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Servicemanual
Precision balance

KERN TPBS-B / TPBJ-B

Version 1.0

02/2026

GB



GB

KERN TPBS/TPBJ

Version 1.0 - 02/2026

Servicemanual

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1 Technical Data

KERN	PBJ 600-3M	PBJ 1000-3	PBJ 2000-2M
Item number / type	TPBJ 620-3M-B	TPBJ 1020-3-B	TPBJ 2200-2M-B
Readability (d)	0,001 g	0,001 g	0,01 g
Weighing range (max)	620 g	1.02 kg	2.2 kg
Reproducibility	0,001 g	0,001 g	0,01 g
Linearity	± 0,002 g	± 0,003 g	± 0,02 g
Settling time (typical)	2,5 s	2,5 s	2,5 s
Calibration value (e)	0,01 g	-	0,1 g
Calibration class	I	-	II
Minimum weight (min)	0,1 g	0,1 g	0,5 g
Smallest part weight when counting parts under laboratory conditions*	1 mg	1 mg	10 mg
Smallest part weight when counting parts under normal conditions**	10 mg	10 mg	100 mg
Adjustment option	Internal		
Warm-up time	4 h	4 h	2 h
Weighing units	kg, g	kg, g	kg, g, ct
Air humidity	max. 80 % relative (non-condensing)		
Permissible ambient temperature	10-30 °C		
Input voltage device	DC 12 V, 1 A		
Input voltage power supply unit	AC 100-240 V, 50 / 60 Hz		
Housing dimensions [mm]	191 x 317 x 79		
Dimensions [mm] (fully assembled)	202 x 317 x 166	202 x 317 x 166	202 x 317 x 166
Weighing plate, stainless steel [mm]	113 x 110	113 x 110	176 x 189
Draft shield dimensions [mm]	Inside 180 x 193 x 87	Inside 180 x 193 x 87	-
	Exterior 202 x 228 x 103	Exterior 202 x 228 x 103	
Net weight (kg)	4.2 kg	5.0 kg	5.0 kg
Interfaces	RS232		
Underfloor weighing system	Hook	Hook	Hook
Degree of soiling	2		
Overvoltage category	Category I		
Altitude metres	Up to 2000 m		
Installation site	Only in closed rooms		

KERN	PBJ 4000-2M	PBJ 6000-2M	PBJ 8000-1M
Item number / type	TPBJ 4200-2M-B	TPBJ 6200-2M-B	TPBJ 8200-1M-B
Readability (d)	0,01 g	0,01 g	0,1 g
Weighing range (max)	4.2 kg	6.2 kg	8.2 kg
Reproducibility	0,01 g	0,01 g	0,1 g
Linearity	± 0,02 g	± 0,02	± 0,2
Settling time (typical)	2,5 s	2,5 s	1,2 s
Calibration value (e)	0,1 g	0,1 g	1 g
Calibration class	II	I	II
Minimum weight (min)	0,5 g	1 g	5 g
Smallest part weight when counting parts under laboratory conditions*	500 mg	10 mg	100 mg
Smallest part weight when counting parts under normal conditions**	5 g	100 mg	1 g
Adjustment option	internal		
Warm-up time	2 h	2 h	2 h
Weighing units	kg, g, ct	kg, g	kg, g
Air humidity	max. 80 % relative (non-condensing)		
Permissible ambient temperature	10-30 °C		
Input voltage device	DC 12 V, 1 A	DC 12 V, 1 A	DC 12 V, 1 A
Input voltage power supply unit	AC 100-240 V, 50 / 60 Hz		
Housing dimensions [mm]	191 x 317 x 79		
Dimensions [mm] (fully assembled)	191 x 317 x 79		
Weighing plate, stainless steel [mm]	176 x 189		
Net weight (kg)	5,0 kg		
Interfaces	RS232		
Underfloor weighing system	Hook		
Degree of soiling	2		
Overvoltage category	Category I		
Altitude metres	Up to 2000 m		
Installation site	Only in closed rooms		

KERN	PBS 600-3
Item number / type	TPBS 620-3-B
Readability (d)	0,001 g
Weighing range (max)	620 g
Reproducibility	0,001 g
Linearity	± 0,002 g
Settling time (typical)	2,5 s
Smallest part weight when counting parts under laboratory conditions*	1 mg
Smallest part weight when counting parts under normal conditions**	10 mg
Recommended calibration weight, not included, (class)	100–600 g (E2)
Adjustment points	100-600 g
Warm-up time	4 h
Weighing units	kg, g, mg, t, gn, dwt, tl (Tw), tl (HK), ozt, tl (Singap, Malays), ct, lb, oz, tl (Cn), m, PCS, %, D, mom, B (m= meshgal, b= baats)
Air humidity	max. 80 % relative (non-condensing)
Permissible ambient temperature	10-30 °C
Input voltage device	DC 12 V, 1 A
Input voltage power supply unit	AC 100-240 V, 50 / 60 Hz
Housing dimensions [mm]	191 x 317 x 79
Dimensions [mm] (fully assembled)	202 x 317 x 166
Weighing plate, stainless steel [mm]	113 x 110
Draft shield dimensions [mm]	Inside 180 x 193 x 87
	Exterior 202 x 228 x 103
Net weight (kg)	3.2 kg
Interfaces	RS232
Underfloor weighing system	Hook
Degree of soiling	2
Overvoltage category	Category I
Altitude metres	Up to 2000 m
Installation site	Only in closed rooms

KERN	PBS 1000-3	PBS 4000-2	PBS 6000-2
Item number / type	TPBS 1020-3-B	TPBS 4200-2-B	TPBS 6200-2-B
Readability (d)	0,001 g	0,01 g	0,01 g
Weighing range (max)	1.02 kg	4.2 kg	6.2 kg
Reproducibility	0,001 g	0,01 g	0,01 g
Linearity	± 0,002 g	± 0,02 g	± 0,02 g
Settling time (typical)	2,5 s	2,5 s	2,5 s
Smallest part weight when counting parts under laboratory conditions*	1 mg	10 mg	10 mg
Smallest part weight when counting parts under normal conditions**	10 mg	100 mg	100 mg
Recommended calibration weight, not included, (class)	600 g (E2)	4 kg (E2)	6 kg (E2)
Adjustment points	100-1000g	1-4 kg	1-6 kg
Warm-up time	4 h	4 h	4 h
Weighing units	kg, g, mg, t, gn, dwt, tl (Tw), tl (HK), ozt, tl (Singap, Malays), ct, lb, oz, tl (Cn), m, PCS, %, D, mom, B (m= meshgal, b= baats)		
Air humidity	max. 80 % relative (non-condensing)		
Permissible ambient temperature	10-30 °C		
Input voltage Device	DC 12 V, 1 A		
Input voltage power supply unit	AC 100-240 V, 50 / 60 Hz		
Housing dimensions [mm]	191 x 317 x 79		
Dimensions [mm] (fully assembled)	202 x 317 x166	202 x 317 x166	202 x 317 x166
Weighing plate, stainless steel [mm]	113 x 110	113 x 110	113 x 110
Draft shield dimensions [mm]	Inside 180 x 193 x 87 Exterior 202 x 228 x 103	-	-
Net weight (kg)	3.2 kg	3.2 kg	3.4 kg
Interfaces	RS232	RS232	RS232
Underfloor weighing system	Hook	Hook	Hook
Degree of soiling	2		
Overvoltage category	Category I		
Altitude metres	Up to 2000 m		
Installation site	Only in closed rooms		

2 TOTAL VIEW

2.1 Components

Models with readability d = 0.001 g:

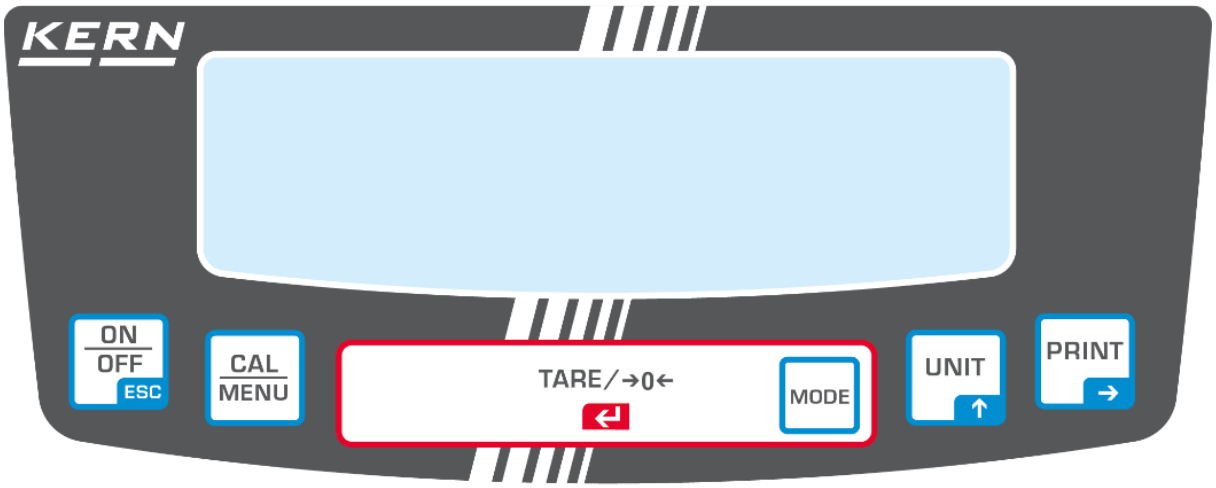


Models with readability d≥ 0.01 g:



1. Windbreak
2. Weighing plate
3. Display
4. Keyboard
5. Foot screw

2.2 Operating elements



2.2.1 Keyboard overview

In weighing mode:

Button	Designation	Press once and again release	Press and hold for approx. 3 seconds
	**[ON/OFF]**	Switches between operating and standby mode.	Exit menu / return to mode
	**[CAL]**	Calls up the adjustment or the menu selection. (*1)	Displays the last menu item set.
	**[TARE]**	Taring / zeroing	No operation
	**[UNIT]**	Switch weighing unit (*3)	No operation
	**[PRINT]**	Output of the weight value to external devices (printer, PC	Output of date and time to external devices.

*1 This button is used to set values if per cent (%), number of pieces (PCS),
specific gravity of solids (▼d) or specific gravity of liquids (d) is displayed.
*3 Units other than "g" must first be set up in the scale before they can be used for measurements.
Only grams (g), per cent (%) and piece counting (PCS) are set at the factory.

In the menu:

Button	Designation	Press once and again release	Press and hold for approx. 3 seconds
	**[ON/OFF]**	Back to the submenu or weighing mode	Back to weighing mode
	**[CAL]**	Goes to the next menu item.	Displays the last set menu menu item.
	**[TARE]**	The last menu item displayed is selected and set.	No operation
	**[UNIT]**	Enter numerical values. Increases the numerical value of the flashing digit by 1.	No operation
	**[PRINT]**	Enter numerical values. Goes to the next digit.	No operation

Numerical input:

Button	Designation	Function
	button ↑	Increase flashing digit
	button →	Digit dialling to the right
	Navigation button ↵	Confirm input
	ESC	Cancel input

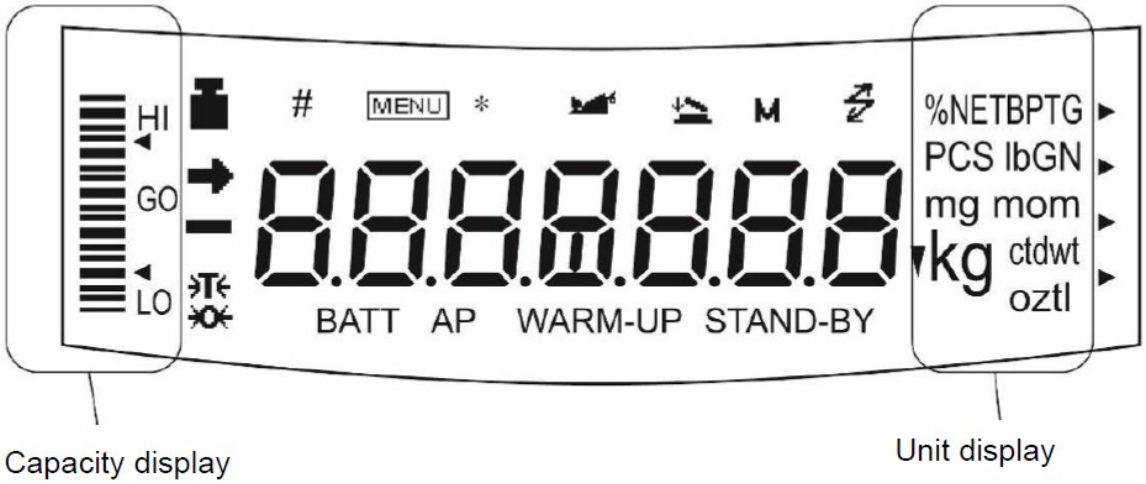
- The [#] indicator is displayed for numerical input.
- "SET" indicates that the value has been saved successfully.
- If "ERR" is displayed, the value could not be saved successfully, return to the menu at  and repeat the entry.

2.2.2 Set decimal point when entering numerical values

A decimal point only needs to be entered when determining density or if a multiplier is to be defined for the user-defined unit.

- Press the  button repeatedly until the last digit flashes. Press the  button again to enter decimal point setting mode. The inverted triangle symbol ▼ or the current decimal point flashes.
- Press the  button to move the decimal point one place at a time to the desired position.
- Press the  button to set the position of the decimal point. The message "SEt" appears briefly to indicate that the setting is complete.

2.3 Display overview



Display	Designation	Description of the
➡	Stability indicator	Indicates that the weight value is stable. (*1) Indicates the currently selected element in the menu element selection.
→T←	Tare symbol	Indicates that a pre-tarring value is set.
▬	Weight symbol	Lights up during measuring range adjustment. Displays the adjustment settings during menu selection. Flashes before the automatic measuring range adjustment starts. **Note:** If automatic adjustment is not activated, the operator must carry out the adjustment as soon as this symbol flashes. • with the built-in weight (**PBJ** models see section8.3 1.1) • with external weight (for **PBS** models, see section).8.1.2
([) (])	Brackets	On calibrated scales, the non-calibrated value is in brackets.
#	Number sign	Displays the input of numerical values.
MENU	Menu icon	Appears during menu selection. Always appears when the menu is locked.
*	Asterisk	Indicates that the displayed numerical value is not a weight value.
	Communication symbol	Lights up during communication with external devices via the RS-232C cable. Signals that the communication functions are set to ON.
▼	Inverted triangle symbol	Displays the setting of the specific weight measurement. Serves as a replacement for the decimal point.
→0←	Zero display	
	Animal symbol	Displays the setting of the animal weighing function.
	Symbol for automatic storage and zeroing	Displays the setting for automatic storage and zeroing.
M	Memory symbol	Scale is in recipe mode
AP	Symbol for automatic printing	Displays the setting of the automatic print function.
STAND-BY	Standby symbol	Lights up when the power supply to the scale is in standby mode. Also lights up when the application function has switched to standby mode.

