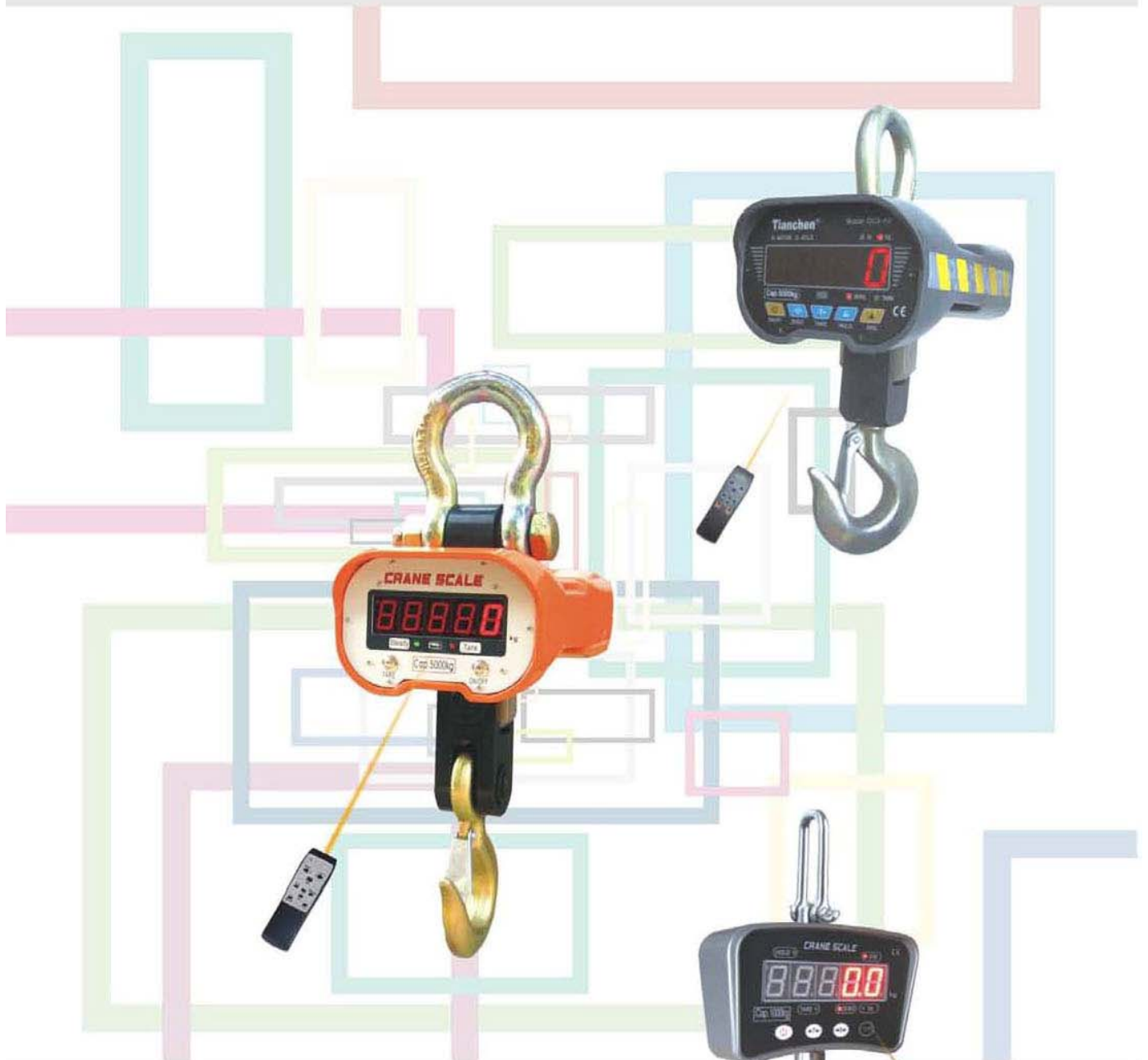


TECHNICAL MANUAL

ELECTRONIC
CRANE SCALE



MODEL: OCS-A2
OCS-A
OCS-M

Edition in 2008

Content

1. USER INPUT	1
KEYS ON SCALE	1
KEYS ON REMOTE CONTROLLER	1
2. ADVANCED OPERATION	2
SCALE CONFIGURATION	2
SYSTEM UNIT	3
AUTO-ZERO RANGE	3
MANUAL-ZERO RANGE	4
ZERO-TRACKING RANGE	4
GRAVITY ACCELERATION	4
CALIBRATION	5
MAXIMUM CAPACITY	7
ZERO WEIGHT CALIBRATION	7
ONE LOAD CALIBRATION	7
TWO LOADS CALIBRATION	8
THREE LOADS CALIBRATION	9
POWER ADJUSTMENT	10
SYSTEM INFO	11
SYSTEM VERSION	12
OVERLOAD TIMES	12
MANUFACTURING DATE	13
3. RS-232 COMMUNICATION	13
COMMUNICATION WAYS	13
RS-232 PROTOCOL	13
4. MESSAGE ILLUSTRATION	16
5. NOTES	17










1. User Input

In this section, you will learn how to operate this scale in a convenient way either on scale or by remote controller.

KEYS ON SCALE

	ON/OFF	ZERO	TARE	HOLD	2ND
Scale Configuration	Exit	↑	→	Confirm	Save
Calibration	Exit	↑	→	Confirm	Save
Power Adjustment	Exit	↑	→	Confirm	
System Info	Exit			Confirm	

KEYS ON REMOTE CONTROLLER


	Scale Configuration	Calibration	Power Adjustment	System Info
	↑	↑	↑	
	→	→	→	
	Confirm	Confirm	Confirm	Confirm
	↓	↓	↓	
	←	←	←	
				
				
	Exit	Exit	Exit	Exit
	Save	Save		



2. Advanced Operation


Operations in this section feature versatile and powerful functions for crane scale measurement. Most of the operations are accessible via dedicated remote controller. Some of the settings to the scale require password. Please contact your local representatives for password information.


SCALE CONFIGURATION

Action

Before entering SCALE CONFIGURATION MODE, press 2ND button on scale or  on remote controller twice to enter the password interface first.

To input SCALE CONFIGURATION password or digits, press ZERO and TARE button on scale or  and  on remote controller.

To confirm the password or input value, press HOLD button on scale or  on remote controller.

