SGD-Micro

Micro Gravimetric Doser

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1. General Description

Please read this manual carefully before installation and using of the machine to avoid damage or personal injuries.

1.1 Introduction

Picture 1-1: SGD-Micro

SGD-Micro is a single-component, gravimetric masterbatch/additive feeder for injection molding machines.

SGD-Micro is a single-component, gravimetric masterbatch/additive feeder for injection molding machines.

During normal operation, the device controls the weight of the masterbatch/additive (from now on referred to as MB/AD) fed into the machine with each injection shot, using a loss-in-weight method. By continuously measuring the weight of the material in its hopper, the system immediately detects any deviation from the preset MB/AD weight, and automatically corrects this by regulating the strength of the vibrator.

If required, the feeder can operate in “constant” (non-regulated) current mode - the vibrator works at a pre-selected strength without being regulated by the controller.

The MB/AD is fed directly into the injection machine’s feeding throat through a neckpiece adapter.

The feeder can be equipped with an integral Venturi loader, which automatically refills the hopper whenever its contents fall below a predefined minimum weight.

The feeder’s entire operation is automatically controlled by a powerful, sophisticated, yet easy-to-operate control unit.

All service work should be carried out by a person with technical training or corresponding professional experience. The manual contains instructions for both handling and servicing. Chapter 6 contains service instructions intended for service engineers. Other chapters contain instructions for the daily operator.

Any modifications of the machine must be approved by SHINI in order to avoid personal injury and damage to machine. We shall not be liable for any damage caused by unauthorized change of the machine.

Our company provides excellent after-sales service. Should you have any problem during using the machine, please contact the company or the local vendor.

Headquarter and Taipei factory：

Tel: (886) 2 2680 9119

Shini Plastics Technologies (Dongguan), Inc：

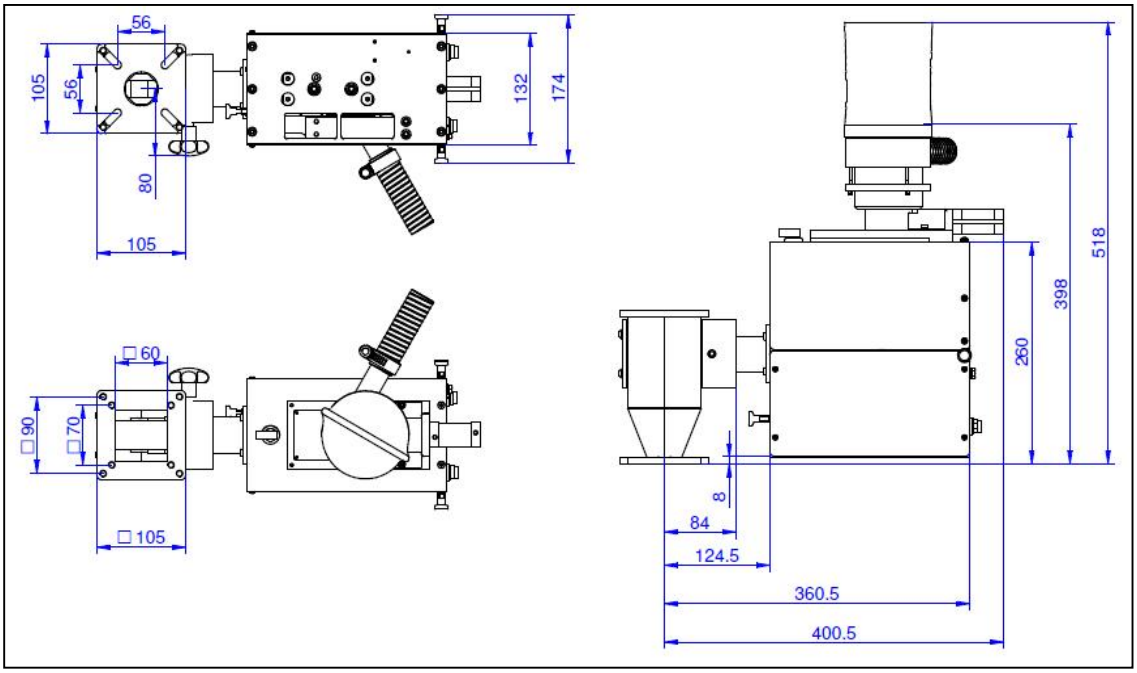
Tel: (86) 769 8111 6600

Shini Plastics Technologies India Pvt.Ltd.：

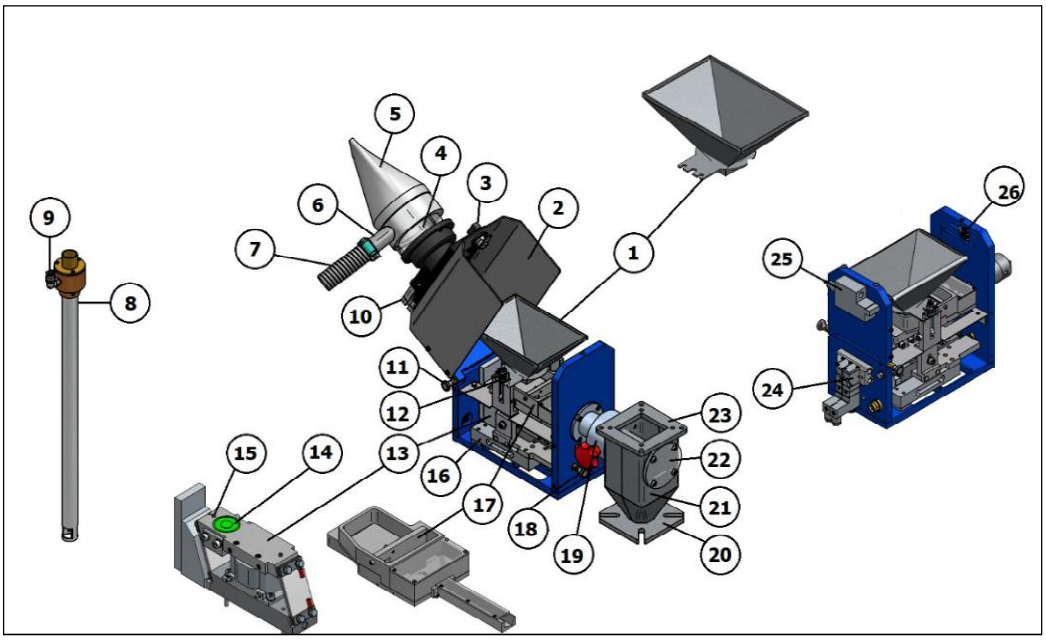
Tel: (91) 250 3021 166

2. Product overview

2.1 Feeding system



Picture 2-1: General View and Dimensions



Picture 2-2: Mechanical Details

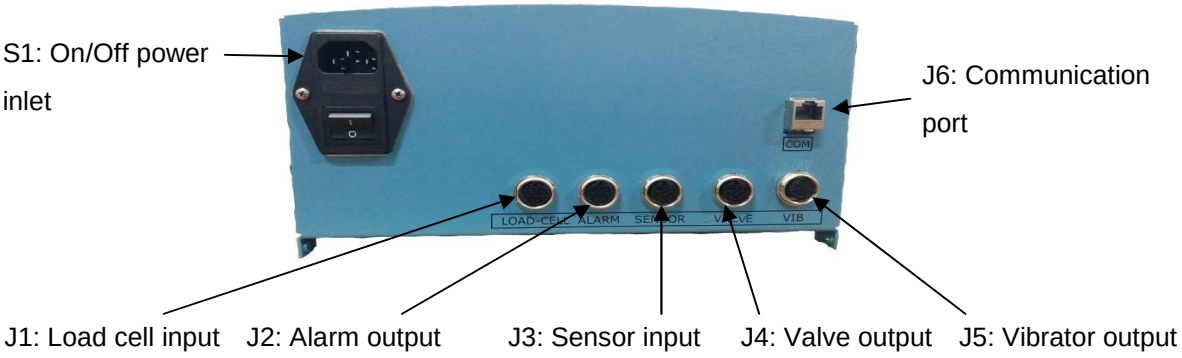
1) Hopper
2) Cover
3) Handle
4) Venturi Loader Receiver
5) Dust collection sac
6) Material loading inlet
7) Flexible loading pipe
8) Venturi suction tube
9) Pneumatic air inlet
10) Shutter
11) Cover lock indexing plunger
12) Hopper fixing spring pin.
13) Vibrator
14) Electromagnet
15) Position pin
16) Load cell
17) Dispenser
18) Load cell protective indexing plunger
19) Adding flange
20) Neckpiece bottom flange
21) Neckpiece
22) Sight glass
23) Neckpiece top flange
24) Solenoid manifold
25) ESD (optional)
26) Microswitch

2.2 Control unit

2.2.1 SGD-Micro controller front view

Picture 2-3: SGD-Micro controller front view

2.2.2 SGD-Micro controller rear view



Picture 2-4: SGD-Micro controller rear view

3. Installation

3.1 General safety notes and warnings

This manual contains information required for installation.

Adherence to the safety notes is mandatory. Non-compliance will invalidate your warranty.

When you receive the equipment, you should immediately check whether any damages were incurred during transport. If this is the case, please consult your agent before installation.

Warning

Persons who are not qualified should not be allowed to handle this equipment/system. Non-compliance with the installation and operation instructions can result in severe personal injury or substantial property damage. Only qualified personnel should be allowed to work on this equipment/system.

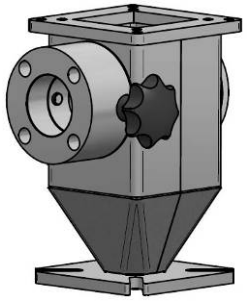
In order to avoid an electric shock, make sure that you first make all necessary connections, before connecting the equipment to the mains. Also, make sure that it is protected by effective short-circuit and over-voltage devices, and any other means required to protect the operator, and that there is an effective earth (ground) connection to the device.

Any installation, maintenance and repair intervention must be performed only by skilled personnel, and only when the equipment/system is disconnected from the power supply mains.

3.2 Mechanical installation

3.2.1 Mounting to the injection-molding machine throat

The neckpiece adapter is used to connect the SGD-Micro to the injection molding machine:



Picture 3-1: Standard hexagonal neckpiece

In order to mount the SGD-Micro into the injection molding machine please do the following steps:

Install the neckpiece in position, between the main hopper and the injection machine’s feeding throat, and fasten it with its screws.

Connect the feeder to the adding flange and fasten it with the quick-release star knob.

3.2.2 Releasing the load cell

The load cell is extremely sensitive and should be always handled with great care.

When the unit leaves the factory, the load cell is locked by its protecting device, to prevent any damage to the load cell during transportation and installation.

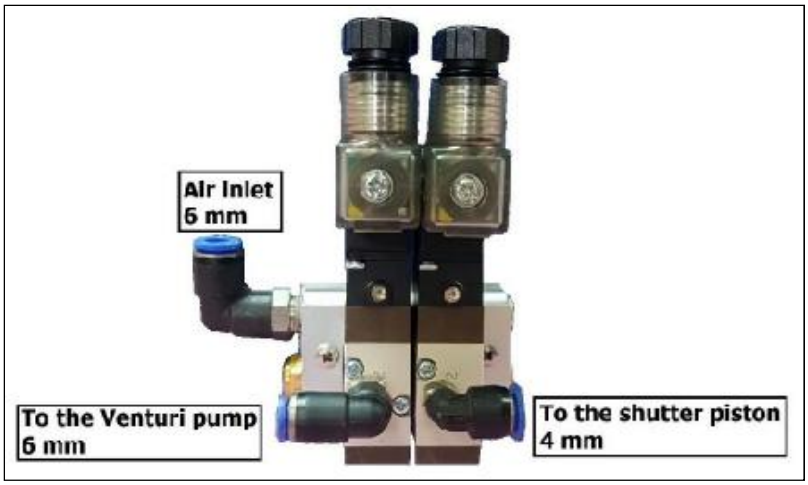
After installation and before starting to operate the feeder, release the limiting pin of the protecting device from its "locked position" to "unlocked position"; otherwise the load cell will not be able to function.

See Appendix A: load cell protection for unlocking instructions after installation.

Important:
Always relock the safety device whenever the SGD-Micro is dismantled from the injection machine and being moved to another location or machine.

Note that there is no guarantee for the load cell for any mechanical damage, or damage caused by an overload.

