

## MS4 PeriStep Pump

# Accurate peristaltic dosing – easy to use & set up



The MS4 patented Maguire peristaltic pumps are designed to accurately meter precise amounts of liquid color into the main flow of natural material directly for both molding and extrusion applications.

### Positive displacement pump

Series MS4 PeriStep pumps are liquid color pumps, with no seals, check valves or clearances to allow even the slightest internal leakage. The units are self-priming.

### Automatic speed control

The MS4 control software uses automatic speed control to assure self-adjusting accuracy. The pump design and control makes it versatile for all types of process including injection and blow molding, and extrusion applications.

### Three tubing sizes available

Three tube diameters and assemblies are available to provide a wider range of dosing outputs.

### Ideal for liquid color applications

Maguire's MS4 PeriStep pumps provide precise metering at low rates to improve the quality of the coloring process.

### Easy maintenance

The pump design is compact and lends itself to minimal maintenance. Liquid delivery tubes are quick and easy to change when color changes are required and can be re-used, requiring replacement periodically according to usage and time. Typical tube life is 1 to 6 months.

### Robust design

The compression rollers are solid rollers, so they never lose their tube compression tolerance, which can otherwise impact on dosing consistency and accuracy. As there are no bearings to wear out, production can keep running.



### Easy disassembly

In the unlikely event of needing to disassemble the pump, the Split Head access is easy – the cover detaches by releasing 3 screws and the complete roller set can be removed from there.

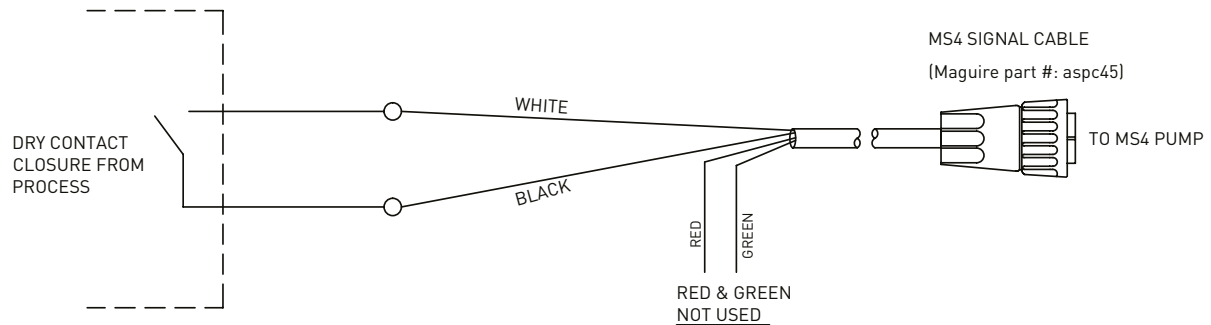
### Run modes

The MS4 is capable of running in Continuous Mode, Injection Molding (Cycle Mode) and Extrusion Following Mode. In Continuous Mode, the MS4 will run the pump continuously at a rate set by the user. In Cycle Mode, the MS4 provides accurate dosing, regardless of variations in the process, by monitoring the screw back time of the injection molding machine. While in Extrusion Following Mode, the speed will change depending on throughput to maintain the correct percentage of color dosed.

