



T-L IRRIGATION COMPANY

Hastings, Nebraska

PRECISION LINK SYSTEM



INSTALLATION, OPERATION AND TROUBLESHOOTING MANUAL

CD90441

Nov. 1, 2018
Latest versions:
PPC III = 6.58 or 7.00
PPT Main v144
PL = 65



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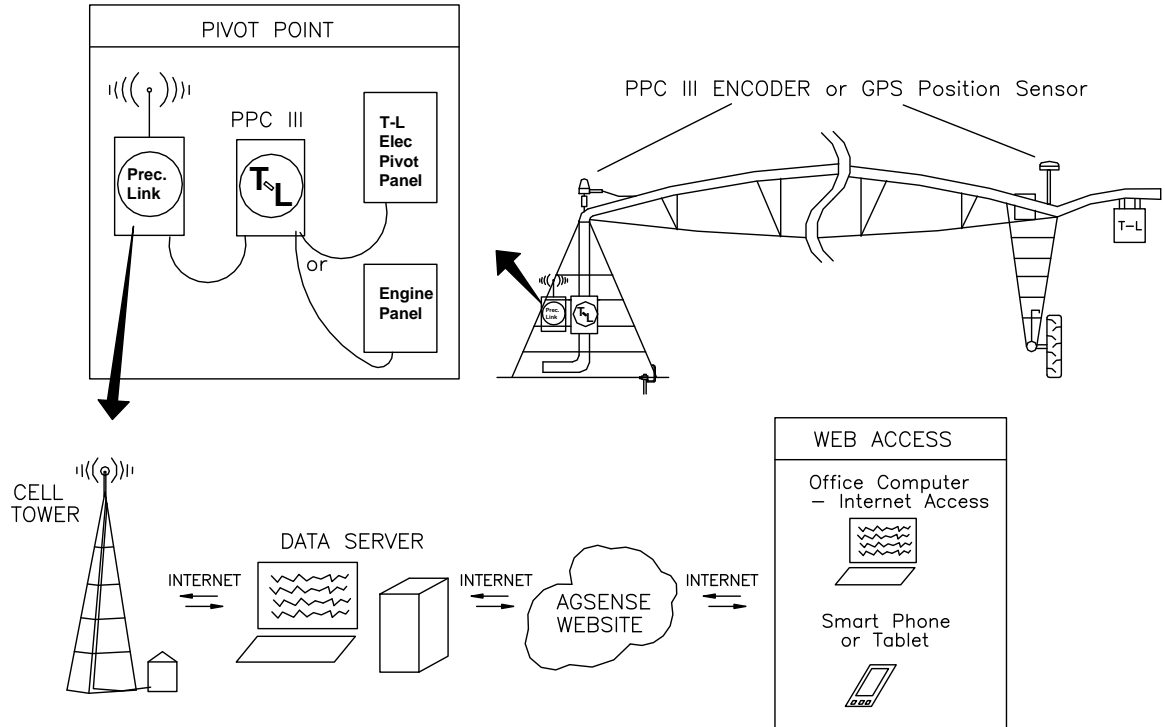
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INTRODUCTION

Overview:

- PPC III Control Panel with Position Sensor (either Encoder or GPS)
- or PPT (Precision Point Touch) Control Panel
- AgSense Precision Link Panel wired into PPC III or PPT so they can “talk” to each other.
- AgSense Website Subscription to allow access from Internet.
 - User Log-In at dedicated web page at www.wagnet.net.
- Monitor and/or control from any web enabled device.



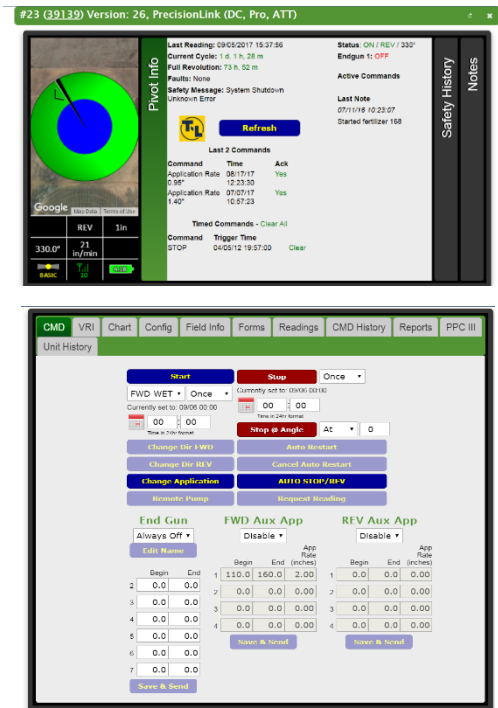
Website Features:

Monitor:

- Graphical view of Pivot & Angle of Pivot
- Operating Information
- AS/AR Status
- Aux Appl. or VRI Appl. Status
- Travel Speed
- Graphs of Angle, Water Pressure if equipped
- Safety Shutdown messages
- Text Alerts

Control:

- Change direction from the website.
- Change application rate (speed).
- Set End Gun Tables, set Aux Appl. Tables.
- Set VRI Table (120 steps possible)
- Start / Stop the system
- Control the Water Pump if Electric
 - Ex. “Start FWD Dry” or “Start FWD Wet”



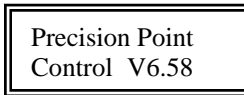


INTRODUCTION

Precision Point III Panel Required with correct Firmware:

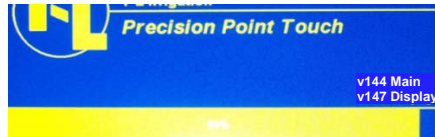
- v6.58 April 20, 2015 = Application increments of 0.05"
- v7.00 Sept. 1, 2017 = Application increments of 0.01" up to 2.00", then 0.05" from 2.05" to 4.75"
= Precision Link must be updated to v60 to work with PPC III v7.00

PPC III Title Screen



Precision Point Touch Panel Required with correct Firmware:

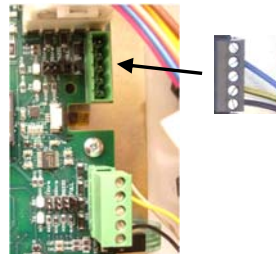
- Main v144 Sept. 1, 2018 = Application increments of 0.01" up to 2.00", then 0.05" from 2.05" to 4.75"
(or later firmware) = Precision Link must be updated to v64 or later



Wiring to Com Port 2:



PPC III:
Comm Port 2 used to communicate with Precision Link.



PPT:
Comm Port 2 used to communicate with Precision Link.

Preferred Installations – Precision Link Designed to work with these:

Other Installations may not be able to use the full functionality of the Precision Link:

- PPC III or PPT Panel at Pivot Point
- T-L Allen Bradley Panel at Pivot Point or Engine at Pivot Point
- If Electric, Water Pump that can be automatically controlled from Pivot Point
 - wired control or wireless via AgSense Crop Link
- If Electric, Water Pressure Start Kit installed.

Intended Operation for Electric Drive to use Full Functionality:

- Start command issued from website.
- Precision Link energizes its Water Pump Relay and Start Relay to start the system Wet.
- Pivot Pressurizes and Water Pressure Start Switch closes to start pivot moving.
- Precision Point Control Panel powers up and initiates communication with Precision Link.
- Operational information available on website.

Precision Link Voltage/Amperage Specifications:

10-35 VDC input. Typical 0.5 amp at 12VDC, 0.25 amp at 24VDC.

Electric Drive Installation Note – High Voltage:

Full time DC power to the Precision Link **should not exceed 35 VDC.**

- If over 35 VDC install either option below. See Section C.2, Figure 5 & Figure 6.

Option 1: EC51075 DC Converter, install in PPC III or PPT Panel for "Full Time" Power to Precision Link.

Note: Included with Precision Link after Jan. 1, 2019.

Option 2: MP53050 Clipper Kit, install in Allen Bradley Panel for "Full Time" Power to Precision Link.

Engine Drive Installation Note:

If random shutdowns are occurring on an Engine Drive installation, a 10 sec. Time Delay can be added per Figure 2.1 or Figure 2.1a depending if the engine has a Murphy 117 or a Murphy 518.



What's in the AgSense Shipping Box?

- Qty 1 - AgSense Precision Link PL1
- Qty 1 - DC Converter/Regulator. Max 75VDC in, 24VDC out. (after Jan. 1, 2019)
- Qty 20 ft - 18 Ga 12 Wire Cable
- Qty 1 - MD90838 Precision Link Installation Kit, (Bill of Materials listed below)



Part No.	Description	# Req'd.
CD90258	Decal Run/Start Sw	1
CD90259	Decal Remote/Local Sw	1
CD90441	Precision Link Manual	1
CD91181	Precision Link Quick Ref	1
EH52350	Wire Nut - Orange	8
EH52394	1/2" Conduit Locknut	3
EH5242	1/2" Strain Relief .170-.470	3
ES5257	Toggle Sw SPST	1
FB5435	HHCS 1/4" X 1"	2
FN5399	Hex Nut 1/4"	2
FW5647	Flat Washer 1/4"	2
FW5648	Lock Washer 1/4"	2

Serial Number of Precision Link

The Serial Number of the Precision Link is on a label on the outside of the box.



Installation of Precision Link Enclosure:

Attach Precision Link (PL) next to PPC III or PPT panel on pivot point (or other structure PPC III is mounted on). Mount close enough so PL cable can be routed into PPC III or PPT. Maintain PL antenna height as high as feasible and unobstructed.

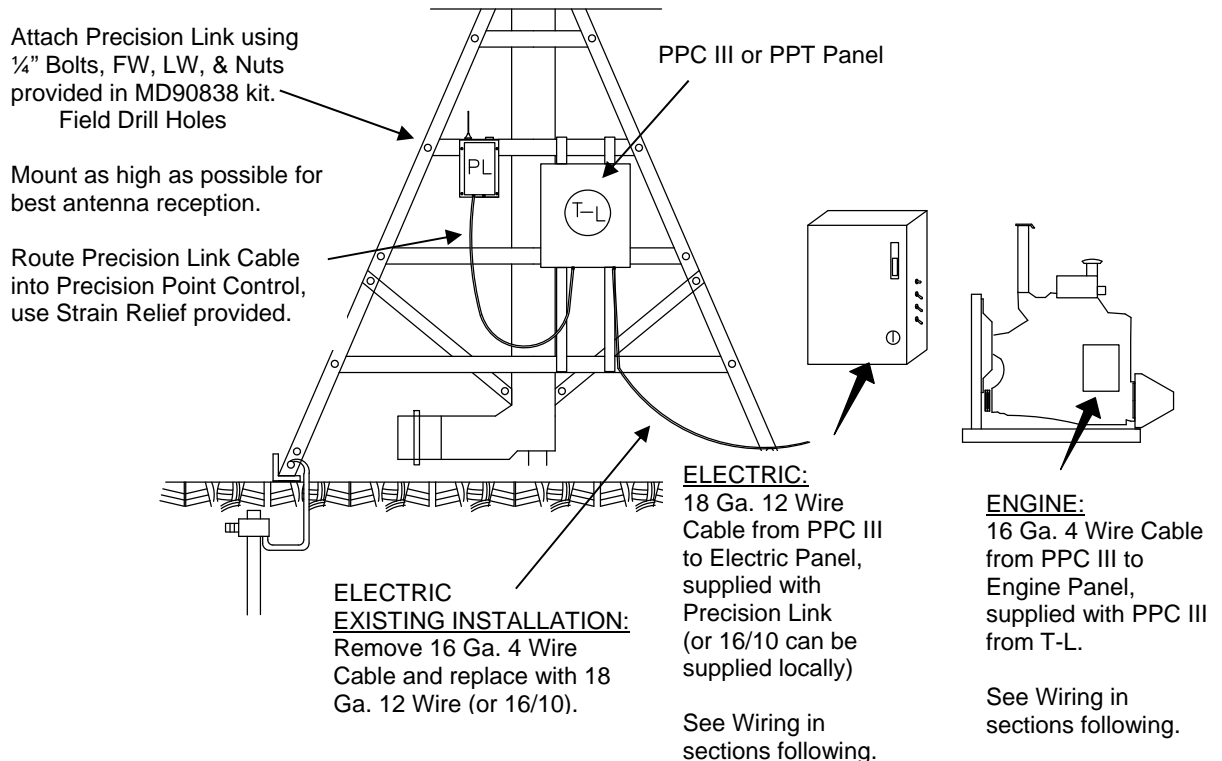


Figure 1. Installation of Precision Link Box.



INSTALLATION & WIRING

Wiring:

A. Wiring PPC III or PPT Panel with Engine Drive Hydraulic Pump to PL:

Part 1 of 2: PPC III Panel – Engine Drive (see next page for PPT Panel)

Note: A 10 sec. Time Delay can be added to avoid nuisance shutdowns. See below and next pg.

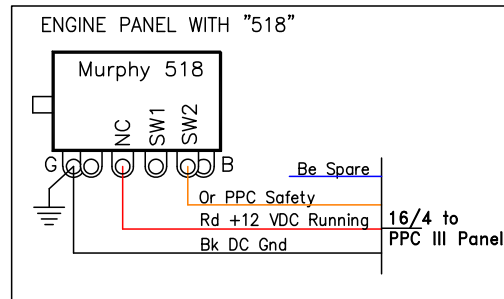
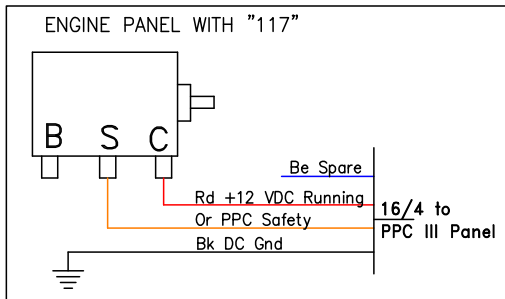
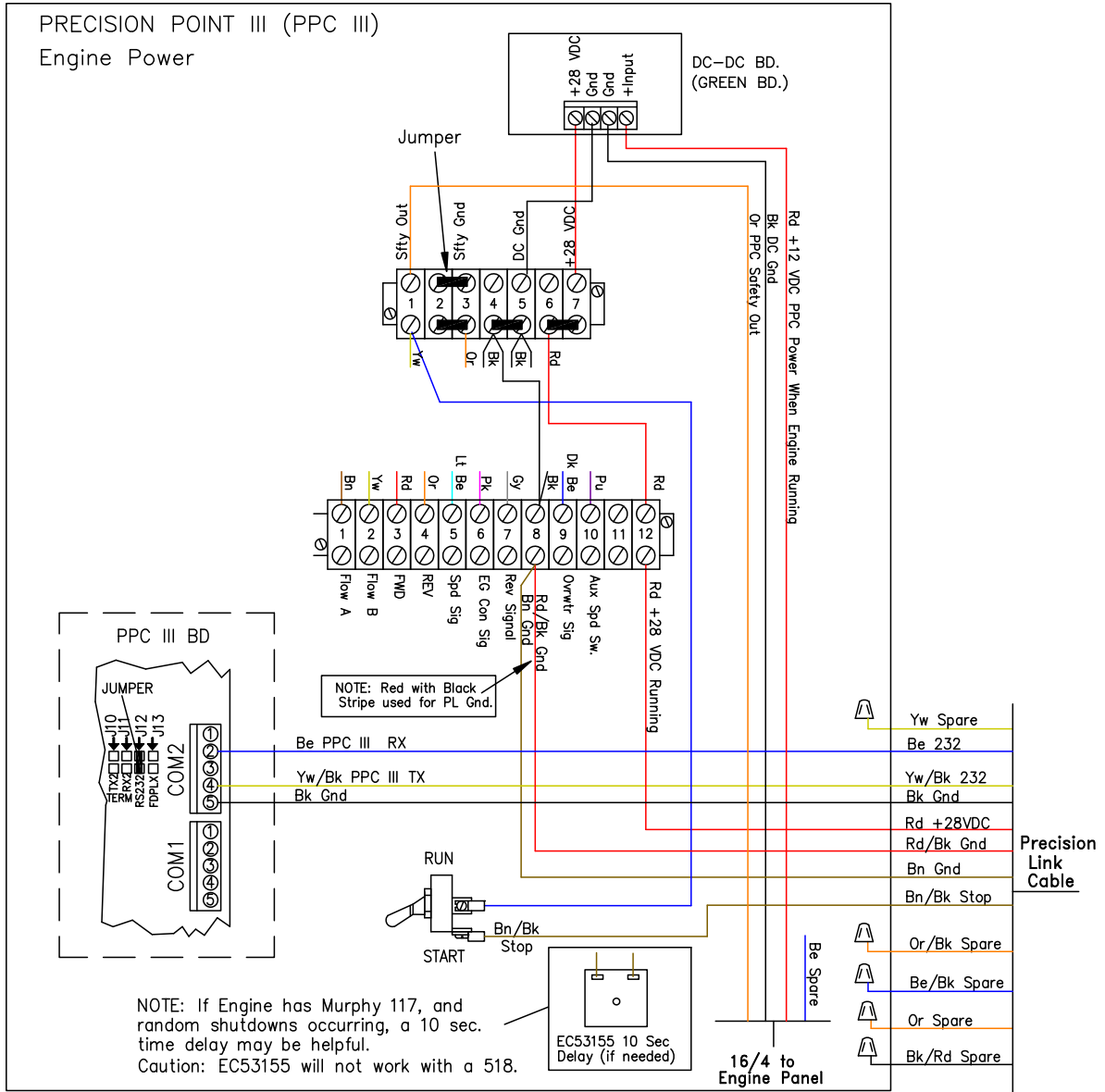


Figure 2.1. Wiring PPC III Panel for Engine Driven Hydr Pump.

