MSC Filtration Technologies

PHoenix™
Membrane Based lube and Hydraulic Oil Purifier

PHX-M - 1 gpm 110/220 Volt Mini hand carried Purifier/Dehydrator

PHX-C4 - 4 gpm 110/220 Volt Portable Cart Purifier/Dehydrator

PHX-C1 - 1 gpm 110/220 Volt Portable Cart Purifier/Dehydrator

Simple Safe Reliable Efficient
PHOENIX™

Disclaimer: Membrane operation diagram is illustrative. Membrane is not claimed to be defect free and very modest amounts of oil permeate over into vacuum side. Any effects of this are minimized by system design and oil dehydration is not effected!

IT'S REVOLUTIONARY

PHOENIX C4 - 4 GPM
20 - 1000 GALLONS

PHOENIX C - 1 GPM
5 - 150 GALLONS

PHOENIX M - MINI
HAND CARRIED 1 GPM
5 - 150 GALLONS

Maintenance free water removal membrane - does not require replacement. Simple and practical mass transfer oil purification.

IT'S RELIABILITY THROUGH SIMPLICITY

* Simple Design
* Easy to use
* Few moving parts
* Small footprint
* Very little maintenance required
* Unlimited water removal
* Autonomous
* Extremely portable
* Effective

The Latest in Mass Transfer Oil Purification Technology
Why throw away perfectly good oil?
Instead flush your system or reclaim with the PHoenix.

ITS SIMPLE!
The freer your lube and hydraulic systems are of water and particulate the fewer equipment breakdowns you will experience!

This means longer uninterrupted manufacturing run times along with more profits for your organization and less stress for you!

**THE PHOENIX REMOVES:**
- Free Water 100%
- Emulsified Water 100%
- Dissolved Water - < 50 ppm
- Particulates - < 3 microns

**Mcpherson, P., Bhachu, R., Sayles, R.,**
"The Influence of Filtration on Rolling Element Bearing Life".

**Cantley, R.E.,**
"The Effect of Water in Lubricating Oil on Bearing Fatigue Life"

**Water Contamination**
4000 ppm

**Water Reduced**
to less than 100 ppm

Paper Plant - field results 220 weight
Gear Box Oil - 48 gallon reservoir

PHoenix™
COMPACT

The Phoenix Mini is small and portable enough to be lifted up and into a Windturbine Nacelle and yet reliable enough to be left operating 280 feet in the air unattended for months. Connection to the Gearbox takes less than a few minutes!

VERSATILE

Add temporary or permanent dehydration to filter pump skids on small lube and hydraulic reservoirs, or with a flow control orifice by tapping off of existing pressure ports such as return filters, bearing supply or oil cooler supply lines. Connect downstream of a 1 gpm filter cart to turn a simple filter cart into an oil dehydrator!

PORTABLE

PHoenix C1 and C4 provide stand alone portable kidney loop purification and are compact enough to move through doors, catwalks, up stairs and to most areas where traditional dehydrator technology cannot fit. Low oil hold up volume means limited oil loss between oil changes and 110 Volts makes it very easy to find power, turn on set and forget!
ROAD CONSTRUCTION AND MINING
* Lift Hydraulic System flushing
* Track and Drive Train Gear Box flushing
* Bucket Truck Dielectric Hydraulic purification
* Transmission System flushing
* Conveyor Gear Box flushing

COOLING TOWER GEARBOXES
Durable enough to be used outdoors on ACC (Air Cooled Condenser) or WCC (Water Cooled Condenser) fan Gear Boxes even in high vibration areas.

