

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Visit our website - *Click HERE*

No. 232M

Parr Instrument Company

Operating Instruction Manual for

4840

Temperature Controllers





TABLE OF CONTENTS

Related Instructions 2
Customer Service 2

Preface 3
Scope 3
Applications 3
Electrical Ratings 3

Connections 4
Connections 4

Instructions for 4842 Controllers . . . 5

Instructions for 4843 Controllers . . . 6

Switches and Indicators 7
Protective Fuses and Relays 7,8
Temperature Limit Controls 8
Access to the Controller Cabinet 8

Modules 9
Optical Tachometer Module 9
Pressure Transducer Module 10
High-Temp Cut-Off Module 11
Ammeter Display Module 12

Communications Modules 13
Solenoid Valve Module 13

Speed Control and Adjustments . . . 14
Motor Speed Control 14
Adjustments 15

Cleaning and Maintenance 15

Circuit Diagrams 16
Circuit Diagram 3676 HCK 16
Circuit Diagram 3677 HCK 17
Circuit Diagram 3678 HCK 18

Related Instructions

The following Parr publications can be ordered to further your understanding of this instrument and its component parts:

No.	Description
230M	Safety Precautions to be observed when operating Pressure Reaction Equipment
231M	Operating Instructions for Parr Safety Rupture Discs
234M	Operating and Maintenance Instructions for Parr Magnetic Drives
323M	Operating Instructions for Parr Pressure Relief Valves
201M	Limited Warranty

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 4842 and 4843, 4844 Temperature Controllers as used with Parr Series 4500 and 4600 Laboratory Reactors and Pressure Vessels. They cover the basic functions provided in each of these controllers and describe the several optional control modules which can be added to these expandable units. 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 4840 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. They are wired for plug-in attachment to current Parr models, but they can be modified for use with older Parr equipment if changes are required. Four additional control and display modules are available for use with these controllers. These are described on pages 6 and 7. Any three of these optional modules can be installed in any Series 4840 Controller. Controllers furnished with Parr reactors equipped with variable speed, DC motors have a motor switch and a speed control knob on the front panel. Controllers to be used with AC equipment or an air motor do not have a speed control knob

Electrical Ratings

Before connecting any Series 4840 Controller 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 The line voltage should not differ from the rated voltage shown on the nameplate by more than 10 percent.
Frequency These controllers can be operated from either a 50 or 60 Hertz power supply without affecting their operation or calibration.
Current The solid state switching relay in these controllers will handle non-inductive loads up to 25 amps maximum, but loads drawn from the PARR HEATING ONLY outlet on the back panel must not exceed 15 amperes on 115 Volt models and 20 amperes on 230 Volt models. For heavier loads up to 25 amperes, the receptacle on the back panel must be replaced with direct wiring. All supply and accessory wiring to this controller shall have minimum insulation rating of 105 °C, type SJT or better.
Inductive Loads Inductive loads must be limited to 750 watts (1 hp) at 115 volts, or to 1100 watts (1-1/2 hp) at 230 volts. Do not connect these controllers to the primary (input) side of an auto-transformer (Variac, Powerstat or the like). The heavy inductive load on the primary side of such transformers will destroy the relay. The secondary (output) side of an auto-transformer can be carried through the relay if this circuit is isolated from the controller. A separate, full-voltage connection must then be made to operate the temperature controller and to actuate the relay.
Thermocouple Unless otherwise specified, all Series 4840 Controllers operate with a Type J (iron-constantan) thermocouple. The total resistance of the thermocouple and the lead wires should not exceed 20 ohms. If the resistance of the thermocouple circuit is higher, it will reduce the sensitivity of the control system.

CONNECTIONS

Connections To A Parr Reactor

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 will not be unduly affected by radiant heat from the reactor. This controller is intended to be used indoors at an ambient temperature between 10 °C and 30 °C with a relative humidity of less than 80 percent.

Labeled plug-in sockets are provided on the rear panel for the reactor heater cord and for a type J thermocouple. There is also a special polarized socket for the stirrer drive motor. An additional socket labeled PARR COOLING ONLY, is energized at full line voltage whenever cooling is called for by the controller. This circuit provides a means for activating an optional cooling system using a solenoid valve to control the flow of cold water through an internal cooling coil. Appropriate connectors are also provided for a pressure sensor, for a high limit type J thermocouple and for an optical tachometer when these options are specified. If the connectors provided on the controller are not compatible with earlier Parr equipment, conversion kits can be supplied to make the necessary modifications.

INSTRUCTIONS FOR 4842 CONTROLLERS

Instructions For 4842 Controllers

The 4842 Controllers have a microprocessor based control module with full three term control and adjustable tuning parameters. Detailed operating instructions are provided in User's Manual as a supplement to these instructions. Users should study these instructions to ensure they take advantage of the capabilities provided by these control modules. The instructions which deal with installation can be overlooked since all of the described steps and connections were accomplished when the module was installed in the Parr chassis.

