6mm	4
10	PCB-FMS	FEMTO PCB	1
11	MOTOR CONTROLLER ASSEMBLY	Motor Driver/Power Supply Bracket	1

PROPER ORDER OF ASSEMBLY:

1. PCB AND STANDOFFS (10)
2. AIR REGULATOR STANDOFFS (3) (4)
3. MOTOR CONTROLER (2)
4. POWER SUPPLY (1)



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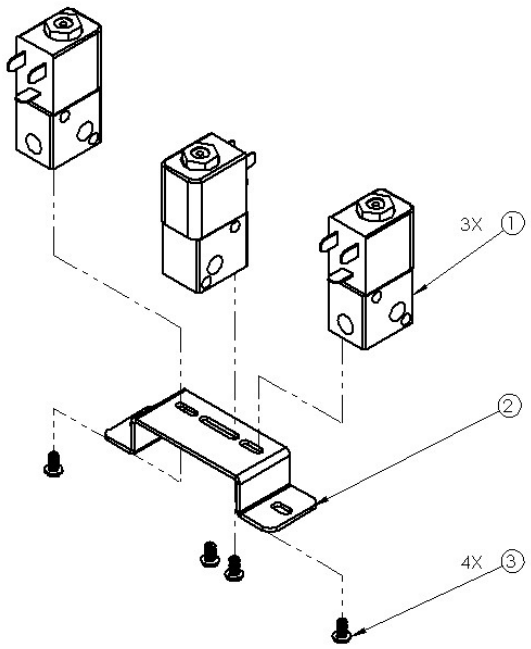
Solenoid Bracket

1. INSTALL ALL HOSE FITTINGS PRIOR TO ASSEMBLY (USE AIR HOSE DIAGRAM FOR REFERANCE)



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	FMS-E-001	pneumatic electromagnetic valve, 3V1-06 DC24V)	3
2	FMS-F-005	FEMTO Solinoid Bracket	1
3	STOCK	M4 0.7x8mm	4

FEMTO-1100S Assembly

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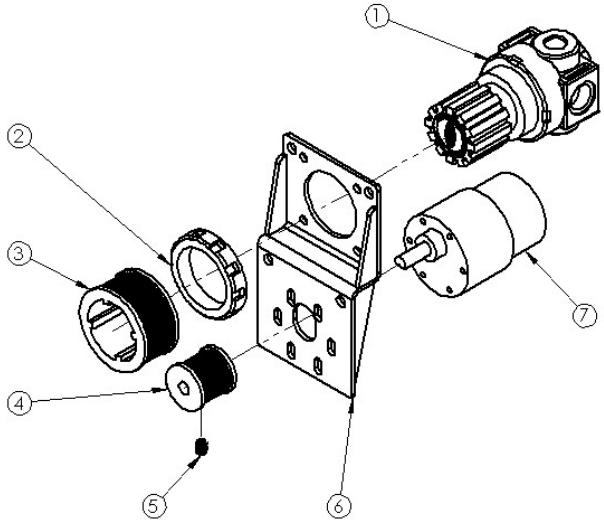
PRESSURE ADJUSTMENT

1. ENSURE THAT ITEM (1) IS TURNED TO THE FULLY "OPEN" POSITION BEFORE INSTALLING
2. A BELT IS CONNECTED TO ITEMS (3) AND (4). SECURE WITH HARDWARE SHOWN ON LATER PAGE
3. TIGHTEN BELT BY PUSHING DOWN ON MOTOR AND SECURING WITH HARDWARE



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	AR-001	FEMTO-1100S NR200-02 Air regulator	1
2	STOCK	Air Regulator Fastening Nut	1
3	FMS-M-017	Air Regulator Gear	1
4	FMS-M-018	FEMTO-1100S 12V motor synchronous wheel	1
5	STOCK	M4 0.7x6	1
6	FMS-F-002	FEMTO-1100S Bracket-1	1
7	MOT-12VDC	DC Motor, 12V, 76 RPM	1

