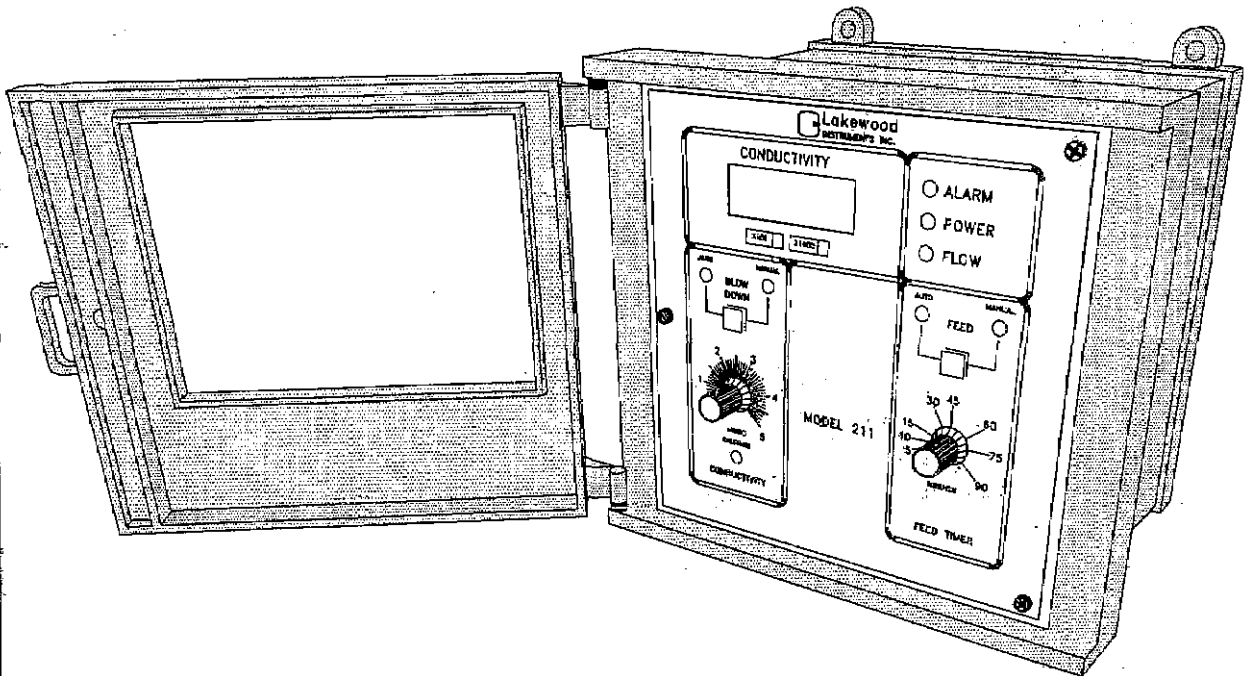


Model 211 CONDUCTIVITY AND TIMER CONTROLLER

INSTRUCTION MANUAL



Lakewood
INSTRUMENTS INC.

4857 W. Van Buren St., Phoenix, AZ 85043
(602) 272-5100 FAX (602) 272-0400

Serial #:

MODEL 211 CAUTIONS

PLEASE READ THIS!

Do not feed molybdate into a sample line. Molybdate should be added directly into the cooling tower. Please ask your water treatment specialist for information and directions on proper feed methods.

CAUTION

CHEMICAL FEED

All electro-mechanical devices are subject to failure from a variety of causes. These include mechanical stress, component degradation, electro-magnetic fields, mis-handling, improper set-ups, physical abuse, chemicals abuse, improper installation, improper power feeds, and exposure.

While every precaution is taken to insure proper functioning, extra precautions should be taken to limit the ability of over-feeding by limiting chemical quantities available, secondary shut-downs, alarms and redundancy or other available methods.

CAUTION

POWER SOURCE AND WIRING

Low voltage wiring and high voltage (110 plus) should not be run in the same conduit. Always run separately. Even shielded low voltage is not a guarantee of isolation.

Every precaution should be taken to insure proper grounding and elimination of shorting or Electro magnetic Field (EMF) interference.

LAKWOOD INSTRUMENTS

MODEL 211

CONDUCTIVITY CONTROLLER

TABLE OF CONTENTS	PAGE
1.0 TECHNICAL DESCRIPTION AND NOTES	
1.1 Introduction	1
1.2 Conductivity Measurement	2
1.3 Alarm Timer	2
1.4 Flow Switch	2
1.5 Output Options	3
1.5.1 -35 Option. Isolated 4-20 Milliamp Output	
1.5.2 -42 Option. Extra High/Low Alarms	
1.6 Chart Recorder	3
2.0 START UP	
2.1 Checking	3
2.2 Setup	4
2.2.1 Conductivity	
2.2.2 Flow switch	
2.2.3 Alarm timer	
2.2.4 211-S7 sensor caution	
2.3 Calibration	4
2.3.1 Hand-held conductivity meter	
2.3.2 Controller as standard	
3.0 TROUBLESHOOTING	
3.1 Problem - Check	5
4.0 PARTS LIST	6
5.0 DRAWINGS	
5.1 Installation	Attached
5.2 Schematics	Attached

1.0 TECHNICAL DESCRIPTION AND NOTES

1.1 Introduction

The cooling tower cools the water through evaporation to the atmosphere. The water that evaporates is pure. Water that remains in the basin contains salts and calcium brought in by the make up plus the salt and calcium left by the pure water that was evaporated. Therefore the longer the tower operates, the higher the salts and calcium in the cooling water. Eventually the calcium becomes so concentrated, it will not stay in solution and plates out (scales) on the hot heat exchanger surfaces. Any film of scale on the heat exchanger surfaces makes the compressors work harder...takes more power...to achieve the same cooling.

Control of the calcium scale requires blowing down some of the cooling water to drain. As the cooling tower basin level drops, a float make up valve opens and brings in fresh make up water. The new make up water dilutes the saturated cooling water.

The term "cycles of concentration" refers to the excess salt in the cooling water divided by the salt in the make up water. If there is 80 PPM salt in the make up water, three cycles of concentration would be $80 \times 3 = 240$ PPM. Since the amount of salts is proportional to conductivity.

$$\frac{\text{Conductivity of cooling water}}{\text{Conductivity of the make up water}} = \text{Cycles of concentration}$$

DESCRIPTION OF FRONT PANEL CONTROLS

Display	LCD display reads micromhos x 1,000
ALARM	Alarm light - exceeded blowdown on time
POWER	Power light
FLOW	Flow switch flow
BLOWDOWN AUTO/MANUAL switch	Press to manually open blowdown valve
SETPOINT	Conductivity setpoint in micromhos x 1,000
CALIBRATION	Calibrates the conductivity instrument
FEED AUTO/MANUAL switch	Press in to manually feed chemical
ALARM TIMER	Limits the chemical feed pump run time per blowdown cycle.

1.2 Conductivity Measurement

A conductivity controller measures the salt content of the cooling water by measuring the water's electrical resistance or conductivity. If the measured value is greater than the controller front panel setpoint, a relay turns on. As the blowdown valve lowers the water conductivity below the setpoint the controller relay turns off.

A chemical pump is actuated at the same time the blowdown valve is opened. Chemical is pumped into the cooling water to replace the chemical lost due to blowdown. It is essential that cooling water treatment chemical is in the water to permit efficient operation of the cooling system. Contact your water treatment engineer for specific recommendations.

1.3 Alarm Timer

If the solenoid valve fails closed, the conductivity controller will continue to try to blow down the cooling water indefinitely. This is because the conductivity will not be reduced without blowdown. Since the chemical is fed off of the conductivity relay, an alarm timer is needed to limit the time that the chemical pump operates continuously. After the alarm timer setpoint time is exceeded, the alarm locks out the chemical pump. The blowdown solenoid valve is not locked out.

If the conductivity setpoint is satisfied or if the flow turns off or if the conductivity setpoint is turned below the water conductivity, the alarm will automatically reset.

The alarm timer should not be used to limit the chemical feed as standard operating procedure. If the controller regularly goes into alarm, the chemical residual in the cooling water will not be controlled. Use it only as an alarm in case the solenoid valve fails.

1.4 Flow Switch

The flow switch locks out all chemical feed and the alarm timer if there is no sample time flow. Only one GPM is needed to raise the flow switch.

A flow sight assembly shows the black ball at the top of the flow switch float. When the ball is above the rim of the finger grip ring, the flow switch is on. The flow sight may be cleaned by turning off the sample flow and turning the red ring lock counterclockwise. Then twist out the flow sight assembly. It is "O" ring sealed. Clean the flow sight insert with a cotton swab. See Figure 1.2.B.

Removing the flow sight assembly permits removal of the flow switch float.

