

MAGUIRE PRODUCTS INC.

Peristep® 4-Roller Pump

Model MS4 Peristaltic Liquid Color Pump®

INSTALLATION • OPERATION • MAINTENANCE



Maguire MS4 4-Roller Pump

This document is the Original Instructions manual of the Maguire MS4 4-Roller Pump.

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To every person concerned with the use and maintenance of the Maguire MS4 4-Roller Pump it is recommended to read thoroughly these operating instructions. Maguire Products Inc. accepts no responsibility or liability for damage or malfunction of the equipment arising from non-observance of these operating instructions. Any modifications or amendments to the equipment, without prior consent of the manufacturer, may invalidate CE compliance of the equipment.

To avoid errors and to ensure trouble-free operation, it is essential that these operating instructions are read and understood by all personnel who are to use the equipment.

Should you have problems or difficulties with the equipment, please contact Maguire Products Inc. or your local Maguire distributor.

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Manufacturer's Contact Information

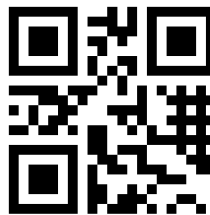
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Model MS4 PeriStep™ 4-Roller Pump

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Principles of Pump Operation

The MAGUIRE PeriStep™ pump is designed for years of rugged industrial service with little or no maintenance. Only the inexpensive pumping tube needs to be replaced from time to time to keep these units performing like new.

Metering is accomplished by the compression and release of a flexible pumping tube. These peristaltic pumps are true positive displacement pumps. Unlike other positive displacement pumps such as piston, gear, diaphragm, and rotary screw pumps, a peristaltic pump has no seals, check valves or clearances to allow even the slightest internal leakage. Liquid is retained within a flexible tube at all times and never comes into contact with any surfaces of the pumping mechanism. There are no check valves used at all. Where tubing passes through the pump head, rollers alternately close off a portion of the tube and squeeze the liquid inside the tube forward by rolling over the tube in the forward direction. As the tube behind the roller springs back to its original round shape, the expanding inside cavity creates a vacuum that draws liquid into the tube. At least one roller is always in the position of closing off the tube completely, thereby assuring that no liquid can "leak" backwards.

Pumping is so complete that this type of pump can pump air as effectively as liquid and can develop a near full vacuum of 30 inches of mercury. These pumps are self-priming and will pass any entrapped air bubbles in the liquid through the pump without loss of prime.

A highly accurate stepper motor drives the pump's rollers. As the rollers move over the tube, they cause the liquid inside to be squeezed forward in small uniform increments. The accuracy of these pumps for metering small amounts of viscous liquids is unmatched.

Principle of Controller Operation

Contact closure, *or mechanically switched 24 to 120 VAC screw signals are fed into the MS4 via the white and black wires of the signal cord for continuous extrusion and injection molding applications.

*MS4 pumps sold prior to 2017 utilize a contact closure only screw signals.

The MS4 will also work in extrusion following applications by being fed variable 0-10 V DC via separate the red (+) and green (-) wires of the signal cable.

Unlike any previous liquid color pump, the MS4 PeriStep™ liquid color pump has an input parameter for the liquid color density (lbs/gal or kg/l). Because of this, a weight calibration is not required. Simply enter in the liquid color density that you are metering, and set the tube color (green, red, or clear) that you are using with the pump. With the correct data entered, the MS4 will always provide accurate, consistent throughput.

When used in cycle mode, the speed of the stepper motor is automatically controlled by the internal microprocessor to allow color metering to occur uniformly over the entire screw return cycle. The operator will need not to be concerned with motor speed adjustment. Changing cycle times or fluctuations in plant voltage are automatically detected and compensated for and, therefore, will have no effect on metering accuracy.

Two innovations are key to the MS4 PeriStep™ liquid color pump. Instead of a standard motor, the drive system is a stepper motor whose shaft rotates in discrete, minute increments that make possible precision and repeatability of movement. This motor drives a central "sun" roller, whose motion transfers to the "planetary" rollers that provide the compression / relaxation

cycle of a peristaltic pump. The sun roller drives the planetary rollers by means of friction contact, providing a 5 to 1 speed reduction without a gear box.

Pump Tubing & Throughput Specifications

The MS4 PeriStep™ liquid color pump utilizes the same 3 tube sets that our traditional MPA series pumps utilize. The tube sets are: green, red, and clear. They vary in size according to their color. Larger tube will offer a higher throughput capability, whereas smaller tubing will offer higher resolution. A choice should be made according to the user's specific application.

The MS4 PeriStep™ liquid color pump will ONLY operate properly with the 3 choices of Maguire supplied tube sets. Maguire tubing is readily available. Refer to our part numbers listed below when ordering.

IMPERIAL					
	EXTRUSION CONTINUOUS DOSING RANGE			MOLDING-CYCLICAL DOSING RANGE	
Tube Set	MIN (lbs/hr)	MAX (lbs/hr)		MIN (lbs/hr)	MAX (lbs/hr)
GREEN (1/8" I.D.)	0.006	9.5		0.04	3.2
Red (3/16" I.D.)	8.6	20.4		2.9	6.8
CLEAR (1/4" I.D.)	18.4	32.2		6.1	10.7
METRIC					
	EXTRUSION CONTINUOUS DOSING RANGE			MOLDING-CYCLICAL DOSING RANGE	
Tube Set	MIN (kg/hr)	MAX (kg/hr)		MIN (kg/hr)	MAX (kg/hr)
GREEN (3.18 mm I.D.)	0.003	4.3		0.02	1.4
Red (4.76 mm I.D.)	3.9	9.3		1.3	3.1
CLEAR (6.35 mm I.D.)	8.3	14.6		2.8	4.9
-Based off liquid density of 10 lbs/gal (1.198 kg/l)					
-Based off an avg. cycle time of 33%					
-Minimum suggested rate generated for best resolution					

Maguire Pump Tubing Part numbers:

1/8" Green

- Entire pickup assembly: **at04**
- Pump tube with fittings: **at07**
- Pump tube only: **tur24**

