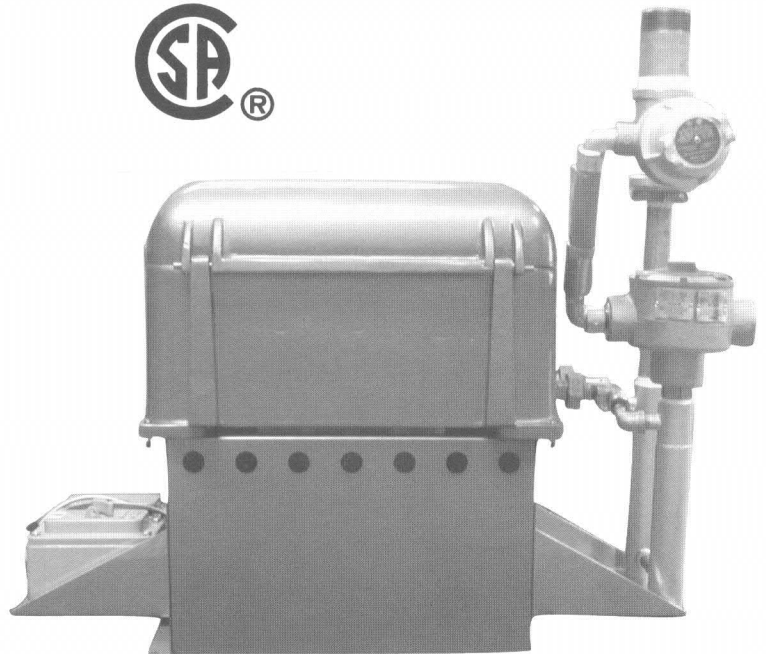
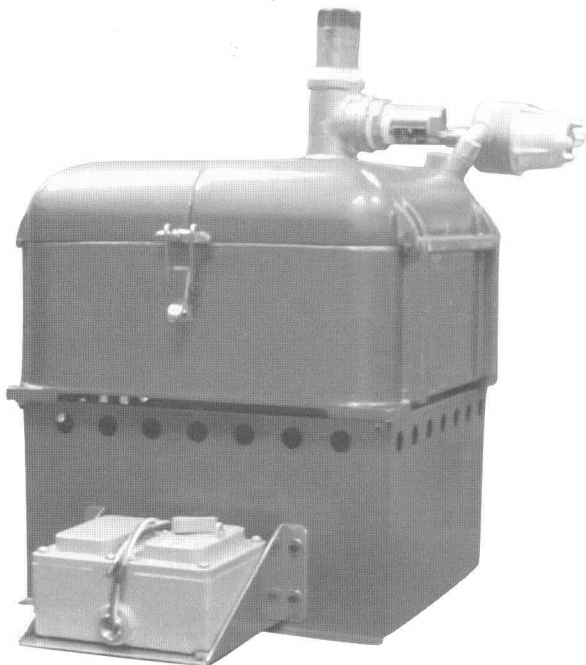


Manual for 18028CS or 18018CS with 18094 Therm-O-Cycle

April 24, 2006

**THE W.L. WALKER 115 VOLT
THERM-O-CYCLE
HEATED CENTRIFUGE
EXPLOSION-PROOF C.S.A. APPROVED**
For Class 1, Group D, HAZARDOUS LOCATIONS



INDEX

Page 1) CSA Certificate of Compliance

Page 2) Specifications

Page 3) Set-up and Filling

Page 4) Operating Instructions

Page 5) Maintenance

Page 6) Motor Wiring

Page 7) Therm-O-Cycle Heater Wiring

Page 8) Motor / Head Spindle Breakdown

Page 9) Graph of Heating Performance

Certificate of Compliance

Certificate: 1559365 (LR 88082-1)

Master Contract: 180880

Project: 1559365

Date Issued: May 26, 2004

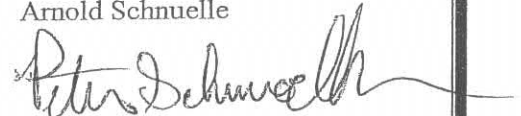
Issued to: W.L. Walker Co., Inc.
1009 South Main Street
Tulsa, OK 74119

Attention: Loay Suffer

The products listed below are eligible to bear the CSA Mark shown



Issued by: Arnold Schnuelle



Authorized by: Peter Schimmoeller
Manager Certification Services

PRODUCTS

CLASS - 8728 01 - LABORATORY EQUIPMENT - For Hazardous Locations

Class I, Division 1, Group D, T3C

Model 18018, 18028 Centrifuge rated 115 V, 60 Hz, 1.9 FLA, 1/12 Hp.

