

# **TEMPEST™**



## **60" Mobile Ventilation Unit Operation Manual**

**Read and understand all information in this manual before operating the MVU.**

**For questions and additional information, contact the Tempest Technology factory at:**

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Manufacturer: Tempest Technology Corporation

Technical Information: The information contained in this operation manual, images, and data correspond to the product as of the date it was written. The Tempest MVU is in a continuous cycle of development and improvement. We reserve the right to make any changes or improvements that we consider to be appropriate. Any obligation to earlier delivered models shall not be connected herewith.

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## **Operating Instructions**

These operating instructions contain the descriptions for operation, maintenance and replacement parts. Before putting the MVU into service, take the time to thoroughly read this manual to familiarize yourself with it.

## **Standard Equipment**

The operating instructions contain descriptions of standard and non-standard equipment. For this reason, the equipment that you receive can deviate partially from these descriptions and/or images.

If your device should be equipped with different equipment that is not itemized or described in these operating instructions, please notify Tempest Technology. You will be informed by our technical staff about the correct operation and maintenance.

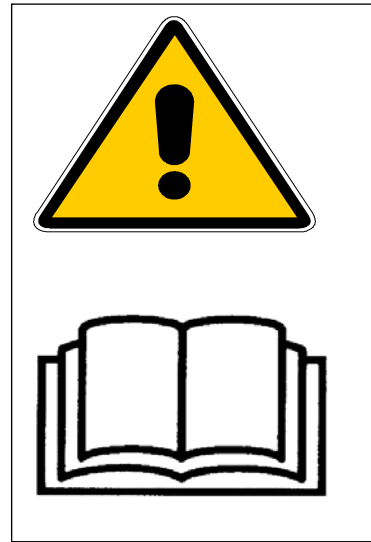
## General

Before operating the unit, read these operating instructions carefully in order to understand the correct operation and maintenance of the Mobile Ventilation Unit (MVU) and to avoid injury or damage to the MVU.

The Mobile Ventilation Unit is constructed with the latest state-of-the-art technology and safety features. Nevertheless, it can be dangerous for the user if not operated properly.

The MVU may only be serviced by personnel who have been properly trained in the hydraulic and operating systems maintenance.

Ongoing training with the MVU as well as education through specialty training will guarantee proper performance and reliability.



## **Warning Signs and Symbols**

### **Meaning**

#### **Warning Sign**

In the operating instructions, all safety warnings are marked with this sign.

It means that injury potential exists.

Follow all security warnings as well as the accident prevention instructions!



### **Meaning**



**DANGER!**  
Injury Danger!

Indicated to prevent personnel or extensive property damage.

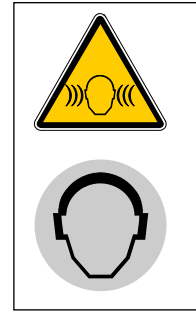


**ATTENTION!**

Special statement to prevent property damage and promote general cautious measures.

## **Safety Measures**

Wear operator ear protection when standing near the diesel engine and ventilator!



## **Emissions**

The diesel engine which powers the hydraulic system can emit poisonous exhaust fumes!

**Duration  
Sound  
Pressure  
Level**

Exhaust fumes can cause severe health damage!

**Exhaust  
Fumes**

Do not operate the ventilator in a closed, unventilated room! Dangerous exposure to carbon monoxide (CO) can result!



**Handling  
of Fuel**

Use caution when handling fuel – fire danger is increased!

Refuel the MVU only when the motor is turned off.

Do not refuel the MVU in a closed room; The fumes are poisonous and explosive!

Always clean up spilled fuel!

Be especially careful of sparks, open flame, large heat radiation, etc.!

**Protection  
Devices**

Only operate the ventilator if all protection devices and safety guards are in place!

Always disconnect the battery cables before removing any protection devices during inspection or periodic maintenance.

## Protective Clothing

To protect from the dangers of fire fighting operations, wear appropriate protective clothing and safety equipment. For hazardous materials or decontamination incidents, wear appropriate safety clothing.



## Ventilator Operation

Never operate the MVU when on a slope of more than +/- 5 degrees longitudinal slope or +/- 2 degrees lateral slope. Never move the MVU or vehicle when fully elevated or during fan operation.

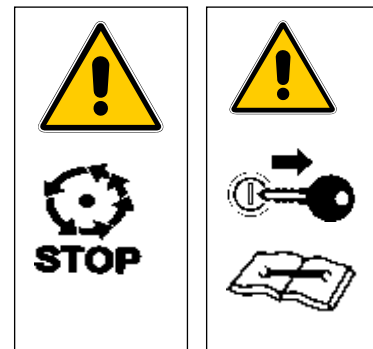


Observe the gauges for the hydraulic oil pressure while operating the MVU.

## Maintenance

Maintenance and service should only be conducted by persons who are properly trained and know the safety precautions and accident-prevention procedures.

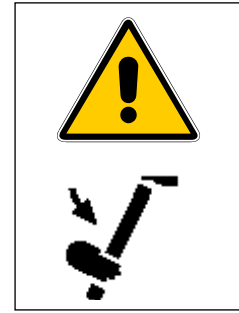
Disengage the battery cable prior to performing any service or maintenance.



## Protective Devices

The dismantling of protection-devices and security arrangements may be required during maintenance and service. Directly after completion of the work, all protective devices must be reinstalled and security arrangements again tested.

***The MVU may not be operated in an explosive environment!***



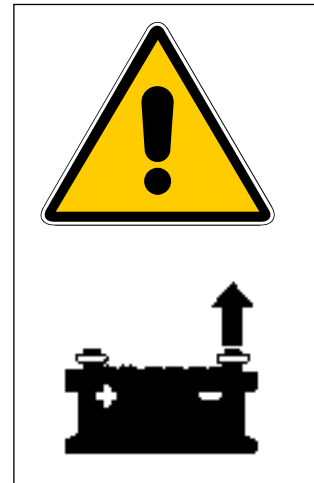
## Electrical System

Work on the electrical system may only be performed by an electrician or by trained personnel under the direction and supervision of an electrician in accordance with proper guidelines and procedures.

