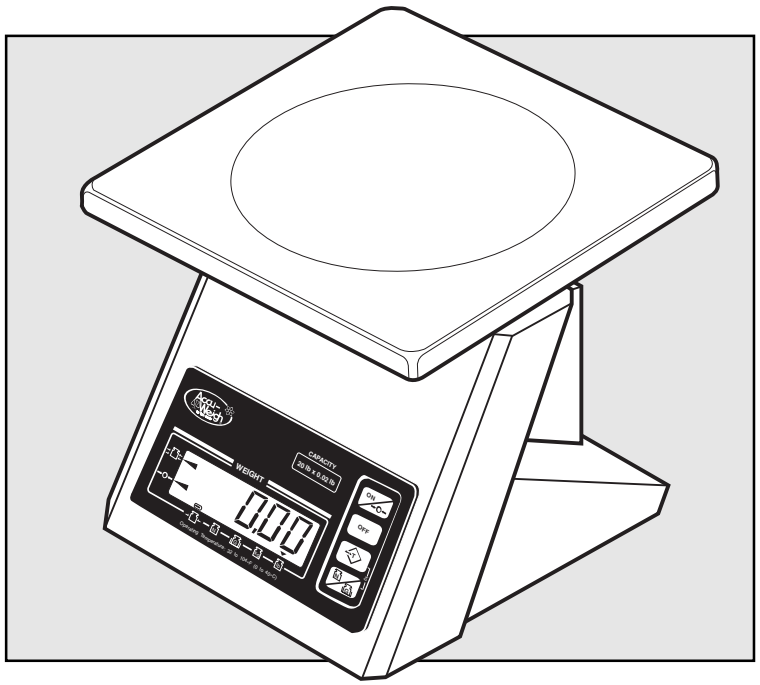
DIGITAL SCALES

MODEL DSY-1100
TECHNICAL MANUAL



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I. FEATURES

Introduction and General Description

The Yamato DSY-1100 Series Scales are 1,000 external count units that incorporate the lastest microprocessor technology. The DSY-1100 is versitile and reliable. Standard Features include:

- zero tracking
- automatic zero reset
- push-button zero reset
- center zero indication
- stability indication
- push-button lb/Kg toggle
- net/gross weighing
- auto display check
- low battery indication
- overload display warning
- large, easily readable 0.8" LCD
- color switch panel
- programmable auto-shutoff for long battery life
- programmable startup in lb, kg, or oz

Additional Standard Features include:

- shatterproof ABS plastic housing and base
- stainless steel platform
- vibrating wire sensing element

Optional Features:

- Foot Switch Tare Device (ODS-222)
- Cradle (ODS-285)
- Table Mount (ODS-286)
- Baby Scale Kit (ODS-300)

The many features of the DSY-1100 allow it to be used in applications ranging from the labratory to industrial installations.

I. FEATURES (CONT.)

Specifications

MODEL: DSY-1100
CLASSIFICATION: Class III, 1000 divisions, NTEP approved (C of C 95-065)
SCALE CAPACITIES/GRADUATIONS:

Capacity	Minimum Graduation
1 Kg 2 lb	1g 0.002 lb
2 Kg 5 lb	2 g 0.005 lb
5 Kg 10 lb	5 g 0.01 lb
10 Kg 20 lb	10 g 0.02 lb
20 Kg 50 lb	20 g 0.05 lb

The following capacities are available, but they are not NTEP approved or legal-for-trade.

Capacity	Minimum Graduation
2 lb	0.05 oz
5 lb	0.1 oz
10 lb	0.2 oz
25 lb	0.5 oz
50 lb	1.0 oz

LOAD CELL: Parallelagram type (Vibrating Wire Load Cell)
PLATFORM: Stainless Steel; 9" x 9"
DISPLAY: 7 Segment LCD
INITIAL ZERO RANGE: -7% to +12% of Full Scale (FS)
ZERO RESET % TRACKING: +/- 1.9% of FS
TARE: Available up to FS
STABILIZER: Incorporated in electronic circuitry
MICROPROCESSOR: Model # M38223

I. FEATURES (CONT.)

Specifications (cont.)

LOAD CELL MODEL NUMBERS:

Scale Capacity	Load Cell Model Number
1 Kg	VP321-1-B
2 Kg	VP321-2-B
5 Kg	VP321-5-B
10 Kg	VP321-10-B
20 Kg	VP321-20-B

POWER: 6 VDC (use 4 1.5 V "D" cell batteries)
POWER CONSUMPTION: 0.02 W (max)
OPERATING TEMPERATURE: 32°F to 104°F (0°C to 40°C)
WEIGHT: 6.2 lb (2.2 Kg)
VIBRATING SENSOR:

