

RBU-27 SE

## Manual for use and maintenance



## RBU-27 SE

Emergency Backup

Ag/MIS/UmGB-2138-09/13 rev 1.0  
P/N: 116557

 **Munters**

# RBU-27 SE

## Manual for use and maintenance

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**Product Software:** N/A

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 RBU-27 SE!

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 Precautions

- Ensure that the unit is grounded as explained in Appendix B: Electrical Grounding, page 20.
- It is extremely important that the Inlet/Tunnel switch be set correctly! Failure to do so can cause major damage to your flock/herd or physical plant. Refer to Inlet or Tunnel Air Source, page 8.

## 3 Introduction to the RBU-27 SE

The RBU-27 SE system is a backup controller that operates during a primary controller failure or during extreme temperatures.

The RBU-27 SE has 27 heavy duty relays, up to five thermostats and four delay times. The RBU-27 SE is a five stage backup consisting of:

- one heating stage having two heat zones
- three cooling stages
- one cool pad stage
  - up to four cool pad pumps
  - temperature independent

Each stage is powered from its own circuit breaker. LED indicators on the front panel indicate which stages are currently active.

- To prevent overheating, all four heater relays are defined as Off or Auto.
- To ensure cooling in all situations, all 16 cooler relays are defined as On or Auto (two fans can be set to On, Off, or Auto).

The RBU-27 SE can be expanded to include up to four heaters, four cool pads, and 16 fans. The unique design provides a greater control in choosing the ventilation method, testing equipment, and emergency climate control (Latch On/Off function).

Figure 1 shows a pre-wired relay; the relay's logic serves as the RBU-27 SE's "non-electronic brain". In addition, the relay is highly resistant to lightening and other transient electrical disturbances.

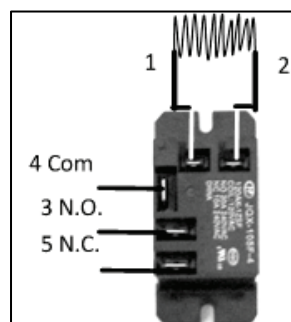


Figure 1: Pre-Wired Relays

NOTE While the RBU-27 SE is designed to work with Munters' Platinum Controllers, it supports all Munters Controllers.

- Switch Functions
- RBU-27 SE Functions

### 3.1 Switch Functions

Table 1 lists the available switch functions.

LED	When On
Controller Alarm	Indicates controller failure
Heat Stage	Heat stage is active
Cool Pad Stage	Cool pad stage is active
Cool Stage 1/2/3	Cool stage is active

Table 1: Available Switch Functions

Switch	Function	Comments
Inlet/Tunnel	Toggles between ventilation methods: <ul style="list-style-type: none"> <li>• <b>Inlet:</b> One or two vents open.</li> <li>• <b>Tunnel:</b> Tunnel curtain opens in case of backup operation</li> </ul>	Ventilation method depends on the livestock age, the equipment in the house, and the season of the year. Important: Refer to Inlet or Tunnel Air Source, page 8.
Latch On/Off	<ul style="list-style-type: none"> <li>• <b>Latch ON:</b> Once Thermostat 4 (Cool Stage 2) is activated, the RBU continues to run in Cool Stage 2 (Fans 1-10) until switched off manually.</li> <li>• <b>Latch OFF:</b> RBU runs Cool/Heat Stages according to thermostats.</li> </ul>	You can use the Latch feature to lock the facility into tunnel mode for an extended period. This may help remove built up heat stress in your poultry.
Heater 1 - 4 Off/Auto	The <b>Off</b> option prevents heater activity. The <b>Auto</b> option activates heaters only if the thermostat temperature set point has been reached.	Each stage has its own circuit breaker, and its own thermostat.
Cool Pad 1 - 4	The <b>On</b> option activates the sprayers manually. The <b>Auto</b> option activates the sprayers according to temperature readings of the thermostat.	
Fans 1 - 2 / 5 - 16	The <b>On</b> option activates the fans manually. The <b>Auto</b> option activates the fans according to temperature readings of the thermostat.	Each stage has its own circuit breaker, and its own thermostat.
Fans 3 - 4	The <b>On</b> option activates the fans manually. The <b>Off</b> option prevents the fans from operating. The <b>Auto</b> option activates the fans according to temperature readings of the thermostat.	Each stage has its own circuit breaker, and its own thermostat.

## 3.2 RBU-27 SE Functions

The RBU-27 SE has the following functions:

- Inlet or Tunnel Air Source
- Cool Weather Protection
- Hot Weather Protection
- Platinum Fail Safe
- Inlet/Tunnel Power Supply

### 3.2.1 Inlet or Tunnel Air Source

The following section details how the RBU-27 SE operates the house's air sources.

#### 3.2.1.1 Active Cool Stage

RBU-27 SE controls two sources of the chicken/pig house air supply, inlets and tunnels. In general, inlets are used during the winter to supply minimum ventilation. Tunnels are used in the summer when the required air supply increases to the point where minimum ventilation is insufficient.

- When Cool Stage 1 or 2 is active, the toggle switch position defines the air source (inlet or tunnel).
- When Cool Stage 3 is active, the air source is the tunnel ventilation only. If the Inlet/Tunnel toggle switch is set to Inlet, RBU-27 SE bypasses the setting.

#### 3.2.1.2 Air Source Setting

It is extremely important to ensure that the RBU-27 SE air source is set correctly.

- Using tunnel ventilation in the winter can bring in too much cold air, endangering your birds/animals health.
- **Inlets supply only a limited supply of air.** The house's fans remove the house's air, creating negative pressure. When Cool Stage 2 begins, Fan 5 – 10 begin to operate (along with Fans 1 – 4). In this situation, negative pressure can drop so low that the drop ceiling can physically collapse.

**WARNING!** *It is extremely important that the Inlet/Tunnel switch be set correctly! Failure to do so can cause major damage to your flock/herd or physical plant.*

### 3.2.2 Cool Weather Protection

If the temperature drops to the specified levels, RBU-27 SE's heaters begin to function. Thermostat 1 controls Heaters 1- 4 and Thermostat 2 controls Heaters 5 - 8.

**NOTE** *If the heaters are installed in different locations (heat areas) they function independently.*

### 3.2.3 Hot Weather Protection

- Stage operation:
  - If the house temperature rises to Thermostat 3's set temperature, the RBU-27 SE launches Cooling Stage 1 and operates Fans 1-2 and 3-4 to lower temperatures.
  - If temperature continues to rise to Thermostat 4's set temperature, the RBU-27 SE launches Cooling Stage 2 (Fans 5-6, 7-8, and 9-10) and uses the Inlet or Tunnel option as well.
  - If the temperature continues to rise to Thermostat's 5 set temperature, Cooling Stage 3 (Fans 11-12, 13-14, and 15-16) launches.



- If Thermostat 4's set temperature is lower than Thermostat 3's set temperature, Cooling Stage 1 begins simultaneously with Cooling Stage 2.
- Inlet or Tunnel option: The inlets/tunnels open when the first cooling stage begins. In practice, this means the inlets/tunnels open when Cooling Stage 1 begins.
  - If Thermostats 3 and 4's set temperature are higher than Thermostat 5's, the inlet/tunnel opens when Cooling Stage 3 begins.
  - If Thermostat 3's set temperature is higher than Thermostat 4 and 5's, the inlet/tunnel opens when Cooling Stage 2 begins.

Table 2 lists the cooling stages activation and timer delays.

Table 2: Cooling Device Settings

Cool Stage	Thermostat	Active Devices	Default Timer Delay
1	3	Fans 1-4 and Inlet or Tunnel Curtains	60 seconds
2	4	Fans 1-4 / 5-10 and Inlet or Tunnel Curtains	90 seconds
3	5	Fans 1-10 / 12-16 and Inlet or Tunnel Curtains	120 seconds
	N/A	Fail safe delay	30 seconds
Cool pad	2	Cool pads 1-4	N/A

NOTE Munters recommends using the default timer delays; however the timer can be adjusted to any time setting on the potentiometer.

