



Parr Instrument Company

4857

Process Controller
Operating Instruction Manual





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Related Instructions

The following Parr publications are also included to further your understanding of this instrument and its component parts:

No.	Description
201M	Limited Warranty
521M	4857 Process Controller CD
547M	4857 CalGrafix CD
567M	4875 Power Controller Operating Instructions

Customer Service

Questions concerning the installation or operation of this instrument can be answered by the Parr Customer Service Department:

309-762-7716
800-872-7720
Fax: 309-762-9453
www.parrinst.com
parr@parrinst.com



PREFACE

Scope

These instructions cover the installation and operation of Parr Model 4857 Process Controller as used with Parr Laboratory Reactors and Pressure Vessels. They cover the basic functions provided in each of these controllers. The users should study the instructions carefully before using any of these controllers so that they will fully understand the capabilities of this equipment and the safety precautions to be observed in its operation.

Applications

Each Series 4857 Process Controller consists of a packaged temperature control unit completely wired and assembled with appropriate power and safety relays, switches and pilot lights.

These units are designed specifically for use with Parr reactors and pressure vessels and are to be used only with Parr equipment.

Controllers furnished with Parr reactors equipped with variable speed DC motors have a motor switch and a speed control knob on the front panel of the power controller. Controllers to be used with AC equipment or an air motor do not have a speed control knob.

Explanation of Symbols

I	On position
O	Off position
	This CAUTION symbol may be present on the Product Instrumentation and literature. If present on the product, the user must consult the appropriate part of the accompanying product literature for more information.
	Protective Earth (PE) terminal. Provided for connection of the Protective Earth (green or green/yellow) supply system conductor.

Safety Information

To avoid electrical shock, always:

1. Use a properly grounded electrical outlet of correct voltage and current handling capacity.
2. Ensure that the equipment is connected to electrical service according to local national electrical codes. Failure to properly connect may create a fire or shock hazard.
3. For continued protection against possible hazard, replace fuses with same type and rating of fuse.
4. Disconnect from the power supply before maintenance or servicing. The power supply cord of the equipment is the main disconnect device.

To avoid personal injury:

1. Do not use in the presence of flammable or combustible materials where fire or explosion may result. This device contains components which may ignite such materials.
2. Refer servicing to qualified personnel.

Intended Usage

This controller has been designed for use with Parr Pressure Vessels, Reactors and Power Controllers. It has been designed, built, and tested to strict physical and electrical standards. However, it is the user's responsibility to install and operate it in conformance with local pressure and electrical codes.

If the instrument is used in a manner not specified by Parr Instrument Company, the protection provided by the equipment may be impaired.



General Specifications

Electrical Ratings:

115VAC 50/60 Hz 3.0 Amps

230VAC 50/60 Hz 3.0 Amps

Before connecting to a reactor or heating device, the user must be sure that the line, load and other characteristics of the installation do not exceed the following limits:

Voltage: Fluctuations in the line voltage should not exceed 10% of the rated nominal supply voltage shown on the data plate.

Frequency: Controllers can be operated from either a 50 or 60 Hertz power supply without affecting their operation or calibration.

Current: The total current drawn should not exceed the rating shown on the data plate on the controller by more than 10 percent.

Thermocouple. Unless otherwise specified, all Series 4857 Process Controllers operate with a Type J (iron-constantan) thermocouple. The total resistance of the thermocouple and the lead wires should not exceed 100 ohms. If the resistance of the thermocouple circuit is higher, it will not function properly.

Environmental Conditions

This instrument is to be used indoors and requires 3 square feet of space below the controller in a well-ventilated area with convenient access to an electric outlet.

Operating: 15°C to 30°C; maximum relative humidity of 80% non-condensing.
Installation Category II (overvoltage) in accordance with IEC 664. Pollution degree 2 in accordance with IEC 664.
Altitude Limit: 2,000 meters.

Storage: -25°C and 65°C; 10% to 85% relative humidity.

Provisions for Lifting and Carrying

Before moving the instrument, disconnect all connections from the rear of the apparatus. Lift the instrument by grabbing underneath each corner.



Caution

Do not use in hazardous atmospheres.



User's Responsibility

All Parr Reactors and Pressure Vessels are designed and manufactured with great care to assure safe operation when used within their prescribed temperature and pressure limits.

But...the basic responsibility for safety when using this equipment rests entirely with the user; who must:

1. Select a reactor or pressure vessel that has the capability, pressure rating, corrosion resistance, and design features that are suitable for its intended use. Parr engineers will be glad to discuss available equipment and material options with prospective users, but the final responsibility for selecting a reactor or pressure vessel that will perform to the user's satisfaction in any particular reaction or test must rest with the user - not with Parr.

In exercising the responsibility for the selection of pressure equipment, the prospective user is often faced with the choice between over- or under-designed equipment. The hazards introduced by under-designed pressure vessels are readily apparent, but the penalties that must be paid for over-designed apparatus are often overlooked. Recognizing these criteria, Parr reactors and pressure vessels are offered in several different styles, each designed for convenient use in daily operation within certain temperature and pressure limits, using gaskets, closures, and other elements carefully selected for safe operation within the limits specified for that design. But in order to preserve the validity of these designs, all temperature and pressure limits must be observed, and no attempt should be made to increase these limits by making alterations or by substituting components which are not recommended by Parr Instrument Company.

2. Install and operate the equipment within a suitable barricade, if required, with appropriate safety accessories and in full compliance with local safety codes and rules.

All standard Parr pressure vessels are provided with either a suitable relief device or a means to attach one (typically in the form of a plugged opening). When a pressure vessel is delivered without a pressure venting device, it is the customer's responsibility to provide pressure relief in order to protect the operator and the equipment from destructive high pressures. If you need more information or need help in selecting a proper relief device, please contact Parr Instrument Company.

3. Establish training procedures to ensure that any person handling the equipment knows how to use it properly.
4. Maintain the equipment in good condition and establish procedures for periodic testing to be sure the vessel remains structurally sound.

Unpack Carefully

Unpack the equipment carefully and check all the parts against the packing list. If shipping damage is discovered, report it immediately to the delivering carriers. Examine the components closely for any loose parts or shipping damage and be sure to check all layers of packing materials thoroughly so as not to overlook any parts which might otherwise be discarded.

INSTALLATION

General Instructions

Set the controller near the reactor on a sturdy bench or table where there is convenient access to an electrical outlet capable of carrying up to 20 amperes. Leave a space of at least twelve inches between the controller and the heater of the reactor so that the controller will not be affected by radiant heat.

Connections

Labeled connections are provided on the rear panel of each controller.

The **Control Temp** connection is for the internal reactor thermocouple or RTD harness.

The **Auxiliary Temp** connection is for a secondary thermocouple or RTD harness.

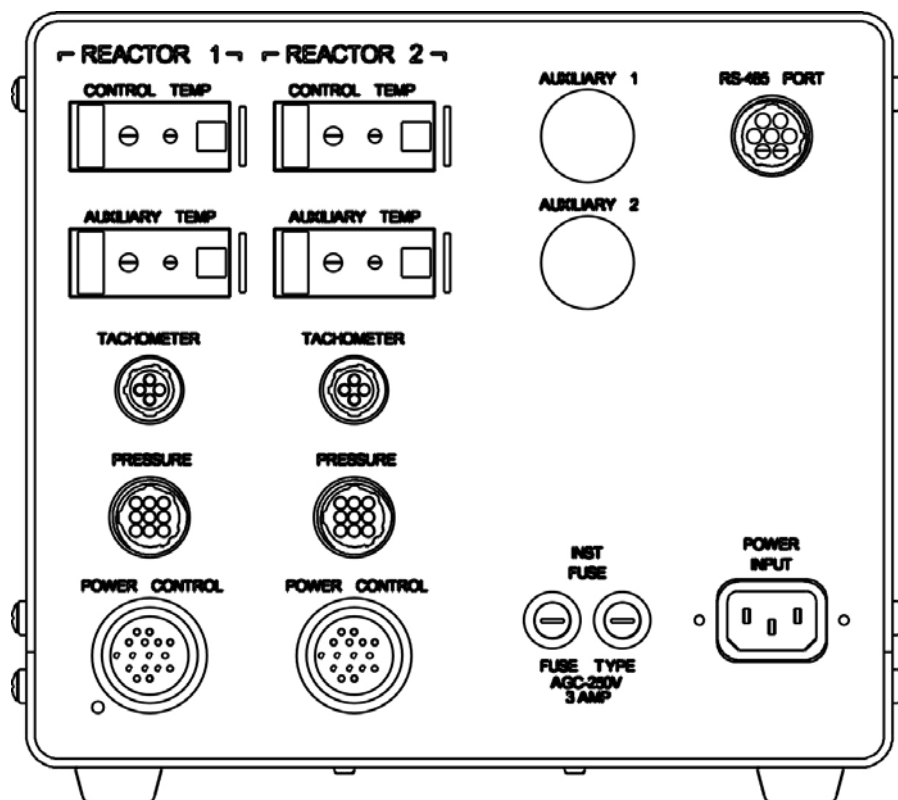
The **Tachometer** connection is for the optical sensor harness.

The **Pressure** connection is for the reactor pressure sensor harness.

The **Auxiliary** connection is for an optional input.

The **Power Control** connection is for connection to the 4875 Power Controller.

The **RS-485 PORT** connection is for communication to PC.





