**FCL5000/FCL5500** Free Chlorine Controller

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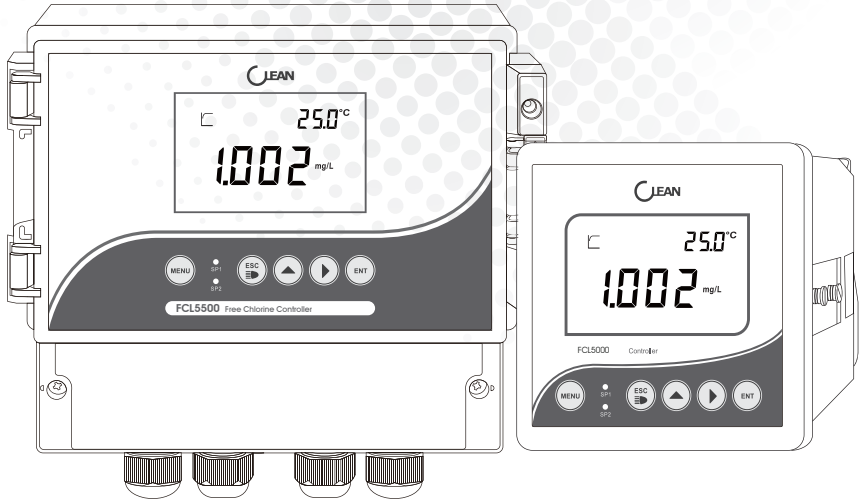
OStriders

CLEAN INSTRUMENTS

Operation Manual

# Free Chlorine Controller

## FCL5000/ FCL5500

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# TABLE OF CONTENTS



# 1 PREFACE

## 1.1 Before Use

Thank you for selecting CLEAN Controller/Transmitter.
Although the Controller / Transmitter use advanced technology and meet the requirements of current safety rules, improper use can still threaten the safety of users, and / or cause harmful influences to factory and other equipments. Therefore, before using the controller / transmitter, relevant person must read and understand contents of this operation manual.

Operation manual should be kept accessible within the person who use the controllers / transmitters.
If you have problems which are not mentioned or can not be explained in this manual, please contact CLEAN local customer service center. They will be very glad to help you.

## 1.2 In Use

On any unmentioned use or the use that contradict with the technical parameters the operators should bear the responsibility.

Other conditions of right use include:
- Remarks and requirements stated in operation manual.
- Local safety regulations on safe operation.
- Information and warning of products that are used together with the transmitters in the contract. (chassis, electrode, etc.)
- Required operating environment and working condition.

## 1.3 Safety

The transmitters may only be carried out by trained experts.

Unqualified Transmitters should not be installed and used.

The transmitters should be used under the required working condition.

The transmitters should not be opened and repaired by clients themselves.

Modified transmitters should not be used. Manufacturers and suppliers do not bear responsibility for the damage and lost caused by modifying instruments without permission. Clients should bear all the risks.
This instrument is IP65 rated. Please use waterproof cable glands when you connect the cable. Also,please loose it when you open the cover. After connecting the cable, please tighten the cable conductor according to the following instruction with cable ties, or it will cause danger such as cable conductor or interface falls off when open the cover.


Please make sure to cut the power off when you open the cover to carry on any operation.

# 2 PRODUCT OVERVIEW

## 2.1 Product Features

This is a microprocessor based analyzer.The purpose of this anaylyzer is designed to analyze and control the free chlorine value (residual chlorine), hypochlorous acid value (HCLO) and the temperature continuously and accurately.

This transmitter has many user-friendly and safety features which include:

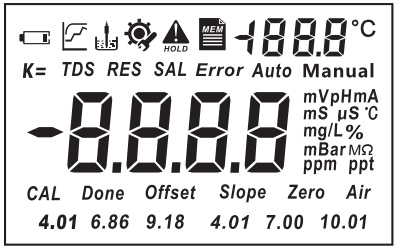
- Double high impedence input .
- IP65 rated,waterproof and anti-gas,applicable in extreme conditions.
- High protection against electromagnetic inteference.
- Menu-driven program that simplifies set-up.
- Built-in memory backup to ensure that setup parameter and calibration information are not erased in power-off condition.
- Scaleable isolated 4-20mA Outputs
- Temperature value offset adjustment.
- LED indicators monitor control status from a distance.
- Large LCD, with high luminance LED backlight.

## 2.2 Technical Specifications

| Model | | FCL5000 | FCL5500 |
|---|---|---|---|
| pH | Range | 2.00～12.00pH | |
| | Resolution | 0.01pH | |
| | Accuracy | ±0.01pH | |
| Free Chlorine / Hypochlorous acid | Range | 0～2.000mg/L or 0～20.00mg/L | |
| | pH compensation | 2.00～9.00pH | |
| | Resolution | 0.001mg/L or 0.01mg/L | |
| | Accuracy | 1%±1LSD | |
| Temperature | Range | -10.0-110.0 ℃ | |
| | Resolution | 0.1 ℃ | |
| | Accuracy | ±0.3 ℃ | |
| | Temperature Sensor | NTC22K / PT1000 | |
| | Temp. Compensation | Automatic -5.0 - +100 ℃ | |
| Signal Output | Signal Output | 4-20 mA (Adjustable) | |
| | Current Accuracy | 1% F.S. | |
| | Load | < 500 Ω | |
| Data interface | RS485 | Yes | |
| Relay Ouput | On/Off | 2 SPST Relays | |
| | Output | 2.5A 230 VAC | |
| | Cleaning/Alarm Relays | 1X 2.5A | |
| Others | Power | 85～260 VAC or 24 VDC | |
| | Working Temperature | 0～60 ℃ | |
| | Humidity | < 90% | |
| | IP Rated | IP65 | |
| | Installation | Panel Mounting | Wall Mounting |
| | Dimensions | (H×W×D) 108×108×158 mm | 160×188×108 mm |
| | Panel Cut Size | 94.5×94.5 mm | —— |
| | Weight | 0.6 kg | 0.7 kg |

## 2.3 Appearance

### 2.3.1 Display




1 Measuring Status-Calculating
2 Measuring Status-Stable Value
3 Electrode inserted display
4 Setup display
5 **Offset** - Electrode Offset
6 **Slope** - Electrode Slope
7 **Done** - Calibration Done
8 **mg/L**、**PH**、**mA**、**℃**、**%** - Unit of Measurement
9 **Auto** / **Manual** - Temperature Compensation
10 **4.01**、**7.00**、**10.01** Calibrated Points -USA Buffer Standard
11 **4.01**、**6.86**、**9.18** Calibrated Points - NIST Buffer Standard

Note: In measurement mode, if the segment icon “9.18” twinkling, it means the pH value is over pH 9, beyond the normal scope of compensation.