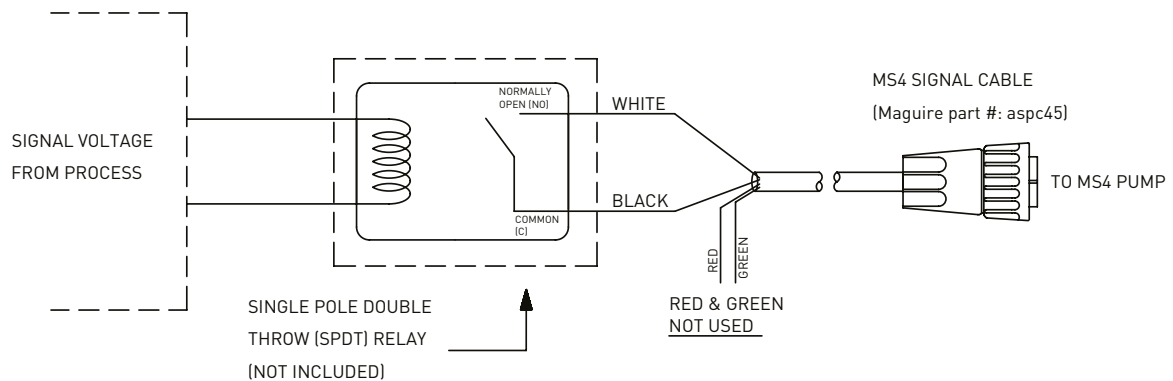


## MS4 Hook Up Guide

### RUNNING PUMP WITH CONTACT CLOSURE (CONTINUOUS OR CYCLE MODE)

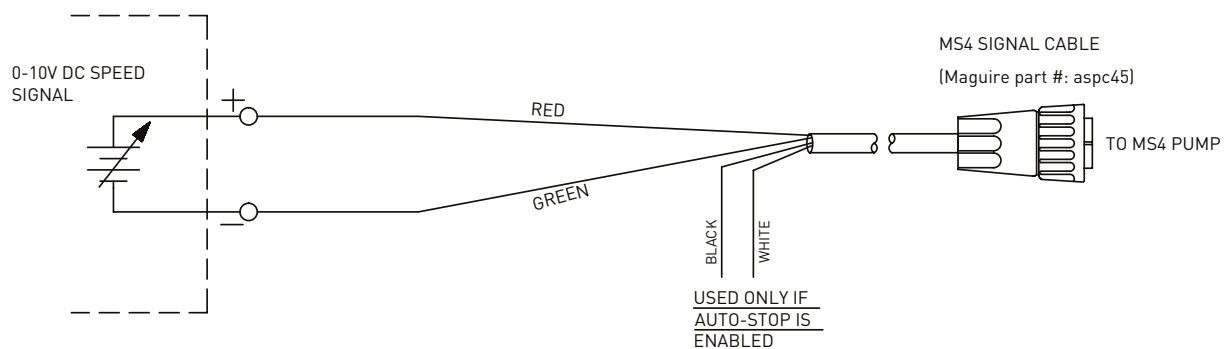


### RUNNING PUMP WITH VOLTAGE SIGNAL (CONTINUOUS OR CYCLE MODE)



THE RELAY COIL VOLTAGE SHOULD BE CHOSEN ACCORDING TO THE PROCESS SIGNAL VOLTAGE THAT IS BEING USED

### RUNNING PUMP IN EXTRUSION FOLLOWING MODE



## Four Roller PeriStep Drive System

The new MS4 pump uses a “Sun and Planetary” design to drive the rollers. The precision stepper motor drives a central “sun” drive roller, which creates friction when pressed against the outer “planetary” rollers. The four outer planetary rollers are held in place by a cage to keep them positioned uniformly around the central drive roller to ensure accurate and precise peristaltic dosing of liquid.

### Stepper motor

The patented design of the pump (**Patent App #: 62/025**), utilizes a stepper motor with no gearbox to drive the dosing of the liquid and provides an extensive range on the dosing control and capacity.

The dosing range is fully maximized by the intelligent technology of the software control combined with the central roller driving an outer set of rollers through friction contact. This provides a 5 to 1 speed reduction without a gearbox, ensuring accurate dosing, an efficient and compact design, minimal on-going maintenance, while still allowing speed of access and color change for operators.

## Three Steps to Easy Operation

The control requires only 3 inputs for an operator to setup and start using the MS4 pump. The design is simple and intuitive and avoids complex or menu driven interfaces that can be slow or complicated to set and start production. The simple 3-step process is:

- 1** Set **SHOT WEIGHT** (part GRAM weight), or extrusion rate (process kg/hr or lb/hr)
- 2** Set **LIQUID COLOR PERCENTAGE** (% of part weight)
- 3** Set **DENSITY** of the Liquid Color (lb/gal or kg/ltr)

### Simpler entry of variables

With these 3 values entered the MS4 control automatically calculates the rest, working out the desired weight to volume to dose – again simplifying operator interface, setup time and minimizing opportunity for error.

## Lock & Load

“Easy Load” & “Safety Lock” design functionality.

### Easy Load

After a color change the “**Easy Load**” design of the MS4 pumps allows a new color tube to be positioned quickly and easily. The tube is simply laid over the top of the rollers without the need to work the tube into a compression zone.

### Safety Lock

User safety is key in the design of the Maguire PeriStep Pump utilizing a safety interlock when accessing the pump drive assembly. The MS4 pump uses a “Split Head” design. When the Split Head is released it provides a 12.7mm (1/2”) access, exposing the top surface of the roller set.

The drive motor is safety-interlocked to ensure the motor cannot run when the top half of the pump head is raised / open, and the drive rollers are accessible.

The design makes sure the rollers cannot run while tubes are removed or inserted. The MS4 PeriStep pump is safer, with no user access to rotating parts.