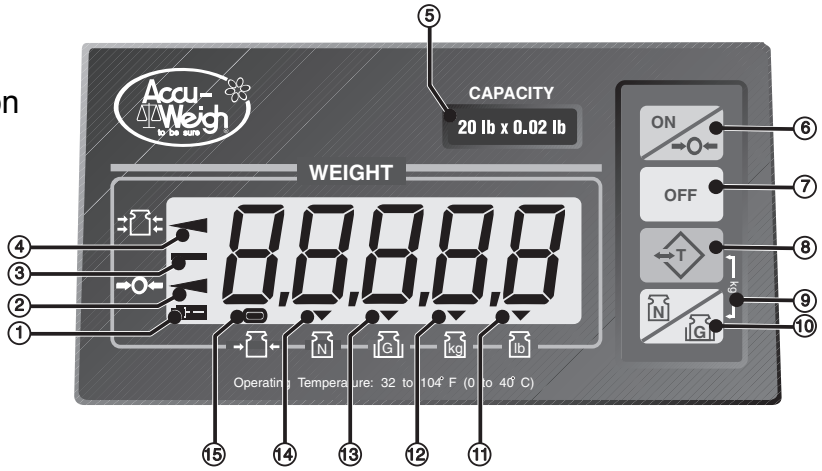
Sensor Type / Specification	VP321 1-B	VP321 2-B	VP321 5-B	VP321 10-B	VP321 20-B
Capacity	1 Kg	2 Kg	5 Kg	10 Kg	20 Kg
Initial Output (Hz)	11700 +/- 500	12150 +/- 500	12350 +/- 500	12400 +/- 500	12200 +/- 500
No-Load Output (Hz)	12500 +/- 500	12500 +/- 500	12500 +/- 500	12500 +/- 500	12500 +/- 500
Rated Output (Hz)	13500 +/- 600	13500 +/- 600	13500 +/- 600	13500 +/- 600	13500 +/- 600
Linearity (%RO)	0.025	0.025	0.025	0.025	0.025
Repeatability	0.015	0.015	0.015	0.015	0.015
Creep (%RO)	0.1	0.1	0.1	0.1	0.1
Hysteresis (%RO)	0.02	0.02	0.02	0.02	0.02
Temp. Effect on Zero (%/5°C)	0.1	0.1	0.1	0.1	0.1
Temp. Effect on Output (%/5°C)	0.05	0.05	0.05	0.05	0.05

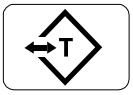
SAFE TEMPERATURE: -4°F to 158°F (-20°C to 70°C)
SAFE OVERLOAD: 150% maximum capacity
MAXIMUM OVERLOAD: 200% maximum capacity

Note: Linearity, Temp. Effect on Zero, and Temp. Effect on Output are calibrated through the parameter settings of the scale.

II. DISPLAY LAYOUT

1. LOW BATTERY Indication
2. CENTER ZERO Indication
3. NEGATIVE WEIGHT Indication
4. DISPLAY HOLD Indication
5. CAPACITY Plate
6. ON / ZERO Key
7. OFF Key
8. TARE Key
9. LB / KG switch*
10. NET / GROSS Key
11. LB Indication
12. KG Indication
13. GROSS WEIGHT Indication
14. NET WEIGHT Indication
15. Stable Indication



*Press  and  simultaneously to toggle between Kg and lb.

SPECIAL DISPLAY MESSAGES:

OVERLOAD Indication

UNDERLOAD Indication

III. SCALE SETUP

WARNING: Never stand the DSY-1100 upside down on the platform support, or pick it up using the platform support as a handle. Severe damage may result to the load cell.

1) Carefully unpack the scale and lay it down on its back or side.
2) Install 4 "D" batteries into the battery compartment, noting the polarity of the batteries.
3) Return the scale to its upright position.
4) Place the platform support over the mounting bracket and press gently into place. Install the thumbscrew.
5) Place the scale on a firm, flat surface. Rotate the adjustable feet, if necessary, to level the scale using the level indicator on the right, rear of the housing.
6) Place the stainless steel platform cover on the platform support. The scale is now ready for weighing!

IV. DISASSEMBLY

Yamato DSY-1100 Series Scales are designed and built for long-term durability and service. However, if a repair is necessary, follow the procedure below to gain access to the internal components.

1) Turn the scale off.
2) Remove the stainless steel platform, the platform support screw, and the platform support.
3) Remove the two housing screws located on the top-rear of the scale.
4) Lean the upper housing forward, and lay it face down. (WARNING: The load cell wires are connected to the CPU board in the upper housing. Care must be taken when leaning the upper housing forward.)

V. CALIBRATION

Keyword Modes

Figure 1 shows a flow chart which illustrates how to access the different modes of the DSY-1100. The USER'S KEYWORD MODE allows users to adjust different parameters, such as the length of the auto off feature or lb/kg priority at power up. The SYSTEM KEYWORD MODE allows scale technicians to change the capacity and minimum increment of the scale. (See **IX. Parameter Settings** for the specific parameter settings.)