SWITCHES AND INDICATORS

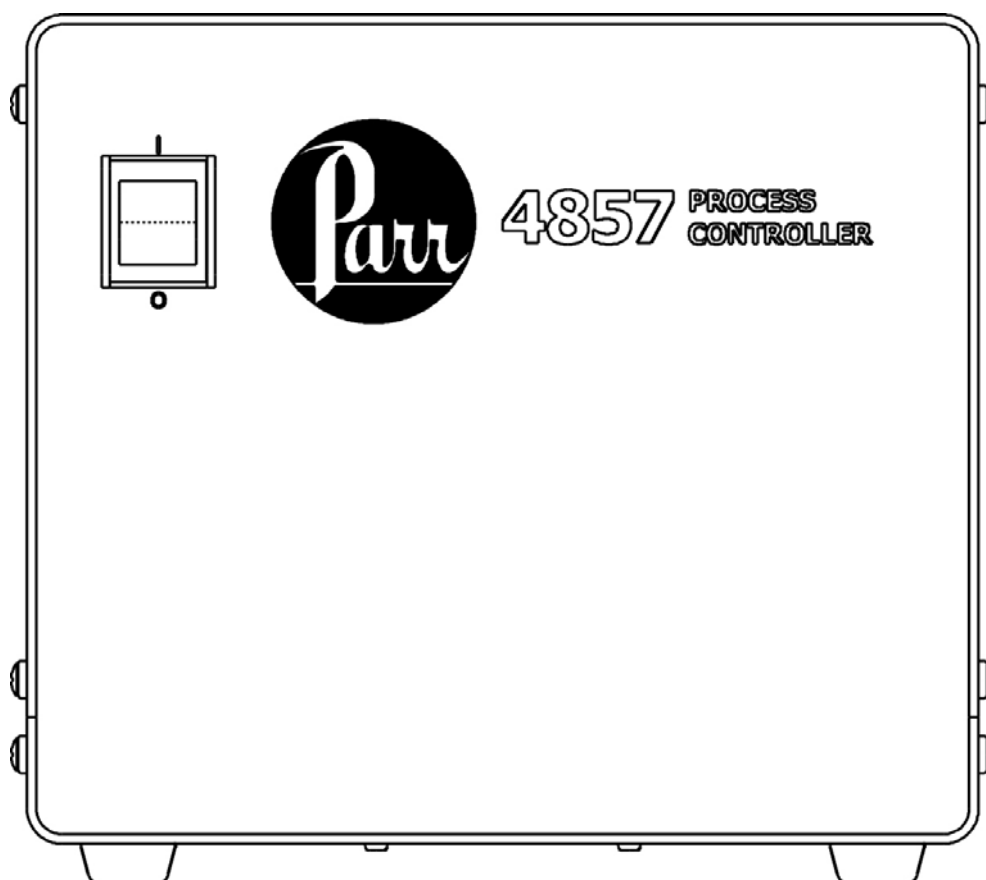
4857 Switches and Indicators

The Main Switch is a manual, two-position, illuminated switch which will cut off power to the controller. The light indicates power the power is on. Take care to position the controller such that the main power switch may be accessed easily when the controller needs to be disconnected.

PROTECTIVE FUSES

4857 Fuses

Two instrument fuses are mounted on the back panel. These are Fast-acting, 250VAC, 3.0 amp fuses, intended to protect the internal circuitry of the controller.



4857 Process Controller Front Panel



MODEL 4857 PROCESS CONTROLLER SPECIFICATIONS

Temperature Control Parameters

To facilitate start up with reasonably good PID control parameters for heating and cooling, all 4857 Process Controllers are programmed at the factory with the temperature control settings shown on the right.

Module 1: Temperature Control

Cycle time	2 seconds
Proportional Band	25 °C
Integral Time	5 min
Derivative Time	25 sec

Output 1 on these controllers drives the heater. Output 2 can be used to activate a cooling system. Control parameters can be set independently for each of these outputs.

Input thermocouple	Type J
Operating range	0 to 800 °C
Display resolution	.1 °C
Setpoint resolution	.1 °C
System accuracy	+/- 0.1% FS +/- 1°C typical
Control action	Three term PID control plus limit control
Control output 1	15 amp @ 115V, 15 amp @ 230V
Control output 2	0.25 amp
Operating voltages	115 and 230 VAC
Maximum switching load	15 amp @ 115 VAC 15 amp @ 230 VAC



SOFTWARE INSTALLATION OF THE 4857 PROCESS CONTROLLER

Before Software Installation

The CalGrafix software should be installed on a PC which has not previously been used to run software for Cal applications. The PC should meet at least the minimum system requirements.

Minimum PC Requirements

As a general requirement, we would recommend a minimum of Pentium 450MHz with 256MB RAM, Windows™ 2000/XP and screen resolution, 1024 x 768. 100MB of free hard drive space is more than sufficient.

Installation Instructions:

Note: Temperature control modules have been set to park mode as a precaution against heating before connection to a PC. Following these installation instructions will reset the parameters for these modules to allow heating and stirring.

Do not connect the 4857 to the PC until the following installation has been completed.

CalGrafix Installation Instructions:

1. Locate the 547M CalGrafix CD and insert it into the CD drive.
2. From the CD, open the setup.exe file to run the installation program.
3. Follow on screen instructions to complete installation.

Install USB Drivers (for USB cables only)

Note: If using serial port communication, no driver installation is required.

1. Insert the 521M CD.
2. Attach USB Cable to PC. Do not connect cable to 4857 Process Controller yet.
3. The "Add new hardware" wizard should appear. Click "Next."
4. Select "Search for the best driver for your device." Click "Next."
5. The wizard will then ask the location of the driver. With the Parr 521M CD in the CD-drive, select "CD-ROM drive" and click "Next."
6. The wizard should find the "\FTDIBUS.INF" file. If it does not find the driver, select "specify driver location" and find the driver at: "/installation/USB-SerialPortAdapter/BB-Elec/USOTL4/VISTA_XP or WIN98_ME". Click "Next."
7. The wizard should install the driver. Click "Next."
8. The wizard will also find the USB Serial Port. This should be installed in the same manner as the previous driver. When it is finished, click "Finish."

Connections between single Reactor, 4857 Process Controller, and single 4875 Power Controller

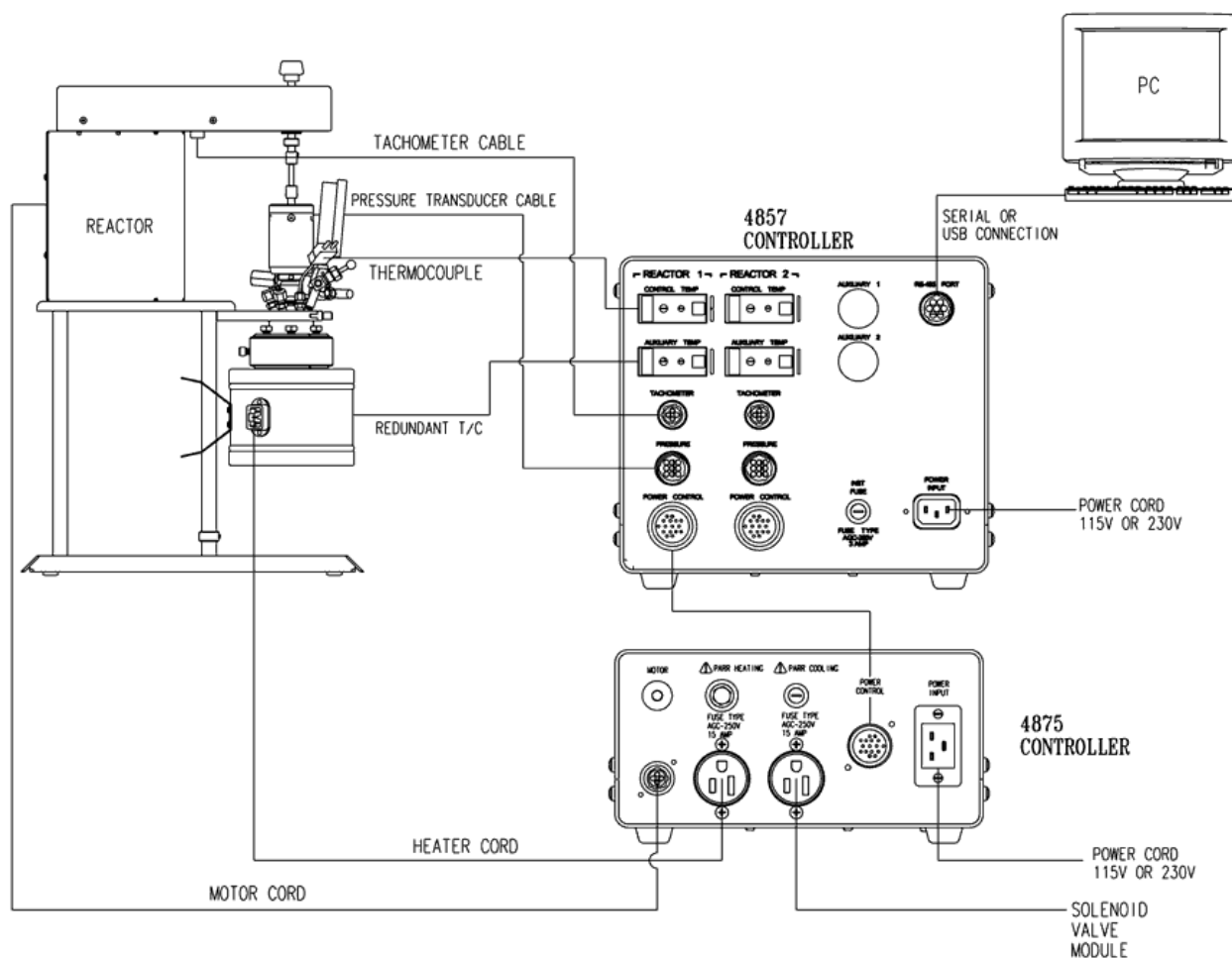


Diagram 1: Schematic Diagram of Connections to 4857 Process Controller for control of a single reactor with 4875 Power Controller

