INSTRUCTION MANUAL
MODEL 7120
STIRRED FLUID LOSS CELL
(Original Instructions)

Revision F – May 2025

P/N: 71-1152

S/N _____

CHANDLER ENGINEERING®

AMETEK®

2001 N. Indianwood Ave.
Broken Arrow, Oklahoma 74012 U.S.A.
Telephone: 918-250-7200 FAX: 918-459-0165
Email: chandler.sales@ametek.com
Website: www.chandlereng.com

Table of Contents

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General Information

Introduction

This manual contains installation, operation, and maintenance instructions for the Chandler Engineering Model 7120 Stirred Fluid Loss.

Purpose and Use

The Model 7120 Chandler Stirred Fluid Loss Test Apparatus (Drawing 7120) is a high-pressure, high-temperature apparatus used to perform stirred fluid loss testing of cement slurries in accordance with ISO 10426 and API 10A standards.

Description

The Fluid Loss Tester cylinder assembly includes an impeller that is rotated at 150 rpm. The mixing speed matches the impeller speed used in pressurized Consistometers during thickening time tests, allowing the sample to be conditioned in the cylinder. At the completion of the simulated thickening-time test, the cylinder assembly is inverted to start the fluid loss test. A graduated cylinder or the back-pressure receiver is used to collect the filtrate for measurement of the fluid loss characteristics of the slurry.

Heat to the cylinder is supplied by an external, electrical-resistance, tubular heater around the cylinder. Cylinder temperature is sensed by a thermocouple in the cell wall and is controlled by a temperature controller.

A supply of compressed air, nitrogen, or other inert gas is required for cylinder pressurization. The pressure of the gas supplied to the cylinder and filtrate chambers is adjusted using pressure regulators mounted on the front panel of the apparatus. Pressure is released from the cylinder using the pressure release valve mounted on the front panel.

A water jacket for cooling of the test cylinder is built into the unit. Water inlet and outlet connections are provided at the rear of the instrument. The flow of cooling water is controlled using a panel-mounted coolant switch.

Specifications

- Meets requirements of ISO 10426-2, Section 10 for Stirred Fluid Loss Tests
- 2000 psi / 0-13,900 kPa Cylinder Pressure Gauge and Regulator
- 160 psi / 0-1200 kPa Filtrate Pressure Gauge and Regulator
- 450ºF / 0-232ºC Programmable Temperature Controller
- J-type thermocouple (ASTM E220) mounted in wall of cylinder
- Screen: 45 µm (325 mesh) with a 22.6 cm^2 (3.5 in^2) filtration area backed by a 250 µm (60 mesh)
- Electronic Timer
- Cylinder Cooling Jacket
- Variable Speed DC Motor Drive
- Filtrate Collection Cylinder
- 50 ml Graduated Cylinder

Operating Conditions

Input Voltage:	208 – 240 VAC
Input Current:	8A
Frequency:	50 / 60 HZ, 1PHASE
Maximum Working Temperature:	450°F (232°C)
Minimum Working Temperature:	41°F (5°C)
Heater Wattage:	700 W
Maximum Water Pressure (for cooling):	100 psi (689 kPa)
Maximum Cylinder Pressure:	2000 psi (13,900 kPa)
Cylinder Volume:	500 ml (approximate)
Collection Volume:	100 ml in filtrate cylinder (approximate)
Impeller Speed:	150 rpm

Environmental Conditions

Environment:	Indoor Use
Altitude:	6561.6 ft (2000m)
Temperature:	41°F - 104°F (5°C - 40°C)
Relative Humidity:	0% to 95% non-condensing

Weights and Dimensions

Dimensions:	35.1” (89cm) high x 19.7 (50cm) wide x 26.2” (67cm) deep
Net Weight:	125 lbs (56.7 kg)

Safety Requirements

READ BEFORE ATTEMPTING OPERATION OF THE INSTRUMENT

The Chandler Engineering Model 7120 Stirred Fluid Loss Cell is designed with operator safety in mind. Any instrument that is capable of high temperatures and pressures should always be operated with **CAUTION**!!

WARNING: Read before attempting operation of instrument. This instrument is capable of high temperatures and pressures and must always be operated with CAUTION. The instrument is designed for operator safety. To ensure that safety it is essential to follow the instructions outlined below.

To ensure safety:

- Provide adequate training of all personnel that will operate the instrument.
- Locate the instrument in a low traffic, well ventilated area.
- This is a bench top device; place the instrument on a suitable level and stable surface. Allow adequate clearance around the instrument to provide adequate ventilation and to allow the head assembly to be rotated safely.
- Always position the instrument in such a manner that allows easy access to the power cord.
- Post signs where the instrument is being operated to warn non-operating personnel that high pressure, high temperature equipment is in use.
- Observe caution notes.
- Observe and follow the warning labels on the instrument.
- Never exceed the instrument maximum temperature and pressure ratings.
- Always disconnect main power to the instrument before attempting any repair.
- Turn OFF the heater at completion of each test. Appropriately-rated fire extinguishers should be located within close proximity.
- Avoid contact with moving parts.
- Although the pressure vessel was designed using appropriate materials and techniques, it is imperative to monitor the condition of the vessel and related components with a focus on safety.
- Note that Chandler Engineering recommends periodic re-inspection and testing of the pressure vessel assembly to maintain the rated temperature and pressure ratings. Without re-inspection and testing, the pressure rating of the vessel assembly should be de-rated as a function of age, usage and condition in accordance with established vessel de-rating schedules at Chandler Engineering. Chandler Engineering supports the design and offers periodic vessel testing services and component replacement if/when required.
- A fire extinguisher, type 8 BC, should be located within 50 feet (15 meters) of the instrument.
- Have the safety officer at your location or laboratory review the safety aspects of the instrument and installation and approve the operational and installation procedures.
- Hearing protection may be necessary during initial startup.
- Before attempting to operate the instrument, the operator must read and understand this manual.

Symbols Used on Equipment

Symbol	Meaning
	Protective Conductor Terminal
	Hazardous Voltage Inside Disconnect power before opening
	Hot Surface Do Not Touch Allow to cool before servicing
	Documentation must be consulted in all cases where this caution symbol is marked.
	Pinch Point Don't touch rotating parts

Where to Find Help

In the event of problems, contact your local sales representative or Chandler Engineering:

- Telephone: 918-250-7200
- Fax: 918-459-0165
- E-mail: chandler.sales@ametek.com
- Website: www.chandlereng.com

Instrument training classes are also available.

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.

Lifting Instructions

To position the instrument for installation, a two person lift is recommended. Firmly grasp the bottom of the instrument frame on opposite sides while lifting to ensure the instrument stays level. Do not attempt to lift, carry, or move the instrument with only one person.

Utilities Required

208-240VAC, 8A, 50/60HZ

Water supply

Drain

Tools/Equipment Required

Basic hand tools

Setting up the Instrument

1. Place the instrument on a sturdy, level table.
2. Close the supply and drain valves.
3. Connect the water supply and drain lines.
4. Connect power cord to the correct voltage source.

Note: *The instrument is now ready to insert the cylinder and operate.*

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Section 2 - Operation

Fluid Loss Cylinder Assembly

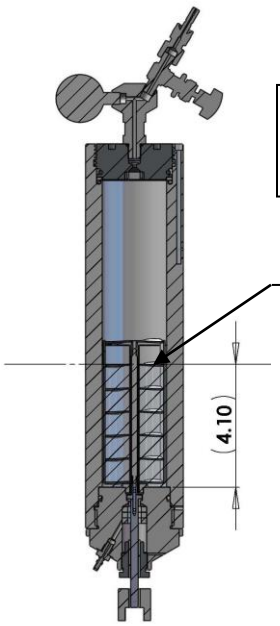
The fluid loss cylinder assembly consists of a stainless steel housing that is sealed with a top housing assembly and a bottom impeller housing assembly. The pressure seal is accomplished using o-rings. The temperature of the cell is measured using a thermocouple located in the cylinder wall. The impeller is driven at 150 rpm using a shaft through the bottom housing assembly. The shaft seal is a high temperature packing material. The packing tension is adjustable by tightening the nut on the bottom of the housing assembly. Pressure is transmitted into the cell using a high pressure quick disconnect and high pressure hose. Pressure enters the cell through the annular area between the paddle shaft and the standpipe assembly. The impeller drive shaft is supported with two bronze bushings that serve to center the shaft and provide a thrust bearing surface. The filter screen is supported between the top cap and a shoulder in the cell and sealed with an o-ring.

Cement Fluid Loss Tests

Note that the Model 7120 Fluid Loss Testing Apparatus is designed to meet the requirements of ISO 10426, Part 2, Section 10. The following procedures are based on this standard with specific additions that are applicable to the device. We recommend obtaining a copy of ISO 10426, Part 2 in addition to this manual.

Low-Temperature Fluid Loss Testing [Below 190ºF / 88ºC

1. Orient the cylinder enclosure to the upright or mid-position detent position.
2. Prepare the slurry in accordance with ISO 10426, Part 2 procedures.
3. Pour the slurry from the blender into the cylinder, taking care not to spill cement on the cylinder threads. Fill the cylinder up to a level slightly below the second blade from the top of the paddle. Use the Fill Gage 71-0162 as a guide. See the following figure.



The slurry height shown here is even with the root of the second paddle and represents **230 ml** (nominal).

Keep Slurry **Below** This Point

NOTE: Using too much slurry in the cell can cause the standpipe to become clogged with cement, preventing the controlled release of pressure.

4. Fit the filter screen in place.
5. Open the bleed valve, and screw the cap assembly into the threaded cylinder, until finger tight. Close the bleed valve.
6. Care must be taken not to rotate the cylinder so that cement slurry comes into contact with the filter screen. If this happens, the slurry residue can bake onto the screen, forming a hard crust and blocking all or part of the screen.
7. Lower the cylinder assembly into the enclosure until the cylinder cap is flush with the enclosure's cover (ensure that the latch snaps in place) and insert the thermocouple with cable connected.
8. Attach the high pressure hose to the bottom of the cylinder.

NOTE: The hose must be connected to apply pressure to the cell. The quick disconnect will not trap pressure in the cell when the hose is disconnected.