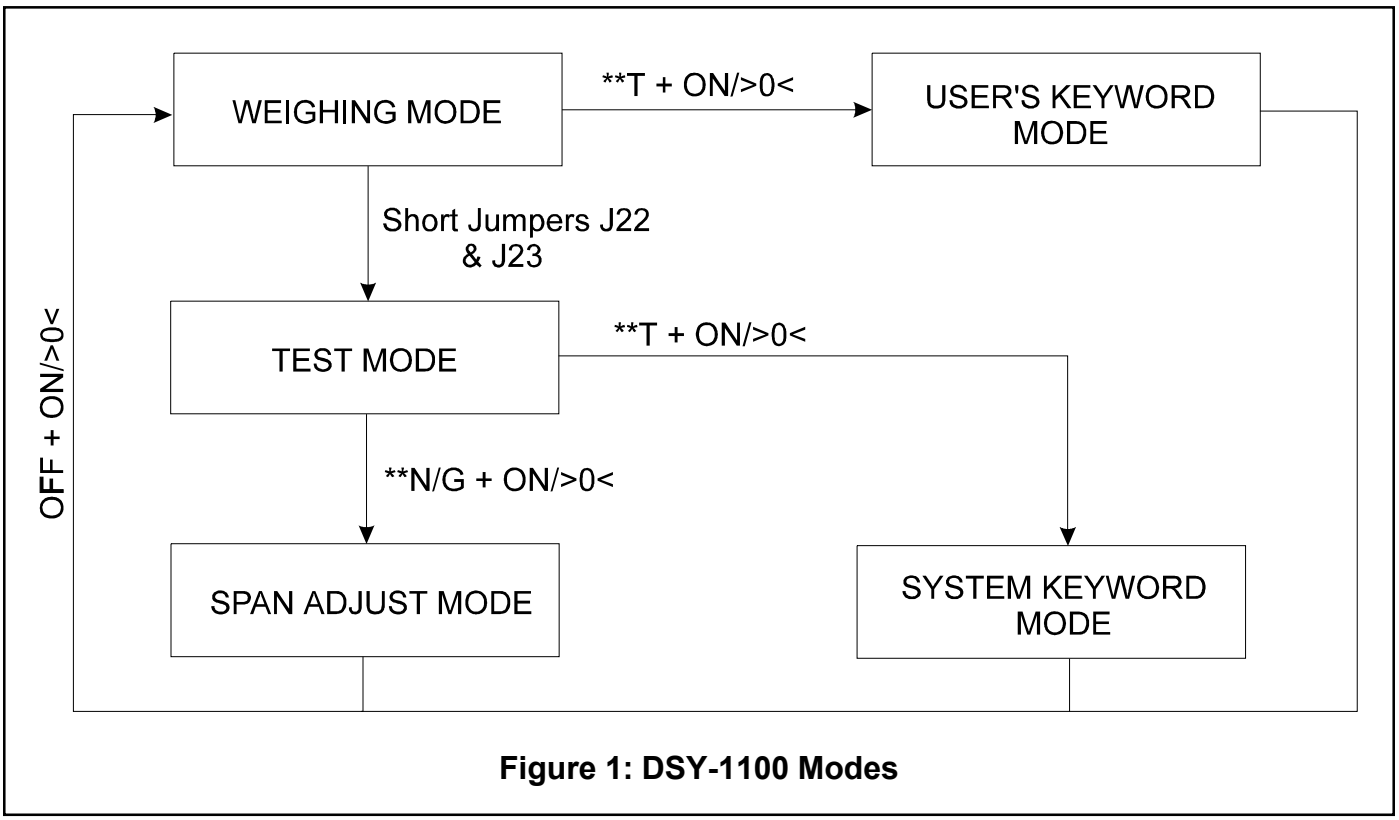
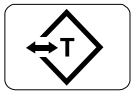
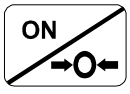


Figure 1: DSY-1100 Modes

When in the SYSTEM KEYWORD MODE or the USERS KEYWORD MODE, the display will look like "30 ; 016". "30" designates the keyword number and "016" designates the parameter value. To increment the keyword number, press **ON/>0<**. To decrement the keyword number, press ****N/G + ON/>0<**. To increment the parameter value, press **T**. To decrement the parameter value, press **N/G**.

Note: ****T + ON/>0<** = Hold 

and press 

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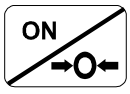
****N/G + ON/>0<** = Hold 

and press 

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OFF + ON/>0< = Press 

and release, then press 

and release.

V. CALIBRATION (CONT.)

Location of Jumper Pins: J22 & J23

Figure 2 shows a crude layout of the back of the CPU board, and the locations of jumpers J22 and J23.

