

Manual for use and maintenance

RSW-2
Breeder



RSW-2 Breeder

Silo Weighing Controller

Ag/MIS/UmGb-2622-07/18 Rev 1.4
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 Munters

RSW-2 Breeder

Manual for use and maintenance

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This manual for use and maintenance is an integral part of the apparatus together with the attached technical documentation.

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1 Introduction

1.1 Disclaimer

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1.2 Introduction

Congratulations on your excellent choice of purchasing an RSW-2 Breeder!
In order to realize the full benefit from this product it is important that it is installed, commissioned and operated correctly. Before installation or using the unit, this manual should be studied carefully. It is also recommended that it is kept safely for future reference. The manual is intended as a reference for installation, commissioning and day-to-day operation of the Munters Controllers.

1.3 Notes

Date of release: July 2011

Munters cannot guarantee to inform users about the changes or to distribute new manuals to them.

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2 Safety Aspects

2.1 Grounding

- Always connect temperature and sensor shields to earth ground. Avoid mixing high voltage wiring with sensor and low voltage wiring.
- Keep the controller as far as possible from heavy contactor boxes and other sources of electrical interference.
- Do not connect communication wire shields, which go from one house to another at both ends. Connect them at one end only. Connection at both ends can cause ground loop currents to flow, which reduce reliability.
- The COM connection for communications is not the shield wire. The COM, RX and TX wires must connect to each other at all controllers.

2.2 Checking the Battery Level

- Check the battery once a year. The output must be 2.7 volts (minimum). Authorized personnel only must replace the battery if the output is below the minimum required level or every five years.

3 Introduction to the RSW-2 Breeder

The MUNTERS **RSW-2 Breeder** is a precision Male/Female poultry (breeder) feed control system. It includes feed and bird scales allowing the grower to precisely control feed delivery and weigh the results. The **RSW-2 Breeder** accepts feed from two feed sources and delivers feed to two different feed systems with up to eight feed lines each. It delivers feed by mealtime, continuous full feeding.

- Display
- Keypad
- Hot Keys
- System Description
- Output Description
- Hopper Valve Outputs
- Line Outputs (F, M, MF) [Feeder]
- Feed Pulse
- Light

3.1 Display

The **RSW-2** normally shows the time, delivered feed for today (can be either Male or Female) and target, as shown in **Figure 1**. If there is an alarm the screen will alternately show the alarm message and the standard display. The second column switches itself between male and female data.

- Press the 'MENU' key to bring up the control menu. If you press 'MENU' again, the standard display will reappear.
- The Main Menu table in **Table 1** shows the entire menu structure for **RSW-2**. Press 'ENTER' to reach the Female Filling entry under the Control Menu, use the cursor keys to move to any other entry. Then press the 'ENTER' key to display that item. Main menu screen shows the column headings in the top line.

Suppl.	Female	Target
0.0	15:04	0.0

Figure 1: Standard Display Sample

Table 1: Menu Structure for RSW-2 Breeder

CONTROL	MANAGEMENT	HISTORY	TEST	CALIBRATION	CONFIGURATION
Male Filling	Male Mortality	Male Consumption	Relays	Silo A	System Parameters
Female Filling	Female Mortality	Female Consumption	Silo a	Silo B	Relay Function
Feed Cycle	Male Inventory	Silo Inventory	Silo b	Silo A Factor	Poultry Curve
Male Feeding	Female Inventory	Water Consumption	Digital Input	Silo B Factor	Silo Layout

CONTROL	MANAGEMENT	HISTORY	TEST	CALIBRATION	CONFIGURATION
Female Feeding	Feed Supply a	Male Mortality	Water Pulse		
Lighting	Feed Supply b	Female Mortality			
Stop/ Resume	Silo A Inventory	Male Weights			
	Silo B Inventory	Female Weights			
	Time/Date	Alarms			
	Growth Day	Last Batch			
	New Flock				
	Alarm Reset				
	Alarm Time				

3.2 Keypad

The keypad consists of eight keys. There are four cursor keys, 'MENU', 'ENTER', '+' and '-' keys.

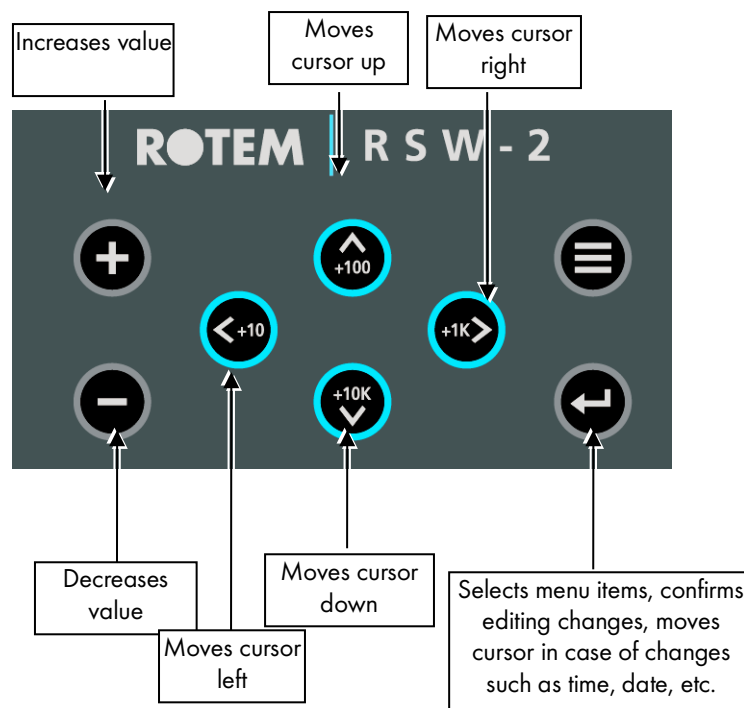


Figure 2: Keypad

- The 'MENU' key shows the user the menu and backs him out when pressing on it once again.
- The 'ENTER' key selects or moves the **RSW-2** into menu items or confirms editing changes. Moreover, it moves the cursor in case of changes such as time, date, etc.
- The Left and Right Cursor keys move the **RSW-2** to the left and right respectively in all the screens and tables. In case there are several entries on a screen, the cursor alone may move. Whenever necessary, the entire screen moves.
- The Up and Down Cursor keys move the **RSW-2** screen up and down menus and tables.
- The '+' key increments values, the '-' key decrements values. The rate at which values increase or decrease change as you hold the keys down. Another way is by holding the '+' or '-' key and

pressing (or holding) on one of the cursor keys. Every cursor has its own factor which multiplies the addition to the value. Table 2 summarizes the factors.





Table 2: Summary of Factors






CURSOR	FACTOR
Left	10
Up	100
Right	1000
Down	10000


3.3 Hot Keys

All available hot keys are summarized in Table 3.

Table 3: Available Hot Keys

Action	Keys to press	Explanation
Communication	'ENTER' and '!' key simultaneously. 	Brings up the communication status. You must connect a wire between the RX and TX and switch the J1 jumpers to Dir before checking the communication.
Weight and Time	'ENTER' and Up Cursor simultaneously. 	Shows the weight in both silos and the daytime. If a filling process is in progress, Filling will be written instead of daytime.
Relay Test	'ENTER' and Left Cursor simultaneously. 	The user can see which relays are closed. (*) Relay is connected. (-) Relay is not connected.
Software Version	'ENTER' and Down Cursor simultaneously. 	Shows the controller's version. The second row has the controller's name.

Action	Keys to press	Explanation
Hopper filling process	'ENTER' and Right Cursor simultaneously. 	"Hopper filling process" hot screen. Through this hot screen you can observe the stages of the process. The right column is the average weight. The left column has the stage number and name: 0 - INITIAL. 1 - INITIAL. 2 - VALVES. 3 - FILLING. 4 - STABILITY. 5 - STABILITY. 6 - STOP DIFF
Left over hot screen (provided 'Hidden Parameters' parameter equals 1)	'ENTER' and 'MENU' key simultaneously. 	This screen will display the feed compensation from auger to auger, line to line and day to day.
Munters engineers' use	'ENTER' key and '+' 	See Table 4.
Software Version	'ENTER' and Down Cursor keys for several seconds while the RSW-2 is showing the standard display. 	This identifies the firmware within the RSW-2 . MUNTERS continuously improves its products, and dates all released software.
Communication Test	'ENTER' and '-' simultaneously. 	To test the unit communication path, jumper the Rx and Tx communication inputs. The message "Good" or "Bad" will be displayed on the screen.
Cold Start	Press simultaneously the following keys: 'ENTER', 'MENU', '+', and '-'. Turn the unit OFF and ON again, the message "RUN" and after that "COLD" will appear on the display.	Returns the values for all the parameters to the factory default and erases the history. There is need to do a Cold Start only after changing a software (EEPROM) in the RSW-2 or if

Action	Keys to press	Explanation
		<p>there is a main problem with the unit.</p> <p>The Cold Start erases all user programmed variables and history so before doing it there is need to write down all the variables, hidden parameters, tables, and all other user programmed variables, so that after Cold Start the user will be able to enter again all the variables and data.</p> <p>After Cold Start there is a need to calibrate feed and bird scale to receive again the scale factors, or to insert all factors (including zero factor for feed scale) manually.</p>
Hidden Parameters	Press and hold all four-cursor keys for several seconds while the RSW-2 is showing the standard display, and then press 'ENTER'.	See Table 5 and its attached explanations.
Relay Display	Press both on 'ENTER' and a Left Cursor key for several seconds while the RSW-2 is showing the standard display.	The relays status is displayed.

3.4 Hot Keys for Munters Engineers

Table 4: Hot Keys for Munters Engineers' Only

	Z	A	W
Silo 1	A/D empty	A/D Average	Silo weight
Silo 2	A/D empty	A/D Average	Silo weight

Table 5: Hidden Parameters Option.

No.	Description	Default	Actual
1	Stop Differential Weight (Kg)	3.0	
2	% Stop Differential	20	
3	Hopper Buff.	10	
4	Minimum Portion	1.0	
5	Compensation	1	

1. The Stop Differential Weight is the point below target weight that the RSW-2 stops the Auger-1 fill auger.
2. Percentage of difference between the actual supplied feed and the feed needed to fix the stop difference.
3. The number of A/D count-readings to calculate the average weight for hopper filling. (Minimum: 1).
4. The minimum filling amount for each hopper. This variable presents a range of weight where if the measured weight in the hopper lays in this range or above it, the hopper is considered to be full and moving to the next one is possible. Note that if the hopper is considered to be full but there are no other silos to be filled, it will exit.
5. The Compensation is a hidden parameter to activate or deactivate the compensation between hoppers, lines and days.

3.5 System Description

The **RSW-2** handles up to two different feed sources for both male and female. These are shown in the **Figure 2** as silos. Auger-1 M and Auger-1 F deliver food from the silos to the hoppers. The **Figure** shows only the male feed system; the female and combined male/ female systems are identical.

