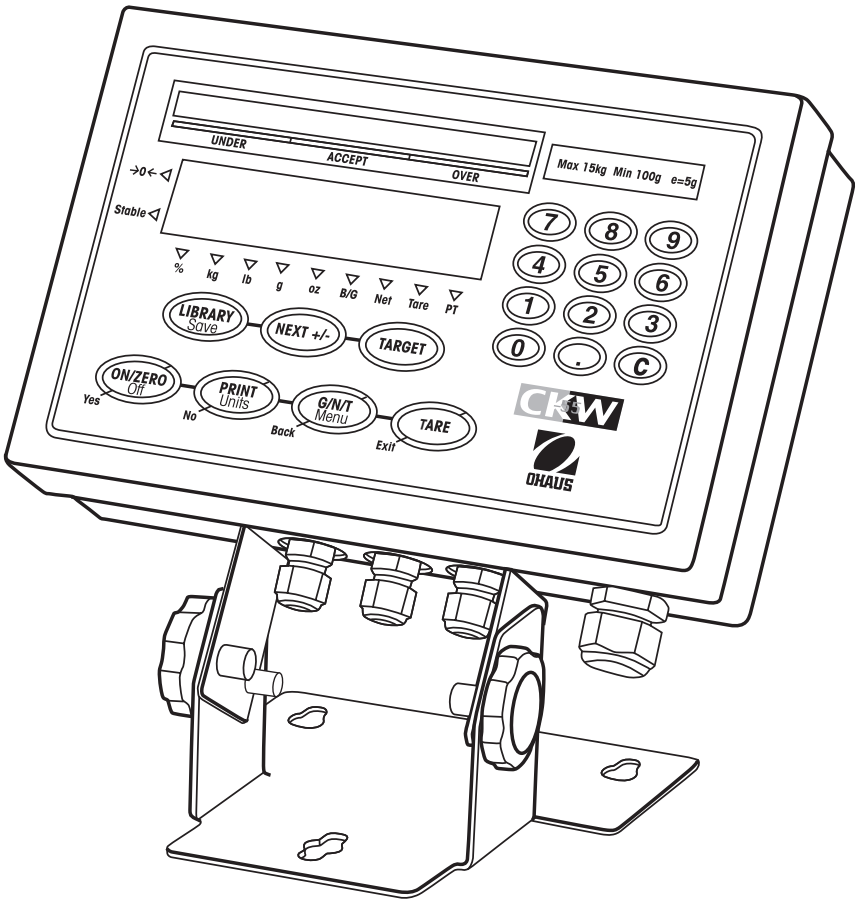
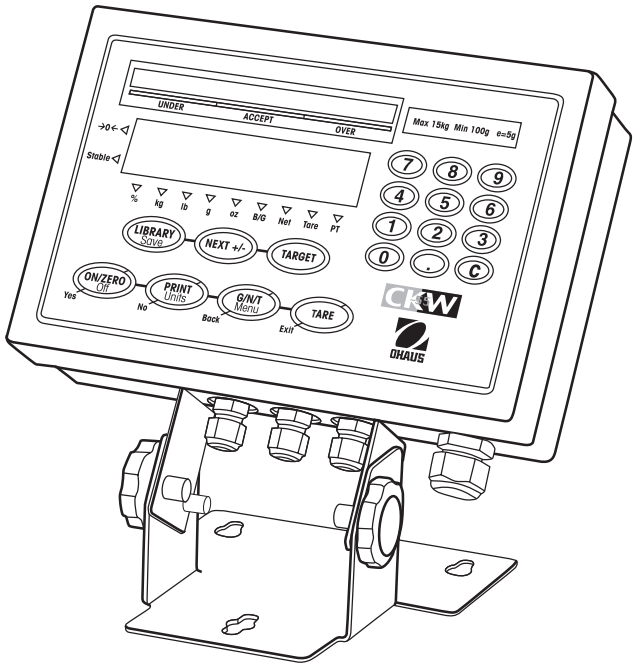
CKW-55 INDICATOR SERVICE MANUAL



CKW-55 Indicator

SERVICE MANUAL



CKW-55 Indicator

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1. INTRODUCTION

This service manual contains instructions for the diagnosis and repair work to be performed by qualified Ohaus service technicians or Ohaus authorized service centers. Knowledge of the operation of the CKW-55 Indicator is assumed. Instruction manuals may be required with this service manual. For complete information on operation, refer to the CKW-55 Indicator and CKW Series Scale Instruction Manual.

This manual covers troubleshooting, repair and testing of the CKW-55 Indicator.

The contents of this manual are contained in five chapters and an Appendix with service menu instructions.

Chapter 1 Introduction - Contains information about service facilities, tools, test equipment, test masses, and service strategy.

Chapter 2 Diagnosis - Contains information on problem verification, indicator examination, preliminary checks, troubleshooting tables, interconnection diagrams and wiring diagrams.

Chapter 3 CKW-55 Indicator Testing and Calibration - Contains testing procedures, performance tests, specifications and calibration of the CKW-55 Indicator.

Chapter 4 Repair Procedures - Contains detailed repair procedures for all major assemblies of the CKW-55 Indicator including the optional Relay Board, RS422/485 Communication Board, the Recharge Board and Battery.

Chapter 5 Parts Lists - Contains an exploded view identifying all serviceable replacement assemblies with associated parts lists.

Appendix A CKW-55 Indicator Service Menu - Contains RS232 commands for the CKW-55 Indicator in a service mode.

1.1 SERVICE FACILITIES

The service area should be a stable environment.

The bench area should be clean and should contain an antistatic mat with a personnel-grounding clip to protect internal circuit boards. The ideal electrical power source for the indicator should be a dedicated line to avoid sudden fluctuations or voltage drops caused by external equipment drawing heavy current.

The service area for the indicator should be away from direct sunlight, overhead heating or air conditioning ducts, magnetic fields such as motors or large transformers or near vibrating sources such as machinery, motors or vibrating equipment.

The power outlet should be grounded for safety. Sufficient space should be provided around the indicator as not to be affected by other equipment. This will ensure that the indicator is operated under ideal conditions.

CHAPTER 1 INTRODUCTION

1.2 TOOLS AND EQUIPMENT

1.2.1 Standard Tools and Test Equipment

The service shop should contain the following equipment:

1. Digital Voltmeter (DVM).
2. Megohmeter
3. Standard Electronics tool kit.
4. Desk magnifier on a stand.
5. Grounding mat and clip.
6. Flat blades and holder.

1.2.2 Special Tools

To service the CKW-55 Indicator, the following equipment is recommended:

1. A Load Cell Simulator
2. A computer
3. RS232 Cable Printer SF42 PN 80500574
4. RS232 Cable/PC 25-pin PN 80500553
5. RS232 Cable/PC 9-pin PN 80500552

1.3 CALIBRATION MASSES REQUIRED

The calibration masses required is dependent on the capacity and readability of the base used. The masses required to test the CKW-55 Indicator when connected to an Ohaus CKW base must meet the requirements of ASTM Class 4 or OIML F2. The mass values are listed in Table 1-1.

TABLE 1-1. CALIBRATION MASSES

MODEL	**Span Cal**	**Linearity Cal**
Cal in kg:	Masses Totaling	Masses Totaling
CKW3R55	3kg	1kg & 3kg
CKW6R55	6kg	3kg & 6kg
CKW15L55	15kg	7kg & 15kg
CKW30L55	30kg	15kg & 30kg

NOTE: During span calibration, a new span value may be entered. The span allowable range is 1kg or 1lb to 100% full scale. During linearity calibration a new midpoint value may be entered, the allowable range is 25% to 75% full-scale capacity (whole numbers only). Values closest to 1/2 span capacity will result in more accurate linearity.

1.4 SERVICE STRATEGY

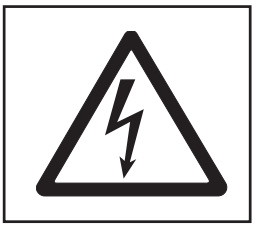
The repair method for the CKW-55 Indicator is the direct replacement of major assemblies.

The CKW-55 Indicator contains the following replaceable assemblies: Cover Assembly with Membrane Switch, Main PC Board with LED and Bar Displays, and Power Supply PCB. Optional assemblies consist of: NiMH Rechargeable Battery, Battery Recharge PCB, RS422/485 Communication PCB, and an AC or DC Relay Board.

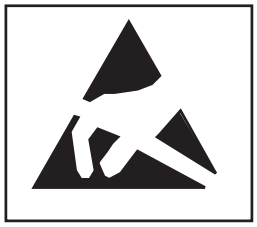
This service manual contains sufficient information to isolate the problem, replace the assembly, test and restore the Indicator to original factory specifications.

1.5 SAFETY AND ENVIRONMENTAL PROTECTION

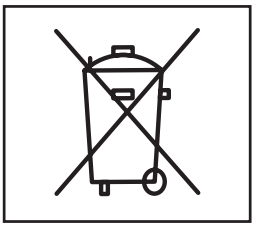
When carrying out service or repair work, always observe the following.



- Before opening the Indicator, isolate it from the AC power line (pull out the plug).



- The Indicator contains sensitive electronic components that are sensitive to **electrostatic discharge**. We recommend that you wear a grounding wrist strap when doing any work in the interior of the Indicator, in order to prevent any electrostatic charge building up. Grounding wrist straps are commercially available from electronic component suppliers. Use only ground straps that include a protective series resistor in the assembly.



- Indicators have a built-in memory backup battery and may contain an optional rechargeable battery. These contain heavy metals which could be hazardous to the environment. Batteries must not be disposed of as normal domestic refuse. Please ensure that used, non-working batteries are disposed of correctly in accordance with the relevant local regulations.

- When this symbol is displayed, important information regarding maintenance instructions should be carefully read before proceeding.

2. DIAGNOSIS

This section contains information needed to properly evaluate the reported problem and diagnose its cause.

2.1 BASIC EXAMINATION

Set up the Indicator according to the Instruction manual. Allow the Indicator to stabilize to room temperature. Examine the Indicator for signs of corrosion or physical damage.

2.2 PRELIMINARY CHECKS

Connect the Indicator's power cord to a suitable AC power source. Turn the Indicator on. Refer to Section 3.9.1 and observe and record power on information codes and software revision. Record all menu settings if possible as received. See section 3.9.4. On indicators equipped with an optional battery, allow the battery to charge up completely at least 4 hours with the indicator turned off. The front panel bar LED's will indicate a full charge when the first green segment begins to blink. If the battery fails to charge, "Lo-Bat" may display when the Indicator is turned on. If a battery problem exists, refer to section 3.7 for corrective actions and testing.

NOTE: This manual covers only Indicator problems. Some testing requires the Indicator to be connected to a known good base. For base problems, refer to the Base Service Manual. If the Indicator is not supplied with a base, testing will be done using a known good base and or Loadcell Simulator.

2.3 TROUBLESHOOTING TABLES

Troubleshooting tables 2-1 through 2-10 identify problems that could be encountered with the Indicator.

The troubleshooting tables refer to interconnection and wiring diagrams in this section to assist in locating the problem.

2-1 INDICATOR WILL NOT TURN ON WITH AC POWER.

SYMPTOM	PROBABLE CAUSE	REMEDY
Indicator will not turn on with AC Power supply connected.	Power cord defective.	Check the power cord for cuts or abrasions. If OK, proceed. Refer to section 4.1 and open the indicator. CAUTION: Hazardous voltages are present; use extreme care when making measurements. Check ac voltage at the Power Supply Board, on connector CN1. Move the power cord and see If the ac line voltage remains constant on the connector. If not, replace the power cord. If OK, proceed.

2-1 INDICATOR WILL NOT TURN ON WITH AC POWER (Cont.)

SYMPTOM	PROBABLE CAUSE	REMEDY
Indicator will not turn on with AC Power supply connected (Cont.).	Power Supply defective.	Refer to section 3.3 and test the Power Supply. Replace if necessary. See Repair Procedure 4.4. If Power supply is OK, proceed.
	Membrane Switch defective.	Refer to section 3.1 and test the Membrane Switch. Replace if necessary. See Repair Procedure 4.2. If Membrane Switch is OK, proceed.
	Main PC Board is defective.	The Main PC Board should be tested in accordance with section 3.2. The Main PC Board if defective should be replaced. See Repair Procedures 4.3. After repair, perform Operational Tests in section 3.9.

TABLE 2-2 INDICATOR WILL NOT TURN ON USING BATTERY POWER (OPTIONAL).

SYMPTOM	PROBABLE CAUSE	REMEDY
Indicator will not turn on using battery power.	Battery discharged or defective.	Refer to section 3.7 and test the battery. Replace if necessary. See Repair Procedure 4.8.
	Wiring harness defective or battery connection broken.	Refer to section 4.1 and open the scale. Refer to section 3.7 and test the battery harness. If OK, proceed.
	Recharge Board defective.	Refer to section 3.5 and test the Recharge Board. Replace if necessary. See Repair Procedure 4.5. If Recharge Board is OK, proceed.
	Membrane Switch defective.	Refer to section 3.1 and test the Membrane Switch. Replace if necessary. See Repair Procedure 4.2

TABLE 2-2 INDICATOR WILL NOT TURN ON USING BATTERY POWER (OPTIONAL)(Cont.).

SYMPTOM	PROBABLE CAUSE	REMEDY
Indicator will not turn on using battery power (Cont.).	Main PC Board is defective.	The Main PC Board should be tested in accordance with section 3.2. The Main PC Board if defective should be replaced. See Repair Procedures 4.3. After repair, perform Operational Tests in section 3.9.

TABLE 2-3 INDICATOR DOES NOT RESPOND TO FRONT PANEL CONTROLS.

SYMPTOM	PROBABLE CAUSE	REMEDY
Indicator does not respond to front panel controls.	Membrane Switch is defective.	Refer to section 3.1 and test the Membrane switch. Replace if necessary. See Repair Procedure 4.2.
	Main PC Board defective	If membrane switches are OK, refer to section 3.2 and test the Main PC Board. If defective, replace the Main PC Board. See Repair Procedures 4.3. After repair, perform Operational Tests in section 3.9.
	Locked out key function.	Review lockout menu in user manual.

TABLE 2-4 NO LED OR BAR DISPLAY OR PARTIAL DISPLAY.

SYMPTOM	PROBABLE CAUSE	REMEDY
Display is not on or partial characters are displayed.	Main PC Board is defective or LED may be defective.	The Main PC Board is replaced as a whole assembly. Check procedures in Table 2-1 first and verify that other problems do not exist. Then, refer to section 3.2 and test the Main PC Board. Replace Main PC Board. See Repair Procedures 4.3. After repair, perform Operational Tests in section 3.9.

TABLE 2-5 RS232 COMMUNICATIONS FAILURE.

SYMPTOM	PROBABLE CAUSE	REMEDY
Cannot communicate using RS232.	Menu settings improperly set.	Refer to the Instruction Manual and check the menu settings. Test the RS232 communications, see section 3.7.2.
	Main PC board defective.	If communications cannot be established, the Main PC Board should be tested in accordance with section 3.2. The Main PC Board if defective should be replaced. See Repair Procedures 4.3. After repair, perform Operational Tests in section 3.9.

TABLE 2-6 RS422/485 COMMUNICATIONS FAILURE (OPTIONAL BOARD).

SYMPTOM	PROBABLE CAUSE	REMEDY
Cannot communicate using optional RS422/485 board.	Menu settings improperly set.	Refer to the Instruction Manual and check the menu settings. If OK, proceed.
	Loose wiring connections.	Refer to Figure 3-2 for proper cable connections.
NOTE: The RS232 must be operational or the RS422/485 will not function.	RS422/485 PC board defective.	Refer to section 3.7 and test the RS422/485 board. If defective replace, see section 4.7. After repair, perform Operational Tests in section 3.9.
	Main PC board defective.	The Main PC Board should be tested in accordance with section 3.2. The Main PC Board if defective should be replaced. See Repair Procedures 4.3. After repair, perform Operational Tests in section 3.9.