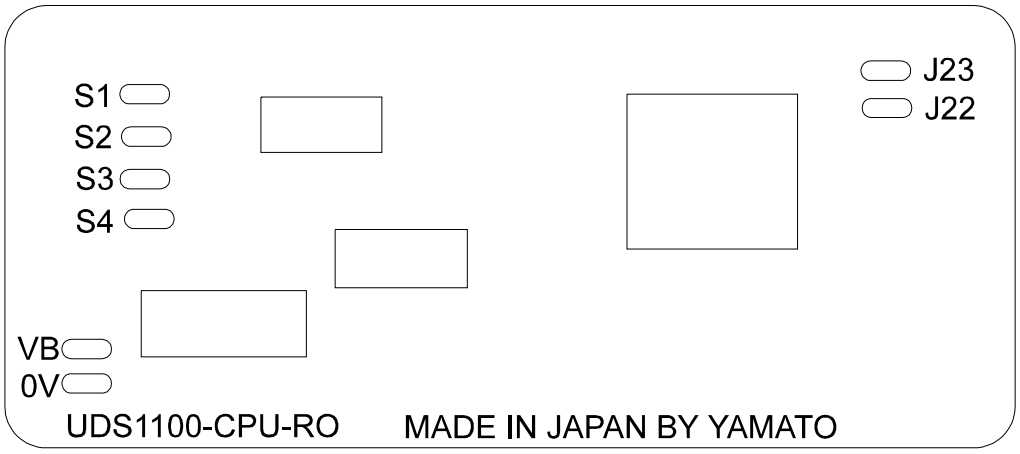


Figure 2: CPU Board Layout

Span Adjustment Procedure

1) Turn the scale on and enter the TEST MODE by shorting between J22 and J23.
2) ****N/G + ON/>0<**

	2 : 0 / 1	
N/G		
	3 : 0 / 2	0/2 (no load)
T		Press T.
	3 : 1 / 2	1/2 capacity load
T		Press T.
	3 : 2 / 2	Add another 1/2 capacity load
T		Press T.
	10,000	Display shows 10,000 counts.
OFF		Calibration stored in memory.
ON		Calibration complete.

NOTICE
The DSY-1100 must be calibrated in kilograms!

V. CALIBRATION (CONT.)

Span Adjustment Procedure (cont.)

When performing the span adjustment procedure on the DSY-1100:

Insure that the scale is stable at zero, then press **T**. Place 1/2 of the scale capacity (kg) on the platform and wait for the scale to become stable. Press **T** again and then place another 1/2 capacity load on the platform. When the indicator becomes stable, press **T**. The indicator will count down until it reaches 10,000 counts. Remove the load from the platform and turn the scale off. Turn the scale on again, and the calibration is complete.

VI. PARTS REPLACEMENT

Load Cell and Vibrating Wire Replacement

A 10mm wrench, 8 mm wrench, 3 mm tubular torque wrench, soldering iron, flat-bladed screw driver,and Phillips screw driver are needed to complete the following procedures. Refer to **X. DSY-1100 BLOWUP AND PARTS LIST** for the location of the parts.

1) Removing the load cell

a) Complete the procedure in **IV. DISASSEMBLY**.
b) On the CPU board assembly, carefully remove the clear membrane cover.
c) Remove the screw and bracket securing the wire cluster to the upper housing.
d) Remove the platform support bracket by removing the (4) 10 mm bolts.
e) Remove the (2) 10 mm bolts on the rear of the base assembly. These bolts hold the load cell in place.
f) Unsolder the BLUE and YELLOW wires from the CPU board and remove the load cell from the scale.

2) Removing the vibrating wire

If the vibrating wire needs to be removed, follow the next procedure. Please also refer to **Figure 4**.

a) Remove both 3 mm nuts.
b) Remove the lock washer and steel, flat washer from the UPPER SIDE (US).
c) Remove the lock washer from the LOWER SIDE (LS).
d) Remove the round, counter weight from the LS.
e) Remove the load cell stopper.
f) Remove the rubber gasket from the US.
g) Remove the steel, flat washer from the US.
h) Remove the magnet holder.

2) (cont.)

i) Remove both 3 mm nuts.
j) Remove both spring washers.
k) Remove the steel, flat washer from the LS.
l) Remove the nylon, flat washer from the LS.
m) Remove both brass rings.
n) Remove the vibrating wire.
o) Remove the stainless steel ring from the US.
p) Remove the ceramic ring from the LS.
q) Remove the brass threaded bars (if necessary).

3) Reinstalling the vibrating wire

To reinstall the vibrating wire, follow the next procedure. Please also refer to **Figure 3** and **Figure 4**.

a) Unsolder the (2) blue wires from the old vibrating wire.
b) Cut the vibrating wire, as shown in **Figure 3**.
c) Resolder the (2) blue wires to the new vibrating wire.
d) Replace both brass, threaded bars.
e) Replace the ceramic ring on the LS and the stainless steel ring on the US.
f) Carefully place the vibrating wire over both rings. The wires face the LS.
g) Replace both brass rings, flange-side down.
h) Replace the nylon, flat washer on the LS.
i) Replace the steel, flat washer on the US.
j) Replace both spring washers.
k) Replace both 3 mm nuts. Torque each nut to 6.9 kgf cm. Use an 8 mm wrench to hold the brass rings in place as each nut is tightened. •
l) Replace the magnet holder.
m) Replace the steel, flat washer and rubber gasket from the US.
n) Replace the load cell stopper.
o) Replace the round, counter weight on the LS.
p) Replace the lock washer on the LS.
q) Replace the steel, flat washer and lock washer from the US.
r) Replace both 3 mm nuts.