### 2.3.2 Display Character Table

| | | | |
|---|---|---|---|
| FCL | Free Chlorine | Slope | Electrode Slope |
| CAL | Calibration | HCLO | Hypochloric acid |
| SEN | Sensor | PH | PH value |
| tYPE | type | Offset | Sensor Offset |
| rNG | Measurement Range | P- | Menu item |
| PH.C | pH Compensation | CodE | Password Setting |
| buF | Buffer Solution | dEF | Factory Defaults |
| nISt | NIST Standard | SL 1 | Sensor Slope 1 |
| USA | USA Standard | SL2 | Sensor Slope 2 |
| t.C | Temperature Compensation | SAVE | Save Data |
| Auto | Automatic Temperature Compensation | Err | Error |
| Manual | Manual Temperature Compensation | On | On |
| tH22 | 22K Sensor | OFF | Off |
| Pt | PT1000 Sensor | no | No |
| tOFS | Temperature Offset | YES | Yes |
| rLY1 | Relay 1 | Ovr | Temperature value Over |
| rLY2 | Relay 2 | Udr | Temperature value Under |
| rLY3 | Relay 3 | FULL | Full Data Storage |
| CUrr | Current Output | OVEr | Measuring Value Over |
| 485 | Data output | UNdr | Measuring Value Under |



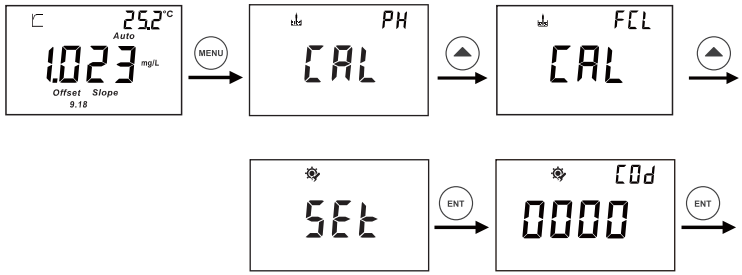
### 2.3.3 Key Panel

| Key | Description |
|---|---|
| MENU | Menu Key<br>In measuring status, press the key once into Calibration mode<br>In calibration or Set up mode, Press the key back to measuring status |
| ESC | Escape Key<br>Press and back to previous screen display in Calibration or Set Up mode<br>Back light on and off switch in measurement status |
| ▲ | Up Arrow Key<br>In measuring status, press the key into "Set Up Status Review" mode, press again to check each set up status.<br>In SET UP mode, press to select items and to adjust set value.<br>In Menu mode, act as forward cycle key |
| ▶ | Right Arrow Key<br>In measuring status, press the key to change measurement mode<br>In SET UP mode, press to select digits of value<br>In Menu mode, act as backward cycle key |
| ENT | Confirm Key<br>Confirm the selection |

### 2.3.4 LED Indicator

LED Indicator
SP1/ SP2 LED light-on shows the relevant relay is in working status.

## 2.4 Menu Preview



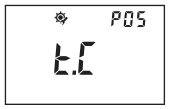

- In measurement mode, press **MENU** key to enter calibration step, and then, press ▲ key to enter set up process.
- Press **ENT** key to pass through, if you have not set up password.


P-01 Free Chlorine or Hypochlorous Acid(HCLO)


P-02 Measurement Range

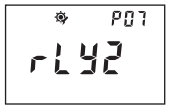

P03 pH Compensation


P04 Standard Solution




P05 Temperature


P06 Relay 1




P07 Relay 2


P08 Relay 3


P09 Current Output


P10 RS-485 output


P11 Password

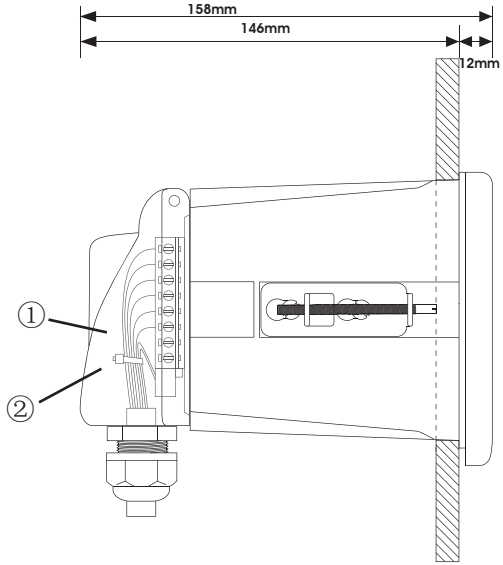

P12 Factory Defaults



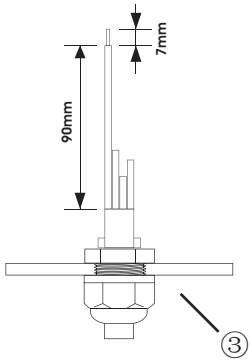
# 3 INSTALLATION

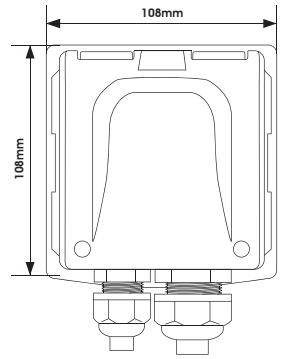
## 3.1 Installation

### Panel Mounting



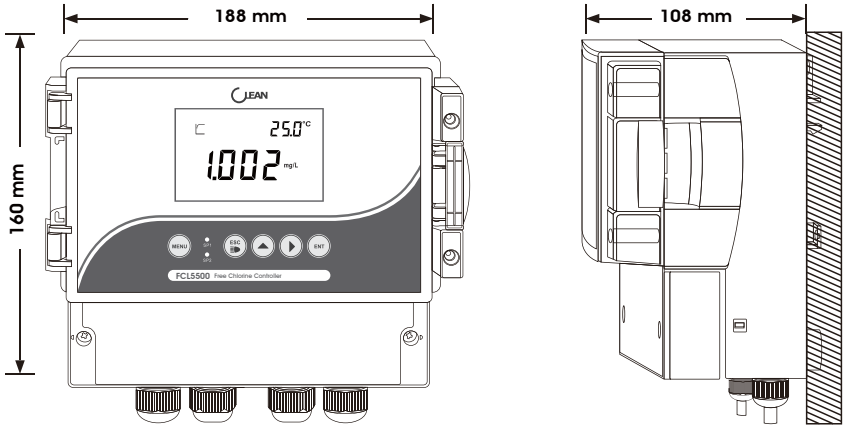

Panel cutout :
94.5 * 94.5mm (± 0.5 mm)
(panel-mounting)