3.2.3 Venturi loader installation



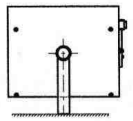
Picture 3-2: Venturi loader valve

1) Connect the pneumatic air inlet of the Venturi tube to the air outlet of the air valve.
2) Connect the shutter piston to the air valve.
3) Connect the "Valve" cable to the electric command shutter and electric command Venturi.
4) Connect a 6-8 AT air supply to the air inlet of the Air valve.
5) Connect the Venturi suction tube to the feeder's loading inlet with the flexible 25 mm dia. loading pipe.
6) Note: The maximum pipe length should not exceed 3 meters and the maximum difference between the end of the Venturi suction tube and the top of the feeder-loading inlet should not exceed 2.5 meters.
7) Dip the Venturi suction tube into the main MB/AD container (21). Verify that the tube is straight and not twisted or bent; otherwise it might disturb the suction process.

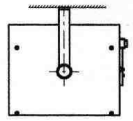
3.2.4 Control unit mounting

Fix the control unit by its mounting arm in one of the following options:

Option A (bottom surface):



Option B (top surface):



Picture 3-3: Control unit mounting

3.3 Electrical installation

3.3.1 Connections

Connector J1 – "Load cell" input, to the load cell (“Load cell” cable).

Connector J2 – "Alarm" output, to the alarm device (“Alarm” cable).

Connector J3 – "Sensor" input to the Injection machine (“Sensor” cable).

Connector J4 – "Valve" output to the loader valve, if exist (“Loader” cable).

Connector J5 – "Vibrator" output to required vibrator ("Vibrator" cable).

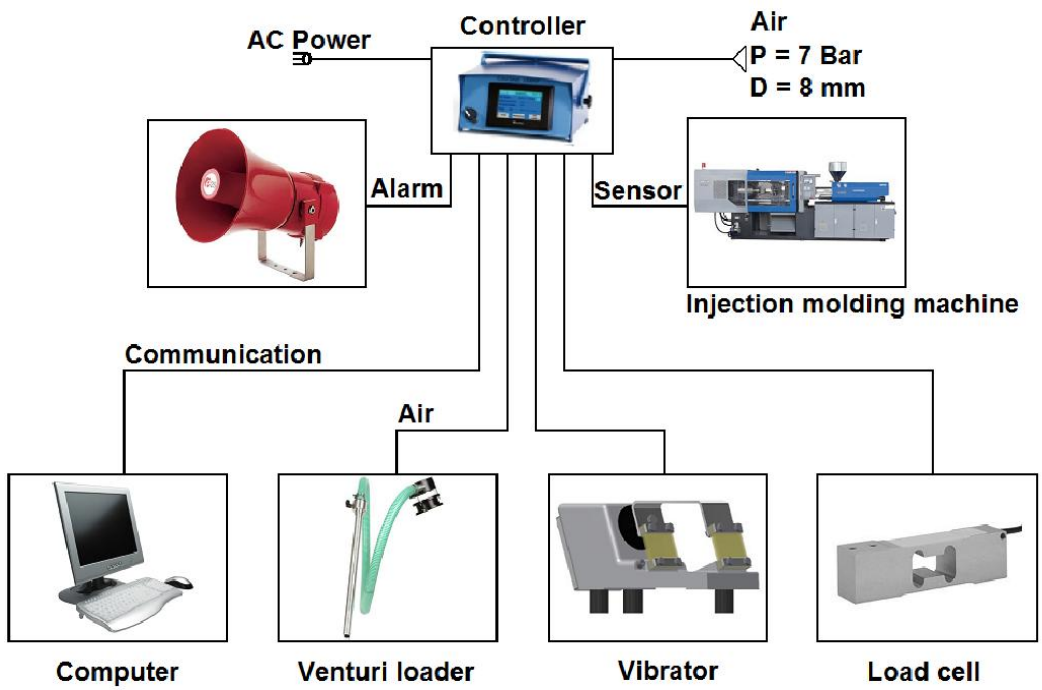
Connector J6 – Communication port to required device (optional).

Connector S1 – to the mains.

Note: Good grounding of the injection machine is required to ensure proper feeder operation.

Warning

Do not connect or disconnect the vibrator cable when the power is "on"



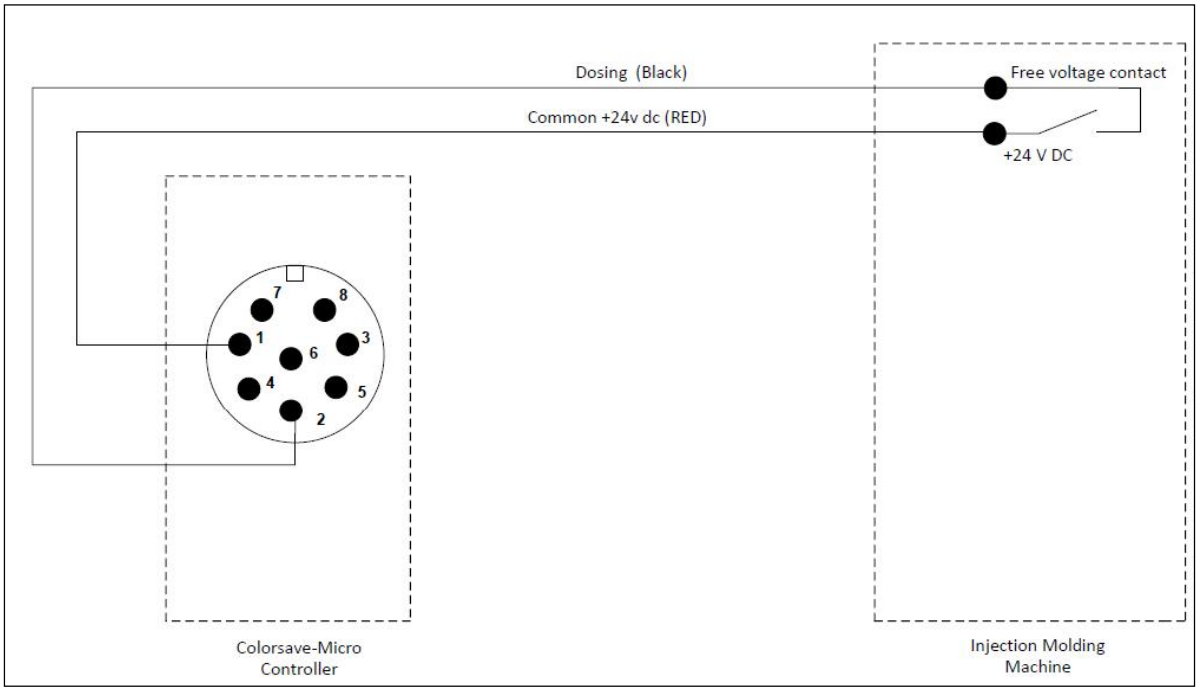
Picture 3-4: Connections diagram

3.3.2 Sensor cable wiring options

Connecting the "dosing" wire (black) and the "common" wire (red) to a "dosing" dry contact in the injection machines, which is synchronized with the dosing phase – indicating the recovery phase time (machine's screw backward motion).

This will ensure the synchronization of the SGD-Micro operation to the injection machine's cycle time, and MB/AD feeding during the dosing (backward motion) time.

Note: The contact should be No Voltage Contact (dry contact) only.



Picture 3-5: "Sensor" cable connections diagram

4. Operation

4.1 General

4.1.1 Operation modes

The device can operate in four (4) pre-selected operation modes:

1. Mode "0"- Gravimetric operation mode (regulated strength/machine feeding time):

   The strength of the vibrator is regulated on-line by the controller according to the required dosing rate, while the feeding time is determined by a signal (dry contact) from the injection machine.

2. Mode "1"- Gravimetric operation mode (regulated strength /constant set feeding time):

   The strength of the vibrator is regulated on-line by the controller according to the required dosing rate, while the feeding time is constant, as set by the operator.

   Start time is synchronized with the injection cycle by a signal (dry contact) from the injection machine.

   This mode is useful in those cases where the feeding time of the injection machine is not steady enough, too short, or too long.

Mode "2"- Volumetric operation mode (constant strength /machine feeding time):

The strength of the vibrator is kept constant, as set by the operator, independent of any variation in the process parameters, while the feeding time is defined by a signal (dry contact) from the injection machine, synchronized with the injection cycle.

3. Mode "3" - Volumetric operation mode (constant strength / constant time)

   Both strength of the vibrator and dosing time are constant, as set by the operator.

   Possible operation modes are shown in the following table:

Operation Mode		Dosing Time	Vibrator Strength
0	Gravimetric	Machine time	Controlled automatically
1	Gravimetric	Set by operator*	Controlled automatically
2	Volumetric	Machine time	Set by operator
3	Volumetric Standard	Set by operator*	Set by operator

4.1.2 Starting sequence

Allows easy switching to Mode 2 (Volumetric).

During setup of the injection machine, SGD-Micro receives pulses from the injection machine, which may not be constant in length and may vary from pulse to pulse, and which also do not match the actual pulse length that SGD-Micro will receive when the setup process is ends and the production process begins.

If the device is in Gravimetric mode (0 or 1), it assesses the pulses and therefore assesses the wrong pulses. Because of the incorrect pulses, when the setup process ends and the production process begins, SGD-Micro will need more time to assess the true pulses. Therefore, during setup it is recommended to work in Volumetric mode, as in this mode the device does not assess the pulses. The switch on the front of the machine is designed to make it easier for the operator to switch to Volumetric mode during setup and switch back to Gravimetric mode during production.

- **VOL.**: Switches automatically to Mode "2"
- **GRAV.**: Returns to the last mode

4.2 Starting up

1. Switch on the power main switch
2. At first the initial screen will be displayed, showing the present control software and language versions now in use
3. After a few seconds, the Main screen will be displayed.

Notes:

1. If you wish to check the Version No. again later during operation, enter the Menu screen and press the Version button. Press Back to return to the Menu screen.

2. If the hopper is empty and the Venturi loader is in use, it will perform an automatic filling sequence soon after the first operating, unless the Loading Time value is 0.

4.3 Main screen

The main screen shows important system indicators and data. This data can be updated on the Set Point screen.

Recipe - The number and name of the current recipe in the system. It appears only if you work with recipes. The system's set point is determined by the recipe.

Material - The material the system is working with. If working with recipes, the material is derived from the recipe. If you do not work with recipes, you can select the material on the Set Point screen. The material must be calibrated prior to be used

Lamp at the top-right corner: Yellow – indicates that the system is still in the assessing phase. The assessing progress can be seen on the Information screen.

Green - the system has completed the learning phase.

If you work with the Start / Stop button, then in Stop mode the lamp does not show.

Yellow attention sign - at the top-right corner indicates an active alarm. Pressing on it will take you to the Alarms screen where the active alarms are displayed.

Blue arrow next to the raw material entry - an indication that the Venturi loader is turned on.

Mode - displays the currently set mode number.

Desired / Actual table shows desired and actual percentage and weights in grams.

The weight of the material in the hopper appears is green in the image of the dispenser.

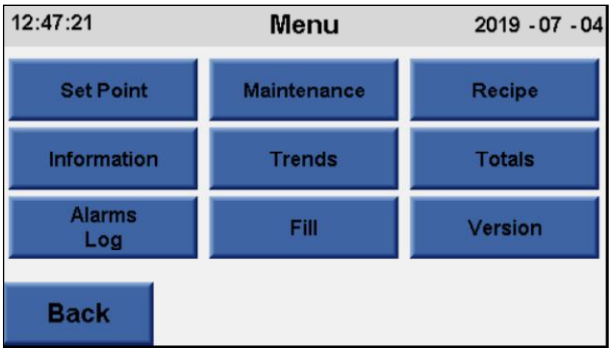
Blue arrow above the dispenser - indicates that the vibrator is working and the system is dispensing material.

Percentage to the right of the dispenser - shows the present strength of the vibrator.

Start / Stop button – Starts and stops the Feeder. The appearance of this button on the main screen can be configured.

Menu button: Press on the Menu to enter the menu from which you can select all of the system functions.

4.4 Menu



The menu screen allows you to select the various system functions.

4.5 Operation

4.5.1 Set point

This screen allows you to change the system setpoint. Values modified in this screen will be reflected in the values displayed on the main screen.

