

C-1000

CONCENTRATION CONTROLLER

Installation and Operating Instruction Manual



C-1000 Series Concentration Controller

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DESCRIPTION

A comprehensive control system has been developed to provide industrial quality and new electronic features to accurately and reliably control the proper level of detergent concentration in washers. The C-1000 was developed to provide a new level of quality in a field crowded with limited, low cost and often unreliable detergent concentration controllers.

The C-1000 was designed to:

- *Accurately feed detergents without overshoot.*
- *Provide reliable operation unaffected by wide and erratic changes in power line voltages.*
- *Prevent possible loss of complete detergent supply due to dirty or broken probe.*
- *Provide simple, understandable alarms and indicators which do not require periodic replacement.*

The C-1000 Concentration Controller is simple to operate but performs some amazingly complex functions.

With the concentration probe sensing the proper level in the wash tank only the "power" light is in operation. When the concentration level drops below the setpoint limit the C-1000 begins feeding - but at a slow rate, 3 seconds on, then a wait of 3 seconds (giving the probe time to "read" the new level), another 3 seconds of detergent, etc., until the set point level is achieved. This avoids the normal "over-shoot" of excessive detergent being injected.

When the wash tank is initially filled with water (or the concentration level drops to 60 percent of setpoint) then the C-1000 will feed at full pumping rate, then it goes to the slower pumping cycle as it closes in on setpoint.

The C-1000 automatically indicates and alarms when the concentration has been low for a preset time (typically 30 seconds). When the concentration has been low for twice that time (1 minute) the C-1000 goes into "over-feed stop", thus preventing the complete detergent supply drum from being pumped into the tank due to a faulty probe. Once the problem is corrected the system is reset by turning the power off momentarily.

For all these functions only two adjustments are required:

1. A control to establish the preset detergent concentration level.
2. A low concentration alarm delay adjustment (factory set for 30 seconds) which allows a delay of 15 seconds to 3 minutes.

Whenever this alarm is established the overfeed stop point is automatically set for twice this time.

Also included is a dual concentration range selector which allows the user greater ease of detergent level calibration.

All of these features are mounted in a compact wall mounted package with easy to understand indicator lights which do not normally require replacement. All functions have been designed to eliminate all normal field service calls.

In case of a field problem the C-1000 control module can be easily removed and replaced.

C-1000 Concentration Controller Specifications

Measured resistance range:

10-300 ohms high range
25-1000 ohms low range

Operating differential:

<3 percent of operating point

Low concentration feed setting:

40 percent increase in resistance across probe tips measured from setpoint.

Alarm delay adjustment:

15 - 180 seconds of pumping time, factory set at 30 seconds

Overfeed stop delay:

Automatically twice alarm delay setting above.

Temperature range (ambient):

32 to 150 F, (0-70 C)

Output power:

24 VA controlled load, fused

Operating voltage:

24 VAC (\pm 20 percent).

Line voltage rejection:

Less than 0.5 percent operating point change per 10 percent line voltage change.

Indicator lights:

Red LEDs, light emitting diodes, indicate *Power on, Feed, or Low Concentration*

Concentration setting:

Slotted adjustment

Alarm delay adjustment:

Slotted adjustment

Intermittent feed cycle:

On - 3 seconds
Off - 3 seconds nominal

Concentration probe:

Dual element, stainless steel probe

Audible Alarm:

High output, Piezo-ceramic type

Warranty:

This Beta Technology Inc. unit is warranted against defects in materials and workmanship. This warranty applies for one year from the date of delivery and covers all parts of the unit. Units will be repaired or replaced which are proven to be defective during the warranty period provided they are returned to Beta Technology, Inc. No other warranty is expressed or implied. Warranty does not cover equipment abuse or misuse, nor does it cover any consequential liability resulting from performance of the equipment.

NOTE:

Specifications are subject to change without notice.

C-1000 INSTALLATION

1. MOUNTING THE UNIT - Normally the C-1000 is mounted on a wall or any convenient vertical surface near the dishmachine.

BE SURE:

- A. The C-1000 is located in easy view of the dishmachine operator.
- B. Avoid placing the C-1000 in an extremely wet or hot area.
- C. Allow for easy access to the C-1000 for set-up and further adjustments.