OTHER POTENTIAL APPLICATION

Power Generation
* Combustion Turbine Lube
* Coal Mill Gear Boxes
* Conveyor Gear Boxes
* Boiler Feed Pump Lube
* Windturbine Gear Boxes
* EHC Control
* ACC - WCC Gear Boxes
* Scrubber Equipment Gear Boxes

Food and Beverage
* Food Grade Hydraulic Oil
* Conveyor Gear Boxes

Agriculture
* Conveyor Gear Boxes
* Harvesting Equipment Hydraulic

Pulp and Paper
* Wet end/dryer lube
* Press section lube and hydraulics
* Boiler Feed Pump lube
* Cooling Tower Gear Boxes

Primary Metals
* Roll mill gear and pinion lube

Transportation
* Ship Board Hydraulic-Lube
* Diesel Locomotive Gear Box
* Transmission Systems

Military
* Military Equipment Hydraulics
* Aircraft - Road Equipment

Light Industrial
* Oil Reclamation
* Blow Molding Hydraulic
* Machine Tool Hydraulic
* Injection Molding
* Automotive transfer line Hydraulic Oil

Fuels and Chemical
* Drilling Equipment Gear Box Flushing
* Extruder Gear Boxes
* Compressor Lube
* Boiler Feed Pump Lube
* Offshore Drilling Platforms

PHoenix™
PHOENIX™ C4
4 gpm portable Membrane Oil Purifier Cart for 10 - 1000 Gallon Oil Reservoirs:
(Larger reservoirs possible depending on water ingestion rate)

PHOENIX SHOWN WITH OPTIONAL AQUATREX MOISTURE MONITORING SYSTEM (SEE PAGES 11-12 FOR DETAILS.)

WATER CONDENSATE DRIP LEG AND DRAIN VALVE

OPTIONAL 1” INLET/OUTLET HOSES SOLD SEPERATELY
PN: PHXC4MH - MINERAL OIL
PN: PHXC4PEHS - PHOSPHATE ESTER

CART FINISH - CHEMICALLY RESISTANT POWDER COATING - NOT PAINTED

PANEL MOUNTED PRESSURE GAUGES
* Oil Pressure
* Membrane Vacuum
* Filter Element DP

LOW MAINTENANCE GAST ROCKING PISTON VACUUM PUMP

CART RIGGING AND LIFTING LUG

PALL 20” SRT CAP SERVICE PARTICULATE FILTER HOUSING WITH AUTO AIR VENT

PALL WS10 WATER SENSOR INCLUDED WITH AQUATREX MOISTURE MONITORING OPTION ONLY

4” WATER REMOVAL MEMBRANE HOUSING

HIGH QUALITY HEAVY DUTY BALDOR WASHDOWN DUTY MOTOR

OUTLET OIL FLOW INDICATOR SIGHT GLASS

PUMP INLET VACUUM GAUGE AND HIGH VACUUM CUT OFF SWITCH SUPPLIED WHEN AQUATREX OPTION IS PURCHASED

HIGH QUALITY 4 GPM VIKING GEAR PUMP

INLET OIL SAMPLE VALVE

JIC OR ORB HYDRAULIC LEAK RESISTANT FITTINGS AND CONNECTIONS WHERE ALLOWABLE.

FILTER PLUGGED POP OUT INDICATOR WITH THERMAL BYPASS

QUALITY
VERSATILITY
RELIABILITY
PHoenix™ C4

Specifications

Flow Rate: 4 gpm constant
Inlet/Outlet Connections: 1” Male JIC
Available Voltage: 110 V or 220V
Max Amp Draw: 10 Amps
Fluid Pump Motor: 1/2 HP Washdown
Dry Weight: 250 Lbs
Inlet Pressure Range: -10 hg - 10 psig
Max Outlet Pressure: 45 psig
Maximum Oil Viscosity: 3000 Cst
Minimum Oil Viscosity: 10 Cst
Maximum Operating Temp: 190 F
Minimum Operating Ambient: 33F
Maximum Free Water Removal: 2-3 Gallons/Day
(Depending on Water Content, Oil Temp and Oil Type)

Oil Type: Low Volatile Mineral Based
Phosphate Ester Optional

Recommended Oil Reservoir Size: 10 - 600 gallons
(Larger Possible depending on water ingestion rate)

Ordering Information

PHX-C4

Table 1: Voltage Options

<table>
<thead>
<tr>
<th></th>
<th>Voltage</th>
<th>Aquatrex</th>
<th>Housing</th>
<th>Oil Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>110 V 60Hz - SP Standard</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>220 V 60Hz - SP Optional</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Aquatrex Moisture Monitoring

