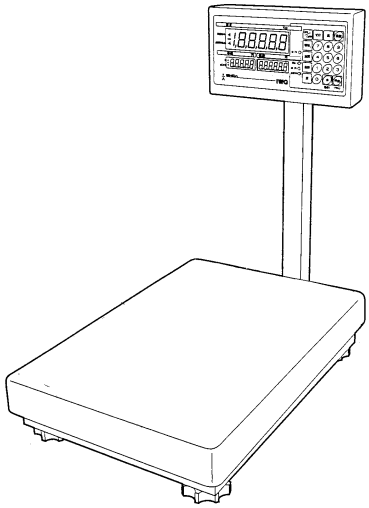
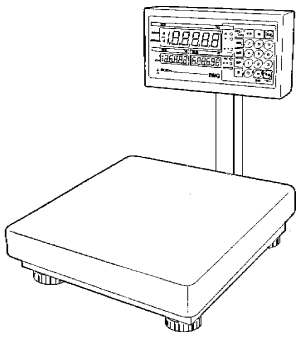
IWQ Series

Service Manual

First Edition





Warning

- Read this manual thoroughly and do not perform installation, operation, maintenance, or inspection unless you fully understand all contents.
- Keep this manual in a safe place where you can refer to it easily while installing, operating, and carrying out maintenance or inspections.

This manual is for use by service personnel of our company or qualified to perform maintenance services for this machine.

Manual No. 0153A

ISHIDA CO., LTD.

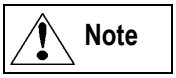
OUTLINE

- Purpose of this manual
  This manual is used for reference at installation, placement or maintenance servicing of IWQ-150 or IWQ-30.
- Symbols in the description

1. Warning symbols

Symbol	Meaning
	Indicates information that, if not avoided, is likely to result in loss of life or serious injury. (The word is used for an urgency most likely to result in loss of life or serious injury if the instruction is not heeded. The symbol is limited to extremely dangerous situations.)
	Indicates information that, if not avoided, may result in loss of life or serious injury. (The word is used for a potentially dangerous situation possibly resulting in loss of life or serious injury if the instruction is not heeded.)
	Indicates information that, if not avoided, could result in relatively serious or minor injury, damage to the machine or faulty operation. (The word is used for a situation possibly resulting in relatively serious or minor injuries, damage to the machine or faulty operation, if the instruction is not heeded.)

2. Explanatory symbols

Symbol	Meaning
	Indicates information to call or emphasize for attention to the note.
	Indicates the page to refer to.
	Indicates information to help understanding.

- Readers of this manual
  This manual is edited for servicing personnel. Use by other personnel is not permitted.
- This manual may be revised in accordance with modification when made in the machine.
-

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Chapter 1. Product Overview

1.1 Product Overview

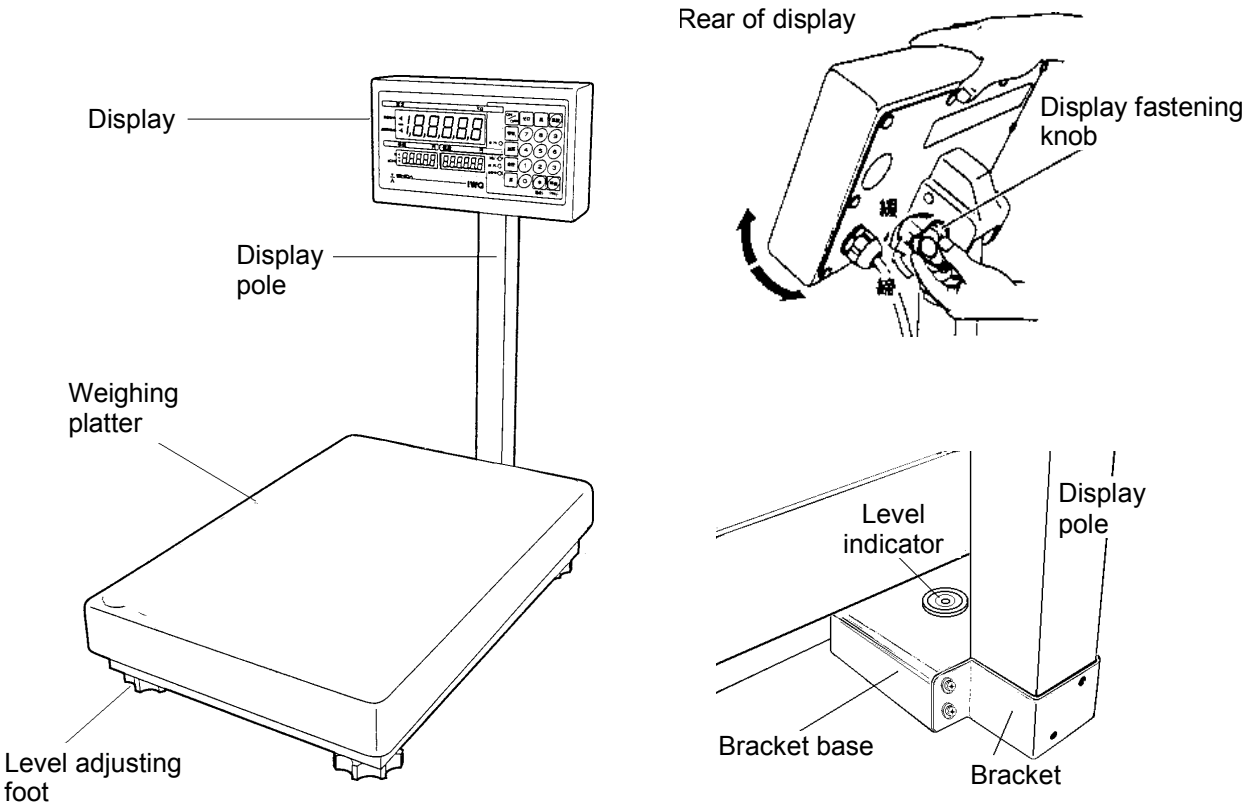
- The IWQ Series is waterproof type electronic scale (waterproof conforming to the class IP-65).
- Both IWQ-150 and IWQ-30 are equipped with checking and counting functions for the upper and lower limits of weight.
- The load cell has improved corrosion resistance by the aluminizing process and the baked finish with acrylic resin.
- For safety considerations, all electric wiring sections are coated with butyl rubber and a watertight lock mechanism is installed for the riser harness from the aluminum frame.

1.2 Standard Specifications

Item	Contents	
Type name	IWQ-150	IWQ-30
Weighing capacity	60kg/150kg Multiple interval	15kg/30kg Multiple interval
Scale unit	0.02kg/0.05kg	0.005kg/0.01kg
Accuracy	1/3000	
Accuracy class	OIML R76 Class III	
Weigh platter size	530mm(L) x 380mm(W) Flat platter (standard)	350mm(L) x 350mm(W) Flat platter (standard)
Sheathing	Display section: Stainless SUS304 Display support column: Stainless SUS304 Weighing platter: Stainless SUS304	
Display angle range	Horizontal (0°) – Front view (90°) step-less fixation by knob lock	
Weight	18kg	10kg
Power source	100VAC – 240VAC 50/60Hz (Insured operation within range 85VAC – 264VAC). Rating voltage shall be specified within the above range for respective country.	
Current consumption	100VAC: 100mA, 110-120VAC: 90mA, 220-240VAC: 80mA	
Environmental conditions	Ambient temperature: –10°C to 40°C without condensation by rapid temperature change	
Waterproof class	Conforming to IP-65	
Display	Figures: Weighed value: 30.5mm(H) Multi-digit fluorescent tube Upper limit: 13.0mm(H) Multi-digit fluorescent tube Lower limit: 13.0mm(H) Multi-digit fluorescent tube (Upper and lower limit display shares 12-digit tube) Mark: Tare weight deducted, zero point for display (multiple-digit tube to display weight,◀cursor) Stable: (Green LED) Over: (Yellow LED) Accept: (Green LED) Under: (Red LED)	
Pre-set functions	PLU1–PLU10 for 10 items (tare weight + upper limit + lower limit)	
Tare weight preset	Able to register up to the weighing capacity less 1 scale unit.	
Upper/lower limit preset	Able to register up to 99999 value.	
Single weight preset	Able to register under 10% of the weighing capacity.	
Key-in tare weight	Able to register up to the weighing capacity less 1 scale unit.	
Maximum quantity display	Display up to the quantity as many as 50000 pieces.	
Sampling quantity	1 to 9999 pieces	
External connector	•DIN-5 (RS-232C···journal printer) •HR12-8P (Relay box)	
Option	•RB-IW Relay box	