Once the feed hoppers are filled, the line outputs deliver the feed to the flock. With the **RSW-2**, any output can be reprogrammed to male, female, or combined male/female. It means that every relay can be configured as any output function.

Besides controlling feeding, the **RSW-2** can be connected to bird scale that can weigh the male and female separately and can monitor the water consumption.

Since all the **RSW-2** relays can perform any output function, you can switch them from male to female or combined male/female operation at any time. You can also define several relays to have the same output function to obtain simultaneous, but isolated outputs.

3.6 Output Description

Auger 1 (F, M, MF)

The Auger 1 outputs moves the food from main silos to hoppers. The three designations F, M and MF refer to female, male and male/female. The **RSW-2** accepts programming information such as meal and fill times only for the male and the female systems.

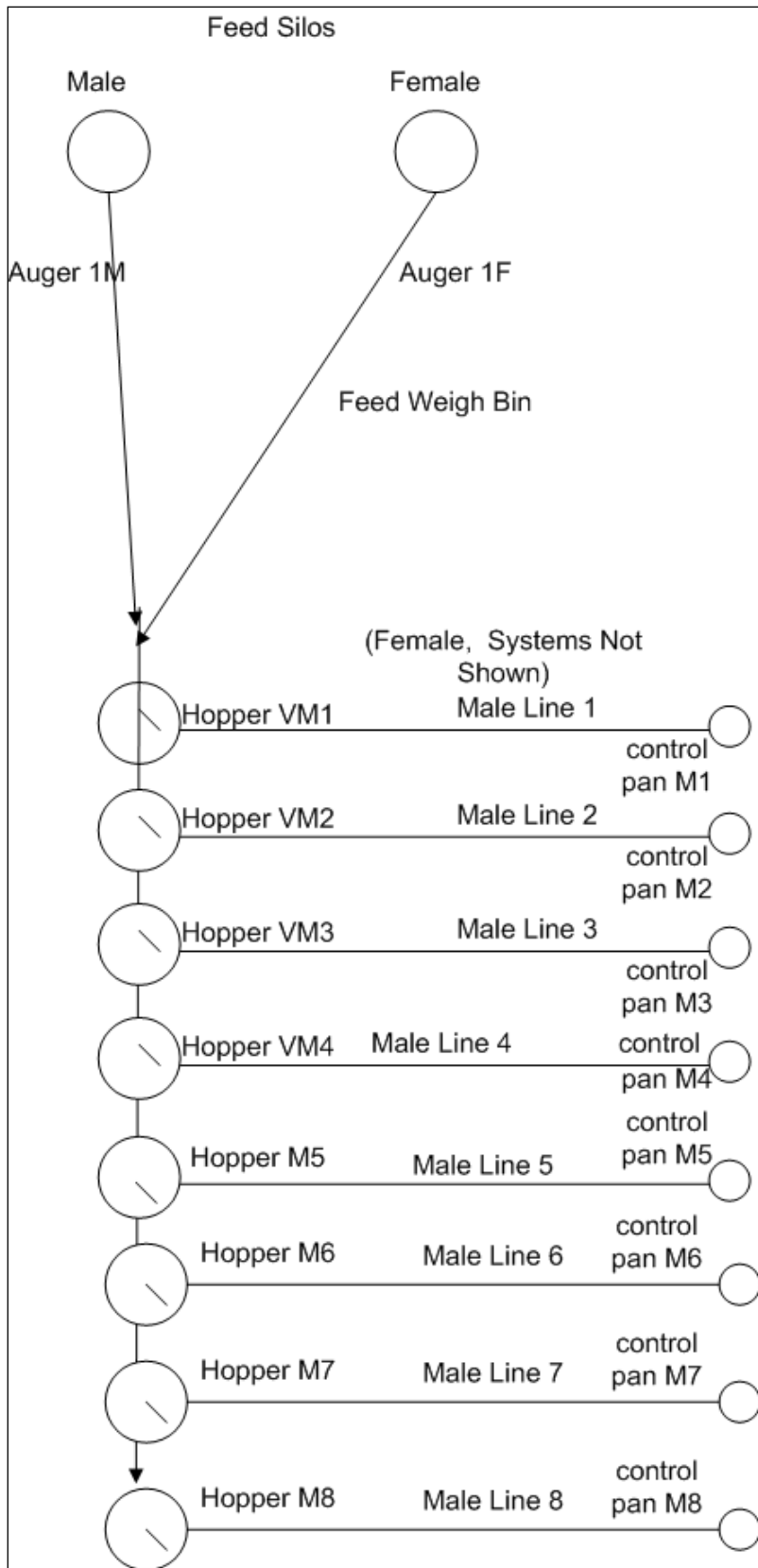


Figure 3: Male/Female feed system brings feed from the silos to the hoppers

3.7 Hopper Valve Outputs

The Hopper Valves allow the **RSW-2** to divide the meal quantities into up to eight individual lines for each of the F, M and MF choices. When inserting the Male/Female quantities, the highest group will not require a valve output. For example, if your system has three lines for the females, program relay outputs for hopper valves: 'hopper_vf1' and 'hopper_vf2', but none for 'hopper_vf3'. Then the felling table would have entries for hoppers 1, 2 and 3 only.

Auger 1 and Fill System Valves run programmed sequences at the filling times. Be aware of the filling time sequences so that all your hoppers are filled prior to mealtimes.

3.8 Line Outputs (F, M, MF) [Feeder]

All the lines for each group run simultaneously at the programmed line/feeder times. Program the feeding times to ensure all hoppers have been fed their meals. The extra mealtimes are for stimulation runs, to ensure that the birds clean up old food; no feeding in the hoppers is needed for stimulation runs.

3.9 Feed Pulse

Feed pulse is used to provide close contact (short pulse) to activate external counter.

3.10 Light

The light relay is connected to the lighting system. The light system operates according to the light table programming.

4 Calibration and Testing

- Initial Setup
- Calibration
- Test
- Test

4.1 Initial Setup

Note that it is essential to follow the following steps according to their order. If in one section a failure from any kind occurs, do not continue.

- Check all the transducer's connections and make sure which Silo is connected / disconnected.
 - Check A/D data in 'Test' selection. This is a crucial step. Otherwise, the values in the next sections won't match the correct ones.
 - Make sure both 'Silo A' and 'Silo B' consist of stable values and do not suffer from noise or disturbance or a stacked valve.
1. Go to option 6.4 (see **Table 1**) and define the following:
 - Define the connection between the Silo and the birds' sex (male or female).
 - Channel 2 can be defined either as Silo or as the birds' weight or non-existing.

Note that a change in Channel B (see **Table 6**) parameter will result a change in all the values in Silo Layout table.

2. Make sure all parameters defined in option 6.1 (see **Table 1**) suit their values.
 - 'Auger Rate' parameter is defined as a rate of Kg (or Lb) per minute. Check this value is appropriate.
3. Go to option 6.2 (see **Table 1**) and validate the following:
 - Define the Relays.
 - Make sure all the relays are connected properly
4. Go to tables 2.7 and 2.8 (see **Table 1**). Since after doing 'Cold Start' procedure the inventory's value can be random, update the silo's inventory
5. Go to option 2.9 (see **Table 1**). Update the hour and the week, day, and date.
6. Update calibration number of every silo by either calibrating the silo or by inserting calibration number in the calibration group (one of the stages contains an inventory update).
7. Go to tables 1.1 and 1.2 (see **Table 1**) the act according to the following:
 - Update the beginning time.
 - Update the status (can be 'Skip' or 'Today')
 - Update the amount in the hopper containers. Note that if you do not want the filling to actually take place today, leave the status as 'Skip'.

4.2 Calibration

This section deals with the system calibration, a process performed once, during installation.

- Silo Calibration with a Known Weight
- Calibration by Truck Filling Process
- Silo A / B
- Silo A / B Scale Factor
- Bird Scale Calibration

- Press the 'MENU' key on board and select 'CALIBRATION' by pressing the Right Cursor key.

4.2.1 Silo Calibration with a Known Weight

To calibrate the scale using a known weight:

1. Press the 'ENTER' button (the controller will take the tare).
2. A message "Please wait" appears. Wait until this screen disappears.
3. Insert a known weight on the scale and place in its value.
4. A message "Please wait" appears. Wait until this screen disappears.
5. Press the 'ENTER' key and either a success or a failure message will appear.
6. Remove the weight and press 'ENTER' once again.
7. A message "Please wait" appears. Wait until this screen disappears.
8. Write the total net feed in silo and press 'ENTER'.

4.2.2 Calibration by Truck Filling Process

To calibrate the scale after filling the silo:

1. Press 'ENTER' (the controller will take the tare).
2. A message "Please wait" appears. Wait until this screen disappears.
3. Write the total filling weight and start filling the silo. Do not press 'ENTER'.
4. After filling, disconnect the truck-filling pipe and press 'ENTER'. A message "Please wait" appears. A message of either success or failure will be displayed.
5. Press the 'ENTER' button.
6. A message "Please wait" appears. Wait until this screen disappears.
7. Write the total new net feed in the silo and press 'ENTER'.

4.2.3 Silo A / B

To calibrate the silo scales, accurate weight of at least either 100 pound or 50 Kg is required.

NOTE Munters recommends using a certified 100-kilogram weight or more.

4.2.4 Silo A / B Scale Factor

An explanation is provided below regarding the parameters in this section.

- **Factor:** Calibration number.
- **%:** Any changes in the '%' will result an inverse proportionally change in the factor of its matching percentage.
- Any change in the factor, will lead a change in the amount of the hopper's filling in the next operation (what has been written in the History, won't be changed).

- **Offset:** Shifts the A/D value of the channel.

For example, if offset=2000 and its A/D value or reading is 3403, and a change in the offset to 3000 increasing the previous value in 1000 so its A/D's value is increased also by 1000, which means this A/D is 4403, where the silo's inventory remains as is.

This is being used if a Load cell has been connected to the system and its A/D value is either very low (about 0) or very high (in such a case, 'offset' is set to a negative value).

4.2.5 Bird Scale Calibration

1. When the scale is empty, press **'ENTER'**.
2. A message "Please wait" appears. Wait until this screen disappears.
3. Put a known weight on the scale and insert its value.
4. Press **'ENTER'** and either a success or a failure message will appear.

Note that an accurate weight of at least two pounds or 1 Kg is needed. A weight of up to 50 pounds or 20 kilograms may be used. To obtain an inexpensive known weight, you may use a 2-liter soda bottle (or equivalent), which you weigh on an accurate calibrated scale such as is used in grocery stores. Follow the instructions on the display. To have an accurate calibration it is recommended to use 5Kg known weight or more.