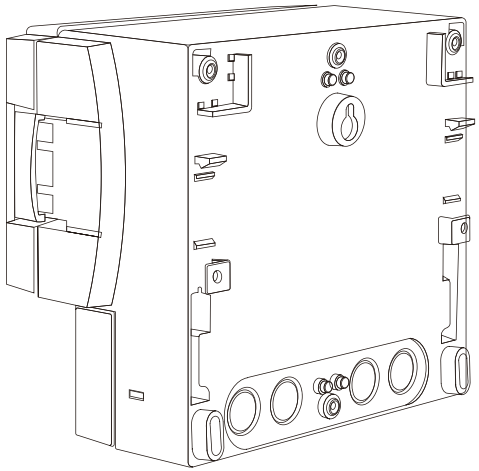


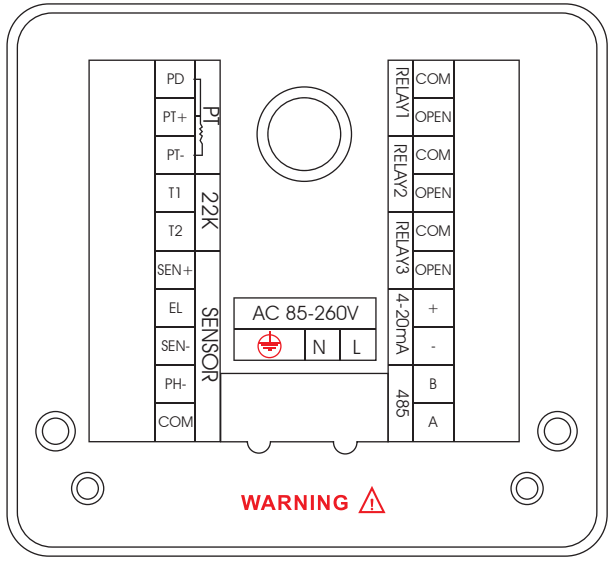

①. Cable (Recommended stripping length for cables is at least 90mm, please use 0.5 to 1 square meter's wire)
②. Cable ties
③. Waterproof cable glands

## Wall Mounting



## 3.2 Connection Diagram

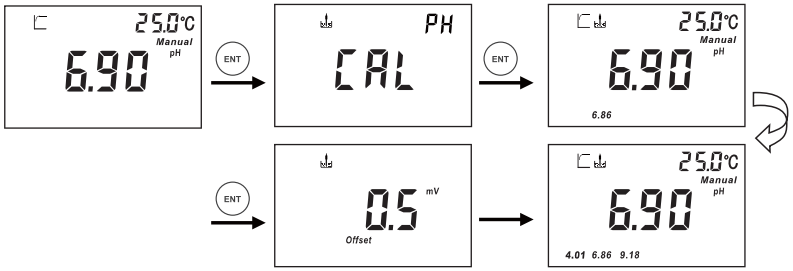



| Terminal | Function | Terminal | Function |
|---|---|---|---|
| PD | Pt1000 drive positive | COM(RL2) | COM(RL2) |
| PT+ | Pt1000 signal positive | OPEN(RL2) | OPEN(RL2) |
| PT- | Pt1000 signal negative | COM(RL3) | COM(RL3) |
| T1 | T1 | OPEN(RL3) | OPEN(RL3) |
| T2 | T2 | 4-20mA (positive) | 4-20mA output, positive |
| SEN+ | FCL Work Electrode | 4-20mA(negative) | 4-20mA output, negative |
| EL | FCL Polarization Electrode | 485(B) | 485 output |
| SEN- | FCL Reference Electrode | 485(A) | 485 output |
| PH- | | pH | pH/ORP input terminal |
| COM | | L | Line |
| COM(RL1) | COM(RL1) | N | Neutral |
| OPEN(RL1) | OPEN(RL1) | ⏚ | Earth |

**Note:**
**For 2-wire Pt1000 temperature sensing terminal system, use short circuit between PD and PT+.**
**Connect Earth with SEN- when Earth pH sensor is required.**

# 4 CALIBRATION

## 4.1 pH Calibration

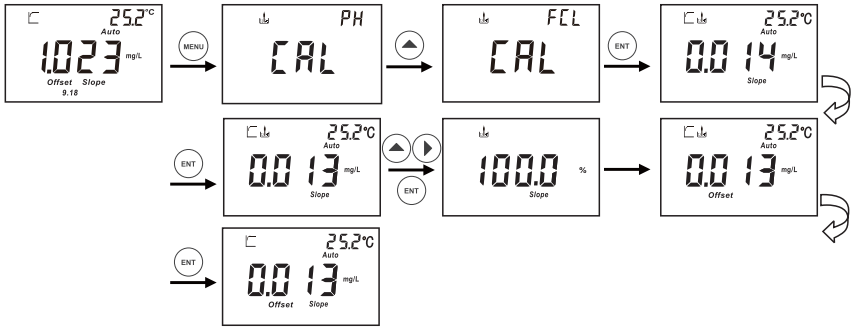



- In pH measurement mode, press **MENU** key to enter pH calibration step, and then, press **ENT** key to enter calibration process.
- Dip the sensor into 7.00 or 6.86 pH buffer solution first, you will soon get the zero point offset value form the screen.
- After point of 7.00 or 6.86 pH calibrated, you can go to next point calibration.