A reed switch assembly senses the position of the magnet. When it closes, it operates the flow switch relay. This assembly can be replaced. See Figure 1.5.

1.5 Output Options

One option can be plugged into the rear circuit board. If the -35 isolated 4-20 ma option is used, an additional power supply is required. The Model 10 power supply will be mounted inside the enclosure as a separate item. Refer to Figure 1.3 for wiring details.

1.5.1 -35 option. Isolated 4-20 milliamp output.

Part Number 700021 plug in circuit board provides and isolated 4 to 20 milliamp output to a computer or control device. The load resistance must not exceed 800 ohms.

The output is factory preset for 0 conductivity = 4 ma and the full scale = 20 ma. ZERO and SPAN adjustments permits scaling the output to another desired conductivity range. Refer to Print 5101096 for component location.

1.5.2 -42 option. Extra High and Low alarms for remote alarm status or computer alarm log.

To set the alarms, simulate the Low conductivity trip point. Just calibrate the controller conductivity for the desired LOW trip point. Adjust the LOW alarm on the board until the relay just pulls in. To set the high alarm, make the controller read the desired high conductivity trip point. Adjust the HIGH adjustment on the plug in board until the relay just pulls in.

Refer to Print 5100986 for component location of the setpoint adjustments.

1.6 Chart recorder.

The Model 21 inkless strip chart recorder requires two connections to the Model 175 back board. Refer to 1.3. The chart recorder motor requires 120 VAC 60 Hz. Unless specified otherwise.

The chart recorder manual is attached to this manual. Refer to the recorder manual for proper loading of the chart paper.

2.0 START UP

2.1 Checking

Check the power wiring. Make sure that the controller is powered from 120 VAC unless it is specifically set up for 220 VAC.

Check the wiring to the controller to make sure that NO power wiring is connected to any of the low voltage circuits.

MAKE SURE THAT THE TWO RED LOCK RINGS ARE FULL CLOCKWISE AND LATCHED BEFORE TURNING ON THE SAMPLE LINE FLOW. THE FLOWSIGHT FITTING AND THE SENSOR WILL BLOW OUT IF NOT SECURELY LATCHED.

Check the plumbing for leaks. Check also for the proper flow direction. It takes one GPM to raise the float ball valve above the lip of the clear flow sight tube.

Check the chemical pump fittings. Make sure that they are safe. Not overtight but tight enough.

Make sure that the controller is piped per the suggested installation drawing.

2.2 Set Up

2.2.1 Conductivity

Determine the make up water conductivity in micromhos. Multiply this number by three to give the conductivity setpoint value. This will give approximately three cycles of concentrations. Check with your water treatment engineer for the desired conductivity value for water conservation and good scale control.

2.2.2 Flow switch

Turn on the water flow. The black flow indicator should rise in the flow sight indicator and the FLOW light should go on. If there is no flow, there will be no power to the chemical pump outlets or the blowdown solenoid valve. If the controller has a biocide timer also installed, make sure that the biocide feed is off. If the biocide timer is feeding biocide, the controller outputs will be disabled.

2.2.3 Alarm timer

To check the alarm timer, set the timer knob full counterclockwise. To run the test the FLOW light should be on and the biocide feed (if any) should be off. After five minutes (approximately) the ALARM light should turn on, the blowdown valve should still run, but the chemical pump should turn off. Turning the conductivity setpoint knob above the actual water setpoint should reset the alarm timer.

Set the conductivity setpoint knob for the desired value. Set the alarm timer at 60 minutes. This should be sufficient time for the blowdown valve to satisfy the conductivity setpoint.

2.2.4 211-S7 Sensor Caution

When sensor is used in conjunction with temperatures in excess of 150°F; Please check sensor tip to body connection for tightness under process temperature conditions. If connection is loose, tighten until secure. Sensor tip to body connection may loosen when exposed to higher temperatures due to material contraction. This adjustment need only be done once.

2.3 Calibration

2.3.1 Handheld conductivity meter secondary standard method.

- Press the DISPLAY push-button to make the display read conductivity.
- Make sure that your handheld conductivity meter is calibrated accurately.
- Measure the tower water with the handheld meter.
- Turn the calibration screw for the conductivity until the meter reads the same as the tower water.

2.3.2 Using the controller as a standard.

- Put a sample of the make up water in a glass beaker or jar.
- Remove the conductivity sensor from the controller and immerse it one inch minimum from the bottom of the jar. The top should not be under water.
- Turn the calibrate screw to make the conductivity read the approximate value of the make up water conductivity. Use 200 to 1,000 umhos if this is not known.
- Multiply the make up water by three. Set the setpoint for this value.
- Reinstall the sensor. The controller should maintain the cooling water at three cycles of concentrations.

NOTE: Some handheld meters are calibrated in PPM of TDS. It is OK to calibrate the controller in PPM instead of umhos.

3.0 TROUBLESHOOTING

3.1 PROBLEM-CHECK

<u>Problem</u>	<u>Check</u>
1.No chemical in the cooling water	1.Other sources of blowdown that prevent the concentrations from rising. 2.Tower overflow. 3.Chemical pump lost prime. 4.Alarm is on. Too short an alarm time. 5.Power on the chemical pump outlet with the A-O-M switch in MANUAL.
2. Blowdown valve does not open	1. Turn A-O-M switch to MANUAL. 2.Check power at the outlet. 3.Is the FLOW light on? No flow? 4.Check out the valve solenoid. Is it burned out? 5.Look at the blowdown relay. If it is very black inside, the rear circuit board must be repaired.
3.The above checks out OK but the valve will not operate in the AUTO position.	1.Remove the front panel at the hinges and return to the factory for repair. Note the ribbon cable polarity for re- installation.
4.All of the above is OK but the alarm turns on at each blowdown cycle.	1.Increase the blowdown rate if possible. 2.Increase the alarm timer setting.
5.The alarm timer is on all the time.	1.Send the front panel to the factory for repair.

4.0 PARTS LIST

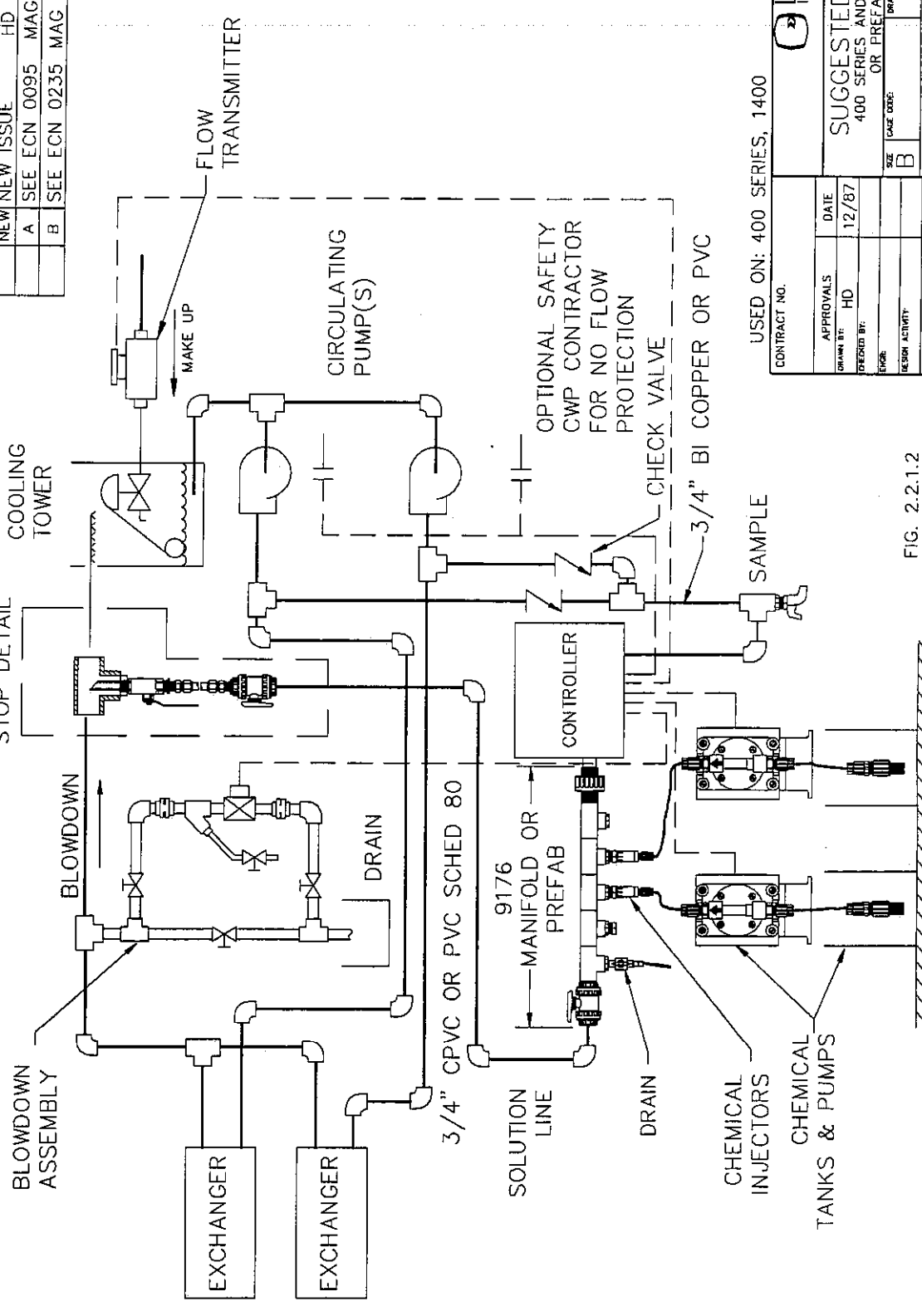
PART NUMBER	DESCRIPTION
700185	Conductivity sensor
700314	Plumbing assembly including flowswitch
700320	Front panel with circuit board and display
700367	Rear circuit board
WA 1\2	Replacement chart paper for chart recorder, six rolls.