9. Verify that the compressed-air supply line or nitrogen gas bottle is connected to the fitting on the back of the instrument cabinet.
10. Turn on the master power switch.
11. Rotate the cylinder Pressure Regulator clockwise to adjust the cylinder pressure. Apply 500 psi ±50 psi / 3500 kPa ±300 kPa.
12. Turn on the motor switch to agitate the slurry at 150 rpm.
13. Enter the desired thickening-time schedule into the temperature controller and turn on the heater switch.
14. Start the timer on the front panel or monitor the time display in the temperature controller to record the test time.
15. Once the slurry has reached the specified temperature invert the vessel.

WARNING: Do not remove the thermocouple without switching the heater off and ending the temperature controller program.

16. Apply 1000 psi ±50 psi / 7000 kPa ±300 kPa differential pressure to the test cell.
17. Open the valve below the screen to start the fluid loss test.

High-Temperature Fluid Loss Testing [Above 190°F / 88ºC

1. Orient the cylinder enclosure to the upright or mid-position detent position.
2. Prepare the slurry in accordance with ISO 10426, Part 2 procedures.
3. Pour the slurry from the blender into the cylinder, taking care not to spill cement onto the cylinder threads. Fill the cylinder up to a level slightly below the top of the impeller standpipe. A scribed line exists in the vessel that may be used as a reference.
4. Fit the filter screen in place.
5. Open the bleed valve, and screw the cap assembly into the threaded cylinder, until finger tight. Close the bleed valve.
6. Care must be taken not to rotate the cylinder so that cement slurry comes into contact with the filter screen. If this happens, the slurry residue can bake onto the screen, forming a hard crust and blocking all or part of the screen.
7. Lower the cylinder assembly into the enclosure until the cylinder cap is flush with the enclosure's cover (ensure that the latch snaps in place) and insert the thermocouple with cable connected.
8. Attach the high pressure hose to the bottom of the cylinder.

NOTE: The hose must be connected to apply pressure to the cell. The quick disconnect will not trap pressure in the cell when the hose is disconnected.

9. Verify that the compressed-air supply line or nitrogen gas bottle is connected to the fitting on the back of the instrument cabinet.
10. Turn on the master power switch.
11. Rotate the cylinder pressure regulator clockwise to adjust the cylinder pressure. Apply 500 psi ±50 psi / 3500 kPa ±300 kPa or sufficient pressure to prevent boiling of water at the test temperature. (Reference Table 1 for vapor pressure of water). Do not close the pressurizing valve.
12. Turn on the motor switch to agitate the slurry at 150 rpm.
13. Enter the desired thickening-time schedule into the temperature controller and turn on the heater switch.
14. Start the timer on the front panel or monitor the time display in the temperature controller to record the test time.
15. Once the slurry has reached the specified temperature invert the vessel.

WARNING: Do not remove the thermocouple without switching the heater off and ending the temperature controller program.

16. Connect the back-pressure receiver to the test valve below the screen. (Reference Table 1 for vapor pressure of water).

17. Apply 1000 psi ±50 psi / 7000 kPa ±300 differential pressure across the screen. Generally, this pressure will equal 1500 psi ±50 psi / 10500 kPa ±300 kPa to create the desired

differential pressure. Apply sufficient pressure to the back-pressure receiver to prevent the cement filtrate from boiling at the test temperature.

18. Open the valve below the screen to start the fluid loss test.

Table 1 - Vapor Pressure of Water

Temperature, °F / °C	Vapor Pressure, psi / kPa	Coefficient of volume expansion for water at saturation pressure
212°F / 100°C	14.7 psi / 100 kPa	1.04
250°F / 121°C	30 psi / 210 kPa	1.06
300°F / 149°C	67 psi / 460 kPa	1.09
350°F / 177°C	134 psi / 930 kPa	1.12
400°F / 204°C	247 psi / 1700 kPa	1.16
450°F / 232°C	422 psi / 2910 kPa	1.21

Recording Fluid Loss Test Results

1. Open the bottom valve to start the test within 30 seconds of inverting the cell. Maintain at the specified temperature for the duration of the test.
2. Collect the filtrate and record the volume at 30 seconds, 1 min, 2 min, 5 min, 7.5 min, 10 min, 15 min, 25 min and 30 min with accuracy of ±1 ml.

   NOTE: While conducting fluid loss tests at sample and filtrate temperatures above 190°F (88°C), the filtrate must be cooled to a temperature below the boiling point before collecting the liquid volume. This may be accomplished by chilling the filtrate receiver prior to the test and cooling the receiver during the test.

3. Reference ISO 10426, Part 2, Section 10 for details relating to determination and reporting of fluid loss values. The following form may be used for reporting the results in a manner that is consistent with ISO 10426, Part 2, Section 10.
4. If nitrogen blows through at less than 30 min, record the volume collected and time at which the blowout occurs.
5. Calculate the ISO Fluid Loss, expressed as milliliters per 30 min. For tests that run the entire 30 min without "blowing out," measure the collected filtrate volume, double the value and report it as the fluid loss value. For tests that "blow out" in less than the 30 min test interval, use Equation (16) to calculate the ISO Fluid Loss.

$$Calculated\ ISO\ Fluid\ Loss = V_t \frac{10.944}{\sqrt{t}}$$

where,

V_t = volume of filtrate collected at the time of the blowout, expressed in milliliters
t = the time of the blowout, expressed in minutes

6. When reporting the fluid loss of cement slurries, those for which the fluid loss was measured for a full 30 min shall be reported as "ISO Fluid Loss" while those for which the fluid "blew out" in less than 30 min shall be reported as "Calculated ISO Fluid Loss."

Form for reporting fluid loss results

Heat-up schedule:	_____ minutes to	_____ °C (°F) Test temperature		[_____ °C (°F)/min]
Conditioning method	[ ] Atmospheric	[ ] Pressurized		[_____ kPa, (psi)]
	[ ] Stirred fluid-loss cell			
	[ ] Optional extra conditioning _____ minutes			
Static cell length	[ ] 12,7 cm (5 in)	[ ] 25,4 cm (10 in)		
Cell type (ends)	[ ] Double	[ ] Single		
Screen type	[ ] 325 mesh × 60 mesh			
	[ ] 325 mesh × 60 mesh with perforated metal back			

Time (min)	Filtrate ([ ] ml or [ ] g)	Time (min)	Filtrate ([ ] ml or [ ] g)
1/2	_____	10	_____
1	_____	15	_____
2	_____	25	_____
5	_____	30	_____
7 1/2	_____		

If filtrate weighed, relative density : _____ at 26,7 °C (80 °F)

API fluid loss	=	_____ ml/30 min		
Blowout	=	_____ ml (or g) at _____ min/s		
Calculated API fluid loss	=	_____ ml/30 min		
Filter cake conditions	=	Thickness[a] _____ Consistency[b] _____		
Time from end of conditioning to test start	=	_____ min		
Temperature	=	Start of test	_____ °C (°F)	
		End of test	_____ °C (°F)	
Location of thermocouple	=	[ ] Cell wall	[ ] In slurry	
Date of calibration of sensors	=		Consistometer	Fluid-loss cell
		Pressure gauge	_____	_____
		Thermocouple	_____	_____

[a] Thickness : of cake only; do not include remaining slurry if gelled.

[b] Consistency : hard, firm, mushy, gelled, etc.

Fluid Loss Test Completion and Clean-up

1. Cool the cell to a safe handling temperature (35°C or less) and release the pressure.
2. After ensuring that all the pressure is released, remove the cylinder assembly from the heating jacket.

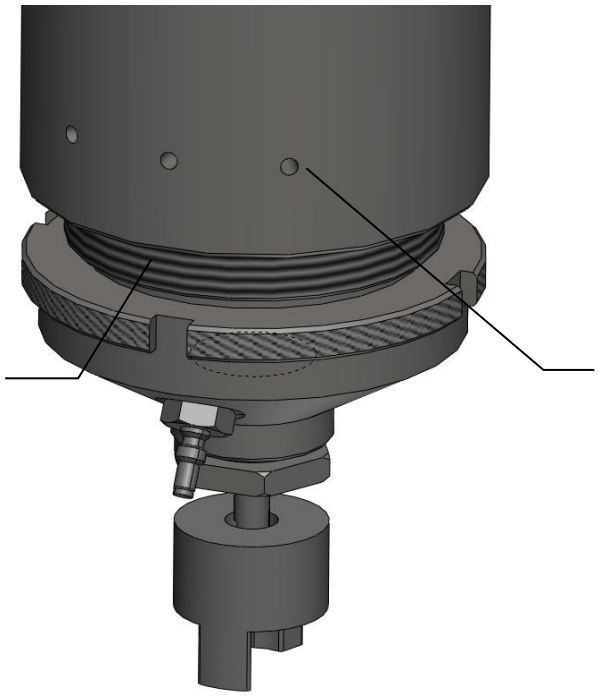
WARNING: Do not attempt to remove the cylinder end plugs without verifying that all pressure has been vented.

Due to the nature of this equipment and sample, it is possible for pressure to remain in the vessel if the sample has blocked the release ports.

If the end plugs are difficult to remove, assume that the vessel is pressurized and proceed with extreme caution. Orient the cylinder assembly with the bleed holes directed away from the operator. Slowly remove the bottom end plug allowing pressure to vent via the bleed holes.

Always remove the bottom plug first. *Do not remove the plug with the filtrate screen first. Refer to the illustration below.*

3. Discard the cement slurry, disassemble the cell and inspect the screen to check for holes or damage. If there is damage to the oring seals or screen, discard the test results and repeat the test.
4. Carefully clean the screen to remove cement or additive residue from all components.
5. Clean and dry the fluid-loss cell in preparation for the next test. Reconnect the pressure hose to the bottom plug and blow N_2 through until all water and residue is removed from the pressure ports. This action ensures that the ports are clear and ready for the next test. If the bleed holes are blocked with sample, clear them before the next test.
6. Verify that the ports in the bottom plug assembly are free from cement. Lubricate the bushings with P-2570 (or equivalent) grease. Clean the impeller stand-pipe. Reassemble the bottom plug assembly, tighten the shaft packing and verify that the impeller shaft turns freely.



Controller Setup

Changing a Profile

The controller is pre-configured from the factory. The EZ1 button is used to manually start and stop a profile. The EZ2 button is used to acknowledge the alarm. If you prefer to change or customize a profile, see the Watlow Controller Support Tools CD for additional instructions.