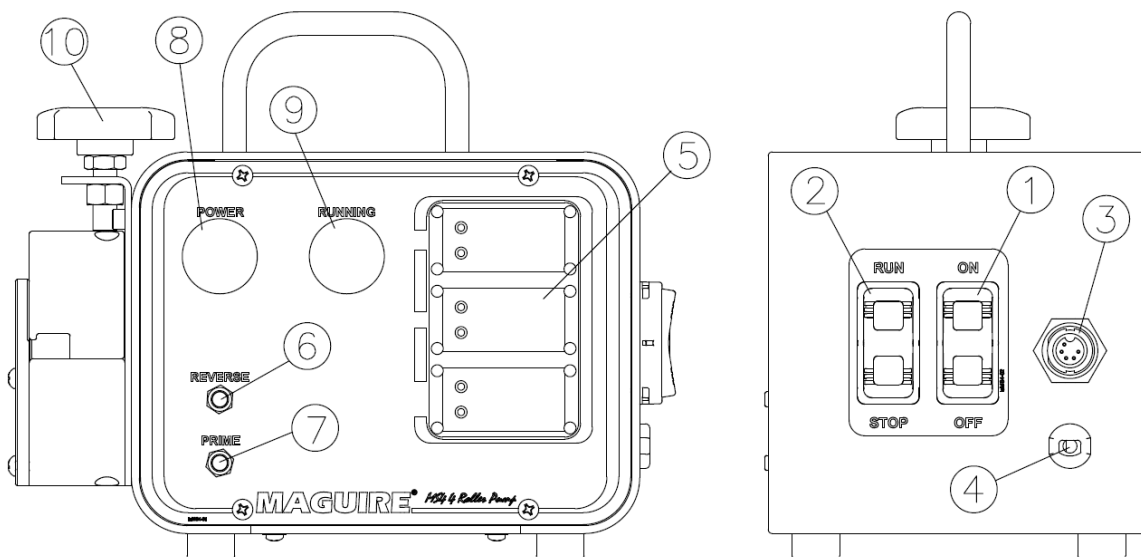
3/16" Red

- Entire pickup assembly: **at05**
- Pump tube with fittings: **at08**
- Pump tube only: **tur35**

1/4" Clear

- Entire Pickup assembly: **at06**
- Pump tube with fittings: **at09**
- Pump tube only: **tur46**

Description of Controls



1. ON/OFF Switch

The power switch is simply the internal connection between the pump's power cord and the pump's power supply. This switch has an internal indicator light that will glow when it is switched on and 120/230 VAC is present.

2. Run Switch

This switch must be set to "RUN" mode anytime the pump is to be operational. Alternatively, this switch must be set to "STOP" anytime an operator needs to run the "PRIME" or "REVERSE" functions. In order to access and sub menus via the boot-sequence, the Run switch must remain in the "STOP" position.

3. 5-Pin Connector Jack

The 5-pin connector jack, used along with the pump's supplied signal cable, provides two separate inputs used to interface the pump with surrounding equipment. This is where a screw signal is fed for continuous extrusion and injection molding applications, and a 0-10v DC signal is fed for extrusion following applications. The 5-pin jack/cable pin-out is as follows:

- Pin #1 (white wire in signal cable)

Screw signal's contact closure *or mechanically switched 24 to 120 VAC

- Pin #2 (black wire in signal cable)

Screw signal's contact closure *or mechanically switched 24 to 120 VAC

*MS4 pumps sold prior to 2017 utilize a dry contact closure only screw signals

- Pin #3 (red in signal cable): Positive lead for 0 to 10 VDC (extrusion following applications only)

- Pin #4 (green in signal cable): 0-volt lead for 0 to 10 VDC (extrusion following applications only)

- Pin #5 (cable shield)

4. AC Power Cord

5. 3-Window Digital Thumbwheel

These 3 windows serve as the pump's display and control interface. Each window is equipped with two push buttons. These pushbuttons are used to adjust the parameter of the window, which they are located next to. Various combinations of these pushbuttons are also used during boot sequences to access the sub-menu screens.

6. Reverse Button

When pressed and held, the “REVERSE” button will do exactly the opposite as the “PRIME” button. This is used to run the pump’s rollers in reverse to pull liquid away from the end of the tubing. This is typically done before changing a used tube set. The run switch must be off, and the pump head must be closed.

7. Prime Button

When pressed and held, the “PRIME” button will run the pump’s rollers at full speed. This is used to quickly bring liquid to the end of the tubing after a tube set is installed into the pump. The run switch must be off, and the pump head must be closed.

8. Power Indication LED

This white LED is illuminated when the pump is turned on.

9. Running Indication LED

This Green LED illuminates anytime the pump head is turning.

10. Hand screw

Turn clockwise to close pump head, turn counter-clockwise to open.

MS4 Pump Startup Procedure

1. Place color drum next to process machine.

2. Install pickup lance into liquid container for suction pickup of liquid, or attach tubing assembly in accordance with color manufacturer's recommendations.

3. There should be provision for attaching the poly-tubing to the process machine so as to allow color to be metered in directly over the feed section of the screw, or into a pre-mixer if one is installed. Assuming provisions have been made, attach or install the poly-tubing to the process machine as required. (The best color mixing without color contamination of the feed throat of your machine is obtained when the color delivery tube is positioned approximately 1/2-inch over the screw at the forward edge of the feed throat toward the side of the screw that is turning downward.)

NOTE: Adaptor Plates are available from MAGUIRE PRODUCTS that mount between the hopper and feed throat. This will allow easy insertion and removal of the color delivery tube into the feed throat of the process machine.

4. Connect the power and signal cord as follows:

Plug the pump’s power cord into a standard 120 or 230 volt continuous power source. Plug the shielded 4-conductor signal cord into the 5-pin jack located on the same side of the pump. This is where a screw signal is fed to the pump in continuous mode, or a timing signal for cycle mode (**see “wiring diagram” section of the manual on page XXXXXXXXXX**). If the pump is being used for extrusion following, the red (+) and green (-) wires should be connected to the 0-10 VDC extrusion speed signal. A screw signal fed between the white and black wires are not required in extrusion following applications unless the operator turns on the auto-stop parameter.

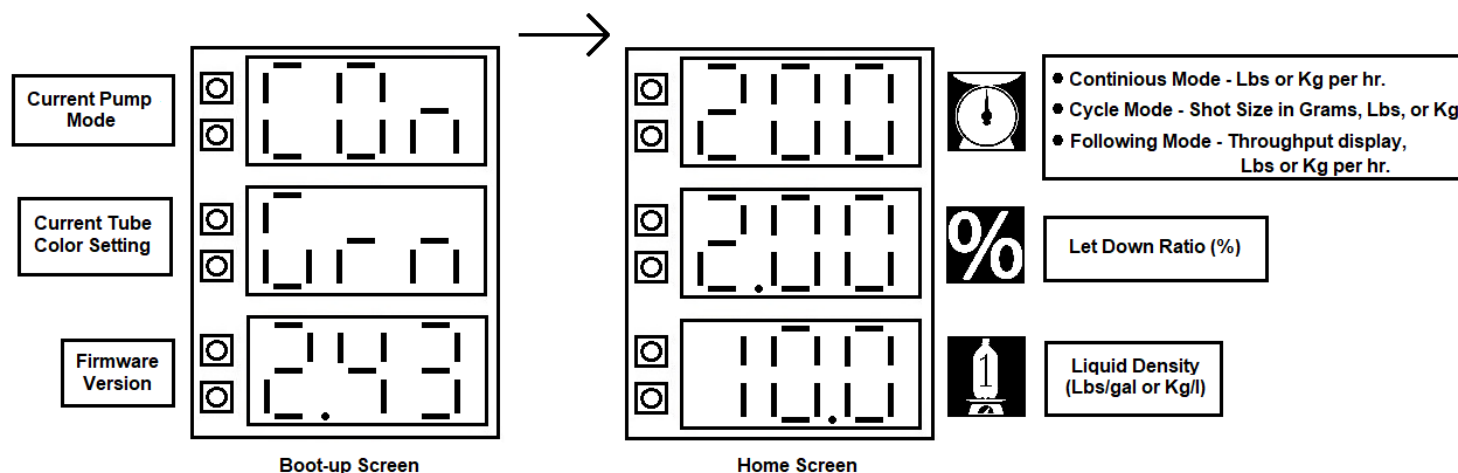
5. Open the pump head by turning the hand screw counter-clockwise. Complete removal of the hand screw is not necessary. Lay the pump tube into the slot above the rollers in the pump head. The brass tube-inlet fitting should be against the right side of the pump head that faces forward.

