


13. OPTIONS

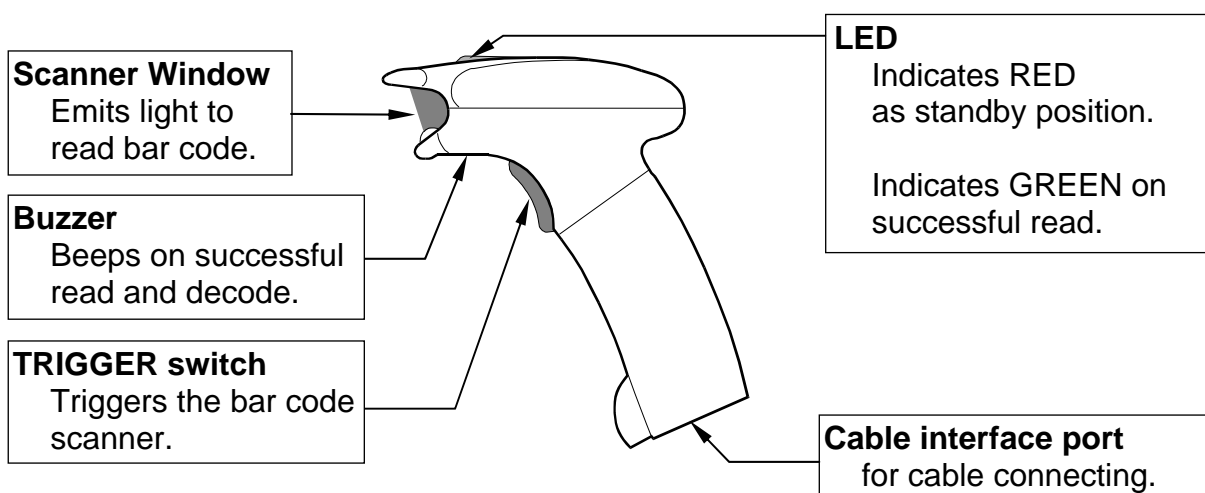
13-1. OP-01 Bar Code Reader



The OP-01 includes a bar code reader, RS-232C cable, AC adapter (100V~240V), power plug adapter (US to European plug) and a setting-up bar code sheet.

- ☐ The OP-01 bar code reader can be connected to one of the RS-232C interfaces. It can read bar codes for the ID number, unit weight, tare weight and comparator limits.
- ☐ When the bar code reader reads the ID number, the scale will recall unit weight from ID memory instead of by using the **ID** key.
- ☐ Set the F-Function $F-06/07/08-01="5"$ to use a bar code reader. For example, to use Ch.1 (PORT 1), set $F-07-01="5"$.

 Refer to "12-6. Using a Bar Code Reader" about the bar code data and prepare bar code labels.

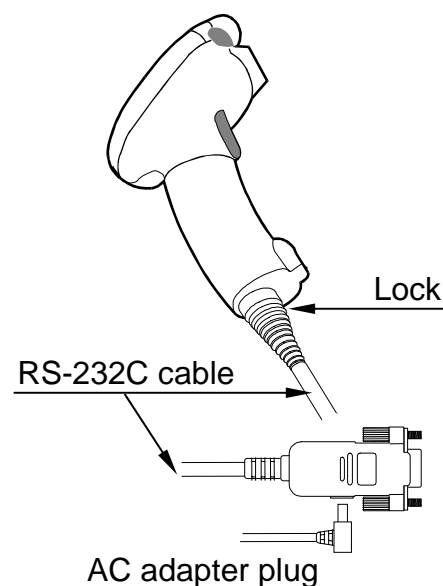
- ☐ The OP-01 bar code reader can be connected to one of the RS-232C interfaces. It can read bar codes for the ID number, unit weight, tare weight and comparator limits.



 01123456	RIGHT	<ul style="list-style-type: none"> Aim the scanner at the barcode and press the trigger. Ensure the scan line crosses every bar and space. Do not hold the scanner directly over the barcode. Maximum reading distance is approx. 15 mm (6 inches).
 01123456	WRONG	

Using OP-01 Bar Code Reader








1. Plug the modular connector of RS-232C cable into the port on the bottom of bar code reader, and twist the lock to the right to lock it.
2. Connect the other end of the RS-232C cable to the RS-232C interface of the scale.
3. Plug in the AC adapter for OP-01. AC adapter jack is located at the side of the RS-232C cable connector.
4. Set the F-Function $F-06/07/08-01="5"$ according to the interface you connected. For example, to use Ch.1 (PORT 1), set $F-07-01="5"$.
5. Read the next bar codes step by step, then the bar code reader will be set to work with the scale.



