Operation Manual

JENCO MODEL 6360

MICROCOMPUTER BASED

pH/mV/Conductivity/TDS/

Salinity/Temperature

PORTABLE METER

6360

# CONTENTS

GENERAL INTRODUCTION

Thank you for selecting the 6360 meter. The 6360 is a precision tool that measure pH, ORP, conductivity, TDS, salinity and temperature. A built-in microprocessor stores, calculates and compensates for all parameters related to conductivity and temperature determinations.

This unit has a waterproof IP65 case. The touch mode keys are highly reliable with tactile and audio feedback. This meter can operate with six AAA-size alkaline batteries or a UL/CE approved AC adapter. Re-calibration is not required when power is restored.

The front of the meter has a large LCD that displays temperature and either temperature compensated or non-temperature compensated conductivity, pH, ORP, temperature compensated TDS or salinity simultaneously along with user prompts and mode indicators. The unit prompts the user through calibration and measurement procedures.

The unit is also equipped with a non-volatile memory allowing the user to store 50 different sets of readings. This unit will assign a site number for each set of reading so the user can review the data easily.

The model 6360 is available with a four-wire conductivity cell (K=0.475) and a two-wire conductivity cell (K=0.1). Other features include automatic conductivity ranging, automatic temperature compensation, long battery life and 50/60 Hz AC noise rejection. This unit is universal and user-friendly for field, industrial and laboratory applications.

① **LCD**
② **RS232 connector**
③ **Keypad**
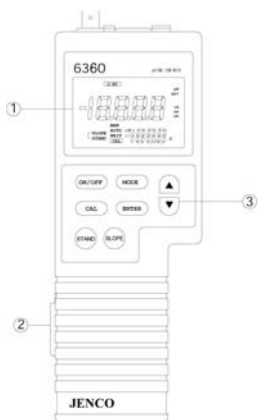
INITIAL INSPECTION

Be careful to unpack the unit and accessories. Inspect for damages made in shipment. If any damage is found, notify your **Jenco** representative immediately. All packing materials should be saved until satisfactory operation is confirmed.

WATER PROOF

Though this unit has a waterproof IP65 case, **DO NOT** use it underwater. The watertight case prevents permanent damage to the unit if accidentally dropped into non-corrosive solutions. Follow these steps immediately if the unit is immersed in any solution:

1. Rinse unit carefully with distilled water. After rinsing and drying, inspect and clean connectors to remove all contaminants that may affect probe connections.

2. Wait for the unit and probe to dry completely before resuming operation.

3. If the unit does not function correctly after step 1 and 2, call JENCO for possible repair or replacement (see Warranty).

INSTALLING THE BATTERIES

The 6360 meter is packaged with six AAA-size alkaline batteries or a UL/CE approved AC adapter, required for operation. To insert the batteries into the meter, follow the procedure outlined below.

Figure 1: Battery compartment
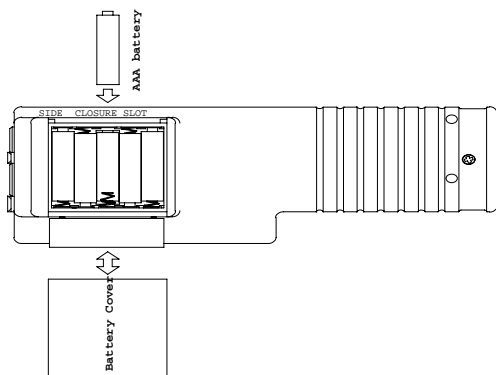
1.   Position the meter so that the bottom part of the meter is facing up . Insert a coin in the side closure slot. Tilt the coin and thrust it upward to open the battery compartment and lift the closure up.
2.   Remove all of the old batteries and insert a new set of batteries ensuring the polarities are correct.
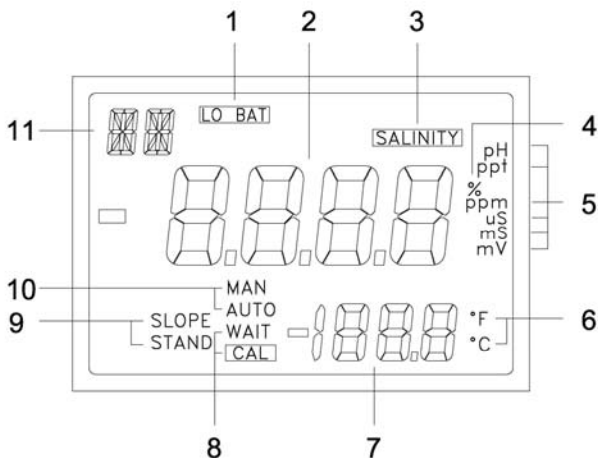
DISPLAY & KEYS FUNCTIONS

