OPERATING INSTRUCTIONS

Plasticolor Proportioning Units, by Plastore, Inc.

AC DRIVES

Groschopp AC Motor
Yaskawa V1000 AC Drive

Plasticolor 2000, 3000 and 4000

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Introductory Notes Section 1

Introduction

Thank you for selecting the Plasticolor Feeder for your additive needs.

To help assure fast, trouble-free installation of this product, we strongly recommend that you ***please review this manual in its entirety before installing or operating the equipment.***

Warnings

As with any industrial equipment installation, care should be used in the installation and operation of this equipment. Please note the following:

1. The Plasticolor Feeder is designed to handle free flowing, non-bridging, non-sticky materials. Unit damage, poor performance, or inconsistent final product could result if used for any other type of material

2. To prevent dangerous access to the production machine screw, the Plasticolor Feeder must be permanently mounted on the production machine. Some type of interlocking is recommended to disable the production machine should the Plasticolor Feeder be removed from the production machine.

3. The Plasticolor Neckpiece must be equipped with your machine feed hopper, or an appropriate guard, to prevent accidental access to the production machine screw.

4. **Always disconnect power before servicing the Plasticolor Feeder or its Controller.**

5. **Never put fingers or tools in the Test Cover opening when the feeder is running.** The rotating Feedscrew in the unit can injure your fingers.

6. **Use extreme care when opening the motor drive Controller**. It contains high voltages Only authorized, trained personnel should open and maintain this Controller. When power is connected to the Controller, the AC drive portion of the control has voltage present.

7. High voltages can be present in the Controller for up to 5 minutes after the unit has been switched off. **Use caution!**

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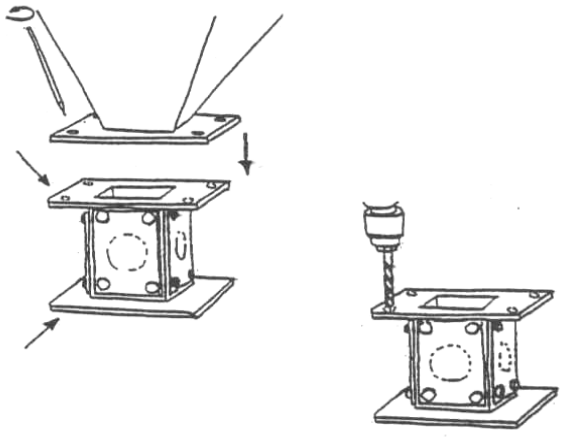
2.1 Mounting the Neckpiece

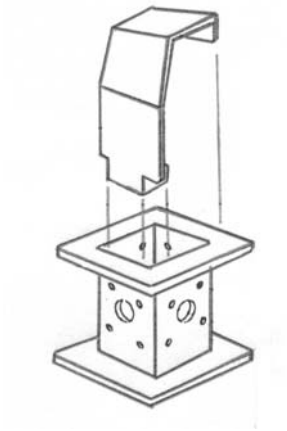
Plasticolor Neckpieces come in a variety of sizes and configurations, but the basic installation procedure is similar. Remove the existing hopper from the production machine. Place it on top of the Neckpiece and mark the mounting holes on the top flange. Flip the Neckpiece and mark the bottom flange in the same manner. Drill holes and mount the Neckpiece to the machine.



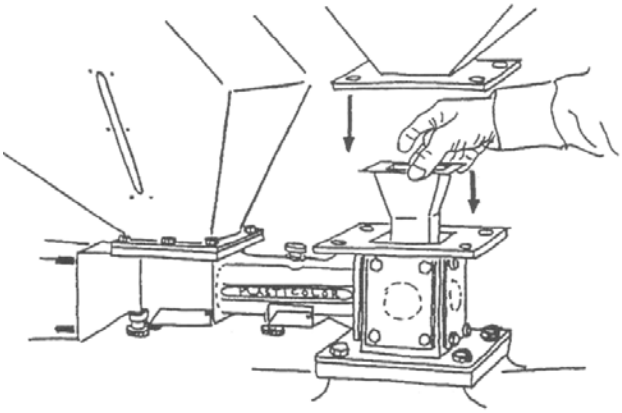
Caution! When mounting the Neckpiece, make sure that no ledges are created on which fed material can get caught. Various adapters are available to adapt Neckpieces to smaller throat openings in the production machine. Contact Plastore, Inc. for more information.

2.2 Installing the Deflector

The Deflector supplied with the Neckpiece assures that virgin material flowing through the Neckpiece will not hinder the additive material being fed. Install the Deflector by hanging it over the top edge of the Neckpiece as shown in the following illustration.



If more than one additive material is being fed into the Neckpiece, or if an additive is to be fed at a rate of 20% or more of the main material feed rate, an optional High Capacity Funnel is recommended instead of the standard deflector (as shown below).



2.3 Completing the Installation

Mount the original material Hopper to the top flange of the Neckpiece.

Mount the Plasticolor feeder to the Neckpiece using the four bolts supplied.

Electrical Installation Section 3

3.1 Yaskawa Controller Installation

WARNING: Disconnect the control from the AC power source before working on the control, motor, or driven equipment

The Yaskawa Controller converts a 220 VAC, single phase input supply voltage to a selected AC voltage to control the speed of the AC motor used on the feeder.

3.2 Electrical Connections to the Yaskawa

The Electrical Connection Diagram for the Yaskawa Controller is located in Addendum 1.

□ Step 1 – Connect Supply Voltage

Connect 220 VAC, Single Phase, 50/60 Hz, 3 amp capacity power to terminals L1 and L2 on the Yaskawa Controller.

□ Step 2 – Connect Motor Power Wires

Connect the three wires from the AC motor to terminals T1, T2 and T3 on the Yaskawa Controller

The power input terminals of the motor are located under the plastic cap on the top of the motor.

If the motor was pre-wired at the factory, the motor power wires will be the White and Black wires.

3.3 Checking Controller Setup

New installations should be checked for proper Controller setup and operation before the feeder is put into production.

Check Motor Rotation

Apply power to the Controller, and verify that the motor shaft is turning in the direction indicated by the arrow on the motor. If incorrect, switch the wires on terminals T1 and T2 on the Yaskawa Controller.

3.4 Connections

Various Start/Stop control possibilities have been built into the Yaskawa Controller for use in various extrusion, and injection molding applications. These connections are illustrated in Addendum 2. Contact the factory if the connections required for your application are not pictured.

3.5 Connecting Optional Equipment

Connections for available Plasticolor Feeder options are as follows:

Synchron Slave Control. A Synchron Slave Control synchronizes the feed rate of the Plasticolor feeder to the tachometer speed of an extruder. Please refer to Addendum 5 for installation instructions for this device.

Injection Molding Timer. A timer is available for limiting the amount of material that can be fed during the recovery cycle of an injection molding machine (preventing an over coloring

situation). Please refer to Addendum 6 for installation instructions for this device.

WARNING: Disconnect the control from the AC power source before working on the control, motor, or driven equipment.

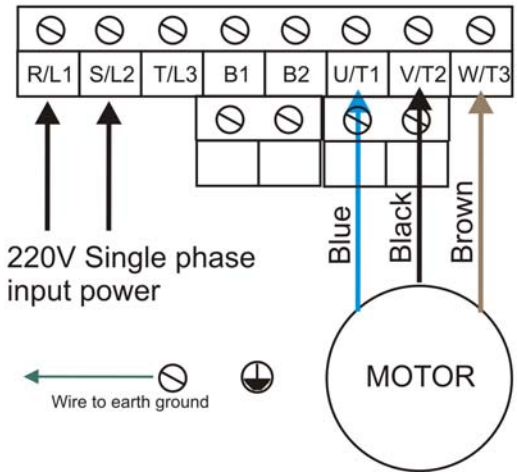
WARNING: All parts of the circuit operate at voltages capable of causing serious injury and death

WARNING: The AC power line should to the control should be the last connection made.

CAUTION

Be certain you connect input power to terminals L1 and L2 only. or serious damage will result. Connect motor to terminals T1,T2 and T3 only.

POWER WIRING SCHEMATIC

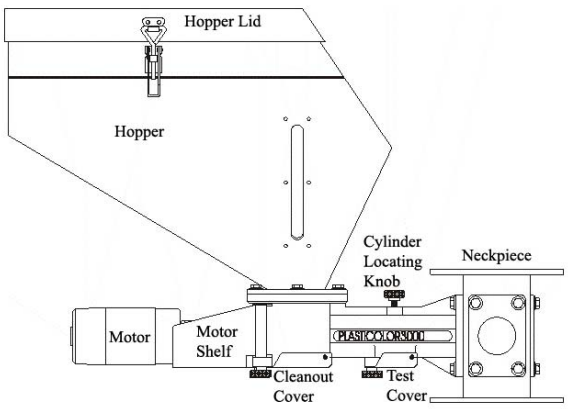


4.1 Operational Overview

Once installed, system operation is as simple as:

1. Filling the Hopper with the material to be fed.
2. Adjusting the Controller for the desired feed rate.

The basic items referred to in the operational description are shown in the following illustration.



4.2 Filling the Hopper

Before putting material into the Hopper, make sure that the Feedscrew Assembly has been installed into the feeder (refer to Section 5 of this manual), the Cleanout Cover is closed, the Test Cover is closed, and the motor has been secured in its operating position.

Fill the Hopper with the material to be fed, and re-secure the Hopper Cover in place. Do not operate the feeder without the cover in place.

4.3 Checking the Feed Rate Range

Varying the speed of the motor that drives the Feedscrew controls the feed rate of the feeder. The slower the motor speed, the lower the feed rate … the faster the motor speed, the higher the feed rate.

For best performance and optimum motor life, **it is recommended that the motor be run between 20% and 90% of its maximum running speed during normal operation**. It can be run slower or faster at times, but feed rate accuracy and motor life can be affected if the system is run at minimum or maximum speeds continuously.

A simple feed rate calibration test will define the feed rate range for a particular combination of Feedscrew Assembly and material to be fed … assuring that the desired feed rate can be obtained between the 20% and 90% recommended running speed of the motor.

The first time a particular material is to be fed, a ***feed rate calibration test*** should be performed to determine the feed rate range of the material. This procedure is described in Section 6.2 of this manual.

4.4 Adjusting the Feed Rate

Adjusting the feed rate is as simple as adjusting the motor speed up or down with the up and down arrows on the front panel of the Yaskawa Controller. The faster the motor speed, the higher the feed rate. The initial speed setting on the Controller should be determined by the feed rate test described in paragraph 4.3 above, and in Section 6.2 of this manual.

It is ***important*** to note that proper use of the **Plasticolor Feeder can result in a significant reduction in both setup time, and the amount of color or additive material being used in a process.**

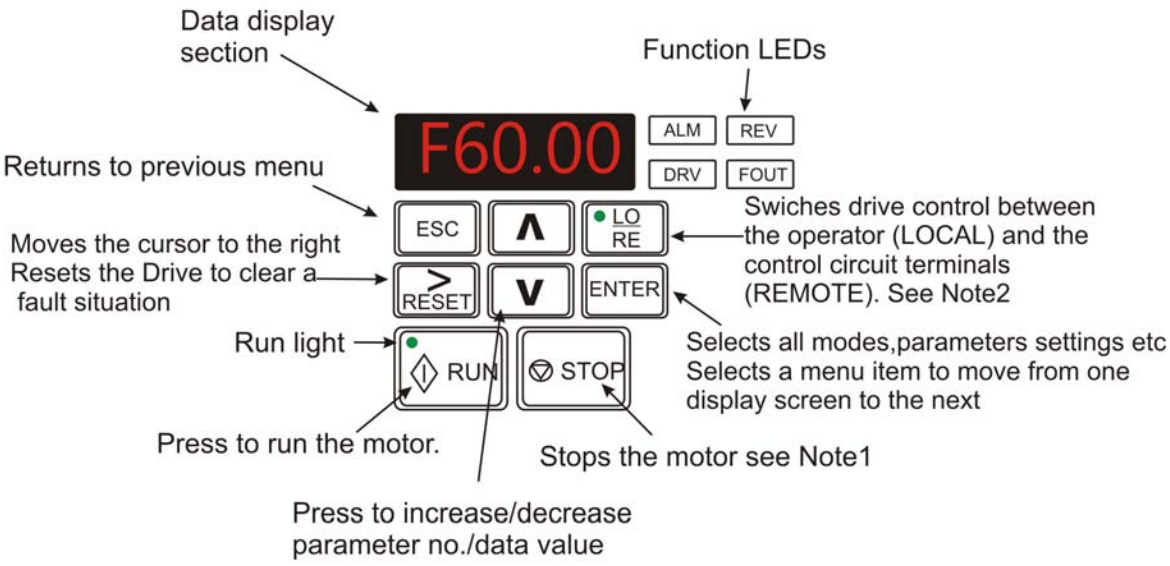
The feed rate range tests define the approximate dial settings for desired feed rates in pounds-per-hour. A listing of these settings as part of the setup procedure **assure fast, easy setups** (or color changes).

In addition to fast setups, the system can be used to minimize wasted additives by minimizing an "over-coloring" situation. Once the production cycle starts, the Controller feed rate setting can be reduced a little bit at a time, until the color is just at a minimum acceptable level. Then, by increasing the feed rate just a little, the operator knows that the color material is being fed at a rate to produce products with correct color , but not at a rate higher than needed ... thereby **minimizing the color material being used.**

For extrusion applications, a Synchron Slave Controller is available that "synchronizes" the speed setting of our Plasticolor Feeder to the speed of your extruder. By synchronizing the speed of the feeder to the extruder's tachometer, the Synchron Slave Controller slows down or speeds up the Plasticolor Feeder with extruder speed changes ... thereby keeping the additive feed rate at the optimum setting. Contact your closest Plastore Sales Representative or Plastore, Inc. directly for more information.

The Digital Operator has a 5-digit LED display. Both numeric and alpha-numeric data can appear on the display.