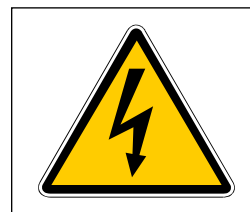
When working on the electrical system, disconnect the cable of the negative terminal of the battery.

When connecting of the battery, – first install the cable to the positive terminal, and then the cable to the negative terminal.

No metal objects should be placed on the battery – this creates the danger of a short circuit.



Problems, like a loose connection and/or frayed cable must be repaired immediately.



## Battery

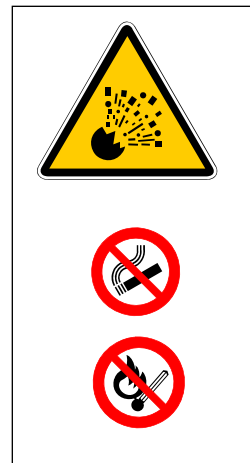
Follow the safety warnings on the vehicle battery!

### Explosion Danger!

Fire, spark, open flame and smoking are forbidden!

Avoid any spark sources when working with the cable and electric devices!

Avoid short circuits!

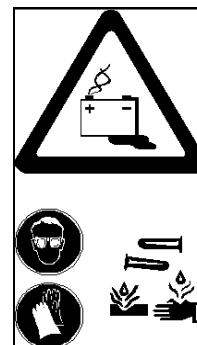


### Personnel Warning!

Battery acid is extremely corrosive, therefore:

- ◆ Wear hand protection.
- ◆ Wear eye protection.

An unloaded battery can freeze, therefore store it where it will not freeze!



## Disposal

Properly recycle old batteries in an authorized recycling facility.

**Spare parts** During maintenance and replacement of parts, only original parts from Tempest Technology Corporation may be used.

The use of spare parts and accessories that do not come from Tempest Technology Corporation or are not tested and approved by Tempest, can adversely affect the durability and performance characteristics of the MVU and affect operator safety!

**Environment Protection Measures** Recycle oils, fuel, battery, and filters in accordance with the legal and environmental rules!

Never dispose of in water or rivers!

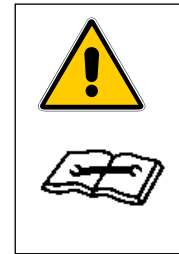
Store used fluids only in approved containers!

Before throwing away a part or fluid, note the correct disposal procedure.

**Maintenance  
Support and  
Service**

If problems occur during the maintenance and service of the ventilator, please contact:

Tempest Technology Corporation  
4708 N. Blythe Avenue  
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## **MVU Specifications**



***Trailer-Mounted MVU-60***

**Ventilator Manufacturer:** Tempest Technology Corporation  
**Type:** 60" Trailer Mounted MVU

### **Overall Specifications**

Total Height:	148 inches
Total Width:	98 inches
Total Length:	308 inches
Total Weight:	17,200 pounds (approximate)

### **Blower Assembly**

Shroud Diameter:	60 inches
Shroud Material:	Steel
Impeller:	7-blades, aluminum

### **Blower Performance**

<b>Impeller Speed:</b>	1,160 RPM maximum
<b>Output at fan outlet:</b>	129,000 CFM at the outlet
<b>Total Air Output:</b>	150,000 CFM with entrained air

## **Fan Adjustment**

<b>Scissors Lift:</b>	112" elevation
<b>Rotation:</b>	360 degrees, continuous
<b>Tilt Up:</b>	30 degrees
<b>Tilt Down:</b>	30 degrees

## **Hydraulic Control System**

<b>Maximum Hydraulic Pressure</b>	
<b>Aux Devices (Scissor/Yoke/Tilt):</b>	2,250 PSIG
<b>Maximum Hydraulic Pressure Fan:</b>	5,000 PSIG
<b>Hydraulic Tank Capacity:</b>	50 gallons

## **Control Systems (Electric and Electric over Hydraulic)**

Fixed Panel with controls:

- Ventilator On and RPM
- Gauges for hydraulic pressure
- Controls for ventilator scissors, tilt and rotation
- Emergency shut-down switch
- Master power disconnect switch

Wired Remote Control:

- Portable control box
- Ventilator On and RPM
- Tilt, up/down
- Rotation, left/right
- Scissors lift, up/down
- Emergency shut-down switch

## **Body Work**

- Silencer hood mounted over diesel engine, hydraulic pump, reservoir, and oil cooler with roll-up doors for access to control panel, engine and hydraulic system.

## **Safety Features**

- Emergency shut-down switch (entire system).
- Steel fence running along both sides and end of the scissors platform.
- Acoustic warning during lowering of fan unit.

## **Water Mist System**

The MVU misting system is used for knocking down suspended gases, providing additional cooling during ventilation operations and protection of exposures. It can also be used for decontamination purposes.

<b>Misting Ring:</b>	1.5" diameter stainless steel, 12 nozzles
<b>Flow Rate:</b>	450 lpm @ 7 bar (130 GPM @ 100 psi)
<b>Reach:</b>	40 meters (130 feet)
<b>Droplet Size:</b>	200 microns
<b>Supply:</b>	Central duct system



***Misting Ring***

A misting ring made from 1 1/2" diameter stainless steel tubing is mounted forward of the propeller inside the ventilator-shroud. A total of twelve evenly spaced, 65 degree spray pattern nozzles on the ring provide a homogenous water fog.

The air stream generated by the ventilator is utilized to transport the water vapor. At a flow rate of 3490 liters/minute and a delivery pressure of 7 bar the reach of the stream is over 40 meters.

The finely dispersed droplets of the water vapor absorb heat, inert fumes, and wash-down hazardous vapors. Flow rates may be decreased or increased if so desired.

The heat absorption capacity amounts to 23,500 BTU/sec.



Water line connection, 1 1/4" FPT ball valve.

## Clinometer



Indicates the degree of slope of the surface that the MVU is sitting on. Reads both lateral and longitudinal slope. MVU scissors lift **must not** be elevated when the clinometer exceeds either of the slope parameters listed below:

### **IMPORTANT:**

- Maximum lateral slope is two degrees ( $2^{\circ}$ ) in either direction.
- Maximum longitudinal slope is five degrees ( $5^{\circ}$ ) in either direction.

