



# ***PPM HC-100<sup>TM</sup>***

## **Closed Loop Hydraulic Prewet Power Module**

# **Operation Manual**

Limited Warranty.....	3
Revision Level of this Manual.....	4
Package Contents.....	4
Functional Overview .....	4
Safety Instructions .....	5
System Components Installation .....	5
Closed loop hydraulic pre wet power unit (p/n PPM100HC) Installation.....	5
System Startup Procedures .....	6
Precautions for Normal Usage.....	6
End of Season Pre-Cautions – this step is critical to maintain the system .....	7
Trouble Shooting References .....	7
Replacement Parts List .....	7

## **Limited Warranty**

### **Cirus Controls, LLC.**

#### **What and who is covered?**

This warranty covers all defects in materials or workmanship in your Cirus Controls system under normal use, maintenance and service. This warranty coverage applies only to the original owner and is not transferable.

#### **How long is the warranty period?**

This warranty coverage runs for a period of 1 year from the date of initial installation (or 13 months from date of shipment from Cirus Controls), whichever occurs first. Replacement parts are warranted for the remaining portion of the original warranty period or thirty (30) days from date of shipment from our factory (whichever is greater).

#### **How can you get service?**

Cirus Controls' obligation under this warranty is limited to repairing and/or replacing, at Cirus Controls' option, any part or parts that are determined, by Cirus Controls, to be defective. To be eligible for any claim under this warranty, the owner (or Cirus authorized dealer) must return any defective part(s) to the factory, within the applicable warranty period (as set out above).

#### **What will we do?**

Cirus Controls' may, at its option, elect to grant adjustments in the field through an authorized representative and may thereby elect to waive the requirement that parts be returned to Cirus Controls' factory. The repair or replacement of defective parts under this warranty will be made without charge to the owner except for transportation of the part to our authorized repair location.

#### **What is not covered under this warranty?**

Cirus Controls will not assume any expense or liability for repairs made outside our plant without our prior written consent. We are not responsible for damage to any associated equipment or product and will not be liable for loss of profit or other special damages.

The provisions of this warranty do not apply to any product or parts which have been subject to misuse, negligence or accident, or which have been repaired or altered outside of Cirus Controls' factory in any way (in the judgment of Cirus Controls) so as to affect adversely its performance or reliability. Neither does this warranty apply to normal maintenance service and parts or to normal deterioration due to wear and exposure.

This warranty is expressly in lieu of other warranties, expressed or implied, in fact or by law, including any implied warranty of merchantability of fitness for a particular purpose. The remedies of repair or replacement as set forth are the only remedies under this warranty, Cirus Controls' disclaims any obligations or liability for loss of time, inconvenience, commercial loss or direct consequential, special or incidental damages. This warranty is in lieu of any other obligation or liability of Cirus Controls' of any nature whatsoever by reason of the manufacture, sale, lease or use of such products and Cirus Controls neither assumes, not authorizes anyone to assume for it, any other obligation or liability in connection with such products.

## ***Revision Level of this Manual***

<u>Rev Letter</u>	<u>Effective Date</u>	<u>Contents</u>
A	7/7/07	Initial Release
B	12/12/07	Periodic Update
C	11/11/08	Periodic Update

Cirus Controls reserves the right to make changes to this manual from time to time without notice.

## ***Package Contents***

A complete **PPM HC-100™** control system contains the following items:

- 1) **PPM HC™** pump and motor unit;
- 2) **PPM NK** optional nozzle kit;
- 3) **PPM IK** optional intake kit;
- 4) This manual;

If any of these items are missing, please contact your distributor for replacement parts.

## ***Functional Overview***

The closed loop hydraulic pre-wet power module is a self contained pre-wet fluid pump, hydraulic motor, liquid flow meter and pre-wet fluid plumbing that can be installed on a new vehicle or added to an existing vehicle.