A. Display

Figure 2: Active LCD screen

1. **LO BAT-** Low battery indicator.	**4. %-** Displays during calibration: Indicates temperature coefficient unit.
2. Main Display- Display the reading of pH, ORP, Conductivity, TDS & Salinity.	**5. Main Display Units-** "pH": pH mode unit. "mV": ORP mode unit. "uS, mS": Conductivity mode unit. "ppm, ppt": TDS and Salinity mode unit.
3. SALINITY- Display that the unit is in the SALINITY mode.	**6. ℃/℉ -** Temperature unit. In Uncompensated Conductivity mode, the temperature unit will not blink. In Compensated Conductivity mode, the temperature unit will blink.

7. Secondary Display- Temperature reading and site number.	**10. AUTO/MAN-** "AUTO": Used to indicate that a temperature sensor is attached. "MAN": Used to indicate that a temperature sensor is not attached and the pH temperature compensation is manual.
8. WAIT/CAL- "WAIT": Used when in pH calibration to indicate that the reading is not yet stable. "CAL": Used to indicate that unit is in calibration mode.	**11. RC-** Indicate that the unit is in recall mode and actively displaying saved data.
9. STAND/SLOPE- During calibration this will indicate which part of pH is being calibrated, in normal operation this will indicate (blinking) which part of pH is not yet calibrated.	

B. Keys

ON/OFF	**ON/OFF-** Powers on and shuts off the meter.
MODE	**MODE-** Selects display mode. In normal operation, press this key to sequentially display pH, ORP, uncompensated conductivity, compensated conductivity, TDS, salinity, Recall and Erasing interface. In calibration mode, press this key to exit the current calibration parameter and enter into the next one. In "rcl" and "ErAS" modes, press this key to exit "rcl" and "ErAS" modes respectively.
∧ ∨	**UP/DOWN-** Increases or decreases the display value as desired. In "rcl" mode, view saved data and data storage site number by pressing these keys.
CAL	**CAL-** In "Measurement" mode, press this key to enter into "Calibration" mode. In pH mode, press this key can enter the pH calibration. In conductivity or salinity or TDS mode, press this key can change TDS，conductivity constant，temperature coefficient, reference temperature, compensated conductivity.
ENTER	**ENTER-** In "Calibration" mode, press this key one time to save the current value to memory. In "Measurement" mode, press this key 5 seconds to save reading into the next available data storage site. In "rcl" mode, press this key to display the last set of saved data. In "ErAS" mode, press this key to erase all data.

STAND	**STAND-** During pH calibration press this key will start the calibration of the OFFSET of the pH electrode. Press this key with ON/OFF when the instrument is off, the unit will acknowledge by displaying "7.00" for (7.00,4.01,10.01) and "6.86" for (6.86,4.00 & 9.18) in the second interface after turning on.
SLOPE	**SLOPE-** During pH calibration this key will start the calibration of the SLOPE of the pH electrode.

OPERATIONAL PROCEDURES

A. Preparing Standard Solutions

Suitable conductivity standards are available commercially, the user can prepare them using research grade reagents.

Here are some standard solutions the user can prepare to calibrate the probe of the model 6360.

1. Standard solution of 14.94uS at 25℃: Accurately measure out 100ml of the 147uS standard solution as in point 4. Dilute it with 900ml of distilled water.

2. Standard solution of 147uS at 25℃: Accurately measure out 100ml of the 1413uS standard solution as in point 1. Dilute it with 900ml of distilled water.

3. Standard solution of 1413uS at 25℃: Accurately weight out 0.746 g of research grade dried Potassium Chloride (KCL). Dissolve in 1000ml of distilled water.

4. Standard solution of 12.90mS at 25℃: Accurately weight out 7.4365 grams of research grade dried Potassium Chloride (KCL). Dissolve in 1000ml of distilled water.