4) Reinstalling the load cell

a) Mount the load cell into the base housing and replace the (2) 10 mm bolts.
b) Twist one blue wire together with one yellow wire. Repeat with the other blue and yellow wires. Solder the BLUE wires to S1 and S2 on the CPU board. Solder theYELLOW wires to S3 and S4 on the CPU board. Refer to **Figure 2**.
c) Replace the wire cluster back into the slot in the upper housing. Replace the bracket and screw to hold the wire cluster in place.
d) Replace the clear membrane.

e) Perform the span adjustment procedure (shown in **V. Calibration**).

CPU Board Replacement

5) Removing CPU board

a) Complete the procedure in **IV. DISASSEMBLY**.
b) On the CPU board assembly, carefully remove the clear membrane cover.
c) Remove the screw and bracket securing the wire cluster to the upper housing.
d) Unsolder the BLUE, YELLOW, RED, and BLACK wires from the CPU board.
e) Remove the (2) fastening screws from the CPU board.
f) Unplug the keyswitch ribbon cable from the CPU board.

6) Reinstalling the CPU board

a) Plug the keyswitch ribbon cable into the CPU board.
b) Mount the CPU board within the upper housing, and replace the two fastening screws.
c) Solder the two blue wires to S1 and S2, solder the two yellow wires to S3 and S4, solder the red wire to VB, and solder the black wire to 0V. Refer to **Figure 2**.
d) Replace the wire cluster back into the slot in the upper housing. Replace the bracket and screw to hold the wire cluster in place.
e) Replace the clear membrane.
f) Perform the span adjustment procedure (shown in **V. Calibration**).

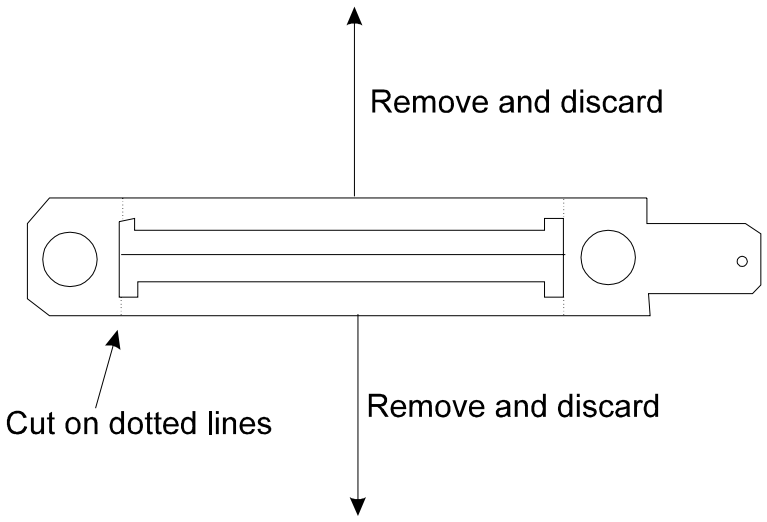


Figure 3: Vibrating Wire

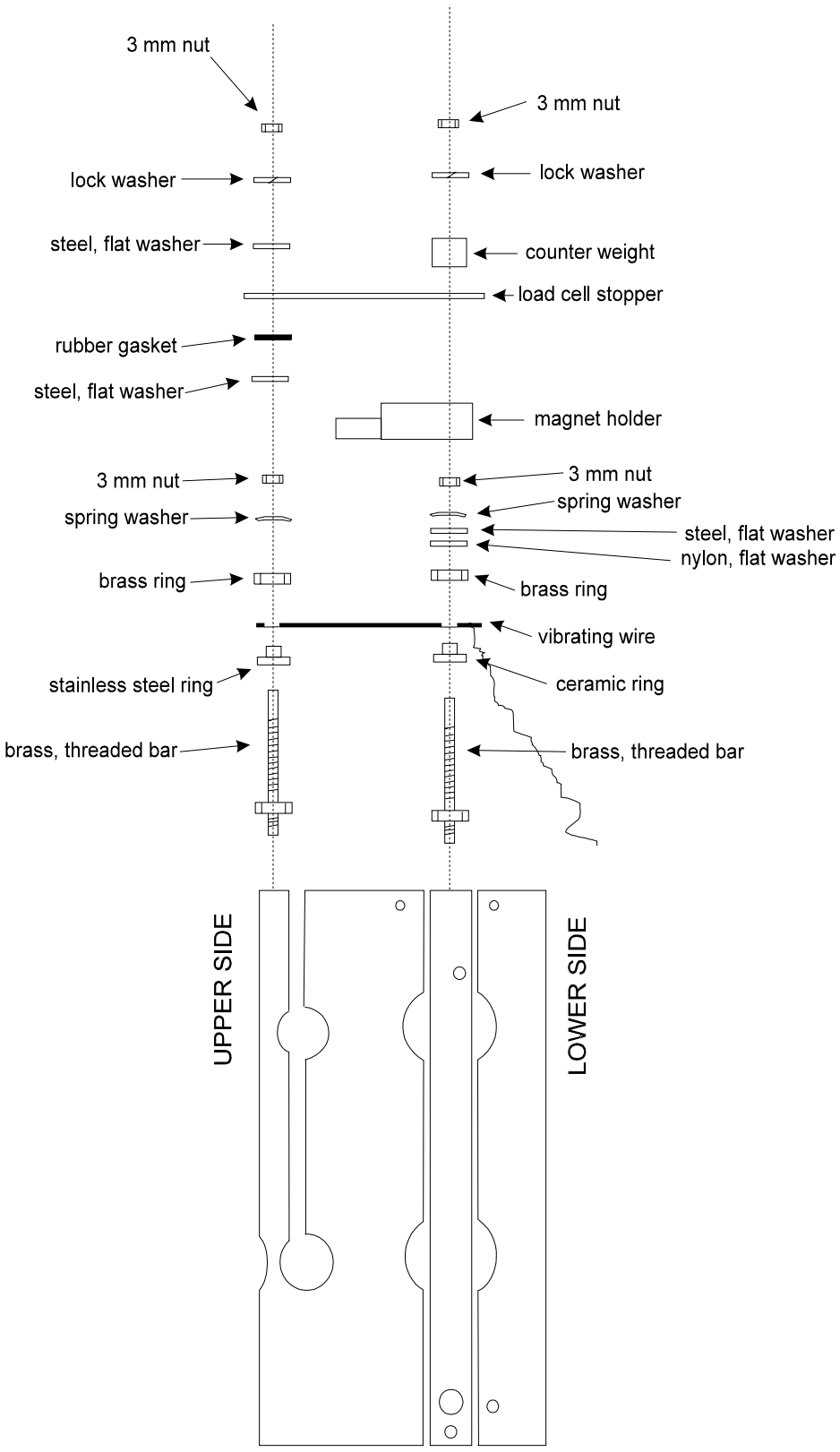


Figure 4: Vibrating Wire Parts Blowup

VII. REASSEMBLY

Complete the following procedure to reassemble the scale:

1) Mount the upper housing on the lower housing.
2) Replace the two housing screws located on the top-rear of the scale.
3) Replace the platform support, the platform support screw, and stainless steel platform.

Note: If the DSY-1100 is a non-"z" (lb/oz) version, it is legal-for-trade. This scale needs to be inspected and sealed by a certified inspector before it can be used for trade.

VIII. TROUBLE SHOOTING

1) The display will not turn on.

Check the batteries. If they are bad, replace them. If the batteries are good, check the ribbon cable on the keyswitch and the keyswitch itself. Also, insure that all of the wires are securely soldered to the CPU board.

2) The display shows all 8's when on.

First, make certain that the platform is on the scale. Check the vibrating wire and make sure that the wire is not broken and that it is installed correctly. Next, check the display board assembly and the load cell.

3) The display shows "- - - L" when on.

First, make sure that the platform is on the scale. If the scale still does not work properly, recalibrate the scale. The next step is to replace the load cell.

4) The display shows "- - - H" when on.

Make sure that there is no load on the platform. If the scale still does not work properly, recalibrate the scale. The next step is to replace the load cell.

5) Display will not stabilize.

Ensure that the scale is on a firm, flat surface. Next, make sure that the platform is installed correctly. If the scale still does not work properly, recalibrate the scale and check the parameter values.

6) The scale does not weigh properly.

Check the level indicator on the scale and make sure that the scale is level. Next, recalibrate the scale. If the scale still does not work properly, replace the load cell.

If the DSY-1100 still does not work, please contact the Yamato Service Department for further assistance.

IX. PARAMETER SETTINGS

System Keyword Mode

The following charts show the parameter settings for the DSY-1100 series scale.