Connections between two Reactors, 4857 Process Controller, and dual 4875 Power Controllers

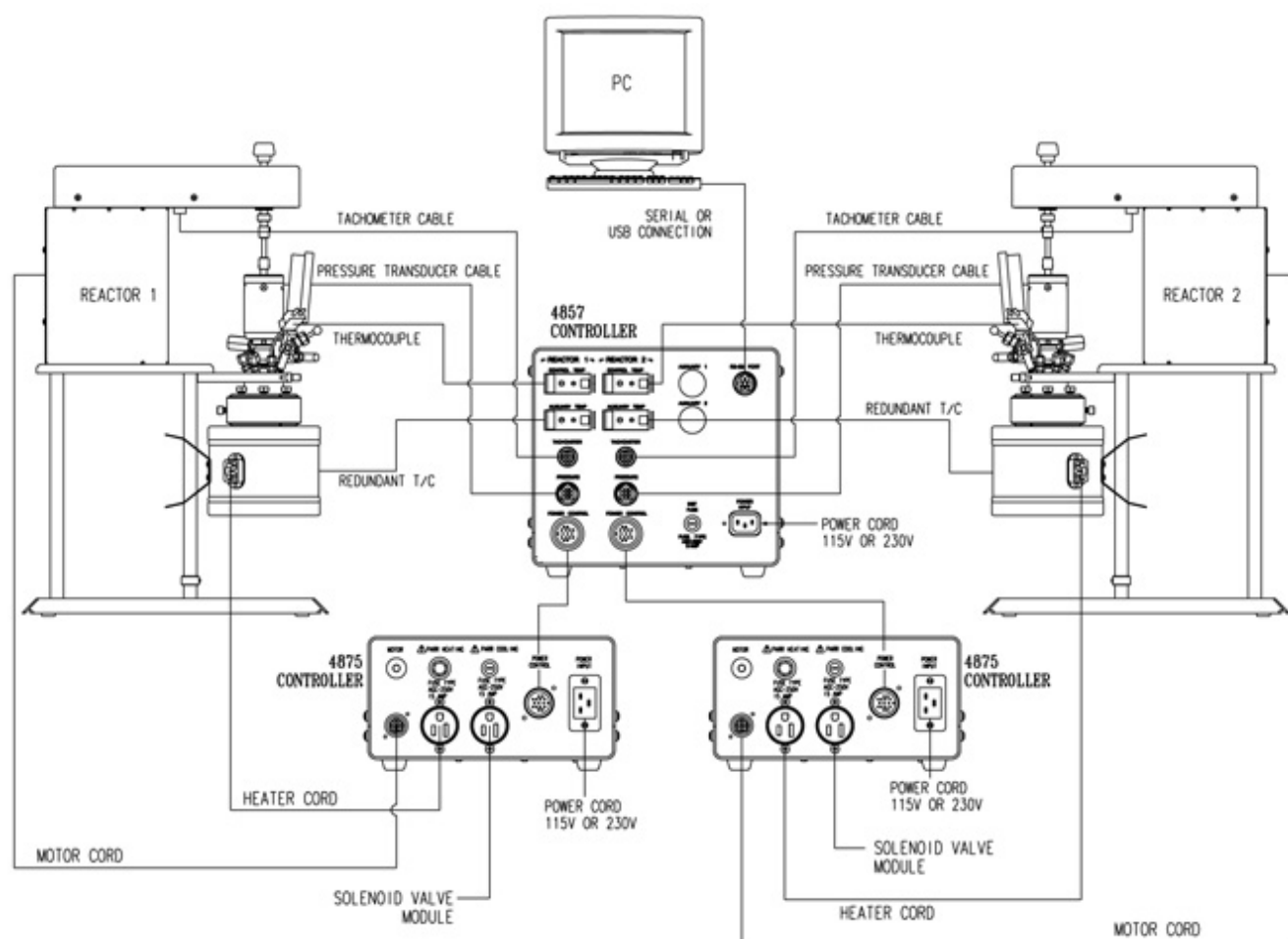


Diagram 2: Schematic Diagram of Connections to 4857 Process Controller for control of two reactors with two 4875 Power Controllers

OPERATION OF THE 4857 PROCESS CONTROLLER

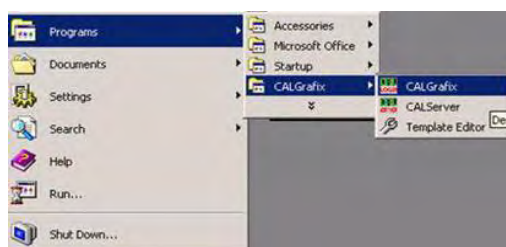
Before operation

Be certain to set the power settings on the PC such that it will not hibernate or time out after a period of time.

After CalGrafix and the USB Drivers are installed on the PC, it is OK to attach the 4857 to the PC according to diagram 1 or diagram 2 and turn it on.

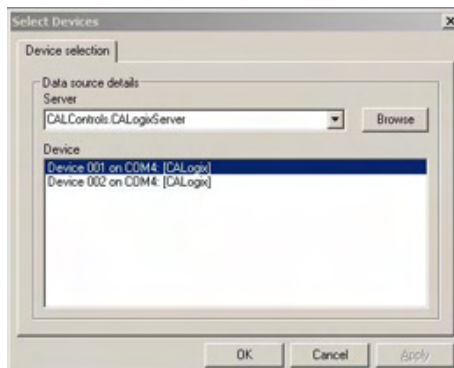
Run the CalGrafix Program

1. The CalGrafix Program has been added to the program list. Access it at:
"Start >> Programs >> CalGrafix >> CalGrafix"



**Accessing the CalGrafix program
through the Start menu**

2. Click on the small controller faceplate icon  on the menu bar, or select **"File >> New Instrument"**.
3. CalGrafix will attempt to locate the 4857 Process Controller.
 - a. If the 4857 is not shown in the device box, click "browse" and select the COM port being used by the 4857. Then click the "browse" button again. Repeat this step until the device appears in the device box. Click OK.
 - b. The 4857B will find two devices when the proper COM port is selected. Using the Shift key, select both devices and click OK.
 - c. If there is uncertainty for which COM port is being used, see the section on "Finding the active COM port" in this manual.



Locating the 4857 with the Device Box

OPERATION OF THE 4857 PROCESS CONTROLLER (CONTINUED)

Run the CalGrafix Program (continued)

4. A graphic of the 4857 Control Module will be displayed. The base module is illustrated in the center with modules 1-4 on either side. The 4857B will have two graphics displayed instead of one.



4857 Main Control Screen

5. The process may be controlled according to the instructions regarding operation of the individual modules.

During initial installation, Modules 1 and 3 are set to Park for safety. See instructions on Modules 1 and 3 to reset mode from Park to the PID (for Module 1) and PI (for Module 3).

6. Save the application file to the PC. Select "File" >> "Save As", and save the file in an appropriate place. One convenient place for this would be located at "C:\Program Files\CAL Controls\CALGrafix". This file may be used later to restore the controller to its current defaults.
7. CalGrafix may be exited by selecting "File >> Quit".

OPERATION OF THE 4857 PROCESS CONTROLLER (CONTINUED)

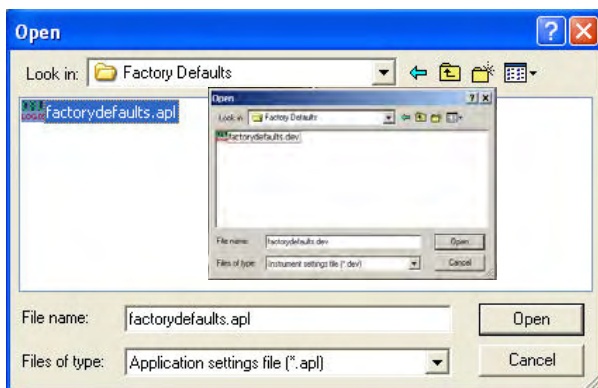
Factory Defaults

Restoring the 4857 to its factory defaults is relatively simple. There is a file on the 521M CD which may be copied to the PC at "**\\Factory Defaults\\factorydefaults.dev**".

Opening the .dev file with CalGrafix will restore the controller settings in the 4857 Process Controller.

Restoring Factory Default Values

1. Set the active COM port to COM7. If you are unsure of how to do this, see the section on "Setting the active COM port" in this manual.
2. Open the CalGrafix program in the usual manner. Connect to the 4857 Controller by clicking on the small controller faceplate icon  on the menu bar, or selecting "**File >> New Instrument**".
3. If the 4857 is not shown in the device box, click "browse" and select COM7.
4. When the CalGrafix program finds the 4857, select "File" >> "Open."
5. Locate the factorydefaults.dev file on the 521M CD at "**\\Factory Defaults\\factorydefaults.dev**". Select open.