4.3 Test

- Relays
- Silo A / B
- Digital Inputs
- Water Pulse

4.3.1 Relays

Use this to manually control each relay. The RSW-2 will not operate automatically in this test mode. Use the Left and Right Cursor keys to move the cursor to the relay number you wish to change. Press the 'ENTER' key to toggle the relay on and off.

4.3.2 Silo A / B

This menu item shows the internal machine numbers for the present scale readings. If you know the weight at two points, you can calculate the conversion factors for the load cells. During normal operations, the numbers should be changed to reflect the silo's average weight at the moment of weighting.

4.3.3 Digital Inputs

- Digital Inputs 1 and 2:
- Digital Input 3:
- Digital Input 4: Water Pulse Input.

4.3.4 Water Pulse

You can view the present water meter count to check that it is working. The count should increment for each unit of water measured by the water meter.

4.4 Configuration

- System Parameters
- System Parameters Explanation
- Relay Functions
- Poultry Curve
- Silo Layout

4.4.1 Relay Functions

A relay function can be assigned on the following functions mentioned below (see Table 8). Each function can apply to as many relays as desired, including extension box relays. Note that relays 0 through 8 are built into the RSW-2 . Use relay expansion boxes (REX-8 or REX-12) for additional relays.

Table 6: Available Functions

Code	Description
None	Relay Inactive
Auger-1-[F,M,FM]	Deliver Feed from Silos to line Hoppers.
Valve-[1..8][F,M,FM]	Select hoppers valves
Line-[F,M,FM]	Deliver Feed to Birds From Line Hoppers
Feed Pulse	Close contact to send pulse to ext. counter
Light	Lights relay
Alarm	Signal Alarm Condition (N.C relay is recommended)

For each relay you may select a LED from the front panel to turn on when the relay is active. These LED's will then provide visual information concerning feed system activity. You may wish to label each LED you program accordingly; if you program several relays to use the same LED, the LED turns on whenever at least one of those relays is active.

4.4.2 Poultry Curve

Reference weight for all kinds of birds should be placed in separately, either according to their age or relating to the time they arrived at the current shed. Curve figures can be set for every 7 days up to 70 days, and then every 35 days up to 245 days.

4.4.3 Silo Layout

Define separate silos for both males and females.

5 Using the Controller

- Control
- Management
- History
- Flow Chart of Using the Controller

Note the following before beginning:

- Press '**ENTER**' after every button you click. Otherwise, the information will not be saved in the system.
- Every time you have to provide information consisting of moving the cursor to another column, use the '**ENTER**' button.
- If the buttons are not in use for a few seconds, the screen returns to its main appearance.

5.1 Control

This choice serves as a Control data diary.

- Press the '**MENU**' key on board and select '**CONTROL**' by pressing the Right Cursor key.
- Male / Female Filling
- Feed Cycle
- Male / Female Feeding
- Lighting
- Store / Resume

5.1.1 Male / Female Filling

1. Select the requested filling ('**MALE**' or '**FEMALE**') by using the Down Cursor key and clicking the '**ENTER**' key.
2. Insert the number to be filled. It is located in the '#' column and is adjusted by using the 'Cursor' keys (see **Table 9**) and press '**ENTER**'.

Cursor	Factor
Up	Increases the line by 1
Down	Decreases the line by 1

Table 7: Using cursor keys to insert '#'

NOTE Go to '**History**' option and '**Last Batch**' selection to make sure that the information is saved in the system.

3. By selecting the Right Cursor key the screen will display **Figure 3**. At first only '#' 1 to 4 appear on and by clicking the '**ENTER**' once again - '#' 5 to 8 appear as well. The '+' key will increase the number by 1 and the '-' key will do the opposite action. Move the Right Cursor key to select a '#' column and insert the required number/s by using the '+' key.

#	1	2	3	4	#	5	6	7	8
1	0	0	0	0	1	0	0	0	0

Figure 4: Screen Display Filling the '#' Column

4. Set the time in 'START' column. Note that the system sorts the time every time you exit the system. Move the cursor to the 'START' column and change the hour by using the '+' button. Set the requested line number in 'LINE' column by using the '+' key.

5. Set the status column to 'TODAY' by using the '+' button (see **Figure 4**). The default value is 'TOMORROW'. Note that as soon as this process ends this status will change automatically to 'SUPPLIED'.

#	START	LINE	STATUS
3	10:05	4	TODAY

Figure 5: Screen Display Example

5.1.2 Feed Cycle

1. When cycle feeding is required, please, refer to the Configuration section regarding the first tuning done to the system.
2. If the previous section is done, the feeding cycle is already set so only make sure that's the requested option.

5.1.3 Male / Female Feeding

1. Insert the number to '#' column by using the '+' button to increase the number by 1.
2. To reach the next column, press the 'ENTER' key and the cursor keys.
3. Insert beginning time to 'FROM TIME' column. '+' key increases the value by 1.
4. Insert the end time to 'TO TIME' column. '+' key increases the value by 1.
5. Press on 'ENTER' to go to the next feeding number.
6. When reaching the last number (# 10), press on 'MENU'.

5.1.4 Lighting

1. Insert a number to '#' column for time period to set the lights on and off.
2. Insert beginning time to 'FROM TIME' column. '+' key increases the value by 1.
3. Insert the end time to 'TO TIME' column. '+' key increases the value by 1.
4. When you reach the last number (# 10), press on 'MENU'.

5.1.5 Store / Resume

Use this option only in case of failure. You can choose to stop all augers and feed lines instantly. By using '+' button you can ask the system to do one of the following options:

- PAUSE: By selecting this option and 'ENTER' key, the system will pause until you ask it to continue running.
- STOP: By selecting this option and 'ENTER' key, the system will stop completely the hopper filling.
- RUN: By selecting this option and 'ENTER' key, the system will resume its normal operation.

5.1.6 System Parameters

Table 8: Available Parameters

No	Description	Default
1	Weight Unit (Kg. / Lb.)	Kg.
2	Min. Emptying (Kg. / Lb.)	10
3	Min. Filling (Kg. / Lb.)	1000
4	Resume Time (Minute)	5
5	Auger Rate (Kg or Lb/minute)	90
6	Maximum Auger-1 Maximum Run Time (minutes)	5
7	Silo A Low Limit (Kg / Lb)	0
8	Silo B Low Limit (Kg / Lb)	0
9	Feed Per Pulse Ratio	5.0
10	Water Per Pulse Ratio	0.0
11	Midnight Time (0 = 24:00)	0
12	Valves Mode: <ul style="list-style-type: none"> • 'mult' - Turn on the last hopper valve first - mult. • 'single' - Turn on hopper valves one by One - single. 	Single
13	Feed Cycle: Always, 2 days, 3 days...,week	Always
14	House Number	0
15	Password For Remote Access	0
16	Communication Baud Rate	9600
17	Date Format USA / Europe	ERU
18	Flock Number	1
19	Channel B	Yes
20	Female Average Weight (Kg / Lb)	0.042
21	Male Average Weight (Kg / Lb)	0.042
22	Female Range Above Reference (%)	30
23	Female Range Below Reference (%)	30
24	Male Range Above Reference (%)	30
25	Male Range Below Reference (%)	10
26	From Time: Start Time For Birds Weighing.	0
27	To Time: Stop Time For Birds Weighing.	24

5.1.7 System Parameters Explanation

1. **Weight Unit:** Default: Kg. Measurement unit: Kg or Lib.

2. **Minimum emptying:** Default: 10 (Kg. / Lb.). Feed withdrawal identifier from silo in Minimum quantity. It will be registered as consumed feed.
3. **Minimum Filling:** Default: 1000 (Kg. / Lb.) Minimum quantity to identify feed supply to the silo, which will also be registered as feed supply to the silo. It will create new feed inventory. (150 minimum)
4. **Resume Time:** Default: 5 (Minute) Delay time. After filling is no longer identified by the controller, determine that the feed truck finished loading the feed into the Silo.
5. **Auger Rate:** Default: 90 Auger rate in either Kg or Lb per minute. Completing small quantities.
6. **Auger 1 Maximum Run Time (minutes):** Default: 5 min. Alarm time delay in case auger 1 are not fill intermediate container with portion (alarm code 4).
7. **Female Silo Low Limit:** Default: 0. If the remaining quantity of feed in female silo is inferior to the low limit, the alarm no. 5 will start.
8. **Male Silo Low Limit:** Default: 0. If the remaining quantity of feed in male silo is inferior to the low limit, the alarm no. 6 will start.
9. **Feed / Pulse: Default:** 10 Kg. Relations between the feed quantity and the number of pulses at the output feed/pulse 1.
10. **Water / Pulse:** Default: 0.000. Defining relations between water quantity and the number of pulses at the input water / pulse.
11. **Midnight Time:** Default: 0. Time for midnight point. The user can set the time preferred. (This is the time for changing the next growth day).
12. **Valve Mode: Default:** Single
 - Multiple: Turn on the last hopper valve first and then the last and the one before, etc.
 - Single: Turn on hopper valves one by one.
13. **Feed Cycle:** Possible values (see Table 7):
 - 1: Always.
 - 2 - 7: Cycle Size to set yes/no for each day in the cycle. Can be displayed as the following: 2 days, 3 days...,week

Table 9: Possible Values Selecting Feed Cycle

Week	2	3	4	5	6	1
d.1-Y/n	d.1-Y/n	d.1-Y/n	d.1-Y/n	d.1-Y/n	d.1-Y/n	ALL
d.2-Y/n	d.2-Y/n	d.2-Y/n	d.2-Y/n	d.2-Y/n	d.2-Y/n	
d.3-Y/n		d.3-Y/n	d.3-Y/n	d.3-Y/n	d.3-Y/n	
d.4-Y/n			d.4-Y/n	d.4-Y/n	d.4-Y/n	
d.5-Y/n				d.5-Y/n	d.5-Y/n	
d.6-Y/n					d.6-Y/n	
d.7-Y/n						

Note that if value 'week' is chosen, the following line is displayed on the screen (table 1.3 (see **Table 1**): 'Su Mo Tu We Th Fr Sa'.

14. **House:** Default: 0. Concerns communication: house number.
15. **Password:** Default: 0. Concerns communication: password.
16. **Baud Rate:** Default: 9600. Concerns communication: baud rate.
17. **Date Format:** Default: EUR. American or European date format.
18. **Flock Number:** Default: 1. Number of Flock for communication. This will define the name of ASCII file when collecting data by PC.
19. **Channel B:** Defines whether channel B is silo or bird scale as not used. Channel B's interface is according to either silo or bird scale. It can receive one of the following options:

- 0 - NO
- 1 - YES
- 2 - SCALE

The default is YES. Note that if the value is not 'YES' the value shown on the screen is: ' —'. Moreover, since the value is not 'YES', Silo B does not exist and therefore, the screen will present information regarding Silo A only (can be quickly reached by using 'ENTER' and '+' keys).