1.3 Appearance

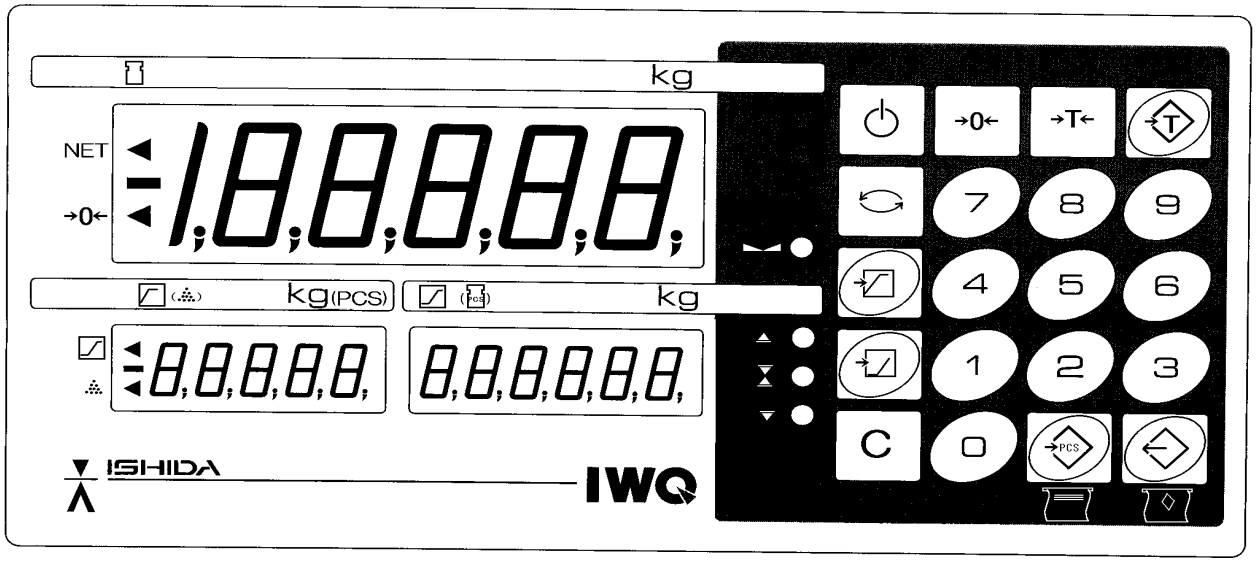
■ IWQ-150



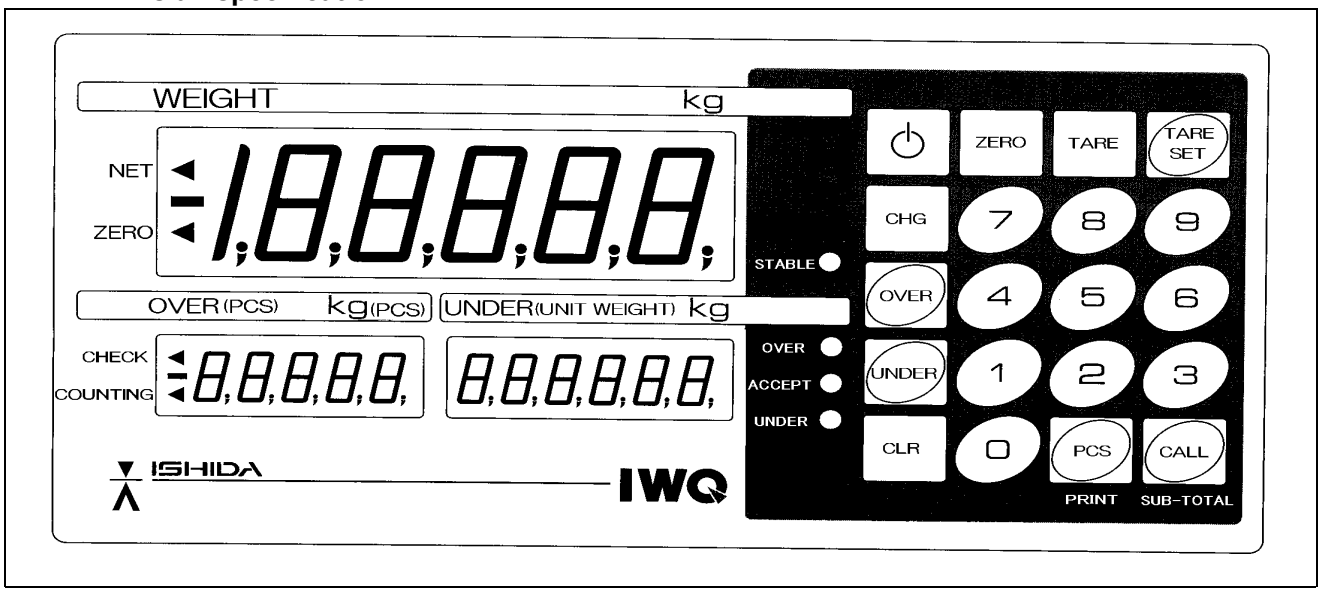
1.4 Appearance of Operation Panel

■ Common to IWQ-150 and IWQ-30

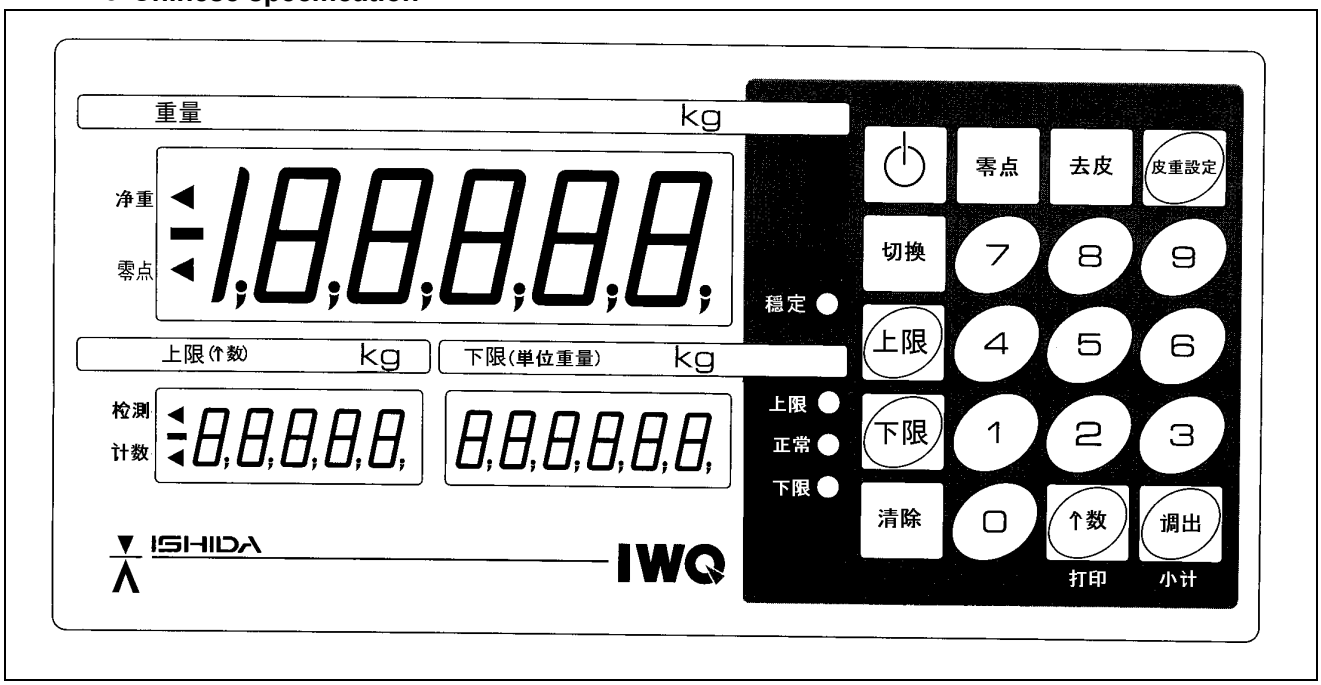
- **European specification**



● **Asian specification**



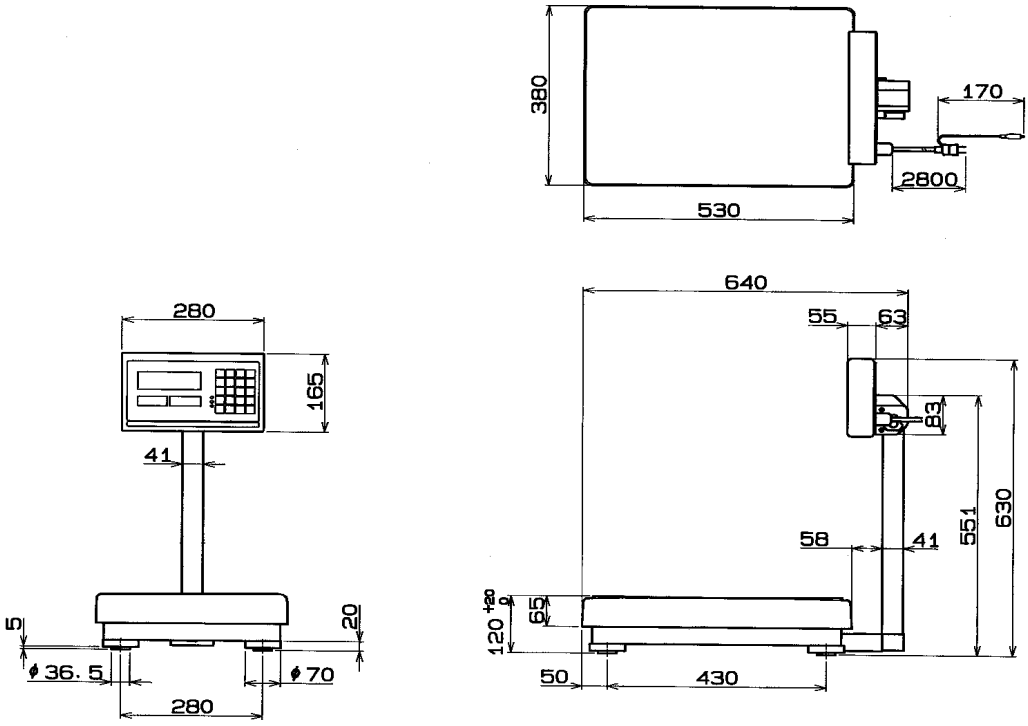
● **Chinese specification**



Chapter 2. Installation, Placement and Setup

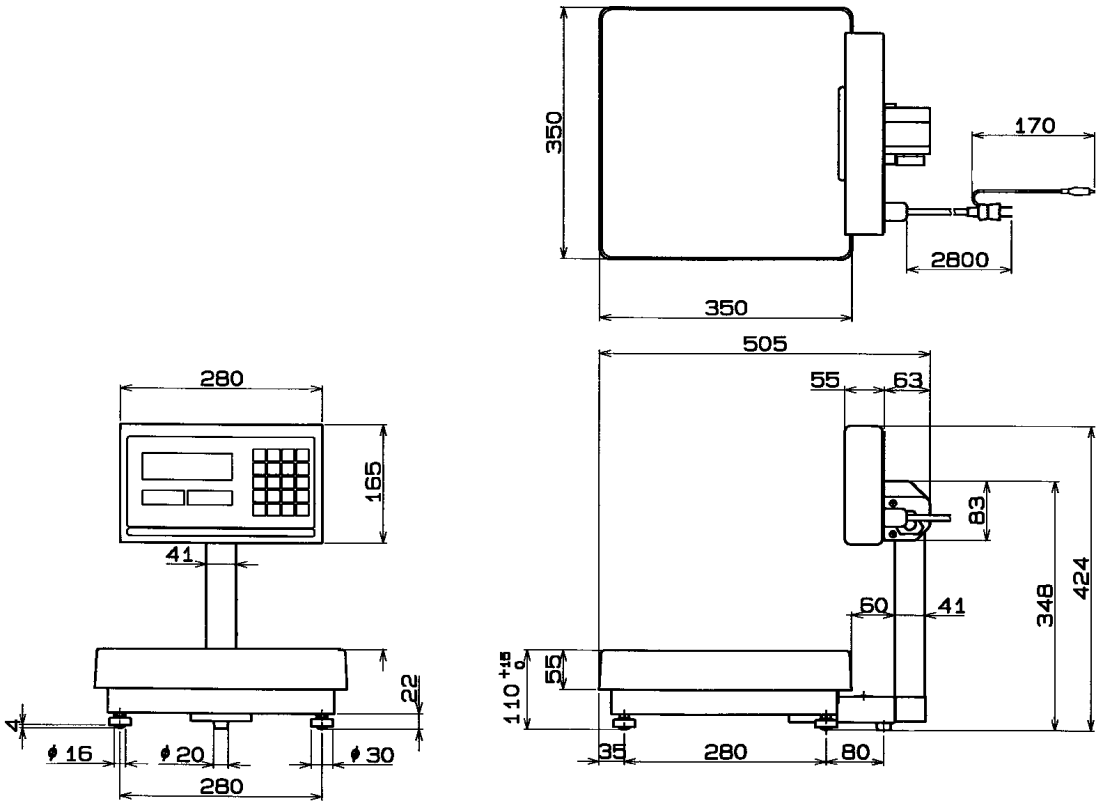
2.1 Outer Dimensions

■ **IWQ-150**



Unit: mm

■ **IWQ-30**

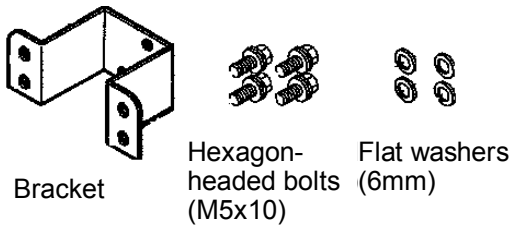


Unit: mm

2.2 Procedures of Installation and Placement

1. Unpack and confirm the following attached parts.

6mm flat washers	4 pieces
Bracket	1 piece
Hexagon-headed bolt (M5x10mm)	4 pieces

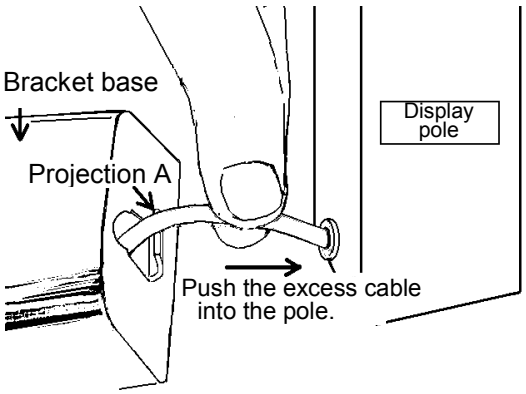


2. Mount the display pole.

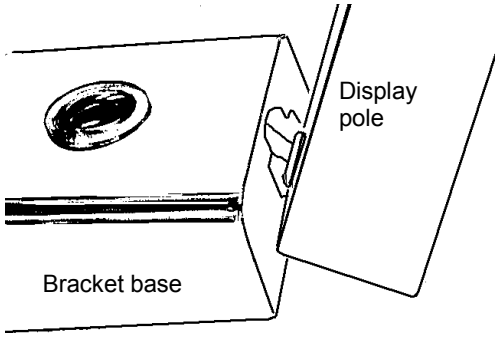
Although the display and the pole are assembled by the fastening knob, the pole and the bracket base are not.

Caution The cell cable may rupture if pulled forcefully. If the cable sheath is damaged, the cable material may corrode and result in malfunctioning.

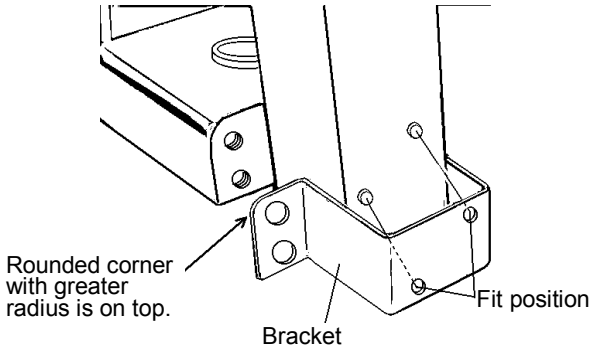
(1) Push the excess length of cable into the support column.



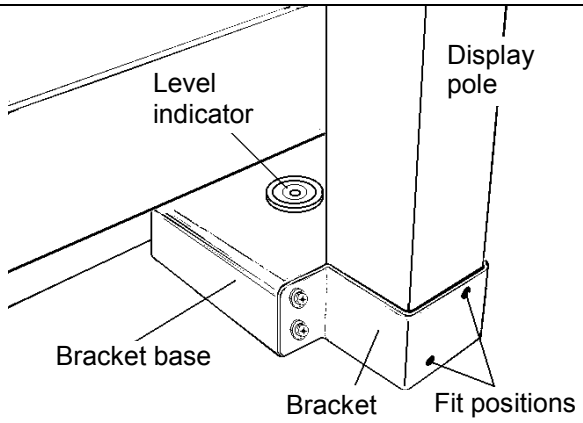
(2) Put the display pole vertically along the bracket base side in the way of inserting the cell cable outlet into the projection A (above figure).



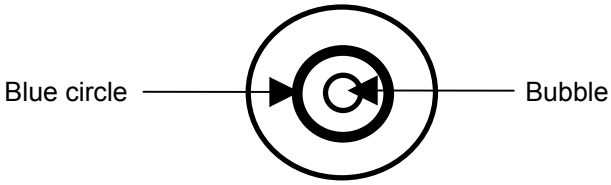
(3) Fasten the bracket temporarily with the flat washers (6mm) and hexagon-headed bolts (M5x10mm) at 4 points. The bracket is asymmetric about the mid-horizontal line. The figure in the right shows the direction of the bracket when it is fastened.



(4) Confirm that the bracket and the display pole fit at the fit positions, and fasten with the four hexagon-headed screws.



4. Adjust the level by the four level adjustment feet so as to position the bubble within the blue circle of the level indicator.



5. Insert the power plug of the scale to the power supply outlet only when ensuring that the voltage is within 100VAC to 240VAC at the outlet using the volt-meter.

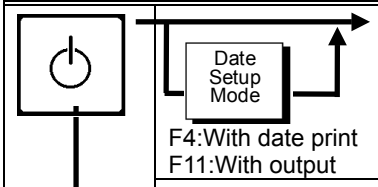
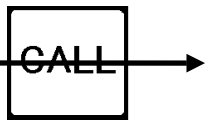
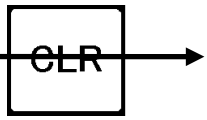
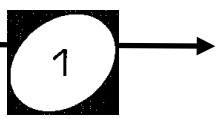
Note This product is live while the power plug is inserted in the outlet.

Caution The product may be damaged if the applied power voltage is outside the rated range.

6. (1) Push the ON/OFF key ⏻ on the operation panel for display.
   (2) Initialize the Test Mode to ensure that weighing capacity and span (weight) meet.
   (3) Base operation-related training for users on the User's Manual.

Chapter 3. Each Setting Mode

3.1 Configuration of Modes

Operation	Mode	Item
	Normal Mode	For the normal mode, a description is given in the "User's Manual".
	Registration Mode	Number of registration: PLU1 – PLU10 (fixed) Items to be registered: Upper limit ·lower limit· tare. For registration, a description is given in the "User's Manual".
	Setup Mode	F1: Selection by key. Turn to Normally ON/OFF by ON/OFF key. F2: Preset automatic call-up function YES/NO. F3: Printer, number of digits 16/20–24. F4: Printer, date printing YES/NO. F5: Printer, PLU No. printing YES/NO. F6: Printer, tare upper-lower limit printing YES/NO. F7: Printer, serial No. printing YES/NO. F8: Printer, selecting Single/Consecutive slip. F9: RS232C, selecting transmission speed. F10: RS232C, selecting output format (transmitted message). F11: RS232C, selecting output (method/no output). F12: RS232C, selecting output conditions. F13: Selecting contact output signal. F14: Selecting contact input. F15: Selecting conditions for loud buzzer (OP). F16: Selecting conditions for internal buzzer (standard). **Caution** Printer is connected to RS232C. Items F9 to F12 are also required.
	Test Mode	C1: Adjusting scale. C2: Key check. C3: Display check (1). C4: Display check (2). C5: Displaying program No. C6: Initializing E2ROM (registration · set data/all). C7: Individual setting for country measurement conditions. C8: Reading out E2ROM data. C9: Inspection mode for A/D, I/F.

Caution	The start-up procedure for registration, setup and test mode requires pressing the ON/OFF key ⏻ while the scale is OFF (immediately while the buzzer is sound-ing), then pressing the CALL , CLR and 1 keys for a while.

3.2 Setup Mode

3.2.1 Setup mode list

(ON/OFF key, PLU automatic call-up function, and concerns relating to the printer)

Set No.	Setup title	Set value & functions (Default underlined)	Remarks
F1	ON/OFF key available/unavailable	0: Available 1: Unavailable	In the “Unavailable” case, the display is normally ON when power is supplied to the power plug.
F2	Call PLU1 when ON	0: NO 1: YES	When the scale is ON, PLU1 upper/lower values and tare weight are called up automatically.

Linked operations with journal printer

Set No.	Setup title	Set value & functions (Default underlined)	Remarks
F3	Selecting number of digits	0: 16 digits 1: 20 to 24 digits	• Relates to line feed. • Selects the linked printer by the number of digits.
F4	Date printing	0: NO 1: YES	• When YES is set for printer output and date, “DATE” and “000000” are displayed when power is turned ON. Input the date in 6 digits and press the PCS key. When “NO” is set for printer output, input date is not displayed.
F5	Printing preset No.	0: NO 1: YES	
F6	Printing tare weight & upper/lower limits	0: NO 1: YES	
F7	Printing serial No.	0: NO 1: YES	
F8	Selecting slip type single/consecutive	0: Single slip 1: Consecutive slip	• Single slip: Feeds 6 lines after printing. Prints header every time. • Consecutive slip: No line feed after printing.

Items relating to RS232C output

Set No.	Setup title	Set value & functions (Default underlined)	Remarks
F9	Baud rate	0: 1200bps 1: 2400bps 2: 4800bps 3: 9600bps 4: 19200bps 5: 38400bps	• Transmission specifications (fixed) Start-stop synchronous, Start bit : 1, Data bit : 8, Stop bit : 2, Parity bit : none, Transmission code : ASCII
F10	Selecting serial output format	0: Specifically designed for printer. 1: DAP-01 format 2: IWQ1 format (DAP-01 expanded) 3: MZ-7000 format 4: IWQ2 format (MZ-7000 expanded)	 Refer to Item 4 Output format.

Set No.	Setup title	Set value & functions (Default underlined)	Remarks
F11	Serial output method	0: No output 1: Send-out in discharge (synchronous to A/D) 2: Output conditions (F12) 3: As requested for DATA input (RS input) (contact input)	• Set other than 0 for linked printer. • When “2: Output conditions” is selected, the conditions selected in F12 are applicable.
F12	Serial output conditions	0: Output when automatic/within range /re-stabilize 1: Output when manual/within range/re-stabilize 2: Output when automatic/range disregarded/re-stabilize 3: Output when manual/ range disregarded/re-stabilize 4: Output when automatic/within range/zero return 5: Output when manual/within range/zero return 6: Output when automatic/range disregarded/zero return 7: Output when manual/range disregarded/zero return • When “Send-out in discharge” is set, the O8 command is not available. • When manual printing is set, key input is determined to be error for a unstable state.	• Functions when selecting 2: output conditions for F11. • ”Within range” means the range between upper and lower limit values. • ”Range disregarded” means free from the range between upper and lower limit values even if they are set. • Applicable to either within or outside the range, when upper and lower limits are not set.

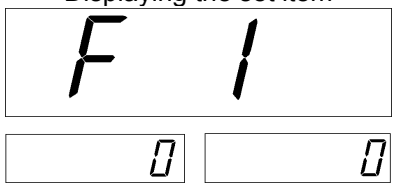
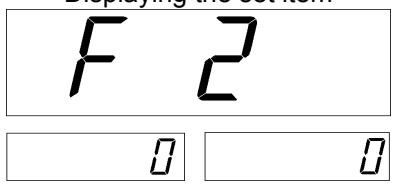
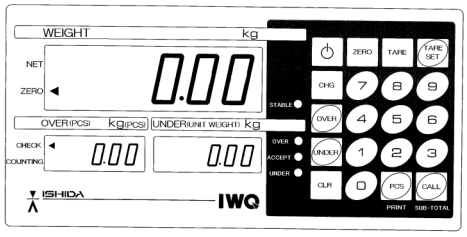
Items relating to relay output (relay box)

Set No.	Setup title	Set value & functions (Default underlined)					Remarks
F13	Setting contact output signal (relay box)		OUT1	OUT2	OUT3	OUT4	• Output is ON for up each of the conditions. • Signals are all OFF when power is ON.
		0	Stable	Zero point marking	Accept	Over	
		1	Stable	Zero display	Accept	Over	
		2	Stable	Zero display	Accept	Under & Over	
		3	Stable	Under	Accept	Over	
		4	Tare deduction	Under	Accept	Over	
F14	Selecting relay input	0: “ON/OFF” key 1: “TARE” key 2: “ZERO” key 3: Scale data output (same response as O8 command)					

Items relating to buzzer

Set No.	Setup title	Set value & functions (Default underlined)
F15	Loud buzzer • Buzzer may sound immediately after the power is turned ON due to unstable power characteristics for an initial second.	0: Same time as internal buzzer; Buzzer ON(normally OFF) 1: When conditioned as "Over"; Buzzer ON(normally OFF) 2: When conditioned as "Accept"; Buzzer ON(normally OFF) 3: When conditioned as "Under"; Buzzer ON(normally OFF) 4: When scale stable; Buzzer ON(normally OFF) 5: On "Over" condition; when scale stable; Buzzer ON(normally OFF) 6: On "Accept" condition; when scale stable; Buzzer ON(normally OFF) 7: Outside range; when scale stable; Buzzer ON(normally OFF) 8: Same time as internal buzzer; Buzzer OFF(normally ON) 9: When conditioned as "Over"; Buzzer OFF(normally ON) 10: When conditioned as "Accept"; Buzzer OFF(normally ON) 11: When conditioned as "Under"; Buzzer OFF(normally ON) 12: When scale stable; Buzzer OFF(normally ON) 13: Under "Over" condition; when scale stable; Buzzer OFF(normally ON) 14: Under "Accept" condition; when scale stable; Buzzer OFF(normally ON) 15: Outside range; when scale stable; Buzzer OFF(normally ON)
F16	Internal buzzer	0: When stable outside range; <Successive "Blips"> 1: When stable under "Accept" condition; <Long continuous "Beeps"> 2: When stable under "Over" condition; <Successive "Blips"> 3: Buzzer OFF (neither key input sound) 4: Only during key input or when stable; 5: Only during key input 6: Upper/lower limits verification function; (regardless of being stable/unstable) UNDER: Successive "Blips" with an interval ACCEPT : Long continuous "Beeps" OVER : Successive "Blips"

3.2.2 Start-up of Setup Mode, setup, and end of setup

Operation	Display
1. How to start On the scall OFF state, press the ON/OFF key ⏻, and then (immediately while the buzzer is sounding) press the CLR key for a while.	Displaying the set item  Set data display Input number display
2. Selecting items F1 to F16 Select one of the three methods; (1) Proceed in the right direction. TARE or CALL Changing successively in the "F1" →"F2" →"F3"…order. (2) Proceed in the reverse direction. TARE SET Changing successively in the "F1" →"F16" →"F15"…order. (3) Input item number and call up. Input item number(s) ☐ ☐, then press CALL.	Displaying the set item  Set data display Input number display
3. Setting data Input data and set using the PCS key.	
4. End of setup Press the ZERO key.	Normal display 

3.2.3 Input command format

• Input commands (received data)

Execution commands for functions

1) Tare weight deduction command (T Command)
2) Zero adjustment command (Z Command)
3) Preset call-up demand (P Command)

Commands for data demand

1) Scale data demand 1 (O8 Command, are time output upon receipt)
2) Scale data demand 2 (O9 Command, are time output upon receipt when transmission conditions meet.)