**Pump Rating:** Pump will deliver up to 8gpm. Pre-wet pump is self priming: (Max. Suction Lift of 20 feet at 1750 RPM, and 9 feet at 900 RPM). Pump Body: Bronze Impeller: Bronze Gears Shaft: 303 SS  
Shaft Seal: Buna Lip Seal -standard



### **Connections:**

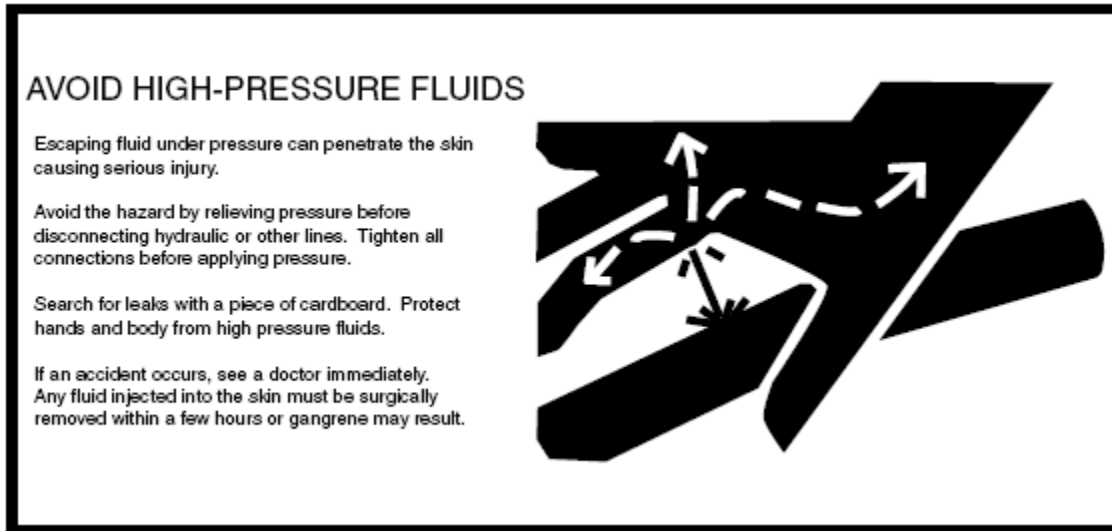
**Hydraulic fluid:** pressure and return (top of unit viewed above).

**Pre Wet Fluid:** Outlet and inlet (bottom of unit viewed above).

**Flow meter sensor:** M12 connection to sensor junction box as positioned on vehicle.

## ***Safety Instructions***

- 1) Read all installation, safety and maintenance instructions completely before operating this equipment;
- 2) Keep all personnel clear of moving parts while equipment is being operated;



## ***System Components Installation***

### **Closed loop hydraulic pre wet power unit (p/n PPM100HC) Installation**

- 1) **Unit may be installed vertically or horizontally;**
  - a. Attach to vehicle using mounting flange on each end of enclosure
  - b. Attach Cirrus Controls Decal to outside of enclosure after installation orientation is chosen.
  - c. Insert photo of assembly before attachment;
- 2) **Hydraulic Plumbing:**
  - a. Verify inlet and outlet using schematic diagram inside enclosure.
  - b. Use only full sized hose and couplings to match inlet and outlet;
  - c. Do not use Teflon tape on any hydraulic fittings;
  - d. Verify that hydraulic fittings do not leak oil.
- 3) **Pre-Wet Fluid Plumbing**
  - a. Fluid hose must be non-collapsible hose to handle the fluid pressure without collapsing;
  - b. Verify that hose clamps on barbed fittings do not leak; Use only stainless steel hose clamps;
- 4) **PPM Nozzle Kit Installation – (Optional)**
  - a. Mount and plumb nozzle kit provided using kitted parts. Nozzle kits selection and placement are completed by the installer.
- 5) **Intake Kit Installation – (Optional)**
  - a. Mount and plumb intake kit provided using kitted parts. Intake kit selection and placement are completed by the installer.