5. Standard solution of 111.9mS at 25℃: Accurately weight out 74.264 grams of research grade dried Potassium Chloride (KCL). Dissolve in 1000ml of distilled water.

[Note: The user can store the remaining solution in a plastic container for one week but the air space between the cap and the solution must be kept to an absolute minimum. Storing the excess solution below 4℃ can increase the storage life. If you have any doubt of the accuracy of the stored solution, a fresh batch should be prepar ed.**]**

B. Calibration

BUFFER SETTING

The buffer setting is factory selected according to user preference, but the user can change this setting by going to normal pH reading 【Pressing [STAND] and turn on when it's off.】 The 6360 will acknowledge by displaying "7.00" (7.00,4.01 & 10.01) or "6.86" (6.86,4.00 & 9.18) and the text "buf" at the first display when it's turned on then turns to normal pH operation.

CALIBRATION SET-UP

A. STAND AND SLOPE CALIBRATION (pH Mode)

To calibrate the stand and/or slope follow these steps:

1. Go to pH mode. Press the [CAL] key, the "CAL" icon will appear in the lower middle of the display. At this point the unit will display the current buffer set 7.00 for buffer set #1 (7.00, 4.01 & 10.01) or 6.86 for buffer set #2 (6.86, 4.00 & 9.18). The "STAND" icon will start to flash indicating that the first buffer to be used is 7.00 or 6.86.

```
                           pH
              7.00
         AUTO
  SLOPE
  STAND   CAL          25.0 °C
```
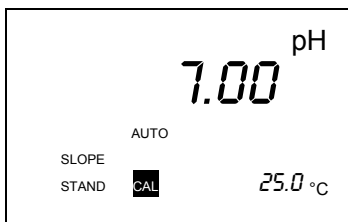
2. Place the probe in a standard buffer solution (7.00 or 6.86 buffer). Press the [STAND] key.
3. The "STAND" icon will stop flashing and stay ON. The display will change to the pH value of the current temperature. If a temperature probe is available, the "AUTO" icon will turn on. If the offset ORP of the solution is greater or less than ±100 mV (for buffer 7.00) or 108.3 mV/-91.7 mV (for buffer 6.86), then an error display will occur. You can clean the probe and change the solution, and press [MODE] to exit the calibration. If no error occurs the unit will wait for the reading to stabilize for about ten seconds (during this waiting time "WAIT" icon will blink) then it will lock the value of the display. If during stabilization period and the reading changes more than

0.01 pH, the waiting time (about 10 seconds) will restart.
In this case:
A. Change the solution.
B. Stop by pressing the [MODE].
C. Wait it out until the electrode stabilizes.
Once the display is locked (the "WAIT" icon will disappear), changing the input or temperature will not change the pH display.

4. The "SLOPE" icon will start to flash indicating that the instrument is ready for the second buffer calibration. You can press [MODE] to exit for a one-point pH calibration.

5. If you are doing a two-point calibration, change the solution now.
Press [SLOPE]. The "SLOPE" icon will stop flashing and stay ON. If the ORP input is greater than 30% or less than -30% of the ideal slope of this buffer then an error display will occur. You can change solution now or you can press [MODE] to abort the SLOPE Calibration. If no error occurs the unit will wait for the reading to stabilize (during this waiting time "WAIT" icon will blink) then it will lock the value of the display. If during stabilization period and the reading changes more than 0.01 pH then this waiting time (about 10 seconds) will restart .
In this case :
A. You can change the solution.
B. Just abort by pressing [MODE].
C. Wait it out until the electrode stabilizes.
Once the display is locked (the "WAIT" icon will disappear) changing the input or temperature will not change the pH display.
You just finished a two-point pH calibration. Press [MODE] to return you to normal operation. The instrument is now ready for pH measurements.

B. COND CALIBRATION

Calibration setup contains five parameters: TDS, Cell, Temperature Coefficient, Temperature reference and Conductivity Calibration with Temperature reference. To access these sections:

1. Connect the conductivity probe which model is either the 101C (K=0.475) or the 109L (K=0.1) to the unit and turn it on. The screen will display the "C0.5" "C0.1" icon and the cell constant of the previous calibration. (Factory default is set at K=0.475).