INSTALLATION & WIRING



PPT Touch Panel – Engine Drive

Note: A 10 sec. Time Delay can be added to avoid nuisance shutdowns. See below and next pg.

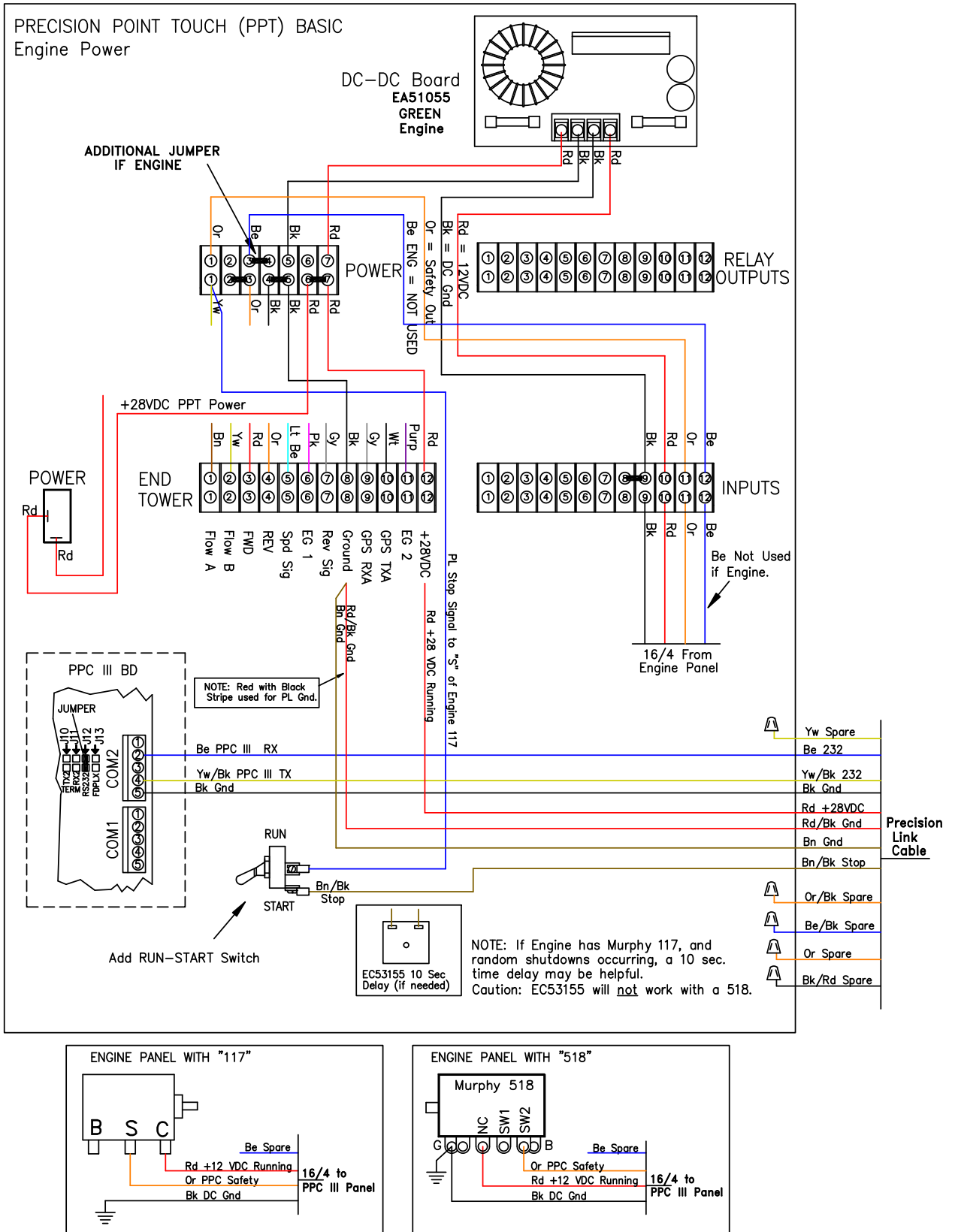


Figure 2.1.5. Wiring PPT Touch Panel for Engine Driven Hydr Pump.



INSTALLATION & WIRING

Engine Drive with Murphy 117 or 518, Random Shutdowns from the PL:

- add Time Delay Relay in PPC III or PPT Panel. (Solid State Timer will not work with 518.)

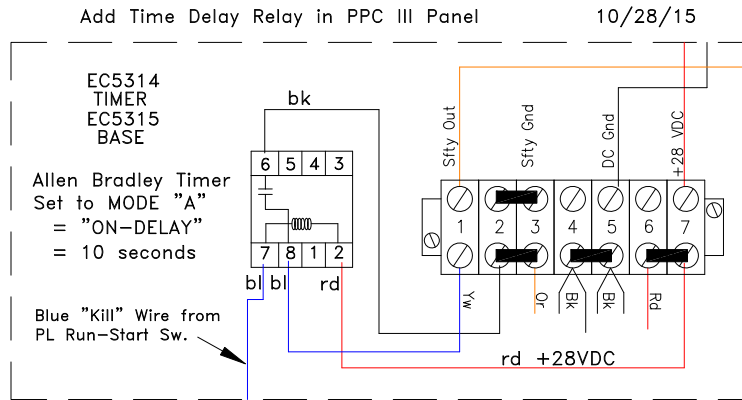


Figure 2.1a. Time Delay Relay for Murphy 117 or 518 with Random PL Shutdowns.

Part 2 of 2: Precision Link Wiring to Engine PPC III or PPT Panel (Pre-wired from AgSense)

09/21/17

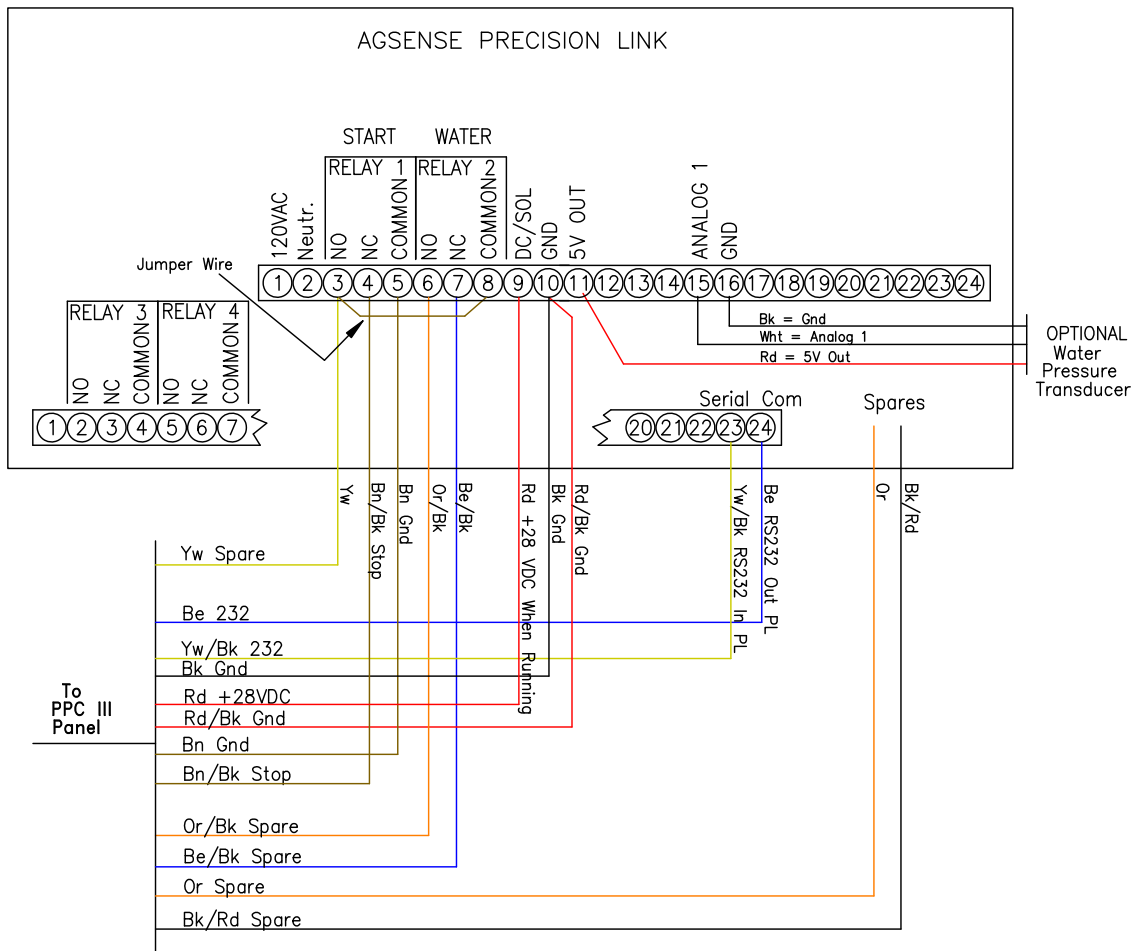


Figure 2.2. Precision Link Wiring to Engine PPC III or PPT Panel.



B. Wiring PPC III or PPT Panel with Electric Drive Hydraulic Pump to PL:

Part 1 of 2: PPC III Panel – Electric Drive (see next page for PPT Panel)

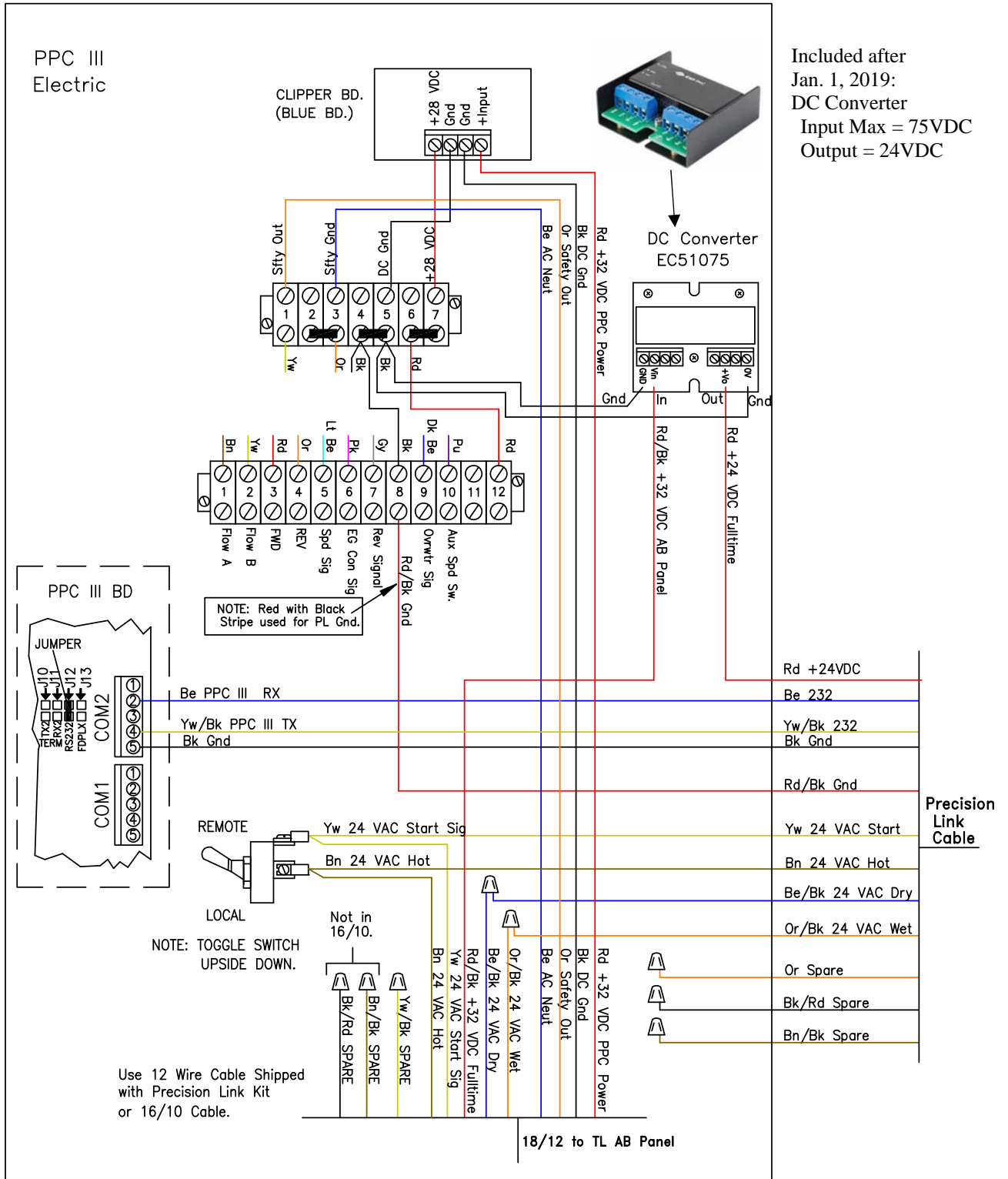


Figure 3.1. Wiring PPC III Panel for Electric Driven Hydr Pump.