Alarm Condition

If an alarm condition occurs, press the EZ2 button to acknowledge the alarm. If the alarm condition continues check the following:

a. Plug the thermocouple into the front panel;
b. Insert the thermocouple into the wall of the top plug;
c. Check the heater connections.

Once the alarm condition is acknowledged, press the EZ1 button to start the test.

NOTE: The alarm is to prevent an over temperature condition. The test will not re-start until the EZ1 and EZ2 buttons are reset.

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Section 3 - Maintenance

Preventive Maintenance

1. Periodic inspection and lubrication of all bearings is essential to avoid bearing damage. Inspect the bearings, packing and oring in the bottom plug assembly. Lubricate and replace as necessary.
2. Inspect the thrust washers in the impeller drive mechanism. Lubricate and replace as necessary.
3. As the packing in the cylinder assembly wears, tightening of the packing gland hex nut is required. The packing must be tightened sufficiently to prevent leaking while allowing the shaft to be turned. Apply grease to the packing to reduce sealing friction.
4. The motor speed is adjusted to 150 rpm. This adjustment is performed using the potentiometer mounted on the right rear of the instrument enclosure. No other motor adjustments are required.
5. Periodic inspection of belt wear and belt tension is necessary. The belt inspection cover may be removed from the top of the drive assembly for this purpose. The belt tension is adjusted by loosening the motor mounting bolts and sliding the motor towards the rear of the unit. Inspect the belt for wear, and replace if it is worn.

Bottom Plug Disassembly

1. Remove the bottom plug assembly from the cell.
2. Remove the impeller by holding the drive coupling and unscrewing the impeller counter-clockwise. Slide the impeller off of the standpipe.
3. Remove the standpipe assembly from the plug using a wrench.

   NOTE: During reassembly, the standpipe threads require Teflon sealing tape.

4. Remove the drive coupling from the impeller drive shaft.
5. Remove the packing tension adjustment nut from the plug.
6. Remove the impeller drive shaft by pushing the shaft through the packing towards the impeller side of the plug.
7. Remove and replace the bronze bushings from the plug and the packing tension nut if worn.
8. Remove and replace the packing if worn.

   NOTE: Replace the packing with approximately 2 inches of packing material (P-3502).

9. Inspect that all of the pressure passageways in the plug and the impeller drive shaft are clean.
10. Replace the plug oring if worn and after each 400°F (204°C) test.
11. Reassemble the bottom plug in reverse order.

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Section 4 - Replacement Parts

Part Number	Description
71-0109	Heater Assembly
71-0123	Impeller
71-0162	Gage, Sample Fill
C06892	Variable Resistor
C07478	Timer
C07932	Relay, 440 VAC, 32 VDC
C09111	Valve, Needle
C09286	Motor
C09287	DC Controller
C09895	Adapter, 3/8 NPT x 1/4T, SST
C12872	Packing, Grafoil,.625X.250
C16434	Temperature Controller
P-0397	Wrench, Hex (1/8")
P-0417	Terminal Strip, 240V
P-0776	Wrench, Hex (3/32")
P-0779	Wrench, Hex (5/32")
P-2359	Quick Connect Body
P-2368	O-Ring (Filtrate Receiver)
P-2369	O-Ring (Bottom Cylinder Plug)
P-2380	Panel Jack (Thermocouple)
P-2383	Thermocouple Cable
P-2392	Quick-Connect Stem
P-2676	O-Ring (Top Cylinder Stem)
P-2701	Heat Sink
P-2712	50 ml Graduated Cylinder
P-2747	Thermocouple
P-2881	Switch, Panel
P-3107	Solenoid Valve
P-3148	O-Ring (Top Cylinder Plug)
P-3156	Filter
P-3376	Timing Belt
P-3389	Circuit Breaker, 230 VAC version
QX-C-1266	Cord, Power

Please give serial number of instrument when ordering Replacement Parts.

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Section 5 – Drawings and Schematics

Drawing Number	Title
7120A	Stirred Fluid Loss
71-0038	Assembly, Index Plunger Knob
71-0074	Filtrate Receiver
71-0110	Top Cap Assembly
71-0115	Cylinder Assembly
71-0130	Impeller Housing Assembly
71-0313	Diagram, Wiring
71-0316	Diagram, Plumbing

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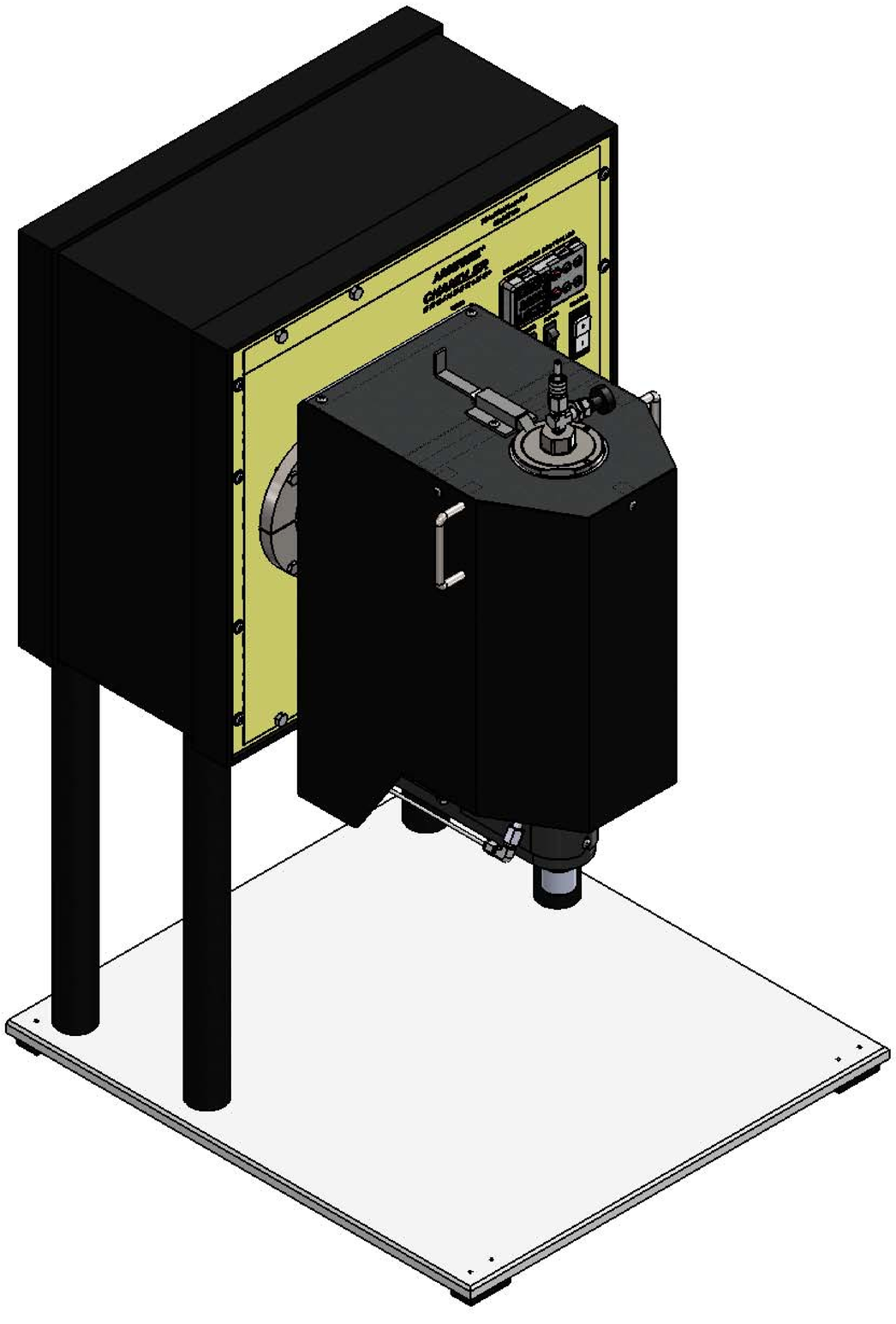
REV	DESCRIPTION	DATE	APPROVED
A	ISSUED	05/14/14	LDR
B	ECN T6412; UPDATED BOM	2/9/15	TC
C	ECN T6706; REPLACE C09603 W/ C16930	7/29/15	TC
D	ECN T6958; ADD 71-0057, CHG QTY OF H-8026 FROM 6 TO 9	12/16/15	TC



