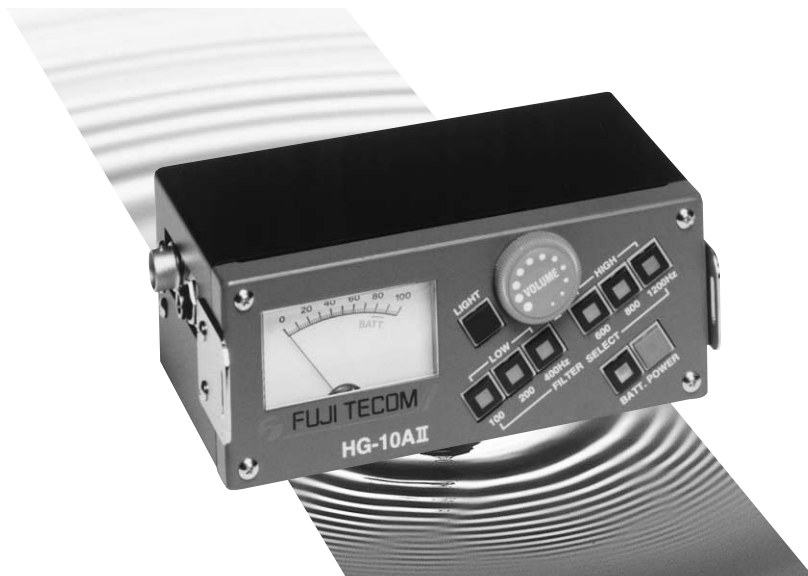


FUJI LEAK NOISE DETECTOR

HG-10AII

INSTRUCTION MANUAL



Instruments for the location of underground utilities and water leaks.

FUJI TECOM INC.

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WARRANTY

Fuji HG-10AII Leak Noise Detector is warranted for repair and replacement at free of charge within the period of twelve (12) months after the purchase from Fuji Representative or Distributor subject to the malfunction caused by the ordinary use in accordance with the instruction and caution given in this Instruction Manual.

WARNING

Pay special attention to the traffic on the site of Leak detection work.

Do not use the HG-10AII Detector for the other purpose except the underground leak detection work.

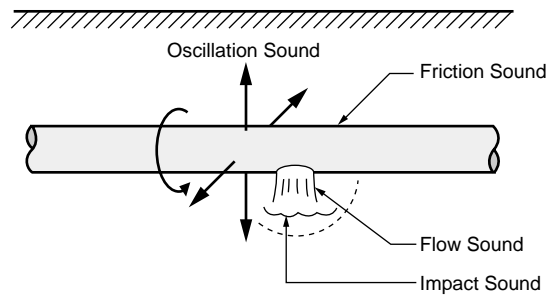
CAUTION

- (1) Do not put water into the Amplifier Case.
- (2) Do not touch or break up the inside component.
- (3) Do not give a strong shock especially to the Pick-Up.
- (4) Do not expose the Amplifier in the strong sunshine for many hours.
- (5) Do not instal the Battery into the Battery Case without confirming the polarity of each Battery.

OUTLINE OF LEAK NOISE

The Leak Noise sounded from the Water Pipe buried under the ground is consisted of four different sounds as (1) Flow Sound (2) Impact Sound (3) Friction Sound and (4) Oscillation Sound. Those sounds are mixed up and become the Leak Noise.

The Leak Noise transmitted to the ground surface is different in its sound quality owing to the conditions of Soil, Pipe Material, Water Pressure and the Depth of Pipeline. Those four different sounds and conditions are producing the different sound quality and never make the fixed frequency range.



CHARACTERISTIC OF HG-10AII LEAK DETECTOR

The HG-10AII Leak Detector is equipped with the Filters of high performance consisted of nine different Filter combinations between the high frequency range and the low frequency range.

Those Filter combinations eliminate the useless noise existed in the site of leak detecting work and enable the operator to distinguish the difference of noise caused by the kind of pipe material.

The large Sound Level Meter helps the operator to determine visually the leaking point from the ground surface.

The robust Sensor (Pick-up) of light weight is equipped with the Ball, Patent Pending, which cuts off the external wind noise.