- To continue to calibrate second point (4.01,10.1,or 9.18). When the value is stable, press **ENT** key to confirm the result. You will get slope value of sensor from the screen.
- You can go next to third point calibration or quit the calibration process.


- During the calibration process, you can press **ESC** key to terminate calibration process, or press **MENU** key to go back to measurement status.

## 4.2 Free Chlorine Calibration




In measurement mode, press **MENU** key, ▲ key, and then **ENT** key to enter Free Chlorine calibration steps.

**First point calibration**:

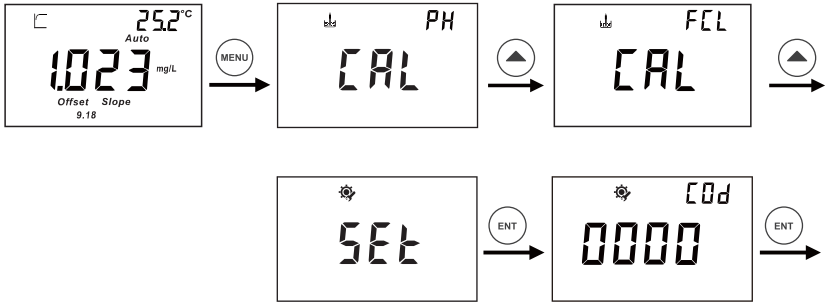
-Dip the free chlorine sensor into known standard solution. When the stable segment icon " " shows up, press ▲ ► key to input the same concentration value as of the known standard solution, then, press **ENT** to confirm it.

It's recommended to use DPD method to measure your free chlorine water sample first, and then press ▲ ► key to enter the free chlorine value you got from DPD method, press **ENT** key to confirm it.

**Zero point calibration**:

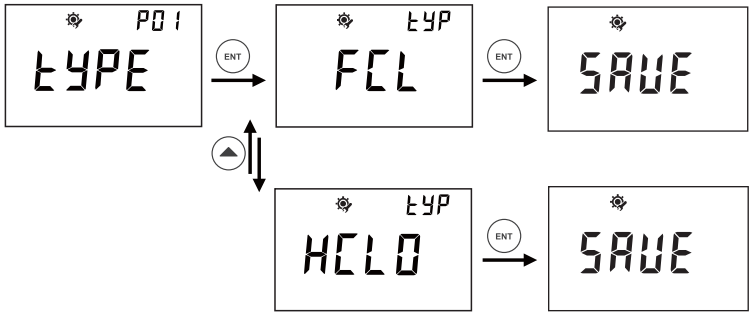
After first point calibration, please dip the sensor into deionized water. When the reading value is 0.00 mg/L, press **ENT** to confirm it. The meter shows OFFSET and Slope value, then automatically back to measurement mode.

# 5 FCL SET UP



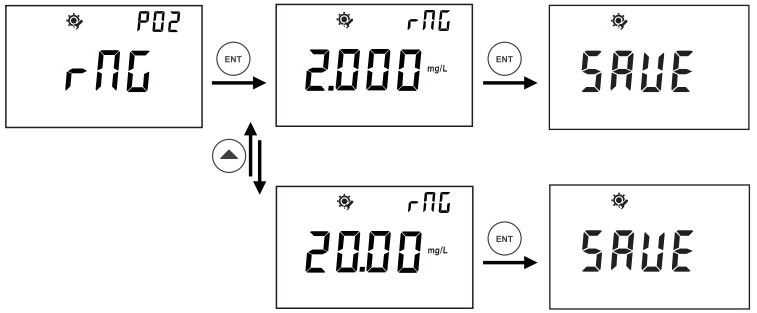

- In measurement mode, press **MENU** key to enter calibration step, and then, press ▲ key to enter set up process.
- Press **ENT** key to pass through, if you have not set up password.

## P-01 Free Chlorine or Hypochlorous Acid (HCLO)



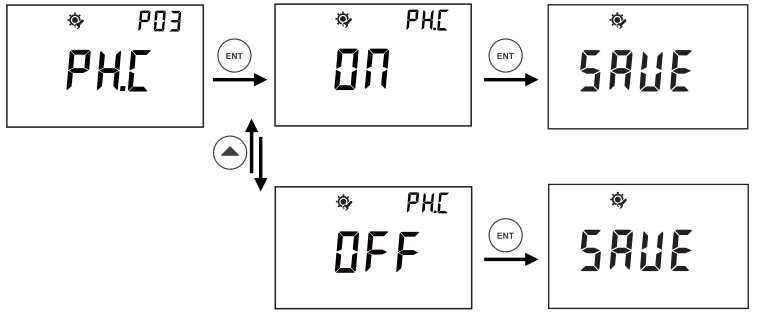

- - In P-01, you can select FCL (Free Chlorine) or Hypochlorous Acid mode
- - Please refer to above description steps to finish setting up P-01
- - You can go to next parameter setting by pressing ▲ ►,or press **MENU** key to quit and go back to measurement mode.
- Factory default: GLASS

## P-02 Measurement Range



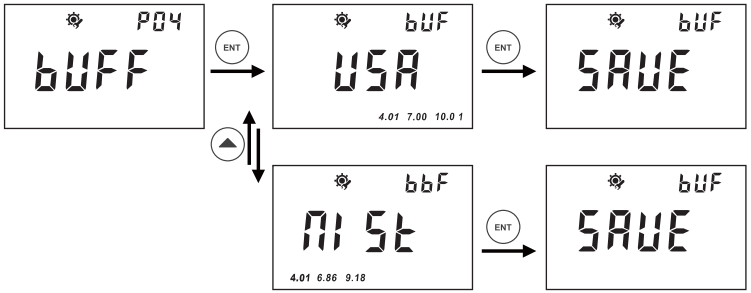

- - In P-02, you can select a measurement range, 0 to 2.000 mg/L or 0 to 20.00 mg/L, according to your needs.
- - Please refer to above description steps to finish setting up P-02
- - You can go to next parameter setting by pressing ▲ ►,or press **MENU** key to quit and go back to measurement mode.