Set point has two modes:

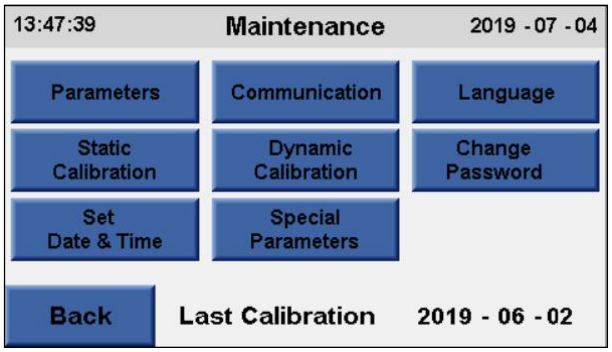
1. If Recipe is enabled only the Recipe field is green and can be updated, while everything else is grayed out and cannot be modified. When a recipe is selected, the Material, Shot Weight and Percentage data are copied from the recipe to the Set Point screen.
2. If Recipe is disabled (on the Parameters screen) the Recipe field does not appear on Set Point; the Material, Shot Weight and Percentage fields are green and can be updated.

4.5.2 General guidelines for working in different modes

- If you are working in Mode 1, then in Set Point screen in addition to the three fields (Material, Shot Weight and Percentage), the Dosing Time field is green and can be updated.
- If you are working in Mode 2, then in addition to the three fields, the Strength field is green and can be updated.
- If you are working in Mode 3, then in addition to the three fields, the Strength and Dosing Time fields are green and can be updated.

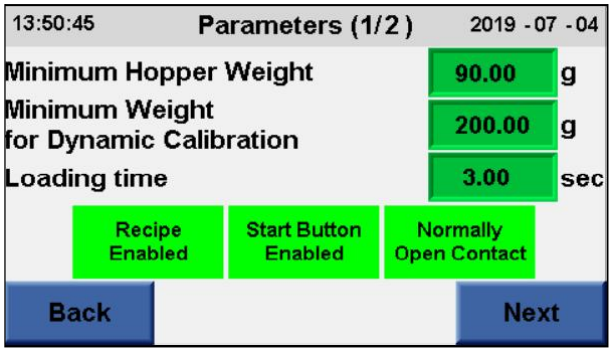
If working in Gravimetric mode (0 or 1), the selected material (whether Recipe is enabled or disabled) must be a material that has undergone Dynamic Calibration, otherwise the system will issue a "No Material Calibration" message.

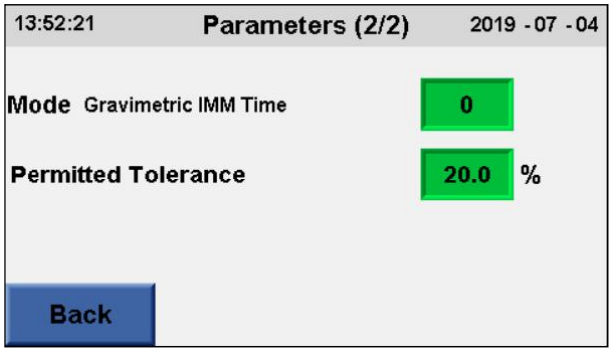
4.6 Configuration parameters setup



4.6.1 Setting parameter values

- In the menu screen, press the Maintenance button to enter the Maintenance screen
- Press the Parameters button to enter the Parameters (1/2) screen
- Press the Next button to enter the Parameters (2/2) screen





4.6.2 Recipe enabled/disabled

Defines working with recipe or not. When disabled the button will be greyed out.

4.6.3 Start Button Enabled/Disabled

Configure display/no-display of the Start/Stop button in the main screen. When disabled the button will be greyed out.

When start button is disabled the feeder starts working automatically upon receiving pulse from the injection molding machine.

4.6.4 Normally open/closed contact

The alarm output can be Normally Opened or Normally Closed. Normally Opened means that when there is an alarm output there will be a dry contact, and when there is no alarm output there will be no dry contact. Normally Closed means that when there is an alarm output there will not be a dry contact, and when there is no alarm output there will be a dry contact. Press the button to switch between Normally Opened and Normally Closed.

4.6.5 Setting the desired operation mode

The available operation modes are (see more details under Operation modes):

"0" – Gravimetric IMM Time (gravimetric with machine feeding time)

"1" – Gravimetric Feeder Time (gravimetric with SGD-Micro constant time)

"2" – Fixed Strength IMM Time (volumetric with machine feeding time)

"3" – Fixed Strength Feeder Time (volumetric with SGD-Micro constant time)

To change mode, enter the **Parameters (2/2)** screen, press the **Mode** value and set the new Desired Mode number.

4.6.6 Setting minimum hopper weight parameter

Once the weight of the material in the hopper decreases below the **Minimum Hopper Weight** set low limit, the unit will continue to work but without control, i.e. the strength remains as the last strength that has been used when the weight was above **Minimum Hopper Weight**, and the unit will not recalculate the strength until the weight increases above the **Minimum Hopper Weight** value.

If a Venturi loader is installed, the controller instructs the Venturi loader to start refilling the hopper.

The refilling operation will continue according to the **Loading Time** parameter.

If, for some reason, the weight in the hopper stays under the **Minimum Hopper Weight** parameter for more than 60 seconds, despite the filling operation, an **Alarm** screen will be displayed, indicating a **No Material** situation.

To change the current **Minimum Hopper Weight** value, enter the **Parameters (1/2)** screen, press **the Minimum Hopper Weight** value and set the new desired value.

Note: If the Loading time parameter has been set to "0", there will be no automatic filling, even when the material weight is below the Minimum Hopper Weight level.

4.6.7 Setting the permitted tolerance parameter

Tolerance is a parameter that is used to produce an alarm whenever the actual tolerance is bigger than the Permitted Tolerance value.

The actual tolerance is the difference (in percentages) of the actual percentage from the desired percentage.

$$AT = \left| \frac{D - A}{D} \right|$$

D: Desired percentage A: Actual percentage AT: Actual tolerance

For example: if the desired percentage is 2% and the actual percentage is 1.5%, then the actual tolerance is 25%.

When the actual tolerance is bigger than the Permitted Tolerance value, there will be an "Out of Tolerance" alarm.

To change the Permitted tolerance value, enter the **Parameters (2/2)** screen, press the **Permitted Tolerance** value and set the new desired value.

4.6.8 Setting the loading time parameter

When the loading process starts (if the Venturi loader is in use), the valve of the loader is closed in order to load a certain volume of material. The Loading time parameter is the loading process duration in seconds. When the loading process ends, the valve is open and let the material fall down to the hopper.

When the **Loading time** value is set to 0 there material loading process is canceled.

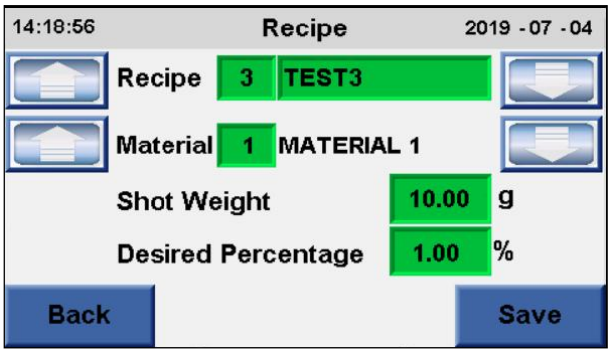
To change the **Loading time**, enter the **Parameters (1/2)** screen, press the **Loading time** value and set the desired value.

4.6.9 Setting the minimum hopper for dynamic calibration parameter

Before performing a dynamic calibration, there must be a minimum of raw material in the hopper, because the dynamic calibration process uses a certain amount of raw material which must not be finished before the process is completed. The factory-set value is 200 grams.

To change the **Minimum Hopper** for **Dynamic Calibration**, enter the **Parameters (1/2)** screen, press the **Minimum Hopper for Dynamic Calibration** value and set the desired value.

4.7 Recipe



A Recipe contains the following data:

Recipe number and name, Material number, Shot weight and Desired percentage.

- You can browse the recipes by using the arrows in the recipe line. You can also enter a recipe number instead of browsing.
- You can browse through the materials using
- the arrows in the row of material. You can also enter a material number instead of browsing.
- Clicking **Save** saves the recipe in memory. Pressing **Back** without first pressing **Save** will exit the screen without saving the recipe.
- To work with a recipe, select it from the Set Point screen.

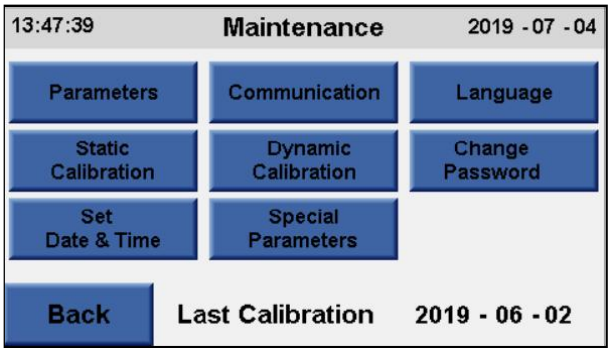
4.8 Dynamic calibration

Dynamic calibration is used to update information about the material flow in a certain strength.

General

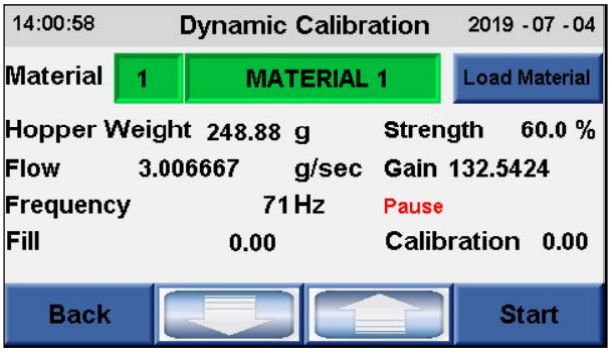
- Dynamic calibration is a process that helps the controller assessing the behavior of a material in different strengths and different frequencies.
- It is important to start the process when the dispenser is full with material.
- The SGD-Micro should be on a flat surface.

4.8.1 Calibration process



Press the **Maintenance** button on the Menu screen – **Maintenance** screen is displayed.

Press the **Dynamic Calibration** button – the **Dynamic Calibration** screen is displayed.

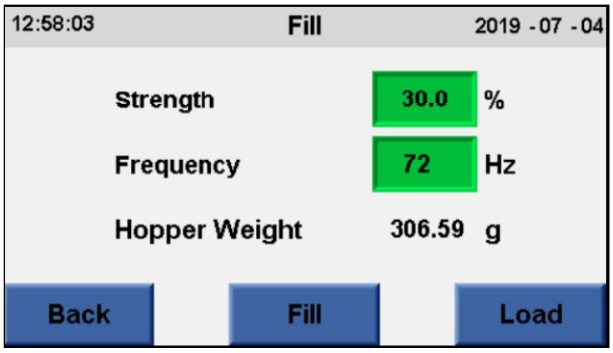


- **Material name and number** – these values can be changed
- **Load Material** button - used to load more material into the hopper
- **Hopper Weight** - weight of the material in the hopper

- **Strength** - the strength with which the current stage of the dynamic calibration process is performed
- **Flow** - the material flow in gram / second, which is updated at every stage of the process
- **Gain** - a value used for control, proportional to the type of material, which is updated at the end of the process
- **Frequency** - The frequency at which the current stage of the dynamic calibration process is performed
- Status - Pause, Calibrating, or Finished
- **Fill** and **Calibration** - during the dynamic calibration process these values represent the remaining time of the phase of the process

1. Make sure there is enough material in the hopper (the weight should be greater than the **Minimum Weight for Dynamic Calibration** parameter that appears on the Parameters screen).
2. Choose a material number for the dynamic calibration process, either enter a value or browse using the arrows below. Update the material name if necessary.
3. Press the **Start** button, the status will change from **Pause** to **Calibrating**.
4. The calibration is performed in several phases, each phase is of different strength and frequency; the strength and frequency of each phase are written on the screen. Each phase consists of 2 parts; filling the dispenser, and the measuring of the flow of the phase. At the end of each phase, the Flow and Gain values are updated. The calibration takes several minutes.
5. If during dynamic calibration the weight in the container drops below the value of the **Minimum Hopper Weight** parameter, the status of the process changes to Pause, and more material must be filled with the **Load Material** button. The button turns on the Venturi loader. When the button is pressed, the shutter is opened and the loading begins. The loading continues as long as the button is pressed (continuous pressing).
6. At the end of the process all the material data is saved to the memory, and you have to click **Back** to exit.

4.9 Filling and loading the dispenser



In the **Menu** screen press the **Fill** button. The **Fill** screen will be displayed.

- **Strength** - the strength of the vibration
- **Frequency** - the frequency of the vibration at the time of filling.