The tube, properly installed, will be in contact with only the uppermost two rollers. The inlet end of the tube will be resting against the side of the pump head that faces forward. The tube will pass through the pump body in a nearly straight line and reappear out the other side of the pump head. Be sure that the tubing is pushed into the pump head far enough so that is not pinched by the outer portion of the pump head when it is to be closed. Close the pump head by turning the hand screw clockwise until the top portion of the pump head meets the bottom portion firmly. This should be lightly tightened. Over tightening the hand screw is unnecessary.

6. The pump can now be turned on via the power switch. Be sure to check if the pump is set to the correct units (Imperial or Metric). **Directions on this are located on page 12, 13, & 14.** After this is done, the user should set their desired mode, tube color (size), Throughput or shot size, let down ratio, and fluid density. These settings are set within the home, program, and sub-program screens. Here descriptions of those various screens, and how to adjust all the parameters within them:

Boot-up Screen

Turn the pump on and the boot screen will appear. The top window will display the mode that the pump is currently set to. The middle will display the current tube color setting. The bottom window will display the software version. After about 4 seconds, the home screen will appear.



Home Screen

In Continuous mode, the top window is the input for throughput (in lbs/hr or Kg/hr). This can be adjusted at any time during the pump's operation from the home screen using the two buttons next to the top window.

In Cycle mode the top window is the input/display for the shot size (in grams, Kg, or Lbs). This can be adjusted at any time during the pump's operation from the home screen using the two buttons next to the top window.

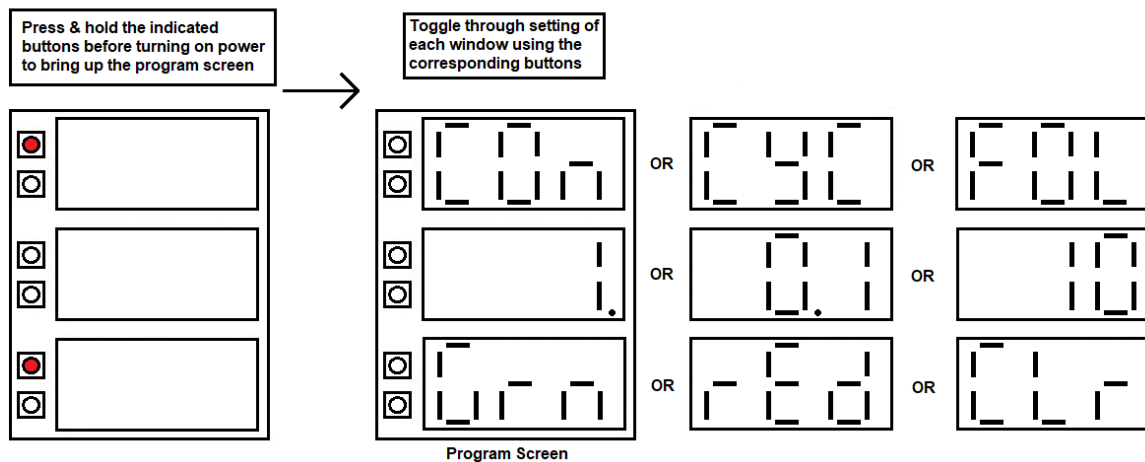
In Extrusion Following mode the top window only shows the live extruder throughput (in Lbs or Kg per hour). The maximum extruder output (XMO) setting is entered in the sub-program screen (see page 13).

In all modes, the middle window is the input/display for the let down ratio, or LDR. This can be adjusted at any time during the pump's operation from the home screen using the two buttons next to the middle display.

The bottom window is the input/display for the liquid density in Lbs/gal or kg/l. This parameter must be set by the user. It can be adjusted from the home screen using the two buttons next to the bottom window.

Program Screen Settings

The pump's mode of operation, X-factor setting, and tubing color (size) are all set within the program screen.



(20 seconds after parameters are set, the pump will automatically save all settings, and return to the home screen.)

The 3 different modes of operation, which are set in the top window include:

- “CO” for continuous extrusion applications.
- “CYC” for Injection molding applications.
- “FOL” for extrusion following applications, using a 0-10 vdc signal.

The 3 different “X-factors” are simply a multiplication parameter that applies to the top display window of the home screen, which allows the user to enter a larger range of throughput or shot size settings. The factory default is set to “1.”

- “0.1” Will allow the user to enter in values within 0 to 99.9, in increments of 0.1
- “1.” Will allow the user to enter values within 0 to 999, in increments of 1
- “10” Will allow the user to enter values within 0 to 9990, in increments of 10

The tubing color setting corresponds to Maguire's 3 different tube size options. This setting must match the actual tubing being used for accuracy. Different tube sizes help to provide a larger dosing range of the pump.

- "Grn" is the setting for our green, 1/8" I.D. tubing.
- "rED" is the setting for our red, 3/16" I.D. tubing.
- "CLr" is the setting for our clear 1/4" I.D. tubing.

Pump Modes & Corresponding Sub-Program Screens

As describe previously, the pump's mode is set from the program screen. The sub-program screen contains additional parameters specific to the pump's current set mode of operation. Depending on which mode the pump is set to, the sub-program screen will populate differently.

Continuous Mode

In Continuous mode, the MS4 will run the pump continuously at a rate set by the user. The top display window will be representative of the process's lbs/hr or kg/hr. The pump will run once the run switch is on, and a proper screw signal is applied to the white and black wires of the signal cable. If the user wants to remove the requirement of a run signal, it can be done via the sub-program screen (see page 12 of the manual).

