

ROTEM®

Control & Management

Alarm and Backup System RBU-3A



User & Installation Manual

Take Control

WARRANTY & LIMITATION OF LIABILITY

1. ROTEM warrants that the product shall be free of defects in materials or workmanship and will conform to the technical specification for a period of 1 (one) year from the date of initial installation on site (the "warranty period").
2. Load cells are not covered by ROTEM's warranty.
3. ROTEM warrants that during said warranty period, any item/items or part/parts of equipment found defective with respect to materials or workmanship or which do not conform to the technical specification shall be repaired or replaced (at ROTEM's sole discretion), free of charge.
4. During the warranty period, in the event of an alleged defect, authorized resellers in relevant regions should be notified as soon as possible from the date of noticing the said defect, but no longer than thirty (30) days from such a discovery. The report shall include (1) a short description of the defects noticed (2) type of card / component and its matching serial number.
5. ROTEM's sole liability under this warranty is the repair or replacement of the defective item of product.

Conditions and Limitations

1. ROTEM will not be responsible for any labor costs or expenses associated with replacement of defective items or other parts of the product or repair.
2. This warranty shall not cover: (i) product or part therein which has been modified (without prior written approval of ROTEM), or (ii) product or part therein which has not handled or installed by an authorized reseller of ROTEM or (iii) product or part therein which has either handled or installed not in strict accordance with ROTEM's instructions, (iv) products which were used for function other than agriculture industry.
3. This warranty will not apply in the following cases: (i) if all components of the product are not originally supplied by ROTEM (ii) the defect is the result of an act of nature, lighting strikes, electrical power surge or interruption of electricity (iii) the defect is the result of accident, misuse, abuse, alteration, neglect, improper or unauthorized maintenance or repair.

ROTEM warns and alerts all users that the Product is inherently complex and may not be completely free of errors. ROTEM's products are designed and manufactured to provide reliable operation. Strict tests and quality control procedures are applied to every product. However, the possibility that something may fail beyond our control exists. Since these products are designed to operate climate control and other systems in confined livestock environments, where failure may cause severe damage, the user should provide adequate backup and alarm systems. These are to operate critical systems even in case of a ROTEM system failure. Neglecting to provide such a backup will be regarded as the user's willingness to accept the risk of loss, injury and financial damage.

In no event will ROTEM be liable to a user or any third party for any direct, indirect, special, consequential or incidental damages, including but not limited to any damage or injury to business earnings, lost profits or goodwill, personal injury, costs of delay, any failure of delivery, costs of lost or damaged data or documentation, lost or damaged products or goods, lost sales, lost orders, lost income.

Except for the above express warranty, ROTEM makes no other warranties, express or implied, relating to the products. ROTEM disclaims and excludes the implied warranties of merchantability and fitness for a particular purpose. No person is authorized to make any other warranty or representation concerning the performance of the products other than as provided by ROTEM.

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FEATURES

- One stainless steel, reliable temperature sensor.
- (Second Temperature sensor optional)
- 3 digits On-line temperature display.
- Guide Light to indicate display status and setting mode.
- Temperature Display in °F or °C.
- User-friendly, one-touch setting.
- Real Time Clock with battery backup.
- Water and dust resistant.
- Un-erasable memory.
- Simple installation and service.

OPERATION

The RBU-3A measures the inside temperature via one or two temperature sensors, and according to the set parameters (High Temp Alarm, Low Temp Alarm) the alarm system is activated as required. There is a real time clock for automatic reduction of alarm set points for the entire growth period.

The RBU-3A also has Phase 1, Phase 2 and Phase 3 inputs and the alarm starts functioning if the voltage decreases below 20% from normal voltage.

There are also 2 Auxiliary inputs AUX1 and AUX2 for external system alarm outputs (The RBU-3A functions also as an alarm center).

In addition, it is possible to connect a dialer to the RBU-3A and to receive alarm messages at any phone number or beeper.

Also it's possible to connect pressure sensor to measured low static pressure inside the house and activate alarms in case of "Low pressure" or "High Pressure".

OPERATION MODE

The RBU-3A is in operation mode when the top guide light is switched on, in the first line (Red) of the menu. The Inside Temperature and the appropriate unit indicator (F° or C°) are displayed.