2. Allow temperature reading to stabilize, in the mode of either temperature compensated or non-temperature compensated conductivity, temperature compensated TDS or salinity, press "CAL" key to enter the calibration

mode. The "CAL" icon appears on the LCD. Press "UP" and "DOWN" key to change the value, press "ENTER" key to save the setting and go into the next setting. If pressing "MODE" key instead of "ENTER" key, the setting will be given up and go into the next setting.

TDS

```
          0.65

   CAL        TDS
```
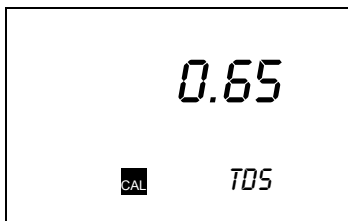
TDS is determined by multiplying conductivity (mS) by a TDS factor. The default factor value is 0.65. To change the TDS factor, use the "UP" and "DOWN" keys to adjust the value between 0.30 and 1.00. Press "ENTER" key to save the new value and the unit will go into the next calibration parameter automatically. If pressing "MODE" key instead of "ENTER" , any changes made will be cancelled and the previous calibration settings will be retained.

CELL

```
          0.475

   CAL        C0.5
```
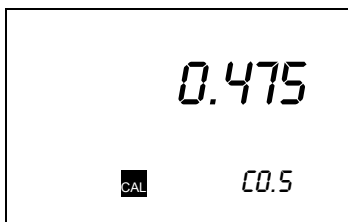
Press "UP" and "DOWN" keys to select cell constant "C0.5" or "C0.1" on the secondary display. Press "ENTER" key to confirm selection, then the unit will go into the next calibration parameter automatically. If "MODE" key is pressed instead of the "ENTER" key, any changes made will be cancelled and the previous calibration settings will be retained.

Temperature Coefficient

$$1.91 \ \%$$

CAL $25.0 \ ℃$
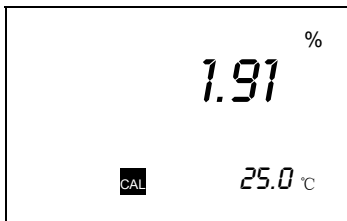
The unit uses the temperature coefficient to calculate
temperature compensated conductivity. The default value is
1.91%. To change the temperature coefficient, use the "UP"
and "DOWN" keys to adjust the value between 0 and 4.00%.
Press "ENTER" to save the new value and the unit will go into
the next calibration parameter automatically. If "MODE" is
pressed instead of "ENTER", any changes made will be
cancelled and the previous calibration settings will be
retained.

Temperature Reference

$$25.0 \ ℃$$

CAL $25.0 \ ℃$
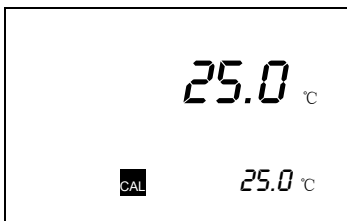
The unit uses the temperature reference value to calculate
temperature compensated conductivity. The default value is
25℃. To change the temperature coefficient , use the "UP"
and "DOWN" keys to adjust the value between 15℃ to 25℃.
Press "ENTER" key to save the new value and the unit will go
into the next calibration parameter automatically. If "MODE"
key is pressed instead of the "ENTER" key, any changes
made will be cancelled and the previous calibration settings
will be retained.

Conductivity Calibration

$$OUER \text{ us}$$

CAL 25.0 ℃

(a) Immerse the probe in a standard of known conductivity, preferably a standard in the middle range of the solutions to be measured. Immerse the probe (at least 2" to 3" or 5~7cm from the tip) into standard solution without touching the sides of the container. Shake the probe lightly to remove any air bubbles trapped in the conductivity cell.

(b) Allow temperature to stabilize. The message "rAGE" (range) may appear briefly on the display indicating auto-ranging; this is normal. After temperature stabilization, use the "UP" and "DOWN" keys to adjust the conductivity value to that of the conductivity standard at 25℃. Press "ENTER" key to calibrate. Calibration is now complete and the unit will switch to "Measurement" mode automatically.

C. Conductivity Measurements

1. Turn on the unit. Place the probe in the solution to be measured. Immerse the probe (at least "2 to 3" or 5~7cm from the tip) in the sample solution. Shake the probe lightly to remove any trapped air bubbles in the conductivity cell.

2. Press "MODE" key to enter into the measurement mode. The message "rAGE" (range) may appear briefly on the display indicating auto-ranging; this is normal. Allow temperature to stabilize read the value.

