



**TORNATECH**

LISTEN DEVELOP LEAD

# **INSTALLATION AND MAINTENANCE MANUAL FOR JOCKEY PUMP CONTROLLERS**

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# IMPORTANT SAFETY INFORMATION

	 <b>DANGER</b>
	<b>RISK OF ELECTROCUTION</b> PERSONAL INJURY OR DEATH COULD OCCUR. ENSURE ALL POWER IS DISCONNECTED BEFORE INSTALLING OR SERVICING THIS EQUIPMENT.



## DANGER

Do not attempt to install or perform maintenance on equipment while it is energized! Death, personal injury or substantial property damage may result from contact with energized equipment. Always verify that no voltage is present before proceeding and always follow generally accepted safety procedures. Controller disconnect switch must be in the “off” position in order to open the enclosure door. Tornatech cannot be liable for any misapplication or incorrect installation of its products.



## Warning:

This product can expose you to chemicals including DINP, which is known to the State of California to cause cancer, and DIDP which is known to the State of California to cause birth defects or other reproductive harm.



## **Warning:**

**This product can expose you to chemicals including lead and lead compounds, which are known to the State of California to cause cancer and birth defects or other reproductive harm.**

For more information go to: [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

# INTRODUCTION

Tornatech Jockey Pump Controllers are intended for use with fire pump systems. They are used for pressure maintenance in fire pump installations to prevent unnecessary cycling of the main fire pump.

They are listed by Underwriters' Laboratories, Inc., in accordance with UL508A, Standard for Industrial Controllers. They are built to meet or exceed the requirements of the approving authorities as well as NEMA and the latest edition NFPA 70 National Electrical Code.

They also comply with the requirements of the Electromagnetic Compatibility (EMC) Directive 2014/30/EU, the Low Voltage Directive (LVD) 2014/35/EU, the Electromagnetic Compatibility Regulations (2016 No. 1091) and The Electrical Equipment (Safety) Regulations (2016 No. 1101).

These instructions are intended to assist in the understanding of the installation and operation of these controllers. Read the instructions thoroughly prior to connecting or operating the controller. If there are any unanswered questions, please contact the local Tornatech representative or the factory service department.

## JOCKEY PUMP CATALOG NUMBER

**Model No. Example: JPLT – 460 / 2 / 3 / 60**

Model Prefix: JPLT

Voltage: 460 V

HP Rating: 2HP

Phase: 3

Frequency: 60 Hz

## TECHNICAL DATA

Rating	Value
Rated Operational Current $I_e$	According to the Motor (HP/kW)
Rated Insulation Voltage $U_i$	690, 600 (IEC)
Rated Operational Voltage $U_e$	110/120, 220/240, 380/415, 440/480, 575/600, 690
Rated Impulse Withstand Voltage $U_{imp}$	6000V
Rated Operational Frequency	50/60Hz
Environmental temperature	4°C to 40°C (Optional -5°C to 55°C)
Altitude	≤ 2000m
Relative humidity	5% to 80%
Pollution degree	3
Short Circuit Current Rating $I_{cc}$ (SCCR) (A)	According to the controller rating label
Rated Peak Withstand Current $I_{pk}$	According to IEC 61439-1:2020 Table 7

## **STORAGE**

If the controller is not installed and energized immediately, Tornatech recommend following the instructions from the chapter 3 of the NEMA ICS 15 standard.

# INSTALLATION

## SEISMIC

Jockey Pump controllers are optionally seismic approved and has been tested in accordance with the ICC-ES AC156, IBC 2015 & CBC 2013 standards. Proper installation, anchoring and mounting is required to validate this compliance report. Refer to this manual and drawings to determine the seismic mounting requirements and location of the center of gravity (you may need to contact factory). The equipment manufacturer is not responsible for the specification and performance of anchorage systems. The structural engineer of record on the project shall be responsible for anchorage details. The equipment installation contractor shall be responsible for ensuring the requirements specified by the structural engineer of record are satisfied. If detailed seismic installation calculations are required, please contact the manufacturer for the performance of this work.