To save and exit SCALE CONFIGURATION MODE, press 2ND button on scale or  on remote controller.

To exit SCALE CONFIGURATION MODE without saving, press ON/OFF button on scale or  on remote controller.

To learn how to input digits or change the option, please refer to 1 User Input section in User's Guide.

Function

In SCALE CONFIGURATION MODE, user can change the scale's metrology performance, like system measurement unit, auto and manual zero, automatic zero-tracking, anti-motion algorithm, and gravity acceleration, etc.

The screen displays the welcome message as below.



WARNING:

Parameters in SCALE CONFIGURATION are closely related to scale's metrology performance. It is NOT recommended to change anything in SCALE CONFIGURATION unless you are authorized from your local representative with the correct password.

Condition

- The scale must not be in **HOLD** mode. Otherwise, error message `hold` will keep flashing.


SYSTEM UNIT


In contrast to the **DISPLAY UNIT**, the **SYSTEM UNIT** is set before it leaves factory. To be more exact, it is set when the scale is calibrated at factory.

A metric scale's **SYSTEM UNIT** is kg by default, while an imperial scale's **SYSTEM UNIT** is lb by default.

To switch between metric and imperial system, please flip to the Display Unit Switch part.



The lb indicator  **lb** lights on, after **SYSTEM UNIT** switches to lb.

The kg indicator  **kg** lights on, after **SYSTEM UNIT** switches to kg.

WARNING:

SYSTEM UNIT needs to be changed only before an imperial scale needs to be recalibrated to a metric scale, or a metric scale to an imperial one. It is absolutely wrong to switch the SYSTEM UNIT here without re-calibrating the scale.

AUTO-ZERO RANGE


During the power-on procedure, load on scale will be automatically zeroed if the load's weight is in **AUTO-ZERO RANGE**.