6. CalGrafix will ask which values to write. Check the boxes of "Modules 1-3". Click OK. If you have a 4th module which needs to be reset, contact Parr Technical Support.
7. CalGrafix will write the application data from the default file to the 4857.



OPERATION OF THE 4857 PROCESS CONTROLLER (CONTINUED)

Finding the Active COM Port

When using CalGrafix to connect to the 4857 Process Controller, it is advantageous to know which COM port the PC is using to connect to the controller. The following instructions detail how to find the active COM port with Windows 2000 as the operating system.

1. Connect the 4857 to the PC using the provided cable and turn the 4857 on.
2. On the Desktop, right click on "My Computer" and select "Properties."
3. Switch to the "Hardware" tab and click on "Device Manager."
4. The Device Manager should come up. Expand the "Ports (COM & LPT)" box.
5. The COM ports which are in use should be listed here. Make a note of the ones listed; one of these should be the one to instruct CalGrafix to use to connect to the 4857.

Setting the Active COM Port

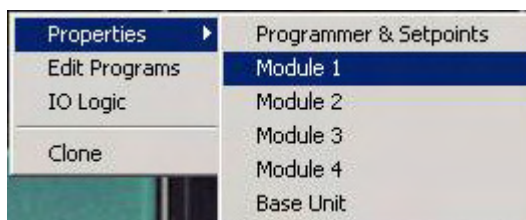
In some instances (such as restoring Factory Defaults) it is necessary to instruct the PC which COM port to use for connection to the 4857. You will need Administrator privileges in order to set the active COM port.

1. Connect the 4857 to the PC using the provided cable and turn the 4857 on.
2. On the Desktop, right click on "My Computer" and select "Properties."
3. Switch to the "Hardware" tab and click on "Device Manager."
4. The Device Manager should come up. Expand the "Ports (COM & LPT)" box.
5. Right click on the active COM port and select "Properties." Tab to "Port Settings" and click on "Advanced."
6. Set the COM port using the "COM port number" box. Click OK and exit the device manager.

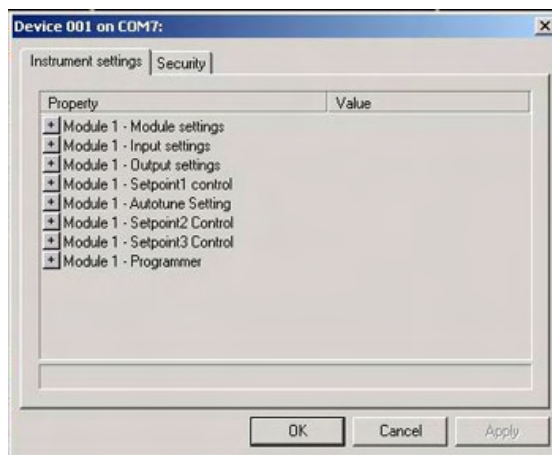
OPERATION OF THE 4857 PROCESS CONTROLLER (CONTINUED)

Changing the Name of a Module

1. Right click on controller image.
2. Select properties and select "**Properties >> Module 1**", or whichever module you would like to change.



3. Expand "**Module Settings**".



4. Change the name from "Module 1" to another name such as "Temperature" and click OK.

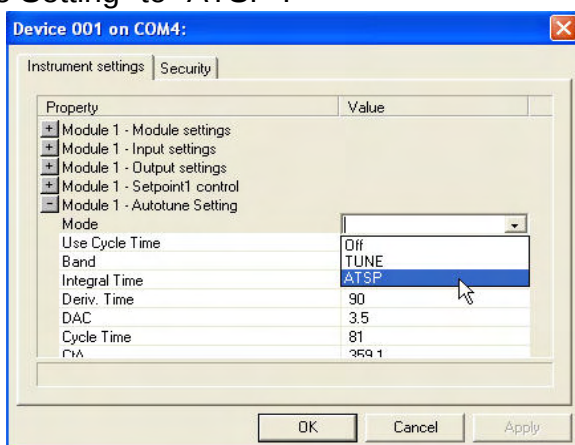
OPERATION OF THE 4857 PROCESS CONTROLLER (CONTINUED)

Autotuning

The 4857 Process Controller is equipped with default PID values from the factory designed to give reasonable temperature control across a wide temperature range. Autotuning is not recommended unless the system has exhibited poor control using the default PID values.

The 4857 Process Controller may be auto tuned at setpoint. Using the other types of auto tune (not the tune at setpoint) will likely result in an error.

1. Bring the system to the desired setpoint for the process by adjusting the setpoint of the controller. Let the system come to equilibrium and hold steady at the setpoint for at least ten minutes. This step may require that the temperature overshoot or undershoot significantly with existing PID values.
2. Right click on the main screen, select "Properties >> Module 1", and then change the mode on "Autotune Setting" to "ATSP".



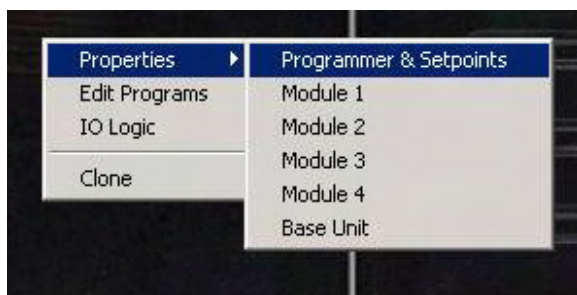
3. On the main screen, Module 1 should flash "ATSP" at the bottom. This indicates that the controller is tuning.
4. During the auto tune, the temperature may rise or fall by a few degrees. This is normal. When the auto tune is complete, the "ATSP" will stop flashing. The temperature should remain at the setpoint upon completion of the auto tune.
5. Check the PID settings in Module 1 after the autotune. Values which were changed by the auto tune will have an "A" before the value.
6. If the auto tune selected a value of less than 5 for either the CyC.t or CyC.2, change this value back to 5. If it selected a value larger than 5, this is OK.

MODULE 1: TEMPERATURE CONTROL MODULE

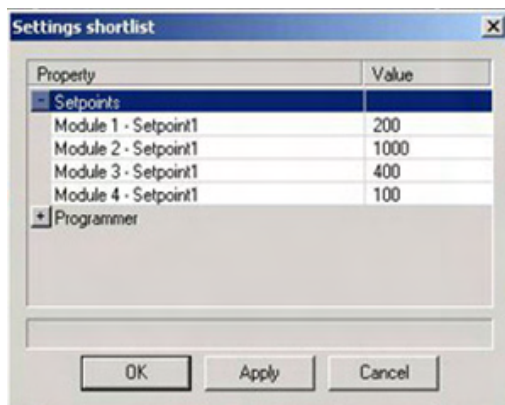
Setpoint Adjustment

Before carrying out an autotune or run with the default settings to ensure the system is safe to operate at the setpoint value.

1. Right click on controller image.
2. Select properties and select **programmer and set-points**.



3. Expand (+) setpoints menu.



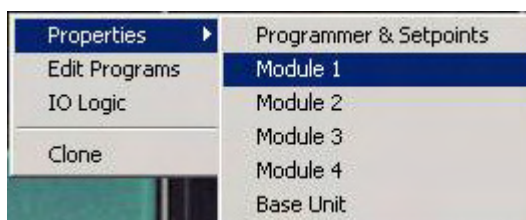
4. Enter **Module 1 - Setpoint 1** value for the required module (click out of value box once setting entered to ensure value is accepted)
5. **Apply** setting and click **OK**
6. New setpoint is now written to the controller and should be visible on controller image.

MODULE 1: TEMPERATURE CONTROL MODULE (CONTINUED)

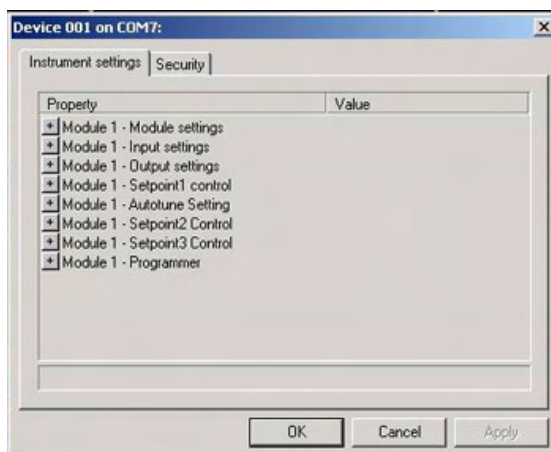
High Temperature Alarm Adjustment

The high temperature alarm on Module 1 may also be adjusted.

1. Right click on controller image.
2. Select properties and select "**Properties >> Module 1**".



3. Expand "Module 1 - Setpoint 3 control".



4. Enter **Module 1 - Setpoint 3** value for the required module (click out of value box once setting entered to ensure value is accepted)
5. **Apply** setting and click **OK**.
6. New setpoint is now written to the controller. The high temperature alarm setpoint will not be visible on the main controller screen.