Model 18094 Centrifuge Heater rated 120 V, 60 Hz, 0.75 kW.

APPLICABLE REQUIREMENTS

The product as described in this report complies with:

- | | | |
|----------------------------------|---|---|
| CSA Standard C22.2 No. 0-M1982 | - | General Requirements - Canadian Electrical Code, Part II |
| CSA Standard C22.2 No. 0.4-M1982 | - | Bonding and Grounding of Electrical Equipment
(Protective Grounding) |
| CSA Standard C22.2 No. 0.5- 1982 | - | Threaded Conduit Entries |
| CSA Standard C22.2 No. 30-M1986 | - | Explosion-Proof Enclosures for Use in
Class I Hazardous Location |
| CSA Standard C22.2 No. 151-M1986 | - | Laboratory Equipment |

Specification for 18028CS(Short Cone) or 18018CS (Pear Shaped) Centrifuge with 18094 Heater

Notice: All specifications and information subject to change without notice.

RPM: 1725

Relative Centrifugal Force (RCF) @ 1725 RPM = 592

Voltage: 115 AC

Amps: Centrifuge motor only 1.9 (running) 9.0 (momentary on startup)
Heater only 6.50

API criteria: Meets requirements of API MPMS 10.4, "Determination of Water and Sediment in Crude Oil by the Centrifuge Method (Field Procedure)"

CSA Approved: Canadian Standards Association for Hazardous Locations for Class 1, Group D

Weight: Centrifuge only = 93 lbs. (42.2 kilograms)
Heater only = 24 lbs. (10.9 kilograms)

Volume of liquid required for Centrifuge/Heater assembly: 8 quarts (7.6 liters) approx.

Dimensions:

Note: some slight variation in dimensions may occur due to assembly and makeup

Depth including switchbox = 23-1/4 inches (590mm)
Depth less switchbox = 18 inches (457mm)
Depth with Therm-O-Cycle attached = 32 inches (812mm)
Width with lids closed = 18 inches (457mm)
Width with lids open = 24 inches (610mm)
Height with lids closed = 19-1/4 inches (489mm)
Height with lids open = 24 inches (610mm)
Height of Therm-O-Cycle = 27-1/2" (698mm)

Setup and filling of 18028CS or 18018CS Centrifuge with 18094 Therm-O-Cycle Heater

Locate and mount the machine on a workbench or table that is capable of supporting the combined weight of the Centrifuge and Therm-O-Cycle Heater assembly. Take care to allow for proper spacing around the Centrifuge/Heater assembly as parts of heater will reach temperatures capable of causing burns to personnel or surrounding equipment.

Attaching Therm-O-Cycle Heater to centrifuge:

- Attach the support for the heater assembly (shipped inside of centrifuge) in the same manner as the control box support.
- Break the unions on the Therm-O-Cycle Heater unit and remove the outer halves. Apply dope or thread tape to the threads of the nipple end of the unions and screw the nipples into the two threaded holes at the back of the centrifuge. Attach the Therm-O-Cycle Heater to the centrifuge by mating the unions and tightening them.

Wiring: Centrifuge and Heater should be wired in accordance with the National Electrical Code.

Filling: Fill the unit with an appropriate mixture of permanent type anti-freeze and water. For most applications a 50/50 mix should be fine. Note: straight water is not recommended due to the possibility of freezing and not providing corrosion protection for internal parts of centrifuge and heater assembly. Approx. 8 quarts (7.6 liters) should be on hand to fill the centrifuge/heater assembly. To fill the unit, remove the small vent screws and washers that are located in the corner of each preheater pocket. This will allow air to escape from the water chamber. Next, add the 50/50 mix through the 2"x 4" nipple on the Therm-O-Cycle Heater unit. Keep filling until there is no air coming out of the vent holes in the corners of preheater pockets. Replace the washers and screws into the vent holes and tighten. Continue to add the 50/50 mixture until it covers the float (visible through the 2"x 4" inch nipple) in the Therm-O-Cycle Heater assembly. The final liquid level should be approx. 2 inches (50mm) below the top of the 2"x 4" nipple. The unfilled portion of the nipple will allow for expansion of the liquid as it is heated. Check unions, nipples and all fittings for leaks and retighten if needed. A quantity of the anti-freeze mix should be on hand to maintain the proper liquid level as there will be a small amount of loss due heating and venting of trapped air on a regular basis.

Operating Instructions for 18028CS or 18018CS with 18094 Therm-O-Cycle Heater

NOTE: ALL ADJUSTMENTS TO THE THERMOSTAT MUST BE MADE WITH THE CURRENT OFF

The Therm-O-Cycle Heater unit is preset to approximate temperature and may need to be adjusted for the users specific requirements and conditions. Allow the unit to come up to temperature. The overall temperature of the unit should stabilize in approx 1 hour to 90 minutes depending on ambient conditions and the temperature required. Place a sample tube or tubes into the preheater pockets of the centrifuge and place a thermometer in the tubes. Allow the temperature of the sample to stabilize. Make needed adjustments to the thermostat by 1) turning the current off to the unit, 2) then remove the cover from the thermostat control box, 3) then turn the thermostat clockwise for higher temperature or counter-clockwise for lower temperature. Replace the cover to the thermostat control box and tighten it firmly. Turn on the current to the unit and check sample for needed change in temperature. Repeat this procedure as needed to obtain the required temperature. Little adjustment is required once the desired temperature is set.

Notes on trapped air in water jacket:

Air trapped in the water jacket can cause the preheater pockets to not heat to the set temperature and or to take a longer than normal amount of time to heat samples.

Trapped air will also expand at a greater amount than the anti-freeze mix and can cause the mix to overflow the 2"x 4" nipple of the Therm-O-Cycle Heater.

Any trapped air must be removed from the water jacket on a regular basis for proper and efficient operation. Do not completely remove the vent screws and washers from the tops of the preheater pockets after the unit is filled with the proper amount of anti-freeze mix. The vent screws need only to be loosened enough (1 or 2 turns) to allow the trapped air to escape and a small amount of the anti-freeze mix to become visible under the vent screw. Each preheater pocket should be vented of trapped air each day of operation. Retighten each vent screw after the pocket is vented. The liquid level in the 2"x 4" nipple of the heater unit should be observed during the venting procedure and replenished as needed. Note that if the power to the Therm-O-Cycle Heater is off for a length of time that allows the unit cool down, the unit will need to be carefully vented of trapped air on restart.

Operation of centrifuge:

Check the shields in the centrifuge head to be sure that all the plastic plugs are in place at the bottom of shields and that the felt cushions are also present.

Remove the heated samples from the preheater pockets and place them into the shields of the centrifuge head. Take care to equally fill each tube for proper balance. If running more than one set of samples at a time, note should be made of the number on the arm of the head by each shield.

Close and latch the lids for safety purposes and to retain heat. The closed and latched lids also allow the motor to operate more efficiently. Turn the machine on and run for the necessary length of time. Turn off the machine and allow the head to coast to a complete stop. Unlatch the lids and remove samples for inspection.

For complete details as to proper methods of testing, we suggest the use of the following “American Petroleum Institute” publications.

- API MPMS Ch. 10.3
- API MPMS Ch. 10.4
- API MPMS Ch. 10.6

These publications are available from

“American Petroleum Institute”
1220 L Street, Northwest
Washington, D.C. 20005-4070

202-682-8000

www.api.org

Maintenance

There is very little maintenance required on 18028CS or 18018CS with 18094 Therm-O-Cycle when used on regular duty cycle.

For units that are expected to be ran on multiple shifts or are in a critical need situation, there a few spare parts that should be ordered in advance to avoid as much down-time as possible. The following items should be on hand for possible repairs over the course of one year.

For Centrifuge:

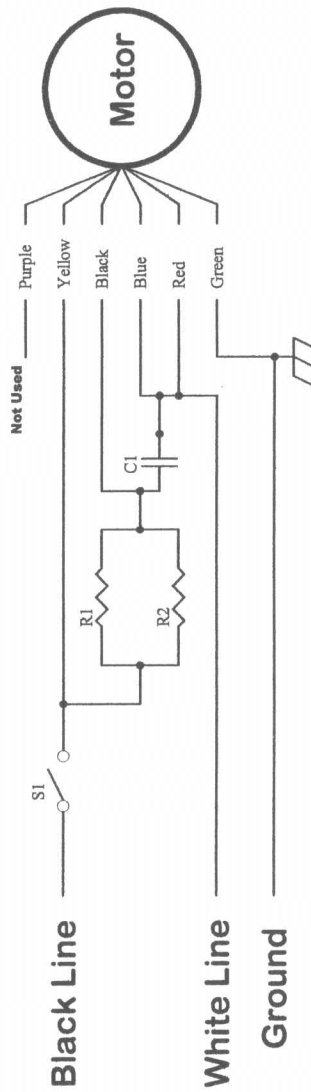
<u>Quan.</u>	<u>Inv #</u>	<u>Description</u>
2	18437	bearing
1	18434	shaft Extension
2	18438	retainer ring for bearing
4	18097	bleeder screws (vent screws)
4	1809701	gaskets for bleeder screws
1	18431XPF	motor

For Therm-O-Cycle Heater:

1	18099	heater/thermostat assembly
1	1809901	thermostat only for 18099

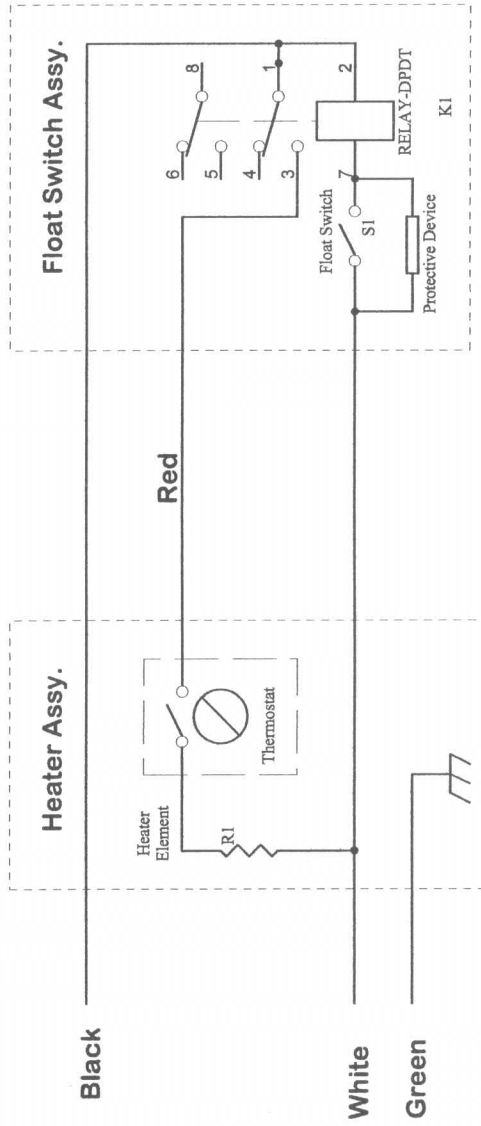
All units can also be shipped to W. L. Walker Co. Inc.s facility in Tulsa, Oklahoma for evaluation and repair with shipper to pay all shipping costs unless prior arrangements are made.