The throughput of the pump can be calculated by:

PHR (lbs per hour) x LDR (let down ratio)

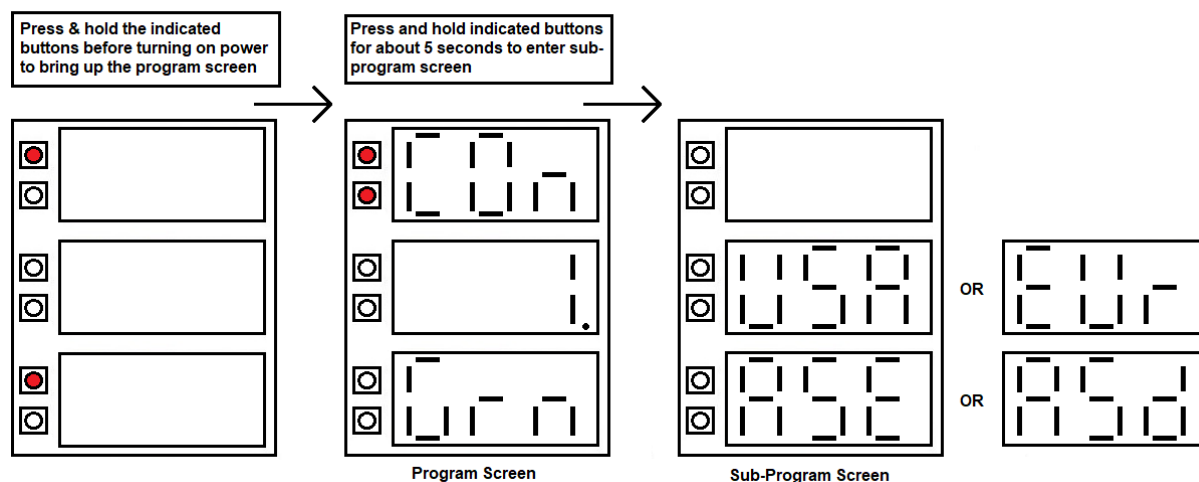
*As an example, PHR is set to **100 lbs/hr**, and LDR set to **2%**.*

*The will dispense at a rate of: (100 lbs/hr) X (2% LDR) = **2 lbs/hr**.*

Continuous Mode Sub-Program Screen

In the middle window, this mode of the sub-program screen allows the user to toggle between imperial ("USA") and metric ("EUr") units. This parameter will change the units of the throughput setting (top window of home screen) between lbs/hr & Kg/hr, as well as the liquid density setting (bottom window of home screen) between lbs/gal & Kg/l.

In the bottom window of the sub-program screen in this mode the sub-program screen allows the user to toggle between auto-stop enable ("ASE") & auto-stop disabled ("ASd"). With auto-stop disabled, the pump will no longer require a run signal to operate. Instead, it will run continuously when the run switch is in the "ON" position.



(20 seconds after parameters are set, the pump will automatically save all settings, and return to the home screen.)

Injection Molding (Cycle Mode)

In Cycle mode, the MS4 will observe the time duration of screw signal between pin 1 and 2 (white and black leads of connected cable), and automatically adjust the pump rate in order to meet the shot size within that time interval of the screw return time. The top display window will be representative of the shot weight (part GRAM weight)

The pump's dispense weight is calculated by:

Shot weight (weight of part) x LDR (let down ratio)

*As an example, shot weight is set to **100 grams**, LDR is set to **2%**, and signal duration is **10** seconds.*

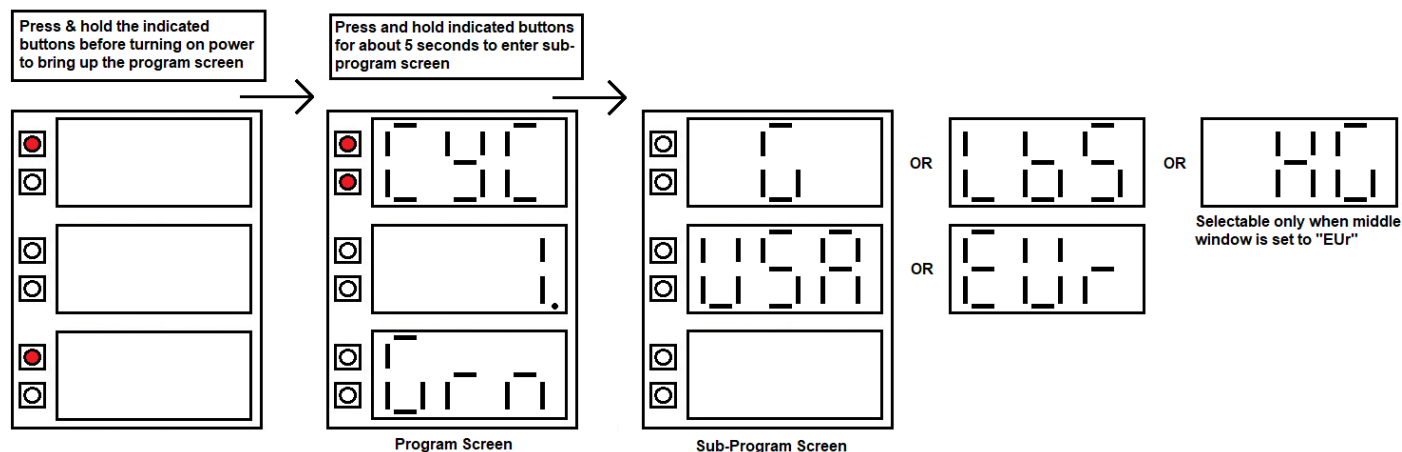
*The pump will dispense: (100 grams) X (2% LDR) = **2.0** grams over the 10-second time interval.*

Please note: The MS4 will not dispense during the very first cycle as it is "learning" the cycle time. After this, it will run every cycle, adjusting each time to any variation in cycle time.

Injection Molding (Cycle Mode) Sub-Program Screen

The top window will allow the user to set the units for the shot weight. This can be set to grams (g), pounds ("LbS") or kilograms ("HG"). Kilogram units are only selectable when the units are set to metric ("EUR") in the middle window.

The middle window allows the user to toggle between imperial (USA) and metric (EUR) units in the middle window. This parameter will change the units of the shot weight (top window of home screen) between grams, lbs or Kg, as well as the liquid density setting (bottom window of home screen) between lbs/gal & Kg/l.



(20 seconds after parameters are set, the pump will automatically save all settings, and return to the home screen.)

Extrusion Following Mode

In Extrusion following mode, a 0-10 VDC signal is fed into the pump over the red (+) and green (-) wires of the attached 5-pin cable. This voltage is a direct representation of your extrusion speed. This voltage will adjust the rate of the pump accordingly. An extruder maximum output (XMO) must first be entered in the pump's parameters. This number represents the throughput of the pump when a 10-volt signal (maximum extruder speed) is applied. Instructions on how to set XMO is located on page 14.

A screw signal between the white and black leads of the signal cable is not required when running the pump in extrusion following mode. If the user wants to make this a requirement, it can be enabled via the sub-program screen (see page 14 of the manual).