- ⚠ This sets the RS-232C to be 9600 bps and 8 bits data / non parity. Set the F-Function $F-06/07/08-04="2"$ and $F-06/07/08-05="2"$. For example, to use Ch.1 (PORT 1), set $F-07-04="2"$ and $F-07-05="2"$.
- ⚠ By this set-up, the FC-*i* / FC-*Si* can accept bar codes of EAN-13/8, JAN-13/8, UPC-A/E, Codabar (NW-7), Interleaved 2 of 5 and Code 39.
- ⚠ The UPC-A bar code can not be used together with EAN/JAN-13. Refer to "Note 1" at "Step 4".

Note 1: When using UPC-A bar code, skip "Step 4".

STEP	Set-up Bar Code	Definition
Step 1		Start of configuration
Step 2		Rest to default settings
Step 3		Select RS-232C interface
Step 4 Refer to Note 1		Force UPC-A to EAN-13
Step 5		Disable transmitting UPC-A check digit

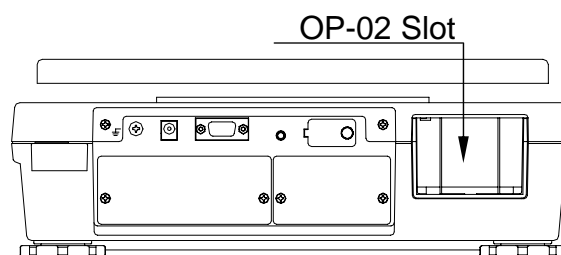
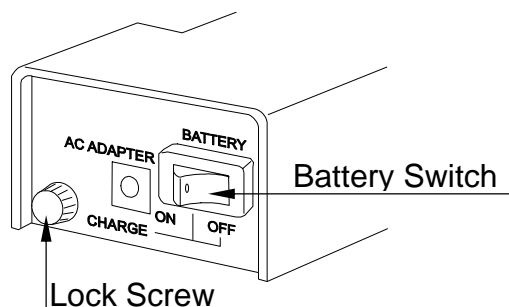
Step 6		Disable transmitting UPC-E check digit
Step 7		Disable transmitting EAN-13 check digit
Step 8		Disable transmitting EAN-8 check digit
Step 9		Disable transmitting CODABAR Start/Stop character
Step 10		Disable transmitting CODE 39 check digit
Step 11		Disable transmitting Interleaved 2 of 5 check digit
Step 12		End of configuration

13-2. OP-02 Ni-MH Battery Pack

Using OP-02 Battery Pack

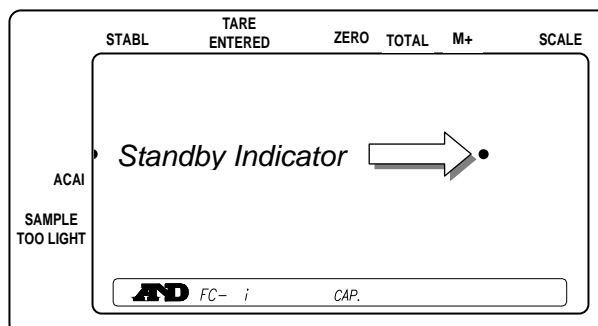
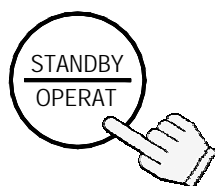
- By using the OP-02 Ni-MH battery pack, the scale can be operated for around 10 hours, after a full charge and using no other options.

- After making sure that the battery switch on the battery pack is "OFF" position, insert the battery pack firmly into the rear side of the scale.



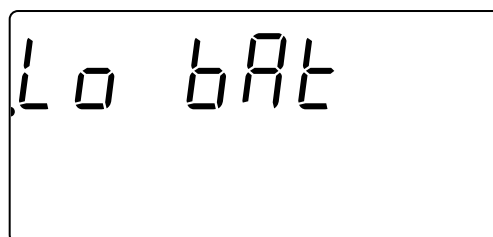
- Tighten the lock screw on the battery pack.
- When desired, turn the battery switch on to supply power to the scale. The display will come on after its self-check.