STRUCTURE



HG-10AII Amplifier

- Amplification = $59.0\text{dB} \pm 3\text{dB}$
- Frequency Range = 100Hz to 1200Hz
- Filter = Low Range High Range

100Hz~	~ 600Hz
200Hz~	~ 800Hz
400Hz~	~ 1200Hz
- Power = 9 Volts (1.5V×6)
- Weight and Size = 800g
170 (W)×70 (D)×103 (H) mm



Sensor (Pick-up)

- Sensitivity = 0.7V/g at 400Hz
- Weight = 500g



Headphones

- Impedance = 8 ohm



Soft Case of Amplifier



Strap



Aluminum Carrying Case

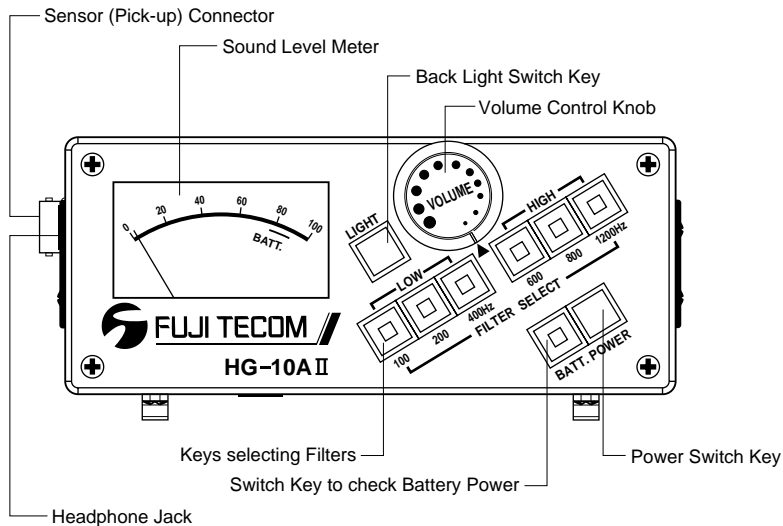


(Option)

3-Section Contact Bar with Sensor Table

- Weight and Size=540g
340mm×3 Pieces (Contact Bar)
 ϕ 52mm×1 Piece (Sensor Table)

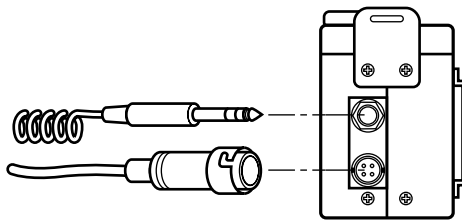
OPERATION PANEL



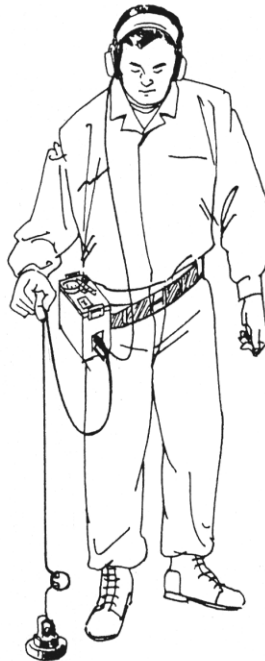
- Sound Level Meter
 - The meter deflection shows the leak sound level visually.
 - The BATT Line shows the residual power of battery.
- Back Light Switch Key
It turns on the lights in the Sound Level Meter and the Filter Selecting Keys.
- Volume Control Knob
It controls the volume of sound listened in the Headphones.
- Power Switch Key
It works when the Headphone connector is plugged in.
- Switch Key to check Battery Power
It is linked with the meter deflection which shows the residual power of battery.
- Keys selecting Filters
The Filter Range is selected with the two keys in the Low and High ranges.
- Headphone Jack for connecting with the Headphones.
- Sensor (Pick-up) Connector for connecting with the Sensor (Pick-up).

HOW TO SET UP HG-10AII DETECTOR

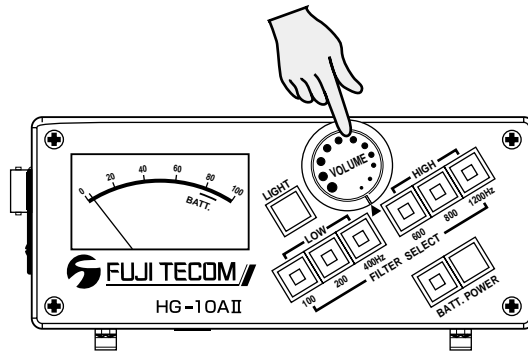
- As shown by the following figure, insert the Headphone Plug into the Jack located at the upper side of Amplifier.
- Connect the Sensor (Pick-up) cable with the connector located at the lower side of Amplifier.



- Wear the Headphones and the Amplifier as shown by the right figure. Otherwise wear the Amplifier by use of its Shoulder Belt.



