



# GUARDIAN CP® DIGITAL CONTROL FOR WELL PUMP & BOOSTER SYSTEMS INSTALLATION & OPERATION INSTRUCTIONS

Model DC2

**INSTALLER: LEAVE THIS MANUAL WITH HOMEOWNER.**



Your Guardian CP DIGITAL CONTROL has been carefully assembled and factory tested. To enjoy the full service this unit can provide, you should read and follow all of the instructions in this manual. When all installation steps have been completed, make sure you also follow the startup, adjustment and operation instructions before using your AMTROL product. You should also read carefully the section describing proper product maintenance and follow the required procedures as you use your Guardian CP DIGITAL CONTROL. Keep this manual with the product. This manual may become out-of-date by later amendments. Check our web site, [www.amtrol.com](http://www.amtrol.com) or ask your AMTROL supplier for any updates relating to your product.

**NOTE:** Inspect for shipping damage. Notify freight carrier or store where purchased immediately if damage is present. To avoid risk of personal injury and property damage, if the product appears to be malfunctioning or shows signs of corrosion, call a qualified professional immediately. Current copies of the product manual can be viewed at [www.amtrol.com](http://www.amtrol.com). Use proper safety equipment when installing.



**THIS IS THE SAFETY ALERT SYMBOL. IT IS USED TO ALERT YOU TO POTENTIAL PERSONAL INJURY AND OTHER HAZARDS. OBEY ALL SAFETY MESSAGES THAT FOLLOW THIS SYMBOL TO REDUCE THE RISK OF PERSONAL INJURY AS WELL AS PROPERTY DAMAGE.**

**WARNING** READ CAREFULLY THE PRODUCT INSTALLATION & OPERATION INSTRUCTIONS. FAILURE TO FOLLOW THE INSTRUCTIONS AND WARNINGS IN THE MANUAL MAY RESULT IN SERIOUS OR FATAL INJURY AND/OR PROPERTY DAMAGE, AND WILL VOID THE PRODUCT WARRANTY. THIS PRODUCT MUST BE INSTALLED BY A QUALIFIED PROFESSIONAL. FOLLOW ALL APPLICABLE LOCAL AND STATE CODES AND REGULATIONS. IN THE ABSENCE OF SUCH CODES, FOLLOW THE CURRENT EDITIONS OF THE NATIONAL PLUMBING CODE AND NATIONAL ELECTRIC CODE, AS APPLICABLE.

**WARNING** This product is used in conjunction with a system containing a tank under pressure, which may over time corrode, weaken and burst or explode, causing serious or fatal personal injury, leaking or flooding and/or property damage. To minimize risk, a licensed professional must install and periodically inspect and service the product and system. A drip pan connected to an adequate drain must be installed if leaking or flooding could cause property damage. Do not locate system in an area where leaking could cause property damage.

**WARNING** This control is capable of running pumps to pressures that may exceed the limitations of system components. Never set the operating pressure higher than that of the safe system capacity.

**WARNING** This control can be adjusted to a narrow pressure differential. An

improperly sized tank can cause the pump to cycle and lead to pump damage. This may require a larger pressure tank than is normally used.

**DANGER** ELECTROCUTION HAZARD. Must be installed by a qualified professional. First disconnect all electrical power before attempting service. For your safety, the installation and operation instructions must be followed to minimize the risk of electric shock, property damage or personal injury.

**WARNING** A water test must be taken before installation of any water treatment equipment. The water quality can significantly influence the life of your system. You should test for corrosive elements, acidity, total solids and other relevant contaminants, including chlorine and treat your water appropriately to insure satisfactory performance and prevent premature failure.

**WARNING** Use only lead-free solder and flux for all sweat-solder connections, as required by state and federal codes.

**WARNING** EXPLOSION OR RUPTURE HAZARD! A relief valve must be installed to prevent pressure in excess of local code requirement or maximum working pressure designated in the product manual, whichever is less. Do not expose system to freezing temperatures or temperatures in excess of 120°. Failure to properly size the system or follow instructions in the manual may result in excessive strain on the system and may lead to product failure, leakage, flooding and/or property damage.

**PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY FOR IMPORTANT GENERAL SAFETY INFORMATION AND ADDITIONAL SPECIFIC SAFETY ALERTS. UNIT MUST BE INSTALLED BY A QUALIFIED PROFESSIONAL.**

**Pre-Installation**

**⚠️ WARNING** DANGER! EXPLOSION HAZARD. When the well tank has been in service and a change to a higher pre-charge pressure is necessary due to a required change in the pressure switch setting, failure to follow instructions below can cause a rupture or explosion, possibly causing serious or fatal personal injury and/or property damage.

- Do not adjust or add pressure if there has been a loss of air.
- Do not adjust the pre-charge pressure if there is visible exterior corrosion.
- Do not adjust the pre-charge pressure if there has been a reduction of the pump cycle time or the pre-charge pressure compared to its initial setting. This is because a reduction in pump cycle time can result from loss of tank air pressure which can mean there may be internal corrosion. Any re-pressurization or additional pressure could result in rupture or explosion.
- Do not use with components or materials that are incompatible with the Guardian CP.

**Plumbing Connection**

1. The Guardian CP should be mounted as close as possible to the pressure tank.

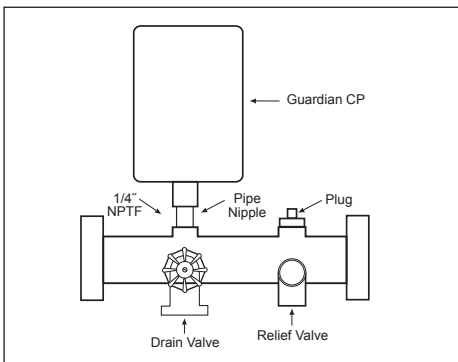
**⚠️ WARNING** LOCATE THE GUARDIAN CP FOLLOWING ALL LOCAL CODES. DO NOT LOCATE THE UNIT WHERE IT CAN BE AFFECTED BY FLOODING.

2. You may assemble the Guardian CP to a "Tank Tee" or "Tank Cross" (Figure 1) or adapt the unit to an in-line pipe fitting (Figure 2). Use pipe sealing tape or pipe sealant. Tighten the Guardian CP using the wrench flats provided on the bottom connection. DO NOT EXCEED 15 LB./FT. of torque.

**NOTE:** Do not allow pipe sealant or other contaminants to enter the small port in the Guardian CP connection.

**NOTE:** A mechanical pressure gauge is not required. Use the appropriate plug to block any unused ports.

**Figure 1. Typical Tank Tee Installation**



**Electrical Connection**

**⚠️ DANGER** ELECTROCUTION HAZARD. FIRST DISCONNECT ALL ELECTRICAL POWER BEFORE SERVICING.

**⚠️ DANGER** ELECTROCUTION HAZARD. THE Guardian CP MUST BE ELECTRICALLY GROUNDED.

**NOTE:** The Guardian CP will operate on 115 VAC & 230 VAC systems. Its ambient air temperature rating is 122°F / 50°C.

**NOTE:** The Guardian CP has openings to accept standard conduit terminations. Outdoor installations must use watertight connections.

1. Disconnect power and verify with a volt meter.
2. Determine the pump electrical requirements. If unknown, contact the pump manufacturer.
3. Select the appropriate wire gauge per local codes and the pump manufacturer's recommendation.
4. Loosen the screw on the cover of the controller and remove the plastic cover, exposing the wiring leads. (When reassembling cover, do not over-tighten screw.)
5. The wire conduit hub is to be connected to the conduit before the hub is connected to the enclosure. The maximum hub diameter cannot exceed 1.15" (1 3/20"). Larger hub will interfere with cover closure.
6. The opening of the enclosure shall be closed with hubs rated 3, 3S, 3SX, 3X, 4, 4X, 6 or 6P.