## System Startup Procedures

- 1) Add fluid to liquid tanks. Fluid choice must be appropriate to the storage location of the vehicle. Do not startup system with liquid that will freeze in the lines if the vehicle is stored outside.
- 2) Prime the Pre-Wet Pump;
- 3) Refer to the pre-wet control system manual for controller operation instructions;
  - **Pulses per Gallon:** enter the pulses per gallon rating of your flow meter. Refer to flow meter manufacturer to determine the signal pulses sent by the flow meter for each gallon (or liter if set in metric mode).
    - 1) Micro Trak FM500 – flow meter used by Cirus Controls
      - a) **Gallons: Pulses per gallon = Flow cal number / 2**
      - b) **Liters: Pulses per gallon = Flow cal number / 7.58**
    - 2) Raven brand flow meters are listed in pulses per 10 gallons.
      - a) **divide the flow meter rating by 10 and input that value.**
- 4) Calibrate controller and verify proper flow rates;

### Test Mode – use to validate calibration numbers on flow meter:

**Confirm your Calibration:** to validate that you are delivering the planned amount of fluid from your liquid system regardless of which flow meter is in use, use the following method:

- a) Plumb your liquid system to allow you to catch and measure an amount of fluid from a single port (2-3 gallons or 8-12 liters). Add enough fluid to do the calibration;
- b) From the menu screen, select Test mode, enter the password;
- c) Ramp up the output on the liquid system in use until the pulses coming back are equal to the flow cal number (such as 1500). Liquid will be flowing at this point:

Granular - SALT Auger Spinner <b>0%</b> 1660 PPM	BRINE Prewet <b>25%</b> 1660 PPM
Speedo: 0 PPM NO GPS	
TEST   <BLAST>=done <PASS>=zero	

- d) Collect fluid for exactly one minute. The volume of fluid collected is equal to the volume flowing in one minute. Because the test mode allows you to see pulses expressed in ppm (pulses per minute), the amount of fluid you collect will tell you if your pulses per gallon (or liter) rating on the flow meter is correct for the spreader control.
- e) If the test gives you more or less fluid than you expected (off by more than 3%), adjust the pulses per gallon (liter) in the spreader setup to compensate for the variation you experience.
- f) The variation is most likely due to the fact that different flow meters are calibrated using different methods, not because of any problem with the flow meter or the spreader control.
- g) Flow meters supplied by Cirus Controls will have the correct pulses/gallon conversion shown on the actual flow meter for use during the set up step.

## Precautions for Normal Usage

- 1) Flush lines, pump and nozzles after each use. Clogged components can malfunction and are not covered by factory warranties;
- 2) During periods of non-use, flush the system of deicing chemicals. Water may not be the best flushing fluid depending upon which de-icing chemical you use. Ask your chemical supplier for compatibility.
- 3) Inspect hoses and plumbing for leaks. Repair or replace as needed.
- 4) Verify that the nozzles are not caked with material and clean if needed.
- 5) Check and clean the in-line strainer filter by removing the bowl and screen and flushing thoroughly.

## End of Season Pre-Cautions – this step is critical to maintain the system

- 1) Flush system with RV antifreeze or equivalent solution. Do not use water to prepare for summer storage, water lays in the valves and may freeze. All system components must be flushed clean of all pre-wetting fluid chemicals to ensure that pump, hoses and nozzles will function at the beginning of the next season;
- 2) Disconnect and inspect electrical cable connectors for corrosion and re-apply dielectric grease before re-assembly.
- 3) Components that are clogged with pre-wet chemicals are not covered by manufacturers warranties;