*1 Stability symbol the display value may fluctuate when the stability symbol is permanently illuminated if the load changes slowly or the stability detection band has been set to a large value.

3 ERROR CODES

Error Indicator	Error Details	Remedies
CAL E0	Calibration weight loading fault	• Unscrew the transportation screws. • Replacement or repair of Weight Loader ASSY.
CAL E1	Unstable data during span calibration by built-in weight.	1) Change the location of installation. 2) Replacement or repair of Weight Loader ASSY.
CAL E2	Appears when there is a large deviation from zero during span calibration (more than 5% of capacity)	1) Check to unload and set Pan assembly during span calibration.
CAL E3	Appears when the calibration external weight is off during PCAL (built-in weight calibration) (more than 1% of capacity)	1) Check the external calibration weight. 2) Replacement or repair of Weight Loader ASSY.
CAL E4	Appears when the span of the internal calibration weight is off during the calibration (more than 1% of capacity).	
CAL E5	The wrong weight has been loaded (more than 10% of capacity).	
ERR 00	Appears when an EEPROM which has not been initialized is fitted	1) Initialize EEPROM. See “1.operating method for the adjustment service”
ERR 10	Appears when there is an error entering the password	1) Enter correct password.
ERR 20	Appears when an incorrect numerical value has been set	1) Enter suitable numerical value.
ERR 21	Appears when the data required in each measurement mode has not been entered	
ERR 23	Appears when the balance is used wrongly	1) See instruction manual.
ERR 24	Appears when the pilot power voltage becomes low. The EEPROM cannot be written.	1) Replace AC adaptor. 2) When using battery pack(option), charge it enough. 3) Replace Assy (B4), Display or Assy ,I/F (B5).
COMERR	Communication error	1) Check command codes and communication setting
Absolute value OL	Appears when an item that is heavier than the weighing capacity is loaded. (more than 105% of capacity)	1) Use balance within capacity. 2) See “11.Trouble shooting”
Displayed value OL	Appears when an item that is heavier than the weighing capacity is loaded. (more than capacity)	
Absolute value -OL	Appears when the pan etc. has been removed. (less than –10% of capacity)	1) Install Pan assembly (6) and Cap, Pan supporter (5) correctly. 2) See “11.Trouble shooting”
Displayed value -OL	Appears when the pan etc. has been removed. (When the negative display value exceeds the negative weighing capacity)	

4 TROUBLE SHOOTING

Symptom	Probable cause	Remedy
(a) Nothing appears in the display.	Correct power is not supplied.	Check the power supply and connect correctly.
	Wrong AC adapter or failure of AC adapter	Replace the AC adapter.
	Cable, Flat26 (B6) is disconnected.	Connect Cable, Flat (B6) correctly.
	Assy, Display (B4) is failed.	Replace Assy, Display (B4).
(b) Missing numbers, symbols in the display.	Assy, Display (B4) is failed.	Replace Assy, Display (B4).
(c) Keys do not operate	Cable, L105(14) is disconnected.	Connect Cable, L105(14) correctly.
	Switch board assy (C3) is failed.	Replace Switch board assy(C3).
	Assy, Display (B4) is failed.	Replace Assy,Display(B4).
(d) "oL" or "-oL" is displayed.	Pan assembly(6) and/or Cap, Pan supporter(5) are not installed.	Install Pan assembly (6) and Cap, Pan supporter (5) correctly.
	Protect cover assy (8) and Pan assembly(6) are in contact.	Install Protect cover assy (8) with double-sided tapes firmly when used.
	Pan assembly (6) is not installed correctly.	Install Pan assembly (6) correctly.
	Pan is loaded exceeding the weighing capacity.	Use the balance within its capacity.
	Cable, L65(U27) is disconnected.	Connect Cable, L65(U27) correctly.
	Pt-Ni band(U14) is twisted/bent/badly soldered.	Replace Pt-Ni band(U14) / Solder Pt-Ni band(U14) correctly.
	The hole of Stopper plate(U11) is contacting with the pin of Lever Assy.	Position and lock Stopper plate(U11) correctly without contacting with the lever pin.
	Stopper, Lever (U12) and/or Assy, Detector (U8) are not correctly positioned.	Position Stopper, Lever (U12) correctly and adjust the height of Assy, Detector (U8) correctly.
	Assy, Analog (B3) is failed.	Replace Assy, Analog (B3).
	Force coil assy (L1) wire break/ earth leak	Replace Force coil assy(L1).
	Force coil assy (L1) and Magnet assy (U6) are contacting directly or with dusts.	Remove dusts and position Force coil assy (L1) correctly.
	Unit assy (1) is damaged.	Replace Unit assy (1).
(e) Large linearity error	Linearity adjustment was incorrect. Inputted calibration weight value was not correct in linearity adjustment.	Perform linearity adjustment correctly using accurate calibration weights.
	Essentially poor repeatability is causing the symptoms.	Check repeatability and refer to (i) (Repeatability)
	Essentially large drift is causing the symptoms.	Check drift and refer to (f) (Drift)
	Essentially large corner load error is causing the symptoms.	Check corner load performance and refer to (h) (Corner load error)
	Span calibration has not been performed correctly.	Perform span calibration.
	Damaged EEPROM data.	Input the data with the Adjustment S/W.
	Unit assy (1) is damaged.	Replace Unit assy (1).
(f) Zero drift, sensitivity drift are large.	Warm up is insufficient.	Warm up the balance sufficiently.
	Direct sunlight, or air current from heater or cooler exist.	Change the balance installation site. Remove sunlight / air current.
	The installation site has been changed.	Warm up sufficiently and perform span calibration.
	Temperature sensor is failed.	Replace temperature sensor.
	Damaged EEPROM data.	Input the data with the Adjustment S/W.
	Unit assy (1) is damaged.	Replace Unit assy (1).

(g) Sensitivity is not correct.	Span calibration has not been performed correctly.	Perform span calibration.
	Warm up is insufficient.	Warm up sufficiently.
	Level adjustment has not been done.	Adjust level correctly.
	The installation site has been changed.	Warm up sufficiently and perform span calibration.
	(PBJ only) Dust or dirt is stuck to Weight (9) (built-in calibration weight).	Clean Weight (9).
(h) Large corner load error	Unit assy (1) is damaged.	Perform corner load adjustment on UniBloc cell when error is within 15mg (PBJ/PBS small-pan models) / 30mg (PBJ/PBS small-pan models) /150mg (PBJ/PBS large-pan models)/300mg (PBJ/PBS large-pan models). Otherwise replace Unit assy (1).
(i) Poor measurement repeatability / large display value fluctuation / The stability mark does not readily appear.	Effects of air current / vibration / movement of persons.	Change the balance installation site. Remove air current / vibration / movement of persons. Set High-stability mode.
	The sample or sample container is charged with static electricity.	Cover the sample with metal, such as foil.
	The sample or sample container is magnetically charged.	Demagnetize the sample and container.
	Essentially large corner load error is causing the symptoms.	Check corner load performance and refer to (h) (Corner load error)
	Essentially large drift is causing the symptoms.	Check drift and refer to (f) (Drift)
	Cable, L65 (U27) is disconnected / damaged.	Connect Cable ,L65 (U27) correctly / Replace Cable,L65(U27).
	Pt-Ni band(U14) is twisted/bent/badly soldered.	Replace Pt-Ni band(U14) / Solder Pt-Ni band(U14) correctly.
	Temp sensor assy (M6) cable is badly soldered.	Solder Temp sensor assy (M6) cable correctly.
	The hole of Stopper plate (U11) is contacting with the pin of Lever Assy. Dusts exist between them.	Clean the hole of Stopper plate (U11) and lever pin and position and lock Stopper plate (U11) correctly.
	Stopper, Lever (U12) is contacting the lever end section. Dusts exist between them.	Clean Stopper, lever (U12) and the lever end section and adjust the height of Assy,Detector(U8).
	Force coil assy (L1) wire is broken/ earth leak.	Replace Force coil assy (L1) .
	Assy, Detector (U8) is failed.	Replace Assy, Detector (U8).
	Assy, Analog (B3) is failed.	Replace Assy, Analog (B3).
	Force coil assy (L1) and Magnet assy (U6) are contacting directly or with dusts.	Remove dusts and position Force coil assy (L1) correctly.
	Damaged EEPROM data.	Input the data with the Adjustment S/W.
	Unit assy (1) is damaged.	Replace Unit assy (1).
(j) Display holds at “CHE 0” after plugging on.	Connector(s) is not properly inserted.	Insert connectors properly.
	Poor soldering of CPU (M201, M202)	Re-solder CPU.
	Poor wiring of temperature sensor	Re-solder temperature sensor cable.
	Leakage of temperature sensor	Replace temperature sensor.

4.1 Information for Inferring the Cause of Board Failure

(All of these balances use only a few boards, and the varied functions work in tandem with each other. It is therefore difficult to determine the failed board from a single breakdown mode. An educated guess to determine the failed board can be made by understanding the functions performed by each board.)

Assy, Display (B4)

A) Function <controls every function>
Its main functions are:(1) To supply power to everything except the I/F board (logic5V, analog ±12V, and LCD backlight power) (2) Display function (3) Clock function (4) Storage of balance constants (5) Man-machine key input (6) Weight loading control (7) RS232C communication control (8) Other external communication (printer, external input/ output, extended communication) functions (9) Control to the Analog board.

Detailed Contents

(1) Supplying power: the Assy, Display (B4) logic power 5V. Power supplied to the Assy, Analog (B3) is ±12V. 16V/100mA power is supplied for the backlight.

(2) Display: Displays the weight values etc. on the basis of signals coming directly from the CPU.

(3) Clock: The IC for the clock (driven by the backup battery) is directly controlled by the CPU.

(4) Memory: Stores the balance constants and the user's balance usage modes.

(5) Man-machine key input: A series of man-machine interfaces including power ON/OFF. For setting the balance environment status modes and setting the clock etc.

(6) Calibration weight loading control: Controls the position, working together with the calibration weight loading device. Also controls the drive torque.

(7) RS232C communications control: Controls communication with PCs as an external peripheral (via IC M105).

(8) The I/O port controls communication with external printers. It controls communication with external keys (e.g. AKB301) for Keyport, as well as having an external contact output function. Other multi-purpose communications ports are controlled directly by the CPU extension ports.

(9) Controls the balance weight value A/D and the communication of temperature measurement A/D with respect to the Analog board and receives data.

Assy, Analog (B3)

A) Function <mainly weight measurement>
(1) PID control (mechanical control) (2) Load value A/D control (3) Temperature A/D control (4) Magnet temperature correction (span calibration) (5) Generation of reference voltage.

Detailed Contents

(1) Mechanicallycontrolledservo: Controls the static balance of the load and the electromagnetic force for measurement with respect to the weighing capacity measurement mechanism.

(2) Load measurement A/D: Reads the electrical current of the coil generating the electromagnetic force for measurement to calculate the raw data value (wAd).

(3) Temperature measurement A/D: Calculates the A/D and value (tAd) which measures the temperature inside the magnet generating the electromagnetic force. Correct the displayed load.

(4) Magnet temperature correction: Temperature correction of the magnetic flux density.

(5) Reference voltage generation: Used mainly as the reference voltage of the A/D converter (the voltage which determines the span etc. of the displayed load).

B) Voltages of each part (reference values)

1. J25 connector; reference electrode ((4), (6): 0V) (pin number in brackets ( ))
   (3)-(4): 2 to 3V ((4); -pole)
   (1)-(2): 0.9 to 1.3V ((2); -pole)
   (5)-(6): 0V ((6); -pole)
   (7)-(6): 0V ((6); -pole)

   If there is a J25 voltage fault, replace the Assy, Detector (U8).
2. J24 Connector;
   (1)-(2): -6V to 6V ((2); -pole)
3. J12 Connector;
   (1)-(2): -12V ((2); -pole)
   (1)-(3): +12V ((3); -pole)
   (4) to (9): 0 to 5V <Logic signal>
   TP1-TP0:0V <Beam signal>

3) Assy, I/F (B5)

A) Function <link between the balance and external devices>

Detailed Contents

(1) Power supply port: Port for receiving DC 12V power (AC adaptor) from an external source.
(2) RS232C communication port: D-sub25 pole female connector. Cable connection port for communicating with external PCs etc.
(3) Printer port: Mainly EP-80/90 or EP-100/110.
(4) External input/ output port: Input/ output dual-use port. The AKB-301 is usable during input mode. Can be used as the contact output for the comparator during output mode. Output is open collector TR.
(5) Extended communication port: External communication port for future expansion options. At present the RDB-201/-202 can be connected.

B) Voltages of each part (reference values)

1. J11 Connector
   (1)-(3): 12V ((3); -pole)/ <AC adaptor input voltage>
2. J2 Connector (15 pole D-sub); open
   (5) to (9)-(1): 5V ((1); -pole)
   (2), (3)-(1): 0V
   (10) to (13)-(1): 0V
3. J3 Connector (25 pole D-sub); open
   (2), (20)-(7): 0 to 5V <RS232C_Logic signal>
4. J4 Connector (6 pole Min-Din); open
   (5)-(3): 5V ((3); -pole)
   (2)-(3): 0V ((3); -pole)
   (1), (6)-(3): 0 to 5V <Logic signal>
5. J5 Connector (8 pole Din); open
   (8)-(2): 5V ((2); -pole)
   (7), (4)-(2): 5V
   (6), (1)-(2): 0 to 5V <Logic signal>

5 Performance Inspection

Performance inspections are to be conducted after at least 2 hours have passed since turning on the power and “g” display (back-light turn on), in a location where there is no air movement, vibrations, or sudden temperature changes. Fit the supplied windbreak set onto models capable of minimum readings of 0.001g.

5.1 Repeatability

1) A mass close to the half of weighing capacity (a calibration weight is desirable) is loaded and unloaded 5 times onto the center of the pan. Repeatability at zero and weighing capacity is calculated.