**NOTE:** Steps 5 and 6 are required for outdoor installations only.

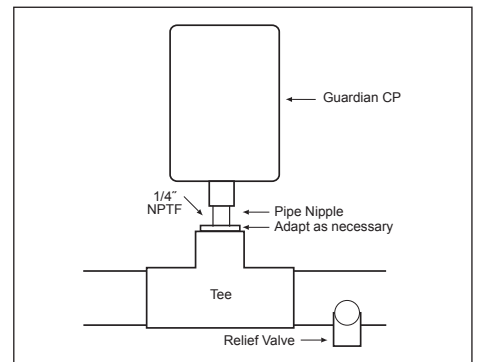
7. Following all electrical codes, wire the Guardian CP using the appropriate wiring diagram (Figure 3).

**⚠️ WARNING** UNIT MUST NOT BE SUPPORTED SOLELY BY THE ELECTRICAL CONDUIT.

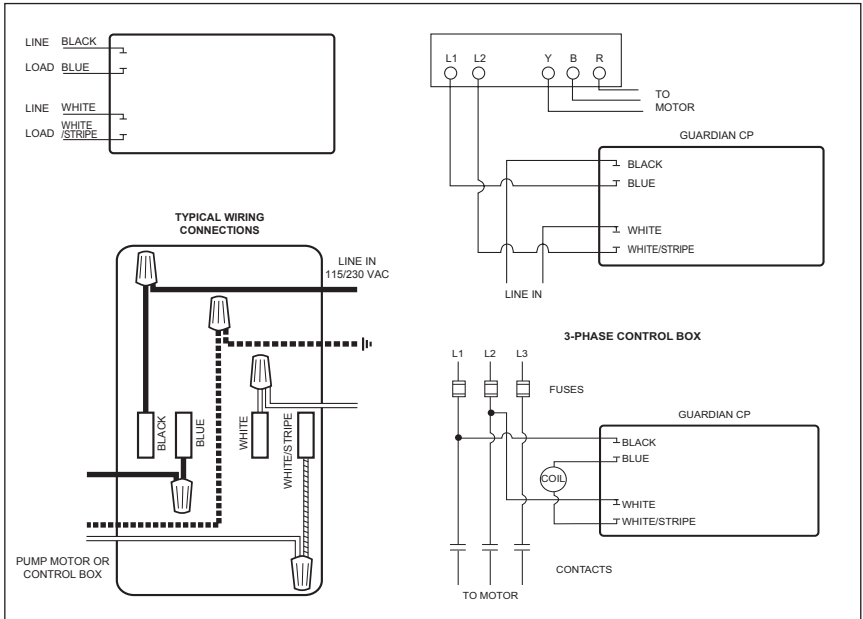
**⚠️ CAUTION** WATERTIGHT CONDUIT CONNECTIONS MUST BE USED WHEN EXPOSED TO DIRECT WEATHER, MOISTURE OR HIGH HUMIDITY.

**⚠️ CAUTION** SYSTEMS WITH METALLIC CONDUIT AS GROUNDING CONDUCTOR (EMT, RMC, IMC, ETC): ELECTRICAL BONDING BETWEEN CONDUIT CONNECTIONS IS NOT AUTOMATIC AND MUST BE PROVIDED AS PART OF THE INSTALLATION. A BONDING KIT CAN BE ORDERED SEPARATELY.

**Figure 2. In-Line Installation**



**Figure 3. Basic Wiring**



## Startup

**WARNING** BEFORE CONTINUING, CHECK FOR OPEN DRAIN VALVES OR OTHER SOURCES OF FLOODING BEFORE STARTING UNIT.

1. Prime pump if necessary and adjust tank precharge to manufacturer's recommendation for intended pressure range. The factory Guardian CP® setting is 40 psi cut-in and 60 psi cut-out.
2. Turn on power and ensure Guardian CP display illuminates, "88" will appear, then code revision number, then "00". Display will blank momentarily and the pump will start. If not, check installation.
3. The display will now read the current line pressure.
4. Allow the pump to reach the factory cut-off setting of 60 psi. IF THE PUMP CANNOT REACH THIS SETTING, DISCONNECT POWER AND SEE THE TROUBLESHOOTING SECTION.
5. Check for leaks and repair as necessary before proceeding.
6. Proceed to the ADJUSTMENT section.

**NOTE:** During the first 30 seconds after start up, the pump can be made to operate manually by depressing the ▲ arrow for 6 seconds. This is useful for priming jet pumps.