## Master Disconnect

The Master Disconnect turns off all power to the control panel. It is located on the right hand side of the MVU control panel. The Master Disconnect Switch should be OFF during storage of MVU.



## **Rotation Locking Pin**

The MVU features a rotation locking pin to prevent wear and tear on the rotation system during transport. The locking pin must be released prior to operating the MVU. The locking pin is located on the operator side of the MVU at the top of the scissors lift platform.

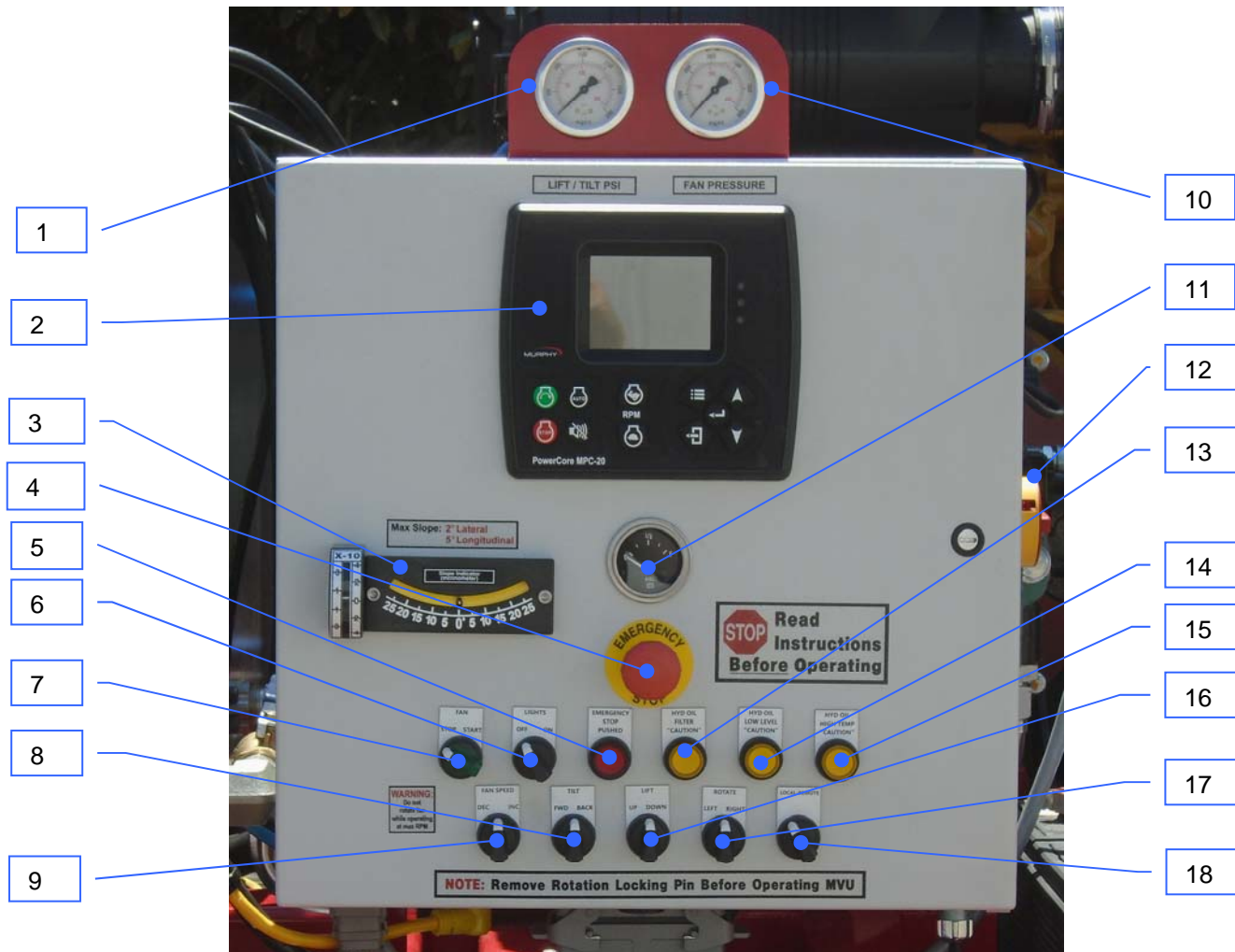


Locking Pin Engaged



Locking Pin Released

## MVU Control Panel Features and Operation

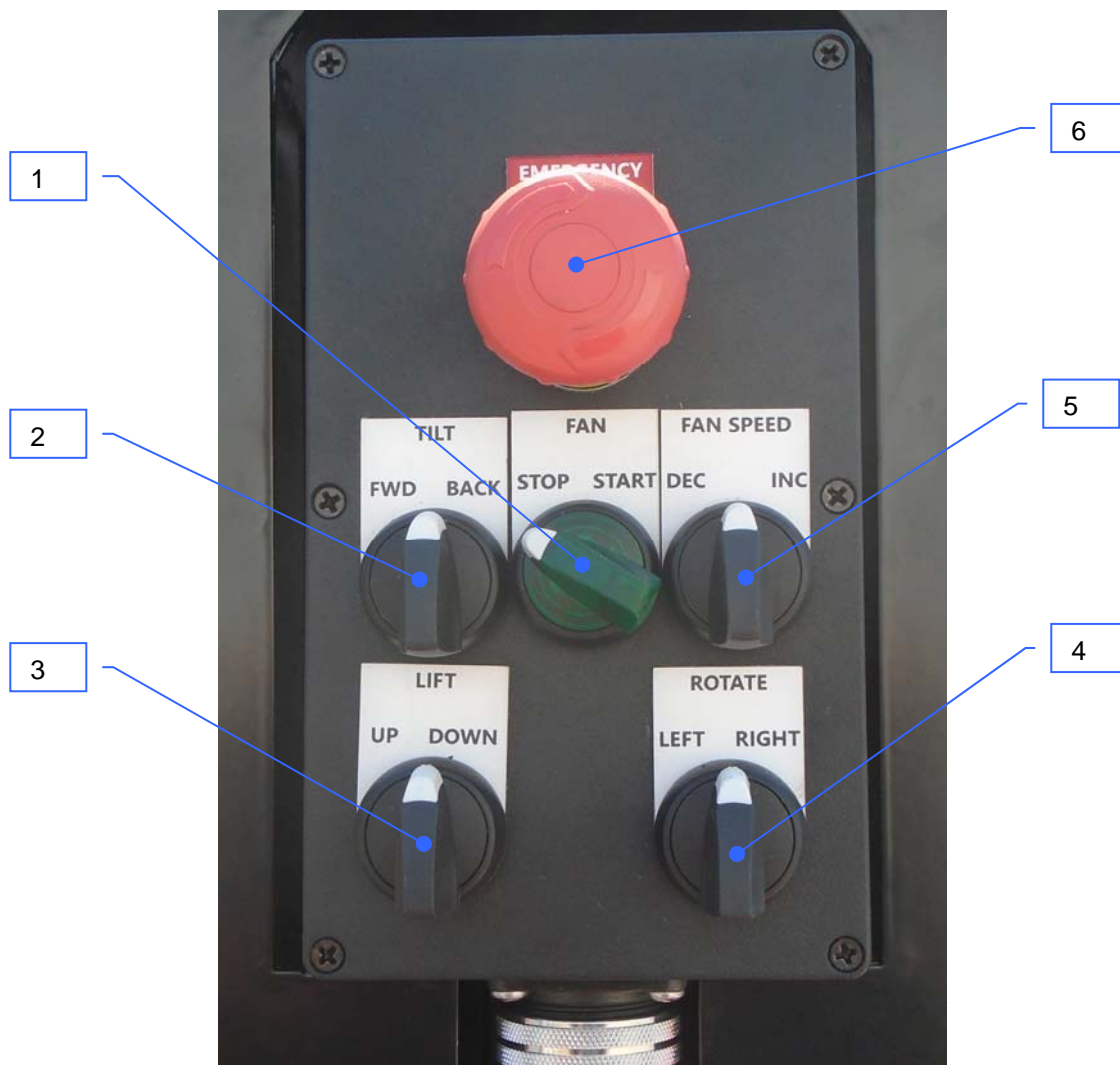


- |   |                               |    |                                     |
|---|-------------------------------|----|-------------------------------------|
| 1 | Lift/Tilt Hydro Pressure      | 10 | Fan Motor Hydro Pressure            |
| 2 | Engine Control / Data Display | 11 | Engine Fuel Gauge                   |
| 3 | Clinometer                    | 12 | Master Power Disconnect             |
| 4 | Emergency Stop                | 13 | Hydraulic Filter Warning Light      |
| 5 | Emergency Stop Warning Light  | 14 | Hydraulic Level Warning Light       |
| 6 | Compartment Light Switch      | 15 | Hydraulic Temperature Warning Light |
| 7 | Fan Start/Stop Switch         | 16 | Scissors Lift Up/Down               |
| 8 | Fan Tilt Forward/Backward     | 17 | Fan Rotate Left/Right               |
| 9 | Fan Speed Control             | 18 | Local/Remote Control Switch         |

Control Panel Feature		Description
1	Lift/Tilt Hydro Pressure	Shows hydraulic oil pressure in the auxiliary pump system (Scissors lift, Tilt).
2	Engine Control / Data Display	Use to start the engine, set engine speed, and to turn the engine off. Shows engine RPM, temperature, volts, oil pressure. Used to access Engine Control Module (ECM) Data.
3	Clinometer	<b>NEVER</b> Exceed +/- 5 degrees longitudinal slope (front to back) or +/-2 degrees lateral slope (side to side).