* The input command is determined to be valid only when the output mode is set to “data demand to be input”, and is undetermined for other cases.

• Transmission procedures

1) Conditions for command receipt
   A command can be received all the while the scale is ON, for the transmission mode is fully duplex, except that double command receipts are prohibited (until the first command is responded to fully, the second command will not be received).

   Except for Normal Mode (Setup Mode, Registration Mode, Tare Weight Setup Mode, etc.), a command is only received and executed/responded after returning to Normal Mode.

2) Response
   When a function execution command is received, an affirmative response (ACK) is output after normally execution. Alternatively, or a data output command is received, and a preset message is output when output conditions meet.

   When an invalid command or an invalid text is received, a negative response (NAK) is given when verifying outside the range for command execution, or when an input text is insufficient, the machine waits.

   For an insufficient text receipt, the receipt buffer will be reset if LF (OAH) is received.

• Input command text

1	2	3	4
C1	C2	CR (0DH)	LF (0AH)
Command		Terminator	

• Response command text

Affirmative response	ACK (06H)
Negative response	NAK (15H)

• Text layout (for function execution command)

♦Receipt text

Tare weight deduction command

	Command		Terminator	
Character	T	[SP]	CR	LF
Code	(54H)	(20H)	(0DH)	(0AH)

Function: Deducting the real tare weight.

Zero adjustment command

	Command		Terminator	
Character	Z	[SP]	CR	LF
Code	(5AH)	(20H)	(0DH)	(0AH)

Function: Adjusting for zero.

Preset call-up demanding command

	Command		Terminator	
Character	P	No.	CR	LF
Code	(50H)	*	(0DH)	(0AH)

Function: Calling up presets.

*Preset No. 0 to 9 (30H ~ 39H) and 10 (":"/40H).

♦Response text

Affirmative response

	Command
Character	ACK
Code	(06H)

Condition: Normally executed in 1 second.

Timing: At command execution completion.

Negative response

	Command
Character	NAK
Code	(15H)

Condition: Outside the range for command execution.
Not executed within 1 second.
Having received an invalid text.
Having received an invalid command.

Timing: Upon receiving an invalid text/command.
Upon verifying outside execution range.
1 second elapsed after receiving a command.

•Text layout 2 (for data output command)

♦Received text

Scale data demand 1

	Command		Terminator	
Character	O	8	CR	LF
Code	(4FH)	(38H)	(0DH)	(0AH)

Function: One time output upon receipt.

Scale data demand 2

	Command		Terminator	
Character	O	9	CR	LF
Code	(4FH)	(39H)	(0DH)	(0AH)

Function: One time output upon receipt when transmission conditions meet.

♦Response text

Affirmative response (data output)

Preset output message

Condition: Normally executed in 1 second (O8 command).
Data output conditions meet (O9 command).

Timing: At completing command execution.

Negative response

	Command
Character	NAK
Code	(15H)

Condition: Outside the range for scale operation.
No output within 1 second (for O8 command).
Having received an invalid text.
Having received an invalid command

Timing: Upon receiving an invalid text/command.
Upon verifying outside scale operation range.
1 second elapsed after receiving a command.

3.2.4 Output format

Five kinds of output format are available for selection at Setup Mode F10.

0: Format-specialized for printer (default), applicable to DAP-IW.
Weight print pattern / quantity print pattern
1: DAP-01 format
2: IWQ1 format (DAP-01 expanded)
3: MZ-7000 format
4: IWQ2 format (MZ-7000 expanded)

0: Format specialized for printer (Quantity number print pattern)

Operation/function	Line no.	Print image	Transmitted character
Date printing With Power ON, or after Sum-up calculation, prints for the initial printing condition. (Except when the date registration is not fulfilled.)	6 (5)	00-06-22 <1> [UW 0.0099kg] [PT - 10.99kg] [H 1111ps] [L 999ps]	, CR, LF ^^^^^^^^^^^^00-06-22, CR, LF ^^^^<1>, CR, LF ^^^^[UW^^0.0099kg^], CR, LF ^^^^[PT^-^10.99kg^], CR, LF ^^^^[^H^^^^1111ps^], CR, LF ^^^^[^L^^^^^999ps^], CR, LF
Weight print (less than the lower limit, stable)	1	L0001: 77ps	^^^^L0001:^^^^^^77ps, CR, LF
Weight print (within the range, stable)	1	0002: 1000ps	^^^^^0002:^^^^1000ps, CR, LF
Weight print (over the upper limit, stable)	1	H0003: 1523ps	^^^^H0003:^^^^1523ps, CR, LF
Weight print (within the range, stable)	1	L0004: 77ps	^^^^L0004:^^^^^^77ps, CR, LF
Weight print (within the range, stable)	1	0005: 1000ps	^^^^^0005:^^^^1000ps, CR, LF
Weight print (over the upper limit, stable)	1	H0006: 2000ps	^^^^H0006:^^^^2000ps, CR, LF
Call-up the preset (on the following printing condition)	4	<2> [UW 0.0321kg] [PT - 0.99kg] [H 2111ps] [L 1999ps]	^^^^<2>, CR, LF ^^^^[UW^^0.0321kg^], CR, LF ^^^^[PT^-^^0.99kg^], CR, LF ^^^^[^H^^^^2111ps^], CR, LF ^^^^[^L^^^^1999ps^], CR, LF
Weight print (within the range, stable)	1	0007: 2000ps	^^^^^0007:^^^^2000ps, CR, LF
Set tare weight (prints at summing up for succeeding item)	1	[T - 0.00kg]	^^^^[^T^-^^0.00kg^], CR, LF
Weight print (within the range, stable)	1	0008: 2000ps	^^^^^0008:^^^^2000ps, CR, LF
Call-up the preset (call-up 0) (on the following printing condition)	4	<0> [UW 0.0000kg] [T - 0.00kg] [H 0ps] [L 0ps]	^^^^<0>, CR, LF ^^^^[UW^^0.0000kg^], CR, LF ^^^^[^T^-^^0.00kg^], CR, LF ^^^^[^H^^^^^^^0ps^], CR, LF ^^^^[^L^^^^^^^0ps^], CR, LF
Weight print (within the range stable)	1	0009: 0ps	^^^^^0009:^^^^^^^0ps, CR, LF
Total	9	---------- TOTAL 0009: 9677ps	^^^^----------, CR, LF ^^^^TOTAL, CR, LF ^^^^^0009:^^^^9677ps, CR, LF
			, CR, LF , CR, LF , CR, LF , CR, LF , CR, LF , CR, LF
		Number of printed characters (20) 12345678901234567890123	Max. number of characters (20 + CR + LF) 12345678901234567890123, CR, LF

* Maximum of sequential No.: 9999
  <Prints after automatic printing for sub-total if exceeding the maximum>
* Maximum weight for sub-total: 9999999 (decimal point position to be fixed according to the weighing capacity)
  <Prints after automatic printing for sub-total if exceeding the maximum>
* Shall not output when weight value is not over 3e or over-the-scale, in unstable state.
  <Except for send-out in discharge, or output set for input command>
  <Output when weight conditions meet, even the quantity number is zero>
* With Japanese specifications (country code 10), does not print "PT" (prints "T" instead), or "N".
* The sub-total is printed automatically when weight / unit is changes.

Notation for above characters:

CR (13H)	= " , CR"
LF (10H)	= " , LF"
Space (20H)	= " ^"
Others	= As is

0: Format specialized for printer (Weight print pattern)

Operation/function	Line no.	Print image	Transmitted character
	6		, CR, LF
Date printing With Power ON, or after Sum-up calculation, prints for the initial printing condition. (Except when the date registration is not fulfilled.)	(5)	00-06-22	^^^^^^^^^^^00-06-22, CR, LF
		<1>	^^^^<1>, CR, LF
		[PT - 10.99kg]	^^^^[PT^-^10.99kg^], CR, LF
		[H 11.11kg]	^^^^[^H^^^11.11kg^], CR, LF
		[L 9.99kg]	^^^^[^L^^^^9.99kg^], CR, LF
Weight print (less than the lower limit, stable)	1	L0001:N 0.77kg	^^^^L0001:N^^^0.77kg, CR, LF
Weight print (within the range, stable)	1	0002:N 10.00kg	^^^^^0002:N^^10.00kg, CR, LF
Weight print (over the upper limit, stable)	1	H0003:N 15.23kg	^^^^H0003:N^^15.23kg, CR, LF
Weight print (within the range, stable)	1	L0004:N 0.77kg	^^^^L0004:N^^^0.77kg, CR, LF
Weight print (within the range, stable)	1	0005:N 10.00kg	^^^^^0005:N^^10.00kg, CR, LF
Weight print (over the upper limit, stable)	1	H0006:N 20.00kg	^^^^H0006:N^^20.00kg, CR, LF
Call-up the preset (on the following printing condition)	4	<2>	^^^^<2>, CR, LF
		[PT - 0.99kg]	^^^^[PT^-^^0.99kg^], CR, LF
		[H 21.11kg]	^^^^[^H^^^21.11kg^], CR, LF
		[L 19.99kg]	^^^^[^L^^^19.99kg^], CR, LF
Weight print (within the range, stable)	1	0007:N 20.00kg	^^^^^0007:N^^20.00kg, CR, LF
Set tare weight (prints at summing up for succeeding item)	1	[T - 0.00kg]	^^^^[^T^-^^0.00kg^], CR, LF
Weight print (within the range, stable)	1	0008:N 20.00kg	^^^^^0008:N^^20.00kg, CR, LF
Call-up the preset (call-up 0) (on the following printing condition)	4	<0>	^^^^<0>, CR, LF
		[T - 0.00kg]	^^^^[^T^-^^0.00kg^], CR, LF
		[H 0.00kg]	^^^^[^H^^^^0.00kg^], CR, LF
		[L 0.00kg]	^^^^[^L^^^^0.00kg^], CR, LF
Weight print (within the range, stable)	1	0009:N 20.00kg	^^^^^0009:N^^20.00kg, CR, LF
Total	9	----------	^^^^----------, CR, LF
		TOTAL	^^^^TOTAL, CR, LF
		0009: 116.77kg	^^^^^0009:^^116.77kg, CR, LF
			, CR, LF
			, CR, LF
			, CR, LF
			, CR, LF
			, CR, LF
			, CR, LF
		Number of printed characters (20)	Max. number of characters (20 + CR + LF)
		12345678901234567890123	12345678901234567890123, CR, LF

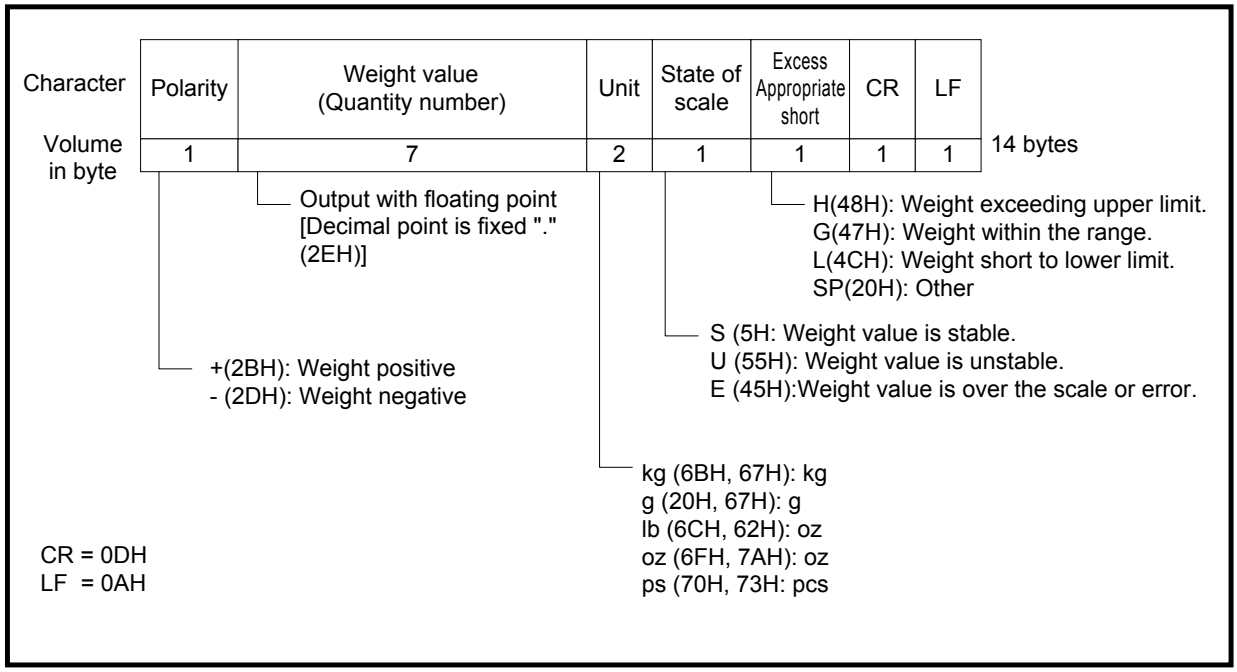
* Maximum of sequential No.: 9999
  <Prints after automatic printing for sub-total if exceeding the maximum>
* Maximum weight for sub-total: 9999999 (decimal point position to be fixed according to the weighing capacity)
  <Prints after automatic printing for sub-total if exceeding the maximum>
* Shall not output when weight value is not over 3e or over-the-scale, in unstable state.
  <Except for send-out in discharge, or output set for input command>
* With Japanese specifications (country code 10), does not print "PT" (prints "T" instead), or "N".

Notation for above characters:
CR (13H) = " , CR"
LF (10H) = " , LF"
Space (20H) = " ^"
Others = As is

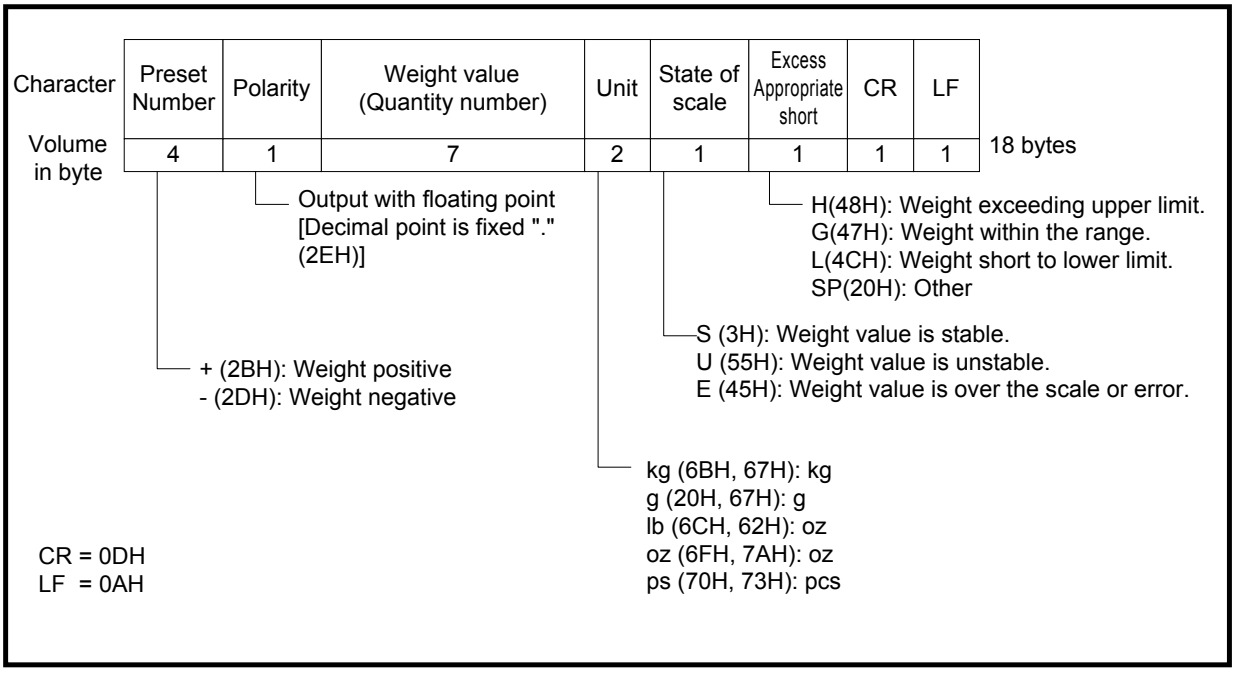
<Other functions>

1) 20~24digits/16 digit toggling for print format is possible.
   (For 16-digit format, the first 4 digits are blank.)
2) Necessary/not necessary toggling for date print is possible.
3) Necessary/not necessary toggling for tare weight and upper/lower limit print is possible.
4) Necessary/not necessary toggling for Preset No. print is possible.
5) Necessary/not necessary toggling for Serial No. print is changeable.
   (when print is not necessary, the sub-total is not printed.)
6) Selting for single chit print is possible (6 line feeding) after printing.

1: DAP-01 Format



2: IWQ1 Format (DAP-01 Expanded)



3: MZ-7000 Format

Character	STX	Preset Number	Polarity	State of scale	Upper limit	Ex-ponent	Weight value (Quantity number)	Ex-ponent	Lower limit	Ex-ponent	ETX
Volume in byte	1	4	1	1	6	2	6	2	6	2	1

32 bytes

30H: Weight value is positive
31H: Weight value is negative

30H: Weight value is stable.
31H: Weight value is unstable.
32H: Weight value is over the scale or error.

Indicates decimal point position.
For example, weight value 12345 is to read;
01:12345.6
02:1234.56
:
:
05:1.23456

STX = 02H
ETX = 03H

4: IWQ2 Format (MZ-7000 Expanded)

Character	STX	Preset Number	Pola-rity	State of scale	Upper limit	Ex-ponent	Weight value (Quantity number)	Ex-ponent	Lower limit	Ex-ponent	Tare weight	Ex-ponent	ETX
Volume in byte	1	4	1	1	6	2	6	2	6	2	6	2	1

40 bytes

30H: Weight value is positive
31H: Weight value is negative

Output in absolute value (without negative mark)

30H: Weight value is stable.
31H: Weight value is unstable.
32H: Weight value is over the scale or error.