## P-03 pH Compensation



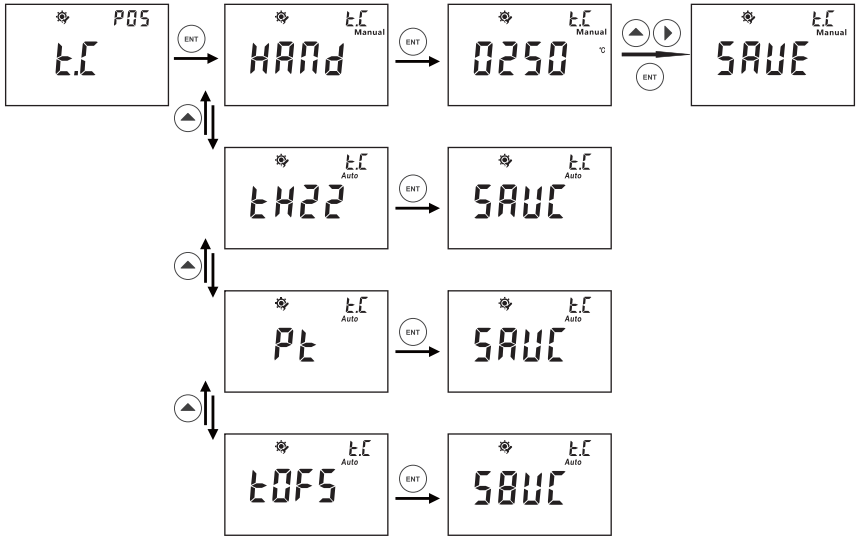

- - In P-03, you can select pH compensation function on or off. It's suggested to turn on pH compensation when you are measuring free chlorine value.
- - Please refer to above description steps to set up P-03

## P04 pH Standard Solution



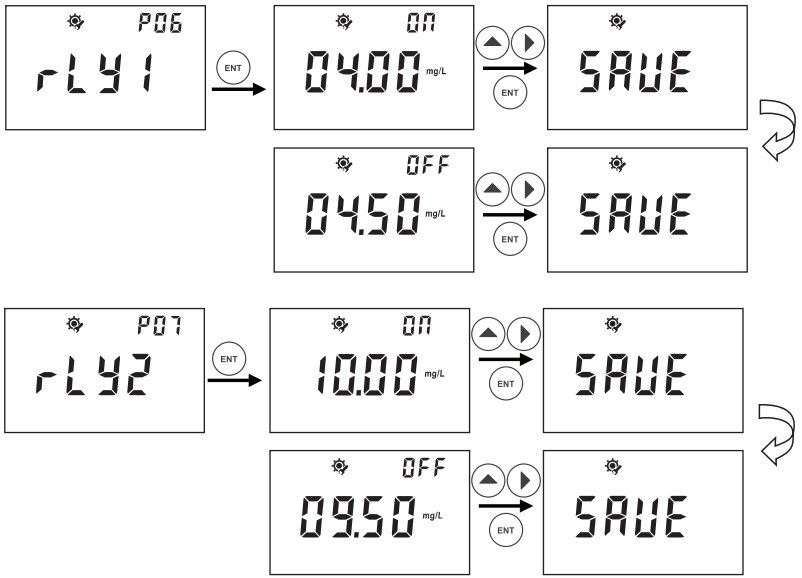

- In P-04, you can select a group of buffer solutions as a standard: USA (4.01，7.00，10.01) or NIST (4.01，6.86，9.18).
- Please refer to above description steps to setup P-02.
- You can go to next parameter setting by pressing ▲ ► ,or press **MENU** key to quit and go back to measurement mode.
- Factory default: NIST

## P05 Temperature



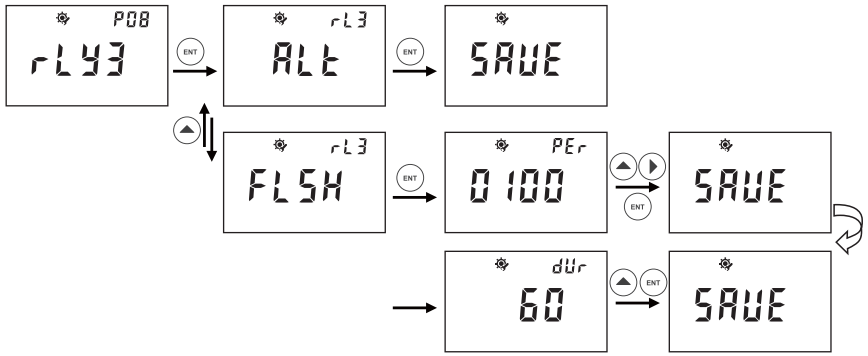

- In P-05, you can complete 3 temperature related settings:
- 1, set up manual temperature compensation or automatic temperature compensation.
- 2, set up temperature sensor type.
- 3, set up temperature offset value.
- Please refer to above description steps to set up P-03.
- You can go to next parameter setting by pressing ▲ ► ,or press **MENU** key to quit and go back to measurement mode.

## P06 Relay 1 (SP1) / P07 Relay 2 (SP2)

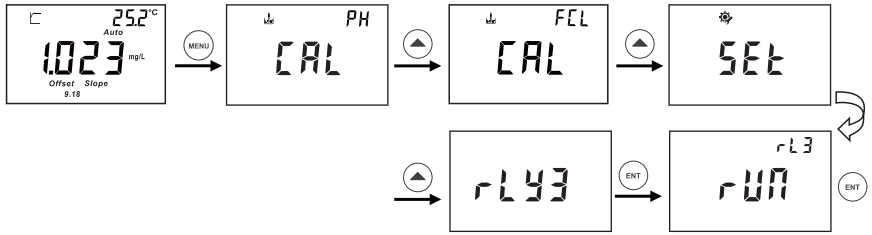



- In P-06, you can set up Relay 1 (SP1): ON-Point and OFF-Point.
- The range for setting up ON-Point and OFF-Point is from -2.00pH to 16.00pH.
- Please refer to above description steps to set up P-04.
- You can go to next parameter setting by pressing ▲ ► ,or press **MENU** key to quit and go back to measurement mode.
- P-05, the same procedure as P-07.