## MS4 Throughput Capabilities & Tube Selection Guide

|                      | Extrusion Continuous Dosing Range |              | Molding-Cyclical Dosing Range |              |
|----------------------|-----------------------------------|--------------|-------------------------------|--------------|
| IMPERIAL             |                                   |              |                               |              |
| Tube Set             | MIN (lbs/hr)                      | MAX (lbs/hr) | MIN (lbs/hr)                  | MAX (lbs/hr) |
| GREEN (1/8" I.D.)    | 0.1                               | 9.5          | 0.1                           | 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               |                                   |              |                               |              |
| Tube Set             | MIN (kg/hr)                       | MAX (kg/hr)  | MIN (kg/hr)                   | MAX (kg/hr)  |
| GREEN (3.18 mm I.D.) | 0.1                               | 4.3          | 0.1w                          | 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          |

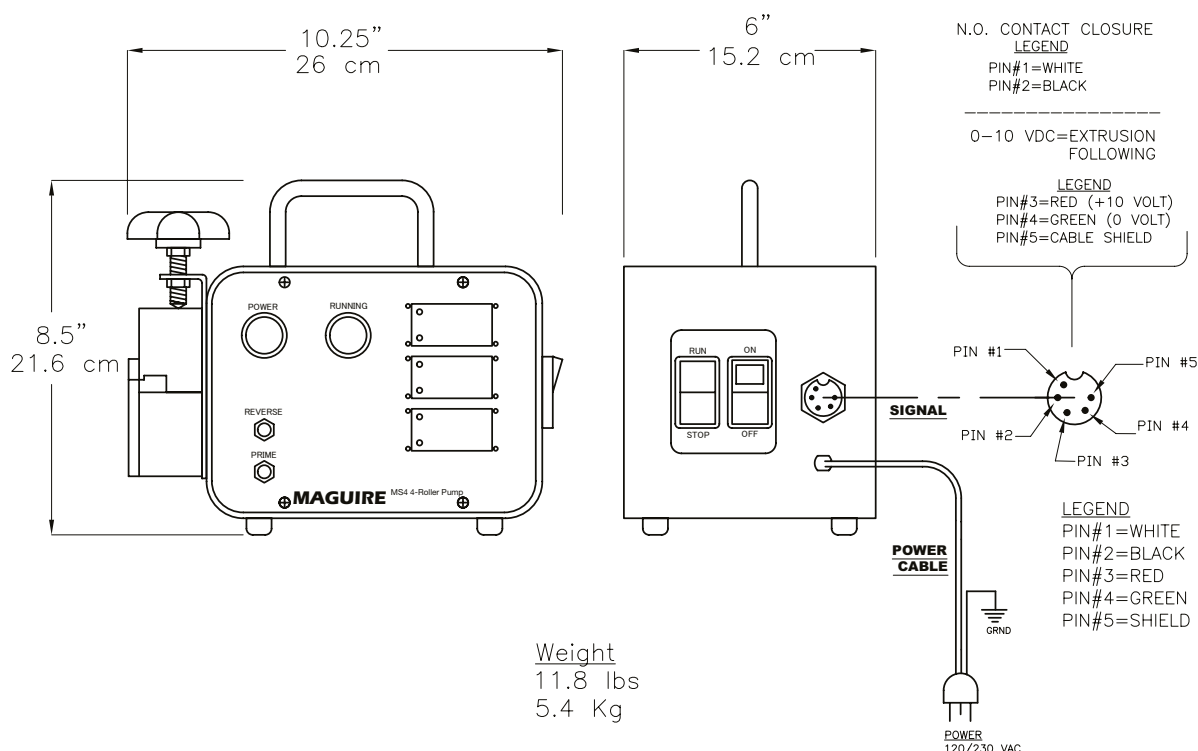
Based off liquid density of 10 lbs/gal (1.198 kg/l).

Based off an avg. cycle time of 33%.

Minimum suggested rate generated for best resolution.

## MS4 Tube Part Guide

|                         | Part Number |
|-------------------------|-------------|
| 1/8" Green              |             |
| Pickup assembly         | at04        |
| Pump tube with fittings | at07        |
| Pump tube only          | tur24       |
| 3/16" Red               |             |
| Pickup assembly         | at05        |
| Pump tube with fittings | at08        |
| Pump tube only          | tur35       |
| 1/4" Clear              |             |
| Pickup assembly         | at06        |
| Pump tube with fittings | at09        |
| Pump tube only          | tur46       |



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