Indicates decimal point position.
For example, weight value 12345 is to read;
01:12345.6
02:1234.56
:
:
05:1.23456

STX = 02H
ETX = 03H

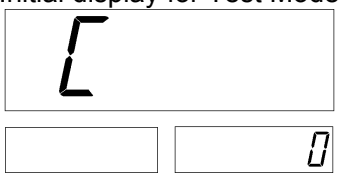
3.3 Test Mode

- Test Mode is used for verification and setup at setting-up or maintenance.
- Item list

Mode	Contents
∗C1	Can verify and/or set Country No., Scale No., Zero point, and Span adjustment.
C2	Key check.
C3	Display check (1) : Fluorescent tube · LED, all digits at a time.
C4	Display check (2) : Fluorescent tube, each segment successively for each digit.
C5	Program No. display.
∗C6	Initializing E2ROM.
∗C7	Individual setup for country specifications and weighing conditions.
C8	Reading out E2ROM data. (Can not change data.)
C9	Board inspection at factory. (A/D check, I/F check)

Note For the final operation of ∗C1, ∗C6, and ∗C7 (writing in E2ROM), peel the seal and press the memory switch.

3.3.1 Start-up and end of Test Mode

Operation	Display
1. Start-up procedure Press ON/OFF key ⏻ at Scale OFF, and immediately (during the time the buzzer is sounding) press 1 key for a while.	Initial display for Test Mode  Test item number displayed
2. Return to the Test Mode initial display Press UNDER Limit key. (Not available during key check in the C2 mode)	Same as above.
3. End Press ON/OFF key ⏻.	Display turns OFF.

3.3.2 C1 Mode ·· Country No. Scale No. and Span Adjustment

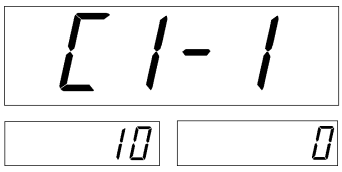
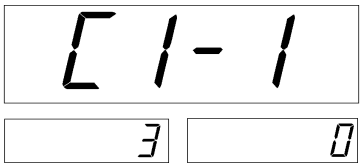
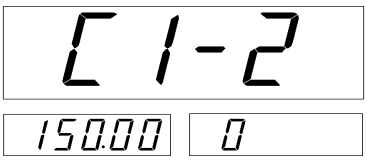
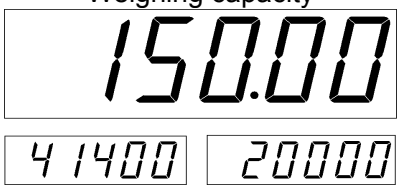
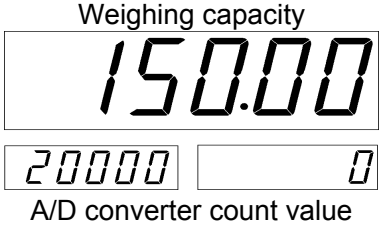
[Data at initialization]

4. Country No.: 10 (Japan)
5. Scale No.: 20

[Setup sample]

Country No. : 3 (ASIA): Please refer page 31/54 [3.4 Country No. List] for other country No., and 32/54 [3.5 Scale No. List] for Scale No.

Scale No. : 0 (Switching function available among 150kg/multiple range/counting)

Operation	Display
1. C1 Mode setup Press [1] key and confirm it by pressing [TARE] key.	 Country No. Input data
2. Setup of Country No. • For changing the set, input Country number. and fix it by pressing the [TARE] key. (3: ASIA) • For the case not changing the set, do not input but press the [TARE] key, and proceed to the next setup.	 Country number
3. Setup of Scale No. • When changing the set, press [TARE] key, input Scale No. and fix it by pressing [TARE] key. (0: Switching among 150kg/multiple range/counting) • When not changing the set, do not input but press [TARE] key, and proceed to the next setup.	 Weighing capacity Scale No.
4. Span adjustment Press the [TARE] key to enter into Span Adjustment Mode. • Press the [UNDER] key to return to Test Mode initial display.	Weighing capacity  A/D converting value A/D converting value at previous zero adjustment
5. Zero adjustment Press the [ZERO] key. Set the A/D converter count value to 20000 for the zero point adjustment. ∗ Press [PCS] key to switch between lb/kg specifications. (For USA only)	Weighing capacity  A/D converter count value

6. Loading weight.

(1) When loading weight as heavy as the weighing capacity.
Press the [TARE] key.

(2) When loading weight at your choice, 50kg for example.
Input [5] [0] [0] [0] and press the [TARE] keys.

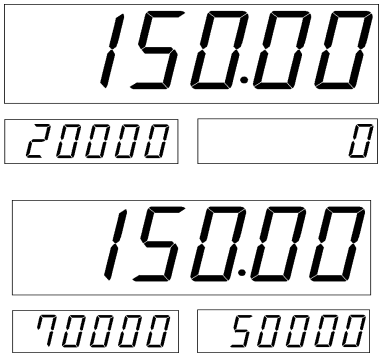
(For lb specification, 100 lb, for example).
Input [1] [0] [0] [0] [0] and press the [TARE] keys.

7. Confirm the span with A/D converter data.

- Remove the weight and press the [ZERO] key.
- Confirm A/D display [20000– 0] and load the weight.

Example: 50kg weight ··· 50000 counts

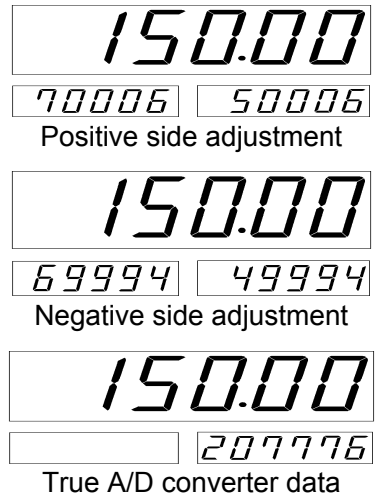
Weighing value = 10 counts/tick



8. Other key functions

- When adjusting the span to the positive side, press the [CHG] key for necessary times.
- When adjusting the span to the negative side, press the [OVER] key for the required number of times.
- To look at A/D converter internal data, press the [CALL] key. Press [CALL] again to return to the normal A/D converter data.

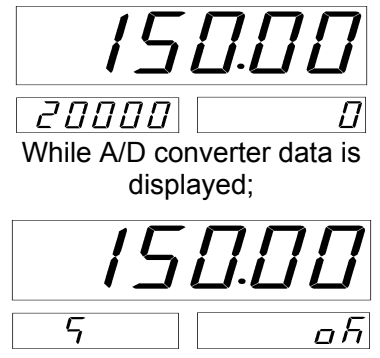
[The internal data obtained by this operation is solely for designer verification, and not to be used in the normal operation.]



9. Data memory

Inputting into EEPROM is necessary when changes are made to Country No., Scable No., or Span adjustment.

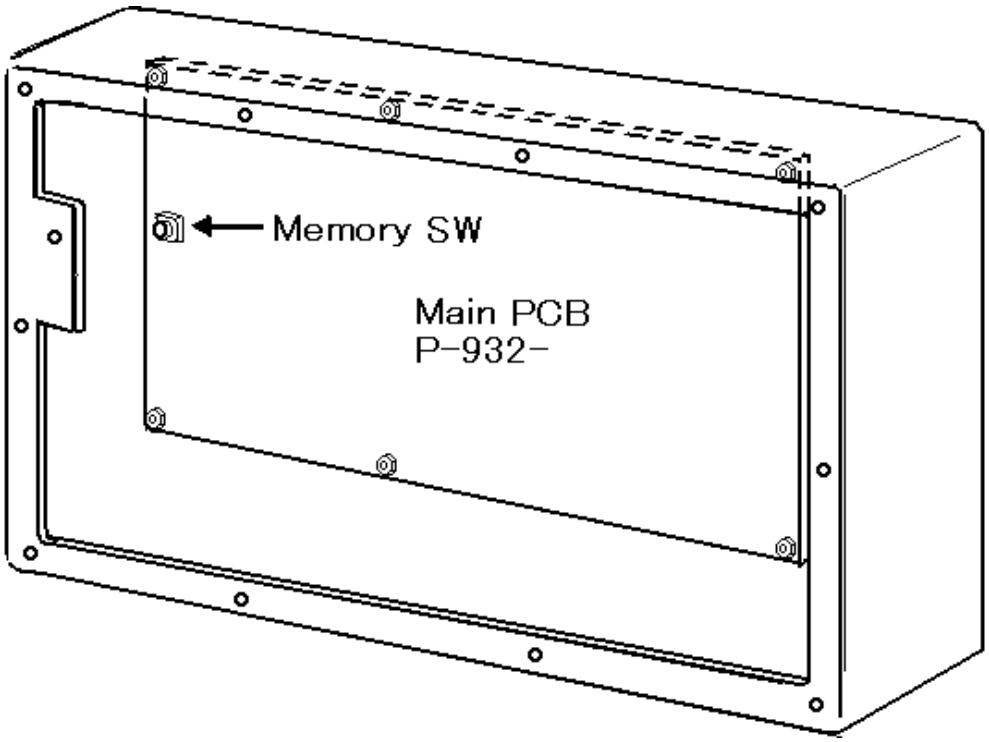
- Press [MEMORY] on the main board.



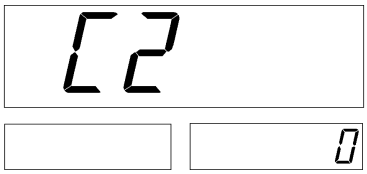
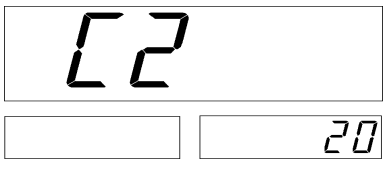
♦ **Memory switch**

Remove 10 screws fastening the display case, the seal on the back of the case, and the seal screws.

The memory switch is located on the main board P-932-2 as illustrated.



3.3.3 C2 Mode ···· Key check

Operation	Display
1. C2 Mode setup Press the ten-key [2] and confirm it by pressing the [TARE] key.	 Input data
2. How to check Press the key to be checked. Displays the key data with a beeping sound. (Example: Press the [CALL] key.)	 Key data
3. How to end key check Press the ON/OFF [⏻] key.	In the OFF state.

Keys and key data

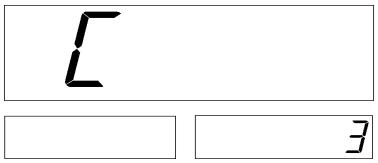
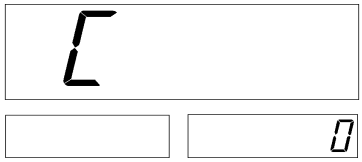
Key	Key data
ZERO	2
TARE	3
TARE SET	4
CHG	5
7	6
8	7
9	8

Key	Key data
OVER	9
4	10
5	11
6	12
UNDER	13
1	14
2	15

Key	Key data
3	16
CLR	17
0	18
*	19
CALL	20

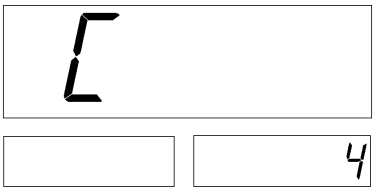
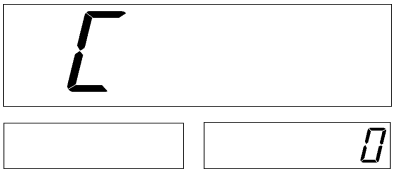
3.3.4 C3 Mode ···· Display check (1)

Check that all digits light up at the same time for each fluorescent indicator tube segmant and that LED light up.

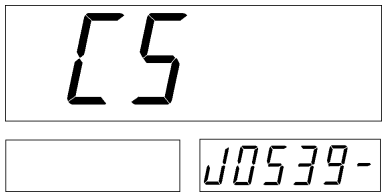
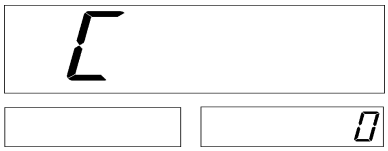
Operation	Display
1. C3 Mode setup Press the ten-key [3] and confirm it by pressing [TARE] .	 Set data Input data Check segments successively from a to g. (The illustration is omitted)
2. Ending display check (1) Press the [UNDER] key.	

3.3.5 C4 Mode ···· Display check (2)

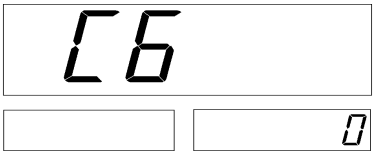
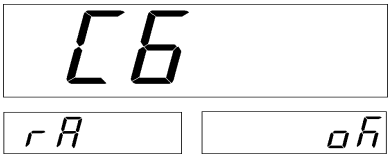
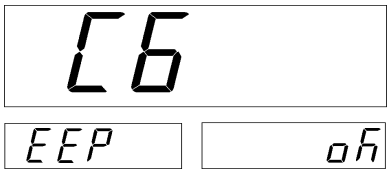
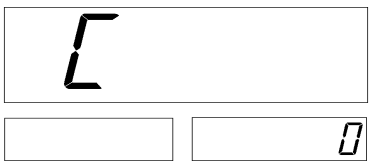
Check that every segment lights up by checking each fluorescent indictor tubes to light. (Short circuit between digits is visible).

Operation	Display
1. C4 Mode setup Press the ten-key [4] and confirm it by pressing the [TARE] key.	 Set data Input data Check digits successively from segments a to g. (The illustration is omitted)
2. Ending display check (2) Press the [UNDER] key.	

3.3.6 C5 Mode ···· Program No. display

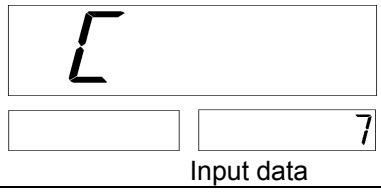
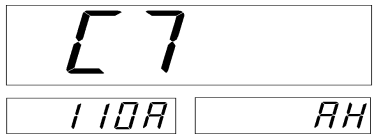
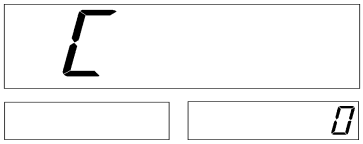
Operation	Display
1. C5 Mode setup Press the ten-key [5] and confirm it by pressing the [TARE] key.	
2. Ending program No. display Press the [UNDER] key.	

3.3.7 C6 Mode ···· E2ROM initialization (Registration · set data/all)

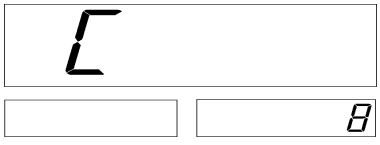
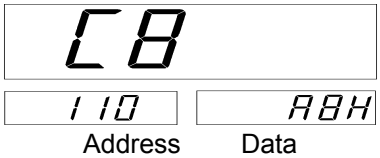
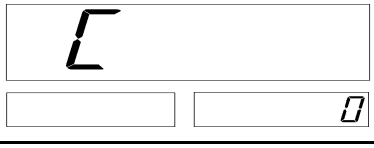
Operation	Display
1. C6 Mode setup Press the ten-key [6] and confirm it by pressing the [TARE] key.	 Input data
2. **Registering and initializing set data** Press the [ZERO] key twice.	 RAM clear o k
3. Complete Initialization (registration · setup · scale data) For execution, press the memory switch on the main board. Then, buzzer sounds. Reference • For the memory switch location, refer to span adjustment at page 27. ❒ Data after initialization 4. Country number: 10 (Japan) 5. Weighing capacity No.: 20 (150kg) 6. Weight span data: Approximate value	 EEPROM clear o k Note Be sure to perform span adjustment using a weight.
4. Ending initialization Press the [UNDER] key. The program starts at Test Mode when the initialization flag is set. The flag is reset when span adjustment is performed, and the normal mode then becomes available.	

3.3.8 C7 Mode ···· Individual setup of country specifications and weighing conditions

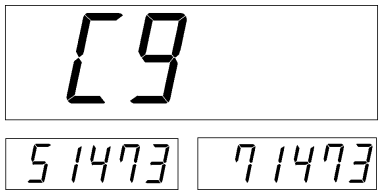
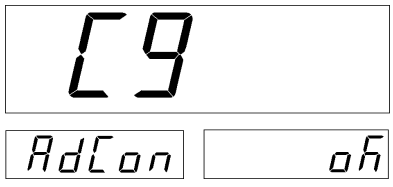
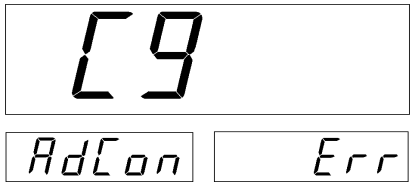
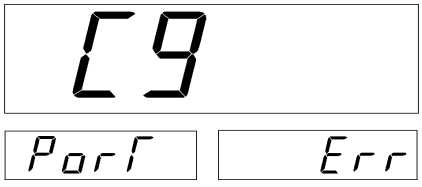
The particular specifications are all included by country specification set at C1 Mode. Therefore, refrain to change the set data other than the initial setup.

Operation	Display
1. C7 Mode setup Press the ten-key [7] and confirm it by pressing the [UNDER] key.	 Input data
2. Setting specifications and conditions Setting address; [TARE] key : forward [ZERO] key : backward Address A indicates higher 4 bits of 1 byte data and address B indicates lower 4 bits. Changing data; [CALL] key: forward [PCS] key: backward **Note** This data can not be changed nor looked into for maintenance service.	 Address + A or B Data
3. Ending C7 Mode Press the [UNDER] key.	

3.3.9 C8 Mode ··· E2ROM data readout

Operation	Display
1. C8 Mode setup Press the ten-key [8] and confirm it by pressing the [TARE] key.	 Input data
2. How to read out data The address ranges from 0 to 127. [TARE] key: address going forward. [ZERO] key: address going backward. **Note** This data can not be changed nor looked into for maintenance service.	 Address Data
3. Ending C8 Mode Press the [UNDER] key.	