CAUTION!

DO NOT FEED ALKALINE CORROSION SCALE INHIBITOR INTO A SAMPLE LINE. ALKALINE CORROSION SCALE INHIBITOR SHOULD BE ADDED DIRECTLY INTO THE COOLING TOWER. PLEASE ASK YOUR WATER TREATMENT SPECIALIST FOR INFORMATION AND DIRECTIONS ON PROPER FEED METHODS.

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVALS
	NEW	NEW ISSUE	HD 12/87	
	A	SEE ECN 0095	MAG 3/92	
	B	SEE ECN 0235	MAG 10/92	

9160 CORPORATION
STOP DETAIL



USED ON: 400 SERIES, 1400

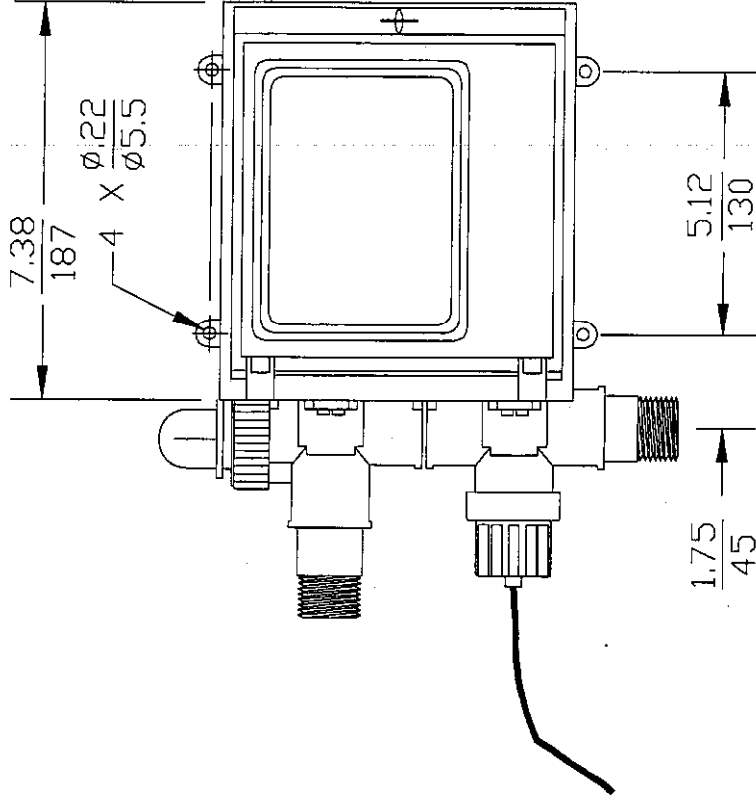
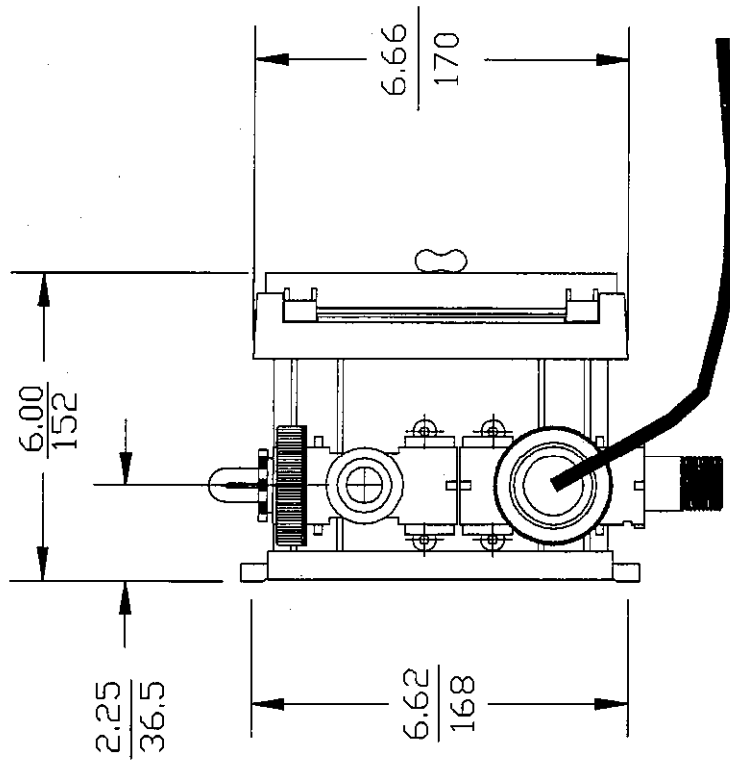
CONTRACT NO.		akewood INSTRUMENTS, INC. PHOENIX, ARIZONA	
APPROVALS	DATE	SUGGESTED INSTALLATION	
DRAWN BY: HD	12/87	400 SERIES AND 1400 CONTROL SYSTEM	
CHECKED BY:		OR PREFABRICATED SYSTEM	
DESIGN ACTIVITY:		SIZE	DRAWING NUMBER:
ACCEPTED BY:		B	5100739-01
		SCALE	MODEL NUMBER: 400/1400
			SHEET 1 OF 2

FIG. 2.2.1.2

NOTES: UNLESS OTHERWISE SPECIFIED;
DIMENSIONS ARE IN INCHES
MM

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVALS
	B	NEW ISSUE	JY 6/86	
	A	CHANGED DIMS	JY 6/86	
	B	REVISED	DH 6/90	



USED ON: 101, 151, 173, 175, 211, 215, 222, 224

CONTRACT NO.	
APPROVALS	DATE
DRAWN BY: JY	6/86
CHECKED BY:	
ENGR:	
DESIGN ACTIVITY:	
ACCEPTED BY:	