The values in these fields are the most recent strength and frequency used, but they can be changed.

- **Hopper Weight** – the weight of the material in the hopper.

4.9.1 Filling

1. Press the **Fill** button to fill the dispenser - the vibrator will work at the selected strength and frequency to fill the dispenser. Press the **Fill** button again to stop the vibrator. (this is recommended after changing material).
2. To repeat the filling, press the **Fill** button again.

4.9.2 Loading

The Load button draws material into the system using the Venturi vacuum. Pressing the Load button opens the shutter, and the loading begins and continues as long as the button is pressed (continuous pressing). The loading stops when the button is released or when the weight reaches 800g. As soon as the loading ends, the shutter closes.

4.10 Monitoring screens

4.10.1 Information screen

This screen is for use by Maintenance personnel only.

This screen shows general information about the unit.

- Enter **Menu** screen
- Press the **Information** button to display **Information** screen

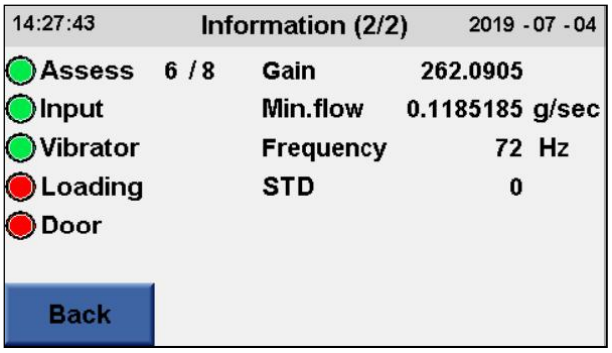
There are two information screens:

4.10.1.1 Information screen 1:

- **Actual weight** - The actual weight of the material dosed in the last cycle. This is a filtered parameter.
- **Actual%** - The actual percentage dosed in the last cycle. This is a filtered parameter.
- **Diff** - The difference between the weight in the hopper before the last cycle started and the weight in the hopper at the end of the last cycle.
- **Weight** - The weight of the material in the hopper.
- **Pulsing time** – this parameter is displayed when the system is working in Pulse Mode see *9.4 Pulse Mode*, page 41. When the system is not in Pulse Mode, this parameter will be 0. The data is in a X b seconds format, where “a” is the number of pulses (which can be 1 to 4) and “b” is the length of each pulse, calculated as Operate time divided by the number of pulses rounded up to 2 digits after the decimal point.
- **Operate time** - When the system is operating in Pulse Mode, this parameter displays the time the system should operate in Pulse Mode. When the system is not in Pulse Mode this value represents the dosing time received by the sensor cable.

- **Strength** - The last vibrator strength. Under the word Strength there is an arrow, which only appears when the vibrator is working.
- **Cycle time** - The last measured cycle time.

4.10.1.2 Information screen 2



5 indicator lamps on the left:

- **Assess** - Red indicates that the system is still in the assessing phase, green indicates that the system has completed the assessing phase. The system continues to assess also after the assessing phase has ended. Next to it are 2 numbers - a / b, where “b” is a size used for assessing and “a” is the current position in the assessing process.
- **Input** - green indicates that there is a dosing input signal in the sensor cable, red indicates no signal.
- **Vibrator** - green indicates that the vibrator is operating, red indicates that the vibrator is at rest.
- **Loading** - green indicates that the Venturi vacuum is operating, red signifies that it is at rest.
- **Door** - green indicates that the shutter is open, red indicates that it is closed.

Data on the right:

- **Gain** - A value used for control, proportional to the type of material
- **Min. flow** - the minimum material flow; if the unit should work below that flow, it switches to Pulse Mode
- **Frequency** - Current working frequency
- **STD** - Standard deviation, the degree of pitching of the weighing at rest

4.11 Trends

Use the **Trends** screen in order to see the vibrator strength, weight, or actual percentage trend.

While in **Menu** screen press the **Trends** button. The **Trends Strength** screen will be displayed.

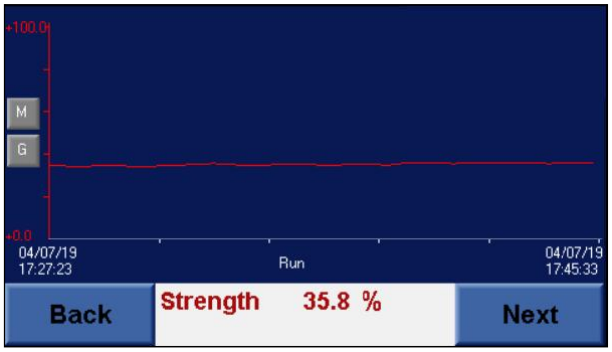
To move on to the other Trend screens, press **Next**.

Note: The trends screens show the trends since the last startup of SGD-Micro.

All trend screens, have two buttons on the right:

- Pressing **M** displays arrows buttons << >> at the bottom of the screen, allowing you to browse different time ranges.
- Pressing **G** adds horizontal lines to the display.

4.11.1 Trend strength



The **Trend Strength** screen displays the vibrator strength trend in relation to time.

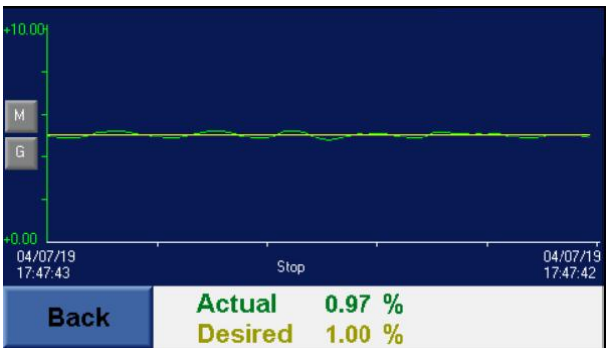
Press **Back** to return to the **Menu** screen or **Next** for the **Trend Weight** screen.

4.11.2 Trend weight

The **Trend Weight** screen shows the desired weight and actual weight that are fed from the system in relation to time.

Press **Back** to return to the **Trend Strength** or Next for the **Trend Percentage** screen.

4.11.3 Trend percentage



The **Trend Percentage** screen displays the actual percentage trend versus the desired percentage.

Press **Back** to return to the **Trend Weight**.

4.12 Accumulated data display

The controller calculates and saves the cumulative values of the total consumed material and total injected cycles.

To view the cumulative totals of weight and cycles press the **Totals** button on the **Menu** screen.

The Totals screen will be displayed:

- **Total Weight**: Total material supplied by the SGD-Micro unit since the last clear operation
- **Total Cycles**: Total injection shots since the last clear operation
- Press the **Clear Totals** button to clear existing cumulative data (accumulation will restart from zero)
- Press **Back** to return to Main Screen

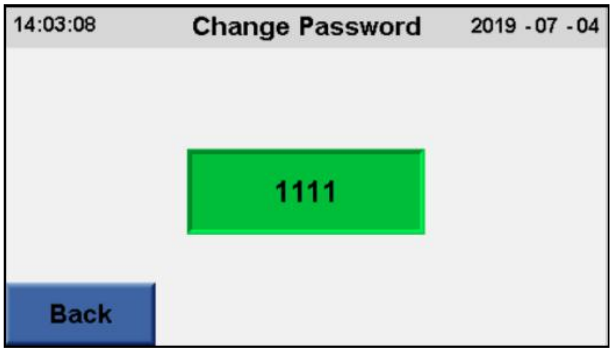
Notes: 1. Weight and cycle values are the accumulated values since the last accumulated data clear.

2. The accumulated data values are updated each cycle.

3. Accumulative values of the process data are memorized during system shutdown, and displayed again on repowering the system on again.

4.13 Advanced operation screens

4.13.1 Password



Some screens such as the Static Calibration and Special Parameters screens are password protected, and require a password upon entrance. The password for

these screens is set in **Change Password** screen. In the **Menu** screen press **Maintenance** to enter the **Maintenance** screen, and then press the **Change Password** button to enter the **Change Password** screen. The password for the **Change Password** screen is “1984”. This password cannot be changed. To change the password in the **Change Password** screen, press in the password green field. A numeric pad will be displayed, allowing you to enter the password.

4.13.2 Static calibration

Static calibration is the procedure that ensures that the weighing system is calibrated.

Static calibration should be performed under the following circumstances:

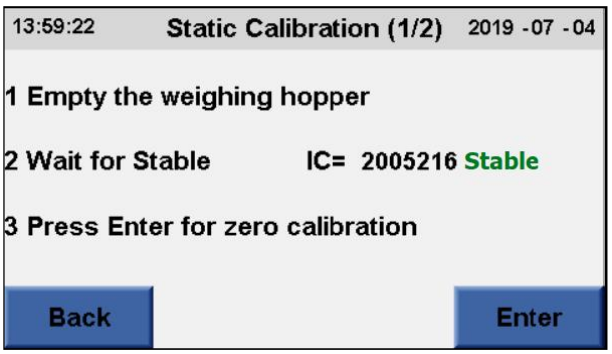
- Upon first installation of the equipment.
- Any time the unit is dismantled and reinstalled.
- After replacing the load cell or the controller.
- Periodically, according to the company’s Q.A. policy, but at least once a year.

Note: Check the calibration periodically by inserting a standard weight inside an empty hopper, and verifying that the Weight value matches the weight. If there is a deviation, a static calibration procedure should be performed again.

4.13.2.1 Static calibration procedure

General

- Static calibration is composed of two sub-procedures: ZERO calibration and GAIN calibration
- Special equipment required: a test weight (about 500g)
- Before starting the static calibration process, empty the hopper



Calibration process

1. Press the **Menu** button and then the **Maintenance** button – the **Maintenance** screen is displayed.
2. Press the **Static Calibration** button. You will be asked to enter a password in order to enter **Calibration** screen.
3. The **Static Calibration (1/2)** screen is displayed.
4. Verify that the hopper is completely empty. During the calibration process the automatic filling of the hopper is prevented.
5. Wait for stabilization of the IC (Internal Counting) factor (the word **Stable** will appear next to it) and press **Enter** to begin the ZERO calibration.

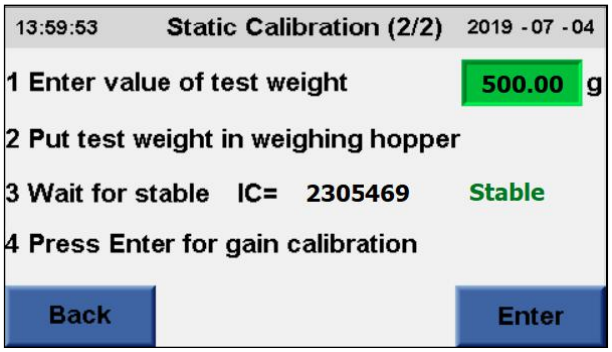
   The "Please Wait" screen (with the remaining time) is displayed, showing the calculated IC Factor.

   If the IC factor is too low – a "Zero calibration error" alarm is displayed.

Possible reasons are:

- The load cell protection device has not been released
- The load cell is defective (replace it)
- The controller is defective (consult your supervisor)

6. After a few seconds (If the IC Factor is OK) – the Static Calibration (2/2) screen is displayed.



7. If desired, change the value of the test weight. Put a standard test weight, about 500 gr, into the hopper.
8. Wait for stabilization of the IC Factor (the word **Stable** will appear next to it), and then press **Enter** to begin the GAIN calibration.

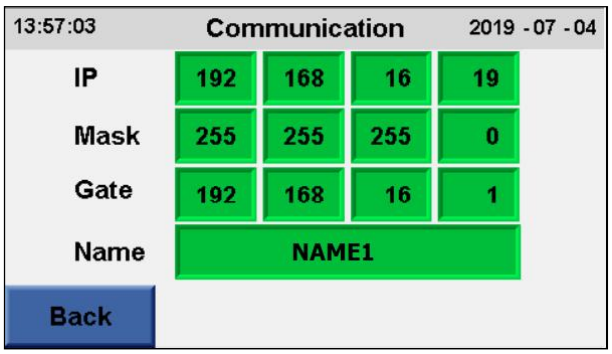
9. The "Please Wait" screen is displayed again (with the remaining time).
10. If the IC Factor is too low, an : Gain Calibration Error" alarm is displayed.

Possible reasons are:

- The load cell protection device has not been released (see Appendix A: Load cell protection).
- No standard weight was installed inside the hopper.
- The load cell is defective (replace it).
- The controller is defective (consult your supervisor).
- The standard weight value has not been set, or a wrong value has been set.