TABLE 2-7 RELAY OPERATION FAILURE (OPTIONAL BOARD).

SYMPTOM	PROBABLE CAUSE	REMEDY
Relay functions not working.	Menu settings improperly set.	Refer to the Instruction Manual and check the menu settings.
	Relay Board defective.	Refer to section 3.6 and test the Relay board. If OK, proceed. If defective replace, see section 4.6. After repair, perform Operational Tests in section 3.9.

TABLE 2-7 RELAY OPERATION FAILURE (OPTIONAL BOARD) (Cont.).

SYMPTOM	PROBABLE CAUSE	REMEDY
Relay functions not working (Cont.).	Main PC Board defective.	The Main PC Board should be tested in accordance with section 3.2. The Main PC Board if defective should be replaced. See Repair Procedures 4.3. After repair, perform Operational Tests in section 3.9.
	Loose or improper wire connections.	Refer to Figure 3-2 for proper wiring.

TABLE 2-8 INDICATOR DISPLAY INCORRECT OR UNSTABLE.

SYMPTOM	PROBABLE CAUSE	REMEDY
Incorrect.	Menu settings improperly set.	Refer to instruction manual and check the menu settings. Perform Operational Tests in section 3.9.
	Loose or improper wiring.	Check wiring on connector J2.
Unstable.	Improper calibration.	Recalibrate properly. See section 3.11.
	Check base used with the indicator.	Examine the base and check settings on the indicator or test using load cell simulator.
	Main PC Board defective.	The Main PC Board should be tested in accordance with section 3.2. The Main PC Board if defective should be replaced. See Repair Procedures 4.3. After repair, perform Operational Tests in section 3.9.

TABLE 2-9 UNABLE TO MAINTAIN TIME AND DATE FUNCTIONS.

SYMPTOM	PROBABLE CAUSE	REMEDY
Fails to maintain set time and date.	Real Time Clock (RTC) battery depleted.	Replace the Real Time Clock battery. Refer to section 4.9. After repair, reset the time and date in accordance with user's local area. If time and date cannot be set with a new battery, proceed.
	Main PC Board defective.	The Main PC Board should be tested in accordance with section 3.2. The Main PC Board if defective should be replaced. See Repair Procedures 4.3. After repair, perform Operational Tests in section 3.9.

CHAPTER 2 DIAGNOSIS

2.4 ERROR CODE TABLE

The CKW-55 Indicator is equipped with software which will display an error code under certain conditions. Review the listed codes and follow instructions to correct the problem.

TABLE 2-10. ERROR CODES

SYMPTOM	PROBABLE CAUSE	REMEDY
Err 1	Overload condition, the load on the Platform exceeds the rated capacity of the base used with the Indicator	Remove excess load. Turn Indicator off then on. Perform calibration. Refer to section 3.11 when using a base or section 3.14 when using a simulator.
Err 2	Underload condition.	Replace platform if removed, cycle power off then on, see section 3.11 or 3.14 and calibrate the Indicator.
Err 3 (LFT mode only)	Power on zero exceeds +10% of original calibration zero.	Clear platform of excess mass, or recalibrate to establish a new zero point.
Err 7	EEPROM data incorrect on Main PC board.	Go through all menus and re-establish all settings or go to each menu and reset to default settings. Check operation of Indicator , see section 3.9. If this fails, the Main PC board is defective. Refer to section 4.3 and replace the Main PC board. Check operation of Indicator , see section 3.9.
Err 10	Library or Real Time Clock (RTC) data incorrect.	Replace RTC (Lithium) back-up battery. Refer to section 4.9 and replace the battery.
Err 14	Zero value exceeds the % zero setting value.	Remove excess load from the base or platform. Select a higher Zero Range value, (Non-LFT only.) in the Setup menu.
Err 21	Calibration incorrect.	Perform calibration using proper masses. Perform Operational Tests, see section 3.8.

TABLE 2-10. ERROR CODES (Cont.)

SYMPTOM	PROBABLE CAUSE	REMEDY
Lo bAt	Battery is discharged.	Connect Indicator to AC power and allow battery to charge.
	Battery is defective.	Refer to section 3.4 and test the battery. Replace if necessary. See Repair Procedure 4.8.
CLr.Pan	Power on zero exceeds +10% of original calibration zero.	Clear platform of excess masses, or recalibrate to establish a new zero point. Refer to section 3.11. **Note**: After several seconds, NON-LFT units will accept the new zero point. LFT enabled units will change to Err 3 if condition is not corrected.

3. CKW-55 INDICATOR TESTING

This section of the manual contains testing procedures of the individual replaceable assemblies of the CKW-55 Indicator. Before and after servicing the CKW-55 Indicator, an operational test and various performance tests should be made to ensure the Indicator meets all specifications.

3.1 MEMBRANE SWITCH TESTING

The Membrane Switch is part of the front panel controls. When the Membrane Switch is disconnected from the Main PC Board, a continuity test can be made to ascertain that all switches are functioning properly. Using an Ohmmeter, each switch can be tested in accordance with the Table 3-1 that lists the pin connections. See Figure 3-1 for pin locations.

CAUTION
REMOVE POWER FROM THE INDICATOR BEFORE TESTING.

With the Ohmmeter connected, pressing a selected function switch should indicate less than 100 Ohms. If the reading is higher than 100 Ohms, the switch is defective and the membrane switches should be replaced.

NOTE: Depending upon pressure placed on the individual switch, the resistance reading can vary anywhere from approximately 15 to 70 Ohms. This is normal.

Check each switch on the panel. The open circuit resistance for each switch should be greater than 5 Megohms. A switch that reads less than 5 Megohms for an open circuit or does not read 100 ohms or less when pressed is defective and the Membrane Switch panel requires replacement.

The Membrane switch can be tested after opening the Front Housing from the Rear Housing.

1. Refer to section 4.1 and open the Front Housing.

2. Disconnect the membrane switch connector from the Main PC Board connector J1.

3. Refer to Table 3-1. Using an Ohmmeter, measure the resistance across the pins indicated in the table. If readings are not in range, the membrane switch is defective. Replace the Membrane Switch panel. Refer to section 4.2.

4. Check that the Membrane Switch is not shorted to the Front Housing case. Check all pins to the case which should be open continuity, if less than 5 Megohms, replace the Membrane Switch. Refer to section 4.2.

5. Connect the Membrane connector to Main PC Board.

6. Replace Front Housing to Rear Housing, refer to section 4.1.

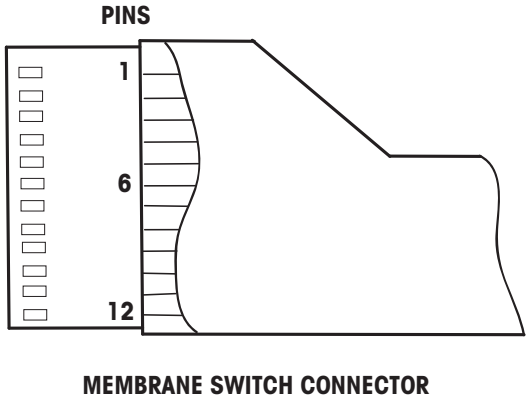


Figure 3-1. Scale Membrane Switch Wiring Diagram.

TABLE 3-1. MEMBRANE SWITCH CONTINUITY TEST

FUNCTION SWITCH	MEASURE ACROSS PINS
LIBRARY	2 & 11
NEXT +/-	2 & 10
TARGET	3 & 10
ON/ZERO	8 & 9
PRINT	4 & 11
G/N/T	4 & 10
TARE	3 & 11
#1	5 & 10
#2	5 & 11
#3	5 & 12
#4	6 & 10
#5	6 & 11
#6	6 & 12
#7	7 & 10
#8	7 & 11
#9	7 & 12
#0	1 & 10
Decimal Point	1 & 11
C	1 & 12

3.2 MAIN PC BOARD TESTING

The Main PC Board can be tested by measuring voltages on various components. If defective components are found, the entire PCB should be replaced. The following tests are made when it is suspected that the Main PC Board is defective.

3.2.1 Voltage Measurements

Disconnect the Battery connector from the Recharge Board if installed.

NOTE: When the power cord is connected to the indicator, the Main PC Board has power applied to it, even when the display is off. When the **On/Zero Off** switch is turned On, the Indicator display will go through a turn on sequence and the LED displays will light. If the Indicator fails to display after turn on, continue with this procedure to identify the problem.

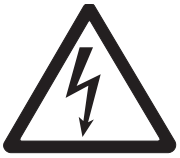
The following components operate as follows:

A. Pressing the ON button activates Transistor Q1 and provides turn-on of 12 V dc power to rest of circuit.
B. IC U13, regulator provides 5 V dc to the board.
C. IC U14, regulator provides the 5 V excitation for the external Load Cell.
D. IC U22, regulator provides 3.6 V to circuitry that controls the LED's and Bar Graph LED's.
E. Batt1, real time clock battery (RTC) provides power to retain time and library information. When depleted, clock functions cannot be set or retained. Error 10 may be indicated.

Procedure

1. Disconnect power from the Indicator.

2. Open the Front Housing, refer to procedure 4.1.



WARNING
HAZARDOUS VOLTAGES ARE PRESENT WITH THE INDICATOR HOUSING OPENED AND AC POWER IS APPLIED, USE CARE WHEN MAKING ALL MEASUREMENTS.

3. Connect the power cord to a suitable power source and turn on the Indicator. Observe the displays and note if problems are visible or if the displays fail to light.

4. Refer to Figure 3-2, Interconnection Diagram that illustrates the interconnections to the Main PC Board and is shown as a top view.

3.2.1 Voltage Measurements (Cont.)

5. Using a DVM, measure the power supply voltage across pins 1 and 3 of J5, location A in Figure 3-3, it should be 12 volts dc, ±0.24V dc. This is the power source for the Main PC board and is regulated. If the voltage is low or is not present, refer to section 3.3 and test the Power Supply Board. If the Power Supply board is defective, refer to section 4.4 and replace the board and continue with this procedure. If the board is OK, continue with this procedure.

NOTE: All voltage measurements are made with respect to case ground.

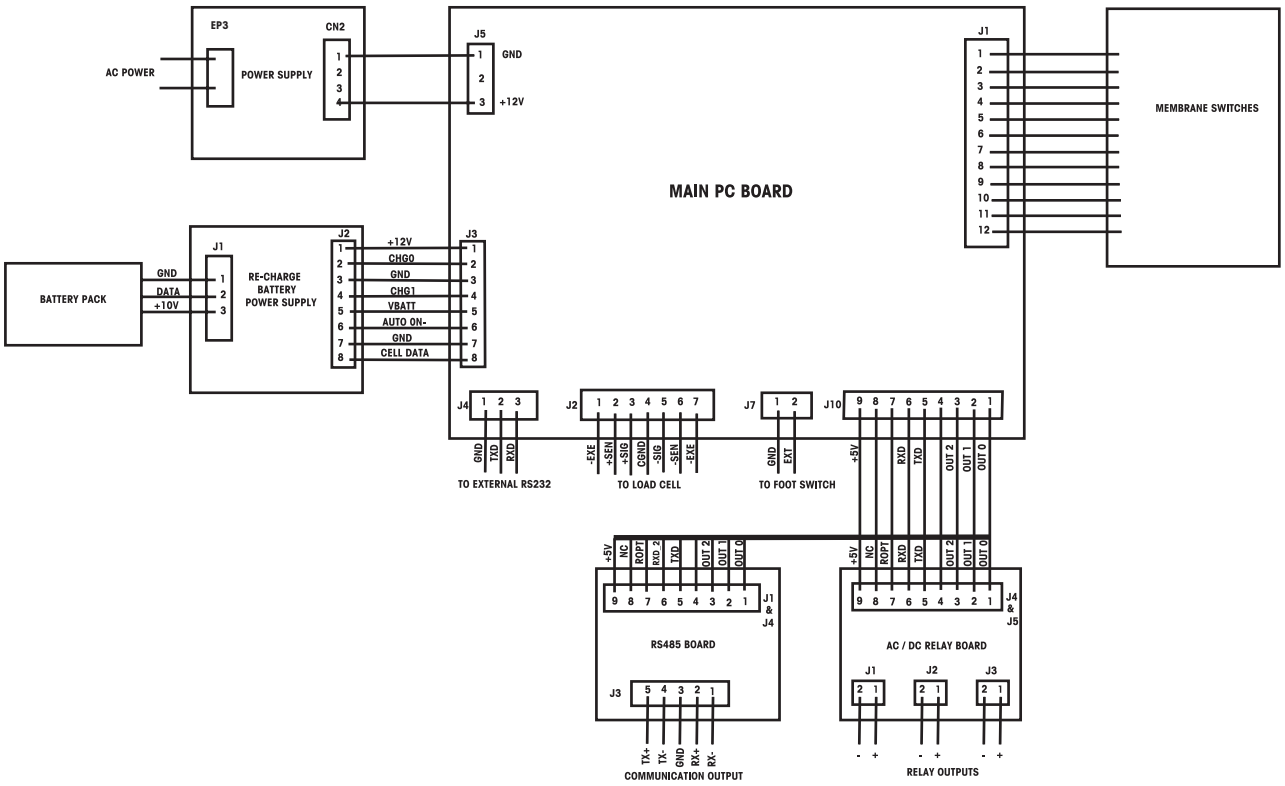


Figure 3-2. Interconnection Diagram.

3.2.1 Voltage Measurements (Cont.)

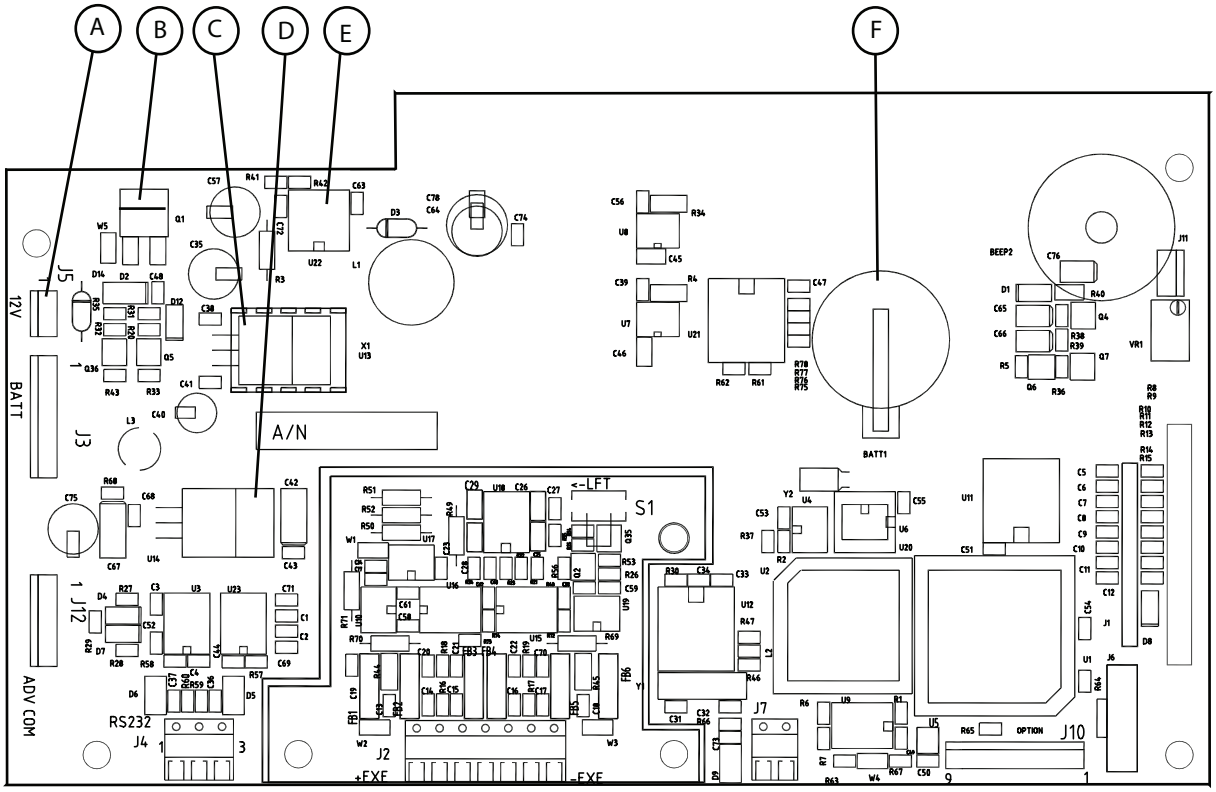


Figure 3-3. Component Layout Diagram.