INSTALLATION & WIRING

PPT Touch Panel – Electric Drive

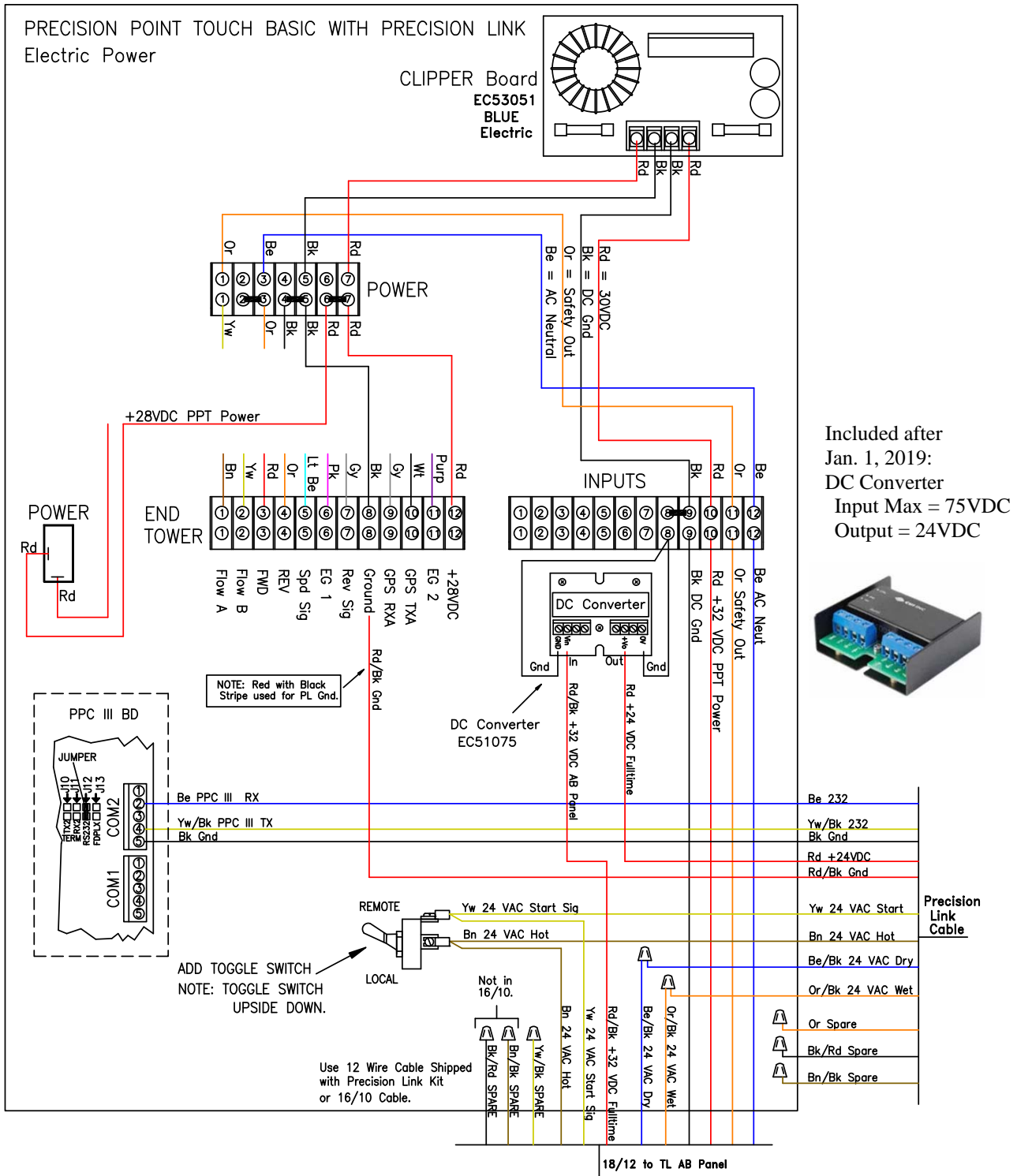


Figure 3.1.5. Wiring PPT Touch Panel for Electric Driven Hydr Pump.



Part 2 of 2: Precision Link Wiring to Electric PPC III or PPT Panel
(Pre-wired from AgSense)

09/21/17

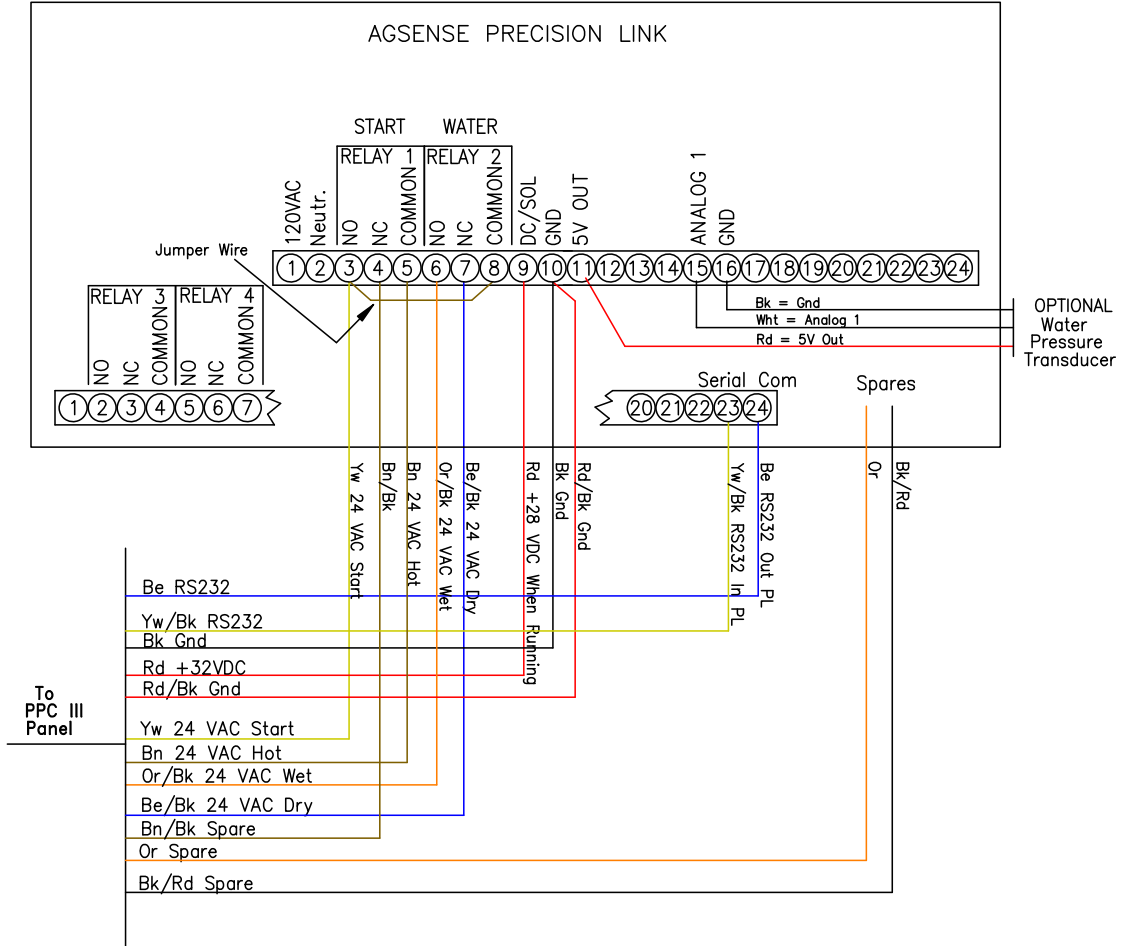


Figure 3.2. Precision Link Wiring to Electric PPC III Panel.



INSTALLATION & WIRING

C. Wiring T-L Allen Bradley Pivot Panel

C.1. With Water Press. Start – Rewire 2 Pole Relay (New Precision Link Installation)

- Electric Driven Hydraulic Pump – Electric Driven Water Pump
 - Precision Link Controls Water Pump to start system Wet, then pivot pressurizes and Water Pressure Start Switch Closes to start pivot moving and power PPC III.
- NOTE: This will also work for Load Control Auto Restart, enable this feature on the website.

- See C.4. later diagram if using an Engine Water Pump to Pressure Start the Pivot.

Part 1 of 2: Allen Bradley Panel with Water Pressure Start, Electric Water Pump

- New AgSense Precision Link Installation – Field Wiring Instructions

AgSense MODIFICATION USING 2 POLE RELAY IN PANEL – PRECISION LINK
CD51785 SPECIAL WATER PRESSURE ACTUATED PIVOT 8/27/12 NJS

PART 1 of 2

NOTE – FIELD WIRING CHANGES FOR AGSENSE PRECISION LINK

- A. Remove Yellow wire to #6 of Relay. Move Yellow wire from #9 of Relay to Term. Strip #8.
- B. Change wiring to Rectifier (Black & Blue wires) to provide "full time" power to AgSense.
- C. Wire Red wires to Relay #6 from Rectifier and from Relay #9 to Term Strip #13 as shown.

NOTE – FIELD WIRING CHANGES FOR WATER PRESSURE START

- D. Turn Water Pressure Switch Upside Down
 - Toggle Up = Wet (Open)
 - Toggle Down = Dry (Closed)
- E. Move Orange Wires on Water Pressure Switch from 3 & 4 to 11 & 12
- F. Remove Jumper on bottom of 11 & 12

Figure 4.1 Wiring of T-L Allen Bradley Panel, Water Pressure Start using Existing 2 Pole Relay.

INSTALLATION & WIRING



Part 2 of 2: Allen Bradley Panel with Water Pressure Start, Electric Water Pump

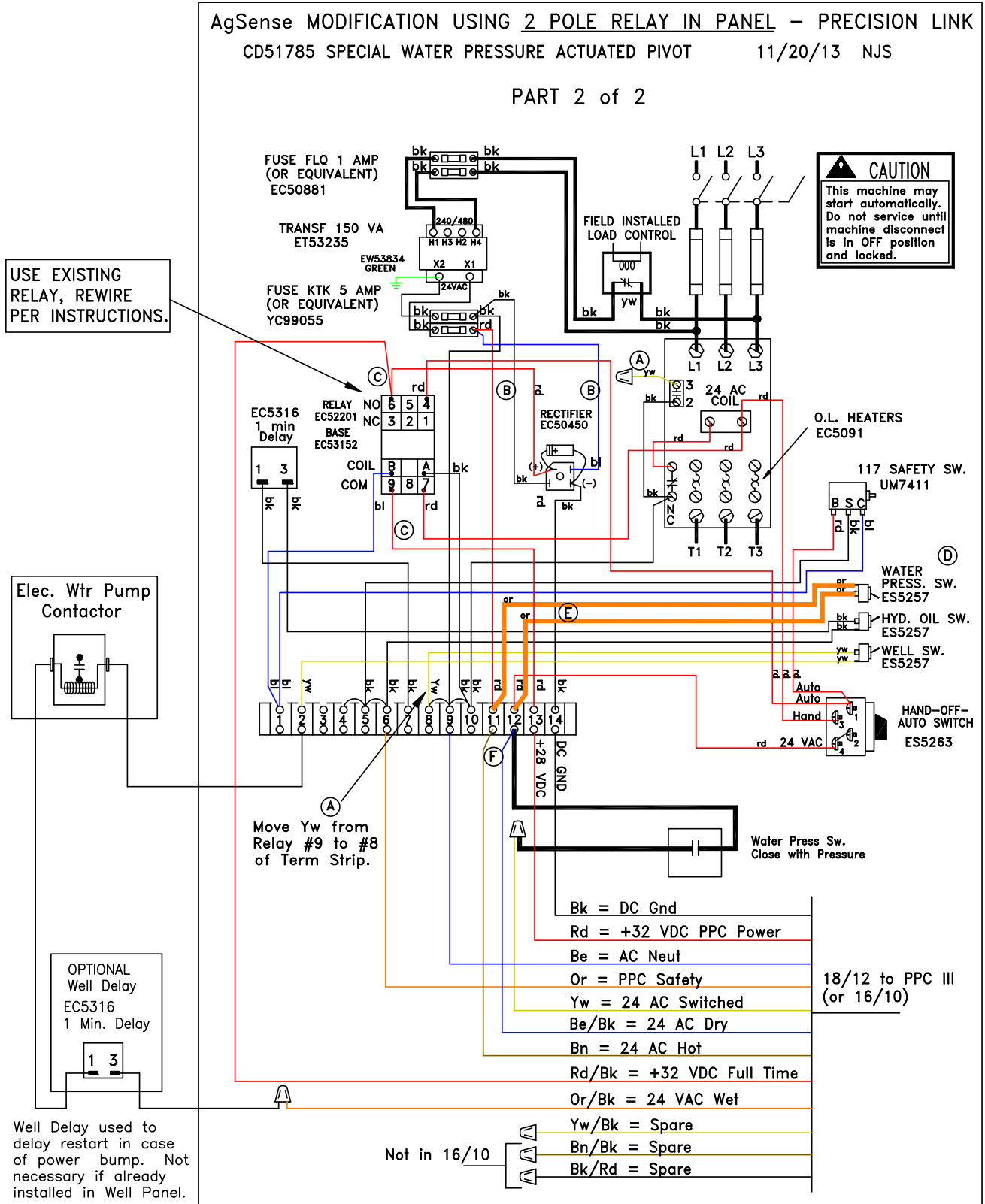


Figure 4.2 Wiring of T-L Allen Bradley Panel, Water Pressure Start using Existing 2 Pole Relay.

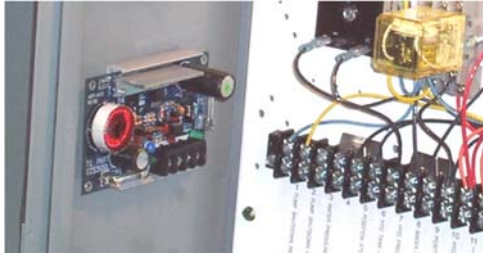


INSTALLATION & WIRING

C.2. Electric Drive Installation – Voltage Regulation if Above 35VDC.

Full time DC power to the Precision Link should not exceed 35 VDC. If over 35 VDC install either option.
NOTE: DC Converter included with Precision Link after Jan. 1, 2019.

