Precision Plex™

Diagnostic Center
User Manual

Precision Circuits Inc
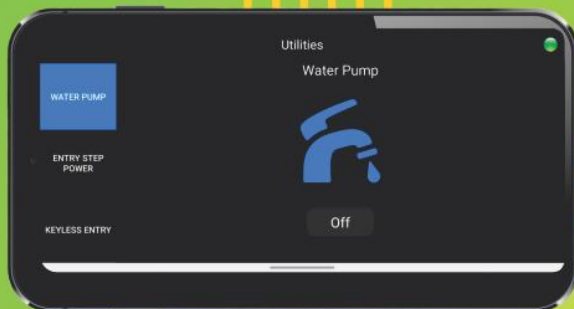
DIAGNOSTICS CENTER

Precision
Circuits
Inc.
SW Ver A 4.12 G

Utilities
Water Pump

WATER PUMP

ENTRY STEP
POWER

KEYLESS ENTRY

Off

Reading Light | Reading Light
Bed Room Clg Lts | Bed Incline Up
Exterior Lights | Bed Incline Down
Night Master Lights | Gen Start / Stop

Celebrating Twenty Years
20
PRECISION CIRCUITS INC

Disclaimer

This document covers information available across multiple products. Some of the features listed in this document may not be available in your system. Available features vary across all manufacturers and model years.

Table of Contents

PRECISION-PLEX brings the control of many of the RV's low voltage appliances to one central location. In a typical RV wiring scheme, the battery is wired to a fuse block, which distributes power to individual switches mounted throughout the RV. These switches are then wired directly to the various appliances to turn them on and off, or to provide other control operations. The Precision Plex differs in that the battery is wired to a master controller, which not only distributes power, but also turns the appliances on and off, or controls the appliances directly.

```
        Precision
        Circuits
           inc.
   SW  Version  X.XXA
```

Main Menu – This is the home screen of the Precision Plex. This screen identifies the software version currently installed on the Precision Plex. You must be on this screen to navigate to the normal operation menus and the diagnostic menus.

```
NORM  OPERATION  MENU
1  Fuse  Status
2  Inputs  Monitor
3  Digi-Level  Monitor
```

Normal Operation Menu – This screen can be accessed by tapping the center button once while on the main menu. To navigate these menus, use the up and down buttons. Use the center button to enter a menu. Use the left button to exit a menu. The right arrow is used on certain items and menus to access extra functions.

```
F01  Awning  Light   OK
F02  Porch  Lights  Chk
FG1  F  El  Wtr  Htr  PWR
FG2  GrpA  Spare  2   ---
```

Fuse Status – This screen is used to check the status of the fuses. This screen can be broken into three sections: fuse identifier, output name, and fuse status. There are 4 different statuses that may be displayed.

"OK "
This is displayed when the fuse is good.

"Chk"
This will be displayed whenever the fuse is blown or missing. In older software revisions you will see this for fuses that are not populated.

"Pwr"
This status is only used for group outputs. The output must be powered before the status can be displayed. To power the output, press the right button. You will now see one of the previously mentioned statues. You can press the right button again to turn these outputs back off.

"---"
This is displayed on outputs that are not populated.

Input Monitor

This screen is used to see the current state of all the inputs. This screen can be broken into three parts: the connector pinout information, the name of the item that responds to the input and the status of the input. There are two types of inputs: Hi side and lo side. A lo side input's default state is hi. When connected to ground you will see the status change to lo. A hi side input's default state is lo. When an incoming positive signal is connected, you will see hi. When diagnosing momentary inputs it

```
I1-1  Park  Brake       Lo
I1-2  Lo  Side  2        HI
I2-1  Ignition          Lo
I2-2  WtrHtrFault        HI
```

is important to know that this screen displays the active state of the incoming signal, not the state of the output tied to the input. The number of lo side and hi side inputs will vary with each multiplex system. Lo side inputs are always listed first.