3.3.10 C9 Mode A/D flickering check, I/F inspection mode

Operation	Display
1. C9 Mode setup Press the ten-key [9] and confirm it by pressing the [TARE] key.	 A/D converter count value
2. A/D flickering check (for factory inspection) Press the [TARE SET] key.	 When stable  When unstable.
3. I/F check (for factory inspection) ∗ Requires an inspection tool connector. Press the [CLR] key to return to C9 Mode. Press the [TARE] key.	 Error if not using the tool.

3.4 Country No. List

Country				North America 1	EU	Oceania	Asia	North America 2						Japan	Indi-vidual setup
Country code				0	1	2	3	4	5	6	7	8	9	10	99
112	A	1	Start range	2	2	2	2	2	2	2	2	2	2	4	—
	B	2	Stable/Re-stabilize times	3	3	3	3	3	3	3	3	3	3	3	—
113	A	3	Stable/Re-stabilize range	4	4	4	4	4	4	4	4	4	4	4	—
	B	4	Re-stabilizing start range	4	4	4	4	4	4	4	4	4	4	4	—
114	A	1	Zero point mark	0	0	0	0	0	0	0	0	0	0	1	—
		2	Over-the- scale indication	2	0	0	0	2	0	0	0	0	0	0	—
		4	Under true zero indication	0	0	0	0	0	0	0	0	4	0	4	—
		8	Decimal point indication	0	8	0	0	0	8	0	8	0	0	0	—
	B	1	Over-the-scale range	0	0	0	0	0	0	0	0	0	0	0	—
		2	Tare deduction	0	2	2	0	0	2	2	0	0	2	0	—
		4	Clear tare by ZERO key	0	4	4	0	0	4	4	0	0	4	0	—
		8	Zero suppress indication	0	0	0	0	0	0	0	0	0	0	0	—
115	A	1	Tare deduction by input value	0	0	0	0	0	0	0	0	0	0	0	—
		2	Zero tracking function	0	0	0	0	0	0	0	0	0	0	0	—
		4	Micro weight follow-up	0	0	0	0	0	0	0	0	0	0	4	—
		8	Unstable range	0	0	0	0	0	0	0	0	0	0	0	—
	B	1	Number of PLU	0	0	0	0	0	0	0	0	1	1	1	—
		2	Counting function	0	0	0	0	0	0	0	0	2	2	2	—
		4	Reserve	0	4	4	4	4	4	4	4	4	4	4	—
		8	Reserve	0	0	0	0	0	0	0	0	0	0	0	—

* Individual setting for “99” cannot be inputted. (Displayed only when changed at C7 Mode.)

* The north America 2 code can switch lb/kg, and can be used anytime for switching regardless of whether there is stability at the zero point or not. North America 1 is only for switching when stable at the zero point.
  When this switching function is used, difference not exceeding 0.2 in scale (0.2 e) may occur in the measurement immediately after switching. However, the difference will be compensated by zero point adjustment (or zero tracking) and correct measurement is guaranteed.
  When using only lb or kg specifications, North America 1 should be used.

3.5 Scale No. List

Number	Weighing capacity specifications	111B	111A	110B	110A
0	150kg (0.05kg/0.02kg) Multi-interval/Counting switching	8	3	C	6
1	60kg (0.02kg/0.01kg) Multi-interval/Counting switching	8	3	B	2
2	30kg (0.01kg/0.005kg) Multi-interval/Counting switching	8	3	B	B
3	15kg (0.005kg/0.002kg) Multi-interval/Counting switching	8	3	C	7
4	6kg (0.002kg/0.001kg) Multi-interval/Counting switching	8	3	B	3
5	6000g (2g/1g) Multi-interval/Counting switching	8	B	B	0
6	3000g (1g/0.5g) Multi-interval/Counting switching	8	B	B	9
7	120kg (0.02kg) 1/6000 Single range/Counting switching	8	2	B	6
8	60kg (0.01kg) 1/6000 Single range/Counting switching	8	2	B	2
9	30kg (0.005kg) 1/6000 Single range/Counting switching	8	2	B	B
10	12kg (0.002kg) 1/6000 Single range/Counting switching	8	2	B	7
11	6kg (0.001kg) 1/6000 Single range/Counting switching	8	2	B	3
12	300kg (0.1kg) 1/3000 Single range/Counting switching	8	2	B	1
13	150kg (0.05kg) 1/3000 Single range/Counting switching	8	2	8	A
14	60kg (0.02kg) 1/3000 Single range/Counting switching	8	2	8	6
15	30kg (0.01kg) 1/3000 Single range/Counting switching	8	2	8	2
16	15kg (0.005kg) 1/3000 Single range/Counting switching	8	2	8	B
17	6kg (0.002kg) 1/3000 Single range/Counting switching	8	2	8	7
18	6000g (2g) 1/3000 Single range/Counting switching	8	A	8	4
19	3000g (1g) 1/3000 Single range/Counting switching	8	A	8	0
20	150kg/60kg (0.05kg/0.02kg) Dual range	8	5	C	6
21	60kg/30kg (0.02kg/0.01kg) Dual range	8	5	B	2
22	30kg/15kg (0.01kg/0.005kg) Dual range	8	5	B	B
23	15kg/6kg (0.005kg/0.002kg) Dual range	8	5	C	7
24	6kg/3kg (0.002kg/0.001kg) Dual range	8	5	B	3
25	6000g/3000g (2g/1g) Dual range	8	D	B	0
26	3000g/1500g (1g/0.5g) Dual range	8	D	B	9
27	150kg/150kg (0.1kg/0.05kg) Dual range, marine product specifications	8	5	8	A
28	150kg(0.05kg) Single range, bathroom scale specifications	2	4	8	A
29	30kg(0.01kg) Single range, baby scale specifications	2	4	8	2
30	300lb/150kg (1/3000) Multi-interval	8	7	C	6
31	150lb/ 60kg (1/3000) Multi-interval	8	7	B	2
32	60lb/ 30kg (1/3000) Multi-interval	8	7	B	B
33	30lb/ 15kg (1/3000) Multi-interval	8	7	C	7
34	15lb/ 6kg (1/3000) Multi-interval	8	7	B	3
99	Individual weighing capacity setup	-	-	-	-

* Individual weighing capacity “99” can not be set. It is displayed only when setup is changed in C7 mode.

3.6 EEPROM Map

3.6.1 EEPROM (0 ~ 127) data format

Address	Data Contents	Data Range	Remark (default)
0~99	Preset data (10 items) · Upper limit value 17 bits · Lower limit value 17 bits · Tare weight (A range/B range) 18 bits · Unit weight 20 bits · Checksum 8 bits	0~60000	10 bytes × 10 data
100A	Scale Mode data Weighing capacity (bit1) 1b Mode (bit2) Counting (bit3)	0~16	
100B	Reserve	—	
101	Check data on 100A, 100B (writing twice)	—	
102A	Selecting ON/OFF key function (bit0) Selecting preset automatic call-up function (bit1) Selecting 16/24 digits printing (bit2) Selecting date printing function (bit3)	0~1 (F1) 0~1 (F2) 0~1 (F3) 0~1 (F4)	
102B	Selecting preset No. printing function (bit4) Selecting singe/consecutive chit print (bit5) Selecting tare weight printing function (bit6) Selecting upper/lower limit values printing function (bit7)	0~1 (F5) 0~1 (F6) 0~1 (F7) 0~1 (F8)	
103A	Portrait setup (bit0~3)	0~16 (F9)	
103B	Output message specifications (bit4~7)	0~16 (F10)	
104A	Data output method (bit0~3)	0~16 (F11)	
104B	Data output conditions (bit4~7)	0~16 (F12)	
105A	Contact output signal setup (bit0~3)	0~16 (F13)	
105B	Contact input signal setup (bit4~7)	0~16 (F14)	
106A	Loud buzzer output setup (bit0~3)	0~16 (F15)	
106B	Internal buzzer selection function (bit4~7)	0~16 (F16)	
107A	Reserve		
107B	Reserve		
108~109	102 ~ 109 checksum	—	

Address	Data Contents	Data Range	Remark (default)
110 ~ 115	Measurement setup data		Refer to scale setup table
116A	Country code (refer to country code list)	0 ~ (15)	(10: Japan)
116B	Reserve		
117	Reserve		
118 ~ 120	A/D zero point data (adref)	24 bits	
121 ~ 123	A/D calibration data (adwidth)	24 bits	
124	Weighing capacity setup (refer to weighing capacity setup table)	0 ~ (99)	(20, 150kg double scale)
125A	Area code (refer to area code table)	0 ~ 15	1 ~ 16 areas
125B	Span adjusted flag	5H or others	5H = OK others = Error
126,127	No. 100 ~ 113 checksum	—	

3.6.2 Measurement conditions setup table

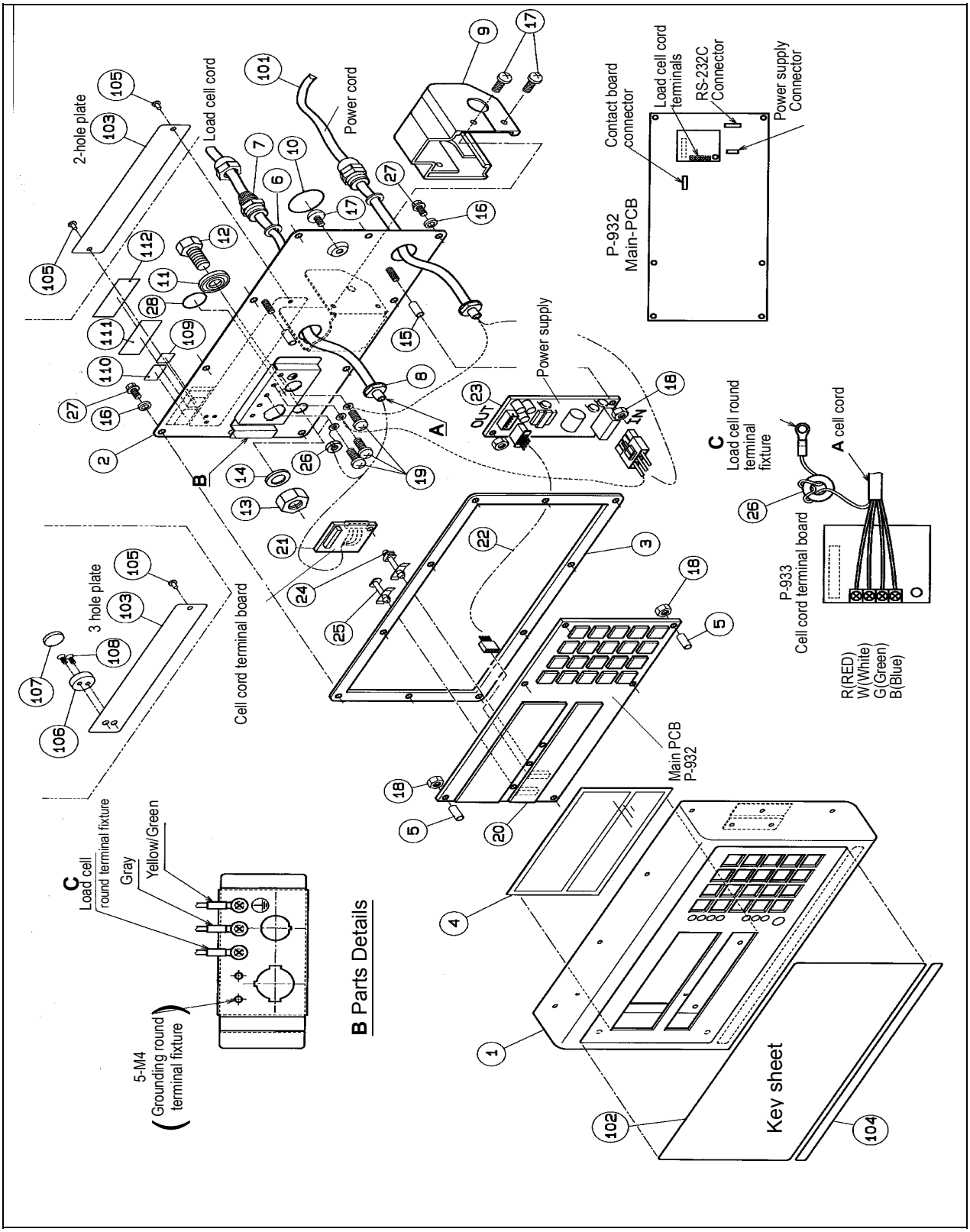
Address	Weight	Data Contents	Data Range
110A	1	Decimal point position	0: 0 1:0.0 2: 0.00 3:0.000
	2		
	4	Minimum indication	0: 1 (At dual range/multi-interval 1 – 2 switching) 4: 2 (At dual range/multi-interval 2 – 5 – 10 switching) 8: 5 (At dual range/multi-interval 5 – 10 – 20 switching) C: Not available
	8		
110B	-	Accuracy (resolution)	0: 1/500 1:1/600 2:1/750 3:1/1000 4: 1/1200 5:1/1500 6:1/2000 7:1/2500 8: 1/3000 9:1/4000 A:1/5000 B:1/6000 C: 1/7500 D:1/10000 E:1/12000 F:1/15000
111A	1	Switching method	0: Single Range, checker mode when power is turned ON. 1: 1/3000 Multi-Interval, checker mode when power is turned ON. 2: Single Range, checker/counting mode maintained. 3: 1/3000 Multi-Interval, checker/counting mode maintained. 4: Single Range (bathroom scale specifications) 5: 1/3000 Multi-Interval (A/B range switching) 6: Single Range (lb/kg switching) 7: 1/3000 Multi-Interval (lb/kg switching) <Except for 2 and 3, the mode not maintained by the CHG key>
	2		
	4		
	8	Weight unit (applicable only to the trans-mission function)	<111A> <111B> 0 + 0 : kg (kg-lb) 8 + 0 : g 0 + 1 : lb 8 + 1 : oz
111B	1		
	2	Filter setup	Filter conditions can be selected to ease sampling time of weight shift and flickering. Optimal condition is determined by scale No. When changed, weight may not be measured correctly. (Cut off) (Notch) (Output rate) 0: 0.66 Hz 2.50 Hz 400 ms 2: 0.84 Hz 3.20 Hz 312 ms 4: 1.05 Hz 4.00 Hz 250 ms 6: 1.31 Hz 5.00 Hz 200 ms 8: 1.68 Hz 6.40 Hz 156 ms A: 2.10 Hz 8.00 Hz 125 ms C: 2.62 Hz 10.00 Hz 100 ms E: 3.35 Hz 12.80 Hz 78 ms
	4		
	8		

Address	Weight	Data Contents	Data Range
112A	-	Starting range	0: ±1/50 of weighing capacity (±2%) 1: ±1/25 of weighing capacity (±4%) 2: ±1/10 of weighing capacity (±10%) 3: ±1/7.5 of weighing capacity (±13.3%) 4: ±1/6 of weighing capacity (±16.6%) 5: ±1/5 of weighing capacity (±20%) 6: ±1/4 of weighing capacity (±25%) 7: ±1/3 of weighing capacity (±33.3%) 8: ±1/2 of weighing capacity (±50%) 9~ Not available.
112B	-	Stabilized, restabilized frequency	0 ~ 15 times.
113A	-	Stabilized/re-stabilized range	n=0 ~ 15 (± n/10 e)
113B	-	Re-stabilization starting range	n=0 ~ 15 (± n/10 e)
114A	1	Zero point mark	0: Lights on at true zero, 1: Lights on at provisional zero
	2	Over-scale indication	0: BLANK 2: “OL”
	4	Below true zero indication	0: “———” 4: Negative value
	8	Decimal point indicator	0: “.” 8: “,”
114B	1	Over-scale range	0: Indication up to +9e 1: Indication up to +3e
	2	Tare deduction	0: Possible 2: Not possible
	4	Clearing tare weight by pressing ZERO key	0: No 4: Yes
	8	Zero suppress function (at multi-interval spec.)	0: Available 4: Not available
115A	1	Input value/preset tare weight deduction and preset unit weight function	0: Available 8: Not available
	2	Zero tracking	0: Available 2: Not available
	4	Micro weight follow-up	0: Available 4: Not available
	8	Unstable range	0: ±0.5e 8: ±20e
115B	1	Number of preset (Area adjustment) <Printer output form>	0: 10 items (available) <with ’PT’,’N’ prints> 1: 5 items (not available) <without ‘PT’,’N’ prints>
	2	Counting function	0: Available 2: Not available
	4	Weight unit cursor indication (at normal switching lb-kg)	0: Normally lighting (Not available) 4: Lighting shutoff for non switching (Available)
	8	Reserve	