4	Emergency Stop	This will shut down the engine and hydraulic system.
5	Emergency Stop Warning Light	Indicates that one of the Emergency Stop switches is activated.
6	Compartment Light Switch	Turns on two interior compartment lights.
7	Fan Run (Start/Stop) Switch	Turns on the fan motor hydraulic circuit.
8	Fan Tilt Forward/Backward	Turn <b>TILT</b> switch to <b>DOWN</b> to tilt fan down, <b>UP</b> to tilt fan up.
9	Fan/Engine Speed Control	After the fan has been engaged, the fan RPM can be adjusted with the <u>FAN SPEED CONTROL</u> . To <b>increase the fan speed</b> , turn the switch to <b>INC</b> . To <b>reduce fan speed</b> , turn the switch to <b>DEC</b> .
10	Fan Motor Hydro Pressure	Show hydraulic oil pressure in the fan motor hydraulic system.
11	Engine Fuel Gauge	Indicates the diesel fuel level.
12	Master Power Disconnect	Turns off all power to the control panel. The Master Disconnect Switch should be OFF during storage of MVU.
13	Hydraulic Filter Warning Light	Illuminates when the oil filter of the hydraulic system needs to be changed.
14	Hydraulic Level Warning Light	Illuminates when the oil level in the hydraulic tank is low.
15	Hydraulic Temperature Warning Light	Illuminates when the temperature of the hydraulic oil reaches 190 degrees fahrenheit. Turn off ventallator and continue running the engine until the temperature cools and the light goes off. The hydraulic cooling fan starts when the oil temperature reaches 145 degrees fahrenheit.
16	Scissors Lift Up/Down	Turn <b>LIFT</b> switch to <b>UP</b> to raise fan and to <b>DOWN</b> to lower fan. Acoustic warning signal sounds during lowering function.
17	Fan Rotate Left/Right	Turn the <b>ROTATE</b> switch <b>CCW</b> (counter clockwise) or <b>CW</b> (clockwise), 360° continuous in either direction. <b>WARNING: DO NOT rotate ventilator while operating at high fan RPM. Reduce fan speed before rotating.</b>
18	Local/Remote Control Switch	Set switch to <u>LOCAL</u> if using the control panel to operate MVU. Set to <u>REMOTE</u> if using the remote control.