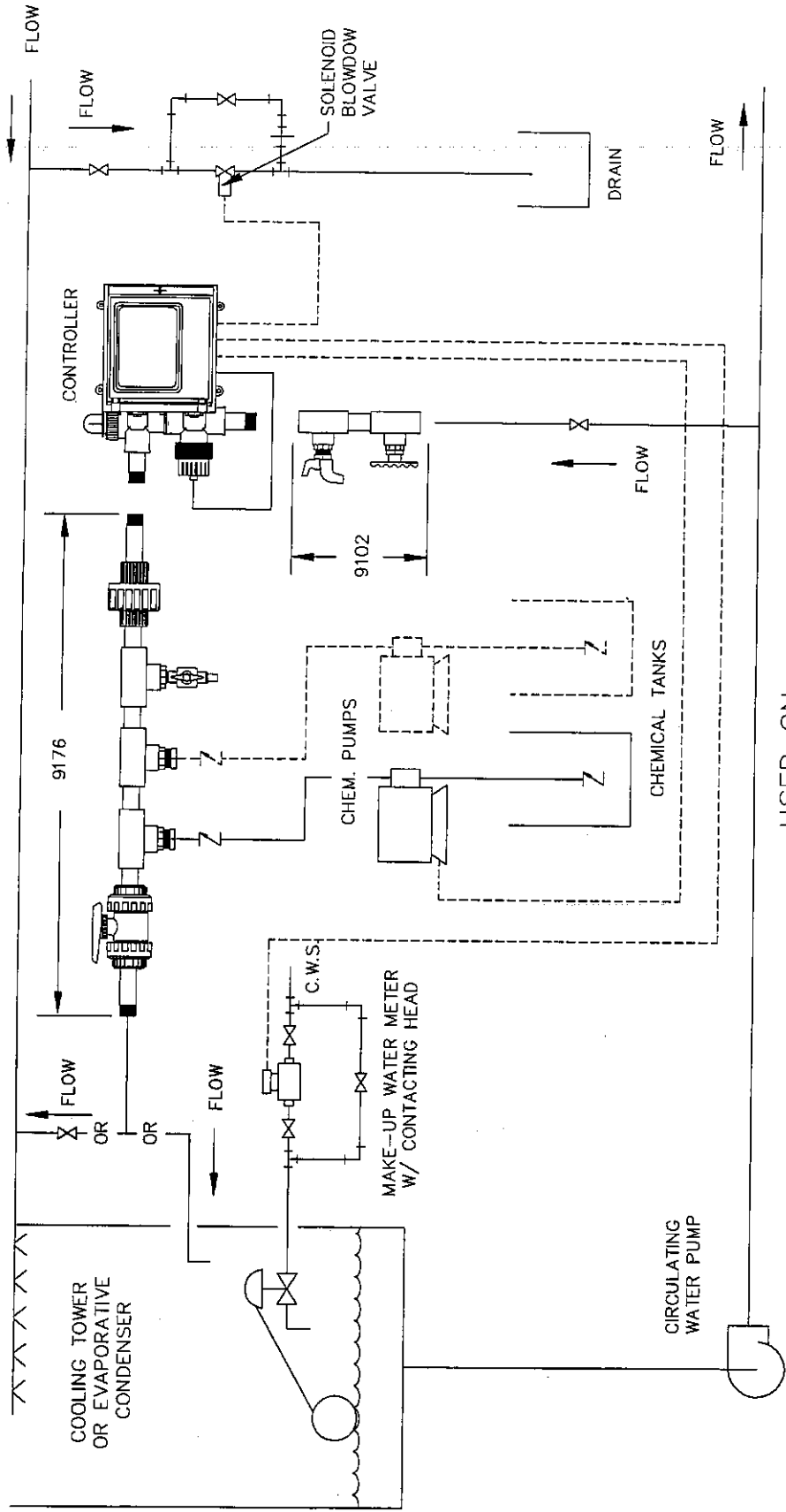


DRAWING - ASSEMBLY
SENSOR & PLUMBING
CONFIGURATION

SIZE	CAGE CODE:	DRAWING NUMBER	REV:
A		5101423	B
SCALE:	NTS	MODEL NUMBER	SHEET: 1 OF 1

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVALS
	NEW	NEW ISSUE	DH 12/90	



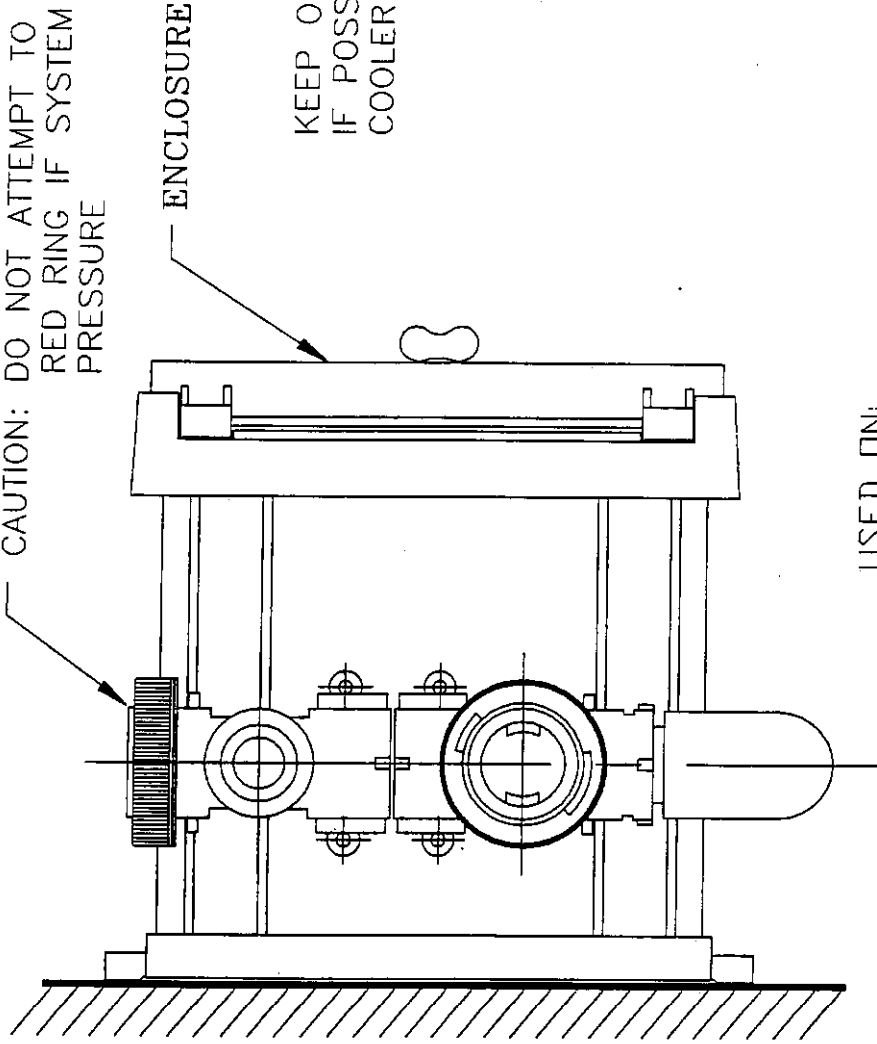
USED ON:

CONTRACT NO.		Lakewood INSTRUMENTS INC.	
APPROVALS	DATE	RECOMMENDED INSTALLATION	
DRAWN BY: DH	12/90	COOLING TOWER CONTROL SYSTEM	
CHECKED BY:		SIZE	CAGE CODE
ENGR:		A	
DESIGN ACTIVITY:		DRAWING NUMBER:	5101424
ACCEPTED BY:		SCALE:	NONE
		MODEL NUMBER:	173, 174, 175
		REV:	
			SHEET 1 OF 1

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVALS
	NEW	NEW ISSUE	JY 6/86	

CAUTION: DO NOT ATTEMPT TO OPEN RED RING IF SYSTEM IS UNDER PRESSURE



KEEP OUT OF DIRECT SUNLIGHT IF POSSIBLE. CONTROLLER RUNS COOLER IN THE SHADE

USED ON:

1. INSTALL ON AN EVEN VIBRATION FREE SURFACE.
2. USE #6 OR #8 BOLTS/SCREWS STUDS.
3. DO NOT OVER TIGHTEN. SNUG IS ENOUGH.

CONTRACT NO.

APPROVALS DATE 6/86

DRAWN BY: JY

CHECKED BY:

ENGR.

DESIGN ACTIVITY:

ACCEPTED BY:



DIAGRAM - INSTALLATION
INSTALLATION NOTES

SIZE A

DRAWING NUMBER:

5101439

SCALE: NONE

MODEL NUMBER:

SHEET 1 OF 1

REV

NOTES: UNLESS OTHERWISE SPECIFIED;

1. TO REMOVE CLEAR FLOW SIGHT TUBE FOR CLEANING, TURN LOCK RING CCW. TWIST OUT TUBE.
2. CLEAN IN SOAP AND WATER.
3. PUT A SMALL AMOUNT OF "O"-RING LUBE ON THE "O"-RING.
4. REINSTALL.
5. TURN LOCK RING CW UNTIL IT SNAPS ON DETENT.
6. LOCK RING OPERATION: CLOCKWISE TO DETENT TO OPEN COUNTERCLOCKWISE TO OPEN

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVALS
	NEW	NEW ISSUE	JY 6/86	

FULL FLOW WILL HOLD BALL AT TOP OF DOME ABOUT 1 G.P.M. AT THIS POSITION



DO NOT ATTEMPT TO OPEN RED LOCK RING IF SYSTEM IS UNDER PRESSURE

USED ON:

CONTRACT NO.		Lakewood INSTRUMENTS INC.	
APPROVALS	DATE	DRAWING - ASSEMBLY	
DRAWN BY: JY	6/86	FLOW SWITCH NOTES	
CHECKED BY:		SIZE	REV.
ENGR:		A	
DESIGN ACTIVITY:		CAGE CODE:	DRAWING NUMBER:
ACCEPTED BY:			5101440
		SCALE: NONE	MODEL NUMBER:
			SHEET 1 OF 1

A) INPUT AC VOLTAGE:

- >115 VAC USE J8 & J7
- >250 VAC USE J9

B) BIOCIDES: (66)

- >TO USE WITH 66 OMIT J3
- >TO USE WITHOUT 66 USE J3

C) MODELS:

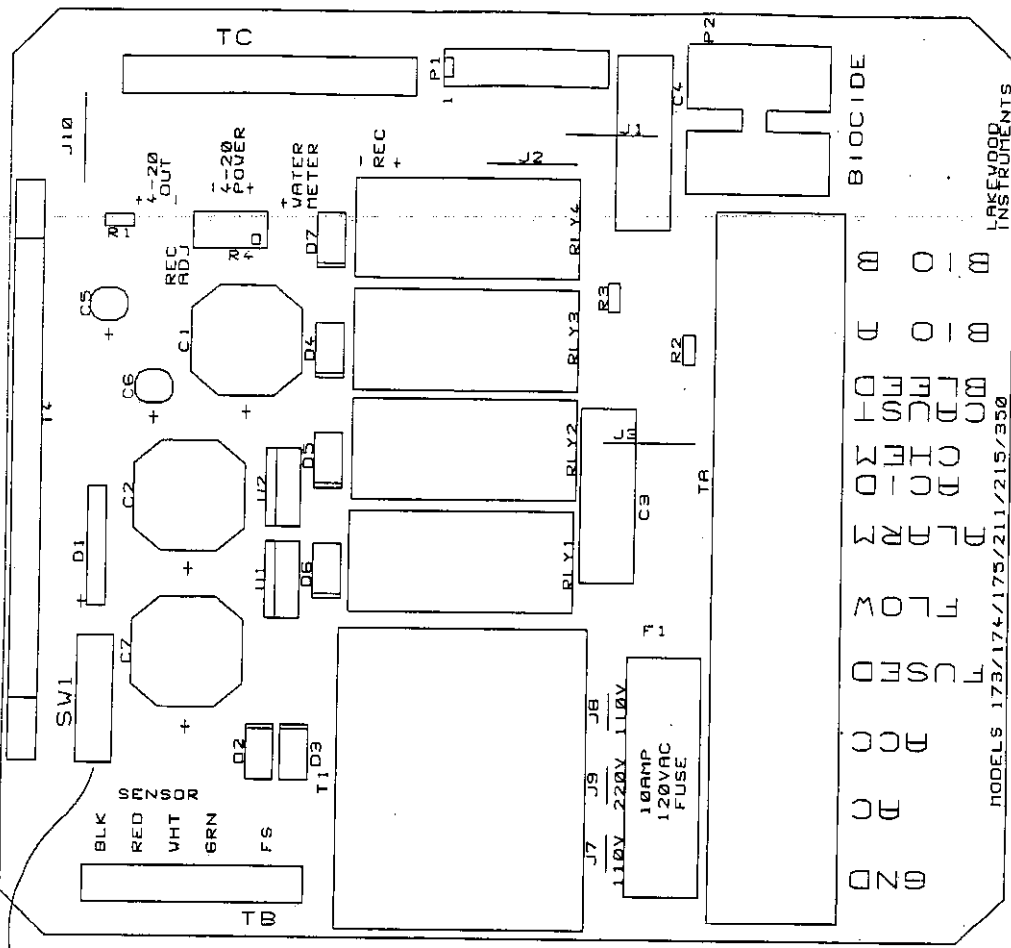
- >173/174/175 USE J1 & J2
- >211/215 USE J2
- >350 USE J1

D) SENSOR OPTIONS:

- >350-RS/STANDARD: USE SW1 S1A-S2A S3A-S3B
- >350-RP: USE SW1 S2A-S2B S4A-S4B S6A-S6B
- >173/175/211-RP: USE SW1 S2A-S2B S5A-S5B S7A-S7B
- >173/175/211/215 STANDARD: USE SW1 S1A-S2A S3A-S3B S4A-S4B S6A-S6B

D) 4-20mA OUTPUT:

- >REMOVE J10 FOR EXTERNALLY POWERED 4-20mA LOAD



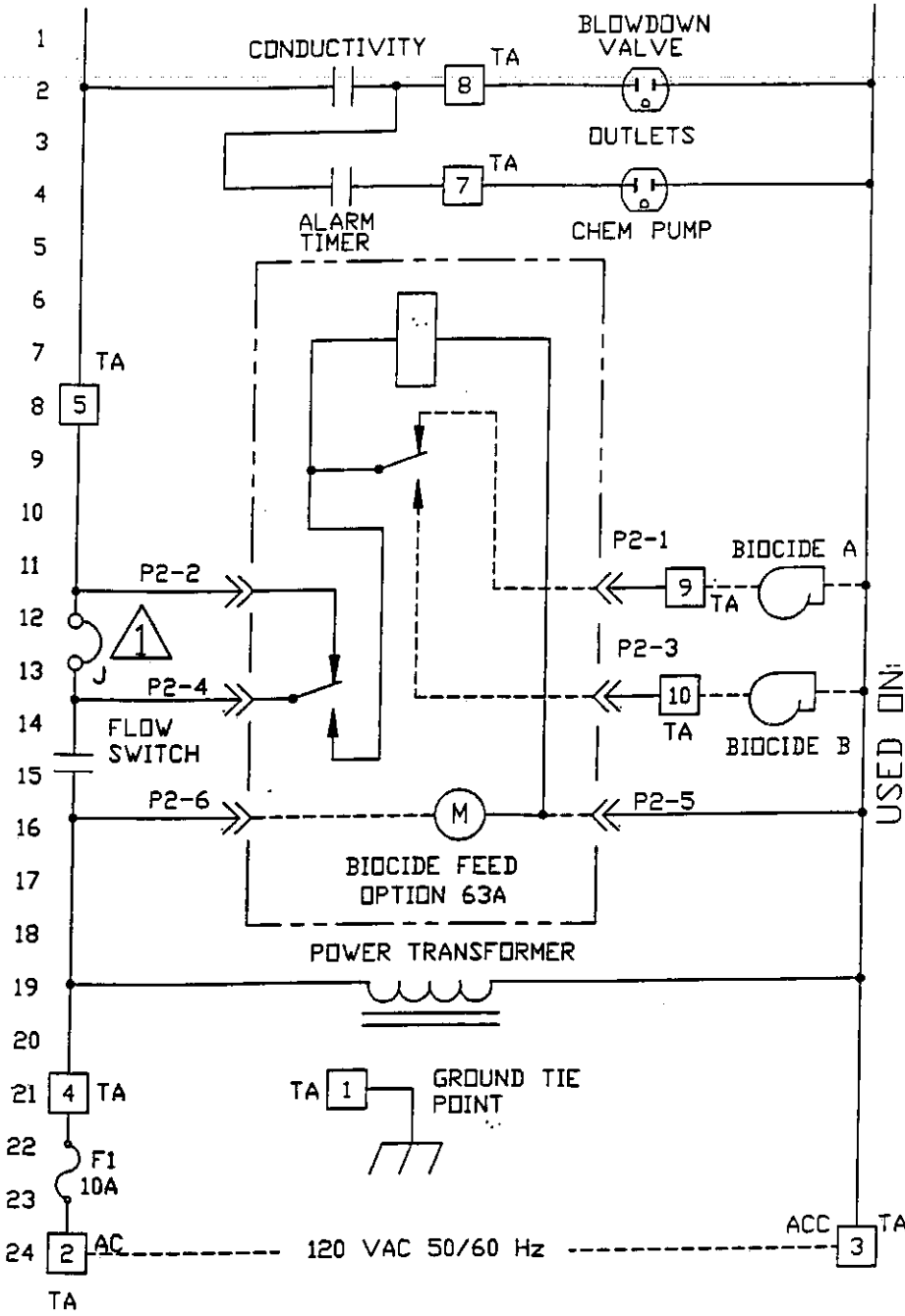
DATE	1/7/91	APPROVED	REV. E	2/25/91
DR. BY:	JHT			
SCALE	1:1			
BACKBOARD COMPONENT LAYOUT				
MODEL NO.	173, 174, 175, 211, 215, 350	DWG. NO.	A-5101409	

NOTES: UNLESS OTHERWISE SPECIFIED;
 REMOVE JUMPER FOR BIOCIDES FEED.



REVISIONS

ZONE REV	DESCRIPTION	DATE	APPROVALS
	NEW ISSUE	JY 9/86	



USED IN:

Lakewood INSTRUMENTS INC.