6. Measure the voltage at transistor Q1, pin 2 (location B), it should be 12 V dc, ±0.24 V dc. If this voltage is not present, the Main PB Board must be replaced. Refer to section 4.3 and replace the Main PC Board.

7. Measure voltage at regulator IC U13, pin 3 (location C), it should be +5 V dc, +0.25 V dc. This is a supply voltage for the board. If this voltage is above or below this limit, the Main PC Board should be replaced. Refer to section 4.3 and replace the Main PC Board.

8. Measure the voltage at IC U14, pin 3 (location D), it should be +5 V dc, ±0.19 V dc. This supplies the analog section and the excitation voltage for the external load cell. If this voltage is above or below these limits, the Main PC Board should be replaced. Refer to section 4.3 and replace the Main PC Board.

9. Measure the voltage at IC U22, pin 2 (location E), it should be 3.6 V dc, ±0.14 V dc. This supplies the operating voltage for the LED displays and bar graph display drivers. If this voltage is above or below these limits, the Main PC Board should be replaced. Refer to section 4.3 and replace the Main PC Board.

10. Measure the real time clock battery voltage at (location F), it should be between 3.6 V dc and 2.0 V dc. If lower than 2.0 volts, replace. See section 4.9.

When all voltages are correct, the unit should be tested with a load cell simulator or a known good base. After replacement, a full operational check should be made in accordance with section 3.9

3.2.2 Simulator Testing

To perform these tests, the use of a load cell Simulator is required. The basic function of a Simulator is to simulate the output of a full bridge load cell allowing the CKW Indicator to be separated from the Base for the purposes of troubleshooting. The CKW Indicator can use a load cell Simulator rated at 2 or 3mV/V output with a 5.00 Volt excitation voltage supplied by the CKW Indicator. The Simulator selected should contain coarse and fine verniers with a step switch. When using a simulator, ensure jumper W1 is correct. Refer to the Instruction Manual.

This test checks the Main PC Board circuitry by simulating load cell voltages at various scale capacities.

NOTE: An 8 position simulator is used in this test.

1. Disconnect power from the Indicator.

2. Open the Indicator housing, refer to procedure 4.1

3. Disconnect the Load Cell cable from connector J2 on the Main PC Board. Refer to Figure 3-3 for connector location.

4. Connect the Simulator to connector J2. See Figure 3-2 for terminal identification.

5. Connect the AC line cord to a power source.

6. Turn on the Indicator, CLr Pan or Err 3 may be displayed. This is OK.

7. Enter the menu on the Indicator and set the desired capacity units (kg, g, etc.).

8. Enter the span Calibration menu and calibrate using the simulator position 2 for zero setting and position 7 for full scale. As an example, an Indicator set up for a 6kg base would display:

Simulator Position	Reading
1 =	Underload Error 2
2 =	0kg
3 =	1.2kg
4 =	2.4kg
5 =	3.6kg
6 =	4.8kg
7 =	6kg
8 =	Overload Error 1

9. Using the simulator, adjust to simulate loads of 0% load, 50% load and 100& load for the capacity that the Indicator is set to. If the readings are unstable, the Main PC Board is defective and must be replaced.

10. After Main PC Board replacement and assembly of the Indicator, perform Operational Tests in section 3.9.

3.3 POWER SUPPLY TESTING

The Power Supply Board is located in the Rear Housing. A replaceable fuse is located on the board. This test is made when the Indicator fails to turn on when the power source is on and the indicator is plugged in.

WARNING

HAZARDOUS VOLTAGES ARE PRESENT WITH THE INDICATOR HOUSING OPENED AND AC POWER IS APPLIED, USE CARE WHEN MAKING ALL MEASUREMENTS.

3.3.1 Voltage Measurements.

NOTE: When the power cord is connected to the indicator, the Power Supply Board has power applied to it at all times.

1. Disconnect power from the Indicator. (Remove the line cord plug from the power source.)

2. Open the Front Housing, refer to procedure 4.1.

3. Refer to Figure 3-4 and locate the fuse on the Power Board. Remove the protective cover and fuse. Check the fuse with an Ohmmeter. If defective, replace with a new fuse of the same type. Reinstall protective fuse cover and reconnect ac power and measure voltage at connector CN2. If voltage is not present, replace the Power Supply board. Refer to procedure 4.4.

4. With a power cord connected to the power supply board, connector CN1 and measure the voltage at connector CN2 that should be 12 V dc, +0.24 V dc. If 12 V dc is not present, continue. If 12 V dc is present, the Power Supply board is good.

CAUTION

THIS NEXT STEP CONTAINS ELECTRICAL HAZARDS, USE EXTREME CARE WHEN MAKING MEASUREMENTS.

5. Carefully measure the AC line voltage at the connector CN1 on the power supply. Check that the power cord is not intermittent and is operational. If the cord is defective, refer to section 4.1 to open the housing and replace the cord. Disconnect the power cord from the power source. If the power cord was not defective, continue with this procedure.

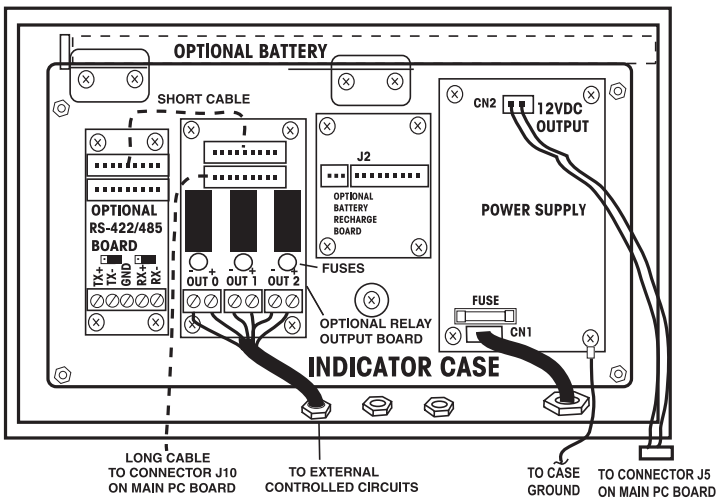


Figure 3-4. Power Supply Location Diagram.

CHAPTER 3 INDICATOR TESTING

3.4 BATTERY TESTING

The optional rechargeable battery is supplied with a Recharge Board. This test is made when the battery fails to charge properly or not at all. Please read section 3.4.1 General Information and section 3.4.2 Recharge Board Information first before proceeding.

CAUTION

DO NOT ATTEMPT TO CHARGE THE BATTERY USING AN EXTERNAL CHARGER. DAMAGE TO THE BATTERY OR AN EXPLOSION COULD OCCUR. USE ONLY THE RECHARGER IN THE CKW INDICATOR FOR PROPER CHARGING.

3.4.1 General Information

The optional battery used in the CKW-55 Indicator and the CKW-55 Series Scale is Nickel Metal Hydride, (NiMH), 7.2 Volts rated at 3800mA and is rechargeable. The battery assembly is internally fused and includes a battery monitor chip. A defective battery assembly must be replaced, not repaired.

Fuses

There are two internal fuses in the battery, One of the fuses will reset after a temporary over heating or over current. The reset is automatic after the assembly cools down. The fuses are not servicable and a defective battery must be replaced as a complete assembly.

Battery Monitor Chip

The battery assembly contains a monitor chip that monitors voltage and temperature. The chip also contains a small amount of non-volatile memory. The number of charge cycles is stored in the non-volatile memory. An RS232 Service command can retrieve the chips data, (<esc>BD command). In addition to the voltage and temperature, the service command returns the number of charge cycles and the present charging status. The center wire on the battery assembly is used to retreive the data from the monitor chip.

3.4.2 Troubleshooting the Battery

To troubleshoot the battery, a DVM is required. To check the memory of the battery, a PC and an RS232 cable is required.

1. Connect the Indicator to a suitable power source. **DO NOT TURN THE INDICATOR ON**.

2. Observe the bar display, Figure 3-5 indicates the status of charging.

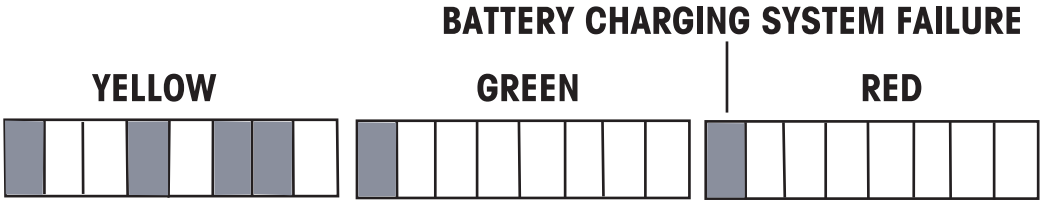


Figure 3-5. Battery Charging Indications.

With the Indicator turned off and AC connected, a flashing LED shows the battery charging status. The first yellow LED shows the Pre-charge, yellow LED's 2 through 7 shows the Quick charge, yellow LED 8 shows the Equalizing charge, the first green LED shows the Maintenance charge. The battery is considered fully charged when the maintenance charge starts. A red LED indicates the detection of a battery system failure.

3.4.2 Troubleshooting the Battery (Cont.)

3. Note the charging status of the battery. If the red bar graph is lit, either the battery and or the charging PCB has failed.

Note: To force a charge cycle, see section 3.5.1.

4. Press the C button momentarily, the Indicator will display the actual battery voltage. Approximately 6.1 Volts dc or lower indicates a discharged battery, 7.2 Volts is the nominal battery voltage and approximately 8.5 Volts dc is the maximum charge voltage. Before replacing the battery, force a charge cycle and allow the Indicator to remain plugged in for several hours and check the battery voltage by pressing the **C** button. If the bar graph indicator for battery status fails to light or advance, refer to testing of the Recharge Board, see section 3-5.

5. After recharging the battery, remove AC power from the Indicator and operate the Indicator using battery power to determine if the battery retained a full charge. A new battery should function for at least 10 hours. When the battery operates the Indicator for less than 5 hours, it should be replaced. See section 4.8 for battery replacement procedures.

Note: The power save function should be turned off to allow testing battery life.

6. The battery contains a monitor chip that can be accessed to determine the battery temperature, voltage, number of charge cycles and present charging state.

   To access data on the battery monitor chip, connect an RS232 cable to the Indicator and a PC. The Indicator should be powered on with ac power. Send the following serial commands, (<esc>SV) followed by the Battery dump command, (<esc>BD). The indicator will output a text string containing the battery voltage, battery temperature, number of charge cycles, and the present charging state. See Appendix A.1 for more details.

   Example shown on the PC screen: **8.22v 24C 1CC 2.** The 8.22v indicates the battery voltage, 24C indicates the battery temperature, 1CC indicates the number of complete charge cycles and 2 indicates the present charging state. (See 3.5.1 for charging information).

7. If the battery fails to produce any voltage, it must be replaced.

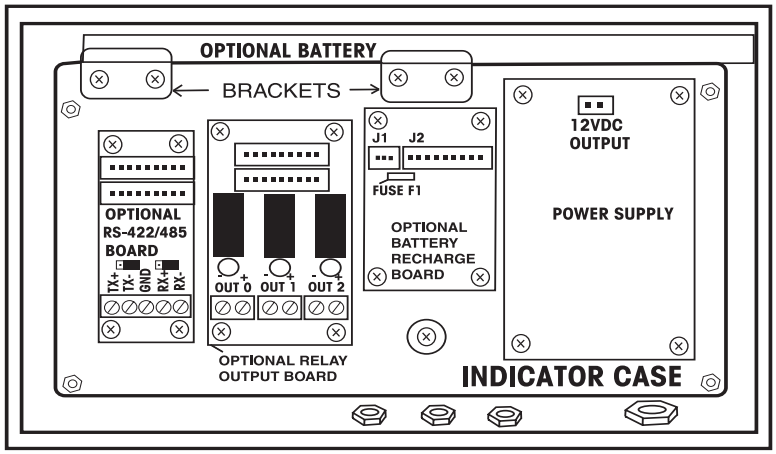


Figure 3-6. Battery and Recharge Board Location Diagram.

CHAPTER 3 INDICATOR TESTING

3.5 RECHARGE BOARD TESTING

The Recharge Board is supplied with the optional rechargeable battery. This test is made when the battery fails to charge properly. The Recharge board is equipped with a soldered in place Fuse F1 located near connector J1 on the board. If this fuse is open, the battery will not charge. See Figure 3-7 for the location of the board and fuse.

3.5.1 Recharge Board Information

The Recharge PC Board, is a multi-mode charger and has 4 charging states:

1. Pre-charge, 2. Quick charge (fast charge), 3 Equalizing charge (top-off charge), and 4. Maintenance charge. Service mode commands can be used to determine the charging state. See Appendix A.1.

With the Indicator turned off and AC connected, a flashing LED shows the battery charging status. The first yellow LED shows the Pre-charge, yellow LED's 2 through 7 shows the Quick charge, yellow LED 8 shows the Equalizing charge, the first green LED shows the Maintenance charge. The battery is considered fully charged when the maintenance charge starts. A red LED indicates the detection of a battery system failure.

If the battery is new and has never been charged, a one time extended time trickle charge is started, (this one time initial charge is shown by 2 yellow LED's). Figure 3-6 illustrates the bar displays during various charging modes.

The batteries do not continually charge. Even the maintenance charge will end after several hours.

The charge sequence is enabled only after the low bat warning is detected. Since the overall battery life is partially dependent on the total number of charge cycles, (even partial charge cycles), limiting the number of charge cycles ensures the longest operating battery life.

The charge cycle can be forced manually at any time as long as ac power is applied. To manually start a charge cycle, the user holds down the "**C**" button while the indicator is off. Continued use of this method will shorten the life of the battery and is not recommended.

A short press of the "**C**" button will display the actual battery voltage. Due to the alternating duty cycle of charging, the display voltage may vary slighty with each button press. Pressing the "**C**" button several times will allow an average reading to be taken.

3.5.1 Recharge Board Information (Cont.)

The battery voltage and temperature are monitored while charging. An over voltage or temperature condition during the charge cycle will halt the charge sequence.

A normal battery charge is about 5 hours. This time may increase as the batteries age. The faster charge times are achieved when the scale is off and connected to the AC power. Charging will continue with the Indicator on but at a slower rate.

The battery run time is nominally greater then 10 hours with medium display brightness settings.

A flashing red LED indicates a charging error. This may be due to battery over voltage, over temperature battery, an extremely low battery voltage or a malfunctioning Recharge board.

3.5.2 Recharge Board Testing

Begin testing with a battery connected to the recharge board.

1. Connect the Indicator to a suitable ac power source. **Do not turn on the Indicator.**

2. Force a charge by a long press of the **C** button.

3. Observe the bar display and note if the battery is charging normally, refer to figure 3-5 for displays. If the bar indicator is blinking in one of the yellow segments, the recharge board is working. To confirm this, momentarily press the **C** button at 1 or 2 minute intervals and note the battery voltage on the indicator display. It should increase slightly with each button press. As an example, the first press indicated 8.62v the second press should increase slightly. A good Recharge board will continue to charge the battery until the first green LED is lit. If the battery fails to indicate an increase in voltage after pressing the **C** button several times or the yellow LED does not icrement after a few hours, either the battery or the recharge board is defective.

