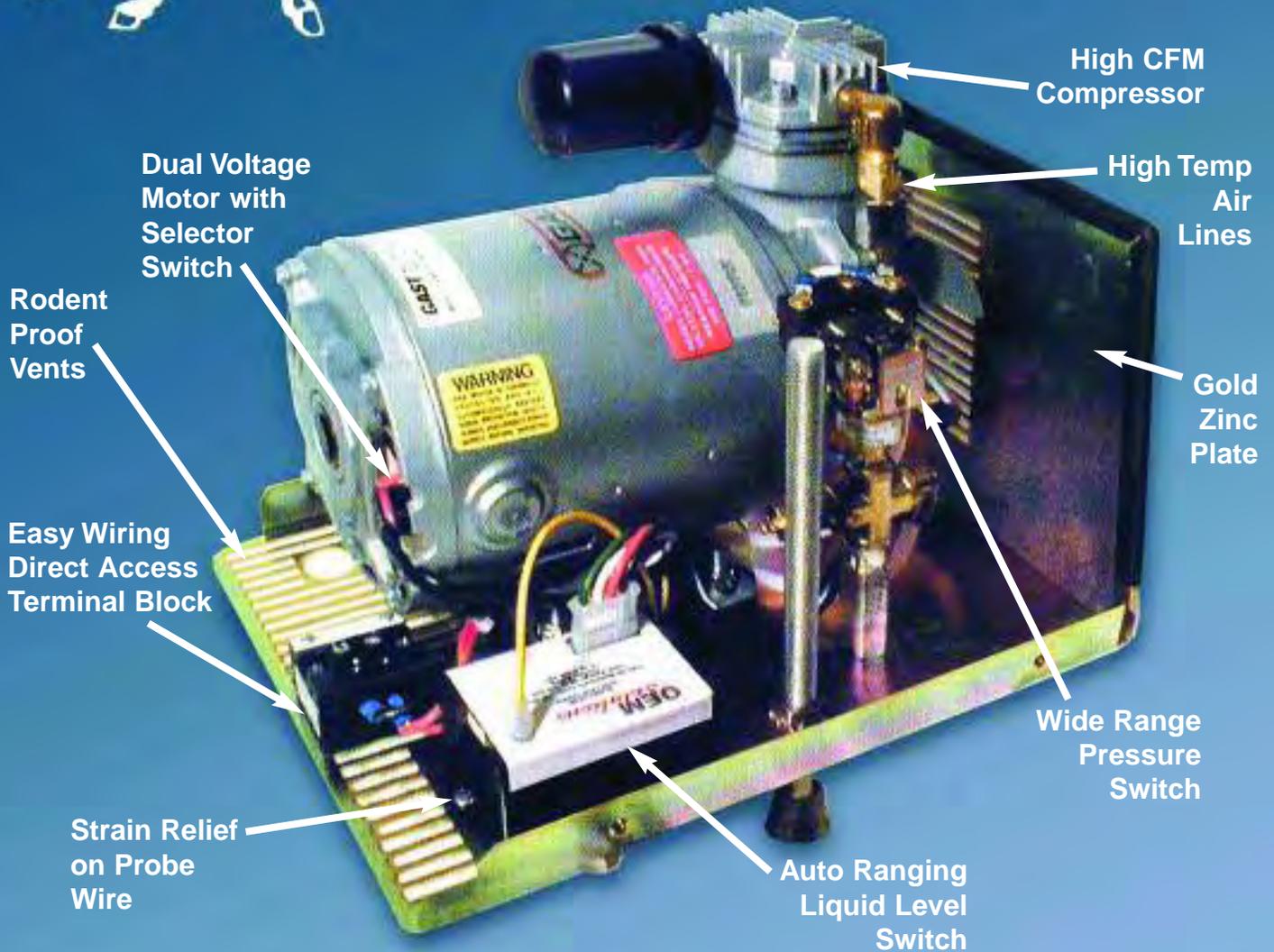




# CHARGE AIR2000

*Universal Aircharging System  
for Hydropneumatic Tanks*



*These innovative features and more.*



MADE in the USA

**MAASS**  
**MIDWEST**

MANUFACTURERS OF QUALITY WATER WELL ACCESSORIES

©2004, MAASS Midwest Manufacturing, Inc. All rights reserved.