Digital Operator

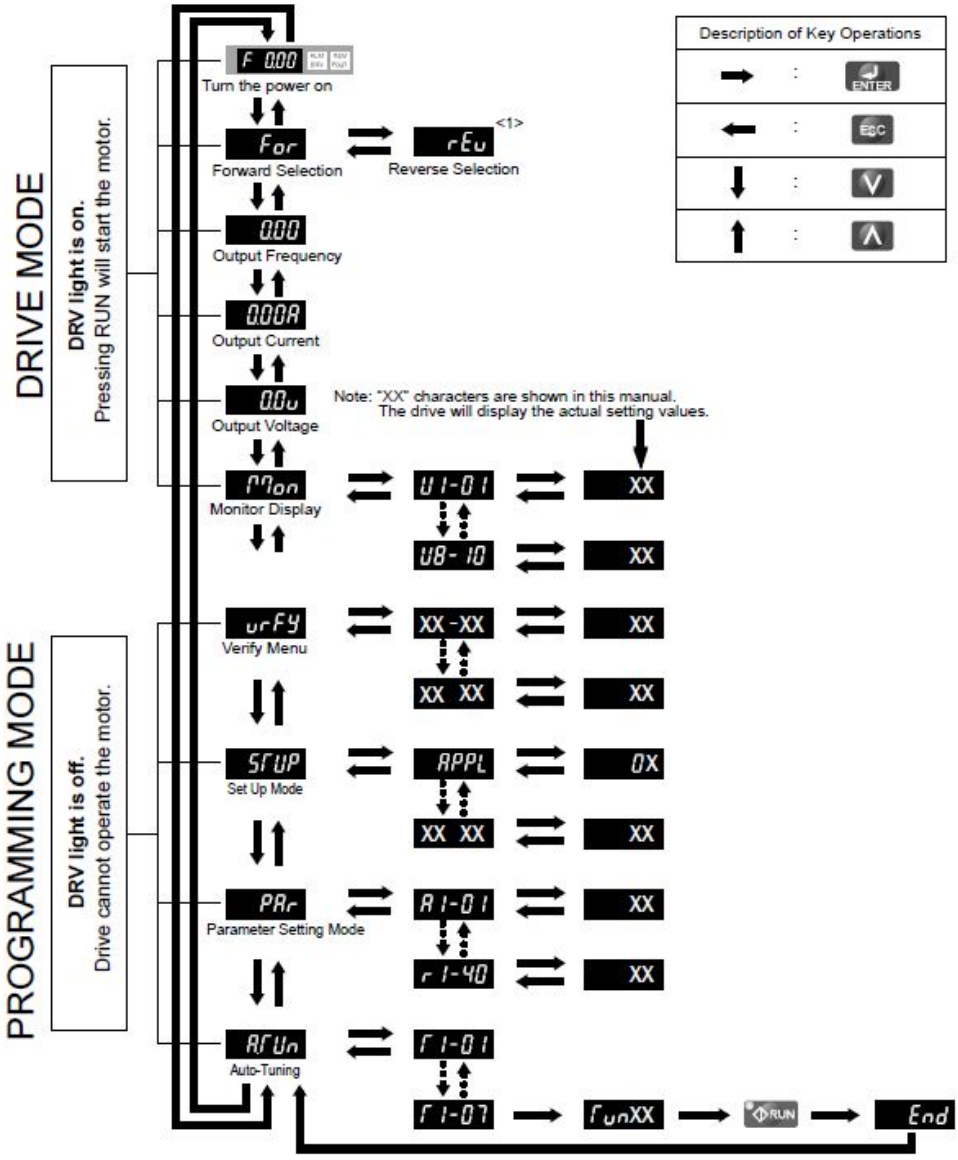


Note1: Stop priority circuit. A fast-stop is available by pressing the STOP key when the drive detects a danger even if the drive is running by a signal from the multifunction contact input terminal (REMOTE is set). To avoid stoppage by using the STOP key, set o2-02 (STOP Key Function Selection) to 0 (Disabled).

Note2: LOCAL/REMOTE key effective during stop in drive mode. If the digital operator could change from REMOTE to LOCAL by incorrect operation.set o2-01 (LOCAL/REMOTE key Function selection) to “0”(disabled) to disable the LOCAL/REMOTE key

Mode Group	Description	Key Press	LED Digital Operator Display
Drive Mode Functions (Motor operation and monitoring)	Frequency Reference Display (Initial power-up state)	∧	F 0.00 DRV
	Forward/Reverse	∧	For DRV
	Output Frequency Display	∧	0.00 DRV FOUT
	Output Current Display	∧	0.00A DRV
	Output Voltage Reference	∧	0.0u DRV
	Monitor Display	∧	Mon DRV
Programming Mode Functions (Changing parameters)	Verify Function	∧	vrFy
	Setup Group Parameters	∧	SrUP
	All Parameters	∧	PAr
	Auto-Tuning	∧	AtUn

◆ Menu Structure for Digital LED Operator



Changing the Feedscrew Assembly Section 5

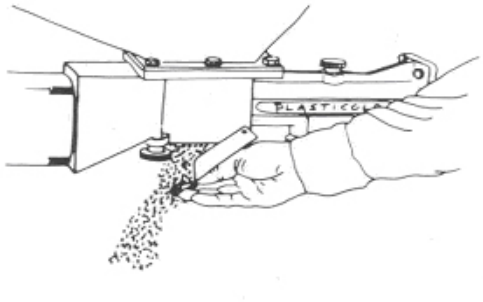
5.1 Easy Feedscrew Changes

Feedscrew Assemblies in the Plasticolor Feeder can be changed in a matter of minutes ... without tools.

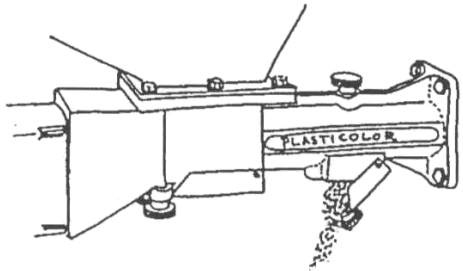
The color coded Feedscrew Assemblies are available in a variety of sizes to provide you with a feed rate to fit your specific needs. Please see Addendum 5 for more feed rate range information.

Follow these simple steps to change your Plasticolor Feedscrew Assembly:

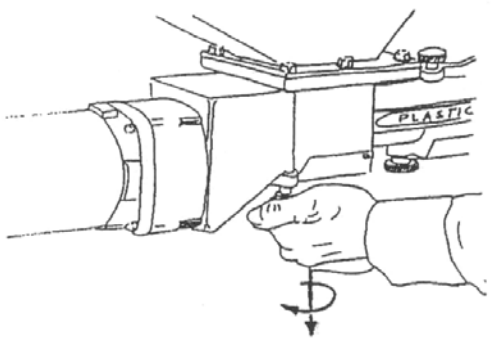
□ **Step 1** - Drain material from the Hopper by opening the Cleanout Cover ...



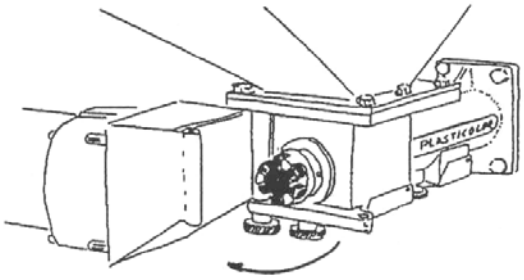
□ **Step 2** - Drain material from Feedscrew Assembly by opening the Test Cover ...



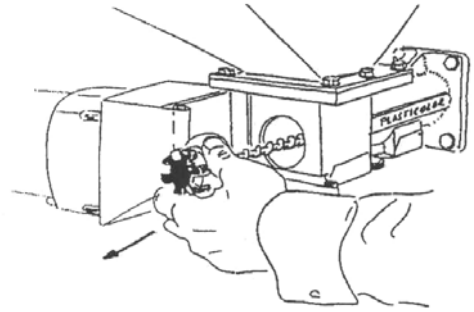
□ **Step 3** - Loosen and remove one of the Motor Hinge bolts ...



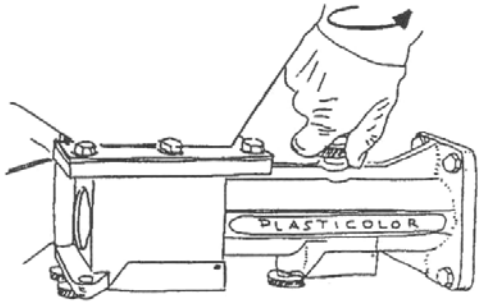
□ **Step 4**- Swing the Motor Shelf to the side ...



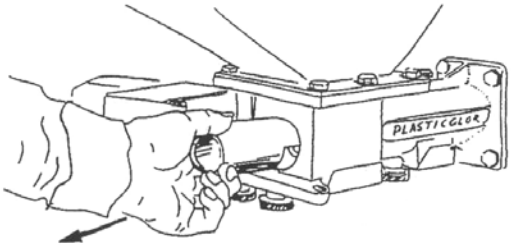
□ **Step 5** - Pull Feedscrew out of the body housing ...



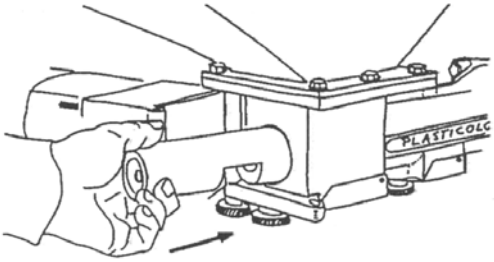
□ **Step 6** - Loosen the Locating Knob on the top of the Plasticolor Feeder ...



□ **Step 7** - Remove the Sleeve by pulling it from the body ...

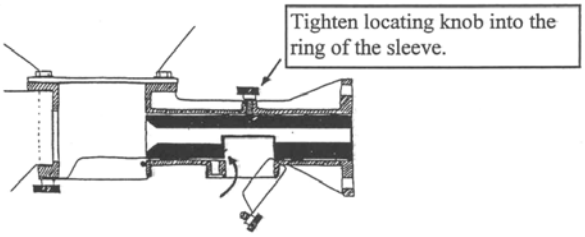


□ **Step 8** - Insert the new Sleeve with the cutout facing down, and chamfer hole toward the motor end of the feeder ...

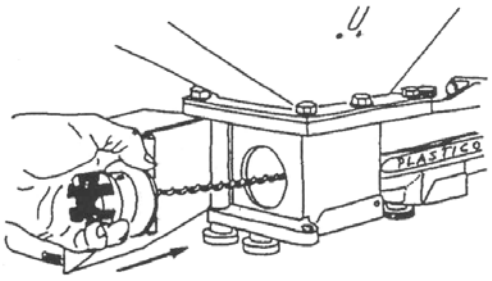


Note: Make sure color coding on screw and sleeve match to verify that they are a matched set.

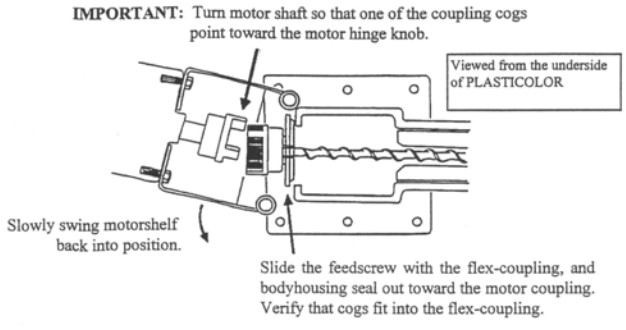
□ **Step 9** - Verify that Sleeve is in the correct position by viewing through the Test Cover opening, then tighten Locating Knob into the ring groove of the Sleeve (but not too tight) ...



□ **Step 10** - Insert the new Feedscrew ...



□ **Step 11** - Close the Cleanout Cover and Test Cover and slowly swing Motor Shelf back into position, after aligning coupling cogs as shown ...



□ **Step 12** - Re-insert Motor Hinge Knob, and tighten.

6.1 Checking the Feed Rate Range

Varying the speed of the motor that drives the Feedscrew controls the feed rate of the feeder. The slower the motor speed, the lower the feed rate … the faster the motor speed, the higher the feed rate.

For best performance and optimum motor life, **it is recommended that the motor be run between 20% and 90% of its maximum running speed during normal operation**. It can be run slower or faster at times, but feed rate accuracy and motor life can be affected if the system is run at minimum or maximum speeds continuously.

A simple feed rate calibration test will define the feed rate range for a particular combination of Feedscrew Assembly and material to be fed … assuring that the desired feed rate can be obtained between the 20% and 90% recommended running speed of the motor.

The first time a particular material is to be fed, a ***feed rate test*** should be performed to determine the feed rate range of the material and selected feedscrew assembly.

6.2 Feed Rate Calibration Test

The feed rate of the system is determined in five easy steps.

□ **Step 1. – Fill the system with material**.

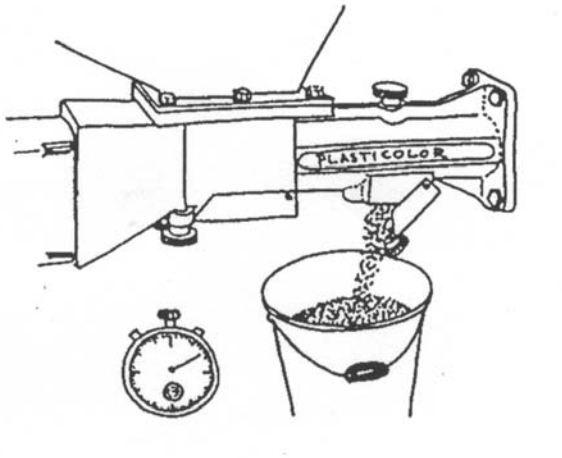
After filling the Hopper with material, open the Test Cover, put a container under the opening to catch the fed material and run the feeder at full speed for a few minutes to fill the Feedscrew and Sleeve with material. Stop the feeder.

To run the system at full speed, set the speed knob on the front panel of the Yaskawa Controller to it's fully clockwise position. This will run the motor at full (100%) speed.

□ **Step 2. – Determine the feed rate at a 90% speed setting.**

Weigh an empty container, and place it under the feeder's Test Cover.

Set the front panel speed control knob to run the feeder at 90% of running speed. Run the system for several minutes, and weigh the amount of material that was fed (don't forget to subtract the weight of the empty container). Use care in weight and time measurements ... a one second timing error in a two minute run (120 seconds) will result in a measured error of almost 1%.



Write down the feed rate at this motor speed. It is typically best to use pounds-per-hour, or Kg-per-hour as the units for feed rate ... whichever your plant typically uses.

For example: If 100 grams was fed in 2 minutes, this would be a feed rate of 3,000 grams-per-

hour (3 Kg-per-hour). Note that 3 Kg-per-hour is approximately equal to 6.6 pounds-per-hour.

□ Step 3. – Determine the feed rate at a 10% speed setting.

Set the feeder to run at 20% of motor speed. Run the system for several minutes and calculate this feed rate.

□ Step 4. – Verify feed rate is right for the application.

Steps two and three basically define the feed rate of the system at the recommended minimum and maximum running speeds. If the desired feed rate is close to, or below the minimum recommended operating speed (20%), change the Feedscrew to a smaller Feedscrew Assembly and re-run the test. If the desired feed rate is close to, or above the maximum recommended operating speed (90%), change the Feedscrew to a larger Feedscrew Assembly and re-run the test.

□ Step 5. – Plot feed rate results.

A simple plot of the feed rate test results will allow you to determine approximate dial settings for other desired feed rates.

Since the output of the system is basically linear, plotting the feed rates in a graphical or tabular form as shown in Addendum 6 will indicate the output for various speed settings. Sample forms have been included in Addendum 6 for you to use.

Handy Hint: Keep copies of the plotted calibration results in a notebook, or central place for fast, easy setup in the future!

7.1 General Description

The Plasticolor Mixing Station provides a way to take precise control of the materials being fed into your production machine. Up to eight single Plasticolor Units simultaneously feed a precise amount of virgin and component materials into a Neckpiece mounted on the throat of the injection molding machine or extruder.