ITEM	PART NUMBER	DESCRIPTION	QTY
	71-0313	WIRING DIAGRAM	REF
	71-0316	PLUMBING DIAGRAM	REF
1	71-0039	IMPELLAR DRIVE MECH ASSY	1
2	71-0115	CYLINDER,ASSY,FLUID LOSS	1
3	188-13044	CONN,SS,1/8MPX1/8T,SW	1
4			
5			
6			
7	C09434	VALVE,RLF,SS,1/4TX1/4T,6000PSI	1
8	C09998	TEE,BRANCH,SS,1/4TX1/4TX1/8FP	1
9	P-0586	VALVE,CHK,SS,1/4FX1/4F,5000PSI	1
10	P-0735	TBE ADAPTER, SST, 0.125MP x 0.25T	1
11	P-1206	SAFETY HEAD,1/4 HIGH PRESSURE	1
12	P-1389	CONN,SS,3/8MPX1/4T,SW	1
13	P-1772	ELBOW,SS,1/4MPX1/4T,SW	3
14	P-1941	CROSS,SS,UN,1/4T,SW	2
15	P-1942	TEE,UNION,SS,1/4T	1
16	P-3500	CONN,SS,1/16FPT,QUICK CONN,SW	1
17	P-3499	ADPTR,RDCG,SS,1/8FPX1/16MP	1
18	C09704	CONN, PORT, 1/4	4
19	H-25-001	NUT,HEX,SS,1/4-20	2
20	H-8026	SCREW,THMS,SS,8-32X0.375,PHIL	9
21	H-25-019	SCREW,1/4-20X3/4,HHCS,SS	12
22	H-10-003	WASHER,FLAT,SS,#10	11
23	H-10-002	WSHR,LOCK,SS,#10	11
24	H-25-036	NUT,1/4-20,SS,KEPS	8
25	70616-90	MODULE,PWR ENTRY,250V,15A,FLTR	1
26	C06892	VARISTOR,250 VAC	1
27	71-0038	ASSY, INDEX PLUNGER KNOB	1
28	104888	REAR PANEL, 7120	1
29	104905	HINGE,BACK PANEL	1
30	188-08984	ELBOW,SS,1/8MPX1/8T,SW	1
31	C16286	SWIVEL,1/4"FPX1/4"FP,SS	1
32	C16249	BUSHING,1/4 NPT X 1/8 NPT, SS	1
33	7120-TUBE-01	TUBE 1,SWIVEL CONNECTOR	1
34	7120-TUBE-02	TUBE 2,SWIVEL CONNECTOR	1
35	105458	BRACKET, SWIVEL, 7120	1
36	C10000	HOSE,FLEXIBLE METAL,0.25T,24"	2
37	7120-0300	ELECTRICAL PANEL	1
38	7120-0201	CHASSIS ASSEMBLY	1
39	7120-0202	FRONT PANEL ASSEMBLY	1
40	7120-0203	CYLINDER HOUSING ASSEMBLY	1
41	7120-0204	REAR BRACKET ASSEMBLY	1
42	71-0156	WIRING HARNESS, 7120	1
43	H-4109	SCREW,BHMS,SS,4-40X0.500	2
44	H-4122	NUT,HEX,4-40,KEPS,SS	2
45	H-10-101	NUT,HEX,SS,10-32	3
46	H-10-132	SCREW,FHMS,SS,10-32X0.500	2
47	C13285	SPRING KIT,YEL,R3A,350-750	1
48	P-2220	DISK,RUPTURE,2275PSI,.250,IN	1
49	71-0180	TUBESET, 7120	1
50	R-0757	WIRE,20 AWG,CONSTANTAN,TYPE J	1.5
51	C16930	TERM,RING,12-10AWG,#8-10,HI-TEMP	4
52	R-1421	WIRE,12 AWG,TAN,HI-TEMP,TGGT	7.5
53	C07410	WIRE,22AWG,BLU,UL1007	.5
54	C12076	WIRE,22AWG,GRN	.5
55	C12074	WIRE,22AWG,BLK	.5
56	71-0057	SUPPORT COVER,HOUSING	1
57	71-0180-01	TUBE, REGULATOR TO CROSS	REF
58	71-0180-02	TUBE, RELEASE VALVE TO CROSS	REF
59	71-0180-03	TUBE, RELEASE VALVE TO BACK PANEL	REF
60	71-0180-04	TUBE,SAFETY HEAD TO BACK PANEL	REF
61	71-0180-05	TUBE,REGULATOR TO CHECK VALVE	REF
62	71-0180-06	TUBE,CHECK VALVE TO TEE	REF
63	71-0180-07	TUBE,RELIEF VALVE TO BACK PANEL	REF
64	71-0180-08	TUBE, REGULATOR TO TEE	REF
65	71-0180-09	TUBE,REGULATOR TO TEE	REF
66	71-0180-10	TUBE,NITROGEN INLET TO TEE	REF
67	71-0180-11	TUBE, FRONT PANEL TO TEE	REF

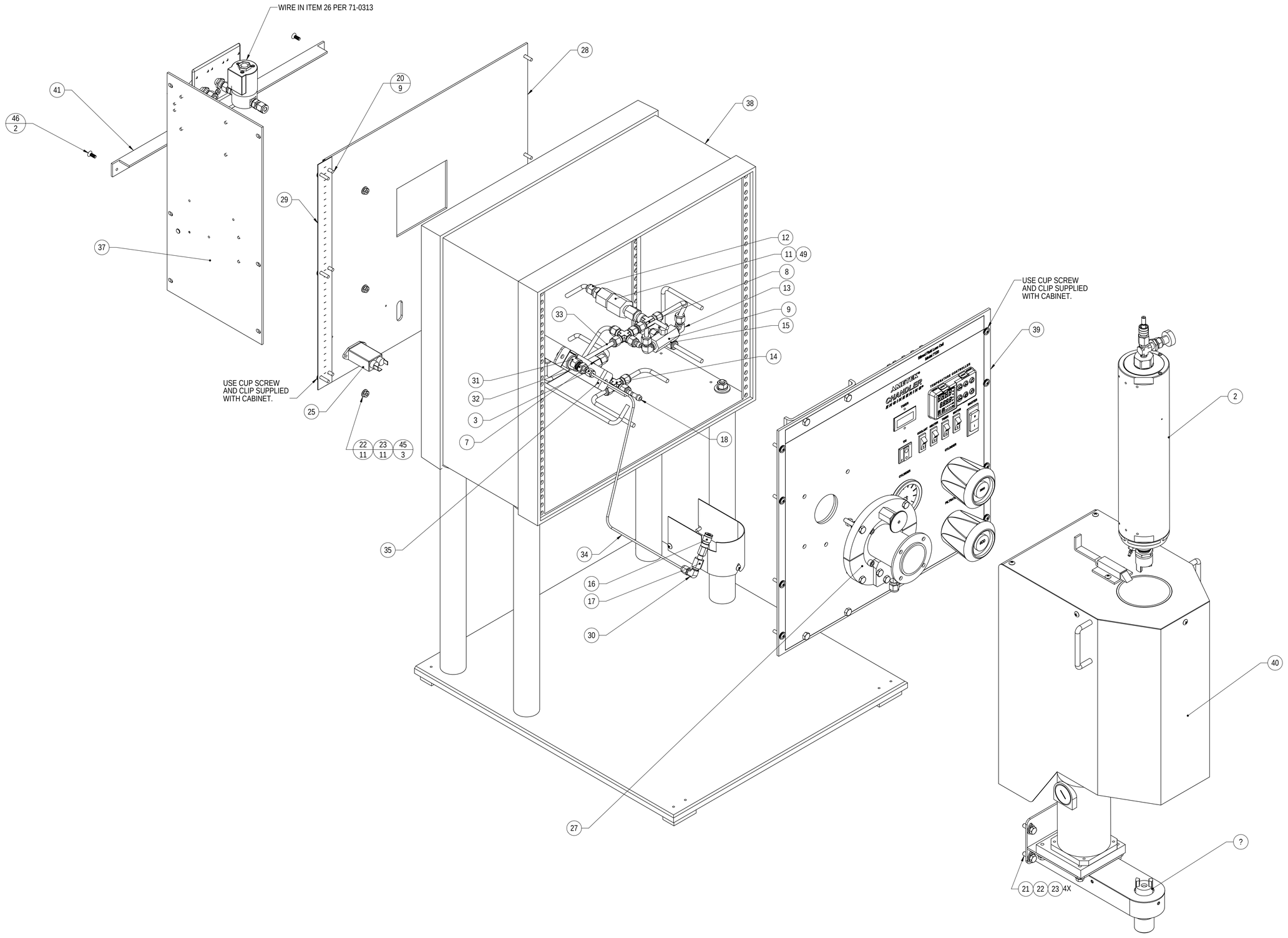
BREAK EDGES, DEBURR
UON DIMS ARE IN INCHES
1 PLC ±0.030 2 PLC ±0.010
3 PLC ±0.005 ANGL ±1/2°
SURFACE FINISH 63 RMS
THIRD ANGLE PROJECTION

DRAWN: TWC 11/20/2014
MFG: TWC 11/20/2014
ENGR: JJM 11/20/2014

CHANDLER ENGINEERING
STIRRED FLUID LOSS

TYPE:
STRUCT:
PN: 7120A
PROJ: Imported Data Set
REV D SIZE D
SHEET 1 OF 3

TITLE BLOCK REV 3



BREAK EDGES, DEBURR
UON DIMS ARE IN INCHES
1 PLC ±0.030 2 PLC ±0.010
3 PLC ±0.005 ANGL ±1/2°
SURFACE FINISH 63 RMS
THIRD ANGLE PROJECTION

DRAWN: TWC 11/20/2014
MFG: TWC 11/20/2014
ENGR: JJM 11/20/2014

TYPE:
STRUCT:

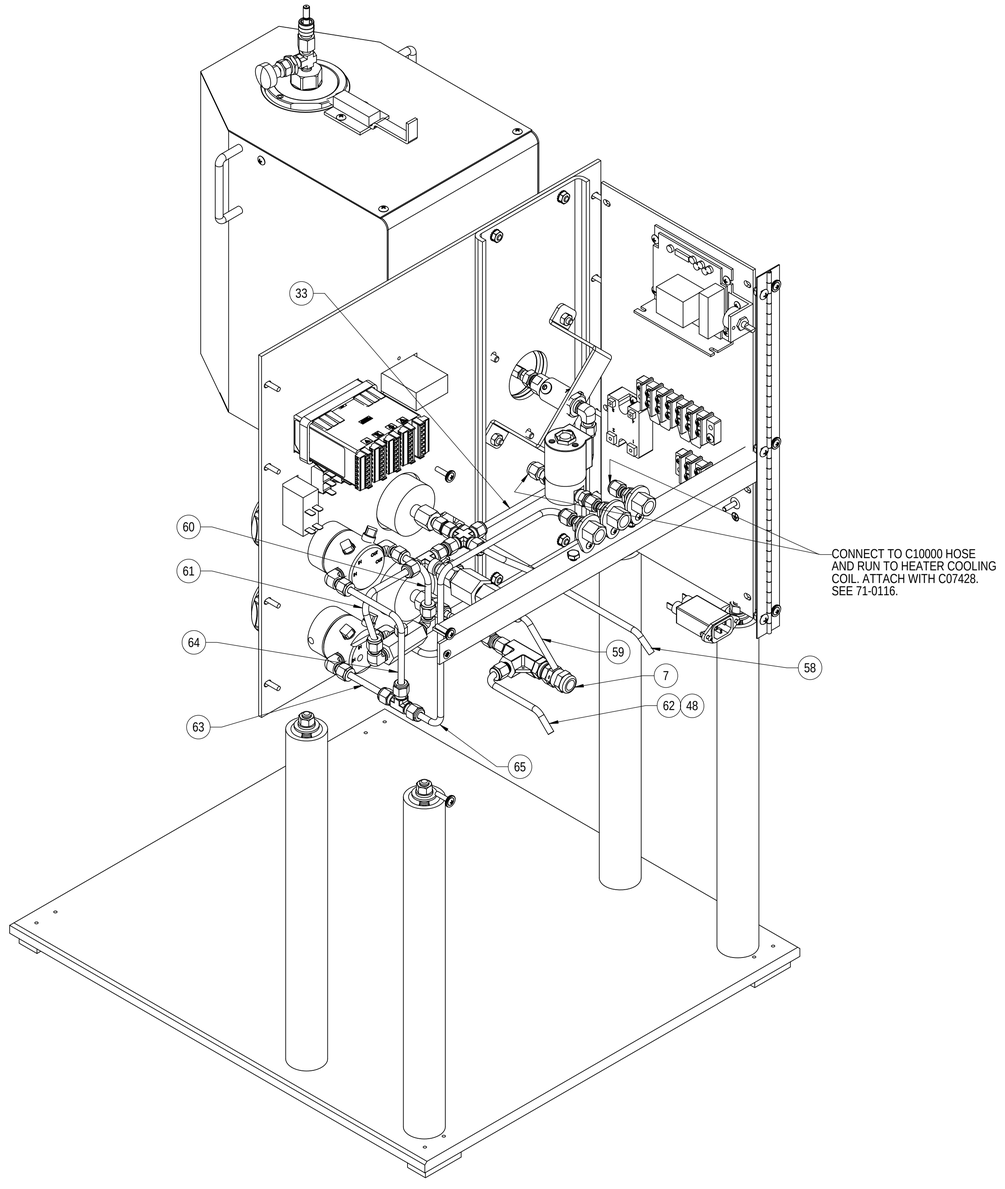
CHANDLER ENGINEERING

STIRRED FLUID LOSS

PN: 7120A
PROJ: Imported Data Set

REV D | SIZE D
SHEET 2 OF 3

TITLE BLOCK REV 3



BREAK EDGES, DEBURR
UON DIMS ARE IN INCHES
1 PLC ±0.030 2 PLC ±0.010
3 PLC ±0.005 ANGL ±1/2°
SURFACE FINISH 63 RMS
THIRD ANGLE PROJECTION

DRAWN: TWC 11/20/2014
MFG: TWC 11/20/2014
ENGR: JJM 11/20/2014

TYPE:
STRUCT:

CHANDLER ENGINEERING

STIRRED FLUID LOSS

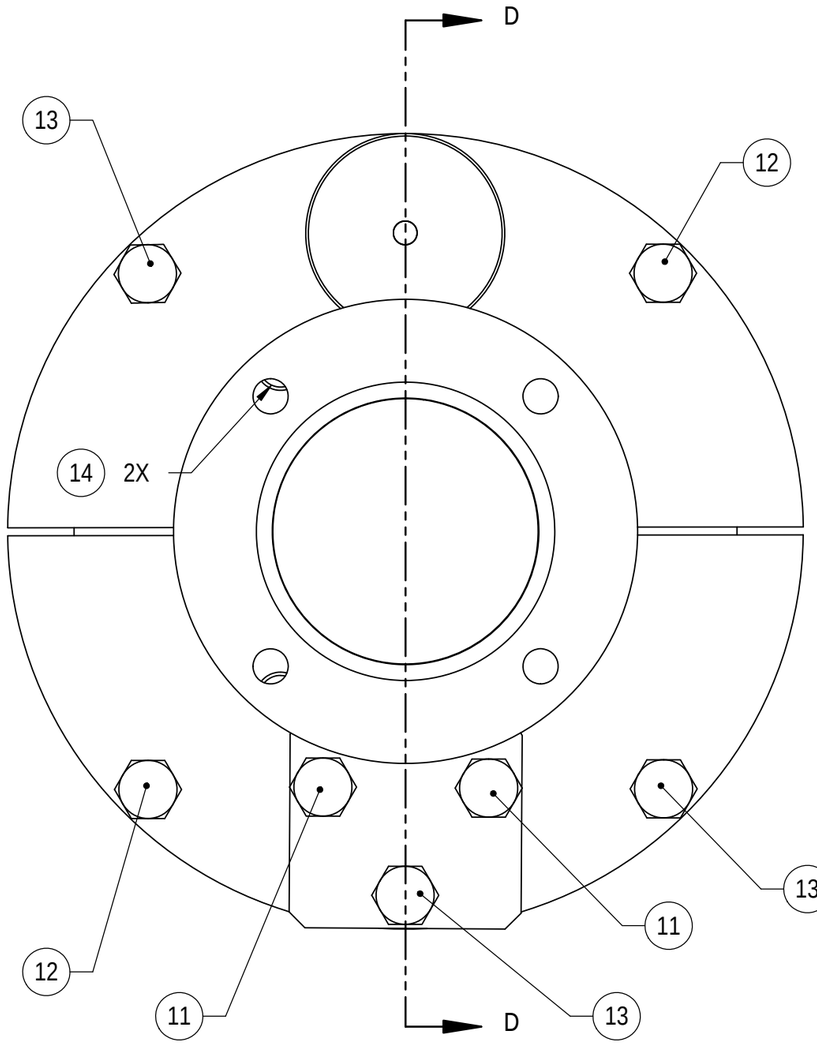
PN: 7120A
PROJ: Imported Data Set

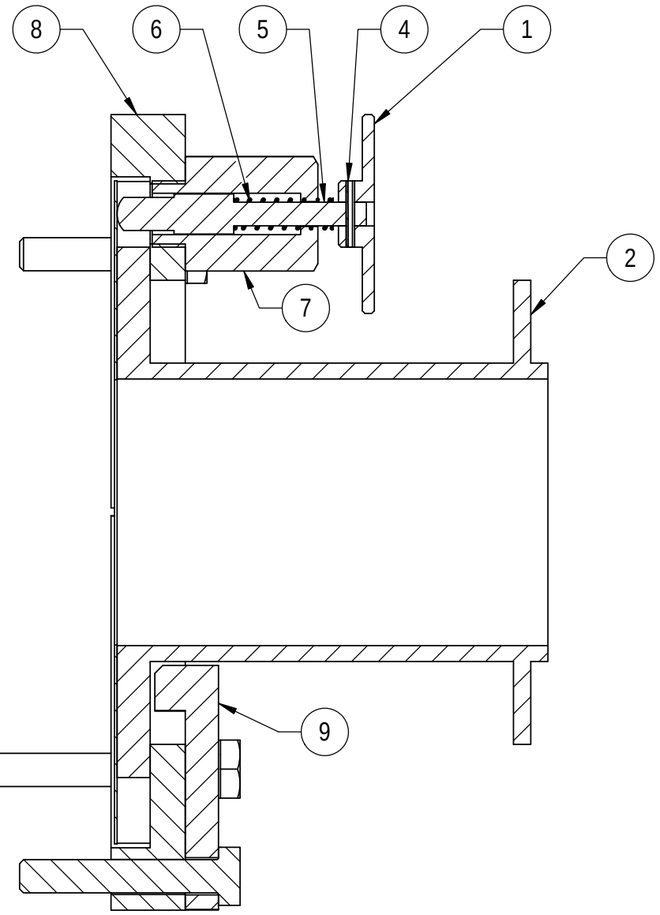
REV D | SIZE D
SHEET 3 OF 3

TITLE BLOCK REV 3

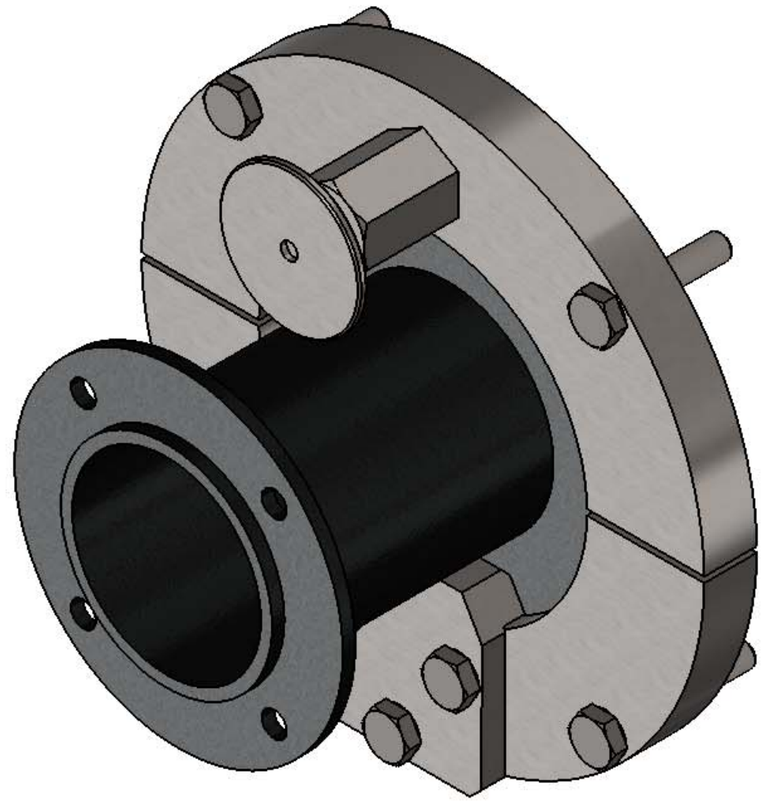
NOTES:
1. SHIM AS REQUIRED FOR PROPER CLEARANCE TO MINIMIZE PLAY.