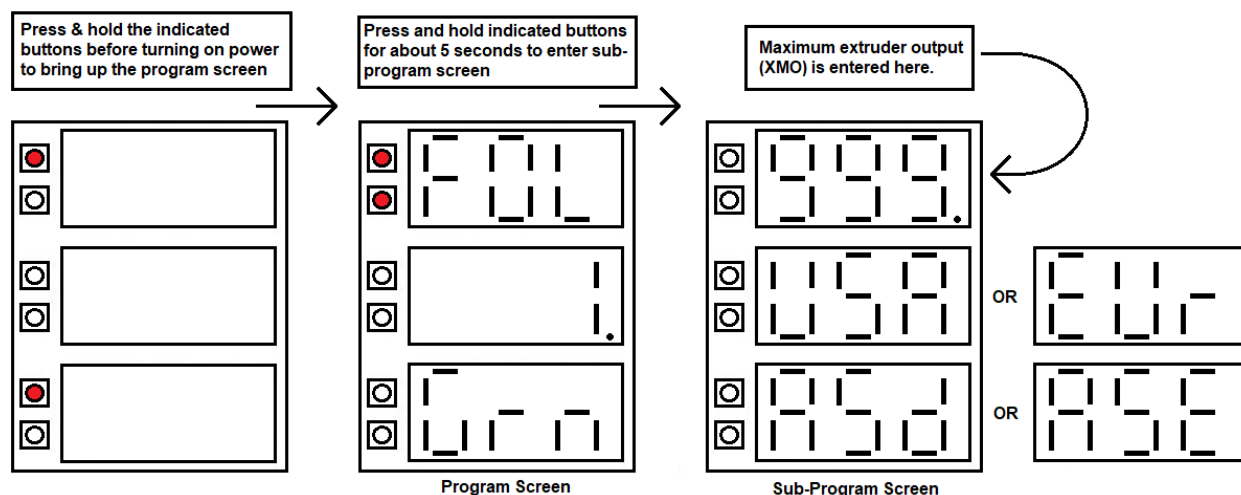
The pump's dispense rate can be calculated by:

Throughput x LDR x (actual extruder output voltage/10 volts)

As an example: XMO set to **100 lbs/hr**, LDR set to **2%** Extrusion voltage signal is at **6.2 VDC**

The pump will dispense at a rate of: (100 lbs/hr) X (2% LDR) X (6.2 volts/10 volts) = **1.24 lbs/hr**.

Extrusion Following Mode Sub-Program Screen



(20 seconds after parameters are set, the pump will automatically save all settings, and return to the home screen.)

The top window will allow the user to set the units for the shot weight. This can be set to grams (“g”), pounds (“LbS”) or kilograms (“HG”). Kilogram units are only selectable when the units are set to metric (“EUR”) in the middle window.

The middle window allows the user to toggle between imperial (“USA”) and metric (“EUR”) units. This parameter will change the units of the shot weight (top window of home screen) between grams, lbs or Kg, as well as the liquid density setting (bottom window of home screen) between lbs/gal & Kg/l.

The bottom window of the sub-program screen allows the user to toggle between auto-stop disabled (“ASd”) & auto-stop enabled (“ASE”). With auto-stop enabled, the pump will require a proper run signal (in addition to the 0-10 signal) to operate.

Tube Selection Guide

Depending on the throughput of your specific application, use the guide on **page 6** to choose a tube size for optimal performance and accuracy. Just remember to enter in the corresponding tube color setting after you have made a choice. (In most cases the pump is sold with the factory default tube setting of “Grn”, which corresponds to 1/8” I.D. green tube sets.

Any model MS4 pump is capable of running the 3 available tube color selections supplied by Maguire Products. The 3 different colors vary in size to enable a wider dosing range for this pump.

The tube size setting lets the pump know what size tube set is actually being used. Tubing size should be chosen according to the desired throughput. A larger I.D. tube will produce a greater throughput than a smaller I.D. tube given a fixed pump speed. Alternatively, a smaller tube will offer higher accuracy shot-to-shot.

In order for the pump to produce accurate throughput, the corresponding tube setting[†] **must** be entered into the pump. The tube setting can be set by following the simple menu direction below.

Throughput of tubing will begin to diminish after prolonged use, due to tube deformation. This can

be compensated by slightly adjusting the Throughput offset calibration over time, or simply replacing the tube set altogether. This is typical of any peristaltic pump.

† MS4 pumps sold prior to 2017 utilize an adjustable “Tubing Factor” number instead of the three fixed options (Grn, rEd, CLr). To set older MS4 units correctly, follow the corresponding table for each color tubing:

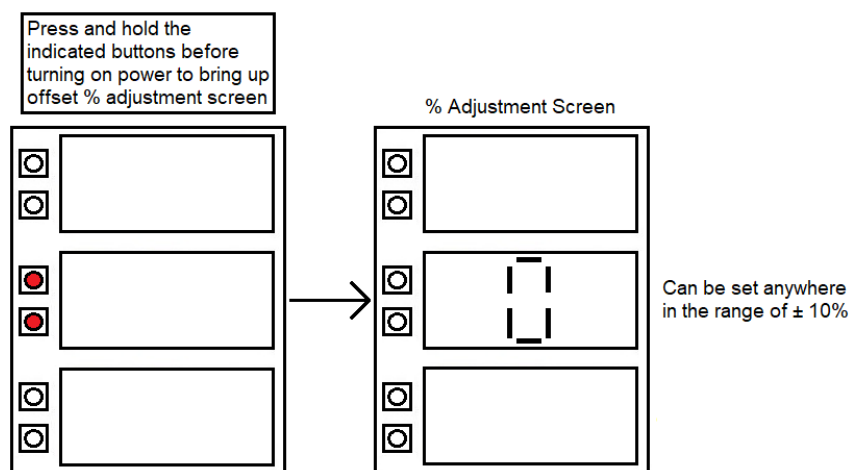
Green (1/8" I.D.): **210**

Red (3/16" I.D.): **443**

Clear (1/4" I.D.): **649**

Throughput Offset Calibration

Due to the small manufacturing tolerances in the peristaltic tubing, standard pump operation may not offer enough accuracy for some applications. In which case, the operator can calibrate the pump's throughput to precisely match the section of tubing it is being used with. The offset range is $\pm 10\%$. This setting is entered into throughput offset calibration screen:



(20 seconds after parameters are set, the pump will automatically save all settings, and return to the home screen.)

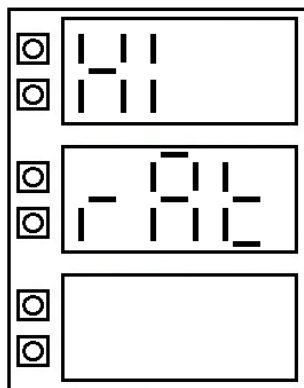
The value used for this setting must be calculated using theoretical shot size or throughput (derived from the pump's home screen display settings), and comparing that to the weight of actual dispenses from the pump.

For example, say that the pump is set to cycle mode with a 150g shot weight, with a 1.00% LDR.

The operator should do the following:

- i. Ensure that the current % adjustment setting is "0".
- ii. Dispense out 10 shots and weigh the total.
- iii. Calculate: $(\text{measured weight} / \text{theoretical weigh}) \times 100$
- iv. In theory, this number should equal 100. If the number does not equal 100, a value should be entered into the throughput offset calibration parameter, so that when added to your calculation from step 2, closely equal 100.
- v. After the value has been entered, the operator should recheck by repeating steps 2 & 3.