Digi-Level Monitor

This screen is only on multiplex systems that have the built in Digi-Level. Multiplex systems that use the external Digi-Level monitors will not have this menu item. This screen shows tank levels, battery voltages, generator status and generator hours. Use the up and down buttons to navigate to the different screens.

```
Fresh   Water   Tank  3/4
  L.P.  Gas     Tank  1/4
Gray1  Water   Tank  1/2
Gray2  Water   Tank    E
```

Tank Levels – Tank configurations vary across manufactures. Tanks and the number of connected sensors are predefined on a per model basis. In older systems the number of tanks and sensors had to be learned.

```
Black1  Waste  Tnk    F
Black2  Waste  Tnk  1/4
```

```
Fresh   Water   Tank  1/3
  L.P.  Gas     Tank  1/4
Gray    Water   Tank  2/3
Black   Waste   Tank  Err
```

Types of Tank Readings – There are four types of tank readings the Digi-Level can show depending on the RV: 1/3's, 1/4's, percentages, and error. L.P. tanks always read in 1/4's. Only RVs with pressure sensors use the percentage display. Err will appear whenever a sensor is outside of normal limits.

```
Fresh   Water   Tank  56%
  L.P.  Gas     Tank  1/4
Gray    Waste   Tank  26%
Black   Waste   Tank  46%
```

Pressure Sensors – Pressure sensor values are shown in 1% increments. When using pressure sensors there will be an additional screen to display each of the tanks' temperatures.

```
   Tank  Temperature
Fresh  Water   Tank    66
Gray    Waste   Tank    67
Black   Waste   Tank    66
```

Tank Learning

For Systems prior to model defined tank levels, the default data was three sensors per tank with only a fresh tank and a black waste tank. There are two requirements to learn the missing remaining tanks: The missing tank must be at least 2/3's of the way full and the coach voltage must be between 12.5 and 13.5 Volts. Once these conditions have been met the missing tanks will appear on the screen. For the Digi to learn to read in 1/4s instead of 1/3s the tanks must be full while inside of the voltage threshold of 12.5 and 13.5.

```
Fresh  Water  Tank  2/3
Black  Waste  Tank  1/3
```

Generator Screen

This screen shows the current state of the generator and the total accumulated hours of run time. There are eight potential states the generator can be in.

```
        Generator
        Starting


      0304.2  Hours
```

Start – This status is displayed when the user is using the manual press and hold start buttons.

```
        Generator
      Auto-Start


      0304.2  Hours
```

Auto-Start – This status is displayed when the Auto-Start function has been activated. The Auto-Start function starts by priming the generator then attempts to start the generator. After 4 unsuccessful Auto-Starts the screen will display Will Not Start.

```
        Generator
      Will  Not  Start


      0304.2  Hours
```

Will Not Start – This will only be displayed after an unsuccessful Auto-Start sequence.

```
        Generator
        Running


      0304.2  Hours
```

Running – The generator is running.

```
        Generator
        Stopping


      0304.2  Hours
```

Stopping – This screen is displayed when the user is using the manual press and hold stop buttons.

```
        Generator
      Auto-Stop


      0304.2  Hours
```

Auto-Stop – This status is displayed when the Auto-Stop function has been activated. After 4 unsuccessful Auto-Stops the screen will display Will Not Stop.

```
        Generator
    Will Not Stop

    0304.2 Hours
```

Will Not Stop – This will only be displayed after an unsuccessful Auto-Stop sequence.

```
        Generator
        Stopped

    0304.2 Hours
```

Stopped – The generator is stopped.

```
House Bat Voltage
  13.3V    ■■■■■---
Coach Bat Voltage
  12.0V    ■■■-----
```

Battery Voltage Screen – This screen shows the chassis and house battery voltages in both digital and analog (bar graph) format. Some systems only show the house battery voltage.

```
ModelB-2021
```

Model Name – This screen will display the model's name that the multiplex system is currently configured for.

```
Backlight LED    100%
Indicator LED    100%
```

```
LED Brightness   100%
```

Switch Panel Brightness – This screen allows you to adjust the brightness of the switch panel's LEDs. Gen 1 and Gen 2 switch panels have individual Backlight and indicator light brightness control. Gen 3 capacitive touch switch panels have one brightness control for both the backlight and indicator LEDs. By default, these values are at 100%

```
      Pairing
    In Progress
```

```
     Forget All
    In Progress
```

Wireless Pairing – Pressing the center button will put the wireless module into pairing mode. Pressing the right button will change it to wireless forget all. This will remove all previously paired devices from the wireless module. There can be a total of 5 different devices paired to a module before a forget all is needed to pair any new devices.