<table>
<thead>
<tr>
<th>C</th>
<th>Without Aquatrex</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>With Aquatrex</td>
</tr>
</tbody>
</table>

Table 3: Filter Housing Option

<table>
<thead>
<tr>
<th>E</th>
<th>20” Pall UR219 7 Micron</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>20” Pall UR319 7 Micron</td>
</tr>
</tbody>
</table>

Table 4: Oil Type

<table>
<thead>
<tr>
<th>G</th>
<th>Mineral Based Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>Phosphate Ester</td>
</tr>
</tbody>
</table>

Dimensions

<table>
<thead>
<tr>
<th>Spare Parts</th>
<th>Qty</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>6000 hr pmkit</td>
<td>1</td>
<td>PHXC4KIT</td>
</tr>
<tr>
<td>219 Filter</td>
<td>1</td>
<td>UE219++20Z</td>
</tr>
<tr>
<td>Optional 319</td>
<td>1</td>
<td>UE319++20Z</td>
</tr>
<tr>
<td>Filter Micron</td>
<td></td>
<td>AZ 1 Micron</td>
</tr>
<tr>
<td>add to ++ in</td>
<td></td>
<td>AP 3 Micron</td>
</tr>
<tr>
<td>Part Number</td>
<td></td>
<td>AN 7 Micron</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AS 12 Micron</td>
</tr>
</tbody>
</table>

USA: PHoenix Distributor:
Pall Trincor 770 Pennsylvania Drive, Suite 100, Exton PA 19341 Phone: 610-458-9500 Fax 610-458-9595
PHOenix™ C1
1 gpm portable Membrane Oil Purifier Cart for 5-150 gallon oil reservoirs!
Larger reservoirs possible depending on water ingestion rates!

INLET/OUTLET WAND HOLDERS STANDARD.
OPTIONAL 3/4" STAINLESS REMOVABLE INLET/OUTLET WANDS SHOWN AND 8' HOSE SET NOT SHOWN SOLD SEPERATELY.
PN: PHXCIMHS - MINERAL OIL PN: PHXC1PEHS - PHOS ESTER

CART FINISH - CHEMICALLY RESISTANT POWDER COATING - NOT PAINTED

CART RIGGING AND LIFTING LUG

PANEL MOUNTED FILTER ELEMENT DIFFERENTIAL PRESSURE GAUGE

PALL 20" SRT CAP SERVICE PARTICULATE FILTER HOUSING WITH AUTO AIR VENT

HIGH QUALITY HEAVY DUTY BALDOR WASHBOARD DUTY MOTOR

PUMP INLET VACUUM GAUGE AND HIGH VACUUM CUT OFF SWITCH SUPPLIED WHEN AQUATREX OPTION IS PURCHASED

HIGH QUALITY 1 GPM VIKING GEAR PUMP

INLET OIL SAMPLE VALVE

FILTER PLUGGED POP OUT INDICATOR WITH THERMAL BYPASS

JIC OR ORB HYDRAULIC LEAK RESISTANT FITTINGS AND CONNECTIONS WHERE ALLOWABLE.

QUALITY VERSATILITY RELIABILITY
**PHoenix™ C1**

**Specifications**

- Flow Rate: 1 gpm constant
- Inlet/Outlet Connections: 3/4” Male JIC
- Available Voltage: 110 V or 220V
- Max Amp Draw: 7 Amps
- Fluid Pump Motor: 1/2 HP Washdown
- Dry Weight: 180 Lbs
- Inlet Pressure Range: -10 hg - 10 psig
- Max Outlet Pressure: 45 psig
- Maximum Oil Viscosity: 3000 Cst
- Minimum Oil Viscosity: 10 Cst
- Maximum Operating Temp: 190 F
- Minimum Operating Ambient: 1/2 C or 33F
- Maximum Free Water Removal: 3/4 - 1 Liter/Day
  (Depending on Water Content, Oil Temp and Oil Type)

**Oil Type:** Low Volatile Mineral Based
Phosphate Ester Optional

Recommended Oil Reservoir Size: 5-150 gallons
(Larger Possible depending on water ingestion rate)