REV	DESCRIPTION	DATE	APPROVED
E	ISSUED ECN 8506, ADDED NOTE 1	05/27/03	PJA
F	ECN T6412, REPL H-25-021 W/ H-25-023	2/9/15	TC





SECTION D-D



ITEM	PART NUMBER	DESCRIPTION	QTY
1	71-0062	INDEX PLUNGER KNOB	1
2	71-0020	ENCLOSURE, SUPPORT	1
3			
4	P-0860	PIN,ROLL,STL,.0625X.50	1
5	71-0024	PLUNGER INDEX	1
6	P-2572	SPRING,COMPR,SST,.180DX.75FL	1
7	71-0023	INDEX BODY	1
8	71-0021	INDEX RING	1
9	71-0022	STOP, INDEXING RING	1
10	71-0151	SHIM, INDEX	1
11	H-25-009	SCREW,HHMS,SS,1/4-20X0.50	2
12	H-25-022	SCREW,HHCS,SS,1/4-20X1.25	2
13	H-25-023	SCREW,HHCS,SS,1/4-20X1.50LG	3
14	C12402	SCREW,SHCS,SS,1/4-20X0.25	2

BREAK EDGES, DEBURR
UON DIMS ARE IN INCHES
1 PLC ±0.030 2 PLC ±0.010
3 PLC ±0.005 ANGL ±1/2°
SURFACE FINISH 63 RMS
THIRD ANGLE PROJECTION

DRAWN: LDR 5/7/2014
MFG: LDR 5/7/2014
ENGR: TC 5/23/2014
TYPE:
STRUCT:

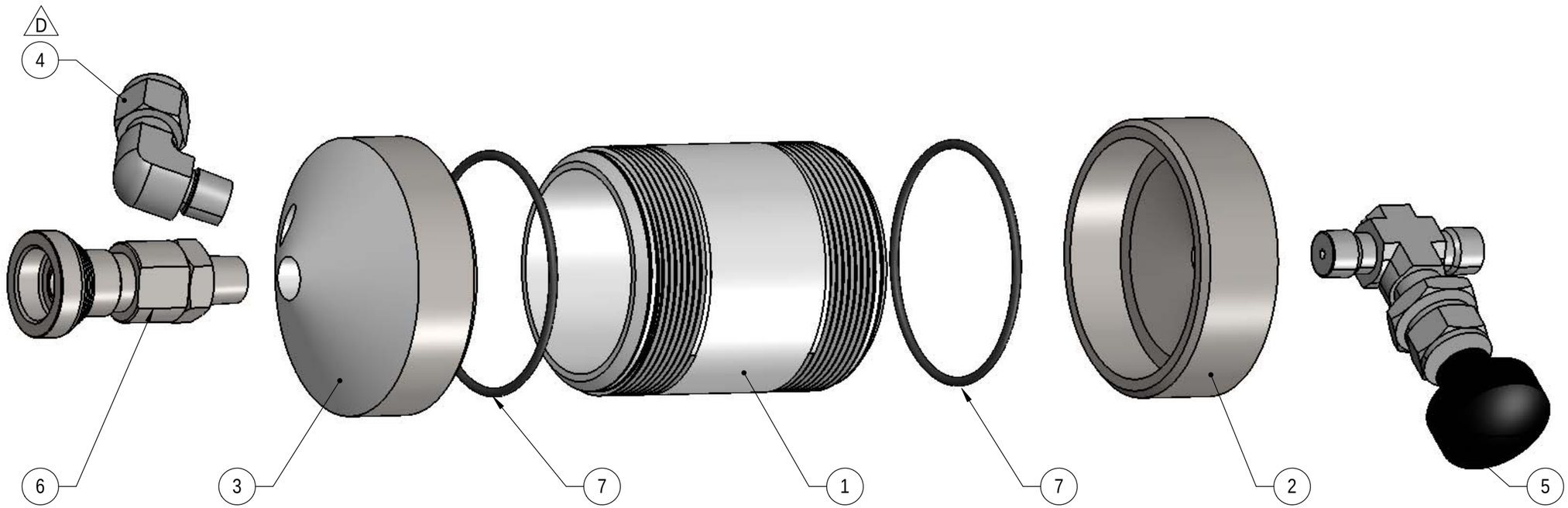
CHANDLER ENGINEERING

ASSY, INDEX PLUNGER KNOB

PN: 71-0038 REV F SIZE B
PROJ: 71 SHEET 1 OF 1

TITLE BLOCK REV 3

REV.	DESCRIPTION	DATE	APPROVED
C	ECN T2841; MOVED INLET FITTINGS	3/16/2010	JJM
D	ECN T6412; REPLACE P-1190 WITH P-1487	2/9/2015	TC
E	ECN T7428; ADD NOTES AND REQUIREMENT FOR BUNKER TESTING AND CERTIFICATION	10/15/2016	JJM



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	71-0026	BODY-FILTRATE RECEIVER	1
2	71-0067	END CAP-FILTRATE RECEIVER	1
3	71-0027	END CAP-FILTRATE RECEIVER	1
4	P-1487	ELBOW, SS, 1/8MPX1/4T, SW	1
D 5	C08161	VALVE,NDL,SS,1/8MX1/8M,2WY-STR	1
6	P-2359	COUPL,SS,1/4IDX1/8MP,QDISC,SW	1
7	P-2368	ORING,BUNA,AS033-70	2
8	71-0418	PROC,TEST,VESSEL	REF

NOTES:
1. VERIFY FULL ENGAGEMENT OF THREADS WITH COMPRESSION OF ORINGS TO ESTABLISH SEALS.
2. BUNKER TEST PER PROCEDURE 71-0418.
3. SHIP TESTED FILTRATE RECEIVER ASSEMBLY WITH A PRESSURE VESSEL CERTIFICATE.

BREAK EDGES, DEBURR
UON DIMS ARE IN INCHES
1 PLC ±0.030 2 PLC ±0.010
3 PLC ±0.005 ANGL ±1/2°
SURFACE FINISH 63 RMS
THIRD ANGLE PROJECTION

DRAWN: JJM 10/17/2016
MFG: DLR 10/18/2016
ENGR: JJM 10/17/2016
TYPE:
STRUCT:

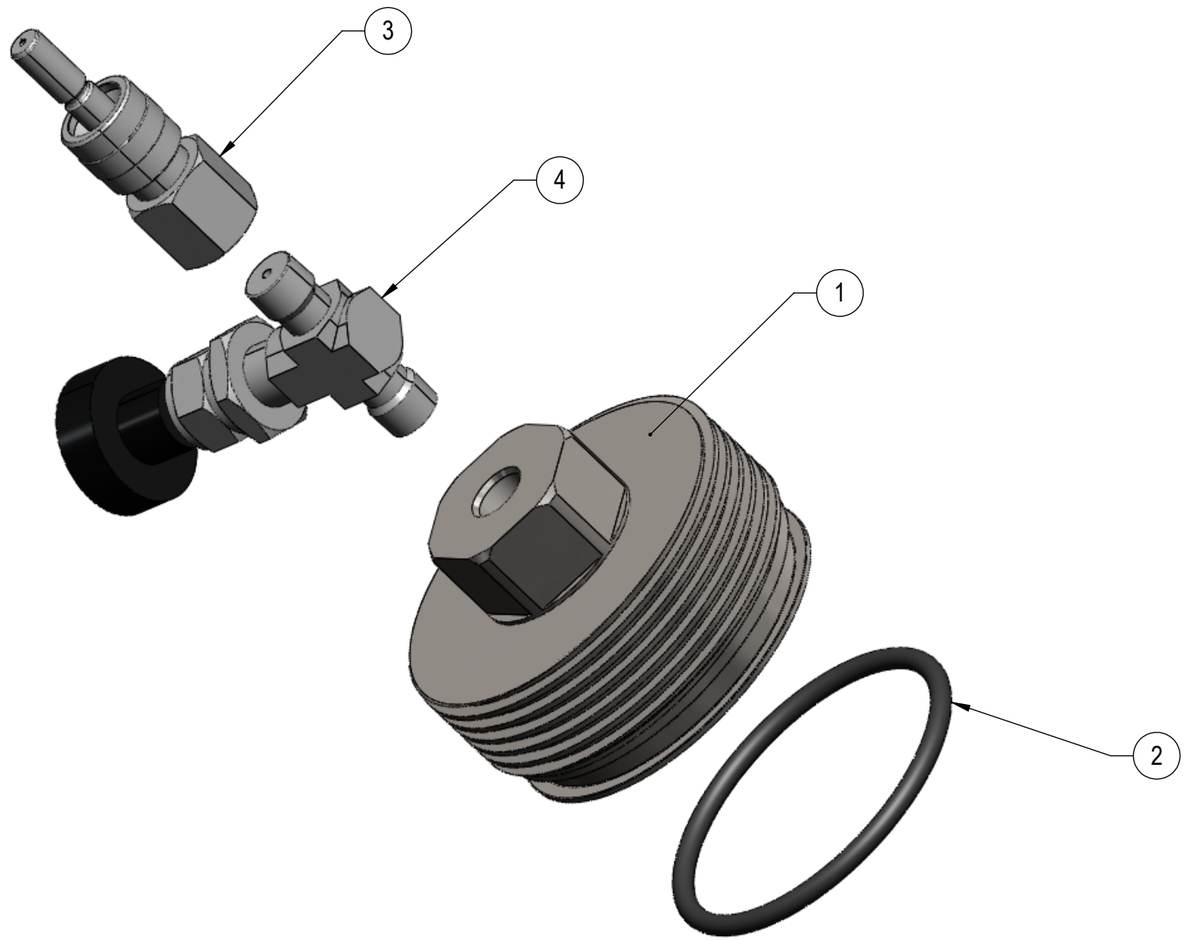
CHANDLER ENGINEERING

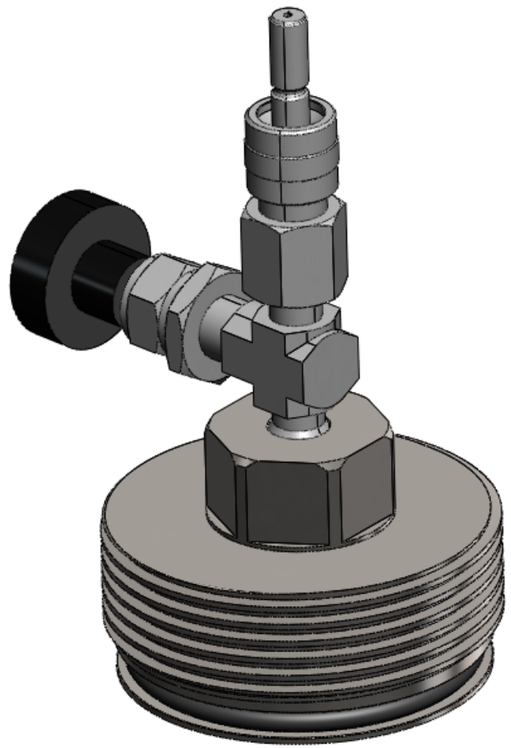
RCVR ASSY,FILTRATE

PN: 71-0074 REV E SIZE B
PROJ: 71 SHEET 1 OF 1

TITLE BLOCK REV 3

REV.	DESCRIPTION	DATE	APPROVED
E	REDESIGNED	03/16/2010	JJM





ITEM	PART NUMBER	DESCRIPTION	QTY
1	71-0103	CAP,TOP	1
2	P-3148	ORING, VITON, PARKER #227	1
3	P-2392	COUPL,SS,1/4ODX1/8FP,QDISC,SW	1
4	C08161	VALVE,NDL SST 1/8MP X 1/8MP WH	1