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```
Sofa/Dinette  SI      On
Sofa/Dinette  SO
Bed  Slide  In
Bed  Slide  Out
```

Manual Control – This menu allows uninhibited control of slides and awnings. Press and hold on an output to control it. You will see "On" appear on the right side of the screen when the output is being controlled. The last item in the list is Master Lights / All Lights. The master lights feature has three functions. The first button press will turn off all the lights, the second button press will turn on the previously turned off lights, pressing and holding will turn on all lights. Lights that are inhibited will not turn on with master lights.

```
Enabled
```

Entry Door Switch – Use the center button to cycle between enabled and disabled. When set to disabled the door switch will no longer activate the entry lights. This feature is enabled by default.

```
Disabled
```

```
   WARNING!  Do  Not
Operate  while  Moving
Press  <  to  Exit  or  >
to  Enter  Diagnostics
```

Diagnostics Menus – To enter this screen, press the top and bottom buttons at the same time. Before entering diagnostics, you will see a warning screen. Press the right button to enter diagnostics. All outputs that were previously turned on will be turned off. Most of the diagnostic screens are made up of three parts: the connector info, the name of the item on that connector's pin and the status of the item on that connector's pin. While in diagnostics some functions will no longer work. These functions include: switch panels, rocker switches, and outputs that have inhibited states. It is important to return to the main menu when finished with diagnostics to return function to these items. To return to the main menu press the left button to exit each screen until you see "Precision Circuits Inc"

Fuse Status
Refer to the information listed under normal operation menus

Input Monitor
Refer to the information listed under normal operation menus

```
O1-2  AwningLight  Off
O1-3  PorchLights  On
O1-6  On/Off  3    Off
O1-5  On/Off  4    Off
```
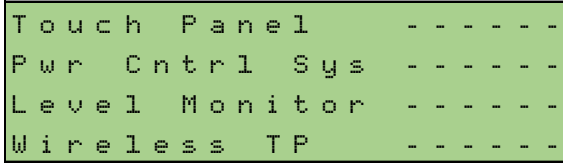
Single Power Control – Single power control outputs have two states: On and Off. A wide variety of outputs can be found under this menu including toggleable lights, water pumps, fan lids and more.

```
O2-1:6  FrEl  WH    Off
```

Group Control Outputs – Group control outputs are toggleable outputs that are all connected. Group outputs are typically used to provide power to multiple lights all at once such as a unit's cargo lights or accent lights. On some systems group control outputs may be used to control a single item.

```
M1-1  Awning  In    Off
M1-2  Awning  Out   Off
M1-3  RearWtrPump   On
M1-4  H-Bridge  2B  Off
```

Motor Control – These outputs can either be toggleable or momentary outputs. Motor outputs are typically used to control awnings, slides, tank heaters and more.

```
S1-1  Sofs/DineSI   Off
S1-2  Sofa/DineSO   Off
S1-3  BedSlideIn    OC
S1-4  BedSlideOut   Off
```

Hi/ Lo Signal Control – These outputs can either be toggleable or momentary outputs. Hi signals are listed first; lo signals are listed last. Not all multiplex systems use lo signals. There are three different statuses that can be displayed: On, Off and OC. OC occurs whenever the line detects a current draw of over 180 mA or when attempting to control an output while the coach battery voltage is below 9 Volts. These outputs are used as signals to other controllers: slides, awnings, keyless entry system outputs, TV lockouts and more.