2. INSTALL ELECTRICAL WIRING

A. POWER - connect barrier terminal 3 and the on/off switch lead to a source of 24 VAC.

NOTE: ALL C-1002 MODELS RUN ON 24VAC AND NO HIGH VOLTAGE WIRING SHOULD BE RUN TO THE CABINET. THE 24VAC SOURCE SHOULD MEET THESE REQUIREMENTS:

-24VAC (between 28.8VAC and 19.2VAC)

-50 or 60 hertz

-Capable of delivering at least 1 amp.

-Isolated from High Voltage lines.

-24VAC power should only be "ON" when dishmachine is "ON".

B. PROBE - run a pair of wires from barrier terminals 5 and 6 to the Concentration Probe located in the dishmachine wash tank. (Probe supplied with C-1000). The polarity of wires does not matter.

C. LOAD - connect barrier terminals 1 and 2 to the output load. This is normally a solenoid valve for flushing a powder detergent into the wash tank or a relay for controlling high

voltage pumps. The load must be rated for 24VAC and can draw no more than 1 amp.

NOTE: A special 60VA C-1000 is available for output loads to 2.5 amps - consult factory.

IMPORTANT: DOUBLE CHECK THAT WIRES ARE CONNECTED TO THE CORRECT TERMINALS AND THAT THE VOLTAGE APPLIED TO THE POWER INPUT IS 24VAC.

3. C-1000 SET UP AND OPERATION

A. Set the "Delay" control fully cw. (max) until the concentration level is set.

B. Select "HI" range for normal to high concentrations. Use the "Lo" range for low concentrations (usually titrations of less than 5 drops half normal acid).

C. Concentration Set: Precharged tank method.

1. Fill wash tank with clean water and manually add exact amount of detergent that your calculations show is required for best results (i.e. percent concentration).

2. Adjust concentration control to full ccw. position (minimum).

3. Turn "ON" dishmachine (and C-1000) and allow detergent to mix well.

4. Slowly turn the concentration adjust control cw (toward max.) until the "FEED" lamp comes "ON". Reverse direction until it just goes "OFF". This setting is now equal to the desired concentration.

D. Concentration Set: Conventional method.

1. Fill wash tank with clean water.

2. Set concentration adjust control to a point slightly toward minimum from the estimated set point. At "HI" range setting the control covers a range from 300 ohms (3,333 umhos) at minimum to 10 ohms (100,000 umhos) at maximum. The mid point is about 85 ohms (11,750 umhos). At "LO" range setting the control

C-1000 TROUBLE SHOOTING GUIDE

covers a range from 1,000 ohms (1,000 umhos) to 25 ohms (40,000 umhos).

3. Run the dishmachine and C-1000 system until the C-1000 has reached set point and no longer feeds. Remember that units with 50 percent feed feature will feed 3 seconds "ON, 3 seconds OFF" during the time just before set point is reached. Time the total time to reach set point as a guide to setting the delay time later.
4. Measure the concentration using any of the standard methods (titrate, pH meter, conductivity meter). Adjust the concentration control as required and recheck after set point is again reached. Repeat as required.

E. Delay Time Set - The delay time is used to alert dishmachine operators that proper concentration has not been reached in the normal time required and that a potential problem exists. When the C-1000 has fed for the "set time" the sonic alert will beep and the Low Concentration Lamp will blink. If the condition is not corrected, after the delay time equal to that of the first delay time, the output power to the load will be turned off and both the sonic alert and the Low Concentration Lamp will be "ON" constantly. This delay function is reset to "0" time each time the 24VAC power to the C-1000 is "OFF". (If powered only when the dishmachine is operating this occurs each time the machine cycles "OFF").

1. The range of delay time to Low Concentration Alert is 15 seconds to 3 minutes.
2. Adjust the delay control so that the time required to bring a new tank of water to concentration is slightly less than the set time. Determine this from test, experience or from the time measured in section 3D3 of this instruction.

In case of a malfunction, the following procedures should be helpful to determine the problem:

A. C-1000 DOES NOT WORK AT ALL (NO LED'S "ON" AND NO OUTPUT).

1. Check that 24VAC is present at terminal 3 and 4.
2. Check fuse. If blown, replace with 3 amp, AGC3 type.
3. Replace circuit board.

B. C-1000 FEEDS CONTINUOUSLY (UNTIL STOPPED BY "OVER-FEED STOP").

1. Wiring to the probe has an "OPEN" circuit. Check wiring with an ohmmeter (from each contact to the C-1000).
2. Probe is coated with grease.
3. Dishwasher problem:
 - Fill "ON" all the time.
 - Drain "OPEN".
 - Wash pump not working.
 - Detergent weak or empty.
 - No water in tank.