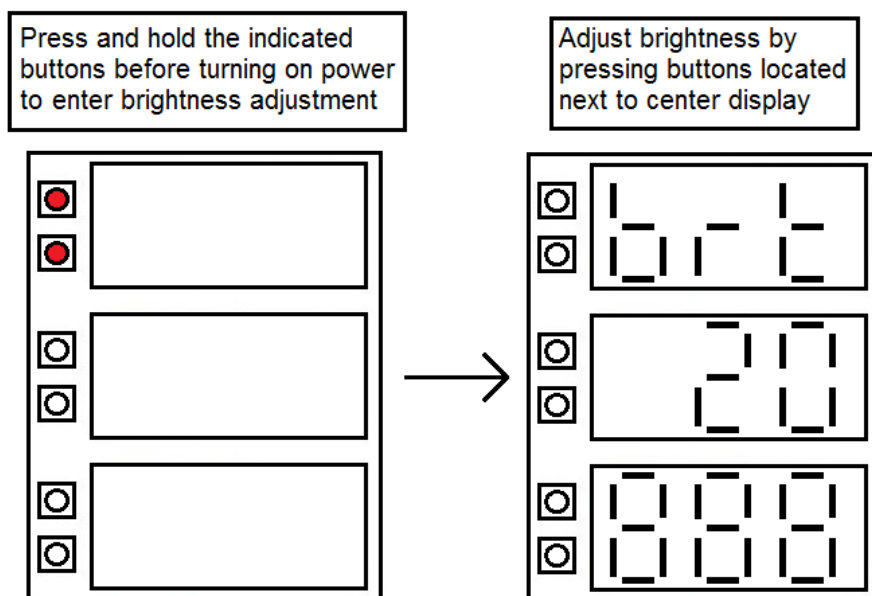
High Rate Notification



If the unit is displaying a high rate notification, this means the pump is having trouble dosing enough liquid. If this happens, the user should refer to the throughput specifications (located on page 5 of this manual). Also, check to see if the proper tube set is being used, and that the corresponding tubing color setting has been properly entered into the pump (see page 13 & 14 of this manual). Additionally, check the input signals to the pump. Make sure a proper signal is being fed between the white and black wires of the signal cable, (if in continuous or cycle mode). Make sure a proper 0-10 VDC signal is present between the red and green wires of the signal cable (if in extrusion following mode).

Adjusting Display Brightness

You may want to adjust the display brightness to accommodate your specific working environments. To do this, make sure the pump's run switch is set to "STOP", and simply follow this flow chart:



(20 seconds after parameters are set, the pump will automatically save all settings, and return to the home screen.)

Changing Colors

1. Run the pump in REVERSE to empty the tube of color.
2. Remove pump tube from pump head.
3. Remove poly-tubing from process machine and coil entire tube onto top of drum. Do not disconnect any other fittings. Tape up the open end of the poly-tubing to prevent dripping of color.
4. Bring in next color drum and repeat Steps 5 & 6 of "Start Up Procedure".

Pickup Assembly

An inexpensive pickup assembly is fitted to the drum of color to be used. If one pump is going to run more than one color, each color drum should be equipped with its own pickup assembly.

Each pickup assembly consists of several components. All are connected together and should never be disassembled except in the case of a tube blockage caused by contaminants in the liquid color. The lance and threaded adaptor are installed directly into the lid of the drum. The other end of the tubing assembly is connected to the feed throat of the process machine. A common source of problems comes from contaminants, such as plastic pellets entering the liquid. When opening a new drum or replacing an empty one, be certain that no openings are left uncovered where contaminants could accidentally enter the liquid.

Tubing assemblies for 30 and 55-gallon drums can be fitted with an optional High Capacity Filter (Maguire part #: at10-1) that reduces the possibility of plastic pellets clogging the pump tube. It is easily cleaned by back flushing with water.

If a pickup assembly is available for every color, operators should never need to come in contact with the liquid color except when replacing an empty drum. The REVERSE button allows the operator to momentarily run the pump in reverse to drain liquid from the tube assembly back into the liquid container. Since there is no cleanup required for a color change and no color is discarded or lost, a considerable amount of coloring is saved over a period of time.

Disassembly & Cleaning

Note: Depending on when your MS4 was sold, the following directions may not reflect the assembly of your particular pump. These directions are intended for the disassembly and cleaning of the most recent pump head design. The latest design pump head parts can be retrofittable into older pumps if necessary.

Cleaning the Pick-up Assembly

If a pickup tube assembly must be used for a different color or if, for some other reason, it becomes necessary to clean the coloring from the inside of a pickup assembly, the following steps will make this potentially messy job easier.

1. Disconnect tubing from the process machine.
2. With the pump tube still installed in the pump head, run the pump in reverse until no more color flows from the tubing assembly.

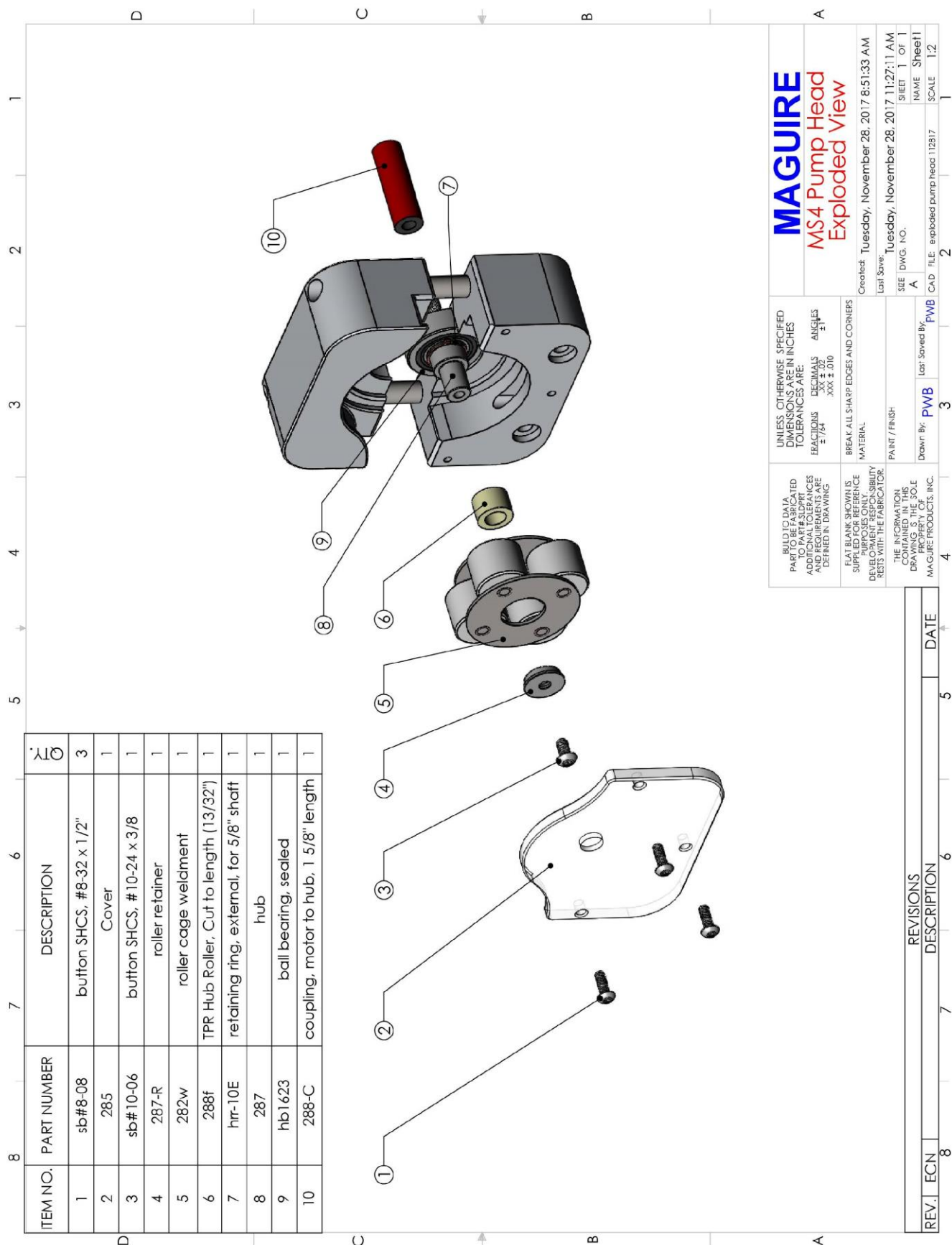
3. Once this is done and you are assured of a continuous air passage through the tubing, the tubing assembly should be removed from the pump head and color container and placed in a large utility sink. Place one end of the tubing assembly into the spigot opening and turn on the hot water SLOWLY. Once you can see water flowing from the other end of the tubing assembly, leave the water running for about 10 minutes. This should be sufficient time to clean all remaining traces of liquid color from the tube. BE PATIENT. HOT WATER AND TIME WILL DO THE JOB FOR YOU.
4. A copper pickup lance can be cleaned in the same manner.