Each material cascades into the Neckpiece on an individually controlled basis … assuring an accurate, precise mix of the components.
The High and Low Level Sensor in the neckpiece starts and stops all Plasticolor units with a frequency depending on the material consumption of the production machine. The set RPM of each Plasticolor remains constant, thereby always giving the correct mixture

7.2 Control Description

In the ***Mixing-Station*** configuration, each of the fed materials cascade into the Neckpiece on an individually controlled basis, that totals a feed rate that is adjusted to match the material usage of the production machine.

8b.3 System Installation

System installation is as follows:

1. Mount the Neckpiece to the production machine. Make sure Neckpiece is mounted solidly, and that no internal ledges are created that can catch material as it is being fed through the neckpiece into the machine.

2. Mount the Plasticolor feeders to the Neckpiece (4 bolts each) with the hardware supplied.

3. Mount the Control Cabinet near the production machine in a location that is convenient to the operator, and within the length of the motor cables.

4. Connect pre-wired motor cables to the connectors on the bottom of the Control Cabinet. Use Motor No. 1 for feeding the main (virgin) material.

5. Connect 220 VAC, Single-phase power to the power connector on the bottom of the Control Cabinet.

7b.4 System Setup

The first time the system is used, the following three setup steps **must** be done:

□ Step 1. Verify that each feeder can deliver the required amount of material, by performing a *Feed Rate Capacity Test*.

A Feed Rate Capacity Test, measures the output of the feeder over its operating range, using a selected Feedscrew Assembly and the material to be fed. The feed rate of each feeder is measured at 20% and 80% of its maximum speed, which establishes the recommended operating range of the feeder. The output is then plotted or tabulated to define the calculated output at other speed settings.

The basic procedure for running a Feed Rate Capacity Test, is to:

A. Put a container under the Front Sampling Box of the feeder to be tested, open the cover on the Front Sampling Box, and run the feeder at full speed for a few seconds to fill the Feedscrew and Sleeve with material.

B. Put an empty, weighed container under the Front Sampling Box and run the feeder at 20% of its maximum running speed (20.0 on the digital display) for one or two minutes (longer if possible). The longer the time sample, the more accurate the results.

   Weigh the amount of material fed, and calculate the feed rate of the feeder (typically in pounds-per-hour, or Kg-per-hour). For example: If 2 pounds of material were fed in 1 minute, the feed rate would be 120 pounds-per-hour (2 pounds-per-minute x 60 minutes-per-hour). If 2 pounds were fed in two minutes, the feed rate would be 60 pounds-per-hour (1 pound-per-minute x 60 minutes-per-hour).

   Use care in measuring the time the feeder is run. A one-second timing error in a two-minute run, results in a feed rate calculation error of almost 1%.

C. Repeat Step B, with the feeder set at 80% of its maximum running speed.

D. The feed rates calculated in Steps B and C, define the recommended operating feed rate range for the feeder. If the desired feed rate is close to, or below, the minimum recommended operating speed (20%) change the Feedscrew to a smaller Feedscrew Assembly and rerun the test. If the desired feed rate is close to, or above, the maximum recommended operating speed (80%), change the Feedscrew to a larger Feedscrew Assembly and rerun the test.

E. Record the output of the feeders at the 20% and 80% speeds, and estimate the output at other speed settings by graphical or tabular methods (see attached sheets “Estimating Feed Rates at Various Speed Settings”).

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The Plasticolor Mixing Station provides a way to take precise control of the materials being fed into your production machine. Up to eight single Plasticolor Units simultaneously feed a precise amount of virgin and component materials into a Neckpiece mounted on the throat of the injection molding machine or extruder.

Each material cascades into the Neckpiece on an individually controlled basis … assuring an accurate, precise mix of the components. Because the Neckpiece only contains enough material to match the usage of the production machine, changes in the mix are available to the production machine almost immediately.

7b.2 Control Description

In the ***Starve Feed*** configuration, each of the fed materials cascade into the Neckpiece on an individually controlled basis, that totals a feed rate that is adjusted to match the material usage of the production machine.

Starve Feed Stations are set up in a ***Master/Slave Controller*** configuration. This means that one Controller (typically the Virgin or main Material Feeder Controller) is designated the **Master Controller**, and has control over the other (Slave) Controllers in the system. If the Master Controller's feed rate is increased or decreased, the feed rate of the other feeder Controllers (Slave Controllers) will also increase or decrease proportionately. In this way, the total output of the system is increased or decreased easily, while maintaining the proper mixture of each of the components.

7b.3 System Installation

System installation is as follows:

1. Mount the Neckpiece to the production machine. Make sure Neckpiece is mounted solidly, and that no internal ledges are created that can catch material as it is being fed through the neckpiece into the machine.

2. Mount the Plasticolor feeders to the Neckpiece (4 bolts each) with the hardware supplied.

3. Mount the Control Cabinet near the production machine in a location that is convenient to the operator, and within the length of the motor cables.

4. Connect pre-wired motor cables to the connectors on the bottom of the Control Cabinet. Use Motor No. 1 for feeding the main (virgin) material.

5. Connect 220 VAC, Single-phase power to the power connector on the bottom of the Control Cabinet.

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speed, which establishes the recommended operating range of the feeder. The output is then plotted or tabulated to define the calculated output at other speed settings.

The basic procedure for running a Feed Rate Capacity Test, is to:

A. Put a container under the Front Sampling Box of the feeder to be tested, open the cover on the Front Sampling Box, and run the feeder at full speed for a few seconds to fill the Feedscrew and Sleeve with material.

B. Put an empty, weighed container under the Front Sampling Box and run the feeder at 20% of its maximum running speed (20.0 on the digital display) for one or two minutes (longer if possible). The longer the time sample, the more accurate the results.

   Weigh the amount of material fed, and calculate the feed rate of the feeder (typically in pounds-per-hour, or Kg-per-hour). For example: If 2 pounds of material were fed in 1 minute, the feed rate would be 120 pounds-per-hour (2 pounds-per-minute x 60 minutes-per-hour). If 2 pounds were fed in two minutes, the feed rate would be 60 pounds-per-hour (1 pound-per-minute x 60 minutes-per-hour).

   Use care in measuring the time the feeder is run. A one-second timing error in a two-minute run, results in a feed rate calculation error of almost 1%.

C. Repeat Step B, with the feeder set at 80% of its maximum running speed.

D. The feed rates calculated in Steps B and C, define the recommended operating feed rate range for the feeder. If the desired feed rate is close to, or below, the minimum recommended operating speed (20%) change the Feedscrew to a smaller Feedscrew Assembly and rerun the test. If the desired feed rate is close to, or above, the maximum recommended operating speed (80%), change the Feedscrew to a larger Feedscrew Assembly and rerun the test.

E. Record the output of the Slave feeders at the 20% and 80% speeds, and estimate the output at other speed settings by graphical or tabular methods (see attached sheets “Estimating Feed Rates at Various Speed Settings”).

The specific procedure for running a Feed Rate Capacity Test on the Master feeder, is:

A. Check the feed rate of the Master feeder using the basic procedure described previously.

B. For the Master Controller, it is recommended that a Feedscrew Assembly be used that requires a motor speed of approximately 70% to 90% when feeding the desired amount of material.

   A higher "normal" running speed is recommended for the Master Controller because of its interaction with the Slave feeders in the system. The maximum running speed of the Slave Controllers are limited by the running speed of the Master Controller. For example, if the Master Controller is set to 50% of its maximum speed, no Slave Controller can run at more than 50% of its maximum running speed. As the Master Controller speed is increased or decreased, the speed of the Slave Controllers will follow.

C. If the Master Controller runs too slowly, use a smaller Feedscrew Assembly and re-test. If the Master Controller is running too fast, use a larger Feedscrew Assembly, and re-test.

The specific procedure for running a Feed Rate Capacity Test on the Slave feeder(s), is:

A. ***Important:*** *Since the Master and Slave Controllers are interconnected electrically,* ***the Master Controller must be "on" and running at a 100% speed setting to test the Slave Feeder's output****. To do this without feeding material, empty the Master feeder Hopper, and run the feeder at a 100% speed setting while testing the Slave feeders.*

B. Check the feed rate at 20% and 80% running speeds, as described previously. If feeder is required to run too slowly to feed the desired amount of material (less than 20% of speed), select a smaller Feedscrew Assembly for use. If the feeder must run faster than 80% of its running speed, select a larger Feedscrew Assembly for use.

C. Record the output of the Slave feeders at the 20% and 80% speeds, and estimate the output at other speed settings by graphical or tabular methods (see attached sheets "Estimating Feed Rates at Various Speed Settings".

□ Step 2. Adjust Master Controller to deliver the required amount of material.

Using the feed rate data obtained in Step 1, adjust Master Controller feed rate setting to the required setting for the required feed rate.

□ Step 3. Adjust the Slave Controller(s) speed to deliver the required amount of material.

Important Note: Since the Master Controller's feed rate setting interacts with the Slave Controller's settings, one small calculation is required to determine the initial Slave Controller setting.

Using the feed rate data obtained in Step 1, determine the Slave Controller feed rate setting needed by multiplying the (Calculated Slave Controller Feed Rate Setting) times (100 / Master Controller Setting in Percent).

Example: If by feed rate tests it was found that a calculated feed rate of 4 pounds-per-hour would be obtained at a 50% feed rate setting on the Slave Controller, and in this case the Master Controller is set at an 80% speed, then our Slave Controller setting to actually get a 4 pound-per-hour feed rate is:

$$\text{(Calculated Slave Controller Feed Rate Setting, in \%)} \times \frac{100}{\text{(Master Controller Setting, in \%)}}$$

$$= 50 \times (100/80)$$

$$= 50 \times 1.25$$

$$= 62.5\%$$

This means that the setting on the Slave Controller must be set at 62.5% to get 4 pounds-per-hour output when the Master Controller is running at 80% of its running speed.

7b.5 Adjusting Running Feed Rates

After the Starve Feed Station has been set up the first time as described above and is running, feed rate adjustments are typically accomplished by changing one potentiometer setting.

To adjust the total feed rate of the system up or down, while maintaining the proportion of all of the components: Adjust the speed of the Master Controller up or down. The output of the Slave Controllers will follow the change in the Master Controller automatically.

To adjust the proportion of one of the Slave Controller materials: Adjust the speed control of the Slave Controller up or down. Only the output of the Slave Controller adjusted will change.

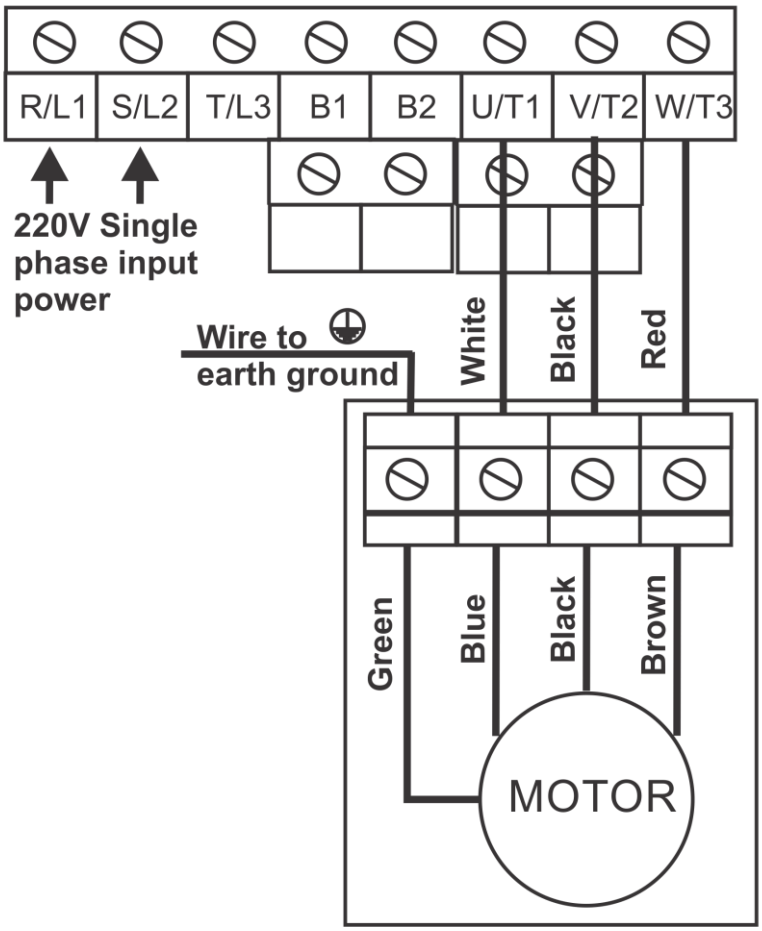
Electrical Connections, Yaskawa Controller
Addendum 1

Controller and Groschopp Motors.

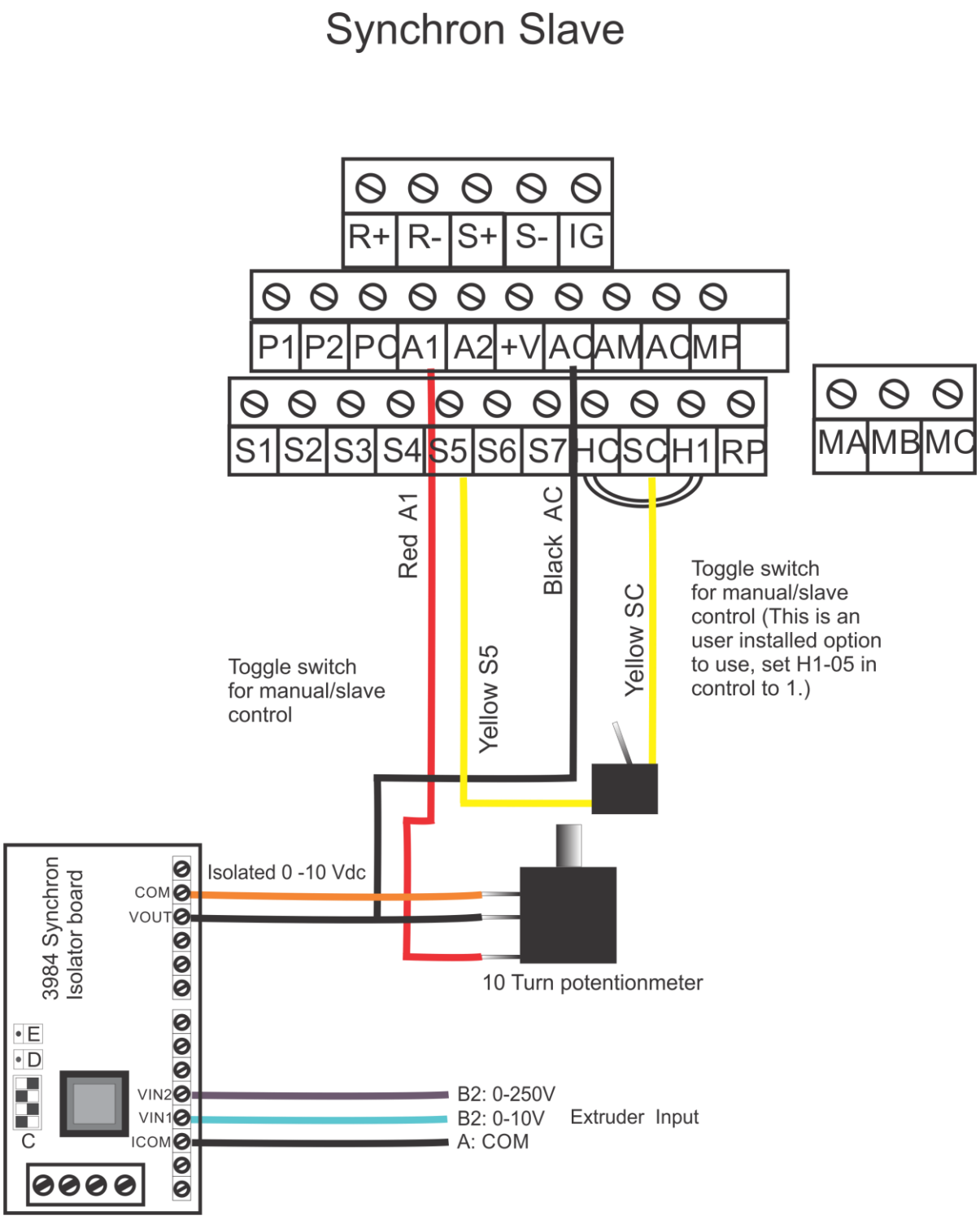
CAUTION

Be certain you connect input power to terminals L1 and L2 only. or serious damage will result. Connect motor to terminals T1,T2 and T3 only.