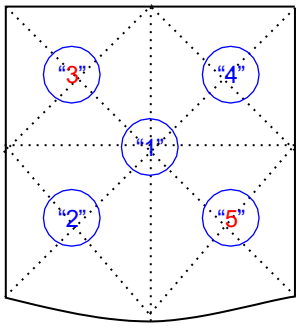
$$R_x = X_{\max} - X_{\min} \qquad : X_1, X_2 \quad \cdots X_5$$
$$R_y = Y_{\max} - Y_{\min} \qquad : Y_1, Y_2 \quad \cdots Y_5$$

5.2 Cornerload error

1) Prepare a weight as shown in “table 1”.

2) Load the weight in turn on center of the pan “1”and positions ”2”,”3”,”4”,”5” located off center of the pan and finally center “1”as shown in Fig.30 and take readings.

3) Operation is normal if the difference between the value obtained in the position away from the center and the value obtained in the center (the corner load error) is below the specification value.
Example: (Corner load error of “3” position) = (“3”value) -(average of ”1” values)



5.3 Linearity

1) Select menu “E-CAL “and calibration the span using the calibration weight.

2) Load the weight as shown in “table 1“in turn and finally unload and take a reading.

3) Obtain the average error of each measurement.

(error) = (reading values) -(actual weight) -(average of unloaded reading values)

4) Operation is normal if the error is less than the specification value.

6 MENU

6.1 User menu

6.1.1 Navigation in the menu

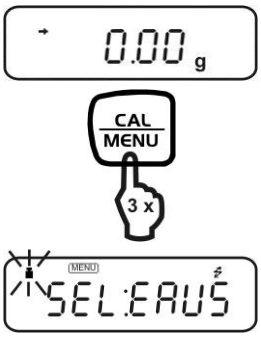
The menu consists of 7 groups and 4 levels.
The menu assignment shows this structure, whereby access to the desired functions is facilitated by the numbering of the corresponding menu elements.
To navigate through the menu, please refer to the menu overview.

The MENU symbol is displayed when navigating the menu.

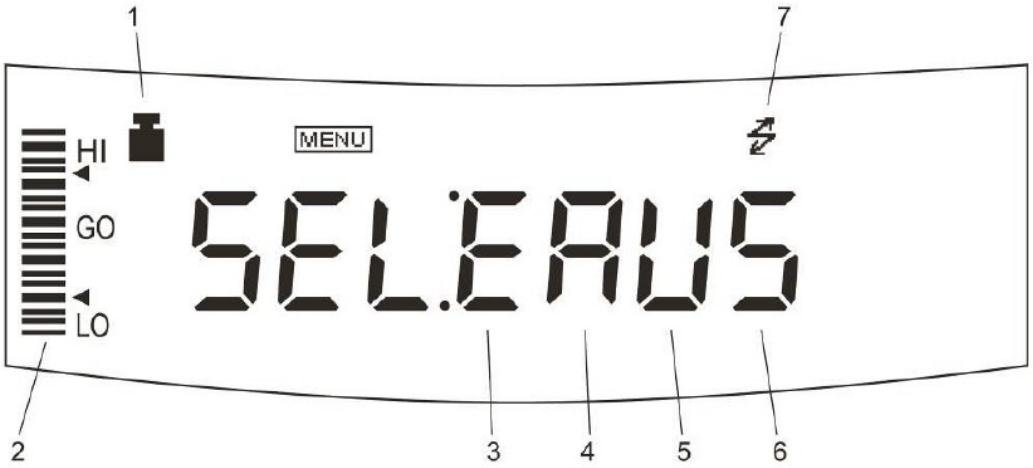
Call up the function:

- In weighing mode, press CAL/MENU 3 times.

The first menu group "Calibration" is displayed, the indicator flashes.



- Use CAL/MENU to select the desired menu group. Each time you press CAL/MENU, the corresponding symbol flashes, see explanation below.

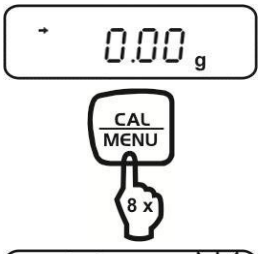


Menu group	Flashing symbol	Description of the
1		Adjustment
2	Analogue display	Capacity display, checkweighing and target weighing
3	E	Installation environment and taring
4	A	Application measurements and automatic output
5	U	Conversion of units and specific weight measurement
6	S	Clock setting and generation of an adjustment data set
7		Communication with external devices

6.1.2 Restore factory settings

This function resets all settings in the menu to the factory settings. Factory settings are labelled with "**#**" in the menu overview.

⇨ In weighing mode, press CAL MENU repeatedly until "S" flashes.





⇨ Confirm with TARE /→0← .



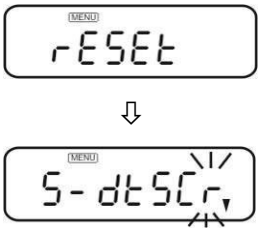
⇨ CAL MENU repeatedly until "r" flashes.



⇨ Confirm with TARE /→0← . The "rESEt?" menu reset query is displayed



⇨ TARE /→0← Press . "rESEt" indicates that the menu reset is complete.



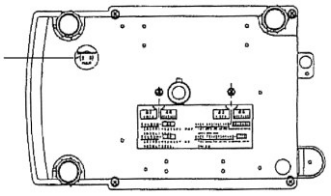
⇨ To return to weighing mode, press ON/OFF ESC repeatedly or for 3 seconds.



6.2 Service menu

6.2.1 Access the service menu

For verified balances:
Break the seal on base (bottom side). Set the slide switch on the back of the display board to ON. Connect the AC adapter. After a short time, the display appears “OFF”.
Press the [ON/OFF] key once. Now you are in weighing mode. Enter the Service Mode following the same procedure as with standard models



Pess the left end of the TARE / →0← and the UNIT together for more than 3 seconds

Press ON/OFF ESC and CAL MENU together for more than 3 seconds and within 10 seconds after the first step. System will display password entry.

Use the UNIT and the PRINT keys to enter the password.



UNIT to increase the highlighted digit

PRINT to highlight the digits from left to right.

Enter the password "**000321**"

Press TARE / →0← to confirm the entered password.



6.2.2 Service menu contents

Version Number: indicates the model code.



Absolute load value



Load analog digital converter value



Temperature analog digital converter value



Power analog digital converter value



Service CAL (writing in the simple linear coefficient)



Loading an unloading the build-in calibration weight



Initializing the build-in calibration weight value



EEPROM (non-volatile memory) editor



Calculating and wirting of the linear coefficient



Calculating and wirting of the temperature coefficient



EEPROM initialization



Outputs the contents of the EEPROM

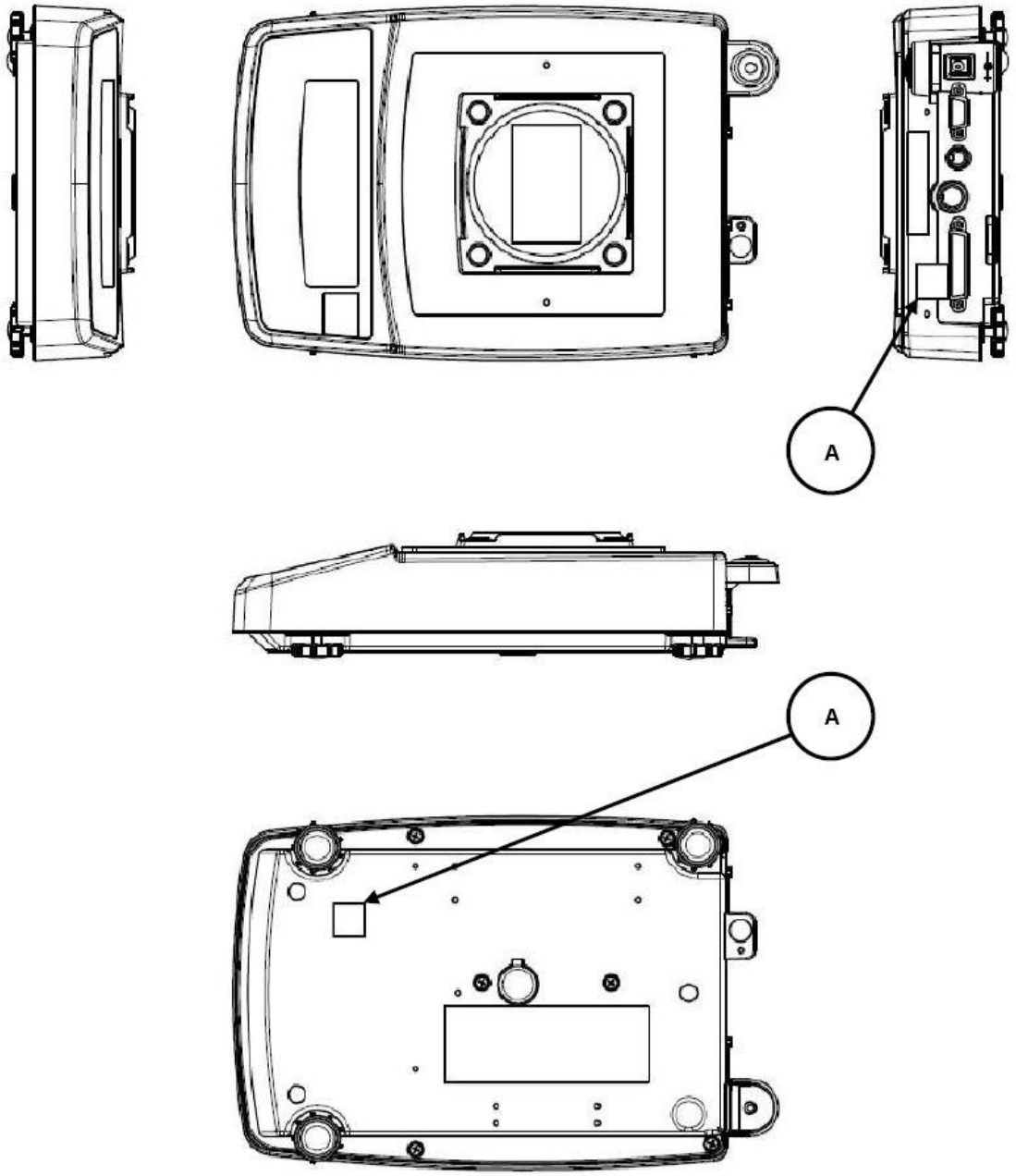


Ends the service menu



7 CONFIGURATION AND ADJUSTMENT

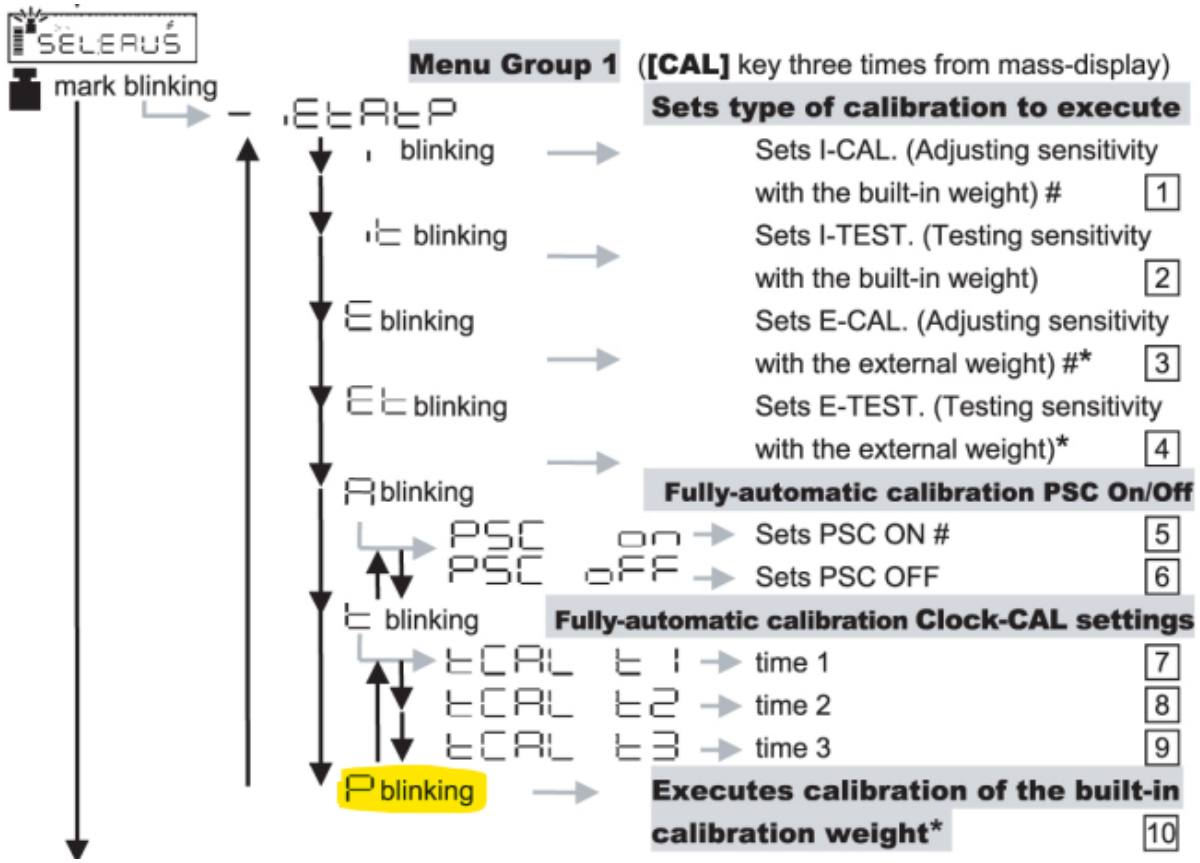
7.1 Position of sealing marks and adjustment switch



7.2 Built-in weight calibration

Calibrate the span using the built-in calibration weight.
Load a calibration weight close to the weighing capacity and take a reading.
Repeat steps 1) to 2) 2 times.
Obtain the average error of the 2 measurements.
(error) = (average of reading values) - (actual weight)
Operation is normal if the error is less than the specification value.

If the error is large, perform **PCAL** (calibration of the built-in weight).
The password required when entering PCAL is "**9999**".



7.3 Adjustment of Linearity

Go into Service menu and set the balance so that wAd and tAd are usable.
After the balance has been turned on for a sufficient amount of time at a stable room temperature, repeat the loading/ unloading of the following weights. The count data values are obtained by converting the absolute value of the weight used into the number of digits required. The values of the weights to be prepared and the count data values are stated below.