## Remote Control System

- |                              |   |
|------------------------------|---|
| <b>1 Fan Start</b>           | Activates FAN SPEED CONTROL (#5 below)                  |
| <b>2 Ventilator Tilt</b>     | <b>FWD</b> = Tilt Fan Down / <b>REV</b> = Tilt Fan Up   |
| <b>3 Ventilator Lift</b>     | <b>UP</b> = Raise Fan / <b>DOWN</b> = Lower Fan         |
| <b>4 Fan Unit Rotate</b>     | <b>LEFT</b> = Rotate Left / <b>RIGHT</b> = Rotate Right |
| <b>5 Fan Speed</b>           | <b>INC</b> = Faster Speed / <b>DEC</b> = Slower Speed   |
| <b>6 Emergency Shut-Down</b> | Shuts Down Hydraulic System and Fan                     |



## **Operating the Mobile Ventilation Unit**

At any point during operation that a problem / emergency arises, press the emergency stop button on the main panel or remote. All functions will stop, including the fan and the engine.

### **Engine / Fan Operation**

#### **Start up.**

Check that the emergency stop buttons on both the remote control and the control panel are reset.

Check that the “Local / Remote” switch on the control panel is set to “Local”.

Set the “Master Power Disconnect Switch” to on.

Wait for the Engine Control / Data Display to power up and indicator lights to clear.

Press the start button on the Engine Control / Data panel. The engine will start on its own. Allow engine 3 minutes to warm up after the first start up each day.

#### **Fan operation for both local panel and remote-control system**

Once the engine has warmed up, press and hold the increase RPM button on the engine control panel. The RPM will ramp up to 2200 RPM.

Set the “Local / Remote” switch on the control panel to the desired function

Set the fan start switch to start.

Turn and hold the fan speed switch to “increase” for four seconds to start fan rotation and then release the fan speed switch.

You can then increase the fan speed to the desired speed rate by momentarily turning the fan speed switch to the increase position. With each momentary turn of the switch the fan speed will increase until maximum fan speed is achieved.

If you continue to hold the speed switch in the “increase” position the fan will ramp up to full RPM.

You can decrease the fan speed to the desired speed rate by momentarily turning the fan speed switch to the decrease position. With each momentary turn of the switch to decrease, the fan speed will decrease until minimum is achieved.

## Shutting down the fan

To shut down the fan, hold the speed switch in the “decrease” position, the fan will ramp down and come to a full stop. Once the fan has come to a full stop, release the speed switch and turn the “Fan Stop Start” switch to stop.

## Engine shut down.

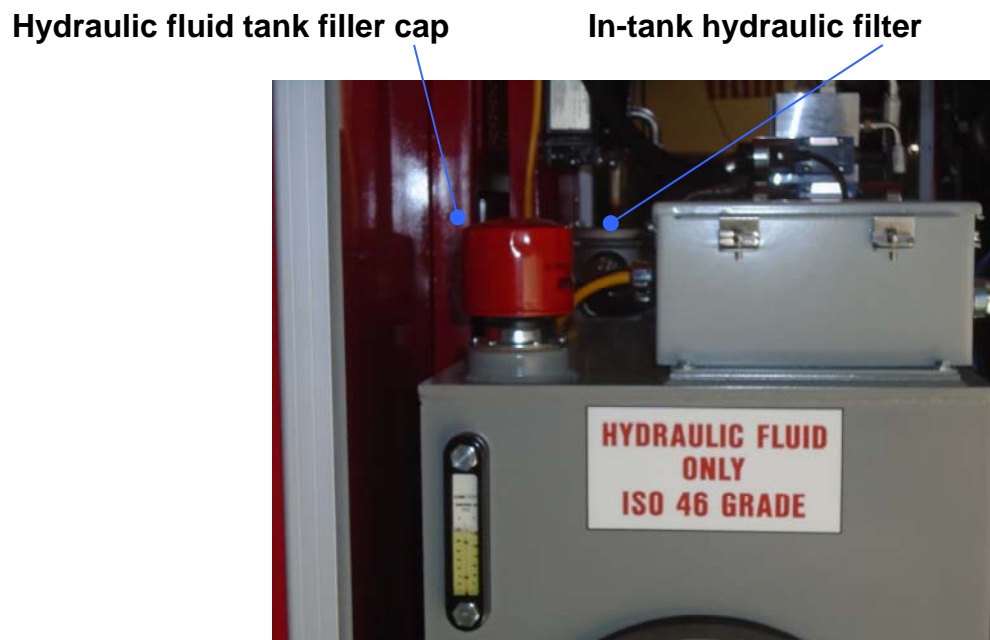
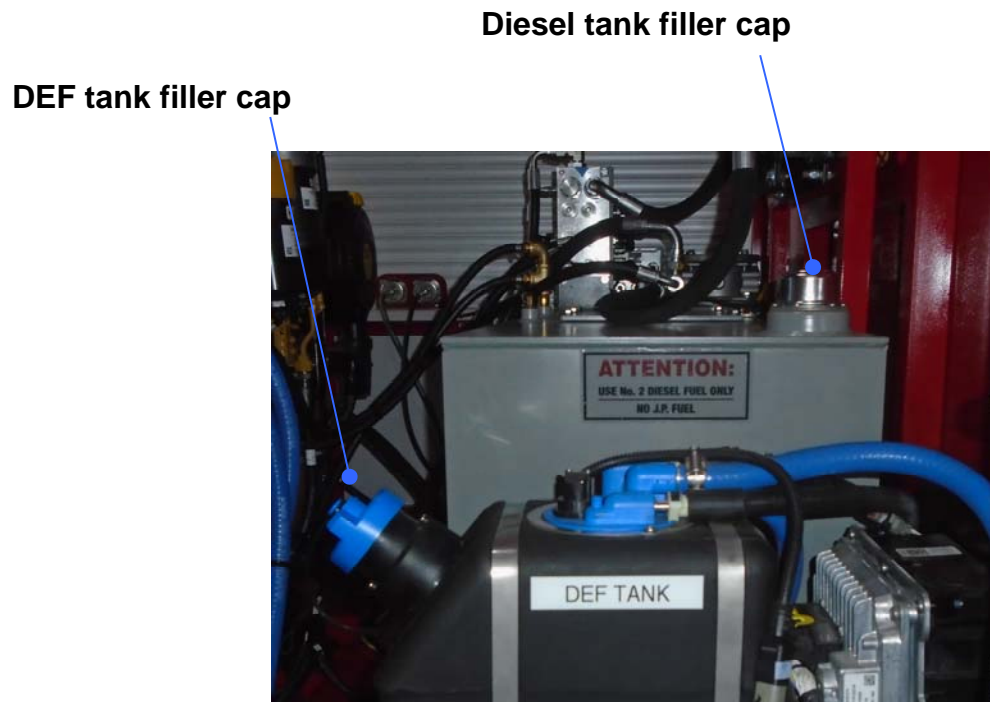
Press and hold the decrease RPM button on the engine control panel. The engine RPM will ramp down to idle. Allow the engine a three-minute cool down at idle speed. After three minutes, press the stop button on the Engine Control / Data panel and the engine will turn itself off.



