

For use with the following model numbers:

3PM0030-x

3PM0100-x



18201 N. 25th Ave, Suite C
Phoenix, AZ 85023

Phone: 602-424-9000

Fax: 602-424-9003

Email: techsupport@precisionpowerlabs.com

Website: www.precisionpowerlabs.com



Power Lab
Version: Alpha Testing

Motor Controller Interface
Instruction Manual

Issued August 2006

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Technical Support Report Form

Please fill in complete answers if possible prior to contacting Factory Technical Support

Phone: (602) 424-9000 X 113

Fax: (602) 424-9003

Email: techsupport@precisionpowerlabs.com

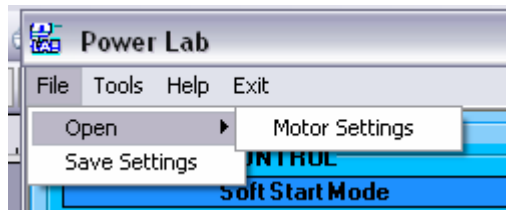
Contact Information	
Date	
Last Name	
First Name	
Company Name	
Phone #1	
Phone #2	
Email	

Board Information	
Power Lab Version	
Board Software Version	
Board Voltage/Current Rating	
Are Any Jumpers On?	

Description of Problem	
Describe general problem, symptoms	
Does software connect?	<input type="checkbox"/> yes <input type="checkbox"/> no
Operating Modes:	
OFFLINE	<input type="checkbox"/> OK <input type="checkbox"/> problem
ONLINE	<input type="checkbox"/> OK <input type="checkbox"/> problem
DELAY TO START	<input type="checkbox"/> OK <input type="checkbox"/> problem
SOFT STARTING	<input type="checkbox"/> OK <input type="checkbox"/> problem
ALL ON	<input type="checkbox"/> OK <input type="checkbox"/> problem
MANUAL SAVINGS	<input type="checkbox"/> OK <input type="checkbox"/> problem
AUTOMATIC SAVINGS	<input type="checkbox"/> OK <input type="checkbox"/> problem
SOFT STOPPING	<input type="checkbox"/> OK <input type="checkbox"/> problem

Menu Items

- The **Save Settings** menu item is used to save all of the current motor settings into a file that can then be opened later by using the **Open** → **Motor Settings** menu item. This is useful for tuning settings for one motor and then applying the same settings to other similar motors.

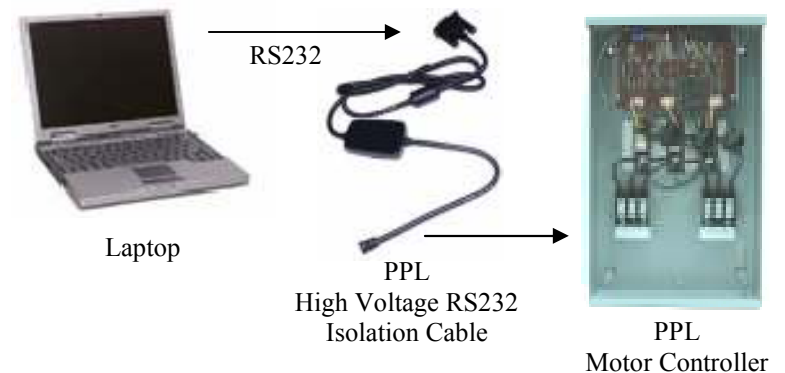


- Clear Board Settings** will erase all of the settings stored on the hardware of the motor controller. This should only be used when initializing new units in the field.
- Factory Settings** is used to automatically default the program settings to the settings used by the factory. This can be done by entering the boards rated voltage and current and then clicking the **Factory Setting** item.
- By clicking **Help** → **About** you can view your version of **Power Lab** for checking compatibility with motor controllers.
- Exit** will disconnect the **Power Lab** from the motor controller and shut down the program.