For PBJ 220, PBS 220

	Value of Weight Used	Count Data Value
Weight 1	20g	00020000
Weight 2	50g	00050000
Weight 3	100g	00100000
Weight 4	150g	00150000
Weight 5	200g	00200000
Weight 6	220g	00220000

For PBJ 420, PBS 420

	Value of Weight Used	Count Data Value
Weight 1	50g	00050000
Weight 2	100g	00100000
Weight 3	200g	00200000
Weight 4	300g	00300000
Weight 5	400g	00400000
Weight 6	420g	00420000

For PBJ 620, PBS 620

	Value of Weight Used	Count Data Value
Weight 1	100g	00100000
Weight 2	200g	00200000
Weight 3	300g	00300000
Weight 4	400g	00400000
Weight 5	500g	00500000
Weight 6	620g	00620000

For PBJ 820S, PBS 820

	Value of Weight Used	Count Data Value
Weight 1	100g	00100000
Weight 2	200g	00200000
Weight 3	400g	00400000
Weight 4	600g	00600000
Weight 5	700g	00700000
Weight 6	820g	00820000

For PBJ 1020, PBS 1020

	Value of Weight Used	Count Data Value
Weight 1	200g	00200000
Weight 2	400g	00400000
Weight 3	600g	00600000
Weight 4	800g	00800000
Weight 5	1000g	01000000
Weight 6	1020g	01020000

For PBJ 2200, PBS 2200

	Value of Weight Used	Count Data Value
Weight 1	200g	00020000
Weight 2	500g	00050000
Weight 3	1000g	00100000
Weight 4	1500g	00150000
Weight 5	2000g	00200000
Weight 6	2200g	00220000

For PBJ 4200, PBS 4200

	Value of Weight Used	Count Data Value
Weight 1	500g	00050000
Weight 2	1000g	00100000
Weight 3	2000g	00200000
Weight 4	3000g	00300000
Weight 5	4000g	00400000
Weight 6	4200g	00420000

For PBJ 6200, PBS 6200

	Value of Weight Used	Count Data Value
Weight 1	1000g	00100000
Weight 2	2000g	00200000
Weight 3	3000g	00300000
Weight 4	4000g	00400000
Weight 5	5000g	00500000
Weight 6	6200g	00620000

For PBJ 8200, PBS 8200

	Value of Weight Used	Count Data Value
Weight 1	1000g	00100000
Weight 2	2000g	00200000
Weight 3	4000g	00400000
Weight 4	6000g	00600000
Weight 5	7000g	00700000
Weight 6	8200g	00820000

For PBJ 820, PBS 820

	Value of Weight Used	Count Data Value
Weight 1	100g	00100000
Weight 2	200g	00200000
Weight 3	400g	00400000
Weight 4	600g	00600000
Weight 5	700g	00700000
Weight 6	820g	00820000

For PBJ 1020, PBS 1020

	Value of Weight Used	Count Data Value
Weight 1	200g	00200000
Weight 2	400g	00400000
Weight 3	600g	00600000
Weight 4	800g	00800000
Weight 5	1000g	01000000
Weight 6	1020g	01020000

(1) Record the data of the temperature data tAd (e.g.: 00031627).
(The Ad value is recorded as 8 digits. If the value does not amount to 8 digits, fill in the higher digits with “0”.)
(2) Record in turn the wAd values of weights 1 to 6 corresponding to each weighing capacity (If the value does not amount to 8 digits, fill in the higher digits with “0”).

For the PBS 620 balance

Switch the weights 1 to 6 in turn and record the wAd values.

	L*		wAd	Count data value (incl. correction values)
0g (No load)	“L0”	=	01000010	00000000
100g (Weight 1)	“L1”	=	02000020	00100000
200g (Weight 2)	“L2”	=	03000030	00200000
300g (Weight 3)	“L3”	=	04000040	00300000
400g (Weight 4)	“L4”	=	05000050	00400000
500g (Weight 5)	“L5”	=	06000060	00500000
620g (Weight 6)	“L6”	=	06200063	00620000

(3) The data obtained in step (2) above (wAd, count data values) are written into storage registers 40 to 5B using Edit in the Service menu. 1 item of data requires 4 storage registers. The upper and lower digits of the count data values are stored in the first two storage registers, and the upper and lower digits of the wAd value of the actually measured "L*" are stored in the next two registers.
Refer to section 14 for information on how to use Edit.

-Write in 00000000 as the L0 count date in registers 40 to 41.
-Write in 01000010 as the wAd of L0s in registers 42 to 43.
(The top 4 digits of the count data are written into register 40 e.g.: 40:00.00) (The bottom 4 digits of the count data are written into register 41 e.g.: 41:00.00) (The top 4 digits of L0 are written into register 42 e.g.: 42:01.00) (The bottom 4 digits of L0 are written into register 43 e.g.: 43:00.10)
-Write in 00100000 as the L1 count data in registers 44 to 45.
-Write in 02000020 as the wAd of L1 in registers 46 to 47.
(The top 4 digits of the count data are written into register 44 e.g.: 44:00.10) (The bottom 4 digits of the count data are written into register 45 e.g.: 45:00.00) (The top 4 digits of L1 are written into register 46 e.g.: 46:02.00) (The bottom 4 digits of L1 are written into register 47 e.g.: 47:00.20)
-Fill in registers 48 to 57 in the same way (L2 to L5 data).
-Write in 00620000 as the L6 count data in registers 58 to 59.
-Write in 06200063 as the wAd of L6 in registers 5A to 5B.
(The top 4 digits of the count data are written into register 58 e.g.: 58:00.62) (The bottom 4 digits of the count data are written into register 59 e.g.: 59:00.00) (The top 4 digits of L6 are written into register 5A e.g.: 5A:06.20) (The bottom 4 digits of L6 are written into register 5B e.g.: 5B:00.63)
To finish, the temperature data (tAd) from section (1) is written in.
-Write in 00031627 as the LT (tAd) in registers 5C to 5D.
(The top 4 digits of tAd are written into register 5C e.g.: 5C:00.03) (The bottom 4 digits of tAd are written into register 5D e.g.: 5D:16.27)

To save the written data onto the EEPROM, keep pressing 

and check that "SET" is displayed.

(4) Select LinEAr in the Service menu and press 

to then calculate the linear coefficient and write it into the EEPROM. The linear correction coefficient is calculated by the incorporated program based on the contents of (storage registers 40 to 5D), and the linear correction information is automatically saved on the EEPROM in a designated storage register.

8 REPLACING PARTS

8.1 Component Replacement Precautions

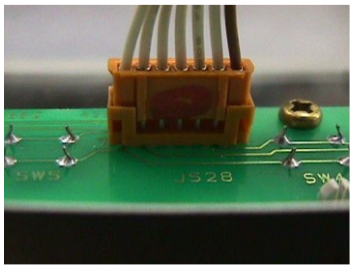
The balance performance may change if the following components are replaced. Therefore, check the performance of the balance after replacement and make adjustments if necessary.

Required adjustments and order / Service act		Service manual reference section	Replacing Unit assy	Replacing Force coil assy	Replacing Assy, Display	Replacing Assy, Detector	Replacing Assy, Analog	Replacing Weight loader assy	Adjustment of Corner Load	Items to be prepared
			4.7	5	4.1	4.5	4.2	4.6	7.3	
1	Height adjustment of Assy, Detector	7.1		X		X				Digital multimeter (DC +/- 5.00V) Check wire set (321-62356)
2	Adjustment of tilt errors	7.2		X						
3	Replacing EEPROM IC				X					
4	Inputting temperature coefficient into EEPROM	4.8	X							EEPROM-ReWriter(When using a computer)
5	Adjustment of linearity	13	X	X		X	X		X	UX-TOOL (When using a computer) Standard weights
6	"CAL wt" in the service menu (for UW only)	1.2	X	X		X	X		X	
7	PCAL (for UW only)		X	X		X	X	X	X	Standard weights
8	i-CAL(UW) or E-CAL		X	X	X	X	X	X	X	(Standard weights)

8.2 Balance assembly / dismantling precautions

1) Pull the connector out straight when disconnecting it. The connector must not be bent when pulling it out.

Note: Failure to do so will bend the pins at the end and it will not be possible to re-insert the connector.



2) The Lever fixing jjg pin (J1) must be inserted into the lever fixing hole as far as the line position of the pin when dismantling/ assembling the balance.

Note: Insert the pin by lifting the Assy,Lever(U4) up slightly. Be very careful to prevent damage to the elastic support.

3)Tighten each screw using the managed torque driver.

Screw Type	Tightening Torque [kgf·cm]
M2	2.5
M2.5 Pan head	4
M3 Pan head	10
M3 Hexagon socket-head bolt	15
M4 Pan head	18
M4 Hexagon socket-head bolt	30

8.3 Inspection of the balance Interior

8.3.1 Disassembling the balance

1) Disconnect the AC adaptor and remove the Pan assembly (6) and the 4 Pan support caps (5).(Fig.2).
2) Turn the balance upside down.
Note: Place a cushioning material underneath the balance to prevent damage to the case when turning the balance upside down.
3) **(PBJ series only)** If the balance is locked by two P4 M4X25 transportation screws (B11), unlock them in accordance with the explanation label.
4)Unscrew the four P4 M4X35 screws (24) and turn the balance so that it is the right way up (Fig.3).



Fig.2

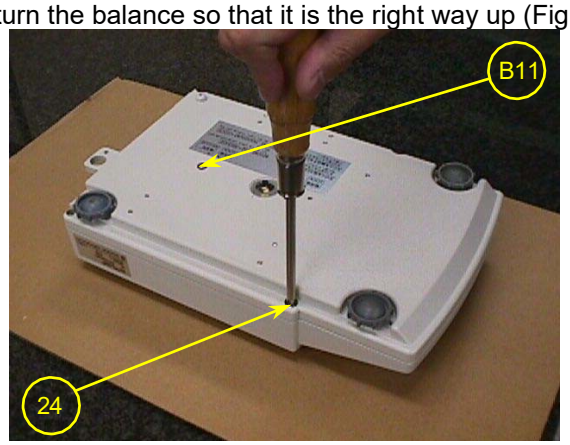


Fig.3

5) Detach the Assy,Case (3) from the Assy,Base (2), and disconnect the Cable,L105 connector (14) at the Assy,Display (B4)(Fig.4).
6) **(PBJ series only)** Remove the Calibration weight (9).
Note: Take care to ensure that the Calibration weight (9) does not get damaged or dirtied when removed.
7) Insert the Lever fixing pin (J1) into the lever fixing hole of the Unit assy (1) down to the notch in the pin (Fig.5).
Note: Insert the pin by lifting the Assy,Lever (U4) up slightly. Be very careful to prevent damage to the elastic support.
8) Loosen the two M4x10 hexagonal socket-head bolts (26) and Washer conical spring M4 (27) and remove the Assy,Pan support (4). The Unit assy (1), Weight loader assy (10) (PBJ series only), and Assy,I/F (B5) can now be inspected.

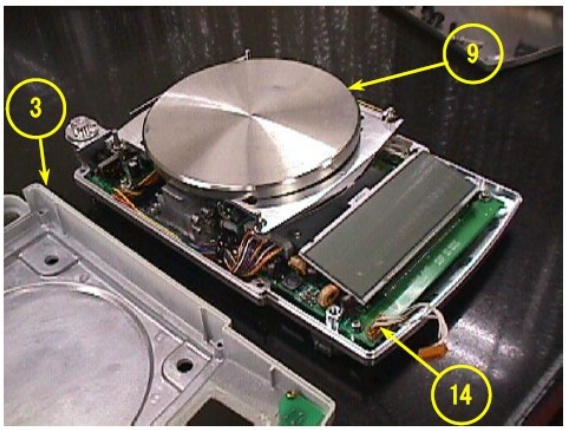


Fig.4

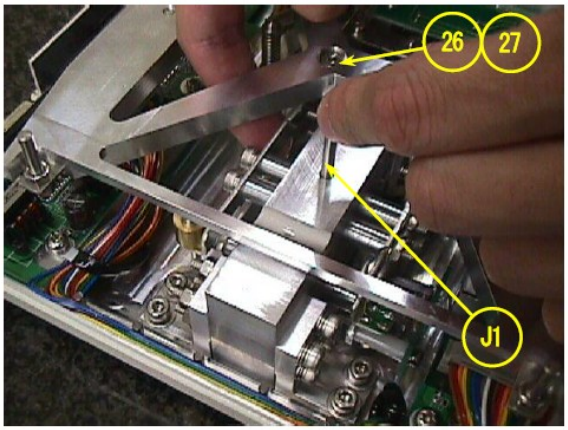


Fig.5

8.3.2 Assembly

1) Fix the Assy,Pan support(4) loosely to the Unit assy(1) the twoM4x10 hexagonal socket-headbolts(26) and Washer conical spring M4 (27)
2) Set the pins of the Pansupport positioning jig (J2) into the holes at the 4 corners of the Assy,Base(3). Align the pins of the Assy,Pan support(4) with the holes of the positioning jig to set its position and fix using the twoM4x10hexagonal socket-headbolts(26) andWasher conical springM4 (27)(Fig.6).
3) Pull the Lever fixing pin (J1) out of the lever fixing hole of the Unit assy(1).
Note: Insert the pin by lifting the Assy,Lever(U4) up slightly. Be very careful to prevent damage to the elasticsupport.
4) Ensuring that the push-up pin of the Weight loader assy (10) fits into the groove of the Calibration weight,placethe weight gently intothe center of the Assy,Pan support(4).
5) Connect the Cable,L105 connector (14) to the Assy,Display(B4), and put the Assy,Case(3)over the Assy,Base(2).Take care to ensure that the cable does not get caughtin between.
6) Turn the balance upside down and fix the Assy,Case(3) and Assy,Base(2) together using the fourP4 M4X35screws (24).
7) Reset the balance the right way up and insert the 4 Caps,pan supporter (5) to the 4 pan support pins and place the Pan assembly(6) on top.
8) Keep an eye on the level indicator and adjust the level of the balance using the 3 Level adjuster(B2). Connect the AC adaptor to the balance and check the operation of the balance.