4. Replace circuit board.

C. FUSE BLOWS CONSTANTLY.

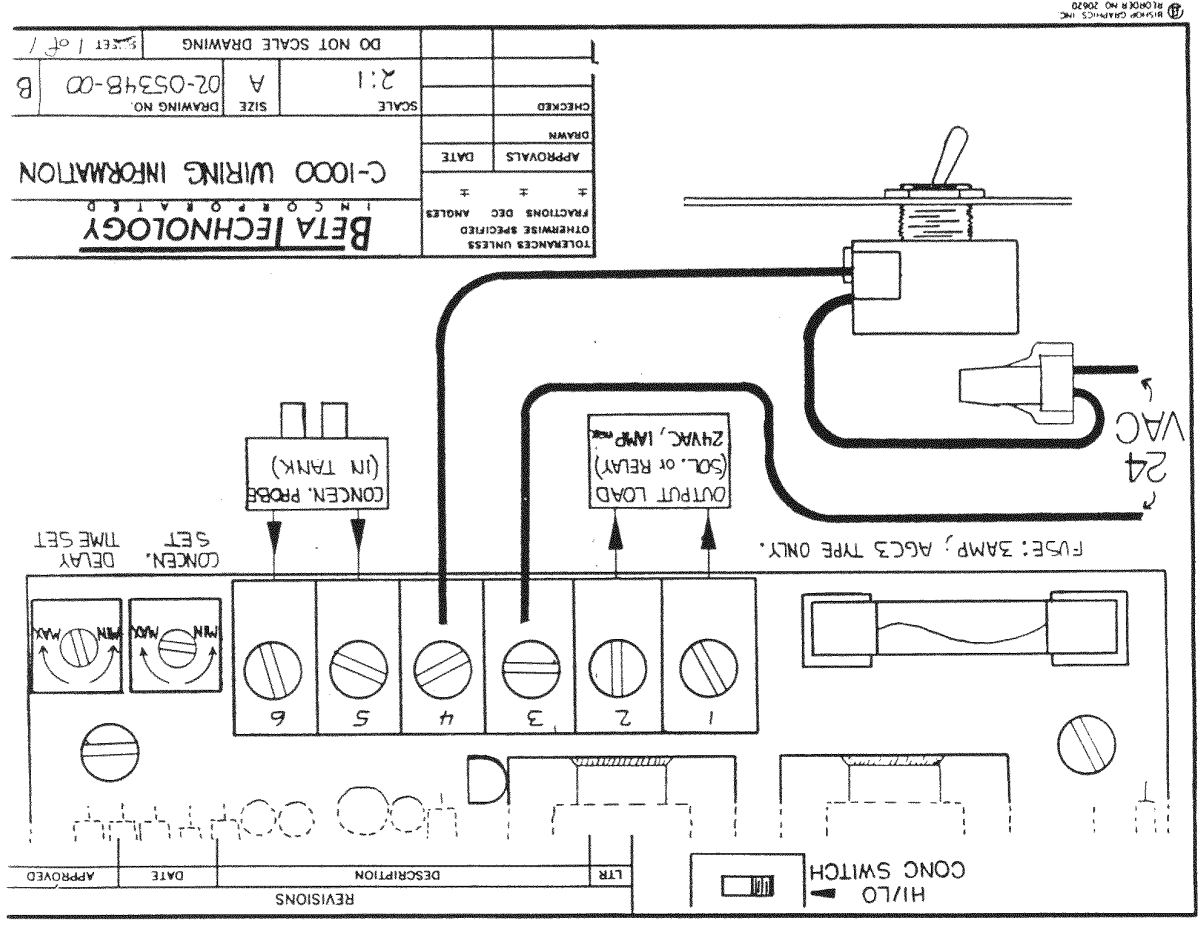
1. Output load draws too much current.
2. Output wiring is "shorted".

