

Manual for use and maintenance

RFS-6 – Breeder Edition



RFS-6 Breeder Edition

Poultry Feed Control

RFS-6 Breeder Edition

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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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Index

<i>Chapter</i>		<i>page</i>
1	INTRODUCTION	5
1.1	Disclaimer	5
1.2	Introduction	5
1.3	Notes	5
2	SAFETY ASPECTS	6
2.1	Grounding	6
2.2	Checking the battery level	6
3	INTRODUCTION TO THE RFS-6 BREEDER	7
3.1	Computer Software	7
3.2	Display	7
3.3	Control menu	7
3.4	Male filling	8
3.5	Keypad keys	8
3.6	Main menu	9
4	SYSTEM DESCRIPTION	10
4.1	Auger 1 (F, M, MF)	12
4.2	Auger 2 (F, M, MF)	12
4.3	Valve (F, M, MF)	12
4.4	Hopper valve outputs	12
4.5	Line outputs (F, M, MF)	12
4.6	Feed pulse	12
4.7	Light	12
5	CONTROL MENU	13
5.1	Male/female filling	13
5.2	Male/female feeding	13
5.3	Skip a day	13
5.4	Lighting	14
5.5	Stop/resume	14
6	MANAGEMENT MENU	15
6.1	Mortality, initial counts, feed silo	15
6.1.1	Time update, growth day and new flock	15

6.1.2 Alarm reset and times	16
6.2 History	16
6.2.1 Feed and water consumption	16
6.2.2 Mortality and alarms	16
7 TEST MENU	17
7.1 Relays	17
7.2 Scales	17
7.3 Digital inputs	17
7.4 Water pulse	17
7.5 Process	17
8 CALIBRATION MENU	19
8.1 Standard weight calibration	19
8.2 Scale factor calibration	19
9 CONFIGURATION MENU	20
9.1 Variables	20
9.2 Relay functions	24
9.3 Poultry curve	24
9.4 Software version	25
9.5 Communication test	25
9.6 Hidden parameters	25
9.7 Relays display	25
9.8 Feed scheme	26
9.9 Pulse output	27
9.9.1 Feed Pulse 1 output	27
9.9.2 Scales	27
10 SPECIFICATIONS	28
10.1 Environmental protection	28
11 INSTALLATION	29
11.1 Cold Start	31
11.2 Feed Scale container dimensions	31
11.3 Feed Scale Container components and assembly	31
12 WARRANTY	33

1 Introduction

1.1 Disclaimer

Munters reserves the right to make alterations to specifications, quantities, dimensions etc. for production or other reasons, subsequent to publication. The information contained herein has been prepared by qualified experts within Munters. While we believe the information is accurate and complete, we make no warranty or representation for any particular purposes. The information is offered in good faith and with the understanding that any use of the units or accessories in breach of the directions and warnings in this document is at the sole discretion and risk of the user.

1.2 Introduction

Congratulations on your excellent choice of purchasing an RFS-6 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 fan, 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 2010

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

- 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 RFS-6 Breeder

The Munters RFS-6 Breeder is a precision Male/Female poultry feed control system. It includes feed and bird scales enabling the grower to precisely control feed delivery and weigh the results. The **RFS-6 Breeder** accepts feed from two feed sources, and delivers feed to two different feed systems with up to six feed lines each. It delivers feed by meal time or continuous full feeding.

The feed mix is made with Auger 1A relay and Auger 1B relay, each relay delivers feed from a different silo. There are two mixing tables, one for males and one for females. The table has a growth day and percentage of feed 1 and 2. Refer to Figure 1.

#	Day	%1	%2
---	-----	----	----

Figure 1: Male/Female Mixing Tables

To alter the percentage value, change field values in field “%2” as seen in Figure 1 above.

3.1 Computer Software

To manage the controller via a personal computer, install NetVision Version 2.2.52. Contact your dealer to obtain the software.

3.2 Display

The **RFS-6 Breeder** default view displays the current time, delivered feed for today and target, as shown here. When an **alarm** is triggered, the screen alternately displays the alarm message and the standard display. The display is switched between male and female data. Refer to Figure 2.

Suppl.	Female/Male	TARGET
0.0	00:00	0.0

Figure 2: Default View

The **RFS-6 Breeder** default view displays the current time, delivered feed for today and target, as shown in Figure 2. When an **alarm** is triggered, the screen alternately displays the alarm message and the standard display. The display is switched between male and female data. Refer to Figure 1.

3.3 Control menu

Press **MENU** to recall the control menu. When you press **MENU** again, the default view reappears. Refer to Figure 3.

CONTROL
1. MALE FILLING

Figure 3: Control Menu

3.4 Male filling

The first item on the control menu is the male feeding quantity.

- Push the **ENTER** key to select the male feeding quantity. Press the **MENU** key to return to the preceding screen.

NOTE The blinking line beneath the hour digit indicates the location of the cursor, and marks the point at which you can make changes. Refer to Figure 4.

#	START	ON	STATUS
1	0 <u>0</u> :00	0	TOMORROW

Figure 4: Male Filling Menu

The Main Menu structure displays the entire menu structure for the **RFS-6 Breeder**. Refer to Table 2. After pushing **MENU** to navigate to the Female Filling entry under the Control Menu, use the directional arrow keys to move to any other entry, and press **ENTER** to display that item. While in the main menu, the **RFS-6 Breeder** keeps the column headings in the top line of the display.

3.5 Keypad keys

The RFS-6 Breeder keypad consists of eight keys, and is described in Table 1.