MODULE 1: TEMPERATURE CONTROL MODULE (CONTINUED)

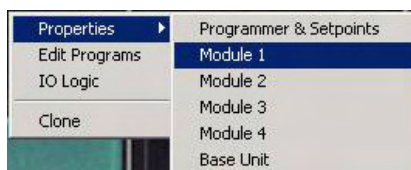
Changing PID Settings, Changing from PARK to PID Mode

Installation Note:

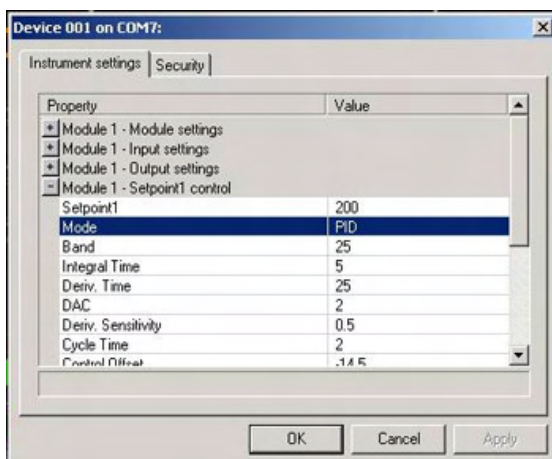
During initial installation, the mode on Module 1 will need to be changed.

Right click on the controller image and select "**Properties >> Module 1.**"
Expand (+) **Module1 – Setpoint1 Control**, and change mode from Park to PID.

1. Right click on controller image.
2. Select properties and select "**Properties >> Module 1.**"



3. Expand "Module 1 - Setpoint1 control".



4. The "Mode" value may be changed to PID. Also, the values for Band, Integral Time, and Derivative Time may be adjusted here as well to suit the process.
5. **Apply** setting and click **OK**.

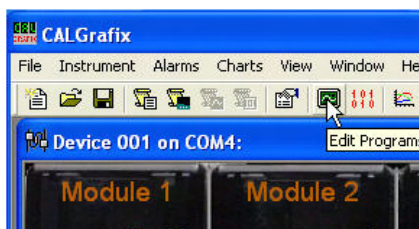
MODULE 1: TEMPERATURE CONTROL MODULE (CONTINUED)

Temperature Programmer

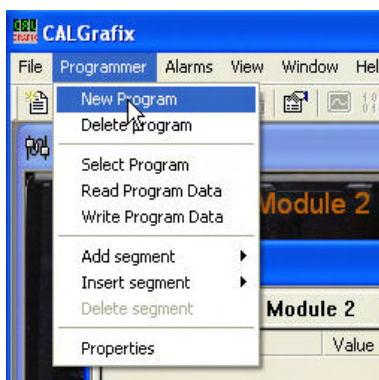
The temperature programmer may be used as an alternative to set point control. This feature is particularly useful when more complex temperature profiles are required.

Creating a Program:

1. From the main screen, click on the "Edit Programs button."



2. The Program window will appear. Click on "Programmer >> New Program."

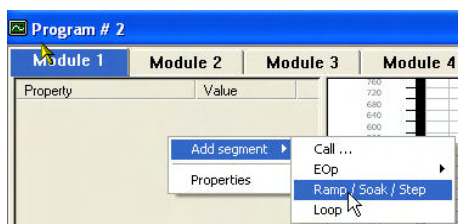


3. You may add your first step to the program by right clicking on the Program window and selecting "Add Segment >> Ramp / Soak / Step."
4. The program will ask the number of segments to add. Add the number of segments necessary for the process and click OK.

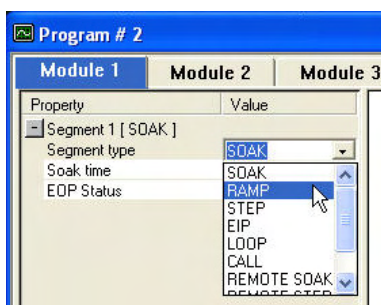
MODULE 1: TEMPERATURE CONTROL MODULE (CONTINUED)

Temperature Programmer (continued)

5. You may select the segment type by clicking on the box next to "Segment Type." Most temperature programs will make use only of the Ramp and the Soak types. A Soak step will hold the temperature at its programmed level for the specified period of time. A Ramp step will increase the setpoint from its current value to another value over a specified period of time.



6. When all the desired steps are entered, write the program to the controller by selecting "Programmer >> Write Program Data." Then close the program window.

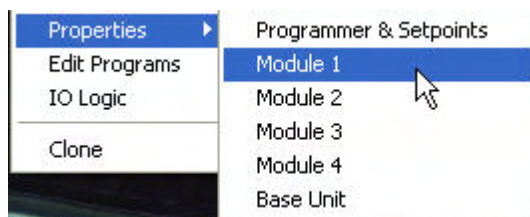


MODULE 1: TEMPERATURE CONTROL MODULE (CONTINUED)

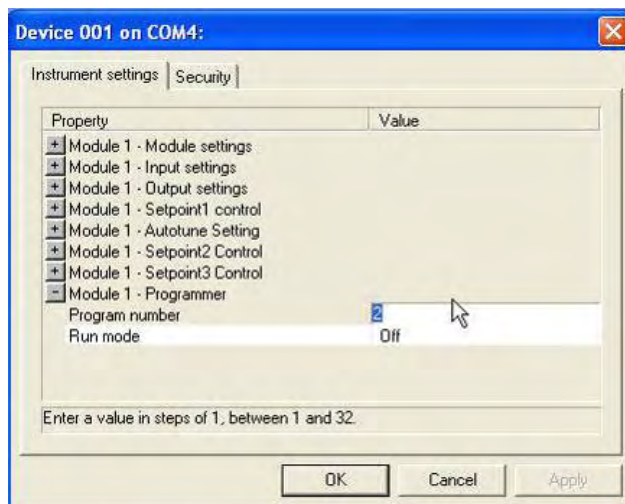
Temperature Programmer (continued)

Running a Program:

1. From the main instrument screen, right click and select "Properties >> Module 1."



2. Then double click on "Module 1 - Programmer" and select your desired program number. Click Apply, and then change the value of "run mode" to "on." Hit OK. If you need to interrupt the program, returning to this screen and changing the value of "run mode" to "off" will halt the program.

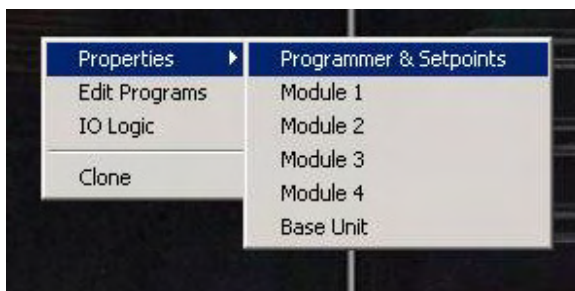


MODULE 2: PRESSURE DISPLAY AND HIGH PRESSURE ALARM

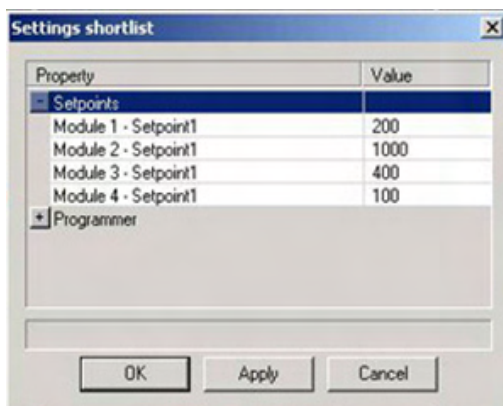
Alarm Adjustment

The high pressure alarm will trip the High Limit Alarm if the pressure exceeds the setpoint specified on Module 2. If the High Limit Alarm is tripped, the power to the heater will be interrupted, and the operator will need to manually reset the switch. The pressure will be shown in the upper display, with the high pressure alarm underneath.

1. Right click on controller image.
2. Select properties and select **programmer and set-points**.



3. Expand (+) setpoints menu.



4. Enter **Module 2 -Setpoint 1** value for the required module (click out of value box once setting entered to ensure value is accepted)
5. **Apply** setting and click **OK**
6. New setpoint is now written to the controller and should be visible on controller image.

MODULE 3: TACHOMETER

Stirring Speed Adjustment

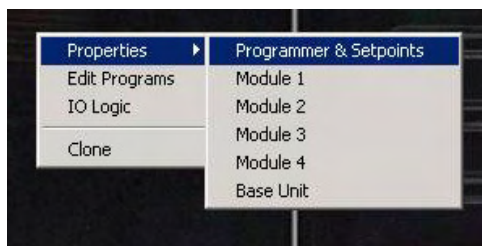
When the local/remote switch on the front panel of the 4875 Power Controller is set to remote, the desired stirring speed will be set by Setpoint 1 on Module 3. The stirring speed should be shown in the upper display, with the setpoint just underneath. The stirring speed may be adjusted manually when the switch is in the "local" position.

Installation Note:

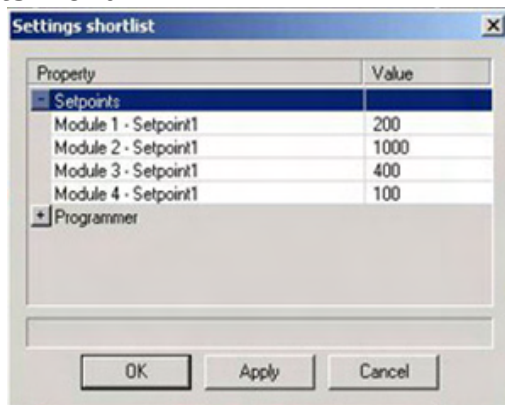
During initial installation, the mode on Module 3 will need to be changed.