Cleaning the Four (4) Roller Pump Head

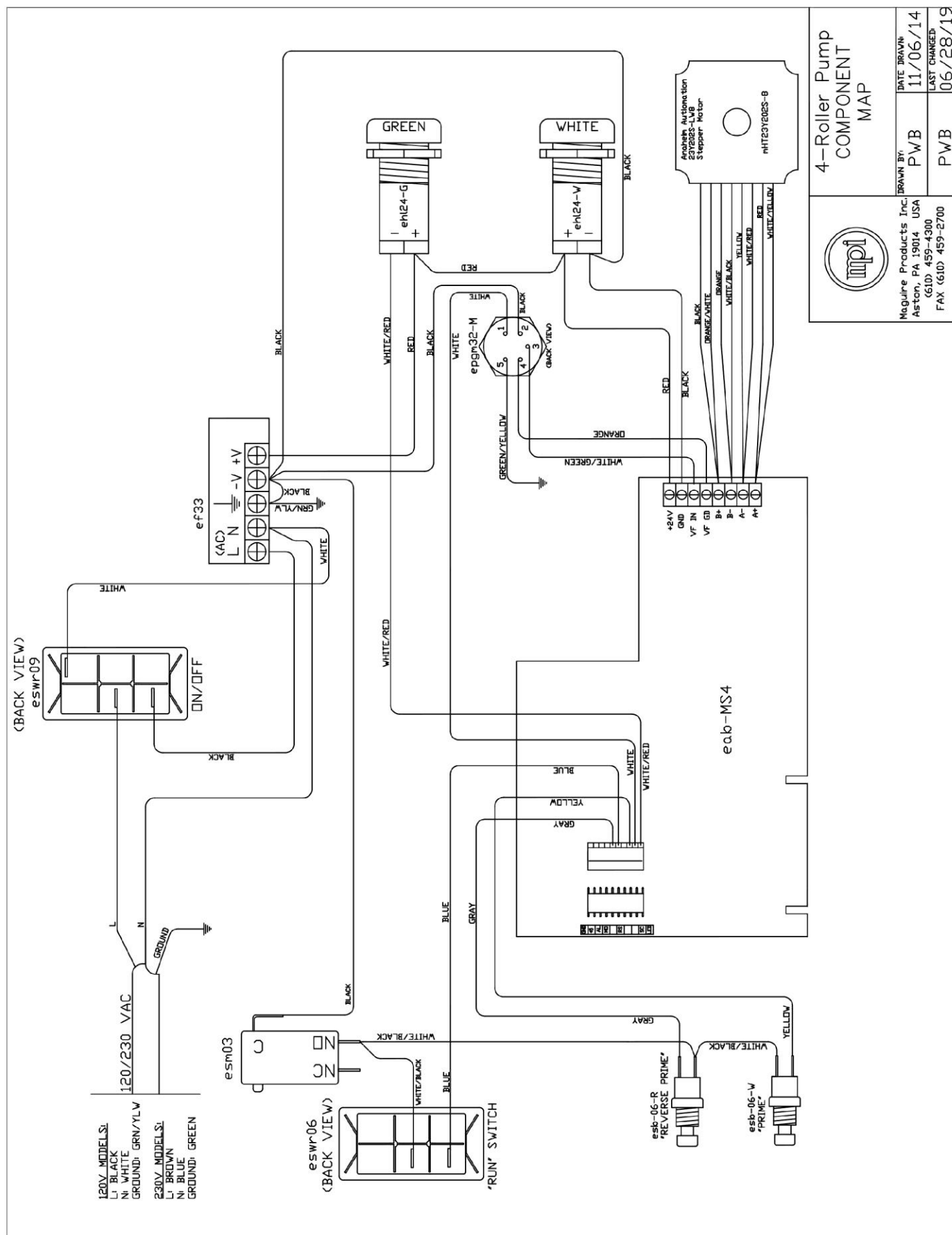
1. Open the pump head by turning the hand screw counter clockwise until the top portion of the pump head is open as far as it will go. Complete removal of the hand screw is not necessary.
2. Using a 3/32" hex key, remove the 8-32 bolts holding the clear cover plate attached to the bottom half of the pump head.
3. Using a 1/8" hex key, remove the 10-32 x 3/8" bolt located in the center of the roller set. This step may require the roller cage to be held in place to prevent rotation while removing the bolt. In some cases, it may be beneficial to gently wedge an additional slotted screwdriver in between a roller and the center rubber hub to prevent unwanted rotation.
4. Remove roller set along with the roller retainer from the center hub. Do this by gently pulling outward on the top and bottom of the metal plate of the roller set.
5. Remove the rubber hub roller by sliding it off the hub.
6. Once disassembled, clean all parts if necessary with soap and water. Inspect for worn or damaged parts.
7. To reassemble, slide the rubber roller onto the hub, followed by the roller cage. Then, carefully install the roller retainer. The roller retainer should slide onto the hub, and also fit between the rollers. Once this is fully in place, reinstall the 10-32 x 3/8 bolt, followed by the clear cover and its fasteners.