To facilitate startup with reasonably good PID control parameters for both heating and cooling, all 4842 Controllers are programmed at the factory with the following settings:

Cycle time	**5 seconds**
Proportional band	**25 °C**
Reset	**0.01(reset/minute)**
Rate	**0 (minutes)**

Output 1 drives the heater. Output 2 can be used to activate a cooling system. Control parameters can be set independently for each output.

Two lines of information are shown on the display during normal operations. The upper line shows the actual temperature as read by the control thermocouple. The lower line shows the set point. The set point can be raised or lowered by pressing the up or down arrows.

Model 4842 Specifications

Input thermocouple	Type J
Operating range	0 to 750 °C
Readout resolution	1 °C
Setpoint resolution	1 °C
System accuracy	+/-2 °C
Control action	Three term PID control plus limit control
Control output 1 20 amp @ 230V	15 amp @115V
Control output 2	0.15 amp
Operating voltages	115 and 230 VAC
Maximum switching load	15 amp @ 115 VAC 20 amp @ 230 VAC 25 amp direct wired



INSTRUCTIONS FOR 4843 CONTROLLERS

Instructions For 4843 Controllers

The Model 4843 Controllers have a microprocessor based control module that provides full three term control with adjustable tuning parameters. Detailed operating instructions are provided in the manufacturer's User Manual which is furnished as a supplement to these instructions. Users should study these instructions carefully to ensure that they take full advantage of the sophisticated capabilities provided by these control modules. That portion of the instructions which deals with installation can be overlooked since all of the described steps and connections were accomplished when the module was installed in the Parr chassis.

To facilitate start up with reasonably good PID control parameters for both heating and cooling all 4843 Controllers are programmed at the factory with the following settings:

Cycle time	**5 seconds**
Proportional band	**25 °C**
Reset	**0.01 (reset/minute)**
Rate	**0 (minutes)**

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.

Model 4843 Specifications

Input thermocouple	Type J
Operating range	0 to 750 °C
Readout resolution	1 °C
Setpoint resolution	1 °C
System accuracy	+/-2 °C
Control action	Three term PID control plus limit control
Control output 1	15 amp @ 115V, 20 amp @ 230V
Control output 2	0.15 amp
Operating voltages	115 and 230 VAC
Maximum switching load	15 amp @ 115 VAC 20 amp @ 230 VAC 25 amp direct wired



SWITCHES AND INDICATORS

Switches And Indicators

There are three illuminated switches on the front panel, along with a speed control potentiometer and a high limit indicator light to show the status of the system.

The instrument switch controls power to the temperature control module and the cooling circuit mentioned above. It also energizes any optional display or control modules installed in the controller.

Main power switch (230 Volt only) The back panel of the 230 Volt models contains illuminated power switch. The switch will cut off power to both lines of a 230 volt system.

Polarity Indicator Light (230 Volt only) The light will illuminate when the unit is properly plugged in. In countries with unpolarized electrical plugs, the main power switch light will only illuminate when the plug is correctly inserted into its socket.

The Heater Switch is a manual, three position, illuminated switch which controls the amount of power sent to the heater. In the HIGH (II) position, full power is developed by the heater. In the middle (0) position the heater is off. In the LOW (I) position, a diode is switched into the system to allow only one-half of the rated power to be developed by the heater. This low setting will be useful when operating the reactor at temperatures below 175 °C. Both the instrument switch and the heater switch must be turned on to activate the heater as power for the heater is supplied through a solid state relay controlled by the temperature control module. The light in the heater switch will glow only when current is flowing to the heater. Turning off the instrument switch will also turn off the heater.

The Motor Controls consist of an on-off switch and a potentiometer to control the speed of the DC motor furnished on current Series 4500 stirred reactors. The speed control knob should be turned down to a minimum setting before turning on the motor switch to minimize electrical surges within the speed control unit. There is no speed control knob on any Series 4840 Controller furnished with a Parr reactor equipped with a constant-speed, explosion-proof AC motor or an air motor. These controllers will have only an on-off motor switch. The speed control function will also be omitted from any controller furnished for use with an earlier Parr reactor equipped with a variable speed motor having it's own, free-standing speed control unit.

The high limit indicator light will glow if the controller receives an indication from any of its sensors that a high temperature or pressure limit has been reached and the lockout relay has opened. When the light comes on, the user must find the source of the problem, correct it, and then manually reset the system using the high limit reset button on the back of the controller. The high limit indicator will come on each time there is a power interruption to the controller. Therefore, each time the controller is activated, the high limit must be reset manually.

Protective Fuses And Relays

An instrument fuse is mounted on the back panel. This is a 3AG Type 0.5 amp fuse, intended to protect the temperature control module and any installed display modules.

Protection for 0-90 volt motors is provided by motor reset fuse mounted on the back panel. This is a resetable breaker designed to protect the motor if it becomes overloaded. The breaker will have a rating selected to match the motor on the apparatus.