4. Disconnect power from the Indicator and refer to section 4.1 and open the Indicator. Verify that power is applied to the Recharge board. See section 3.5.3 before continuing.

5. Remove the battery connector on J1 from the Recharge board, **do not remove the battery.** Refer to Figure 3-2.

6. Temporarily connect a known good battery to the Recharge board.

7. Repeat steps 1 through 3, if the Indicator display does not show increasing charging voltages to the battery with successive presses of the **C** button, the Recharge board is not functioning properly, continue with step 7.

8. Remove power from the Indicator by disconnecting the power cord and disconnect the battery from the recharge board.

CAUTION

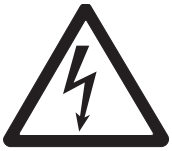
DO NOT CONNECT THE A BATTERY TO THE RECHARGE BOARD DURING CONTINUITY TEST.

3.5.2 Recharge Board Testing (Cont.)

9. Using an Ohmmeter, check the fuse F1, (refer to Figure 3-6) on the Recharge board to see if it is open. If the fuse is open, remove the Recharge board and replace the fuse. Re-install the recharge board in the housing.

10. Connect the original battery to the Recharge board and repeat steps 1 through 3. If the battery indicates charging, allow it to charge for several hours. If the battery is good and does not recharge after the fuse has been replaced, replace the Recharge board, see section 4.5.

11. After the Recharge board has been replaced, allow the battery to charge several hours.



WARNING

HAZARDOUS VOLTAGES ARE PRESENT WITH THE INDICATOR HOUSING OPENED AND AC POWER IS APPLIED; USE CARE WHEN MAKING ALL MEASUREMENTS.

3.5.3 Voltage Measurements

NOTE: When the power cord is connected to the indicator, the Power Supply Board has AC power applied to it at all times.

1. Disconnect power from the Indicator. (Remove the line cord plug from the power source.)

2. Open the Front Housing, refer to procedure 4.1. Locate the Recharge Board as shown in Figure 3-6.

3. Reconnect power to the Indicator.

4. Measure the dc voltage at connector J2 on the recharge board, pins 1 and 3. Pin 1 is +, pin 3 is ground. The voltage should be +12 Volts dc $\pm$0.24 V dc.

5. If 12 Volts dc is not present at connector J2, refer to section 3.3 Power Supply testing before continuing.

3.6 RELAY BOARD TESTING

The Relay Board is supplied as an optional kit for the CKW-55 Indicator.

3.6.1 Relay Kit Information

Two optional Relay Kits are available for CKW Series Indicators. The AC Relay Kit is used for controlling up to three external AC circuits. The solid-state AC relays are rated at 3 Amperes at 24-240 Volts. The DC Relay Kit is used for controlling up to three external DC circuits. The solid-state DC relays are rated at 3 Amperes, 5-60V dc. Each solid-state relay output is equivalent to a single pole, single throw switch (SPST). Each relay circuit is protected by a replaceable fuse rated at 2.5 amperes, 250 Volts.

The I/O menu in the Indicator allows the relays to be programmed for normally open or normally closed operation, on-off or on-hold sequencing, simultaneous, break-before-make (BBM) or make-before-break (MBB) contact switching.

The relays are replaceable. The fuses, one for each solid-state relay output are replaceable.

3.6.2 Relay Testing

There are several reasons why the relays can fail, they are listed as follows:

A. Improper menu settings, see instruction manual.
B. Fuses are open.
C. Improper application AC on DC relays or DC on AC relays.
D. Excessive external currents were switched.
E. External inductive circuits causing high transient spiked voltages when switching.
F. Voltages to be switched are below the minimum voltage:

DC minimum voltage 5.
AC minimum voltage 24.

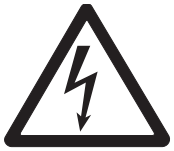
Before testing the relays, make sure that the Main PC board is functioning properly.

1. Disconnect power from the Indicator. (Remove the line cord plug from the power source.)

2. Open the Front Housing, refer to procedure 4.1.

3. Locate the Relay board cover as shown in Figure 3-7 and remove the cover screws.

WARNING



HAZARDOUS VOLTAGES ARE PRESENT WITH THE INDICATOR HOUSING OPENED AND AC POWER IS APPLIED, USE CARE WHEN MAKING ALL MEASUREMENTS.

RELAY TERMINALS MAY BE CONNECTED TO EXTERNAL VOLTAGE SUPPLIES. BE SURE TO REMOVE ALL POWER SOURCES BEFORE SERVICING RELAY BOARDS.

3.6.2 Relay Testing (Cont.)

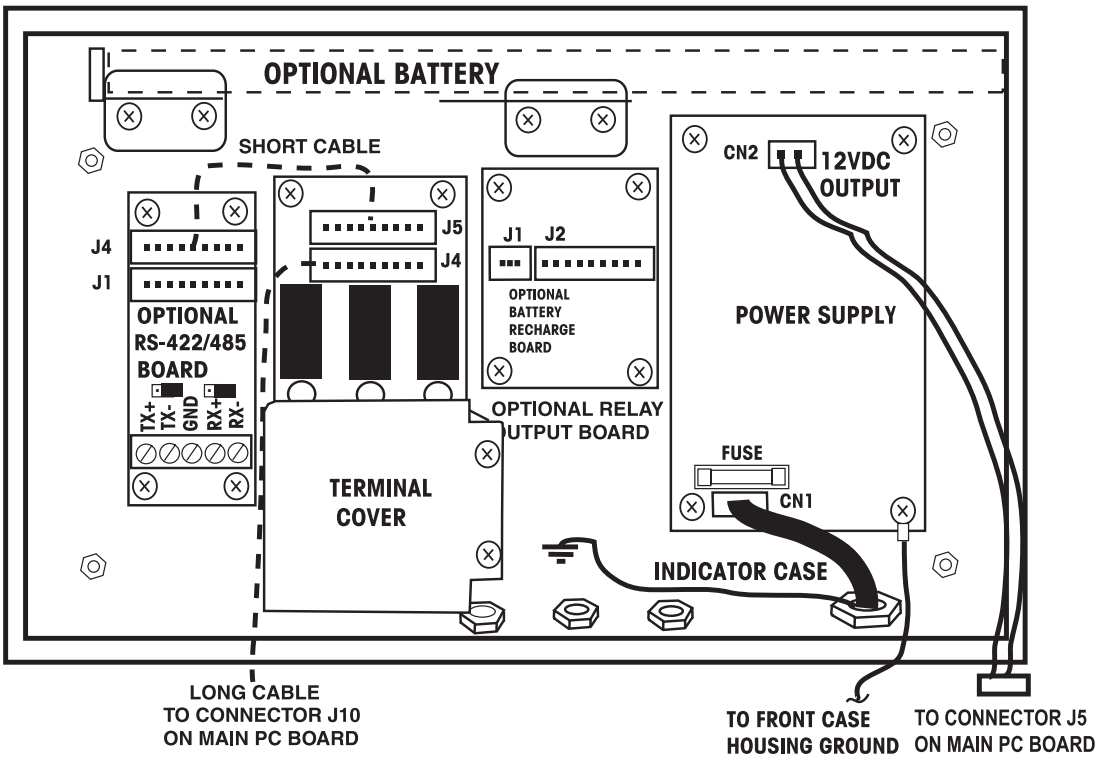


Figure 3-7 Relay Board with Terminal Cover.

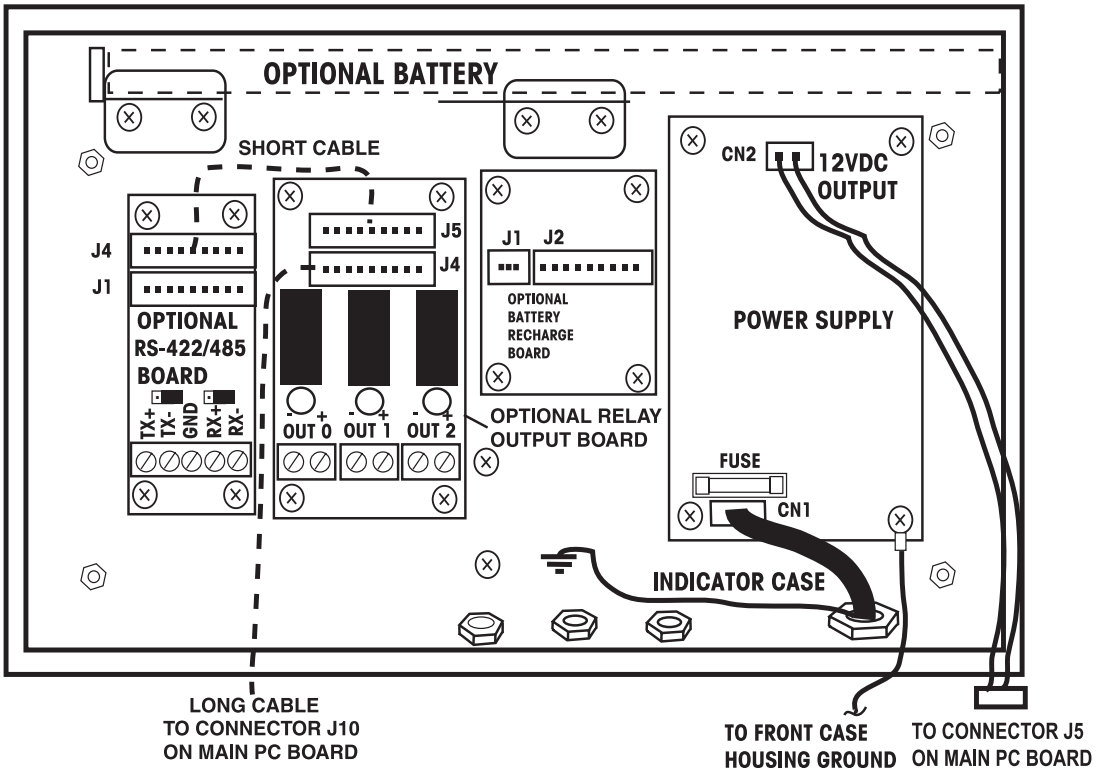


Figure 3-8. Relay Board without Terminal Cover.

3.6.2 Relay Testing (Cont.)

NOTE: When testing the Relay board containing dc type relays, an Ohmmeter providing a minimum of 5 Volts DC can be used to verify operation. When testing ac type Relays, a small circuit consisting of a low voltage (24 V AC) isolation transformer and small lamp (24 Volts) are required.

1. Remove each fuse and check for continuity. Replace defective fuses. See parts list at the rear of this manual. If a fuse is defective, there is also a possibility that the associated relay may also be defective due to over currents.

2. Apply power to the indicator. Refer to the instruction manual and set the Indicator up to provide a test of each relay.

3. For dc relay types, use an Ohmmeter providing a minimum of 5 Volts DC and check each relay operation for open and closed contact operation. If a relay is defective, refer to section 4.6 and replace the Relay or the complete board.

4. For ac type relays, fabricate a small test circuit consisting of a small isolation transformer of 24 volts and a test lamp . Wire in series with each relay output. Check each relay for operation. If a relay or relays are found to be defective, refer to section 4.6 and replace the Relay or the complete board.

5. When testing is completed, remove power from the Indicator and replace the relay cover previously removed.

6. Reassemble the Indicator.

CHAPTER 3 INDICATOR TESTING

3.7 RS232, RS422/485 COMMUNICATION TESTING

The CKW-55 Indicator is equipped with RS232 communication as standard. The RS232 interface is part of the Main PC board. In addition, an optional RS422/485 Communication Board is supplied as a kit for the CKW-55 Indicator and can provide a serial interface to Industry EIA-422/485 standards. A failure of RS232 communications would require replacement of the Main PC board. When the optional kit is installed, either the RS232 or RS422/485 can be used, not both. Selection for the type of communication is made through the Communication menu, see Instruction manual. If the RS232 fails, the RS422/485 will not work.

3.7.1 RS422/485 Communication Board Information

The RS422/485 Communication board is available as an optional kit for CKW Series Indicators. Detailed technical information as to cabling, terminations, addressing, interfacing and jumper setup may be found in Instruction Manual supplied with the Option Kit. Setup information is located in the CKW-55 Indicator and CKW Series Scale Instruction manual, part number 80251031.

3.7.2 RS232 Testing

To test the RS232 communications, the Main PC board voltage checks should be normal in accordance with section 3.2.

NOTE: A possible failure could have occurred on the Main PC board RS232 components and still have normal operating voltages present. To verify proper operation or failure, you will need an interface cable with a Serial interface connector at one end for the computer and stripped, tinned wires at the other end that can be connected to the Main PC board. A computer with a communication program installed is necessary to test the communications.

1. Disconnect power from the Indicator. (Remove the line cord plug from the power source.)

2. Open the Front Housing, refer to procedure 4.1.

3. Connect the interface cable to the computer and the other end of the cable to connector J4 RS232 connections on the Main PC board. Observe that the proper connections are made,

4. Close the Front Housing on the Indicator and connect to AC power.

5. Turn on the Indicator and enter the COM menu and set the Baud Rate, Parity, Data Length, Stop Bit, Handshake and Type to RS232, then exit the menu.

6. On the computer, set the correct COM port and all settings on the communication program to match the settings on the Indicator. The Indicator should now communicate with the computer. See Table 3-2 for Interface Commands. All commands sent to the Indicator must be terminated with a carriage return (CR) or carriage return-line feed (CRLF).

3.7.2 RS232 Testing (Cont.)

TABLE 3-2. SERIAL INTERFACE COMMANDS TABLE.

Command Character	Description Command
PU	Print current weighing unit: kg, g, lb, oz, lb:oz, %.
P	Same as pressing PRINT button.**
T	Same as pressing TARE button.**
Z	Same as pressing ZERO button.**
xS	Enable print stable data only. Where x=0 for Off, x=1 for On.
xP	Auto print condition. Where x = 1 to 3600 second intervals, x=0 for Off, x=C for Continuous, x=S for On Stable.
xCM	Checkweigh Input Mode, where x=0 for Range, 1=Variance, 2=Percent (%).
xCU	Set Under value, as a Range, Variance or Percent value (depending on Checkweigh Input Mode setting).*
xCO	Set Over value, as a Range, Variance or Percent value (depending on Checkweigh Input Mode setting).*
xCT	Set Target value (used only in Variance and Percent Input Modes, not used in range Mode)*.
xU	Set weighing unit: Where x=1 to 6, 1=g, 2=kg, 3=lb, 4=oz, 5=lb:ox, 6=%, if x=blank, then increment to next available mode. (The unit can not be selected if it is not enabled).
PV	Print model name, software revision, and LFT status - if on, (eg. "CKW-55 Sr 1.0 LFT "On", or "CKW-55 Sr 1.1"
xT	Set a pre-tare value of x, in present weighing units.* (Positive values only)

All commands sent to the Indicator must be terminated with a carriage return (CR) or carriage return-line feed (CRLF).

* Up to 6 numeric characters, an optional "-" sign, and single decimal point (e.g., 1.000CU, 2:3.2CU) Use colon ":" as a separator for lb:oz data entry.*

** Alternate characters can be assigned for Print, Tare and Zero as described in the Instruction Manual.

7. When the commands can be transmitted from the computer to the Indicator and from the Indicator to the computer, the RS232 is functional.

Additional service commands are shown in Appendix A.

3.7.3 RS422/485 Testing

The RS422/485 Communication board can be wired to operate in a 4-wire duplex or 2-wire half duplex mode. When RS422/485 is installed, note the jumper arrangement shown in Figure 3-10 and 3-11 RS422/485 Typical 4-Wire and Typical 2-Wire Connections.

Note: W1 must be shorted to allow 2 wire communications.
W2 must be shorted on the last scale connecting to the communcation link. W2 connects the terminating resistance.