WARNING - Clearing the software control settings during motor operation can result in undesired operation of the motor. It is HIGHLY recommended that controllers initialized in the field are done so with the motor disconnected from the controller.

Connection Instructions



- The 9-Pin female connection end of the cable connects to the male RS232 connection port located on your laptop. The 6-pin female connection end of the cable connects to the **Interface Port** location on the PPL Motor Controller. The **Interface Port** location varies depending on the controller model. Please refer to your models manual to locate the **Interface Port**.
- All three **Jumpers** must be removed from the **Jumper Control** section of the board in order to connect to the Power Lab Interface AND to use the settings controlled by the interface. DO NOT add or remove **Jumpers** when the board has power. Please refer to your models manual to locate the **Jumper Control** section.

WARNING - When connected to line power the PPL motor controller is floating at line voltage. Attempting to use ANY Isolation Cable other than the one supplied by PPL may result in damage to the controller and/or personal property. It is strongly recommended that you disconnect line voltage to the controller before connecting the Isolation Cable to the Interface Port to avoid serious injury or death.

RS232 Isolator - Coming Soon

- The PPL RS232 High Voltage Isolator is the device needed to activate and use the Power Lab software.
- It protects the connected Laptop/PC from the floating line voltage of the PPL Motor Controller.
- It will be configurable to allow for a communication mode where the cable will be used to update the settings of the motor controller and collect data from it via the Power Lab software, and also a patch mode where the user can then download and install software patches onto the motor controller.



Data Feedback

- This section of data feedback displays the instantaneous **Line V** (voltage), **Load V** (voltage), and **Current** measured from the board. The voltage is a phase-to-phase RMS voltage. **Min** and **Max** represent the respective minimum and maximum value measured since the last measurement was taken.
- **Angle** represent the phase angle relationship between line voltage and the current.

DATA								
Phase AB RMS			Phase BC RMS			Phase CA RMS		
Line V	210.8	V	Line V	211.8	V	Line V	210.1	V
Min	210.6	V	Min	211.4	V	Min	209.7	V
Max	210.8	V	Max	211.9	V	Max	210.3	V
Load V	150.1	V	Load V	149.8	V	Load V	149.9	V
Min	149.5	V	Min	149.3	V	Min	149.8	V
Max	150.3	V	Max	150.5	V	Max	149.9	V
Current	2.6	A	Current	2.5	A	Current	2.6	A
Min	2.6	A	Min	2.5	A	Min	2.5	A
Max	2.6	A	Max	2.6	A	Max	2.6	A
Angle	27	°	Angle	26	°	Angle	26	°

System Status

OFFLINE

- These are all the normal status conditions that occur during normal operation of the motor controller.

OFFLINE - Software is NOT connected to motor controller.

ONLINE - Software IS connected but motor is NOT running.

DELAY TO START - Controller is delaying start of motor.

SOFT STARTING - Controller is soft starting

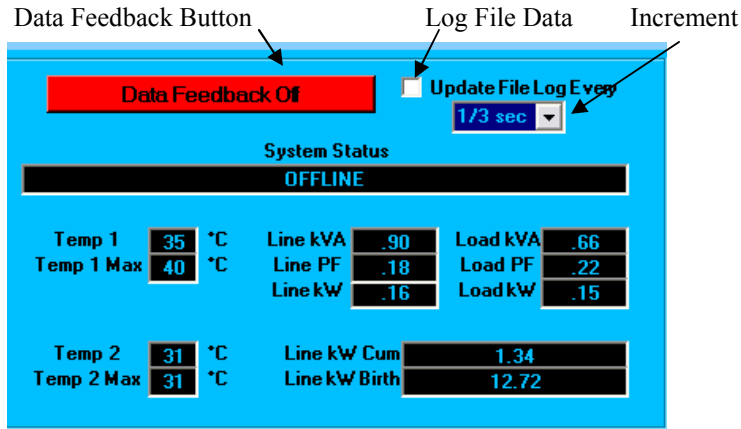
ALL ON - Controller is acting as a shorted circuit.