D. Save, Recall and Delete Data

a. Saving readings to memory.

1. In the modes of either temperature compensated or non-temperature compensated conductivity, pH, ORP, temperature compensated TDS or salinity, hold the "ENTER" key for 5 seconds to save data. The "Save" icon with the corresponding site number will lit up for a brief moment to indicate a successful data to save.

2. If the "Full" icon is displayed, it means that all 50 data saving sites are used up. No new data can be saved until existing saved data are deleted.

b. Recalling readings from memory.

$$RCL$$
$$01$$
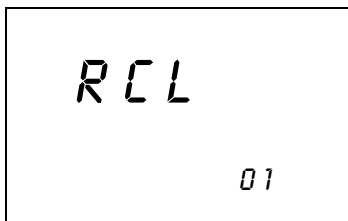
1. To recall saved data, press "ENTER" key to go into the "rcl" mode.

2. Press the "UP" or "DOWN" keys to select the storage site number and Press "ENTER" key to go into the interface, "RC" icon will be displayed at the top left corner. Press "ENTER" key to change the interface of pH, ORP, conductivity, TDS, salinity and temperature

3. Press "MODE" key to exit "rcl" mode.

c. Deleting data.

$$ERAS$$

In the "ERAS" mode, hold the "ENTER" key for 5 seconds, the unit will display "done" icon that all the save data are deleted. The unit will go into the pH mode automatically.

RS232C INTERFACE OPERATION

A. INTRODUCTION

This section assumes you are familiar with the basics of data communication, the RS232 interface, a rudimentary knowledge and a copy of the more popular Windows® computer languages capable of using a an RS232 port.

A simple program must be written in order to send your command and receive data from the meter.

B. PREPARING THE METER

This meter comes equipped with an RS232C interface. This meter communicates with a PC computer (100% IBM PC/AT compatibles) through a DB-9 interface connector. A standard RS232C cable used for interconnecting two IBM PC/ATs can also be used for this operation.

After you have connected the cable and turned on both the meter and the computer, you are now ready for the software preparation.

C. SOFTWARE

A demo program written in Visual Basic® 6.0 and the source are included in the accompanying disk. Read the "Model 6360 RS232 MODBUS RTU PROTOCOL.doc" to understand the procedure used inside the demo program.

ERROR DISPLAYS AND TROUBLESHOOTING

MAIN LCD display	SECOND-ARY LCD display	MODE	Possible cause(s) [Action(s)]
OVEr	ovr	pH	Temperature > 100.0°C or temperature probe is broken. [Replace temperature probe.]
OVEr	ovr	a. temperature compensated Conductivity b. TDS c. Salinity c. Cond-Cal	Temperature > 100.0°C. [Bring solution to a lower temperature.] [Use a temperature probe.]
Normal display	ovr	non-temperature compensated conductivity	Temperature > 100.0°C. [Replace temperature probe.]
Undr	udr	a. pH b. pH-Cal	Temperature < -5.0°C. [Bring buffer/solution to a higher temperature.]
OVer	udr	a. Conductivity b. Cond-Cal c. Salinity	a. Temperature < -5.0°C b. Temperature probe is defective. c. Cond>200mS（k=0.475） Cond>200μS（k=0.1） [Bring solution to a higher temperature or use a temperature probe or change the solution.]
OVer	-5.0~ 100.0°C	pH	pH>16.00 . [Recalibrate.]
OVer	0.0 ~ 60.0°C	pH-Cal	pH>16.00. [Use a new buffer solution.] [Replace the electrode.]
OVer	0.0 ~ 60.0°C	a. pH-Cal-STAND b. pH-Cal-SLOPE	a. Offset mV> 30% of ideal offset. b. Slope mV> 30% of ideal slope. [Use a new buffer solution or replace electrode.]
OVer	> 60.0°C	pH-Cal	Buffer temperature>60.0°C. [Bring buffer to a lower temperature.]
OVer	-5.0~ 100.0°C	a. Conductivity b. Cond-Cal c. pH-Cal	Cond>200mS（k=0.475） Cond>200μS（k=0.1） When in pH-Cal mode, Buffer temperature>60.0°C and <100.0°C [Check calibration.] [Check temperature reference, and temperature.]