[www.maassmidwest.com](http://www.maassmidwest.com)

# ChargeAir 2000 *Universal Aircharging System for Hydropneumatic Tanks* *Manufactured by MAASS Midwest Mfg.*

11283 DUNDEE ROAD • HUNTLEY, IL 60142-0547



- 1** Dual voltage motor, auto ranging 115v/230v liquid level control, and wide pressure range which means one unit does it all, reducing inventory requirements.
- 2** **NEW** Dual voltage selector switch allows for easy voltage selection 115v/230v.
- 3** Direct access terminal block means faster installation.
- 4** High capacity compressor means faster tank charging and larger tank capacity.
- 5** **NEW** More durable liquid level switch includes MOV surge arrestor, increasing switch life.
- 6** Strain relief on probe connection means no call backs from cables broken by waves into the tank.
- 7** Stainless steel fasteners and gold zinc plating means longer life in harsh environmental conditions.
- 8** **NEW** Improved air lines to handle higher temperatures and pressures.
- 9** Rodent proof air vents mean no down time from chewed wires or air hoses.
- 10** Durable heavy cover means your CA2000 will hold up better to sun exposure and harsh environments.

## ChargeAir 2000

**Model:** CA 2000  
**Part Number:** 992000  
**Description:** 115/208/230 Volt, 50/60 Hz, single phase

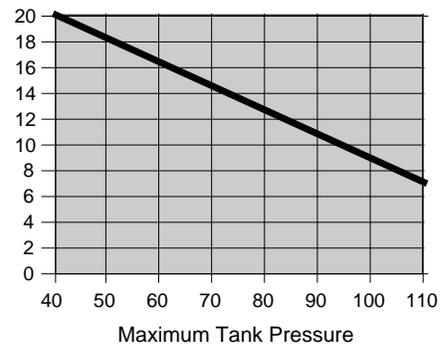
### SPECIFICATIONS

Maximum tank size .....20,000 Gallons  
 Pressure range (adjustable) .....40 to 110 PSI  
 Pressure Switch factory setting .....45 PSI cut-off  
 Operating current at 115 volts.....6 amps  
 Operating current at 208 volts .....3.5 amps  
 Operating current at 230 volts.....3 amps  
 Tank Connection .....2" FPT  
 Size (LxWxH) .....14" x 10" x 17"  
 Shipping weight .....37 lbs.

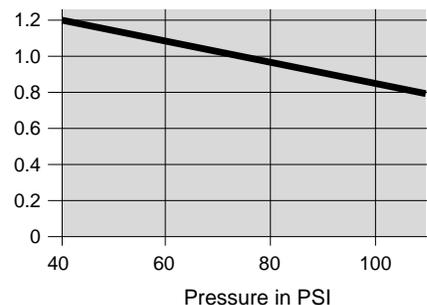
### SPARE PARTS

| DESCRIPTION                           | PART NUMBER |
|---------------------------------------|-------------|
| Compressor .....                      | 000131      |
| Cover .....                           | 000133      |
| Switch, liquid level - complete ..... | 000151      |

Maximum Operating Pressure for Various Tank Sizes



Compressor Output



## MANUFACTURERS OF QUALITY WATER WELL ACCESSORIES

P. O. Box 547, 11283 Dundee Road, Huntley, IL 60142-0547  
 (800) 323-6259 • IL AREA (847) 669-5135 • FAX (847) 669-3230  
[www.maassmidwest.com](http://www.maassmidwest.com)

# CHARGE AIR 2000 Specifications

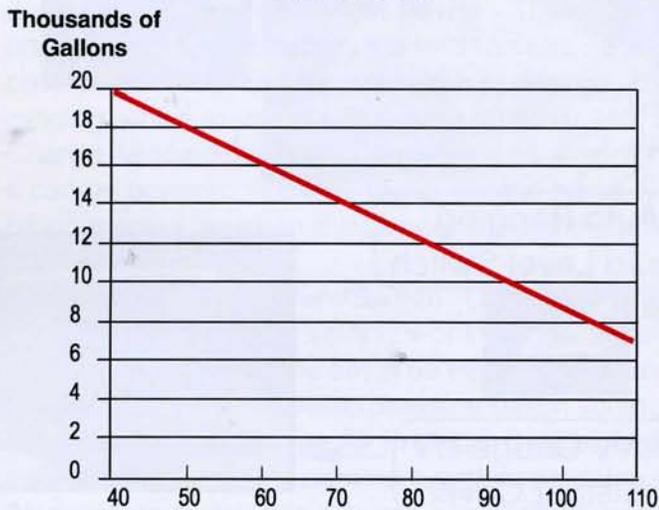
Manufactured by  
MAASS Midwest Mfg.  
Huntley, IL 60142-0547