20. **Female Reference Weight (Kg / Lb)**: Default: 0.042 Kg. Female reference weight for the bird scale. Weight measurements are compared to in order to check they are within the desired range (Cannot be set by the user, it only displays the poultry curve position).

21. **Male Reference Weight (Kg / Lb)**: Default: 0.042 Kg. Male reference weight for the bird scale, compared measurements to a Weight to check that they are within the desired range. (Cannot be set by the user, it is only display of poultry curve position).

22. **+ Female %**: Default: 30%. Percentage of measurements. In the range above the female reference weight. Weight above this limit will not take as a legal female weight.

23. **- Female %**: Default: 30%. Percentage of measurements, within the range below the female reference weight. Weight below this limit will not take as a legal female weight.

24. **+ Male %**: Default: 30%. Percentages of measurements, within the range above the male reference weight. Weight above this limit will not take as a legal male weight.

25. **- Male %**: Default: 10%. Percentage of measurements, within the range below the male reference weight. Weight below this limit will not take as a legal male weight.

26. **From Time**: Default: 0. Start time for weighing the birds.

27. **To Time**: Default: 24. Stop time for weighing the birds.

5.2 Management

This choice serves as Management input diary.

- Press the 'MENU' key on board and select 'MANAGEMENT' by pressing the Right Cursor key.
- Male / Female Mortality
- Male / Female Inventory
- Feed Supply A / B
- Silo A / B Inventory
- Time / Date
- Growth Day
- New Flock
- Alarm Reset
- Alarm Time

5.2.1 Male / Female Mortality

1. Select either the 'MALE MORTALITY' option or the 'FEMALE MORTALITY' option and click 'ENTER'.

2. Use '+' button to insert the number of mortality poultry in the 'ADD MORTALITY' column.

The 'DAILY SUM' column will be automatically updated.

5.2.2 Male / Female Inventory

Use this option only once, at the first time when documenting flocks is essential.

1. Select either the 'MALE INVENTORY' option or the 'FEMALE INVENTORY' option and click 'ENTER'.
2. Use '+' button to insert the number of initial poultry in the 'INITIAL MALE/FEMALE' column. The 'UPDATE MALE/FEMALE' column will be automatically updated.

5.2.3 Feed Supply A / B

This option serves as a diary for food supply.

1. The '##' column presents the line number. Next updating it will increase automatically.
2. The 'DATE' column indicates the date the supply is updated in the system. If change the date is needed, use either '+' or '-' buttons to either increase or decrease the date accordingly.
3. The 'FEED' column indicates the quantity updated in the system. The quantity can be either in Kg or in Lb.

5.2.4 Silo A / B Inventory

1. Press the 'MENU' key on board and select 'MANAGEMENT' by pressing the 'ENTER' key. This option serves as a silo inventory.
2. Insert silo's weight in Kg to 'SILO WEIGHT' column.
3. In 'ARE YOU SURE' column select either 'YES' or 'NO' by using the '+' button.

5.2.5 Time / Date

This option is usually done only once, at the initial step.

1. 'TIME' column can be changed by using '+' and '-' buttons to increase and decrease the values by one accordingly.
2. Click the Down Cursor to reach the 'DATE' column. The current date can be changed if necessary by using the '+' and '-' buttons to increase and decrease the values by one accordingly.
3. Click the Down Cursor to reach the 'DAY' column. The current day can be changed if necessary by using the '+' and '-' buttons to change the name of the weekday.

5.2.6 Growth Day

This option is usually done only once, at the initial step.

- Insert 'GROWTH DAY' in number. Use the '+' and '-' buttons to increase and decrease the values by one accordingly.

5.2.7 New Flock

This option is usually done only once, either when initial flock state occurs or when new flock arrives.

- Choose either 'YES' or 'NO' by using the '+' and '-' buttons. After 'Yes' is selected a new line appears. This line enables the user to zero the silo.

5.2.8 Alarm Reset

This option is done only when the alarm begins.

- While working on a problem the alarm should be set to off position.
- By using the '+' or '-' button select either 'YES' or 'NO' accordingly. Note that if either a new alarm occurs or the alarm reoccurs, the controller will turn the alarm relay on again.

5.2.9 Alarm Time

This option is usually done only once, at the initial step.

- This option provides individual enable times for the alarms per action (see **Table 10**). Every action is selected by using "ENTER". This will lead a screen of setting up the time 'FROM' and by clicking the 'ENTER' key once again the option 'TO' will be displayed. To set those times use the '+' and '-' buttons.
- Clicking Down Cursor button leads to the next action.

Table 10: Alarm Time Possible Actions

Alarm	Message	From (HH:MM)	To (HH:MM)
Silo A Failure	SILO A FAIL		
Silo B Failure	SILO B FAIL		
Auger Female Overrun	AUGER F OVR		
Auger Male Overrun	AUGER M OVR		
Low Limit Silo A	LOW FEED A		
Low Limit Silo B	LOW FEED B		

5.3 History

This choice serves as a history diary. Note that this information cannot be changed in this option.

- Press the 'MENU' key on board, and select 'HISTORY' by pressing the Right Cursor key
- Male / Female Consumption
- Silo Inventory
- Water Consumption
- Male / Female Mortality
- Male / Female Weights
- Alarms
- Last Batch

5.3.1 Male / Female Consumption

A summary of day number (= 'DAY'), consumption (= 'CON.') and accumulation - addition of all days including today (= 'ACC.') is shown on the screen.

5.3.2 Silo Inventory

A summary including day number (= 'DAY'), amount of food in silo A (= 'SILO-A') and amount of food in silo B (= 'SILO-B').

5.3.3 Water Consumption

A summary consisting of day number (= 'DAY'), quantity (= 'QTY.'), accumulation - addition of all days including today (= 'ACC.') and percentage change from previous days (= '%GAIN'). Note that if no information is saved on the system the value of '%GAIN' will be 'N/A'.

5.3.4 Male / Female Mortality

A summary containing day number (=DAY'), number of mortalities per day (=DAILY'), accumulation - addition of all days including today (=ACC.!) and percentage of change (=%).

5.3.5 Male / Female Weights

A summary of bird scale including day number (=DAY'), average weights (=AVG.'), number of weights (=COUNT') and Standard deviation of all weights (=S.D.').

5.3.6 Alarms

A summary consisting of line number (=##'), alarm message displayed the same as it looked like the day it occurred (=MESSAGE') and the time the message has been displayed (=TIME').

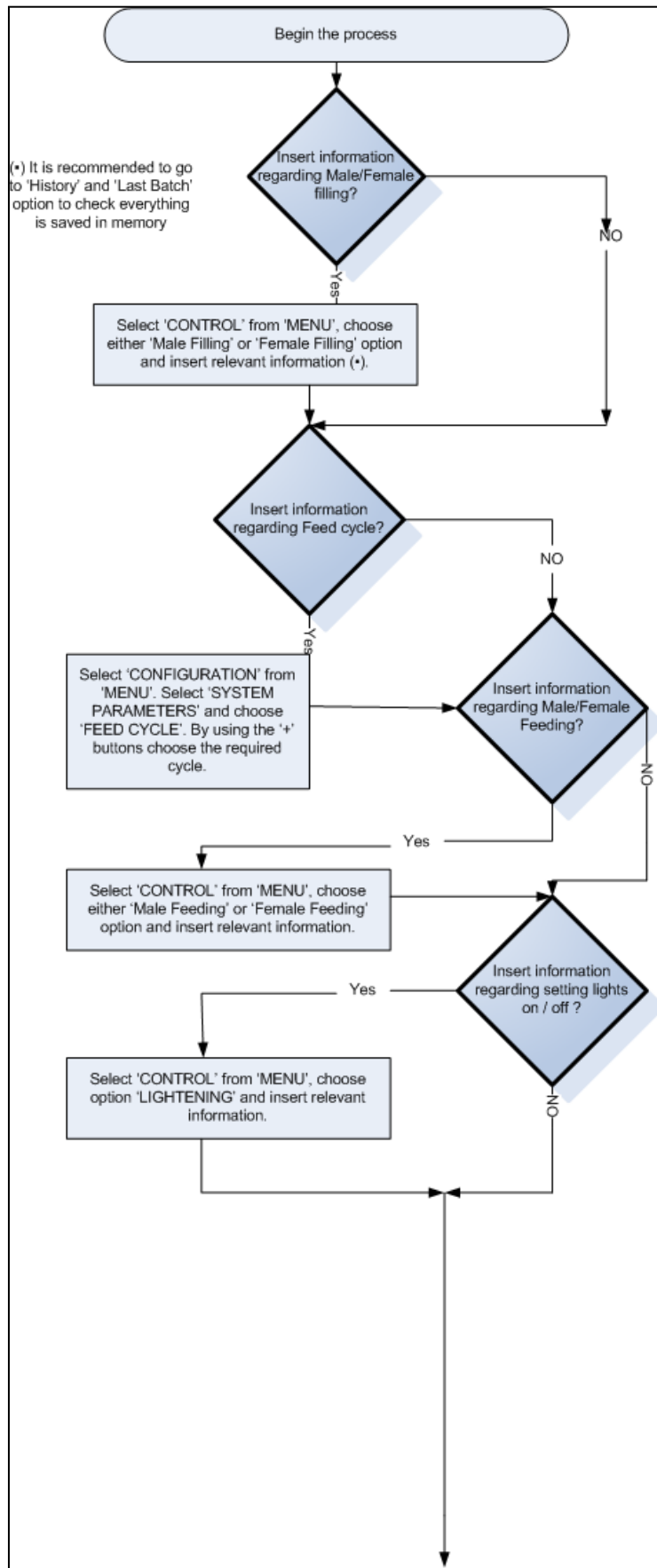
- Clicking the 'ENTER' button will lead to information regarding day number (=DAY').