OVer	-5.0~ 100.0°C	ORP	ORP input > 1999 mV
OVer	-5.0~ 100.0°C	Salinity	Salinity > 80.0 ppt. [Check calibration.] [Check temperature reference and temperature coefficient.]
Undr	-5.0~ 100.0°C	Cond-Cal - after pressing [Enter]	New cell constant > 1.3 (k=1.0). [Use a new standard solution or clean/replace probe.]
Undr	-5.0 ~ 100°C	a. pH b. pH-Cal	pH < -2.00. When pH-Cal temperature>-5°C and <-5°C [Recalibrate or use a new standard solution.]
Undr	0.0 ~ 60.0°C	a. pH-Cal-STAND b. pH-Cal-SLOPE	a. Offset mV< 30% of ideal offset. b. Slope mV< 30% of ideal slope. [Use a new buffer solution.] [Replace electrode.]
Undr	< 0.0°C	pH-Cal	Buffer temperature < 0.0°C. [Bring buffer to a higher temperature.] [Replace temperature probe.]
Undr	-5.0~ 100.0°C	Cond-Cal - after pressing [Enter]	New cell constant < 0.7 (k=1.0). [Use a new standard solution.] [Clean/replace probe.]
Undr	-5.0~ 100.0°C	ORP	ORP input < -1999 mV

[Note: If the unit still does not perform normally after the above measures are taken, call **Jenco** Service Department.**]**

SPECIFICATIONS

Display	Range	Resolution	Accuracy
pH	-2.00~16.00	0.01pH	±0.01pH±1digital
ORP	-1999~1999mV	1mV	±0.1% FS±1digital
Conductivity K=0.475	0.0 to 475.0uS/cm 475 to 4750uS/cm 4.75 to 47.50mS/cm 47.5 to 200.0mS/cm	0.1uS/cm 1uS/cm 0.01mS/cm 0.1mS/cm	±0.5% FS
Conductivity K=0.1	0.00 to 99.99uS/cm 100.0 to 200.0uS/cm	0.01uS/cm 0.1uS/cm	±0.5% FS
TDS K=0.475	0.0 to 475.0 ppm 475 to 4750 ppm 4.75 to 47.50 ppt 47.5to 200.0 ppt	0.01 ppm 1 ppm 0.01 ppt 0.1 ppt	±0.5% FS
TDS K=0.1	0.00 to 99.99 ppm 100.0to 200.0ppm	0.01 ppm 0.1 ppm	±0.5% FS
Salinity	0.0 to 80.0ppt	0.1ppt	±1% FS
Temperature	-5.0 to 100.0 °C	0.1 °C	±0.3°C±0. 1°digital

Reference Temperature	15.0 to 25.0 °C
Temperature Coefficient	0.0% to 4.0% default: 1.91%
Cell Constant	Four-wire cell: K=0.475 and two-wire cell: K=0.1
TDS Constant Range	0.30 to 1.00 default: 0.65
Power	six AAA-size alkaline batteries or a UL/CE approved AC adapter
Datalogging capabilities	50 data sets
Automatic shut off function	10 minutes of non-use
Audio Feedback	All Touch Keys
Display(Conductivity/ Salinity /TDS/ORP: Temp)	12mm : 8mm high LCD
Ambient Temperature Range	0 to 50 °C
Relative Humidity	At 90% RH
Case	IP65 waterproof
Dimensions (W x D x H)	241mm x 86mm x 72mm
Weight	470 grams (Batteries included)

WARRANTY

Jenco warrants this product to be free from significant deviations in material and workmanship for a period of 1 year from date of purchase. If repair or adjustment is necessary and has not been the result of abuse or misuse, within the year period, please return-freight-prepaid and the correction of the defect will be made free of charge. If you purchased the item from our **Jenco** distributors and it is under warranty, please contact them to notify us of the situation. **Jenco** Service Department alone will determine if the product problem is due to deviations or customer misuse.

Out-of-warranty products will be repaired on a charge basis.
RETURN OF ITEMS
Authorization must be obtained from one of our representatives before returning items for any reason. When applying for authorization, have the model and serial number handy, including data regarding the reason for return. For your protection, items must be carefully packed to prevent damage in shipment and insured against possible damage or loss. **Jenco** will not be responsible for damage resulting from careless or insufficient packing. A fee will be charged on all authorized returns.

NOTE: Jenco reserves the right to make improvements in design, construction and appearance of our products without prior notice.