**Model CA 2000**  
P/N (992000)

**115/208/230 Volt, 50/60 Hz**  
Single Phase

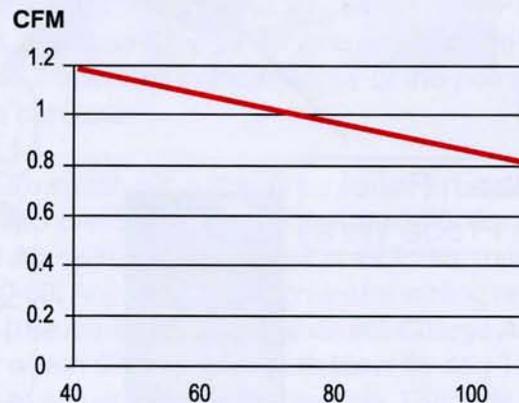
|                                 |                |
|---------------------------------|----------------|
| Maximum tank size               | 20,000 Gallons |
| Pressure range (adjustable)     | 40 to 110 PSI  |
| Pressure Switch factory setting | 45 PSI cut-off |
| Operating current at 115 volts  | 6 amps         |
| Operating current at 208 volts  | 3.5 amps       |
| Operating at 230 volts          | 3 amps         |
| Tank Connection                 | 2" FPT         |
| Size (LxWxH)                    | 14x10x17"      |
| Shipping weight                 | 37 Lbs.        |

## Maximum Operating Pressure for Various Tank Sizes



Maximum Operating Pressure

## Compressor Output



Pressure in PSI

## SPARE PARTS

| Description                     | Part Number |
|---------------------------------|-------------|
| Compressor                      | 000131      |
| Cover                           | 000133      |
| Switch, liquid level - complete | 000150      |

MAASS Midwest Mfg., P.O. Box 547, 11283 Dundee Road, Huntley, IL 60142-0547  
Phone (800) 323-6259 IL Area (847) 669-5135 Fax (847) 669-3230  
www.maassmidwest.com  
Effective: 03/01/06

MAASS

MIDWEST

MANUFACTURERS OF QUALITY WATER WELL ACCESSORIES

**CHARGE AIR 2000**

## Universal Aircharging System for Hydropneumatic Tanks

-  Dual Voltage System (115-240 VAC Single Phase)
-  Auto Ranging Solid State Liquid Level Control
-  Oil-less Long Life Compressor
-  Adjustable Pressure Switch (40-110 PSI)
-  One Year Warranty

### **CHARGE AIR** Standard Features

**Charge Air** is an entirely self-contained dual voltage air charging system. All components are mounted on a corrosion resistant gold zinc plated base using stainless steel fasteners and enclosed within a heavy gauge high density polyethylene, weatherproof outer shell. The protected components include a long life oil-less compressor, auto ranging solid state liquid level control with isolated electrode circuit and time delay and an adjustable 40 to 110 P.S.I. pressure switch.

### **CHARGE AIR** Operation...

**Charge Air** utilizes three primary components: a liquid level switch, a pressure switch, and an air compressor. Through an electrode suspended into the tank from the Charge Air system the liquid level control continuously monitors the water level of the tank. Simultaneously the pressure switch monitors the air pressure in the tank. When the water level is above the electrode and the air pressure in the tank drops below its setting the compressor will start and continue to run until the proper air pressure is reached or the water level drops below the electrode. This constant monitoring guarantees that the optimum air charge is maintained.



## ***Charge Air Model CA2000 Air Volume Control Installation Instructions***

**1. Attaching the Water Level Probe:** The bottom of the probe should hang half way from the top of the tank and the center of the outlet pipe at the bottom. Measure this distance, divide by two, and add 4 inches. Cut the white probe wire to this length, and strip 1/2" of insulation from the end of the wire. Also strip 1/2" of insulation from the end of the wire that is on the bottom of the **Charge Air**. Use the wire splicing kit that is provided to connect the probe wire.