Protection 0-180 volt motors is provided by meter reset fuse holder mounted on the back panel. A light will come on if the motor becomes overloaded and the fuse burns out. The fuse rating will be selected to match the motor on the apparatus.

One or two heater fuses are mounted inside the cabinet on the upper right-hand corner of the back panel when viewed from the back of the controller. These are KAX Type 25 amp fuses, and are intended to protect the solid state relay from an overload in the heater circuit. They are specially designed to protect solid state devices and must be replaced with a fuse of the same design and rating.

A high-limit relay is provided to shut-off power to the heater whenever any of the alarm conditions are reached. It can be actuated either by the high temperature alarm setting in the basic control module, or by the high temperature or high pressure limit settings in any of the optional modules installed in the controller. When tripped, this breaker must be reset manually using the push button on the back panel.

SWITCHES AND INDICATORS *CONTINUED*

Protective Fuses And Relays *continued*

Thermocouple burnout protection is included in each of these controllers. If the thermocouple should burn out, or if there is a break in the thermocouple circuit, power to the heater will be shut off. In most cases this will cause the controller to show a maximum temperature reading. A similar high reading will be displayed if the controller is turned on without an attached thermocouple. In either of these situations, the high-limit relay will activate. The thermocouple break must then be corrected and the high limit relay reset, in order to activate the system.

Temperature Limit Controls

As mentioned above, each Series 4840 Controller has a high temperature limit control which will trip the lockout relay and shut off the heater if the temperature reaches a preset level. If tripped, the lockout relay must be reset manually, thereby preventing the system from reheating the reaction as soon as the temperature falls below the limit setting.

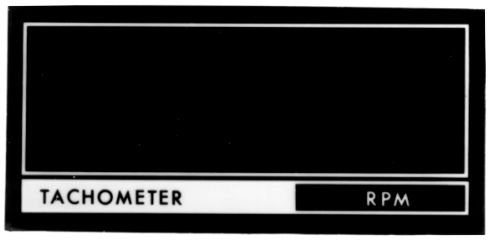
On Model 4842 Controllers the high temperature limit is preset at the factory to 375 °C. The prompting and tuning steps required to change this setting are described in the controller's User's Manual furnished as a supplement to these instructions. On these controllers an alarm condition is indicated by a display of "A3HI" on the setpoint display as well as the L3 enunciator being illuminated. If the temperature exceeds the limit, the controller alarm conditions will appear, the lockout will be tripped, and power to the heater will be shut off.

On Model 4843 Controllers the high temperature limit is preset at the factory to 375 °C. The steps required to change this setting are described in the controller's User's Manual furnished as a supplement to these instructions. On these controllers an alarm condition is indicated by a display of "A3HI" on the setpoint display as well as the L3 enunciator being illuminated. If the temperature exceeds the limit, the controller alarm conditions will appear, the lockout relay will be tripped, and power to the heater will be shut off.

Access To The Controller Cabinet

To open the controller cabinet, unplug the power cord and remove the two screws in the upper corners of the back panel and lift the top plate upward about 1/4 inch. This will allow the hinged top and front panel to swing forward, providing full access to all internal components.

OPTICAL TACHOMETER MODULE



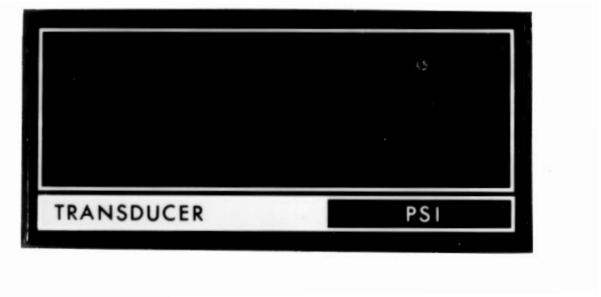
Digital RPM Display Module

This optional feature can be included in any Series 4840 Controller to provide a means for continuously monitoring the stirring speed in a Parr reactor. It consists of a digital readout mounted in the controller cabinet connected to an optical sensor installed in the overarm drive on the reactor. The connecting cable has a microphone plug which fits into a marked socket on the back panel. The digital display will show the stirring speed over a range from 0 to 1999 rpm with a 1 rpm resolution and +/-10 rpm accuracy.