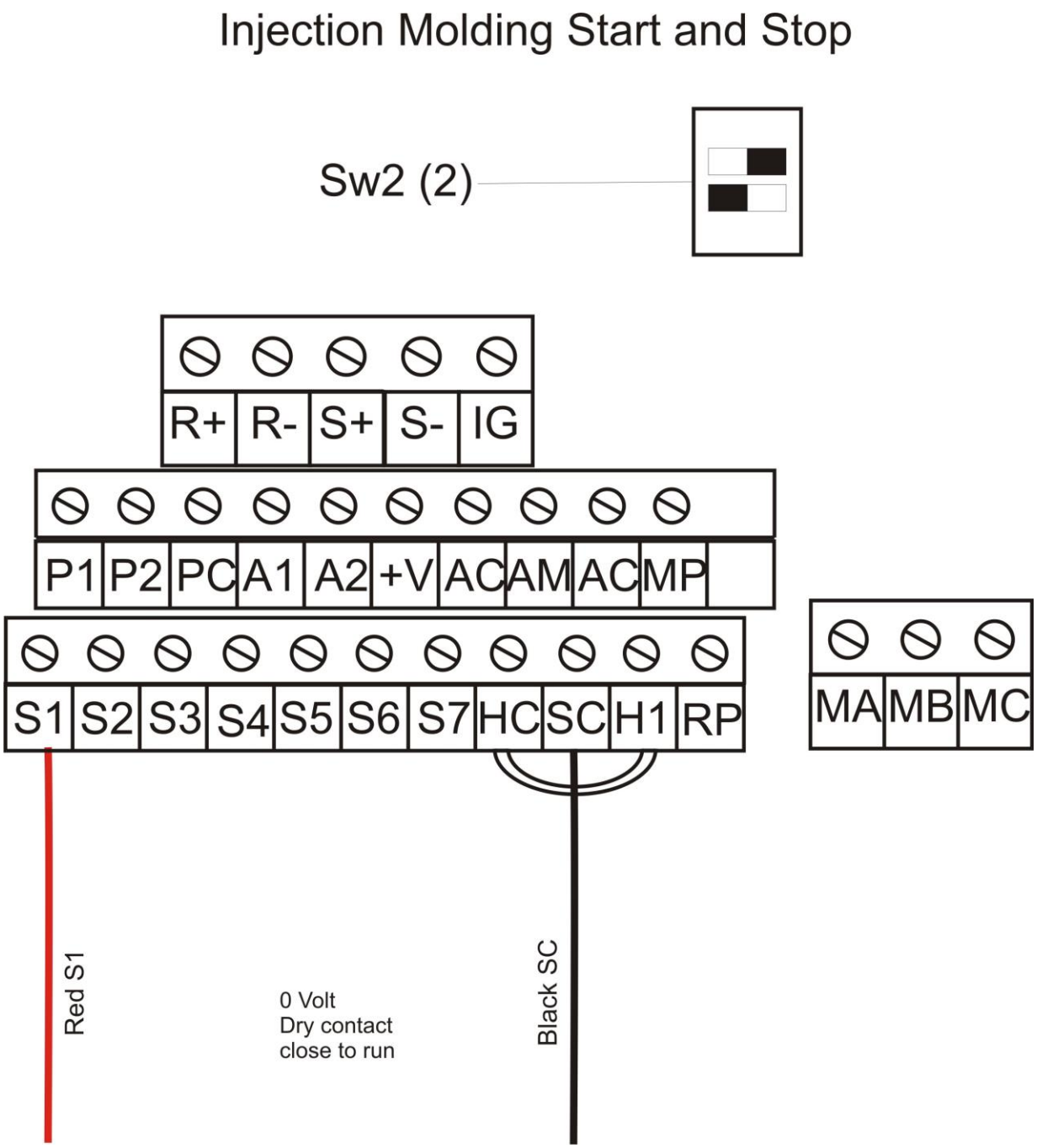
POWER WIRING SCHEMATIC



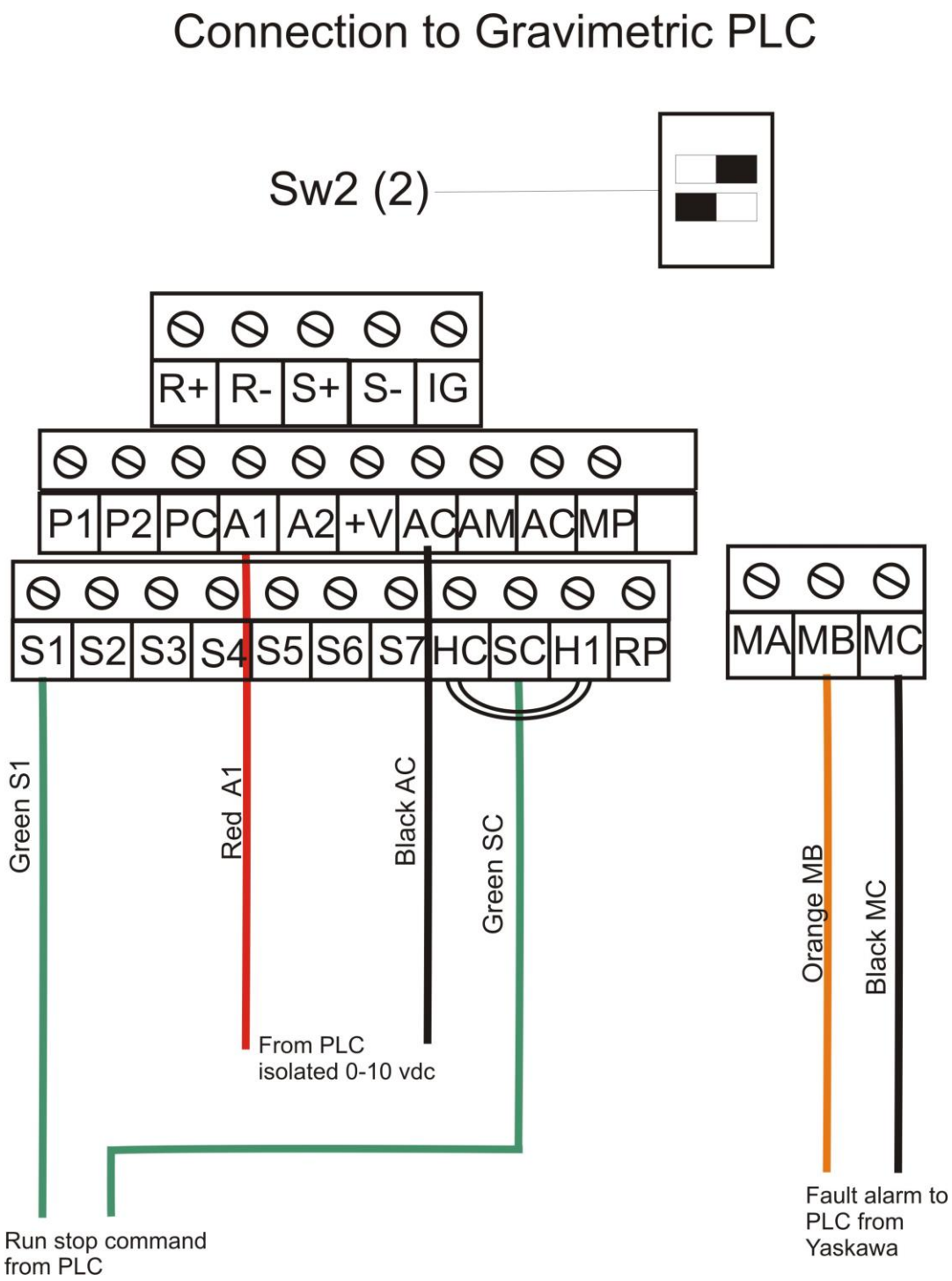
Electrical Connections, Yaskawa Controller
Addendum 1



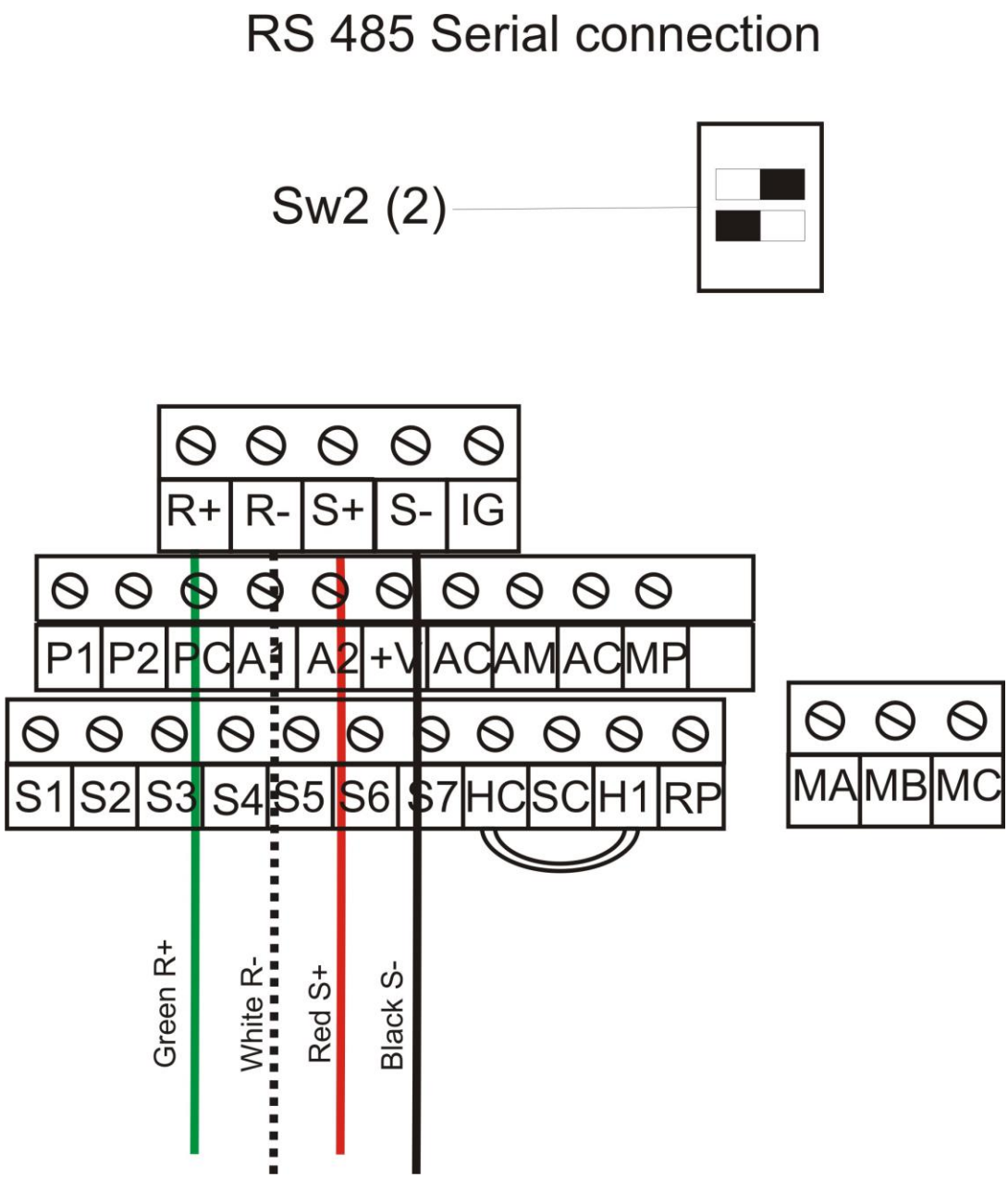
Electrical Connections, Yaskawa Controller
Addendum 1



Electrical Connections, Yaskawa Controller
Addendum 1



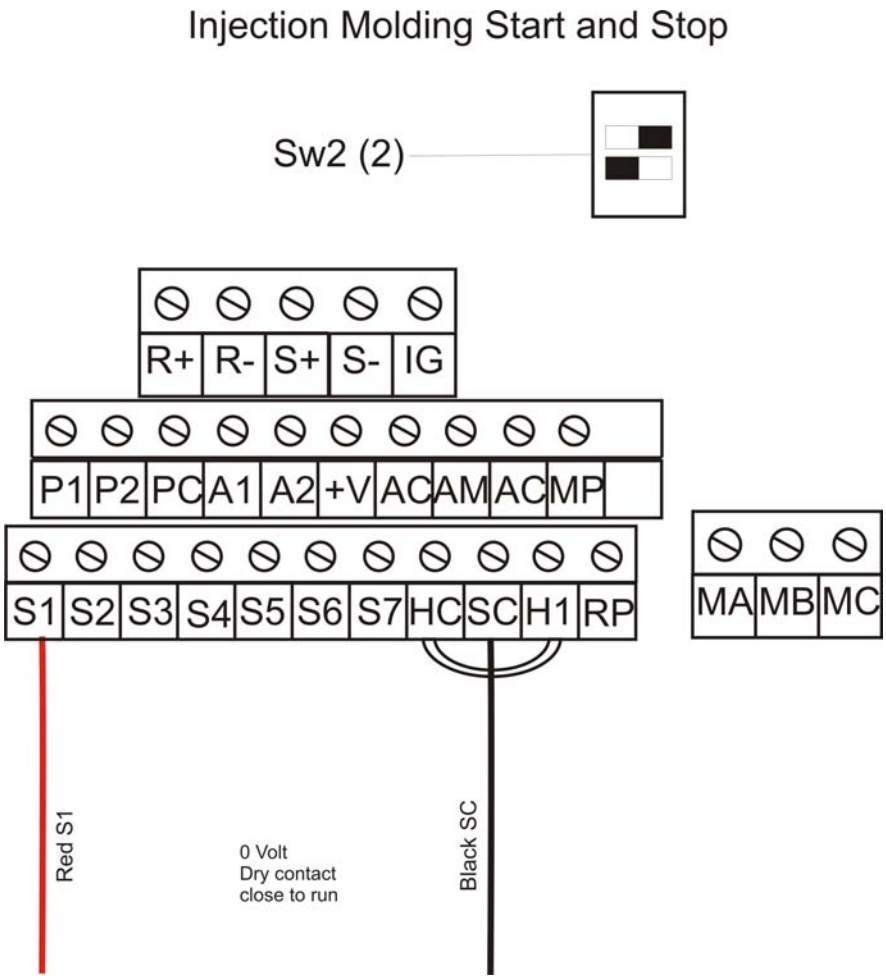
Electrical Connections, Yaskawa Controller
Addendum 1