Option 1: Install Clipper in AB Panel



Option 2: Install DC Converter in PPC III



Included after Jan. 1, 2019:
EC51075 DC Converter
Input Max = 75VDC
Output = 24VDC
0.40 amps
(CUI PYB10-Q48-S24-U)

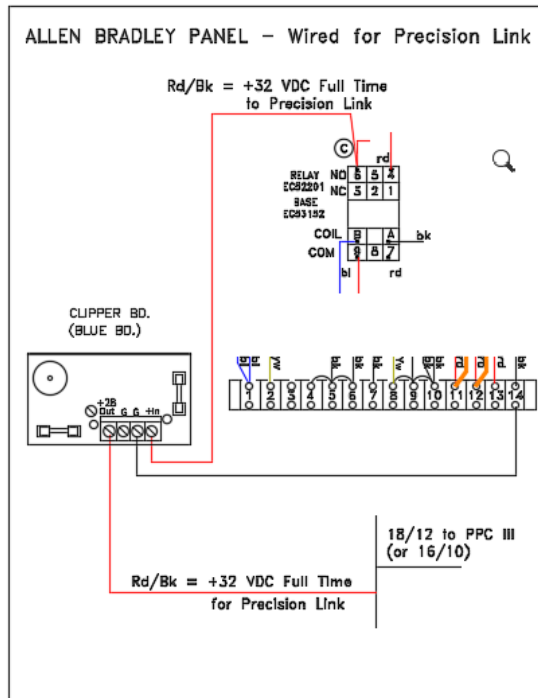


Fig 5. Install Clipper Board in AB Panel

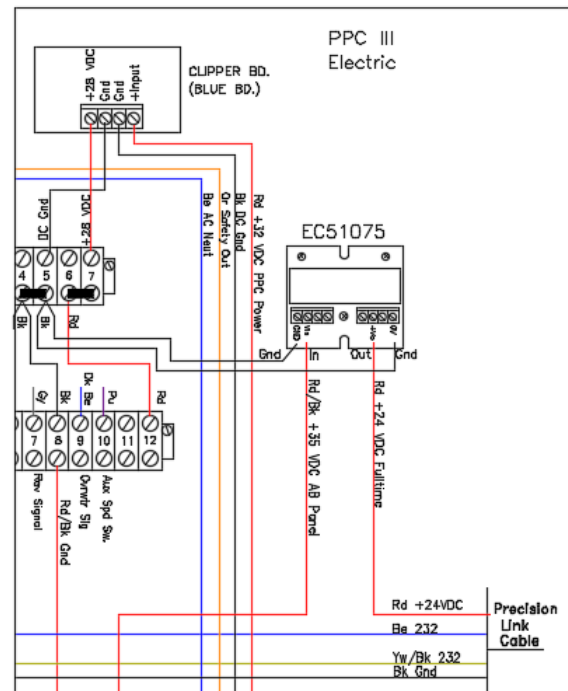


Fig 6. Install DC Converter in PPC III Panel.

C.3. All Other T-L Allen Bradley Panels:

Rewire to C.1 shown previously

- Electric Driven Hydraulic Pump – Electric Driven Water Pump

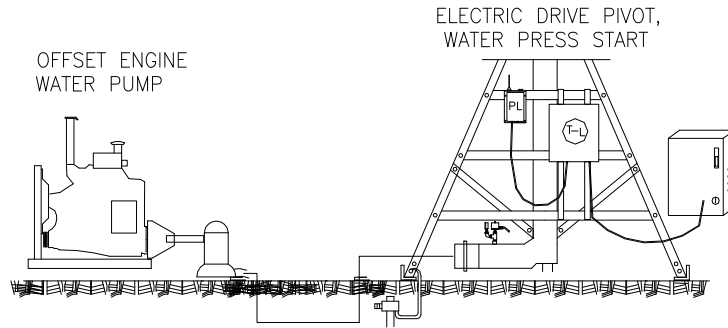
Older 10-terminal or 12-terminal versions.

Order the parts and Rewire to C.1 shown previously

We have had too many issues with wiring, phone calls, and the system not working. If you have older versions, rewire to C.1 shown previously so we have consistency in wiring. If you call for help and have not wired the panel per C.1 shown previously, we will ask you to wire it per C.1 and then call back.



C.4. Offset Engine Water Pump – Water Pressure Start - Electric Drive at Pivot Point



With this option, the water pump cannot be automatically started from the Wagnet website. Also, the pivot must be started before the Run-Start Switch at the Engine can be moved to Run.

- “Stop” Control when running wet available from website. “Start Dry” & then “Stop” also available.

Wiring: Remove “Yw 24VAC Switched” wire from Pressure Switch wire and connect Pressure Switch wire to Term. 11 as shown below.

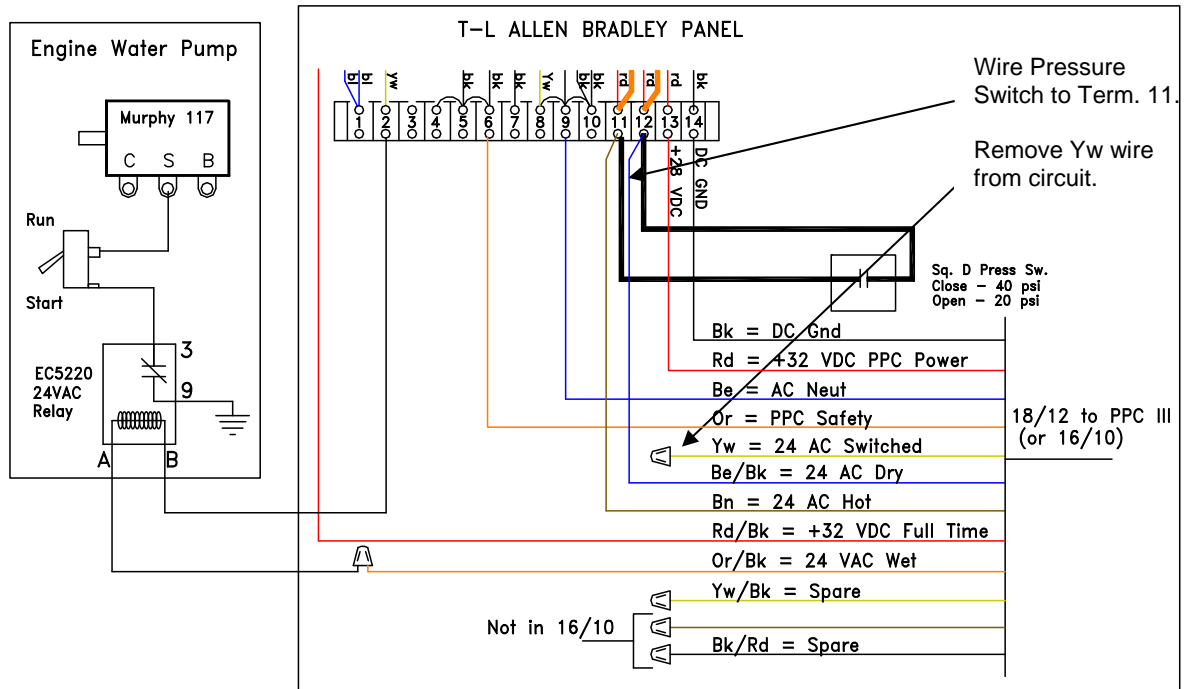


Figure 7. Wiring of T-L Allen Bradley Panel with Engine Water Pump & Pressure Start.

Operation:

See Start / Stop Operation Section following:

- OPERATION OF ELECTRIC DRIVE PIVOT, ENGINE WATER PUMP



INSTALLATION & WIRING

D. Wiring of PL to PPC III for Monitor Only

Wire as shown below. (Follow similar wiring for PPT.)

- No Start/Stop Functionality
- Precision Link Control Relays are not wired in.
- All PPC III functions still available from website with system running.
 - Change Direction, Application
 - End Gun, Aux Appl settings

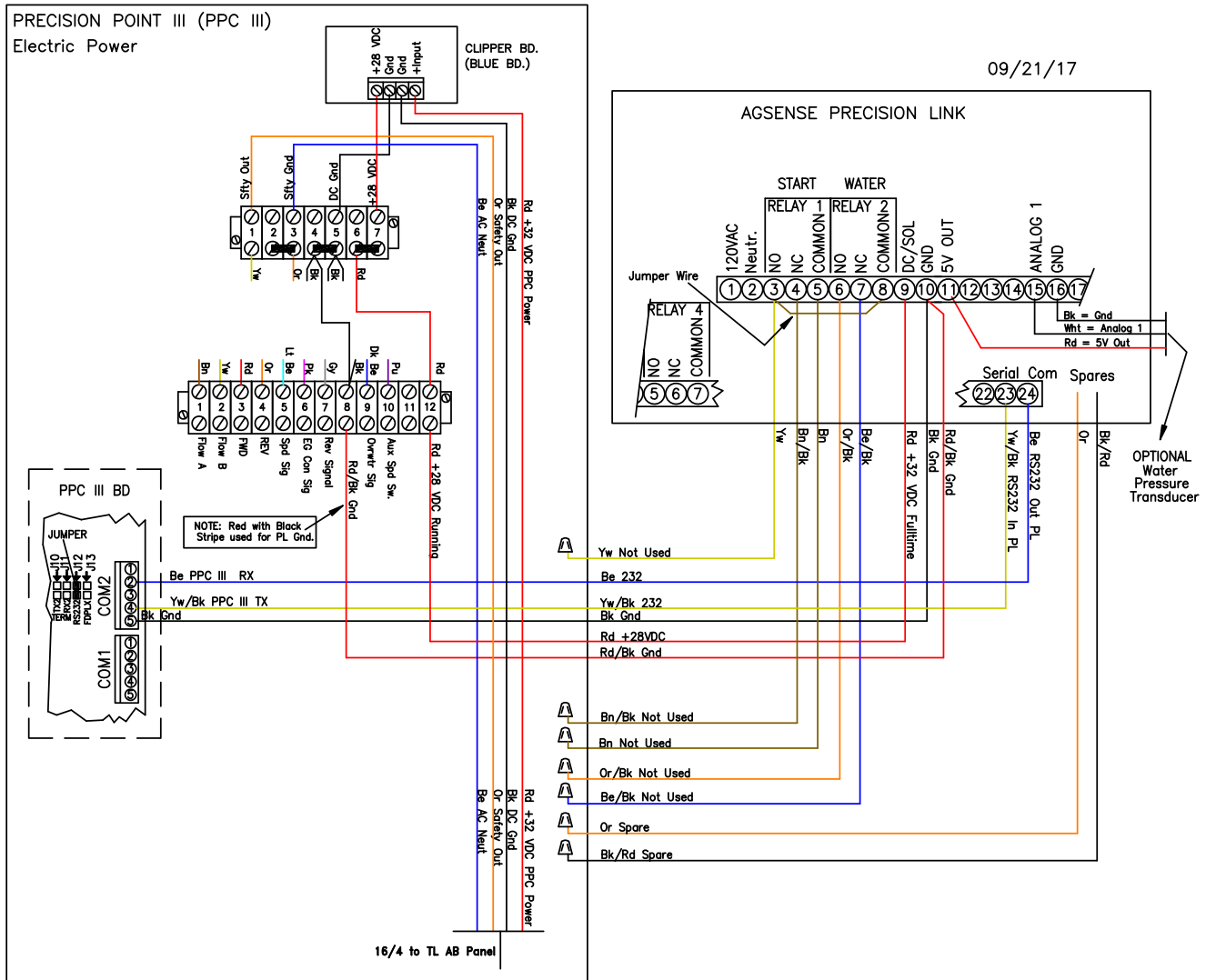


Figure 8. Wiring of Precision Link to PPC III Panel for Monitor Only.



Precision Link Board:

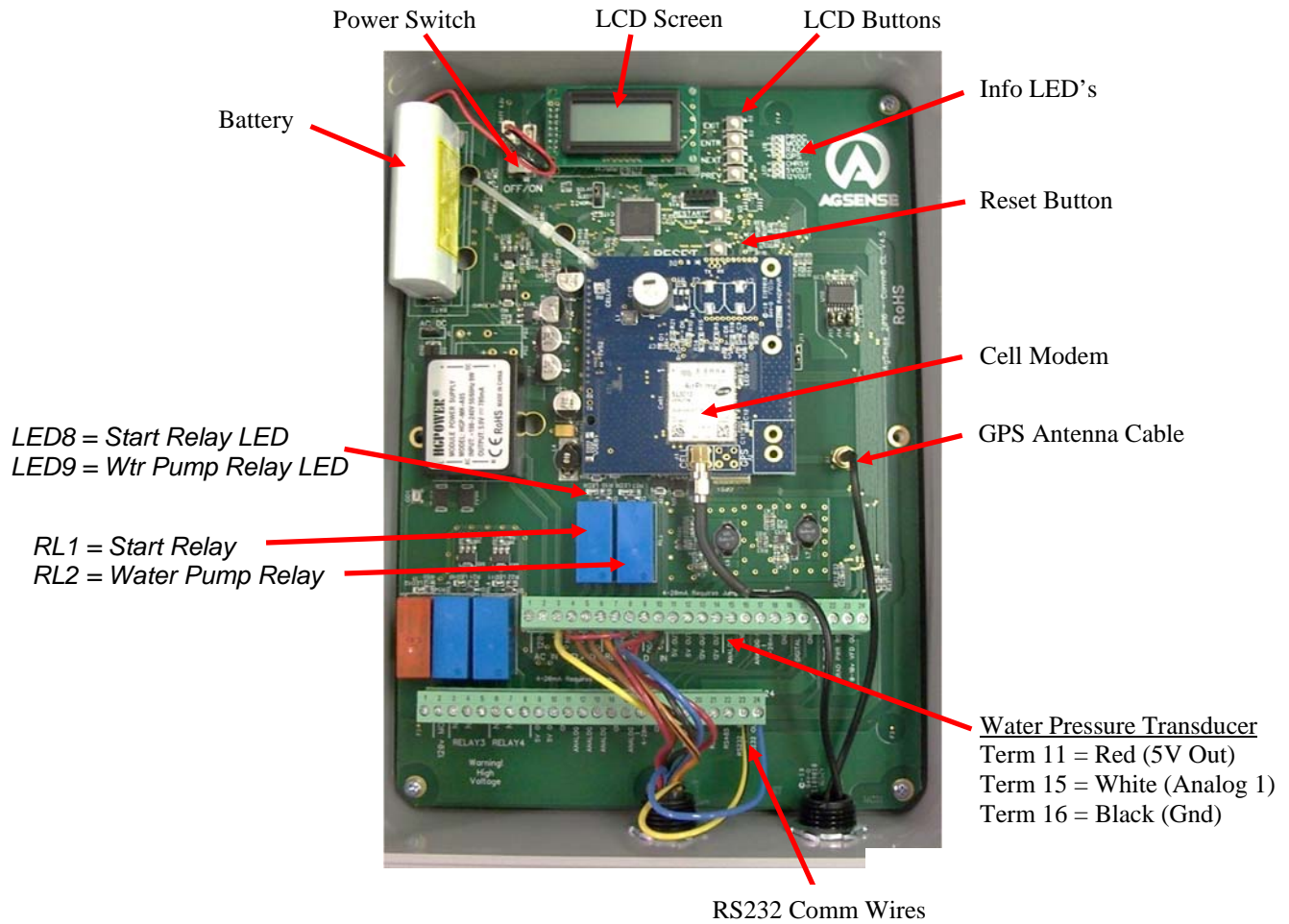


Figure 9. Precision Link Board (v4.5) 2016.

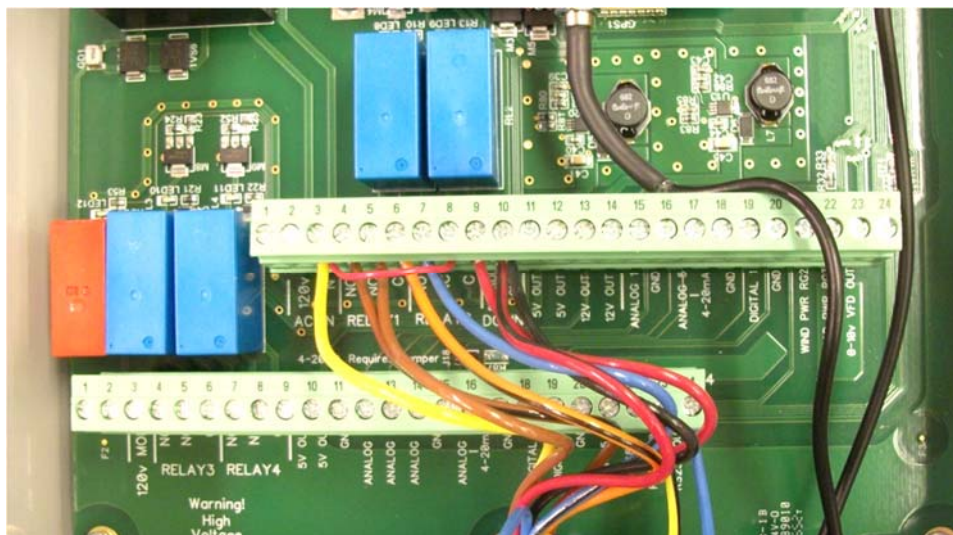


Figure 9.1 Precision Link Board Close Up (v4.5) 2016.