Parts For Optical Tachometer Module

PART NO.	DESCRIPTION
A1001E	Optical sensor for cart reactor
A1001E2	Optical sensor for bench top reactor
A1001E3	Gear Box Drive
A1001E4	New floor st units
A1001E5	4560/4520 bench - new st
A1001E6	For Model 5100 Glass Reactors
A1564HC	Optical Wheel
A1005E*	Tachometer display
A1005E2*	Tachometer display w/4-20ma analog out
A1005E3*	Tachometer display w/0-5vdc analog out
A1005E4*	Tachometer display w/0-10vdc analog out
A1544E	Tachometer internal harness assembly
A1544E2	Tachometer internal harness assembly w/analog
A1002E	Cable Assembly, 3 feet
A1002E2	Cable Assembly, 6 feet
A1002E3	Cable Assembly, 10 feet
A1002E4	Cable Assembly, 20 feet

PRESSURE TRANSDUCER MODULE



Digital Pressure Display/Cut-Off Module

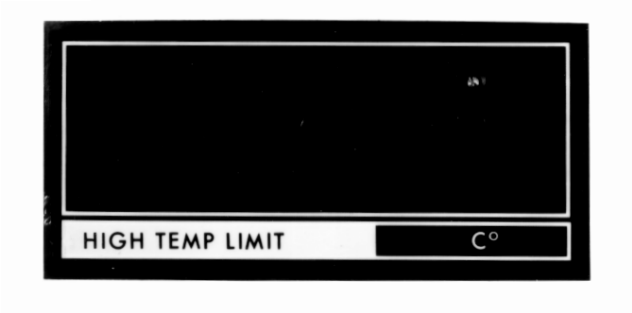
This module provides a digital readout for continuously monitoring the pressure within the reactor, plus a backup safety feature which will shut down the system if a preset maximum is reached. Pressure is displayed with 1 psi resolution and 10 psi accuracy on a bright LED digital readout, normally calibrated from 0 to 2000 psig. The safetycut-out feature offers excellent protection against accidental over-pressure by allowing the user to set a maximum pressure which, If reached, will activate the high limit relay and turn off the heater immediately.

To set the pressure limit, depress the button on the face of the display and turn the screw located above the button until the desired pressure limit is shown on the display. The display will return to the current actual pressure when the button is released. The signal for the pressure display is generated by a transducer in a stainless steel housing mounted on the reactor near the Bourdon tube pressure gage. The transducer must not be heated above 120 °C. A water cooling sleeve attached to the transducer fitting can be used to keep the transducer below this limit when operating the reactor in a higher range. For applications involving reactants corrosive to stainless steel, the stainless steel transducer fitting can be replaced with an isolator which will keep the reactants away from the transducer. Users should consult with the Parr engineering staff regarding possible corrosion protection arrangements. When ordering a pressure display module separately or installed in any Series 4840 Controller, always specify the reactor in which the transducer will be installed so that the proper mounting hardware can be furnished.

Parts For Pressure Transducer Module

PART NO.	DESCRIPTION
A818E*	Pressure display, 2000 psi
A818E4*	Pressure display, 20,000 psi
A818E6*	Pressure display, 2000 psi 5 vdc analog
A818E7*	Pressure display, 2000 psi 10 vdc analog
A818E8*	Pressure display, 2000 psi 4-20 ma analog
A818E9*	Pressure display, 345 bar
A818E10*	Pressure display, 20,000 psi 5 vdc analog
A818E11*	Pressure display, 172 bar
A818E12*	Pressure display, 172 bar 5 vdc analog
A818E13*	Pressure display, 172 bar 4-20 ma analog
A818E14*	Pressure display, 345 bar 5 vdc analog
A818E15*	Pressure display, 5000 psi 10 vdc analog
A818E17*	Pressure display, 5000 psi 4-20 ma analog
A821E	Pressure harness, external, 5 ft
A821E3	Pressure harness, external, 20 ft
825HC	Snap ring for cooling sleeve
827HC	O-ring for cooling sleeve
828HC	Cooling sleeve
A836EP25	Pressure transducer, 2500 psi
A836EP50	Pressure transducer, 5000 psi
A1546E	Internal pressure harness assembly
A1546E2	Internal pressure harness, assembly, analog
1394HC	Adapter, Body

HIGH-TEMP CUT-OFF MODULE



Digital Hi-Temp Display/Cut-Off Module

This module provides a redundant high temperature safety cut-off which will shut down the reactor if any unusual malfunction should develop in the primary control system. It is a completely independent safety backup system, operating in addition to the high-limit control built into each Series 4840 Controller. It has its own thermocouple, digital display and wiring, and can be preset to shut down the reactor at any desired temperature.

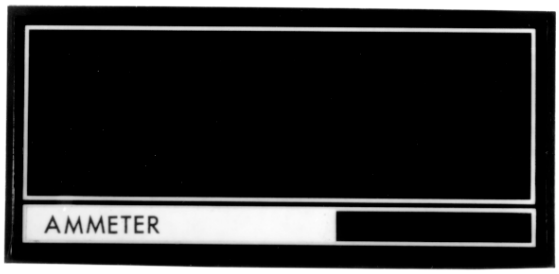
To set the temperature limit, depress the button on the face of the display and turn the adjoining screw until the desired temperature limit is shown on the display. The display will return to the current temperature value when the button is released.

When used with any Parr Mini Reactor, this module requires a dual thermocouple consisting of two thermocouples sealed within a single sheath and installed in the single thermocouple fitting in the reactor head. In all other Parr reactors this module operates from a second thermocouple inserted into the thermowell together with the basic control thermocouple. When ordering this option separately or installed in any Series 4840 Controller, always specify the reactor with which it will be used so that a thermocouple of the proper style and length can be furnished.