MANUAL SAVINGS - Controller is in manual savings mode.

AUTOMATIC SAVINGS - Controller is in auto savings mode.

SOFT STOPPING - Controller is in soft stop mode.

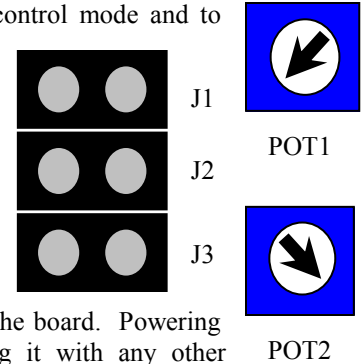
Data Feedback



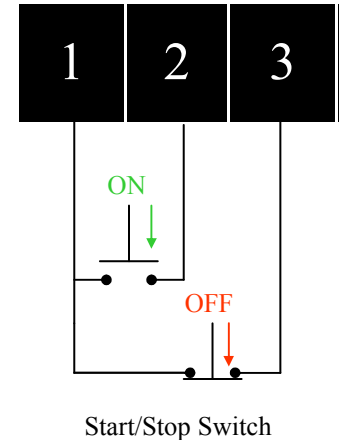
- Data feedback is used to collect data from board. It is turned on and turned off by using the **Data Feedback Button**. Also by checking the **Log File Data** box the program will collect and store the data into an Excel CSV file which can then be viewed with Microsoft Excel. The file will log data depending on the selected **Increment** which ranges from every 1/3 second to every hour. The data files are automatically saved when **Log File Data** is unchecked or data feedback is turned off. Files are saved in the executable directory in the **LogFiles** folder.
- **System Status** displays the current status of the board. Normal operation **System Status** codes are available on the next page.
- **Temp1** and **Temp2** display the current temperature readings from the temp sensors and **Temp1 Max** and **Temp2 Max** display the maximum temperature read since Data Feedback has been turned on.
- This section of data feedback also displays instantaneous line side and load side **kVA** (kilovolt-ampere), **PF** (power factor), and **kW** (kilowatt). **Line kW Cum** is the cumulative kW since the controller was last reset, and **Line kW Birth** is the collective kW since the controller was shipped from the factory.

Software Control Mode

- In order to activate software control mode and to communicate with the Power Lab software all three control **Jumpers** (J1, J2, J3) must be removed BEFORE the unit is powered up. When in software control mode the motor controller will ignore the settings of the **Jumpers** and the settings of the **Potentiometers** (POT1 and POT2) located on the board. Powering down the board and restarting it with any other **Jumper** configuration will exit software control mode



- When in software control mode the board will continue to operate normally from the signals available in the **Terminal Strip** located on the board, unless the Power Lab software is connected. When the Power Lab software is connected the software will override the **Start/Stop Switch** located on the **Terminal Strip**. Power Lab will then be in control of starting and stopping the motor for diagnostics and changing settings. Please refer to your models manual for the locations and other functions of these controls.



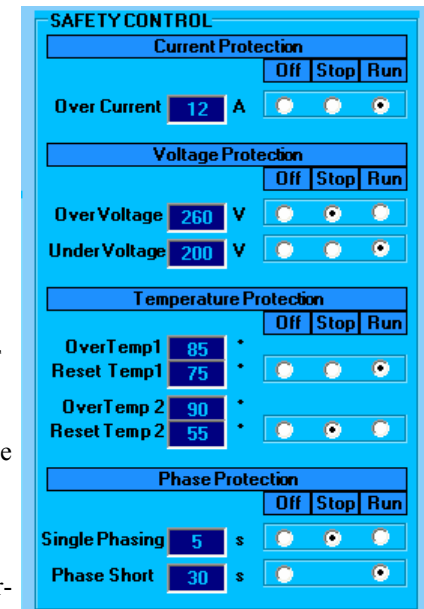
Power Lab Interface



- The Power Lab software is designed into 5 major sections: **MAIN CONTROL**, **SOFT START/STOP**, **SAFETY CONTROL**, **SAVINGS CONTROL**, and **DATA FEEDBACK**.
- Most motor controls are located in the main window of the program. All other controls and program settings can be accessed through the menu bar.
- All sections in **Blue** indicate settable parameters, and all sections in **Black** indicate data that can be retrieved from the board.

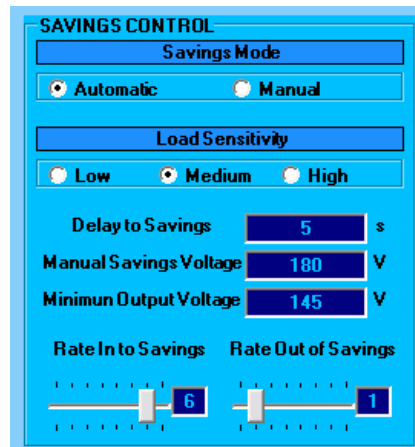
Safety Control

- Most safety controls have three functions. **Off** means the safety control is off, **Stop** means the control will stop the motor, and **Run** means the controller will continuously run the motor with no savings.
- **Over Current** is used to detect abnormally high current when the board is NOT in soft start. If detected it will **Stop** the motor until a restart is initiated or **Run** the motor until current drops below the over current value.
- **Over Voltage** detects abnormally high line voltage and **Under Voltage** detects abnormally low line voltage. Both will **Stop** or **Run** the motor until line voltage is within normal range.
- **Over Temp1** and **Over Temp2** detect abnormally high temperatures and **Stop** or **Run** the motor and continue normal operation when the **Reset Temp** is reached. NOTE - The motor controller will shutdown if 100° C is detected *no matter what*.
- **Single Phasing** will detect the absence of a phase due to line failure, board failure, or load failure. It will **Stop** the motor until a restart is initiated or **Run** the motor until normal phase operation is detected. NOTE - Loosing the line B phase will result in a loss of power the motor controller which will shut down the motor.
- **Phase Short** detects a shorted phase which is most likely the result of a faulty SCR. Stopping the motor will cause single phasing so **Running** the motor is the only active response.



Savings Control

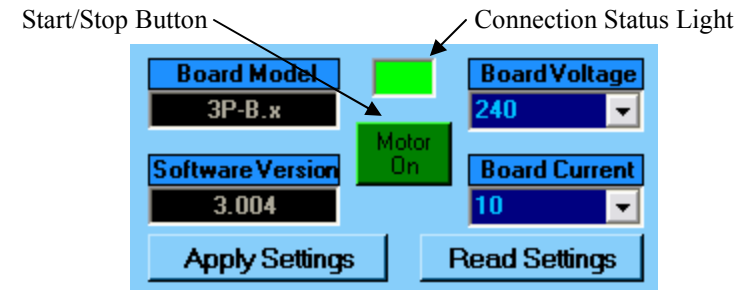
- There are two types of savings modes. **Automatic** and **Manual**.
- **Automatic** savings is the recommended savings mode. In this mode the board will monitor the motor and automatically determine optimal savings. It functions similarly to automatic savings used in normal control mode. The **Minimum Output Voltage** setting works similarly to **POT1** for controlling how low voltage can go.
- **Manual** savings is a ramped voltage cut to the voltage value entered in **Manual Savings Voltage**. It works the same as adjusting **POT1** when in manual savings and normal control mode.



WARNING - Manual savings mode does NOT have safety controls and it is HIGHLY recommended that you do not leave the controller in manual savings to avoid injury or damage to equipment.

- **Load Sensitivity** can be adjusted for highly sensitive loads. **Low** sensitivity provides the most savings and should be used for ideal loads where the line voltage and motor loads are relatively stable. **Medium** sensitivity should be used for average loads where line voltage and loads vary. High sensitivity should be used for applications where line voltage and loads can change rapidly.
- **Rate Into Savings** controls how fast Automatic savings drops the voltage and **Rate Out Of Savings** controls how fast it increases voltage coming out of savings.

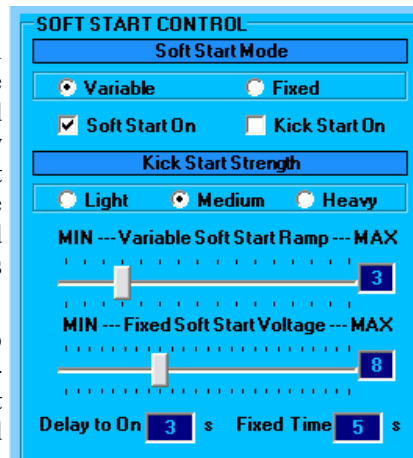
Main Control



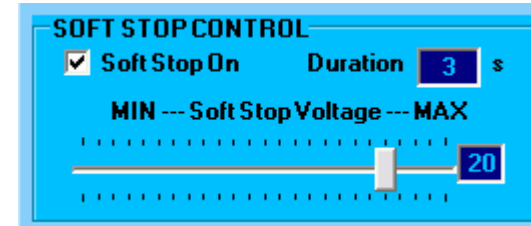
- The **Connection Status Light** color determines the status of the connection between the Power Lab software and the board.
 - BLACK** - Indicates NO signal between board and software.
 - DARK GREEN** - Indicates a GOOD signal and also that the software is waiting for a signal to turn on the motor.
 - LIGHT GREEN** - Indicates a GOOD signal and also that the software is running the motor.
 - RED** - Indicates a GOOD signal but the motor controller is in some emergency state.
 - BLUE** - Indicates a BAD signal possibly caused by a faulty cable connection.
- **Board Model** displays the current boards model number and **Software Version** displays the version of the DSP software.
- **Board Voltage** and **Board Current** display the boards factory configured voltage and current ratings. These settings can be modified for boards that are reconfigured in the field.
- The **Read Settings** button is used to read the settings that are saved on the board, and the **Write Settings** button is used to update configured settings and load these settings onto the board. Both can be used during board operation.

Soft Start Control

- For the **Soft Start Mode** there are two different types of soft starts. **Fixed** and **Variable**. Soft start is active when **Soft Start On** is checked.
- **Variable** soft start will ramp out the voltage to the motor with a predetermined ramp which is controlled by the **Variable Soft Start Ramp** slider. It is the same as the soft start controlled by **POT2** when the board is in normal control mode.
- **Fixed** soft start will ramp up to a fixed voltage determined by the **Fixed Soft Start Voltage** slider and stay at that voltage for the amount of time determined by **Fixed Time**. This soft start is more applicable for heavily loaded motors that have very high inrush currents.
- **Kick Start** is used to apply a large amount of voltage for a very short period of time allowing heavily loaded or highly resistive motors to overcome inertia and continue on with a normal soft start. The strength of the kick start can be selected as **Light**, **Medium**, or **Heavy**. Kick Start is active when **Kick Start On** is checked.
- **Delay to On** delays the motor from starting for the entered amount of time once the hardware/software signal has been given to the motor controller. A value of zero represents no delay.



Soft Stop Control



- The soft stop control is a fixed soft stop. If **Soft Stop On** is checked the motor controller will ramp down the voltage to the motor to a fixed voltage when a hardware/software stop signal is received. This voltage level is determined by the **Soft Stop Voltage** slider. Once it reaches the preset fixed voltage level the motor will continue to run at that level for the amount of time entered into the soft stop **Duration**.
- The software control mode soft stop differs from the normal control mode in that it's a fixed voltage for an extended period of time. The normal soft stop is a 1 second voltage ramp down to zero volts.
- Soft stop is useful for motor applications where a large amount of back pressure is applied to the motor when it powers down, such as vertical pumps or high friction belt systems.

WARNING - Delaying the start of a motor once a start signal has been received can be dangerous if misconceived as a malfunction. Use with caution.