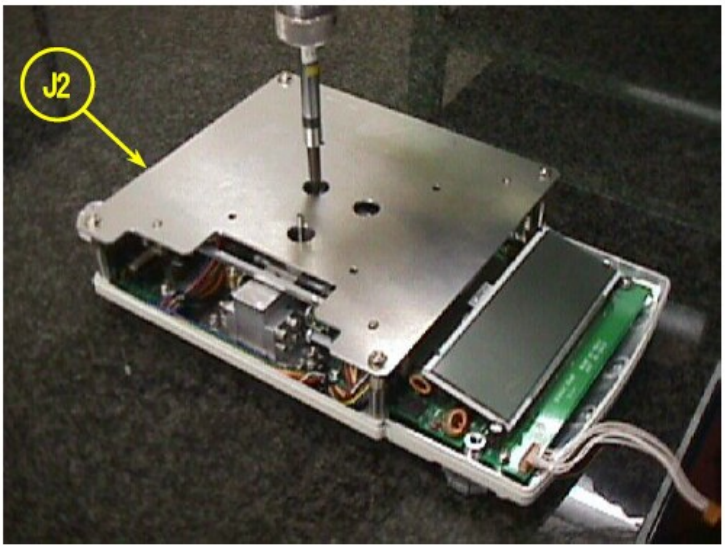


Fig.6

8.3.3 Replacement of Components

8.3.4 Replacing the Assy,Display

1) Detach the Assy,Case(3) / Assy,Pan support(4)in accordance with the steps outlined in “3.Inspection of the Balance Interior”.
2) Undo the CS-5clip (15) which secures the Cable,45(B7) and the Weight loader assy (10)cable, and pull out the connectors of the Weight loader assy (10)and Cable,45(B7)atthe Assy,Display (B4).
3) Unscrew the three P4 M4x8screws (B10) fixing the Assy,Display(B4) in place (Fig.7).
Note: Place the Assy,Display(B4) in a location free of dirt and static.
4) Take the EEPROM located at the back of the Assy,Display(B4) out of its socket, taking care to ensure that its feet donot get damaged.
5) Fit the EEPROM that has been removed in the new Assy,Display(B4).
6) Fit the new Assy,Display(B4) by following steps 2) to 5) outlined above in reverse order.

8.3.5 Replacing the Assy,Analog

1) Detach the Assy,Case (3) / Assy,Pan support(4)in accordance with the steps outlined in “3.Inspection of the Balance Interior”.
2) Unscrew the three P4 M4x8screws (B10) fixing the Assy,Display(B4) in place and undo the CS-5clip (15) which secures the Cable,45(B7) and the Weight loader assy (10)cable. Next, pull the connectors of the Weight loader assy (10)and Cable,45(B7)outatthe Assy,Display(B4).
Note: Place the Assy,Display(B4) in a location free of dirt and static.
3) Disconnect the connector of Cable,65(U27) atthe Assy,Analog(B3).
4) Disconnect the Assy,Relay(U9) connector fromtheAssy,Analog(B3).
5)If there is shield case (B8),loosen the two P4 M4x8screws (B10) fixing the Shield case (B8) and remove the shield case.
6) Loosen the P4 M4x8 screw (B10) and Spacers (B13,B14) fixing the Assy,Analog(B3) to detach it (Fig.8).
7) Fit the new Assy,Analog(B3) by following the steps 2) to 7) outlined above in reverse order.

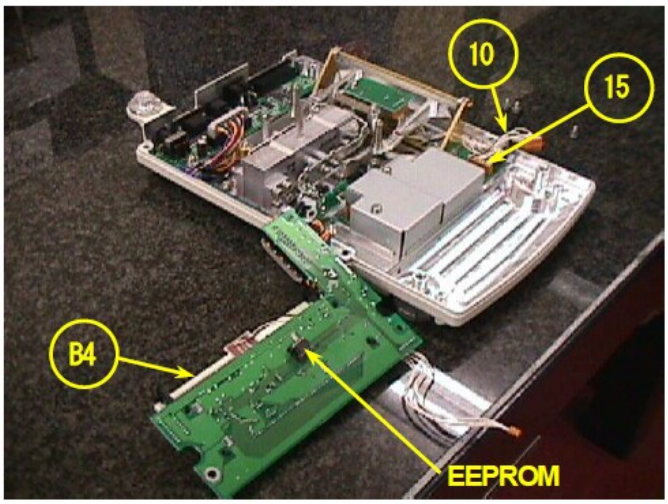


Fig.7

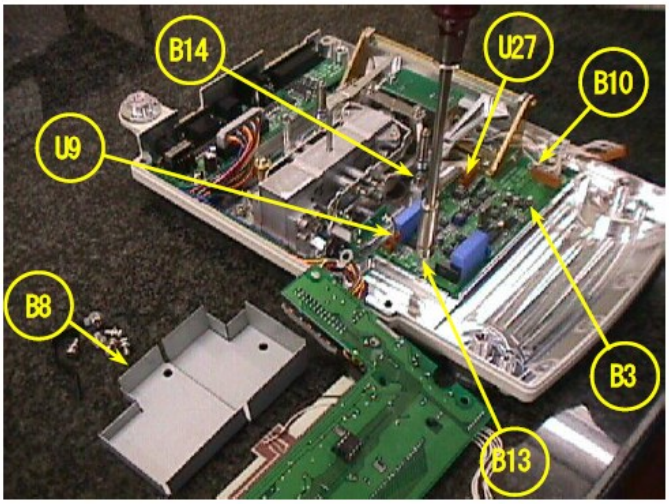


Fig.8

8.3.6 Replacing the Assy,I/F

1) Detach the Assy,Case (3) / Assy,Pan support (4) in accordance with the steps outlined in “3 Inspection of
the Balance Interior”.
2) Undo the CS-5 clip (B15) securing Cable,flat26 (B6).
3) Disconnect the Cable,flat26 (B6) connector from the Assy,I/F (B5).
4) Unscrew the two P4 M4x8 screws (B10) fixing the Assy,I/F (B5). Loosen the four CDHWE101S00
screws (B9) securing the external key connector (15-pin connector) and the RS-232C (D-Sub25 pin
connector) to detach the Assy,I/F (B5) (Fig.9).
5)Fit the new Assy,I/F (B5) by following the steps 2) to 4) outlined above in reverse order.
6)

8.3.7 Replacing the Switch board assy

1) Detach the Assy,Case (3) / Assy,Pan support (4) in accordance with the steps outlined in “3 Inspection of the Balance Interior”.
2) Disconnect the Cable,L105 connector (14) from the Switch board assy (C3).
3) Loosen the five M3x6 screws (C7) and detach the Switch board assy (C3).
4) Detach the Spacer for switch (C2) from the Switch board assy (C3) (Fig.10).
Note: The Spacer for switch (C2), made of resin, is thin in certain parts. Handle with care to avoid damaging it.
7)Fit the new Switch board assy (C3) by following the steps 2) to 4) outlined above in reverse order.

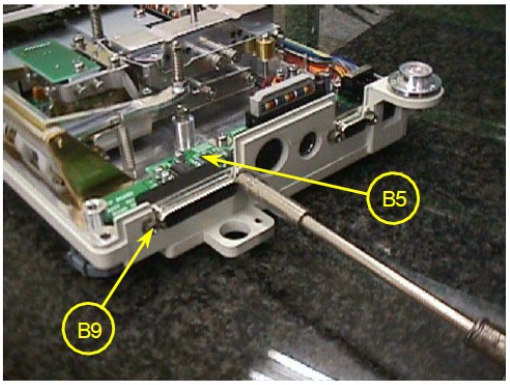


Fig.9

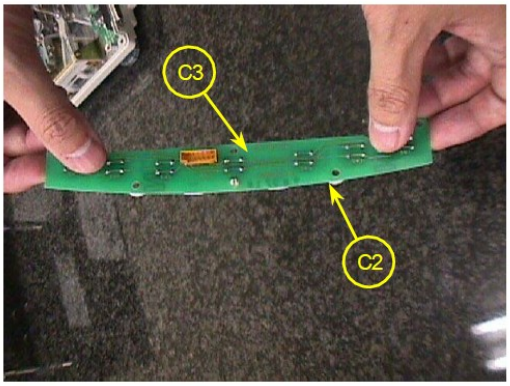


Fig.10

8.3.8 Replacing the Assy,Detector

1) Detach the Assy,Case(3) / Assy,Pan support (4) in accordance with the steps outlined in “3. Inspection of the Balance Interior”.
2) Disconnect the Cable,65(U27) connector atthe Assy,Analog(B3).
3) Remove the two P3 M3x10 hexagonal socket-headbolts(U22) that fixes the

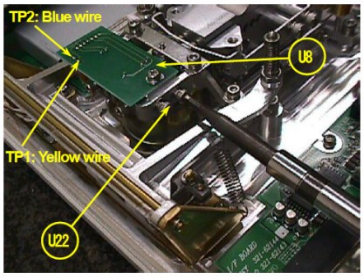


Fig.11

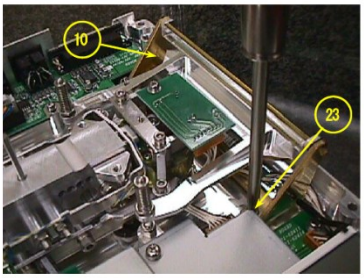


Fig.12

Assy,Detector (U8) (Fig.11).
4) Remove the soldering of the temperature sensor cable connected to the Assy,Detector (U8).
Note: TP1: Yellow wire, TP2: Blue wire
5) Detach the Assy,Detector(U8).
Note: Be very careful when removing it to avoid damaging the elastic support by hitting theAssy,Lever(U4).
6) Fitthe new Assy,Detector (U8) by following the steps 2) to 5) outlined above in reverse order.
7) Conduct **“7.1Adjustment of the Assy,Detector (U8) Height”**.

8.3.9 Replacing theWeight loader assy (PBJ series only)

1) Detach the Assy,Case(3) / Assy,Pan support(4)in accordance with the steps outlined in “3.Inspection of the Balance Interior”.
2) Undo the CS-5 clip (15) securing the Cable,45(B7) and the Weight loader assy (10) and disconnect the Cable,45(B7)and Weight loader assy (10)connectors at the Assy,Display(B4).
3) Loosen the four P4 M4x10screws (23) fixing the Weight loader assy(10)in place to detachthe Weight loader assy (10)(Fig.12).
4) Fitthe new Assy,Calibration weight loading (10) by following the steps 2) to 3) above in reverse order.
5) Perform **“Adjustment of the Pin Height of the Weight loader assy (10)”**.

8.3.10 Replacing the Unit assy

1) Detach the Assy,Case(3) / Assy,Pan support(4)in accordance with the steps outlined in “3.Inspection of the Balance Interior”.
2) Disconnect the Cable,65 (U27) connector at the Assy,Analog(B3).
3) Disconnect the Assy,Relay (U9) connector from the Assy,Analog(B3).
4) Loosen the P3 M4X14 hexagonal socket-headbolt (25) fixing the Unit assy(1) in place to detach the Unit assy(1)(Fig.13).
Warning: Neverhold the Unit assy (1) in the parallel guide or/and movable columnwhen lifting it up.Always hold it in the base part.(Refer to Fig.14.)
5) Remove the under hook (12), and washer spring from the Unit assy(1) (Fig.14).
6) Fitthe new Unit Assy (1) by following the steps 2) to 5) above inreverse order. Thetightening torque is 30 [kgf･cm].
8)Input the attached EEPROM data to the balance. Temperature Coefficients at Address Numbers 00 to 0E.

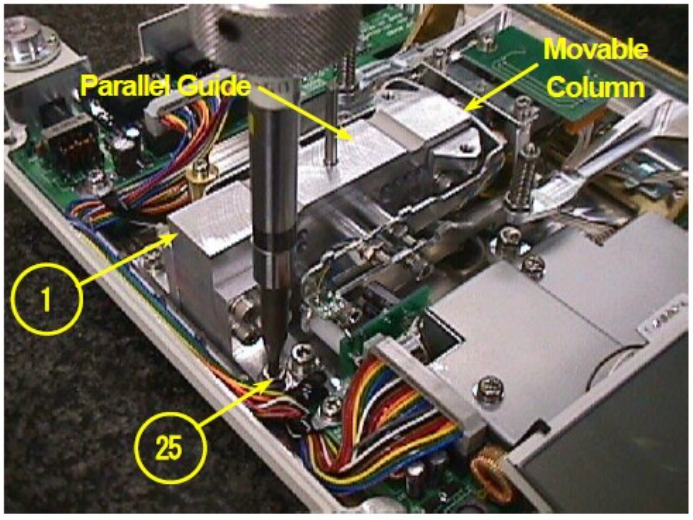


Fig.13

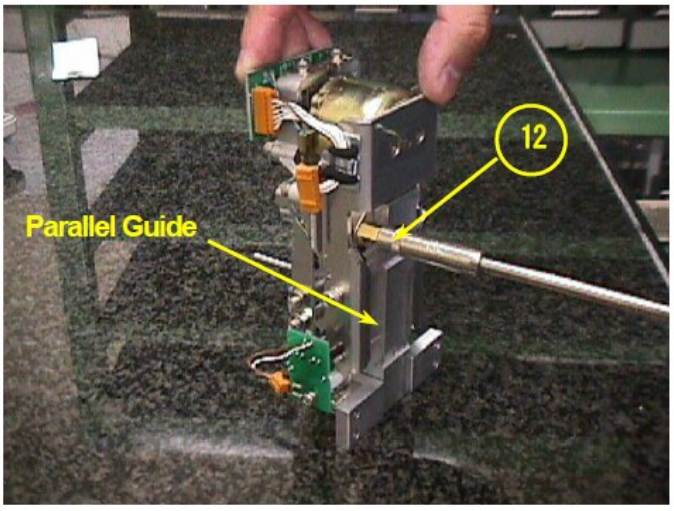


Fig.14

8.3.11 Input of temperature coefficient data

1) Prepare the EEPROM data print out that is attached to the new Unit Assy for replacement.
2) Copy the print-out data of addresses 00 to 0E into the same addresses of the existing EEPROM using “Edit”in theservice menu (See 14.).

8.3.12 Replacement of the level

1) Detach the Assy,Case(3) in accordance with the steps outlined in “3.Inspection of the Balance Interior”.
2) Place the balance on a level surface with the four feet including the fixed one at even lengths.
3) Loosen the three set screws and remove the level from the mount by unscrewingit.
4) Screw the level into the mount until it stops, then unscrew it about one turn.
5) Screw down one of the three set screws of the level until it slightly tightens against the mount surface.
6) Screw down the other two set screws and tighten them until the bubble of the level comes into the red circle.

8.3.13 Replacing the Force coil assy

8.3.13.1 Disassembly

1) Detach the Unit assy (1) in accordance with the procedures outlined in steps 1) to 5) of “4.7 Replacing the Unit assy (1)”.

2) Remove the soldering of the two PT-NI bands (U14) on the Assy,Lever(U4).

Note: Do not break or damage the PT-NI band.

3) Loosen the P4 M3x25screws (U16) and remove the Assy,Relay (U9) and Spacer(U15) (Fig.15).

4) Loosen the P3 M3x10 hexagonal socket-headbolt (U22) fixing the Detector frame (U7) in place to remove it (Fig.16).

5) Loosen the four M2.5x6 screws (U25) fixing the fourMagnetlids in place (U13) and pull the Magnet lids(U13) out horizontally to detach it (Fig.16).

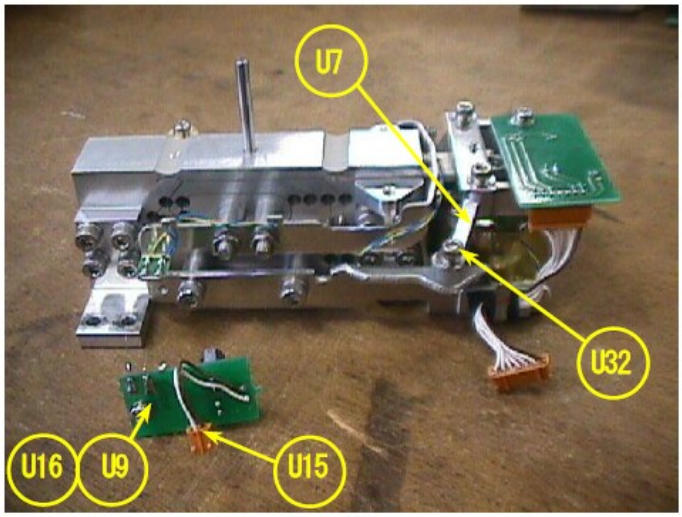


Fig.15

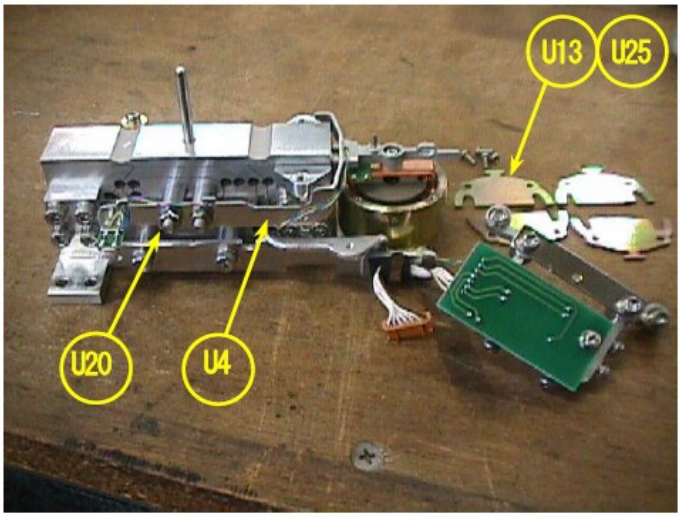


Fig.16

6) Loosen the two M4x55 hexagonal socket-headbolts (U20) fixing the Assy,Lever(U4) in place to remove the Assy,Lever(U4) from the top of the unit.

7) Remove the soldering of the Twisted wire (U7) connected to the Force coil assy (L1).

8) Loosen the M2.5X6 screw (U25) and washer PB SPG M2.6 (U26) fixing the Force coil assy(L1) in place to detach it (Fig.17).

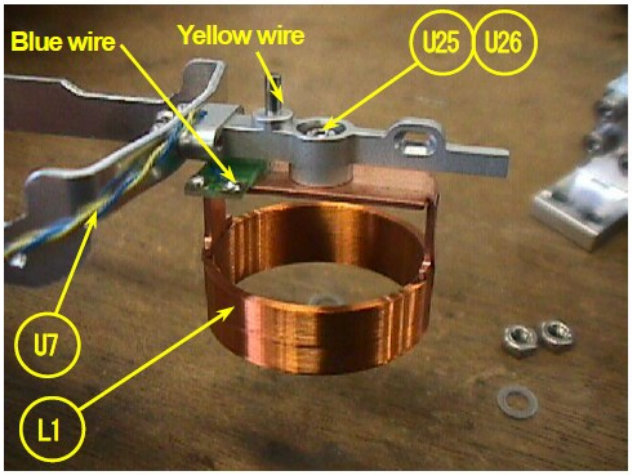


Fig.17

8.3.13.2 Assembly

1) Fix the new Force coil assy(L1) loosely to the Assy,Lever(U4) using theM2.5x6 screw (U25) and washer PB SPG M2.6 (U26) and solder the Twisted wire (U7) onto the Force coil assy(L1).
Note: Left hand side of Force coil assy(L1): Yellow wire; Right hand side of Force coil assy(L1): Blue wire (Fig.17)
2) Insert the Assy,Lever(U4) from the top of the unit and fixit loosely using the two M4X55 hexagonal socket-headbolts(20).
3) Pass the Lever stopper (U12) and the Stopper plate (U11) of the Detector frame (U7) through the Assy,Lever(U4) and fix loosely using the P3 M3X12 hexagonal socket-headbolt (U32).
4) Insert the Gap setting shim (J3) between the Assy,Lever(U4) and the Lever stopper (U12) to set the position of the Assy,Lever (U4), and fix the Assy,Lever(U4) using the two M4x55 hexagonal socket-headbolts(20) (Fig.18).
5) Loosen the P3 M3X12 hexagonal socket-headbolt (U32) and detach the loosely fixed Detector frame (U7).
6) Look infrom the top of the Unit assy(1) and fix theForce coil assy(L1) into place wherethe center of the Force coil assy(L1) is aligned with the Assy,Magnet (U6) (Fig.19).

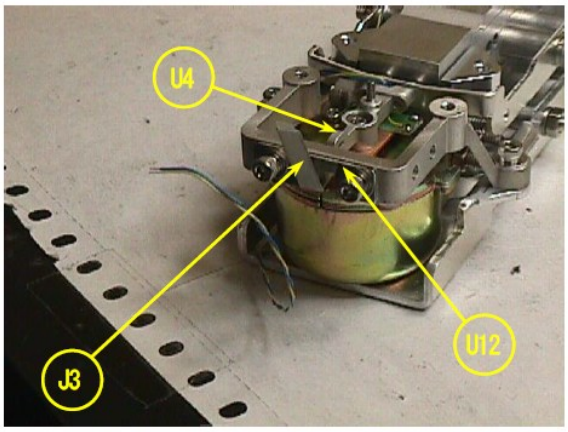


Fig.18

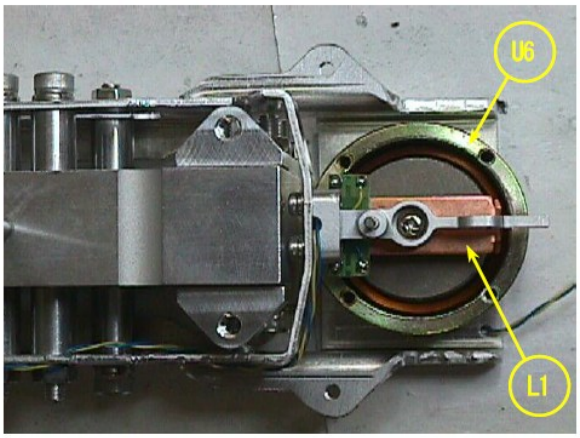


Fig.19

7) Slide the four Magnet lids (U13) in horizontally and fix into place with the four M2.5x6 screws(U25).
8) Pass the Lever stopper(U12) and the Stopper plate (U11) of the Detector frame(U7) through the Assy, Lever(U4) again and fix into place using the P3 M3X12 hexagonal socket-head bolt (U32).
9) Fix the Assy, Relay(U9) and the Spacer (U15) to the Magnet frame (U5) using the P4 M3x25 screw(U16).
Note: The components turn with the screw so screw fix by holding the top right of the Assy, Relay(U9) with your hands.
10)Solder the twoPT-NI bands(U14) to the Assy, Lever(U4) (Fig.20).
Note: Solder them with the PT-NI band (U14) facing upwards at an angle to avoid touching the Assy, Lever(U4).

11) Fix the Stopper plate (U11) when the centers of the stopper plate and the pin of the Assy, Lever (U4) is aligned together using the M3x6 hexagonal socket-head bolts(U31) Washer M3 (U30) (Fig.21).

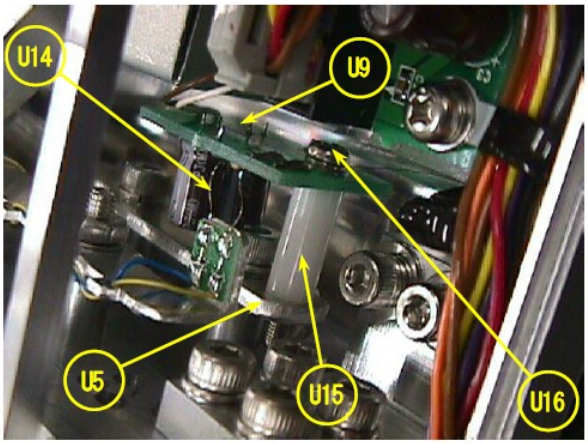


Fig.20

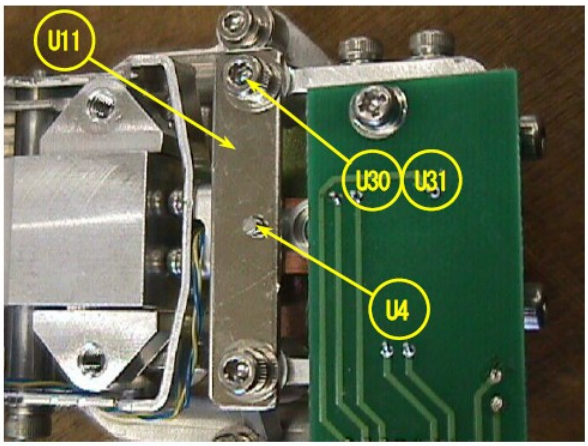


Fig.21

12) Pull the Lever fixing pin (J1) out of the lever fixing hole of the Unit Assy (1). And shake the Unit Assy (1) gently. Assembly is complete if the Assy, Lever (U4) goes up and down and hits the Lever stopper (U12) making a clear sound in the process.

Note: If a clear sound is not heard, either the Assy, Lever (U4) pin and the Stopper plate(U11), or the Force coil Assy (L1) and the Assy, Magnet (U6) may be touching. In both cases, adjust the positions of the respective components in accordance with sections 6) and 11).

13) Attach the Unit Assy (1) by following steps 1) to 5) of “4.7 Replacing the Unit Assy (1)” in reverse order.

14) Fit Assy, Pan support (4) by following steps 1) to 3) of the【Assembly】procedure in “3. Inspection of the Balance Interior”.

15) Perform “7.2Adjustment of Tilt Errors”.

8.3.14 Dismantling/ Assembling the Weight loader assy

【Dismantling】

1) Detach the Weight loader Assy (10) in accordance with steps 1) to 3) in “4.6Replacing the Weight loader Assy (10)”.
2) Detach the pulling spring (W7) at the Lever calibration weight support (W1).
3) Detach the Snap ring D2(W9), pull out the Shaft (W12), and detach the Lever calibration weight support(W1) by pushing down the Hooking shaft(W6) hooked onto the Lever calibration weight support(W1) (Fig.22).
At this point the Nut (W14) can be loosened to detach the Assy Push-up stick(W28).
In addition, the Pull screw for the lever (W5), the Washer, M2(W20), the Compression spring (W24), the Washer, M2(Small)(W11), the Hooking shaft(W6) (bonded to the pull screw for the lever of the Detector lever(W3)) can be detached from the Lever calibration weight support (W1).
Note: The Assy, Push-up stick(W28) and Hooking shaft (W6) etc. must not be detached unless necessary.
4) Unscrew the two M3x8 self-binding screws (W13) and the two M1.4 screws (W10) fixing the Assy, Photo interrupter(W25). Then, remove Plate, motor case (W34).
Next, undo the clamp securing the mini-motor and Photo interrupter cables to detach the Assy, Photo interrupter(W25) and Bottom board (W22).
5) Detach the Binding spring (W17) and the Fixed ring (W27) using tweezers and split the Drive case ASSY, Cal wt (W15, W16) into two. Detach the mini-motor (with gear head), Nut, clamp (W18) and Screw, clamp (W19) (Fig.23).
Note: The mini-motor gear head and Screw, clamp (W19) are coated with Pure seal grease2H(W26), whose viscosity barely changes with the temperature. Take care when handling these.
When re-assembling, apply a slightly generous amount of the Pure seal grease2H(W26) onto the gears and shaft bearing of the gear head and the thread of the Screw, clamp (W19) (do not use any other kind of grease).
6) Remove the Snap ring D3(W8) and detach the Detector lever (W3).
7) Detach the Detector lever shaft(W4) from the Calibration weight loading stand (W2).

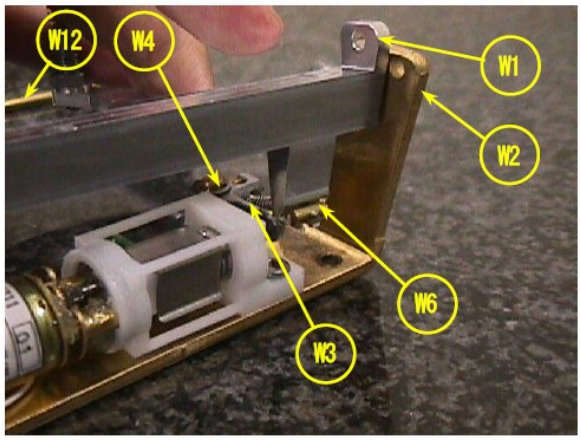


Fig.22

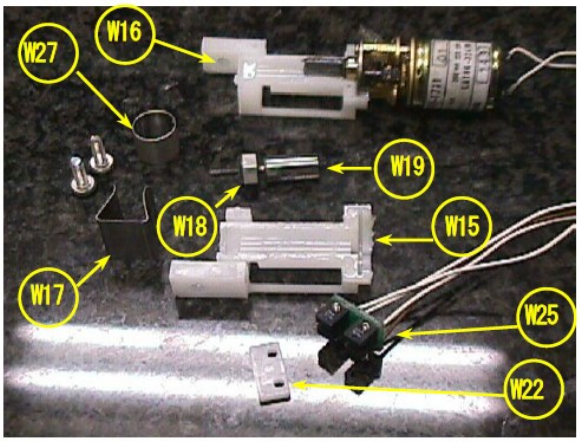


Fig.23

【Assembly 】

1) Replace the faulty component with a new one and screw fix it into place.
2) Hook the Hooking shaft(W6) onto the Lever calibration weight support (W1), pass the Shaft (U12) through and insert the Snap ring D2(W9).
3) Fix the Assy, Push-up stick (W28) loosely to the Lever calibration weight support (W1) using the Nut (W14).
4) Hook the Pulling spring (W7) onto the Lever calibration weight support (W1).
5) Turn and adjust the Hooking shaft(W6) at the Lever calibration weight support(W1) so that the Lever calibration weight support (W1) becomes horizontal (Fig.24).
6) Fit the Weight loader assy by following steps 1) to 3) of “4.6 Replacing the Weight loader assy (10)” in reverse order.
7) Fit the Assy, Pan support (4) in accordance with the procedures of “3. Inspection of the Balance Interior”

【 Adjustment of the pin height of the calibration weight loading 】

8) Unlock the Transportation screws (B11) in accordance with the explanation label.
9) Connect the Weight loader assy (10) connector to the Assy, display (B4).
10) Connect the balance to the AC adaptor and turn on the power.
11) Select ”Ld_w” (built-in calibration weight raised) in the Service menu by following the procedures in “1. Operating Method for the Adjustment Service”.
12) While the calibration weight is raised, adjust the height of the Assy, Push-up stick (W28) so that its tip sticks out above the top of the Assy, Pan support (4) by the amount stated below, and lock it in place using the Nut (W14) (Fig.25).