## P08 Relay 3

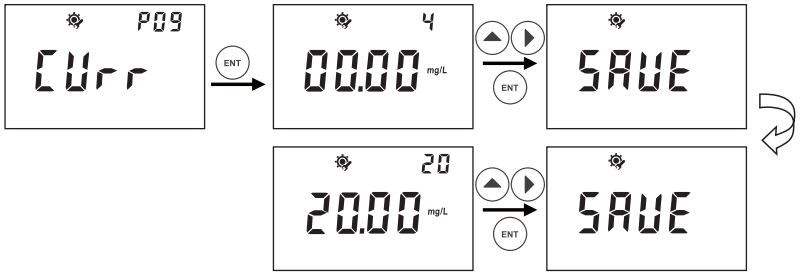



- In P-08, you can set up Relay 3 ( rLY3) , also called the Cleaning/Alarm Relay.
- After entering P-06, you can press ▲ to set the ALT and FLSH.
- By pressing **ENT** to set the ALT function, the unit will then alarm if the other two Relays have any operation.
- FLSH refers to the Cleaning function. The cleaning frequency can be set per each 0-1000hours and 0-120 seconds for the time of duration.
- You can press ▲ ► to set the specific hours you need to clean per each time. Press ▲ to set the duration time per each cleaning.
- Please refer to above description steps to set up P-06.




Note: The Cleaning/Alarm Relay can also be set as Manual in the measuring mode as below: After entering Relay 3 Manual setting, press **ENT** Key, the screen will twinkle and display "RUN". The twinkling will stop by pressing **ENT** and the unit starts to clean/alarm.

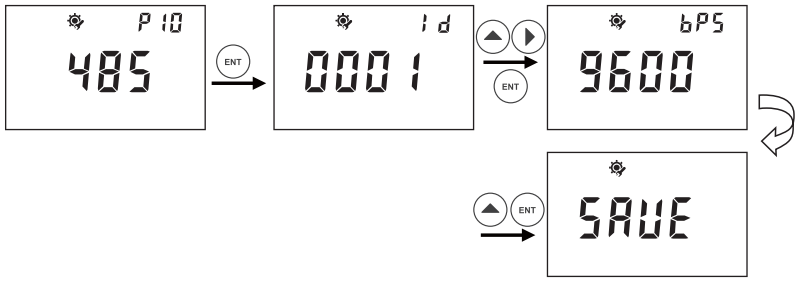
## P09 Current Output




- In P-09, you can set up current output / transmitting for measurement valve for advanced application.
- After entering P-09, the figure 4 on top right corner represents transmitting 4 mA out for below set value (0.00pH), you can press ▲ ► to set a value you need to transmit 4 mA for your application.
- The figures 20 on top right corner represent transmitting 20 mA out for below set value (14.00pH).
- The pH range for setting is from -2.00 to 16.00pH.
- Please refer to above description steps to set up P-05
- You can go to next parameter setting by pressing ▲ ►,or press **MENU** key to quit and go back to measurement mode.

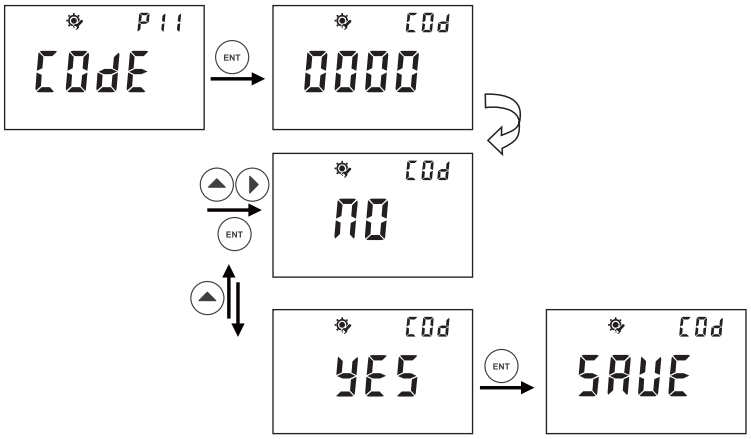


## P10 RS-485 output



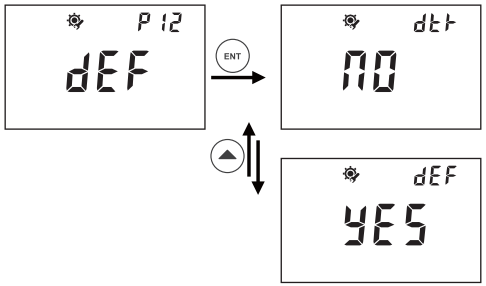

- After entering P-10, you can press ▲ ► to set the ID of the protocol address and press **ENT** to confirm. ID range can be set from 01 to 200.
- You can press ▲ to set the protocol rate you need and confirm by pressing **ENT**.

## P11 Password




- In P-11, you can set up password method to prevent anyone from changing your settings.
- Please refer to above description steps to set up P-06
- You can go to next parameter setting by pressing ▲ ►,or press **MENU** key to quit and go back to measurement mode.
- Factory default: 0000

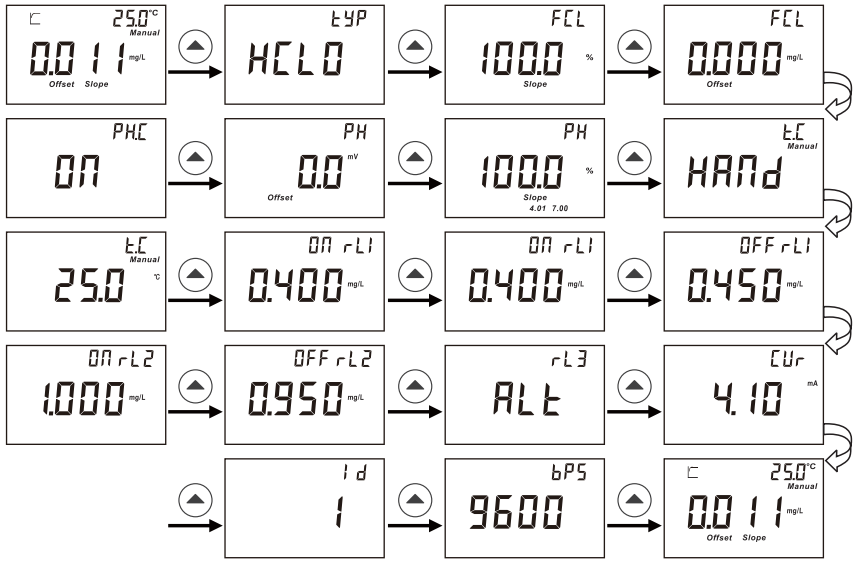
## P12 Factory Defaults




- In P-12, you can select to change factory defaults or to revert to factory default status.
- Please refer to above description steps to set up P-04
- You can go to next parameter setting by pressing ▲ ►,or press **MENU** key to quit and go back to measurement mode.