Parts For Hi-Temp Cut-Off Module

PART NO.	DESCRIPTION
1129E	Thermocouple socket
A819E*	Temperature display
A819E3*	Temperature display, 5 vdc analog
A819E4*	Temperature display, 4-20 ma analog
A819E5*	Temperature display, 10 vdc analog
A1545E	Internal temperature harness
A1545E2E	Internal temperature harness, analog
A470E2	Thermocouple extension wire, 5 ft
A470E2	Thermocouple extension wire, 10 ft
A470E4	Thermocouple extension wire, 20 ft
A490E	Dual element thermocouple
A472E	Single element thermocouple series
A511E2	Series - spring tension

DIGITAL AMMETER DISPLAY MODULE



Digital Ammeter Display Module

This module provides a means for continuously monitoring the current being drawn by the stirrer motor. Since the motor speed control will provide a constant stirring speed at any given setting, changes in the current drawn by the motor will correspond to changes in the viscosity of the reactants in the vessel. This will be a useful option for users who want to monitor the progress of a polymerization reaction in which there is a viscosity change as the reaction proceeds.

Parts For Ammeter Module

PART NO.	DESCRIPTION
1129E	Thermocouple socket
A819E	Temperature display
A819E3	Temperature display, 5 vdc analog
A819E4	Temperature display, 4-20 ma analog
A819E5	Temperature display, 10 vdc analog
A1545E	Internal temperature harness
A1545E2E	Internal temperature harness, analog
A470E2	Thermocouple extension wire, 5 ft
A470E2	Thermocouple extension wire, 10 ft
A470E4	Thermocouple extension wire, 20 ft
A490E	Dual element thermocouple
A472E	Single element thermocouple series
A511E2	Series - spring tension

COMMUNICATIONS MODULES

Communications

This module provides a communications board which will permit communication with a laboratory computer. The 4842, 4843, and 4844 Controllers offer RS232C, RS422 or RS485 protocols. With this arrangement, many parameters can be set and read by the host computer. This option is offered for 4842, 4843, and 4844 Controllers only and must be specified at the time the controller is ordered. It cannot be installed in the field without replacing temperature control module. Parr can exchange new controllers if the user wants this option but neglected to specify it at the time of purchase.

Solenoid Valve Module

This module provides a solenoid valve, a metering valve and all parts needed to assemble an automatic cooling system for any reactor. It usually is installed in a cold water line with a flow connection to the cooling coil and an electrical connection to the cooling socket on the back of the temperature 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.



Series 4840 Controllers 115 Volt



Series 4840 Controllers 230 Volt

SPEED CONTROL AND ADJUSTMENTS

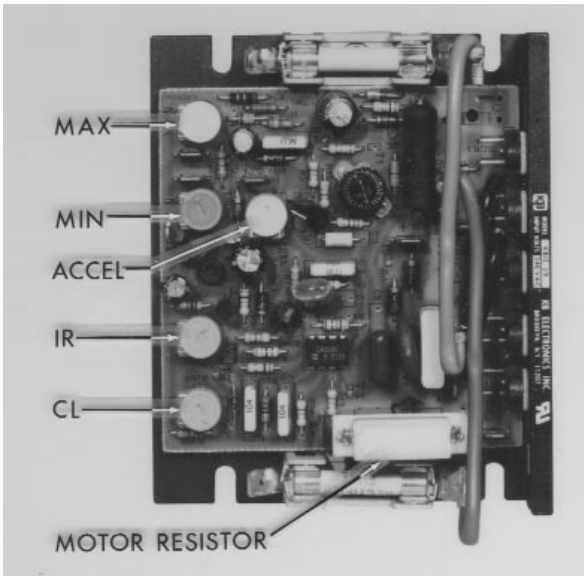
Moter Speed Control

All Series 4840 Controllers are equipped with a solid state speed control module for use with the variable speed, DC motors installed on Parr stirred reactors. The module itself (approximately 4 inches square) is mounted inside the chassis on the bottom plate. A motor switch and a speed adjustment potentiometer are mounted on the front panel. A transient protector is included with each module to prevent damage to the power bridge from voltage spikes in the AC line. Each module also requires a resistor matched to the horsepower of the motor with which it will be used, as listed in the table below:.

Motor Rating	Motor Voltage	Resistor Required	Parr Number
1/12HP	90 VDC	0.25 ohm	876E6
1/8HP	90 VDC	0.18 ohm	876E4
1/4HP	90 VDC	0.05 ohm	876E
1/4HP	180 VDC	0.10 ohm	876E3
1/2HP	90 VDC	0.025 ohm	876E2
1/2HP	180 VDC	0.05 ohm	876E
3/4HP	180 VDC	0.035 ohm	876E5
1/50HP	48 VDC	0.51 ohm	876E7

Controllers furnished as a part of a complete Parr stirred reactor system will have the proper resistor installed at the factory. Any controller sold separately will require a motor specification so that the proper resistor may be provided.