Note : Adjustment height of the Assy, Push-up stick (W28)

Small pan= 5.2±0.3mm	Large pan= 5.7±0.3mm

In this adjustment, check the height by below jig.

13) Pan support height check jig (J10) and Height gauge (J11).
14) 13) Raise and lower the built-in calibration weight repeatedly from the Service menu to ensure that there are no problems.

8.4 Hardware Adjustments

8.4.1 Adjustment of the Assy,Detector Height

1) Detach the Assy, Case (3) / Assy, Pan support (4) in accordance with “3 Inspection of the Balance Interior”.
2) Disconnect the Assy, Relay (U9) connector from Assy, Analog (B3) and adjust the height of the Assy, Detector (U8).
3) Connect the (+) terminal of the voltmeter to the TP1 pin of the Assy, Analog (B3) and the (-) terminal to the TPG pin.
4) Connect the AC adaptor to the balance and turn on the power.
5) Slightly loosen the two P3 M3x10 hexagonal socket-head bolts (U22) fixing the Assy, Detector (U8).
Gently raise/ lower the lever of the Assy, Lever (U4) until it touches the Lever stopper (U12), and adjust the Assy, Detector (U8) to a height where the voltmeter display inverts (+) (-). (Fig.26).
Note: Adjustment target and guidance

The absolute values of Assy, Detector (U8) output: 3.5±0.5V (both positive/negative

First, balance the voltage by adjusting the height of Assy, Detector (U8).

(U8) movement	Voltage balance
Upwards	Positive side gains
Downwards	Negative side gains

Then, adjust gain (positive and negative sides at the same time) by rotating the adjuster with a plus screwdriver through the center hole of the shield case of Assy, Analog (B3).

Adjuster rotation	Voltage
Clockwise	Gains
Anti-clockwise	decreases

6) Once adjustment is complete, use the two P3 M3x10 hexagonal socket-head bolts(U22) to fix the Assy, Detector(U8).
7) Remove the voltmeter terminals from the Assy, Analog(B3).
8) Disconnect the AC adaptor of the balance and connect the Assy, Relay(U9) connector to the Assy, Analog(B3).

8.4.2 Adjustment of tilt errors

1) Detach the Assy, Case (3) in accordance with “3. Inspection of the Balance Interior”.
2) Adjust the level of the balance using the 3 Level adjusters(B2) while referring to the level indicator and then connect the ACadaptor to the balance.
3) Insert the Pan support cap (5) into the Assy, Pan support (4), and place the Pan assembly (6) on top.
4) Load the following weights onto the Pan assembly (6) and press the **-->0/T<--** key.

Model	Weight
PBJ / PBS (Small pan)	250g
PBJ / PBS (820,1020)	400g
PBJ /PBS (Large pan)	4000g

5) Insert a 1mm thick board under the two feet on the right-hand side of the balance at the front and rear. Read off the display while the balance is grounded like this (the right-hand side of the balance will be raised).
6) Loosen the M3 nut (L9) of the Assy, Lever(U4) if it does not meet the specification. (See “Table 1of 8. Performance Inspection”)
7) If the display is (+), turn the P4 M3x25 screw (L12) of the Assy, Lever(U4) in a clockwise direction. If the display is (-), turn the P4 M3x25 screw (L12) of the Assy, Lever(U4) counterclockwise.
8) Once adjustment is complete, lock the P4 M3x25 screw (L12) with the M3 nut (L9) (Fig.27).

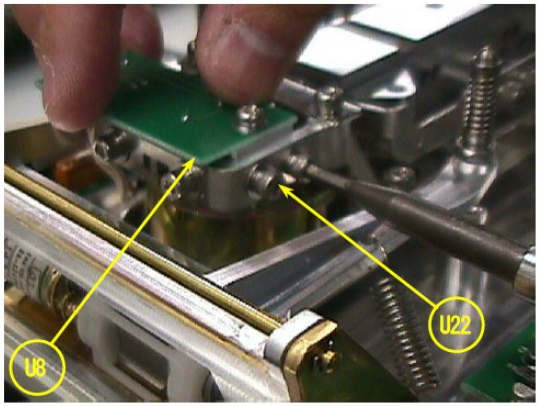


Fig.26

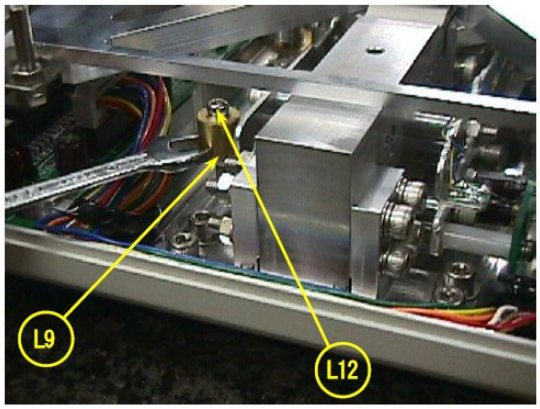


Fig.27

8.4.3 Adjustment of Corner Load

Warning: Perform corner load adjustment only when corner load error is within the below-listed amount. When corner load error is larger than this amount, replace Unit Assy (1).

Adjustable corner load error limit:
PBJ/PBS models with small pan, ± 15mg
PBJ/PBS models with small pan, ± 30mg
PBJ/PBS models with large pan, ±150mg
PBJ/PBS models with large pan, ±300mg

1) Dismount ASSY, CASE (3) following “3. Inspection of the Balance Interior.

2) Adjust the level so that the bubble of level indicator comes in the red circle and connects the balance to power.

3) Insert CAP, PAN SUPPORTER (5) to PAN SUPPOTER ASSY (4) and Install PAN ASSY (6).

4) Place the calibration weight (Refer to Corner error, Table 1, Chapter 8) and press [O/T] key to zero the display.

5) Move the weight in the order of “⇗ L ⇗ R ⇗ F ⇗ B ⇗ Center “1”” (off-center positions are shown in Fig.28) and record the reading of each position.

6) Grind slightly with the corner load adjustment tool (J4, J5) the parts of the flexures corresponding to the off positions of the pan showing plus errors. Note: First adjust L-R direction as this direction is relatively less sensitive than the F-B direction. For L-R adjustment, grind the center of the flexure part. (Fig.29) For F-B adjustment, grind the parts of flexure just off the edge (Fig.29).

7) Repeat steps 5) and 6) and when corner load errors are reduced, place the calibration weight at the “2”, “3”, “4”and “5” positions and further adjust until the adjustment criteria (Refer to Table 1, Chapter 8) is met.

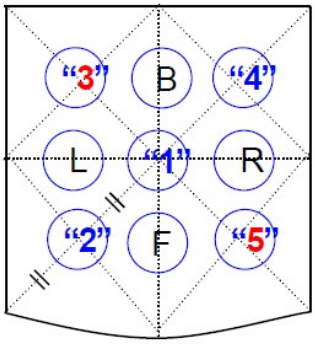


Fig.28

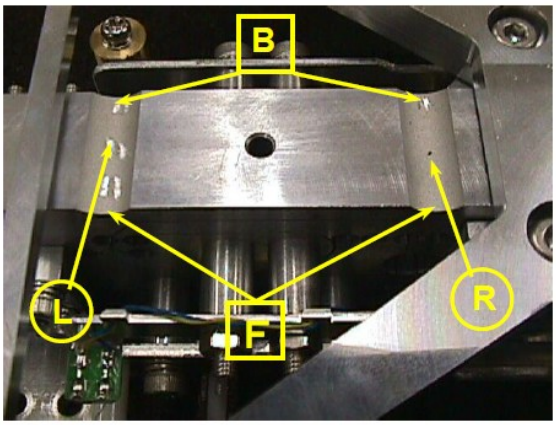


Fig.29

8.4.4 Tilt error

1) Load the weight as shown in “table 1 “and press the -->O/T<--key. (⇒ A)
2) Insert a 1mm thick board under the two feet on the front side of the balance and take a reading. (⇒ B)(error) = (B) -(A)
3)If the error is large, perform “7.2. Adjustment of tilt errors “.

Table 1 PBJ / PBS Series Adjustment Specification

TYPE		220	420	620	820	1020	420	820
CAPACITY	[g]	220	420	620	820	1020	420	820
Readability	[mg]	1	1	1	1	1	10	10
Repeatability(Rx,Ry) Weight	[mg]	2	2	2	2	2	20	20
	[g]	100	200	300	400	500	200	400
Corner load Error Weight	[mg]	±3	±3	±5	±5	±5	±10	±20
	[g]	100	100	200	300	400	100	200
Linearity Error Weight	[mg]	±2	±2	±2	±3	±3	±10	±10
	[g]	50 100 150 200 220	100 200 300 400 420	100 200 400 600 620	100 200 400 600 700 820	200 400 600 800 1000 1020	100 200 300 400 420	200 400 600 800 820
Built-in Calibration Error (*1) Weight	[mg]	±3	±3	±5	±5	±5	±10	±20
	[g]	200	400	600	800	1000	400	800
Tilt Error Weight	[mg]	±30	±30	±30	±30	±30	±300	±300
	[g]	250	250	250	400	400	250	250

TYPE		2200	4200	6200	4200	8200
CAPACITY	[g]	2200	4200	6200	4200	8200
Readability	[mg]	10	10	10	100	100
Repeatability(Rx,Ry) Weight	[mg]	20	20	20	200	200
	[g]	1000	2000	3000	2000	4000
Corner load Error Weight	[mg]	±30	±30	±50	±100	±200
	[g]	1000	1000	2000	1000	2000
Linearity Error Weight	[mg]	±20	±20	±20	±100	±100
	[g]	500 1000 1500 2000 2200	1000 2000 3000 4000 4200	1000 2000 4000 6000 6200	1000 2000 3000 4000 4200	2000 4000 6000 8000 8200
Built-in Calibration Error (*1) Weight	[mg]	±30	±30	±50	±100	±200
	[g]	2000	4000	6000	4000	8000
Tilt Error Weight	[mg]	±300	±300	±300	±3000	±3000
	[g]	4000	4000	4000	4000	4000