## ENVIRONMENT

Jockey Pump controllers are intended to be installed in locations where ambient temperatures are within 4°C and 40°C and the relative humidity is controlled between 5% and 80%. Optionally, the controller can have an extended temperature of up to 55 °C and as low as -5°C, provided that the controller and the pressure water pipes are heated to prevent water freezing and damaging the electronic and the piping system.

They are intended for pollution degree 3 and shall be installed at an altitude of no more than 2000 meters. For abnormal installation environment, consult factory.

## ELECTROMAGNETIC COMPATIBILITY (EMC)

Jockey Pump controllers have been tested for the most stringent conditions for emissions (Environment B) and immunity (Environment A), hence controllers can be installed in either environment. All controllers variants share the same electronics and comply to those criteria without requiring additional measures.

## HANDLING

The weight of each Jockey Pump controller is indicated on the packing label. Lightweight controllers do not require special handling instructions, while heavy controllers are equipped with lifting means and should be handled following the guidelines specified in Tornatech's document "Large Enclosure Safe Handling Requirements\_PN12162021".

## MOUNTING

**Consult the appropriate job plans to determine the controller mounting location.**

### **TOOLS AND MATERIALS REQUIRED:**

1. Assortment of common hand tools of the type used to service electromechanical equipment.
2. Drill for drilling wall anchor holes.
3. Hole (conduit) punch.

4. Hand level.
5. Tape measure.
6. Four anchors with bolts and washers, per enclosure.

## PROCEDURE

### **Refer to the controller dimension drawing for necessary mounting dimensions.**

The controller is wall mounted by using at least four (4) wall anchors, 2 anchors for the top mounting brackets and 2 anchors for the bottom mounting brackets. The brackets are dimensionally on the same centerline for ease in mounting. There should be a clearance of at least 6 inches around the controller to allow proper air circulation around the equipment.

1. Using either the dimension print or by measuring the distance between the center lines of the lower bracket slots, transcribe this dimension on to the wall. Note: The bottom edge of the enclosure should be a minimum of 12" (305mm.) from the floor in case flooding of the pump room occurs.
2. Drill and put anchors into the wall for the lower mounting brackets.
3. Mark on the wall, the location of the holes in the upper mounting brackets.
4. Drill and put anchors into wall for the upper mounting brackets.
5. Install bolts and washers in lower anchors.
6. Align holes in upper mounting brackets and install bolts and washers in anchors.
7. Shim anchors as necessary to ensure rear of enclosure is vertical level and enclosure is not stressed.
8. Tighten all anchor bolts.
9. Check to be sure enclosure door open and closes freely and that enclosure is level.

## MAKING SYSTEM PRESSURE CONNECTIONS

The controller requires one (1) "System Pressure" connection from the system piping to the enclosure. The connection fitting, 1/2" NPT male port, is provided on the bottom, external side of the enclosure for this purpose. Refer to NFPA 20 (or Publication GF100-30) for correct field piping procedure of the sensing line between the pumping system and the controller.

## MAKING ELECTRICAL CONNECTIONS

### IMPORTANT PRECAUTIONS

A licensed electrician must supervise the electrical connections. The dimension drawings show the area suitable for incoming power and motor connections. No other location shall be used. Only watertight hub fittings shall be used when entering the cabinet to preserve the NEMA or IP rating of the cabinet.

**The installer is responsible for adequate protection of the Jockey Pump controller components against metallic debris or drilling chips. Failure to do so may cause injuries to personnel, damage the controller and subsequently void warranty.**



Prior to making any field connections

1. Open door of enclosure and inspect internal components and wiring for any signs of frayed or loose wires or other visible damage.
2. Verify that the controller information is what is required on the project:
  1. Tornatech catalog number
  2. Motor electrical nameplate information matches controller rating for voltage, frequency, FLA and HP.
3. Project's electrical contractor must supply all necessary wiring for field connections in accordance with the National Electrical Code, local electrical code and any other authority having jurisdiction.
4. Refer to the appropriate field connection drawing for wiring information.