Table 1: Keypad Keys Description

Key	Description
MENU	Backs the RFS-6 Breeder out of menus
ENTER	Selects or moves the RFS-6 Breeder into menu items, or confirms editing changes.
+ (Plus)	Increments values. The rate at which values increase changes as the keys are depressed. You can increase values by holding the + key and depressing (or holding) on one of the arrow keys. Every arrow has its own factor which multiplies the addition to the value.
- (Minus)	Decrements values. The rate at which values decrease changes as the keys are depressed. You can decrease values by holding the - key and depressing (or holding) on one of the arrow keys. Every arrow has its own factor which multiplies the addition to the value.
◀ (Left)	Moves to the left in all the screens and tables. When there are several entries on a screen, the cursor alone may move. Whenever necessary, the entire screen moves. Multiplies x 10.
▲ (Up)	Moves up menus and tables. Multiplies x 100.
▶ (Right)	Moves to the right in all the screens and tables. When there are several entries on a screen, the cursor alone may move. Whenever necessary, the entire screen moves. Multiplies x 1000 (1K).
▼ (Down)	Moves down menus and tables. Multiplies x 10,000 (10K).

NOTE The RFS-6 Breeder does not accept changes until you confirm them by pressing **Enter**.

3.6 Main menu

Table 2 displays the complete RFS-6 Breeder main menu structure.

Table 2: RFS-6 Breeder Main Menu Structure

Control	Management	History	Test	Calibration	Configuration
Male Filling	Male Mortality	Male Consump.*	Relays	Feed Scale	System parameters
Female Filling	Female Mortality	Female Consump.*	Feed Scale	Bird Scale	Relay Function
Skip a Day	Male Inventory	Water Consumption	Poultry Scale	Feed Factor	Poultry Curve
Male Feeding	Female Inventory	Male Mortality	Digital Inputs	Bird Scale Factor	
Female Feeding	Male Feed Silo	Female Mortality	Water Pulse	Modem Setting **	
Lighting	Female Feed Silo	Male Weights			
Stop / Resume	Silo Inventory	Female Weights			
	Time/Date	Alarms			
	Growth Day				
	New Flock				
	Alarm Reset				
	Alarm Time				

* Consumption

** Inactive

4 System description

The RFS-6 Breeder handles up to two different feed sources for male, female and also an option for joint Male/Female feeding. These are displayed as silos in Figure 5. Auger-1M, and Auger-1F convey feed from the silos to the weigh bin.

- After weighing the feed, Valve-M, or Valve-F releases the feed into the fill system for delivery by Auger-2M, or Auger 2-F to the appropriate feed hoppers. Figure 5 displays the male feed system only; the female and combined male/female feed systems are identical.
- Once the feed hoppers are filled, the line outputs deliver the feed to the intended flock.
- Any RFS-6 Breeder feed output can be reprogrammed for male, female, or combined male/female. Every relay can be configured as any output function.
- Besides controlling feed, the RFS-6 Breeder can:
 - Connect to a bird scale that can weigh the males and females separately
 - Monitor flock water consumption

Since all the **RFS-6 Breeder** relays can perform any output function, you can switch the units 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.

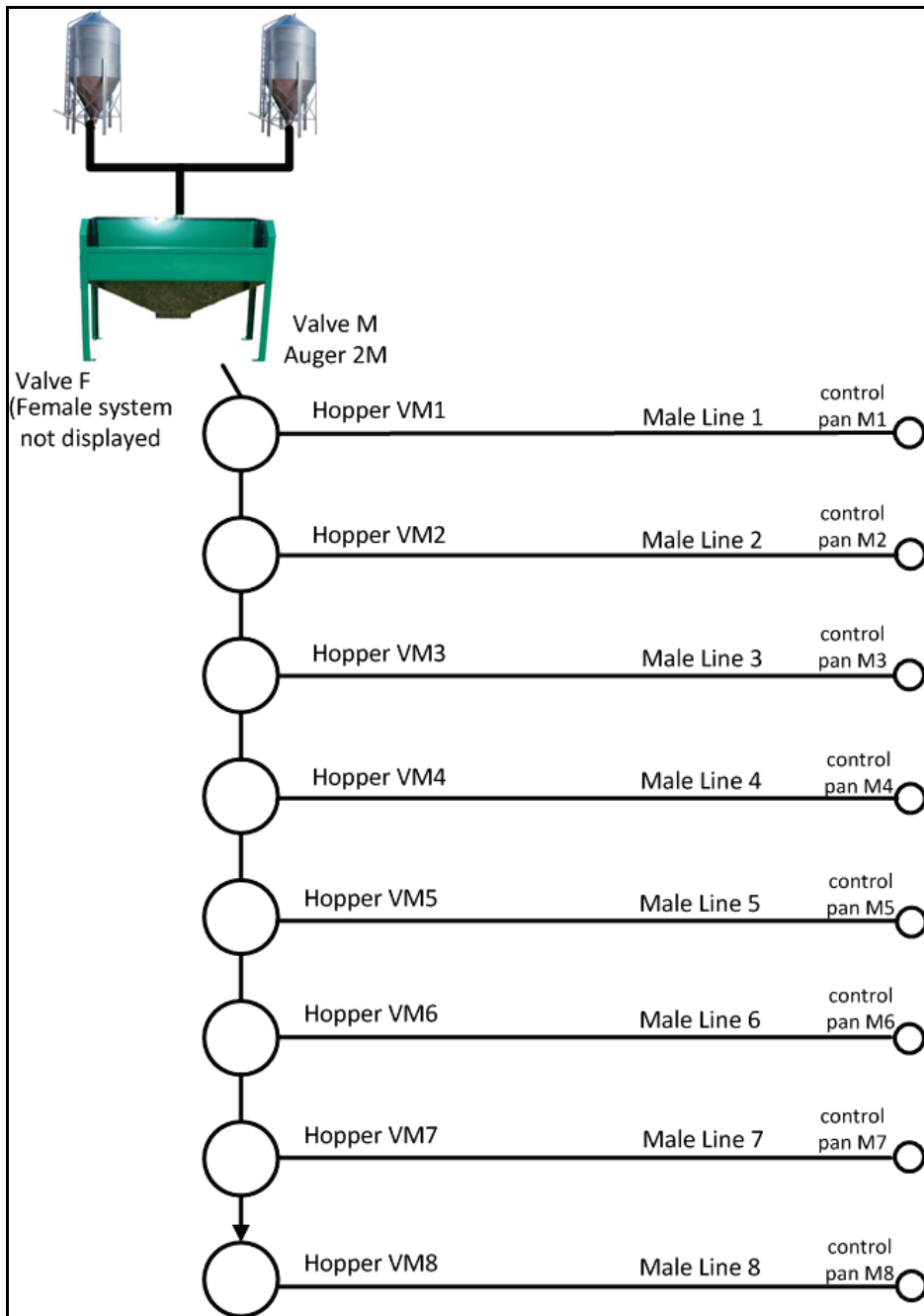


Figure 5: Schematic Feed Diagram

The following section describes the:

- Auger 1 (F, M, MF)
- Auger 2 (F, M, MF)
- Valve (F, M, MF)
- Hopper valve outputs
- Line outputs (F, M, MF)
- Feed pulse
- Light

4.1 Auger 1 (F, M, MF)

The Auger 1 outputs move feed from the main silos to the weighing bin via feed augers. Three designations F, M and MF refer to female, male and male/female. The **RFS-6 Breeder** accepts programming information such as meal and fill times only for the male and the female systems.

4.2 Auger 2 (F, M, MF)

The Auger 2F, Auger 2M and Auger 2MF outputs run feed delivery devices from the fill system to the line hoppers. The line hoppers hold the feed until meal times.

4.3 Valve (F, M, MF)

The Valve-F, Valve-M and Valve-MF outputs control feed distribution to the female or male, and combined male/female lines. The valves coordinate with the corresponding Auger-2 outputs.

4.4 Hopper valve outputs

The Hopper Valve Outputs enable the **RFS-6 Breeder** to divide the meal quantities into up to six individual lines for each of the F, M and MF choices. When entering the Male/Female Percent quantities, the highest group does 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 percent feed table has entries for lines 1, 2 and 3 only.

Auger 1, the Weigh Bin, Fill System Valves, and Auger 2 run programmed sequences at the filling times. Make sure to time the filling sequences so that all the hoppers are filled prior to meal times. It is suggested to stagger the male and female fill times to prevent flock conflict at the weigh bin. The total time to assign for filling includes delays in hidden variables 3 and 4, system variable 2, the feed bin filling, and hopper emptying and weighing times.

4.5 Line outputs (F, M, MF)

All the lines for each group run simultaneously at the programmed meal times. Program the filling times to ensure that all the hoppers have feed for the meals. The extra meal times are for:

- Stimulation runs
- Old feed consumption

No feed in the hoppers for stimulation run

4.6 Feed pulse

The Feed Pulse option is used to provide close contact (short pulses) to activate an external feed counter.

4.7 Light

A light relay is connected to the lighting system to control flock light exposure according to a lighting table and desirable exposure.

5 Control menu

The Control Menu includes:

- Male/female filling
- Male/female feeding
- Skip a day
- Lighting
- Stop/resume

5.1 Male/female filling

The RFS-6 Breeder provides up to eight feed hopper filling times for males and females. You enter the time and quantity per hen, and the time and quantity per male, for each filling. Set the status column to TODAY. At the end of filling process the status is changed to SUPPLIED. The default value for the status is TOMORROW.

The ON time is for feeding lines activation. In the end of filling the hoppers the feeding lines operate ON time in minutes. Another way to activate the feeding lines is by the feeding table. Refer to Figure 6.

#	START	ON	STATUS	#	1	2	3	4	#	5	6	7	8
1	00:00	0	TOMORROW	1	0	0	0	0	1	0	0	0	0

Figure 6: Male/Female Filling

5.2 Male/female feeding

Enter up to ten time periods for the feed lines to run. These time periods may include brief stimulation runs between hopper fill times to ensure that the birds consume the older feed.

5.3 Skip a day

The Skip A Day feature enables you to skip feedings periods according to your schedule. The following are skip modes, which can be selected by variable 19 (see Table 5):

- **Skip by number of days:** The user interface asks for a number to skip. If 0 is selected, there is no day selected to skip. If 1 is selected, then there is one day skipped (no feeding) and one day for feeding. If 2 is selected, then two days are skipped (no feeding) and one day for feeding. The cycle begins at a feeding day, and 0 is the default setting.
- **Skip by day in the week:** The user interface displays in the upper line the weekday and the user selects the days to skip. No skipping is the default setting.

5.4 Lighting

The Lighting option controls the light periods for the flock. You can enter up to ten time periods for the lights to turn on and off.

5.5 Stop/resume

The Stop/Resume option enables you to stop all augers and feed lines instantly and then to resume to normal operation.

6 Management menu

The Management Menu includes:

- Mortality, initial counts, feed silo
- History

6.1 Mortality, initial counts, feed silo

You can maintain an accurate flock membership count by entering the counts for any losses to the flock in the "Add Mortality" line. The **RFS-6 Breeder** maintains the total for each day in the second line, and adjusts the total count. After entering the added quantity, the cursor advances to the "Daily Sum" line. You can also correct the daily count if necessary.

You can enter the total current flock count in the "Initial Female" or "Initial Male" entry line.

The **RFS-6 Breeder** maintains the current flock population count in the second line as "Update Female" or "Update male".

You can enter the amount of feed supplied to the silos which feed the female and male members with the date for historical purposes. The **RFS-6 Breeder** calculates the amount of feed present in the silo and generates an alarm if the amount of feed left is less than specified in system variables 5 and 6 in the Configuration menu (see Table 5).

The following are included in this section:

- Time update, growth day and new flock
- Alarm reset and times

6.1.1 Time update, growth day and new flock

- The **RFS-6 Breeder** maintains time in military 24-hour format. The internal battery (part number CR2450) maintains the correct time for up to three years of power outage.
- The **RFS-6 Breeder** maintains track of all significant data on a daily basis. The information is kept by growth day data.
- The New Flock entry causes the **RFS-6 Breeder** to erase history data and restarts the growth cycle over from the beginning.

6.1.2 Alarm reset and times

The Alarm Reset function turns off the alarm relay for current alarms to silence the alarm bell while you solve the alarm trigger issue. When a new alarm occurs, or the alarm reoccurs, the **RFS-6 Breeder** turns the alarm relay on again.

The **RFS-6 Breeder** provides individual alarm enable times. The alarms register but do not activate the alarm relay other than during the programmed times. You can, for example, disable selected alarms during sleeping hours. Table 3 describes the alarm codes.

Table 3: RFS-6 Breeder Alarm Codes

Alarm Code	Description
1	Scale 1 failure (feed scale)
2	Bird scale 2 failure
3	Weigh container overflow
4	Auger 1 time overrun
5	Female feed silo below low limit
6	Male feed silo below low limit
7	Memory failure (no disable option)
8	Power loss (message only)
9	Power restore (message only)

6.2 History

The history parameter enables you to monitor and record feed and water consumption, mortality rates and alarms.

The following are included in this section:

- Feed and water consumption
- Mortality and alarms

6.2.1 Feed and water consumption

The **RFS-6 Breeder** maintains a complete daily feed consumption record for the entire flock growth period by sex, as well as combined daily water consumption. You can view the data with these menu items, which displays daily and cumulative and change of information.

6.2.2 Mortality and alarms

The **RFS-6 Breeder** maintains a daily bird mortality count for both sexes. Each record displays the daily, cumulative and percent change from the initial number of male or female chicks.

The **RFS-6 Breeder** also maintains a record of the last 20 alarms. You can view the growth day, time and alarm code for each of these alarms.

7 Test menu

Test mode enables you to test various system controls and actions.

The following are included in this section:

- Relays
- Scales
- Digital inputs
- Water pulse
- Process

7.1 Relays

This option manually controls each relay.

To control manually each relay:

1. Use the left and right directional arrow keys to move the cursor to the desired relay number you wish to change.
2. Press the **ENTER** key to toggle the relay on and off.

*NOTE The **RFS-6 Breeder** does not operate automatically while in the Relay Test mode.*

7.2 Scales

The Scales menu item displays the internal machine numbers for the present feed 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 change to reflect current weigh bin weight.

7.3 Digital inputs

The digital inputs are available for sensor input. The display shows '0' for an open input, and '1' for a short to COM point.

If input 1 is shortened to COM, the valve is not opened.

7.4 Water pulse

You can view the present water meter count to check that it is performing as required. The water meter count increments for each unit of water measured by the water meter.

7.5 Process

Press both **Enter** and the Right directional arrow keys for several seconds while the **RFS-6 Breeder** is displaying the standard display to toggle the relay on and off.

The **RFS-6 Breeder** can display the current feed system operation state. This simplifies troubleshooting timing overlap errors, such as when a fill system has not completed before meal time start. The display shows the present stage that the fill system has reached. Refer to Table 4.

Table 4: Feed System Operation State

State	Description
Initial	Normal idle state, waiting for filling time
Stability	Delay for zero weight of empty weigh bin
Stability	Measure zero weight of empty weigh bin
Valve Off	Wait for valves to close
Zero	Check absolute zero
Filling	Turn on appropriate Auger 1
Filling	Monitor weight while filling weigh bin
Filling	Turn Auger 1 off, delay for weight check
Stability	Check stability of weigh bin with feed
Stability	Take final weight of weigh bin , update history
Emptying	Open appropriate fill system valve
Emptying	Check zero weight of weigh bin
Valve On	Check alarm conditions (overflow, timeout)
Auger2	Transport feed to line hoppers
Initial	Normal idle state, waiting for filling time
Stability	Delay for zero weight of empty weigh bin

8 Calibration menu

The following are described in this section:

- Standard weight calibration
- Scale factor calibration

8.1 Standard weight calibration

To calibrate a scale, use an accurate known weight of at least one pound or 454 grams. A weight of up to 50 pounds or 20 kilograms may be used. To obtain an inexpensive accurate weight, a 2 liter soda bottle (or equivalent) can be used. Weigh the calibration sample first on an accurate calibrated scale such as one used for trade in grocery stores.

Follow the instructions on the display to calibrate the scale.

NOTE To calibrate accurately, Munters recommends using 5 kilograms or more of a known weight.

8.2 Scale factor calibration

Munters calibrates each scale platform prior to shipment from the factory. Instead of using an accurate known weight, you can enter the calibration number from the scale.

NOTE Every scale has its own calibration number. Do not use the calibration number from one scale to calibrate another one.

9 Configuration menu

The following are included in this section:

- Variables
- Relay functions
- Poultry curve
- Software version
- Communication test
- Cold Start
- Hidden parameters
- Relays display

9.1 Variables

Table 5 lists a description of alarm codes, their variables and default values. Table 6 gives a detailed description of the RFS-6 Breeder configuration variables.

Table 5: RFS-6 Breeder Configuration Variables

Alarm Code	Description	Default
1	Feed container maximum portion (kg / lbs.)	25 kg
2	Auger 2 run time (seconds)	180 seconds
3	Auger 1 maximum run time (minutes)	5 minutes
4	Feed container not empty maximum time (minutes)	30 minutes
5	Female silo low limit (kg / lbs.)	0
6	Male silo low limit (kg / lbs.)	0
7	Output # 1 - feed per pulse ratio	5 kg
8	Water input - water per pulse ratio	0.000
9	Operating mode: <ul style="list-style-type: none">• 0 - Automatic• 1 - Manual	0
10	Female average weight (kg / lbs.)	0.039 kg
11	Male average weight (kg / lbs.)	0.045
12	Female range above reference (%)	30
13	Female range below reference (%)	30
14	Male range above reference (%)	30

Alarm Code	Description	Default
15	Male range below reference (%)	10
16	Midnight time (0 = 24:00)	0
17	Valve Modes: <ul style="list-style-type: none"> 0 - Open the last hopper valve first and then the last hopper valve and the one before, etc. 1 - Open hopper valves one by one. 	0
18	Skip Mode: <ul style="list-style-type: none"> 0 - Skip a day's menu 1 - Skip by days of the week 	0
19	From time: Start time for birds weighing.	0
20	To time: Stop time for birds weighing.	24
21	Unit number for Communication	0
22	Password for remote access	0
23	Communication baud rate	9600
24	Weight system unit of measure: kg / lbs.	kg
25	Date Format: USA / Europe	USA
26	Sex weight mode: <ul style="list-style-type: none"> 1 - All birds in average 0 - Male / female distinction 	0
27	Weight auto-correction: <ul style="list-style-type: none"> 1 - Enable 0 - Disable 	1
28	Flock number	1
29	Travel time between hoppers (seconds). To add to Auger 2 run time to the next hopper. Auger 2 run time = Variable 2 + Variable 29 *(n-1), where n is the hopper number.	20 seconds

Table 6: RFS-6 Breeder Alarm Code Detailed Descriptions

Alarm Code	Detailed Description
1	The feed container default setting of 25 kg is the maximum weight for one portion.
2	Auger 2 run time default setting is 180 seconds. This is the calculated running time of Auger 2 until empty of feed.
3	Auger 1 maximum run time default setting of 5 minutes for the alarm to be triggered when Auger 1 is not filling the intermediate container with the designated feed portion (See Alarm Code 4).

Alarm Code	Detailed Description
4	The delay time default setting is 1 hour (60 minutes) while emptying in case intermediate container is not completely empty. After the delay time the system continues to the next step (close the system valve and start to fill).
5	The female feed silo low limit default setting is 0. If the remaining quantity of feed in the female feed silo is at the set low mark, Alarm 5 is triggered.
6	The male feed silo low limit default setting is 0. If the remaining quantity of feed in the male feed silo is at the set low mark, Alarm 6 is triggered
7	The feed pulse default setting is 10 kg. This is the relation between the feed quantity and the number of pulses at the output feed / pulse 1.
8	The water/pulse default setting is 0.000. This is defined as the relation between the water quantity and the number of pulses at the input water/pulse ratio.
9	The operating mode default setting is 0 (automatic). Automatic for normal operation. In 1 (manual) mode, the unit fills up the hopper below the Munters feed tank with the programmed quantity of feed without Auger 2 operating and the valve performs. The system weighs the target feed and waits.
10	The female reference weight for the bird scale default setting is 0.039 kg. This is the weight to which measurements are compared, to check that they are within the desired range. (This setting cannot be set by the user as it is only for the display of the poultry curve position).
11	The male reference weight for the bird scale default setting is 0.045 kg. This is the weight to which measurements are compared, to check that they are within the desired range. (This setting cannot be set by the user as it is only for the display of the poultry curve position).
12	The + (plus) female percentage default setting is 30. Measurements are reported in percent (%), within the range above the female reference weight. Weight registered above this limit is not considered as a legal female weight.
13	The - (minus) female percentage default setting is 30. Measurements are reported in percent (%), within the range below the female reference weight. Weight registered below this limit is not considered as a legal female weight.
14	The + (plus) male percentage default setting is 30. Measurements are reported in percent (%), within the range above the male reference weight. Weight registered above this limit is not considered as a legal male weight.
15	The - (minus) male percentage default setting is 10. Measurements are reported in percent (%), within the range below the male reference weight. Weight registered below this limit is not considered as a legal male weight.
16	The midnight default setting is 0. This is the time for a midnight point. The user can set the preferred time. (This is the point in time for changing to the next growth day).

Alarm Code	Detailed Description
17	<p>The valve default setting is 0. The available settings are as follows:</p> <ul style="list-style-type: none"> • 0 – Open the last hopper valve first, and then the last hopper valve, and then the hopper valve before, etc. • 1 – Open hopper valves one after another.
18	<p>The skip mode default setting is 0. This parameter sets the skip a day method. The available settings are as follows:</p> <ul style="list-style-type: none"> • 0 – Skip by days so that in the 'skip a day' menu enter 0 sets as 'No Skip'. A value of 1 sets one day of feeding and one day of no feeding, etc. 2 sets one day of feeding and two days off etc. • 1 – Skip by days of the week. In the 'skip a day' menu mark the days in the week that you want to skip. Unmarked days are not supplied feed.
19	<p>The From time default setting is 0 (hour). This is the start time for weighing the birds. Refer to Alarm Code 16.</p>
20	<p>The To time default setting is 24 (hour). This is the stop time for weighing the birds. Refer to Alarm Code 16.</p>
21	<p>The house default setting is 0. This is a communication-related issue, namely the house/extension telephone number.</p>
22	<p>The communication password default setting is 0. This is a communication issue, namely the password.</p>
23	<p>The baud rate default setting is 9600. This is a communications issue.</p>
24	<p>The weight unit of measure default setting is kg. The unit of measurement is either kg or lbs.</p>
25	<p>The date default setting is for the USA. The options for this mode are as follows:</p> <ul style="list-style-type: none"> • USA • European
26	<p>The weight mode default setting for the bird weight mode is 0. The options for this mode are as follows:</p> <ul style="list-style-type: none"> • 0 – Weighs all the birds together not using the poultry curve to separate males from females. The Female reference + and – % set the reference and limits for the birds weights. The female reference can be manually changed in this mode. • 1 – Male/Female weighing mode. The poultry curve sets the reference weight for male and female birds separately.
27	<p>The weight auto-correction default setting is 1. The options for this mode are as follows:</p> <ul style="list-style-type: none"> • 1 – Enables the birds' scale to automatically correct the reference weight in weight mode 0 only. For example, this is used when moving the platform from one house to another, the system can automatically calculate the average (For time efficiency, it is recommended to enter the approximate average weight as a Female reference in case of moving a platform). • 0 – Disable. Does not change the reference even if all the weights are outside the limits.

Alarm Code	Detailed Description
28	The flock number default for communication is 1. This value defines the ASCII file when collecting data by a remote computer.
29	The default setting for the hopper travel time is 0. If you need to set the run time of Auger 2 according to the distance between the beginning of Auger 2 to the relevant hoppers. Set the travel time between the hoppers (seconds) to add to the run time of Auger 2 as follows: $\text{Auger 2 run time} = \text{Var. 2} + \text{Var. 29} * (n - 1)$ Where "n" is the hopper number. That sets the time for Auger 2 run time according to the filling of the actual hopper number.

9.2 Relay functions

You can assign each relay one of the following functions. Each function can apply to as many relays as desired, including extension box relays. For each relay you can select an LED from the front panel to be lit when the relay is active. These LED's provide visual information concerning the feed system activity. Refer to Table 7.

NOTE Relays 0 through 8 are built into the RFS-6 Breeder. Use relay expansion boxes (REX-8 or REX-12) for additional relays.

Table 7: Relay Descriptions

Code	Description
None	Relay Inactive
Auger-1-[F,M,FM]	Deliver feed from silos to weigh bin (RFC-1)
S-Valve-[F,M,FM]	Select system valve (RFC-1 valve)
Auger-2-[F,M,FM]	Deliver feed 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 external counter
Light	Lighting relay
Alarm	Signal alarm condition (N.C. relay is recommended)

NOTE You can label each LED you program accordingly; if you program several relays to use the same LED, then that LED is lit whenever at least one of those relays is active.

9.3 Poultry curve

Enter your reference weight for male and female birds separately, according to their age or the time they arrived to the current coop. Curve figures can be set for every 7 days up to 70 days, and then every 35 days up to 175 days with the termination at 350 days.

9.4 Software version

To view the current software version, press both the **Enter** and **Down** arrow keys for several seconds when the **RFS-6 Breeder** is displaying the standard display.

This identifies the firmware within the **RFS-6 Breeder**. Munters continuously improves its products, and all released software is version controlled and dated.

9.5 Communication test

To test the unit communication path, connect the Rx and Tx communication inputs and press **Enter** and **Minus** simultaneously. The message "Good" or "Bad" appears on the screen indicating the communications status.

9.6 Hidden parameters

Hidden parameters are those various parameters that determine specific weight issues, time delay and valve closings.

To view the hidden parameters, press and hold all four arrow keys for several seconds while the **RFS-6 Breeder** displays the standard display. For a detailed description of specific hidden parameters, refer to Table 8.

Table 8: Hidden Parameters

Number	Description	Default
1	Stop Differential Weight (kg) . This is the point just below the target weigh bin set weight that the RFS-6 Breeder stops Auger-1 fill auger.	0.100 kg
2	Stability Weight (kg) . This is the maximum difference between readings that the RFS-6 Breeder allows. If the readings vary by more than this amount, it uses its best estimate of the weight to continue the operation.	0.050 kg
3	Stability Time (seconds) . This is the time delay after any major change (valve movement, auger change) that the RFS-6 Breeder waits before attempting to weigh the feed bin.	30 seconds
4	Valve Close Time (seconds) . This time period informs the RFS-6 Breeder how long it takes Valve-F, Valve-M and Valve-MF to close.	5 seconds
5	Maximum Empty Weight (kg) . This is the maximum empty weight the amount over the tare allowable that is established in the calibration procedure.	1.000 kg
6	Weigh Container Overflow Time (minutes) . This is a time delay before emptying the container when Alarm 3 is triggered.	10 minutes

9.7 Relays display

To display the Relays display, press both the **Enter** and **Left** arrow keys for two seconds while the **RFS-6 Breeder** displays the default view.

9.8 Feed scheme

Figure 7 illustrates a feed scheme.