BREAK EDGES, DEBURR
UON DIMS ARE IN INCHES
1 PLC ±0.030 2 PLC ±0.010
3 PLC ±0.005 ANGL ±1/2°
SURFACE FINISH 63 RMS
THIRD ANGLE PROJECTION

DRAWN: JB 10/24/2007
MFG: TC 10/30/2007
ENGR: JJM 10/24/2007

TYPE:
STRUCT:

CHANDLER ENGINEERING

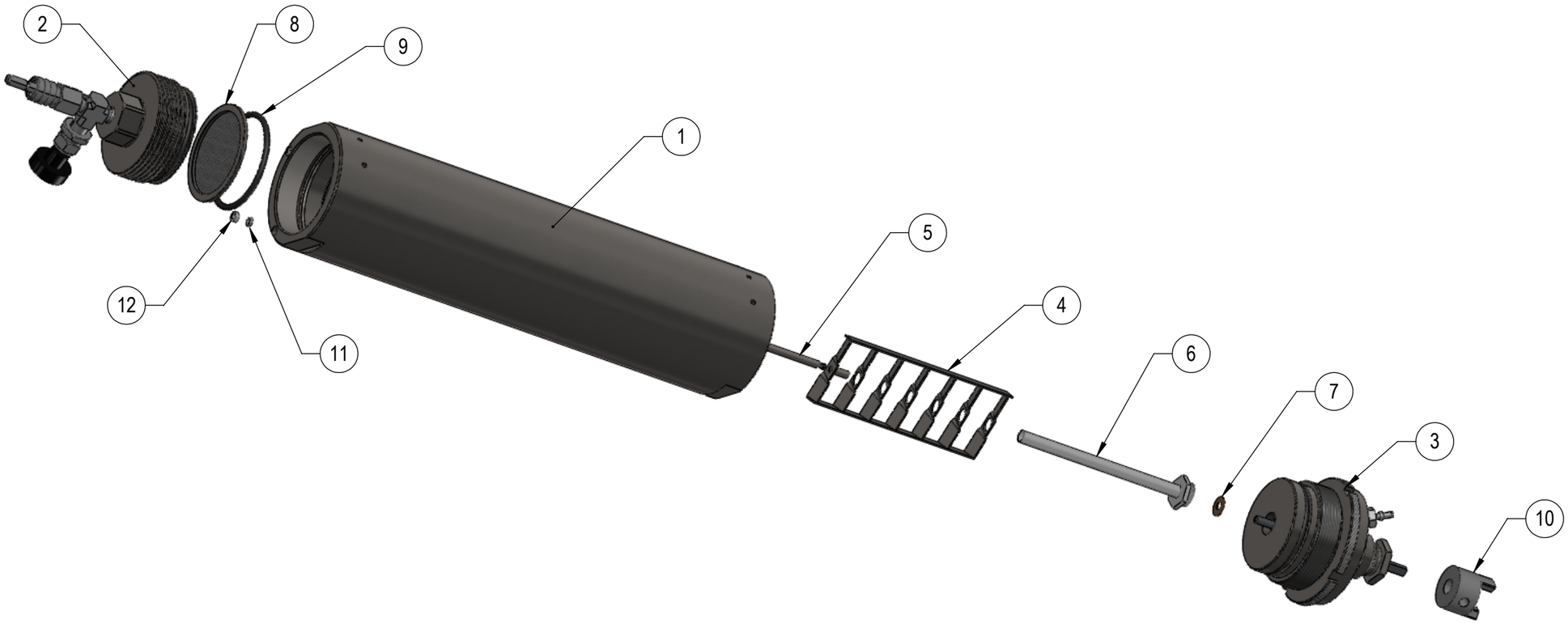
CAP,ASSY,CYL,TOP

PN: 71-0110 REV E SIZE B
PROJ: 71 SHEET 1 OF 1

TITLE BLOCK REV 3

NOTES:
1. VESSEL WORKING PRESSURE: 2000 PSI (13.78 MPa)
2. PRESSURE TEST PER TEST PROCEDURE 71-0153.
3. SHAFT TO BE STRAIGHT WITHIN .005 T.I.R.
4. APPLY LITHIUM GREASE (P-3217) TO O-RING AREA ON BOTH PLUGS BEFORE BEING ASSEMBLED INTO CYLINDER.
5. ORING (C00595) AND RETAINING RING (71-0111) ARE PRESSED INTO PLACE ON THE VESSEL 90 ° APART.

REV.	DESCRIPTION	DATE	APPROVED
F	ECN# T2338, ADDED (2) C0595 AND (2) 71-0111 AND NOTE 7	6/4/09	SS
G	ECN T2841; MODIFIED DESIGN OF VESSEL, ADDED BLEED HOLES, ETC...	3/15/2010	JJM



ITEM	PART NUMBER	DESCRIPTION	QTY
1	71-0100	CYLINDER,LARGE CELL	1
2	71-0110	CAP,ASSY,CYL,TOP	1
3	71-0130	HOUSING ASSY,IMPELLER	1
4	71-0123	IMPELLER	1
5	71-0129	SHAFT,IMPELLER	1
6	71-0124	STANDPIPE,IMPELLER	1
7	71-0141	SPACER,STANDPIPE,Oilite	1
8	P-3156	SCREEN,325MESH,3.5SQ.IN.	1
9	P-3149	ORING,VITON,AS228-75	1
10	P-2371	COUPL,3/8IDX1/4ID,SHAFT	1
11	C00595	ORING,VITON,AS006-V75	2
12	71-0111	RING - RETAINING	2

BREAK EDGES, DEBURR
UON DIMS ARE IN INCHES
1 PLC ±0.030 2 PLC ±0.010
3 PLC ±0.005 ANGL ±1/2°
SURFACE FINISH 63 RMS
THIRD ANGLE PROJECTION

DRAWN: JB 10/24/2007
MFG: TC 10/30/2007
ENGR: JJM 10/24/2007
TYPE:
STRUCT:

CHANDLER ENGINEERING

CYLINDER,ASSY,FLUID LOSS

PN: 71-0115 REV G SIZE B
PROJ: 71 SHEET 1 OF 1

TITLE BLOCK REV 3

REV.	DESCRIPTION	DATE	APPROVED
D	ECN T2841; UPDATED DRAWING CONTENT	3/16/2010	JJM

ITEM	PART NUMBER	DESCRIPTION	QTY
1	71-0131	CYLINDER PLUG BASE	1
2	71-0127	PLUG,ADJUSTMENT,PACKING	1
3	71-0125	SHAFT,IMPELLER,HEAT TREATED	1
4	P-3497	BEARG,BRZ,1/4IDx3/8ODx1-1/4LG	1
5	P-3498	BEARG,BRZ,1/4IDx1/4LGx1/2OD	1
6	P-3148	ORING, VITON, PARKER #227	1
7	C12872	PACKING, GRAFOIL, .625 X .250	1
8	P-3501	CONN,SS,1/8ODX1-16MP,QDISC,SW	1

BREAK EDGES, DEBURR
UON DIMS ARE IN INCHES
1 PLC ±0.030 2 PLC ±0.010
3 PLC ±0.005 ANGL ±1/2°
SURFACE FINISH 63 RMS
THIRD ANGLE PROJECTION

DRAWN: JB 10/22/2007
MFG: TC 10/30/2007
ENGR: JJM 10/22/2007

TYPE:
STRUCT:

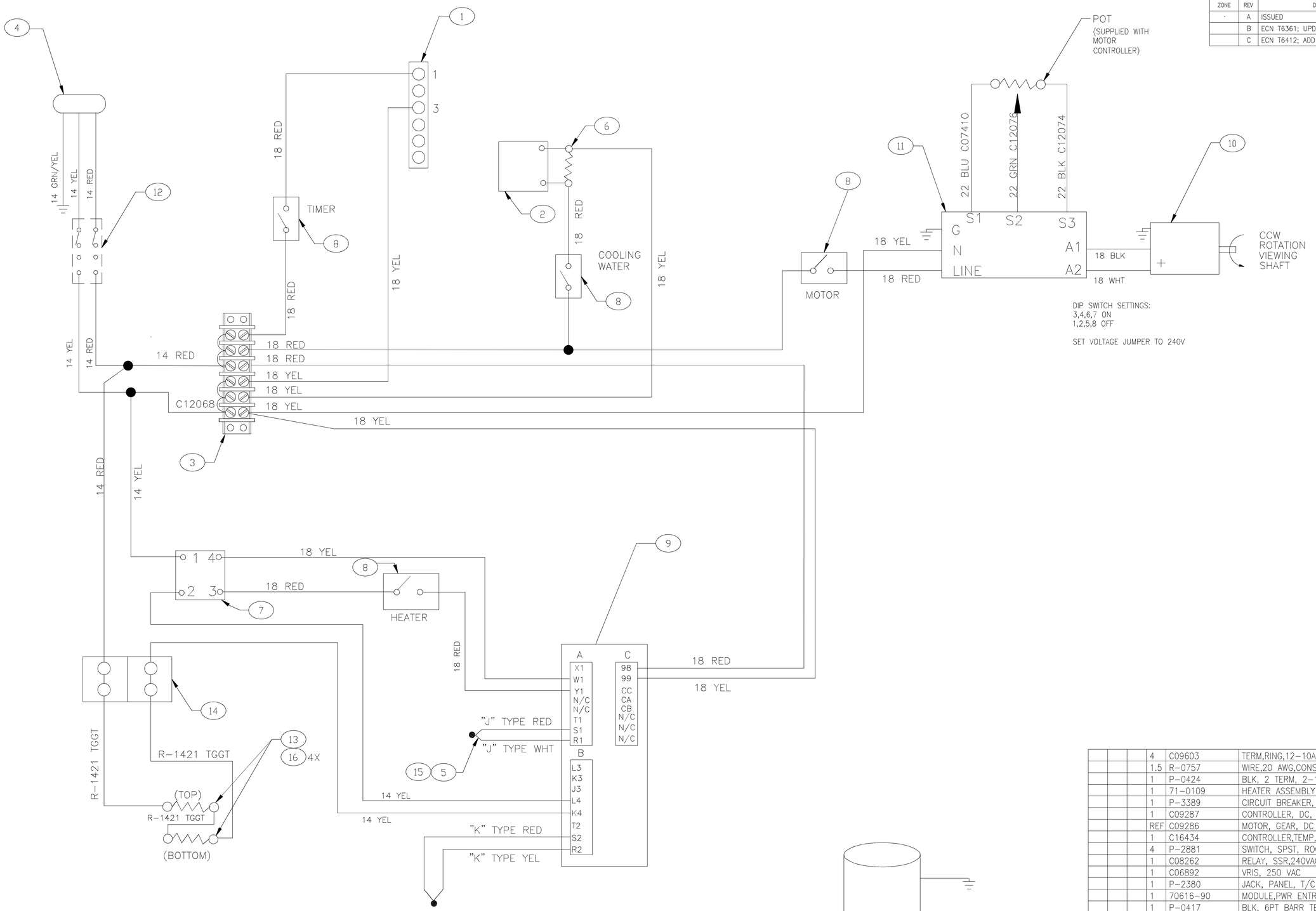
CHANDLER ENGINEERING

HOUSING ASSY,IMPELLER

PN: 71-0130 REV D SIZE B
PROJ: 71 SHEET 1 OF 1

TITLE BLOCK REV 3

REVISIONS					
ZONE	REV	DESCRIPTION OF REVISION	DATE	APPROVALS	
-	A	ISSUED	9/3/14	TC	JS
	B	ECN T6361; UPDATE WIRE COLORS TO ITEM 9	1/14/15	TC	TC
	C	ECN T6412; ADD SW SETTINGS, UPDATE BOM	2/9/15	TC	TC



71-109
HEATER ASS'Y

			4	C09603	TERM,RING,12-10AWG,#10,HI-TEMP		16
			1.5	R-0757	WIRE,20 AWG,CONSTANTAN,TYPE J		15
			1	P-0424	BLK, 2 TERM, 2-142		14
			1	71-0109	HEATER ASSEMBLY		13
			1	P-3389	CIRCUIT BREAKER, 8A		12
			1	C09287	CONTROLLER, DC, MOTOR SPEED		11
			REF	C09286	MOTOR, GEAR, DC		10
			1	C16434	CONTROLLER,TEMP,1/8 DIN HORZ.		9
			4	P-2881	SWITCH, SPST, ROCKER, 10A, 250 VAC		8
			1	C08262	RELAY, SSR,240VAC,45A,CHASSIS		7
			1	C06892	VRIS, 250 VAC		6
			1	P-2380	JACK, PANEL, T/C, SQ. FACE		5
			1	70616-90	MODULE,PWR ENTRY,250V,15A,FLTR		4
			1	P-0417	BLK, 6PT BARR TERM, 6-142		3
			1	P-3107	V, SOL, MIN, 230V		2
			1	C12945	TIMER,W/RESET, KAL-TIME1 W/AC		1
-04	-03	-02	-01	PART NUMBER	DESCRIPTION	MATERIAL SPEC.	ITEM

PARTS LIST

NEXT ASSY | USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES [mm]

TOLERANCES:
1 PLACE ±0.030
2 PLACE ±0.010
3 PLACE ±0.005
ANGLES ±1/2°
SURF. FINISH 63

CHANDLER ENGINEERING

TITLE: ELECTRICAL SCHEMATIC
200-240 VAC - FLUID LOSS

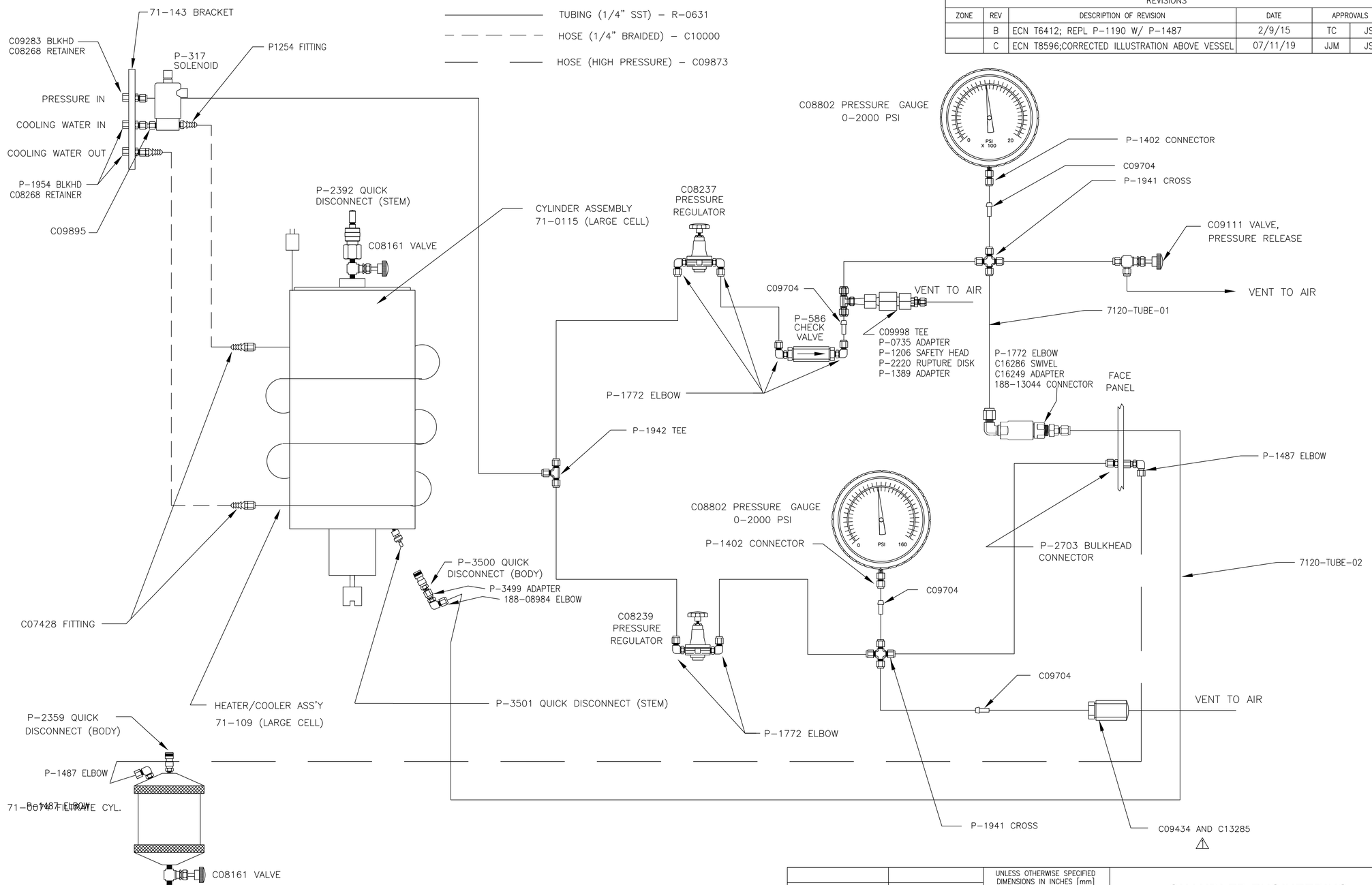
	APPROVALS	DATE
DRAWN:	TC	11/20/14
CHECKED:	JS	11/20/14
ENGR.:	JJM	11/20/14

SIZE A1 | S.O. NO. | DWG NO. 71-0313 | REV. C

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

NOTES:
1. USE 600V CE COMPLIANT UL AWM TYPE 1015 OR 11028 WIRE. NO SUBSTITUTIONS ALLOWED.
2. ROUTE AC AND DC WIRING SEPARATELY.
3. CLEARLY MARK CHASSIS GROUND CONNECTIONS WITH A GROUND SYMBOL.

REVISIONS					
ZONE	REV	DESCRIPTION OF REVISION	DATE	APPROVALS	
	B	ECN T6412; REPL P-1190 W/ P-1487	2/9/15	TC	JS
	C	ECN T8596;CORRECTED ILLUSTRATION ABOVE VESSEL	07/11/19	JJM	JS



NOTES:

⚠ ADJUST RELIEF PRESSURE TO 500 PSI AND SAFETY-WIRE IT BEFORE INSTALLING.

		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: DIAGRAM,PLUMBING,7120,CE			
NEXT ASSY	USED ON	APPROVALS	DATE				
APPLICATION		DRAWN: TC	11/14/14	SIZE: A2	S.O. NO.	DWG NO. 71-0316	REV. C
		CHECKED: JS	11/14/14				
		ENGR.: JJM	11/14/14	SCALE: 1 = 1	DO NOT SCALE DRAWING	SHEET: 1 of 1	

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Please Send Us Your Comments on This Manual

Model Number _____ Serial Number _____

Printing Date of this manual (from the Title Page) _____

Please circle a response for each of the following statements. Use:

(1)= Strongly agree (2) =Agree (3) =Neutral, no opinion (4) =Disagree (5) =Strongly disagree

a) The manual is well organized.	**1**	**2**	**3**	**4**	**5**
b) I can find the information I want.	**1**	**2**	**3**	**4**	**5**
c) The information in the manual is accurate.	**1**	**2**	**3**	**4**	**5**
d) I can easily understand the instructions.	**1**	**2**	**3**	**4**	**5**
e) The manual contains enough examples.	**1**	**2**	**3**	**4**	**5**
f) The examples are appropriate and helpful.	**1**	**2**	**3**	**4**	**5**
g) The manual layout is attractive and useful.	**1**	**2**	**3**	**4**	**5**
h) The figures are clear and helpful.	**1**	**2**	**3**	**4**	**5**

i) The sections I refer to most often are _____

_____

Other comments _____

_____

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Our warranty does not cover damage or failure caused by abuse, misuse, abnormal usage, faulty installation, improper maintenance, or any repairs other than those provided by authorized Chandler Engineering personnel.

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Our total liability for any claim shall not exceed the price allocable to the product or service or part thereof that gives rise to the claim.

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