Controller Start/Stop Connections Addendum 2

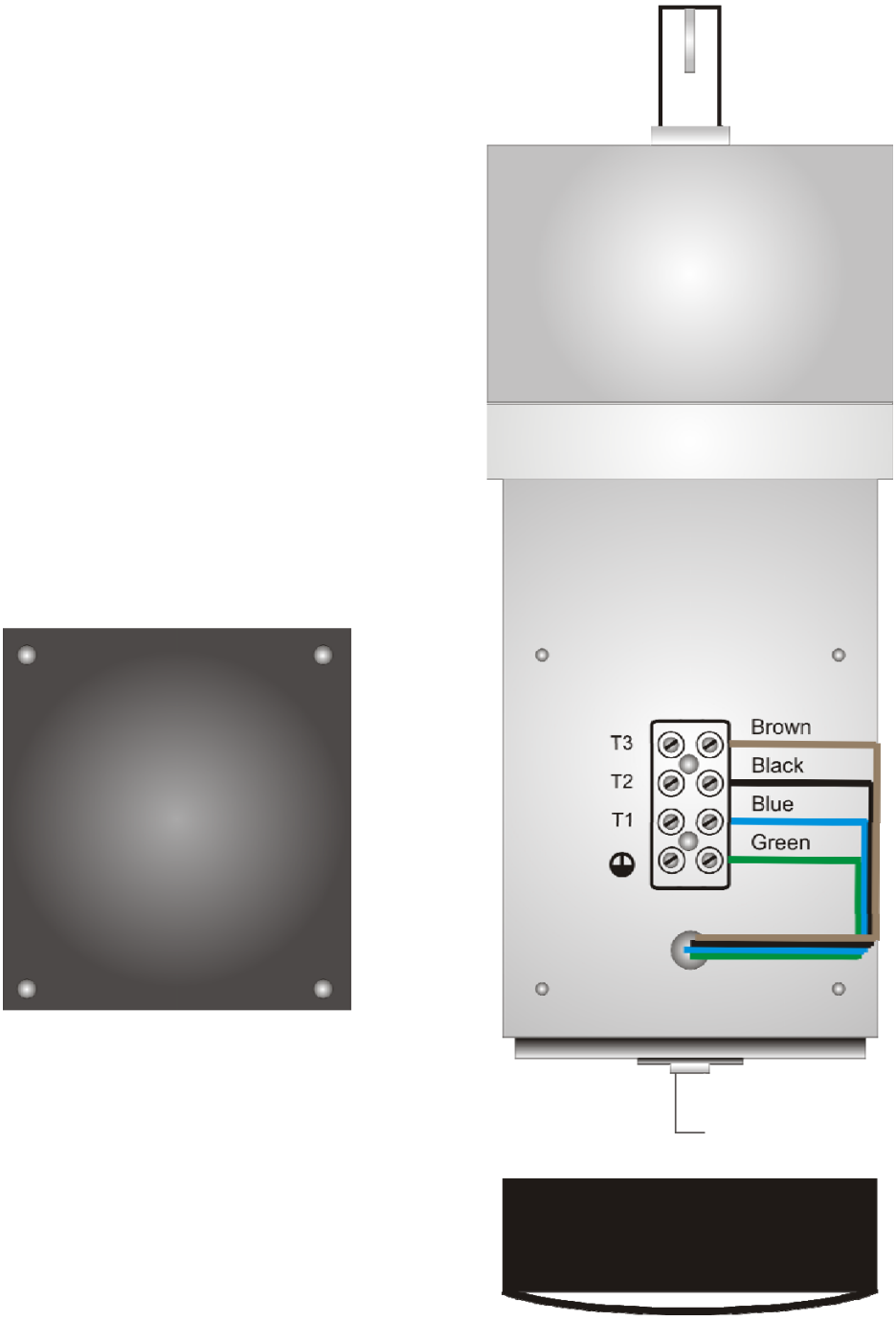
A1.1 Start/Stop Connection Description

The Yaskawa Controller includes the ability to be started and stopped externally , by either a dry contact or an Level sensor. This capability is typically used in an injection molding application or in PLASTORE MIXING STATIONS.



Warning! Disconnect power to the Controller before wiring to these connection points. Shorting either of these two points to ground while the Controller is under power **will most likely result in damage to the Controller.**

AC Motor without digital encoder



Synchron Control Installation Addendum 5

A5.1 Description

The Synchron Slave Control is an optional printed circuit board added to a Yaskawa Controller, that synchronizes the feed rate of the Plasticolor Feeder to the tachometer speed of an extruder. (Required if the 0 – 10 volt signal from the extruder is not isolated or if it is a higher voltage or mA).

The Synchron function provides two modes of operation, "MANUAL" and "SLAVE". In the "MANUAL" mode, the 10-turn knob on the front panel of the Controller controls the feeder speed. In the "SLAVE" position, the speed setting of the Controller is modified by the speed of the extruder.

The Synchron Slave Control accepts a current or a DC voltage from the extruder's tachometer, isolates it and converts it to a 0 - 10 VDC signal used to modify the speed of the Yaskawa Controller.

A5.2 Electrical Connection

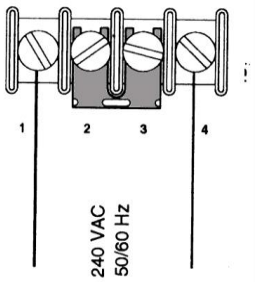
1. Connect the DC voltage of the extruder tachometer to the Synchron Control as shown on the following illustration. The tachometer common signal is connected to the "ICOM" terminal (point "A") on the board. The positive side is connected to Terminal VIN1 (point B1) or VIN2 (point B2) depending on the level of the incoming voltage. See Chart below.

Input Voltage Range	Terminal Connection	Dip swithes ON	Dip swithes OFF
0 to 25 VDC	VIN1	None	1,2,3
0 to 250 VDC	VIN2	None	1,2,3
Input Currrent Range	Terminal Connection	Dip swithes ON	Dip swithes OFF
1 to 5 mA	VIN1	3	1,2
4 to 20 mA	VIN1	2	1,3
10 to 50 mA	VIN1	1	2,3

2. AC Power should always be the last connection made during installation and the first item disconnected before servicing. The Synchron board may be connected to either 120 or 240 VAC 50/60Hz.

   For 120VAC:
   Connect jumpers from terminals 1 to 2 and from 3 to 4. Then connect 120 VAC to terminals 1 and 4. Refer to figure 1.

   For 240VAC:
   Connect a jumper from terminals 2 to 3 Then connect 240VAC to terminals 1 and 4. Refer to figure 1



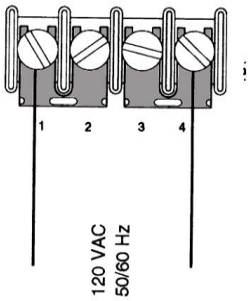


Figure 1

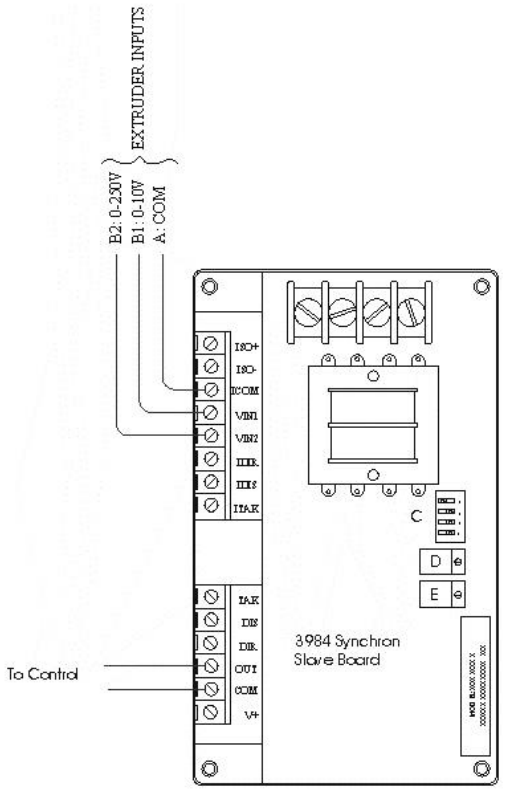


Figure 2

A5.3 Calibration

The Synchron Slave Control must be calibrated for the specific output voltage of the extruder as follows:

1. Check "MANUAL" Calibration.

Place the "MANUAL/SLAVE" switch of the Controller in the "MANUAL" position, and verify that the motor speed is adjusted for 0% to 100% speed. When adjusted with the 10-turn speed knob on the front panel. **Both the 0% and 100% speed settings must be correct before proceeding.** If necessary, recalibrate the 0% and 100% speeds per paragraph 3.4 in Section 3 of this manual before proceeding.

2. Adjust Synchron's "MIN" speed pot.

Put the "MANUAL/SLAVE" switch in the **"SLAVE" position**, and the front panel speed knob in its **full speed position (fully CW).**

Bring the extruder to zero speed, and adjust the Synchron Slave Control's "MIN" potentiometer (point "E" on diagram) so feeder motor is at zero speed.

Do this by turning the Synchron Slave Control's "MIN" pot CW until the feeder motor starts to turn or pulse, then slowly backing-off the pot (CCW) until motor stops.

3. Adjust the Synchron's "MAX" speed pot.

With the "MANUAL/SLAVE" switch still in the SLAVE position, and the front panel speed knob still in its 100% speed position (fully CW), run the extruder up to its maximum operation speed. Adjust the Synchron Slave Control's "MAX" potentiometer (point "D" on diagram) so the front panel digital display (optional) indicates 100%. If the control does not have a digital readout, Measure over terminal COM and VOUT the on the Synchron control board using a volt meter. The voltage should read 10 VDC

4. Check Synchron Operation.

Verify that the Synchron Slave Control has been calibrated properly by bringing the extruder to 50% running speed, and verifying that the controller's front panel display (Optional) indicates a 50% feeder running speed (front panel 10-turn knob should still be in the full speed, fully CW position). If the control does not have a digital readout, measure over terminal COM and VOUT on the synchron control board using a volt meter. The voltage should read 5 VDC.

5. The Synchron Control is now calibrated.

A5.4 V1000 built in scaling features.

You will need an isolated 0 VDC - 10 VDC signal from the extruder. And a 0-10 volt Duo-Dial potentiometer for adjusting the feeder speed. (Optional Synchron Slave Isolation Board is required for signals other than 0 VDC - 10 VDC)

When the controller has been properly scaled to the correct signal ratio, the feeder will be able to accurately follow the extruder speed.

The "LO/RE" (Local/Remote) button on the keypad will toggle the control between Synchronized and Manual control mode.
Note: the control has to be stopped before you can toggle between LO and RE. (An optional mechanical switch can be installed to avoid stopping the control when switching mode).

When running in the "RE" mode, run the extruder to the desired operating speed, adjust the Duo-Dial for the proper feed rate of the feeder. From this point the feed rate will vary up and down as the extruder speed varies up and down, providing the proper amount of additive material.

For example: If the extruder is running at its designated maximum speed, the feeder speed will match the Duo-Dial setting. When the extruder slows down to ½ of its designated max speed the feeder will slow down and the feeder speed will be ½ of the Duo-Dial setting.

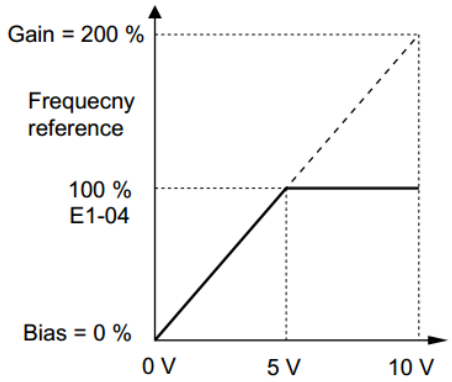
To take control of the Feeder speed stop the feeder and toggle the LO/RE button to LO mode the V1000's key pad will now control the feeder speed.

PROGRAMMING

- Press “Arrow Up/Down” Until “PAr” shows on the display
- Press “Enter”
- Press “Arrow Up/Down” to “H3-01
- Use “Up/Down and side Arrow” to navigate to “H3-03”
- Press “ENTER”
- Use “Up/Down and side Arrow” for scaling the signal 0 to 999.9 %. Default is 100%
- Press “ENTER”
- Press “ESC” four times to return to main menu.

Example of the use of the built in scaling feature in the Yaskawa V1000.

The feeder needs to be running at 100% when the signal from the extruder is 5 VDC. Set H3-03 to 0200 (%). The feeder will now give you the full feed range between an out-put of 0 - 5 VDC from your extruder.