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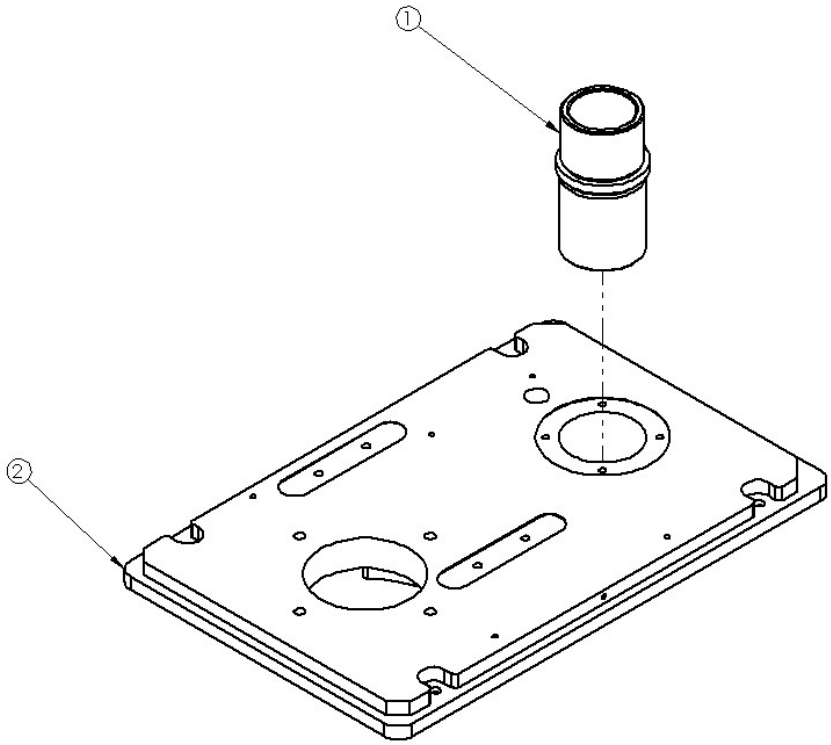
STEP 1



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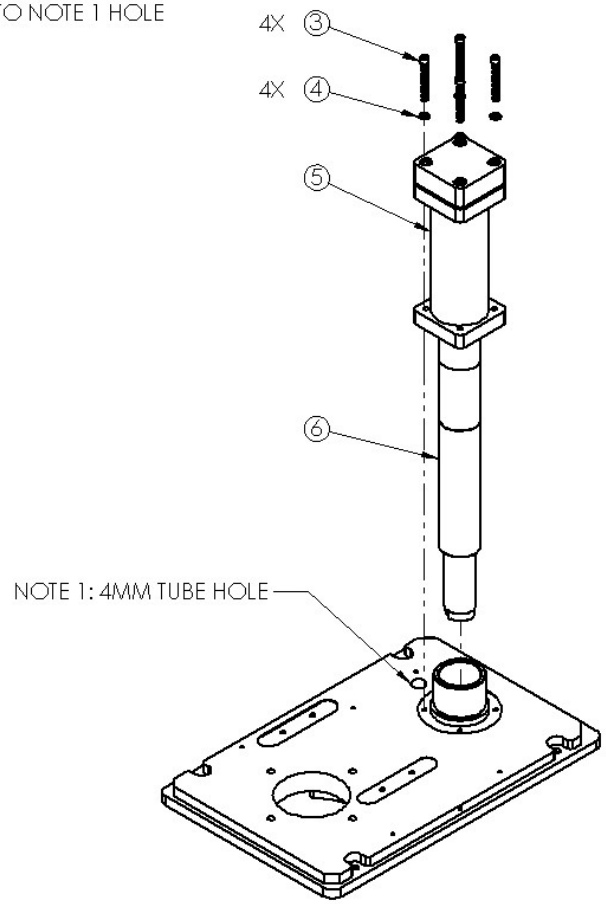
STEP 2

STEP TWO INSTRUCTIONS:
1. INSTALL POST ACTUATOR WITH TUBE FITTING POINTED TO NOTE 1 HOLE



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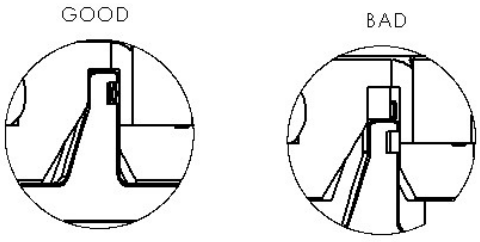
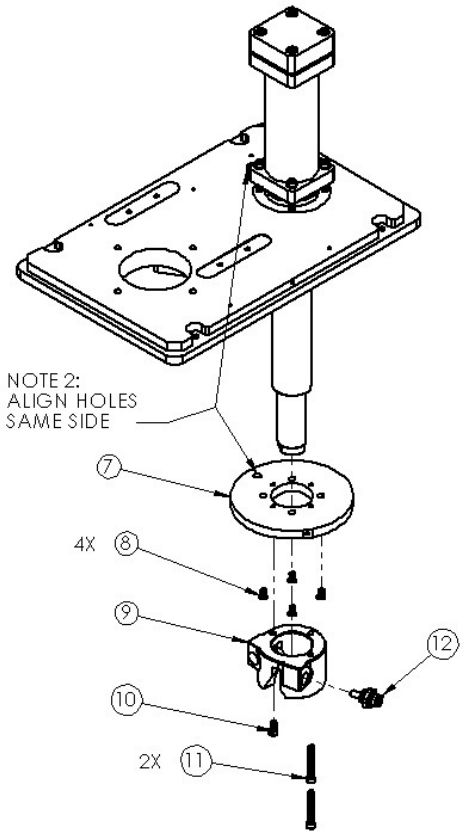
STEP 3