11. After a few seconds (If the IC Factor is OK), the system returns to the **Main** Screen.
12. Verify that the displayed hopper weight is identical to that of the test weight.
13. Take out the test weight from the hopper, and verify that the Weight that appears on the screen is around 0 g. If the weight is not around 0 g, there is a mechanical problem.
14. The calibration procedure is completed.

4.14 Communication



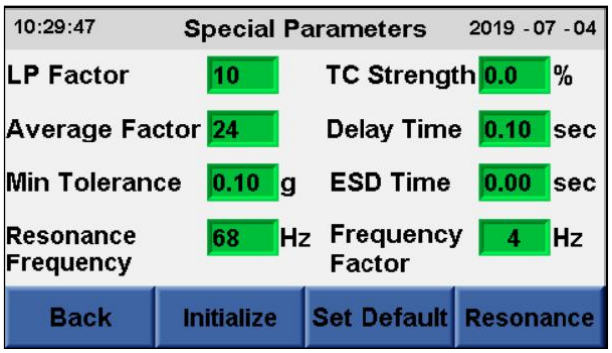
1. Enter the **Menu** screen and then press the **Maintenance** button to enter the **Maintenance** screen and then press on the **Communication** button. The **Communication** screen will be displayed.
2. **IP** - The IP Address of the unit.
3. **Mask** - The subnet mask.

4. **Gate** - Enter Gateway Address.

5. **Name** - The name of the system used for PC monitoring software.

6. After configuring the communication setup, the system requires a reset.

4.15 Special parameters



The parameters in this screen are for senior technicians and it is recommended that you do not change them without consulting a LIAD expert.

LP Factor: This is the “Low pass filter factor”. The larger the number, the more stable the weighing, but the smaller the response speed (i.e. the response of the display reflecting weight change is slower).

TC Strength: Parameters can be used in Pulse mode. The value can be positive or negative. This value decreases or increases the strength while the system is in Pulse mode.

Average Factor: The size of the array used to calculate the weight; the larger the number, the more stable the weighing, but the smaller the response speed.

Delay Time: Time in seconds that the system waits from the cycle start pulse to system weight sampling. In places where there are vibrations of the injection molding machine that affect the SGD-Micro, if the signal occurs during vibration then the sample used in this parameter can be rejected. The allowed minimum is 0.1 seconds.

Min Tolerance: a minimum value used in the Permitted Tolerance parameter (Parameters screen). If the calculated weight value of the Permitted Tolerance parameter is less than the minimum (Min Tolerance) then this minimum is used. (Default = 0.1 g).

ESD Time: This parameter is used if the ESD system is used (see detailed explanation in 9.3*9.3 ESD - Electro static discharge*, page 40). If a solenoid manifold (No. 24 in Figure 2-2: Mechanical Details) with 3 valves is used, then this parameter determines how long the ESD will run. If you use a 2-valve solenoid manifold then this parameter activates the ESD mechanism regularly as long as the value is greater than 0.

Resonance Frequency: This is the resonance frequency of the system - the frequency at which the vibration vibrates with the highest strength. It can be changed by entering a value or by measuring with the **Resonance** button, see below.

Frequency Factor: This is a factor added to the resonance frequency to calculate the working frequency, the frequency at which the system works (the working frequency is always different from the resonance frequency). The value of this parameter can be between 1 and 4.

4.15.1 Special Parameters screen buttons

Initialize: Performs an *Initialize* operation for all materials, i.e., all data of the materials is reset.

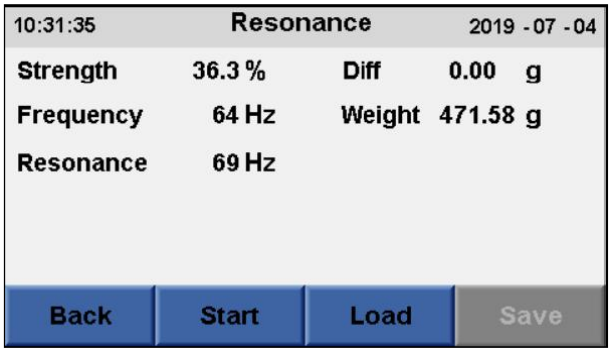
Note: This is a reboot operation that deletes data, so be careful not to run it accidentally.

Set Default: Inserts the default values to all values on this screen.

Resonance: Activates the Resonance screen, see below.

Back: Back to the Maintenance screen.

4.15.2 Resonance



This screen allows running a process to check the system's resonance frequency - the frequency at which the vibrator vibrates with the highest strength.

Before starting the process, the hopper must have a weight greater than the "Minimum Weight for Dynamic Calibration" parameter, which appears on the Parameters screen. If there is not enough weight, material can be loaded using the **Load** button.

This screen displays the following data:

Strength: The strength of the resonance used in the resonance frequency test process.

Diff: At the end of each phase of the resonance frequency check process, this field displays the weight that was dropped in the last phase.

Frequency: The frequency of the current phase in the resonance frequency test process.

Weight: The current weight in the hopper.

Resonance: The resonance frequency according to the resonance frequency test process.

> ***Note: When ColorSave 1000-U-INJ leaves our factory it is calibrated and its' resonance value is set. A resonance frequency test process should be performed only in case of error after consulting with LIAD's experts.***

Buttons:

Start: Starts the resonance frequency check process.

Load: Filling additional material into the hopper using the Venturi loader. When the button is pressed the shutter opens and the loading begins. The loading continues as long as the button is pressed (continuous pressing). When the weight reaches the value of the "Minimum Weight for Dynamic Calibration" parameter, the filling stops and the shutter closes.

Save: Saves the resonance frequency value. You can see it and change it in the **Special Parameters** screen.

Back: Back to the Special **Parameters screen**.

4.16 Failure alarms

Once there is an alarm condition, it is indicated by the yellow attention sign at the top-right corner of the main screen.

Whenever a new alarm situation occurs, an alarm window is displayed, indicating the current alarm.

As long as an alarm situation exists, the Alarm Output (J2) is activated.

You can enter the **Alarm List** screen anytime by pressing the yellow attention sign at the top-right corner of the main screen.

4.16.1 “No material” alarm

Under normal conditions (both Shot Weight and Desired Percentage > 0), once the weight of the material in the hopper decreases below the Minimum Hopper Weight parameter, if the Venturi loader is in use the controller instructs it to start loading material. After a predefined number of seconds (as set in the Loading Time parameter), the load stops, the shutter opens and material fall down to the hopper.

If, for some reason, the weight in the hopper stays under the Minimum Hopper Weight parameter for more than 60 seconds, despite the filling operation, an “Alarm” screen will be displayed, indicating a “No material” situation.

Check the material in the hopper and/or proper operation of the Venturi loader and the air pressure.

4.16.2 “Low battery” alarm

The controller battery level is low, and should be replaced. If the battery empties completely all of the controller memory will be deleted. The controller’s memory includes the recipes, materials, parameters and calibration data.

This alarm does not trigger the Alarm Output (J2).

4.16.3 “Out of tolerance” alarm

This alarm appears when the actual tolerance is bigger than the Permitted Tolerance parameter.

Note that this alarm is only triggered if the deviation has occurred 5 times in a row, in order to avoid false alarms that are the result of deviation in weighing is a result of the machine vibration.

4.16.4 “Over maximum vibrator strength” alarm

This alarm appears once the required vibrator strength is more than the vibrator strength maximum range.

If the process data (shot weight, desired percentage and feeding time) requires a vibrator strength that is above its maximum strength, the strength will be restricted to the maximum value and the **Over Max Vibrator Strength** alarm screen will be displayed.

Check the entered process data (**Shot weight** and **Desired percentage** parameters). Consider changing the dosing time in Mode 1.

4.16.5 “Zero calibration error” and “gain calibration error” alarms

Calibration alarms might be displayed if the IC (Internal Count) Factor value is too low, either during Zero calibration or Gain calibration.

Possible causes:

1. Unreleased load cell (see Appendix A: Load cell protection)

2. Damaged or unconnected load cell

3. Wrong selection or definition of the standard weight during gain calibration

4. Defective controller

In order to proceed with the calibration procedure, repeat the procedure from the beginning.

4.16.6 “Feed deviation” alarm

When the change in the measured weight of the SGD-Micro hopper between 2 successive shots is irregular - more than twice the set point (the desired amount of

dosed material), or 1 gr., whichever is bigger, the controller will disregard this change in its control calculation, and will issue a **Feed Deviation** alarm.

Notes:

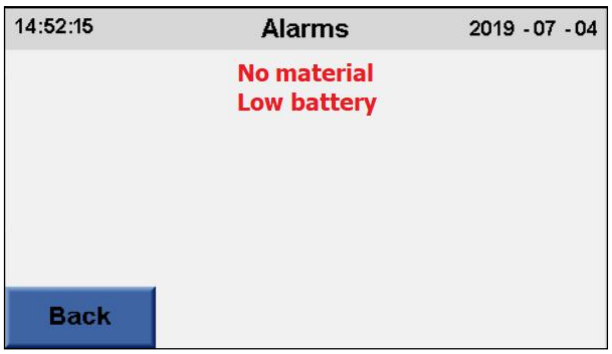
1. ***The alarm will appear only during gravimetric mode, as this deviation is irrelevant during volumetric mode.***
2. ***The deviated batch will not be taken into account in the control process, but it will be added to the accumulative measurement and display.***
3. ***This alarm doesn't activate the Alarm Output (J2).***

4.16.7 Alarm output (J2)

Once one of the alarm situations occurs (except for "Feed Deviation" and "Low battery" alarms), the Alarm Output is activated. Pins 1 and 4 – dry contact open or closed depending on the parameter. Pins 2 and 3 – 24VDC active 30mA max.

It will remain active (open or closed depending on the parameter) for as long as the alarm situation continues (except for Feed Deviation and Low battery)**.**

4.16.8 Alarm list

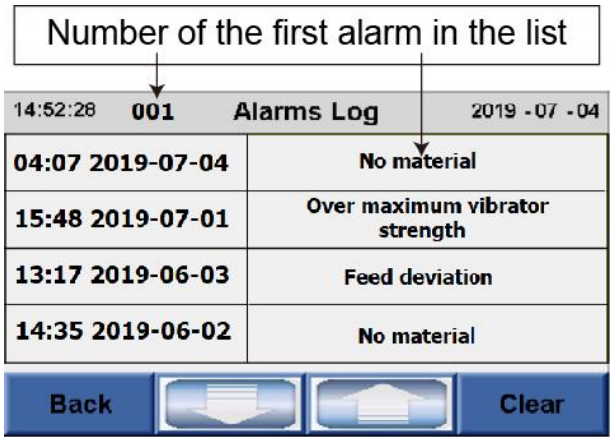


The **Alarm List** screen shows the list of alarms that are currently active.

You can enter the **Alarm List** screen anytime by pressing the yellow **"Alarm**" attention sign at the top-right corner of the main screen.

Press **Back** to return to the previous screen.

4.16.9 Alarms log



The **Alarms Log** screen shows the log of the alarms of the SGD-Micro. Each alarm is shown next to the date and time of the alarm raise.

Use the arrow buttons to scroll to the previous and next log screens.

Clear – deletes all the Alarms log, after user confirmation.

Press **Back** to return to the previous screen.

Note: The alarm log remains even after shutting down and starting up the SGD-Micro.

5. Maintenance

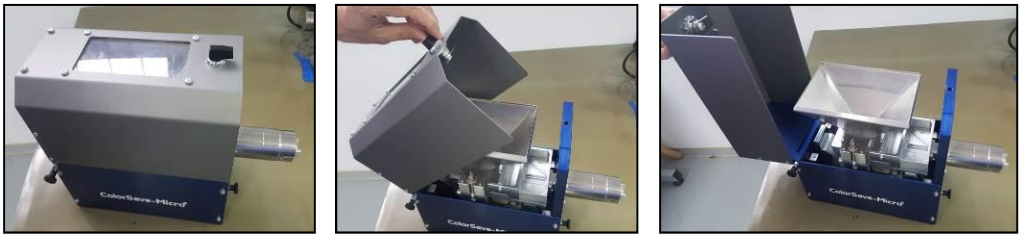
5.1 Emptying and cleaning

1. Use load cell protective indexing plunger to lock the load cell (see Appendix A: Load cell protection).
2. Open the cover.

Note: When the cover is open there is a microswitch that prevents the system operation and deactivates the electromagnet that holds the dispenser in place.

There are two ways to open the cover:

1) Open the cover using the handle on top.