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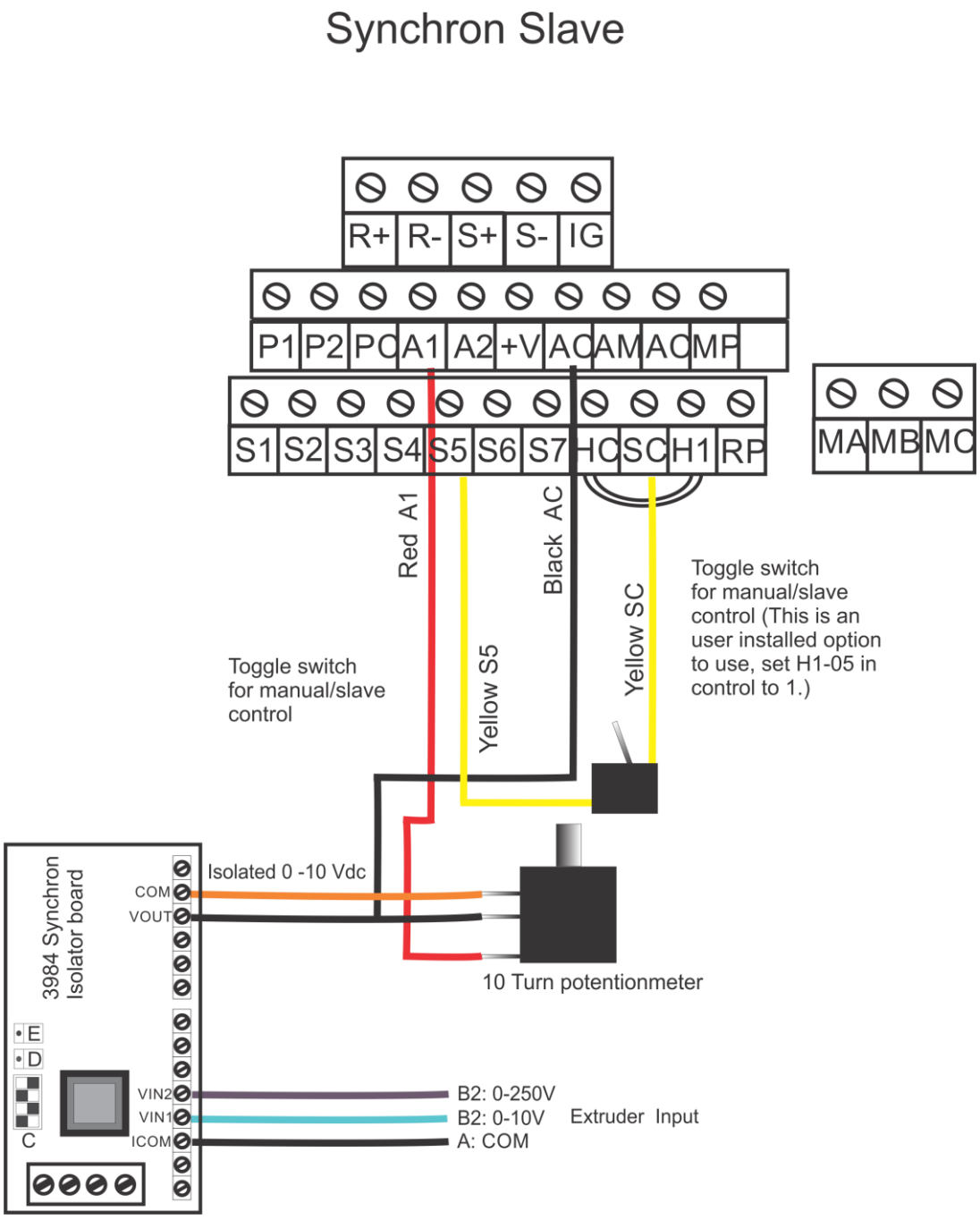
Addendum 5



Plastore Synchron Control Installation Addendum 5 Discontinued

A5.5 Description

The Synchron Slave Control is an optional printed circuit board added to a Yaskawa Controller, that synchronizes the feed rate of the Plasticolor Feeder to the tachometer speed of an extruder.

The Synchron function provides two modes of operation, “MANUAL” and “SLAVE”. In the “MANUAL” mode, the 10-turn knob on the front panel of the Controller controls the feeder speed. In the “SLAVE” position, the speed setting of the Controller is modified by the speed of the extruder.

The Synchron Slave Control accepts a DC voltage from the extruder’s tachometer as high as 400 VDC, isolates it and converts it to a 0 to 10 VDC signal used to modify the speed of the Yaskawa Controller.

A5.6 Electrical Connection

Connect the DC voltage of the extruder tachometer to the Synchron Control as shown on page A5:5. The tachometer common signal is connected to terminal 6 on the board. The positive side is connected to Terminal 1 thru 5 depending on the level of the incoming voltage at full extruder speed. See Chart page A5-6.

Connect the Synchron Control to the Yaskawa Controller as follows:

Connect terminal 12 of the Synchron Control to terminal 12 on the Yaskawa Controller. Connect Terminal 11 of the Synchron Control to Terminal 11 on the Yaskawa Controller. Disconnect the wire from Terminal 10 of the Yaskawa Controller and connect it instead to Terminal 10 of the Synchron Control. You will need to splice additional wire to make this connection.

Place the “HAND/AUTO” switch in the “AUTO” position. While in this position, run the extruder up to its maximum operation speed, Turn the ten-turn Duo-Dial control of the Yaskawa

Controller to its maximum speed (100%) position, and adjust the Cal Potentiometer on the Synchron Control until the 100% LED is illuminated. If the Digital Display option was purchased with Yaskawa Controller, the Digital Display will also indicate 100% (or maximum RPM if set to the RPM Mode).

The Synchron Control is now calibrated.

A5.7 Operating Notes

When the “HAND/AUTO” Switch on the Synchron Control is in the “HAND” position, the Synchron Control is disengaged, and the ten-turn Duo-Dial on the Yaskawa Controller takes full Control of the Plasticolor Feeder Speed.

When the “HAND/AUTO” Switch on the Synchron control is in the “AUTO” position the ten-turn Duo-Dial will only adjust the speed of Plasticolor Feeder speed relative to the speed of the extruder. For example: If the extruder is running at ½ of its maximum speed, the feeder speed will be ½ of the Duo-Dial setting.

When running in the “AUTO” Switch position, run the extruder to the desired operating speed, and adjust the Duo-Dial for the proper feed rate of the feeder. From this point the feeder feed rate will vary up and down as the extruder speed varies up and down, providing the proper amount of additive material.

Injection Molding Timer Installation Addendum 6

Description

In injection molding applications, the Plasticolor Feeder is typically wired to feed an additive to the virgin material during the screw retraction portion of the machine cycle. In some cases, this time can vary, causing the feeder to feed different amounts of material each cycle. This limitation is overcome by putting a timer in the control circuit to limit the feeder operation time during each cycle to a fixed amount of time.

Application

In a typical application, the timer starts the Yaskawa Unit with a closing (momentary) contact from the production machine. The Yaskawa Unit will then run for a maximum period of time as set by the timer controls. The following describes the connections for this typical application. The timer however is a multifunction timer and can be configured as desired by referring to the diagram on the side of the timer.

Parts Included

The timer kit from Plastore includes: a timer (S103 156 924), a plug-in connection socket, a DIN rail socket mounting bracket, and a 1Kohm resistor.

Installation

Mount the timer where it will be accessible to the machine operator, by using the mounting provisions on the socket, or by mounting the DIN rail bracket to a solid surface and clipping the socket to the DIN rail bracket.

Wire the timer to H1 and H2 onthe Yaskawa Controller to start the feeder with a contact closure.

The function slide switches on the timer should be set to the “Interval Timer” position, which puts switch 5 in the “ON” position, and switch 6 in the “OFF” position.

Set the time range switches on the timer to a time range that is applicable to the running time needed per cycle (as shown on the side of the timer). Six time ranges are available: 0.1 to 1.0 seconds, 1.0 to 10.0 seconds, 0.1 to 1.0 minute, 1.0 to 10.0 minutes, 0.1 to 1.0 hours, and 1.0 to 10.0 hours. As an example, for a 5 second cycle time, use the 1.0 to 10.0 second range, which will put switches 1 and 2 in the “ON” position and switches 3 and 4 in the “OFF” position. The dial on the front of the timer can now be set for the desired running time on receiving a contact closure. Note that the contact closure must open again before the timer can be reactivated.

Feedscrew Application Notes Addendum 7

The following notes will help explain Feedscrew terminology and application:

1. FEEDSCREW SIZES

   Feedscrew sizes as listed in the Plastore literature, define the Feedscrew and Sleeve sizes in mm. For example: a listing of 6/12 designates a 6 mm screw and a 12mm sleeve.

2. FEED RATES

   The feed rates listed in the literature for various Feedscrew sizes are for polystyrene pellets with a diameter of approximately 1/8", and a volume weight of 33 pounds per cubic foot. Other materials, shapes of pellets, diameters, or volume weight will affect feed rates.

3. COATED FEEDSCREWS

   Coated Feedscrews provide additional lubricity to the Feedscrew to prevent materials from clinging to the Feedscrew, and to extend the Feedscrew life when feeding abrasive materials. The coating is a Dicronite material, fusion bonded to the screw and has a lubricity approximately twice that of graphite.

4. CUTOUT AND SOLID FEEDSCREW SLEEVES

   Standard Feedscrew Assemblies include a **Cutout Sleeve**. This cutout allows sampling of the fed material from the feeder's Test Cover.

   These Sleeves are designed for maximum accuracy when feeding standard size rounded pellets (1/16" to 3/16"). If the pellets being fed are significantly larger or smaller, or if they have square cut or sharp edges, there is a possibility that the material can get caught in the Test Cover area and block the screw. For these cases, a **Solid Sleeve** can be utilized to minimize the chances of this happening.

   IMPORTANT NOTE: When a Solid Sleeve is utilized, the Test Cover can no longer be used to test the material feed rate, and a Neckpiece with a Front Sampling Box will be required.

5. FRONTSAMPLING BOXES (on Neckpiece)

   When a Solid Feedscrew Sleeve is used, the sampling port on the bottom of the Plasticolor Feeder is no longer functional for testing the unit's feed rate. In these cases, a Neckpiece with a Front Sampling Box should be used to allow for feed rate calibration and testing.

6. FEEDSCREW/ SLEEVE CLEARANCES

   In cases when the material being fed is significantly larger or smaller than the ideal size, it may be advantageous to use Feedscrew Assemblies with clearances other than the standard ones listed in the price book.

   In these cases, contact Plastore, Inc. for application assistance. Material feed rate tests can be run at the factory to determine the ideal Feedscrew combination. Do not hesitate to contact us if you should have any questions.

Feed Rate Tables Addendum 8

Table 1: Feedscrew Assemblies and Feed Rates for PC2000 Feeders

	FEEDSCREWS					
Motor	White 6/12	Silver 8/15	Orange 10/17	Purple 13/20	Gold 15/22	Red 17/24
GAC-170	0.16 - 2.2 (0.14 - 1)	0.4 – 6.2 (0.18 – 2.8)	0.6 - 13 (0.27 – 5.9)	1.1 - 24 (0.5 - 11)	2.0 - 36 (1.04 – 16.3)	2 - 46 (0.90 - 20)

Feed Rates listed are in Pounds per Hour, and (Kg/hr)

Table 2: Feedscrew Assemblies and Feed Rates for PC3000

	FEEDSCREWS							
Motor	White 6/12	Yellow 8/15	Orange 10/17	Brown 13/20	Gold 15/22	Red 17/25	Green 25/34	Black 40
GAC-170	0.16 - 2.2 (0.14 - 1)	0.4 – 6.2 (0.18 – 2.8)	0.6 - 13 (0.27 – 5.9)	1.1 - 24 (0.5 - 11)	2.0 - 36 (1.04 – 16.3)	2 - 46 (0.90 - 20)	8 - 150 (3.6 - 68)	28 - 572 (12 - 260)
GAC-340	0.4 – 4.4 (0.2 - 2)	0.6 – 12.4 (0.3 – 5.6)	0.8 - 26 (0.4 – 11.80)	1.5 - 48 (0.7 – 22)	2.5 - 72 (1.2 - 34)	3 - 92 (1.4 - 42)	9 - 300 (4.5 - 136)	33 - 1144 (15 – 519)
GAC-680	0.7 – 8.2 (0.30 – 3.8)	0.8 - 25 (0.4 – 11.5)	1 - 52 (0.5 – 23.)	1.9 - 96 (0.9 - 46)	3.5 - 144 (1.6 - 65)	4.4 - 184 (2.00 - 83)	11 - 600 (5 - 272)	55 - 1900 (25 – 862)

Feed Rates listed are in Pounds per Hour, and (Kg/hr)

Table 3: Feedscrew Assemblies and Feed Rates for PC4000

	FEEDSCREWS
Motor	58/70 Blue
GAC-340	88 -3,600 (40 - 1,634)
GAC-680	121 - 6,000 (55 - 2,724)

Feed Rates listed are in Pounds per Hour, and (Kg/hr)

Note: All feed rates listed above are for smooth polystyrene pellets with a diameter of approximately 1/8", and a volume weight of approximately 33 pounds-per-cubic-foot. Other materials, shapes of pellets, diameters, or volume weights will affect feed rates.

A6.1 Description

The forms included in this Addendum will allow you to estimate the feed rate output of the Plasticolor Feeder at various motor speed settings, based upon feed rate data taken at 10% and 90% running speed settings.

A6.2 Procedure

1. Record Material being tested, Feedscrew size, Sleeve size and motor size.

2. Take feed samples at 10% and 90% motor running speeds.

3. Convert samples to a Feed Rate in lbs/hr or kg/hr. Some conversion factors listed below for reference.

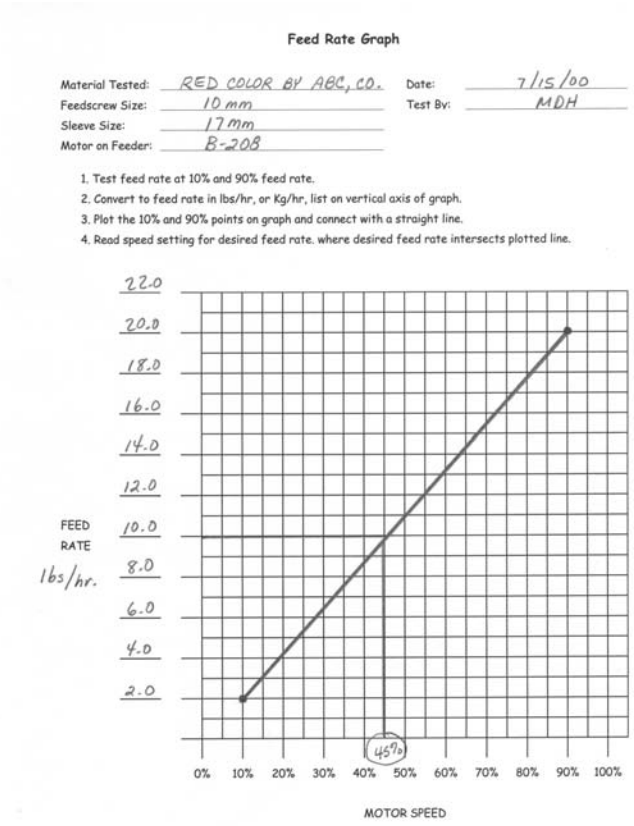
4. Select a Feed Rate Scale on the graph that includes the 10% and 90% feed rates.

5. Plot the 10% and 90% points on the graph and connect them with a straight line.

6. The speed settings for various feed rates are determined by finding the intersection point of the desired feed rate and the plotted line, and reading the corresponding controller speed setting.

Example: The following example Feed Rate Graph page shows a test feed rate of 2.0 lbs/hr at a 10% motor speed, and 20.0 lbs/hr at 90% motor speed.