**Ordering Information**

**PHX-C**

<table>
<thead>
<tr>
<th>Spare Parts</th>
<th>Qty</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>6000 hr PmKit</td>
<td>1</td>
<td>PHXC4KIT</td>
</tr>
<tr>
<td>219 Filter</td>
<td>1</td>
<td>UE219++20Z</td>
</tr>
<tr>
<td>Optional 319</td>
<td>1</td>
<td>UE319++20Z</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Filter Micron</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>add to ++ in</td>
<td></td>
</tr>
<tr>
<td>AZ</td>
<td>1 Micron</td>
</tr>
<tr>
<td>AP</td>
<td>3 Micron</td>
</tr>
<tr>
<td>AN</td>
<td>7 Micron</td>
</tr>
<tr>
<td>AS</td>
<td>12 Micron</td>
</tr>
</tbody>
</table>

**Table 1: Voltage Options**

<table>
<thead>
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<th>Voltage</th>
<th>Options</th>
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<tbody>
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<td>A</td>
<td>110 V 60Hz - SP Standard</td>
</tr>
<tr>
<td>B</td>
<td>220 V 60Hz - SP Optional</td>
</tr>
</tbody>
</table>

**Table 2: Aquatrex Moisture Monitoring**

<table>
<thead>
<tr>
<th>Aquatrex</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Without Aquatrex</td>
</tr>
<tr>
<td>D</td>
<td>With Aquatrex</td>
</tr>
</tbody>
</table>

**Table 3: Filter Housing Option**

<table>
<thead>
<tr>
<th>Housing</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>20&quot; Pall UR219 7 Micron</td>
</tr>
<tr>
<td>F</td>
<td>20&quot; Pall UR319 7 Micron</td>
</tr>
</tbody>
</table>

**Table 4: Oil Type**

<table>
<thead>
<tr>
<th>Oil Type</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Mineral Based Only</td>
</tr>
<tr>
<td>H</td>
<td>Phosphate Ester</td>
</tr>
</tbody>
</table>
**PH²enix™ M**

Mini - 1 gpm hand carried portable Membrane Purifier for oil reservoirs between 5 and 150 gallons.

(Larger reservoirs possible depending on water ingestion rate)

**OPTIONAL AQUATREX MOISTURE MONITORING SYSTEM NEMA 4 CONTROLBOX**

- **4” WATER REMOVAL MEMBRANE HOUSING WITH GLYCOL FILLED OIL PRESSURE AND VACUUM GAUGES**
- **EASY TO GRAB LIFT HANDLE**
- **LOW MAINTENANCE GAST ROCKING PISTON VACUUM PUMP**
- **CHEMICAL RESISTANT POWDER COATED ALUMINUM FRAME**
- **OPTIONAL PALL UR219 8” CAP SERVICE FILTER HOUSING WITH OIL SAMPLE VALVE AND FILTER ELEMENT PLUGGED POP OUT INDICATOR WITH THERMAL BYPASS**

**QUALITY**

**VERSATILITY**

**RELIABILITY**

**SHOWN WITHOUT OPTIONAL AQUATREX MOISTURE MONITORING SYSTEM**

**PALL WS10 WATER SENSOR SUPPLIED WITH OPTIONAL AQUATREX MOISTURE MONITORING SYSTEM**

**OPTIONAL REMOVABLE MAGNETIC RAILS. TO LOCK DOWN PHENIX TO METAL SURFACES. HELPFUL IN HIGH VIBRATION AREAS SUCH AS WINDTURBINES TO PREVENT TRAVEL FROM VIBRATION.**
PHoenix™ M - Mini

Specifications

Flow Rate: 1 gpm constant
Inlet/Outlet Connections: 1/2” Male JIC
Available Voltage: 110 V or 220V
Max Amp Draw: 4 Amps
Dry Weight: 55 Lbs with Aquatrex
35 Lbs without Aquatrex
Max Outlet Pressure: 45 psig
Maximum Oil Viscosity: 3000 Cst
Minimum Oil Viscosity: 10 Cst
Maximum Operating Temp: 190 F/
Minimum Operating Ambient: 1/2 C or 33F
Maximum Free Water Removal: 3/4 - 1 Liter/Day
(Depending on Water Content, Oil Temp and Oil Type)