```
D1-1  Dimmer  1  Lt  Dim
D1-2  Dimmer  2  Lt  Off
D1-3  Dimmer  3  Lt  On
D1-4  Dimmer  4  Lt  Off
```

Dimmer Control – These outputs control the dimmable lights in the coach. Pressing the center button will turn the outputs on and off. Holding the right button will alternate between brightening and dimming with each button release. The output status will display Dim when the output is between 0-100% brightness.

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```
Touch Panel      - - - - - -
Pwr Cntrl Sys    - - - - - -
Level Monitor    - - - - - -
Wireless TP      - - - - - -
```

Module Status – This menu displays the communication status of all connected modules. Below are the modules listed under the module status menu.

Touch Panel

This is the main touch panel inside of the RV. Pressing the right arrow will power cycle the touch screen.

Wireless TP

This is the Bluetooth module that allows the app to communicate with the RV. Pressing the center button will put the module into pairing mode. Pressing the right button will reset the device.

Level Monitor

This is the Digi-Level that displays tank levels, battery levels and generator hours and status. On Digi-Levels that are not integrated with the Precision Plex the right arrow will perform a Digi reset causing the Digi-Level to forget all learned data and reset to defaults.

Power Control System

This is the energy management system that manages the 120VAC service to prevent circuit breakers from tripping. There are three different power control systems that can be connected to the system. Depending on the power control system that is installed, different diagnostic controls will be available.

00-10050-000

When using this power control system, the only thing Module Status does is display the communication status. This power control system does not control HVAC outputs and will not display Amp readings while using 50 Amp service.

00-10069-000

This power control system has the capability for HVAC control but does not have the ability to show Amp draw while using 50 Amp service. Pressing the right button will perform an HVAC reset. An HVAC reset can fix some problems you are experiencing with control over the AC units. If issues continue, utilize the HVAC diagnostics on the touch screen.

00-10070-000

This power control system has capability for HVAC control and displays Amp draw while on 50 Amp service. Some Precision Plex systems allow for direct control of HVAC modules and PCS controlled signal hi outputs from this diagnostic menu. Precision Plex systems that do not will perform an HVAC reset when the right button is pressed.

```
Pwr  Cntrl  Sys  5 - - - -
```

```
Pwr  Cntrl  Sys  Reset
```
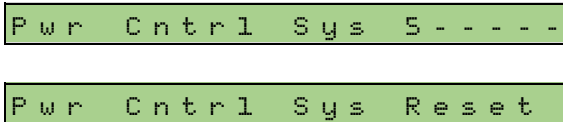
WARNING! You can damage the AC unit by turning on the compressor and heat pump outputs without also turning on the fans. Be sure to turn on the fan outputs before turning on compressors. This screen does not provide visual indication that outputs have turned on. If possible, it is better to utilize the touch screen's HVAC diagnostics to control these outputs. See the submenu explanation below.

Signal Hi Outpts	Signal Hi 1	Signal Hi 2	Signal Hi 3	Signal Hi 4	Signal Hi 5
5	–	–	–	–	–
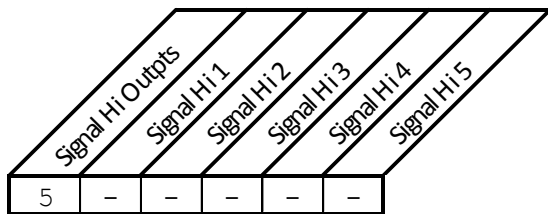
When you press the right button, you will see the six dashed lines turn into the number 5 with 5 dashes after it and a blinking cursor that you can move from left to right. While the cursor is in the first position you can access the different type of outputs. Use the up and down arrows to change between 1-5. When the cursor is over one of the 5 dashed lines you use the up arrow to turn outputs on and down to turn outputs off. When set to 5, the dashed lines are used for signal hi outputs. When set to 1-4, the dashed lines are used for controlling each HVAC module. The examples on the left show which output is associated with each dashed line.