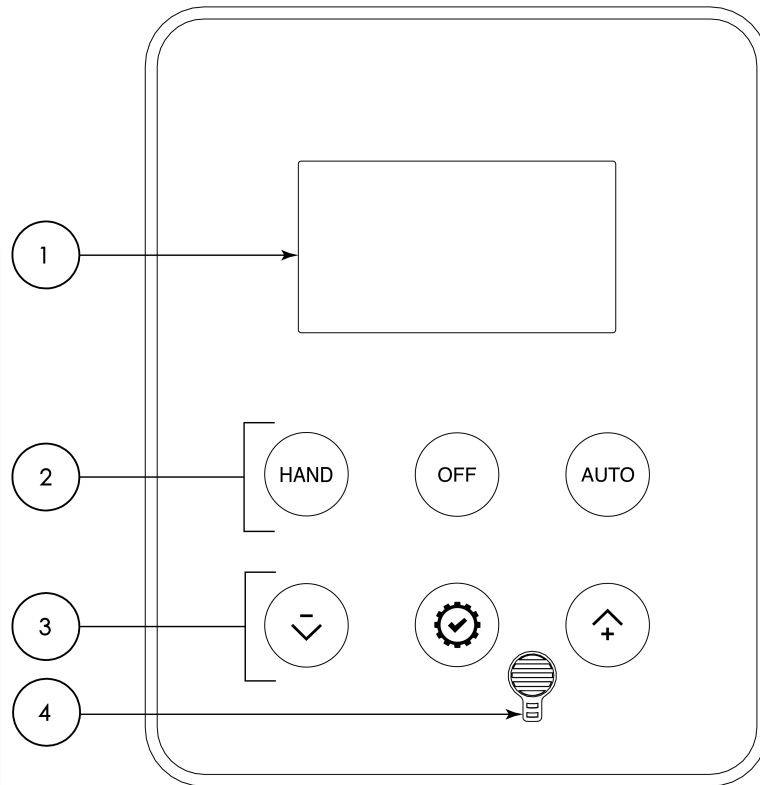
## **PROCEDURE**

All field connections, remote alarm functions and AC wiring are brought into the enclosure through the top or bottom conduit entrances as indicated on the dimensional drawing.

Do not place conduit entrances on the sides of the enclosure.

1. Using a hole (conduit) punch, create a hole in the enclosure for the size conduit being used.
2. Install necessary conduit.
3. Pull all wires necessary for field connections, remote alarm functions, AC power and all other optional features. Bring enough wire inside the enclosure to make up connections to the appropriate line, load and control terminal block points. Be sure to consult the appropriate field connection diagram included with the manual. For proper wire sizing, refer to the National Electrical Code, NFPA 70.
4. Make all field connections to the remote alarm functions and any other optional features.
5. Connect motor to controller load terminals.
6. Find nameplate on Jockey Pump motor and make note of its full load amp rating. Verify the overload within the controller is set for that number of amps.
7. Verify AC line voltage, phase and frequency with the controller data plate on the enclosure door prior to connecting.
8. Connect AC power.
9. Check to see that all connections are both correctly wired (in accordance with the field connection diagram) and tight.
10. Close the enclosure door.

# OPERATOR INTERFACE



1. LCD screen
2. Hand-Off-Auto selector
3. Menu navigation buttons.
  1. Down / decrease value
  2. Enter configuration / enter
  3. Up / increase value
4. Integrated alarm buzzer

## HOW TO CONFIGURE THE CONTROLLER

To enter the configuration, press the enter configuration button. Use the up and down buttons to select the value to edit, then press enter. Use the increase or decrease value button to edit the value. Holding those buttons will change the value with an increased speed. Once satisfied with the value, press the enter button.