The OPERATION MODE is also used to display the following:

- ERROR MESSAGE - A blinking "SF" (Sensor Failure) message is displayed each time that the installed temperature sensors are disconnected or faulty. For more information, see TEMPERATURE SENSORS



HIDDEN PARAMETERS

RBU-3A has hidden parameters that have a different access format to protect them from being changed accidentally. While these Hidden parameters are pre-programmed with default values of a typical system, a check should be performed after installation has been completed. Make sure that you understand what they mean before doing any changes. If you are uncertain, use the default values given below each parameter.

To display the Hidden parameters, the controller must be in OPERATION MODE first. When that is done, press the Up and Down arrow keys simultaneously for about 2 seconds. The first parameter "FC" and its current value (blinking) are displayed. To display other Hidden Parameters, use the SELECT Key. Each time pressed, it moves to the next parameter. To return to OPERATION MODE, pass, with the SELECT key through all the hidden parameters.

To change the value of a parameter, use the UP and DOWN arrow keys.

Alarm Code	Description
FC	Temperature units of measurement. Select from Fahrenheit Or Celsius (1=F°, 0=C°)
FH	(Fan Hysteresis) Hysteresis for fans (F° or C°)
HH	(Heaters Hysteresis) Hysteresis for heaters (F° or C°)
P2	Phase 2 alarm Enable/Disable (1-Enable, 0-Disable)
P3	Phase 3 alarm Enable/Disable (1-Enable, 0-Disable)
PrC	Percentage of nominal voltage for alarm on phase 1
CUr	Using curves for high and low temperature alarm setting
Fr.d	First day to start the curve
Fr.H	From Day High Temperature Alarm set point
Fr.L	From Day Low Temperature Alarm set point
to.d	Last day of the curve
to.H	Last Day High Temperature Alarm set point
to.L	Last Day Low Temperature Alarm set point

Table 1: Hidden Parameters

FC - Fahrenheit or Celsius (1=F°, 0=C°)

RBU-3A can display temperature in Celsius or Fahrenheit. Set this parameter according to your needs.

FC = 1 is for Fahrenheit

FC = 0 is for Celsius

Default is FC = 0

NOTE: The Unit Indicator F° is on for Fahrenheit and C° for Celsius.

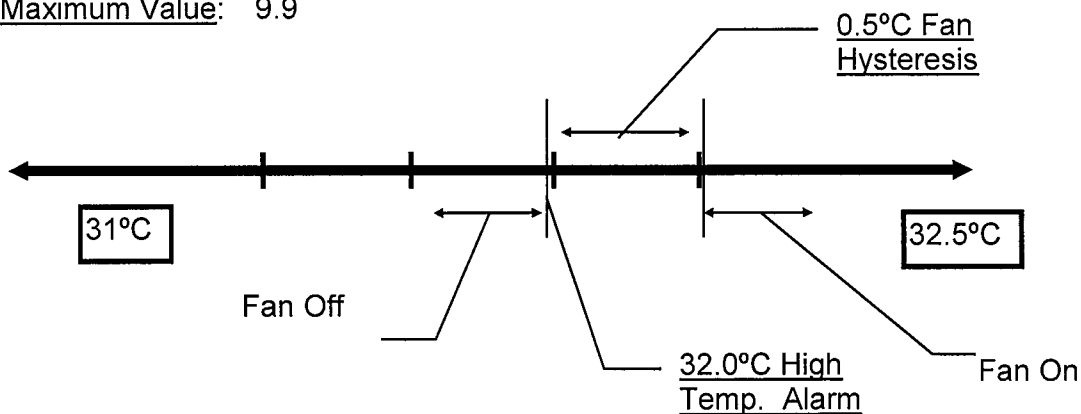
FH - Fan Hysteresis (F° or C°)

This parameter defines a Hysteresis in degrees (F° or C°), near High Temperature Alarm, above which the Fans do not function. We recommend not to change this parameter but to keep the default value.

Default Value: 0.5 C° (1.0 F°)

Minimum Value: 0.0

Maximum Value: 9.9



For this example the high temperature alarm is at 32.0°C. The fan is OFF when temperature is under 32.0°C and it is turned ON if the temperature increases over 32.5°C (High Temp + Hysteresis).

The fan stays ON until the temperature decreases under 32.0°C (High Temp).