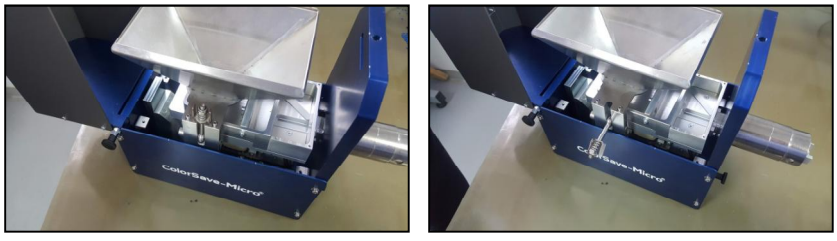
Picture 5-1: Cover open using handle

OR

2) Open the cover using the cover lock indexing plunger.

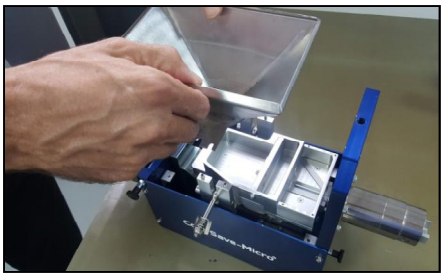
Picture 5-2: Cover open using indexing plunger

3. Pull up the hopper fixing pins and turn them in side.



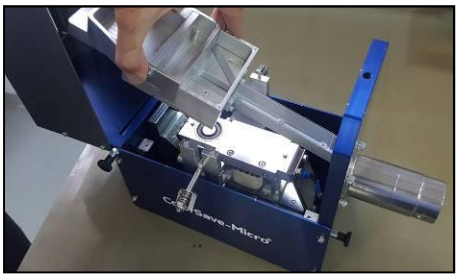
Picture 5-3: Turning hopper fixing pins

4. Lift up the hopper from the device.



Picture 5-4: Lifting up the hopper

5. Pull back the dispenser and lift it up



Picture 5-5: Lifting up the dispenser

6. Empty all the material from the dispenser and make sure there are no particles left.
7. When all the material has been emptied out, re-install the dispenser and reposition it by fitting the position pin into the position hole.
8. Then mounting the hopper back, in opposite way with inserting properly into location pins on the device.
9. Finally return the cover using the top handle or the lock indexing plunger, depending on the method the cover was removed.
10. Power up the machine, to activate the electromagnet that holds the dispenser in place.

5.2 Moving the feeder to another injection machine or replacing controller

The same feeder can easily be used with several injection molding machines, provided that each machine is equipped with its own neckpiece adapter.

To move the feeder (without the neckpiece) from one injection machine to another:

1. The load cell protection must be locked (as before moving a system). Lock the load cell protection by using the “Load Cell Protective Indexing Plunger” (see no. 18 in Figure 2-2: Mechanical Details, or Figure 0-1: Load cell protection device in Appendix A).
2. Remove the feeder from the neckpiece by releasing its two quick release star knobs.
3. Install the feeder on the new injection machine. Open the load cell protection lock (after the transfer is completed) by removing the Protective Indexing Plunger.

5.3 ESD-electro static discharge

If there is a masterbatch or an additive with a lot of static electricity, the SGD-Micro system has trouble feeding it continuously.

ESD uses an air ionizer, which ionizes air molecules. The ionized air is injected through the “Venturi loader receiver”, thus neutralizing the static electricity of the masterbatch / additive that is there after pumping.

The material loading into the hopper is different when ESD is used. When ESD is on, first the shutter opens for 10 seconds and then all the material, from which the static electricity is eliminated, falls into the weighing hopper and the shutter is closed. Then, material is loaded according to the time set in the “Loading Time” parameter, and from that moment on, the masterbatch or additive in the Venturi loader receiver receives ionized air from the ESD until the next time there is a refill requirement and the shutter opens.

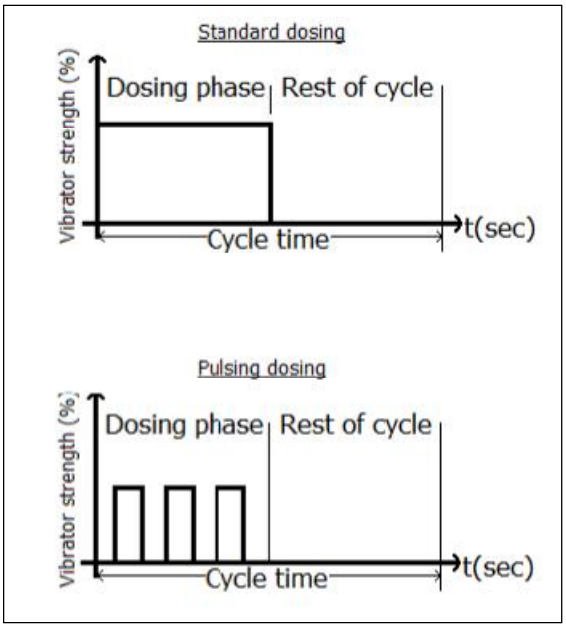
Refill operation with and without ESD:

Normal	ESD
1. Filling according to the “Loading time” parameter. 2. The shutter opens for 10 seconds, the material falls in. 3. The shutter closes.	1. The shutter opens for 10 seconds, the material falls in. 2. The shutter closes. 3. Filling according to the “Loading time” parameter. 4. Ionized air flows from the ESD through the material in the receiver.

For the system filling to work with ESD (as described in the table above), the “ESD Time” parameter on the “Special Parameters” screen has to contain a value greater than 0.

It is possible to connect another solenoid to the Solenoid manifold designed for the ESD, and then the ESD will not work regularly but only for a predefined period according to the ESD Time parameter on the Special Parameters screen.

5.4 Pulse mode



Picture 5-6: Lifting up the dispenser

If the required flow is less than the minimum (at minimum strength) in continuous (normal) work mode, the system automatically switches to pulse mode. Switching to pulse mode is done to prevent a situation where the system is operating at a strength that is too low, in which the raw material will not move in the dispenser. In pulse mode, the system reduces the time needed for feeding the material (vibration time), and divides this time into several packets. Reducing the vibration time increases the required strength (the same amount of material in less time requires a higher strength).

The reduced vibration time is divided into several portions designed to "disperse" the vibration time as much as possible during the filling time. The number of packets is determined by the system and can be up to 4 packets.

5.5 Trouble shooting

Symptom	Possible cause	Correction actions
Controller does not work	Power cord is damaged or disconnected	-Check cable -Plug it into the power outlet
	Fuse is blown	Replace fuse
No weighing or unreasonable weighing results	Load cell is not connected	Connect load cell to its connector in the controller
	Load cell safety catch is still in "locked" position (see Appendix A: load cell protection)	Release safety catch to "Unlock" position (see Appendix A: load cell protection)
	Load cell cable is damaged or not connected	-Check connection to the controller -Repair or replace if required
	The nuts fixing the load cell to the weighing hopper are loose	Refasten the nuts
	Adjustment of load cell protection device has been changed, and the limiter is no longer centered (clearance is less than 0.5mm)	Readjust the clearance according to instructions in Appendix A: load cell protection
	Static calibration has been changed for some reason	Repeat static calibration procedure according to Appendix B: static calibration
	Load cell is damaged	Replace the load cell
	No free clearance (there is some obstacle) between internal and external hoppers	Check for reason and clear it
	Controller fault	Consult maintenance dept. or ask for service
Significant discrepancy between desired % value and actual measured value	The pulse arriving from the injection machine is not steady; there are "dips" which the controller interprets as more than one pulse. It can be detected by comparing the value of accumulative cycles in the SGD-Micro controller to that of the IMM controller	Try to improve the pulse quality
"No Material" Alarm	Air valve does not work	Check air supply Check air valve
	Material container is empty	Refill material
	No command order to air valve	Check cable or consult maintenance dept.

"Over Max Vibrator Strength" Alarm	Required vibrator strength is above the maximum value	Check process data (product weight and desired percentage). If data O.K., consider working in mode 1 and increase dosing time
Calibration error – "Offset too low"	Load cell is in "Locked" state	Unlock load cell (see Appendix A: load cell protection)
	Load cell is out of order	Replace the load cell
	Controller is out of order	Consult Maintenance dept.
Calibration error – "Gain too low"	Test weight has not been put in the hopper, or its value does not match entered value	Check and enter weight or update value, if required
	Load cell is in "Locked" state	Unlock load cell (see Appendix A: load cell protection)
	Load cell is out of order	Replace the load cell
"No vibration" alarm	Vibrator cable is damaged or not connected	- Check its connection to the controller, or - Repair or replace it if required
	No vibrating command from the controller	Consult maintenance dept.
	Vibrator or vibrator card is defective	Consult maintenance dept.
	Material is bridged in the dispenser	Empty hopper and clean it
	The vibrator cannot convey the material in the dispenser	Increase Minimum vibrator strength parameter (see section 4.3.4 Setting max/min vibrator strength parameters)
"Feed deviation" alarm	Penetration of vacuum from the main material hopper loader into the machine's neck. This vacuum sucks material from the SGD-Micro hopper and thus disrupts the control operation	- Check sealing of the hopper loader's emptying valve - Release undesired vacuum in the neck by drilling small holes in neck's sight glass, or by installing small discs (spacers) on its screws, creating a narrow releasing slot.

6. Technical data

6.1 Technical features

Feature	Specifications
Output range	Up to 4 kg/h (0.7 gr./cm3 bulk density)
Operation principle	Loss-in-weight dosing
Load cell	5 kg max., temp. compensated
Hopper	0.64 liter
Additive loading	Optional automatic Venturi loader
Alarm output	N/O dry contact, 24V/30mA max. Activated at: failure in filling or overdose or calibration error
Vibrator	110V/220V, 50Hz/60Hz, TBD before order
Synchronizing with injection machine	Dry contact from the injection machine. Feeding period duration determined either by the injection machine or by the operator
Operation and setup	Setting of shot weight and desired percentage Automatic setup and calibration
Controller	Powerful, sophisticated controller, with color touch screen
Data recording	Process data (shot weight and actual percentage) and accumulated data (total injection cycles, total MB/AD consumed and average %)
Communication	TCP/IP protocol
Mounting	By neckpiece adapter and quick-release star knobs
Power	230v or 115V +/-10%, 50-60 Hz Fuse rating: 2A
Dimensions	See section Feeding system
Weight	7.8 kg

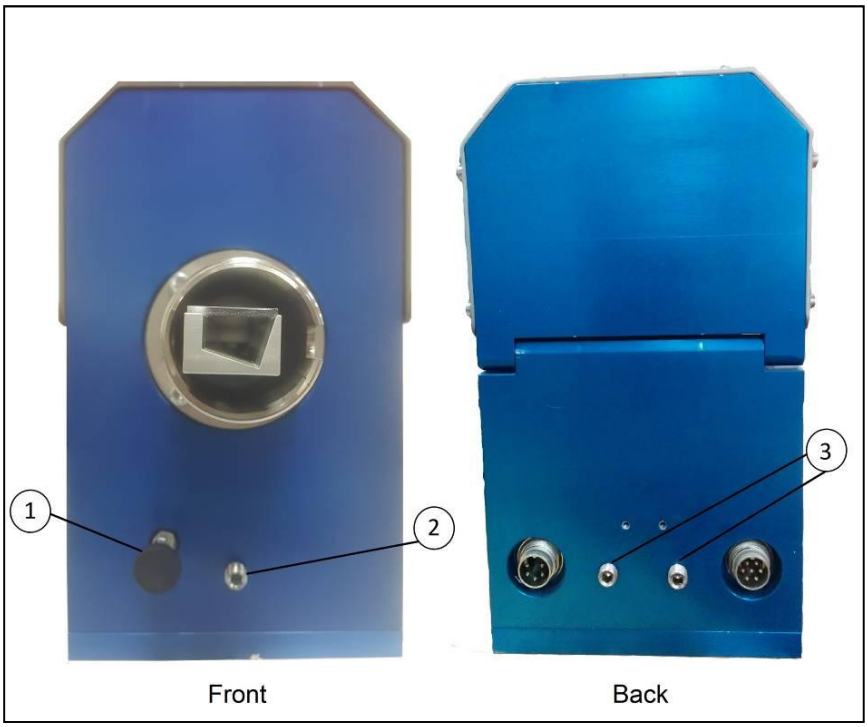
6.2 Environmental conditions

1) Indoor use
2) Working temp: 5°C - 45°C, storage temp: -20°C to +70°C
3) Working altitude: up to 2000m
4) Max. relative humidity: 5%-90%
5) Pollution: Degree 2
6) Vibrations: When installed in accordance with the instructions in this manual, the vibration that occurs will not create a risk for the operator. If unusual vibration occurs, the operator must stop the machine and contact service assistance personnel.