Edited items are not directly applied to the controller and are marked on the screen with an asterisc. Once satisfied with your new values, exit the menu by selecting the first menu line and pressing enter. A

confirmation popup will appear asking you to apply the new values to the controller, select "yes" then press enter. You may alternatively discard all changes made by selecting "no".

## **METHODS OF STARTING/STOPPING**

### **AUTOMATIC MODE**

When the mode selector is in automatic, the controller will start automatically on low pressure detection by the pressure sensor (below the cut-in threshold).

The motor is automatically stopped after the restoration of the pressure (above the cut-out threshold), after a programmable run period timer.

### **MANUAL MODE**

When the mode selector is in manual, the controller will run the motor continuously.

### **OFF MODE**

When the mode selector is in off, the motor cannot be started and will be stopped if it was previously running.

### **BUMP FOR ROTATION**

Successively applying manual mode and off mode to the controller can be used to bump for the motor and check rotation. If the rotation is incorrect, turn OFF power with the door mounted disconnect. Swap any two existing motor lead wires that are on the motor contactor in the controller

# COMMISSIONING

1. Verify, and adjust if necessary, the motor overload setting.
2. For three-phase motors, verify the motor rotation by bumping the motor. In case of incorrect rotation, **power off the controller** and swap two wires at the contactor load side.
3. Enter the configuration menu and input the appropriate values for
  1. Pressure unit if required, in the Advanced sub menu;
  2. Cut-out<sup>1</sup>;
  3. Cut-in;
  4. Timer on;
  5. Timer off.
4. Exit the configuration menu and save changes.
5. Place the hand-off-auto selector in auto.

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<sup>1</sup>Cut-out is required to be at least 10 PSI more than cut-in value and should be edited first.

# MAINTENANCE

Tornatech controllers are covered by a limited warranty and backed by a 10-years service life or until supply last, provided that proper installation, commissioning, use and maintenance of the controller is made as per this document and any maintenance standard applicable.

Proper controller performance must be asserted at least once a month by executing the following:

1. With the system being at nominal pressure, ensure that the pressure reading is within tolerances
2. Perform a manual start sequence and verify that
  1. There is no nuisance tripping
  2. The motor starts properly and is able to accelerate within the expected time
  3. The motor rotates in the appropriate direction
3. Perform an automatic start sequence and verify that
  1. The motor starts when the pressure falls below cut-in
  2. The pump is able to rise the pressure above the cut-out
  3. The motor stops when the pressure is above cut-out, for automatic stop systems, or by performing a manual stop otherwise

In addition to the above, the following preventative maintenance must be performed at least once year:

1. Turn off the controller
2. Do a visual inspection of the exterior of the controller
3. Open the enclosure and do a visual inspection of the interior of the controller
4. Make sure that there is no dust accumulation inside the controller
5. Inspect the tightness of each dead cable
6. Put the controller back in service

# PATENTS

Country	Title	Grant NO
CA	Mechanical activator for contactor	2741881
US	Mechanical activator for contactor	US8399788B2
CA	Mechanical activator for electrical contactor	165512
CA	Mechanical activator for electrical contactor	165514
US	Mechanical activator for electrical contactor	D803794
US	Mechanical activator for electrical contactor	Patent pending
EP	Mechanical activator for electrical contactor	002955393-0001/2
AE	Mechanical activator for electrical contactor	Patent pending
AE	Mechanical activator for electrical contactor	Patent pending
CA	Fire pump digital operator	163254
US	Fire pump digital operator interface	D770313
AE	Fire pump digital operator interface	Patent pending
EP	Fire pump digital operator interface	002937250-0001
CA	System and method for detecting failure in a pressure sensor of a fire pump system	Patent pending
US	System and method for detecting failure in a pressure sensor of a fire pump system	Patent pending

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