- Use the **STANDBY/OPERATE** key to turn the display on or off. When the scale is in standby mode, a period appears in the weight display as an indicator.



- When the count display shows "Lo bAt" for low battery, the battery power is almost exhausted and should be recharged.

- Before getting to low battery, the display will show "Lo bAt" on and off to indicate that the battery power is coming close to low battery.



The **STANDBY/OPERATE** key only turns the display on or off (and keeps the scale warmed up on standby). When the scale is not used for a long periods, switch the battery switch to "OFF" position.

Recharging the Battery

- Turn the battery switch off on the battery pack.

2. Fully loosen the lock screw and remove the battery.

- ☐ If you want to recharge the battery while it is still in the scale, you may do so. In that case, disregard step 2 – but do not turn the battery switch on. If you wish to use the scale, connect another AC adapter.

3. Connect the AC adapter to the battery pack.

- ☐ The battery pack will take about 15 hours to fully charge.
- ☐ Charge the battery pack at a temperature between 0°C (32°F) and 40°C (104°F).
- ☐ Do not charge too long as overcharging will reduce the life of batteries.
- ☐ Be sure to charge the battery pack when using for the first time or if it was not used for long time (more than one month). Two or three times of recharging may be needed to reach full charge.
- ☐ Be sure to use the AC adapter that is provided with the scale.

Battery switch	AC Adapter to battery pack	AC Adapter to scale	Charge	Scale operation
ON or OFF	Connected	Connected	Yes	Operational
ON or OFF	Not connected	Connected	No	Operational
OFF	Connected	Not connected	Yes	Not operational
ON	Connected	Not connected	No	Not recommended (See note)

Note The scale will be operational. After connecting the AC adapter to the battery pack, you may have to turn the battery switch OFF once and turn it ON to operate the scale.

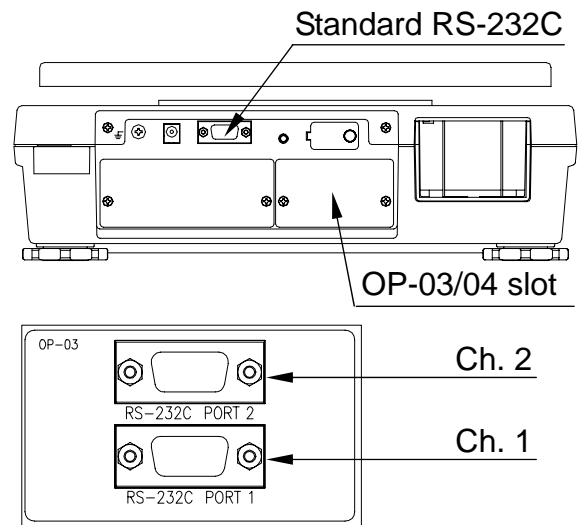
13-3. OP-03 2 Ch. RS-232C

Multiple RS-232C interfaces expanding your counting applications are obtained by installing OP-03.

OP-03 Installation

1. Disconnect the AC adapter from the scale.
2. Remove the two screws and panel covering the OP-03/04 slot.
3. Connect the connector in the scale to the OP-03 unit.
4. Secure the OP-03 unit using the screws removed in the step 2 above.

- ☐ Specifications are same as the standard RS-232C interface and refer to “12. RS-232C SERIAL INTERFACE”.