If a feed rate of 10.0 lbs/hr, was desired, a speed setting of approximately 45% would be required. This setting was determined by finding where the 10.0 lbs/hr feed rate line intersected the plotted line, and following that point down to the motor speed line.



A6.3 Handy Conversions

grams/minute x 0.1323 = pounds/hr.

grams/hour x 0.035274 = ounces/hr.

grams/hr. x 0.002205 = pounds/hr.

Estimating Feed Rates Graphical Method

The following will estimate the output of the Plasticolor Feeder at various speed settings, based upon feed rate readings taken at 20% and 90% running speeds.

Step 1: Record Test Parameters:

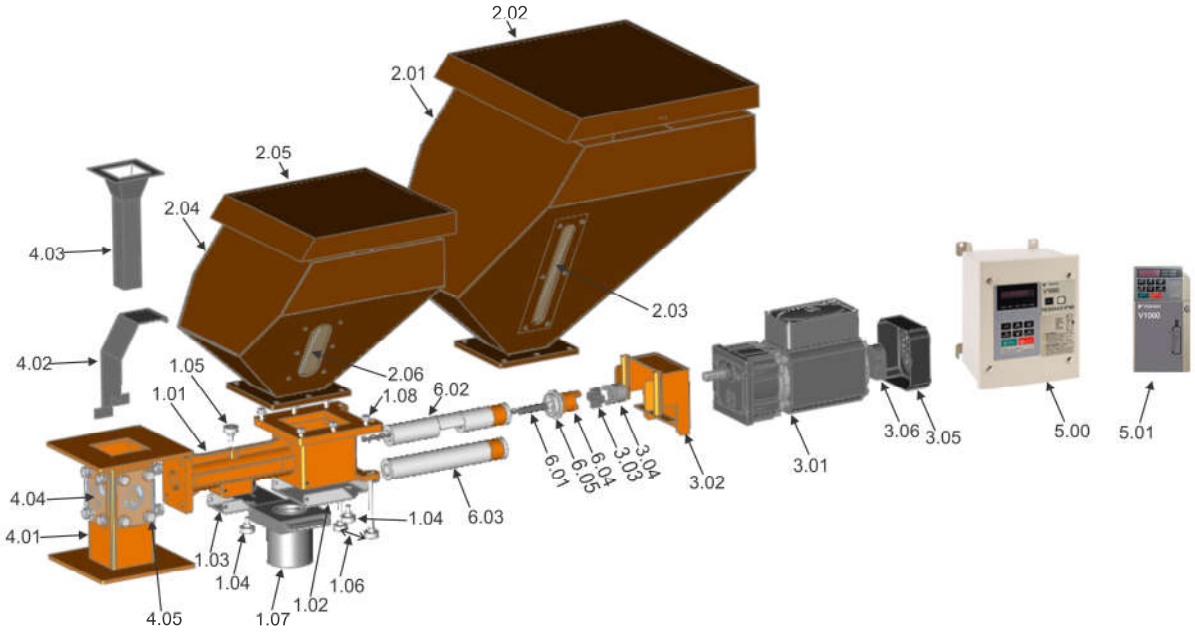
Material Tested:	
Plasticolor Unit	
Feedscrew Size:	
Motor	
Line/Machine Info:	
Date/Test Person	

Step 2: Select a Material Feed Rate Scale that includes the feed rate at both the 20% and 80% speeds.
Step 3: Plot the 20% and 90% feed rates on the graph.
Step 4: Plot a line through the 20% and 90% plotted points.
Step 5: Speed settings for various desired feed rates are determined by finding the intersection point of the desired feed rate and the plotted feed rate line, and reading the corresponding controller speed setting.

Material Feed Rate											
□ lbs/hr											
□ Kg/hr											
	10	20	30	40	50	60	70	80	90	100	
	Controller Speed Setting, % of Full Speed										

Feed Rate at 20% Speed = _____

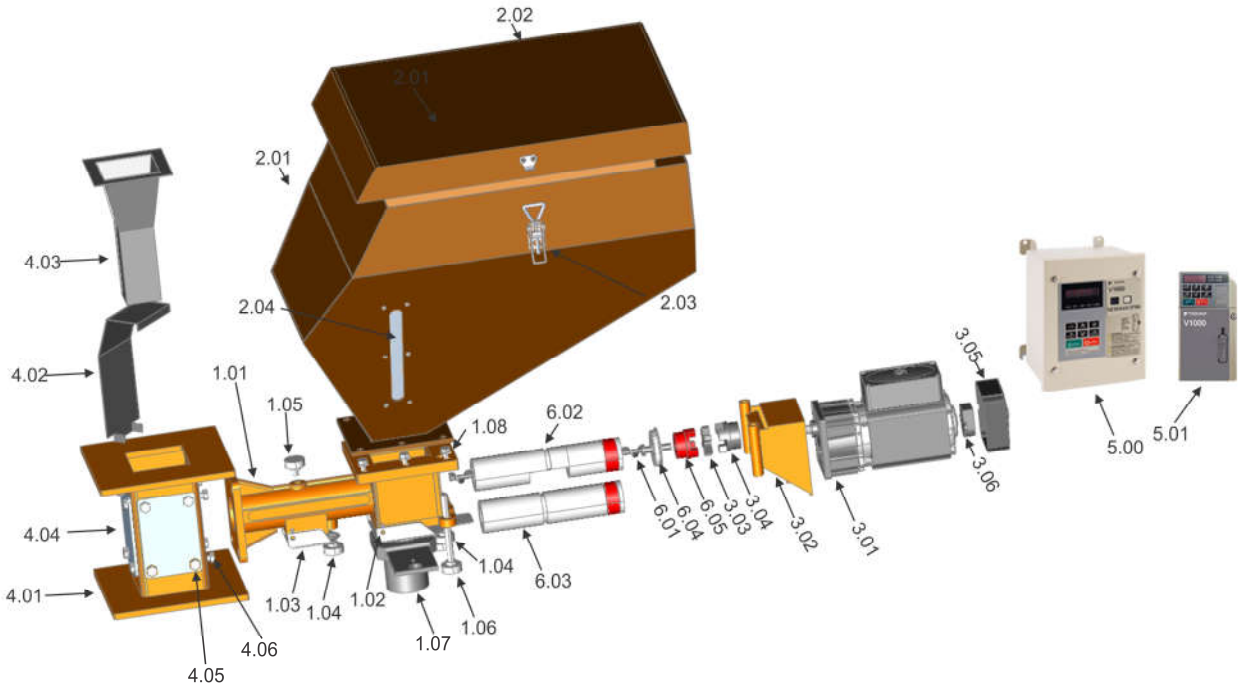
Feed Rate at 80% Speed = _____



REF. NO.		PART NUMBER		DESCRIPTION OF COMPONENT
		100-02000-000		**Assembly, Body housing, PC2000 includes the following:**
1.01		100-02000-010		Body housing (1)
1.02		100-02000-001		Cleanout Cover Lid (1)
1.03		100-02000-002		Test Cover Lid (1)
1.04		100-02000-003		Knob, Cleanout, and Test Cover
1.05		100-02000-004		Knob, Cylinder Locating (1)
1.06		100-02000-005		Knob, Motor Hinge (2)
1.07		100-02003-100		Quick Drain (Optional equipment)
1.08				M6-1.0 X 16mm, Hex Head Cap Screw, 8.8, Z (6)
		200-02000-000		**Assembly, 25 liter Hopper includes the following:**
2.01				25 Liter Hopper Body
2.02		200-02000-001		25 Liter hopper Lid
2.03		410-02000-000		Sight glass, 25 liter Hopper (2)
				Pop Rivet, 1/8 X 3/16 (4)
				Pop Rivet, 1/8 X ¼, AL-STL (16)

REF. NO.		PART NUMBER		DESCRIPTION OF COMPONENT
		200-02001-000		**Assembly, 8 liter Hopper, PC2000 includes the following:**
2.03				8 Liter Hopper Shell
2.05		200-02000-001		8 Liter Hopper Lid.
2.21		410-02001-000		Sight glass, 8 liter Hopper (2)
				AC Motor
3.01		300-310AC-170		Motor, GAC 170
		300-310AC-340		Motor, GAC 340
3.02		300-31000-203		Motor Shelf, AC Motor
3.03		300-20000-002		Flex Coupling (Rubber Spider)
3.04		300-31000-200		Motor Coupling, AC Motor
3.05		300-310AC-010		AC Motor Endcap
3.06		300-310AC-000		Optional Encoder
				M4 7x10 mm HHCS. 8.8 Z (4)
				Neckpiece
		400-02000-100		**Assembly, Standard 7" High Neckpiece includes the following:**
4.01		400-02000-000		Shell, Standard 7" Neckpiece (1)
4.02		400-02000-TYC		Deflector, Standard 7" Neckpiece (1)
4.03		400-02000-002		(Optional) High-Capacity Inlet, Standard 7" Neckpiece
4.04		410-00001-006		Sight glass, Standard 7" Neckpiece (3)
4.05		820-03000-052		M8-1.25 X 16mm, Hex Head Cap Screw, 8.8, Z (12)
4.05		820-03000-004		M8, Flat Washer, Z, 433 (16)
4.05		820-03000-003		M8-1.25 X 20mm, Hex Head Cap Screw, 8.8, Z (4)
				AC Drive
5.00		500-00070-008		Yaskawa V1000 Nema 4
5.01		500-00070-001		Yaskawa V1000 Nema 1
				Feed Screws
6.01		602-00000-001		Screw Coupling (1)
6.02a		602-00000-002		Body Housing Seal (Disk) for Pellets (1)
6.02b		602-00000-003		Nylon Body Housing Seal (Disk) for Seal Kit (Powders) (1), includes:
		602-00000-004		Nylon Disk only for Seal Kit (1)
		602-00000-005		O-Ring, BUNA-19, (1)
		603-00000-011		Oil Seal, 9mm I.D., for Seal Kit Nylon Disk (1)
6.01 Feed screw	Contact Plastore, Inc. for specific a Part Number. Please specify size (diameter) in mm, or color code on screw coupling, Available sizes are 6mm, 8mm, 10mm, 13mm, 15mm, and 17 mm.			

REF. NO.	PART NUMBER	DESCRIPTION OF COMPONENT
6.02 and 6.03 Sleeve	Contact Plastore, Inc. for specific a Part Number. Please specify the internal bore size in mm, or the color of the band around the sleeve. Also, indicate whether the sleeve is solid or cutout. Available sizes are 10mm, 12mm, 15mm, 17mm, 20mm, 22mm, and 24mm.	



REF. NO.		PART NUMBER		DESCRIPTION OF COMPONENT
				Body Housing
		100-03000-000		**Assembly, Body housing, PC3000, includes the following:**
1.01		100-03000-010		Body housing (1)
1.02		100-03000-101		Cleanout Cover Lid (1)
1.03		100-03000-102		Test Cover Lid (1)
1.04		100-03000-003		Knob, Cleanout and Test Cover
1.05		100-03000-004		Knob, Cylinder Locating (1)
1.06		100-03000-005		Knob, Motor Hinge (2)
1.07		100-03000-300		Quick Drain (Optional Equipment)
1.08				M8, Flat Washer, Z (6)
1.08				M8-1.25 X 20mm, Hex Head Cap Screw, 8.8, Z (6)
				Hopper
		200-03000-000		**Assembly, 50 liter Hopper, PC3000, includes the following:**
2.01		200-03000-005		50 Liter Hopper Body
2.02		200-03000-002		50 Liter Hopper Lid
2.03		200-03000-003		Striker, Lid (2)

REF. NO.	PART NUMBER	DESCRIPTION OF COMPONENT
2.03	200-03000-004	Swivel Latch, Hopper (2)
2.20	410-03000-000	Sight glass, 50 liter Hopper (2)
		AC and Servo Motor
3.00	300-310AC-170	Motor, GAC 170
3.00a	300-310AC-340	Motor, GAC 170
3.01	300-31000-303	Motor Shelf, Motor (1)
3.02	300-30000-001	Flex Coupling (Rubber Spider) (1)
3.03	300-31000-300	Motor Coupling, Bodine Brushless
3.83	820-03000-015	M4 7x10 mm HHCS. 8.8 Z (4)
3.05	300-310AC-010	AC Motor Endcap
3.06	300-310AC-000	Optional Encoder
		Neckpiece
	400-03000-100	**Assembly, Standard 8" High Neckpiece includes the following:**
4.01	400-03000-000	Shell, Standard 8" Neckpiece (1)
4.02	400-03000-001	Deflector, Standard 8" Neckpiece (1)
4.03	400-03000-002	(Optional) High Capacity Inlet, Standard 8" Neckpiece
4.04	410-00001-002	Sight glass, Standard 8" Neckpiece (3)
4.05		3/8-16 X 5/8, Hex Head Cap Screw, GR5, Z (12)
4.05		3/8, Flat Washer, SAE, Z, (16)
4.05		3/8-16 X 7/8, Hex Head Cap Screw, GR5, Z (4)
		AC Drive
5.00	500-00070-008	Yaskawa V1000 Nema 4
5.01	500-00070-001	Yaskawa V1000 Nema 4
		Feed Screws
6.05	603-00000-001	Screw Coupling (1)
6.04a	603-00000-002	10 mm Body Housing Seal (Disk) for Pellets (1)
6.04b	603-00000-012	10 mm Body Housing Seal (Disk) for Seal Kit (Powders) (1), includes:
	603-00000-007	Nylon Disk only for Seal Kit, 10MM I.D. (1)
	603-00000-008	O-Ring (-122 BUNA 70), (1)
	603-00000-011	Oil Seal, 9mm I.D., for Seal Kit Nylon Disk (1)
6.01 Feed screw	Contact Plastore, Inc. for specific Part Number. Please specify size (diameter) in mm, or color code on screw coupling, and if screw is standard or coated (typically used with powders. Available sizes are 6mm, 8mm, 10mm, 13mm, 15mm, 17mm, 25mm, and 40mm.	
6.03, 6.02 Sleeve	Contact Plastore, Inc. for specific Part Number. Please specify internal bore size in mm, or color of band around sleeve. Also indicate whether sleeve is solid, or cutout. Available sizes are 10mm, 12mm, 15mm, 17mm, 20mm, 22mm, and 25mm, and 34mm.	

Hopper Alarm Addendum 12

A12.1 Description

The optional Plastore Hopper Alarm provides an audible and visual alarm when the material level in a hopper reaches a low level.

A12.2 Installation

1. **Mount the alarm** near the hopper to be monitored, in a position that is easily visible to the production machine operator.

2. **Install the Level Sensor** by drilling or punching a 45/64" hole in the hopper, at a point representing a 10% to 20% capacity point. Install the sensor with ¼ (or more) of the sensor's length extended into the hopper. The sensor is a capacitive type sensor that senses the presence of material around it, so do not mount the sensor with the tip close to the walls of the hopper.

3. **Connect** the sensor to the sensor cable, and the power cord to a 110 VAC power source.