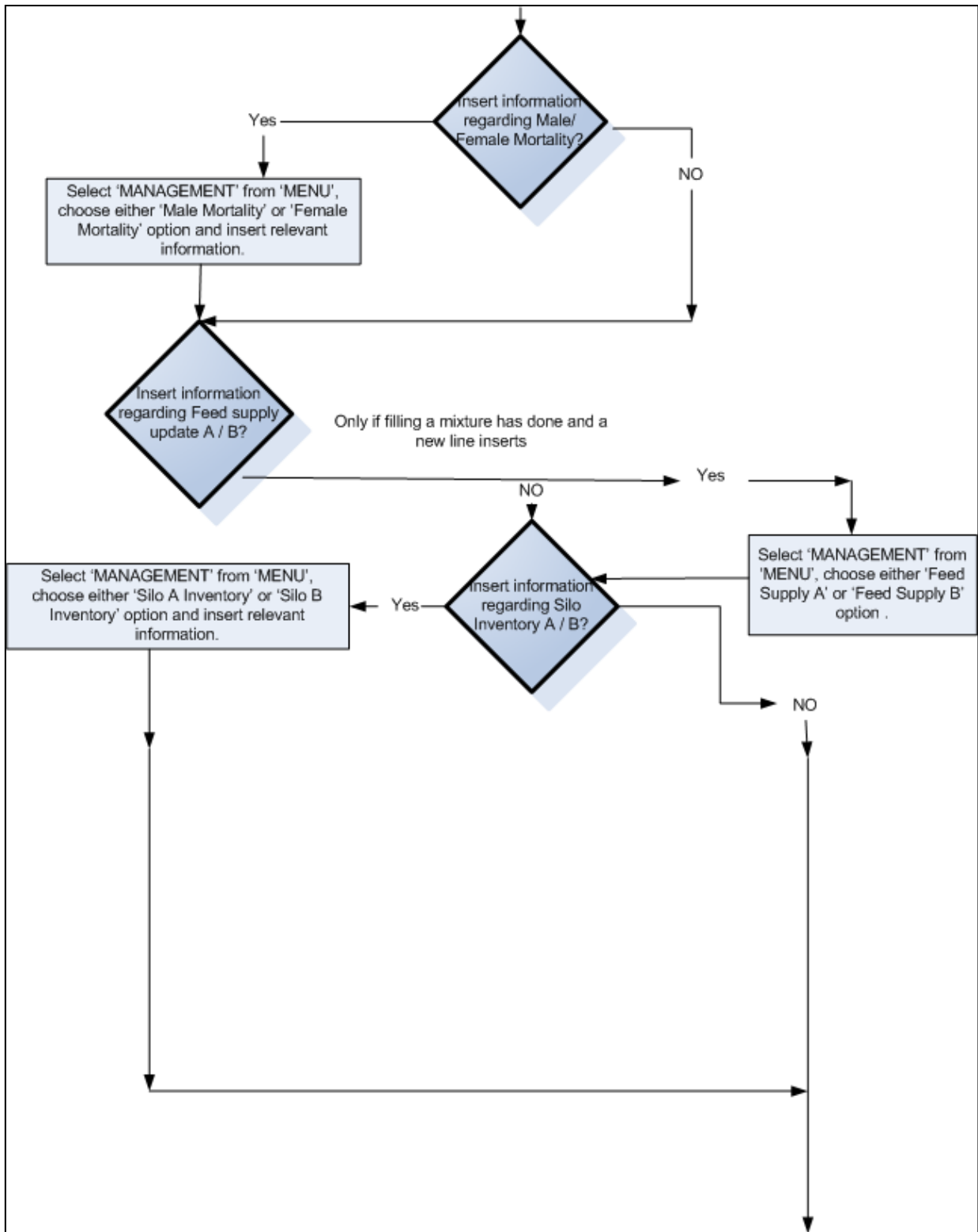
5.3.7 Last Batch

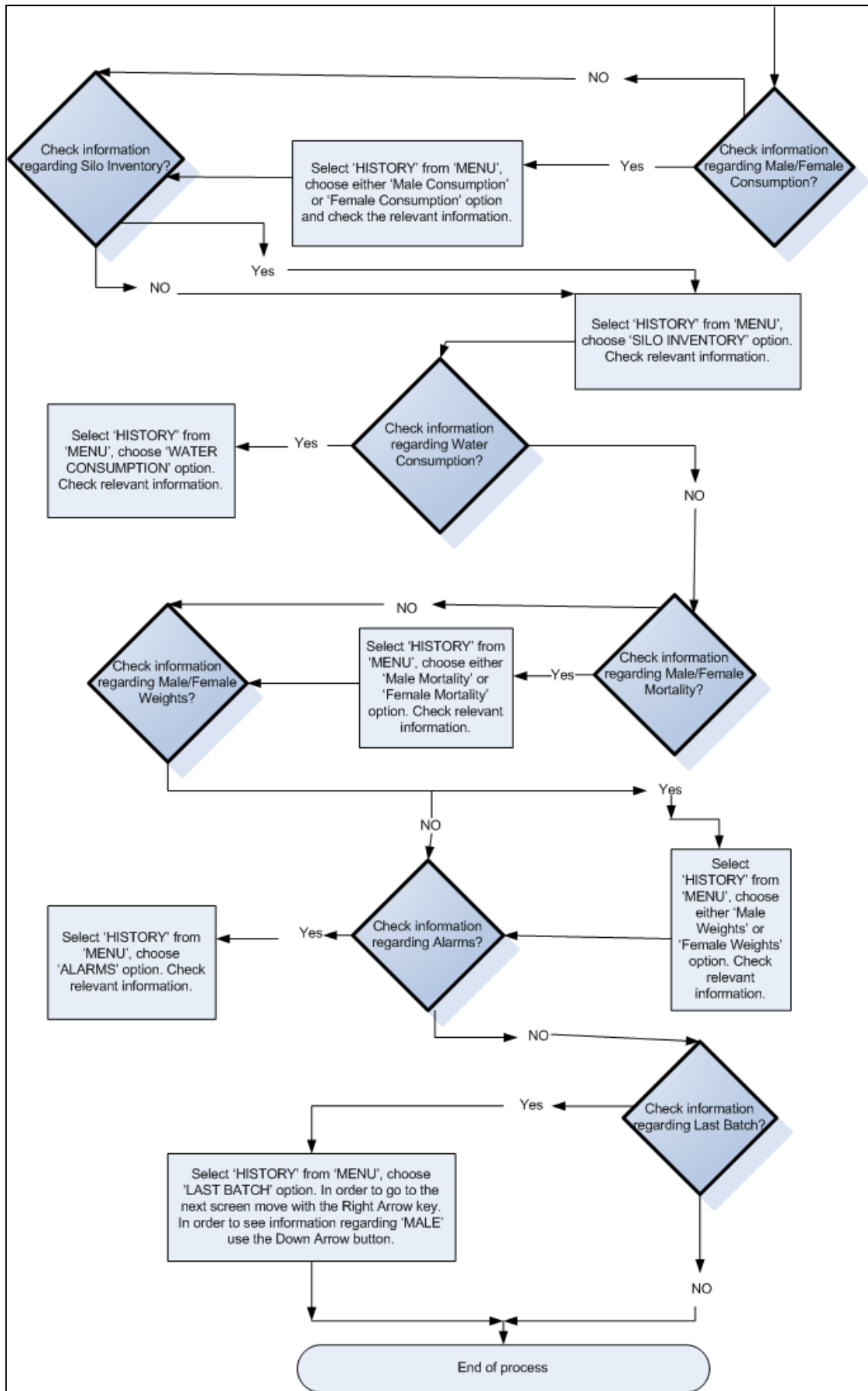
This option is usually done only once, at the when filling the hopper containers ends.

- A summary of how many hopper containers have been filled. The first screen displays information regarding the female poultry whereas using the Down Cursor key will lead the information regarding the male poultry. The screen shows only four hopper containers at a time. To reach the other four - use the Right Cursor button.

5.4 Flow Chart of Using the Controller







6 Specifications

Input Voltage Supply	Single phase: 110 VAC (USA & Canada)
	Single phase: 240 VAC (Outside the US & Canada)
	0.315 Amp, 50 - 60 Hz
Relays Outputs	5 Amp. Normally Open Relays
Alarm Output	NO and NC Pilot Duty
Operating Temperature Range	0° to +50° C (32° to 122° F)
Enclosure	Water and dust tight (IP55)
Fuses	Main Fuse: 0.315 Amps Slow, Relays Fuse: 5 Amps Slow

6.1 Environmental Protection



Recycle raw materials instead of disposing as waste. The controller, accessories and packaging should be sorted for environmental-friendly recycling. The plastic components are labeled for categorized recycling.

7 Installation

- Only an authorized electrician may install the RSW-2.
- To avoid exposing the RSW-2 to harmful gases or high humidity, install the unit in the service room.
- Installation Category (Over voltage Category) III
5 Amps circuit breaker should protect the power supply to the controller.

WARNING! POWER MUST BE DISCONNECTED TO AVOID ELECTRICAL SHOCK AND DAMAGE.

7.1 Installation Instructions

1. Open the enclosure lid by unfastening the two screws to the left-hand side in the front.
2. Place the required cables through the cable holders at the bottom of the unit. Connect the wires as seen in the wiring diagrams
3. The RSW-2 must be installed with RPLP-1 (power line protector) to have an EMI and lightning protection for the power input of the unit. In cases of noisy power lines, isolated transformer is required.
4. The units should be installed, not near high power lines (like auger power, variable speed, dimmers, etc.) or other noisy units. Keep at least 0.5-meter distance between the RSW-2 and the noise source.
5. The load cell cable carry mV so it must be a shielded cable grounded on the RSW-2 side. This cable also must not be close to source of noise like high power cables and the distance should be at least 0.5 meter.
6. Water pulse also should be a shielded cable grounded on one side and should be kept far from high power cables.
7. Close the RSW-2 enclosure lid carefully and tightly. Use RTV silicon or equivalent sealant to seal the cable holders.
8. After installation is completed, operate the **RSW-2** for a few hours and re-check for proper operation.

7.2 Wiring Diagrams

- RSW – RJB Wiring
- Powering the RSW/RSLC Units
- Wiring External Devices
- Communication Wiring