Always turn the speed control knob fully counterclockwise to the off position before turning on the motor switch, then advance the knob clockwise slowly to develop the desired speed. Do not overload the motor. Any high speed or high viscosity load which trips the circuit breaker is too heavy. Use the reset button on the rear panel to restart the motor and reduce the speed to avoid overloading.



Motor Speed Control

SPEED CONTROL AND ADJUSTMENTS *CONTINUED*

Adjustments

There are five trimpots in the speed control module that can be used to adjust the performance of the motor. These are set at the factory for optimum performance and should not be disturbed unless customized settings are required to match a particular set of operating conditions. The instructions below should be followed carefully if these controls are to be readjusted.

The CL, current limiting/torque adjustment (with an orange knob) is set at the factory to 1.5 times the motor rating. It is intended to protect both the module and the motor against overloads and heavy surge currents during startup. It can also serve as a torque limiting device by reducing the maximum power output of the system.

The IR, compensation adjustment with an orange knob) is used to improve motor control under varying load conditions. If the loads do not fluctuate, this control can remain at approximately one-fourth of full setting. But if the motor speed drops more than 2% under load, this adjustment should be increased. If it is set too high, the motor speed will fluctuate in a cyclical manner.

The MAX, maximum speed adjustment (with a white knob) controls the maximum speed of the motor. To increase the motor speed, turn the control knob on the front panel to its maximum setting, then use the MAX trimpot to raise the speed to the desired level. Note, however, that the motor may become unstable if the speed is raised above the motor's rated rpm.

The MIN, minimum speed adjustment (with a red knob) can be used to raise the minimum motor speed above zero. To change this setting, turn the control knob on the front panel to its minimum setting, then adjust the MIN trimpot to obtain the desired minimum speed, this adjustment will also affect the maximum setting, making it necessary to adjust both MAX and MIN trimpots to obtain the desired spread.

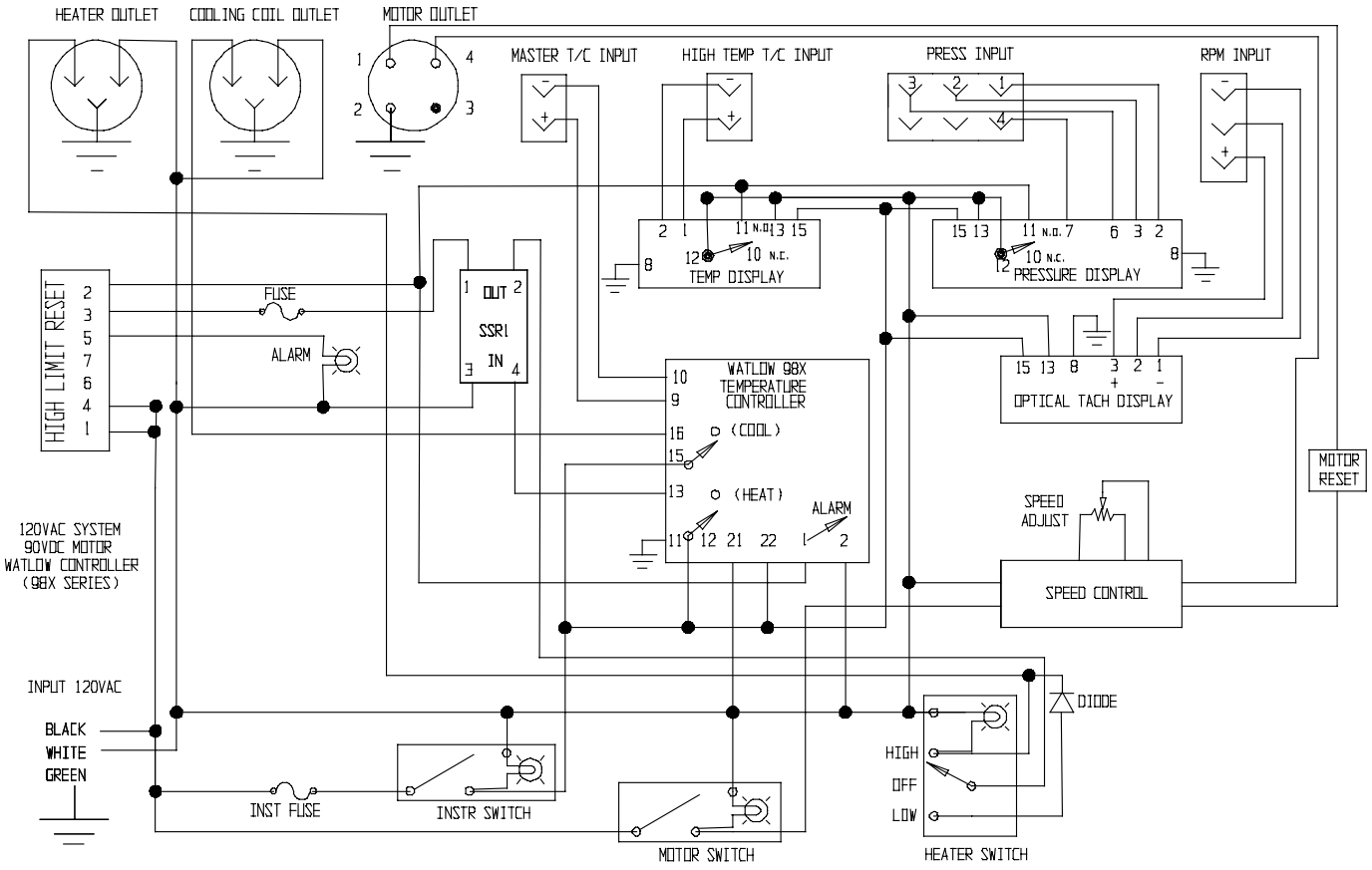
The ACCEL, acceleration adjustment (with a yellow knob) is normally set to provide controlled acceleration from zero to full speed in 2 seconds. It can be adjusted to higher or lower acceleration times anywhere between 0.5 and 4 seconds, but changing this setting will affect the MAX speed and IR compensation which will have to be readjusted. If the acceleration time is reduced to 0.5 seconds (6 o'clock trimpot position), increase the IR trimpot one quarter turn clockwise and decrease the MAX trimpot one fifth turn counterclockwise. If the acceleration time is increased to the maximum time of 4 seconds (full rotation), the IR trimpot must be decreased and the MAX increased in the same rotation amounts mentioned above.