Right click on the controller image and select "**Properties >> Module 3.**"
Expand (+) **Module3 – Setpoint1 Control**, and change mode from Park to PI.

1. Right click on controller image.
2. Select properties and select **programmer and set-points.**



3. Expand (+) **setpoints** menu.



4. Enter **Module 3 - Setpoint 1** value for the required module (click out of value box once setting entered to ensure value is accepted)
5. **Apply** setting and click **OK**
6. New setpoint is now written to the controller and should be visible on controller image.



MODULE 4: OPTIONAL MODULE

Optional Module

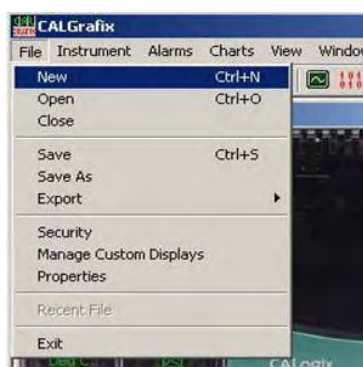
Module 4 may be specified as a temperature, pressure, control logic module, or not present at all. Control will be similar to modules 1 and 2.

DATA LOGGING

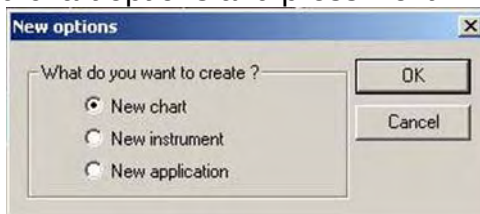
Creating a Chart

Data logging is most easily accomplished by creating a chart to plot the values you wish to log, and then exporting the chart data as a .CSV file. CSV files can be opened directly by most data analysis type programs, including Microsoft Excel.

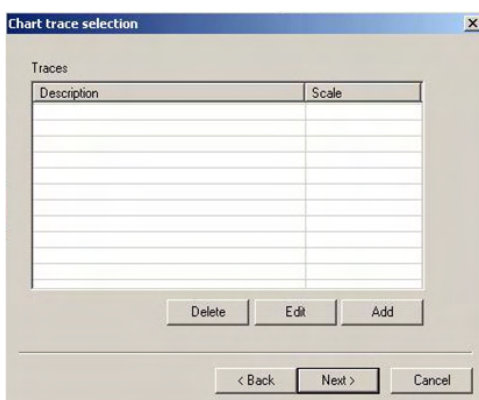
1. Select the <new> option from the File menu, and then click the “New Chart” button and click OK. Alternatively, you may press the [New Chart] button on the toolbar.



2. This opens the Chart Properties dialog. First, enter the required title for the new chart. Then select any changed chart options and press Next.



3. This opens the Chart Trace Selection dialog. Press the Add button to add a new trace to the chart.

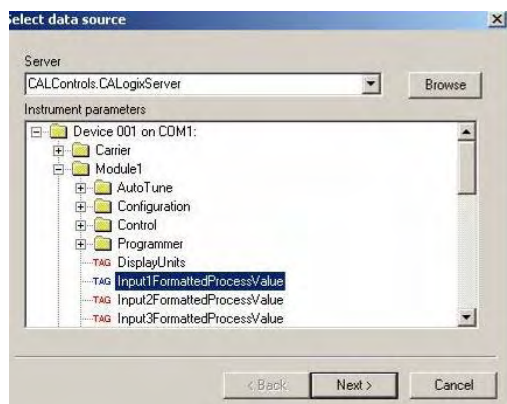


DATA LOGGING (CONTINUED)

Creating a Chart (continued)

4. This opens the Select Data Source dialog. First select "CalControls.CALogixServer" from the Server pull down list. Then select a data source tag from the tree in the instrument list to add to the chart. The default name for the temperature read from the control thermocouple is:

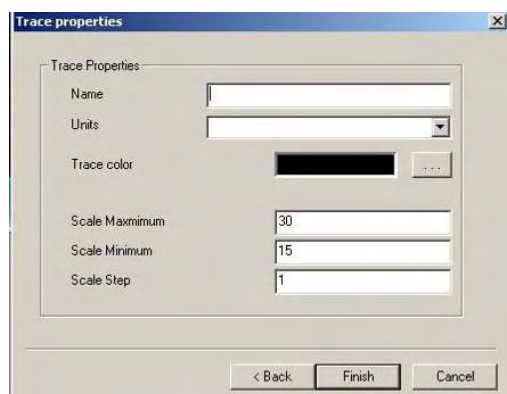
"Module 1 >> tag-Input1FormattedProcessValue"



The pressure tag would be located under
"Module 2 >> tag-Input1FormattedProcessValue"

and the RPM tag would be
"Module 3 >> tag-Input1FormattedProcessValue."

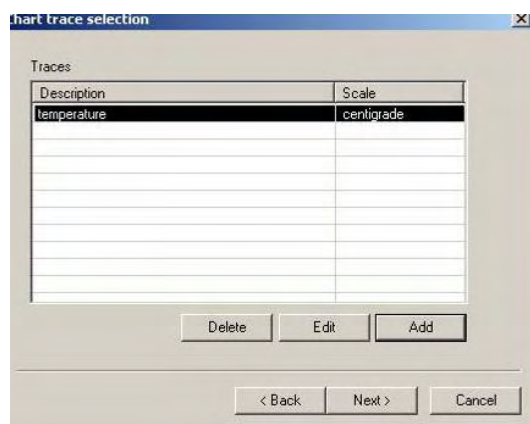
5. This should bring you to the Trace Properties dialog. Enter the required name and scales for this trace (or use default values) and press Finish.



DATA LOGGING (CONTINUED)

Creating a Chart (continued)

6. Repeat to add more traces as required and then press Next. This brings you back to the Chart properties dialog. Change chart properties as required, and press Finish.



7. A new chart window will now appear in the application. This chart automatically scrolls to the end of the selected timescale. Hit Next to format properties, then hit Finish.

Exporting Data from a Chart

Select the File, Export => Chart menu option. This exports the chart data into the specified Comma Separated Value (CSV) file. CSV files can be opened directly by most data analysis type programs, including Microsoft Excel.

SOLENOID VALVE MODULE

The Solenoid Valve Module provides a solenoid valve, a metering valve and all parts needed to assemble an automatic cooling system for any reactor fitted with a cooling coil. It usually is installed in a cold water line with a flow connection through the solenoid valve, to the cooling coil, and to the drain. The solenoid valve has an electrical connection to the cooling socket on the back of the 4875 Power Controller. Coolant will then be admitted to the coil whenever cooling is called for by the controller, thereby minimizing any temperature overshoot. This system is particularly advantageous when holding fixed temperatures below 150°C or for controlling exothermic reactions. Compressed air can be used as a coolant if the amount of heat to be removed is not large.

CLEANING AND MAINTENANCE

Periodic cleaning may be performed on the exterior surfaces of the controller with a lightly dampened cloth containing mild soap solution. All power should be disconnected and the power cord should be unplugged when cleaning the controller.

There are no user serviceable parts inside the product other than what is specifically called out in this manual. Advanced troubleshooting instructions beyond the scope of this manual can be obtained by calling Parr Instrument Company in order to determine which part(s) may be replaced or serviced.

Fuses

Description	Parr No.	Type	Ratings
For 4857			
Instruments fuse	139E24	Fast-Acting	3 Amp, 250VAC
For 4875			
Heater fuse	139E23	Fast-Acting	15 Amp, 250 VAC
Cooling fuse	139E10	Fast-Acting	.25 Amp, 250 VAC
For 230 VAC model:			
Fuse (A+) on motor control circuit board	959E5	Very Fast-Acting	8 Amp, 250VAC
Fuse (L) on motor control circuit board	185E2	Fast-Acting	10 Amp, 250VAC

Access to the Controller Cabinet

To open the controller cabinet, turn off the power switch, unplug the power cord and locate the four screws on the upper half of the chassis, and the eight screws on the lower half of the chassis. The four screws on the upper half should be removed first, and then the four screws on the upper row on the lower half of the chassis should be removed. Then lift the top panel away.



WARNING:

The inside of the controller cabinet should be accessed by qualified personnel only.