# 6 Parameter Review




Press ▲ to check through all the Calibration parameters and Setting parameter in measurement mode.
Press **MENU** or **ESC** to quit and go back to measurement mode.

# 7 APPENDIX

## pH temperature Corresponding To pH Buffer Solution

| Temperature (°C) | pH4.01 | pH6.86 | pH9.18 | pH4.00 | pH7.00 | pH10.01 |
|---|---|---|---|---|---|---|
| 0 | 4.01 | 6.98 | 9.47 | 4.01 | 7.12 | 10.32 |
| 5 | 4.01 | 6.95 | 9.38 | 4.00 | 7.09 | 10.25 |
| 10 | 4.00 | 6.92 | 9.32 | 4.00 | 7.06 | 10.18 |
| 15 | 4.00 | 6.90 | 9.27 | 4.00 | 7.04 | 10.12 |
| 20 | 4.00 | 6.88 | 9.22 | 4.00 | 7.02 | 10.06 |
| 25 | 4.01 | 6.86 | 9.18 | 4.00 | 7.00 | 10.01 |
| 30 | 4.01 | 6.85 | 9.14 | 4.01 | 6.99 | 9.97 |
| 35 | 4.02 | 6.84 | 9.10 | 4.02 | 6.98 | 9.93 |
| 40 | 4.03 | 6.84 | 9.07 | 4.03 | 6.97 | 9.89 |
| 45 | 4.04 | 6.83 | 9.04 | 4.04 | 6.97 | 9.86 |
| 50 | 4.06 | 6.83 | 9.01 | 4.06 | 6.97 | 9.83 |
| 55 | 4.08 | 6.83 | 8.99 | 4.07 | 6.97 | 9.81 |
| 60 | 4.10 | 6.84 | 8.96 | 4.09 | 6.98 | 9.79 |
| 70 | 4.12 | 6.85 | 8.92 | 4.12 | 6.99 | 9.76 |
| 80 | 4.16 | 6.86 | 8.89 | 4.16 | 7.00 | 9.74 |
| 90 | 4.20 | 6.88 | 8.85 | 4.20 | 7.02 | 9.73 |



# 8 PROTOCOL

## 1. General Introduction

The unit adopts the RS-485 Modbus Protocol. The communication distance is as long as 1200m by merging 1-200 units in one communication line. Range of the ID code can be from 001-200.

Communication baud rate range 1200, 2400, 4800,9600,19200.

Data format can refer to the Modbus RTU format.

## 2. Composition of the communication command: Command from the Host computer

| Console computer address(ID code) | Command code | Command object | CRC (Calibration) |
|---|---|---|---|
| 1 byte | 1 byte | 1 byte | 2 bytes( High order in front) |

## 3. Console computer address and the unit (ID code of the Console computer)

Command code: 03 is fixed here to read the contents from the register

Command object: the data format of the Host computer need to read from

| Command | Object | Explanation of the data |
|---|---|---|
| 01 | Floating data (measured data) | The measured data, include the output current and the status of the Relays |
| 02 | Calibration data | The zero point, slope, calibration point, etc of the electrode after the calibration done |
| 03 | Parameter setting 1 | The public part of the setup data |
| 04 | Parameter setting 2 | The exclusive part of different units |

## 4. The complete command from the Host computer

**(suppose the Console computer address is 01)**

| Console computer address | Command Code | Command Object | CRC Calibration | Explanation of the data |
|---|---|---|---|---|
| 01 | 03 | 01 | E1 30 | reading the floating data |
| 01 | 03 | 02 | A1 31 | reading the calibration data |
| 01 | 03 | 03 | 60 F1 | reading the parameter setting |
| 01 | 03 | 04 | 21 33 | reading the the parameter setting |

## 5. Analyze on the error data from the Console computer

1) No responding from Console computer
a. Wrong sending address from the Host computer
b. Receive time out. Timing when the Console computer receives the first data. The receiving will stop if the received data is less than the required command bytes (5 bytes) when the second system is interrupted.
c. Host computer command bytes exceeding. Command will be invalid if the received command bytes in the receiving time are more than required. If the command sending from the Host computer is too frequent also leads to the same problem. Suggest the interval of the Host computer command sending be more than 0.5 seconds.

2) Returned Error code from the Console computer
Returned Error code from the Console computer is 5 bytes. The command from the Host computer and the Error code share the same beginning of 8, for example:

| Address | Host computer command +0X80 | Error code | CRC calibration |
|---|---|---|---|
| 1 byte | 1 byte | 1 byte | 2 bytes |

The Error code can be classified as the following 4 circumstances:
a. Error in command: The command from the Host computer is for example 01 05 01 E2 90 instead of 03.
The Console computer will return 01 05+80 81 82 F0
Command Error→01 85 81 82 F0
b. Error in Command objects. Available command object: 01. 02.03.04. If 01 03 07 61 32
the console computer will return: 01 03 +80 82 C1 51
Command object Error: 01 83 82 C1 51
c. Error in CRC calibration code: If 01 03 01 AA BB（correct code: 01 03 01 E1 30）
the console computer will return: 01 03 +80 83 00 91
CRC calibration code Error: 01 83 83 00 91
d. Unit not in the measurement condition, specially refers to when there is no mistake from the Host computer command, however, the Console computer is not in the correct measurement condition cause the failure of uploading the measurement results. For example:
Console computer returns: 01 03+80 80 40 90
Unit not in the measurement condition: 01 83 80 40 90

## 6. Analyze on the correct data from the Console computer

Note: The lower byte is behind the high byte in all returned integer data.
The returned data from the Console computer can also be classified in 4 circumstances as the Host computer.