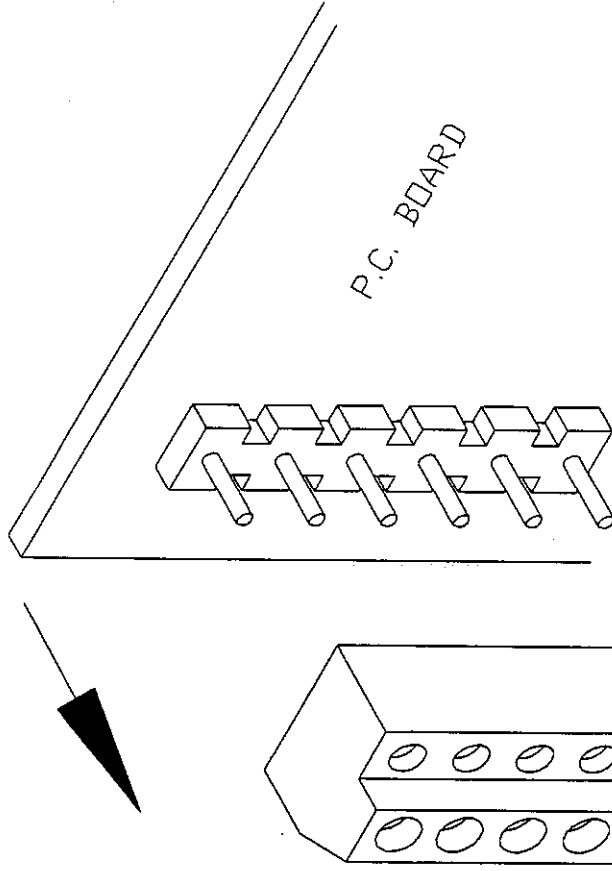
DIAGRAM - LADDER
 200 SERIES BACKBOARD

CONTRACT NO.	APPROVALS	DATE
	DRAWN BY: JY	9/86
	CHECKED BY:	
	ENGR:	
	DESIGN ACTIVITY:	
	ACCEPTED BY: JY	

SIZE: A	PAGE CODE:	DRAWING NUMBER: 5101513	REV.:
SCALE: NONE	MODEL NUMBER:		SHEET: 1 OF 1

NOTES: UNLESS OTHERWISE SPECIFIED;

1. PULL ON TERMINAL BLOCK WITH PLIERS FOR EASE OF WIRING.
2. INSTALL WIRES, THEN PUSH TERMINAL BLOCK ON PIN HEADER.



USED ON:

REVISIONS			
ZONE	REV	DESCRIPTION	DATE
	NEW	NEW ISSUE	JY 9/86

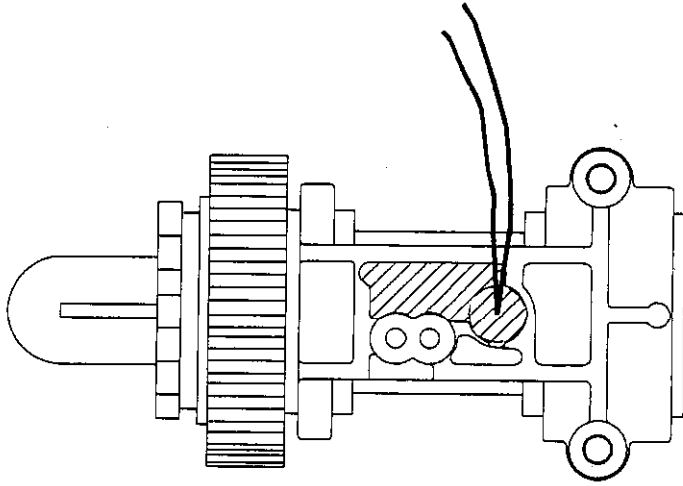
CONTRACT NO.		APPROVALS		DATE
		DRAWN BY: JY		9/86
		CHECKED BY:		
		ENGR:		
		DESIGN ACTIVITY:		
		ACCEPTED BY:		
		SIZE	CAGE CODE	DRAWING NUMBER
		A		5101519
		SCALE	NONE	
		Lakewood INSTRUMENTS INC		REV
		DIAGRAM - REMOVAL		
		TERMINAL BLOCK		
		P.C. BOARD		
		SHEET		1

NOTES: UNLESS OTHERWISE SPECIFIED;

1. INSTALL / REMOVAL PROCEDURES
- A. REMOVE 3 SCREWS HOLDING FLOW SWITCH.
- B. REMOVE SCREWS HOLDING OTHER PLUMBING COMPONENTS.
- C. PULL HARD ON THE GREEN WIRES TO REMOVE THE REED SWITCH.
- D. INSTALL AND WIRE NEW REED SWITCH.
- E. RE-INSTALL PLUMBING.

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVALS
	NEW	NEW ISSUE	JY 9/86	

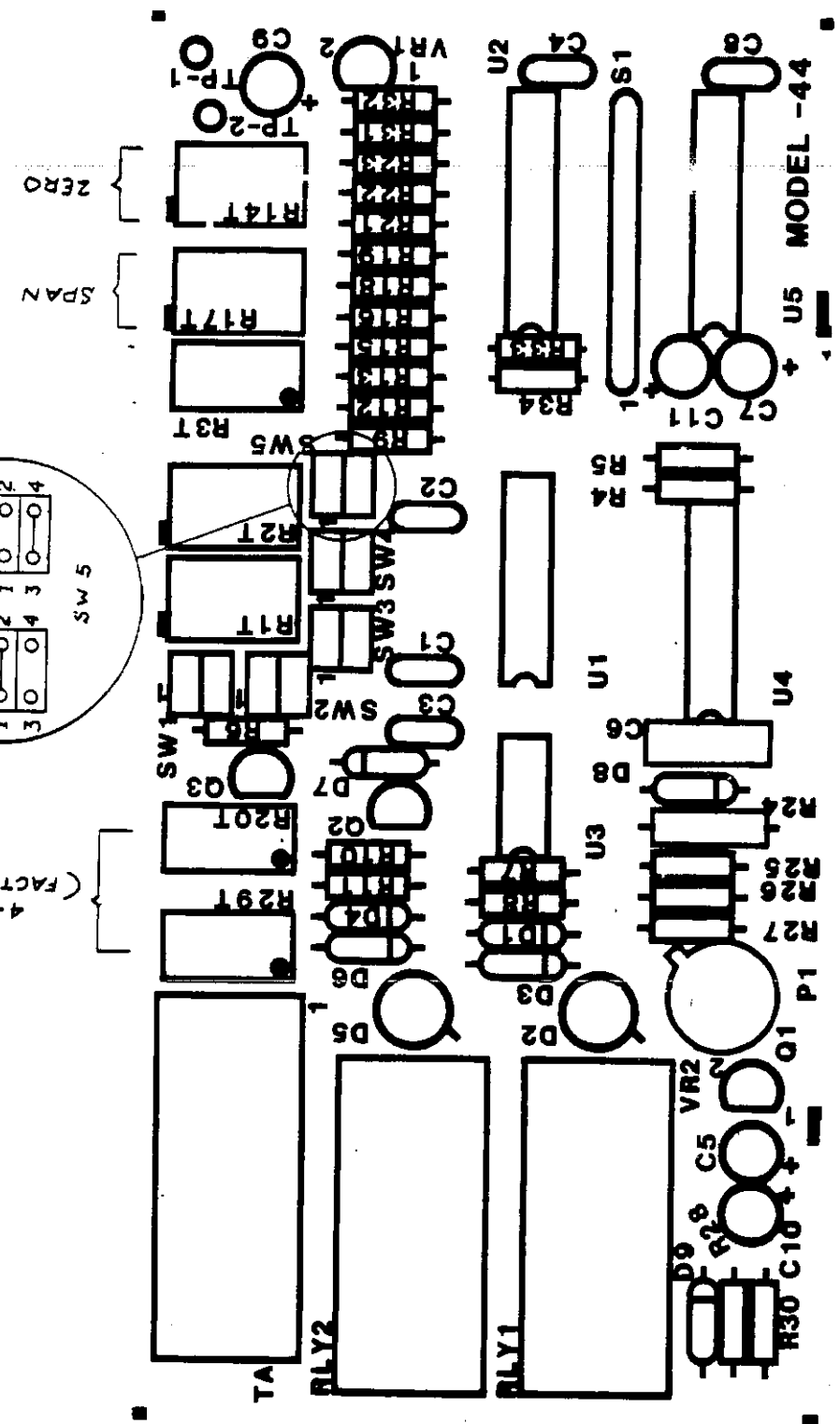
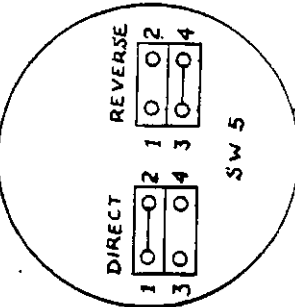


USED ON:

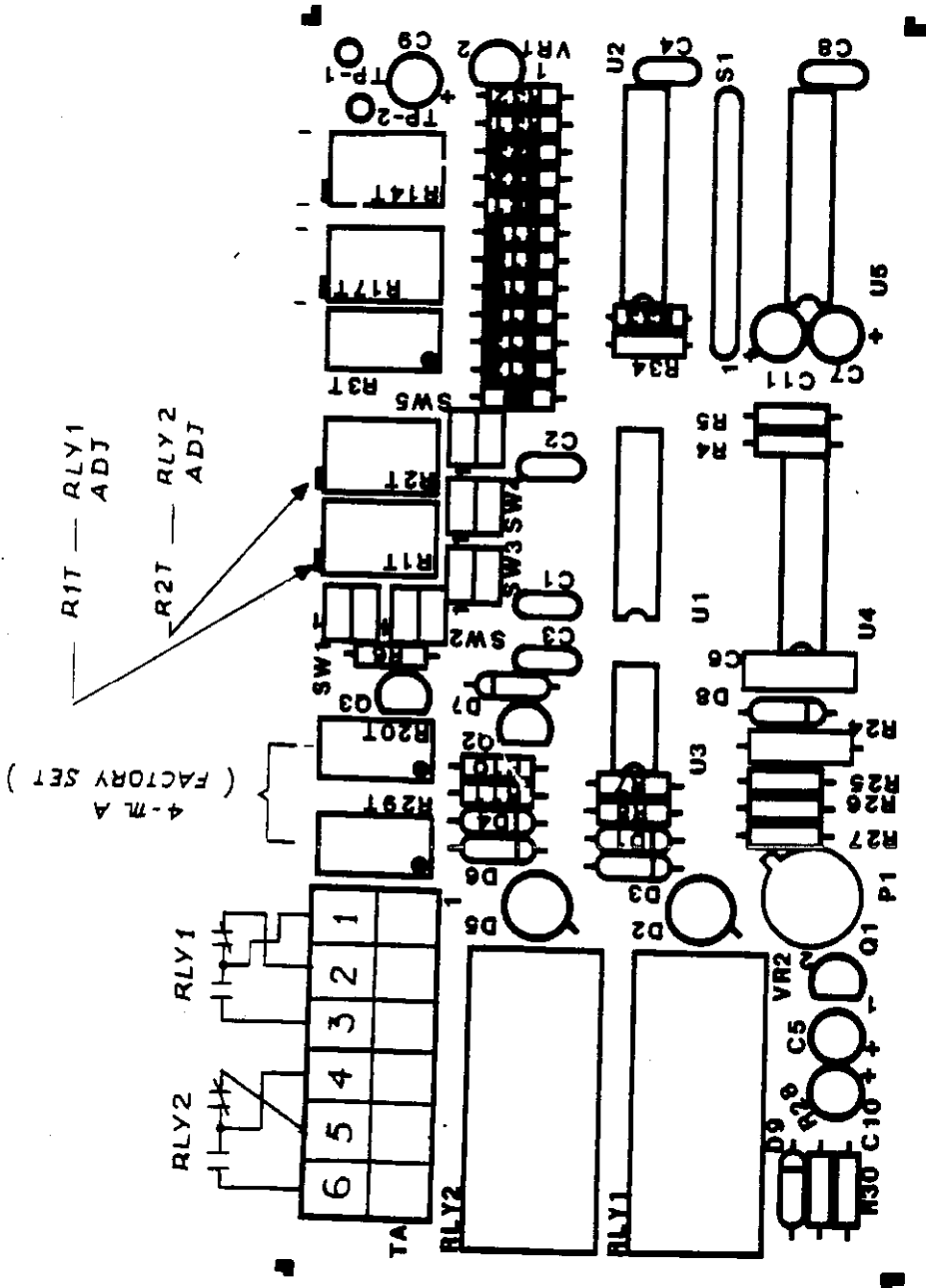
CONTRACT NO.		Lakewood INSTRUMENTS INC.	
APPROVALS	DATE	DRAWING - ASSEMBLY	
DRAWN BY: JY	9/86	REED SWITCH REPLACEMENT	
CHECKED BY:		SIZE	REV.
ENGR:		A	
DESIGN ACTIVITY:		CAGE CODE	DRAWING NUMBER:
ACCEPTED BY:			5101520
		SCALE: NONE	MODEL NUMBER: 700359
			SHEET 1 OF 1

DIRECT / REVERSE
JUMPER M-35

(FACTORY SET)
4-mA



DATE 12-22-69	APPROVED	REV.
DR. BY D H	35 CARD 4 - 20 mA OUTPUT	
SCALE X		
MODEL NO. M-35 CARD	DWG. NO. A - 5102611	



NOTES:

- SW 1 — HIGH RELAY 1 .
- SW 2 — LOW RELAY 1 .
- SW 3 — HIGH RELAY 2 .
- SW 4 — LOW RELAY 2 .



DATE 6-6-90	APPROVED	REV.
DR. BY DH		
SCALE α		
MODEL M-42 CARD	M-42 CARD A/L (ALARM)	DWG. NO. A-5102840

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVALS
	NEW	NEW ISSUE	DH 8/91	
	A	SEE ECN 0061	MAG 2/92	
	B	SEE ECN 0112	MAG 4/92	

A #700498 (PROCESS CONDUCTIVITY DRIVER)

1. USE JUMPER A,B,D AND F
2. R T.C. = 10K
3. RANGE SWITCH TABLE:

SWITCH	COND. μ S	SIMULATOR
1, 2, 3, 7	100,000	10 OHMS
1, 2, 3	10,000	100 OHMS
1, 2, 4	1,000	1 KOHMS
5	100	10 KOHMS
6	10	100 KOHMS

B #700498-B (BOILER CONDUCTIVITY DRIVER)

1. USE JUMPER A,B,D AND F
2. R T.C. = 1K
3. RANGE SWITCH TABLE:

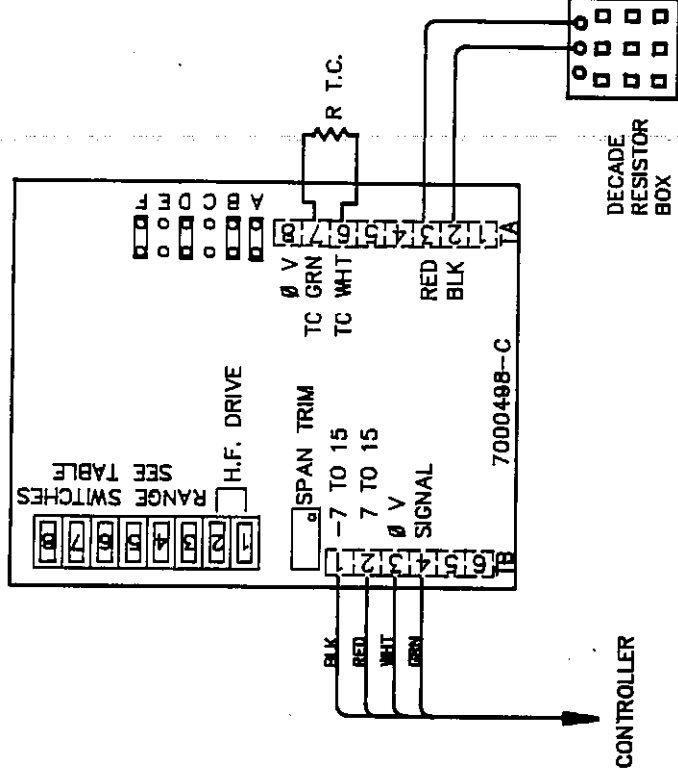
SWITCH	COND. μ S	SIMULATOR
1, 2, 3	10,000	10.8 OHMS
1, 2, 4	1,000	108 OHMS

C #700498-C (COOLING TOWER CONDUCTIVITY DRIVER)

1. USE JUMPER A,B,D AND F
2. R T.C. = 500 OHMS
3. RANGE SWITCH TABLE:

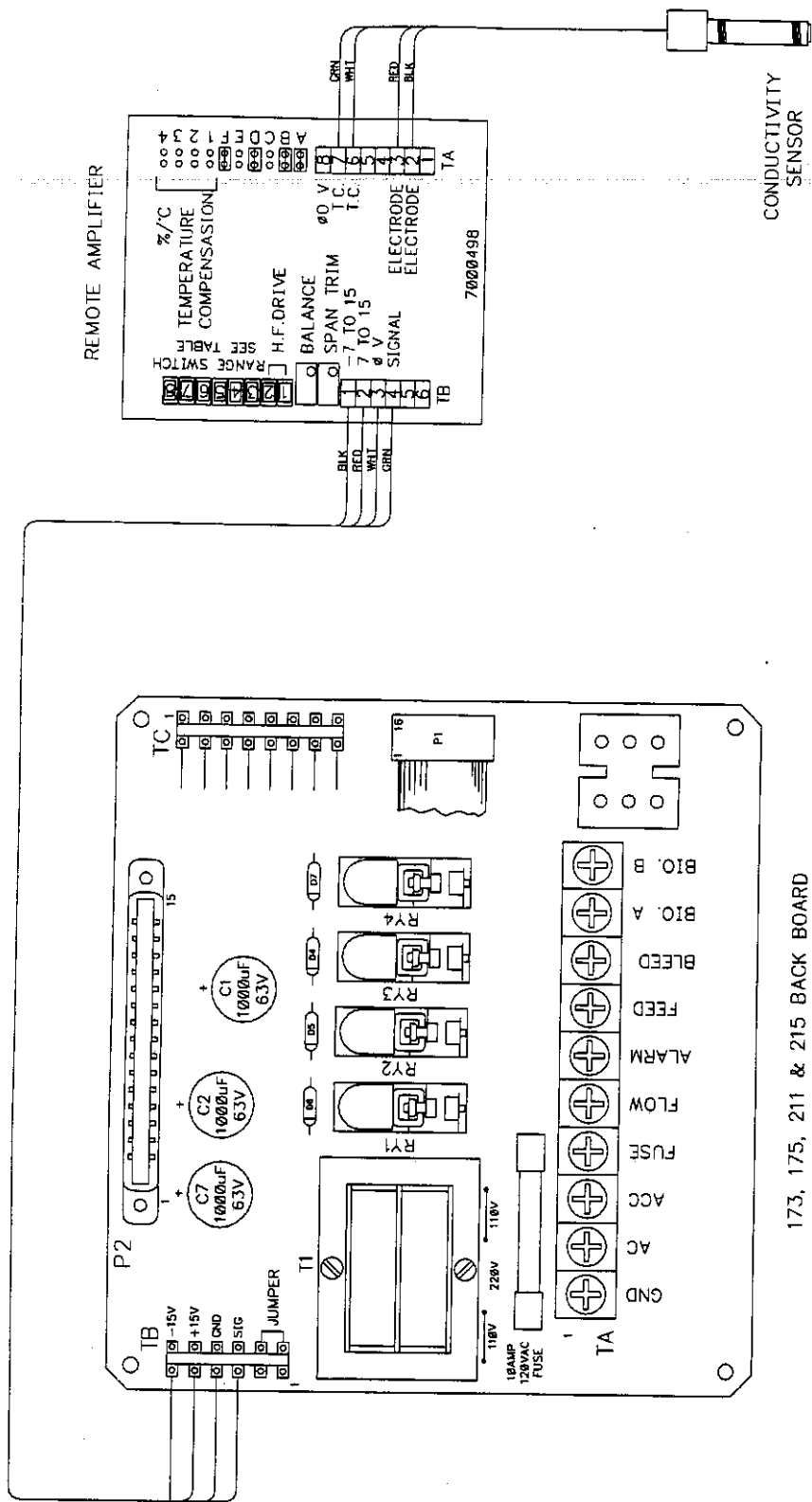
SWITCH	COND. μ S	SIMULATOR
1, 2, 3	10,000	100 OHMS
1, 2, 4	1,000	1 KOHMS

700498
700498-B
700498-C



USED ON: 700498/700498-B/700498-C

CONTRACT NO.		LAKEMOOD INSTRUMENTS & PHOENIX, ARIZONA	
APPROVALS	DATE	CHART-SIMULATOR CONDUCTIVITY DRIVER	
DRAWN BY: DH	8/91	SIZE	DRAWING NUMBER: 5103365
CHECKED BY:		SCALE	MODEL NUMBER: NONE
ENGR:			
DESIGN ACTIVITY:			
ACCEPTED BY:			
			SHEET 1 OF 1



NOTES:

A. CONDUCTIVITY RANGE:

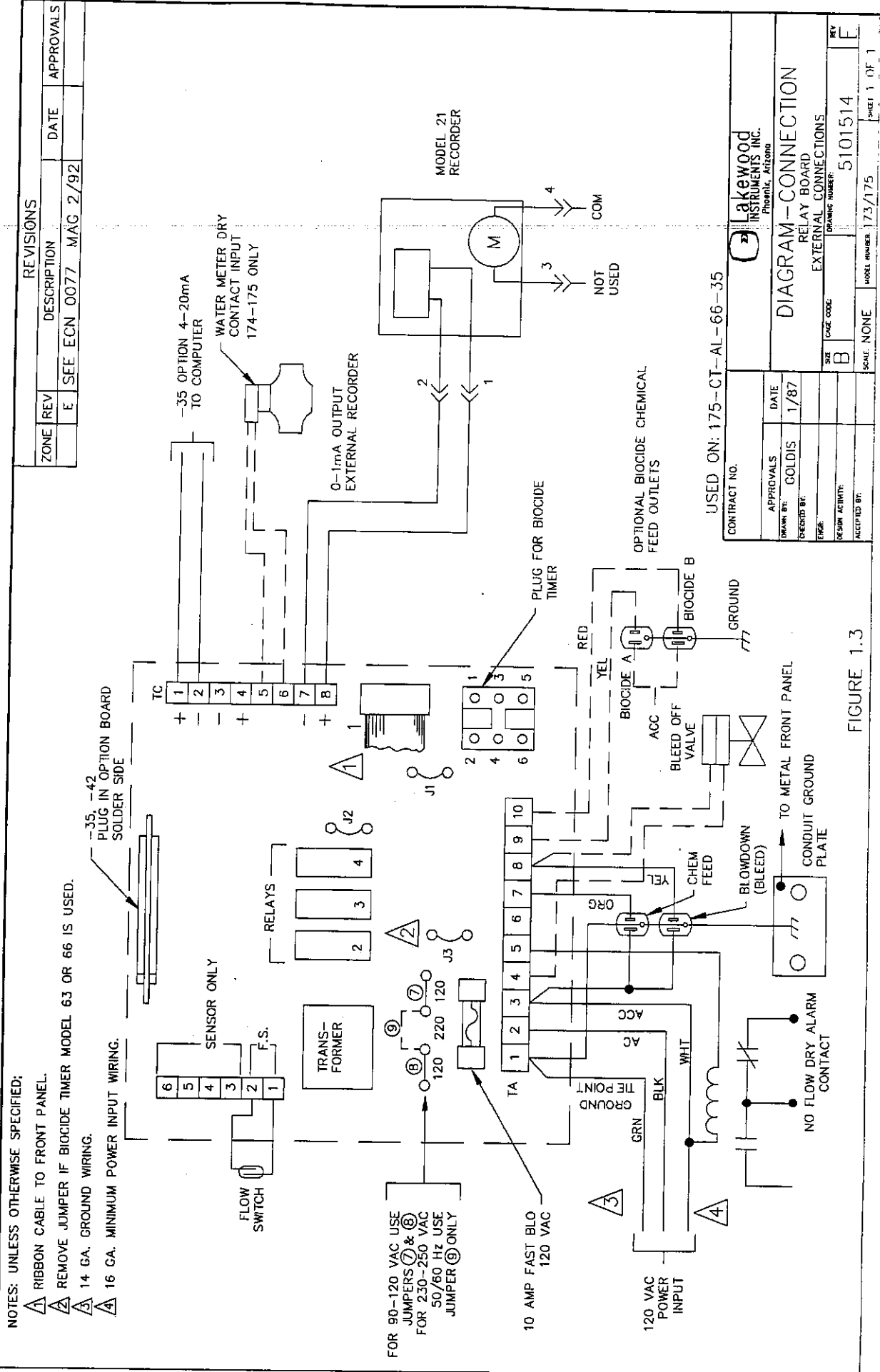
CONDUCTIVITY umhos	SWITCH NUMBER
0-10,000	1,2,3
0-1,000	4
0-100	5
0-10	6

B. TEMPERATURE COMPENSATION:
 10 KNTC USE A, B, D, F JUMPERS.

173, 175, 211 & 215 BACK BOARD



DATE	8-13-91	APPROVED	REV.
DR. BY	DH	WATER TREATMENT CONTROLLER WITH -RP OPTION	
SCALE	NTS		
MODEL NO.	RP	DWG NO.	A-5103357



- NOTES: UNLESS OTHERWISE SPECIFIED;
- A RIBBON CABLE TO FRONT PANEL.
 - B REMOVE JUMPER IF BIOCIDIE TIMER MODEL 63 OR 66 IS USED.
 - C 14 GA. GROUND WIRING.
 - D 16 GA. MINIMUM POWER INPUT WIRING.

REVISIONS		DESCRIPTION	DATE	APPROVALS
ZONE	REV	SEE ECN 0077	MAG 2/92	
	E			

USED ON: 175-CT-AL-66-35

Lakewood INSTRUMENTS INC. Phoenix, Arizona	
DIAGRAM - CONNECTION RELAY BOARD EXTERNAL CONNECTIONS	
CONTRACT NO.	5101514
APPROVALS	DATE
DRAWN BY: COLDIS	1/87
CHECKED BY:	
ENG:	
DESIGN ACTIVITY:	
ACCEPTED BY:	
SCALE: NONE	MODEL NUMBER 173/175
SHEET 1	OF 1

FIGURE 1.3