1. The parameters for the DSY-1100 in the decimal pound configuration.

Capacity	Parameters									
Pound	31	33	34	35	36	42	43	44	45	46
2.000 lb x 0.002	004	001	003	000	000	002	003	003	002	003
5.000 lb x 0.005	004	002	003	001	000	005	003	003	005	002
10.00 lb x 0.01	004	005	003	002	000	001	003	002	001	003
20.00 lb x 0.02	004	001	003	000	002	002	003	002	002	003
50.00 lb x 0.05	004	002	003	001	002	005	003	002	005	002

2. The parameters for the lb / oz "Z" configuration.

Capacity	Parameters									
lb/oz "Z"	31	33	34	35	36	42	43	44	45	46
2.00 lb x 0.05	005	001	003	000	000	025	000	000	005	001
5 .0 lb x 0.1	005	002	003	001	000	005	000	001	001	001
10.0 lb x 0.2	005	005	003	002	000	010	000	001	002	002
20.0 lb x 0.5	005	001	003	000	002	025	000	001	005	001
50.0 lb x 1	005	002	003	001	002	005	000	002	001	001

IX. PARAMETER SETTINGS

3. The parameters for the DSY-1100 in the continuous ounce configuration. These parameters are valid for **CPU Version UDS0003 and higher only!**

Capacity	Parameters									
Ounce	31	33	34	35	36	42	43	44	45	46
40 oz x 0.05 oz	007	001	003	000	003	025	000	002	005	001
80 oz x 0.1 oz	007	002	003	001	003	005	000	001	001	001
160 oz x 0.2 oz	007	005	003	002	003	010	000	001	002	002
400 oz x 0.5 oz	007	001	003	000	002	005	000	001	005	001
800 oz x 1 oz	007	002	003	001	002	005	000	000	001	001

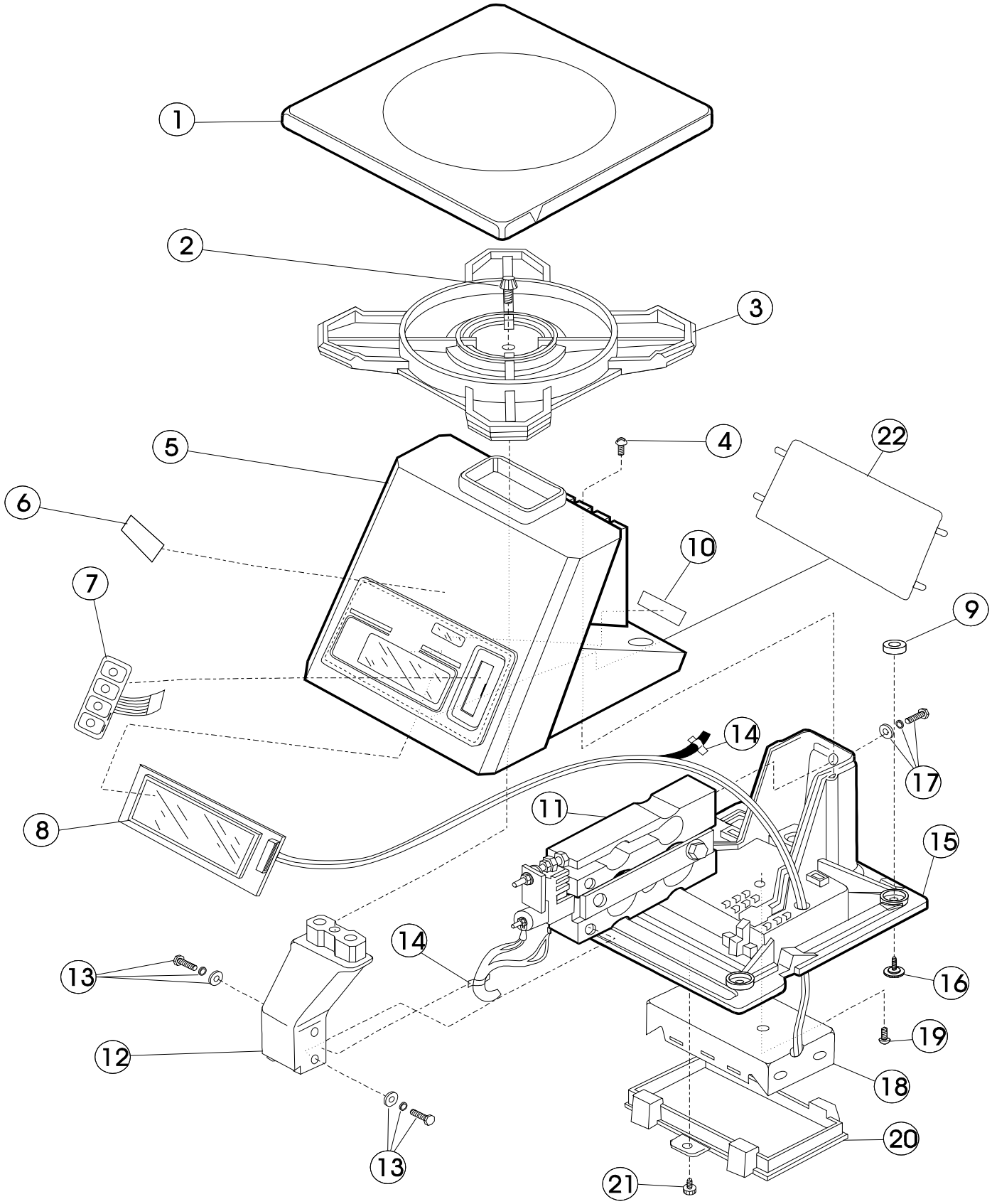
4. To turn the "Hold" feature off: Access the System Keyword Mode, as shown in **Fig. 1p. 8**. Press the ON/0 key until the left two digits on the display show "62". Press the TARE key or the N/G key until the right three digits read "000". Press ON/0 once to save the change into memory. Turn the scale off. The hold feature is now disabled.