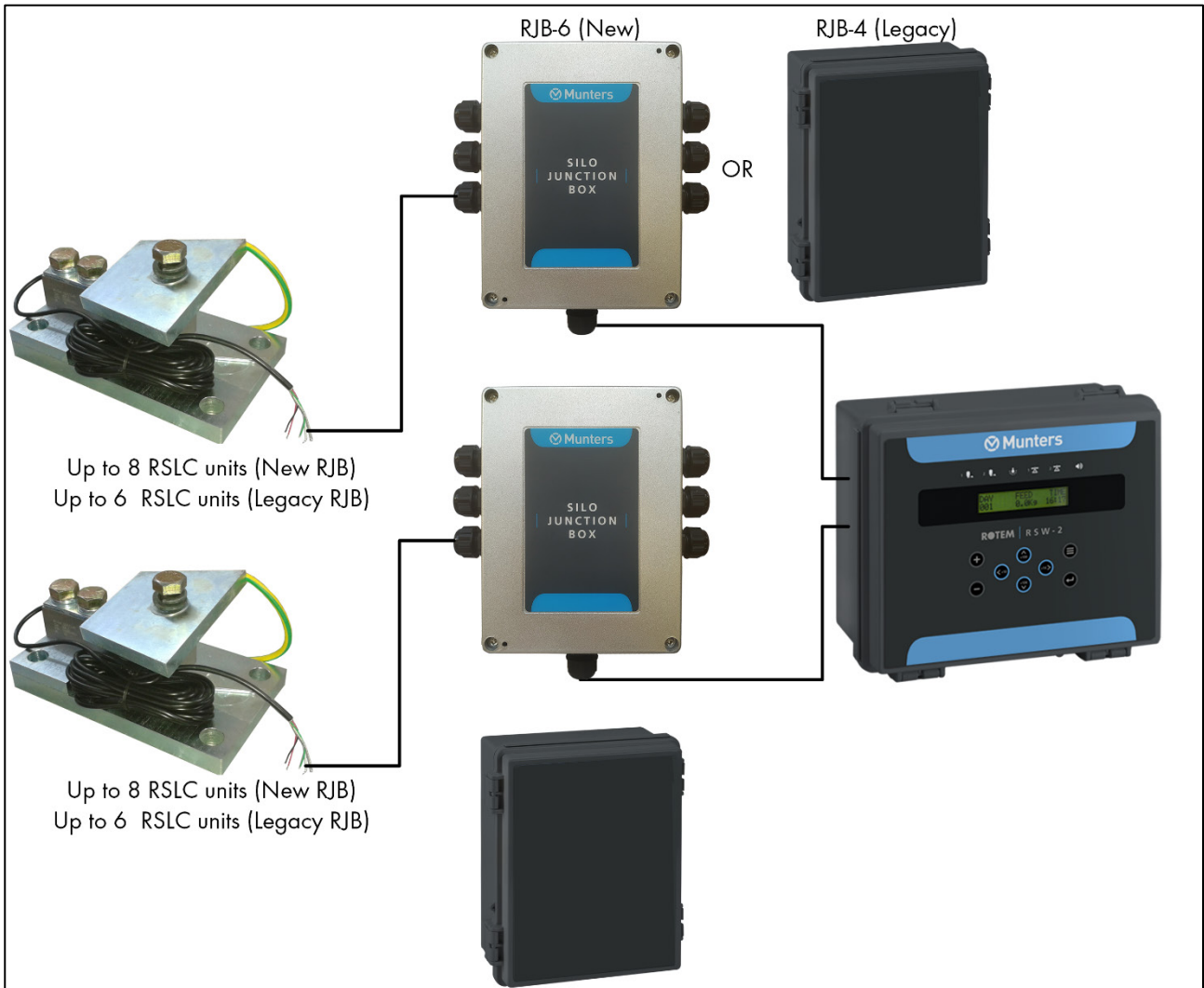


Figure 6: RSW – RJB – RSLC Block Diagrams

For details on the RJB – RSLC wiring, refer to the relevant manual.

7.2.1 RSW – RJB Wiring

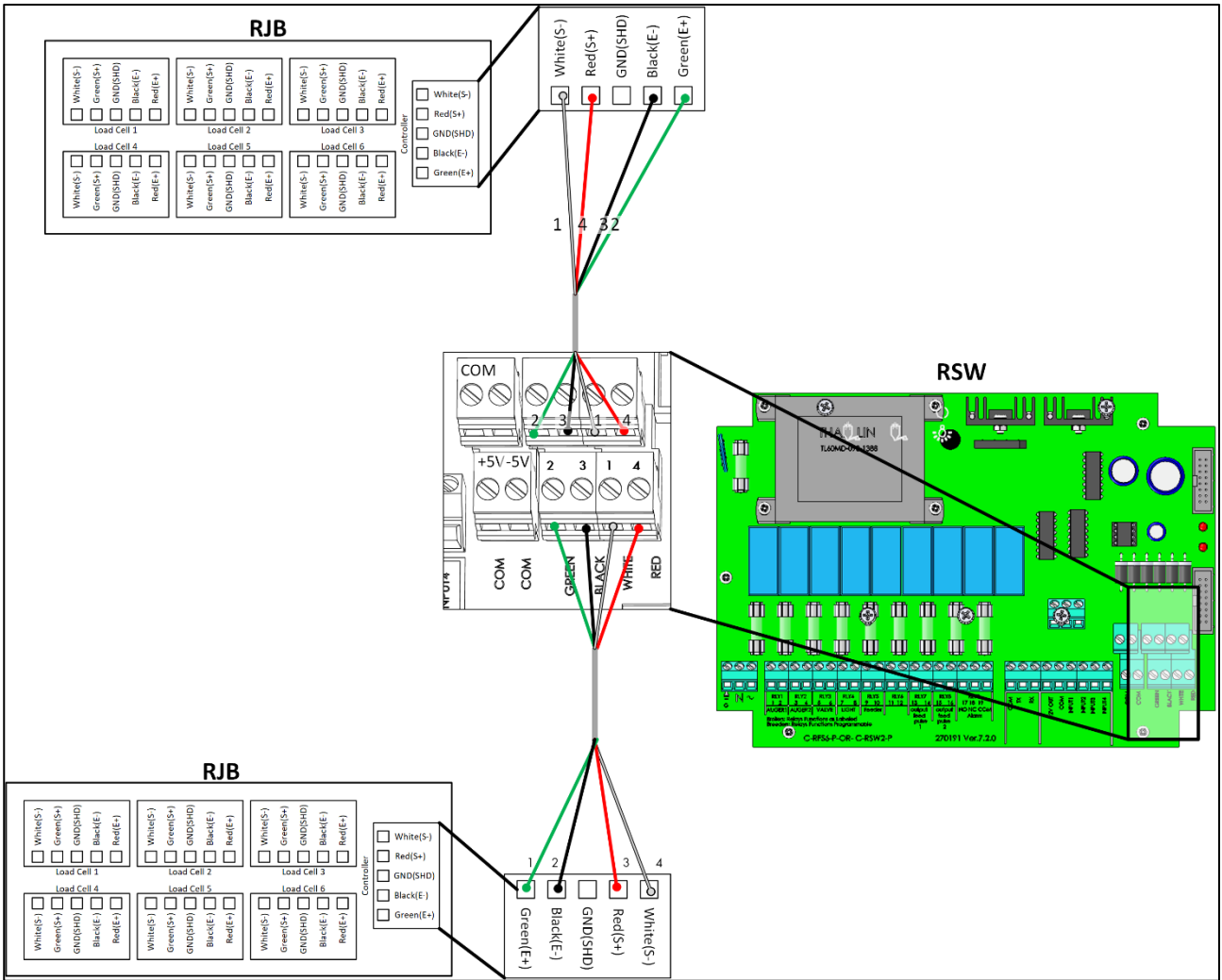


Figure 7: RSW-2 RJB Wiring Diagram

NOTE There can be up to 100 meters of the supplied black/gray cable between the RSW and the RJB.

Number	Wire
1	White
2	Green
3	Black
4	Red

7.2.2 Powering the RSW/RSLC Units

- The RSW-2 input power is 110 or 240 VAC.
- RSLC:
 - The RSW-2 can power up to six (6) RSLC units internally (Figure 8).
 - When seven (7) or eight (8) RSLC units are connected an RSW-2/RJB, an **additional** external power source (SILO-PS) is required (Figure 10).
- In both cases, jumpers must be set correctly (Figure 9 and Figure 11).

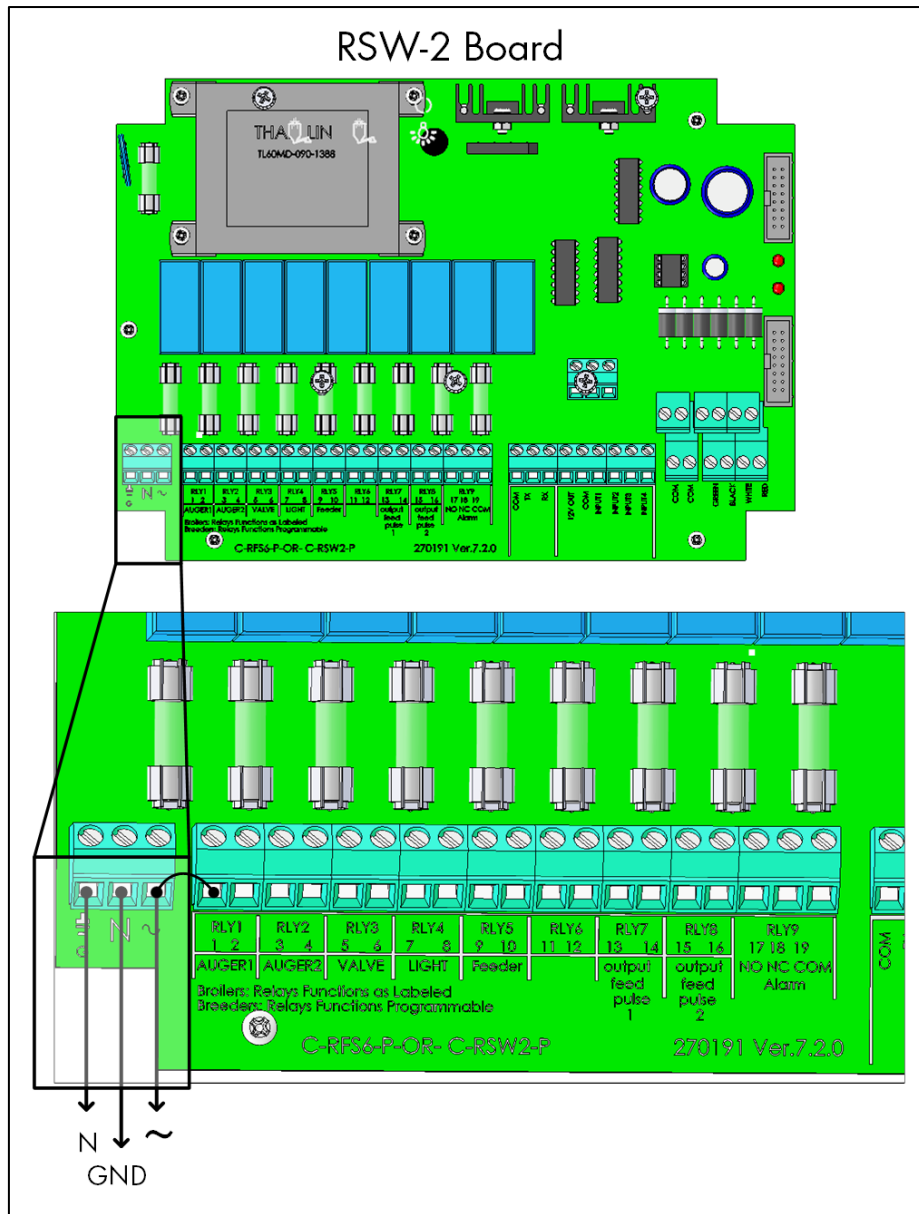


Figure 8: Internal Power Supply Wiring Diagram

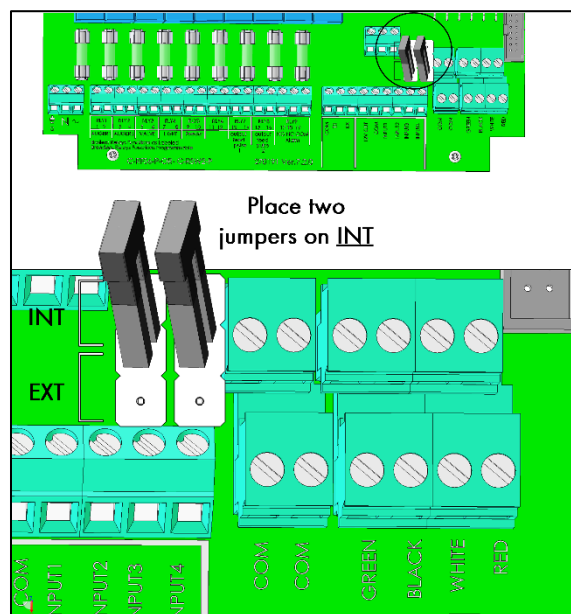


Figure 9: RSW-2 Jumpers set to Internal Power Supply

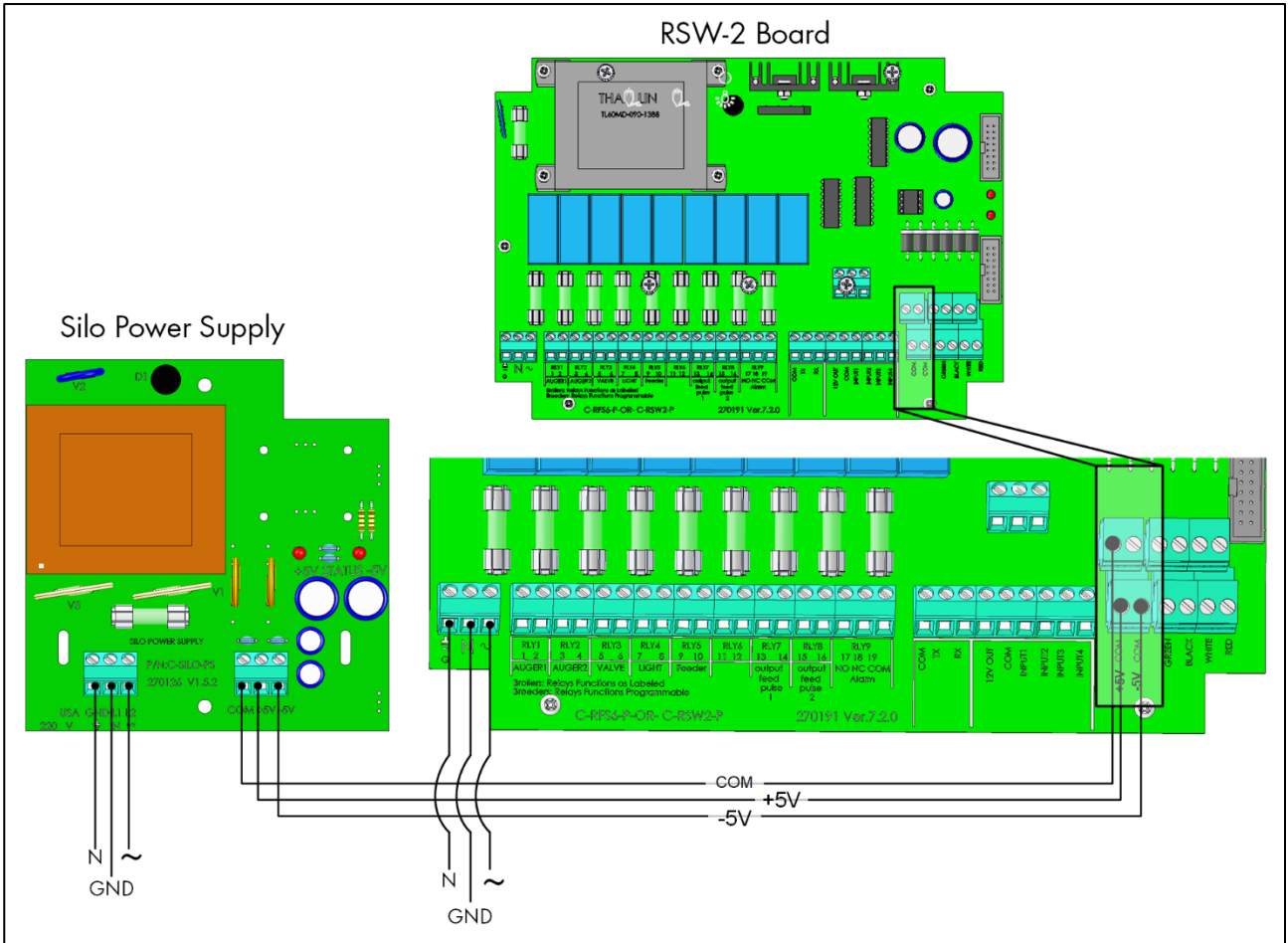


Figure 10: External Power Supply Wiring Diagram

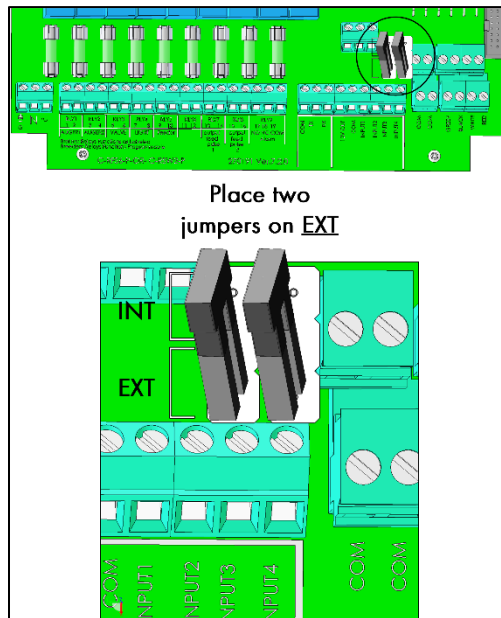


Figure 11: RSW-2 Jumpers set to External Power Supply)

7.2.3 Wiring External Devices

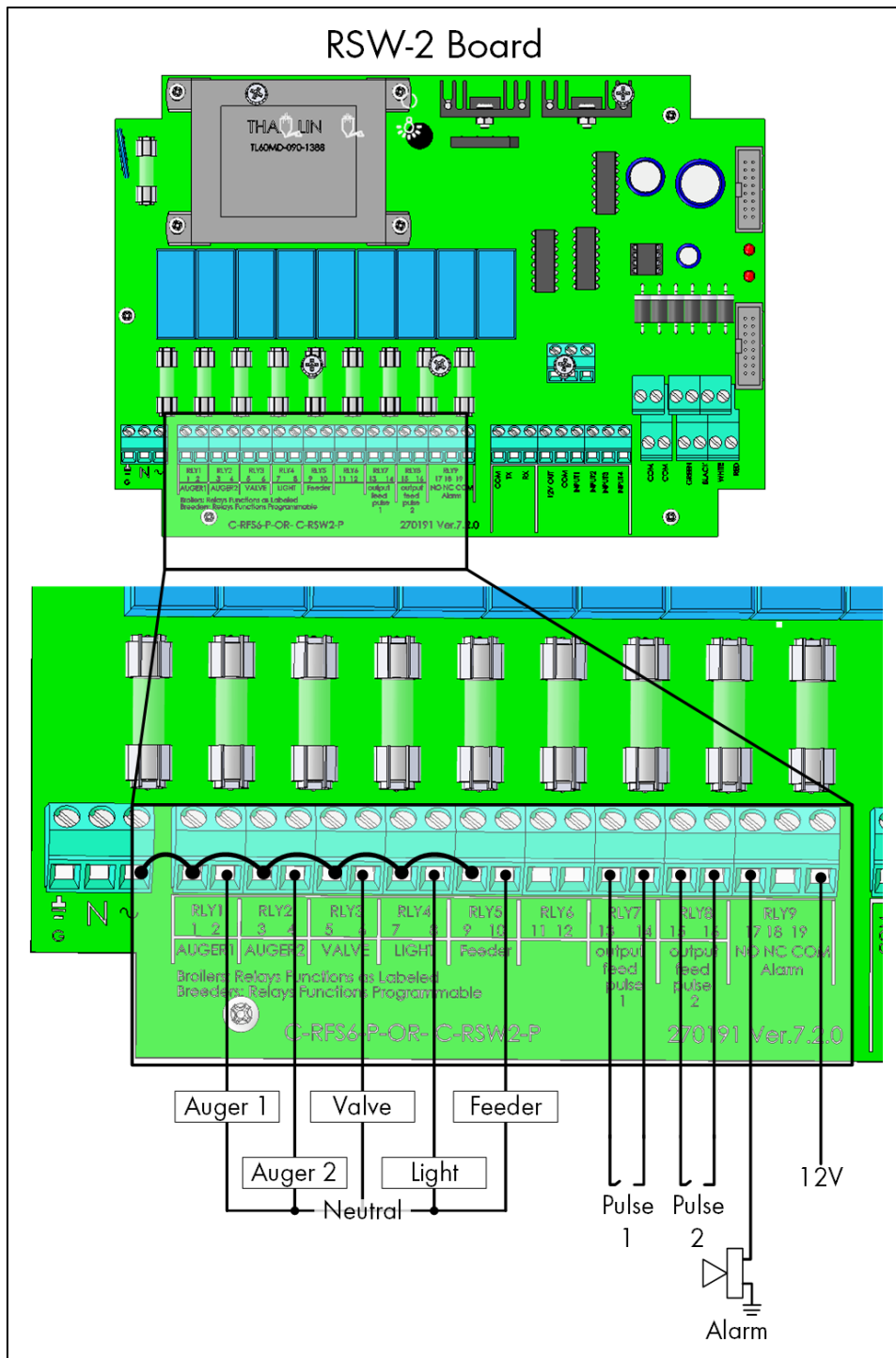


Figure 12: Relay Devices

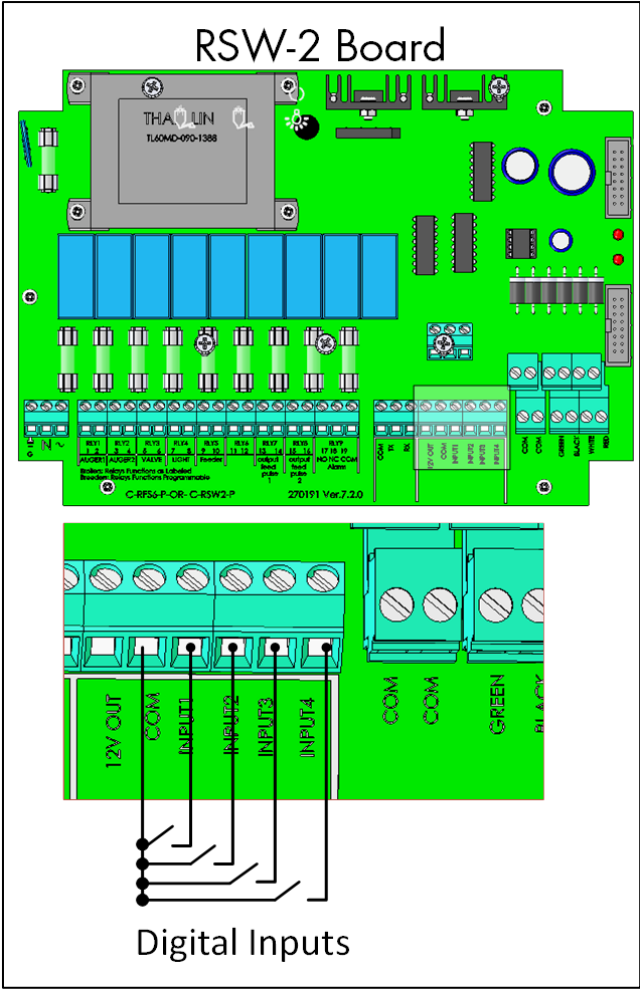


Figure 13: Digital Devices

7.2.4 Communication Wiring

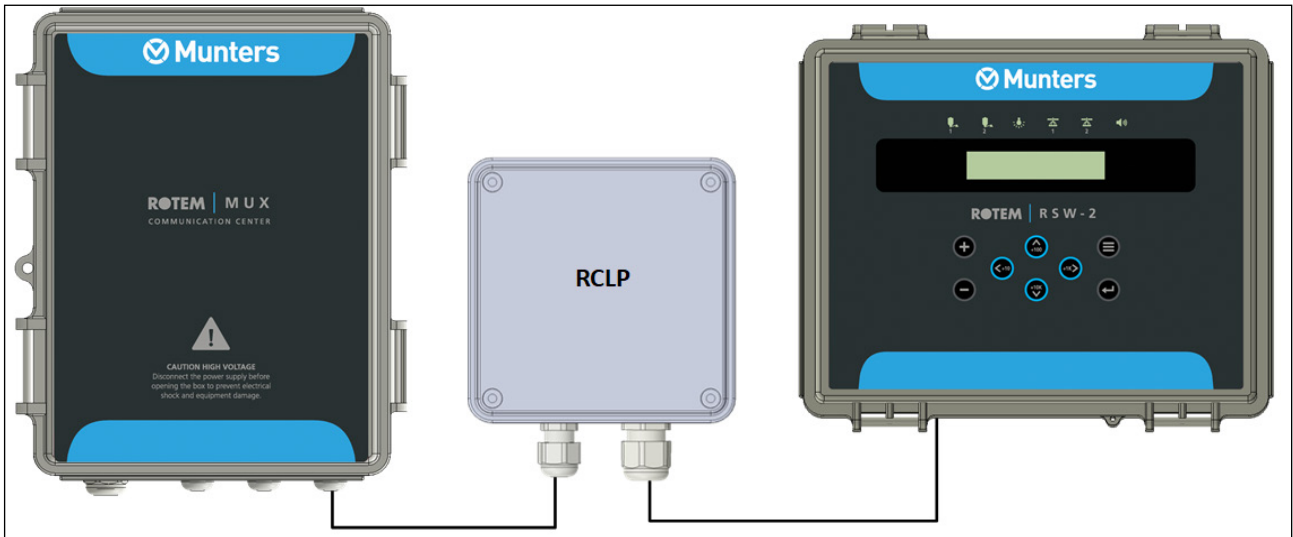


Figure 14: RSW-2 Communication Block Diagram

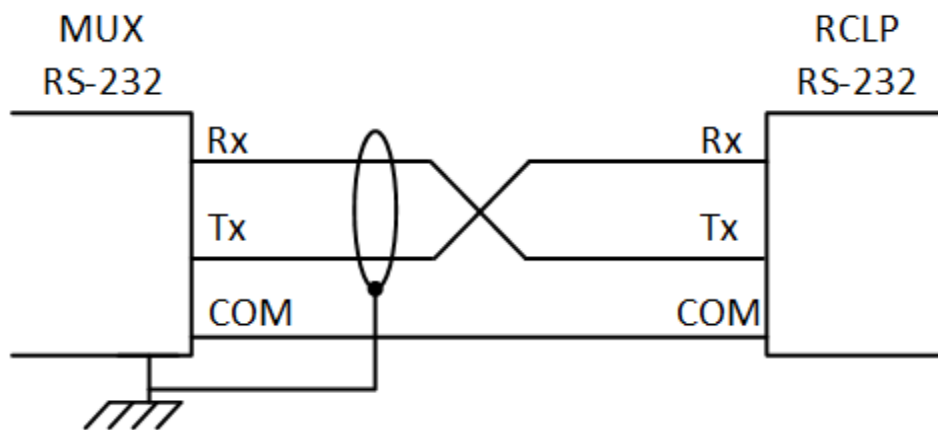


Figure 15: MUX to RCLP Wiring Diagram

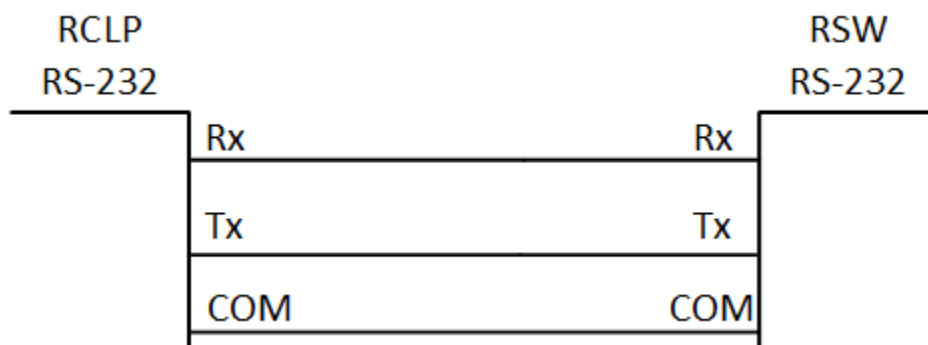


Figure 16: RCLP to RSW-2 Wiring Diagram

- Notes:
 - Connect the cable shields only at one end only of every section of the MUX-232 cable, as illustrated and in each house.
 - Cross wire once only!
 - Refer to the MUX manual and RCLP manual for details on installing those units.

8 Troubleshooting

#	Problem Description	Troubleshooting
1	Installation and filling feed has been done but silo stops weighing.	<p>If the display of Silo 1 does not show A/D '65536' counts on 16 bits, lower the offset (see the RJB/RSLC manual for further explanation) until this number changes. After receiving numbers shown on the screen, reducing the numbers should be done according to:</p> <ul style="list-style-type: none"> • [65536 - (number of Kg missing in the silo * Silo 1 Scale Factor)] <p>After reinstalling and emptying the silo, the A/D reading should be around 1000 counts (near zero); use the offset feature to get it. If the display shows '0', increase it by using offset feature.</p>
2	The controller display shows "disconnected" (or Error) and the test menu shows 65,536 or 0 rather than a voltage measurement that is required to identify the error.	<ol style="list-style-type: none"> 1. Check if RJB-4 receives voltage from controller (green and black wires from controller should be approximately 10 DCV). If it is not receiving, check wire connections on the controller's side. 2. Check load cells (see the RJB/RSLC manual for further explanation). Take White and Green wires from each load cell and check their voltage using a digital multi meter (the amount is not important, but it must be identical throughout load cells with a difference of up to 2 mV). If difference is more than 2 mV there is a problem with one of the load cells. The range of voltage should be between 0 to 20 mV depending on the silo load. 3. In some cases, when the prior test is not effective and voltage between Black (common) wire and White, and between Black and Green, wires must be checked (amount of voltage must be between 4-4.5V and identical throughout load cells).

9 Warranty

Warranty and technical assistance

Munters products are designed and built to provide reliable and satisfactory performance but cannot be guaranteed free of faults; although they are reliable products they can develop unforeseeable defects and the user must take this into account and arrange adequate emergency or alarm systems if failure to operate could cause damage to the articles for which the Munters plant was required: if this is not done, the user is fully responsible for the damage which they could suffer.

Munters extends this limited warranty to the first purchaser and guarantees its products to be free from defects originating in manufacture or materials for one year from the date of delivery, provided that suitable transport, storage, installation and maintenance terms are complied with. The warranty does not apply if the products have been repaired without express authorisation from Munters, or repaired in such a way that, in Munters' judgement, their performance and reliability have been impaired, or incorrectly installed, or subjected to improper use. The user accepts total responsibility for incorrect use of the products.

The warranty on products from outside suppliers fitted to RSW-2, (for example RSW-2's, sensors, cables, etc.) is limited to the conditions stated by the supplier: all claims must be made in writing within eight days of the discovery of the defect and within 12 months of the delivery of the defective product. Munters has thirty days from the date of receipt in which to take action, and has the right to examine the product at the customer's premises or at its own plant (carriage cost to be borne by the customer).

Munters at its sole discretion has the option of replacing or repairing, free of charge, products which it considers defective, and will arrange for their despatch back to the customer carriage paid. In the case of faulty parts of small commercial value which are widely available (such as bolts, etc.) for urgent despatch, where the cost of carriage would exceed the value of the parts, Munters may authorise the customer exclusively to purchase the replacement parts locally; Munters will reimburse the value of the product at its cost price.

Munters will not be liable for costs incurred in demounting the defective part, or the time required to travel to site and the associated travel costs. No agent, employee or dealer is authorised to give any further guarantees or to accept any other liability on Munters' behalf in connection with other Munters products, except in writing with the signature of one of the Company's Managers.

WARNING: *In the interests of improving the quality of its products and services, Munters reserves the right at any time and without prior notice to alter the specifications in this manual.*

The liability of the manufacturer Munters ceases in the event of:

- dismantling the safety devices;
- use of unauthorised materials;
- inadequate maintenance;
- use of non-original spare parts and accessories.

Barring specific contractual terms, the following are directly at the user's expense:

- preparing installation sites;
- providing an electricity supply (including the protective equipotential bonding (PE) conductor, in accordance with CEI EN 60204-1, paragraph 8.2), for correctly connecting the equipment to the mains electricity supply;
- providing ancillary services appropriate to the requirements of the plant on the basis of the information supplied with regard to installation;
- tools and consumables required for fitting and installation;
- lubricants necessary for commissioning and maintenance.

It is mandatory to purchase and use only original spare parts or those recommended by the manufacturer.

Dismantling and assembly must be performed by qualified technicians and according to the manufacturer's instructions.

The use of non-original spare parts or incorrect assembly exonerates the manufacturer from all liability.

Requests for technical assistance and spare parts can be made directly to the nearest [Munters office](#).