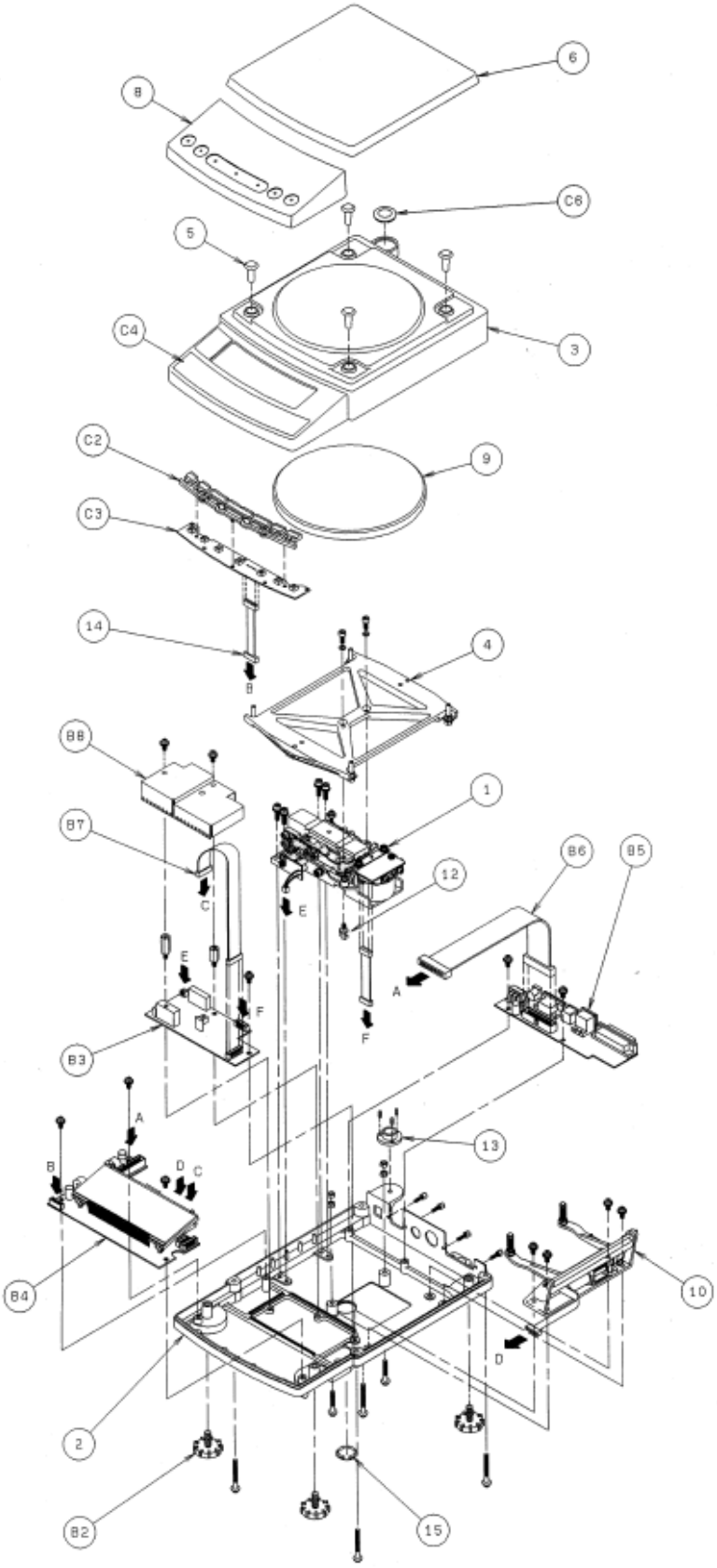
9 Editing EEPROM data

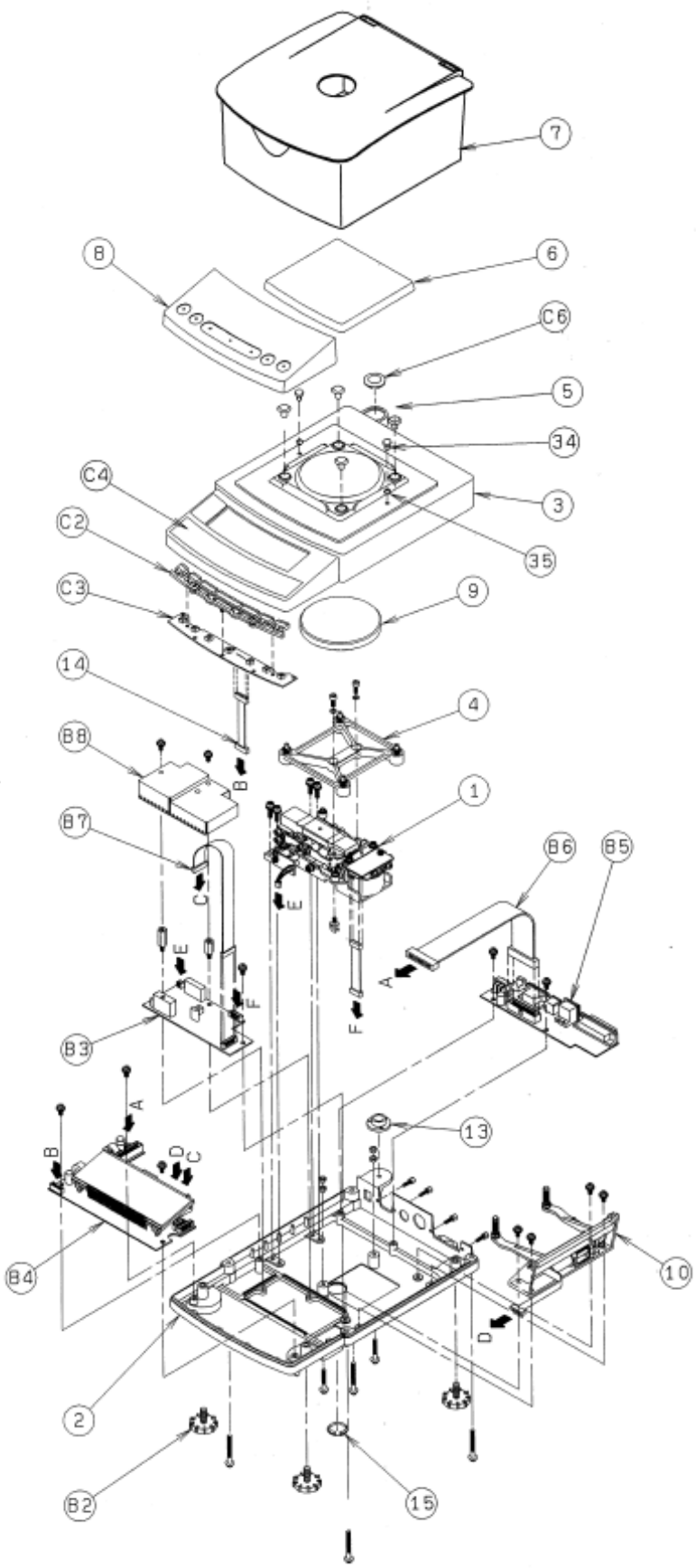
Using“Edit”

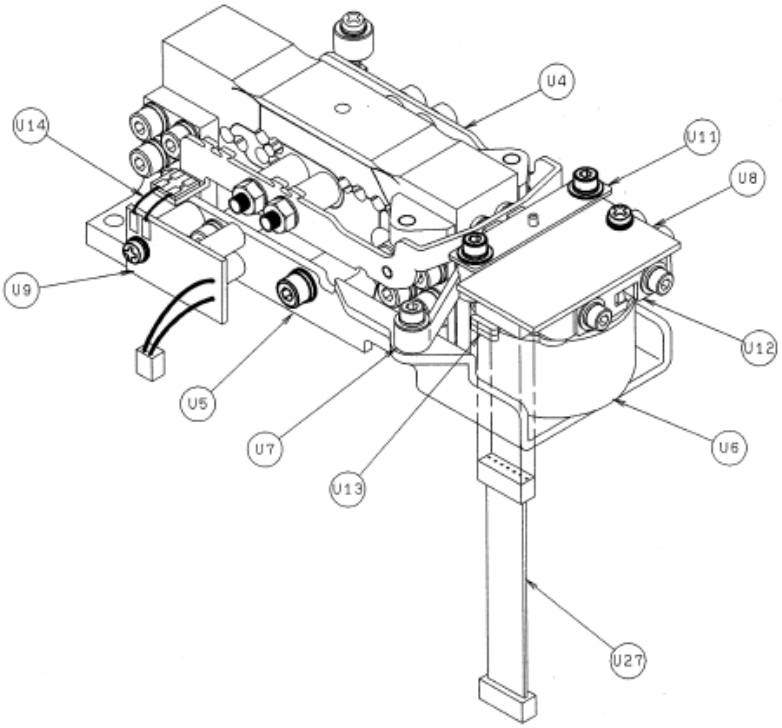
Edit is displayed through the Service menu mode (by repeatedly turning the **[CAL]** key **[ON/OFF]** and the Edit mode is selected with the **[TARE]** key (the contents of the EEPROM will be displayed); at the same time, the storage register 10 will flash.

(1) Repeatedly turn the **[UNIT]** key **[ON/OFF]** to select 4 (flashes): registers numbered in the 40s are selected.
(2) Press the **[PRINT]** key to go to the single digit: The “0” of “40” will flash.
(3) Press the **[UNIT]** key to select 1 (flashes): Register 41 is selected.
(4) Press the **[TARE]** key to provisionally set the data inregister 41: the contents of register41 are displayed (the contents of the EEPROM will not be altered at this point).
(5) Manipulatethe **[PRINT]** and **[UNIT]** keys to change the data flashing currently to the desired value. Press the **[TARE]** key after the change is established to save the data.
At the same time, the storage register will move up onelocation, and the “4” of register “42” will flash. By pressing the **[TARE]** key at this point you will enter the register 42 data edit mode. To alter the register, repeat steps (1) (2) (3) above, select the register with step (4) and change the data with step (5). Repeat this as necessary.
(6) To renew the EEPROM (non-volatile memory) data, press the **[TARE]** key down for more than 3 seconds until “---“is displayed. “SET” will appear after this, and the data will be renewed. To leave this section without renewing the data, press the **[ON/OFF]** key. “Abort” will be displayed and the EEPROM data will not be renewed.
How to initialize the EEPROM (performed only when “Err 00” or “Err 05”is shown)
(From “Err 00” or “Err 05” display) Keep pressing the left end of [O/T] key and [UNIT] key simultaneously until “rESEt” is displayed. The EEPROM is then initialized.

10 EXPLODED VIEW

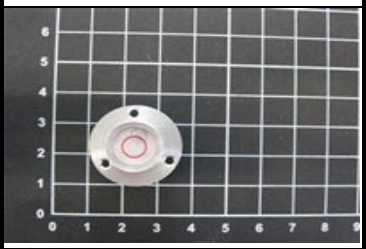
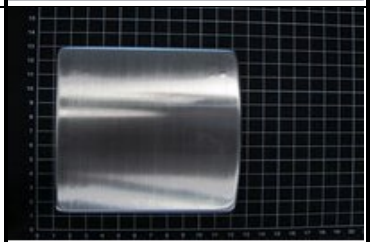
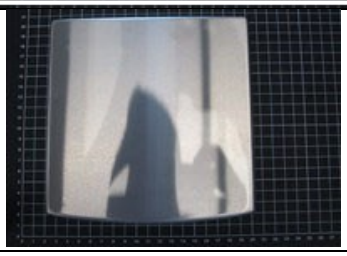


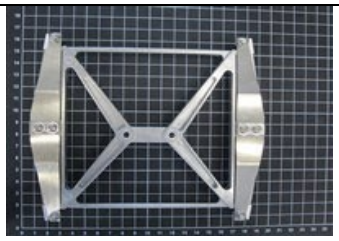
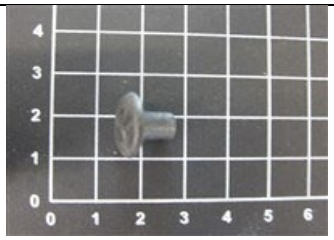
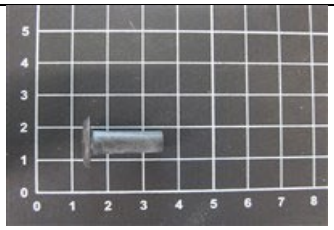
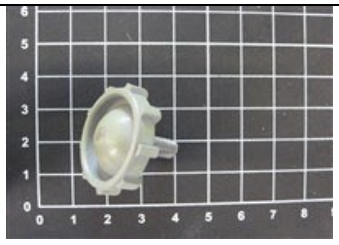
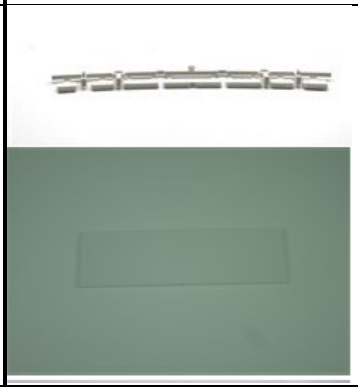

7
8
6
C6
5
34
C4
3
C2
35
C3
9
14
4
B8
B
1
B7
C
E
B6
B5
A
E
F
F
B3
A
13
B
D
C
B4
10
D
2
B2
15


U4
U14
U11
U8
U9
U12
U5
U7
U6
U13
U27

11 SPARE PART LIST

KERN-Spare parts TPBJ-B, TPBS-B

Article no.	Description	Image	
PBS-A01	Protective Working Cover for series PBS/PBJ (105 x 105 mm)		for TPBJ 1020-3-B,TPBJ 620-3M-B,TPBS 1020-3-B,TPBS 620-3-B
PBS-A02	Protective Working Cover for series PBS/PBJ (180 x 170 mm)		not TPBJ 1020-3-B,TPBJ 620-3M-B,TPBS 1020-3-B,TPBS 620-3-B
RACS-8002	Level indicator for Kern ACS/ACJ, ABS-N/ABJ-NM		for TPBJ 4200-2M-B,TPBJ 6200-2M-B,TPBS 1020-3-B
RPBJ-2002	Automatic adjustment motor		
RPBS-2006	Switch Board Assy for Kern PBS/PBJ		
RPBS-6001	Weighing Plate 108 x 105 mm for Kern PBS/PBJ		for TPBJ 1020-3-B,TPBJ 620-3M-B,TPBS 1020-3-B,TPBS 620-3-B
RPBS-6002	Weighing Plate 170 x 180 mm for Kern PBS/PBJ		not TPBJ 1020-3-B,TPBJ 620-3M-B,TPBS 1020-3-B,TPBS 620-3-B

RPBS-6003	Pan Supporter Assy (small) for PBS/PBJ up to 800g		for TPBJ 1020-3-B,TPBJ 620-3M-B,TPBS 1020-3-B,TPBS 620-3-B
RPBS-6004	Pan Supporter Assy (large) for PBS/PBJ up to 8kg		not TPBJ 1020-3-B,TPBJ 620-3M-B,TPBS 1020-3-B,TPBS 620-3-B
RPBS-6005	Rubber Cushion (small) for Pan Supporter PBS/PBJ		for TPBJ 1020-3-B,TPBJ 620-3M-B,TPBS 1020-3-B,TPBS 620-3-B
RPBS-6006	Rubber Cushion (large) for Pan Supporter PBS/PBJ		not TPBJ 1020-3-B,TPBJ 620-3M-B,TPBS 1020-3-B,TPBS 620-3-B
RPBS-8001	Level Adjuster for Kern PBS/PBJ		
RPBS-8002	Level Cover for Kern PBS/PBJ		
RPBS-8003	Spacer for Switch for Kern PBS/PBJ		

RPBS-8004	Display Panel for Kern PBS/PBJ		
RPBS-8007	Wind Shield (plastic) for PBS/PBJ up to 800g		for TPBJ 1020-3-B,TPBJ 620-3M-B,TPBS 1020-3-B,TPBS 620-3-B
RTPBJ-2001	Display board		for TPBJ 2200-2M-B,TPBJ 4200-2M-B,TPBJ 6200-2M-B,TPBJ 620-3M-B,TPBJ 8200-1M-B
RTPBJ-2002	Board, analgoue for TPBJ 620-3M-B		for TPBJ 620-3M-B
RTPBJ-2003	Board, analgoue		for TPBJ 2200-2M-B,TPBJ 4200-2M-B,TPBJ 6200-2M-B,TPBJ 8200-1M-B
RTPBJ-9001	Automatic adjustment for TPBJ-B		not TPBS-B
RTPBS-2001	Board, power supply for TPBJ-B, TPBS-B		

RTPBS-2002	Detector Assy for TPBJ-B, TPBS-B		
RTPBS-2003	Display board for TPBJ 1020-3-B, TPBS-B		for TPBJ 1020-3-B,TPBS-B
RTPBS-2004	Board, analgoue for TPBS 620-3-B		for TPBS 620-3-B
RTPBS-2005	Analogplatine nicht eichfähige Modelle mit großer Wägeplatte		for TPBS 4200-2-B,TPBS 6200-2-B
RTPBS-2006	Board, analgoue for TPBJ 1020-3-B, TPBS 1020-3-B		for TPBJ 1020-3-B,TPBS 1020-3-B
RTPBS-4001	Keyboard overlay for TPBJ-B, TPBS-B		
RTPBS-8001	Draft shield (BLUE)		for TPBJ 1020-3-B,TPBJ 620-3M-B,TPBS 1020-3-B,TPBS 620-3-B

TYKA-60-A	Power supply (EURO) for TPBJ-B, TPBS-B 12 V DC, 1500mA; Input: 100 ... Wall power supply, Switching power supply		
YKA-19	Power supply (AUS;CH;EURO;UK;US) 12V DC, 1500mA; Input: 100 V - 240 V, 50 / 60 Hz Wall power supply, Switching power supply		for TPBJ 4200-2M-B,TPBJ 6200-2M-B,TPBS 6200-2-B