CLEANING AND MAINTENANCE

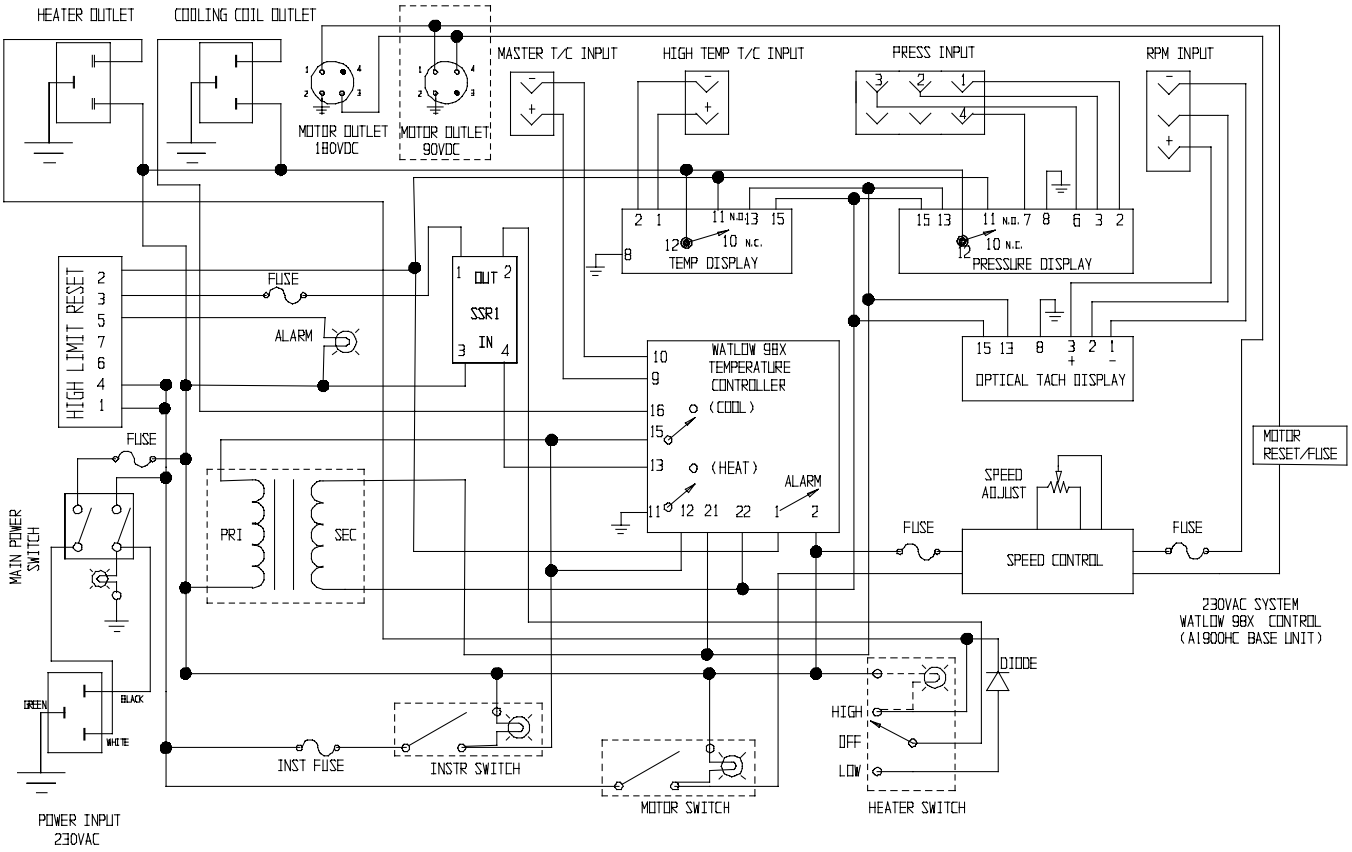
Cleaning and Maintenance

Periodic cleaning may be performed on the exterior surfaces of the controller with a damp cloth. All power should be disconnected when cleaning Series 4840 Controller. The replacement of protective fuses for the heater and motor circuits are the only internal maintenance procedures that should be performed by the user. There are no user serviceable parts inside the Series 4840 Controller. Advanced