STEP THREE INSTRUCTIONS:

1. INSTALL ITEM (9)
2. INSTALL ITEM (12)
   1. ENSURE ITEM (12) DOES NOT STICK OUT INTO THE SLOT ON ITEM (9) . THIS WILL CAUSE DAMAGE TO THE MACHINE
   2. USE LOCK NUT TO SECURE





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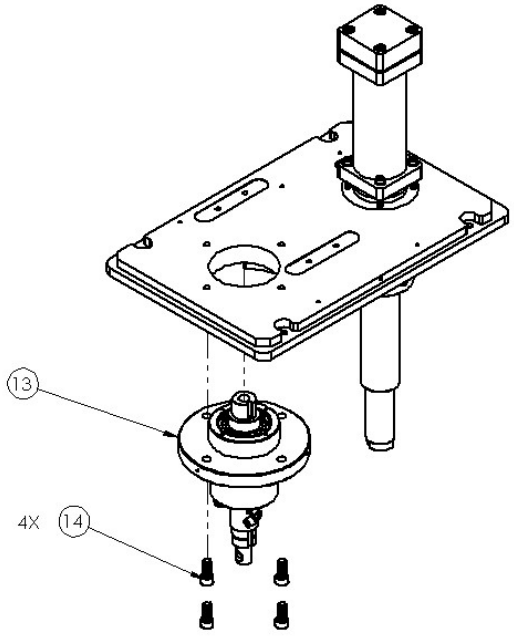
STEP 4

STEP FOUR INSTRUCTIONS:
1. INSTALL ITEM (13)



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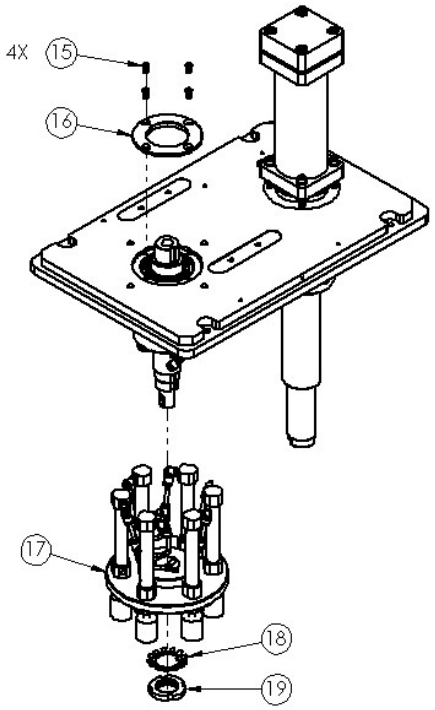
STEP 5

STEP FIVE INSTRUCTIONS:

1. INSTALL ITEM (16) TO HOLD IN BEARINGS
2. USE KEY WHEN INSTALLING ITEM (17)
3. TIGHTEN ITEM (19) WITH A HAMMER AND FLAT HEAD UNTIL SECURE
    1. IF THERE IS ANY WOBBLE IN ITEM (17) THEN THE BOLT NEEDS TO BE TIGHTENED MORE
    2. ONCE TIGHT SECURE THE NUT WITH ONE OF THE FLAPS ON ITEM (18) BY BENDING IT DOWN AND INTO A SLOT