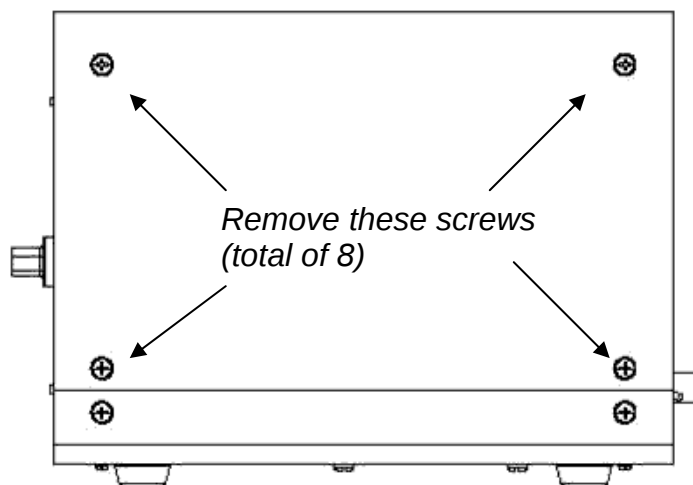


Diagram 3: 4857 Process Controller
Side View showing screws

CONTROLLER AND CIRCUIT DIAGRAMS

Diagram 4: Schematic of 4857 top plate components

Diagram 5: Schematic of 4857 back panel

Diagram 6: Schematic of 4875 components

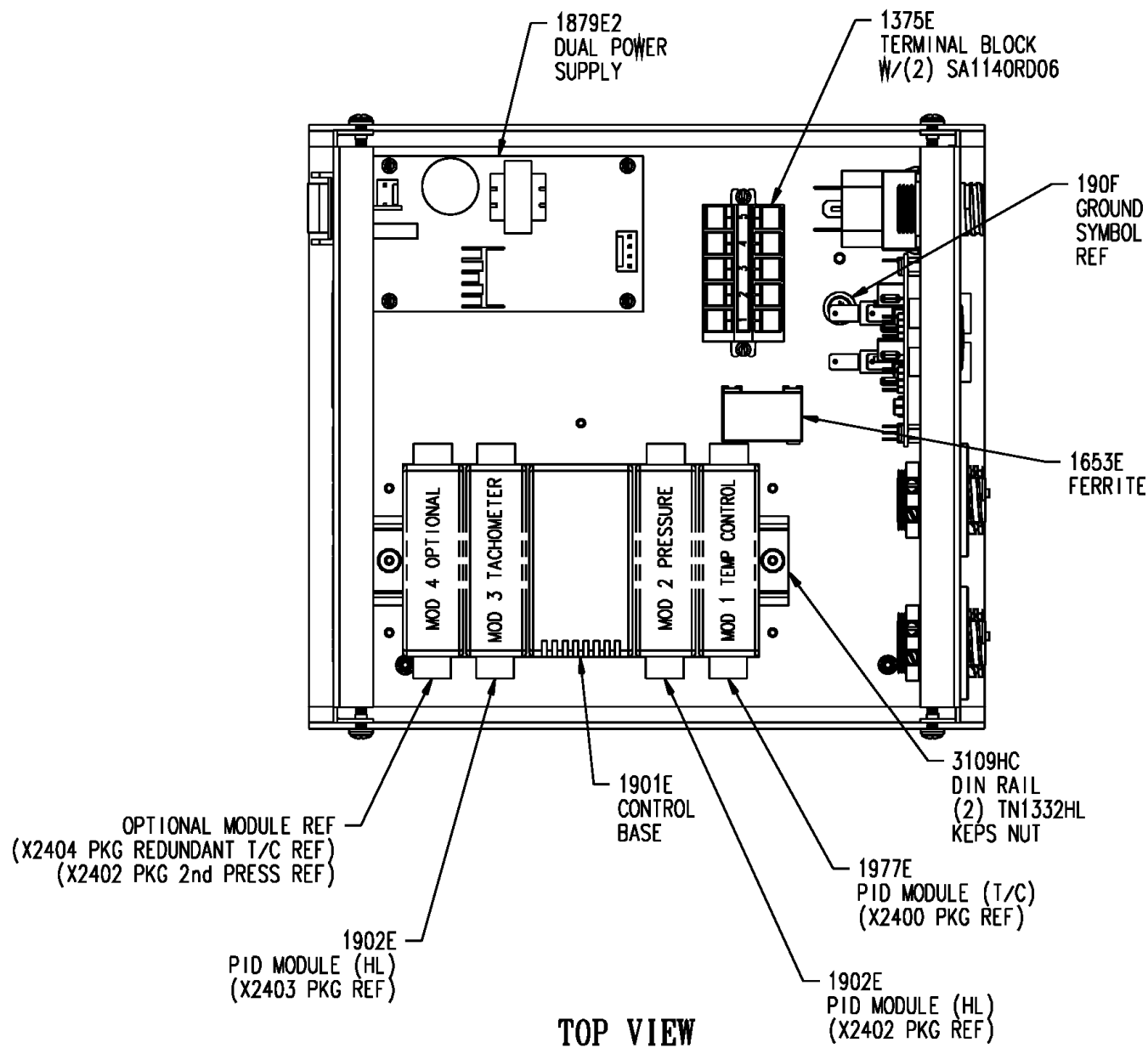


Diagram 4: Schematic of top plate of 4857

CONTROLLER AND CIRCUIT DIAGRAMS (CONTINUED)

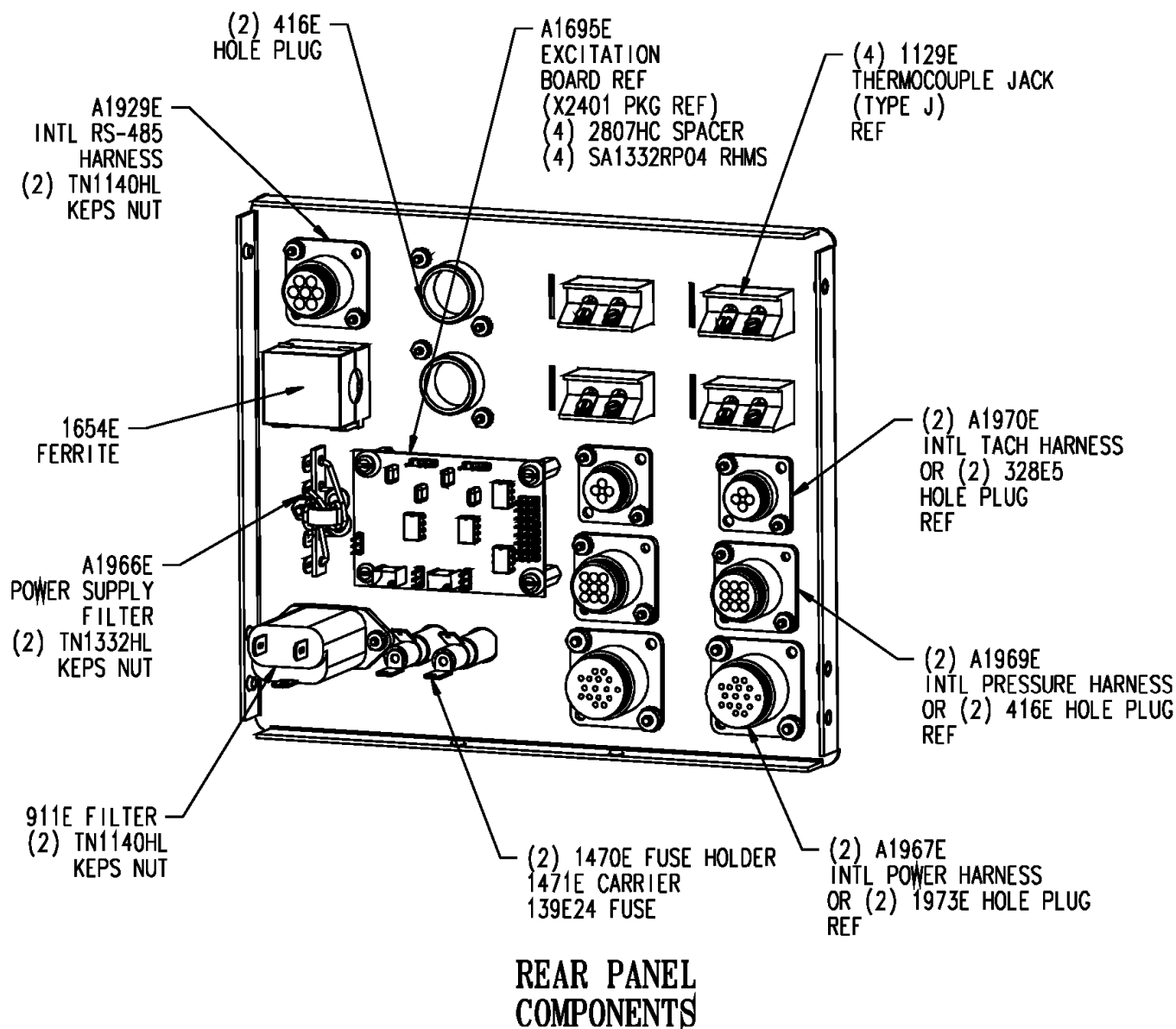


Diagram 5: Schematic of back plate of 4857 Process Controller

CONTROLLER AND CIRCUIT DIAGRAMS (CONTINUED)