troubleshooting instructions can be obtained by calling the Parr Instrument Company to determine which parts may need to be replaced or serviced.

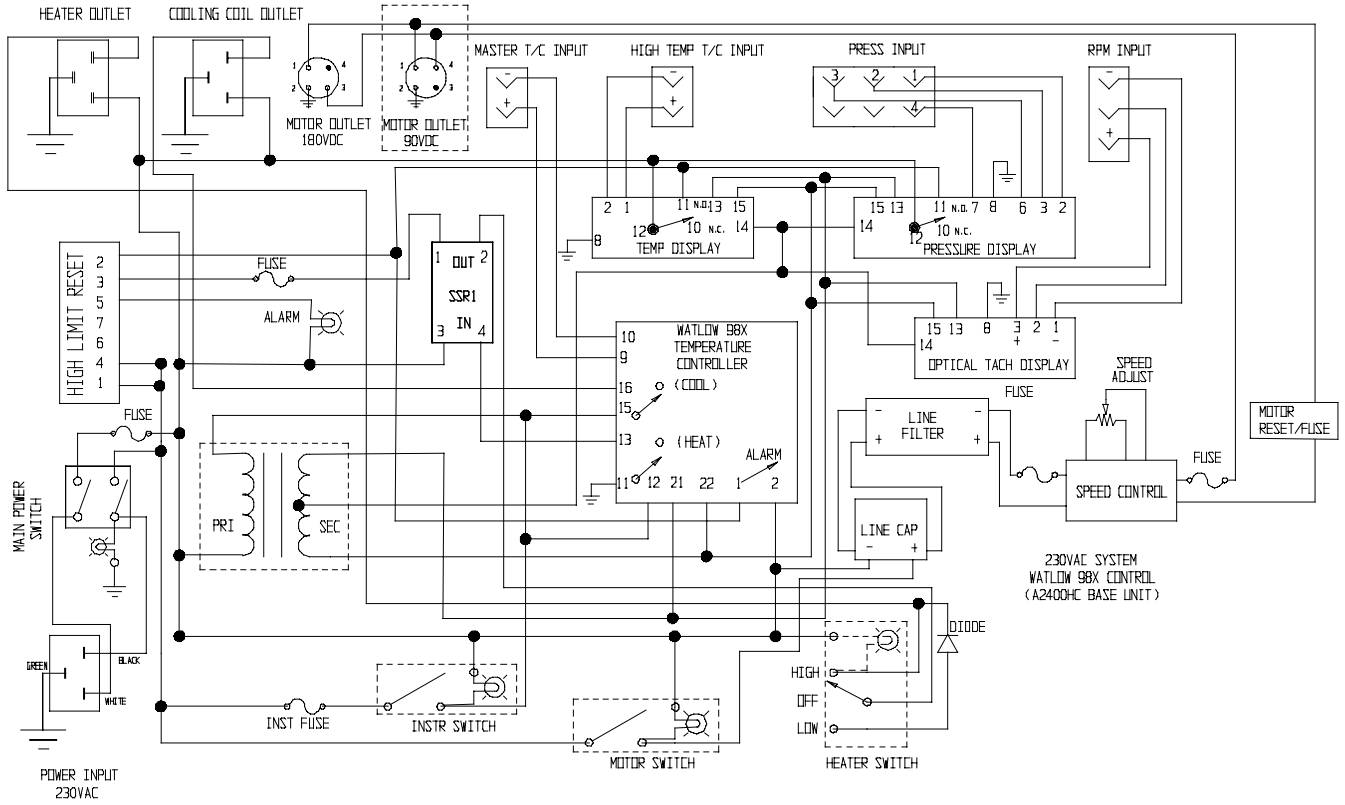
CIRCUIT DIAGRAM 3676HCK



CIRCUIT DIAGRAM 3677HCK



CIRCUIT DIAGRAM 3678HCK





Parr Instrument Company

211 Fifty-Third Street
Moline, Illinois 61265 USA
309/762-7716 800/872-7720
Fax: 309/762-9453
www.parrinst.com
e-mail: parr@parrinst.com

Printed in USA
12-01

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP