INSTRUCTION MANUAL
MODEL 1250
ATMOSPHERIC CONSISTOMETER

Revision A – November 2015
P/N: 12-0186

S/N: _____

AMETEK®
CHANDLER
ENGINEERING®

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General Information

Introduction

This manual contains installation, operation, and maintenance instructions for the Chandler Engineering Model 1250 Recording Atmospheric Consistometer.

Purpose and Use

The Chandler Engineering Model 1250 Recording Atmospheric Consistometer is used for various tests of oil well cements as detailed in the American Petroleum Institute *Specification for Materials and Testing for Well Cements - Specification 10 A/B (API Spec 10 A/B)*. The apparatus is used in conjunction with tests for:

- Determination of Water Content of Slurry
- Determination of Fluid Loss
- Determination of Rheological Properties of Cement Slurries

Description

The Chandler Engineering Model 1250 Recording Atmospheric Consistometer consists of a stainless-steel water bath that houses two slurry containers. The slurry containers are rotated by engaging the pins of the lid with the slots on the rotator. The rotators are fitted with timing sprockets driven by the motor, which is factory set at 150 rpm. The belt also drives an impeller that agitates the water bath.

An instrument cabinet, with a removable front panel, houses a microprocessor-based temperature controller that also serves as a digital temperature indicator. The temperature controller operates a relay that controls a 1500-watt heater. The Model 1250 includes cooling coils as a standard feature.

Lighted switches that also serve as circuit breakers are installed in the front panel. The circuit breaker function of these switches eliminates the necessity for in-line fuses.

The Model 1250 indicates consistency and temperature on a panel-mounted strip chart recorder. The Model 1250 also includes audible alarms that sound at preset consistency values. The alarm set points are individually adjustable on the recorder.

Slurry consistency is expressed in Bearden units of consistency, Bc, where 100 Bc is equivalent to the spring deflection observed with 2,080 grams-centimeter of torque (400 grams weight) using the weight-loaded calibrating device. For further details, refer to *API Spec 10 A/B*.

The Model 1250 is easily calibrated using the Consistency Calibration Potentiometers located on the back panel.

Features and Benefits

- Temperature is measured accurately using a microprocessor-based temperature controller.
- Rate of water bath rise can be controlled to conform with *API Spec 10 A/B* requirements or other temperature gradients desired.
- Stainless-steel water bath ensures long trouble-free operation in the normally corrosive cement testing environment.
- Operational simplicity provides freedom from operator error and a short training period for new operators.
- Units are designed for trouble-free oil field laboratory operation.
- Direct torque spring readout permits instant determination of the slurry viscosity in Bearden Units (Bc).
- Standard deadweight calibration is both simple and rapid, aiding measurement accuracy. (An optional calibrator unit may be purchased.)
- Constant temperature is maintained by a motor-driven stirred water bath that eliminates any hot spots on the slurry containers.
- Rotational speed of the slurry container is held constant by the drive motor assembly, which is factory set at 150 rpm.
- A variable speed option is available for studies at slurry container rotational speeds other than 150 rpm.
- Internal cooling coils provide quick cooling of the slurry.
- Equipped with a strip chart recorder to provide a permanent record of temperature and viscosity.
- Viscosity alarms that can be set over the range from less than 30 Bc to 100 Bc. The alarms alert the operator that a specific viscosity has been obtained for recording data or taking other action.

Specifications

Measurement Range:	0 - 100 Bc
Operating Conditions:	50°F - 120°F (10°C - 49°C)
Maximum Temperature:	200°F (93°C)
Input Voltage:	100–130VAC/200-240VAC, 50/60 Hz ± 10%
Input Power:	2 kVA
Heater Wattage:	1500 W
Dimensions:	25” (64cm) high x 15.5 (39cm) wide x 18” (45cm) deep
Shipping Dimensions:	29” (74cm) high x 20” (51cm) wide x 29” (74cm) deep
Net Weight:	110 lbs (50 kg)
Shipping Weight:	190 lbs (86 kg)
Slurry Container Volume:	28 cubic inches (470 ml)
Slurry Cup Rotational Speed:	150 rpm supplied as standard Option D-1 provides variable speeds from 50 - 200 rpm

Safety Requirements

READ BEFORE ATTEMPTING OPERATION OF INSTRUMENT

The Chandler Engineering Model 1250 Recording Atmospheric Consistometer is designed for operator safety. Any instrument that is capable of high temperatures should always be operated with **CAUTION**!!

To ensure safety:

- Locate the instrument in a low traffic area.
- Post signs where the instrument is being operated to warn non-operating personnel.
- Read and understand instructions before attempting instrument operation.
- Observe caution notes!
- Observe and follow the warning labels on the instrument.
- Never exceed the maximum temperature rating of the instrument.
- Due to high temperatures, be careful not to touch the water bath tank during operation.
- Always disconnect main power to the instrument before attempting any repair.
- Turn off the heater at completion of each test.
- When removing the slurry containers, use gloves to protect against high temperatures.
- Appropriately-rated fire extinguishers should be located within close proximity.

Before attempting to operate the instrument, the operator should read and understand this manual.

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Section 1 – Installation

Unpacking the Instrument

Verify all parts listed on the packing slip have arrived with the instrument. If parts are missing, contact Chandler Engineering immediately.

Utilities Required

100-130VAC/200-240VAC
20/15 A
50/60 Hz
Water supply
Drain

Tools/Equipment Required

Basic hand tools

Setting Up the Instrument

Refer to *Figure 1* for the following steps:

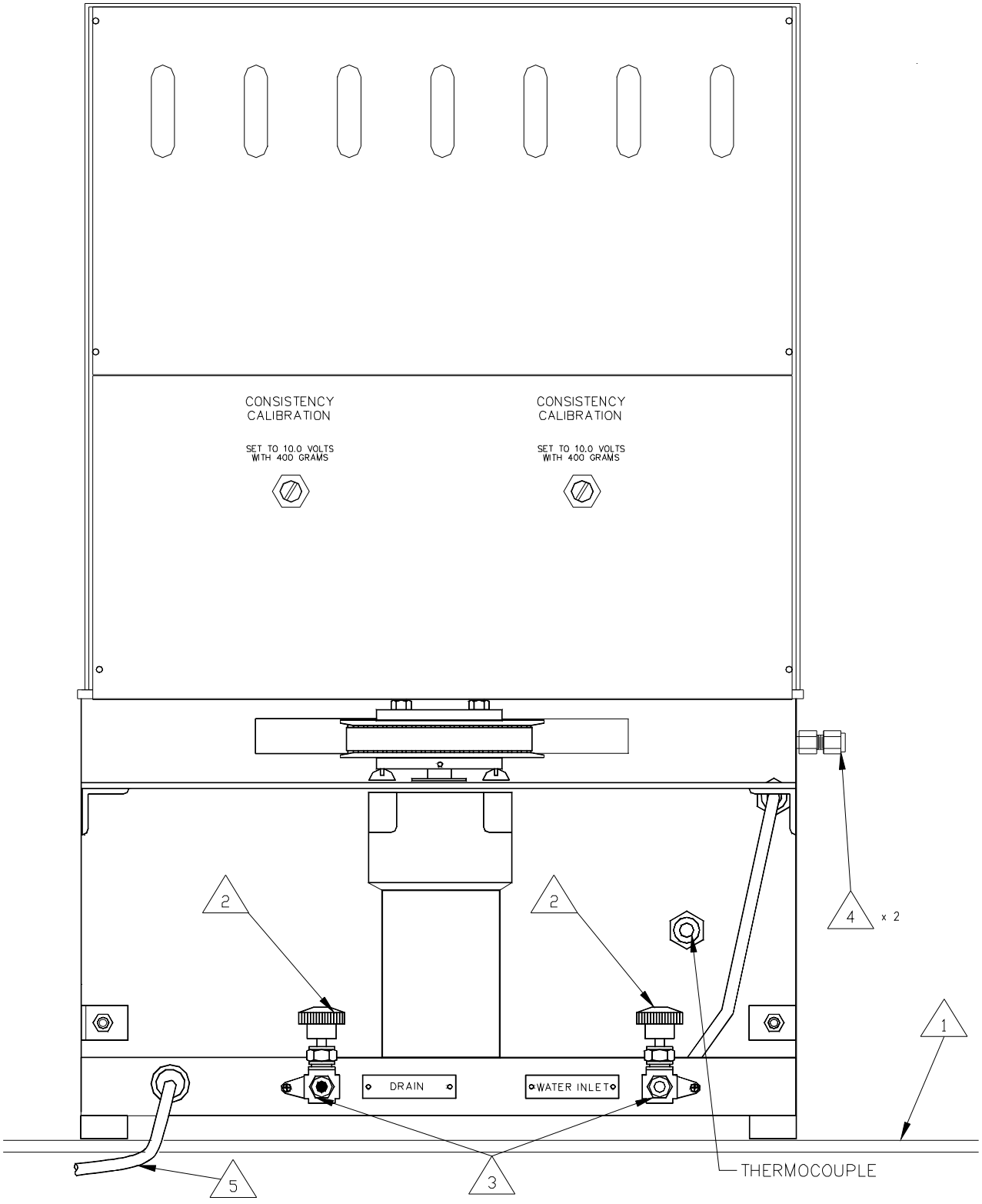
1. Place the instrument on a sturdy, level table.
2. Close the supply and drain valves by turning the knobs counterclockwise.
3. Connect the water supply and drain lines.
4. Connect cooling coils to a cold water source and drain, if so desired. Cooling coil use is optional. Either connection can be used for the inlet or outlet.
5. Connect power cord to the correct voltage source.

Note: To prevent shock hazard, connect the instrument to an electrical outlet using a three-prong socket to provide positive ground.

FIGURE 1

INSTALLATION – SETTING UP THE INSTRUMENT

△x = STEP #



Section 2 – Operating Instructions

Model 1250

As described in *Calibration Procedure*, found in *Maintenance - Section 3*, the paddle should be checked to ensure that it is not bent or does not rub the inside of the slurry container.

Refer to *Figure 2* for the following steps unless otherwise noted:

1. Remove the slurry container.
2. Open the water supply valve by turning the knob counterclockwise and fill the bath until it is 1/2" (12.5mm) below the brass rotating sleeve (Refer to *Section 1 – Installation; Figure 1*).
3. Close the water supply valve by turning the knob clockwise when the appropriate water level is obtained (Refer to *Section 1 – Installation; Figure 1*).
4. Prepare sample and fill the slurry container as detailed in *API Spec 10 A/B*.
5. Attach the container lid to the slurry container.

Caution: Line up the pointed end of the paddle to the center pivot hole at the bottom of the slurry container to ensure smooth rotation.

6. Install the slurry container in the instrument. Be sure the bottom roll pin on the container lid fits into the brass rotator sleeve slots.
7. Turn the container lid until the torque bar fits into the anchor stop.
8. Verify the Mic plug is connected to the appropriate socket located on the front panel.
9. Turn the master switch on.
10. Use the temperature controller to set the desired temperature or heating profile. Refer to *Set-point Control* in the *Temperature Controller* section for further details.
11. Turn on the motor switch.
12. Turn on the heater switch.
13. An alarm will sound upon completion of the test (the alarm is factory set to 100 Bc and will independently sound for each cylinder).

Caution: Remove the slurry on or before 100 Bc of torque to prevent shearing of the shear pin or slippage of the indicator caused by forcing it against the stop.

14. After completion of the test, the alarm will sound. Turn off the motor switch.
15. Remove the slurry container. If only one slurry container is removed, the motor switch can be turned on to finish the other test if necessary.

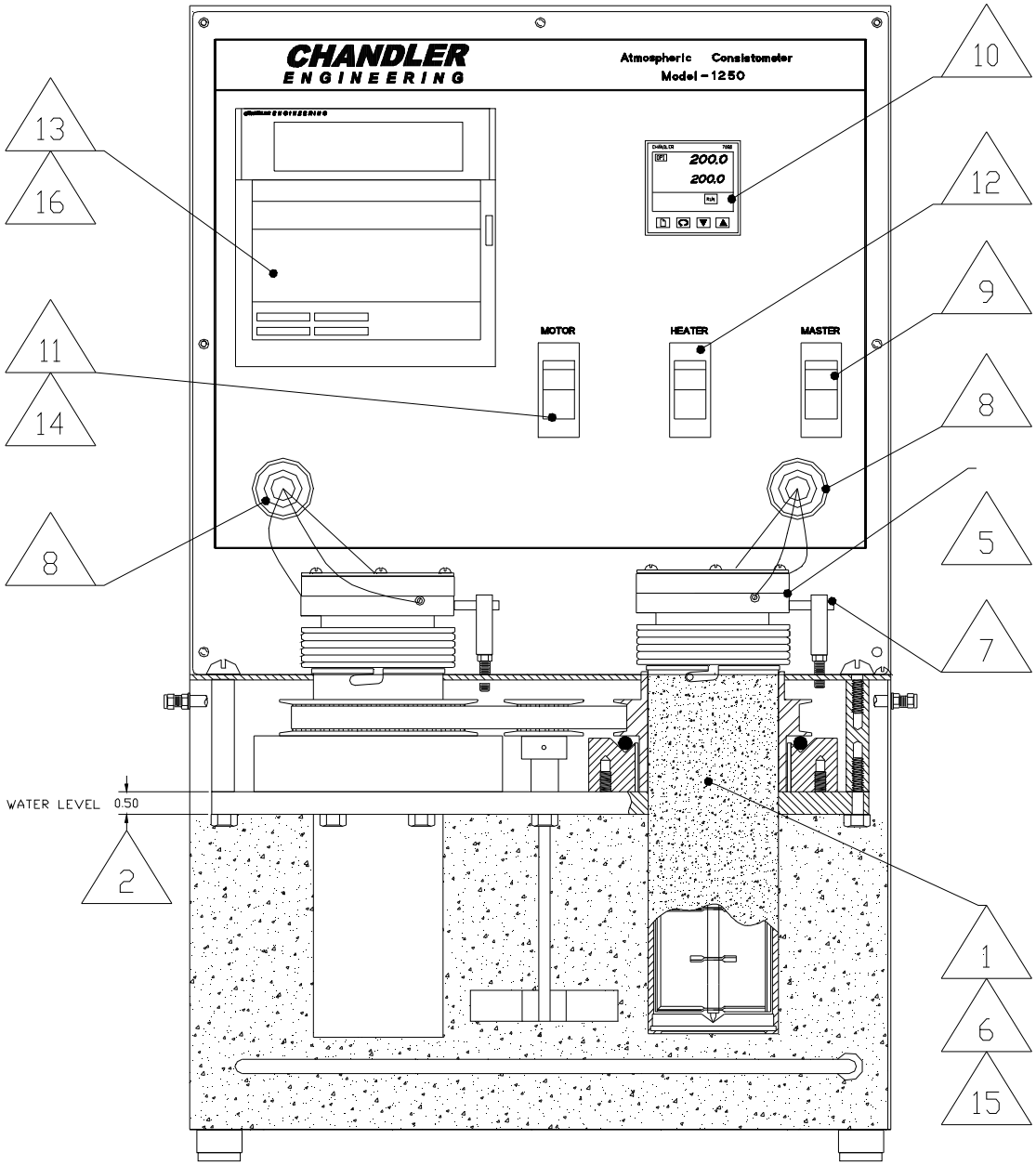
Note: When the slurry container is removed or the potentiometer cable is unplugged, the buzzer will stop.

16. Before draining the water, turn off the heater and power switches.
17. Open the drain valve by turning the knob counterclockwise to remove the water from the tank (Refer to *Section 1 – Installation; Figure 1*).
18. Close the drain valve by turning the knob clockwise (Refer to *Section 1 – Installation; Figure 1*).

FIGURE 2

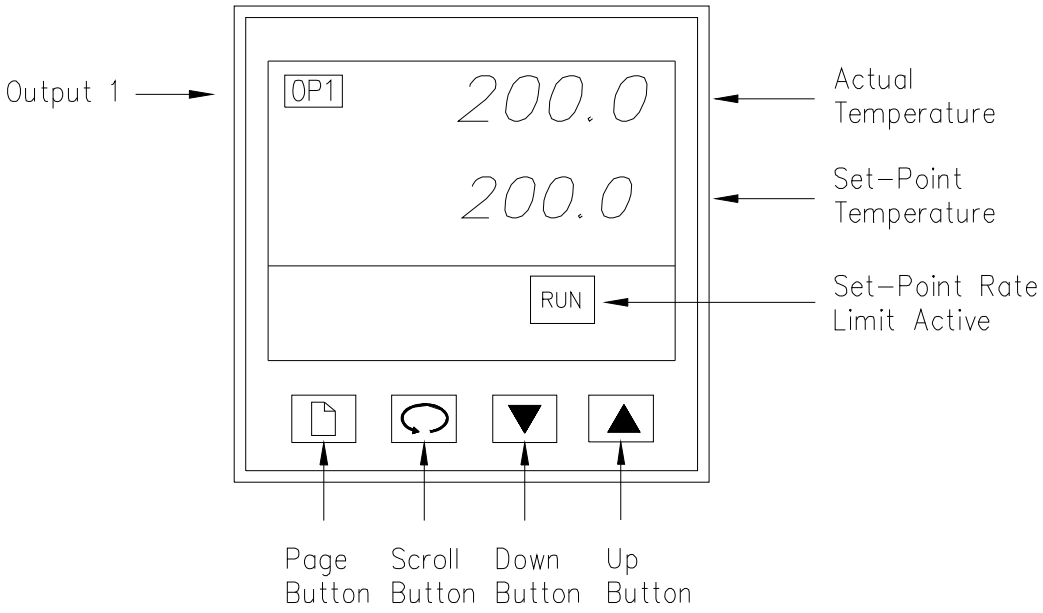
OPERATING PROCEDURE -- MODEL 1250

△X = STEP #



Temperature Controller

FIGURE 3



Set Point Control

The temperature controller is used to control the temperature of the water bath. To set the water bath temperature, use the "**Up/Down**" arrow buttons to change the set-point temperature value. This will heat the bath as fast as possible to the set point. The "**OP1**" light will turn on indicating the controller is operating. To disable the temperature controller press the "**Down**" arrow button and set the controller to "**0.0**." The "**OP1**" light will shut off.

Ramp Rate Control

To heat using a ramp rate, press the page button until the "**SP**" list (set point list) is displayed. Press the scroll button until the **"SPrr**" (set point ramp rate) is displayed, press the "**Up/Down**" arrow buttons to set the desired ramp rate (degrees/minute). Press the page button to return to the normal display. Using the "**Up/Down**" arrow buttons, adjust to the final temperature desired. Both the "**RUN**" and "**OP1**" lights will turn on. To disable the heater, press the "**PAGE**" button to "**SP**" list, scroll to "**SPrr**," and adjust the ramp rate to "**OFF**." Press the "**PAGE**" button to advance to the normal display and adjust the set point to "**0.0**" using the "**Down**" arrow button. The "**RUN**" and "**OP1**" lights will shut off.

Strip Chart Recorder

Refer to the accompanying instruction manual for the strip chart recorder for operation.

Section 3 – Maintenance

Tools Required

Adjustable wrench
Phillips screwdriver

Strip Chart Recorder

Refer to the accompanying instruction manual for the strip chart recorder regarding any maintenance instructions.

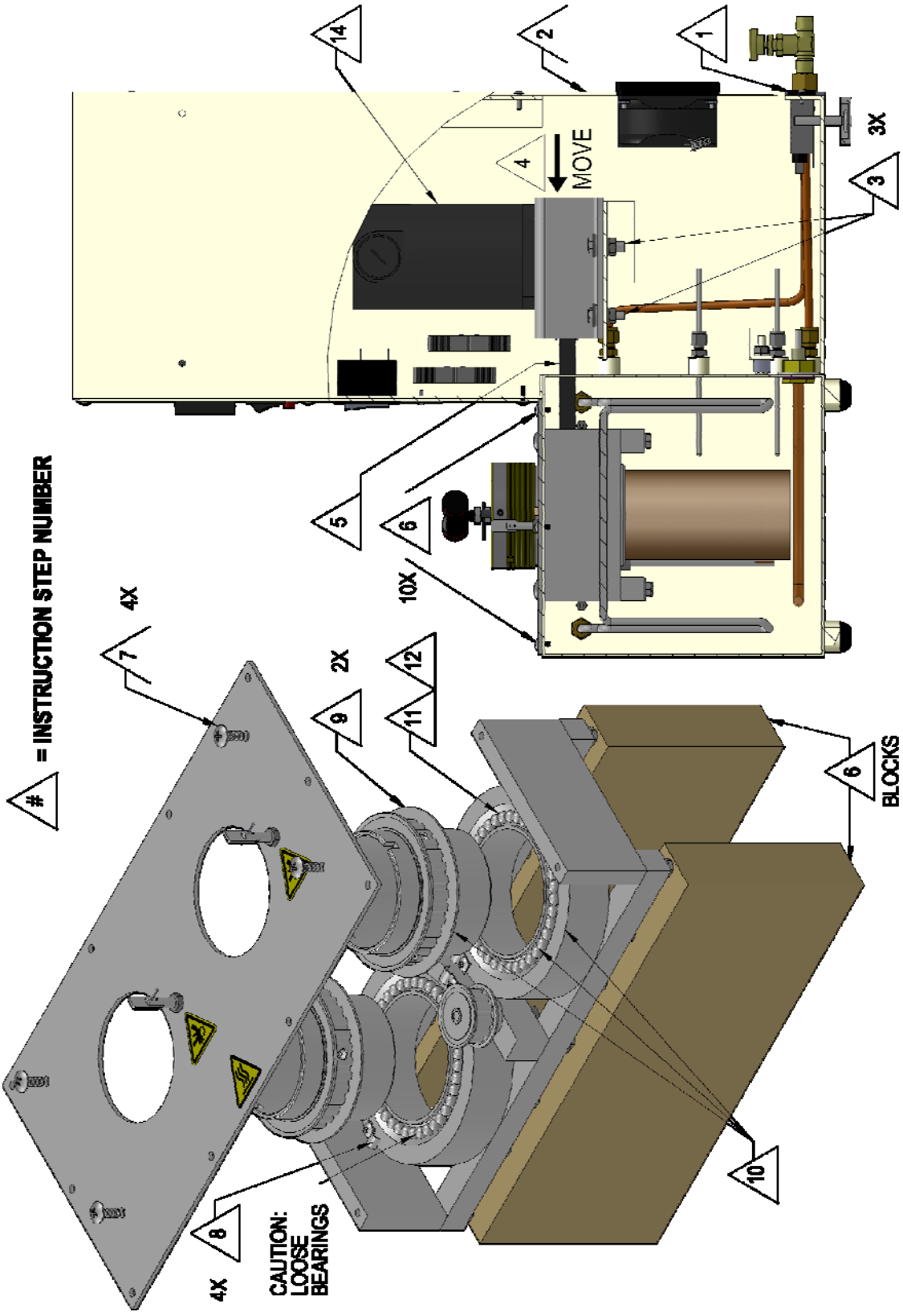
Cleaning and Service Tips

The slurry cup rotators are moved on fluorocarbon polymer bearings that have low friction resistance and require only occasional lubrication. It is recommended that the rotators be examined periodically and lubricated with a light lubricating oil.

Refer to *Figure 3* for the following steps:

1. Disconnect electrical power.
2. Remove back protective cover plate.
3. Loosen bolts on motor mounting bracket.
4. Push motor forward.
5. Remove belt from motor timing sprocket.
6. Remove the ten (10) outer screws on the deck cover, remove the entire assembly from the water bath, and set it on blocks to prevent damage to the rotators.
7. Remove the four (4) inner screws on the deck and remove the top plate from the bearing housing.
8. Loosen and rotate retaining tabs securing the rotators in the bearing housing.
9. Pull rotators. (**CAUTION:** Watch for loose bearings when rotators are removed!)
10. Clean rotators, bearings and bearing assembly.
11. Place bearings in bearing assembly. (**CAUTION:** Use 38 bearings per rotator!)
12. Apply oil generously to bearings.
13. Re-assemble instrument.
14. Pull motor back only enough to prevent belt slippage. Allow approximately 1/2" (12.5mm) slack in drive belt to prevent excessive side thrust to bearings. (**CAUTION:** Do not over-tighten belt!)

FIGURE 4 - CLEANING AND SERVICE TIPS



Calibration Procedure

Before calibration and operation of the instrument, the paddle should be tested for excessive friction by running the slurry container without cement inside. If the paddle is bent so that it rubs on the side, appreciable movement will be shown on the strip chart recorder. The bearings in the slurry-indicating lid should be checked for excessive friction. Any abnormality should be corrected before proceeding with the instrument calibration.

Calibration and operation of the instrument is described in *API Spec 10 A/B*. This instrument is equipped with a calibrating spring and can be calibrated using the calibration device. The calibration device can be purchased separately. The roller located on the side of the calibration device is raised to a position so that the cord is level with the lid.

Refer to *Figure 4* for the following steps unless otherwise noted:

1. Place the container lid on the calibration assembly.

2. Place the cord counterclockwise around the lid and attach 400 grams of weight.

3. Connect the wires to the appropriate pins located on the container lid. Position the wires so they don't restrict the rotation of the container lid.

4. Pull the weight down slightly and release a few times to obtain an average reading.

5. Adjust the Consistency Calibration Potentiometer located on the back of the instrument (*Refer to Section 1 – Installation; Figure 1)* until the recorder reads 100 Bc.

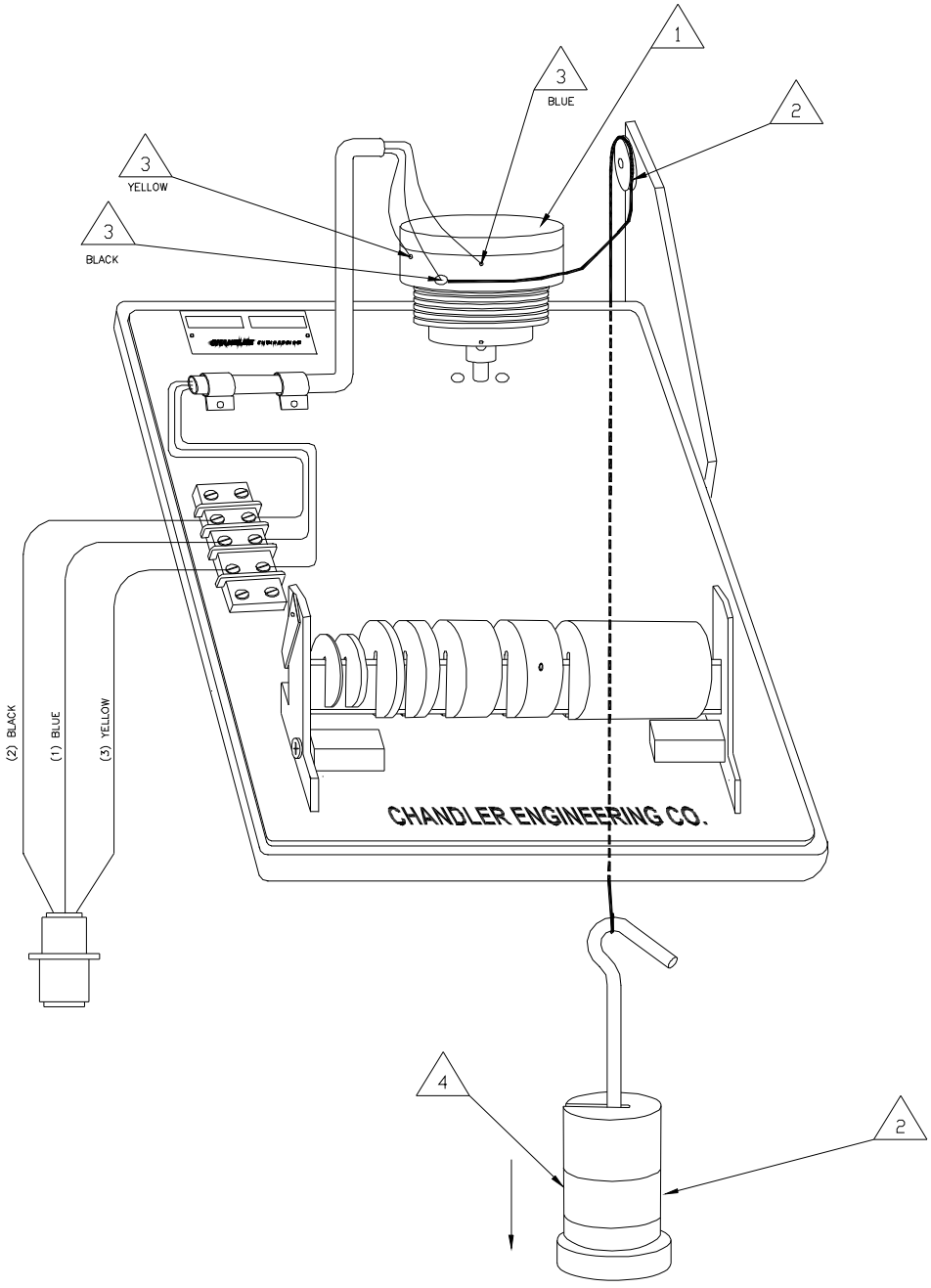
6. Repeat steps 1 through 5 for the other slurry container if necessary.

Note: The Consistency Calibration Potentiometers are located on the back panel of the instrument and directly behind the appropriate slurry containers.

FIGURE 4

CALIBRATION PROCEDURE- MODEL 1250

△X = STEP #



Maintenance Schedule

MAINTENANCE SCHEDULE MODEL 1250 ATMOSPHERIC CONSISTOMETER					
COMPONENT	EACH TEST	MONTHLY	3 MONTHS	6 MONTHS	ANNUAL
Slurry Cup	Disassemble Clean Inspect				
Potentiometer Mechanism	Clean Inspect		●Calibrate		
Drive Motor					●Check Speed
Rotators and Bearings			Clean Lubricate		
Temperature Controller					●Calibrated By Qualified Factory Service Technician
Thermocouple					●Calibrated By Qualified Factory Service Technician

This maintenance schedule applies to normal usage of two tests per day. Detailed procedures for these operations are contained in your manual.

● Per API Specifications

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Section 4 – Troubleshooting Guide

Problem	Solution
Unit will not power-up.	1. Check main power.
Drive motor is inoperative.	1. Replace motor controller fuse on the motor speed control board. 2. Clean and lubricate the bearings and rotators. 3. Replace brushes in the motor. 4. Replace the motor speed control board. 5. Replace motor.
Heater system is inoperative.	1. Replace solid state relay. 2. Replace temperature controller. 3. Replace heater.
Timer is inoperative.	1. Replace timer.
Chart is hard to read.	1. Replace pens.

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Section 5 - Replacement Parts

Part Number	Description
07-0176	Thermocouple Assembly
07-0505-03	Potentiometer Calibrating Device Assembly (Optional)
12-0021	Paddle Assembly
12-0023	Container Assembly
12-0031	Cross Bar Support
12-0033	Heater Assembly, 220V
12-0044	Bearing Housing Assembly
12-0045	Rotator Assembly
12-0047	Sprocket, Idler and Stirrer Assembly
12-0048	Impeller and Shaft Assembly
12-0057	Heater Assembly, 110V
12-0059	Internal Cooling Coil
12-0082	Container Lid Assembly - Potentiometer Type
12-0091	Anchor Stop Assembly
12-0126	Cabinet and Tank Assembly
12-0176	Timing Belt Sprocket, Coated
12-0177	Split Bushing, Coated
7080	Temperature Controller
C07882	DC Power Supply
C07952	Potentiometer, 100 Ohm, CTS, 5W, 500 VDC
C09286	Motor, Gear, DC (S/N 1254 and above)
C09287	Controller, DC Control, Model 0865 (S/N 1254 and above)
C10647	Recorder, 3 Pen
C10828	Recorder, 3 Pen, Red
C10829	Recorder, 3 Pen, Green
C10830	Recorder, 3 Pen, Blue
C10832	Recorder Paper
P-0025	Cable Clamp
P-0417	Terminal Block, 6 Conductor
P-0424	Terminal Block, 2 Conductor
P-0655	Glider Foot
P-1233	Rubber Foot
P-1418	Socket, 3 Contact
P-1500	Needle Valve
P-1648	Set Collar
P-1649	Timing Belt
P-1653	Terminal Strip
P-1698	Nylon Bearing Balls
P-1938	Step-down Transformer, 220 VAC
P-2005	Terminal Jumpers
P-2702	Resister,2K Ohm,8W,5%,WW
P-2948	Variable Speed Control Knob
P-3255	Motor, Gear, DC,1/17HP, 208RPM (S/N 1253 and below)
P-3256	Control, Motor Speed (S/N 1253 and below)

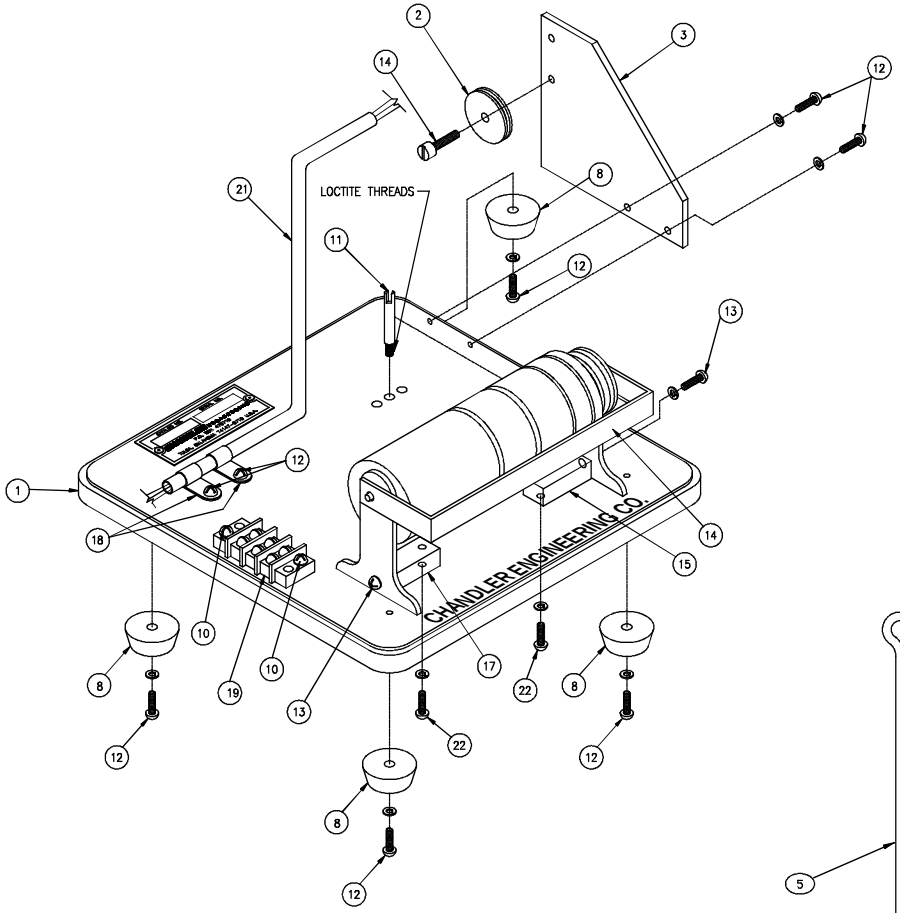
Part Number	Description
P-3330	Solid State Relay
P-3387	Circuit Breaker Switch, 16A, 110 VAC
P-3388	Circuit Breaker Switch, 10A, 220V
P-3389	Circuit Breaker Switch, 8A, 220V
P-3390	Circuit Breaker Switch, Motor, 3A,110 VAC

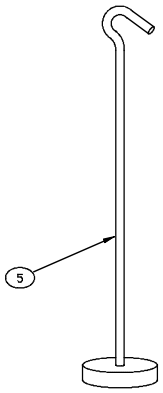
To ensure correct part replacement, always specify Model and Serial Number of instrument when ordering or corresponding.

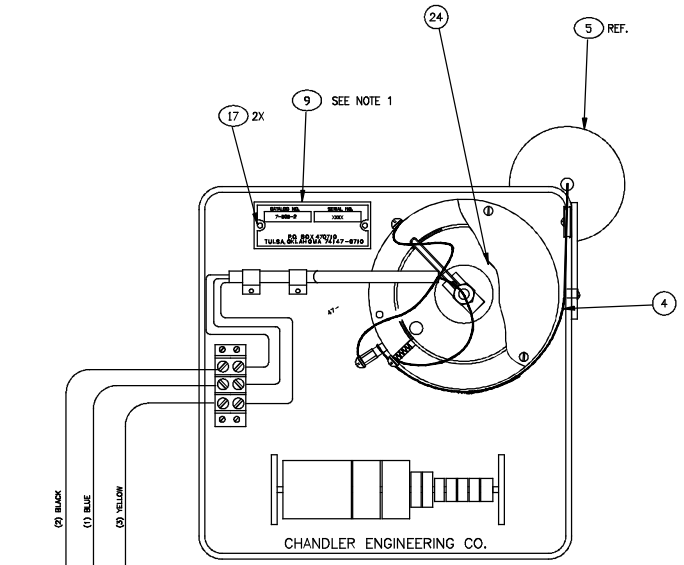
Section 6 - Drawings and Schematics

Drawing Number	Description
07-0505-03	Potentiometer Calibration Device Assembly
12-0082	Container Lid Assembly
12-0134	Model 1250 Atmospheric Consistometer
12-0158	Wiring Schematic, 200-240VAC
12-0178	Wiring Schematic, 100-130 VAC

REVISIONS					
ECN	ZONE	REV	DESCRIPTION	DATE	APPROVED
T1726		F	ADDED ITEMS 9 & 17 AND NOTES	7/8/08	TC
T2889		G	UPDATED MANMAN BOM ONLY	4/15/10	TC
T3138		H	UPDATE P-1417	7/20/10	SS/TC
T3329		J	MAKE 12-0082 A REF, CHG ITEMS 23,26,27 TO 22 GA	9/23/10	SS/TC
T4282		K	ADD ITEM 28	12/12/11	SS/TC







NOTES:
1. 57-0003 SERIAL NUMBER PLATE MUST BE STAMPED WITH PART NUMBER AND SERIAL NUMBER OF 07-1564 WEIGHT SET BEFORE RIVETING IN PLACE.
2. SERIAL NUMBER OF CALIBRATOR MUST MATCH WEIGHT SET, HANGER, AND CERTIFICATION SHEET. CERTIFICATION SHEET MUST BE SHIPPED WITH CALIBRATOR.

-04	-03	-02	-01	QTY. REQD.	PART NUMBER	DESCRIPTION	MATERIAL SPEC.	ITEM
				1	07-1564	SET, CALIBRATED WEIGHTS&HANGER		28
				6"	C07405	WIRE, 22 GA. YELLOW, STRANDED	COPPER	27
				6"	C07410	WIRE, 22 GA. BLUE, STRANDED	COPPER	26
								25
				REF	12-0082	LID ASS'Y, RECORDING (SUPPLIED W/ ATMOSPHERIC		24
				6"	C07409	WIRE, 22 GA. BLACK, STRANDED	COPPER	23
				2	H-8018	SCREW, 8-32 X 5/8"LG		22
				1	07-0516-02	TUBE, WIRE HOLDER	SST	21
				1	P-1417	CABLE,3 COND,TURCK RSM30-2M		20
				1	P-0898	TERMINAL, 3 CONDUCTOR		19
				2	P-0724	CLIP, TUBE HOLDER	NYLON	18
				2	H-100000	RIVET,POP,AD 32 ABS	ALUM	17
				2	H-8001	WASHER, LOCK #8	SST	16
				6	H-6001	WASHER, LOCK SPLIT #6	SST	15
				1	C08848	SCREW, S/H, SHOULDER, 8-32 X 3/16 LG	SST	14
				4	H-8011	SCREW, BNDG HD, 8-32 X 3/8 LG.	SST	13
				8	H-6017	SCREW, BNDG, 6-32 X 3/8 LG.	SST	12
				1	07-0593	SHAFT, PIVOT ADAPTER	SST	11
				2	H-6019	SCREW, 6-32 X 1/2"LG		10
				1	57-0003	MODEL/SERIAL PLATE		9
				4	P-1233	FEET, BASE	RUBBER	8
				2	07-0508	BAR, MOUNTING, WEIGHT SET	ALUM.	7
				REF	07-1537	SET,CALIBRATED WEIGHT	BRASS	6
				REF	07-1538	HANGER,CALIBRATED WEIGHT	ALUM	5
				1	07-0519	CORD ASSEMBLY, WEIGHT HANGER	NYLON	4
				1	07-0595	SUPPORT, PULLEY	ALUM.	3
				1	C08847	PULLEY	PLASTIC	2
				1	07-0507	BASE PLATE	CAST ALUM.	1

BOTH MAKE UP 07-1564 SET

PARTS LIST

1250-00 — NEXT ASSY
ATMOSPHERIC-RECORDING — USED ON
APPLICATION
BREAK SHARP EDGES, DEBURR

TOLERANCES: 1 PLACE ±0.030 [.76]; 2 PLACE ±0.010 [.25]; 3 PLACE ±0.005 [.127]; ANGLES ±1/2°; SURF. FINISH 32

APPROVALS		DATE
DRAWN:	AB	04/26/00
CHECKED:	JH	04/26/00
ENGR.:	BD	04/24/00

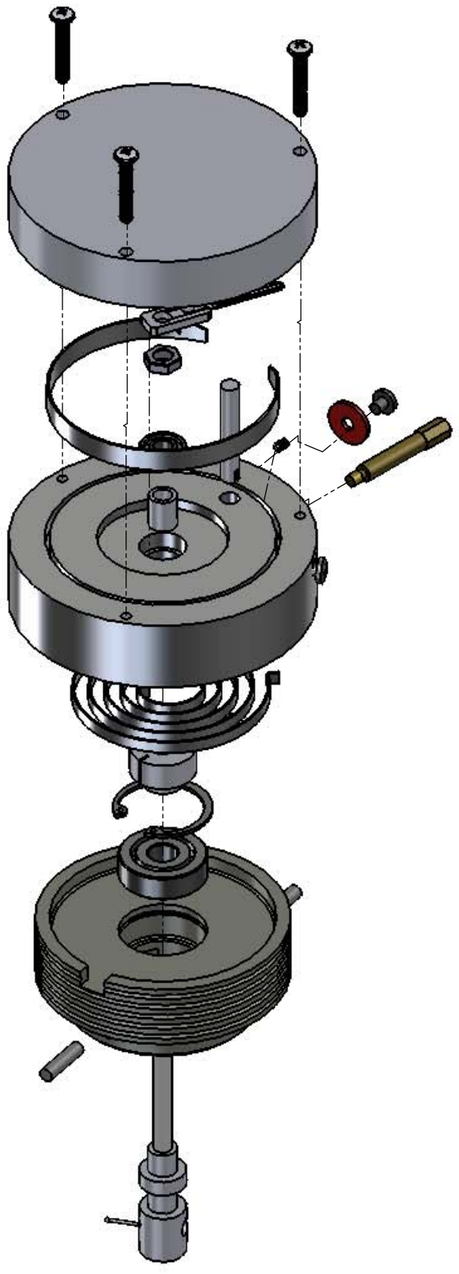
CHANDLER ENGINEERING

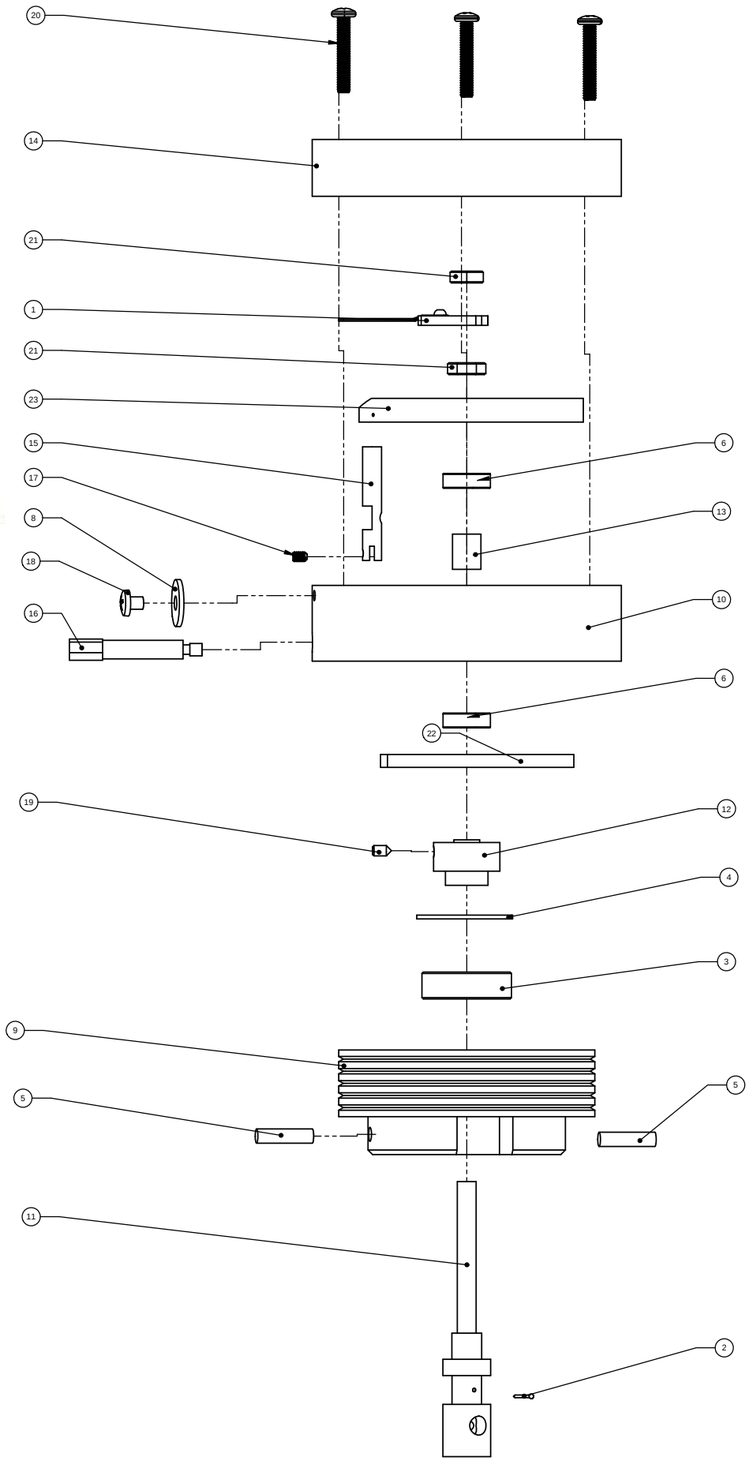
TITLE: ASSEMBLY, POTENTIOMETER CALIBRATING DEVICE-RECORDING

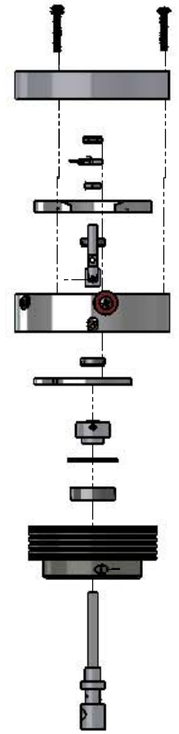
SIZE	S.O. NO.	DWG NO.	REV.
D		07-0505-03	K

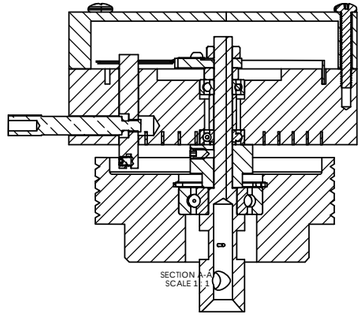
SCALE: 1 = 1 | TITLE BLOCK REV: 1.0 | SHEET: 1 of 1

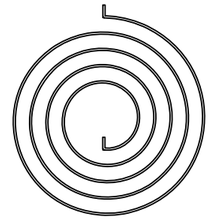
REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	H	ECN# T2247, CREATE IN SOLIDWORKS	4/14/09	SS/TC



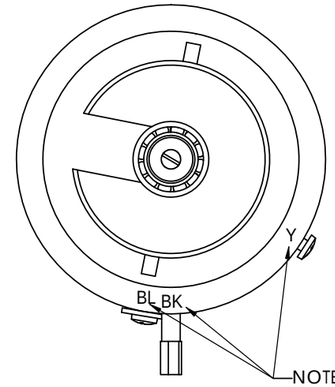








SPRING ORIENTATION
(CLOCKWISE ROTATION)



NOTE: STAMP ON LID ASSY.

ITEM NO.	PART NUMBER	Description	exploded/ QTY.
1	12-0090	WIPER	1
2	P-0844	PIN,SHEAR,BRS,0.035x0.50L	1
3	P-1588	BEARG,BALL,.393X1.181X.354	1
4	P-1642	RING,RTNG,INT,1.319OD	1
5	P-1683	PIN,ROLL,.1875X.75L	2
6	P-1809	SPRING, CONTACT	2
7	P-2046	WASHER, FIBRE	2
8	07-0451	SYNTHANE,RND,3.50X1.50L,GR LE	1
9	12-0015	FRAME	1
10	12-0083	SHAFT, TORQUE	1
11	12-0084	CALIBRATION SPRING COLLAR	1
12	12-0085	SPACER-BEARING	1
13	12-0086	COVER	1
14	12-0087	CALIBRATION SPRING RETAINING PIN	1
15	12-0088	TORQUE BAR	1
16	12-0089	SCREW,SKHSS,SS,5-40X0.187,CUP	1
17	H-5003	SCREW, 8-32 X 3/16 LG. BNDG HD PHILLIPS	2
18	H-8007	SCREW, SET, 6-32 X 1/4 LG. CONE POINT	1
19	H-6035	SCREW,BHMS,SS,8-32X1.000,PHIL	3
20	H-8022	NUT,SST,HX,10-32	2
21	H-25-002	SPRING,CALIBRATION	1
22	07-0064	ASSY,RESISTOR,POT MECH	1
23	07-0058-1		1

QTY. REQD. | PARTS LIST

NEXT ASSY | USED ON

APPLICATION

BREAK SHARP EDGES, DEBURR

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES

TOLERANCES:
1 PLACE ±0.030
2 PLACE ±0.010
3 PLACE ±0.005
ANGLES ±1/2°
SURF. FINISH 32

APPROVALS		DATE
DRAWN:	SS	4/14/09
CHECKED:	TC	4/15/09
ENGR.:	JJM	4/15/09

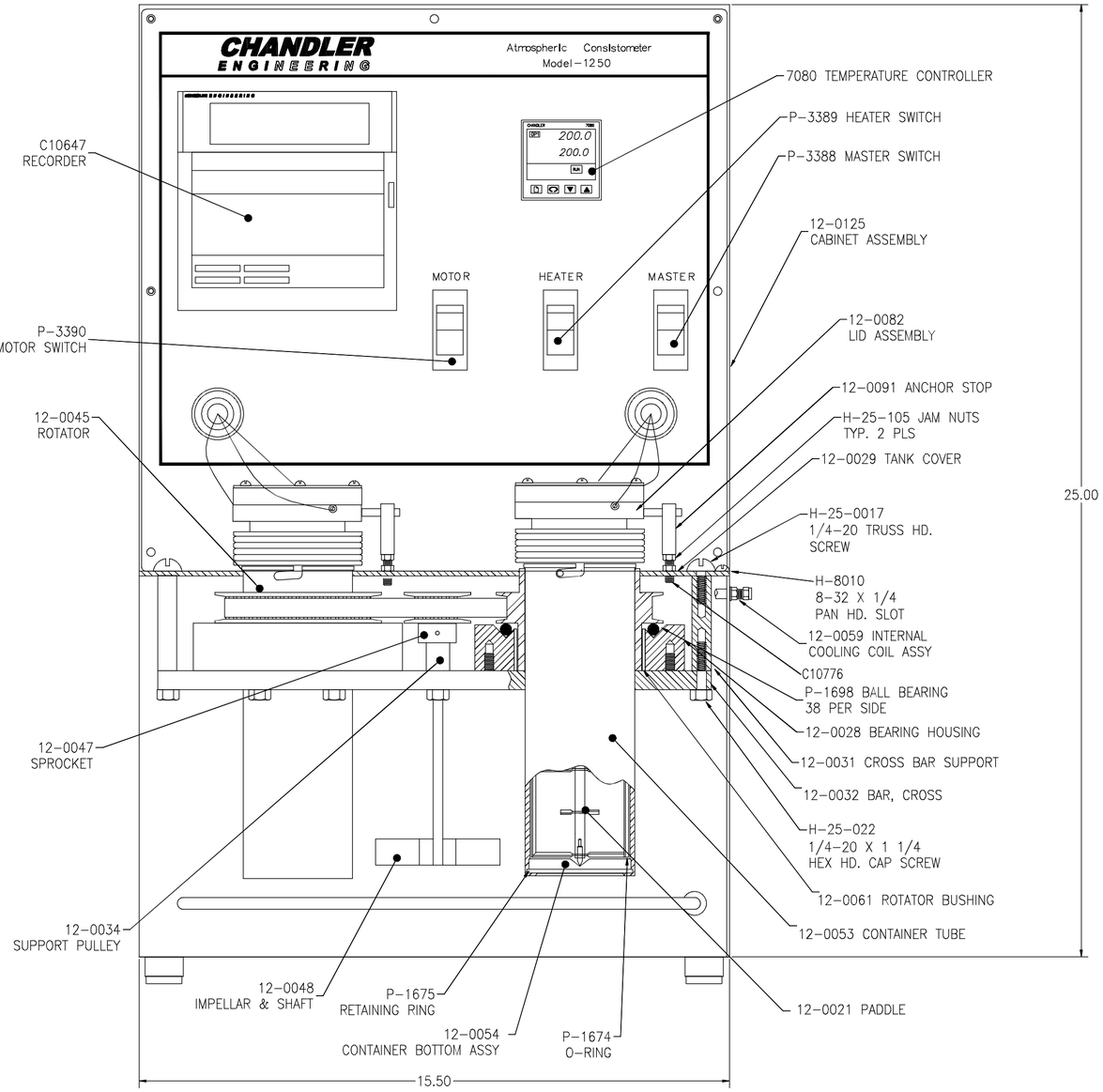
CHANDLER ENGINEERING

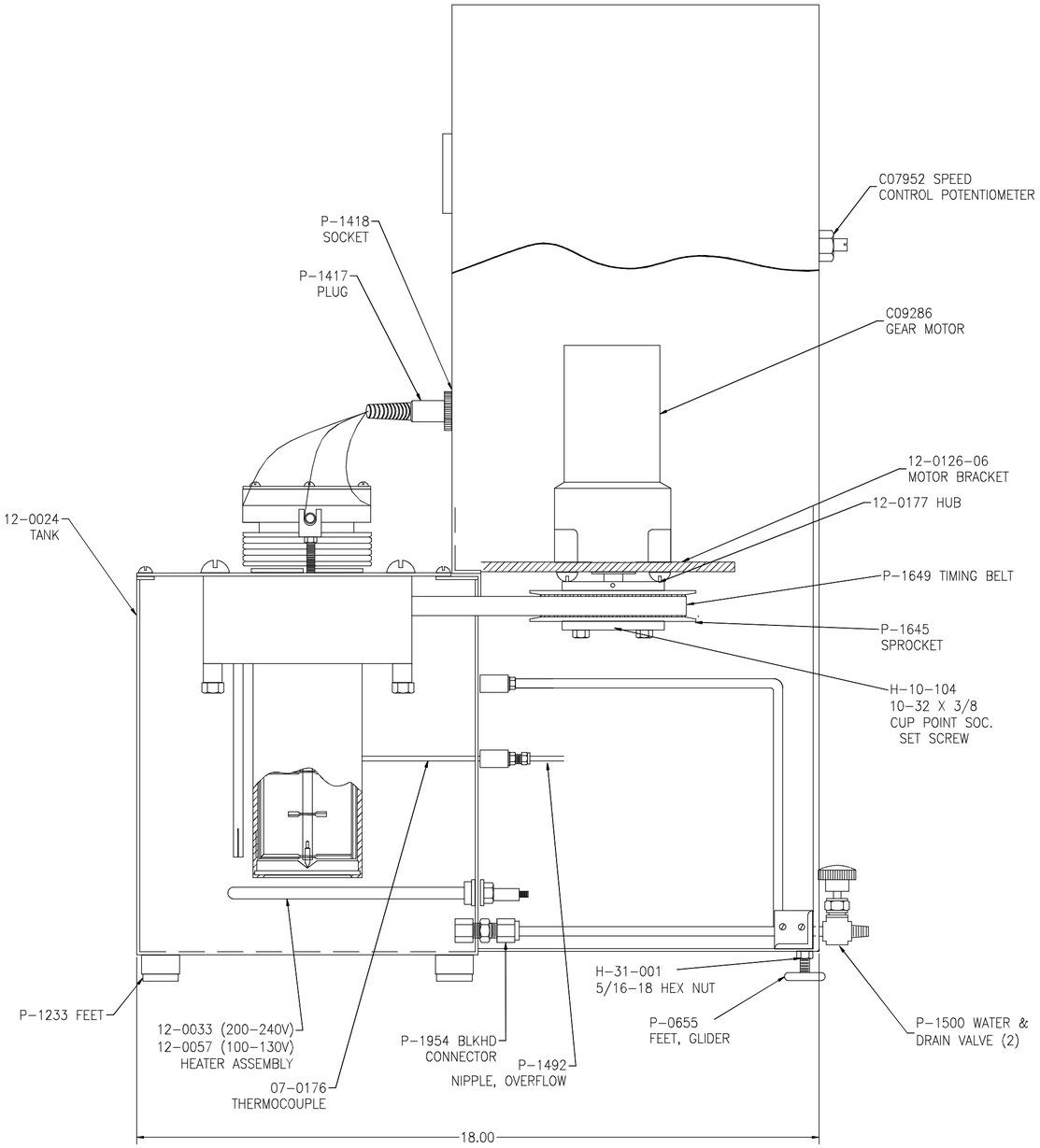
TITLE: LID ASSEMBLY

SIZE D | DWG NO. 12-0082 | REV. H

SCALE: 1:8 | TITLE BLOCK REV. 2.0 | SHEET: 1 of 1

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	H	ECN 8668; CHANGED RECORDER	09-19-03	AMH/TC
C-5	J	ECN T1816; ADDED "38 PER SIDE"	8/7/08	TC
C-5	K	ECN T2010; C10647 WAS C10812	11/07/08	SS/TC
D-2	L	ECN T6863;MOTOR ORIENTATION	10/28/15	CAC/TC





		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES [mm]		**CHANDLER ENGINEERING**			
		TOLERANCES: 1 PLACE ±0.030 [.76]; 2 PLACE ±0.010 [.25]; 3 PLACE ±0.005 [.127]; ANGLES ±1/2°; SURF. FINISH 32		TITLE: MODEL 1250 ATMOSPHERIC CONSISTOMETER			
NEXT ASSY	USED ON	APPROVALS	DATE				
APPLICATION		DRAWN: AEB	12/17/98	SIZE: A2	S.O. NO.	DWG NO. 12-0134	REV. L
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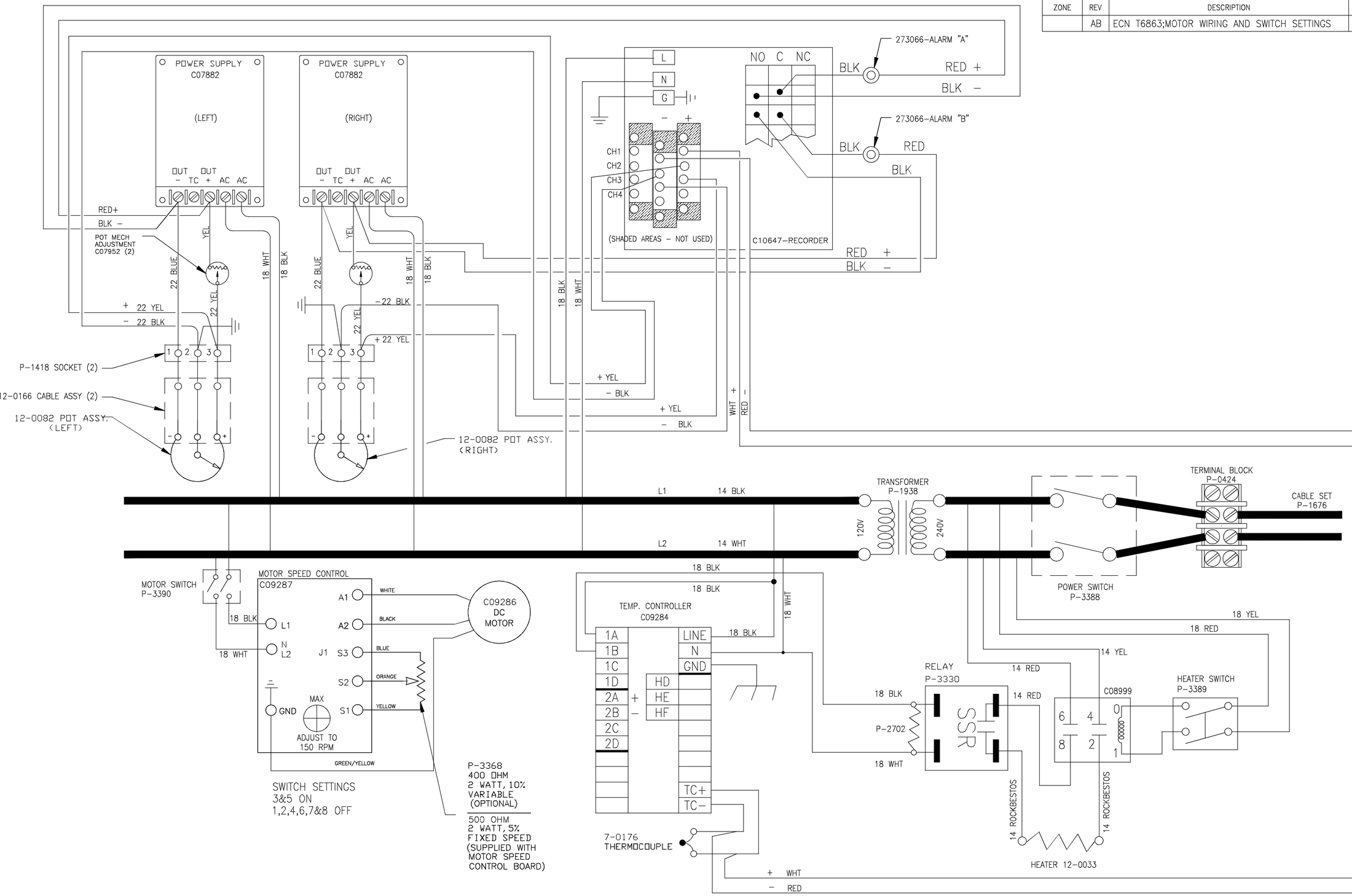
Copyright by Chandler Engineering Company LLC		ENGR.: JJM	12/17/98	SCALE: 1 = 1	DO NOT SCALE DRAWING	SHEET: 1 of 1	

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	AB	ECN T6863;MOTOR WIRING AND SWITCH SETTINGS	10/28/15	CAC/TC



NOTES:
1. COVER ALL SOLDER JOINTS WITH SHRINK TUBING.
2. TIN ALL WIRE ENDS FOR CONNECTION TO RECORDER, CONTROLLER AND POWER SUPPLIES.
3. ALL WIRE 18 AWG UNLESS OTHERWISE NOTED.
4. CALIBRATE TORQUE SYSTEM USING CALIBRATION APPARATUS AT 100 Bc.
5. USE TERMINAL BLOCKS (P−0417, P−1653) AS REQUIRED TO ROUTE AC POWER WIRING.
6. TWIST ALL AC POWER AND DC SIGNAL WIRING.

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES [mm]
TOLERANCES:
1 PLACE ±0.030 [.76]
2 PLACE ±0.010 [.25]
3 PLACE ±0.005 [.127]
ANGLES ±1/2°
SURF. FINISH 32

APPROVALS		DATE
DRAWN:	STAFF	02−03−98
CHECKED:	JJM	02−04−98
ENGR.:	JJM	02−04−98

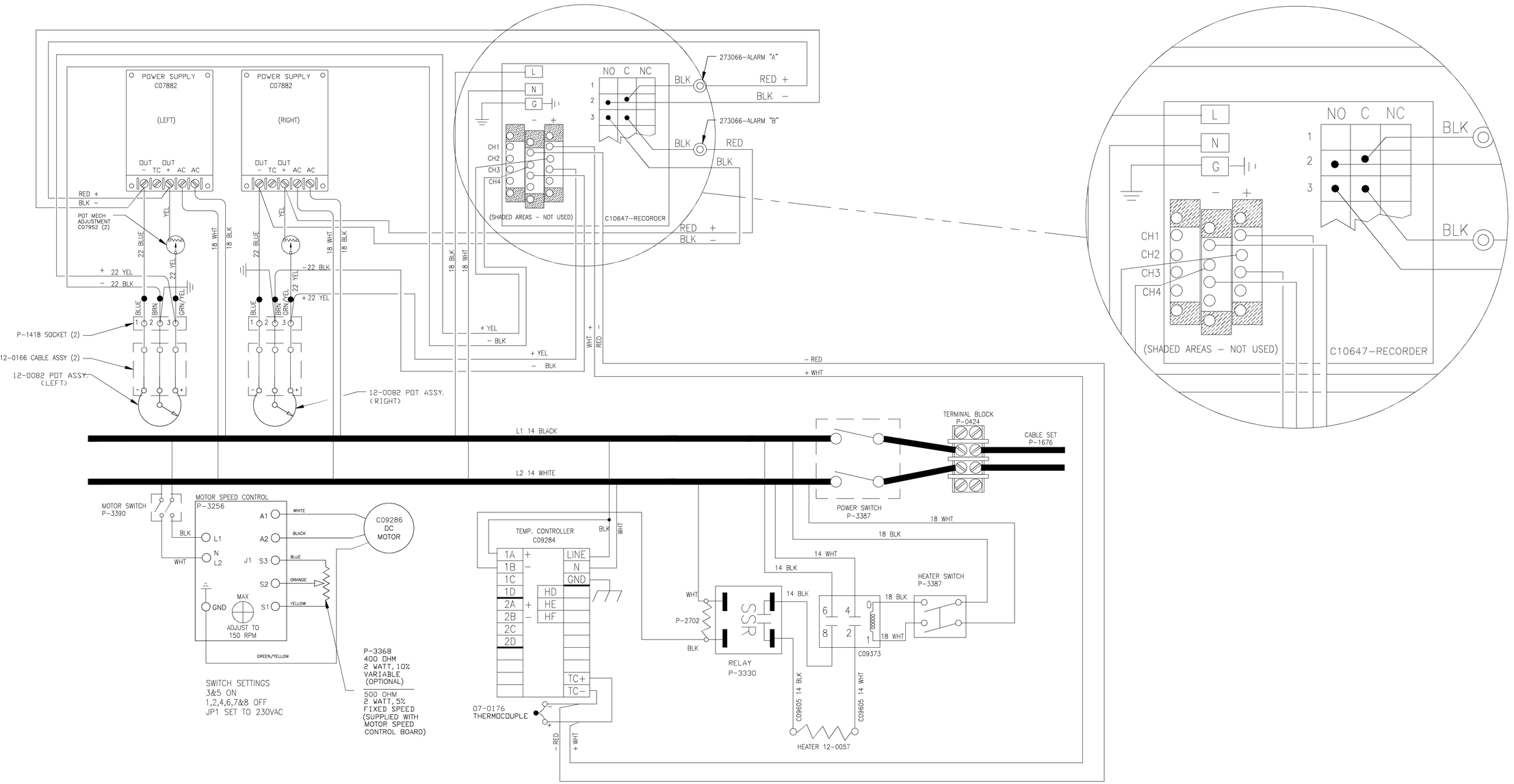
CHANDLER ENGINEERING

TITLE
WIRING DIAGRAM
ATMOS. CONSISTOMETER 200−240V

SIZE	S.O. NO.	DWG NO.	REV.
C		12−0158	AB

SCALE: 1 = 1 | DO NOT SCALE DRAWING | SHEET: 1 of 1

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
D-7	M	ECN T3138, UPDATE P-1418	7/20/10	SS/TC
	N	ECN T5910; REPL P-3255 W/C09286	5/2/14	TC
	P	ECN T6863;MOTOR WIRING AND SETTINGS	10/28/15	CAC/TC



NOTES:
1. COVER ALL SOLDER JOINTS WITH SHRINK TUBING.
2. TIN ALL WIRE ENDS FOR CONNECTION TO RECORDER, CONTROLLER AND POWER SUPPLIES.
3. ALL WIRE 18 AWG UNLESS OTHERWISE NOTED.
4. CALIBRATE TORQUE SYSTEM USING CALIBRATION APPARATUS AT 100 Bc.
5. USE TERMINAL BLOCKS (P-0417, P-1653) AS REQUIRED TO ROUTE AC POWER WIRING.
6. TWIST ALL AC POWER AND DC SIGNAL WIRING.

		UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES [mm]		**CHANDLER ENGINEERING**			
		TOLERANCES:					
		1 PLACE ±0.030 [.76]					
		2 PLACE ±0.010 [.25]					
NEXT ASSY	USED ON	3 PLACE ±0.005 [.127]					
		ANGLES ±1/2°		TITLE			
APPLICATION		SURF. FINISH 32		WIRING DIAGRAM			
BREAK SHARP EDGES, DEBURR		APPROVALS	DATE	ATMOS. CONSISTOMETER 100-130V			
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		ENGR.: JJM	10-29-98	SCALE: 1 = 1	TITLE BLOCK REV: 1.0	SHEET: 1 of 1	