1) Returned floating data: suppose the Unit ID code is 01

| 01 | 03 | Number of data | Data | CRC value |
|---|---|---|---|---|
| Unit ID | Command | 1 byte (fix the number of data as 15 here) | 15 bytes data | The last 2 bytes |



Analyze on the data:

| 01 | 03 | Number of data | Data | CRC value |
|---|---|---|---|---|
| Unit ID | Command | 1 byte (fix the number of data as 15 here) | 15 bytes data | The last 2 bytes |

Analyze on the data:

| Byte | 1、2 | 3 | 4 |
|---|---|---|---|
| Analyze | Free Chlorine integer value | decimal point | unit |

Note: Free chlorine and HCLO integer value: 7FFF is over rang for free chlorine mode and HCLO mode.
Decimal: 02 is two decimal, 03 is three decimal
Unit: 14 is mg/L

| Byte | 5、6 | 7 | 8 |
|---|---|---|---|
| Analyze | The pH value integer | decimal point | unit |

Note: 7FFF is outranged, 8000 is below is range.
Decimal point of the third byte: 02 is 2 decimal places,00 is without decimal point
Unit of the fourth byte: 10 is pH、 00 is mV

| Byte | 9、10 | 11 | 12 |
|---|---|---|---|
| Analyze | The temperature value integer | decimal point | unit |

Temperature value: 7FFF is outranged, 8000 is below is range.
Byte 11: The decimal point of temperature 01 is a 1 decimal place.
Byte 12: 11 is °C、12 is °F
Byte 9、10 、11、12 are reserved bytes.
Byte 13 and 14 are the current transmission output value (integer). The default is 2 decimal places, unit is mA.
Byte 15 is the status of the Relays, 0 is disconnect, 1 is closed. The first 5 figures are independent bits. The sixth figure is Relay 3、the seventh figure is Relay2、 the eighth figure is Relay 1.

2) Returned Calibration data: suppose the ID code of the unit is 01

| 01 | 03 | OF | Data | CRC value |
|---|---|---|---|---|
| Unit ID | Command | 1 byte (fix the number of data as 15 here) | 15 bytes data | The last 2 bytes |

The definition of data part:

Calibration status of Byte 1:

pH: the first 3 figures are independent bits. The forth figure is the high point; fifth is the middle point and sixth is the low point. The last 2 figure are independent bits.

0 refers to without calibration、1 refers to calibration done.

Byte 2 and 3 is the offset integer of pH. Default the unit of 1 decimal point is mV

Byte 4 and 5 are the acid slope、Byte 6 and 7 are the alkalinity slope.

Byte 8 for free chlorine sensor calibration status

0 is no calibration, 1 is one point calibration done, 2 two points calibration done(including zero point)

Byte 9, 10, is free chlorine offset integer value, one decimal default and unit is mg/L

Byte 11,12 is free chlorine slope

Byte 13、14、15 are reserved bytes.

3) Returned setting data, suppose the unit ID code is 01

| 01 | 03 | XX | Data | CRC value |
|---|---|---|---|---|
| Unit ID code | Command | Number of data 1 byte ( 28 bytes) | 28 bytes | The last 2 bytes |

The definition of data part:

Relay 1:

| 1、2 | 3 | 4 | 5、6 | 7 | 8 |
|---|---|---|---|---|---|
| ON integer | Decimal point | unit | OFF interger | Decimal point | unit |

Relay 2:

| 9、10 | 11 | 12 | 13、14 | 15 | 16 |
|---|---|---|---|---|---|
| ON integer | Decimal point | unit | OFF interger | Decimal point | unit |

Relay 3:

| 17 | 18 | 19、20 |
|---|---|---|
| Relay type | Cleaning second(s) | Cleaning interval(hours) 2bytes integer |

Relay 3:

| 21、22 | 23 | 24 | 25、26 | 27 | 28 |
|---|---|---|---|---|---|
| The transmitter 4mA corresponding value (2bytes integer) | Decimal point | unit | The 20mA corresponding value(2bytes integer) | Decimal point | unit |

4) Returned setting data, suppose the unit ID code is 01

| 01 | 03 | XX | Data | CRC value |
|---|---|---|---|---|
| Unit ID | Command | Number of the data | | The last 2 bytes |



Analyze on the data part:

| Byte | 1 | 2 | 3 |
|---|---|---|---|
| Analyze | Unit type: 4 is for Free Chlorine | Parameter: 0 is free chlorine, 1 is HCLO | Range: 0 is 2.00 mg/L; 1 is 20.00 mg/L |
| Byte | 4 | 5 | |
| Analyze | pH compensation: 0 is ON 1 is OFF | pH Standard solution: 0 is USA; 1 is NIST | |
| Byte | 6 | 7、8 | |
| Analyze | Temperature compensation type: 0 is Manual、 1 is TH22、2 is PT1000 | Manual temperature setting value or temperature offset value (Default 1 decimal point for 2 bytes integer, unit is ℃) | |

Unit comparison table

| Data | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| Unit | mV | nA | uA | mA | Ω | KΩ | MΩ |
| Data | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| Unit | uS | mS | S | PH | ℃ | ℉ | Ug/L |
| Data | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Unit | mg/L | g/L | ppb | ppm | ppt | % | mbar |
| Data | 21 | 22 | | | | | |
| Unit | bar | mmHg | | | | | |

# 9 GENERAL INFORMATION

## 9.1 Warranty

CLEAN Instruments warrants this product to be free from significant deviations in material and workmanship for a period of one year from the date of purchase. If repair is necessary and has not been the result of abuse or misuse within the warranty period, please return to CLEAN Instruments and amendment will be made without any charge. CLEAN Instruments Customer Service Center will determine if product problem is due to deviations or customer abuse. Out of warranty products will be repaired on a charge basis.

## 9.2 Return Of Malfunction Instruments

Authorization must be obtained from CLEAN Instruments Customer Service Center to issue a RIR number before returning items for any reason. When applying for authorization, please nclude date requiring the reason of return. Instruments must be carefully packed to prevent damage in shipment and insured against possible damage or loss. CLEAN Instruments will not be responsible for any damage resulting from careless or insufficient packing.
Warning: Damage as a result of inadequate packaging is the User / distributor's responsibility.
Please follow the guidelines below before transporting.

## 9.3 Guidelines Or Returning Unit For Repair

Use the original packaging materialif possible, when transporting back the unit for repair.
Otherwise wrap it with bubble pack and use a corrugated box for better protection. Include a brief description of any faults suspected for the convenience of Customer Service Center, if possible.If there are any questions, feel free to contact our Customer Service Center or distributors.


28