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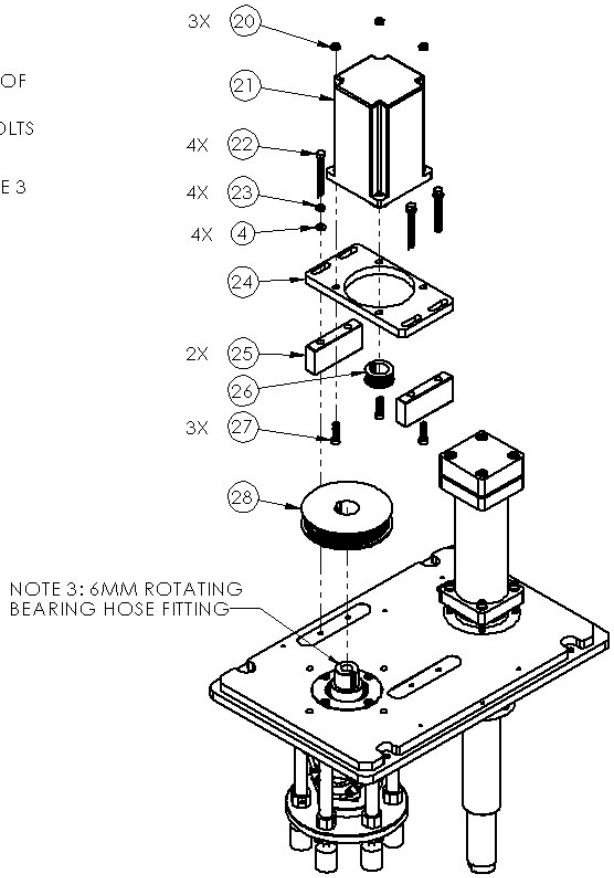
STEP 6

STEP SIX INSTRUCTIONS:

1. ATTACH MOTOR TO ITEM (24) USING BOLTS
   1. POSITION MOTOR WITH WIRES POINTED TO THE BACK OF THE MACHINE
2. INSTALL BELT AROUND ITEMS (28) AND 2X (25). TIGHTEN BOLTS 4X (22) WHILE PULLING TENSION TO SECURE IN PLACE
3. INSTALL ROTATING BEARING 6MM TUBE FITTING ONTO NOTE 3 (SEE AIR HOSE DIAGRAM)



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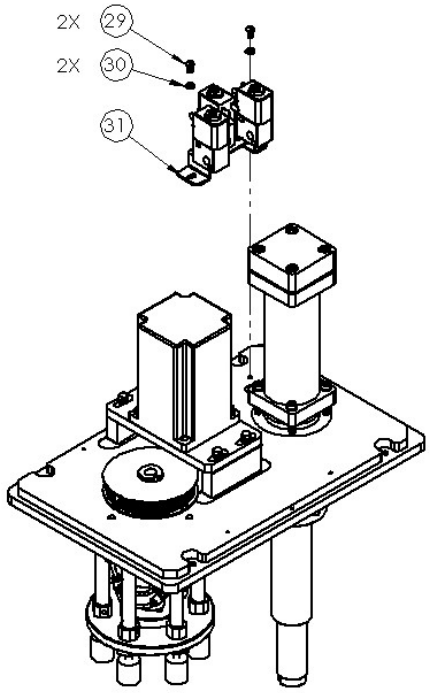
STEP 7

STEP SEVEN INSTRUCTIONS:
1. INSTALL SOLENOID ASSEMBLY AS SHOWN



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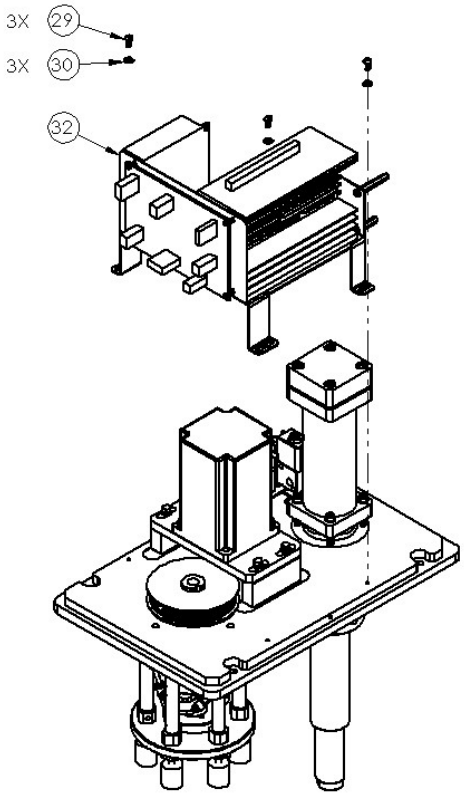
STEP 8

STEP EIGHT INSTRUCTIONS:
1. INSTALL AS SHOWN



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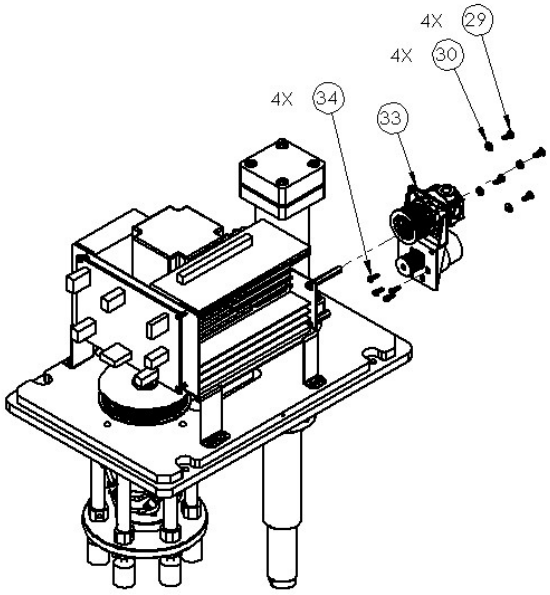
STEP 9