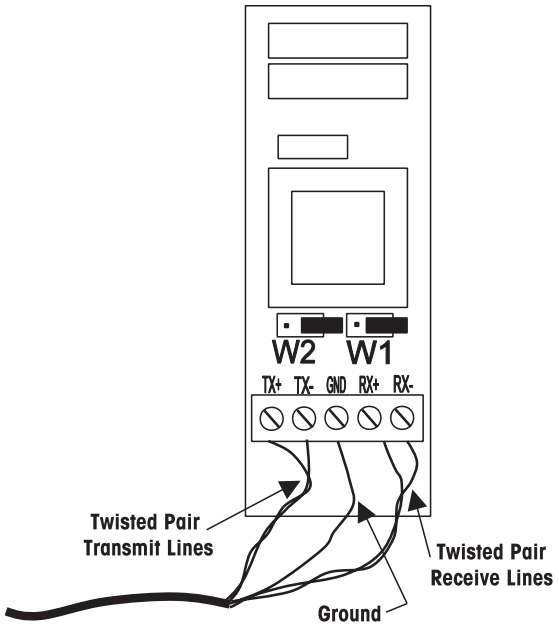


Figure 3-9. RS422/485 Typical 4-Wire Duplex Connection.

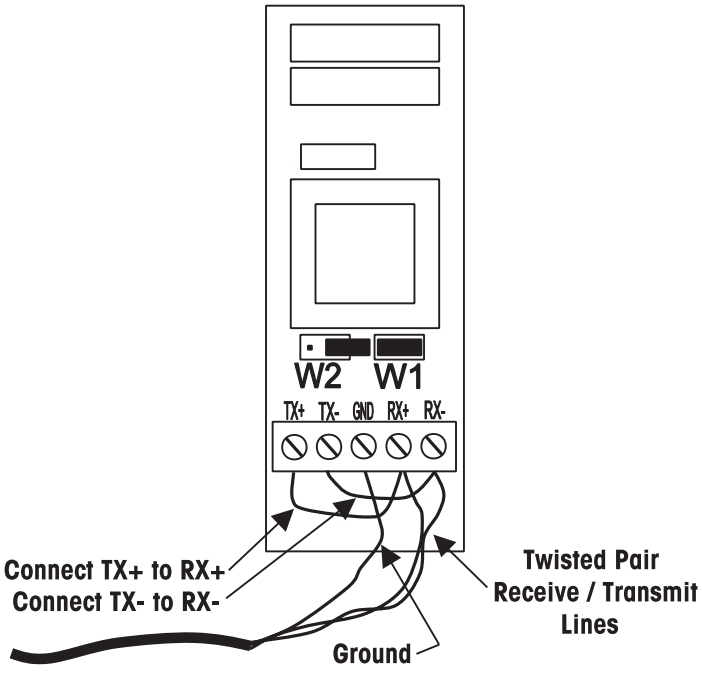


Figure 3-10. RS422/485 Typical 2-Wire Half Duplex Connection.

3.7.3 RS422/485 Testing (Cont.)

1. Disconnect power from the Indicator. (Remove the line cord plug from the power source.)

2. Open the Front Housing, refer to procedure 4.1.

NOTE: Make sure the computer is equipped with RS422/485 communications or a suitable converter.

3. Connect the interface cable to the computer and the other end of the cable as shown in Figures 3-9 or 3-10.

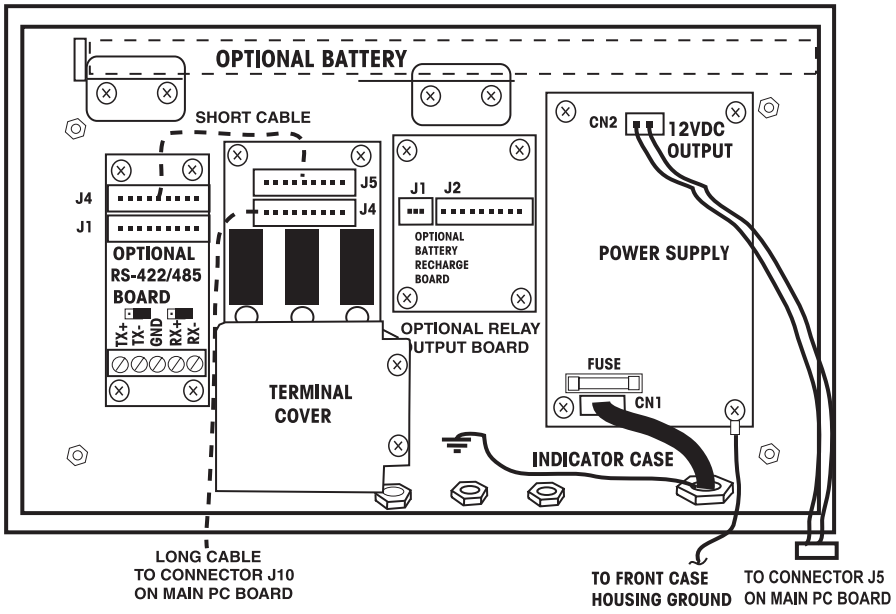


Figure 3-11. RS422/485 Location in Housing.

4. Close the Front Housing on the Indicator and connect to AC power.

5. Turn on the Indicator and enter the COM menu and set the Baud Rate, Parity, Data Length, Stop Bit, Handshake, Type to RS485 and address number, then exit the menu.

6. On the computer, set the correct COM port and all settings on the communication program to match the settings on the Indicator. The Indicator should now communicate with the computer. See Table 3-1 for Interface Commands. All RS485 commands sent to the Indicator must be preceeded by "@" character and the address number and must also be terminated with a carriage return (CR) or carriage return-line feed (CRLF).

7. When the commands can be transmitted from the computer to the Indicator and from the Indicator to the computer, the RS485 is functional.

8. Additional service commands are shown in Appendix A.

CHAPTER 3 INDICATOR TESTING

3.8 EXTERNAL INPUT TESTING

The CKW-55 Indicator I/O menu contains an INPUT menu item that is used to define a function to be controlled by an optional external input device such as a foot switch. The switch must to be a momentary contact type and the contacts must be normally open.

Table 3-3 identifies the various commands that can be set up to be activated when the external switch input is momentarily closed.

TABLE 3-3. EXTERNAL INPUT SELECTIONS.

To set up the input functions, enter the menu I/O settings.
This menu item is used to define a function to be controlled by an optional external input device such as a foot switch.

Selections are:

Off	= The external input is disabled.
Tare	= The external input initiates a Tare function.
Zero	= The external input initiates a Zero function.
Print	= The external input initiates a Print function.
Units	= The external input changes to the next available weighing unit..
GNT	= The external input simulates the function of the G/N/T button.
Accumulation	= The external input increments a weighment totalizing function.
Start-Stop (S-S*)	= The first external input signal enables the output relay operation, (Start). The second external input signal disables the relay operation, (Stop).
Tare-Start-Stop (T-S-S*)	= The first external input signal initiates a Tare function. The second external input signal enables the output relay operation, (Start). The third external input signal disables the relay operation, (Stop).

Note: Start-Stop and Tare-Start-Stop are only available when the Relay Option is installed. When selected, pressing the **NEXT +/-** button will have the same effect as if a switching signal was received from an external device. The accumulate function is not available if either of these I/O selections are made.

To test external input functions, proceed as follows:

1. Disconnect power from the Indicator. (Remove the line cord plug from the power source.)

2. Open the Front Housing, refer to procedure 4.1.

3. Connect a cable containing a test switch (normally open contacts) to connector J7 on the Main PC board.

Note: Do not attempt testing by momentarily touching the screw contacts on top of connector J7, the screw heads may not be in contact with the circuitry. You must connect the switch to the proper terminals and then screw it tightly.

4. Connect power to the Indicator and turn on the indicator.

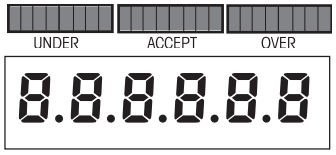
5. Enter the I/O Menu, INPUT menu and set each function as listed in Table 3-3 one-by-one and test each by pressing the external switch. Observe the Indicator input for proper functions. If the indicator fails to respond to the input, replace the Main PC board. See section 4.3 for replacement.

3.9 OPERATIONAL TESTING

This section of the manual contains operational testing procedures of the CKW-55 Indicator. After servicing the CKW-55 Indicator and replacing defective boards, an operational test and various performance tests should be made to ensure the Indicator meets all specifications. Before checking the Indicator, refer to sections 3.11 or 3.12 and calibrate. Use a known good Base or Load Cell Simulator connected to the Indicator.

3.9.1 Indicator Display Segment Test – Power On Sequence

With the Indicator connected to an appropriate power supply, press the **ON/ZERO *Off*** button. The Indicator performs a self-test, momentarily indicating the battery status (if installed), model and options information, and then goes into the active weighing mode. At this point, the Indicator is ready for initial setup and operation.



Power On Using AC Power

With AC power connected, all segments and annunciators will light simultaneously at the previously selected setup brightness for 1 second. Simultaneously, the Beeper will sound at the previously selected setup volume for 1/2 sec.

Power On Using Only Battery Power

With No AC power connected, 7-Segment digits light for 1 second, then the Bar Graph segments light for 1 second, then the Arrow announciators light for 1 second. When the 7-segment digits turn on, the Beeper will sound at the previously selected setup volume for 1/2 second.

After segment check, additional Model information is displayed in sequence.

Model number, of Indicator or scale unit.

Version of software Sr. xxx,

LFT status LFT On is shown only if the LFT menu setting is turned On and the Lock Switch is also set to ON. If LFT or switch is OFF, no display, skip to next display.

Lock Switch status LOC On, is shown only if the Lock switch is On and LFT Menu setting is set to OFF. If Lock Switch is Off, no display, skip to next display.

Geo code setting GEO xx,

ON BAT if running on battery power, none if running on AC (skip to next display,

3.9.1 Indicator Display Segment Test – Power On Sequence (Cont.)

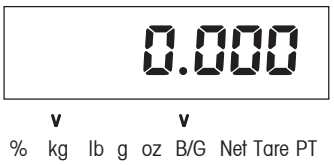
After power source information, Options list is displayed for 0.5 sec. each (if installed). If none installed, proceed directly to active weighing mode:

BAT OP (when battery option installed),

RLY OP (when relay output option is installed),

485 OP (when RS422/485 option is installed).

Total time of power-on sequence is from 5 to 8 sec. depending on options installed.



After power-on display sequence above, the Indicator will enter the last active weighing mode (sample shows 0 kg, gross weight)

NOTE: The weighing mode and decimal point position may be different depending on the last set up of the Indicator. When Tare is not active, Gross weight is displayed by default. If Tare is active, NET weight is displayed.

3.9.2 Turning Off the Indicator

To turn the Indicator off, press and hold the **ON/ZERO *Off*** button until the display shows –OFF-(The OFF function will operate in all modes.).

3.9.3 Performance Testing

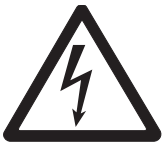
Performance testing can only be done when the Indicator has been repaired, connected up to a known good base and has been calibrated.

To start testing, refer to the Instruction manual and go though all of the menus verifying that all functions work properly. This will include LFT and lock out procedures. Refer to Table 3-4 Specifications. The Indicator must meet the outlined specifications.

3.9.4 Checking Menu Libary Settings

In some cases, improper menu settings give the appearance of a failure. If the Main PC board is functional, this check can be made easily. It is required that either a printer or computer be connected to the Indicator RS232 terminals.

This test allows every menu setting, library contents, to be displayed or printed when first receiving the Indicator for service and can be used as a final check of all menu settings.



WARNING

HAZARDOUS VOLTAGES ARE PRESENT WITH THE INDICATOR HOUSING OPENED AND AC POWER IS APPLIED.

1. Disconnect power from the Indicator. (Remove the line cord plug from the power source.)

2. Open the Front Housing, refer to procedure 4.1.

3. Refer to section 3.7 and connect a computer or printer to J4- RS232 connections to the Indicator.

4. Apply power to the Indicator and turn the Indicator on. Use an appropriate software program and test communications between the Indicator and PC.

5. Enter the Print menu and select List, Menu, Yes. The computer or printer will be sent every menu setting. Shown on the next page is a typical print-out or computer list of the menu settings.

3.9.4 Checking Menu Library Settings (Cont.)

Typical Computer or Printer Output of Menu Settings

```
OHAUS CKW-55
Software Version = Sr1.29
02/18/05  13:13:59
Calibration Menu
 Geo = 19
Setup Menu
 LFT = OFF
 Cal Unit =  kg
 Capacity =    6
 Grad =  0.005
 Zero Range =  2%
 Retain Zero Data = OFF
 Auto-Tare = OFF
 Beeper Volumn = Low
 Beeper Key = OFF
Readout Menu
 Units On =
  kg
  lb
  g
  oz
  lb:oz
  %
 Stable Range =  1d
 AVG Level = High
```

```
Auto-Zero Tracking =  0.5d
 Display Brightness = High
 Bar Brightness = Mid
 Power Save = Sleep  0 min
 Power Save = Auto-off  0 min
 Mode Menu
Library =  ON
Checkweigh =  ON
Set Input = Range
Beeper Signal =  OFF
Display Signal =  OFF
Graph Incr = Auto
Graph Display = Bar
Print Menu
Print Stable =  ON
Auto Print = OFF
Print Content On =
 Date-Time
 GMP User ID
 GMP Proj.ID
 GMP Scale ID
 GMP Name ID
 Format = Column
 Feed = OFF
Communication Menu
```

```
 Baud Rate =  2400
 Parity = None
  Data Length =  7
  Stop bit =  2
 Hand Shake = XON/XOFF
  Type = RS232
  Alternate Command
   Print =  80
   Tare =  84
   Zero =  90
I/O menu
  External Input =  Zero
  Input Beep = OFF
  Output type = Open
  Output Sequence = Normal
  Contact = Simultaneous
GMP data menu
  USER ID._____
  PROJ.ID._____
  SCALE ID._____
  Date Format = M/D/Y
  Time Format = 24hr
Lockout menu
  Locked Menus =
  Locked Functions =
 ————END————
```

Typical Computer or Printer Output of Library Settings

6. A second function can be used to document library settings. All data stored in the Library setup can be displayed on the computer or printer. Enter the Print menu and select List, Lib, Yes. The printer or computer will be sent every library setting. Shown below is a typical print-out or computer list of the library.

```
OHAUS CKW-55
Version Sr1.29
02/18/05  13:20:17
LIB ID 01
PART No.   001
P-Tare =  0 3.00 lb:oz
Setpoint Input = Range
Range Under =  0 1.00 lb:oz
Range Over  =  0 2.00 lb:oz
```

```
LIB ID 02
PART No.   002
P-Tare =  0 3.00 lb:oz
Setpoint Input = Range
Range Under =  0 1.00 lb:oz
Range Over  =  0 2.00 lb:oz
```

```
LIB ID 03
PART No.   003
P-Tare =  0 3.00 lb:oz
Setpoint Input = Range
Range Under =  0 1.00 lb:oz
Range Over  =  0 2.00 lb:oz
LIB ID 04
PART No.   004
P-Tare =  0 3.00 lb:oz
Setpoint Input = Range
Range Under =  0 1.00 lb:oz
Range Over  =  0 2.00 lb:oz
```

3.10 SPECIFICATIONS

Table 3-4 lists the specifications for the Indicator. Scale Model specifications are also included.

