

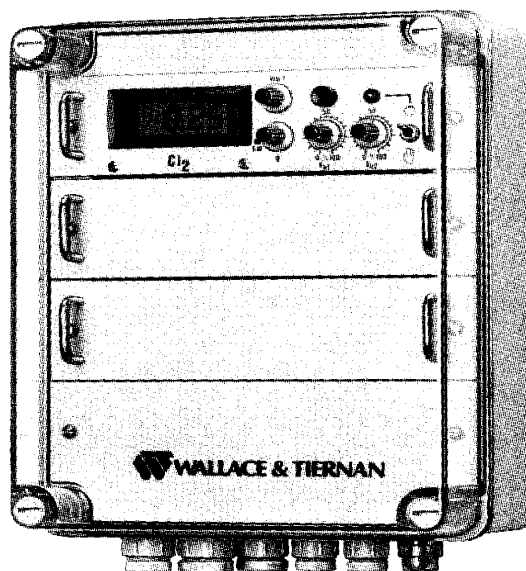
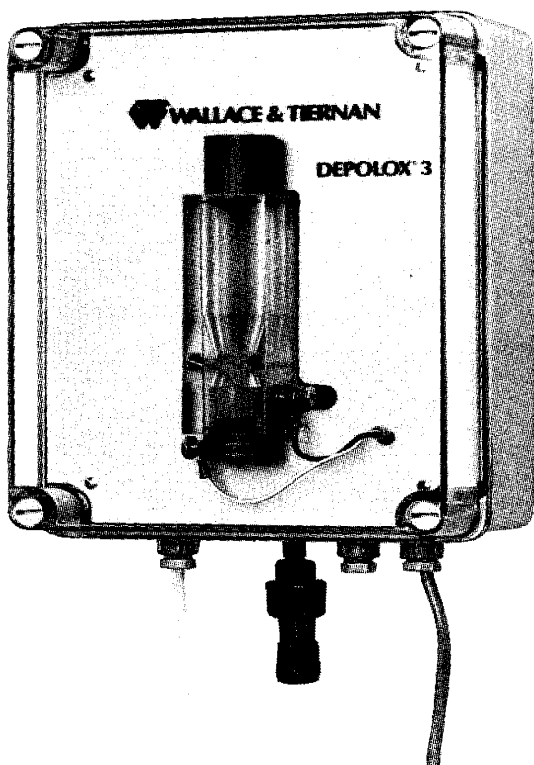
OPERATING INSTRUCTIONS



WALLACE & TIERNAN

WALLACE & TIERNAN, INC.
25 MAIN STREET • BELLEVILLE, NJ 07109-3057

DEPOLOX[®] 3 For Measurement, Control and Recording of Chlorine



Book No. WEA 50.550

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INTRODUCTION

This instruction book provides information on the installation, operation and maintenance of the Wallace & Tiernan Depolox 3 arrangement for "free" chlorine measurement and control. The DEPOLOX 3 consists of two packages - the Basic Unit and the measuring package. The optional measuring packages are the Chlorine Measuring Package, the pH Measuring Package and the Fluoride Measuring Package. A chart recorder is also available as an option.

The Chlorine Measuring Unit contains a temperature compensated electro-chemical cell and a flow regulator. A steady sample of water to be analyzed is passed to the Measuring Unit where it flows through the flow regulator, to the cell and then exits to a drain. The current generated in the cell is input to the measuring amplifier in the Basic Unit. The Basic Unit also contains the terminals for connection of the Measuring Unit cell and AC power and for connection to the control and alarm relay contacts and 4-20 mAmp output. The amplifier displays the corresponding, calibrated residual and transmits a proportional mAmp signal for use by an optional recording device. The amplifier board will also actuate relays in the Basic Unit at customer selected residual levels. These relays may be used to control chlorine feed and to actuate alarms.

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SECTION 1 - TECHNICAL DATA

BASIC UNIT

Power Requirements: 120V, 50/60Hz (230V optional)
Fused at: 0.5A (230V unit fused at 0.2A)
Output Relays: DPST NO/NC, 250V, 4A,
Unpowered Dry Contacts
Enclosure: Nema 12

CHLORINE MEASURING AMPLIFIER

Ranges (factory set at 1.00 mg/L, customer adjustable):

Chlorine mg/L (ppm) 0...0.50
0...1.00
0...2.00
0...5.00
0...10.00
0...19.99

Power Requirements: 120V, 50/60Hz (230V optional)
Power Consumption: 2 Amps
Input Signal: 4...100 uAmps (measuring cell
current)
Output Signal: 4...20 mAmps,
300 Ohm max. load, non-isolated
Temperature
Compensation Range: 35...125 Deg. F
Ambient Temperature: 35...125 Deg. F

CHLORINE MEASURING UNIT

Sample Supply: 5 - 60 psi, 580 mL/min (9.2 US GPH)

SECTION 2 - INSTALLATION

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1 GENERAL

Install the Chlorine Measuring Unit in a location where it is protected from freezing, if necessary in a heated room. Install the Basic Unit near the Measuring Unit in order to keep the shielded connection cable short and to ease calibration.

2 UNPACKING

Whenever possible, unpack the equipment at the installation site. Items such as spare parts not required at the time of installation should be set aside where they will be available when needed.

NOTE: Do not discard or remove this instruction book when the installation is completed. The operator will need it.

3 LOCATION OF INSTALLATION

When installing the unit it is very important to consider both the chlorine contact time and mixing with the treated water.

A sufficient blending of chlorine in the main water flow, prior to sample take off, will be achieved if the distance between the point of application and the sample water take off equals at least 20 times the diameter of the main water line.

The contact time is the time elapsed between chlorine application and chlorine residual measurement. It is made up of both the flow time in the main from the point of application to the sample take off, and the flow time in the sample line from the sample take off to measuring unit. If the sufficient contact time can be achieved by proper location of the sample water take off from the main flow, the Measuring Unit should be installed as close as possible to the sample water take off point to simplify the installation and to minimize the flow time in the sample line. In this case 1/4 in. PVC pipe or 1/4 in. I.D. hose is recommended for use in the sample line. If additional contact time is required, larger diameter pipe or hose may be used or a mixing/delay tank may be mounted in line with the sample line.

4 MOUNTING

The Basic Unit and Measuring Unit should be mounted on a flat vertical surface. Four screws are supplied for mounting. For external and mounting dimensions of the Basic and Measuring Units, refer to Fig. 2 - Basic Unit and Fig. 3 - Chlorine Measuring Unit.

5 SAMPLE WATER TAKE OFF AND DRAIN LINE

The pressure at the inlet of the DEPOLOX 3 must be in the 5 to 60 psig range. At this pressure the sample water flow is approximately 580 mL/min. Higher water pressures must be reduced using a pressure reducing valve or, if the required minimum pressure is not available, a sample water pump must be installed. The inlet of the sample water line should be positioned near the center of the main flow, from which the sample is drawn.

NOTE: Do not use metal pipe in the sample inlet to the measuring unit.

The sample water should flow freely out of the drain pipe (Item 8, Fig. 1 - Typical Installation). A hose no longer than 6ft. should be connected to the outlet of the measuring unit. A longer drain line to suit may be installed from the drain funnel (Item 9, Fig. 1 - Typical Installation) to waste.

6 INSTALLATION WIRING

CAUTION: Installation wiring must conform to local electrical codes. This assembly should be installed, operated and serviced only by trained, qualified personnel who are thoroughly familiar with the entire contents of this instruction book.

CAUTION: Non-isolated mA output should only be connected to an isolated receiving device. Grounding of either of the outputs or connection to a non-isolated receiving device will result in erroneous output and may damage the amplifier.

NOTE: In general, the normally open contacts of the control relay should be used for chlorine feed control, unless there is good reason to do otherwise (re. SECTION 3 - OPERATION). For the attenuation of inductive voltages, the normally open contacts of the control relay (K2) are protected by an RC network. If desired the RC network may be made inoperative by removal of the red jumper "J2" on the motherboard.

External connections are made to the terminal blocks in the bottom of the Basic Unit (re. Fig. 2 - Basic Unit). To gain access to the terminals remove the bottom panel from the front of the unit by releasing the quick-release fasteners at both ends of the panel. Conduit hubs are mounted to the base of the unit to provide access for power and relay contact wiring. Cord grips are provided for the mAmp output signal and for input wiring from the Measuring Unit. Unused conduit plugs should be plugged to seal the enclosure. Connect to the terminal block as shown in Fig. 4 - Basic Unit Installation Wiring.

7 MEASURING AMPLIFIER

CAUTION: Turn off power switch (up-position) before installing or removing the amplifier. Installing or removing the amplifier with the power on may damage the amplifier.

NOTE: If the amplifier board is operated while plugged into the wrong receptacle, it will not be damaged but will not operate properly.

To install the Chlorine Measurement Amplifier in the Basic Unit, first remove the top panel (if installed) on the front of the Basic Unit to expose the receptacle marked "CL2" (re. Fig. 2 - Basic Unit), by releasing the quick-release fasteners at both ends of the panel. Insert the amplifier into the receptacle, making sure to properly engage the guide rails and the receptacle. Tighten the fasteners at each end of the amplifier front panel.

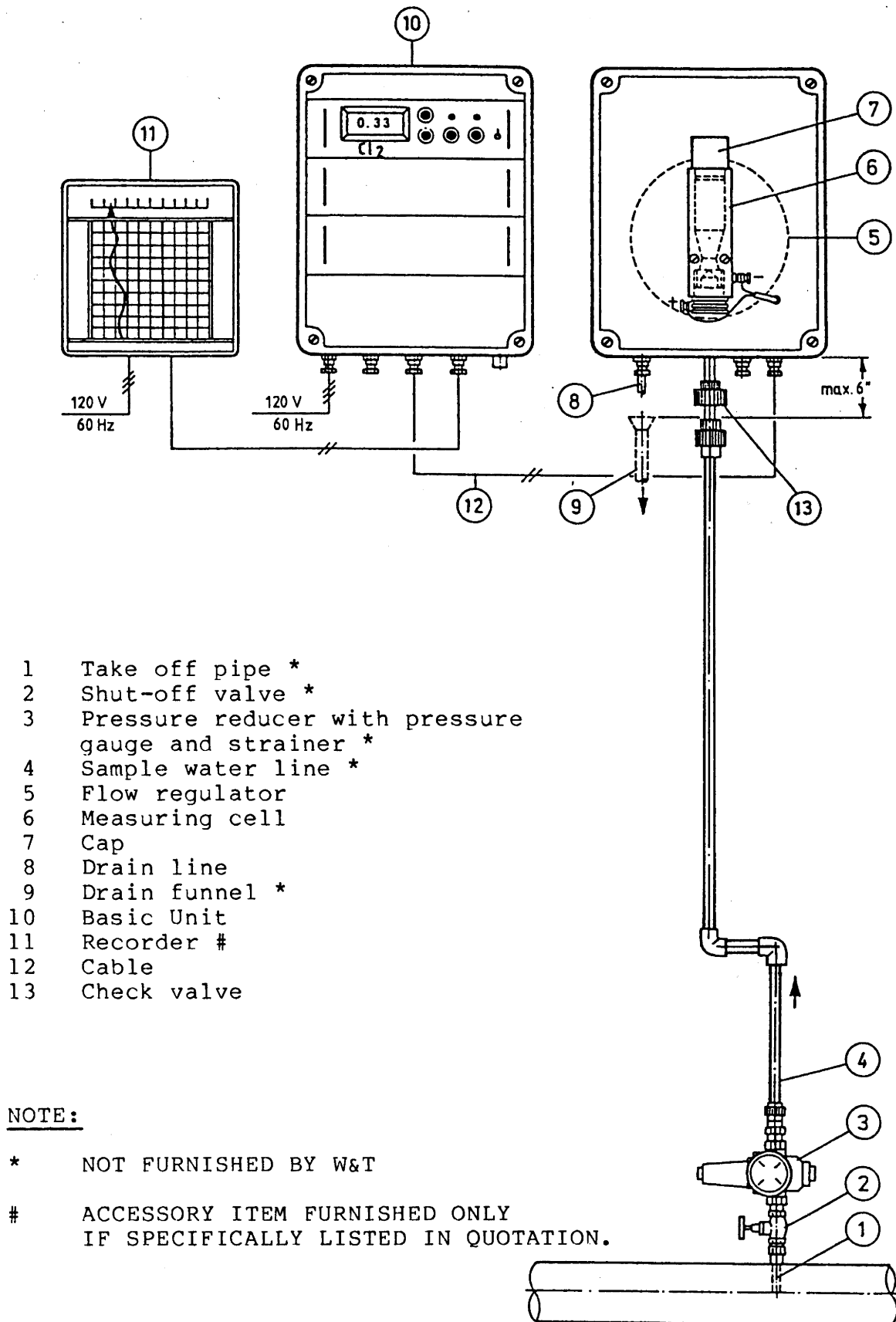


Fig. 1

DEPOLOX 3 - TYPICAL INSTALLATION
Chlorine Measuring Package

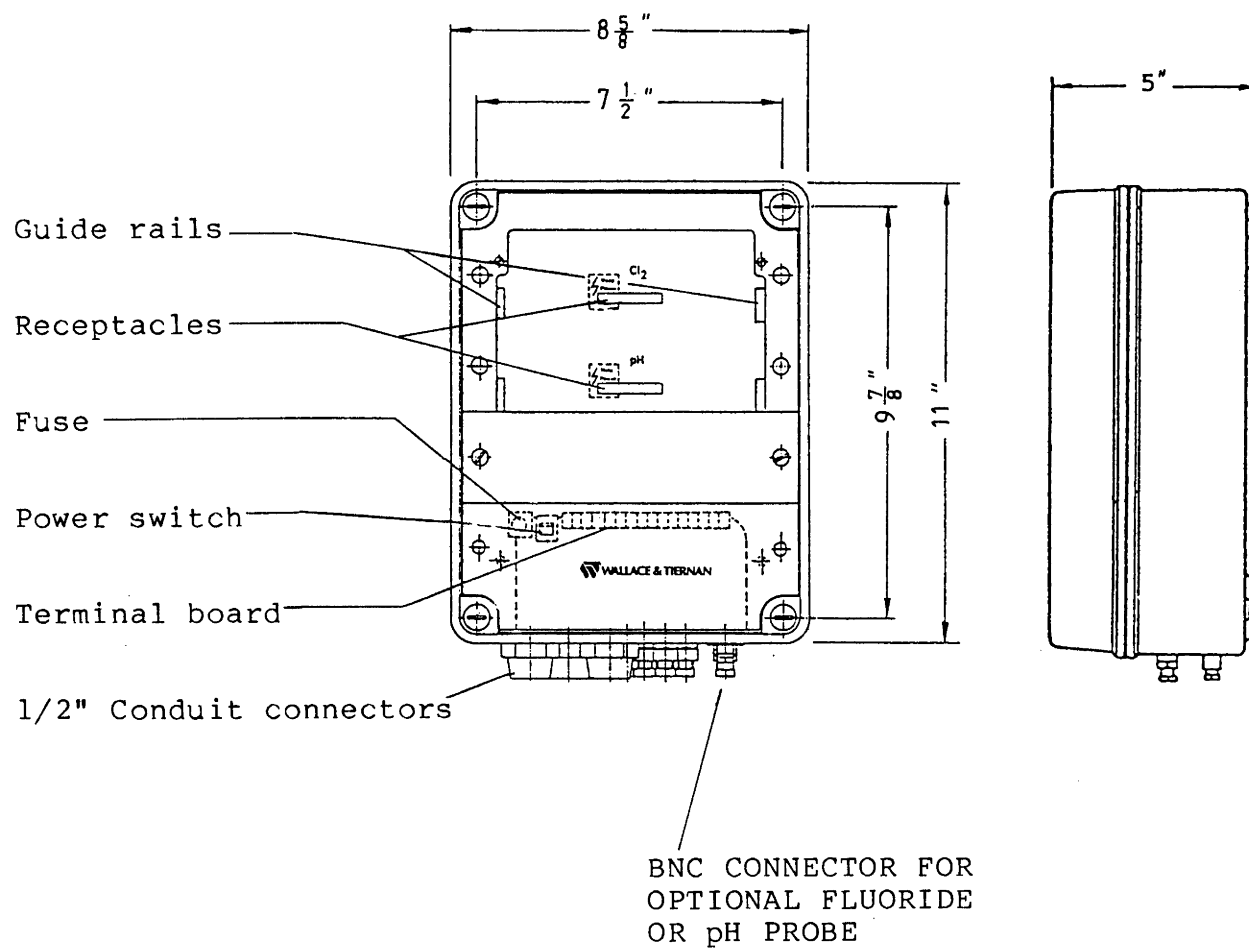


Fig. 2 DEPOLOX 3 - U-95213 BASIC UNIT

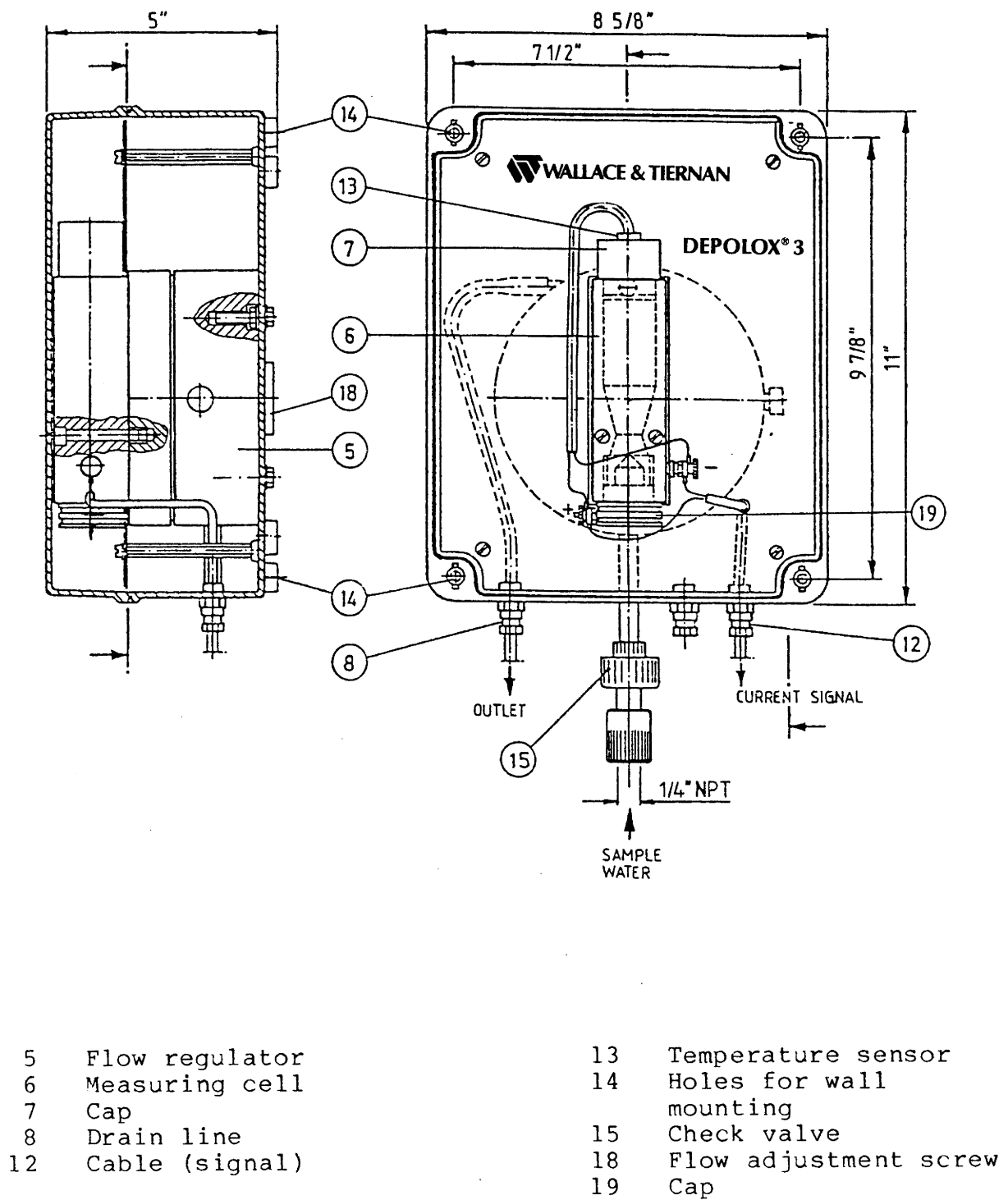


Fig. 3

DEPOLOX 3 - U-95220 CHLORINE MEASURING UNIT

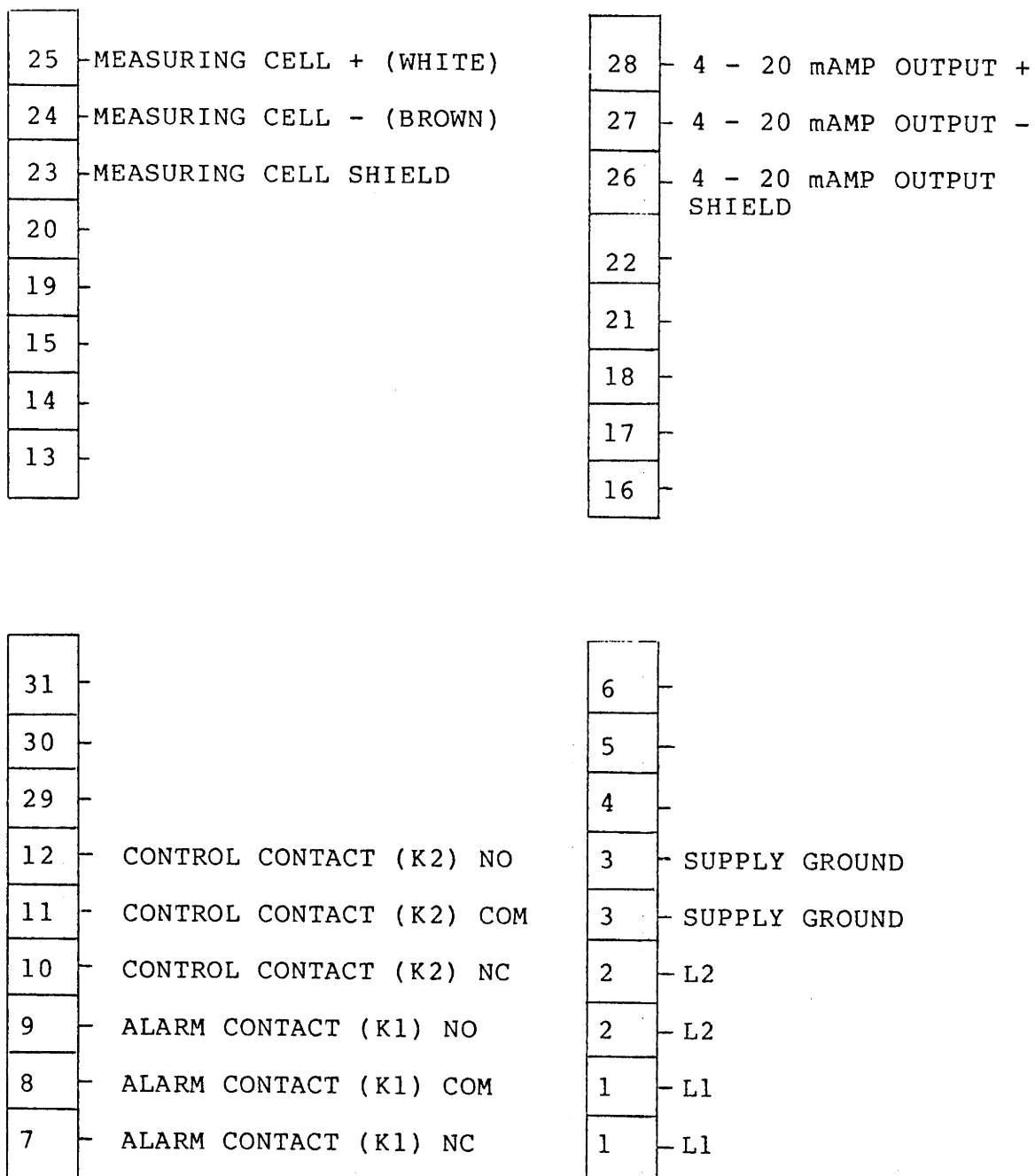


Fig. 4 DEPOLOX 3 - BASIC UNIT INSTALLATION TERMINAL WIRING
With Chlorine Measuring Package

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1 GENERAL

The following sections of this paragraph provide general information on the operation of the chlorine measuring package and should be read and understood before operating the unit.)

1.1 ALARM RELAY SET POINT (XK1)

The alarm relay (K1) may be used to actuate an alarm when the free chlorine residual exceeds the user selected alarm point. The percent of range above which the alarm relay is energized is indicated by the knob marked "XK1" on the front of the amplifier (see Fig. 5 - Chlorine Measuring Amplifier). For example, if the range of the analyzer is set at 1.00 mg/L (1.00 ppm) and the relay is to be energized when the residual is greater than 0.75 mg/L, the knob should be set at 75%. The lamp above the XK1 alarm set point knob (which also serves as the range indication button) will light when the alarm relay is energized.

1.2 CONTROL RELAY SET POINT (XK2)

The control relay (K2) may be used to actuate a chlorine dosage pump or other electrically actuated chlorine feed device when the free chlorine residual falls below the user selected set point. The percent of range below which the control relay is energized is indicated by the knob marked "XK2" on the front of the amplifier (re. Fig. 5 - Chlorine Measuring Amplifier). For example, if the range is set at 1.00 mg/L (1.00 ppm) and the control relay is to be energized when the residual is below 0.50 mg/L, the knob should be set at 50%. The LED above the XK2 control set point knob will light when the control relay is energized.

1.3 CONTROL RELAY AUTO/OFF/ON SELECTOR SWITCH

The function of the control relay is determined by the Auto/Off/On selector switch on the front of the amplifier (re. Fig. 5 - Chlorine Measuring Amplifier). In the Auto (up) position the actuation of the relay is automatically determined by the measured chlorine residual (re. Para. 1.2 CONTROL RELAY SET POINT). In the Off (center) position the relay is de-energized. In the On (down) position the relay is energized.)

CAUTION: If the DEPOLOX 3 unit is used in an automatically controlled chlorination system, disable the control relay (using the selector switch) before any servicing or adjustment is performed on the unit. This is to prevent the incidental activation of the control relay while service is being performed.

1.4 AMPLIFIER RANGE ADJUSTMENT

The amplifier range determines the 4 - 20 mAmp output response - 4 mAmps corresponds to 0.00 mg/L and 20 mAmps indicates that the residual is at (or above) the range of the amplifier. The range can be adjusted to any value between 0 and 20 mg/L, but would normally be adjusted to correspond to the full scale level of the recording device. For example if the optional recorder is being used with 5 mg/L (full scale) chart paper, the range of the amplifier would normally be set to 5 mg/L. The range of the amplifier/controller is factory set at 1.00 mg/L, but is customer adjustable. To display the set range, press the range indication button on the front panel of the amplifier. To adjust the range to one of the alternate values listed in the TECHNICAL DATA - SECTION 1, press the range indication button to display the range and (using a small screw-driver) adjust the range set potentiometer on the front panel of the amplifier (re. Fig. 5 - Chlorine Measuring Amplifier) until the desired range is displayed (clockwise to increase, counter-clockwise to decrease).

NOTE: Range adjustment affects the calibration. The chlorine measurement amplifier will require calibration after range adjustment.

1.5 CALIBRATION

The calibration of DEPOLOX 3 has to be carried out on site due to various water qualities at different locations. The chemical determination of free chlorine residual and other oxidizing agents may be performed conveniently with a colorimeter, titrator or a photometer (DPD method). While amperometric titration is the most accurate, the other methods may be acceptable. Refer to the instruction manual for the measuring instrument used for the measuring procedure.

If the unit is inoperative for a long period of time or if the electrodes are cleaned or replaced, it should be allowed to operate for 24 hours before calibrating. Repeat the calibration daily for one week after start of operation, or after changing the measuring cell electrodes and every second day for another week. After a few weeks it can be empirically determined how often the calibration has to be performed in the future.)

If chlorine free water is available, it may also be used for zero-calibration rather than the "water-off-zero" method described in CALIBRATION PROCEDURE. This is for instance the case when the feedrate of the chlorinator is set on zero and a sample analysis shows 0.00 mg/L Cl₂.

1.6 CALIBRATION PROCEDURE

Turn off the water sample flow to the measuring unit. Within one half of a minute, the residual indication should begin to fall and should be sufficiently stable after 2 - 5 minutes. After stabilization adjust the knob of the zero potentiometer on the amplifier to display 0.00 mg/L (clockwise to increase, counter-clockwise to decrease).

Turn on the sample water and take a sample from the drain hose for determination of the chlorine content in the sample by colorimeter, titrator or photometer. To keep the error as small as possible, compute the average of 3 consecutive samples and adjust the digital indication to this value by means of the knob on the span (mg/L) potentiometer (clockwise to increase, counter-clockwise to decrease). If the computed value cannot be achieved by potentiometer adjustment, shunt the measuring cell input to the Basic Unit (re. Fig. 4 - Basic Unit Installation Wiring) with a 1 kOhm resistor across terminals 24 and 25 and repeat the calibration procedure.

Turn off the sample water to recheck the zero. If a zero adjustment of more than 2 digits is required, repeat the span adjustment.)

2 **START-UP**

CAUTION: Prior to initial operation, ensure that the procedures detailed in INSTALLATION - SECTION 2 have been followed and completed.

WITH POWER OFF:

Start sample flow to the Measuring Unit and insure that the sample inlet pressure is in the range of 5 to 60 psi.

Inspect sample and drain lines and Measuring Unit for water leakage and correct as necessary.

Remove cap from top of measuring cell and pour one-half of a grit container cap-full of grit into the cell. The grit should settle to the bottom of the cell. The flow through the cell should be great enough so that the grit is circulated rapidly around the base of the cell but not so great that the grit is carried out of the cell drain. If the flow does not appear to be correct, adjust the sample flow by turning the flow regulator adjustment screw at the rear of the Measuring Unit.

If the control relay (K2) is wired up for automatic control, disable the relay to prevent actuation until start-up is completed - if the normally open contacts of the control relay are used, the selector switch should be placed in the OFF (center) position (re. Para. 1.3 CONTROL RELAY AUTO/OFF/ON SELECTOR SWITCH).

WITH POWER ON:

Check the measuring amplifier range and adjust, if necessary, as instructed in Para. 1.4 AMPLIFIER RANGE ADJUSTMENT.

Adjust the alarm and control relay set point knobs on the front of the measuring amplifier to the desired actuation level as instructed in Para. 1.1 ALARM RELAY SET POINT (XK1) and 1.2 CONTROL RELAY SET POINT (XK2).

Calibrate the measuring amplifier as described in paragraphs 1.5 CALIBRATION and 1.6 CALIBRATION PROCEDURE.

If the system is set up for automatic control and there is no chlorine residual present at the time of start-up, the control relay selector switch can be used to manually feed chlorine, for the purpose of calibration, by moving the switch to the manual position (down position, relay energized).

Adjust (if used) the alarm relay set point knob (XK1) to the desired percent range above which the alarm is to actuate.

Adjust (if used) the control relay set point knob (XK2) to the desired percent range below which the control relay is to actuate and enable the control relay by moving the selector switch on the front of the amplifier to the AUTO (up) position.

3 DAILY OPERATIONAL CHECKS

Visually check that the flow through the measuring cell is within the proper range so that the grit is circulated rapidly around the base of the cell but is not carried out the drain. If the flow is not sufficient, remove the cap at the top of the cell - if the sample overflows from the top of the cell, check the drain hole and drain line for blockage; otherwise, check the sample inlet pressure and adjust the inlet pressure and sample flow regulator as necessary. If the flow is too great, adjust the inlet pressure and the sample flow regulator as necessary.

Check that there is sufficient grit in the cell - the equivalent of about one-half of a grit container cap-full. Add grit if needed.

Perform free chlorine residual measurement and compare to the residual displayed by the amplifier, adjust the amplifier span (mg/L) knob to correspond to measured residual. If an adjustment of more than about 10% is required, the amplifier zero should also be checked and adjusted.

4 PERIODIC OPERATIONAL CHECKS

Inspect sample and drain lines and Measuring Unit for water leakage and correct as necessary.

Clean the sample inlet strainer periodically - frequency of cleaning depending on water quality.

Test high residual alarm system, if installed, by turning the alarm set point knob to zero - the alarm relay should energize (as indicated by the lamp above the set point knob) if there is chlorine residual present as indicated by the measuring amplifier. If the alarm does not operate, insure that output relay is functioning (the normally open contacts of alarm relay K1 should be closed when the alarm set point is exceeded) and check external wiring. Return the alarm set point knob to its proper position.

Perform full span and zero calibration as instructed in paragraph 1.6 CALIBRATION PROCEDURE.

5 THEORY OF OPERATION

A sample of the water of which the free chlorine residual is to be measured is passed to the measuring unit sample line at between 5 and 60 psi. A flow regulator at the inlet to the measuring unit regulates the flow to the measuring cell at approximately 580 mL/min - the flow regulator is adjusted by turning the adjustment screw at the rear of the measuring unit. The sample flow then enters the measuring cell. The velocity of the flow entering the cell circulates the grit in the cell - cleaning the electrodes. The chlorine measuring amplifier maintains a constant potential across the measuring cell electrodes, so that the electro-chemical reaction of free chlorine residual on the electrodes generates a small current which is proportional to the concentration of free chlorine in the sample. This current is then passed to the measuring amplifier, contained in the basic unit, which displays the corresponding free chlorine residual as mg/L (ppm). The amplifier will then actuate an alarm relay when the residual exceeds the customer selected value (as a percent of the selected range) and will actuate a control relay when the residual is below the customer selected value (as a percent of the selected range). The measuring amplifier also provides a 4 to 20mA signal for use with an optional recording device.

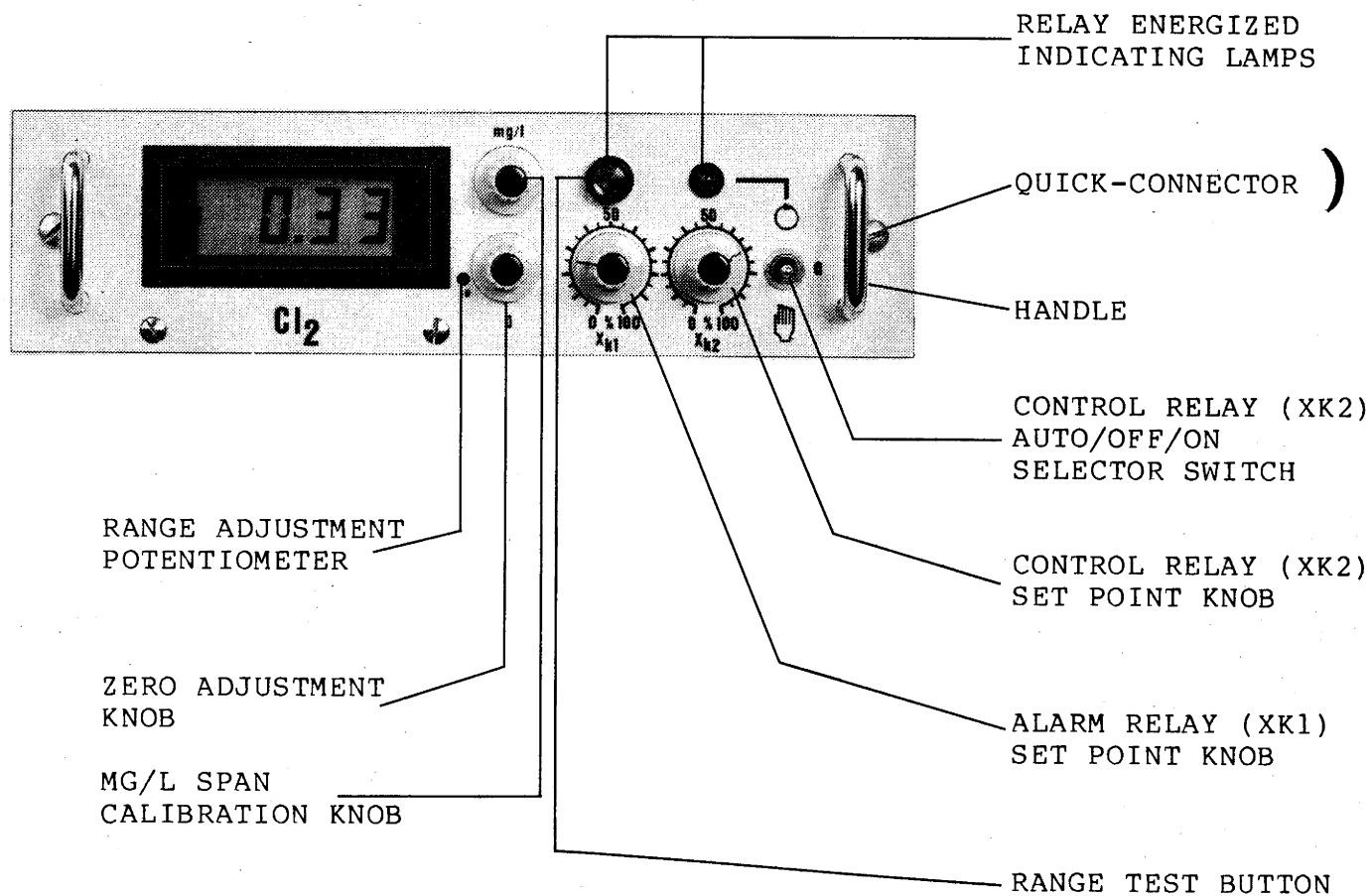


Fig. 5

DEPOLOX 3 - UXB-94 072 Cl₂ MEASURING AMPLIFIER
4 - 20 mA, 120 V (230 V Optional), 50/60 Hz

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1 ELECTRODES - REMOVAL AND REPLACEMENT

WARNING: TO AVOID POSSIBLE SEVERE PERSONAL INJURY FROM
ELECTRICAL SHOCK, TURN OFF POWER BEFORE DISCONNECTING
CELL LEADS.

The electrodes should last one year or more. However, it may be necessary to substitute the electrodes after a shorter operating period. The life of the electrodes depends on both the chlorine residual and the necessary amount of grit used for cleaning the electrodes.

1.1 MEASURING CELL DISASSEMBLY

(re. Fig. 6 - Measuring Cell)

- a) Turn off power to the Basic Unit, then turn off sample flow to the Measuring Unit.
- b) Disconnect wiring from base of measuring cell and position wiring so that it will not get wet when the electrode assembly is removed from the bottom of the cell.
- c) Hold small container beneath the measuring cell to catch the water which will spill from the cell and gently twist and remove the electrode assembly from the cell.
- d) Remove the cell cap and then remove the cell from the Measuring Unit.
- e) Rinse the cell, the cell cap and the electrode assembly to remove grit.
- f) Dissassemble the electrodes from the cell and the electrode assembly, carefully so as not to bend the electrodes.

1.2 MEASURING CELL ASSEMBLY

(re. Fig. 6 - Measuring Cell)

Assembly is the reverse procedure of disassembly. Be certain to rinse all grit from the cell assemblies before reassembly - the grit will damage sealing surfaces. Apply a light coat of silicone O-Ring grease to O-rings and sealing surfaces before assembly. Make sure that the electrodes are not touching after assembly is complete.

2 ELECTRODE CLEANING

NOTE: After cleaning the electrodes, the measuring amplifier will need to be recalibrated. The calibration should then be rechecked after 24 hours of operation.

The electrodes may require chemical or manual cleaning periodically, if they become fouled in operation.

2.1 ELECTRODE - CHEMICAL CLEANING

WARNING: HYDROCHLORIC AND NITRIC ACID WILL SEVERELY IRRITATE EYES AND CAUSE CHEMICAL BURNS TO SKIN. ALWAYS WEAR APPROPRIATE PROTECTIVE EQUIPMENT DURING HANDLING. WHEN DILUTING ACID, ALWAYS POUR THE ACID INTO THE WATER, NEVER POUR WATER INTO ACID. IT IS THE RESPONSIBILITY OF THE USER TO OBTAIN AND FOLLOW THE SAFETY PRECAUTIONS OF THE MANUFACTURER OF THE HAZARDOUS MATERIAL.

If the electrodes of the inside surface of the measuring cell become coated by deposits of carbonates, hydroxides of iron, manganese or flocculates etc., they may be cleaned with dilute hydrochloric (Muriatic) acid or dilute nitric acid as follows:

- a) Turn off the sample inlet flow and then drain the sample from inside the cell by removing the electrode assembly (ref. Para. 1.2 ELECTRODE DISASSEMBLY). Rinse the electrode assembly to remove grit, then reinstall the assembly in the cell.

- b) Remove the cell cap and fill the cell with dilute (approximately 10% by volume) hydrochloric acid, then rinse and replace the cell cap. After 3 to 5 minutes, turn on the sample inlet flow and allow the cell to rinse thoroughly.

If the deposit is difficult to remove from the electrodes, dilute nitric acid (approximately 15% by volume) may be used. If nitric acid is used, disassemble the measuring cell completely and place only the electrodes in the nitric acid solution. Do not leave the copper electrode in the nitric acid solution for more than about one minute, as it will be quickly dissolved. Rinse the electrodes thoroughly before reassembly.

2.2 ELECTRODE - MANUAL CLEANING

If the deposits can not be removed chemically, the electrodes may be cleaned using a fine abrasive cleaner or fine sand paper. Disassemble the measuring cell as instructed in paragraph 1.1 MEASURING CELL DISASSEMBLY. Clean only the inner surface of the copper electrode, so as not to damage the coating on the outer surface. Rinse the electrodes thoroughly before reassembly of the measuring cell. Use care not to bend the electrodes when cleaning them.

3 ELECTRONIC TROUBLE-SHOOTING

WARNING: High voltage (115V/230V) conductors exposed on the Basic Unit motherboard. Removal of the amplifier boards or front panels, with power supplied to the Basic Unit, exposes the operator to AC line voltage. Inadvertent contact with motherboard components, with power supplied to the unit, may damage the circuit boards and may cause serious personal injury.

CAUTION: To avoid unnecessary damage to a good measuring amplifier, verify that the motherboard is functioning properly before substituting a new amplifier.

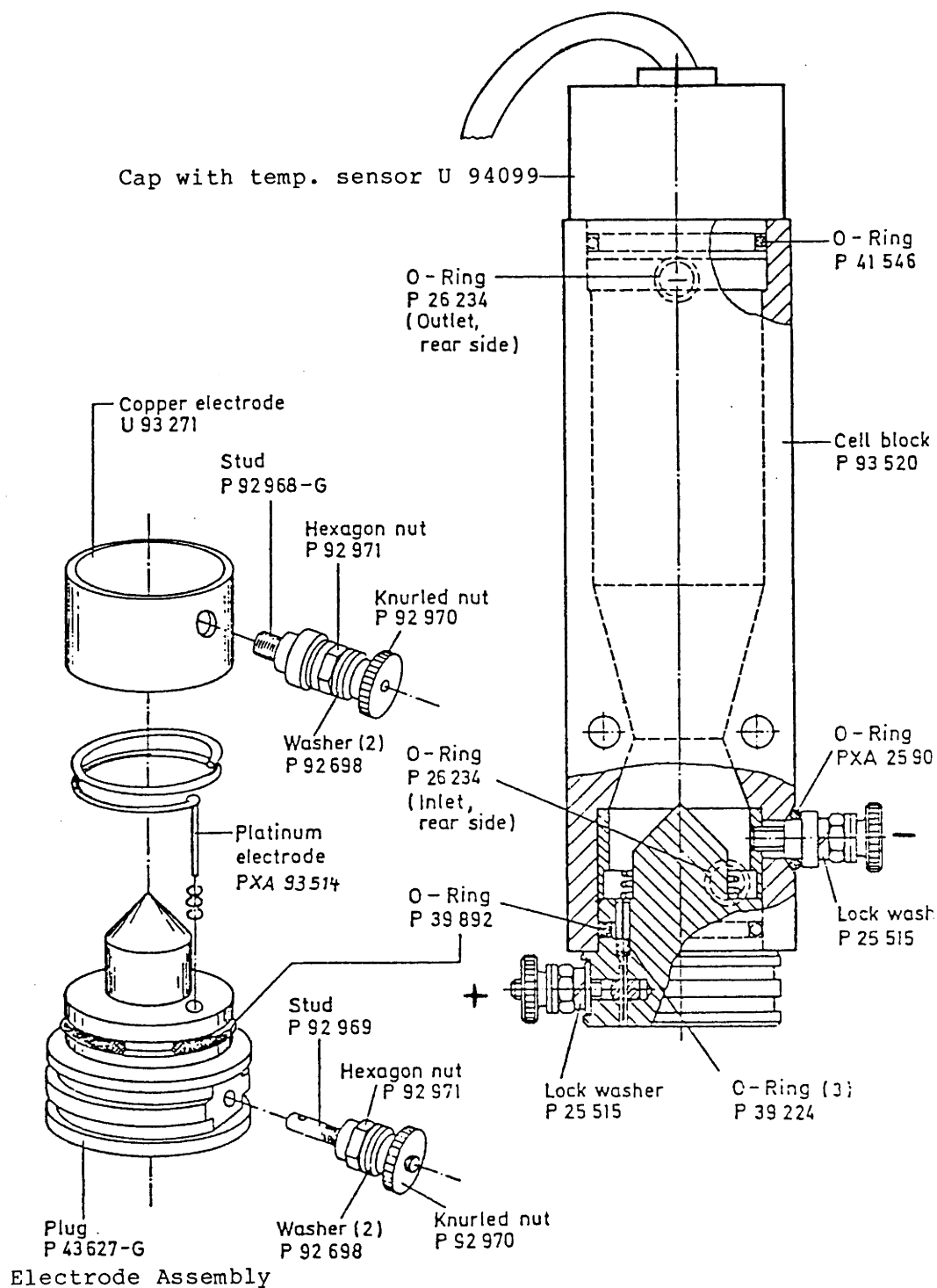
NOTE: The following trouble-shooting procedure covers the chlorine, fluoride and pH measuring packages, each of which is an optional package.

Electronic trouble-shooting consists of localizing the problem to the amplifier or motherboard or external wiring. The amplifier board is not accessible for testing and is not customer serviceable. The motherboard is repairable (re. Figs 9, 10 and 11 - Motherboard). Once it is established that the motherboard is functioning properly and that the external wiring is correct (and in good condition), repair is made by replacing the plug-in amplifier.

- A. If the unit does not show any indication of power, check that the fuse in the Basic Unit enclosure is not blown and that the power switch in the unit is in the "on" position (down).
- B. Check that the amplifier is plugged into the correct receptacle and that the amplifier is properly engaging the receptacle - the Chlorine Measuring Amplifier into the receptacle marked "Cl2" and the pH or Fluoride Measuring Amplifier into the receptacle marked "pH".
- C. If the control relay (K2 with the Chlorine Measuring Amplifier, K3 with the pH or Fluoride Measuring Amplifier) is not functioning, reinstall the amplifier board and actuate the control relay by operating the selector switch on the amplifier front panel. Test for contact function on the appropriate terminal. Test for power to the relay by measuring the DC voltage to the relay coil across the coil kickback diode (diode V2 with relay K2, V3 with relay K3 - re. Fig. 9 Motherboard). The voltage should be 24V +/- 0.5V.
- C. If the alarm relay (K1) used with the Chlorine Measuring Amplifier is not functioning, actuate the relay by turning the alarm set point knob (XK1) all the way down to 0%. Test the contacts on the terminal strip and the DC voltage across the kickback diode (diode V1). The voltage should be 24 +/- 0.5V.
- D. Check that external wiring is correct and that all connections are sound and in good condition.
- E. Disconnect external power from the Basic Unit and remove the plug-in amplifier(s). Inspect the motherboard for obvious signs of damage. Check that the motherboard conductors are not damaged or shorted by testing continuity as indicated by Fig. 8 - Amplifier Receptacle Pin-Outs.
- F. If the above steps do not locate the problem, replace the measuring amplifier.

4. TROUBLE SHOOTING

TROUBLE	POSSIBLE CAUSE	REMEDY
Insufficient sensitivity.	Water flow too low.	Check sample water line and cell for deposits or clogging, clean strainer.
	No grit particles.	Refill grit in the measuring cell.
	Grit particles discolored.	Refill grit.
	Dirty electrodes.	Clean electrodes.
Zero or span cannot be adjusted.	Zero current too high.	Measure the current directly on the electrodes. The measured current must be less than 100 uAmps with no chlorine residual present. If greater than 100 uAmps, shunt cell current with a 1 KOhm accross the cell input to the Basic Unit.
	Measuring cell generating insufficient current.	Check the wiring connections to the measuring cell. Clean the electrodes.
Erratic residual indication does not correspond to measured residual (after calibration).	Water pressure varies considerably.	Check the sample supply pressure regulator (if installed) and the inlet strainer and the sample flow regulator.
	Fouled electrodes.	Clean electrodes and cell.
	Bad electrical connection.	Check electrical connections between the Basic Unit terminals and the measuring cell terminals. Check measuring cell terminals for tightness or for loose electrode.
	Malfunctioning amplifier board.	Measure potential between positive (+) and negative measuring cell leads at the Basic Unit connections; the potential should be 0.0V +/- 10mV.



NOTE: BROWN LEADS TO COPPER (-) ELECTRODE
WHITE LEADS TO PLATINUM (+) ELECTRODE

Fig. 6 DEPOLOX 3 - U-95221 MEASURING CELL

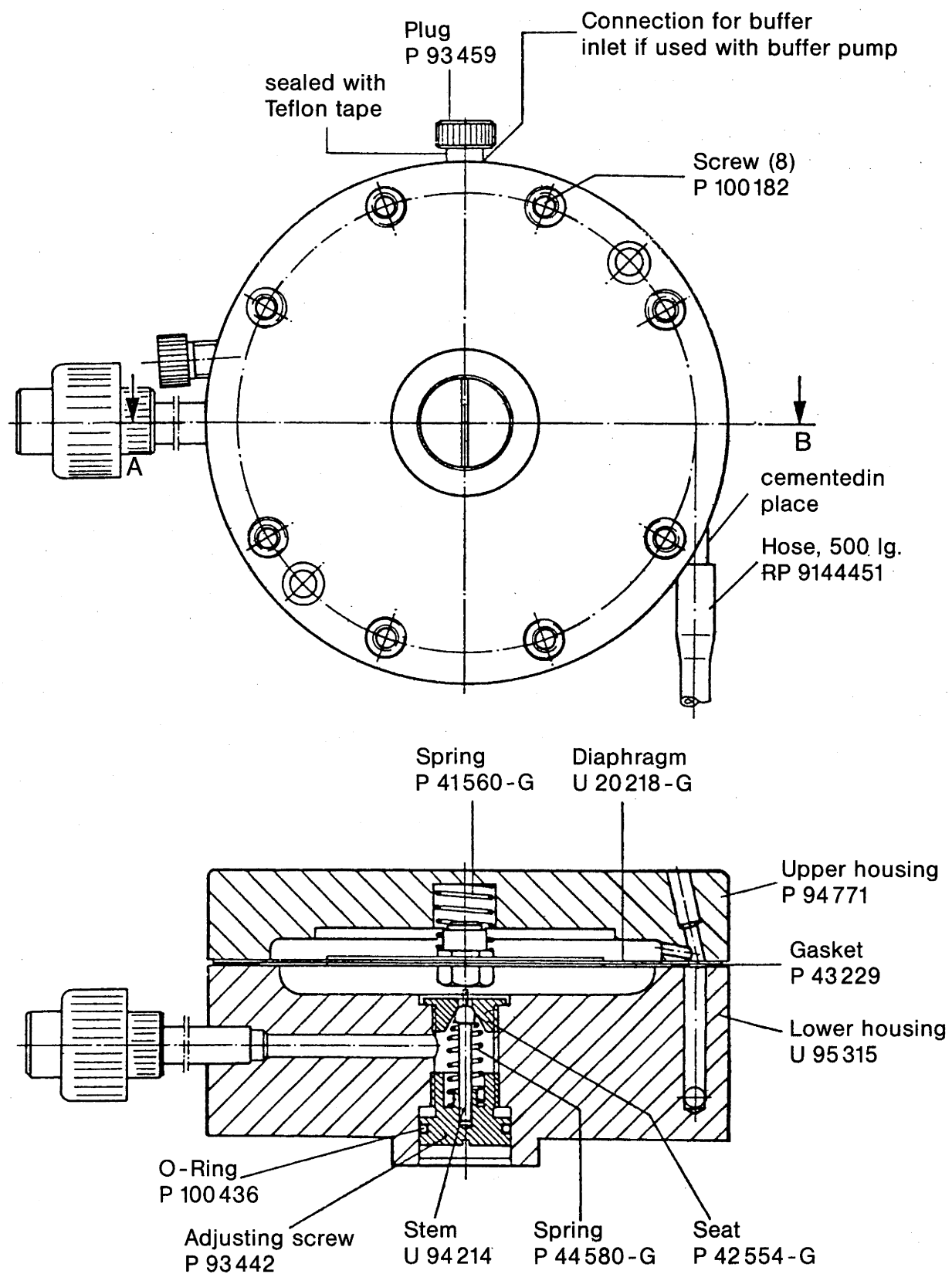


Fig. 7 DEPOLOX 3 - U-95219 FLOW REGULATOR

Diagram illustrating a 1D chain of 27 sites. The sites are numbered 1 through 27. The chain contains two types of excitations: $K1^-$ (represented by a single circle with two dots) and $K1^+ K2^+$ (represented by a double circle with four dots). The excitations are located at sites 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, and 27. The excitations are labeled $K1^-$ and $K1^+ K2^+$ on the right side of the chain.

Diagram of a 22-pin connector. Pins 1, 2, and 3 are grouped under the label $K3^-$. Pins 21 and 22 are grouped under the label $K3^+$.

K1, K2, AND K3 INDICATE OUTPUT RELAY COIL CONNECTIONS.

Fig. 8 DEPOLOX 3 - AMPLIFIER RECEPTACLE PIN-OUT

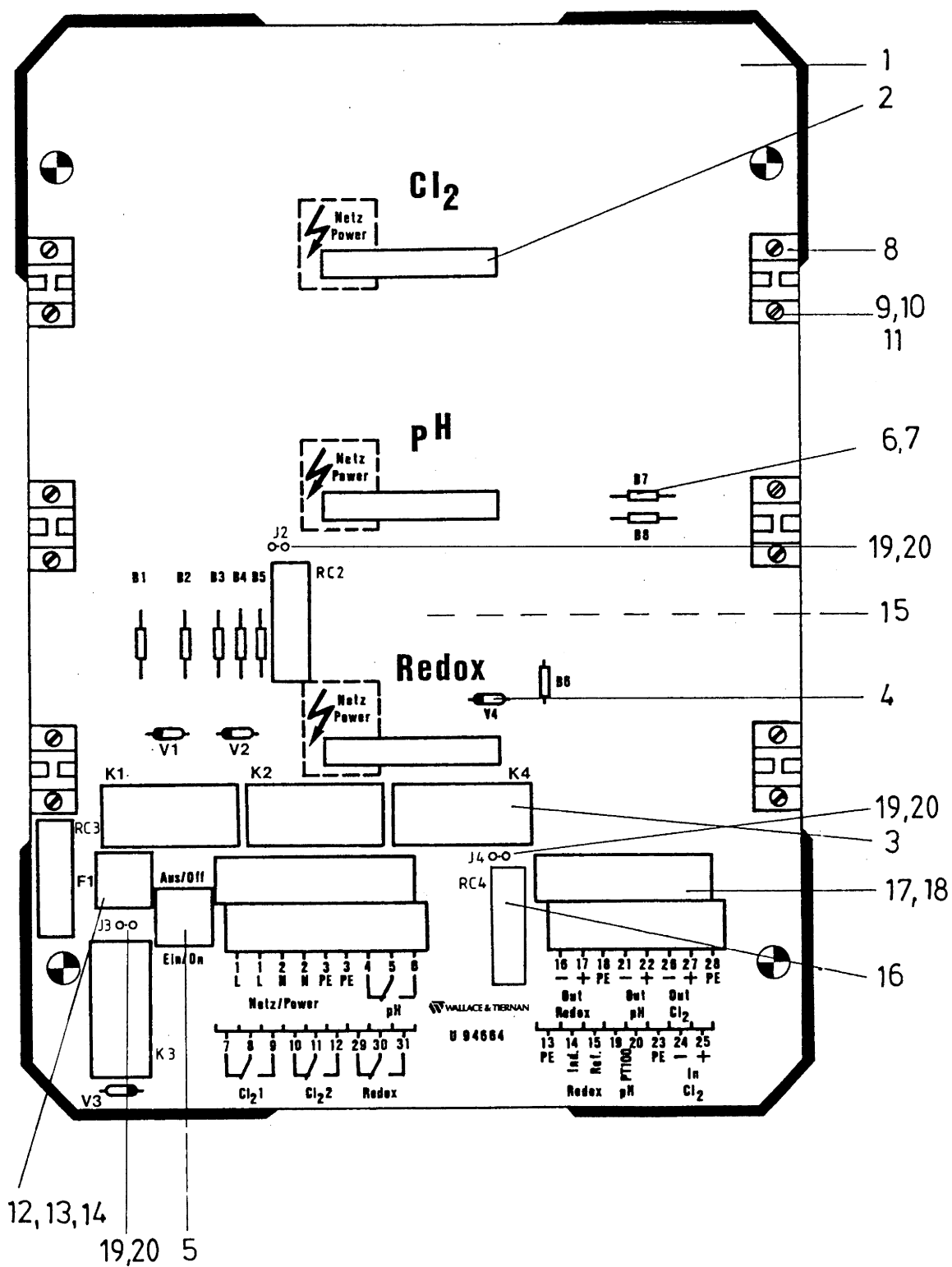


Fig. 9 DEPOLOX 3 - U-94664 MOTHERBOARD

KEY NO.	PART NO.	QTY.	DESCRIPTION
1	P 95201	1	CIRCUIT BOARD
2	P 94307	3	RECEPTACLE
3	UXA 94079	4	RELAY, 24V, K1 - K4
4	P 93357	4	DIODE, V1 - V4
5	U 94078	1	POWER SWITCH
6	P-93986	7	JUMPER, 0 OHM, B1 - B5, B7 - B8
7	P 93986	1	JUMPER, 0 OHM, B6
8	P 94384	6	GUIDE RAIL
9	P 100030	12	SCREW
10	P 92700	12	NUT, M 3
11	P 100416	12	WASHER
12	PXA 93561	1	FUSE HOLDER
13	PXB 93561	1	FUSE HOLDER CAP
14	*	1	FUSE, 20MMx5MM
15	P 93653	1	SPACER
16	P 93579	3	SNUBBER, RC2 - RC4
17	UXA 93343	1	4 POS. TERM. BLK.
18	UXB 93343	5	6 POS. TERM. BLK.
19	P 94738	3	JUMPER, J2 -J4
20	P 93942	6	JUMPER PIN

* RE. SECTION 5 - SPARE PARTS

Fig. 10 DEPOLOX 3 - U-94664 MOTHERBOARD
Parts List

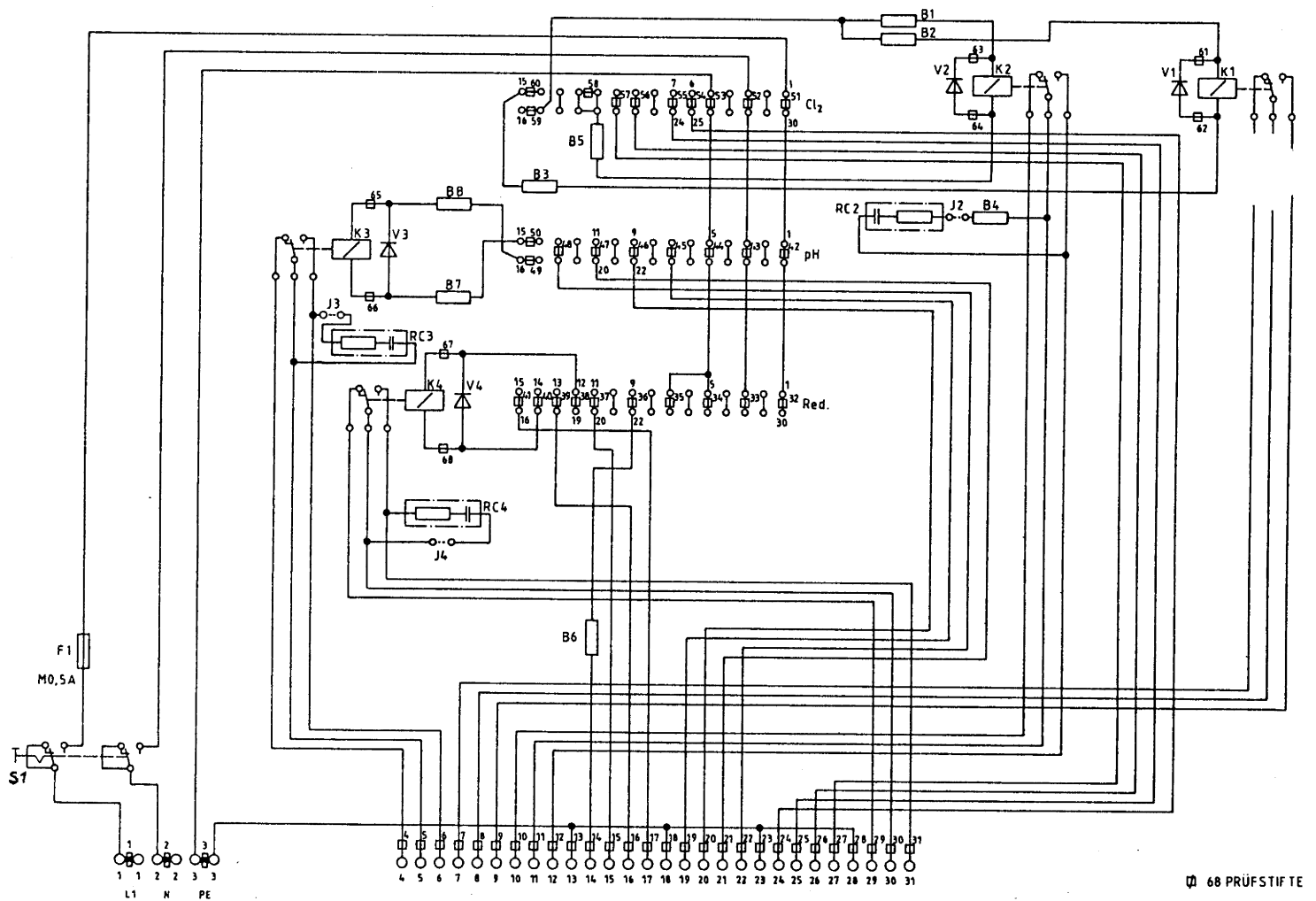


Fig. 11 DEPOLOX 3 - U-94664 MOTHERBOARD
Circuit Schematic

SECTION 5 - SPARE PARTS

QUANTITY	DESCRIPTION	PART NO.
1	Tube, Grit	UXB 10846
1	Electrode, Platinum	PXA 93514
1	Electrode, Copper	U 93721
1	Tube, Silicone Grease	U 10242
1	Fuse, 0.5A (115V unit)	P 59480
1	Fuse, 0.2A (230V unit)	P 59326

FOR USE WITH OPTIONAL RECORDER:

1	Pen, Recorder	U 28065
100	Paper, Range 0 - 0.5, 24Hr.	P 58351
100	Paper, Range 0 - 1.0, 24Hr.	PXA 58351
100	Paper, Range 0 - 2.0, 24Hr.	PXB 58351
100	Paper, Range 0 - 5.0, 24Hr.	PXC 58351
100	Paper, Range 0 - 10, 24Hr.	PXD 58351
100	Paper, Range 0 - 20, 24Hr.	PXE 58351
100	Paper, Range 0 - 0.5, 7Day	P 58352
100	Paper, Range 0 - 1.0, 7Day	PXA 58352
100	Paper, Range 0 - 2.0, 7Day	PXB 58352
100	Paper, Range 0 - 5.0, 7Day	PXC 58352
100	Paper, Range 0 - 10, 7Day	PXD 58352
100	Paper, Range 0 - 20, 7Day	PXE 58352