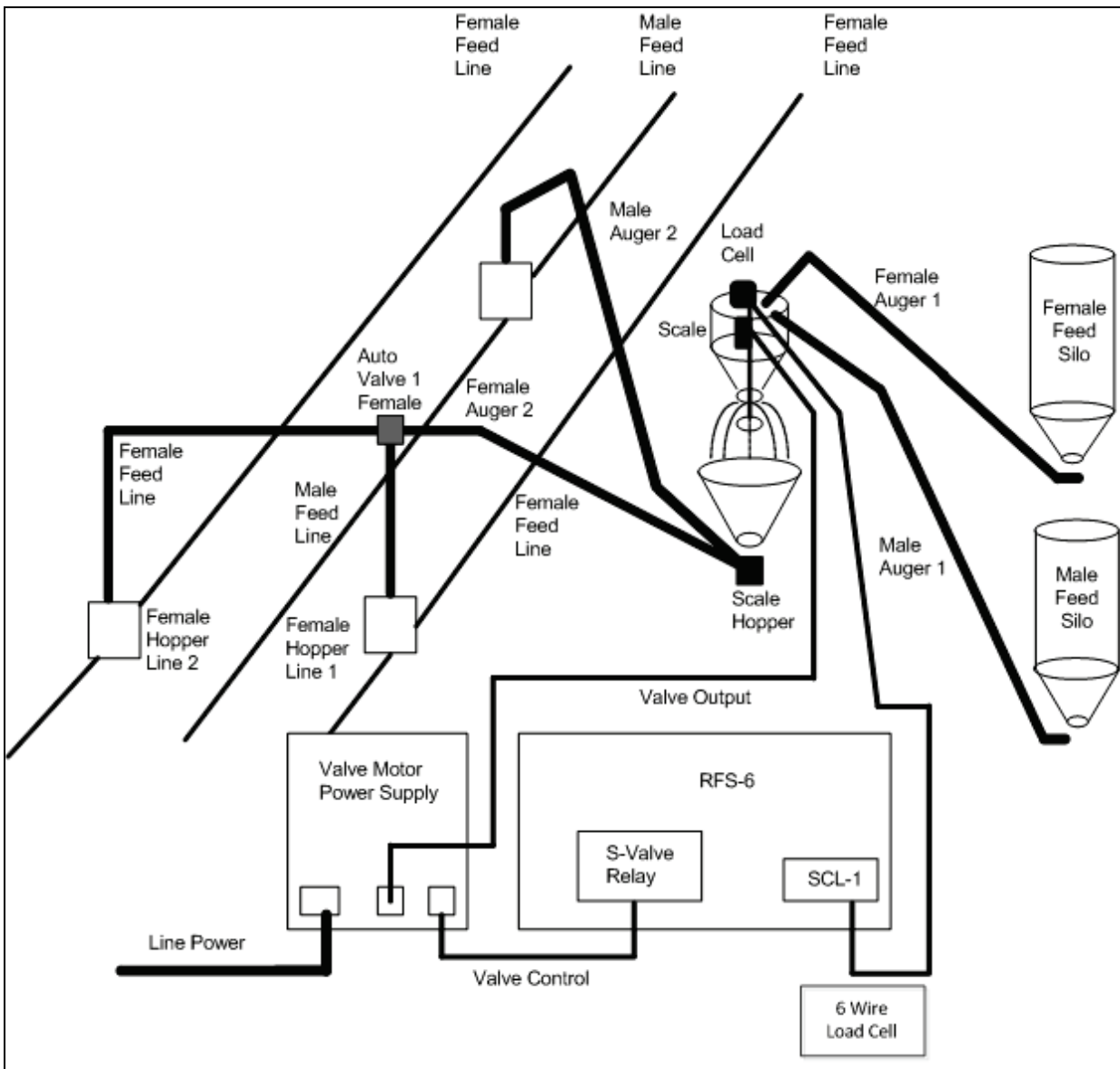


Figure 7: Feed Scheme

9.9 Pulse output

- Feed Pulse 1 output
- Scales

9.9.1 Feed Pulse 1 output

This output provides dry contact pulses per feed supplied quantity as programmed. It can be connected to the AC2000 feed pulse input to report to the environment controller the quantities of feed supplied.

NOTE The valve output (motor) on the motor power box is connected to the motor valve wires as marked on the board (blue and brown wires). Refer to Figure 8.

9.9.2 Scales

Scale 1 terminal block is connected to the feed scale 6 wires cable (The terminal colors are printed on the board).

NOTE For feed containers not supplied by Munters: If the load cell is weight sensitive the red and white connection wires should be exchanged.

Scale 2 terminal block is connected to the optional bird scale.

10 Specifications

Input Voltage Supply	Single phase 110 VAC (USA and Canada)
	Single phase 240 VAC (outside the USA and Canada)
	0.315 Amp, 50 - 60 Hz
Relays Outputs	5 Amps. Normally Open Relays
Alarm Output	NO and NC Pilot Duty
Operating Temperature Range	-10° to 50° C (14° to 122° F)
Enclosure	Water and dust tight (IP55)
Fuses	Main Fuse: 0.315 Amp Slow
	Relays Fuse: 5 Amp. Slow

10.1 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.

1 1 Installation

CAUTION The RFS-6 Breeder must be installed by an authorized electrician.

CAUTION To avoid exposing the RFS-6 Breeder to harmful gases or high humidity, it is recommended to install the device in the service room.

CAUTION Installation Category (Overvoltage Category) III.

CAUTION The power supply to the controller should be protected by a 5 Amps circuit breaker.

WARNING! Disconnect the power to avoid electrical shock and damage.

To install the RFS-6 Breeder:

3. Open the **RFS-6 Breeder** controller enclosure lid by unfastening the two screws on the left-hand side in the front cover. The front cover swings open.
4. Position the required cables through the cable holders at the bottom of the RFS-6 Breeder controller enclosure. Connect the wires according to the wiring diagrams. Refer to Figure 8.

NOTE The **RFS-6 Breeder** must be installed with a RPLP-1 (power line protector) to provide EMI and lightning protection for the unit's power input. In limited cases of very noisy power lines an isolated transformer may be required.

The **RFS-6 Breeder** controller should be installed a proper distance from high power lines and other electrical/mechanical equipment (i.e. Augers power, variable speed, dimmers, etc.) or another noisy units. A distance of at least 0.5 meter distance should be maintained between the **RFS-6 Breeder** controller and the noise source.

As the load cell cable carries mV it must be a shielded cable grounded on the **RFS-6 Breeder** side. This cable must also not be close to source of noise such as high power cables, and a distance of at least 0.5 meter distance should be maintained.

The water pulse should also be a shielded cable grounded on one side, and kept a safe distance from high power cables.

5. Close the **RFS-6 Breeder** enclosure lid carefully and tightly. Use of RTV silicon or equivalent sealant to seal the cable holders is highly recommended.
6. After initial **RFS-6 Breeder** installation is completed, operate the **RFS-6 Breeder** for a test period and check for proper operation.