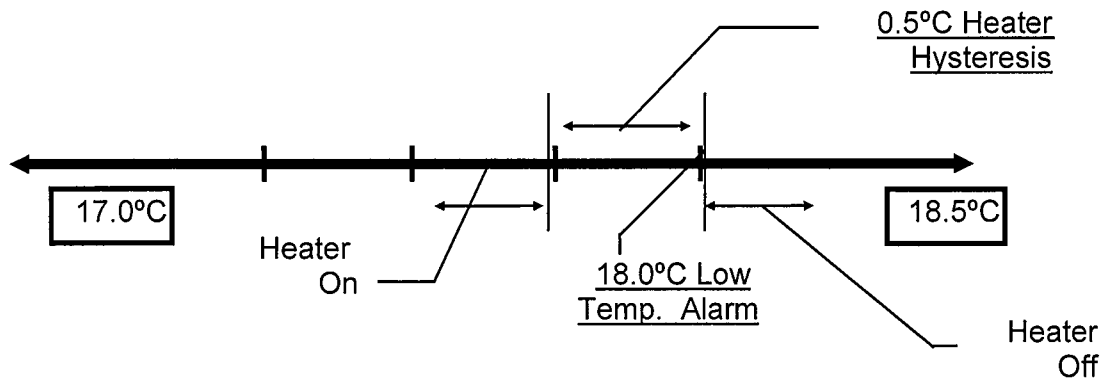
HH - Hysteresis for Heaters (F° or C°)

This parameter defines a Hysteresis in degrees (F° or C°), near Low Temperature Alarm, above which the heaters do not function. We recommend not to change this parameter but to keep the default value.

Default Value: 0.5 C° (1.0 F°)

Minimum Value: 0.0

Maximum Value: 9.9



For this example the low temperature alarm is at 18.0°C. The heater is OFF when the temperature is superior to 18.0°C and it is turned ON if the temperature decreases less than 17.5°C (Low Temp - Hysteresis).

The heater stays ON until the temperature increases above 18.5°C.

P2 - Phase 2 failure detect (1 or 0)

This parameter is to enable or disable phase 2-failure alarm.

In case there is no phase 2, in order to detect a failure, the grower can disable phase 2-failure alarm by resetting this parameter to 0.

This will prevent to activate the alarm when phase 2 is not connected to the unit.

P3 - Phase 3 failure detect (1 or 0)

This parameter is to enable or disable phase 3-failure alarm.

In case there is no phase 3, in order to detect a failure the grower can disable phase 3-failure alarm by resetting this parameter to 0.

This will prevent to activate the alarm when phase 3 is not connected to the unit.

PrC - Percentage for Phase 1 failure detect

This parameter is to set the percent of the nominal line voltage, which below it will cause Phase 1 failure alarm.

For example for 220V unit 80% on this parameter will generate Phase 1 alarm if the power voltage will decrease below approximately 180V.

Default Value: 80 (%)

Minimum Value: 0

Maximum Value: 100

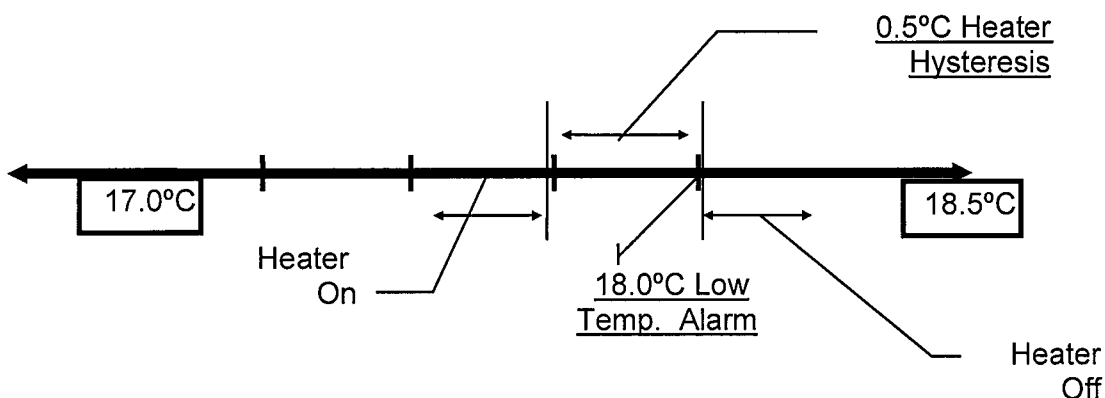
CUr - Curve enable (1 or 0)

This parameter is to enable or disable curves for high and low temp. Alarms.

In case there is no curve needed for the entire of the growth period, the grower can disable curve option by resetting this parameter to 0.

This will give a constant high and low temperature alarm set point, regardless of the growth day.

If this parameter is set to 1 than, it will be followed by 6 more variables to define the curves for High Temperature alarm and Low Temperature alarm according to growth period.



Fr.d - From Day (1 - 999)

This parameter set the first day for starting the curves for High/Low Temp. alarm.

Fr.H - From High Temp. Alarm (0 - 50°C / 132°F)

This parameter sets the High Temp. alarm for the first day. The High Temp. alarm LED will blink while setting this parameter.

Fr.L - From Low Temp. Alarm (0 - 50°C / 132°F)

This parameter set the Low Temp. alarm for the first day. The LED Low Temp. Alarm will blink while setting this parameter.

to.d - To Day (1 - 999)

This parameter set the last day for ending the curves for High/Low Temp. alarm.

to.H - To High Temp. Alarm (0 - 50°C / 132°F)

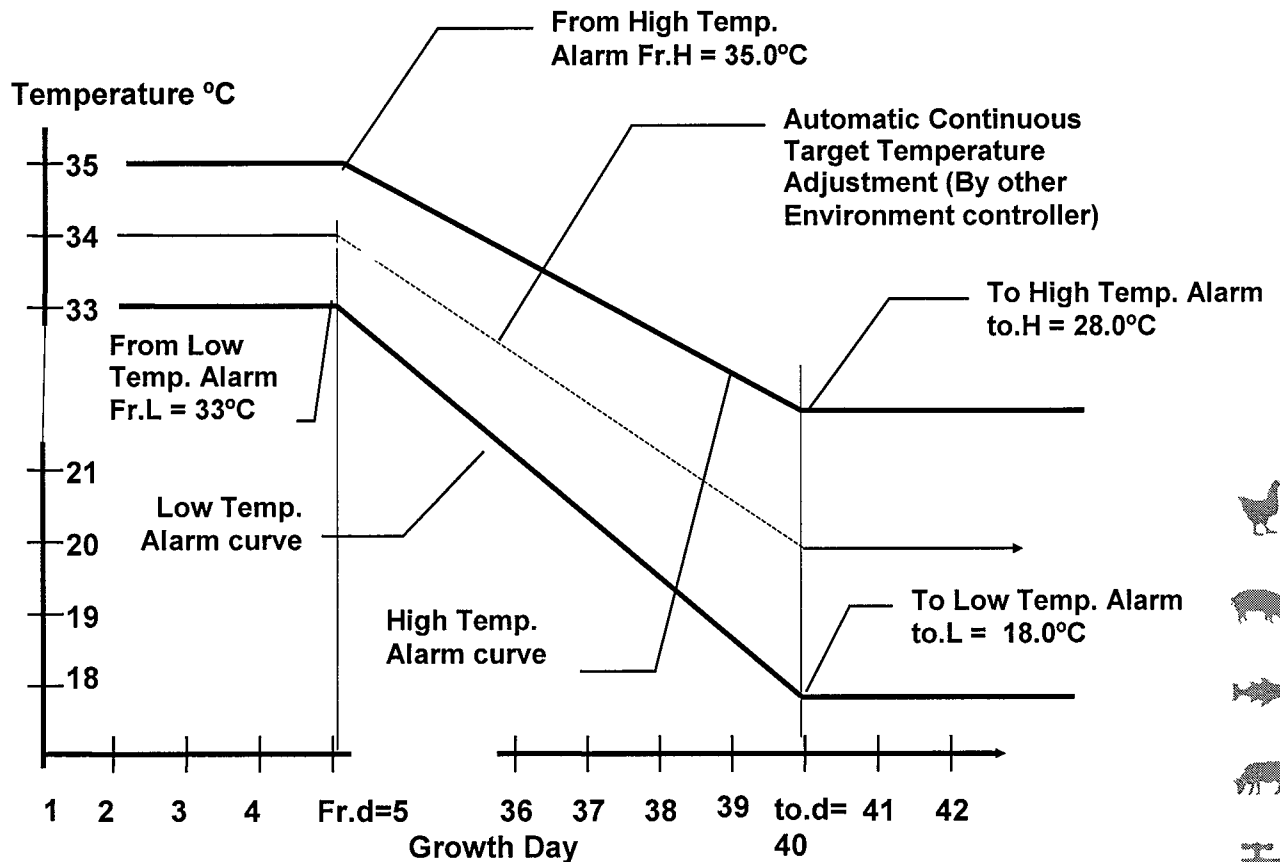
This parameter set the High Temp. alarm for the last day. The LED High Temp. Alarm will blink while setting this parameter.

to.L - To Low Temp. Alarm (0 - 50°C / 132°F)

This parameter set the Low Temp. alarm for the last day. The LED Low Temp. Alarm will blink while setting this parameter.

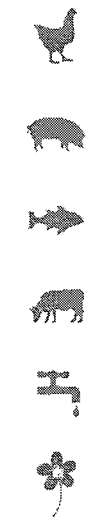
The RBU-3A has an automatic temperature adjustment feature. This permits you to set the High/Low temperatures limits for the entire flock growth period, and let the RBU-3A adjust the temperatures for you each day.

Attached is a diagram for the curve definition (6 points):



As shown in the figure above, High/Low Temperature Alarm is constant up to the first day (Fr.d = 5) of automatic temperature adjustment. The RBU-3A then automatically adjusts the alarms high/low temperature set points each day (also during the day) up to the last day of automatic adjustment (to.d = 40). In the figure, the first day is 5 (Fr.d = 5), and High Temperature is 35.0°C. As long as the growth day is less than or equal to five, the RBU-3A keeps a high temperature alarm of 35.0°C. Last day is set to 40 (to.d = 40) with high temperature alarm of 28.0°C. From growth day 40 and on the high temperature alarm will be 28.0°C. (These numbers are an example only; your settings may be different.)

The same with low temperature alarm in this example till day 5 the low temperature alarm is 33°C, between days 5 and 40 there is a linear curve, and after day 40 the low temperature alarm is 18°C.



Take Control

SETTING MODE

The SETTING MODE is used for setting the parameters according to which the user wishes to operate his barn. Press the SELECT key to choose between the setting options (note that the setting options have a yellow background on the panel of the controller). The guide light will blink and indicate the chosen option. To choose another option, press the SELECT key.

After choosing the desired option, use Up & Down arrow keys to adjust the desired parameter.

After adjusting parameters, press SELECT repeatedly to return to the OPERATION MODE. If you do not do this, the controller will return to the Operation Mode, automatically, after about 2 minutes during which it keeps normal operation.

SETTING OPTIONS

High Temperature Alarm. (While Hidden parameter CUR = 0)

Sets the High Temperature Alarm (the temperature at which the user wants the alarm for high temperature to start functioning). If the inside temperature increases above the set temperature, a blinking message will be displayed, and the Controller will operate the fans. If after the time delay set by the user, the temperature does not decrease, the alarm system will start operating.

Default Value: 40.0 C° (104 F°)

Minimum Value: 0

Maximum Value: 132

NOTE: When setting High Temp. Alarm, the minimum possible value is limited by the low Temp Alarm setting.

This means that the grower cannot set a value for High Temp Alarm under the value for Low Temp Alarm.

The minimum difference between the two values must be at least 1°.

If Hidden parameter CUR = 1 then the line High Temp. Alarm will only display what is the current High Temp Alarm according to the curve defined by the hidden parameters and there is not possible to set it.

Low Temperature Alarm (While Hidden parameter CUR = 0).

Sets the Low Temperature Alarm (the temperature at which the user wants the alarm for Low temperature to starts functioning). If the inside temperature decreases under the set temperature, a message will be displayed and the Controller will operate heaters. If after the delay time set by the user the temperature does not increase, the alarm system will start functioning.

Default Value: 10.0 C° (50 F°)
Minimum Value: 0
Maximum Value: 132

NOTE: When setting Low Temp. Alarm the maximum value is limited also by High Temp Alarm setting.
 That means that the grower cannot set a value for Low Temp Alarm above the value for High Temp Alarm.
 The minimum difference between the two values must be at least 1°.
 If Hidden parameter CUR = 1 than the line Low Temp. Alarm will only display what is the current Low Temp Alarm according to the curve defined by the hidden parameters and there is not possible to set it .

GROWTH DAY SETTING

Press Select and go down to Growth Day line and Use UP and DOWN arrow keys to change the growth day. Press Select to return to OPERATION MODE.



TIME SETTING

To display the time, the controller must be in OPERATION MODE first. When that is done, press the Down and Select arrow keys simultaneously for about 2 seconds. The display will show hh:mx (for example 15:3x is hour 15 and 3x minutes while x is not shown because there is only 3 digits display). Press Select again and the hour digits (hh) will blink, Use UP and DOWN arrow keys to change hours. Press Select, then UP and DOWN arrow keys to change minutes (The display will change to xh.mm for the example if the hour was 15:34 than the display will be 5.34 and the 34 will blink for minute setting)

ALARM DELAY

Set the delay period between the moment of an alarm cause and the moment when the alarm relay should operate the alarm system.

This delay period enables to stabilize the unit, to eliminate false alarms and in case of High/Low temp alarm, to enable the fans/heaters to control the temperature before activating the alarm system.

ALARM DELAY ADJUSTMENT PROCEDURE

1. To adjust the Alarm delay parameters, the controller must be in OPERATION MODE first.
2. Press and hold the Select key until the alarm led indicator blinks.
3. An AL.d (For Alarm Delay) message will blink alternating with the current set value per minute.
4. Use the Up Arrow and Down Arrow keys to edit the value.
5. Press the Select key to return to OPERATION MODE.
6. If you forget to finish editing with the Select key, the RBU-3A automatically returns to the standard display after a short delay.

Default Value: **0.5 Minute. (30 Second)**
Minimum Value: **0**
Maximum Value: **9.9**

ALARMS OPERATION

Rotem's RBU-3A can provide an alarm for six different alarm sources (sensor failure, "SF" not included).

The message that indicates the alarm source will be displayed, alternating with INSIDE TEMPERATURE as soon as there is an alarm.

Yet, the alarm relay (and led) will not operate until the set alarm delay is not over.

The alarm messages (listed also on the front panel) are as follows:

- P1, P2, P3 - Phase 1, Phase 2 or Phase 3 Failure respectively.
- L0 - Low Te. alarm
- HI - High Temp. alarm
- A1, A2 - Auxiliary 1 or Auxiliary 2 alarm

NOTE: In situations where there are multiple alarm sources, the complete list of alarm sources are displayed blinking, alternating with the current inside temperature.

P1, P2, P3

When the voltage on phase 1, phase 2 or phase 3 goes below 180V (for 230V unit), the message P1, P2 or P3 or both (it depends what phase voltage failed) are blinking.

Once the alarm delay is over, if the phase does not return to normal operation, the alarm relay operates the alarm system.

NOTE: The voltage for P2, P3 alarm is setting by hardware (2 trimmers on the power board), and for P1 is setting by hidden parameter PrC. See Table 1 for more information.

LO

When the inside temperature decreases below the Low Temp alarm setting minus heater hysteresis, the alarm message "LO" starts blinking alternating with inside temperature.

Once the alarm delay is over, if the inside temperature does not raise above Low Temp alarm setting, then the alarm relay operates the alarm system.



HI

When the inside temperature increases above the High Temp alarm setting plus fan hysteresis then the alarm message "HI" start blinking alternating with inside temperature.

Once the alarm delay is over, if the inside temperature does not decrease under High Temp alarm setting, then the alarm relay operates the alarm system.

A1, A2

The RBU-3A has two Aux inputs to connect external systems alarm.

Connect the dry contact output of the external system to COM and to one of the auxiliary inputs (AUX 1 for example).

If the external system does operate the alarm (contact close) then the message "A1" starts blinking alternating with inside temperature.

Once the alarm delay is over, if the external system alarm still works, the alarm relay will operate the alarm system.

ALARM RESET

When the alarm relay is operating it is possible to reset the alarm by pressing any key.

Doing this the alarm relay will stop operating the alarm system. Still the alarm led indicator remains lit and the alarm message remains flashing until the source of alarm is removed.

TEMPERATURE SENSORS

Rotem's RBU-3A can work with one or two temperature sensors. Proper sensor deployment should be inside the coop.

If one sensor is used, RBU-3A works according to its temperature reading. If two sensors are used, RBU-3A works according to the average of the two. If two are installed and one is faulty, RBU-3A works safely according to the working sensor.

FAULTY SENSORS

- ❖ If all the temperature sensors that were installed (either one or two) are faulty, a blinking ERROR message ("SF") will be displayed. This message will be removed, only when at least one good sensor is installed.
- ❖ If two sensors were installed and only one is faulty, a blinking ERROR message will be ("SF") displayed, alternating with the INSIDE TEMPERATURE read by the working sensor.

To identify the faulty sensor and to remove the blinking message, do the following:

1. In OPERATION MODE, press the UP key and then press SELECT and keep them pressed simultaneously for about two seconds. The display alternates between the current inside temperature and the sensor number.
2. Press SELECT to display the second sensor.
3. Return to OPERATION MODE by pressing SELECT once more.

A faulty sensor will read 32 F° (or 0 C°). If any of the two sensors shows this value, it means that it is defective and should be replaced (if so desired). (The user can keep the controller running safely with one sensor). At the end of this procedure, the ERROR ("SF") message will stop blinking.

TEMPERATURE SENSORS CALIBRATION

Whenever RBU-3A is installed or a temperature sensor replaced, a calibration of the temperature sensors must be performed. To do this:

- Use an accurate thermometer.
- Place it near the temperature sensor.
- Make sure that the inside temperature is stable. (No heater, etc.)
- Calibrate the temperature sensor immediately.



CALIBRATION PROCEDURE

- Press the UP Key and then press SELECT and keep them pressed simultaneously for about two seconds. The display will alternate between the current inside temperature and the sensor number.
- Use the UP or DOWN Keys to calibrate the sensor according to the thermometer reading.
- Press SELECT to display the second sensor, use the UP or DOWN Keys to calibrate.
- Press SELECT again to return to Operation Mode.

NOTE: A disconnected sensor will display 32 F° or 0 C°. In this case, do not attempt to calibrate this sensor

INSTALLATION



Only an authorized electrician should install the **RBU-3A**. Power must be disconnected to avoid electrical shock and damage.

To avoid exposing the **RBU-3A** to harmful gases or high humidity, it is recommended to install it in the service room.

Installation Category (Overvoltage Category) III

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

1. Open the enclosure lid by removing the two left-hand side screws in the front.
2. Mount RBU-3A to the wall, using the three supplied screws through the mounting holes. (FIG 2)
3. Place the required cables through the cable holders at the bottom of the unit. Connect the wires according to the wiring diagram.
4. To connect the temperature sensors, use the two shielded conductors #18-#24 gauge cable.
5. Close the lid carefully and tightly. Use RTV silicon or equivalent sealant to seal the cable holders.
6. After installation is completed, operate RBU-3A for a few hours and check the operation.



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TECHNICAL SPECIFICATIONS

INPUT POWER VOLTAGE

One Phase

110 VAC (USA and Canada)
240 VAC (Outside USA and Canada)

0.2 Amp, 50-60Hz.

Heater Output

5 AMP. Normally Open Relay

Fan output

5 AMP. Normally Open Relay

Alarm Output

3 AMP. Normally close Relay

Operating Temperature Range

0÷C to 50÷C (32÷F to 132÷F)