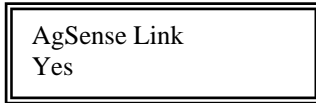


PPC III SETUP FOR PRECISION LINK COMMUNICATION

PPC III: Enable Communication PPC III to Precision Link:

PPC III Panel: Enable the AgSense Precision Link:

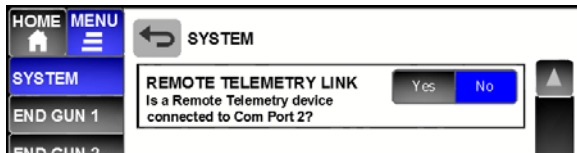
PPC III, System Setup Group, "+" down to this screen.



Change to "YES", press ENTER.

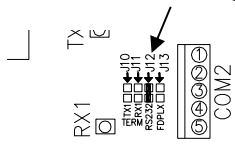
PPT: Enable Communication PPT to Precision Link:

PPT Panel: MENU – SYSTEM, Set "Remote Telemetry Link" to Yes.



Wire Precision Link Serial Connection to Com Port 2 of PPC III or PPT:

Com Port 2: Ensure correct wiring to Com Port 2 from Precision Link and set the Jumper to RS232.



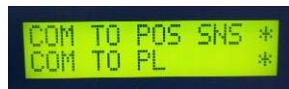
Power the Precision Point Control and the Precision Link and check for Communication:

Open the Precision Link Box and view the display to see if communication between the PPC III or PPT and the PL is taking place.



"*" Asterisk if PL is receiving information from PPC III. (But PL may not be communicating back to PPC III.)
"!" Exclamation Point if not receiving from PPC III.

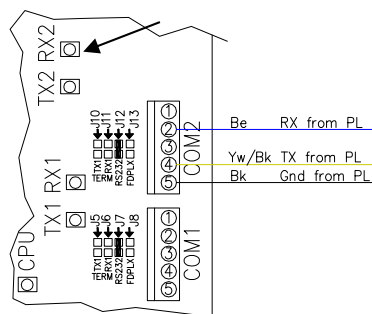
In the PPC III Panel, scroll through the "Test" Screens till you get to the following:



Asterisk flashing if communicating with PL. (Ensures 2 way communication taking place.)
Solid or blank if not communicating.

On the PPT or PPC III Board, the RX2 LED should be flashing if communication is taking place.

- A voltage measurement can also be taken to see if the communication is working. This reading will fluctuate, but should stay within the 4 to 6VDC range.



Voltage Measurement:
Pins 2 to 5 = roughly 4 to 6 VDC
Pins 4 to 5 = roughly 4 to 6 VDC

Figure 10. RX2 Flashing on PPC III or PPT.



REMOTE OPERATION -START FROM WEBSITE
- ELECTRIC DRIVE PIVOT, ELECTRIC WATER PUMP
 Operator uses Website or App.

Intended Operation to use Full Functionality:

- Precision Link Controls Water Pump to start system Wet, then pivot pressurizes and Water Pressure Start Switch closes to start pivot moving and power PPC III.

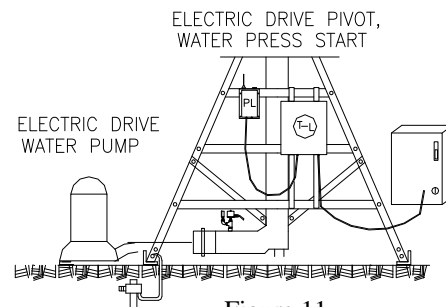


Figure 11.

STEP 1: ENSURE THE CORRECT PANEL SETTINGS IN FIELD:

T-L Electric Drive Allen Bradley Panel (TL AB Panel) with Water Pressure Start

- System will not start because there isn't any water pressure to close the pressure switch.

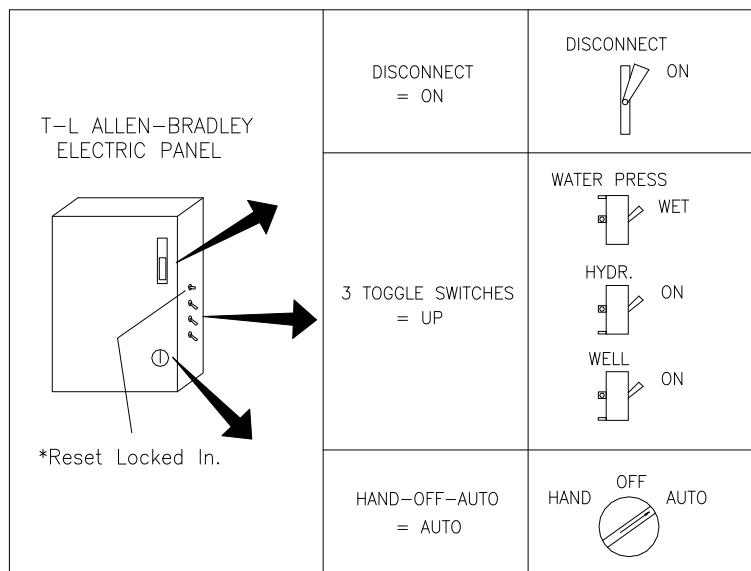


Figure 12. Remote Operation – Electric Panel Settings.

Precision Point III or Precision Point Touch Panel

- **PPT panel = Make sure Auto Restart is set to YES in MENU – SYSTEM.**
- PPC III or PPT will NOT have power because system is not running.

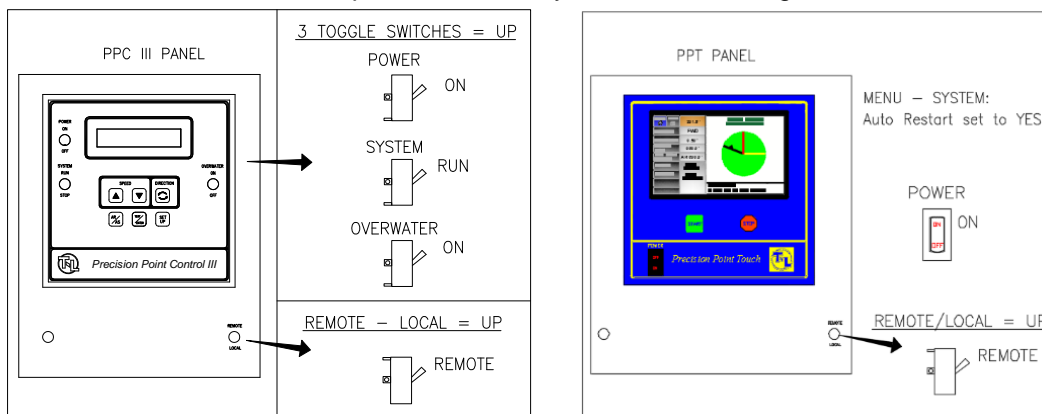


Figure 13. Remote Operation – Precision Point Control Panel Settings.

AgSense Precision Link (PL)

- Should have power on “+32 Full Time Power” terminal.
- “Start” and “Water Pump” Relays NOT energized.



START / STOP OPERATION

STEP 2: REMOTE "START" SYSTEM FROM WEBSITE:

- Select the Start Options and click "Start".
- See following section on Precision Link website operation



What Occurs?

- PL closes its "Start Relay" and if Wet operation chosen closes the "Water Pump Relay".
 - 24VAC power supplied to Water Pressure Start Switch - waiting for switch to close. (If set to run DRY, the NC of the Water Pump Relay bypasses the Water Press Switch because the water pump relay will not be energized for Dry operation.)
 - 24VAC power supplied to Water Pump Contactor and Well starts.
 - PPC III or PPT will not have power yet (since it is Water Pressure Start).
- Water pressure in system builds, then Water Pressure Start switch closes.
 - allow 18 minutes for PPC III or PPT to get power and to send "I'm On" serial message to PL. (Ver 42 changed to 18 minutes, was 10 minutes prior.)
- Hydraulic Pump will start and "+32 VDC Running" is sent to power the PPC III or PPT.
- PPC III or PPT is powered and starts operation that was running when last shut off.
- PPC III or PPT now has power and sends "I'm On" serial message to PL and communication between PPC III or PPT and PL can now be established.
- PL begins reporting information to the Website.
 - In normal operation the PL will send pivot information to the web site every 30 minutes.
 - Safety messages or any change of state except for angle change will be sent as soon as they occur.

STEP 3: REMOTE "STOP" SYSTEM FROM WEBSITE:

- Select the Stop Options and click "Stop".
- See following section on Precision Link Website Operation



What occurs?

- Final communication between PPC III or PPT and PL takes place since PPC III or PPT is about to lose power. This is a known condition and not a safety shutdown.
- "Start Relay" and "Water Pump Relay" both open.
 - Water Pump stops
 - Hydraulic Pump stops
- Power is lost to PPC III or PPT and it powers off.
- PL should still have power on "+32 VDC Full Time Power"
 - ready to go again the next time the Operator wants to start the system.

"RUNNING" Operation:

- Standard update times for information displayed on website.
 - PL updates to Web site every 30 minutes except when system changes occur.
 - Web site updates web page once every 30 minutes. Clicking refresh button on web page will update web page from web site.
- If a change is made at either location (field or website) to Direction, Application, End Gun Tables, Auto Stop/Reverse, or Aux. Appl tables, then changes are sent to the other place.
 - System Setup and Position Sensor Setup can only be changed at the PPC III or PPT Panel in the field.
- Entering into setup menus while system is running in remote mode will stop communication from PPC to PL. The PL will shut down after 90 seconds. If you need to review or make changes in setup menus while running switch Remote to Local. After exiting Setup return switch to Remote.



LOCAL OPERATION - START IN FIELD

- ELECTRIC DRIVE PIVOT, ELECTRIC WATER PUMP

Operator at Panels in Field

Precision Link will provide power to Water Pump Contactor

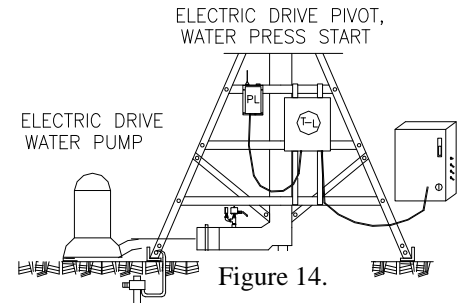


Figure 14.

STEP 1: ENSURE THE CORRECT INITIAL PANEL SETTINGS IN FIELD:

T-L Electric Drive Allen Bradley Panel (TL AB Panel) with Water Pressure Start

- Disconnect On
- Hand-Off-Auto (HOA) in the OFF Position
- Wet/Dry Toggle on Side of Panel in Down position,
- Hydraulic Toggle can be either up or down, make sure it is up before leaving the field.
- Well Toggle Switch will be Up for Wet operation, or Down for Dry operation.

NOTE: When Water Pressure Switch is placed in down “DRY” position and kept there, then Stop & Start from Website will not work (for electric-electric).

- Use Remote Operation – Start from Website explained earlier if operation from Website is desired.

PPC III Panel

- All 4 Switches in Panel down, including Remote/Local Switch in “Local” Position

If using PPT Panel

- Power Switch Off and Remote/Local Switch in “Local” Position.
- **Make sure Auto Restart has been set to Yes in MENU-SYSTEM.**

PL Panel

- PL will have power on Rd/Bk wire for +32 VDC Full Time.
- Waiting for “I’m Running” serial message from PPC III or PPT.

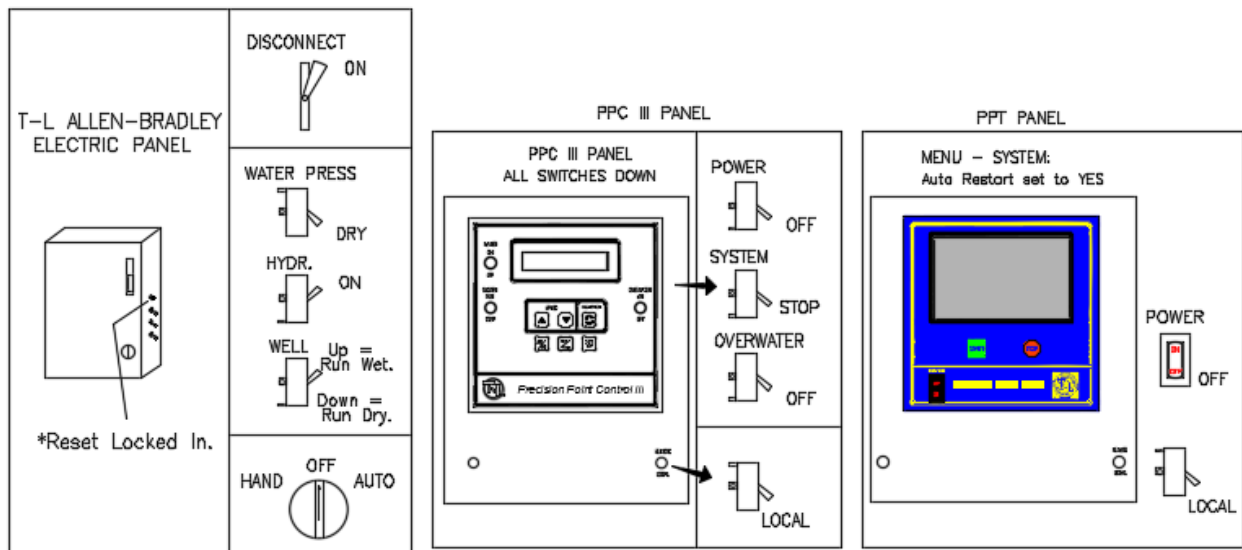


Figure 15. In Field / Local Operation – Initial Panel Settings.



START / STOP OPERATION

STEP 2: PROCEED WITH START UP SEQUENCE:

- a. TL AB Panel Hand-Off-Auto (HOA) Switch to "Auto".
 - This will start the Hyd. Pump with the Wet/Dry Switch bypassing the Water Pr Sw.

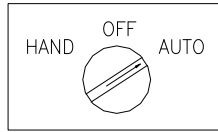


Figure 16. Move HOA to Auto.

- b. Power is now supplied to the +32 VDC PPC III or PPT Wire.
- c. Operator powers on PPC III or PPT Panel and sets the operation, places the System Toggle & Overwater Toggle in RUN.
 - If PPT, Power On and Start system. (PPT does not have System or Overwater Toggles.)

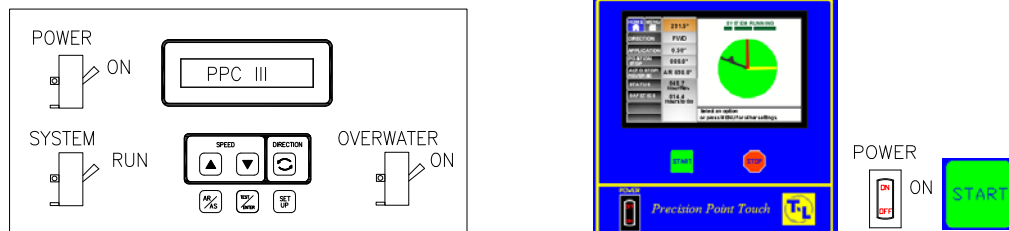


Figure 17. Power on to PPC III or PPT and Start System moving.