D. C-1000 DOES NOT REACH DESIRED CONCENTRATION BEFORE STOPPING

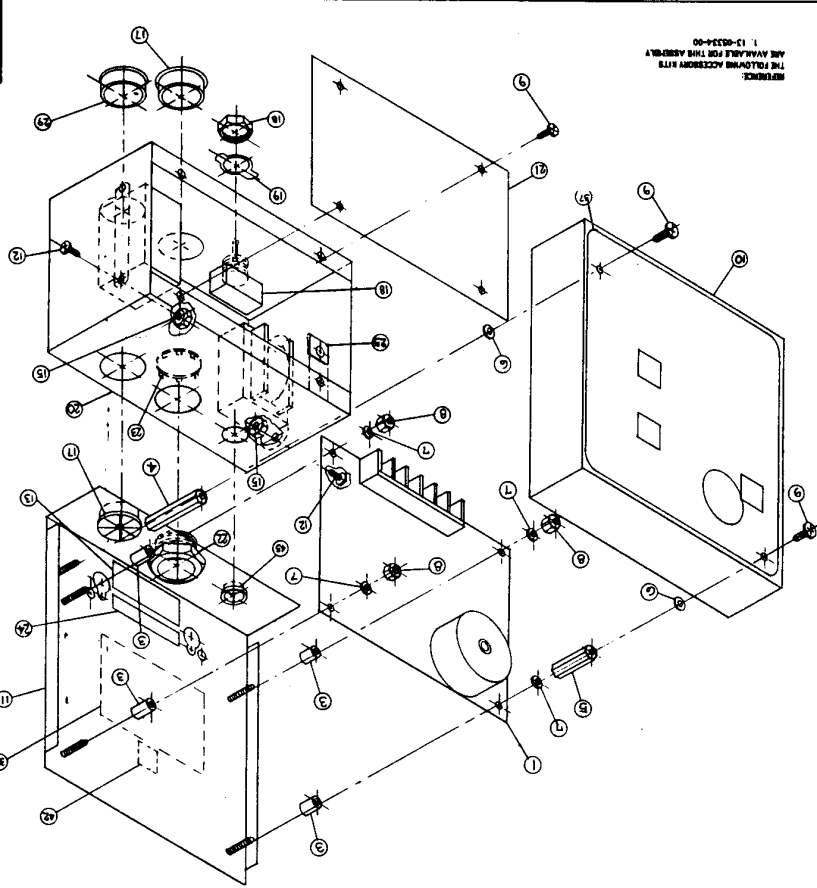
1. Delay is set too short.
2. Probe is partially "shorted" with conductive build up.

E. ERRATIC OPERATION.

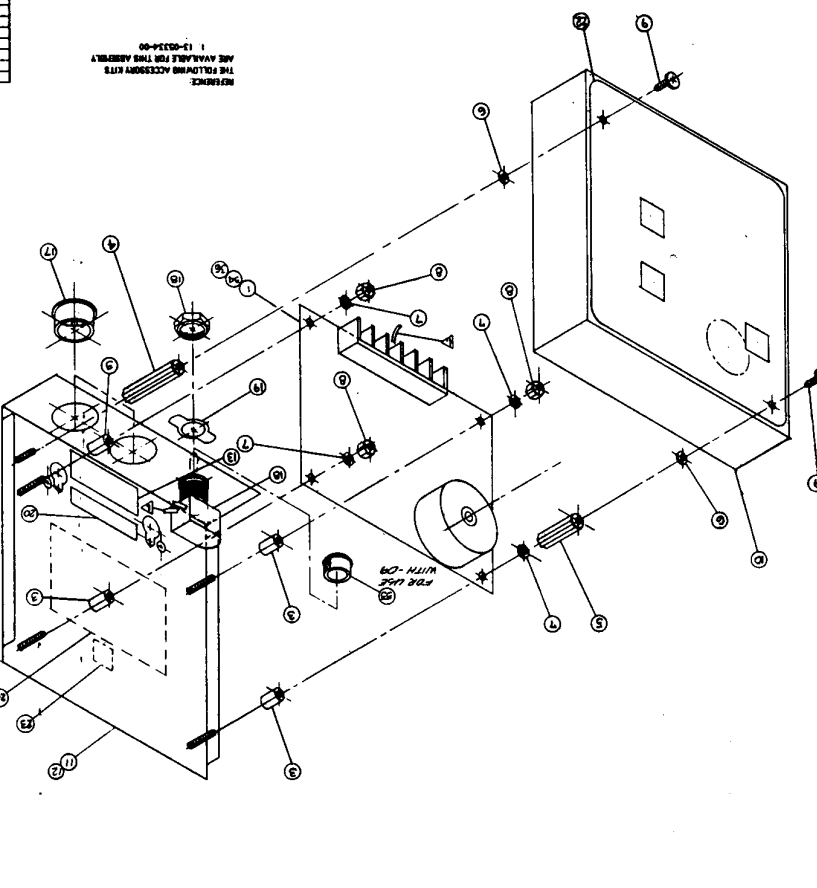
1. Dirty probe.
2. Loose wires.
3. Moisture has penetrated the coating on the circuit board. Dry out and try again.
4. Replace circuit board.