There are optional 6 **AUTO-ZERO RANGE**, "0%", "2%", "4%", "10%", "20%", and "100%" Max. Cap.. When **AUTO-ZERO RANGE** is "0%" Max. Cap., the **AUTO-ZERO** function is disabled.

The default **AUTO-ZERO RANGE** is set to "20%" Max. Cap..



MANUAL-ZERO RANGE

After powered on, the scale can be zeroed manually (by pressing ZERO button on scale or  on remote controller), if the load's weight is in **MANUAL-ZERO RANGE**.

There are optional 6 **MANUAL-ZERO RANGE**, "0%", "2%", "4%", "10%", "20%", and "100%" Max. Cap.. When **MANUAL-ZERO RANGE** is "0%" Max. Cap., the **MANUAL-ZERO** function is disabled.

The default **MANUAL-ZERO RANGE** is set to "4%" Max. Cap..



ZERO-TRACKING RANGE

ZERO-TRACKING function zeros the scale when weight reading is in **ZERO-TRACKING RANGE**.

There are optional 6 **ZERO-TRACKING RANGE**, 0.0 division, 0.5 division, 1.0 division, 1.5 division, 2.0 division, and 2.5 division, respectively "0E", "0.5E", "1.0E", "1.5E", "2.0E", and "2.5E". When **ZERO-TRACKING RANGE** is "0.0E", the **ZERO-TRACKING** function is disabled.

The default **ZERO-TRACKING RANGE** is set to 0.5 division, namely, "0.5E".



NOTICE:


Enabling Zero-Tracking will enhance temperature and drift performance of the scale

GRAVITY ACCELERATION

Adjust the **GRAVITY ACCELERATION**, only when you use the scale in a place where acceleration of gravity is greatly different from the place where the scale is calibrated.

GRAVITY ACCELERATION can be set from "9.700" to "9.899".
The default **GRAVITY ACCELERATION** is set to level "9.794".






After pressing 2ND button on scale or  on remote controller, scale will save current settings, exit the **SCALE CONFIGURATION MODE** automatically and returns to **WEIGHING MODE**.




CALIBRATION


Action

Before entering **CALIBRATION MODE**, press 2ND button on scale or  on remote controller twice to enter the password interface first.

To input **CALIBRATION** password or digits, press ZERO and TARE button on scale or  and  on remote controller.

To confirm the password or input value, press HOLD button on scale or  on remote controller.

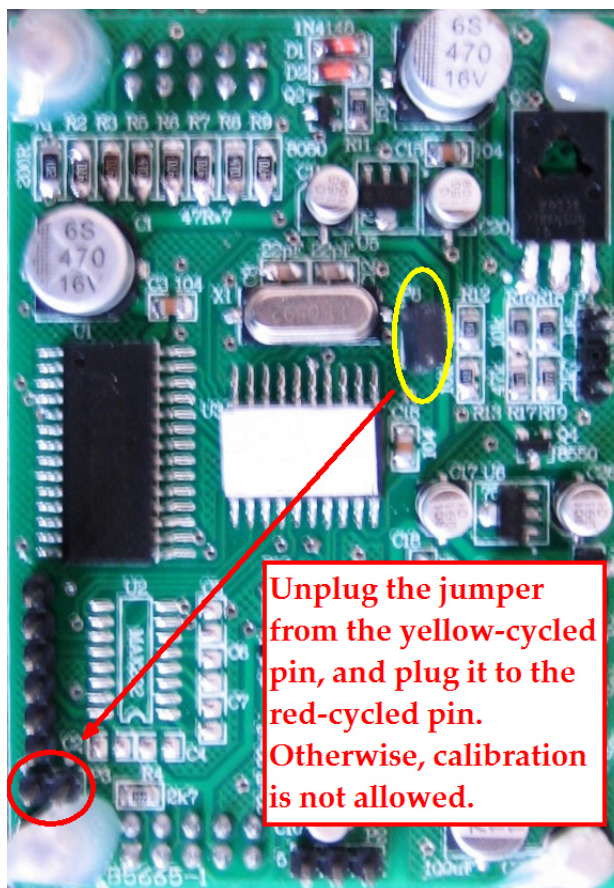
To save and exit **CALIBRATION MODE**, press 2ND button on scale for  on remote controller.