**2. Mounting Charge Air to the Tank:** **Charge Air** should be located near the end of the tank if possible, for greater ease of installation and servicing, but not over the water inlet pipe where waves might disturb the probe readings. Attach **Charge Air** using a 2" steel pipe nipple 3" long. Use a good thread sealing compound or Teflon tape to assure an air tight seal. The vibration damper rod must be adjusted so it is snug against the tank, and lined up with the tank center-line if on a horizontal tank.

**3. Connecting the Electrical Power:** The **Charge Air** operates on either 115, 208 or 230 volts single phase. The motor is factory set for 115 volts, so if higher voltage is used, simply remove the cover on the back of the motor and flip the switch to desired voltage. The liquid level switch electronic module is auto ranging, which means it will operate on either 115, 208, or 230 volts without any adjustment. Power to the **Charge Air** should be a separately fused 15 amp circuit. Because **Charge Air** circuitry is surge protected, it can be powered from the pump control panel. Since it operates independently of the pump, it should be connected between the disconnect and the pump contactor.

**4. Adjusting the pressure Switch:** **Charge Air** pressure switch cut-out must be set 5 PSI below the pump pressure switch cut-out setting. For instance, if the pump pressure switch is set at 40-60, the **Charge Air** pressure switch must be set at 55 PSIG. The **Charge Air** switch is factory set at 45 PSIG, making it suitable, as shipped, for a pump pressure switch setting of 30-50. Any other pump pressure setting requires an adjustment of the **Charge Air** pressure switch. **(NOTE: The minimum set point on the Charge Air pressure switch is 40 PSI, so the minimum system pressure for which Charge Air is suitable is 25-45.)** The **Charge Air** pressure switch has a thumb wheel which is used to adjust its pressure setting. The pressure gauge must be used to make final adjustments. Before adjusting the setting, drain enough water out of the tank to make the pump cycle. Watch the pressure gauge and note the exact pressure reading when the pump shuts off at the end of the pumping cycle. Adjust the **Charge Air** pressure switch to turn the thumb wheel until the compressor turns on, then slowly increase the setting until the desired cut-out pressure is achieved. When adjusting the setting, make sure there is enough water in the tank to contact the probe so the compressor will run. Some means of bleeding air out of the tank without changing the water level makes setting the compressor cut-out pressure much quicker and more accurate.

***(NOTE: Should the compressor not start as expected, remember the 15 second on-delay timer built into the water level control circuitry to prevent it from short cycling due to waves in the tank.)***

Distributed by:



MANUFACTURERS OF QUALITY WATER WELL ACCESSORIES

## Trouble shooting guide for CA2000

**Theory of Operation** – The CA2000 is an air charging system that uses a pressure switch and water level probe to maintain the proper air charge in a hydro pneumatic tank. The unit is designed to turn on towards the end of the pump cycle to add a small amount of air just before the pump pressure switch turns off the pump. This is accomplished by setting the CA2000 pressure switch turn off setting 5-PSI below the pump pressure switch turn off setting.

As air is absorbed into the water, the air/water interface in the tank slowly raises over time. Eventually, toward the end of a pump cycle, water will touch the CA2000 probe. If the tank pressure has not yet exceeded the turn off setting of the CA2000 pressure switch, the compressor will turn on for a short period of time until it's pressure switch is satisfied, adding a small amount of air to the tank. During the next pump cycle, if water again touches the probe, more air will be added to the tank. Eventually, enough air will have been added that the water level does not reach the probe by the end of the pump cycle, and the compressor will not come on.