Motor wiring for 18028CS & 18018CS

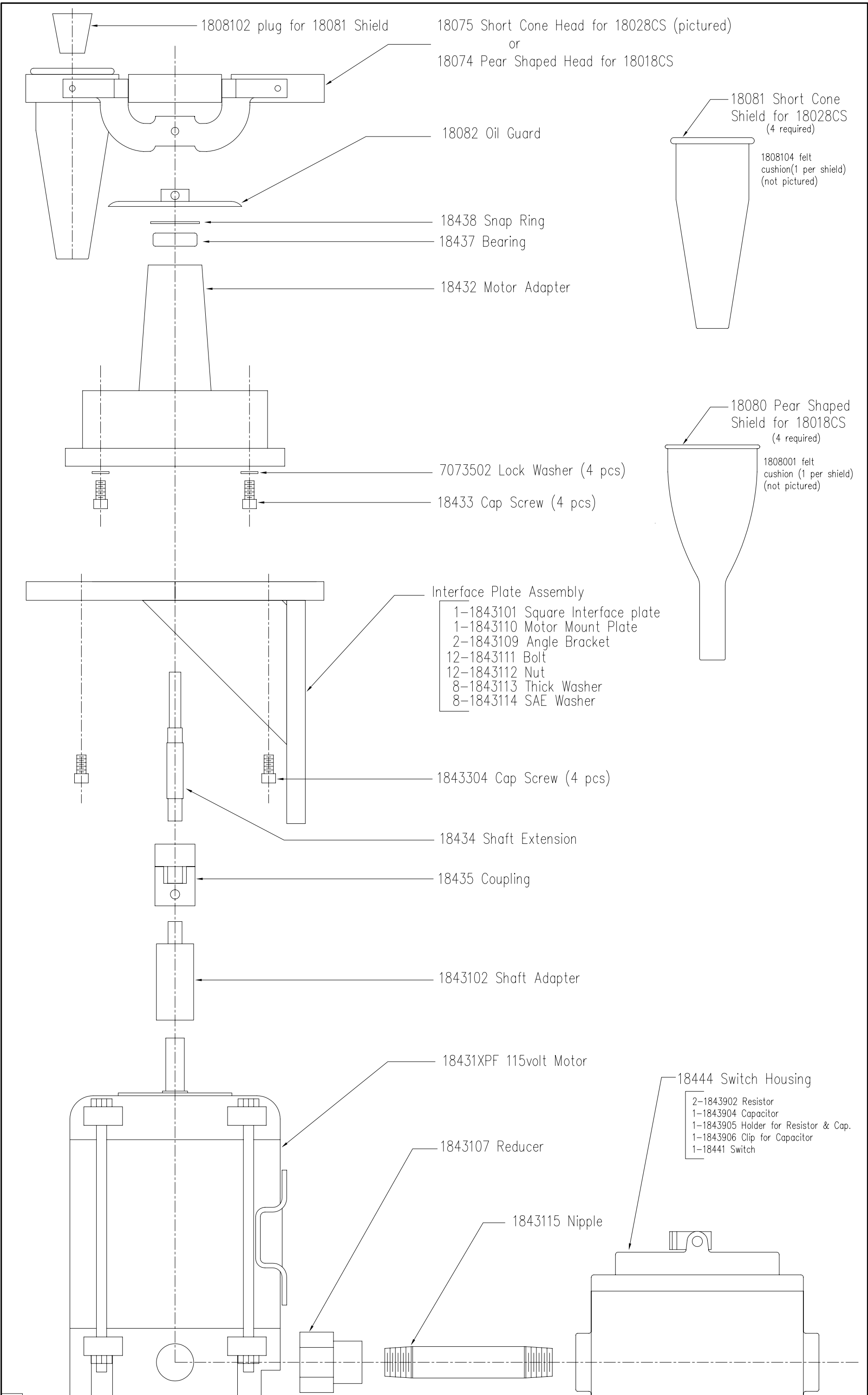


Title			Motor wiring for 18028CS & 18018CS		
Size	Number	Revision			
A		1.0			
Date:	8-Aug-2004		Sheet 1 of 1		
File:	P:\CSA_unitworking\Protei.ddb				
3		2		4	

Wiring for 18094 THERM-O-CYCLE Heater



Title		Wiring for 18094 THERM-O-CYCLE Heater	
Size	Number	Revision	
A		1.3	
Date:	11-Aug-2004	Sheet 1 of 1	
File:	P:\CSA_unitworking\Protei.ddb	Drawn By:	
3	1	2	4



Heat-up time of 18028CS with 18094 Therm-O-Cycle Heater and samples placed in preheater pockets

Notice: This information is for reference only. These tests were conducted under specific conditions in a climate controlled environment. Actual field results will vary depending on many conditions.