NOTE Timer delay differs if when the unit is in Fail Safe mode. Refer to Platinum Fail Safe.

**To adjust the delay:**

1. Disconnect power from the RBU-27 SE.
2. Open the unit.
3. Adjust the timer delay potentiometers as required (Figure 3).
4. Figure 4 illustrates which potentiometer controls the delay for the different stages.

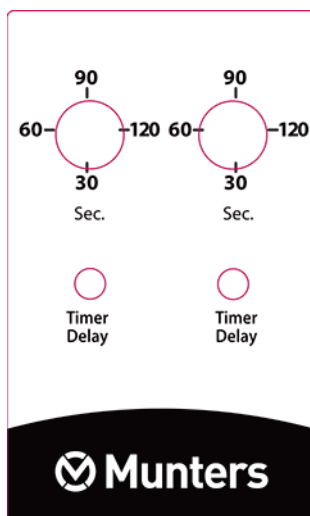


Figure 2: Timer Delay Unit

### 3.2.4 Platinum Fail Safe

In case of a failure in a Platinum controller, the RBU-27 SE:

- opens the selected air source (Inlet or Tunnel)
- turns on Fans 1-4
- lights the Controller Alarm LED

*NOTE Only Platinum Controllers support the Fail Safe feature.*

**WARNING!** On the Platinum Front Panel, set the Fail Safe Relay to Auto. Do not set the Fail Safe relay switch to ON. Setting the switch to On overrides the software; the relay is not released during a controller failure and RBU-27 SE does not operate!

Set a relay in the Platinum Controller to act as the fail-safe relay.

#### 3.2.4.1 Timer Delay

Normally, RBU-27 SE timers operate consecutively. Meaning, each device's begins to operate 1) only after the previous device is already operating and 2) after the device's delay time has elapsed. However, in Fail Safe mode all devices begin to operate simultaneously, after the 30 second delay time has passed.

#### 3.2.4.2 Setting the Relay

Platinum Software Version 3.0 and above includes a dedicated Fail Safe relay.

Go to *Management > Fail Safe* settings and configure the alarm type for the fail safe function.

### 3.2.5 Inlet/Tunnel Power Supply

Even during normal operations, power to the Platinum Controller Open Inlet/Tunnel is routed through the RBU-27 SE. When the RBU-27 SE takes control for opening the inlets or tunnel curtains, it disconnects power to the Platinum.

*NOTE The RBU-27 SE only opens inlets or tunnel curtains. It does not close them.*

Anytime that the RBU-27 SE detects that power is not being supplied via L1 it automatically activates Fans 1 - 4. In this case, the Control Failure LED is lit on the front panel.

# 4 Specifications

## Power Supply

Mains voltag	Single phase 115 VAC 50 - 60 Hz
Mains frequency	50-60Hz

## Relay Outputs

Resistive load	30 A, 277 VAC
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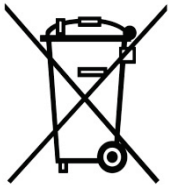
## Housing

Polycarbonate	UL 94-5V IP 65
Dimensions (L x W x H)	500 x 400 x 200 mm (19.7 x 15.7 x 7.9 inches)

## Ambient Climate

Operating temperature range	-10° to +50° C / (14° to 125° F)
Storage temperature range	-10° to +70° C / (14° to 158° F)
Operating humidity range	0 to 100%

## 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.

# 5 Installation

The following sections describe the installation process.

- Safety Instructions
- Mounting the Unit
- Platinum Controller Notes
- Wiring
- Drilling
- Appendix B: Electrical Grounding

## 5.1 Safety Instructions

To protect yourself and your controller, observe the following rules:

- ONLY an authorized electrician may install the RBU-27 SE.
- Disconnect the power to avoid electrical shock and damage.
- Install the RBU-27 SE in the service room to avoid exposing the unit to harmful gases or high humidity.
- Always disconnect the power before opening the front enclosure door.

**WARNING!** *There is a risk of an electric shock when working with the unit.*

**CAUTION** *Any use of the RBU-27 SE in way which is not specified by Munters may impair the equipment protection.*

## 5.2 Mounting the Unit

1. Connect the equipment according to the tags written on the PCB. Figure 4 displays some of the connections.
2. Connect the heater to Relays K24 and K25, fans to Relays K16 through K23, and cool pads to K26 and K27. Figure 14 displays the relay numbers. See Figure 5.
3. Make proper grounding connections.
4. Set the thermostats to the required temperatures and the timers to the required delay time.
5. Perform a primary controller failure to make sure the backup system functions.
6. Verify that the fans and heaters are working by moving switches to "ON" position.
7. Lower thermostats temperature set points and ensure they are functioning properly. Toggle between Inlet and Tunnel to see that they are also properly connected.
8. Toggle between Latch On/Off while the backup is active and turn the controller on and off to make sure everything is connected properly.

**NOTE** *If the RBU-27 SE is set to Latch On, the backup continues to function as the primary controller even after the controller starts working.*

### 5.3 Platinum Controller Notes

1. To power the Platinum Controller, apply 220 volts AC (single phase) to a Platinum power connector, and connect a safety ground to the Ground Bus.
2. In the RBU, connect Neutral to the 1st terminal.
3. Connect L1 for Inlet and Tunnel Machines from their circuit breakers to the corresponding terminal in the RBU. The backup turns L1 back out on the PWR pin immediately to the right of L1 inputs.
4. Connect the PWR pin to the corresponding relays in the Platinum Controller Electrical Grounding for Controllers.

### 5.4 Wiring

- Figure 5: Relay Connections to Controller – Section 3
- Figure 6: Vent Machine Wiring
- Figure 7: Fan and Cooling Wiring
- Figure 8: Heater Wiring
- Figure 9: Fail Safe Wiring
- Figure 10: Relays Diagram – Inlet / Tunnel – Section 3

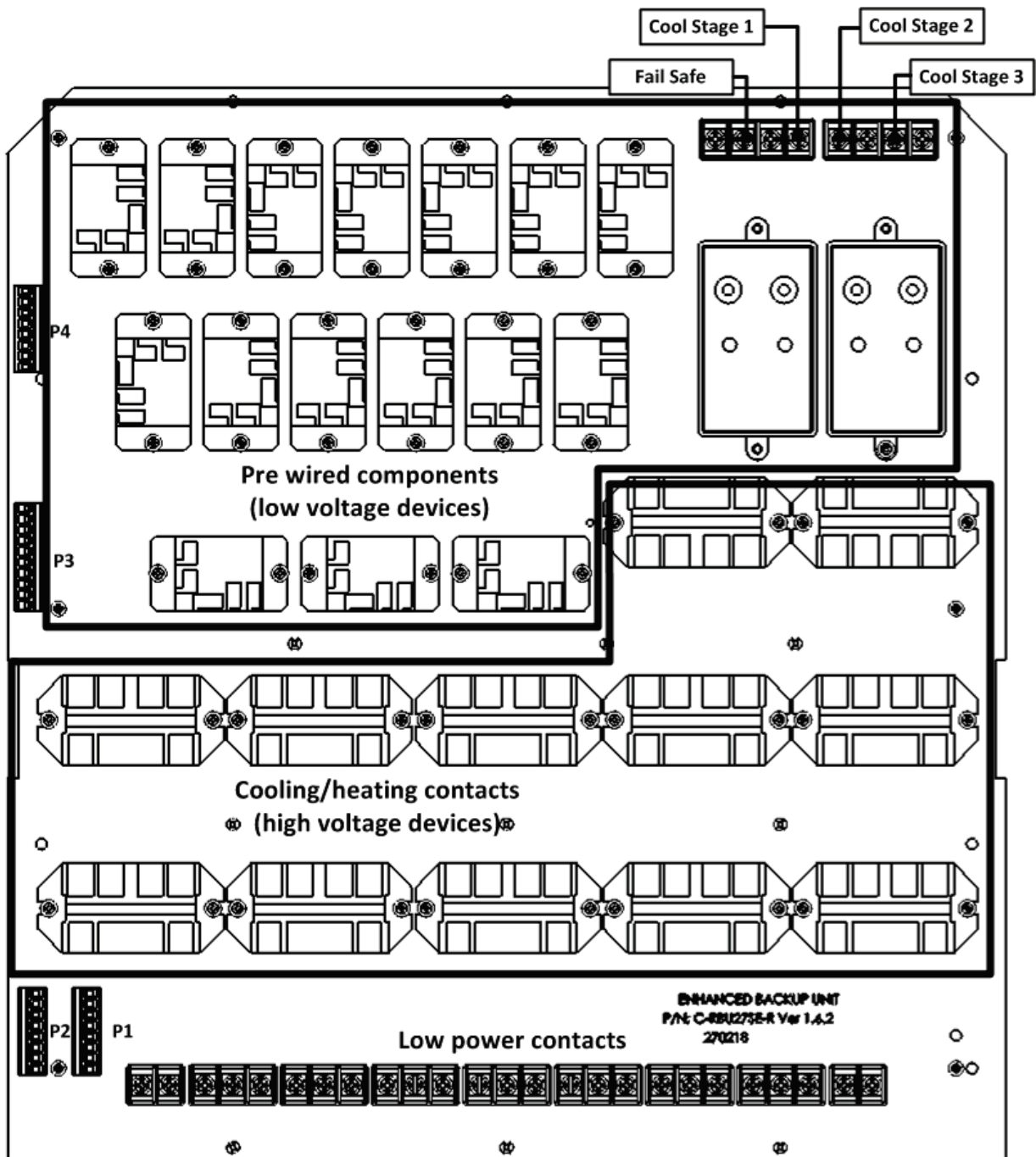


Figure 3: Card View

Figure 4 presents a view of the card divided into the following main sub-units:

- **Section 1 - Pre-wired sub-units:** Designed to be used only in case an error occurs. Only authorized technicians can replace or repair these subunits.
- **Section 2 - Fans and heater contacts:** Designed to define the relays that activate the cool pad, fans, and the heaters. Figure 6, Figure 7, and Figure 8 focus on defining the connections to the controller and other equipment.
- **Section 3 - Thermostat and vents connection sub-unit:** Illustrated in Figure 10. Designed to connect the Tunnel curtain and the Inlet.

Note that each cool pad, fan, and heater has a separate pair of relay contacts capable of directly driving the load. The board connections are written on the board in the following order (left to right):

- Neutral
- Inlet Line (L1)
- Power to Inlet
- Open1 and Open2
- Tunnel Line (L1)
- Power to Tunnel
- Tunnel Open
- Heat Line
- Thermostat common (TC)
- Thermostat normally closed (TNC)

A similar order applies for other heaters and fans.

During normal operation the Platinum Inlet/Tunnel curtain is connected through the RBU-27 SE PWR output (L1). In case of a Platinum failure or in case the RBU-27 SE thermostat reaches the set point (Main Controller failure), the RBU-27 SE takes control and cuts the PWR output to the Platinum and opens Inlet/Tunnel curtain. This feature prevents conflicting commands between RBU-27 SE and Platinum.

*NOTE Other powered devices (for example heaters or fans) are powered normally.*

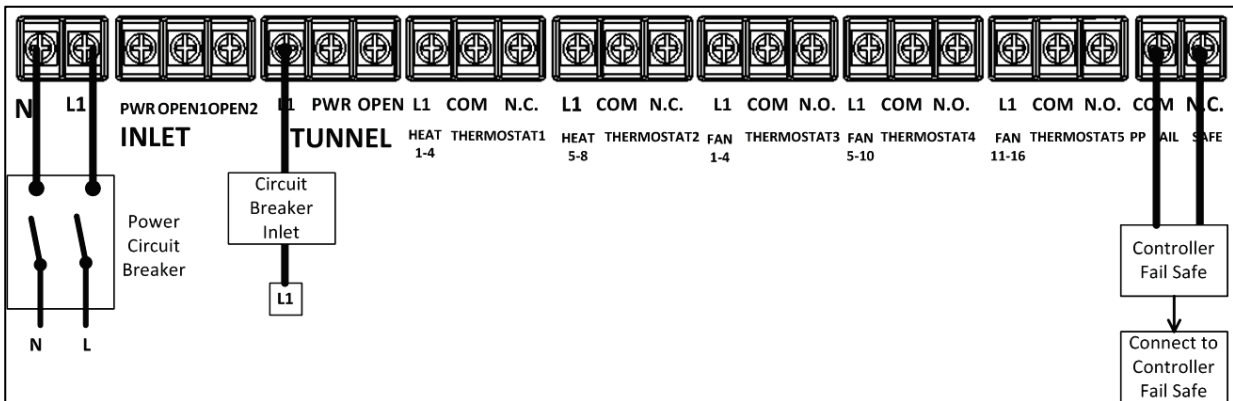


Figure 4: Relay Connections to Controller - Section 3

*NOTE The following drawings illustrate installation examples. In an actual installation the relays used can differ.*

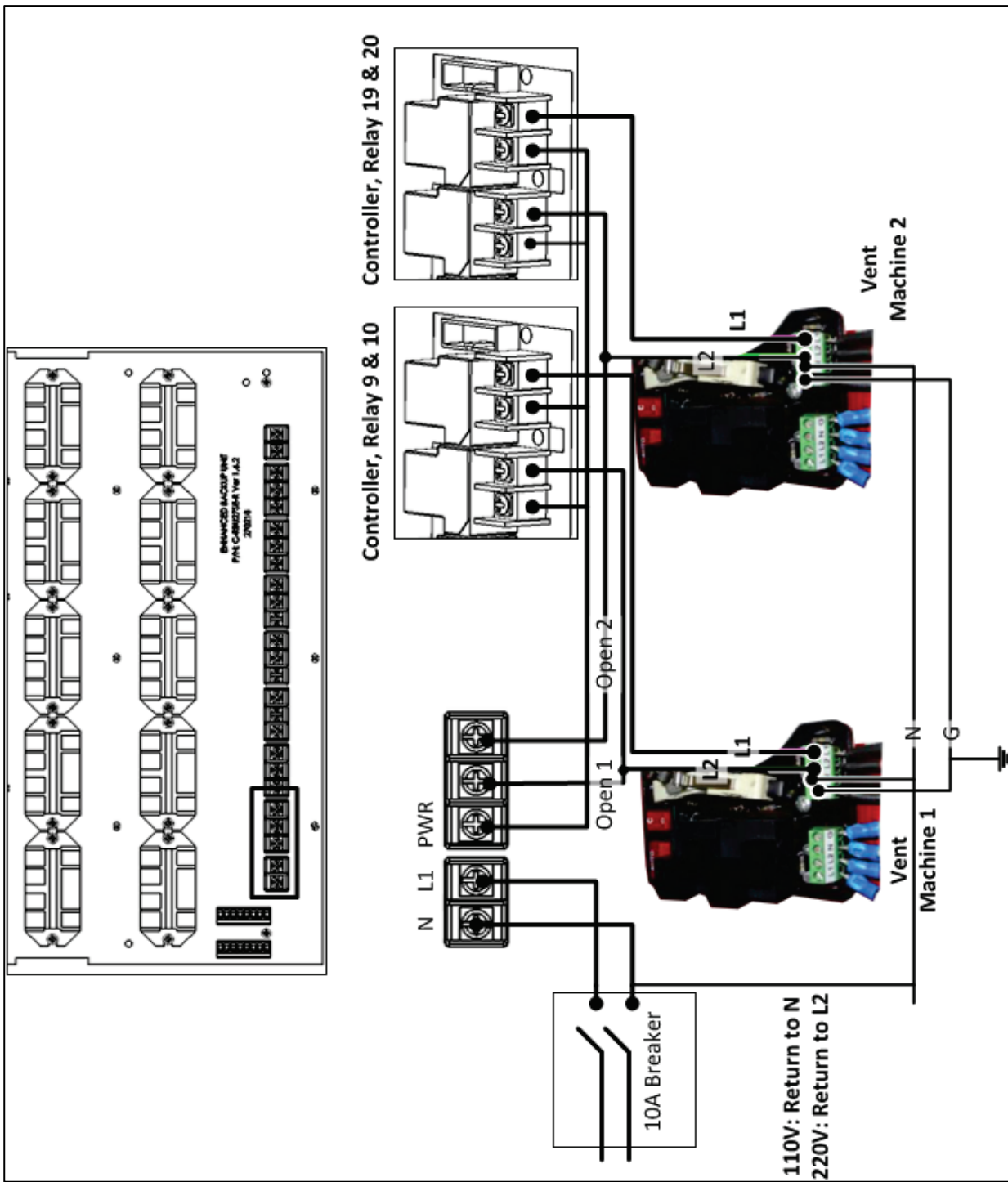


Figure 5: Vent Machine Wiring

**Notes:**

- During normal operation, the RBU-27 SE connects L1 through PWR to the Platinum relays. During emergencies, the RBU stops supplying power to the Platinum controller.
- The RBU-27 SE can only open the vent machines.
- If the vent machines operate backwards, swap the L1 and L2 wires at the Platinum relays or at the vent machine.
- Do not change the wiring on the vent machine left terminal.

**CAUTION** Connect a safety ground and follow the National Electrical Code!



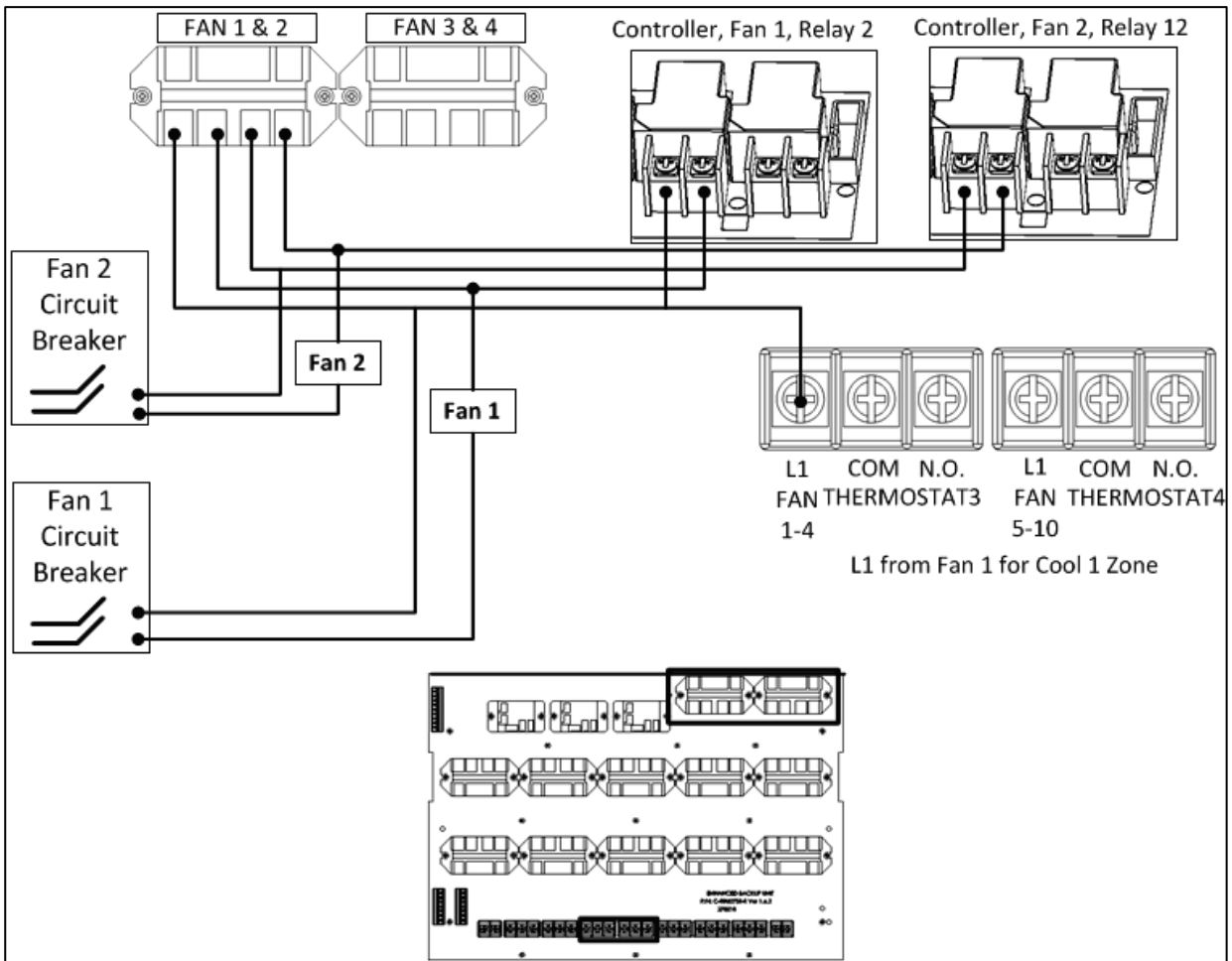


Figure 6: Fan and Cooling Wiring

**Notes:**

- The fans connect in standard order (meaning factory labeled) in the RBU-27 SE.
- Cool 1 (Platinum Relay) and Cool 2 (Platinum Relay) connect from the Platinum Extension Box to Fan 15 and Fan 16 terminals in the RBU-27 SE.
- Avoid using 120 volt motors (Cool 1 and 2) if possible. They stress Platinum relays more than 240 volt motors. If you do use 120 volt motors, derate from 2 HP UL about 50%.

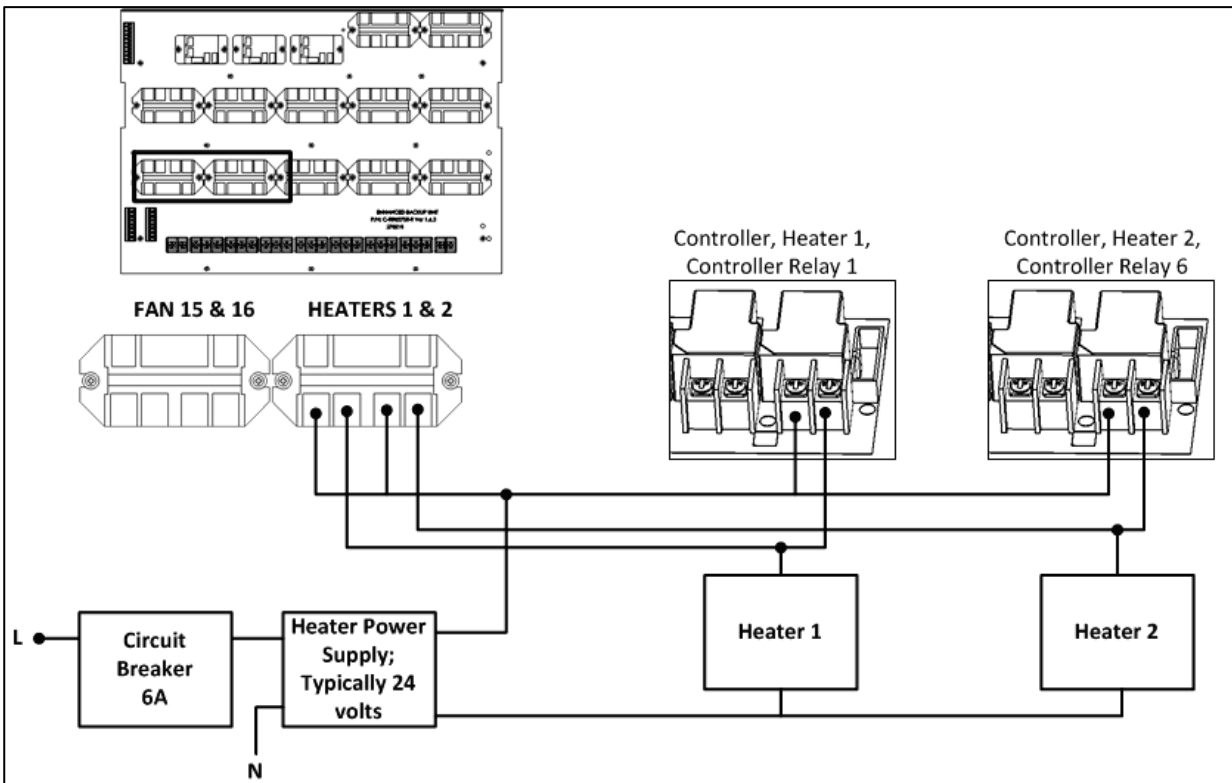


Figure 7: Heater Wiring

**Notes:**

- Connect L1 Power to the RBU-27 SE from the Heater 1 circuit breaker (not shown in diagram).
- Back up heaters in the brooding zone (up to 4).
- Backup turns heaters on in one zone (one thermostat).

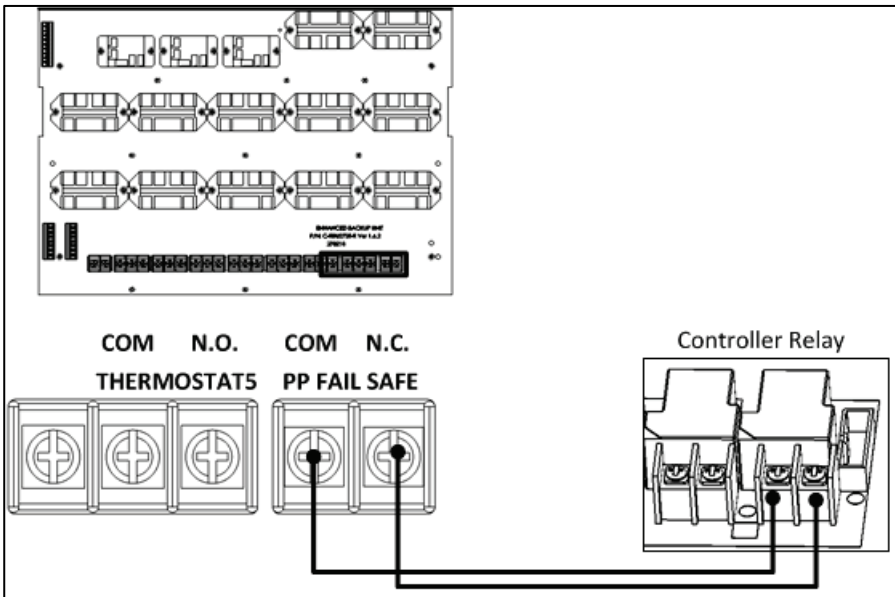


Figure 8: Fail Safe Wiring

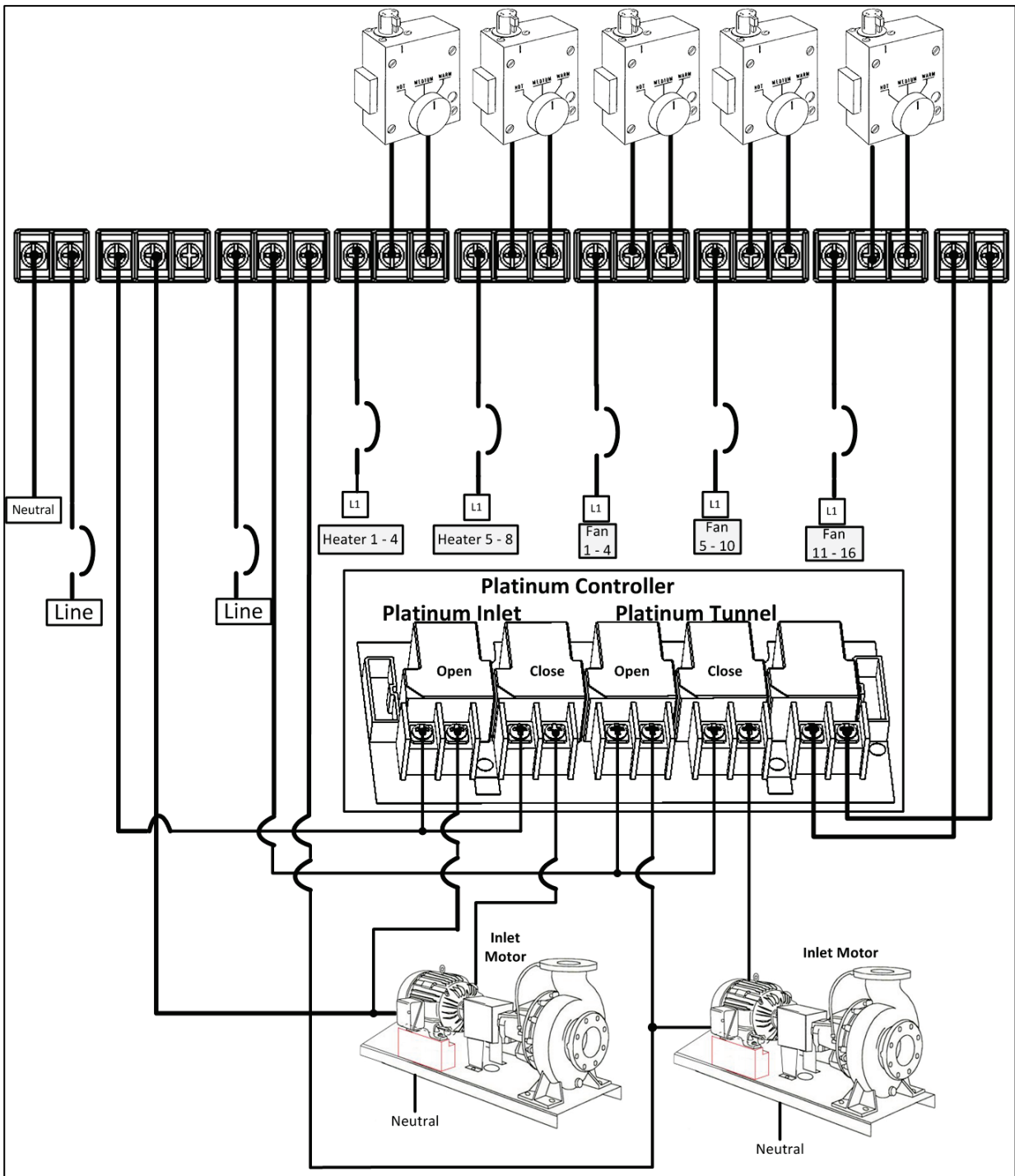


Figure 9: Relays Diagram - Inlet / Tunnel - Section 3

## 5.5 Drilling

Drill several holes on the bottom of the unit. Route the cables through these holes/

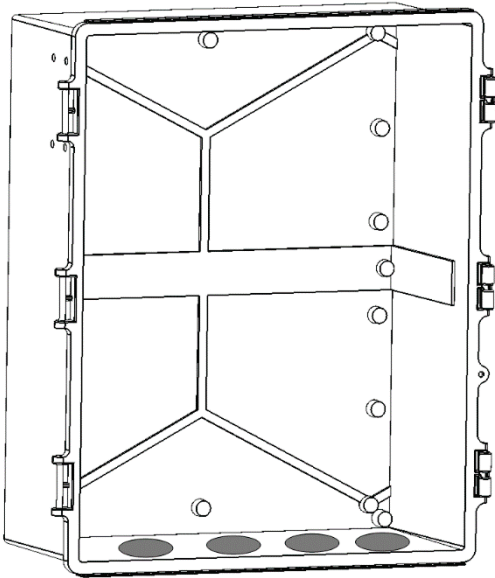


Figure 10: Hole locations (example)

*NOTE* Figure 11 is an example only. The number of holes in each installation depends on the number of cables being run.

# 6 Troubleshooting

The following sections detail how to troubleshoot the RBU-27 SE.

- General Issues
- Contactors and Terminals Issues

## 6.1 General Issues

Table 3 describes the outputs and their related relays. In case there is a problem check the following before troubleshooting your unit:

- Voltage
- Circuit breakers
- All other connections

After verifying that the above are operating, follow the instructions given in Table 3 .

Table 3: General Troubleshooting Issues

Issue #	Issue Description	Related Relay
1	Inlet open1 power fails	Replace K2
2	Inlet open2 fails	Replace K3
3	Tunnel open power fails	Replace K5
4	Fan 1 & 2 fails	Replace K16
5	Fan 3 & 4 fails	Replace K17
6	Fan 5 & 6 fails	Replace K18
7	Fan 7 & 8 fails	Replace K19
8	Fan 9 & 10 fails	Replace K20
9	Fan 11 & 12 fails	Replace K21
10	Fan 13 & 14 fails	Replace K22
11	Fan 15 & 16 fails	Replace K23
12	Heater 1 & 2 fails	Replace K24
13	Heater 3 & 4 fails	Replace K25
14	Cool Pad 1 & 2 fails	Replace K26
15	Cool Pad 3 & 4 fails	Replace K27

## 6.2 Contactors and Terminals Issues

Table 5, Table 6, and Table 7 detail troubleshooting issues that concern contactors and terminals. For layout issues, refer to Figure 14.

### 6.2.1 Contactor Check and Terminals Example

To check K4, ensure that the inputs/terminals settings are set as follows:

- TH1: • short
- TH2: • open
- TH3: • open
- TH4: • open
- TH5: • open
- PP-F: • short
- Latch: • off

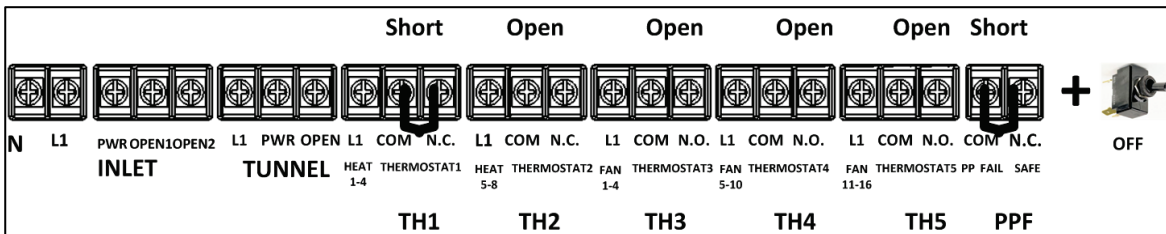


Figure 11: Shorting the unit

### 6.2.2 Internal Contacts

To check internal contacts:

1. With the power off, disconnect the quick connect from the COM, NO and NC relay terminals (Figure 13).
2. Turn the power back on.
3. Using an Ohm meter, check that the resistance between the COM and NO is zero (0), and the contact between COM and NC is open.
4. Turn the power OFF, and check that the contact between the COM and NO is open, and check that the resistance between COM and NC is zero (0).
5. Reconnect the quick connect to COM, NO and NC relay terminals and turn the power back on.

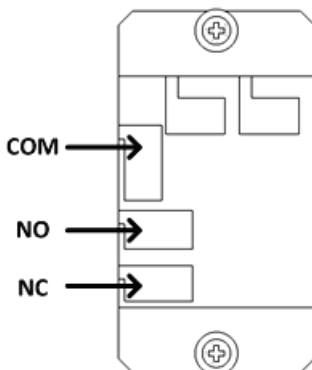


Figure 12: Testing internal contacts

### 6.3 Detailed Troubleshooting Issues I

Table 4: Inputs/Terminals

Inlet, All Switches-Auto						
TH1	TH2	TH3	TH4	TH5	PP-F	Latch
short	open	open	open	open	short	off
open	short	open	open	open	short	off
open	open	open	open	short	short	off
open	open	open	open	open	open	off
open	open	open	short	open	short	off

Table 5: Contactors K1-10

K1	K2	K3	K4	K5	K6	K7	K8	K9	K10
115V	115V	115V	115V	115V	115V	115V	115V	115V	115V
115V	115V	115V	115V	115V	115V	115V	115V	115V	115V
115V	115V	115V	115V	115V	115V	115V	115V	115V	115V
			115V	115V				115V	115V
			115V	115V				115V	

Table 6: Contactors K11-20

K11	K12	K13	K14	K15	K16	K17	K18	K19	K20
115V									
	115V	115V	115V	115V	115V	115V	115V	115V	115V

Table 7: Contactors K21-28

K21	K22	K23	K24	K25	K26	K27	K28
			115V	115V			
					115V	115V	115V
115V	115V	115V					

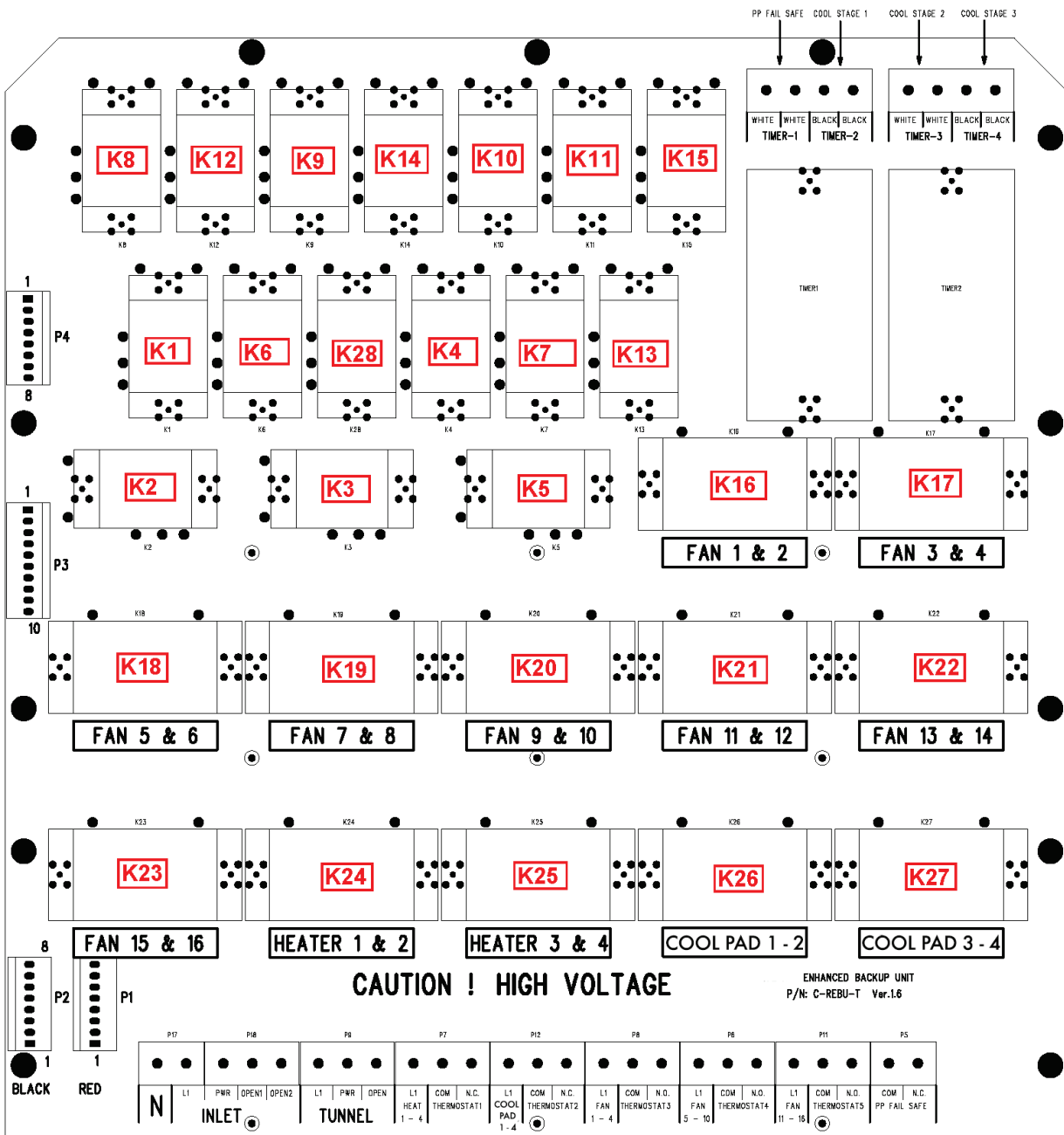

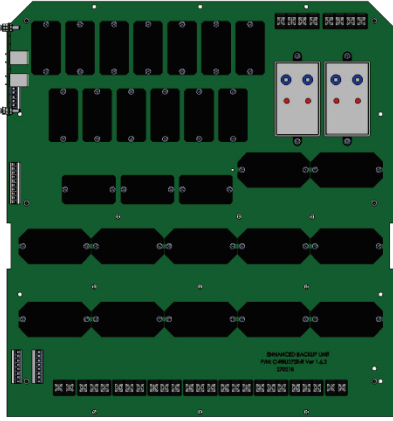

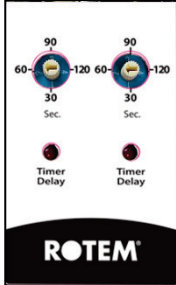




Figure 13: Contactor and Terminals Layout Map



Ordering Information

Part	Part Number	Part Description	Image
Controller	P-RBU-27 SE-CD4-V1	Enhanced Backup Stage SE 4 DLY Unit 115 V	
Card	C-RBU27-R	RBU-27 SE Relay Card (relays included)	
Card	C-RBU27-SC	RBU-27 SE Switch Card	
Timer	SP-EB-T2	RBU-27 SE Timer Delay Unit	
Relay	300034	Pre-Wired Relay	
Relay	300035	Large Relay (Contactor)	

# 7 Appendix A: Adding a Timer Stage

Adding a timer stage to the RBU-27 SE can save fuel costs. Rather than running fans continuously, adding a timer ensures that they are used only when needed.

The following diagram illustrates a system consisting of a timer wired to the RBU-27 SE relays coils.

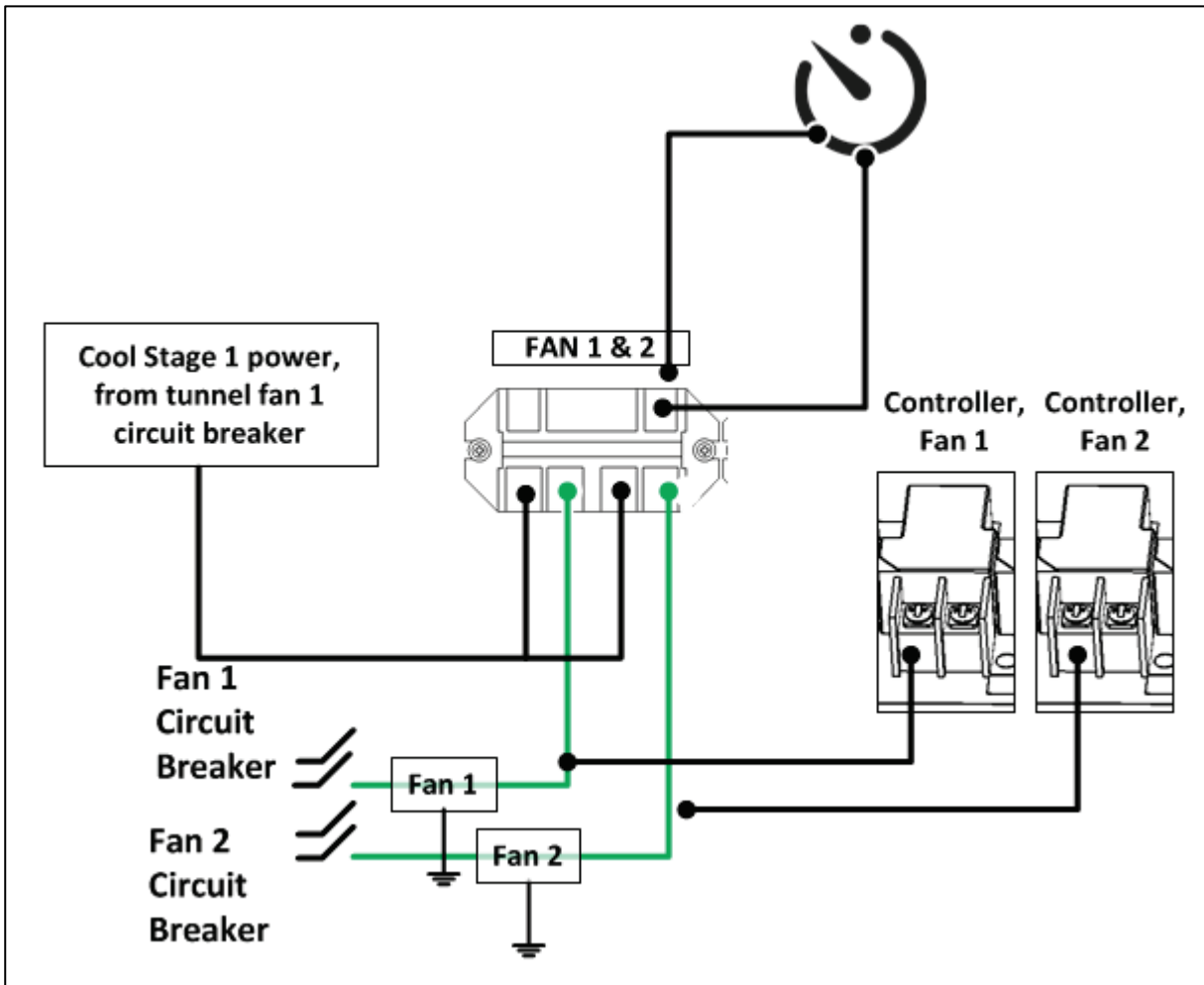


Figure 14: Backup Unit with an External Timer

The following diagram illustrates a system consisting of a timer and coolers wired to the RBU-27 SE relays coils. By wiring the unit to a timer, the RBU-27 SE becomes a four level cooling controller:

- Cool 1 on timer for minimum ventilation during cold/baby bird conditions
- Cool 1 on full time
- Cool 1 and 2 on full time
- Cool 1, 2 and 3 on full time

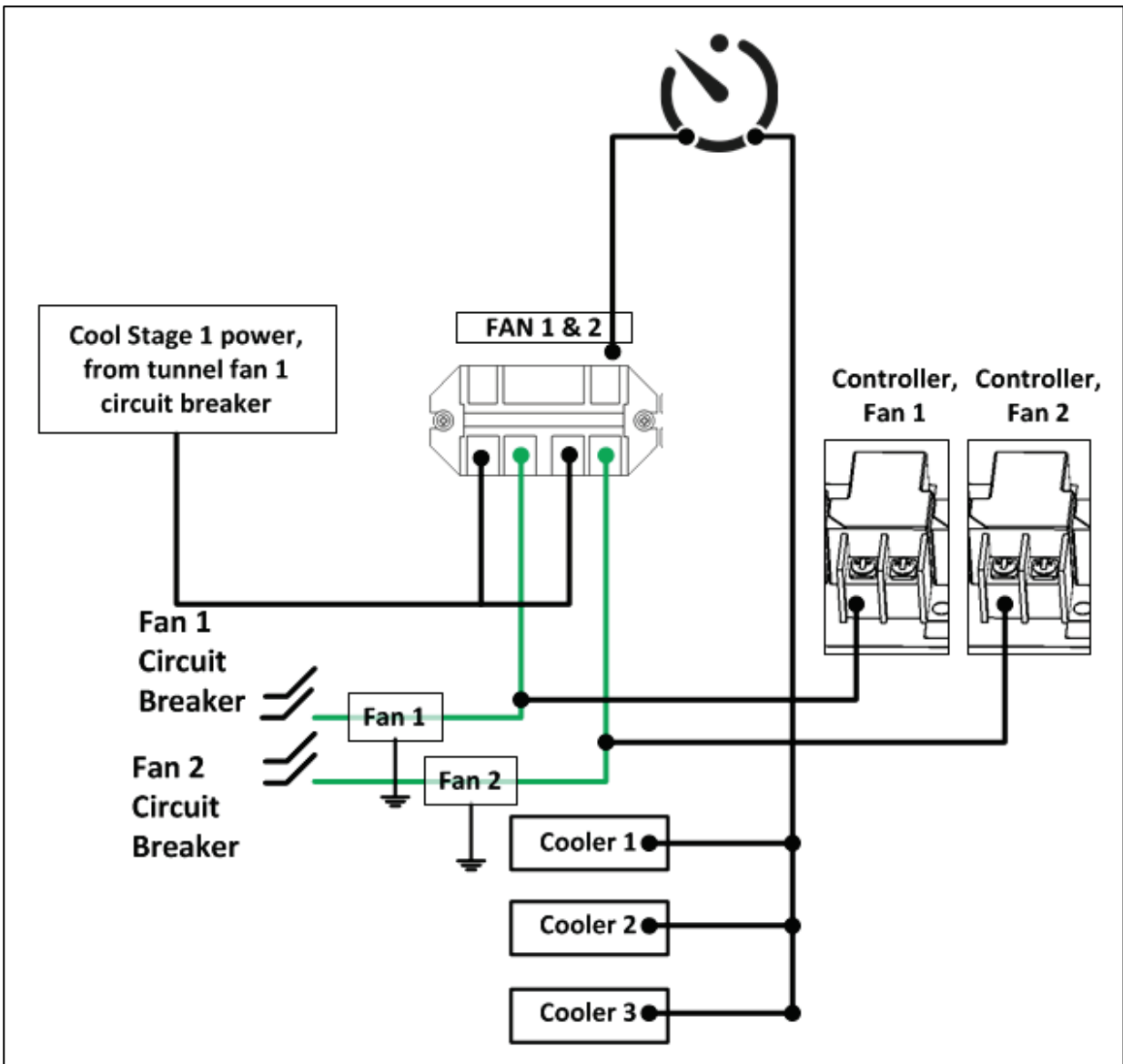


Figure 15: Backup Unit with an External Timer and Coolers

# 8 Appendix B: Electrical Grounding

- Electrical equipment can be destroyed or slowly damaged by voltage spikes, lightning hits, etc.
- Proper electrical grounding in combination with the RBU-27 SE internal protections is essential for system protection, reduction of systemic damage and prolongs its lifetime.
- Grounding reduces the risk of human injury.
- Proper grounding provides an easy path for an electrical current to return to its source.
- A grounding system should tie all non-current carrying conductors to earth ground (0 volts).
- The grounding system should present a minimum resistance to current flow.
- Make sure all items used are in proper condition. For example: a corroded wire clamp attaching a ground wire to a ground rod might add 100  $\Omega$  or more resistance to a system.
- Less than 25  $\Omega$  is considered good grounding.

## 8.1 Ground Rods

Ground rods are used to efficiently connect the system to earth where a current may dissipate in the soil.

- **Material:** Ground rods should be copper clad or galvanized steel.
- **Diameter:** Minimum 5/8", preferably 3/4". The larger the rod diameter, the lower its resistance to current flow.
- **Length:** Minimum 2.5 meters (8 feet), preferably 3-meter (10-foot). A longer ground rod will reach a soil with higher moisture content. Moist soil carries currents better than drier soil.
- **Single grounding:** It is important that there is only one grounding location where a rod or series of rods are connected to each other using a ground wire.
- Independent ground rods increase the risk of a current being dissipated through one rod and reentering the system through an adjacent rod (from a lightning strike for example).
- **Location:** Close to the main circuit breaker panel and in moist soil.  
For example: a usually wet area from a drip or a low spot where water drains.  
Make sure the area is well protected from damage by lawnmowers, tractors, etc.
- **Rod installation:** Drive rod into the earth until about 10 cm (4 inches) is left above grade. If it is impossible to drive the rod into the proper depth, it is acceptable to lay the rod horizontally, 80 cm (2.5 feet) below grade.
- If rod is exposed to damage (for example lawnmowers, tractors, and so on) install it in a hole, about 20 cm (8 inches) deep, so that the rod is about 10 cm under grade and 10 cm above the hole level.

*NOTE The National Electric Code (NEC) mandates two ground rods unless you can show less than 25  $\Omega$  resistance with one rod.*

## 8.2 Ground Wire

Ground wire: a large copper wire that connects main circuit breaker panel with ground rod.

- **Material:** Ground rods should be copper clad or galvanized steel.
- **Diameter:** 16 mm (6-gauge) copper wire is sufficient. If wire run is greater than 20 feet, 20 mm (4-gauge) wire is usable.
- **Length:** Minimum 2.5 meters (8 feet), preferably 3-meter (10-foot). A longer ground rod will reach soil with higher moisture content. Moist soil carries currents much better than drier soil.

**CAUTION** The ground wire should be protected from damage made by lawn mowers, tractors, etc. It should be buried a minimum of 15 cm (6 inches) under grade for protection and enter the house as soon as possible. It is important that the wire remains continuous and should not be cut.

### 8.3 Ground Clamps

Ground wires should not be wrapped around a ground rod. **Ground clamps** are used to attach a ground wire to a ground rod. The most common clamp is known as an acorn clamp. Make sure the ground clamps you select are made for outdoor use. Do not use pipe clamps made for inside water lines or hose clamps to attach the ground wire (see Figure 17).



Figure 16: Ground Connection

### 8.4 What Should Be Grounded?

- Any equipment that is, or could become energized, even accidentally, should be grounded.
- Electric circuits should be wired with a 3-wire conductor consisting of hot, neutral and grounding wires.
- The grounding wire should be attached cleanly and securely to devices or systems to be grounded. The other end of the grounding wire should be attached to the ground bus on the main panel.

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# 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 **RBU**s, (for example 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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