Panel is set to display engine RPM, engine temperature, volts, engine oil pressure, DEF tank fluid level %, and soot % in exhaust treatment system.

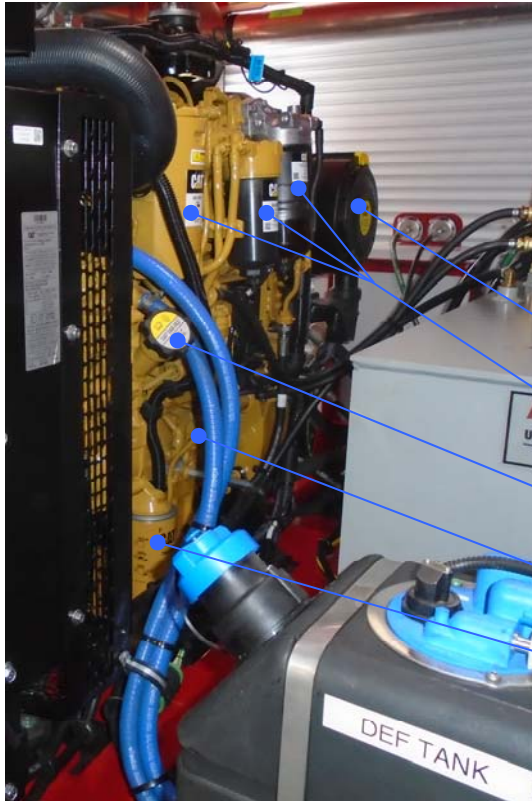
Note; see the MCP-20-R2 operations manual for additional engine control panel information.

## Fuel, DEF, and Hydraulic Fluid



## Engine Access Compartment

The diesel fuel filter, hydraulic system filter and engine oil dipstick can be accessed through the compartment on the left side of the MVU.



Engine Air Filter

Diesel Filters

Engine Oil Fill Spout

Engine Oil Dipstick

Engine Oil Filter

Draining the engine oil.



From under the trailer, connect a hose from the drain valve on the engine oil pan and into a waist container. Open valve to drain the oil. Close the valve and remove the hose when finished.

## **MVU Maintenance Schedule**

### **Prior to Each Operation**

1. Check hydraulic oil level.
2. Inspect hoses and fittings for leaks or abrasions.

### **Every 250 Hours or 3 months**

1. Apply a light film of grease to rotation spur gear to prevent corrosion.
2. Lubricate scissor hydraulic lift cylinders (4 places) (See next page)
3. Lubricate rotation system bearing via four grease zerks located on the inside face of the rotation bearing through the top center of the yoke (See next page)
4. Lubricate fan shaft bearings via the remote grease zerks located on the bottom of the fan housing (2 places) (See next page)
5. Lubricate fan tilt bearing pillow blocks (2 places) (See next page)
6. Lubricate fan tilt cylinder (2 places) (See next page)
7. Lubricate yoke lift cylinders (4 places) (See next page)

### **Every 1,000 Hours or 1 Year**

1. Replace In-Tank Hydraulic Oil Filter Element

### **Every 2,000 Hours or 2 Years**

1. Replace Hydraulic Air Intake Filter



### Grease Points

- A. Eyelet of cylinders (Lift cylinders x 4,)
- B. Underside of Fan Housing x 2
- C. Rotation Bearing Zerk x 2
- D. Fan Tilt Bearings (X2)

IMPORTANT: Lubricate with a high NLGI no. @ Lithium-base grease having rust inhibitors and antioxidant additives, and a minimum oil viscosity of 500 SUS at 38°C (100°F)

## **Troubleshooting Guide**

Follow these instructions if any of the systems on the MVU are not working properly. If the problem cannot be resolved, please contact Tempest Technical Support at (559) 277-7577 (M-F 8 a.m. – 5 p.m. PST).

### **PROBLEM: The rotation system does not turn**

The rotation system is electrical and operates via the control panel or remote switch.

1. Check that the power voltage is between 24 – 26 VDC.
2. Ensure the “Local/Remote” switch on the control panel is in the proper position.
3. Check for loose wires on the switch.
4. Check fuses in control panel box.

### **PROBLEM: The scissors lift, yoke lift and fan tilt are not working.**

The lift, yoke and tilt systems are separate in function but are the same in design. Each system is controlled through a directional control valve to actuate the extension and retraction of the cylinder.

#### **POTENTIAL CAUSE: The electrical system.**

1. The Local/Remote switch is in the wrong mode. Check to make sure the switch is set to the correct position.
2. Check for loose wires on the switch and junction box terminals.
3. Check continuity across the solenoid valve coils.
4. Check fuses in control panel box.

#### **POTENTIAL CAUSE: The hydraulic system.**

1. Check hydraulic fluid level.
2. Check that the Aux. Pressure is registering pressure when the switch is turned.
3. Check for kinked or pinched hoses.

### **PROBLEM: Warning lights are “ON”**

#### **YELLOW LIGHT: Hydraulic Oil Filter**

1. Filter has excessive contamination and requires replacement.
2. The switch inside the tank is malfunctioning. Replace the switch to the sending unit.
3. Loose wire connection between the sending unit and the light.

#### **YELLOW LIGHT: Hydraulic Oil Temperature.**

1. Oil level is low (below sight glass).
2. Oil filter is clogged.
3. High ambient air temperature (+125 degrees Fahrenheit)
4. Cooling fan malfunction. The cooling fan will turn “ON” at 145 degrees F.

5. Gauge is malfunctioning (check analog gauge).

**YELLOW LIGHT:** Hydraulic Oil Level

1. Oil level is low (below sight glass).
2. Gauge is malfunctioning.

**RED LIGHT:** Emergency Fan Stop

1. Emergency switch at cabinet or remote control is activated (Pushed IN).
2. Relay malfunction.

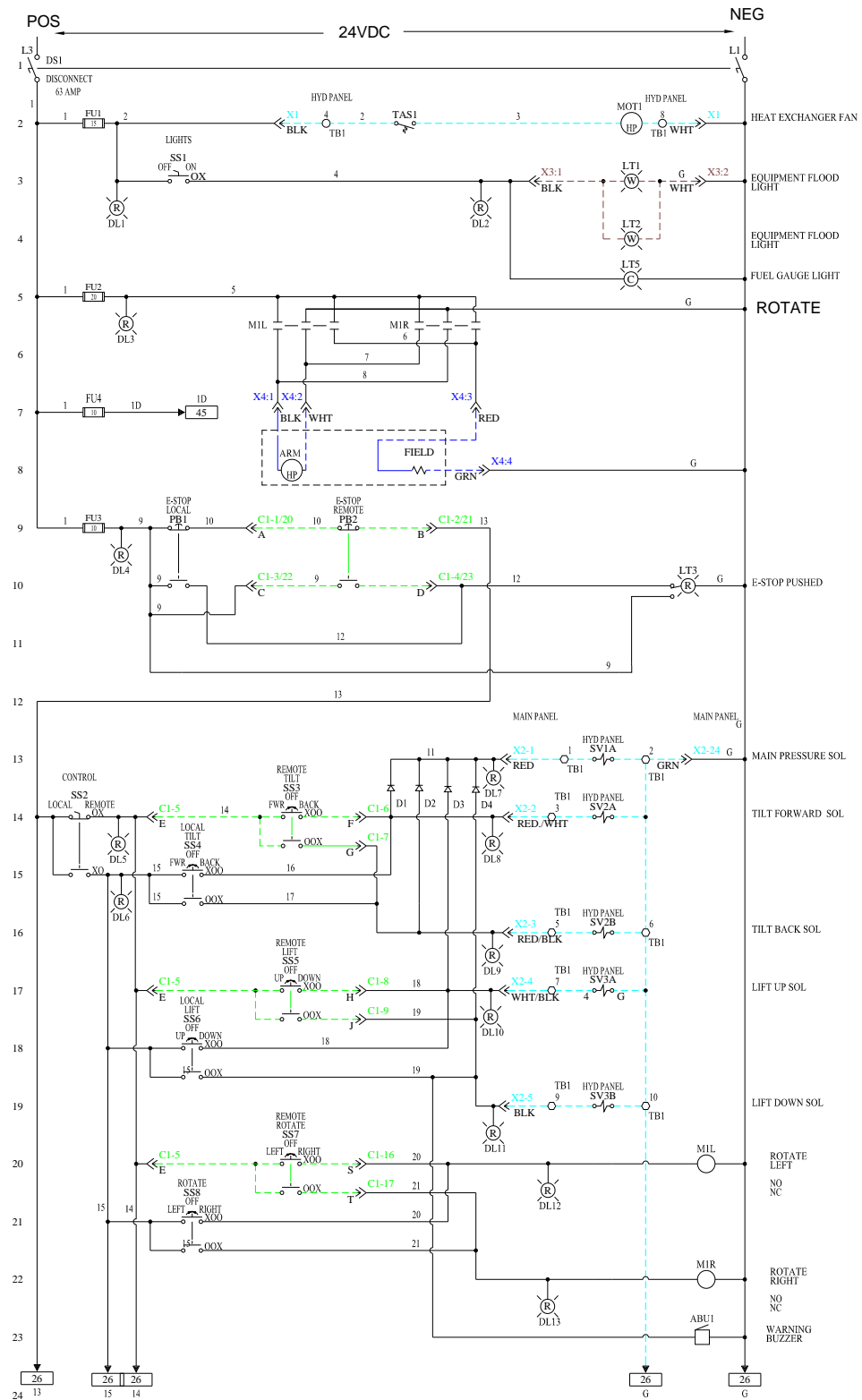
### **Spare Parts List**

<b>Engine and Hydraulics</b>	<b>Brand</b>	<b>Part Number</b>
Hydraulic Valve D03	Rexroth	RR00561288
Hydraulic Valve D03	Rexroth	RR00561284
<b>Control Panel Switch</b>	<b>Brand</b>	<b>Part Number</b>
3 Position Switch	Tempest	582-001
2 Position Switch	Tempest	582-002
Switch Keyed Start	Tempest	582-003
3 Position Green Light	Tempest	582-004

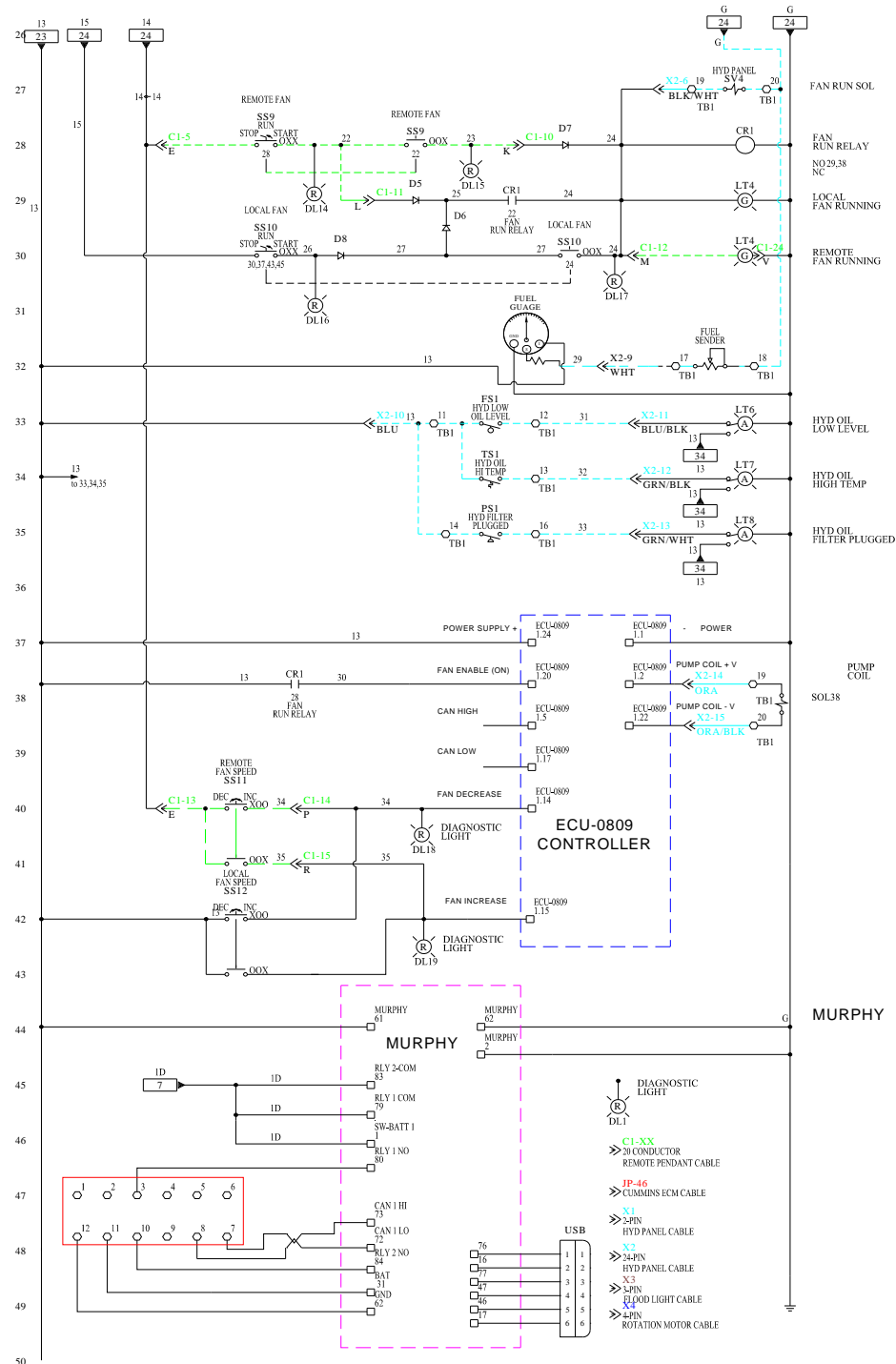
### **MVU Filters and Fluids**

<b>Hydraulic System</b>	<b>Brand</b>	<b>Part Number</b>
In-Tank Filter	Schroeder	#K10
Hydro Pump Filter	Brueninghaus Hydro.	#91530/02601380
Air Intake Filter	Schroeder	#ABF-3/10-F

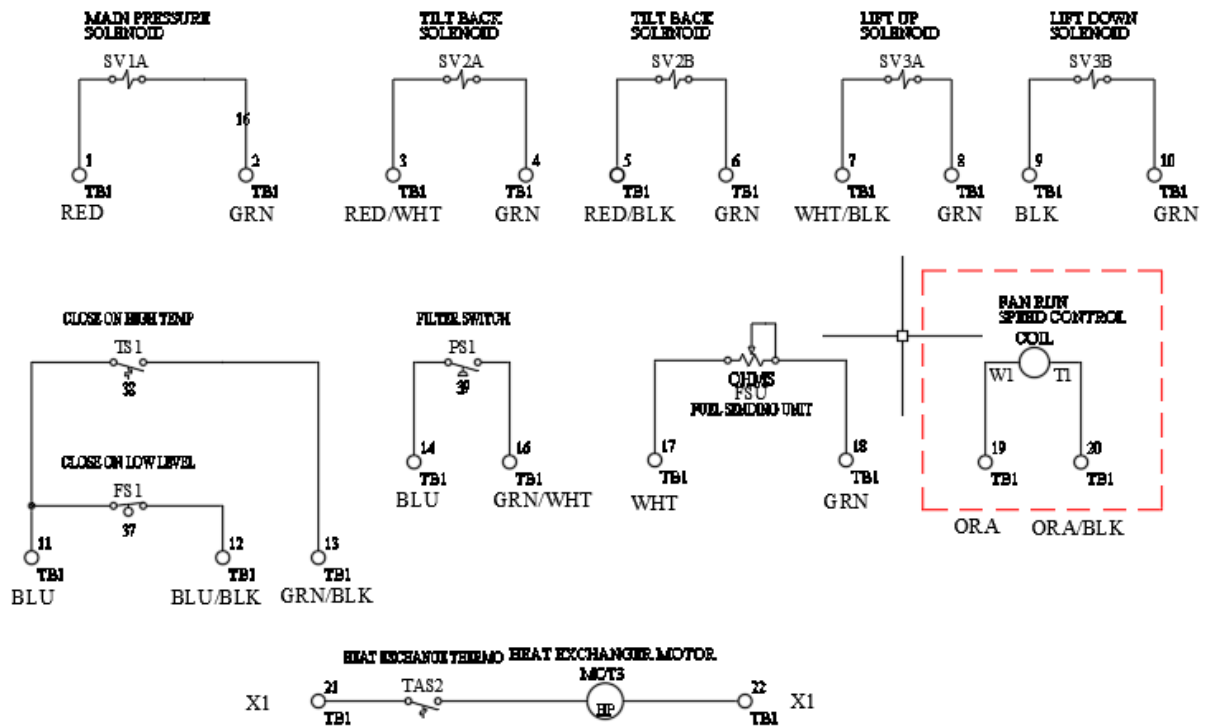
# Electrical Wiring Diagrams



PDF files of electrical diagrams available upon request.



## Hydraulic Panel





**Manufacturer**

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All information provided in this operations manual is subject to change without notice.

Note: Unauthorized repair or modification of the factory assembly or parts voids the warranty.