7. Appendix

7.1 Appendix A: load cell protection

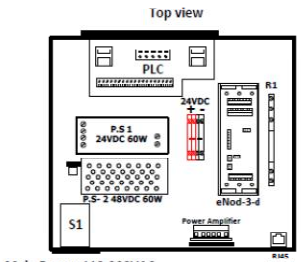
1) Load cell protective indexing plunger
2) Transportation protective screw in front side
3) Transportation protective screws in backside

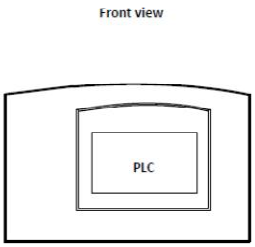


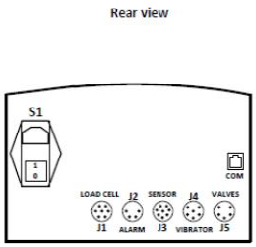
Picture 7-1: Load cell protection device

1. The load cell is a delicate element, very sensitive to extreme mechanical vibration and shocks. In order to prevent any damage that might be caused by such vibrations or shocks, a special mechanical device, as described below, protects the load cell. While in "locked position", the load cell protection prevents any undesired movement of the load cell.
2. The load cell protection devices (see Picture 7-1), consist of one indexing plunger in the front (1), one transportation protective screw in the front (2) and two transportation protective screws in the back (3).
3. When the unit leaves the factory, the load cell protecting is its "locked position" (safe state) in order to prevent any damage to the load cell during the transportation and installation.
4. After installation, before starting to operate the feeder, you should unlocked the unit by releasing the three transportation protective screws in the front and in the back, using Allen M8 screwdriver and unlock the indexing plunger in the front by pulling and turning it.
5. The three transportation protective screws should be totally removed, otherwise they can turn because of the vibrations.
6. For quick load cell protection just lock the indexing plunger in the front by turning it. Re-lock the indexing plunger by turning and releasing it, each time that the SGD-Micro is dismantled from the injection machine and being moved to another location or machine.
7. For long term and higher load cell protection, lock the indexing plunger in the front by turning it and also fix the protective screw in the front and the two protective screws in the backside of the SGD-Micro, using Allen M8 screwdriver. You should fix until you feel the protective screws are fixed. If you are going to transport the unit to another site, Re-lock the indexing plunger and return the three transportation protective screws in the front and in the backside of the SGD-Micro-EXT, using Allen M8 screwdriver. You should fix until you feel the protective screws are fixed.
8. Note that there is no guarantee for the load cell for any mechanical damage, or damage caused by an overload.