- e. Once the PPC III or PPT Panel is in RUN, it sends "I'm Running" serial message to the PL.
- f. PL closes both the "Start Relay" and "Water Pump Relay", so the Electric Water Pump should be operating.
- g. System is now operating, but may not have water pressure yet.
- h. Once the Water Press Switch closes, the Wet/Dry Water Pressure Toggle Switch on the T-L AB Panel can be switched to the Up - Wet position.
- i. All switches in PPC III or PPT Panel and on T-L AB Panel should be up for Wet Operation.
- j. For Dry operation in the field, the Operator will just leave the Well Switch of the AB Panel in the down position so the Well Contactor will not energize.

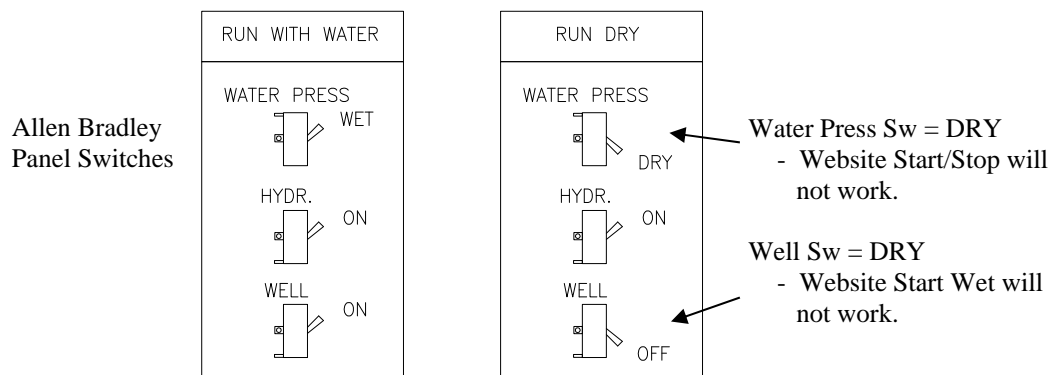


Figure 18. Set the 3 Toggle Switches on the Allen Bradley Panel for intended operation.

- k. Remote/Local Switch can be moved to "Remote" position 25 seconds after PPC III System Toggle is in RUN position or after PPT started.
 - Remote Control is available.
 - If AB Panel set for "Dry" operation, cannot start WET from website.

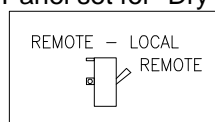


Figure 19. Remote-Local Toggle Switch to "Remote".

START / STOP OPERATION

STEP 3: STOP SEQUENCE INITIATED IN FIELD:

Option 1: Allows for automatic restart of operation in field.

Note: Must have Auto Restart enabled from the website and also on the PPT.

- a. T-L Allen Bradley Panel Disconnect Off.
 - This stops power to both the PPC III or PPT Panel and the Precision Link simultaneously.

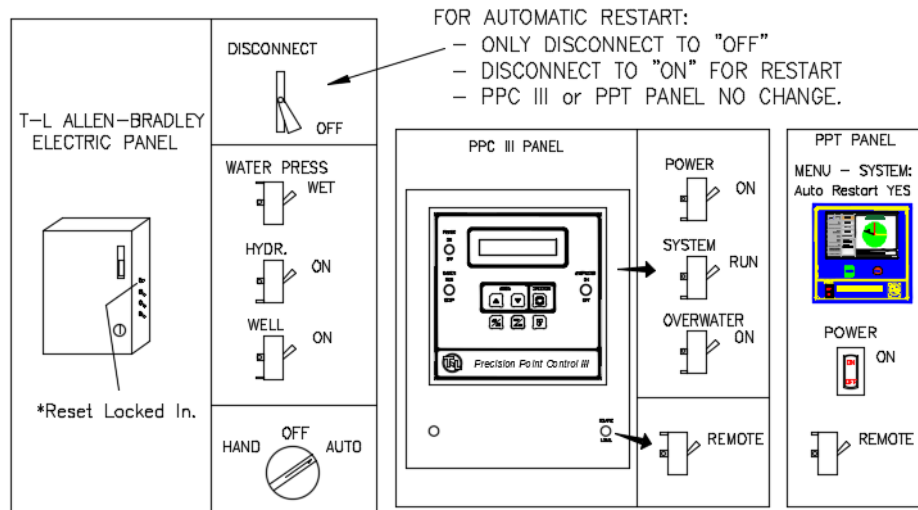


Figure 20. Disconnect Off to allow Automatic Restart of Operation.

- b. All other Toggle Switches remain as set.
- c. To Automatically Restart (must be done in the field):
 - AB Panel Disconnect "On"

Option 2: Stop the System by moving, requires "Local Operation Start in Field" to restart.

- a. T-L Allen Bradley HOA (Hand-Off-Auto) to Off.
- or b. PPC III or PPT Panel Power to Off

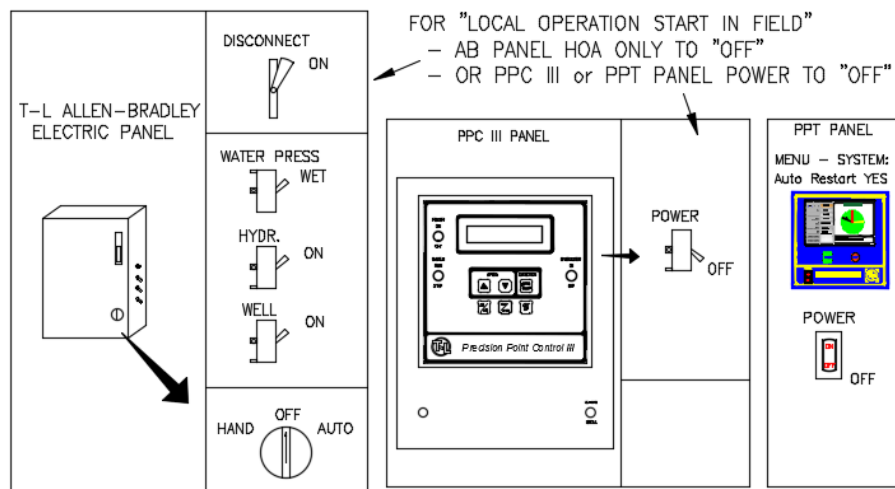


Figure 21. HOA to "Off" or PPC III or PPT Panel Power to "Off".

AUTO RESTART Operation:

- a. If "+32 VDC Full Time" power to the PL and power to the PPC III is lost at the same time during operation, the Web page will have the Safety message "NONE" and will show power Off to the pivot. When "+32 VDC Full Time" power is restored and "AUTO RESTART" is enabled on web page, the start sequence (Start Relay and Water Pump Relay Energized) will occur.
- b. If using a Precision Point Touch PPT make sure AUTO RESTART is set to Yes in MENU-SYSTEM.



START / STOP OPERATION

OPERATION OF ELECTRIC DRIVE PIVOT, ENGINE WATER PUMP

Operator starts Engine to Pressure Start Pivot

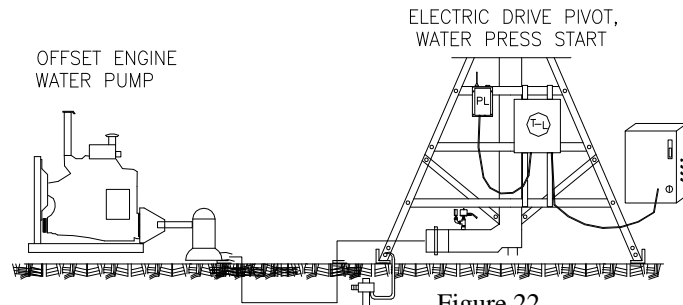
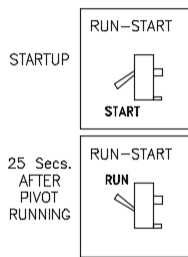


Figure 22.

Intended Operation – Operator at Engine Water Pump:

STEP 1: ENSURE THE CORRECT PANEL SETTINGS IN FIELD:

AT ENGINE WATER PUMP



AT PIVOT POINT

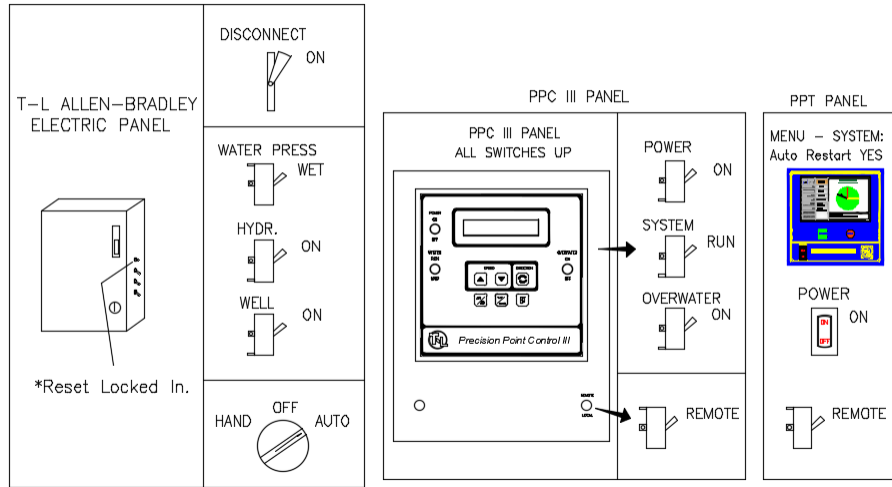


Figure 23. Switch Settings for Engine Water Pressure Start.

STEP 2: PROCEED WITH START UP SEQUENCE:

- Start Engine Water Pump and pressurize pivot.
- Pivot starts, powers up.
- Engine Run-Start Switch moved to RUN position.
- Use Website to monitor and control PPC III or PPT functions.

STEP 3: STOP SYSTEM:

- System can be stopped from Website, then restarted from engine.
- System can be stopped from Engine, then restarted from engine.

STEP 4: START SYSTEM DRY:

- System can be started "Dry" from Website without the engine running.

LOCAL OPERATION AT PIVOT POINT:

Panel Settings in field are same as above, except set the Wet-Dry Switch on AB Panel to Dry.

- Remote-Local Switch is ALWAYS kept in the "Remote" position.
- PPC III – System Toggle Switch can be set to "Stop" to stop the pivot and change settings.



Figure 24. Switch Settings for Local Operation.

START / STOP OPERATION



LOCAL OPERATION - START IN FIELD - ENGINE DRIVE PIVOT Operator at Panels in Field

STEP 1: FOLLOW THE PROPER STARTUP PROCEDURE AS FOLLOWS:

Note: If random shutdowns are occurring, a Time Delay can be added per Fig. 2.1 or Fig. 2.1a.

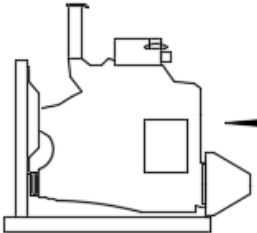



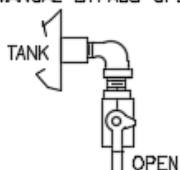
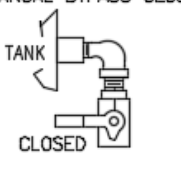
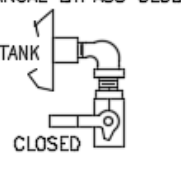
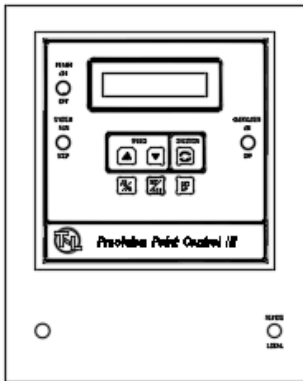














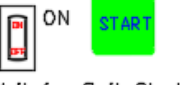




	ENGINE OFF. MANUAL BYPASS OPEN. PPC III PANEL OFF. PL RUN-START TO START.	ENGINE RUNNING. MANUAL BYPASS CLOSED. PPC III PANEL ON. PPC III SET TO RUN.	ENGINE SWITCH TO RUN. PL RUN-START TO RUN.
ENGINE PANEL 	ENGINE  START	ENGINE  START	ENGINE  RUN
	MANUAL BYPASS OPEN  OPEN	MANUAL BYPASS CLOSED  CLOSED	MANUAL BYPASS CLOSED  CLOSED
PPC III PANEL 	POWER  OFF SYSTEM  STOP OVERWATER  OFF	POWER  ON SYSTEM  RUN OVERWATER  ON	POWER  ON SYSTEM  RUN OVERWATER  ON
	PRECISION LINK (PL) RUN - START  START	PRECISION LINK (PL) RUN - START  START	PRECISION LINK (PL) RUN - START  RUN After 5 secs.
PPT PANEL 	POWER  OFF	POWER  ON START Wait for Soft Start	POWER  ON START Running
	PRECISION LINK (PL) RUN - START  START	PRECISION LINK (PL) RUN - START  START	PRECISION LINK (PL) RUN - START  RUN After Soft Start

Figure 25. Engine Operation with PPC III Panel and Precision Link.

STEP 2: REMOTE OPERATION FROM WEBSITE:

- All Monitor functions are available from the Precision Link Website.
- Control functions NOT available from website are:
 - Start Options
 - Auto Restart
- Control functions that ARE available from website are:
 - Stop Options



OPERATION NOTES:

SYSTEM OPERATING – PPC III System Switch to Stop or PPT Stop – PL Relays will power Off:

If the system is operating with the Remote-Local Switch in the Remote position, then the operator goes to the Precision Point Control and places the PPC III System Switch to Stop, this will cause the Precision Link to power off its relays and the system will stop and lose power.

SYSTEM STOPS - Safety from PPC III or PPT occurs while running:

- a. If the system stops during normal operation, and a Safety Message is generated by the PPC III or PPT, the shutdown of the PPC will be delayed by a few seconds, allowing communication to take place with the PL before the PPC III or PPT loses power.
- b. The PL should transmit this safety message to the website and alert the operator via text or e-mail if enabled.
- c. Possible Safety Messages from the PPC III:
 - Overwater Safety
 - Auto Stop Safety
 - ET Sensor Safety
 - Enc Comm Lost
 - GPS Comm Lost
 - GPS Not Set
 - GPS Error
 - Wrong Direction

SYSTEM STOPS, not a Safety from the PPC III or PPT

“System Shutdown” message at website.

- a. If the system stops during normal operation and it is NOT from a PPC safety generated message, then PPC power will be lost and the PL will lose Comm to the PPC III or PPT.
- b. PL should remain powered on and generate a safety message to the website:
“System Shutdown” and alert the operator via text or e-mail if enabled.
 - could be a low oil level problem, could be a normal stop sequence initiated in the field.
- c. PL should open its Start Relay and Water Pump Relay to stop the system.:
- d. Operator will know that he will not be able to remotely start the system. He will have to go to the field site to restart.

COMMUNICATION PROBLEM between PPC III or PPT to PL during normal operation:

“System Shutdown” message at website.