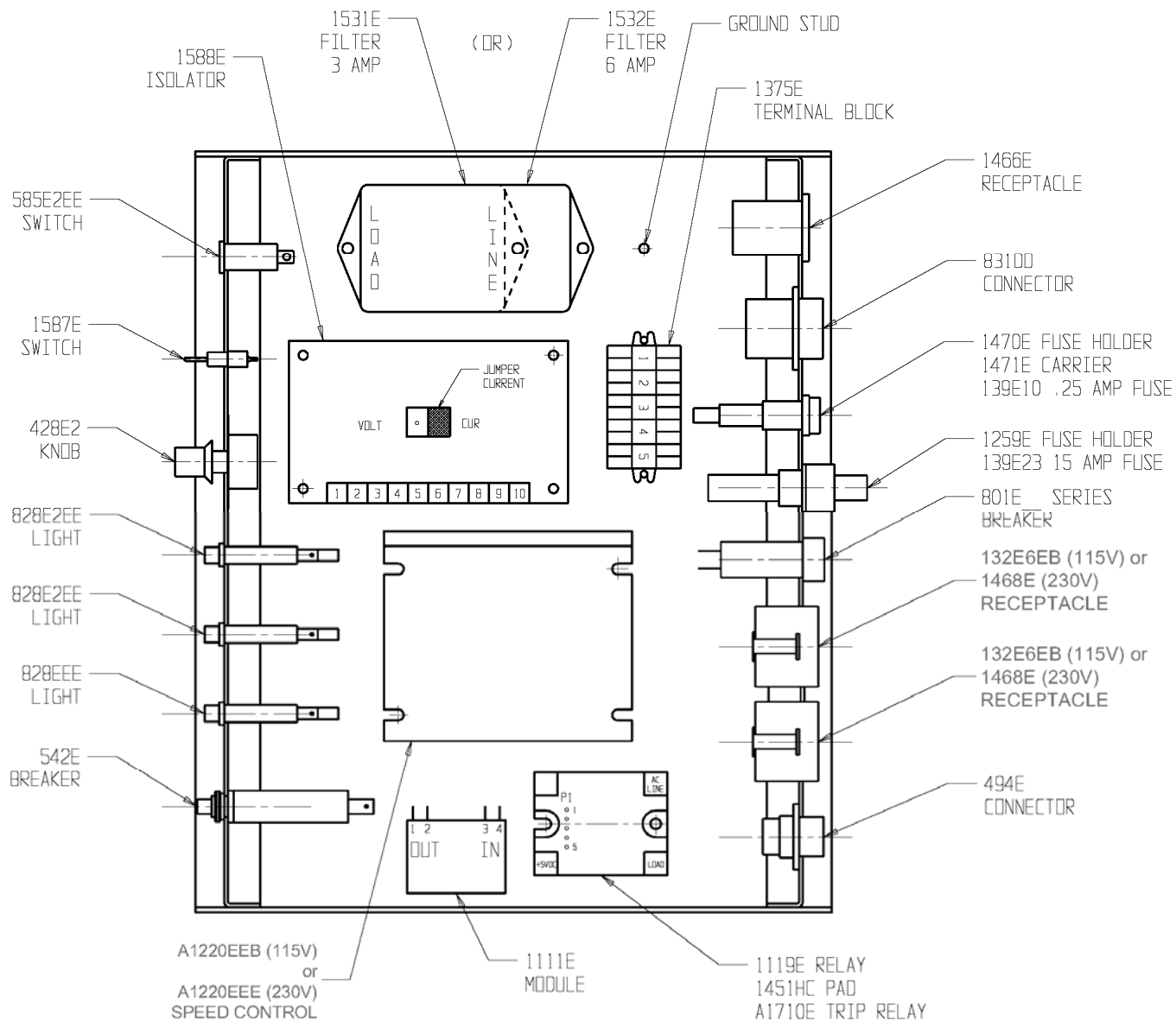


Diagram 6: Schematic of 4875 Power Controller



PARTS FOR THE 4857 PROCESS CONTROLLER

<u>Part #:</u>	<u>Description:</u>
<u>Controller Electrical part</u>	
139E23	Heater fuse, fast-act, 15A, 250V
139E24	Main instrument fuse for 4857, fast-act 3A, 250V
139E10	Cooling fuse, fast-act, 0.25A, 250V
328E5	Hole plug for secondary tachometer port
416E	Hole plug for Auxilary ports
494E	Connector, motor, back panel of 4875
542E	High limit reset breaker
585E2EE	Motor switch
828EEE	Light, red, 250 V, high limit indicator
828E2EE	Light, green, 250 V, heating/cooling indicator
831DD	Connector, Power Control
909E	Power, 16 amp, main power switch
911E	Filter
1111E	Solid State Relay, cooling
1119E	Solid State Relay, heating, 25 A, 3-32 VDC input
1259E	Fuse holder, lighted
1375E	Terminal Block in 4857
1451HC	Solid State Relay pad
1466E	Receptacle, main power cord
1468E	Receptacle, Heating/cooling output
1470E	Fuse holder
1471E	Carrier
1484E	Main power switch on front panel
1531E	RFI Power Line Filter 3A/2A
1532E	RFI Power Line Filter 6A/5A
1587E	Local / Remote Switch
1588E	Signal Isolator
1879E	Power Supply, 24 VDC, converts 115 V to 24 VDC
1901E	Calogix module, base unit
1902E	PID Module, pressure, rpm
1903E	PID Module, thermocouple
1973E	Hole plug for secondary Power Harness port
3109HC	DIN Rail for Control Base and Modules
A1695E	2 Tachometer / 8 Pressure Excitation Board
A1710E	Trip relay for 1119E Solid State Relay
A1929E	RS-485 harness receptacle
A1966E	Power Supply Filter
A1967E	Internal Power Harness
A1969E	Internal Pressure Harness
A1970E	Internal Tachometer Harness



WARNING: For continued protection against possible hazard, replace fuses with same type and rating of fuse.

PARTS FOR THE 4857 PROCESS CONTROLLER (CONTINUED)

Part #:

Description:

Communication cables:

A1725E	Communication cordset, RS-485 to Serial
A1925E	Communication cordset, RS-485 to USB

Cordsets:

A1478EEB	115 V N.A. Plug to IEC
A1478E	230 V N.A. Plug to IEC
A1477E	European Plug to IEC
A1482E	British 13 A Plug to IEC
1859EEE	16 A / 220 V China Plug to IEC

Motor parts:

139E8	Fuse for 1/2 hp motor, 180 VDC. 2.5A, 3AG, slo-blo
139E19	Fuse for 1/4 hp motor, 180 VDC. 1.5A, 3AG, slo-blo
139E20	Fuse for 3/4 hp motor, 180 VDC, 4.0A, 3AG, slo-blo
185E2	Speed control fuse, 250V, 10A
428E2	Speed control knob, with screw
801E2	Breaker for 1/4 hp motor, 90 VDC. 2.5 amp.
801E3	Breaker for 1/8 hp motor, 130 VDC. 1.5 amp.
801E4	Breaker for 1/2 hp motor, 90 VDC. 5 amp.
876E	Resistor for 1/4 hp motor, 90 VDC. .05 ohm. Also for 1/2 hp motor, 180 VDC.
876E2	Resistor for 1/2 hp motor, 90 VDC. .025 ohm.
876E3	Resistor for 1/8 hp motor, 130 VDC. .10 ohm.
876E5	Resistor for 3/4 hp motor, 180 VDC. .035 ohm. Also for 1/4 hp motor, 180 VDC.
959E5	Speed control fuse, 8A, fast-acting
A410E8EB	Speed control board, 1/4 hp, 90 VDC, 115 V
A410E8EE	Speed control board, 1/4 hp, 90 VDC, 230 V
A410E9EB	Speed control board, 1/2 hp, 90 VDC, 115 V
A410E9EE	Speed control board, 1/2 hp, 90 VDC, 230 V
A410E10EB	Speed control board, 1/8 hp, 130 VDC, 115 V
A410E10EE	Speed control board, 1/8 hp, 130 VDC, 230 V
A1250EEE	Speed control, 240VAC/180VDC
A1252EEE	Speed control board, 1/2 hp, 180 VDC, 230 V
A1252E2EE	Speed control board, 1/4 hp, 180 VDC, 230 V
A1252E3EE	Speed control board, 3/4 hp, 180 VDC, 230 V



WARNING: For continued protection against possible hazard, replace fuses with same type and rating of fuse.

PARTS FOR THE 4857 PROCESS CONTROLLER (CONTINUED)

Part #:

Description:

Pressure module parts:

A1906EP02	Pressure transducer, 0-200 psi
A1906EP05	Pressure transducer, 0-500 psi
A1906EP10	Pressure transducer, 0-1000 psi
A1906EP20	Pressure transducer, 0-2000 psi
A1906EP30	Pressure transducer, 0-3000 psi
A1906EP50	Pressure transducer, 0-5000 psi

A2599HC2	Transducer mounting body with cooling sleeve, 1/8"NPTF
A1905E	Harness, pressure transducer, 10-ft
A1905E3	Harness, pressure transducer, 20-ft
A1905E5	Harness, pressure transducer, 5-ft

Temperature module parts:

A472E	Thermocouple, type-J, 7-1/2", grounded
A472E2	Thermocouple, type-J, 9-1/2", grounded
A472E3	Thermocouple, type-J, 11-1/2", grounded
A472E4	Thermocouple, type-J, 5-1/2", grounded
A472E5	Thermocouple, type-J, 21-1/2", grounded
A472E6	Thermocouple, type-J, 15-1/2", grounded

1129E	Thermocouple socket, snap-in type-J panel
A470E2	Thermocouple extension wire, type-J, 5-ft
A470E4	Thermocouple extension wire, type-J, 10-ft
A470E5	Thermocouple extension wire, type-J, 20-ft

Tachometer module parts:

A1001E	Tachometer sensor for benchtop reactor
A1001E2	Tachometer sensor for floor stand reactor

A1177E	Tachometer harness, 10-ft
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Cooling module parts:

A160HW3EB	Solenoid valve package, 115 V
A160HW3EE	Solenoid valve package, 230 V



WARNING: For continued protection against possible hazard, replace fuses with same type and rating of fuse.



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