Enclosure

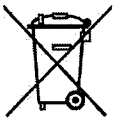
Water and Dust tight, IP-55

Fuses

Main fuse: 0.315 Amps T

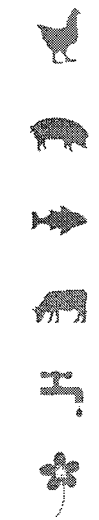
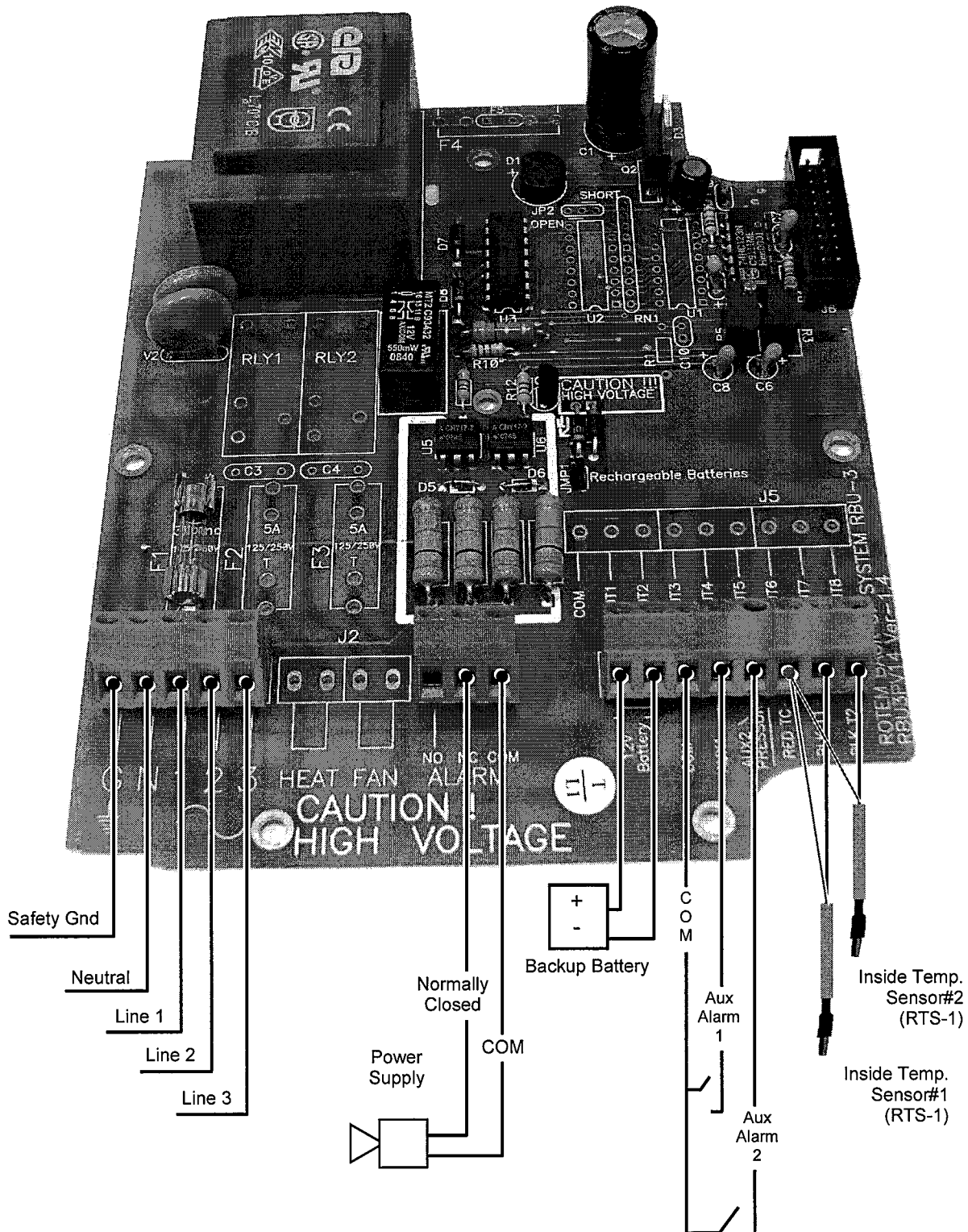
Others: 5 Amp T

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.

WIRING DIAGRAM



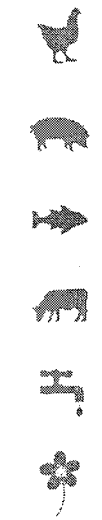
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Warning!

ROTEM products are designed and manufactured to provide a reliable operation. Strict tests and quality control procedures are applied to every product.

Yet, a failure might occur, beyond our control. The user should take this into account. As these products are designed to operate climate control systems in livestock confined environments -where a failure may cause a severe damage - the user should provide adequate back-up and alarm systems to operate vital climate control systems and to support livestock even in case of a **ROTEM** system failure. Neglecting to provide such back-up systems will be considered as the user's responsibility to accept the risk of loss, injury and financial damage.



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