TABLE 3-4. SPECIFICATIONS

INDICATOR CKW-55	
Maximum Displayed Resolution	1:20,000
Approval Resolution	1:10,000
Weighing Units	kg, lb, g, oz, lb:oz, %
Functions	Static Weighing, Checkweighing, Accumulation
Weight Display	0.8" / 20 mm High 6-digit, 7-segment LED with Adjustable Brightness Control
Checkweigh Indication	24-segment LED (3 color x 8) Bar Graph and Audible Beeper with Multiple User Setups
Keyboard	7-Function, 12-Numeric with dedicated Tare and Target Entry Buttons
Construction and Protection	Stainless Steel NEMA 4X / IP66
Load Cell Excitation Voltage	5V DC
Load Cell Input Sensitivity	2 or 3 mV/V
Load Cell Drive	Up to 4 x 350 ohm Load Cells
Stabilization Time	Within 2 Seconds
Auto-zero Tracking	Off, .5, 1 or 3 Divisions
Zeroing Range	2%, 18% or 100% of Capacity
Span Calibration	1 kg or 1 lb to 100% Capacity
Overall Dimensions (W x D x H)	230 x 75 x 217 mm / 9" x 3" x 8.5" (includes bracket)
Net Weight	3.0 kg / 6.61 lb
Operating Temperature Range	-10°C to 40°C/14°F to 104°F
Power	100-240 VAC / 50-60 Hz Universal Power Supply, Hardwire Cord, Optional Internal Rechargeable NiMH Battery (10-hour operation is typical)
Interface	Built-in RS232 and External Input / Optional: RS422/485, Relay Output

SCALE MODEL	**CKW3R55**	**CKW6R55**	**CKW15L55**	**CKW30L55**
Capacity x Enhanced Readability	3 kg x 0.0005 kg 3000 g x 0.5 g 6 lb x 0.001 lb 96 oz x 0.02 oz 6 lb x 0.02 oz (lb:oz)	6 kg x 0.001 kg 6000 g x 1g 15 lb x 0.002 lb 240 oz x 0.05 oz 16 lb x 0.05 oz (lb:oz)	15 kg x 0.002 kg 15000 g x 2 g 30 lb x 0.005 lb 480 oz x 0.1 oz 30 lb x 0.1 oz (lb:oz)	30 kg x 0.005 kg 30000 g x 5 g 60 lb x 0.01 lb 960 oz x 0.2 oz 60 lb x 0.2 oz (lb:oz)
Maximum Resolution	1:6000	1:6000	1:7500	1:6000
Capacity x Approvable Readability	3 x 0.001 kg 3000 x 1 g 6 x 0.002 lb 96 oz x 0.05 oz	6 x 0.002 kg 6000 x 2 g 15 x 0.005 lb 240 oz x 0.02 oz	15 x 0.005 kg 15000 x 5 g 30 x 0.01 lb 480 oz x 0.2 oz	30 x 0.01 kg 30000 x 10 g 60 x 0.02 lb 960 oz x 0.5 oz
Approval Resolution	1:3000	1:3000	1:3000	1:3000
Column	Tubular 304 Stainless Steel 11.8" / 300 mm Fixed Height with Indicator and Base Mounting Brackets			
Net Weight	8.7 kg / 19.2 lb	9.8 kg / 21.7 lb	11.9 kg / 26.3 lb	12.9 kg / 28.5 lb

CHAPTER 3 INDICATOR TESTING

3.11 CALIBRATION USING AN EXTERNAL BASE

After the indicator has been repaired, calibration should be performed using a known good base. It is not necessary to pass the cable through the liquid-tight connectors for this procedure.

1. Remove power from the Indicator.

2. Refer to section 4.1 and open the Front Housing.

3. See Figure 3-12 and remove the switch cover. Retain the screws and cover.

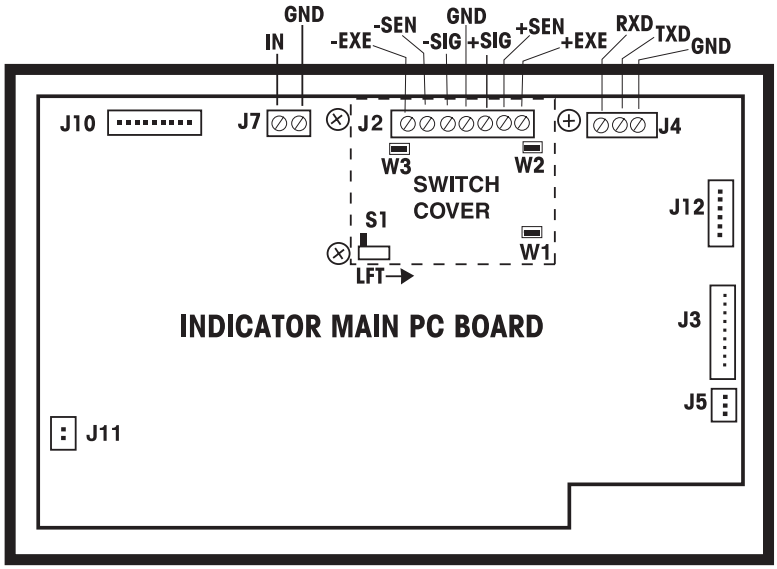


Figure 3-12. Main Printed Circuit Board.

4. Refer to the manufacture's wiring code of the load cell cable and connect the wires to Terminal Strip J2 according to the proper signal names. See Figure 3-12. Tighten all terminal screws securely.

5. When connecting a 2 mv/v load cell: Jumper W1 is to be left in place shorting the two pins. See Figures 3-12 and 3-13.

6. When connecting a 3 mv/v load cell: Jumper W1 must be removed or left in place with one pin uncovered.

7. When connecting a 4-wire load cell with no sense wires: Jumpers W2 and W3 must be left in place shorting the two pins.

8. When connecting a six wire load cell that includes sense wires: Jumpers W2 and W3 must be removed or left in place with one pin uncovered..

9. When connecting a load cell with an extra ground shield wire: The shield wire may be connected to the center position of J2.

3.11 CALIBRATION USING AN EXTERNAL BASE (Cont.)

10. After wiring is completed and jumpers are in place, the Indicator can now be calibrated.

11. After testing, replace the cover.

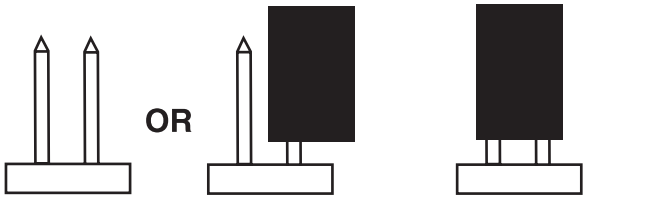


Figure 3-13. Open and Shorted Jumpers.

3.12 CALIBRATION

When the CKW-55 Indicator is initially set up with a base, it must be calibrated before use to ensure accurate weighing results.

Complete CKW Scale models are shipped pre-calibrated from the factory. However, many conditions may require that the scale be recalibrated. Temperature changes, geographic gravity variations and rough handling are few reasons why a scale may need recalibration.

NOTES:

1. Make sure that appropriate calibration masses are available before beginning calibration.
2. Make sure that the scale base is level and stable during the entire calibration process.
3. Masses required to perform the procedures should be in compliance with the requirements of the scale base being used with the Indicator.
4. Calibration is unavailable if LFT set to On.
5. Before calibration, allow the scale to warm up for approximately 5 minutes after stabilizing to room temperature.
6. To cancel calibration, press the **TARE** button anytime during the process. The Indicator will retain previously stored calibration data.

3.12.1 Span Calibration

Span Calibration uses two points to adjust the scale. One point is called the zero value where there is no weight on the scale. The other point is the Span value that is often, but not necessarily, at full capacity. The CKW-55 Indicator allows the user to select alternate Span calibration values. Span values closest to the full scale capacity are recommended to give the best performance over the entire weighing range. Other Span values may be specified due to limited availability of calibration masses or for improved accuracy at a lower weight range. Before calibrating the scale, check that the weighing base is correctly level.

1. Press and hold the **G/N/T *Menu*** button until MENU is displayed. When the **G/N/T *Menu*** button is released, CAL is displayed.

2. With CAL displayed, press the **Yes** button, SPAN is displayed.

3.12.1 Span Calibration (Cont.)

3. Press the **Yes** button to select and perform Span Calibration.

4. The display flashes 0, indicating that nothing should be placed on the platform at this time.

5. After ensuring that the scale platform is clear, press the **Yes** button. -C- is displayed while the zero point is established.

6. After a few seconds, the requested calibration value and unit (based on the Full Scale Capacity and Calibration Unit setting from the Setup Menu) flashes on the display. A Span Calibration value based on a Full Scale Capacity and Calibration Unit setting is displayed.

7. If a different Span Calibration value is desired, enter the new value via the numeric keypad.

NOTE: The allowable span range capacity is 1 kilogram or 1 pound to 100% full scale are accepted, (whole numbers only). Note that values closer to the full span capacity will usually yield the most accurate calibration.

8. Place the corresponding mass on the platform, then press the **Yes** button. -C- is momentarily displayed while the reading is stored.

9. If calibration was successful, the calibration weight is displayed and the scale exits automatically to the active weighing mode. Remove the weight and begin weighing operations.

3.12.2 Linearity Calibration

Linearity Calibration uses three points, zero, mid range and full scale. The mid range value can be optionally changed by the user. Mid-range values closest to 1/2 full scale capacity are recommended to give the best performance over the entire weighing range. Before calibrating the scale, check that the weighing base is correctly leveled.

1. Press and hold the **G/N/T *Menu*** button until MENU is displayed. When the **G/N/T *Menu*** button is released, CAL is displayed.

2. With CAL displayed, press the **Yes** button. SPAN is displayed. Press the **No** button to skip and proceed to the next sub-menu item LIN.

3. Press the **Yes** button to select and perform Linearity Calibration. The display flashes 0, indicating that nothing should be placed on the platform at this time.

4. After ensuring that the scale platform is clear, press the **Yes** button. -C- is displayed while the zero point is established. After a few seconds, the requested mid-point calibration value and unit (based on the Full Scale Capacity and Calibration Unit setting from the Setup Menu) flashes on the display.

3.12.2 Linearity Calibration (Cont.)

5. If a different mid-point Linearity Calibration value is desired, enter the new value via the numeric keypad.

NOTE: The mid-range mass should be used for precise calibration. If the correct mass is not available, 25% to 75% full scale Capacity mass can be used.

6. Place the corresponding mass on the scale platform, then press the **Yes** button.-C- is momentarily displayed while the reading is stored.

7. After a few seconds, the requested Full Scale calibration value and unit flashes on the display. This is a fixed value based on the full scale capacity and cannot be changed.

8. Place the corresponding mass on the scale platform, then press the **Yes** button. -C- is momentarily displayed while the reading is stored.

9. If calibration was successful, the calibration weight is displayed and the scale exits automatically to the active weighing mode. Remove the weight and begin weighing operations.

3.12.3 Calibration Test

Calibration Test is used to compare a known calibration mass against the calibration data stored by the Indicator. When any selection within the Read-GMP menu is enabled, calibration test results are automatically printed.

NOTE: The Calibration Test function is available even when the CAL menu is locked out.

1. Press the **GNT Menu** button until MENU is displayed, CAL will be displayed. Press the **Yes** button to enter the CAL menu. Repeatedly press the **No** button until the sub-menu item CALTST is displayed. Press the **Yes** button to select and initiate Calibration Test.

2. The display flashes 0, indicating that no weight should be placed on the platform at this time.

3. After ensuring that the scale platform is clear, press the **Yes** button. -T- is displayed while the zero point is measured.

4. The display flashes the calibration test mass.

5. If a different calibration test mass is desired, enter the new value via the numeric keypad, (whole numbers only).

6. Place the corresponding test mass on the scale platform and press the **Yes** button. -T- is momentarily displayed while the data is measured.

7. The display now indicates (flashes) the actual difference between the stored calibration data and the test mass data.

8. After approximately 5 seconds, Calibration Test ends. If enabled, the result of the calibration test is printed. The scale returns to the active weighing mode and displays the current weight on the platform.

3.13 Geographical Adjustment Factor

This menu item is used to allows entry of values from 0 to 31 and is used to compensate for variations in gravity at different geographical locations around the world.**(Complete Geographical Adjustment Factors are listed in Table 3-5.)**

This feature allows authorized personnel to accurately calibrate the scale at a location other than the location where the scale is to be used. Prior to calibration, the Geo factor is set to correspond to the geographical location where the calibration is being performed. Following calibration, the Geo factor is changed to match the location where the scale is to being used. If required, the scale may also be sealed according to the required approval regulations.

NOTE: Only an authorized manufacturer's representative or certified verification personnel should make these changes. Changing the Geo Factor alters the calibration values.

1. With CAL displayed, press the **Yes** button. SPAN is displayed. Press the **No** button repeatedly to skip to the sub-menu item GEO.

2. Press the **Yes** button to select and access the Geo Factor menu. The current Geo Factor setting flashes on the display.

3. If a different Geo Factor setting is desired, enter the new value via the numeric keypad.

4. Press the **Yes** button to confirm the displayed value. The -END- is displayed.

5. Press **Exit** to exit to the active weighing mode.

3.13 Geographical Adjustment Factor

TABLE 3-5. GEOGRAPHICAL ADJUSTMENT VALUES.

Geographical latitude away from the equator, (North or South) in degrees and minutes.	Elevation above sea level in meters										
	0 325	325 650	650 975	975 1300	1300 1625	1625 1950	1950 2275	2275 2600	2600 2925	2925 3250	3250 3575
	Elevation above sea level in feet										
	0 1060	1060 2130	2130 3200	3200 4260	4260 5330	5330 6400	6400 7460	7460 8530	8530 9600	9600 10660	10660 11730
0°00' - 5°46'	5	4	4	3	3	2	2	1	1	0	0
5°46' - 9°52'	5	5	4	4	3	3	2	2	1	1	0
9°52' - 12°44'	6	5	5	4	4	3	3	2	2	1	1
12°44' - 15°06'	6	6	5	5	4	4	3	3	2	2	1
15°06' - 17°10'	7	6	6	5	5	4	4	3	3	2	2
17°10' - 19°02'	7	7	6	6	5	5	4	4	3	3	2
19°02' - 20°45'	8	7	7	6	6	5	5	4	4	3	3
20°45' - 22°22'	8	8	7	7	6	6	5	5	4	4	3
22°22' - 23°54'	9	8	8	7	7	6	6	5	5	4	4
23°54' - 25°21'	9	9	8	8	7	7	6	6	5	5	4
25°21' - 26°45'	10	9	9	8	8	7	7	6	6	5	5
26°45' - 28°06'	10	10	9	9	8	8	7	7	6	6	5
28°06' - 29°25'	11	10	10	9	9	8	8	7	7	6	6
29°25' - 30°41'	11	11	10	10	9	9	8	8	7	7	6
30°41' - 31°56'	12	11	11	10	10	9	9	8	8	7	7
31°56' - 33°09'	12	12	11	11	10	10	9	9	8	8	7
33°09' - 34°21'	13	12	12	11	11	10	10	9	9	8	8
34°21' - 35°31'	13	13	12	12	11	11	10	10	9	9	8
35°31' - 36°41'	14	13	13	12	12	11	11	10	10	9	9
36°41' - 37°50'	14	14	13	13	12	12	11	11	10	10	9
37°50' - 38°58'	15	14	14	13	13	12	12	11	11	10	10
38°58' - 40°05'	15	15	14	14	13	13	12	12	11	11	10
40°05' - 41°12'	16	15	15	14	14	13	13	12	12	11	11
41°12' - 42°19'	16	16	15	15	14	14	13	13	12	12	11
42°19' - 43°26'	17	16	16	15	15	14	14	13	13	12	12
43°26' - 44°32'	17	17	16	16	15	15	14	14	13	13	12
44°32' - 45°38'	18	17	17	16	16	15	15	14	14	13	13
45°38' - 46°45'	18	18	17	17	16	16	15	15	14	14	13
46°45' - 47°51'	19	18	18	17	17	16	16	15	15	14	14
47°51' - 48°58'	19	19	18	18	17	17	16	16	15	15	14
48°58' - 50°06'	20	19	19	18	18	17	17	16	16	15	15
50°06' - 51°13'	20	20	19	19	18	18	17	17	16	16	15
51°13' - 52°22'	21	20	20	19	19	18	18	17	17	16	16
52°22' - 53°31'	21	21	20	20	19	19	18	18	17	17	16
53°31' - 54°41'	22	21	21	20	20	19	19	18	18	17	17
54°41' - 55°52'	22	22	21	21	20	20	19	19	18	18	17
55°52' - 57°04'	23	22	22	21	21	20	20	19	19	18	18
57°04' - 58°17'	23	23	22	22	21	21	20	20	19	19	18
58°17' - 59°32'	24	23	23	22	22	21	21	20	20	19	19
59°32' - 60°49'	24	24	23	23	22	22	21	21	20	20	19
60°49' - 62°09'	25	24	24	23	23	22	22	21	21	20	20
62°90' - 63°30'	25	25	24	24	23	23	22	22	21	21	20
63°30' - 64°55'	26	25	25	24	24	23	23	22	22	21	21
64°55' - 66°24'	26	26	25	25	24	24	23	23	22	22	21
66°24' - 67°57'	27	26	26	25	25	24	24	23	23	22	22
67°57' - 69°35'	27	27	26	26	25	25	24	24	23	23	22
69°35' - 71°21'	28	27	27	26	26	25	25	24	24	23	23
71°21' - 73°16'	28	28	27	27	26	26	25	25	24	24	23
73°16' - 75°24'	29	28	28	27	27	26	26	25	25	24	24
75°24' - 77°52'	29	29	28	28	27	27	26	26	25	25	24
77°52' - 80°56'	30	29	29	28	28	27	27	26	26	25	25
80°56' - 85°45'	30	30	29	29	28	28	27	27	26	26	25
85°45' - 90°00'	31	30	30	29	29	28	28	27	27	26	26

CHAPTER 3 INDICATOR TESTING

3.14 CALIBRATION VERIFICATION USING A LOAD CELL SIMULATOR

To perform these tests, the use of a Load Cell Simulator is required. The basic function of a Simulator is to simulate the output of a full bridge Load Cell allowing the Indicator to be separated from the Load Cell for the purposes of troubleshooting and calibration.