To exit **CALIBRATION MODE** without saving, press ON/OFF button on scale or  on remote controller.

To learn how to input digits or change the option, please refer to 1 User Input section in User's Guide.

NOTICE:

To meet metrology government's requirement in some of the European countries, the scale is protected against user calibration with calibration plug. In this version's scale, user must take off the front panel and change the position of the calibration plug. See below picture.



Error message `noPLG` will fresh, indicating that there is no plug on required position.

After calibration, put the plug back onto its original pin.

Function

When the scale needs to be re-calibrated, user can recalibrate the scale in **CALIBRATION MODE**.

The screen displays the welcome message as below.

**WARNING:**

It is **NOT** recommended to do the **CALIBRATION** unless you are authorized from your local representative with the correct password.

Condition

- The scale must not be in HOLD mode. Otherwise, error message `hold` will keep flashing.

MAXIMUM CAPACITY

Action

To set the scale's MAXIMUM CAPACITY, input the capacity in unit "ton". For example, "1" means 1,000 kg or lb, "5" means 5,000 kg or lb.



WARNING:


Do NOT attempt to set maximum capacity bigger than the scale's actual capacity. Overloading causes severe harm to the scale, and is very dangerous.

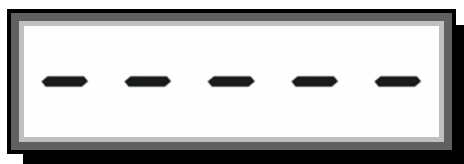
ZERO WEIGHT CALIBRATION



Action

When the screen displays `LoAd0`, keep the scale unloaded or with relatively zero weight.

After pressing HOLD button on scale or  on remote controller, the scale will detect current weight, displaying the below detection message.




ZERO WEIGHT CALIBRATION is finished when message `LoAd1` is displayed.


ONE LOAD CALIBRATION

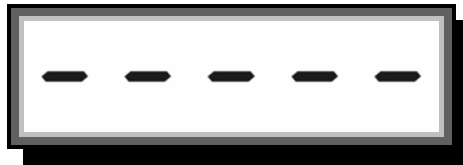
**Action**


Put on the weight, when the screen displays **LoAd 1** .

After pressing HOLD button on scale or  on remote controller, the scale displays the below message, waiting for user's input of the load's weight.





After pressing HOLD button on scale or  on remote controller, the scale will detect the load's weight, displaying the below detection message.



ONE LOAD CALIBRATION is finished when message **LoAd 2** is displayed. To finish the calibration, press 2ND button on scale or  on remote controller.

Condition

- The load must be heavier than "0", (or "0.0" or "0.00", depending on the resolution). Otherwise, error message  will flash.
- The load must not be heavier than the scale's maximum capacity. Otherwise, error message  will flash.

NOTICE:

It is recommended to use the weight that is equal to scale's maximum capacity to calibrate the scale.


NOTICE:


*In most cases, one load calibration is enough.
Calibrating the scale with more than one weight is usually required only when the scale's linearity performance is not desired.*

TWO LOADS CALIBRATION




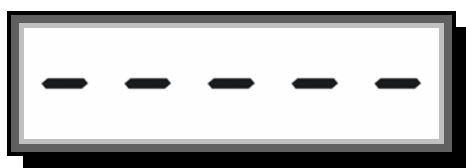
Action

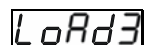

Put on the second weight, when the screen displays  .

After pressing HOLD button on scale or  on remote controller , the scale displays the first load's weight, waiting for user's input of the second load's weight.


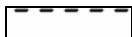


After pressing HOLD button on scale or  on remote controller, the scale will detect the second weight, displaying the below detection message.



TWO LOADS CALIBRATION is finished when message  is displayed. To finish the calibration, press 2ND button on scale or  on remote controller.

Condition

- The second load must be heavier than the first load. Otherwise, error message  will flash.
- The second load must not be heavier than the scale's maximum capacity. Otherwise, error message  will flash.