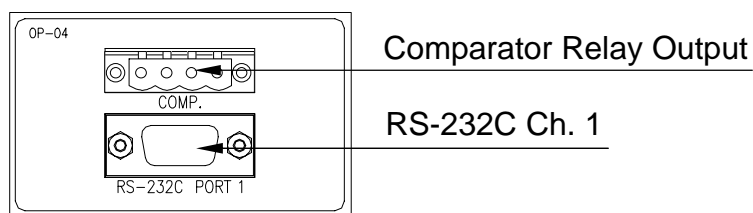


13-4. OP-04 RS-232C and Comparator Relay Output

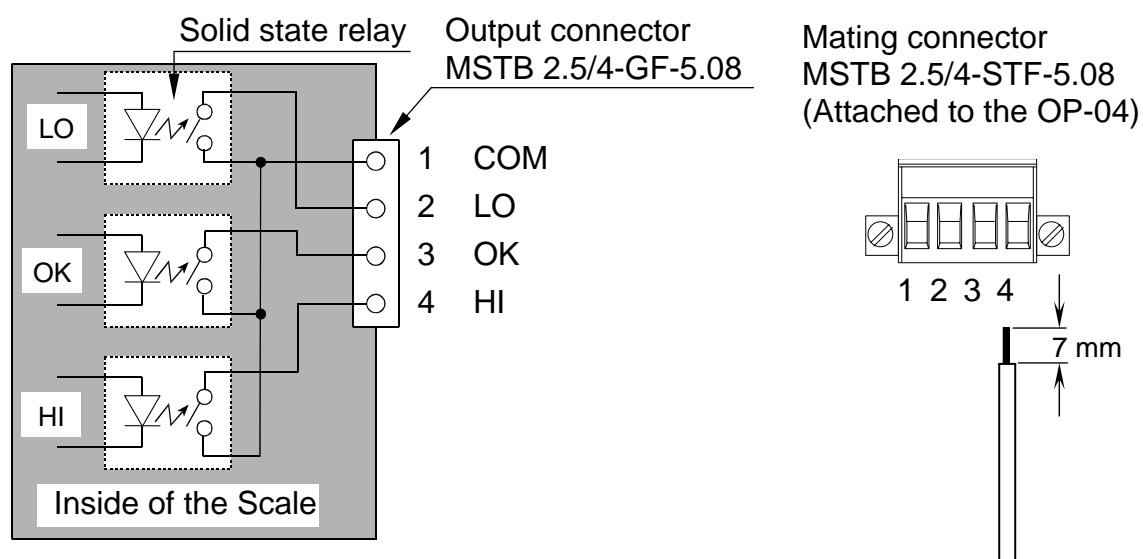
Multiple RS-232C interfaces and relay output for the comparator results are obtained by installing OP-04.

OP-04 Installation

- ☐ See the OP-03 installation.
- ☐ OP-04 is installed to the same slot as option OP-03.
- ☐ The RS-232C specifications are same as the standard RS-232C interface. Refer to “12. RS-232C SERIAL INTERFACE”.



Comparator Relay Output Circuit



Maximum rating of the Relay Output

The maximum rating of the replay output is as follows.

- ☐ Maximum voltage: 50V DC
- ☐ Maximum current: 100mA DC
- ☐ Maximum ON resistance: 8Ω

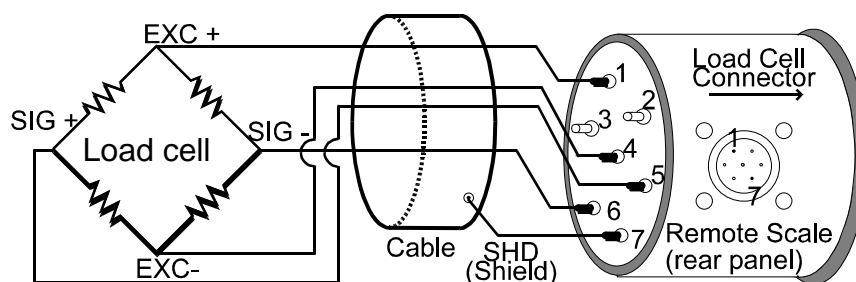
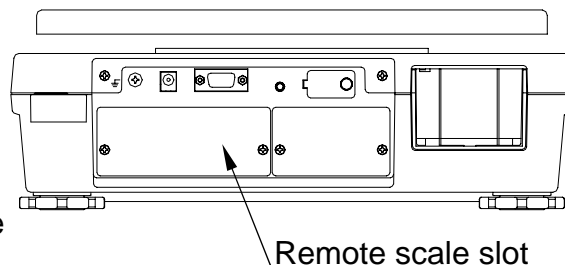
13-5. OP-05 Remote Scale Interface

A two-scale system using the scale is possible by installing OP-05 and connecting a remote scale. You can use any load cell platform that meets the conditions in this section.

OP-05 Installation

1. Disconnect the AC adapter from the scale.
2. Remove the two screws and panel covering the Remote scale slot.
3. Connect the connector in the scale to the OP-05 unit.
4. Secure the OP-05 unit using the screws removed in the step 2 above.

- ☐ If you are not using the remote scale for the moment, attach the protective screw cap to the remote scale connector.