STEP NINE INSTRUCTIONS:
1. INSTALL AS SHOWN
2. AFTER INSTALLATION; WIRE THE MACHINE
   1. FOLLOW WIRE DIAGRAM FOR WIREING INSTRUCTION
3. USE THE AIR HOSE DIAGRAM TO CONNECT ALL PNUMATICS



FEMTO-1100S Assembly

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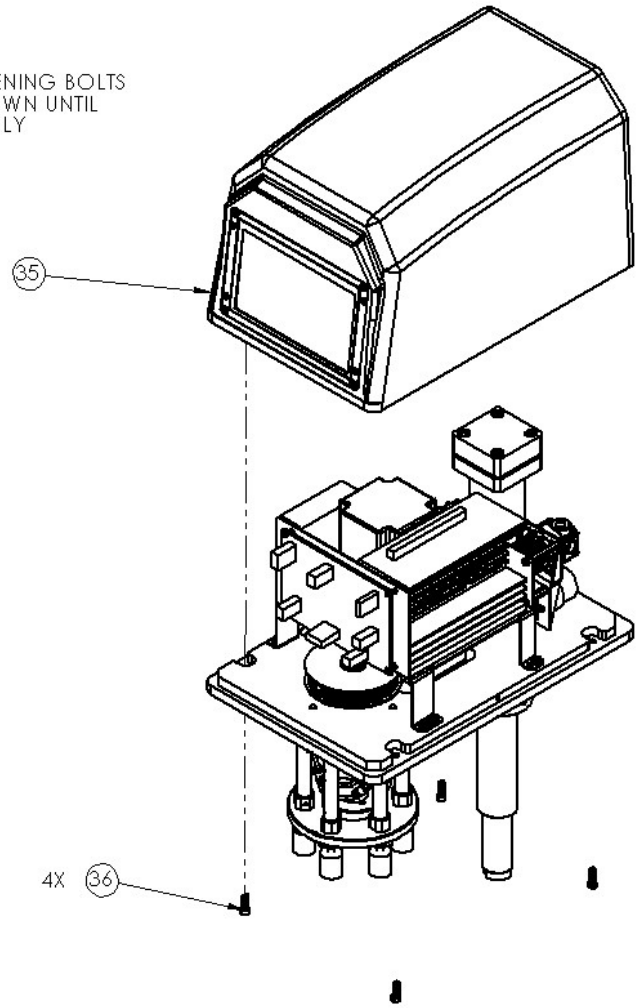
STEP 10

STEP TEN INSTRUCTIONS:
1. CONNECT SCREEN WIRE TO PCB PRIOR TO TIGHTENING BOLTS
    1. IT IS ADVISED TO WAIT TO TIGHTEN HOOD DOWN UNTIL AIR AND ELECTRICAL ARE TESTED THOROUGHLY



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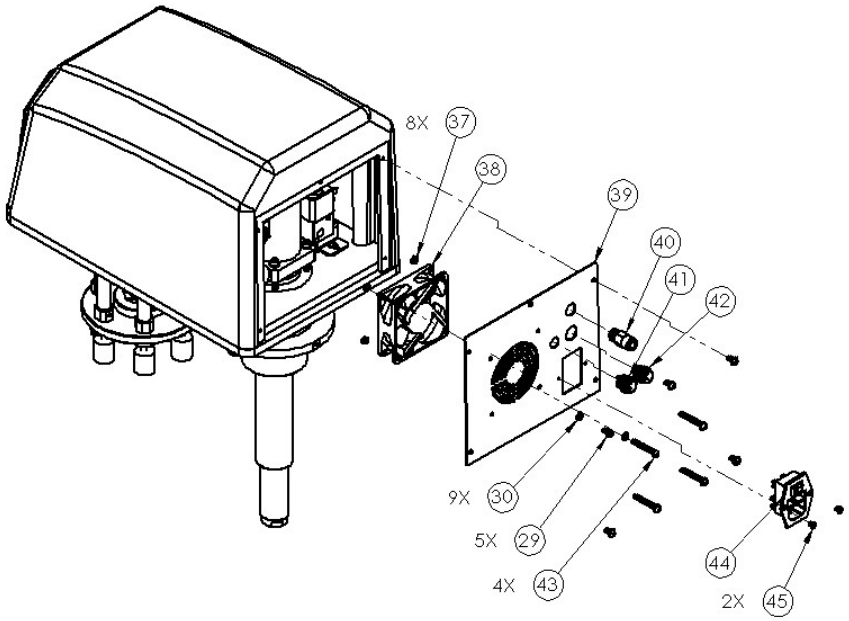
STEP 11