- a. Initial Delay = 18 minutes (ver 42. Was 10 minutes prior to ver 42)
Remote Start command, PL will energize Start and Water Pump Relays as commanded then wait 18 minutes for communication from the PPC III or PPT. The PPC III or PPT must get power and be placed in the RUN mode for communication to take place.
- b. Running Delay = 90 seconds (ver 42. Was 60 seconds prior to ver 42)
If communication is lost between the PPC III or PPT and PL for more than 90 seconds once the system is running, then the PL should generate an error message to the website
“System Shutdown” and alert the operator via text or e-mail if enabled.
- c. PL should open its Start Relay and Water Pump Relay to stop the system.:

SAFETY CONDITION, Operator must go to Field Site:

Under ANY of the above safety conditions, the operator will have to go to the field site and trouble shoot the problem. Once the problem is rectified, the system can be operated normally again, either started locally in the field, or from the website.



Browser Note & App Note:

The WagNet site seems to work best with Google Chrome. Problems may occur with Internet Explorer. The “WagNet Mobile” app is available for iPhone or Android. See the App Guide on the WagNet site.

Web Site Log In:

Log on to www.wagnet.net

- “User Name” and “Password” originally set by Dealer when ordered; and will show up on the Dealer login page the day the unit is shipped. Contact your Dealer or AgSense for your “User Name” and “Password”. If contacting AgSense, you must know the Serial Number of the Precision Link.

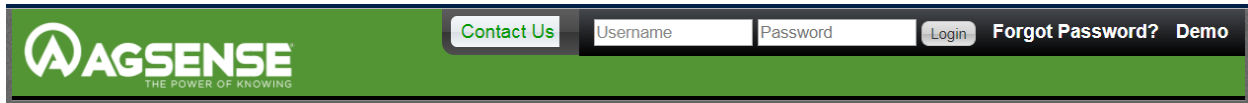


Figure 26. WagNet Login Screen.

Web Site Overview:

The intent of this manual is to explain operation specific to the T-L Precision Link on the WagNet website. Refer to other Wagnet Manuals for information concerning features not described here.

Below is just a general overview of the website when logging into WagNet.

Refer to WagNet Manuals for additional Information.

Use “Account Settings” to set Time Zone & Units.

GLOBAL COMMANDS for All Pivots. -If Starting All, need to set the “PL’s Only” for how to start.



PRECISION LINK WEB SITE OPERATION

Precision Link Unit Web Page Overview:

The screenshot shows the Precision Link web interface. At the top, a green header bar displays "#23 (39139) Version: 26, PrecisionLink (DC, Pro, ATT)". Below this, the interface is divided into several sections:

- Graphical Display & Information Window:** A circular gauge showing a green outer ring and a blue inner circle, with a needle pointing to the right.
- PL Ser No. & Firmware Vers.:** A box containing the unit's serial number and firmware version.
- Pivot Info Tab:** A tab labeled "Pivot Info" with a sub-tab "Pivot Info".
- Safety History & Notes Tabs:** Tabs for "Safety History" and "Notes".
- Refresh Button:** A blue button labeled "Refresh" with a circular arrow icon.
- Navigation Tabs:** A row of tabs including "CMD", "VRI", "Chart", "Config", "Field Info", "Forms", "Readings", "CMD History", "Reports", and "PPC III".
- Command Buttons Section:** A section with buttons for "Start", "Stop", "Once", "Change Dir FWD", "Auto Restart", "Change Dir REV", "Cancel Auto Restart", "Change Application", "AUTO STOP/REV", and "Remote Pump".
- End Gun & Aux App Tables Section:** A section with "End Gun" and "FWD Aux App" controls, and a table for "REV Aux App".
- Request Reading:** A button labeled "Request Reading".
- Remote Pump Control button if AgSense Wireless Pump Control feature is used.** A callout pointing to the "Remote Pump" button.

Figure 27. WagNet Website Overview.

Refresh vs. Get Reading Buttons:

Overview: For information to travel from the PPC III to the WagNet website, it travels as follows:

- PPC III Serial Comm to PL Panel at field site. (happens instantly)
- PL Panel to Secure Server via cellular system. (every 30 minutes or upon an "event")
- Secure Server to Web Page. (every 30 minutes or upon an "event")

Refresh

Refresh: Updates the Web Page with information from the Server. May be up to 30 minutes lag of what is happening in the field.

Request Reading

Request Reading: Updates the Web Page with information from the Prec. Link and writes it to the "Readings" Tab. This should reflect what is currently happening in the field.



Initial Setup and Configuration:

Each Precision Link must be set up and configured on the web page. For more help, see the AgSense Tech Manual. Click on "Installation Guides" in the left hand tab area, then the appropriate year, for example 2013.

Config Tab

- Proceed through the Steps to enter information for the respective Precision Link.

Items 3 – 6 do NOT affect operation. These are only for graphical viewing on the website.

Item 7: Not used with Precision Link.

Item 8: Water Flow GPM used for reports.

Analog:
Pressure Transducer
or Rel Humidity
or Press Switch

Digital:
Flowmeter
or Rain, etc.

The screenshot shows the 'Config' tab for a unit named 'PPC III'. The settings are as follows:

- Alias: 2 tower pl
- Circle/Lateral: Circle
- Pivot Length: 236 ft
- Endgun Length: 10 ft
- Graphical Min: 260
- Graphical Max: 0
- Full Run Time: 24 hour 0 min
- Estimated Flow: 100 gpm
- Estimated Endgun Flow: 0 gpm
- Analog 1-6: None
- Digital 1-2: None
- Latitude: 40.58140563964844
- Longitude: -98.26795959472656
- Google Map Zoom: 17
- Pivot Image Circle Opacity: 100%

Buttons: Save Settings, Center on Map

Map: Map | Satellite



PRECISION LINK WEB SITE OPERATION

Graphical Display Area

- Contains information about the specific Pivot the Precision Link is connected to.

Arrows show direction of travel.

Pivot location.

Blue: EG Areas

Pivot Circle: Green = Running, White = Powered, not running, Red = Not Powered

Application Rate: or Aux Appl Rate or VRI Appl Rate

Water Pressure (psi) - if Optional Sensor installed.

Direction

End Trw Speed set in PPC III

Refer to Wagnet Manual for bottom row information.

If set: Auto Rev. or Auto Stop, by Switch or Angle.

Pivot location.

AR0349 REV 0.75in

40° 27 ipm

WAAS 10 4.2

Pivot Information Tab

- Contains information about the specific Pivot the Precision Link is connected to.

2 tower pl (36551) Version: 60, PrecisionLink (Unknown, Pro, Verizon)

Last Reading: 08/29/2017 10:39:57

Current Cycle:

Full Revolution:

Faults: None

Safety Message: PL Power Loss

Status: OFF / IDLE / 270°

Endgun 1: OFF

Active Commands

Stop at 0

Last Note

08/15/12 10:44:30

corn

Refresh

Last 2 Commands

Command	Time	Ack
Stop at 0	08/10/17 16:04:08	Yes
Config	08/10/17 16:04:08	Yes

Timed Commands - Clear All

Command	Trigger Time
IDLE	0.08in
270.0°	0 in/min
WAAS	19 4.2

Safety History Tab

- Lists the last 5 safeties.
- Any PPC III Safety will be shown by name.
- Other Safeties are not monitored, will show up as "System Shutdown".

Safety History

08/29/17 08:51:38	PL Power Loss
08/10/17 16:04:10	System Shutdown - Stop at 0
08/07/17 15:10:22	Auto Stop Safetv
08/02/17 12:05:34	PL Power Loss
08/02/17 11:46:13	System Shutdown - Stop at 0
08/02/17 11:29:21	System Shutdown - Stop at 0

Notes Tab

- User notes can be added.

Notes

Submit Note Download CSV

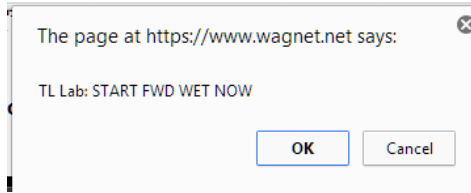
08/15/12 10:44:30

corn



Command Notes:

1. When clicking on any command button to send it, a popup window will always appear to allow you to cancel or confirm the command being sent.



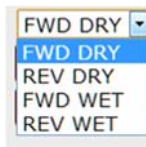
2. You must wait at least 1 minute between sending Commands. A pop-up window will alert you if you try to send another command too soon.

CMD Tab – START Section

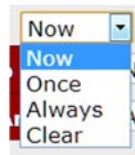
Note:



1st Set the Direction & Water Pump Status desired:

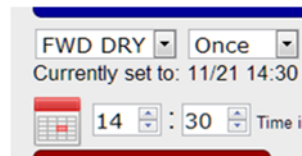


Then Set the Timing desired for Start:

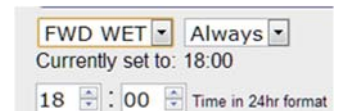


Now
- Start Immediately

Once
- Start at date/time set



Always
- Start each day at time set. Use with "Stop Always."



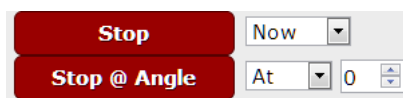
Then click the "Start" button and Confirm you want to Start:



CMD Tab – STOP Section

Note: For Electric Driven systems, the following Website Stop Commands will **NOT** release the Murphy 117, it will only open the Start and Water Pump relays in the Precision Link, so the machine **can** be remotely started again.

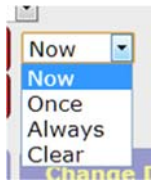
Using the PPC III Auto Stop by Angle **will** release the Murphy 117 so the machine **cannot** be remotely started again. You will have to go to the pivot site to reset it and restart the system.





PRECISION LINK WEB SITE OPERATION

If Stopping immediately, or at a date & time or a specific time each day, set as follows:



Now
- Stop Immediately

Once
- Stop at date/time set



Always
- Stop each day at time set. Use with "Start Always."



Then click the "Stop" button and confirm you want to Stop.



If Stopping at a specific Angle:

Set the Angle to Stop at (or "Clear" to reset).

Then click "Stop @ Angle" button and confirm you want to Stop.



CMD Tab – Direction Change with System Running

System must be running to access the Change Direction buttons.

Use the "Change Dir FWD" or "Change Dir REV" buttons to change the direction of the pivot.

- FWD = Clockwise.
- REV = Counterclockwise

A confirmation popup window will appear, click on OK



CMD Tab – Change Application

System must be running to access the Change Application button.

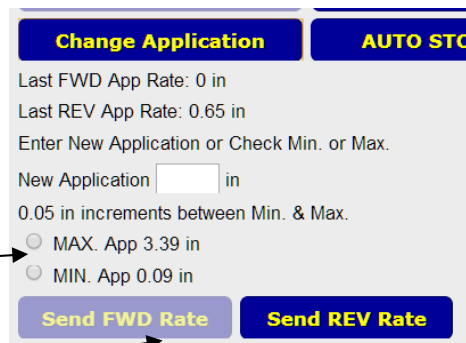
Click on "Change Application" and the drop down items will appear. Click again to remove.

Note: The "Graphical Display Area" will show the existing application rate for the current direction.

To reference the Application set for each direction, the last application entered from the website will appear here. "0 in" will show if no application set from website.

Enter the "New Application" rate in 0.05" increments.

- or check either MAX or MIN App. buttons



Click on "Send FWD Rate" or "Send Rev Rate"

- Only the direction the system is currently traveling in can be changed.

A confirmation popup window will appear, click on OK



CMD Tab – set Auto Stop/Reverse for the PPC III

- Note this is for the PPC III operation.
- Changes made here will be downloaded and saved in the PPC III. Changes made at the PPC III to the AR/AS function will be uploaded to this web page.

Click on “Auto Stop/Rev” button in Command window.

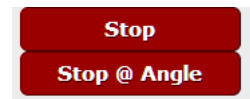
- Enable or Disable Auto Stop/Reverse with “Yes” or “No”.
- Each direction can be set independently, they do not have to be the same for both.
- Select either “Auto Stop” or “Auto Reverse” depending on the action desired for the respective direction.
- Select “By Switch” if the system has an Auto Reverse Switch at the End Tower or Intermediate Tower and is to be used for the direction being set.
- Select “By Angle” and enter the angle for the direction being set.
- The “Delay time” entered in the PPC III Panel is shown only for information purposes.. The “Delay time” cannot be set from the website.
- Click on “SAVE & SEND’ to upload to PPC III.
- A confirmation popup window will appear, click on OK.

IMPORTANT – Auto Stop PPC III vs. Stop from Website

Auto Stop “By Switch” or “By Angle” are PPC III functions and will “pop” the 117 Reset in the field, requiring the operator to travel to the field site to restart the system.



Command Tab Stop Commands are website functions and will allow the system to be restarted from the website.



CMD Tab – Auto Restart

On electric driven machines with “Load Control”, the PL can be set to allow the PPC III to resume operation when electrical power is restored.

- Enable by clicking on “Auto Restart”.
 - A pop up window will appear for confirmation.
 - Click OK to confirm “Auto Restart”.
- If “Auto Restart” button is grayed out then Auto Restart is active. When power is restored the PPC III will resume irrigating with the application it was running when power was turned off.
- To prevent Auto Restart, click on “Cancel Auto Restart”.
- Power loss and or restoration when Auto Restart is enabled will not generate Safety messages. However, text’s or e-mails can be generated with Power ON or OFF. Use “Txt Msg Configuration” to set this.
 - See AgSense Users Manual





PRECISION LINK WEB SITE OPERATION

CMD Tab – End Gun Tables

The PPC III allows up to 3 different End Gun tables with up to 6 areas.
The PPT allows 2 End Guns, with 3 different End Gun tables and 8 areas.
(multiple EG Tables for towable machines)

Changes made to the tables at either location (website or in field at PPC Panel) will be sent to the other location.

- End Gun areas are where the End Gun is to be ON.
- Enter in ascending order (clockwise) starting at 000 degrees.
- Area 1 can start at 000, and the last area can end at 000.
- Do NOT program across 000, example 290 to 10. In that case, Area 1 would be entered as 000 to 010, through to the last area set at 290 to 000.
- Areas are the same in both the FWD and REV directions.
- After populating EG tables click “Save & Send” to save to PL and PPC III.
 - PL and PPC III must be running to Save the table.
- A confirmation popup window will appear, click on OK
- After EG areas are saved in PL, the graphic display will show the EG areas with blue bands.

End Gun

Table 1 ▾

Edit Name

	Begin	End
1	20	70
2	110	160
3	200	250
4	290	340
5	0	0
6	0	0

Save & Send

End Gun

End Gun 1 ▾

Table 1 ▾

Edit Name

	Begin	End
1	260.0	265.0
2	270.0	275.0
3	280.0	285.0
4	290.0	295.0
5	300.0	305.0
6	310.0	315.0
7	320.0	325.0
8	330.0	335.0

Save & Send

“ALWAYS ON” will set the following:

- Area 1 = 000 to 359
- Area 2 = 359 to 000

“ALWAYS OFF will set the following:

- Areas 1 to 6 = 000 to 000
- (will Disable the End Gun at the PPC III)

End Gun

Table 1 ▾

Table 1

Table 2

Table 3

Always On

Always Off

CMD Tab – Fwd and Rev Auxiliary Tables

Auxiliary application rates can be set by angle for up to 4 different areas in the field. Fwd and Rev Tables are independent so each direction can have up to 4 different Aux. applications.

- Ascending order for the FWD (CW), starting with 000.
- Descending order for REV (CCW), starting at 000.
- Application rates are in 0.05” increments.
- Auxiliary areas cannot be programmed across 000, example 290 to 100.