Notes on Using the Remote Scale

- ☐ To get a highly accurate counting unit weight, use the main scale to register the unit weight and use ACAI feature. After registration, switch to the remote scale to count.
- ☐ If $F-01-03$ is set at "1", then the scale will automatically switch to the remote scale after the unit weight (by sample pieces) is registered by the main scale. Pressing the **SAMPLE** key will always return to the main scale.
- ☐ Be aware that both the main and remote scales have separate tare values. So, if you want to use a tare container on both, it must be tared on both.
- ☐ F-Function $F-01-06$ can be set so the remote scale has an independent unit weight, or is restricted to the same as the main scale.

Specifications for Remote Scale

The scale has the ability of driving up to 4 load cells (350Ω) in a remote scale (platform). Set for the capacity range 0.5kg to 5,000kg (1 lb to 10,000 lb).

☐ The scale has the ability of driving up to 4 load cells (350Ω) in a remote scale (platform).

☐ **Capacity range** for the remote scale is 0.5kg to 5,000kg (1 lb to 10,000 lb).

☐ **Minimum output** at zero point is 1mV.

☐ **Maximum output** at full load is 14mV.

 Excitation Voltage of the scale is 5V.

☐ **Cable length** should be kept under 5m (16.5 ft.) for higher accuracy.

☐ **Pin connection** (JM:NJC-207-PF):

The Load Cell and Input Sensitivity

The relationship between load cell and input sensitivity (X) for the scale is follows:

<input type="checkbox"/> Example	Load Cell Capacity	100kg	"A"
	Rated Output	3mV/V	"B"
	Min., Division of Display	0.01kg	"D"

☐ When a single Load Cell is used, the following formula should apply:

$$"X" = \frac{5,000 \times B \times D}{A} \mu V$$

☐ System design will be satisfactory if "X" is greater than 0.5μV. In the example above

$$"X" = 1.5\mu V.$$

Capacity and Resolution

☐ The resolution of the remote scale is automatically determined during the calibration procedure. The following is to enable you to calculate the resolution for a given capacity.

1. Decide the capacity value and assign it to "Ws". Maximum 5 digits.
2. Get the maximum count "Ns" for the capacity. Ignore the decimal point and add "0" to Ws until it is 5 digits.
3. Calculate: $d' = Ns / 10,000$.
4. Decide the minimum division "d".

$d' = 1$	$\rightarrow d = 1$
$2 \geq d' > 1$	$\rightarrow d = 2$
$5 \geq d' > 2$	$\rightarrow d = 5$
$d' > 5$	$\rightarrow d = 10$ This should be changed to $d = 1$, dividing Ns by 10.
5. Now "Ns x d" and the resolution $1/No = d/Ns$ can be determined.

Step	Parameters	Example 1	Example 2	Example 3
1	Ws	200kg	30.0kg	600kg
2	Ns	20,000	30,000	60,000
3	d'	2	3	6
4	d	2 (=0.02kg)	5 (=0.005kg)	10 (=0.1kg)
5	Ns x d	20,000 x 2	30,000 x 5	6,000 x 1
	1/No (=d/Ns)	1/10,000	1/6,000	1/6,000

6. Calculate the voltage sensitivity “Es”.

$$Es = (As - Ao) \times 5,000 \times 1/No \text{ (}\mu\text{V)} \quad [5,000 \text{ means excitation voltage } 5V]$$

Ao: Load cell output at zero point (mV/V)

As: Load cell output at full capacity (mV/V)

7. Check the voltage sensitivity “Es”.

$Es \geq 0.5\mu\text{V}$ → Calculated “Ns x d” is fixed. In example 3 in the step 5, a 600kg x 0.1kg scale will be obtained.

$Es < 0.5\mu\text{V}$ → Change “d” for new resolution 1/No.

d=1 → 2

d=2 → 5

d=5 → 10 → 1 (dividing “Ns” by 10)

In example 1,

the new d=5: $1/No = d/Ns = 5/20,000 = 1/4,000$ (200kg x 0.05kg)

In example 2,

the new d=1 and Ns=3,000: $1/No = d/Ns = 1/3,000$ (30kg x 0.01kg)

Using the new 1/No, go to step 6 and repeat it until $Es \geq 0.5\mu\text{V}$ in step 7.