HVAC Module 1-4	Fan Low	Fan Medium NU	Fan High	Compressor	Heat Pump
1–4	–	–	–	–	–
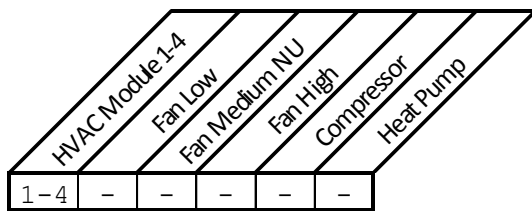
HVAC Module 1 and HVAC Module 2
These are modules used to communicate with systems using Atwood Air Conditioners.

TP1 HVAC info and WTP HVAC Info
This displays the communication status of HVAC data between the touch panel and the wireless module.

Digital Display
This is a remote display panel used by systems that use an integrated-Digi to provide Digi-Level information in the tank bay.

Touch Panel 2

This displays the comm status of the 2nd touch screen in the RV. Pressing the right button will perform a power cycle on the touch.

```
213---D----    67    NI
214---------   70    NI
215---------   NI    NI
216------      NI    NI
```

```
102  70  NI  104  67  NI
105  73  NI  107
108          113
```

```
102------   104-------
105------   107-------
108--C---   113-------
```

Switch Panel Diagnostics – This screen shows the communication status of all switch panels that are inside the RV. There are two different menu configurations that vary by manufacturer. RVs using capacitive touch switch panels will always use a single column display. Address is listed first, then the communication status, and finally the temperature reading from the thermistor connected to the switch panel is last. If there aren't any thermistors connected to a switch panel you will see NI. Upon entry to the switch panel diagnostics screen the two-column display will show the address and its communication status. Pressing the right button will change the screen from displaying communication status to thermistor Information. Use the left button to return to the communication status page. Along with displaying communication status the dashed lines also represent that a button is not being held. When a button is held one of the 6-8 dashes will update to the corresponding letters A-H.

```
 ModelA-2022
*ModelB-2022
 ModelC-2022
 ModelD-2022
```

Model Name Select – This screen allows you to change the currently selected model. The * will be next to the selected model. To select a different model, use the up and down arrows to scroll and the center button to select. Use the left arrow to back out of the Model selection menu. After selecting a different model, the multiplex system must be power cycled before some connected modules will work properly.

Diagnosing an Output

1. Enter Diagnostics
    a. Tap the top and bottom buttons at the same time.
    b. Clear the warning message by pressing the right button.
2. Enter the fuse status menu.
    a. Press the center button when the cursor is flashing on fuse status.
3. Look for the fuse with a name like entry ceiling lights. We can see in menu item F45 "Entry Lt" with a status of OK. This tells us the fuse is good.

```
F45  1/0  Entry  Lt    OK
F46  1/0  On/Off  1     OK
F47  1/0  Gal0HDLt      OK
F48  1/0  On/Off  7     OK
```

4. Exit the fuse status menu and enter the single power control menu.
    a. Press the left button once to exit fuse status.
    b. Use the bottom arrows to scroll down to the single power control.

```
J3-1  On/Off  1       Off
J3-2  EntryCeilLt     On
J3-3  Porch  Light    Off
J3-4  Awning  Lght    Off
```

    c. Press the center button while the cursor is on the single power control system line.
5. Turn on the entry ceiling lights.
    a. Use the bottom button to scroll down to the entry ceiling lights output.
    b. Press the center button to turn the output on. You will see the status change from off to on.
6. If the output turns on here we need to check the communication status of the item that could not turn the output on. If the output does not turn on, we need to check power coming out of the specific pin on the board.
7. Remove the panel from the wall to access the connectors on the back.
8. Locate pin 2 of the J3 connector.
    a. There will be small numbers printed near each corner of the connector to help identify each pin.
9. Check the voltage of the output.
    a. Apply the black voltmeter cable to ground.
    b. Apply the red voltmeter cable to J3 – 2.
    c. See the voltage is outputting 12 Volts.
10. If the board is putting out 12 Volts there is an issue outside of the Precision Plex system.