Chapter 4. Hardware Configuration

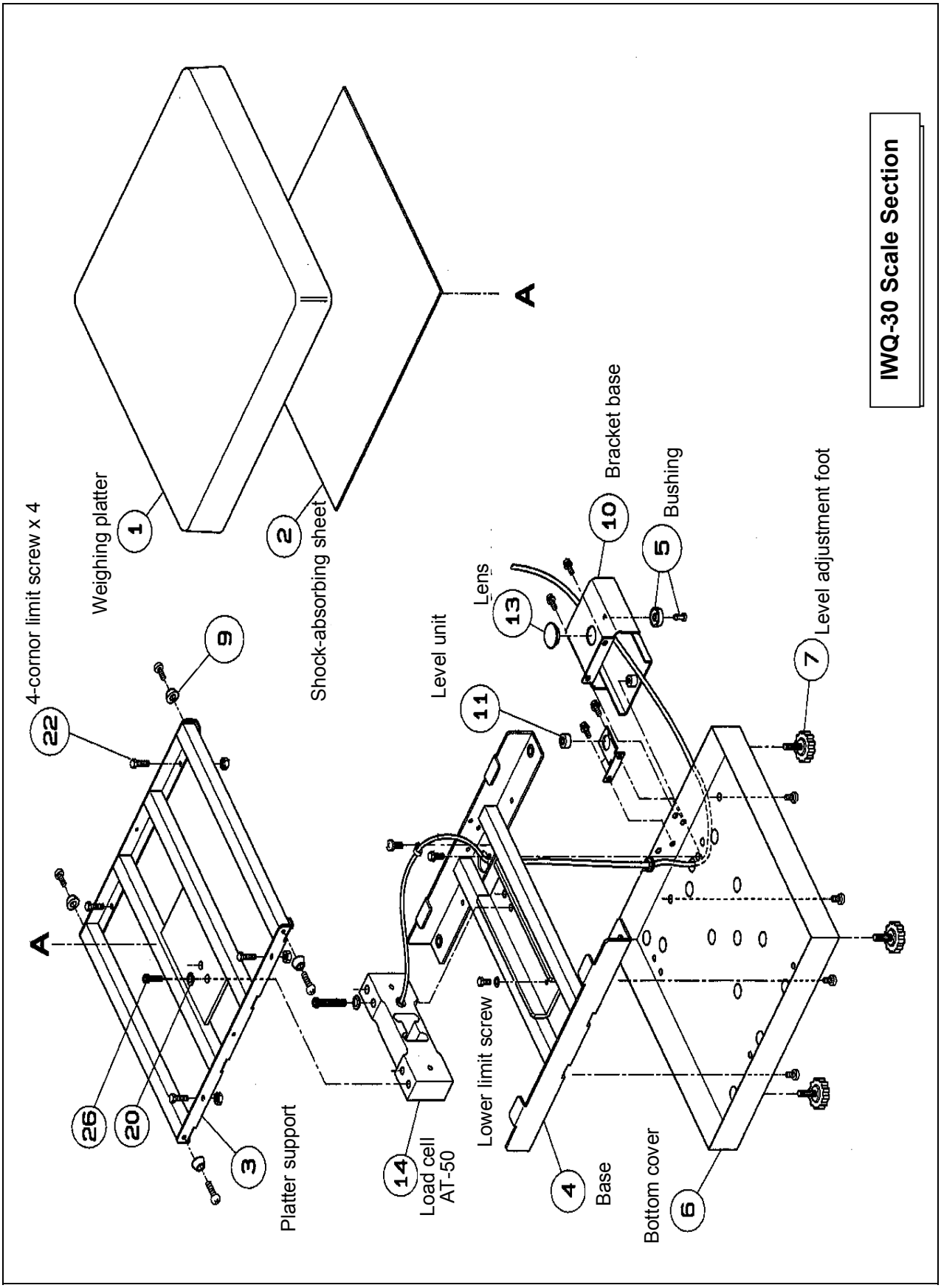
4.1 Mechanisms

4.1.1 Display section (IWQ-30/150 common)

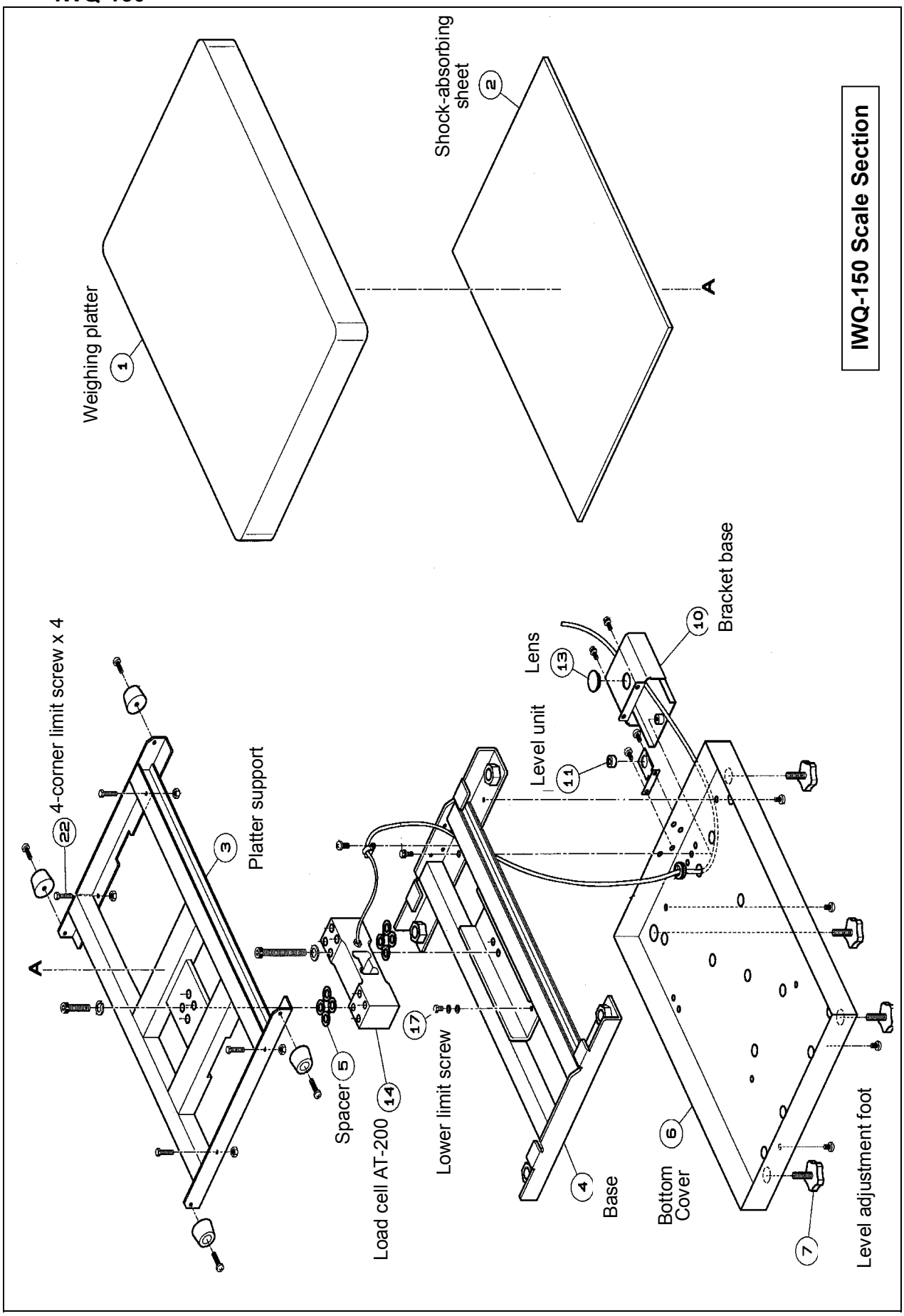


4.1.2 Scale section

IWQ-30

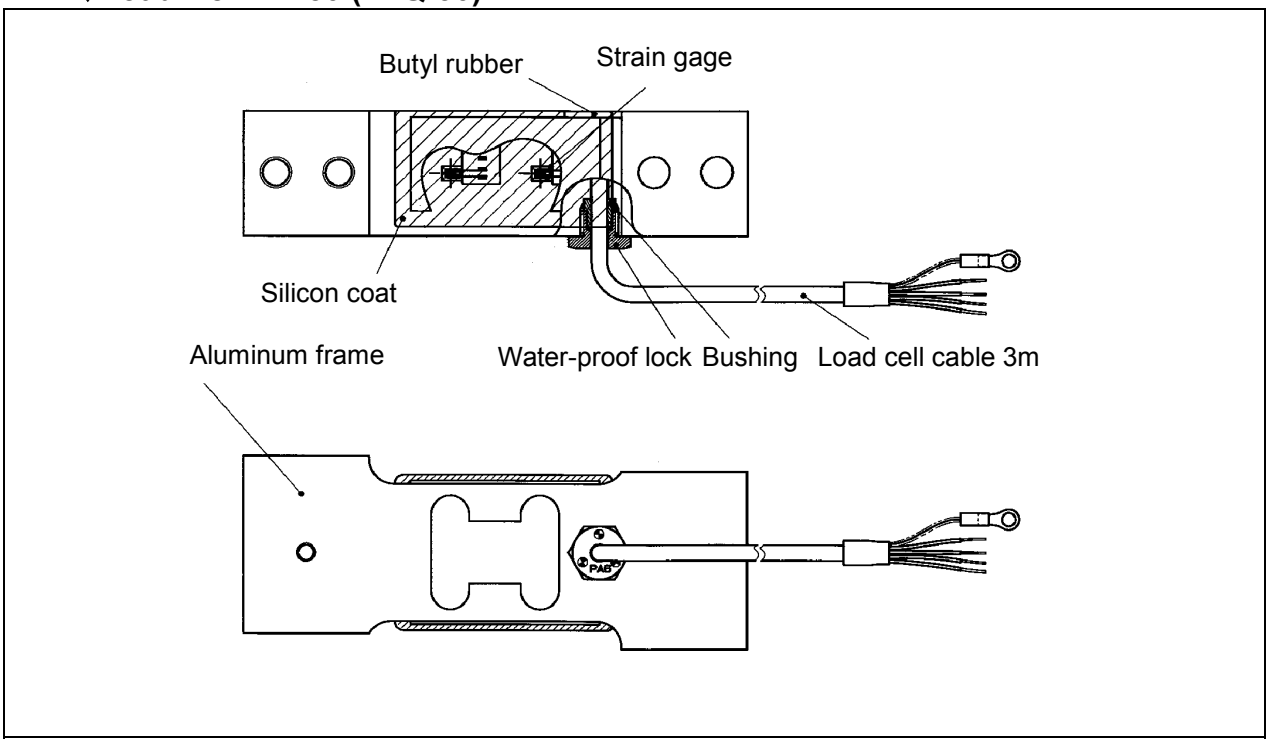


IWQ-150

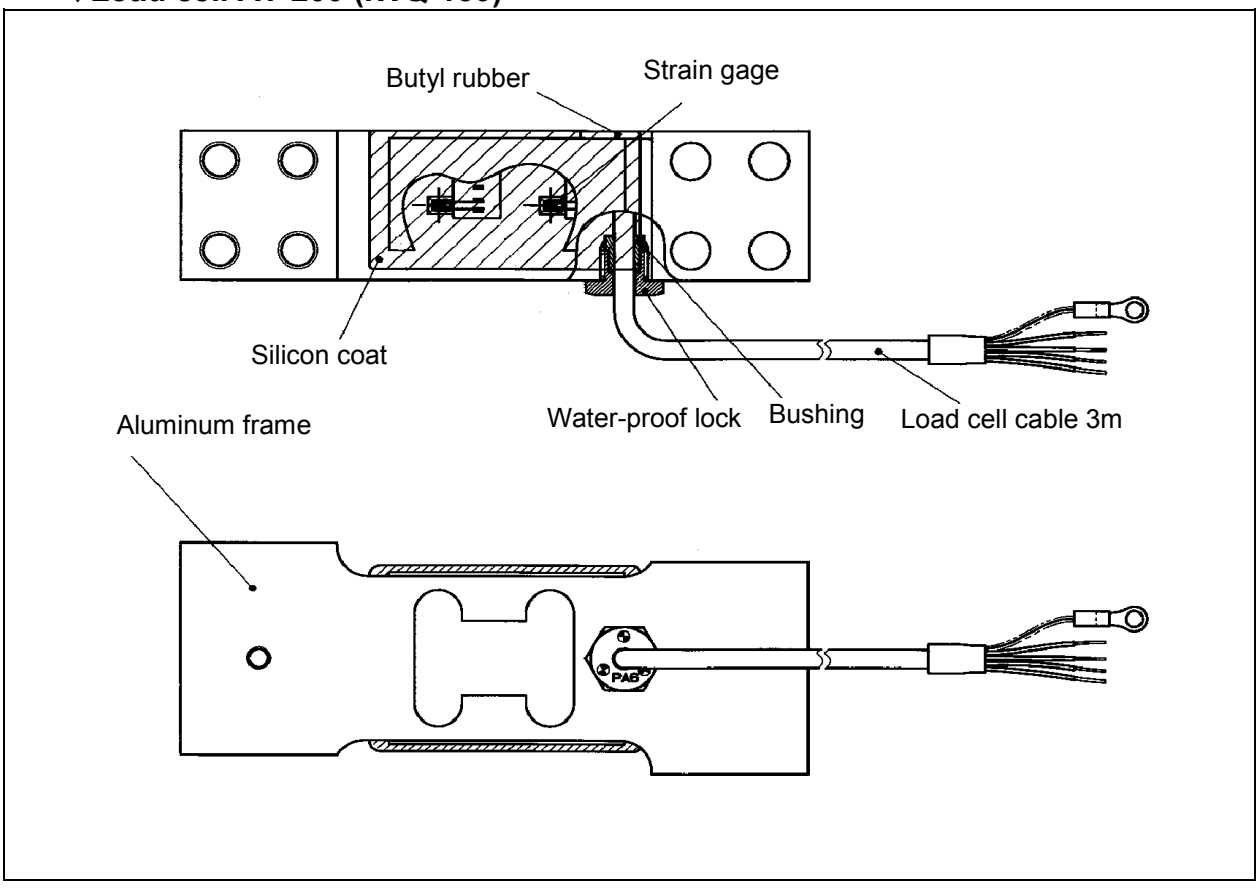

IWQ-150 Scale Section
Weighing platter
1
Shock-absorbing sheet
2
A
A
4-corner limit screw x 4
22
Platter support
3
Spacer
5
Load cell AT-200
14
Lower limit screw
17
Level unit
11
Lens
13
Bracket base
10
Base
4
Bottom Cover
6
Level adjustment foot
7

Load Cell

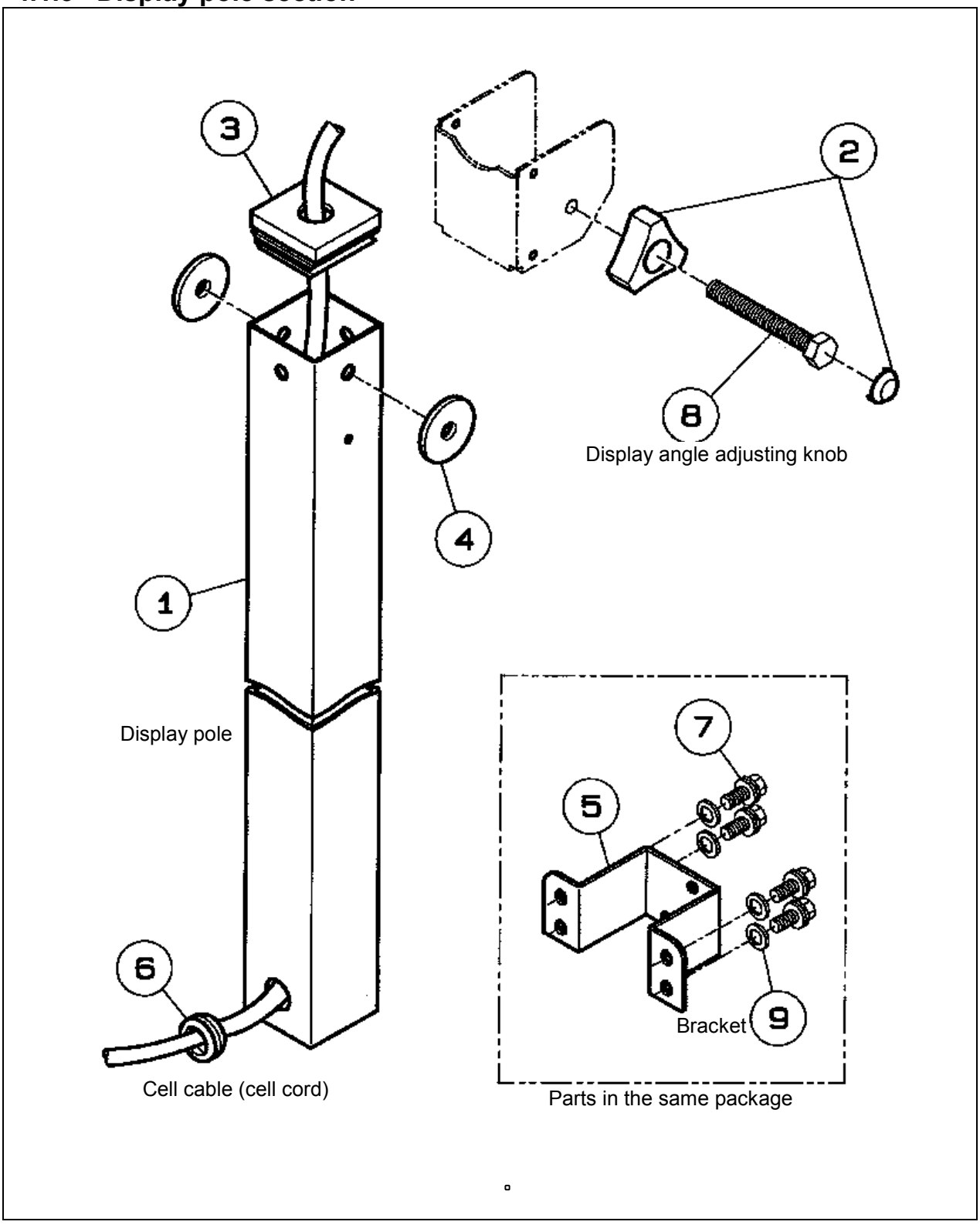
♦Load Cell AT-50 (IWQ-30)



♦Load cell AT-200 (IWQ-150)