1. Remove power from the Indicator. Refer to section 4.1 and open the Front Housing.

2. See Figure 3-14 Printed Circuit Board Connections and remove the switch cover. Retain the screws and cover.

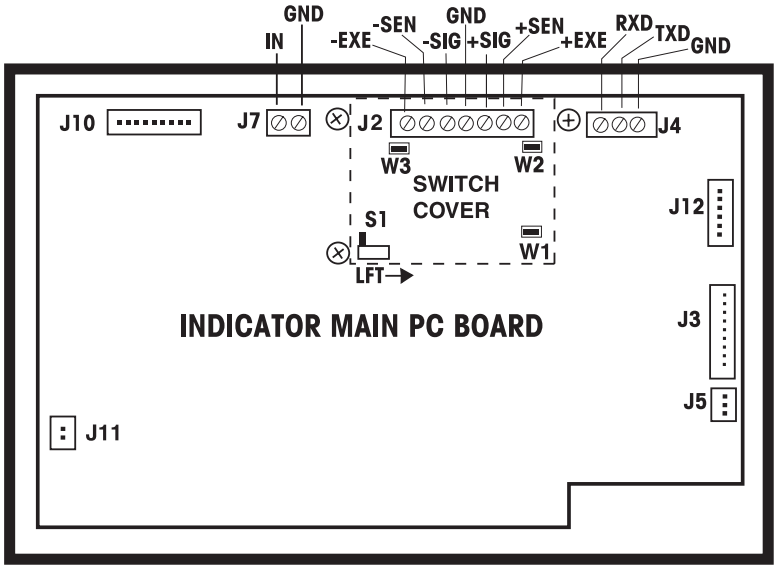


Figure 3-14. Main Printed Circuit Board Connections.

3. Connect the Simulator to Terminal strip J2. See Figure 3-14. Tighten all terminal screws securely.

4. When connecting a 2mv/v simulator, jumper W1 is to be put in place shorting the two pins. See Figure 3-15.

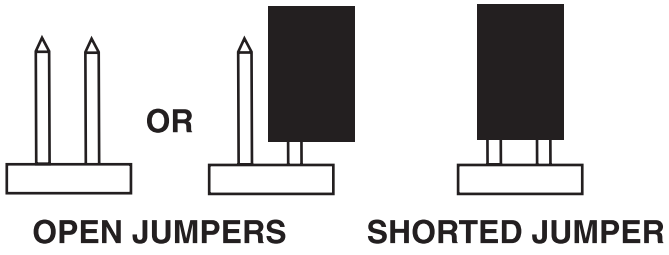


Figure 3-15. Open and Shorted Jumpers.

3.14 CALIBRATION VERIFICATION USING A LOAD CELL SIMULATOR (Cont.)

5. When connecting a 3 mv/v Simulator: Jumper W1 must be removed or left in place with one pin uncovered. See Figure 3-15.

6. When connecting 4-wires with no sense wires: Jumpers W2 and W3 must be in place shorting the two pins.

7. When connecting six wires that includes sense wires: Jumpers W2 and W3 must be removed or in place with 1 pin uncovered.

8. When connecting a Simulator with an extra ground shield wire: The shield wire may be connected to the center position of J2.

9. After wiring is completed and jumpers are in place, the Indicator can now be calibrated.

10. After testing, replace switch cover.

3.14.1 Calibration Test Using a Simulator

This test calibrates the Indicator using a Load Cell Simulator and can verify that the Main PC Board is functioning properly.

1. With the Indicator on, CLr. PAn, ERROR 3 may be displayed, this is normal. Enter the menu and perform a span calibration.

2. Follow the Indicator prompts. When the Indicator indicates a given mass should be placed on the base, set the Simulator to an equivalent value to simulate the output for the base. Alternate values from Table 3-6 can be set if a CKW Base is used. For example, when a span value of 6 kg for a 6 kg Indicator application is shown, the simulator should be set to 7.2 (1.6 + 5.6) mV/V.

3. Upon completion of calibration, the Main PC Board can be further checked using the Simulator to simulate various weight values. Review Table 3-6 and adjust the Simulator to simulate 0% load, 50% load and 100% load for the capacity that the Indicator is rated for. If simulator settings and weight reading on the Indicator agree, the Main PC Board is functional. If the Indicator readings vary or are not linear, the Main PC Board is defective and should be replaced.

Note: The Indicator readings are only as accurate as the Load Cell Simulator.

4. If needed, remove power from the Indicator and proceed with Section 4.3 and replace the Main PC Board.

5. After Main PC Board replacement and assembly of the Indicator, perform Operational Tests in Section 3.9.

TABLE 3-6. LOAD CELL OUTPUT READINGS FOR CKW BASES.

NOMINAL OUTPUT IN MILLIVOLTS AT 5 VOLTS EXCITATION			
CAPACITY	ZERO	50%	100%
3 kg	4.3 ±2.0	Zero + 2.3	Zero + 4.7
6 kg	1.6 ±2.0	Zero + 2.8	Zero + 5.6
15 kg	1.7 ±2.0	Zero + 2.4	Zero + 4.8
30kg	1.3±2.0	Zero + 2.7	Zero + 5.4

4. REPAIR PROCEDURES

This section describes how to replace individual assemblies of the CKW-55 Indicator. When doing this, please refer to the exploded view drawings and parts lists in Section 5.

Important: After repairs are complete, an operational test of the Indicator must always be carried out, (see Section 3.9).

4.1 OPENING THE INDICATOR HOUSING

1. Remove power from the Indicator.

2. Unfasten the 4 side screws of the Indicator housing; pull the front housing section forward. Retain the screws.

CAUTION

THE INDICATOR IS POWERED BY AC AND HAZARDOUS VOLTAGES ARE PRESENT WHEN CONNECTED TO EXTERNAL POWER. DO NOT ATTEMPT TO REPLACE ANY ASSEMBLIES WHEN POWER IS APPLIED TO THE UNIT. IF A RELAY OPTION IS INSTALLED, AC VOLTAGE MAY BE CONNECTED TO THIS PCB. REMOVE ALL POWER SOURCES TO THE INDICATOR BEFORE SERVICING.

4.2 REPLACING THE MEMBRANE SWITCH

NOTE: Read this procedure through first before proceeding.

1. Remove power from the Indicator.

2. Refer to section 4.1 and open the Front Housing.

3. With the Housing opened, disconnect the connector from J1 on the Main PC board. This is the cable from the Membrane Switch.

4. Facing the front panel of the indicator, carefully pry the Membrane Switch from the Indicator housing. A sharp instrument such as a knife or razor blade may be necessary to get underneath the Membrane Switch.

5. Carefully pull the Membrane Switch free of the Indicator housing.

6. The Membrane Switch was affixed to the Housing with an adhesive. Remove the adhesive froM the housing by using denatured alcohol, a clean cloth and a razor blade. Wipe thoroughly clean. There should be no residual adhesive left on the housing.

7. Insert the cable from the new Membrane Switch though the hole in the Front Housing and the Main PC board. Peel off the protective film from the new Membrane Switch and carefully align and affix to the front Housing of the Indicator.

8. Press the Membrane Switch down uniformly. Using your fingers with a cloth, roll from the center of the Membrane Switch outwards toward the edges to remove any air bubbles that may be trapped.

CAUTION

DO NOT PRESS ON THE CLEAR WINDOW AREAS OR ON THE SWITCHES.

4.2 REPLACING THE MEMBRANE SWITCH (Cont.)

9. Connect the cable from the Membrane Switch to connector J1 on the Main PC board.

10. Position the Front Housing into place over the Rear Housing and reassemble by replacing the four screws on the sides of the housing.

4.3 REPLACING THE MAIN PC BOARD

NOTE: Read this procedure through first before proceeding. The Main PC board when replaced contains the RTC Battery installed.

1. Remove power from the Indicator.

2. Refer to section 4.1 and open the Front Housing.

3. With the Housing opened, disconnect the connector from J1 on the Main PC board. This is the cable from the Membrane Switch.

4. Disconnect all cables leading to the Main PC board.

5. Remove switch cover and disconnect load cell cable if attached.

6. Remove the four screws holding the Main PC board in place and remove the Main PC board. One screw contains a grounding clip.

7. Replace the Main PC board and install the four screws previously removed. Make sure the grounding clip is in place under one of the screw heads.

8. Reconnect all connectors to the Main PC board and the Membrane Switch connector.

9. Connect a known good base or simulator.

10. Refer to section 3.9 and perform Operational Tests and recalibrate the Indicator, see section 3.12. Make sure all specifications are met.

11. Replace switch cover using original screws.

4.4 REPLACING THE POWER SUPPLY

NOTE: Read this procedure through first before proceeding.

1. Remove AC power from the Indicator.

2. Refer to section 4.1 and open the Front Housing.

3. With the Housing opened, disconnect connector CN2 from the Power board; this is the 12 V dc output cable (Red and Black wires).

4. Disconnect connector CN1 from the Power board; this is the AC power input line.

5. Remove the four screws holding the Power board in place and remove the Power board. One screw contains a grounding clip.

4.4 REPLACING THE POWER SUPPLY (Cont.)

6. Replace the Power board and install the four screws previously removed. Make sure the grounding clip is in place under the screw head shown in figure 3-11.

7. Reconnect connectors CN1 and CN2 to the Power board.

8. Reassemble the Indicator housing.

9. Refer to section 3.9 and perform Operational Tests.

4.5 REPLACING THE OPTIONAL RECHARGE BOARD

The Recharge board is supplied as an optional kit that includes a rechargeable battery. The Recharge board can be ordered separately and replaced using the original battery supplied.

NOTE: Read this procedure through first before proceeding.

1. Remove AC power from the Indicator.

2. Refer to section 4.1 and open the Front Housing.

3. With the Housing opened, disconnect connectors J1 and J2 from the Recharge board.

4. Remove the four screws holding the Recharge board in place and remove the Recharge board.

5. Replace the Recharge board and install the four screws previously removed.

6. Reconnect connectors J1 and J2 to the Recharge board.

7. Reassemble the Indicator housing.

8. Refer to section 3.9 and perform Operational Tests.

4.6 REPLACING THE OPTIONAL RELAY BOARD

The Relay board is supplied as part of an optional kit, either AC or DC. The replacement procedure is the same for either board; the basic difference is the relay type. If a relay is found to be defective, it can be replaced separately. See parts list in section 5 of this manual for part numbers. To replace the entire relay board, see procedure 4.6.1. To replace only a relay or relays, see procedure 4.6.2.

NOTE: Read this procedure through first before proceeding.

4.6.1 Relay Board Replacement Procedure

1. Remove all power sources from the Indicator.

2. Refer to section 4.1 and open the Front Housing.

3. With the Housing opened, remove terminal cover and disconnect wiring from the Relay board.

4.6.1 Relay Board Replacement Procedure (Cont.)

4. Remove the four screws holding the Relay board in place and remove the Relay board.

5. Replace the Relay board and install the four screws previously removed.

6. Reconnect wiring to the Relay board and replace terminal cover.

7. Reassemble the Indicator housing.

8. Refer to section 3.9 and perform Operational Tests.

4.6.2 Relay Replacement

To replace a relay, proceed as follows:

1. Perform procedure 4.6.1, steps 1 through 4.

2. On the solder side of the Relay board, unsolder the defective relay.

3. Install the new relay into position on the board and solder all connections.

4. Position the relay board into position and perform steps 5 through 8 of procedure 4.6.1.

4.7 REPLACING THE OPTIONAL RS422/485 COMMUNICATION BOARD

The RS422/485 Communication board is supplied as an optional kit.

NOTE: Read this procedure through first before proceeding.

1. Remove AC power from the Indicator.

2. Refer to section 4.1 and open the Front Housing.

3. With the Housing opened, remove connectors and wiring from the RS422/485 Communication board.

4. Remove the four screws holding the RS422/485 board in place and remove the board. Note the position of the jumpers on the board. You will want to return the Indicator set-up for the proper mode when returned. Also, note if the RS422/485 board is set up for 4-wire duplex or 2-wire Half duplex operation on the interface connector.

5. Replace the RS422/485 board and install the four screws previously removed. Replace wires in the same position as removed on the interface connector and replace jumpers W1 and W2 as previously installed.

6. Reconnect connectors to the RS422/485 board.

7. Reassemble the Indicator housing.

8. Refer to section 3.9 and perform Operational Tests.

4.8 REPLACING THE OPTIONAL RECHARGEABLE BATTERY

The rechargeable battery is supplied as part of an optional kit complete with a recharge board. If the battery requires replacement, it can be replaced separately, the recharge board does not have to be replaced with it unless defective.

NOTE: Read this procedure through first before proceeding.

1. Remove AC power from the Indicator.

2. Refer to section 4.1 and open the Front Housing.

3. With the Housing opened, remove the 3-pin battery connector from the Recharge board.

4. Remove the two screws on each battery bracket and remove old battery.

5. Position the new battery with the wire leads to the left and facing forward. Important, make sure there is a foam cushion at each end of the battery. See Figure 5-1.

6. While holding the battery in place, mount the center bracket using the supplied screws. The mounting screws must remain loose at this step.

NOTE: The center bracket is the part without the extra side tab.

7. Install the bracket at the left side of the battery. Before tightening the mounting screws, slide the left bracket and battery fully to the right. When the foam pad is slightly compressed, tighten the mounting screws.

8. Tighten the mounting screws of the center bracket.

9. After tightening all mounting screws, check that the battery is held tightly in place. Readjust the brackets if needed.

10. Connect the cable from the battery to the Recharge board.

11. Reassemble the Indicator housing.

12. Refer to section 3.9 and perform Operational Tests. Allow the replacement battery to reach full charge before testing the Indicator under battery operation. Refer to the CKW Battery Option Kit manual P/N 80251037 for a full description of battery charging and battery operation.

CHAPTER 4 REPAIR PROCEDURES

4.9 REPLACING THE REAL-TIME CLOCK (RTC) BATTERY

The Real Time Clock battery is mounted on the Main PC board. When the time and date cannot be set or loses the setting after AC power is removed, the battery must be replaced.

NOTE: Read this procedure through first before proceeding.