NOTICE:
If the scale is calibrated with two loads, it is recommended to use the second weight that is equal to scale's maximum capacity to calibrate.


THREE LOADS CALIBRATION




Action

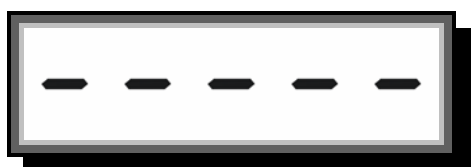
Put on the third weight, when the screen displays

LoAd3 .

After pressing HOLD button on scale or  on remote controller, the scale displays the second load's weight, waiting for user's input of the third load's weight.





After pressing HOLD button on scale or  on remote controller, the scale will detect the third weight, displaying the below detection message.



THREE LOADS CALIBRATION is finished when the below message is displayed. The scale will exit **CALIBRATION MODE** automatically and returns to **WEIGHING MODE**.


**Condition**

- The third load must be heavier than the second load. Otherwise, error message  will flash.
- The third load must not be heavier than the scale's maximum capacity. Otherwise, error message  will flash.


NOTICE:


If the scale is calibrated with three loads, it is recommended to use the third weight that is equal to scale's maximum capacity to calibrate.

POWER ADJUSTMENT**Action**

Before entering **POWER ADJUSTMENT MODE**, press 2ND button on scale or  on remote controller twice to enter the password interface first.

To input **POWER ADJUSTMENT** password or digits, press ZERO and TARE button on scale or  and  on remote controller.

To confirm the password or input value, press HOLD button on scale or  on remote controller.

To save and exit **POWER ADJUSTMENT MODE**, press 2ND button on scale for  on remote controller.

To exit **POWER ADJUSTMENT MODE** without saving, press ON/OFF button on scale or  on remote controller.


To learn how to input digits or change the option, please refer to 1 User Input section in User's Guide.

Function

System power needs to be adjusted, when the scale is reset manually. User can adjust the system voltage in **POWER ADJUSTMENT MODE**.

The screen displays the welcome message as below.



After pressing HOLD button on scale or  on remote controller, the scale displays current system voltage (or 6.50V if the scale has been reset), waiting for user's input of new voltage.




After pressing HOLD button on scale or  on remote controller, the scale saves the new voltage, and returns to **WEIGHING MODE**.





SYSTEM INFO

Action

Before entering **SYSTEM INFO MODE**, press 2ND button on scale or  on remote controller twice to enter the password interface first.

To input **SYSTEM INFO** password or digits, press ZERO and TARE button on scale or  and  on remote controller.

To confirm the password or go to next setting, press HOLD button on scale or  on remote controller.

To exit **SYSTEM INFO MODE**, press ON/OFF button on scale or  on remote controller.

To learn how to input digits or change the option, please refer to 1 User Input section in User's Guide.


Function

In **SYSTEM INFO MODE**, scale's system information will be displayed, like system version, overload times, manufacturing month, etc.

The screen displays the welcome message as below.



Condition

- The scale must not be in **HOLD** mode. Otherwise, error message  will keep flashing.

SYSTEM VERSION

SYSTEM VERSION is the version of scale's hardware and software.

For example, the below message shows the system version is "1.0".



OVERLOAD TIMES

OVERLOAD TIMES shows how many times the scale overloads after the factory calibration.

For example, the below message shows the scale has overloaded 5 times.



MANUFACTURING DATE

MANUFACTURING DATE shows the month the scale is produced.

For example, the below message shows the scale is produced on 2007 April.



3. RS-232 Communication

The scale is equipped with a RS-232 serial input/output port, which is intended for interfacing scoreboards, desktop indicator, hand-held data collector, and computer, etc.

COMMUNICATION WAYS

There are optionally two ways of communication in between scales and peripherals, cabled way and wireless way. Through cable, peripherals can be connected to the scale's full duplex communication port (optional), while via wireless, peripherals can communicate with scale through its half-duplex wireless port (optional).

Cable connection distance is up to 15 meters. Plug one end of the 9-pin D-type connector into the RS-232 socket in the rear of scale. Plug another end of the connector to your peripherals that support RS-232 communication.