7.2 Appendix B: static calibration

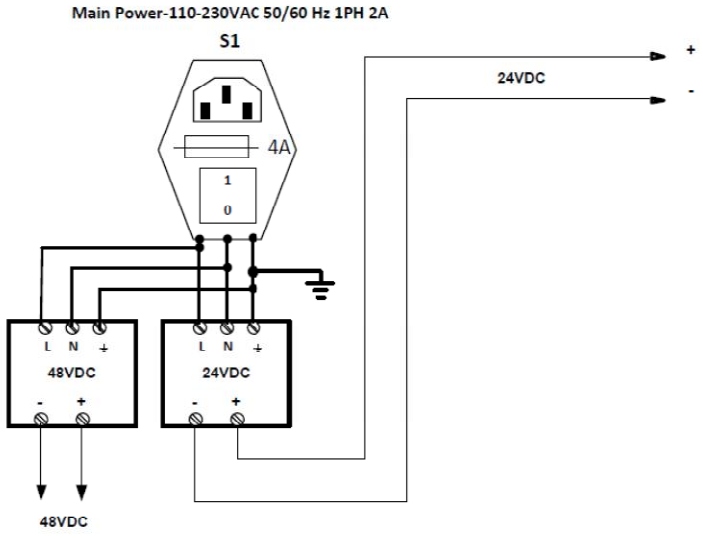


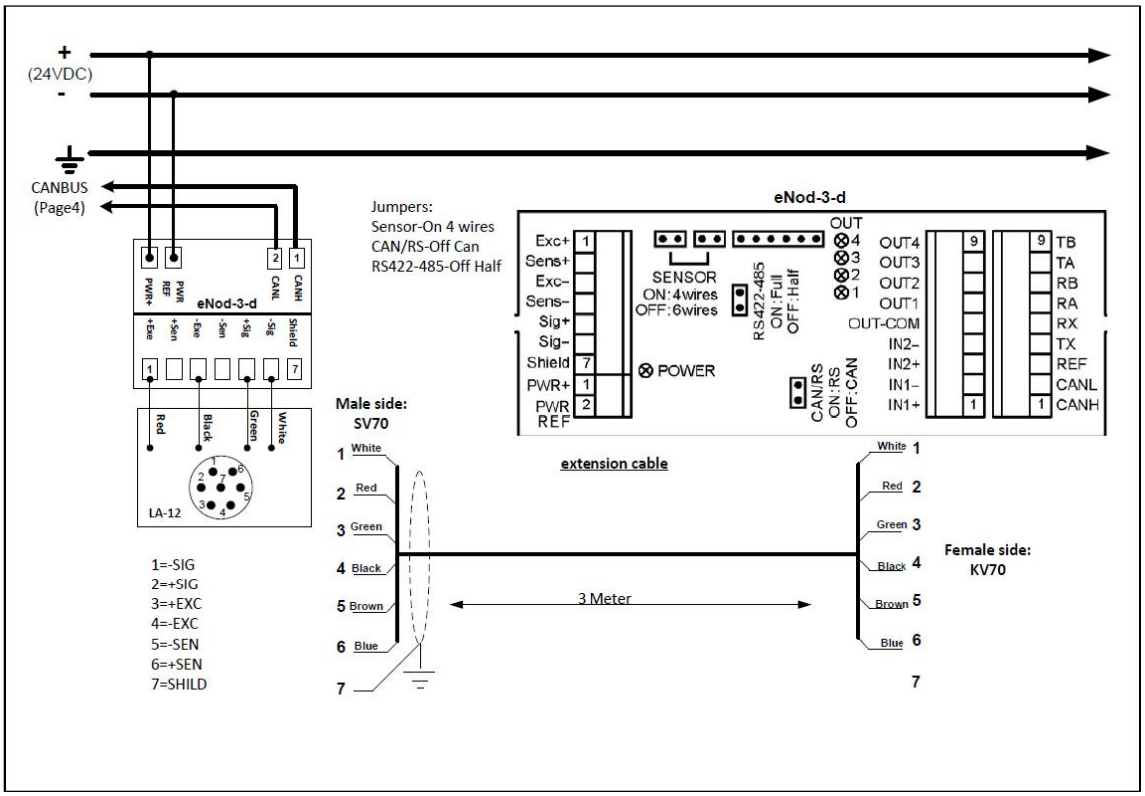


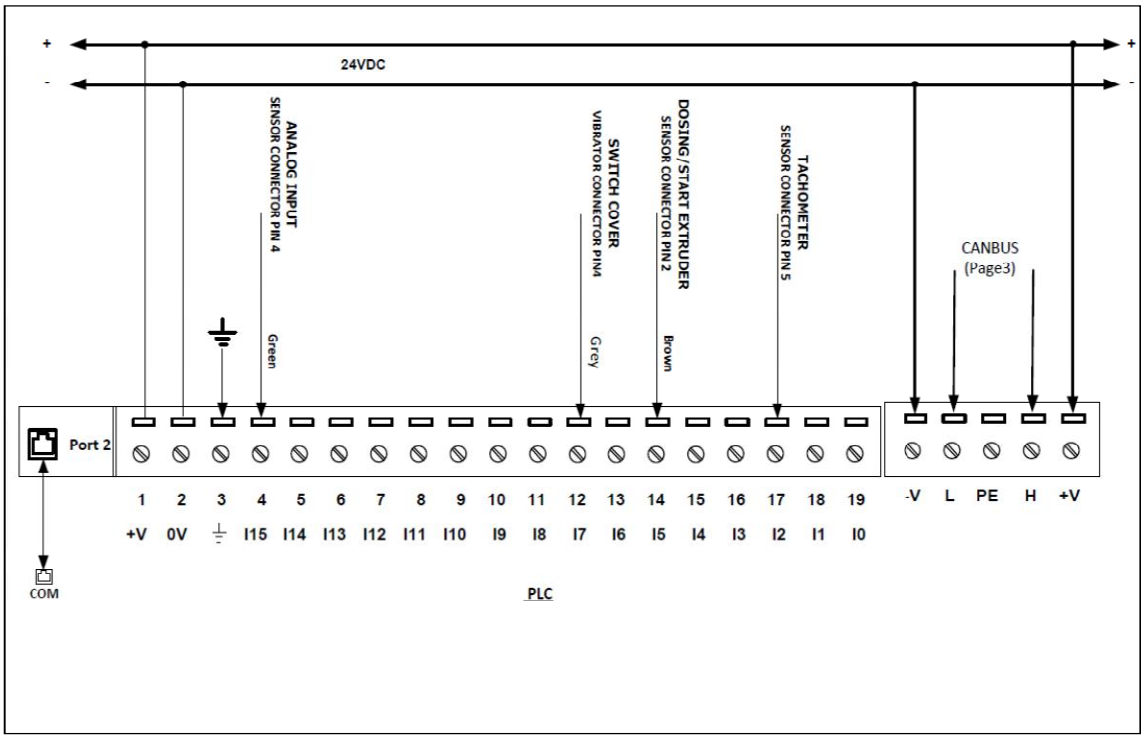


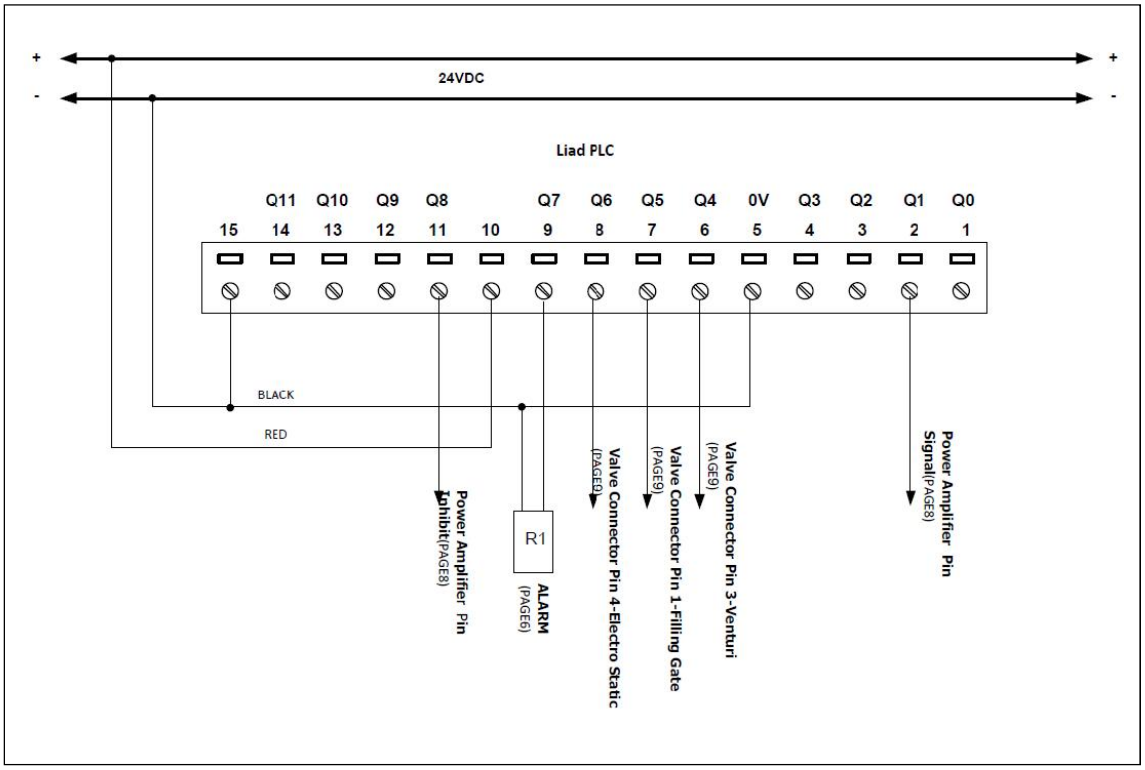
Main Power-110-230VAC
50/60 Hz 1PH 2A

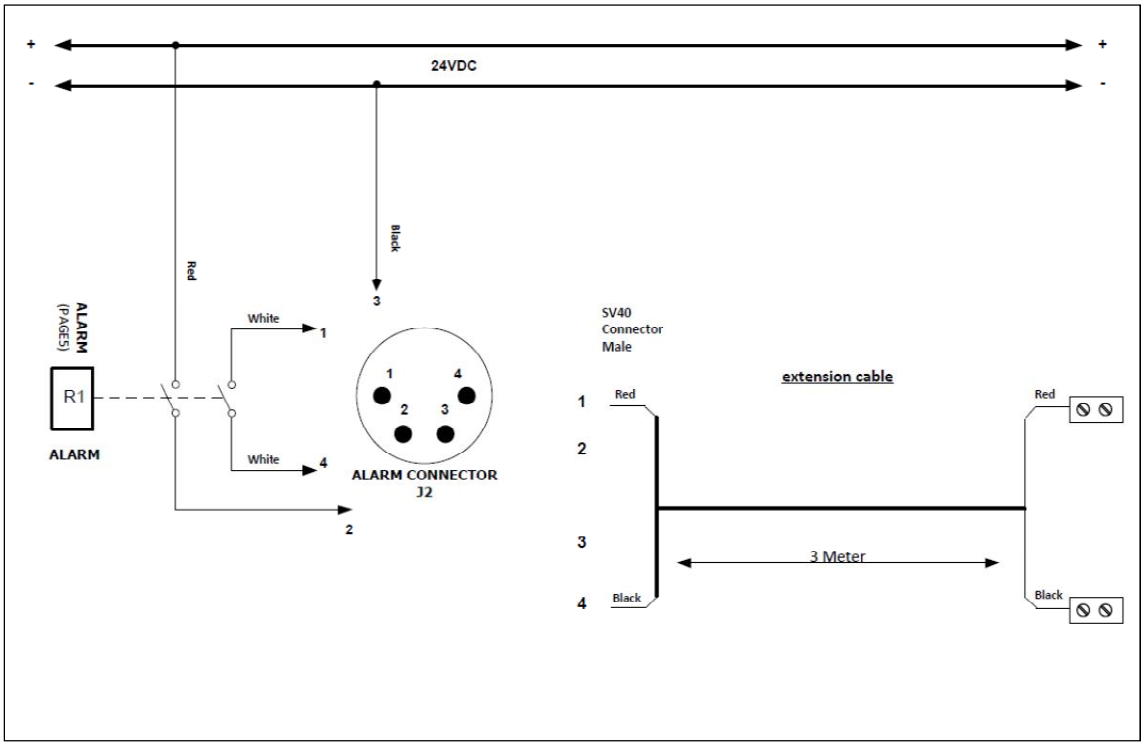
Part No.	Symbol	Name	Manufacture	Type	Specification
1	S1	EMI FILTER	YUNPEN	YQ04A1	Main power connector and switch ,EMI filter with 4A fuse
2	P.S-1	POWER SUPPLY 1	PHOENIX CONTACT	UNO POWER	110-240VAC-24VDC 60W
3	P.S-2	POWER SUPPLY 2	MW	RS-50-48	110-240VAC-48VDC 60W
4	PLC	PLC	UNITRONICS/LIAD	SX43-J-LD1	24VDC 15 INPUTS 12 OUTPUTS CANBUS
5	eNod-3-d	eNod-3-d	SCAME	eNod-3-d	Weight Card
6	Power Amplifier	Power Amplifier	LIAD		Power Amplifier For 48V Vibrator
7	R1	RELAY		HF41F	24VDC
8	RJ45 FEMALE	RJ45 FEMALE		RJ45	RJ45 FEMALE
9	LA12+J1	LOAD CELL CONNECTOR	LUMBERG	KGR70	LA12(Card)+7 PIN FEMALE
10	J2	ALARM CONNECTOR	LUMBERG	KGV40	4 PIN FEMALE
11	J3	SENSOR CONNECTOR	LUMBERG	KGV80	8 PIN FEMALE
12	J4	VIBRATOR CONNECTOR	LUMBERG	KGV50/6	5 PIN FEMALE
13	J5	VALVES CONNECTOR	LUMBERG	KGV60	6 PIN FEMALE



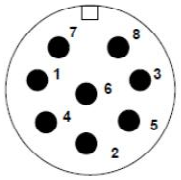

+
(24VDC)
-
CANBUS
(Page4)
eNod-3-d
PWR+
PWR REF
CANL
CANH
+Exe
+Sen
-Exe
-Sen
+Sig
-Sig
Shield
Red
Black
Green
White
LA-12
1=-SIG
2=+SIG
3=+EXC
4=-EXC
5=-SEN
6=+SEN
7=SHILD
Jumpers:
Sensor-On 4 wires
CAN/RS-Off Can
RS422-485-Off Half
eNod-3-d
Exc+
Sens+
Exc-
Sens-
Sig+
Sig-
Shield
PWR+
PWR REF
SENSOR
ON:4wires
OFF:6wires
POWER
RS422-485
ON:Full
OFF:Half
CAN/RS
ON:RS
OFF:CAN
OUT
OUT4
OUT3
OUT2
OUT1
OUT-COM
IN2-
IN2+
IN1-
IN1+
TB
TA
RB
RA
RX
TX
REF
CANL
CANH
Male side:
SV70
extension cable
Female side:
KV70
3 Meter
White
Red
Green
Black
Brown
Blue


+
-
24VDC
ANALOG INPUT
SENSOR CONNECTOR PIN 4
Green
SWITCH COVER
VIBRATOR CONNECTOR PIN4
Grey
DOSING/START EXTRUDER
SENSOR CONNECTOR PIN 2
Brown
TACHOMETER
SENSOR CONNECTOR PIN 5
CANBUS
(Page3)
Port 2
COM
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
+V 0V ⏚ I15 I14 I13 I12 I11 I10 I9 I8 I7 I6 I5 I4 I3 I2 I1 I0
-V L PE H +V
PLC

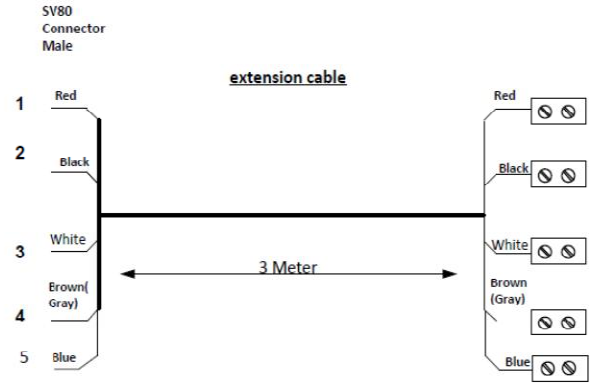

+
-
24VDC
+
-
Liad PLC
Q11 Q10 Q9 Q8 Q7 Q6 Q5 Q4 0V Q3 Q2 Q1 Q0
15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
BLACK
RED
Power Amplifier Pin Inhibit(PAGE8)
R1
ALARM (PAGE6)
Valve Connector Pin 4-Electro Static (PAGE9)
Valve Connector Pin 1-Filling Gate (PAGE9)
Valve Connector Pin 3-Venturi (PAGE9)
Power Amplifier Pin Signal(PAGE8)


+
-
24VDC
+
-
Red
Black
3
ALARM (PAGE5)
R1
ALARM
White
1
White
4
2
1 4 2 3
ALARM CONNECTOR J2
SV40 Connector Male
extension cable
1
2
3
4
Red
Black
3 Meter
Red
Black

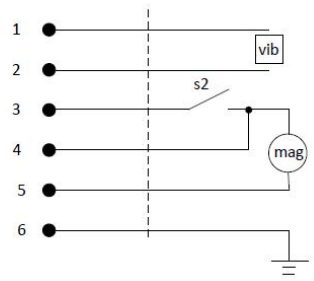
1-24VDC+..... Red
2-DOSING/ START EXTRUDER..... Black
3-0VDC ..... White
4-ANALOG INPUT 0-10V..... Brown(Gray)
5-TACHOMETER _____ Blue
6-
7-
8-

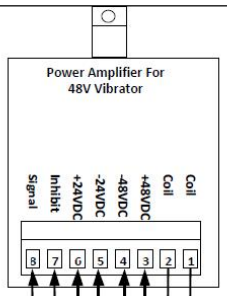


SENSOR CONNECTOR
J3

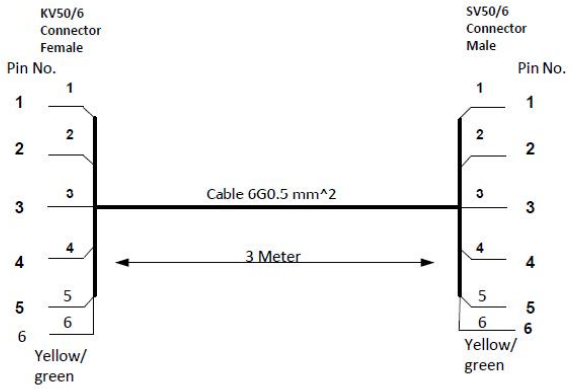


1- WHITE
2-BROWN
3-BLACK
4-BLUE
5-GREY
6-GREEN/YELLOW



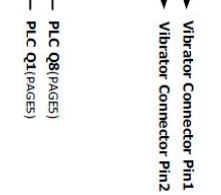


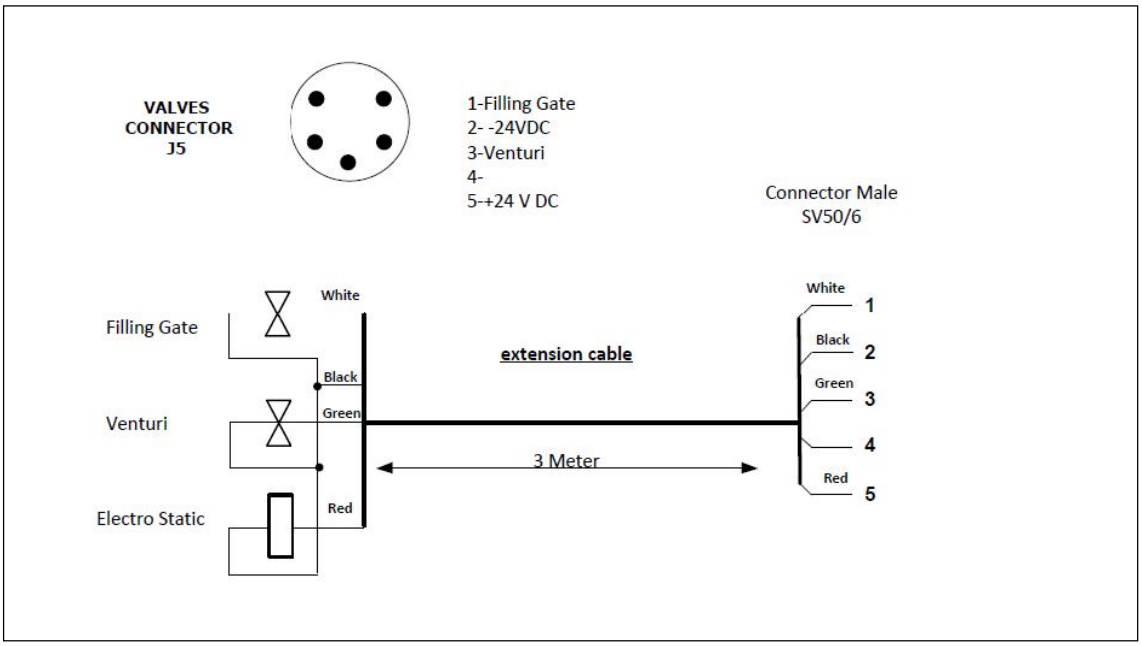
extension cable



VIBRATOR
CONNECTOR
J4

1-Vibrator
2-Vibrator
3-+24VDC
4-input I7
5—24VDC
6-GND




VALVES
CONNECTOR
J5
1-Filling Gate
2- -24VDC
3-Venturi
4-
5-+24 V DC
Connector Male
SV50/6
Filling Gate
Venturi
Electro Static
White
Black
Green
Red
extension cable
3 Meter
White
Black
Green
Red
1
2
3
4
5