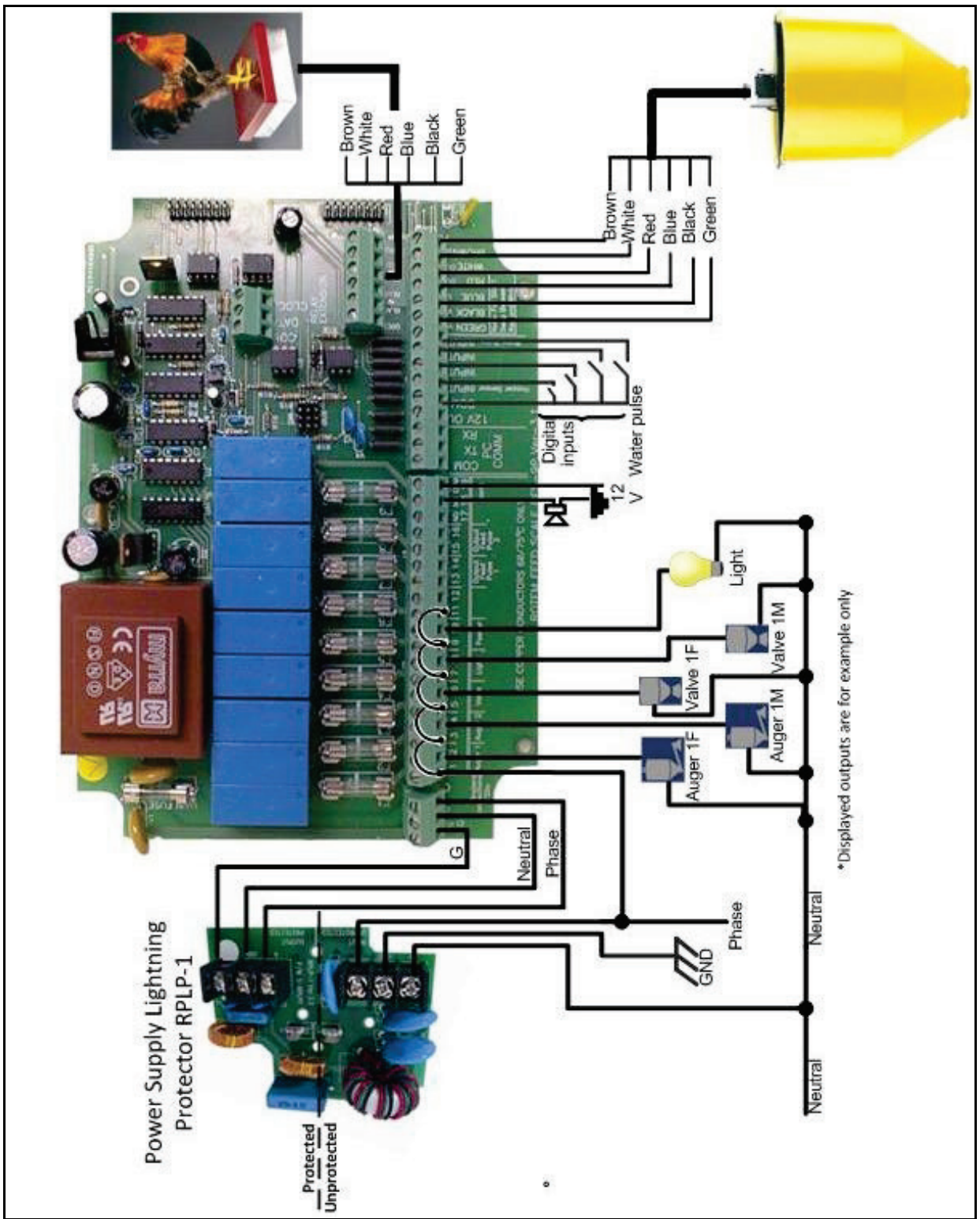


Figure 8: General Wiring Diagram

11.1 Cold Start

A Cold Start returns all the parameter values to the factory default settings and erases the history.

Perform a Cold Start *only* after changing the software (EEPROM) in the RFS-6 Breeder *or* if there is a main issue with the unit.

NOTE It is strongly suggested to create a backup file of all the variables, hidden parameters, tables, and other user programmed variables, so that they can be re-entered after a Cold Start.

NOTE After a Cold Start you must recalibrate the feed and bird scales to retrieve the scale factors, or to enter all factors (include the zero factor for feed scale) manually.

To activate a cold start:

- Simultaneously press the following keys: **Enter**, **MENU**, **+, -**, and turn off and on again the device. The message RUN and then COLD appear on the display.

11.2 Feed Scale container dimensions

Figure 9 displays the feed scale container components and dimensions.

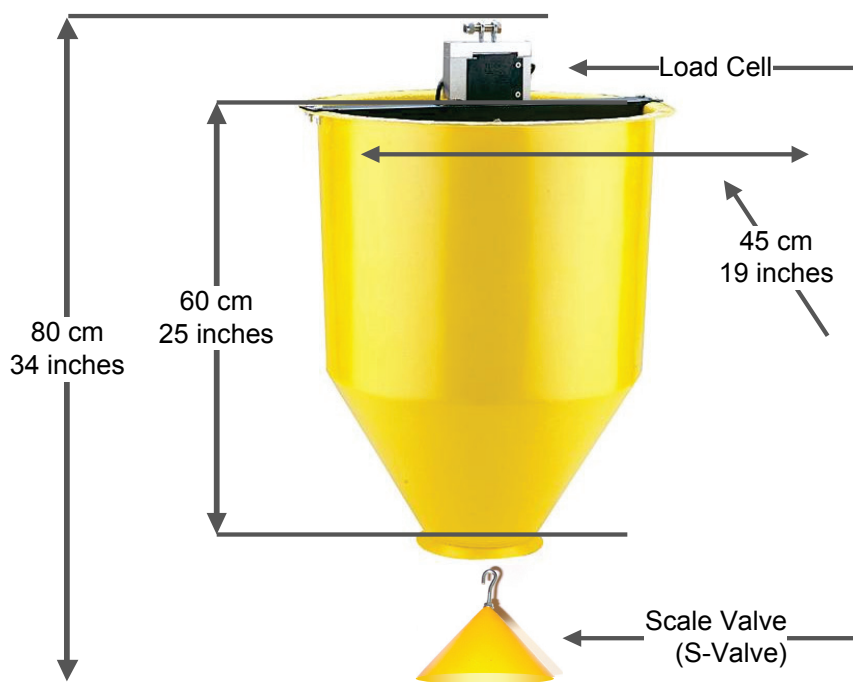


Figure 9: Feed Scale Container Component Dimensions

11.3 Feed Scale Container components and assembly

The feed scale container is composed of the following:

- Scale container
- Valve motor and load
- Scale valve

Refer to Figure 10.



Figure 10: Feed Scale Container Components



Figure 11: Assembled Feed Scale

To assemble the feed scale:

1. Insert the Valve Motor and Load Cell component into the top of the Feed Container and screw it to the container.
2. Insert the Scale Valve component at the bottom of the Scale Container and hook it onto the Valve Motor.

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12 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 RFS-6 Breeder, (for example RFS-6 Breeder, sensors, cables, thermostats, 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. A full list of contact details can be found on the back page of this manual.

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