Oil Type: Low Volatile Mineral Based
Phosphate Ester Optional

Recommended Oil Reservoir Size: 5-150 gallons
(Larger Possible depending on water ingestion rate)

Ordering Information

PHX-M

Table 1: Voltage Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Voltage Options</th>
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<tr>
<td>A</td>
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Table 2: Aquatrex Moisture Monitoring

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<tr>
<th>Option</th>
<th>Moisture Monitoring</th>
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</thead>
<tbody>
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<td>C</td>
<td>Without Aquatrex</td>
</tr>
<tr>
<td>D</td>
<td>With Aquatrex</td>
</tr>
</tbody>
</table>

Spare Parts

<table>
<thead>
<tr>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHXC4KIT</td>
</tr>
<tr>
<td>UE219++08Z</td>
</tr>
</tbody>
</table>

Filter Micron

<table>
<thead>
<tr>
<th>Micron</th>
</tr>
</thead>
<tbody>
<tr>
<td>AZ</td>
</tr>
<tr>
<td>AP</td>
</tr>
<tr>
<td>AN</td>
</tr>
<tr>
<td>AS</td>
</tr>
</tbody>
</table>

Table 3: Filter Housing Option

<table>
<thead>
<tr>
<th>Option</th>
<th>Filter Housing Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>20” Pall UR219 7 Micron</td>
</tr>
<tr>
<td>F</td>
<td>No Filter Housing Supplied</td>
</tr>
</tbody>
</table>

Table 4: Oil Type

<table>
<thead>
<tr>
<th>Option</th>
<th>Oil Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Mineral Based Only</td>
</tr>
<tr>
<td>H</td>
<td>Phosphate Ester</td>
</tr>
</tbody>
</table>

Table 5: Magnetic Rails

<table>
<thead>
<tr>
<th>Option</th>
<th>Magnetic Rails</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>With Magnetic Rails</td>
</tr>
<tr>
<td>J</td>
<td>Without Magnetic Rails</td>
</tr>
</tbody>
</table>

* Only use option F if Phoenix is to be used with existing Pall 12 micron or lower filtration such as permanent filter/pump skids or Filter/Pump Cooler Packages.
DO I EVEN HAVE WATER IN MY OIL?

Pall WS10 Water Sensor

Optional PHoenix Aquatrex Moisture Monitoring System

HOW CAN I TELL?
The optional Aquatrex Moisture Monitoring System measures the level of water contamination in your oil using a Pall WS10 Watersensor and displays it in percent saturation on the Aquatrex PLC touchscreen.

Aquatrex provides both reliability and accountability!
WHAT ELSE CAN IT DO?

A SIMPLE DIAGNOSTIC TOOL.

The Aquatrex is also helpful when trying to identify troublesome and difficult to quantify intermittent water ingestion. The Aquatrex touchscreen allows operators to program low and high water level set points. The Aquatrex will monitor the water level of the oil and only turn the water removing vacuum pump on when the high level has been reached and turn it back off when the low acceptable level has been reached.

A resettable vacuum pump run time clock and cycle counter will monitor how often and for how long the PHoenix had to run to remove the water. More cycles and longer vacuum pump run times mean more water ingestion.

FLUID PUMP CONTROLLER.

When used on the PHoenix C1 and C4 the Aquatrex will prevent cavitation and potential damage to the fluid pump where the inlet suction might become restricted. Restriction may be caused by accidental deadhead or due to temperature drops and significant oil viscosity increases from intermittent use of the lube or hydraulic system.

In the event of shutdown the Aquatrex will automatically try to start itself back up every hour if the oil viscosity lowers to acceptable levels. This feature makes the PHoenix totally autonomous and does not require operator reset.

Aquatrex System Includes

* Weather Resistant Nema 4 Control Box
* Allen Bradley PLC and Components
* Pall WS10 Water Sensor
* C1 & C4 only: Fluid Pump Vacuum Switch
STILL NOT CONVINCED?

Check with your PHoenix representative for rental and or lease opportunities.