Wirelessly, scale works with peripherals over 500 meters, on condition that there is no block between them.

RS-232 PROTOCOL

The scale sends out data in the format of string. A string is consisted of 10 bytes, 1 byte of start flag, 1 byte of scale address, 5 bytes of LED data, 1 byte of indicator data, and 1 byte of check sum, showed as below:

Byte	ASCII	Default Value
flag of start	0x7F	0x7F

address of scale	user defined	0x00
data of LED1	according to display	according to display
data of LED2	according to display	according to display
data of LED3	according to display	according to display
data of LED4	according to display	according to display
data of LED5	according to display	according to display
data of indicator	according to display	according to display
check sum	according to all data	according to all data

Flag of start are always fixed to be 0x7F.

Scale address is defined at **SCALE ADDRESS** in **COMMUNICATION SETUP**, default address is set to 00 (0x00 in hexadecimal).

LED data is defined as below.

ASCII	Hex	Display	ASCII	Hex	Display
'0'	0x3F	0	'a'	0x77	A
'1'	0x06	1	'b'	0x7C	b
'2'	0x5B	2	'c'	0x39	C
'3'	0x4F	3	'd'	0x5E	d
'4'	0x66	4	'e'	0x79	E
'5'	0x6D	5	'f'	0x71	F
'6'	0x7D	6	'g'	0x3D	G
'7'	0x07	7	'h'	0x74	h
'8'	0x7F	8	'i'	0x30	I
'9'	0x6F	9	'j'	0x0E	J
','	0xBF	,	'k'	0x72	K
!'	0x86	!	'l'	0x38	L
'@'	0xDB	@	'm'	0x55	M
'#'	0xCF	#	'n'	0x54	N
'\$'	0xE6	\$	'o'	0x5C	O
'%'	0xED	%	'p'	0x73	P
'^'	0xFD	^	'q'	0x67	Q
'&'	0x87	&	'r'	0x50	R
'*'	0xFF	*	's'	0x6D	S
'('	0xEF	('t'	0x78	T
''	0x00		'u'	0x3E	U
'*'	0xFF	*	'v'	0x1C	V
'~'	0x01	~	'w'	0x6A	W
'-'	0x40	-	'x'	0x76	X
'_'	0x08	_	'y'	0x6E	Y
			'z'	0x49	Z

Data of indicator has two formats, depending on the PCB version.

version 1		version 2	
bit	indicator	bit	indicator
bit 0	kg indicator	bit 0	not defined
bit 1	b indicator	bit 1	STB indicator
bit 2	ZERO indicator	bit 2	TARE indicator
bit 3	not defined	bit 3	ZERO indicator
bit 4	TARE indicator	bit 4	lb indicator
bit 5	HOLD indicator	bit 5	kg indicator
bit 6	STB indicator	bit 6	HOLD indicator
bit 7	not defined	bit 7	not defined

Check sum is the XOR sum of 7 bytes, 1 byte of Scale Address, 5 bytes of LED data and 1 byte of indicator data.

4. Message Illustration

Possible messages the scale displays are listed here.

SCALE	scale configuration	SCALE CONFIGURATION welcome message
AE 20	auto-zero range	AUTO-ZERO RANGE
AE 4	manual-zero range	MANUAL-ZERO RANGE
ET00E	zero-tracking range	ZERO-TRACKING RANGE
G9.794	gravity acceleration	GRAVITY ACCELERATION
CLbrt	calibration	CALIBRATION
FS 2	full scale	MAXIMUM CAPACITY
LoAd0	load 0	ZERO WEIGHT CALIBRATION
LoAd1	load 1	ONE LOAD CALIBRATION
LoAd2	load 2	TWO LOADS CALIBRATION
LoAd3	load 3	THREE LOADS CALIBRATION
End	end	Save and exit.
U Adj	power adjustment	POWER ADJUSTMENT
SYS	system information	SYSTEM INFO
Ver 10	version	SYSTEM VERSION
ou005	overload times	OVERLOAD TIMES
d0704	manufacturing date	MANUFACTURING DATE

5. NOTES