STEP ELEVEN INSTRUCTIONS:

1. ITEM (41) IS THE SMALLER ZETA CONNECTOR
2. ITEM (40) IS A DOUBLE FEMALE 6MM HOSE CONNECTOR
3. ITEM (44) TAKES A 6AMP FUSE



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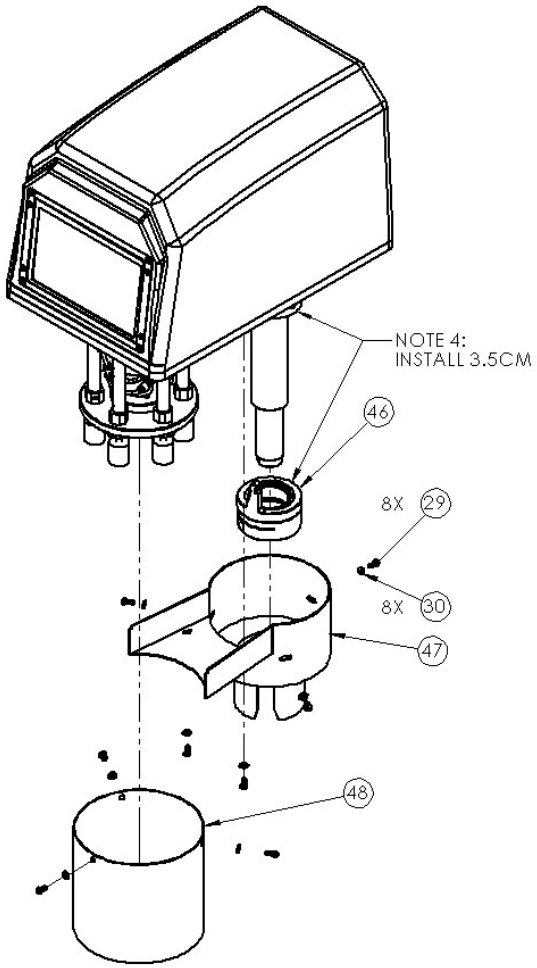
STEP 12