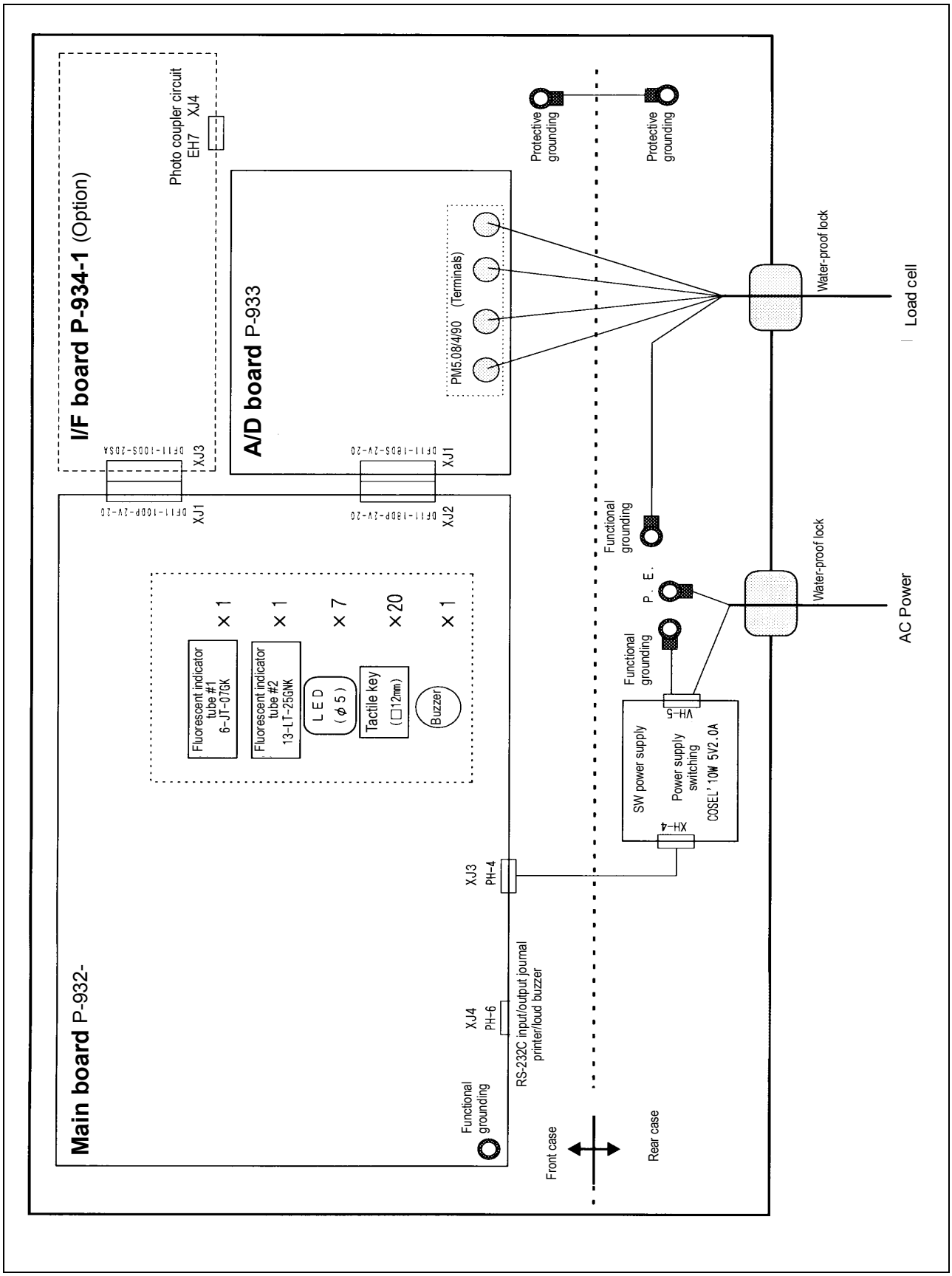


4.1.3 Display pole section



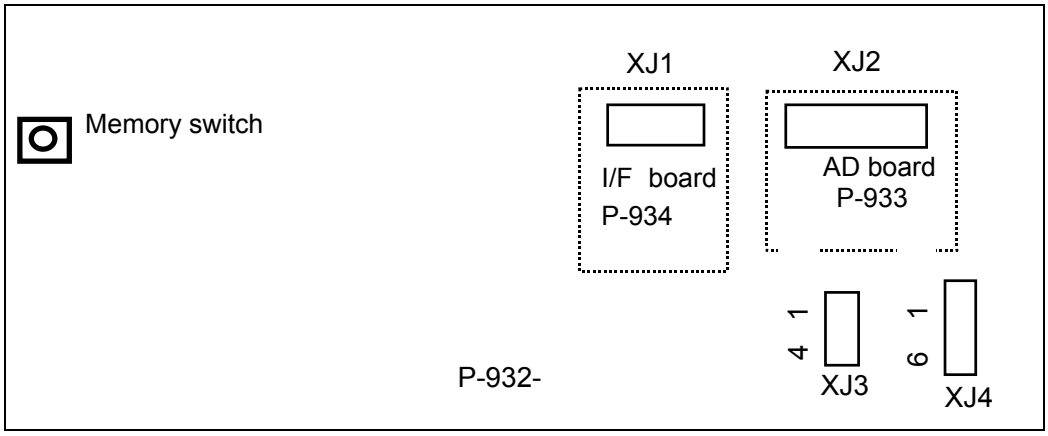
4.2 Electric Concerns

4.2.1 Block diagram



4.2.2 Main board P-932-

Parts side of the main board (indicator tubes and keys are mounted on the soldering side)



(1) Memory switch
- Used for data rewriting at Test mode initialization
- Used for data rewriting at country/span adjustment in Test mode.

(2) Connector XJ1
- Directly mounted connector for connecting with I/F board P-934

PIN No.	Signal code	to P-934
1	IN1	1
2	OUT4	2
3	OUT3	3
4	OUT2	4
5	OUT1	5

PIN No.	Signal code	to P-934
6	NC	NC
7	RESET	NC
8	VPP	NC
9	GND	NC
10	VCC	10

(3) Connector XJ2 (NC: Non connection)
- Directly mounted connector for connecting with AD board P-933

PIN No.	Signal code	to P-933
1	VCC	1
2	GND	2
3	VEX	3
4	CE	4
5	DRDY	5
6	SD0	6
7	SCLK	7
8	SD1	8
9	STANBY	9

PIN No.	Signal code	to P-933
10	XIN	10
11	ASWF2	11
12	ASWR2	12
13	ASWF1	13
14	ASWR1	14
15	NC	NC
16	NC	NC
17	AIN+	NC
18	AIN-	NC

(4) Connector XJ3
- +5VDC input

PIN No.	Signal code	Wire color	to power supply
1	GND	Red	1
2	GND	Red	2
3	+5V	Red	3
4	+5V	Red	4

(5) Connector XJ4

- RS-232C input/output

PIN No.	Signal code		Remarks
1	BUZ	OUT	All outputs are at the TTL level.
2	DTR	OUT	
3	RXD	IN	
4	TXD	OUT	
5	GND		
6	NC		
-	FG		

(6) Program memory medium

- Mask ROM 256 KB (Re-writing or replacing is not permitted.)

4.2.3 A/D board P-933

(1) Major parts

- Amplifier circuit (LC8000)
- A/D converter (AD7714YR)

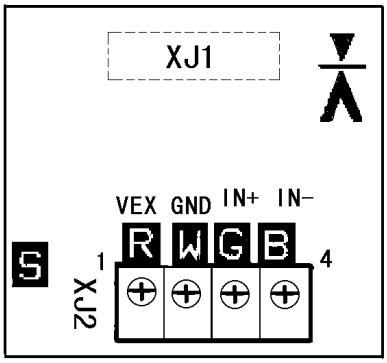
(2) Connector XJ1

- Used for direct connection with the main board.

Reference — Refer to "connector XJ2" of the main board for PIN No. and signal code.

(3) Connector XJ2

- Load cell-connecting terminal with screws
- Tools: 2.5 mm Phillips screwdriver, or flatblade screwdriver for adjustment.

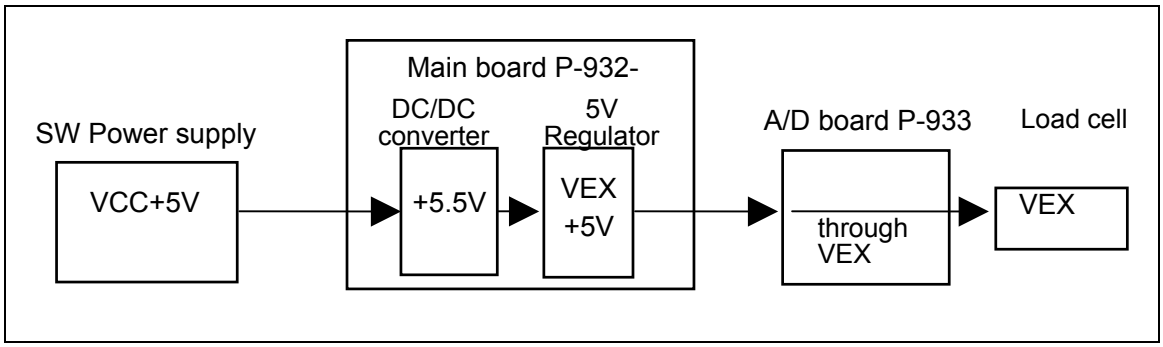


[Soldering side]

Terminal No.		Signal code	Wire color	Contents
1	R	VEX	Red	Cell supply +5V
2	W	GND	White	GND
3	G	IN+	Green	Input +
4	B	IN-	Blue	Input –

(4) VEX (Load cell supply +5V)

- SW (switching) power supply contains noises at the level not influential to the logic circuit. When it is supplied to the load cell directly, the load cell output also contains noises and weighing is made unstable. For the countermeasure, a DC/DC converter is incorporated in the main board so that the voltage is once raised to be regulated by passing through a 5V regulator.



4.2.4 I/F board P-934-1 (option)

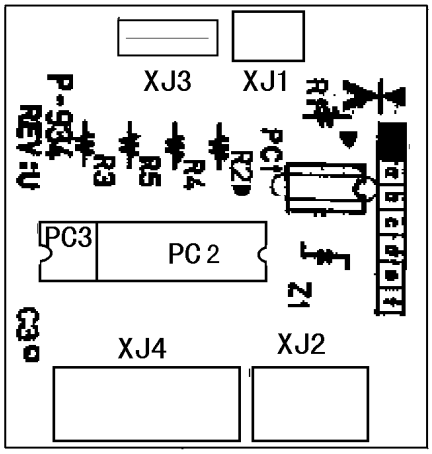
(1) Major parts

- Output: 4 photo couplers NECPS2501-1 x 4
- Input : 1 photo couplers NECPS2501-1 x 1

(2) Connector XJ1 · XJ2 · PC1 not mounted

(3) Connector XJ3

- Used for direct connection with the main board.



[Parts side]

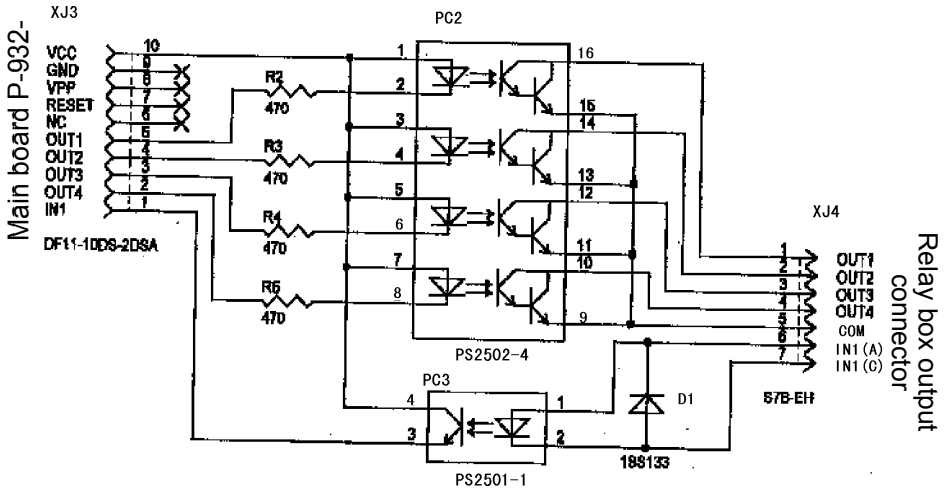
Reference Refer to “connector XJ1” of the main board for PIN No. and signal code.

(4) Connector XJ4

PINNo.	Signal code	Wire color	Operational function		to HR12 8P
1	OUT1	Orange	Output selected at “relay output setup” in Setup Mode F13.		1
2	OUT2	Orange			2
3	OUT3	Orange			3
4	OUT4	Orange			4
5	COM	Orange	Output common		5
6	IN1 (A)	Orange	Input anode	Input selected at “relay input select” in Setup Mode F14.	6
7	IN1 (C)	Orange	Input cathode		7
-	Empty	-	-		8

Reference Refer to “relay output setup” in “Setup Mode F13” and “relay input select” in “Setup Mode F14”, for input/output contents.

Circuit diagram I/F board P-934

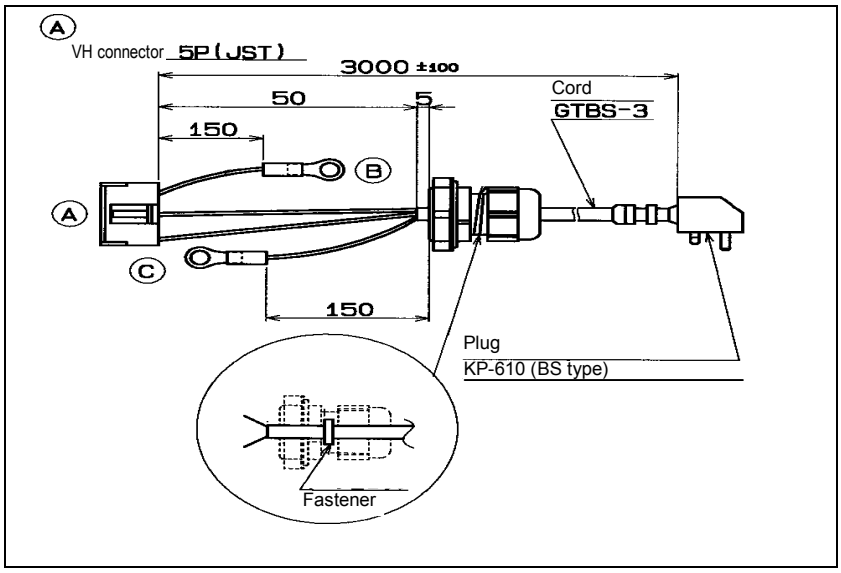


4.2.5 SW Power supply

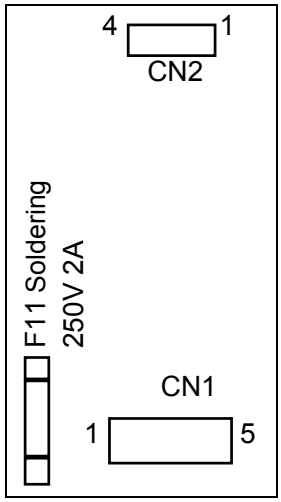
- SW (switching) power supply is rated 100VAC–240VAC for input, and 5V 2.0A for output.
- Maker : COSEL
- Type : LDA10F-5

(1) Connector CN1

A PIN No.	Signal code	Wire color	To power plug
1	AC Input	Brown	100VAC~240VAC
2	NC	-	-
3	AC Input	Light blue	100VAC~240VAC
4	NC	-	-
5	Ground	Gray	Terminal B
6	Ground	Yellow · Green	Terminal C



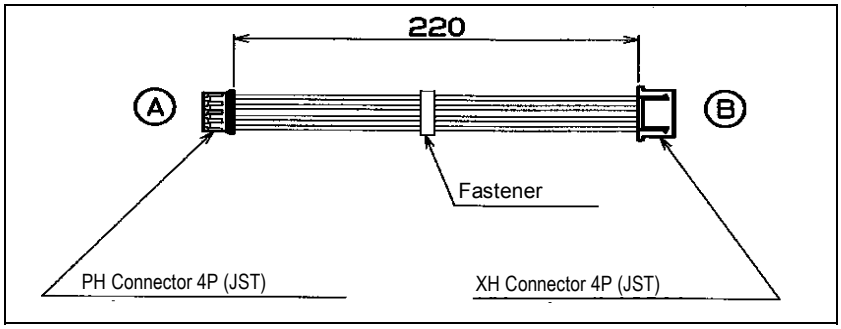
∗Outer shape of power plug varies according to country.



SW power supply

(2) Connector CN2

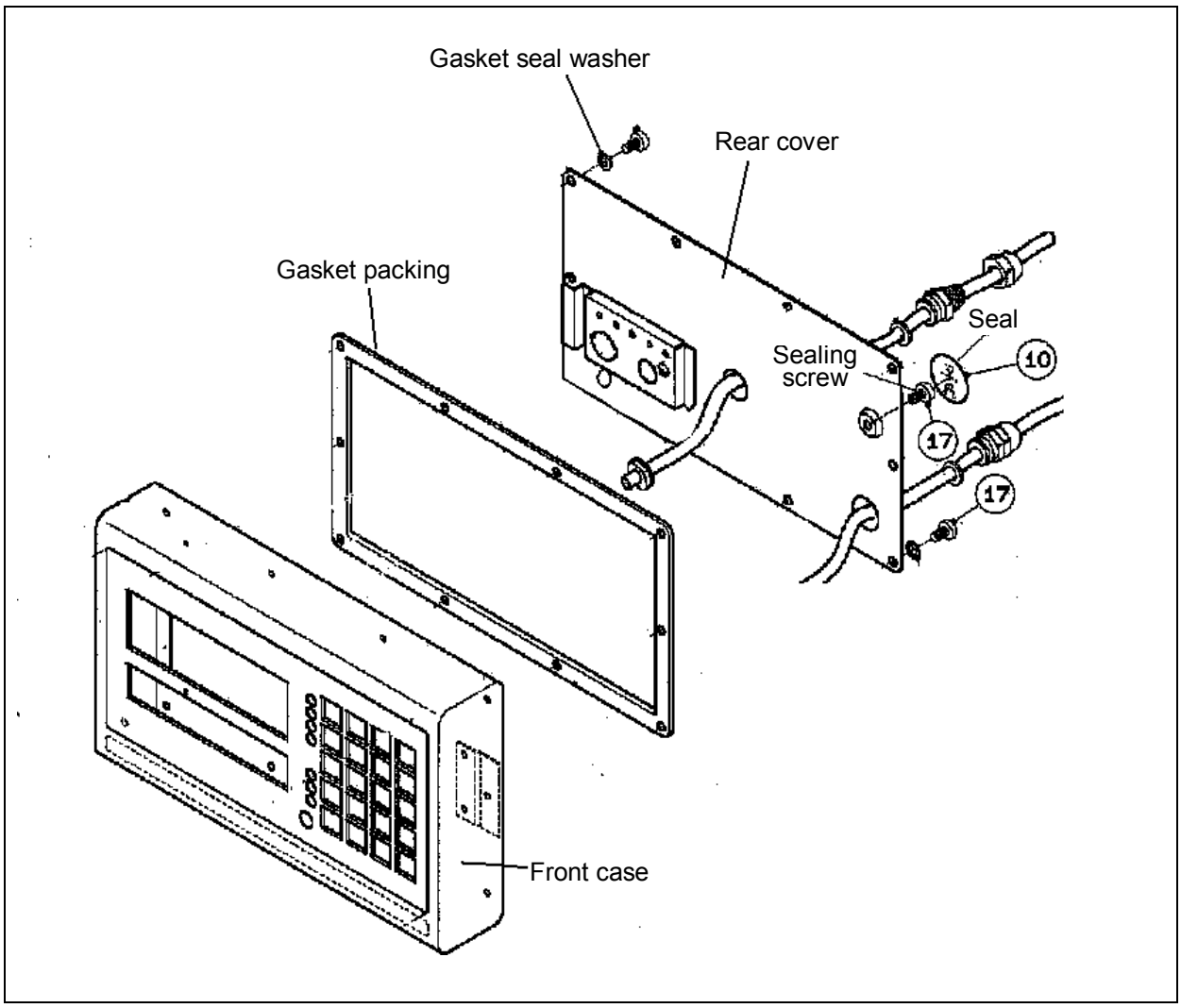
A PIN No.	Signal code	Wire color	B, to main board XJ3
1	GND	Red	1
2	GND	Red	2
3	+5V	Red	3
4	+5V	Red	4