## Adjustment

**NOTE:** Differential pressure cannot exceed 55 psi or be less than 10 psi. If display will not change, alter cut-in or cut-out to within 55 psi.

1. Press and hold ■ until "LO" appears, then release. This will determine the pressure at which the pump activates.
2. When number appears, tap ▲ or ▼ to change cut-in setting.
3. Press ■ again. When "HI" appears, tap ▲ or ▼ to change cut-out setting. This will determine the pressure at which the pump shuts off.

**NOTE:** Press ■ a third time to display the last Error Code in memory (see Error Code table). If no errors have occurred, the display will show "- -".

4. After approx. 10 seconds "Pr" will appear, indicating the settings are programmed. Display will then revert to line pressure.

**NOTE:** Settings will be stored until changed manually, even if there is a power failure.

**NOTE:** If pump cannot reach cut-out setting within 5 minutes with no water running, lower the pressure settings to fall within the pump's pressure capabilities.

**NOTE:** Pressing ▲ ▼ together for 3 seconds will rotate the screen 180 degrees for easier viewing.

## Operation

The Guardian CP incorporates built-in diagnostic functions to protect the system and alert the user or installer to potential problems. If a fault is found, an error code will be displayed, indicating that service may be necessary. Error codes are listed in the Error Codes section.

## Maintenance

A professional plumber should check the complete system, including the Guardian CP, yearly and more frequently as the system ages.

## Warranty

Guardian CP Model DC2: Two (2) Year Limited Warranty Unit contains no serviceable parts. Removal of main circuit board cover will void warranty.

Visit [www.amtrol.com](http://www.amtrol.com) for complete warranty details.

# Troubleshooting

Problem	Cause	Solution
Display will not illuminate.	No power. Improper wiring. Improper voltage.	Check circuit breaker and wiring connection. Check polarity and wiring. Ensure voltage is 115V or 230V.
HI or LO setting will not change.	Differential attempted is below 10 psi or above 55 psi. Minimum cut-in reached. Maximum cut-out reached.	Differential cannot be less than 10 psi or greater than 55 psi. Adjust as necessary. LO cannot be set below 10 psi. HI cannot be set above 80 psi.
Pump will not reach cut-out (HI).	HI setting greater than pump rating. Insufficient prime (above ground pumps). No water to pump. Pump or line blockage. Fixture open or leak in plumbing.	Reduce HI setting to within pump capability. Prime pump as directed by manufacturer - use manual operation mode. Check shutoff valves. Remove obstructions. Determine cause of water flow and remedy.
Pump rapid cycles.	Pressure tank too small. Differential too narrow. Waterlogged pressure tank. Improper tank air charge. Improper wiring.	Size tank per manufacturer's literature. Spread range via HI or LO setting. Replace tank. Charge as instructed by manufacturer. Check proper wiring to "line in", L1 & L2.
Pump will not start.	No power. Guardian CP error encountered. Faulty pump. Improper wiring (Guardian CP or pump).	Check circuit breaker and wiring connections. See error chart below. Contact pump manufacturer. Check wiring per manufacturer's instructions.
Water flow stops before cut-in.	Tank precharge too high.	Adjust precharge per manufacturer's instruction.
Display reads upside-down.	Mounting position may vary.	Press ▲ ▼ together for 3 seconds and screen will rotate 180 degrees.

# Error Codes

Code	Reason	Action	Solution
<b>E1</b>	Rapid cycle. Excessive amp draw.	Pump continues to operate.	See "Pump Rapid Cycles" above. Have pump checked for proper operation.
<b>E2</b>	Low water cut-off. Running pressure below 10 PSI.	Pump shuts off. Auto restart after 60 min.	(A) Determine cause of low-suction (B) Check Wiring (C) Inspect pump
<b>E3</b>	Improper voltage.	Pump shuts off. Auto restart when voltage connected.	Restore voltage to proper range. Unit will monitor voltage until it returns to normal. Pump will restart automatically.
<b>E4</b>	Electrical disturbance.	Pump shuts off.	Disconnect power for one minute to reset. If error persists, contact Amtrol Technical Support.

To reset switch at any time: Press ▲ ■ ▼ buttons simultaneously for 5 seconds.



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