1. Remove AC power from the Indicator.

2. Refer to section 4.1 and open the Front Housing.

3. With the Housing opened, locate the RTC Battery on the Main PC board.

4. The Real-Time Clock, (RTC) battery is a 3V lithium "coin" cell. The recommended battery type is CR2032. Refer to figure 4-1. Remove the old battery as shown by pressing down on the Retaining Clip and sliding the battery up and out of the holder.

CAUTION! : RISK OF EXPLOSION IF BATTERY IS REPLACED WITH WRONG TYPE OR CONNECTED IMPROPERLY. DISPOSE OF BATTERY ACCORDING TO LOCAL LAWS AND REGULATIONS.

Attention! : Risque d'explosion si la batterie est remplacée par un type inapproprié ou si elle est incorrectement branchée. Jeter la batterie conformément aux lois et règlements locaux.

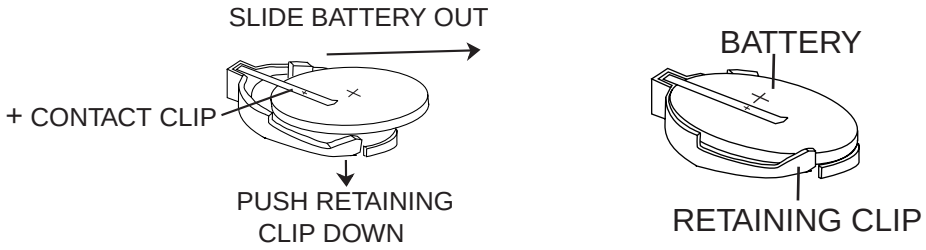


Figure 4-1. RTC Battery Removal/Installation.

5. To install a new battery into the holder, hold the battery with the "+" mark facing up. Slide the battery under the Contact Clip until the Retaining Clip springs up and locks the battery in place.

CAUTION:
Do not dispose of used batteries in normal trash.

Follow the proper disposal or recycling requirements in accordance with local laws and regulations.

6. Reassemble the Indicator housing.

7. Refer to the Instruction manual and reset the current time and date.

5. PARTS LISTS

This section of the manual contains exploded views, and parts lists for the CKW-55 Indicator. The exploded view drawings identify the replaceable parts.

NOTE:
In all cases where a part is replaced, the Indicator must be thoroughly checked after the replacement is made. The Indicator **MUST** meets the parameters of all applicable specifications in this manual.

If further technical information is needed, in the United States call toll-free 1-800-526-0659 between 8.00 a.m. and 4.00 p.m. EST. An Ohaus factory service technician will be available to provide assistance. Outside the U.S.A., please visit our site www.ohaus.com to locate the nearest Ohaus office.

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CHAPTER 5 PARTS LISTS

5.1 CKW-55 INDICATOR EXPLODED VIEW

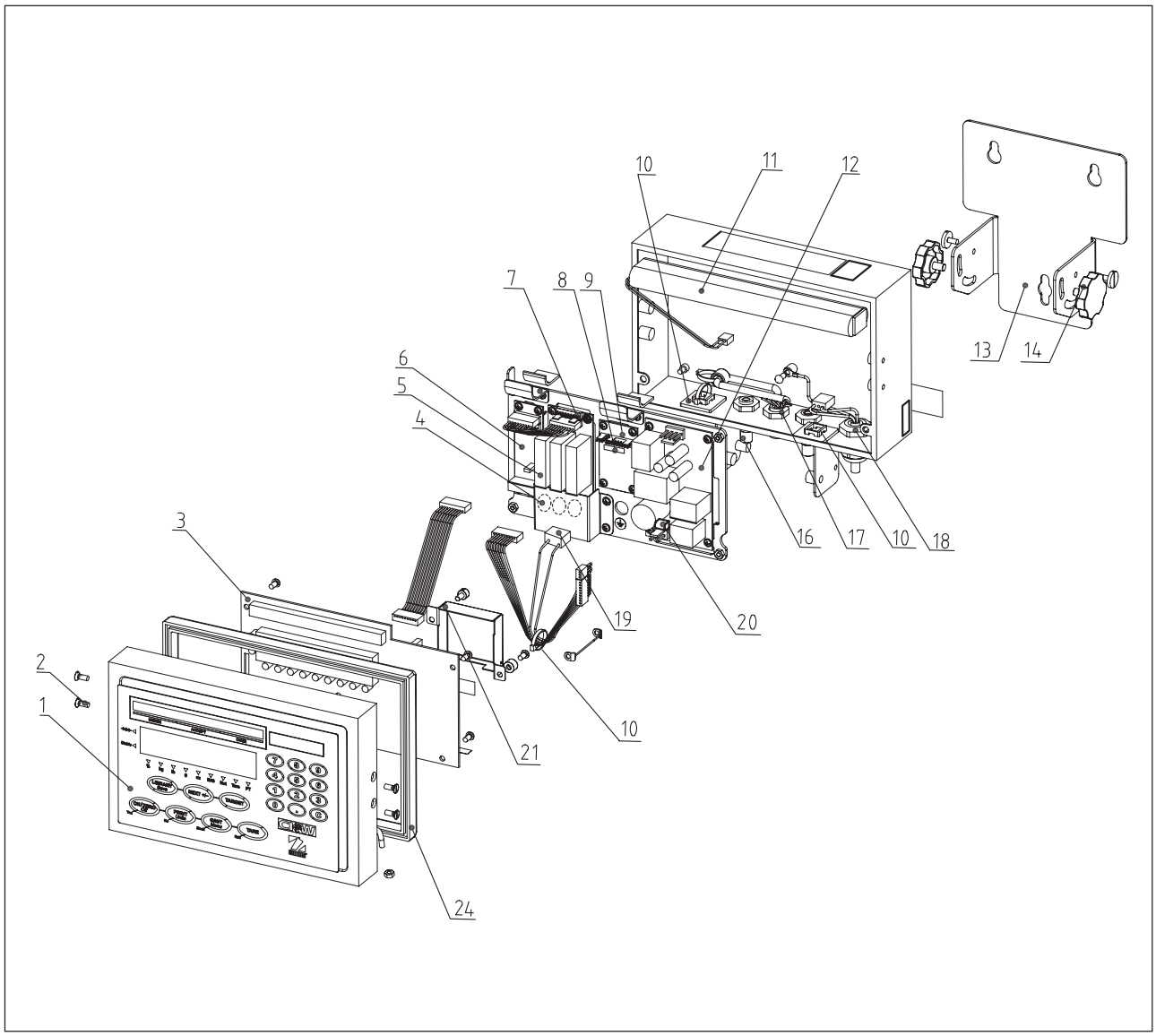

Figure 5-1. Exploded View of CKW-55 Indicator.

5.2 CKW-55 INDICATOR PARTS LIST

TABLE 5-1. CKW-55 INDICATOR PARTS LIST

ITEM NO.	PART NO.	DESCRIPTION
1	71154791	Switch, Membrane CKW
2	71209058	Hardware, Kit, Housing Screws
3	71152473	PCB, Main, CKW
4	71173386	Fuse, Radial, 2.5A/250. TR5. UL/VDE, CKW
5	71209081	Relay, AC, CKW
5	71209083	Relay, DC, CKW
6	71167965	RS485 Kit, DC, CKW Accessory
7	71167967	Relay Kit, AC, CKW Accessory
7	71173377	Relay Kit, DC, CKW Accessory
8	71209076	Fuse, Recharger PCB, CKW
9	71152475	PCB, Battery Charger, CKW
10	71209069	Cable Mounts, Internal, CKW
11	71172942	Replacement Battery, Rechargeable Accessory, CKW
12	71169978	PCB, Power Supply, CKW
13	71167964	Wall Bracket Accessory, CKW
14	71169473	Knob, Locking, Wall bracket, CKW, CKW
16	71209068	I/O Filler Plugs, CKW
17	71209064	I/O Fitting, P7, CKW 7mm ID
17	71209067	I/O Fitting, P9, CKW 9mm ID
19	71209084	Cable, Power Supply, CKW
20	71209078	Fuse, Power Supply, Kit of 2, CKW
21	71209061	LFT Cover with hardware, CKW
24	71154804	Gasket, CKW
—	80251031	Manual, Instruction, English, CKW
—	80251032	Manual, Instruction, Spanish, CKW
—	80251033	Manual, Instruction, French, CKW
—	80251034	Manual, Instruction, German, CKW
—	80251035	Manual, Instruction, Italian, CKW
—	80251039	Manual, Instruction, RS422/485 Interface Kit, 5 lang CKW
—	80251037	Manual, Instruction, Rechargeable Battery Kit, CKW
—	80251038	Manual, Instruction, AC/DC Relay Kit, EN, CKW
—	80251040	Manual, Instruction, Base, 5 lang
18	71172176	Power Cord, AUS, CKW, (not shown) w/P11 Fitting
18	71172177	Power Cord, EU, CKW, (not shown) w/P11 Fitting
18	71172930	Power Cord, UK, CKW, (not shown) w/P11 Fitting
18	71209118	Power Cord, US, CKW, (not shown) w/P11 Fitting
—	71209075	Shorting Jumpers, CKW (not shown)

Note: Proper power cord is supplied pre-wired to the Indicator to destination country

CHAPTER 5 PARTS LISTS

5.3 CKW-55 COLUMN EXPLODED VIEW

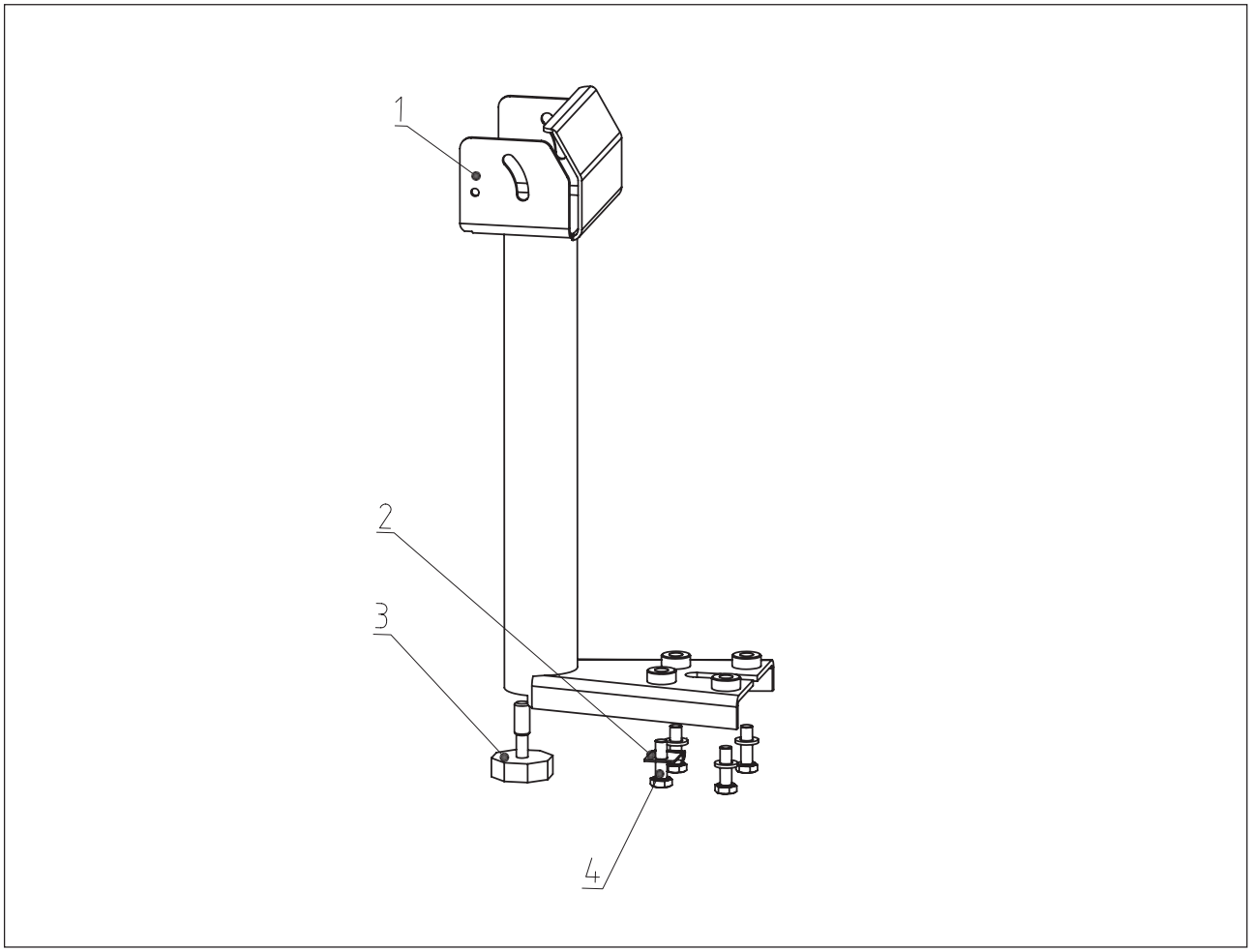

Figure 5-2. Exploded View of CKW Column.

TABLE 5-2. CKW-55 COLUMN PARTS LIST.

ITEM NO.	PART NO.	DESCRIPTION
1	71167972	Column Mount Accessory, SS, CKW Tube, 230mm
1	80251059	Column Mount Accessory, SS, CKW Tube, 6800 mm
2	71128010	Cable, Clamp CKW
3	71170889	Foot with locking nut for column CKW
4	71176886	Column Mount Bolt Kit, Kit of 4

A.1 SERVICE MODE

This section of the manual contains service mode commands.

A.1.1 Service Mode Commands:

The Service Commands are only enabled after the scale receives a <esc>SV command through the RS-232 interface. This command sets the scale into the Monitor mode. The Monitor mode is exited when the scale is turned off with the **ON/ZERO *Off*** button or a power off/on cycle, or a command is received which resets the scale. (The Monitor mode is exited regardless of the state of battery power.) Table A-1 lists the available service commands.

TABLE A-1. SERVICE MODE COMMANDS.

<esc>SV	Enters the Monitor Mode
<esc>RS	Reset the scale, (similar to power off and on) and exits the Monitor Mode
<esc>EPX*	Indicator is set to 10 times expanded display mode. X=1 ON, X=0 OFF
<esc>DF*	Resets all scale set ups to default values for a CKW55.
<esc>BD	Battery voltage, temperature, and charge state are printed. (x.xxV yy°C zzzCC w, where zzz= the recorded number of full charge cycles, w=the present charge state 0 to 4, 0=off, 1=precharge 2=fast, 3=trickle, 4=maintenance.)
<esc>	Indicates sending the ASCI code for the ESC key (27).

*The Service Commands marked with a *, will not be operational if the LFT menu selection has been set to On, or if the LFT "LOCK" switch has been set to "LFT" ("LOCK") position.

NOTE: All commands sent to the Indicator must be terminated with a carriage return (CR) or carriage return-line feed (CRLF).

APPENDIX A SERVICE MODE

Table A-2 lists the ASCII to Character conversions used to enter library data.

TABLE A-2 ASCII NUMBER TO CHARACTER CONVERSION

ASCII	Character	ASCII	Character	ASCII	Character
032	space	064	@	096	`
033	!	065	A	097	a
034	`	066	B	098	b
035	#	067	C	099	c
036	$	068	D	100	d
037	%	069	E	101	e
038	&	070	F	102	f
039		071	G	103	g
040	(	072	H	104	h
041	)	073	I	105	i
042	*	074	J	106	j
043	+	075	K	107	k
044	,	076	L	108	l
045	-	077	M	109	m
046	.	078	N	110	n
047	/	079	O	111	o
048	0	080	P	112	p
049	1	081	Q	113	q
050	2	082	R	114	r
051	3	083	S	115	s
052	4	084	T	116	t
053	5	085	U	117	u
054	6	086	V	118	v
055	7	087	W	119	w
056	8	088	X	120	x
057	9	089	Y	121	y
058	:	090	Z	122	z
059	;	091	[	123	{
060	<	092	\	124	l
061	=	093	]	125	}
062	>	094	^	126	~
□□□		□□□	B	□□□	□□

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