IX. PARAMETER SETTINGS (CONT.)

User's Keyword Mode

01	RS232C Communication			
		000	:	RS232C off
		001	:	Receive command
		002	:	Send zero detection
		003	:	Send motion detection
		004	:	Continuous communication
02	Speed of Communication			
		000	:	9600 bps
		001	:	600 bps
		002	:	1200 bps
		003	:	2400 bps
		004	:	4800 bps
		005	:	9600 bps
		006	:	19200 bps
		007	:	38400 bps
03	Length of Character			
		000	:	8 bits
		001	:	7 bits
04	Parity			
		000	:	No parity
		001	:	odd
		002	:	even
05	Length of Stop Bit			
		000	:	1 bit
		001	:	2 bits
06	Contents of Output			
		000	:	Net weight (1 time)
		001	:	Net, tare, gross weight (1 time)
		002	:	Net, tare, gross weight (3 times)
		003	:	Contents of display (1 time)
		004	:	Serial printer format (1 time)
07	Auto off time			
		000	:	"auto off" off
		001 - 060	:	auto off after 1 - 60 minutes
08	Tare clearing at auto off			
		000	:	Clear tare at switch on after auto off
		001	:	Hold tare at switch on after auto off
09	lb/kg priority at power on			
		000	:	gram unit at power on
		001	:	pound unit at power on
10	Length of Display Hold			
		not available without sealed system keyword through test mode		

X. DSY-1100 BLOWUP AND PARTS LIST



X. DSY-1100 BLOWUP AND PARTS LIST (CONT.)

ITEM	PART #	DESCRIPTION	QTY.
1	YAM-1350-921001	Stainless Steel Platform Cover	1
2	YAM-1350-921002	Thumbscrew, Support Bracket	1
3	YAM-1350-921003	Platform Support Bracket, 2-10 lb	1
	YAM-1350-921103	Platform Support Bracket, 20-50 lb	1
4	MCH-5000-049000	Housing Screw, M4 x 14	2
	YAM-1350-810100	NTEP Screw	2
5	YAM-1350-810005	Upper Housing	1
6		Sticker,Do Not Lift Platform	1
7	YAM-1350-810002	Keyswitch Panel	1
8	YAM-1350-810004	Display Board Assembly	1
9	YAM-1350-810003	Bubble Level	1
10	YAM-1350-921109	Capacity Sticker, DSY-2	1
	YAM-1350-921119	Capacity Sticker, DSY-5	1
	YAM-1350-921129	Capacity Sticker, DSY-10	1
	YAM-1350-921139	Capacity Sticker, DSY-20	1
	YAM-1350-921149	Capacity Sticker, DSY-50	1
	YAM-1350-921159	Capacity Sticker, DSY-2Z	1
	YAM-1350-921169	Capacity Sticker, DSY-5Z	1
	YAM-1350-921179	Capacity Sticker, DSY-10Z	1
	YAM-1350-921189	Capacity Sticker, DSY-25Z	1
	YAM-1350-921199	Capacity Sticker, DSY-50Z	1
11	YAM-1350-921110	Load Cell, 2 lb	1
	YAM-1350-921120	Load Cell, 5 lb	1
	YAM-1350-921130	Load Cell, 10 lb	1
	YAM-1350-921140	Load Cell, 25 lb	1
	YAM-1350-921150	Load Cell, 50 lb	1
12	YAM-1350-921111	Platform Holder	1
13	MCH-5000-901734	Loadcell/Platform Holder Bolt & Washer, M6 x 18	4
14	YAM-1350-921013	Adhesive Foam Tape	2
15	YAM-1350-810006	Lower Housing (2 lb to 25 lb)	1
	YAM-1350-810007	Lower Housing (50 lb)	1
16	YAM-1350-810001	Leveling Leg (2 lb to 25 lb)	4
	YAM-1350-810011	Leveling Leg (50 lb)	4
17	MCH-5000-901734	Loadcell/Lower Housing Bolt & Washer M6 x 18	2
18	YAM-1350-921019	Battery Housing	1
19	MCH-5000-901559	Battery Housing Screw	1
20	YAM-1350-921021	Battery Cover	1
21	YAM-1350-921022	Thumbscrew, Battery Cover	1
22	YAM-1350-810009	Waterproof Packing	1
	YAM-1350-100700	Vibrating Wire Kit	1
	YAM-1350-810000	Wire Seal For DSY-1100	1