STEP TWELVE INSTRUCTIONS:
1. ITEM (46) REQUIRES A HARDENED BOLT FOR LOCKING POSITION



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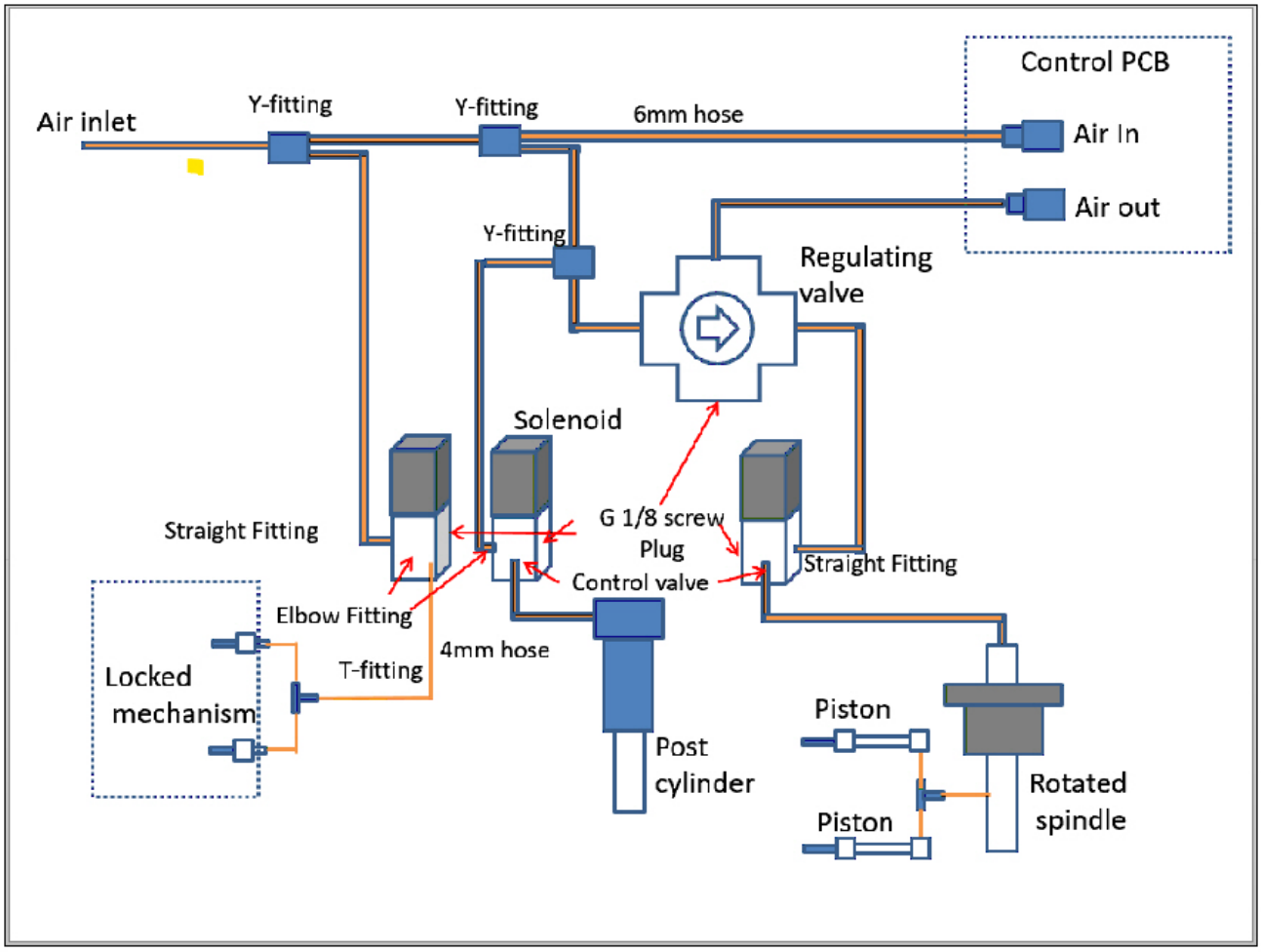
AIR HOSE DIAGRAM



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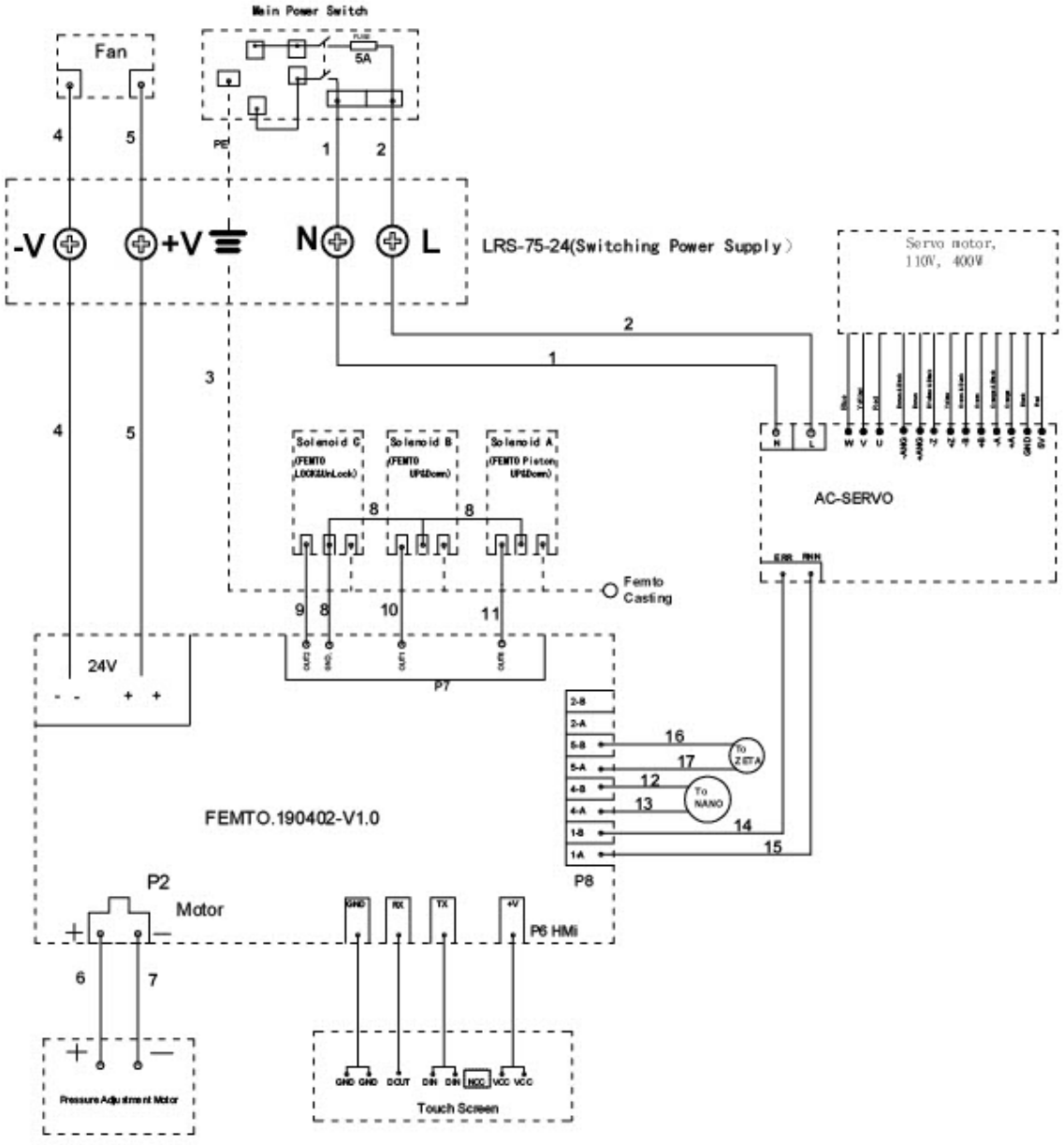
WIRING DIAGRAM