4. **Adjust the Level Sensor Sensitivity**. Manually fill the hopper with enough material to just cover the face of the sensor. With the small screw driver supplied, turn the sensitivity adjustment screw to its fully counter-clockwise position (least sensitive position), then slowly turn the sensitivity screw clockwise, until the indicating light on the sensor illuminates.

A12.3 Operation

When the material in the hopper drains to the level of the sensor, a buzzer will sound, and a flashing, red dome light will light.

Pressing the "Acknowledge" button will silence the buzzer, but the flashing red light will continue to flash until the hopper is refilled.

Introduction

Your Plastore Hopper Loader is an automatic, compressed air system for transferring material from a bulk container to a feeder hopper.

The system is designed to handle typical free-flowing material such as pellets, beads. The system is not designed to handle non free-flowing materials or powders.

A13.1 Basics of Operation

The material transfer Suction Wand uses compressed air to generate a powerful vacuum that lifts material from a bulk container and transfers it to a feeder hopper through a material transfer hose. The air used to create the suction in the Suction Wand is directed through the material transfer hose to help carry the material to the hopper.

The hopper-mounted Loader uses a cyclone effect to separate the transferred material from the air stream and deposits the material into the hopper. An easily obtainable automotive type air filter on the Loader stops air-born dust from entering the plant. High/Low Level Sensors in the hopper tell the Controller when to load material, starting the feeder when the material reaches the low level sensor and stopping the feeder when the hopper is full.

A13.2 Included Components

Your Plastore Hopper Loader system includes:

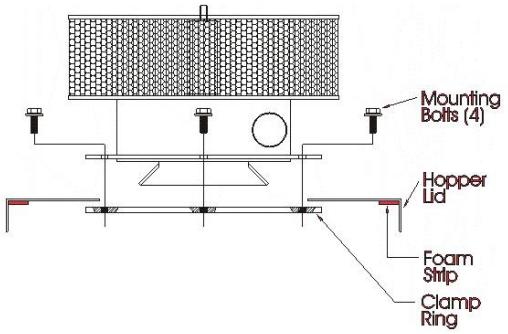
- Hopper-mounted Loader with integral, clamp-type mounting ring
- Material Suction Wand, Stainless Steel
- Controller with integral Air Regulator/Filter/Water Separator
- High/Low Level Sensors, and cables
- Material Transfer Hose, 10 ft long, anti-static
- Air Supply Hose, 10 ft long

A13.3 Installation

Installation steps include:

1. Mount the Hopper Loader to the Hopper

Start by cutting a 7 ½ inch diameter hole in the center of the hopper lid. ***Take your time here*** ... a round, clean-edged hole will result in a trouble-free installation. The loader is clamped to the hopper lid with its Clamp Ring as shown. Install the unpainted side of the Clamp Ring "Up", against the hopper lid. Leave clamping bolts finger tight until the material inlet tube is positioned to point in the desired direction. Then, tighten the bolts to clamp the loader securely to the hopper lid. Install the hopper sealing foam strip to the inside of the hopper lid to seal the lid to the top edge of the hopper.



2. Install the Level Sensors in the Hopper

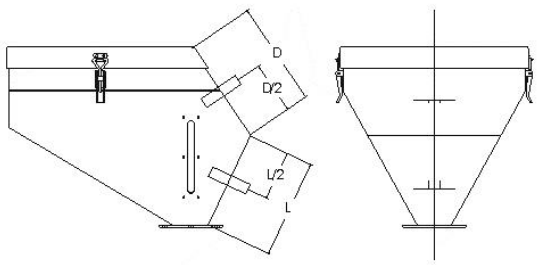
Drill or punch two, 45/64 inch diameter holes in the Hopper, as shown in the following diagram. Install the top and bottom level sensors into the

hopper. Install sensors with at least one-half of the sensor's length extended into the hopper.

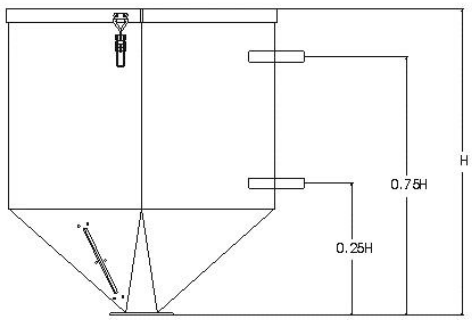
Important: The High Level Sensor should be installed at a level representing approximately 75% of the hopper's capacity. The Low Level Sensor should be installed at a 25% capacity point. Do not try to fill the hopper to the top with each fill cycle. Mounting the top sensor too high in the hopper will result in transferred material being drawn into the Loader's filter area.

Caution: The top and bottom sensors are not interchangeable. If sensor positions are reversed, the system will not work properly. The sensors are clearly marked with their positions.

PLASTORE ASYMETRICAL HOPPER



GENERIC STRAIGHT SIDE HOPPER



Attach the top and bottom sensor cables from the Controller to the sensors. Cables and sensors are clearly marked "Top" and "Bottom". They must be installed and connected in their proper location.

3. Mount the Controller/Regulator Assembly

Mount the Controller/Regulator Assembly within easy reach of the system operator and within 10 ft of both the Hopper Loader and the bulk material container location. Longer hose assemblies are available for applications requiring longer distances.

4. Connect the Air Source to the Regulator

Avoid air sources with excessive moisture. The system will use air in the 40 psi to 100 psi range, at approximately 5 to 7 CFM, depending primarily on the material transfer rate desired. An air supply shut-off valve is recommended and should be installed near the Loader's Controller/Regulator Assembly.

The regulator includes a water separator with automatic drain. Attach a plastic drain hose to the regulator to drain condensed water to an acceptable location.

5. Connect the Controller's power cord

Connect the Controller's power cord to a 110 VAC, single phase, 50/60 Hz power source.

6. Connect the Material Transfer and Air Hoses

The Material Transfer Hose supplied is an anti-static type hose that includes an internal, electrical drain wire. When connecting the Material Transfer Hose to the Hopper Loader and Suction Wand, fold the drain wire inside of

the hose, so it is in contact with the bare metal of the Hopper Loader and Suction Wand. Clamp the Air Supply Hose securely to both the Suction Wand and Air Regulator fittings.

7. Adjust the Level Sensor Sensitivity

The level sensors are "capacitive" type of sensors that sense the presence of material around them. The sensitivity of these sensors is adjustable and should be adjusted for the type of material that is being loaded. This is a simple two step process. This calibration should be done with the **compressed air source "OFF" and power to the system "ON"**.

Step 1: Manually, fill the hopper with enough material to just cover the face of the Low Level Sensor. With the small screwdriver supplied, turn the sensitivity adjustment screw to its fully counter-clockwise position (least sensitive position), then ***slowly*** turn the sensitivity screw clockwise until the indication light illuminates.

Step 2: Manually, continue filling the hopper until the material just touches the bottom edge of the High Level Sensor. With the small screwdriver supplied, turn the sensitivity adjustment screw to its full counter-clockwise position (least sensitive position) then ***slowly*** turn the sensitivity screw clockwise until the indication light illuminates.

The level sensors are now calibrated for the material being transferred.

A13.4 Hopper Loader Operation

Insert the Suction Wand into the bulk material to be transferred. Adjust the air regulator pressure to approximately 50 psi and put the Controller power switch into the "ON" position.

The two indicating lights on the front of the Controller will indicate the operation status of the unit.

The Loading Light indicates that the system is calling for material to be loaded and material should be flowing through the material transfer hose.

The Standby Light indicates that the system is energized, but that the hopper has enough material in it to cover the Low Level Sensor. In this mode, material is not being called for and material will not be flowing through the material transfer hose.

Note: The air pressure to the system can be raised or lowered for your specific application as required.

Raising the air regulator pressure will result in faster material transfer rates, but more air will be consumed. *Do not use air regulator settings greater than 100 psi.*

Lowering the air regulator pressure will result in a lower material transfer rate, but the system may be a little "quieter" and less material dust will be created. Depending on the material being transferred, the system will operate at pressures as low as 40 psi. If the pressure used is too low, the material will not be transferred reliably and may be subject to clogging.

A13.5 Hopper Loader Maintenance

A few simple maintenance checks done regularly will keep you Plastore Hopper Loader working like new:

- Check the air filter and clean or replace it if it becomes clogged. A light held behind the filter is an easy way to see if it is clogged.
- Check the material transfer hose occasionally for leaks or loose fitting clamps.
- Check and clean regulator filter occasionally, as required.
- Check the Suction Wand occasionally to make sure that it is free and clear of large items that may have been pulled into it.

A11.6 Specifications

Input Power: 120 VAC
Input Air Supply Pressure: 40 to 100 psi
Approximate Air Volume Usage: 5 to 7 cfm
Material Transfer Hose: 10 ft
Air Hose: 10 ft, Braid Reinforced
Filter, Automotive Type: Fram CA3588, Purolator AF3195, AC A773C, Deutch A234, or equal
Loader Height: Approximately 5.5 inches

Setup Parameters for Yaskawa Drives Addendum 15

Single unit continuous run

Set Control to PAr and press enter

Parameter	Default value	Change to value	Description
A1-01	2	2	Password (Allows modification of all parameters.
A1-02	0	0	Control method 0 Volt/Frequency and 2 is open loop vector
b1-01	1	0	Digital operator
b1-02	1	0	Digital operator
b1-03	0	0	Stop method 0 Ramp to stop, 1 Coast to stop
b1-04	0	0	Reverse prohibit 0 enabled 1 disabled
E1-09	1.5	0.5	Minimum frequency
C1-01	10	0.1	Acceleration time in Seconds
C1-02	10	0.1	Deceleration time in Seconds
o1-03	0	3	0= Hz, 1 = % , 2 Rotor Rpm, 3 User set display units in o1-10 and decimal point is set in o1-11
E2-03	0.8	0	Set to a lower value than E2-01
E2-01	0.35	0.75	Motor rated current
C4-01	1	0	Torque Compensation Gain
L1-01	0	1	Electronic Thermal Overload Protection Short term rating 1 Standard rating 2 Disabled
A1-03		1110	Resets the control to Plastore default settings

Setup Parameters for Yaskawa Drives Addendum 15

Single units with external start and stop

Set Control to PAr and press enter

Parameter	Default value	Change to value	Description
A1-01	2	2	Password (Allows modification of all parameters.
A1-02	0	0	Control method 0 Volt/Frequency and 2 is open loop vector
b1-01	1	0	Digital operator
b1-02	1	1	Digital operator
b1-03	0	0	Stop method 0 Ramp to stop, 1 Coast to stop
b1-04	0	0	Reverse prohibit 0 enabled 1 disabled
E1-09	1.5	0.5	Minimum frequency
C1-01	10	0.1	Acceleration time in Seconds
C1-02	10	0.1	Deceleration time in Seconds
o1-03	0	3	0= Hz, 1 = % , 2 Rotor Rpm, 3 User set display units in o1-10 and decimal point is set in o1-11
E2-03	0.8	0	Set to a lower value than E2-01
E2-01	0.35	0.75	Motor rated current
C4-01	1	0	Torque Compensation Gain
L1-01	0	1	Electronic Thermal Overload Protection Short term rating 1 Standard rating 2 Disabled
A1-03	1110		Resets the control to Plastore default settings

Note: Change parameter b1-02 to (0) for Calibration (Enables the use of the touch pad for running tests)This setting disables the Start/Stop function.

Note: Always use dry contact relay for Start/Stop function (Closed contacts runs the unit)Note: The above settings have been tested by Plastore and will allow the unit to run as low as 2 Rpm on a 170 Rpm motor. (Some cogging may occur at low Rpm's)

Setup Parameters for Yaskawa Drives Addendum 15

Mixing Station

Set Control to PAr and press enter

Parameter	Default value	Change to value	Description
A1-01	2	2	Password (Allows modification of all parameters.
A1-02	0	0	Control method 0 Volt/Frequency and 2 is open loop vector
b1-01	1	0	Digital operator
b1-02	1	1	Digital operator
b1-03	0	0	Stop method 0 Ramp to stop, 1 Coast to stop
b1-04	0	0	Reverse prohibit 0 enabled 1 disabled
E1-09	1.5	0.5	Minimum frequency
C1-01	10	0.1	Acceleration time in Seconds
C1-02	10	0.1	Deceleration time in Seconds
o1-03	0	3	0= Hz, 1 = % , 2 Rotor Rpm, 3 User set display units in o1-10 and decimal point is set in o1-11
E2-03	0.8	0	Set to a lower value than E2-01
E2-01	0.35	0.75	Motor rated current
C4-01	1	0	Torque Compensation Gain
L1-01	0	1	Electronic Thermal Overload Protection Short term rating 1 Standard rating 2 Disabled
A1-03	1110		Resets the control to Plastore default settings

Note: The above settings have been tested by Plastore and will allow the unit to run as low as 2 Rpm on a 170 Rpm motor. (Some cogging may occur at low Rpm's)

Setup Parameters for Yaskawa Drives Addendum 15

Synchron slave control

Set Control to PAr and press enter

Parameter	Default value	Change to value	Description
A1-01	2	2	Password (Allows modification of all parameters.
A1-02	0	0	Control method 0 Volt/Frequency and 2 is open loop vector
b1-01	1	1	Digital operator
b1-02	1	0	Digital operator
b1-03	0	0	Stop method 0 Ramp to stop, 1 Coast to stop
b1-04	0	0	Reverse prohibit 0 enabled 1 disabled
E1-09	1.5	0.5	Minimum frequency
C1-01	10	0.1	Acceleration time in Seconds
C1-02	10	0.1	Deceleration time in Seconds
o1-03	0	3	0= Hz, 1 = % , 2 Rotor Rpm, 3 User set display units in o1-10 and decimal point is set in o1-11
E2-03	0.8	0	Set to a lower value than E2-01
E2-01	0	2	Electronic Thermal Overload Protection
C4-01	1	0	Torque Compensation Gain
H1-05	40	1	This enables external LO/RE switch and disables the LO/RE on key pad
H3-03	100	0 – 999.9%	Scaling of incoming voltage 0-999.9%
L1-01	0	1	Electronic Thermal Overload Protection Short term rating 1 Standard rating 2 Disabled
A1-03		1110	Resets the control to Plastore default settings

Setup Parameters for Yaskawa Drives Addendum 15

Auto tuning of Control

Set control to  **and press enter**

Parameter	Default value	Change to value	Description
T1-01	0	0	0 = Open Loop Vector. For more info see Yaskawa OEM manual
T1-02	0.06 = 65 Watts		Motor output power
T1-03	230		Motor rated voltage
T1-04	0.35		Motor rated current
T1-05	60		Motor rated frequently HZ
T1-06	2		Number of motor poles
T1-07	3500		Rotor speed RPM (2 x 1750)
T1-10	Run		Start the tuning.
	You will get an End1 (according to the OEM manual it should be End) message at end due to the low current of the motor. The tuning is now complete.		

Trouble Shooting:

If above Plastore factory settings have been changed. Reset the drive by going to A1-03 and set the value to 1110 hit enter the drive is now reset to Plastore factory defaults