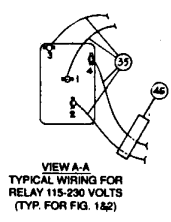
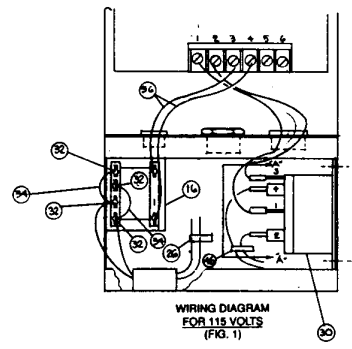
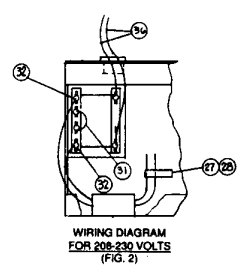
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REV.	DATE	BY	APP.	DESCRIPTION

PART OR IDENTIFYING NO. C-1000 115-230 VOLTS (N-VOLTAGE) PLUNG. ASSEMBLY	NOMENCLATURE OR IDENTIFICATION		
PARTS LIST	C-1000 115-230 VOLTS (N-VOLTAGE) PLUNG. ASSEMBLY		
CHECKS: DIMENSIONS, WEIGHTS, MATERIALS, FINISHES, FUNCTIONS, SERIALS, ANGLE, A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BU, BV, BW, BX, BY, BZ, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, FZ, GA, GB, GC, GD, GE, GF, GG, GH, GI, GJ, GK, GL, GM, GN, GO, GP, GQ, GR, GS, GT, GU, GV, GW, GX, GY, GZ, HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ, IA, IB, IC, ID, IE, IF, IG, IH, II, IJ, IK, IL, IM, IN, IO, IP, IQ, IR, IS, IT, IU, IV, IW, IX, IY, IZ, JA, JB, JC, JD, JE, JF, JG, JH, JI, JJ, JK, JL, JM, JN, JO, JP, JQ, JR, JS, JT, JU, JV, JW, JX, JY, JZ, KA, KB, KC, KD, KE, KF, KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ, LA, LB, LC, LD, LE, LF, LG, LH, LI, LJ, LK, LL, LM, LN, LO, LP, LQ, LR, LS, LT, LU, LV, LW, LX, LY, LZ, MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK, ML, MM, MN, MO, MP, MQ, MR, MS, MT, MU, MV, MW, MX, MY, MZ, NA, NB, NC, ND, NE, NF, NG, NH, NI, NJ, NK, NL, NM, NN, NO, NP, NQ, NR, NS, NT, NU, NV, NW, NX, NY, NZ, OA, OB, OC, OD, OE, OF, OG, OH, OI, OJ, OK, OL, OM, ON, OO, OP, OQ, OR, OS, OT, OU, OV, OW, OX, OY, OZ, PA, PB, PC, PD, PE, PF, PG, PH, PI, PJ, PK, PL, PM, PN, PO, PP, PQ, PR, PS, PT, PU, PV, PW, PX, PY, PZ, QA, QB, QC, QD, QE, QF, QG, QH, QI, QJ, QK, QL, QM, QN, QO, QP, QQ, QR, QS, QT, QU, QV, QW, QX, QY, QZ, RA, RB, RC, RD, RE, RF, RG, RH, RI, RJ, RK, RL, RM, RN, RO, RP, RQ, RR, RS, RT, RU, RV, RW, RX, RY, RZ, SA, SB, SC, SD, SE, SF, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SP, SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TT, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WU, WV, WW, WX, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YY, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ.	APPROVALS: DATE: 1/28/55 DESIGNED BY: J.C. DRAWN BY: J.C. CHECKED BY: J.C.	BETA ELECTRONIC CORP.	
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APPLICATION:	DO NOT SCALE DRAWING	SCALE:	SHEET 2 OF 2