### Trouble shooting

- **Unit puts too much air into tank**
  - o Symptoms - The water level in the tank drops low enough to allow air to escape from the tank into the piping system.
  - o Background – In order to the compressor to run, two conditions must be met.
    - The tank pressure must be below the upper set point of the CA2000 pressure switch (the turn off setting.)
    - The tank probe must be in contact with the water.
  - o Possible causes leading to too much air in the tank.
    - Probe set to low – The probe should be installed near the center of the tank. If it is set too low in the tank it is possible of the tank to essentially run out of water before the pump turns on allowing air to enter the water piping system. Raise the probe.
    - Bad pressure switch – If the CA2000 pressure switch does not switch off the compressor when its set point is reached, the compressor will continue to run and the tank pressure will reach the set point of the pressure relief valve, about 125 PSI. This runaway pressure condition could only occur if water was not drawn from the tank after the pump turned off because the probe would have to be in contact with the water for the compressor to keep running.
    - Short in the probe wiring – This would fool the water level monitor into thinking the probe was in contact with the water.
    - Bad water level monitor – The relay contacts in the water level monitor could become stuck closed due to a lightning strike or similar high voltage condition causing the compressor to come on even though the probe is not in contact with the water.
  - o Tests and solutions
    - Check the tank pressure gauge. If it reads a higher pressure than the setting of the pump pressure switch, replace the CA2000 Pressure switch.
    - Remove the yellow wire from the water level module while the compressor is running. If the compressor stops immediately, the probe is either in the water or the yellow wire is shorted to the tank. To determine which condition exists, perform the following test.
      - Measure the resistance between the yellow wire and the tank. If you get a reading close to 0 ohms, the yellow wire is shorted. A reading from 1,000 to 20,000 ohms means the probe wire is OK and the probe is in contact with water. A reading of infinity (no needle movement) means the probe is not in contact with water and the yellow wire is not shorted.
    - If the compressor does not stop running when the yellow wire is removed from the module, the module is defective and must be replaced.
- **Not enough air in the tank**
  - o Symptoms – Tank becomes water logged as indicated by the pump short cycling.
  - o Background



MANUFACTURERS OF QUALITY WATER WELL ACCESSORIES

- The compressor output is about .8 CFM at 100 PSI.
- A 1000-gallon tank half full of air would have about 65 CF of air in it.
- It would take about 1.5 hours for a CA2000 completely charge a 1000-gallon hydro pneumatic tank half full of water.
- Under normal conditions, the compressor should only run for a minute or so at a time to keep the tank charged, depending on the pumping rate vs. the water usage rate.
- The tank can only become water logged if the air charging system does not pump enough air into the tank. If it does become water logged, either there is an air leak or the compressor does not run long enough because the probe is set too high or the CA2000 pressure switch is set too low or the compressor does not run at all.
- o Possible causes
  - There is a small air leak in the tank or CA2000 plumbing, which exceeds the charging capacity of the CA 2000 compressor.
    - Test – Isolate the tank by closing the tank outlet valves and look for a drop in pressure over time. If the pressure drops with not water draw there is an air leak in the tank or air charging system. Use a listening device or soap solution to locate the leak.
  - The water level probe is set too high. It should be set as the mid point of the tank. Adjust as necessary.
  - The compressor is not coming on because the circuit from the water level probe to the water level module is faulty. This would most likely occur due to the probe wire breaking inside the tank.
    - Test - Remove the yellow wire from the module and use a small jumper wire to create a short circuit between the CA2000 chassis and the socket where the yellow wire connects to the module. If the pressure in the tank is below the turn off setting of the CA2000 pressure switch, the compressor should come on approximately 15 seconds after the connection is made. (There is a 15-second delay built into the water level module circuitry to prevent the compressor from short cycling due to waves in the tank). If it does come on there is an open circuit in the probe wire circuit.
    - Solution - Check the integrity of the yellow wire from the module to the bulkhead connection where it enters the tank under the compressor. If the yellow wire looks to be intact, remove the CA2000 from the tank and check the rest of the circuit to the probe.
  - The compressor does not come on because the pressure switch is set too high or is defective.
    - Double check, the tank pressure is well below the turn off setting of the CA2000 pressure switch. Run a jumper wire across the two pressure switch terminals. If the compressor starts in 15 seconds, the pressure switch is either defective or is set above the present tank pressure. If the pressure setting is correct, replace the pressure switch.
  - The compressor does not come on because the compressor motor is not wired properly or is defective.
    - Check the wiring in the back of the compressor motor to make sure it is properly connected for the voltage being used and that the spade connectors are snug. If it is properly connected go on to the next test.
  - The compressor does not come on because the water level module is defective.
    - Double check, the tank pressure is well below the turn off setting of the CA2000 pressure switch. If it is, and the preceding checks have been successfully performed, the module may be defective.
    - Test - Run a jumper wire from either terminal on the pressure switch to where the back wire connects to the terminal block, thus by passing the module. If the motor starts immediately, the module is defective. If it does not and the preceding tests have been successfully performed, the compressor motor is defective and must be replaced.

ONE YEAR LIMITED WARRANTY

[www.maassmidwest.com](http://www.maassmidwest.com)