Remote Scale kg/lb relationship

USA Version ONLY

❑ When the capacity was set by “kg”:

Let capacity x minimum division = Ws x Wd (kg)

When:

d = 1, then $Wd \text{ (lb)} = Wd \text{ (kg)} \times 2$

d = 2, then $Wd \text{ (lb)} = Wd \text{ (kg)} \times 5/2$

d = 5, then $Wd \text{ (lb)} = Wd \text{ (kg)} \times 2$

And:

$Ws \text{ (lb)} = Wd \text{ (kg)} \times No$

Example: $15\text{kg} \times 0.002\text{kg}$, $No = 15\text{kg}/0.002\text{kg} = 7,500$

$Wd \text{ (lb)} = 0.002 \times 5/2 = 0.005 \text{ (lb)}$

$Ws \text{ (lb)} = 0.005 \text{ (lb)} \times 7,500 = 37.5 \text{ (lb)}$

❑ When the capacity was set by “lb”:

Let capacity x minimum division = Ws x Wd (lb)

When:

d = 1, then $Wd \text{ (kg)} = Wd \text{ (lb)} \times 1/2$

d = 2, then $Wd \text{ (kg)} = Wd \text{ (lb)} \times 1/2$

d = 5, then $Wd \text{ (kg)} = Wd \text{ (lb)} \times 2/5$

And:

$Ws \text{ (kg)} = Wd \text{ (lb)} \times No$

Example: $30\text{lb} \times 0.005\text{lb}$, $No = 30\text{lb}/0.005\text{lb} = 6,000$

$$W_d \text{ (kg)} = 0.005 \times 2/5 = 0.002 \text{ (kg)}$$

$$W_s \text{ (kg)} = 0.002 \text{ (kg)} \times 6,000 = 12 \text{ (kg)}$$

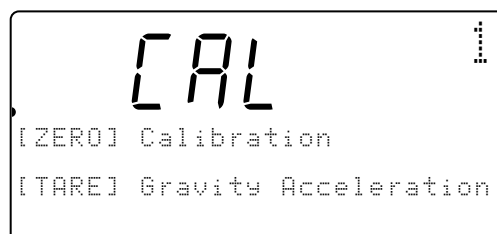
Calibrating the Remote Scale

⚠ When a remote scale is newly connected, set the capacity and calibrate the scale using a weight.

⚠ The scale must be warmed up (plugged in) for at least 30 minutes before starting calibration.

1. Remove the calibration switch cover, and press the calibration **[CAL]** switch.
The scale shows "CAL" in the count display.

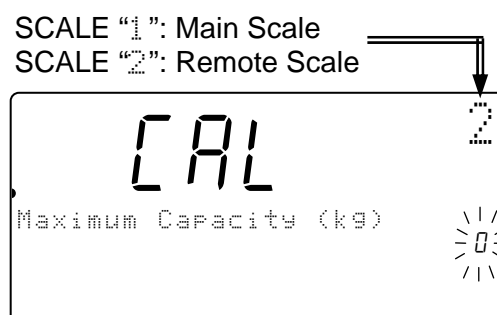
❑ Press the **[CAL]** switch to exit without calibrating the scale.



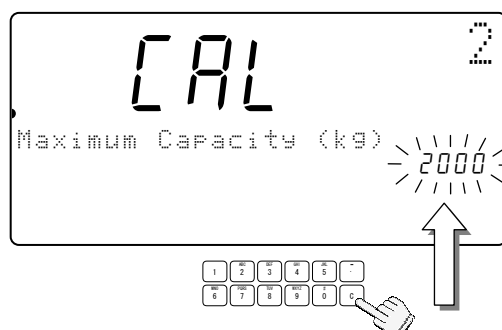
2. Press the **[REMOTE SCALE]** key to display SCALE "2".

⚠ When SCALE "1" is displayed, press the **[REMOTE SCALE]** key again.

❑ Once the remote scale has been calibrated, the display will go to step 4.

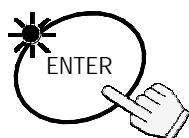


3. Use the **[0] → [9]** and **[.]** 10-key pad to display the desired capacity.
(Example of capacity 2000kg)



4. Press the **[ENTER]** key.
The capacity value stops blinking.

❑ When the remote scale has been changed or to change capacity, go back to step 3.



5. Press the **[ENTER]** key again to store the capacity entered and the remote scale is ready to be calibrated.