Chapter 5. Maintenance

5.1 Periodical Replacement Parts

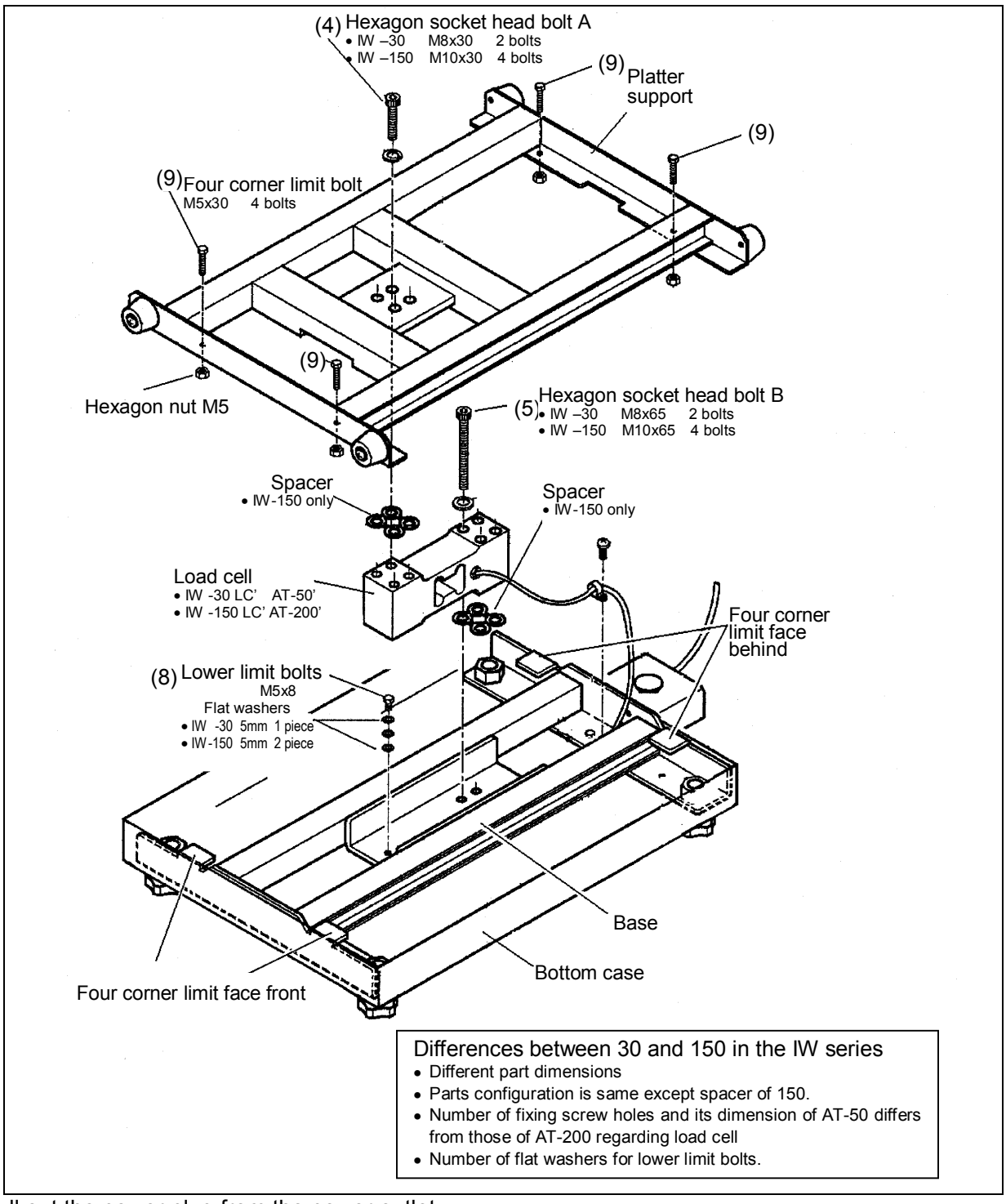
- No periodical parts replacement is needed against five-year product life.
- By disassembling the rear cover for maintenance service, the airtight quality of the gasket packing decreases. Replace with a new gasket packing.



5.2 Replacing and Adjusting Load Cell

Specifications

Type	Model code	Rated output	Input resistance	Output resistance	Insulation resistance
IWQ-150	LC'AT-200'	2.3mV/V±15%	2000~2600Ω	2000~2600Ω	10GΩ
IWQ-30	LC'AT-50'	2.3mV/V±15%	2000~2600Ω	2000~2600Ω	10GΩ



(1) Pull out the power plug from the power outlet.
(2) Remove the weighing platter. (Figure is omitted)
(3) Remove the shock absorbing sheet stuck on the weighing platter. (Figure is omitted)
(4) Remove the hexagon socket head bolts A, and remove the weighing platter and spacer (IWQ-150 only).
(5) Remove the hexagon socket head bolts B, then, remove the spacer (IWQ-150 only) and the load cell.
(6) Disconnect the load cell cable from the screw terminal of the A/D board, and loosen the waterproof lock to pull out from the scale section side.
(7) When mounting the load cell, go through (4) to (6) in reverse order. Use the removed cord and bushing for reassembling the bottom case and support column section.

Caution	The cell cable may rupture when forcefully pulled. Surface flaws may invite water intrusion and inner corrosion, resulting in fluctuated measurement and/or other malfunctioning.

(8) Confirming the lower limit

A flat washer 5mm is fastened using a M5 x 8mm long hexagon headed bolt.
Confirm the gap by using a thickness gage.

Model	Number of M5 washer (pcs)	Gap (mm)	Remarks
IWQ-150	2	1.6±0.3	
IWQ-30	1	0.9±0.2	

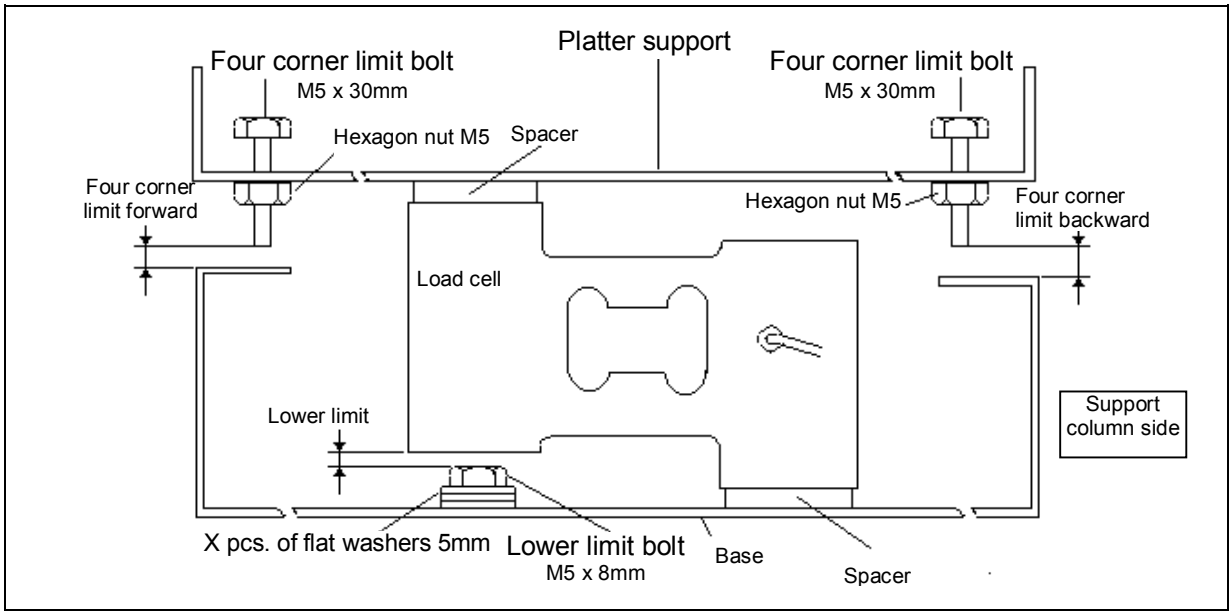
(The gap may be decreased due to plastic deformation of the load cell. In that case, the load cell should be replaced.)

(9) Confirming and adjusting the four-corner limit gaps

Confirm gaps at the four corner limit forward (near the support column), and gaps at the four corner limit backward, at 2 positions each.

When the gap does not meet the rated value(s) in the following table, loosen the hexagon nut(s) and turn the four-corner limit bolt(s) to adjust the gap. Fasten the hexagon headed bolt(s) after adjustment is complete.

Model	Four corner limit forward (mm)	Four corner limit backward (mm)	Remarks
IWQ-150	4.5	5.0	
IWQ-30	2.0	2.5	



(10) Confirming and adjusting the four-corner limit gaps

Reference

Refer to Item 2. C1 Mode, Section 3. Test Mode in Chapter 3. Setup Mode, in this manual for zero point and span adjustment.

5.3 Troubleshooting

Phenomenon	Cause	Measure
1. Nothing is displayed even when the ON/OFF key is pressed.	1. No AC power supply.	• Confirm voltage at the power outlet. • Check the power cord, and replace if necessary. Confirm conduction of CN1 1:Black or 2:Red and plug of SW power supply. Also check voltage between the same pins.
	2. ON/OFF key defect	• Check conduction of the key using a multi-meter, and replace if necessary.
	3. No VCC+5V supply.	• Check conduction of harness C2 VCC, and replace if necessary. • Check SW power supply, and replace if necessary. Confirm grounding of the CN2 1,2 pin, and +5V at the 3,4 pin of the SW power supply using a multi-meter.
	4. Main board defect.	• Confirm by replacing the P-932 main board with a new or defective one.
2. "Err" displays when pressing ON/OFF key .	1. E2ROM data is garbled.	• Initialize Test Mode C6 E2ROM entirely. (Span adjustment is required after initialization.) • If not recovered, repair or replace the main board.
3. Test Mode "C" displays when pressing ON/OFF key .	1. Scale data is in the initialization state.	• Span adjustment.
4. When pressing ON/OFF key , and after display check is finished, "----" is displayed for weight and buzzer sounds continuously.	1. A/D value is outside the start range, or unstable. • AD initial value drifts. • Defect in load cell.	• Remove item from on the weighing platter. • Check and adjust A/D value. Perform Test Mode C1, and if unstable, replace A/D board and load cell in the order. If outside start range, perform zero and span adjustment. • Replace load cell if weighing value reaches the lower limit under the weighing capacity at zero/span adjustment.
	2. Incorrect supplied voltage VEX+5V of load cell. • Defect in main board	• Check VEX+5V between R-W of A/D board XJ2 by using multi-meter. If the voltage is low or fluctuated, replace main board to generate VEX.
5. Zero point and/or weighing value is fluctuated.	1. Influence of wind or vibrations at the set location.	• If the scale is exposed to wind, move the scale to an other place, etc. • If influenced by vibrations from floor or platform, move the scale.

Phenomenon	Cause	Measure
	2. Interference to weighing platter, platter support, or load cell.	• Check visually for any contact to weighing platter, platter support or load cell. If any, remove it.
	3. Defect in A/D board or load cell.	• Run Test mode C1 to check A/D value, and if necessary, replace A/D board and load cell in the order.
	4. Incorrect supplied voltage of VEX+5V, load cell. • Defect in main board	• Check VEX+5V between R-W of A/D board XJ2 by using multi-meter. If the voltage is low or fluctuated, replace main board to generate VEX.
	5. Influenced by electromagnetic wave	• Identify the source to eliminate, or move to the other place.
6. Not responding, or a hard to operate key.	1. Defect of the key.	• Replace the tactile key soldered to main board.
	2. A gap between key sheet and key (main board) is inappropriate.	• Adjust so that main board fits with key sheet.
	3. Defect in main board	• Replace the main board.
7. Display trouble, such as no lighting, or double lighting for a digit or segment.	1. Defect in main board.	• Replace the main board.

• RS-232C journal printer in linked operation (Optional)

Phenomenon	Cause	Measure
1. Printer not reopening, to printing command.	1. Defect in the printer.	• Confirm that power is ON. • Confirm that the cable is connected. • Confirm that it is online. • Confirm that there are no errors. • Confirm matching that it matches the scale, or the transmission specifications. Reference Refer to the Setup Mode list.
	2 Defect in the scale side.	• Confirm that the cable is connected. • Confirm that the cause is other than setup item F11 0:no output. • Check that there is connection via the main board XJ4 connector. • Replace the main board.
2. Mis-printing (garbled)	1. Mis-matching transmission specifications	• Confirm that the scale side and the printer side match. • Replace the main board.

• Contact BOX in linked operation (Optional)

Phenomenon	Cause	Measure
1. No output (OUT1 – OUT4) or incorrect operation. Contact input (IN1) is not operating either.	1. Contact output signal is not correctly set.	• Confirm set value of Setup Mode F13/F14. Reference Refer to the Setup Mode list.
	2. Insufficient conductivity at contacts.	• Check the main board XJ1 connector and I/F board XJ3 connector for contacts or disconnection.
	3. Board-related defect.	• Replace the I/F board. • Replace the main board.

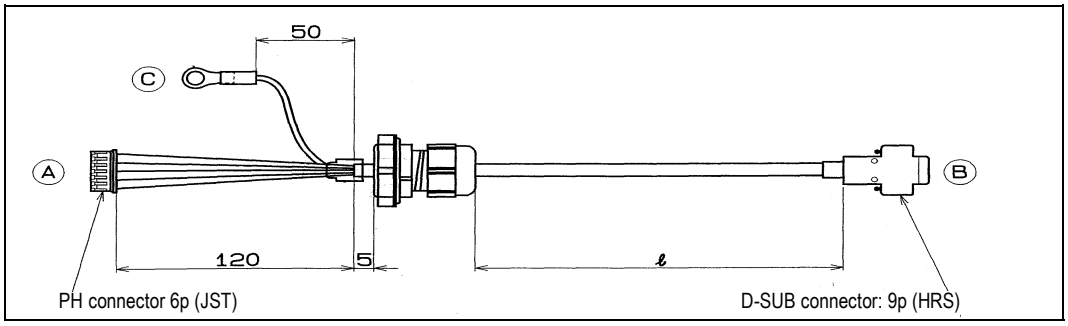
• Loud buzzer (Optional)

Phenomenon	Cause	Measure
1. Buzzer is not sounding.	1. Incorrect setup.	• Check set value of Setup Mode F15. Reference Refer to the Setup Mode list.
	2. Insufficient conductivity at contact.	• Check the XJ4 connector and harness C2 RS232C for contact or disconnection. • Check for contacts or disconnection of the cable coming from the loud buzzer.
	3. Board-related defect.	• Replace the main board.

Chapter 6 Others (Appendix)

6.1 RS-232C Connecting Cables (Optional)

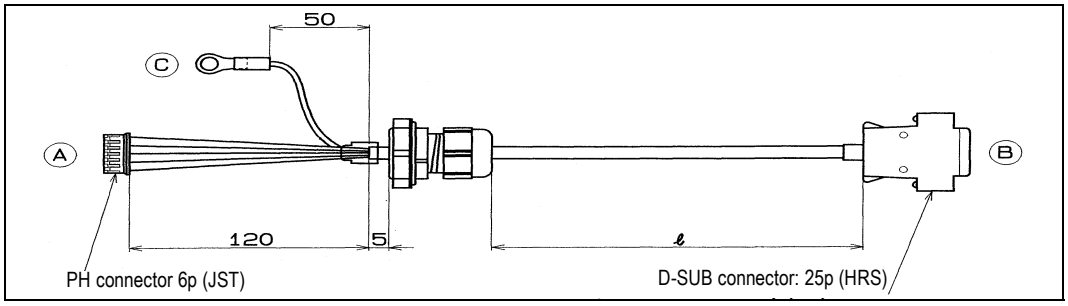
6.1.1 RS232C cable DSUB9Pin



- Harness “C2” RS-232C
- L: 250mm (Part No.: 79-1317-03) L: 3000mm (Part No.: 79-1318-07)

A PH connector PIN No.	Signal code	Wire color	B D-SUB 9P PIN No.
1	BUZ	-	-
2	DTR	White	6
3	RXD	Red	3
4	TXD	Green	2
5	SG	Black	5
6	-		-
-	RTS/CTS	Orange	7 (7/8 jumper wire)
-	RTS/CTS	Orange	8 (7/8 jumper wire)
Terminal C	Shield wire	Shield wire	Connected at the shell

6.1.2 RS232C cable DSUB25 Pin



- Harness “C2” RS-232C
- L: 250mm (Part No.: 79-1314-02) L: 3000mm (Part No.: 79-1315-06)

A PH connector PIN No.	Signal code	Wire color	B D-SUB 25 PIN No.
1	BUZ	-	-
2	DTR	White	6
3	RXD	Red	2
4	TXD	Green	3
5	SG	Black	7
6	-		-
-	RTS/CTS	Orange	4 (4/5 jumper wire)
-	RTS/CTS	Orange	5 (4/5 jumper wire)
Terminal C	Shield wire	Shield wire	Connected at the shell