FWD Aux App

Enable ▾

	Begin	End	App Rate
1	000	90	1.10
2	180	270	0.75
3	000	000	0.00
4	000	000	0.00

Save & Send

REV Aux App

Enable ▾

	Begin	End	App Rate
1	000	270	1.10
2	180	90	0.75
3	000	000	0.00
4	000	000	0.00

Save & Send

- Note: The “Change Application” button is used to change the application rate for the standard FWD & REV directions. If the pivot is in an active Aux. Appl. area, you can still change the FWD & REV application rates, but it will not change the Aux. Appl. currently running.

Change Application

- The graphic display window will display color differences for the different Aux. Appl. areas.
- The Application Rate Text Box will indicate when the pivot is in an active Aux. Application area.





VRI Tab

NOTE: Aux Applications must be Disabled before sending a VRI Table to the PPC III, otherwise the VRI Table will not be enabled automatically.



A Variable Rate Irrigation (VRI) Table can be created, changing the application in anywhere from 5 up to 120 steps. This allows changing the application rate in small pie shaped areas.

Several different Tables can be created and saved or uploaded.

Create a VRI Table:

- 1st Step must Start at 000.
- The Stop of the 1st Step is the Start of the next step, etc.
- Enter a minimum of 5 steps.
- Enter the Application Rate for each step in 0.05" increments.
- The Last Step must end at 000.

“Upload Table”

- used to upload a table saved in .csv or .xml format.

“Save to DB”

- Saves the Table to the Database on the Server, but does not send it to the PPC III

“Save & Send”

- Will send the Table to the PPC III. If an Aux. Appl is currently running it will Disable it and will not enable the VRI Table.

“Enable”

- Will Enable the VRI Table that is saved in the PPC III.
- The VRI table must already be saved in the PPC III to Enable it.

“Disable”

- Will Disable the VRI Table that is currently running on the PPC III. The pivot will return to its standard Fwd or Rev application rate.

“Delete”

- Will delete the current Table from the Database. Will not delete it on the PPC III.

Step	Start	Stop	App Rate
1	0	6	0.95
2	6	12	0.85
3	12	18	0.9
4	18	24	0.95
5	24	30	0.9
6	30	36	1
7	36	42	0.95
8	42	48	1
9	48	54	1
10	54	60	0.9
11	60	66	0.95
12	66	72	0.95
13	72	78	1
14	78	90	1
15	90	135	1
16	135	180	0.65
17	180	225	0.75
18	225	270	0.65
19	270	315	0.6
20	315	000	0.5
21	000	000	0.35
22	000	000	0.35
23	000	000	0.35
24	000	000	0.35
25	000	000	0.35
26	000	000	0.35
27	000	000	0.35
28	000	000	0.35
29	000	000	0.35
30	000	000	0.35
31	000	000	0.35
32	000	000	0.35
33	000	000	0.35
34	000	000	0.35
35	000	000	0.35
36	000	000	0.35

Graphical Display window will show if VRI is running.

- Application box will show “VRI TBL”.





PRECISION LINK WEB SITE OPERATION

PPC III Tab

This tab displays most of the PPC III system setup and position sensor parameters. These settings cannot be changed from the web. They can be changed only at the PPC III and are displayed here only for reference.

The screenshot shows a web interface with a navigation bar at the top containing tabs: CMD, VRI, Chart, Config, Field Info, Forms, Readings, CMD History, Reports, and PPC III (which is highlighted in green). Below the navigation bar is a sub-tab labeled 'Unit History'. The main content area displays a list of system parameters and their values:

PPC III Version	7.01
Circle to Use	Circle 1
Position Sensor	GPS
Last Wheel Track	237 ft
Irrigated Radius	315 ft
Water Flow	100 gpm
Last Tower Gear	Planetary
Last Tower Tire	27 in
Overwater Sensor	GPS
Overwater Time	60 Mins
Min App Rate	0.08in
Max App Rate	1.53in
Max Speed ET Spd	120 ipm
Speed Adj Rate	0.015
ET Sensor Safety	60 secs
ET Sen Spd Con	Enabled
Wrong Direction Safety	Disabled
System Run Time	7 hr 59 min
Units	English

Other Tabs

Refer to the WagNet Users Manual for specific information about the other Tabs not covered here.



Troubleshooting

See “Operation Notes” on page 24 for explanation of Safety messages.

Symptom	Possible Cause	Test Procedure	Possible Remedy
1. Buttons are grayed out when I want to use them.	A. PL and PPC III not running.	A. Check that the graphical pivot area is a green color.	A. Click on Refresh button or Get Readings to access up to date status.
2. Web page tells me to wait one minute when I send a command.	A. Web command being sent too quickly after previous command sent.	A. None	A. Wait at least 1 minute in between any commands before sending.
3. Aux. Appl. area is displaying Max Appl.	A. Incorrect appl. entry into table.	A. None	A. Incorrect entries into appl. will display as min or max. Example if you enter 25 instead of 0.25 it will display max.
4. No Comm.	A.	A. See Previous Section “Enable Communication PPC III to Precision Link”	A.
5. Hydraulic pump turns ON and OFF every few seconds when running dry.	A. Water pressure toggle switch not turned upside down as per installation instructions. B. Switches not in correct position.	A. Visually look at switch terminals to ensure they are at the top and middle. B. Check PL Manual or Quick Ref Guid.	A. Install water pressure toggle switch correctly. B. Verify correct position of all switches.
6. Engine Drive – Random Shutdowns	A. Precision Link cycling its Relays.	A. None	A. Install 10 Sec Time Delay, per Fig. 2.1. and Fig. 2.1a.
7. Random Shutdowns	A. Firmware issues.	A. Check PPC III and Precision Link firmware versions.	A. Make sure the latest firmware is in both the PPC III and the Precision Link. (check cover page)
8. High DC Voltage to PL, Elec Drive. DC voltage over 35 volts.	A. High incoming AC voltage.	A. Check DC Voltage off the Rectifier. Should not be over 35 VDC.	A. Install MP53050 Clipper Kit into Rd/Bk wire supplying DC voltage to Prec Link.
9. System shuts down when in Setup menu	A. PPC does not communicate with PL when in Setup Menus	A. System running in Remote mode. Go into Setup for more than 90 seconds.	When entering Setup menus while running switch to Local operation first.



TROUBLESHOOTING

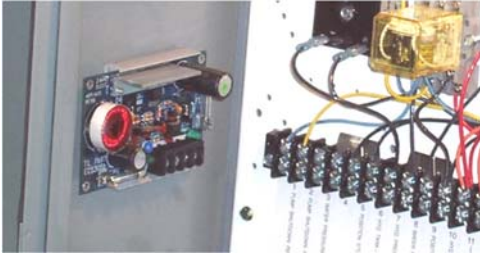
Engine Drive Installation Note:

If random shutdowns are occurring, a Time Delay can be added per Figure 2.1 or Figure 2.1a.

Electric Drive Installation Note:

Full time DC power to the Precision Link should not exceed 35 VDC. If over 35 VDC see Section C.2 to install a voltage regulator device.

NOTE: DC Converter included with Precision Link after Jan. 1, 2019.





PRECISION LINK NOT WORKING & NEED TO RUN SYSTEM

If the Precision Link is not functioning, wiring in the T-L Allen Bradley Panel can be changed to allow the Pivot and PPC III to operate. Remote control via Wagnet will NOT be operational.

Wiring Change in Allen Bradley Panel if PL not Working:

See three wiring change notes below.

REFERENCE FIGURE 4.2 FOR ORIGINAL WIRING

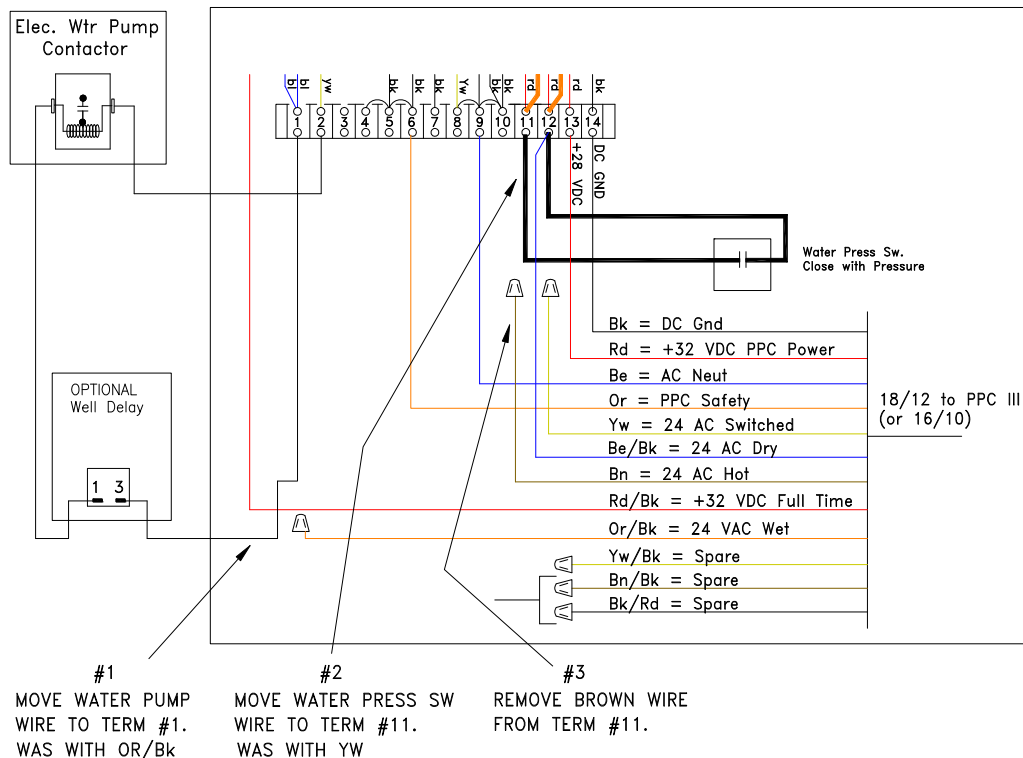


Figure 28. Wiring Change in Allen Bradley Panel if PL not Working.

Operation:

Begin with "Local" Operation settings:

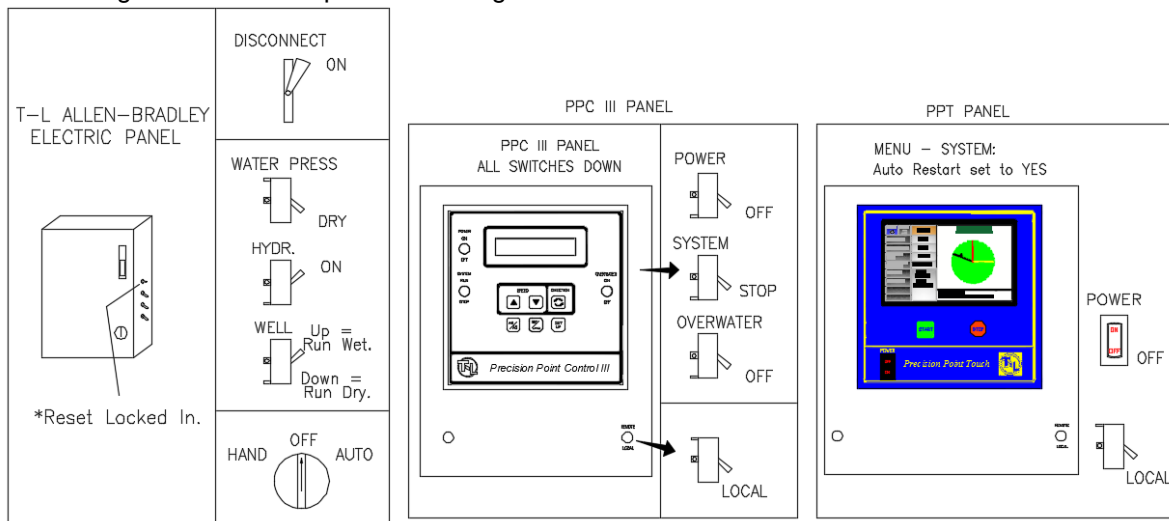


Figure 29. In Field / Local Operation – Initial Panel Settings.



REWIRE & OPERATION IF PL NOT WORKING

PROCEED WITH START UP SEQUENCE:

- a. TL AB Panel Hand-Off-Auto (HOA) Switch to "Auto".
 - This will start the Hyd. Pump with the Wet/Dry Switch bypassing the Water Pressure Switch. The Water Pump will start if the Well Switch is set to On.

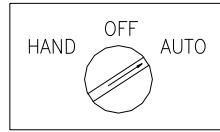


Figure 30. Set to Auto.

- b. Toggle Switch Settings on the Allen Bradley Panel

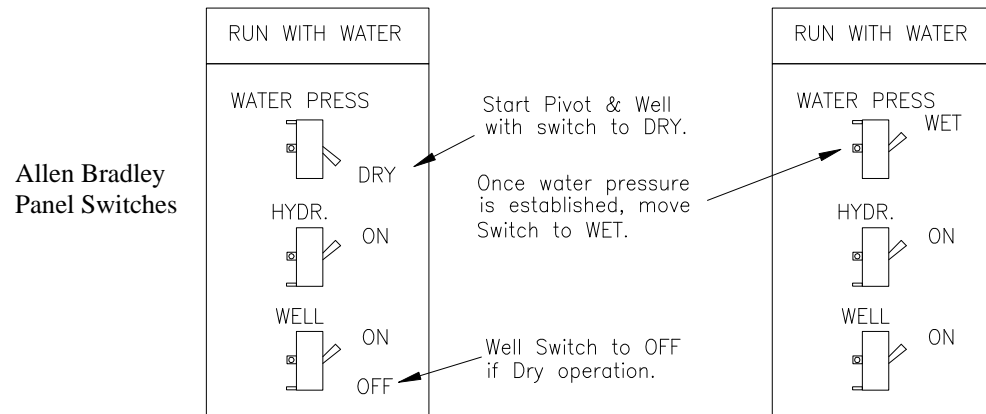


Figure 31. Set the 3 Toggle Switches on the Allen Bradley Panel.

- c. PPC III or PPT Operation

- NOTE: The Remote-Local Switch in the PPC III or PPT Panel will not affect operation. The wiring is changed to remove it from the circuit.

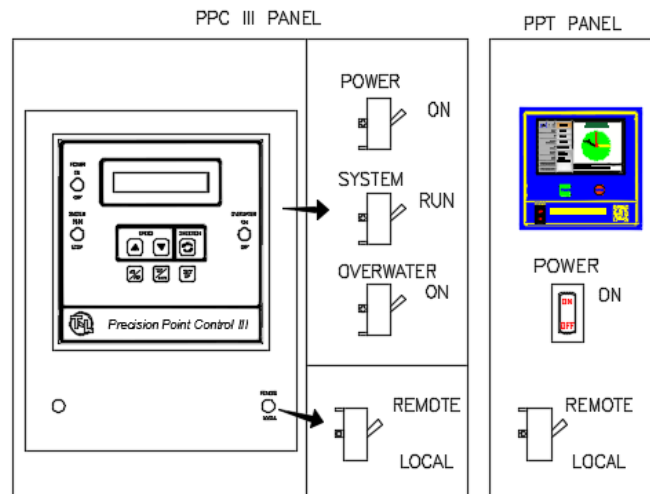


Figure 32. PPC III or PPT Toggle Switch Settings.