NOTE: DO NOT LUBRICATE ANY PUMP HEAD PARTS. The pump works best when totally DRY with NO lubrication. Since the center drive roller relies on friction to drive the 4 tube compression rollers, any lubrication such as Liquid Color contamination will interfere with proper operation.

Exploded View of Pump Head

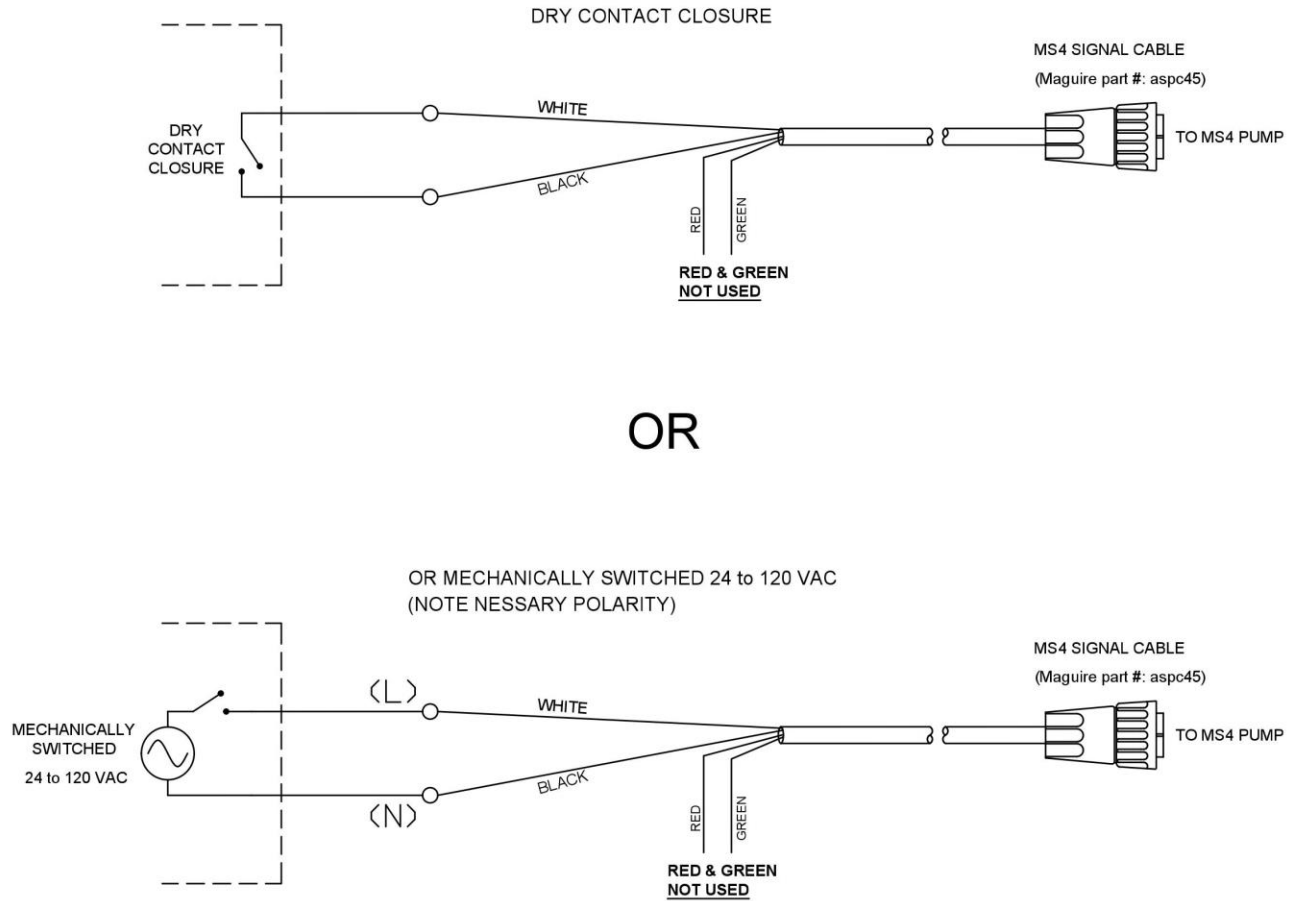


Internal Wiring Diagram



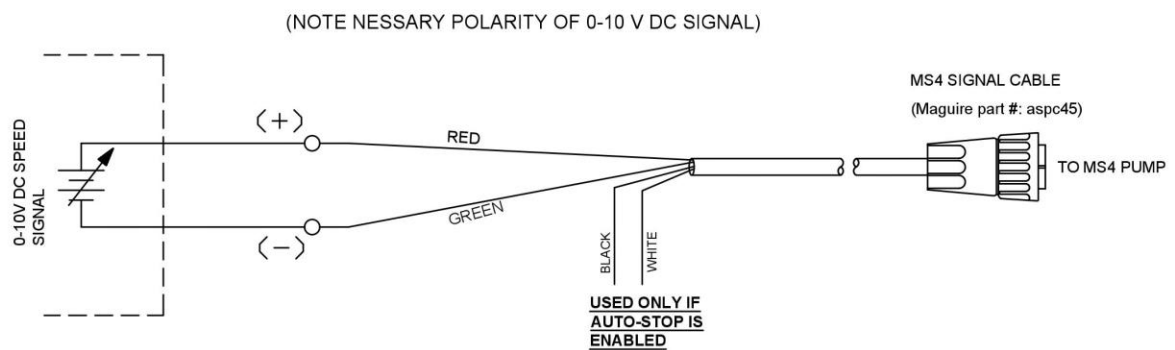
Hook-up Diagram

FOR INJECTION MOLDING (CYCLE) or CONTINUOUS EXTRUSION APPLICATIONS



NOTE:
MS4 pumps sold prior to 2017 REQUIRE a contact closure type signal ONLY.
Voltage signal types will damage pump's input.

RUNNING PUMP IN EXTRUSION FOLLOWING MODE



WARRANTY - Exclusive 5-Year

Warranty – Exclusive 5-Year

MAGUIRE PRODUCTS offers one of the MOST COMPREHENSIVE WARRANTIES in the plastics equipment industry. We warrant each Pump manufactured by us to be free from defects in material and workmanship under normal use and service; our obligation under this warranty being limited to making good at our factory any Feeder which shall within FIVE (5) YEARS after delivery to the original purchaser be returned intact to us, transportation charges PREPAID, and which our examination shall disclose to our satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on our part, and MAGUIRE PRODUCTS neither assumes nor authorizes any other persons to assume for it any other liability in connection with the sale of its products.



This warranty shall not apply to any Feeder which shall have been repaired or altered outside MAGUIRE PRODUCTS factory, unless such repair or alteration was, in our judgment, not responsible for the failure; nor which has been subject to misuse, negligence or accident, incorrect wiring by others, or installation or use not in accord with instructions furnished by Maguire Products.

Our liability under this warranty will extend only to Feeders that are returned to our factory in Aston, Pennsylvania PREPAID.

It should be noted, however, that we strive to satisfy our customers in whatever manner is deemed most expedient to overcome any problems they may have in connection with our equipment.

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