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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	FMS-M-006	Cylinder Mold	1
2	FMS-M-009	FEMTO Base Casting	1
3	STOCK	Allen Head Bolt M5 0.8x45mm	4
4	STOCK	M5 Flat Washer	9
5	FEMTO POST ACTUATOR	FEMTO Sleeve of post-actuator	1
6	FMS-M-002	FEMTO Shaft	1
7	FMS-M-013	FEMTO Lock PLate	1
8	STOCK	Flat Head Screw M5 0.8x10	4
9	FMS-M-014	FEMTO Locking Mechanism	1
10	STOCK	Allen Head Bolt M5 0.8x10mm	1
11	STOCK	Allen Head Bolt M5 0.8x40mm	2
12	FMS-006	FEMTO Locking Piston	1
13	ROTATING ASSEMBLY TOP	Rotating Housing Base Flange	1
14	STOCK	Allen Head Bolt M8 1.25x20	4
15	STOCK	Flat Head M4 0.7x10mm	4
16	FMS-M-011	Rotating Housing Top Cover	1
17	ROTATING ASSMBLY BOTTOM	Rotating Assembly Piston Holder	1
18	FMS-AC13	M24 Locking Washer	1
19	FMS-AC12	M24*1.5mm Round Lock Nut	1
20	STOCK	M5 Hex Nut	3
21	MOT-SVO-750	servo motor ,110V ,400W Y01320LB	1
22	STOCK	Hex Head M5 0.8x50mm	4
23	STOCK	Locking Washer M5	4
24	FMS-M-008	FEMTO Motor Mounting Bracket	1

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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
25	FMS-M-007	Motor Mounting Block	2
26	FMS-M-004	FEMTO Motor Gear	1
27	STOCK	Allen Head Bolt M5 0.8x20mm	3
28	FMS-M-005	Motor Drive Gear	1
29	STOCK	Pan Head M4 0.7x10mm	26
30	STOCK	M4 Flat Washer	26
31	FEMTO SOLINOID ASSEMBLY	FEMTO Solinoid Bracket	1
32	MOTOR CONTROLLER ASSEMBLY	Motor Driver/Power Supply Bracket	1
33	AIR REGULATOR ASSEMBLY	Air Regulator Mounting Bracket	1
34	STOCK	Allen Head Bolt M3 0.5x16mm	4
35	COVER ASSEMBLY	FEMTO SMC Cover	1
36	STOCK	Allen Socket Head M5 0.8x16m	4
37	STOCK	M4 Hex Nut	8
38	80MM-FAN	80mm Fan	1
39	FMS-F-001	FEMTO Back Panel	1
40	STOCK	DOUBLE FEMALE 6MM HOSE COMPRESSION FITTING	1
41	STOCK	GX16 Circular Push-Pull Connector- 2-male	2
42	STOCK	Femto Communication cable port male	1
43	STOCK	Pan Head M4 0.7x19mm	4
44	POW-F-SWITCH	Power Switch With Fuse	1
45	STOCK	M4 0.7x6mm	2
46	COLLAR ASSEMBLY	HEIGHT ADJUSTMENT COLLAR	1
47	FMS-F-003	Locking Collar Guard	1
48	FMS-F-006	Piston rod housing	1