## Trouble Shooting References

Start Up Issues		
System won't pump fluid	* Pump isn't primed; * Hydraulic fluid not flowing;	* Prime Pre-Wet pump * Verify that there is fluid in tanks, lines and pump; * Inlet/outlet tubing kinked/ restricted or leaking; * Strainer or pump is plugged with debris (inspect) * Check for proper operation of in-cab controller; * Operate in-cab controller in Test mode (allows for operation while truck is stationary); * Check for proper hydraulic plumbing and electrical connections at the valve;
No sensor pulses received by controller	* Sensor or cable failure; * Stuck impellor in flow meter; * System doesn't have a flow meter;	* Replace sensor/cable assembly; * Clean or replace flow meter; * Operate controller in test mode to observe pulses; * Install flow meter and connect cabling;
LED in sensor cable junction box not lit up;	Normal condition for some brands of flow meter sensors;	* No action needed unless all other remedies fail. If so, contact factory to verify proper flow meter jumper settings in controller;
Operational Issues		
No sensor pulses received by controller	* Sensor/cable failure; * Stuck impellor in flow meter;	* Replace sensor/cable assembly; * Clean or replace flow meter;
Fluid doesn't flow	* plugged nozzles, filter, or pump;	* Inspect and clean each component;

## Replacement Parts List

	Cirus PN	Description	Qty	Units
	<b>PreWet Power Module - Hydraulic,Closed loop</b>			
	PPM-HC	Complete closed loop prewet power module	1	ea.
	<b>Individual Components of Kit</b>			
	ENC001000	Sealed Enclosure	1	ea.
5	FM500	Flow Meter (no sensor)	1	ea.
	FMS001000	Flow Sensor w/ M12 wiring	1	ea.
	00099155	Strain relief bushing for M12 wiring	1	ea.
1	HYD09000	Hydraulic Motor	1	ea.
2	PW01000	Bronze Gear Pump	1	ea.
9	PW02000	SD Motor Mount	1	ea.
3	PW02010	SD Motor Coupler	1	ea.
4	PW02100	Spider Drive	1	ea.
	0008117	1/4-28 1/2" Socket Head Cap Screw	3	ea.
7	HYD09100	3/8" ORB x 1/2" Female JIC	2	ea.
8	HYD09110	1/2" JIC bulkhead	2	ea.
12	PL01000	1/2" ID Nylon reinforced hose	1.5	Feet
15	PL01005	3/4" ID Nylon reinforced hose	0.5	Feet
11	PL01200	Stainless Hose Clamp For Hose I.D. 1/2"	4	ea.
14	PL01205	Stainless Hose Clamp For Hose I.D. 3/4"	2	ea.
17	PL01400	1/2" barb coupler	1	ea.
16	PL01405	3/4" barb coupler	1	ea.
10	PL01500	1/2" NPT - 1/2" barb 90	2	ea.
13	PL01505	1/2" NPT - 3/4" barb 90	1	ea.
6	PL01520	1/2" NPT - 1/2" barb	1	ea.
	0008084	3/8"-16 1" bolt Stainless	2	ea.
	0008081	3/8"-16 nylock nut stainless	2	ea.
18	0009905	back plate (hydraulic open or closed)	1	ea.
	000787	Straight Thru Strain Relief bushing	1	ea.
	<b>Intake Kit</b>			
	PPM-IK	Complete Kit	1	ea.
	<b>Individual Components of Kit</b>			
	PW03000	Suction Strainer	1	ea.
	PL01530	Barbed fittings for 3/4" hose, threaded to suction strainer	2	ea.
	PL01005	3/4" ID Nylon reinforced hose	10	Feet
	PL01205	Stainless Hose Clamp For Hose I.D. 3/4"	4	ea.
	<b>Nozzle Kit</b>			
	PPM-NK	Complete Nozzle Kit	1	ea.
	<b>Individual Components of Kit</b>			
	PW04010	Quickjet Cap, Yellow	2	ea.
	PW04020	Nozzle, Teejet, Floodjet, Stainless, Gray	2	ea.
	PW04030	Gasket, Single Epdm For Quickjet Caps	2	ea.
	PW04040	Vari-Clamp, Round For 3/4" Pipe	2	ea.
	PW04050	Elbow Body, 1/2"	1	ea.
	PW04060	Tee Body, 1/2"	1	ea.
	PW04070	Check Valve, Pvc Spring, 1/2" Fpt	1	ea.
	PL01200	Stainless Hose Clamp For Hose I.D. 1/2"	4	ea.
	PL01000	1/2" ID Nylon reinforced hose	25	Feet



## Schematic Drawing of Pre Wet Power Module