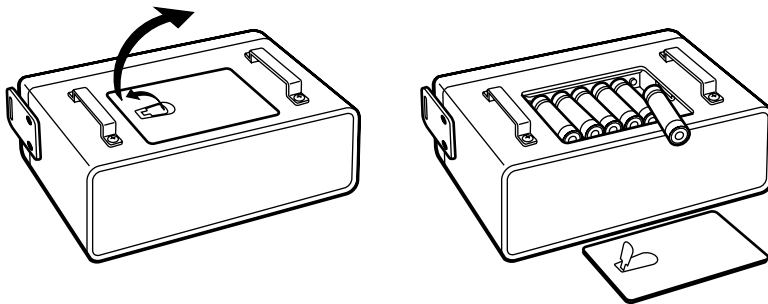
TO CHECK EACH ACTION



- Push the Key of Power Switch.
CAUTION : In this case, the Plug of Headphones is required to be inserted into the Jack. Otherwise, the Power Switch does not work.
- Push the Key of BATT and confirm the residual power.
CAUTION : When the METER does not deflect into the BATT Line, change all Batteries (6 pieces of 1.5 Volt Battery).
- Turn the Volume Control Knob to its minimum.
- Wear the Headphones and put the Sensor (Pick-up) on the ground surface. Then push the Mute Switch Button and turn the Volume Control Knob clockwise for listening to ground noise.
- Try to push the Filter Selecting Keys i. e. one Key in the Low Frequency Band Keys and another Key in the High Frequency Band Keys so as to confirm if the Filters are working well.
- After confirming the above actions in good condition, work at the detection of water leak.

HOW TO CHANGE BATTERY

- Insert the Headphone Plug into the Jack of Amplifier.
 - Push the Power Switch Key and then the BATT Key.
 - Confirm if the METER deflects into the Red Line of BATT. If it does not deflect so, change all Batteries right away.
 - Turn up the Locker Plate and detach the Battery Case Cover as shown by the following figure.
 - Change all Batteries together (6pcs).
- CAUTION : When the HG-10AII is not used for a long time, keep it without Batteries.



HOW TO DETECT LEAKS (1)

- Wear the HG-10All Leak Detector as shown by either way of figures (A) and (B).
- Walk along the buried pipeline and look for a point sounding a quasi-leak.

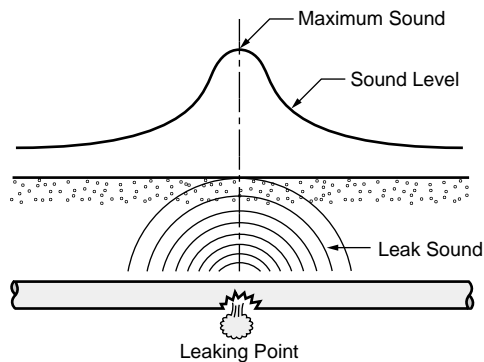


(A)



(B)

- The maximum point sounded on the ground surface indicates the leak existed right under the ground as shown by the figure.
- Read the maximum METER deflection by listening to the maximum sound through the Headphones so as to determine the point of leak from the ground surface.

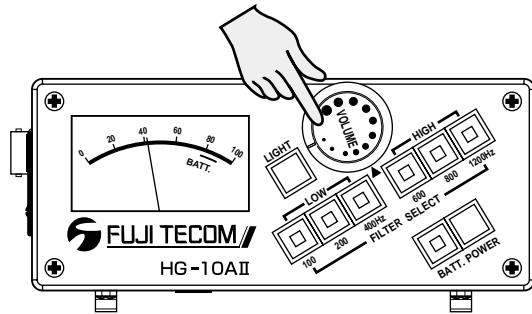


HOW TO DETECT LEAKS (2)

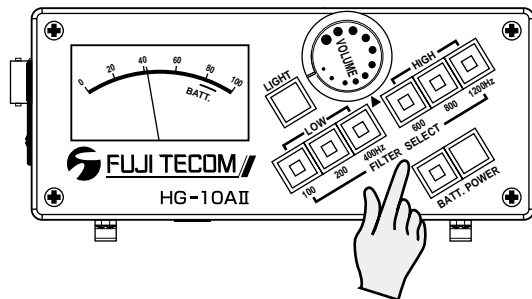
- The sound volume listened through the Headphones should be adjusted lowerly. The lower sound to ears minimizes fatigue and makes the operator easier to listen to leak sounds.

CAUTION : The bigger sound through the Headphones makes the operator difficult to listen to the traffic noise and warning voice. It may cause a hard of hearing.

CAUTION : The Mute Switch is required to be operated after placing the Sensor (Pick-up) on the ground so as to avoid the disagreeable noise to ears.



- The Filter Function consists of 9 combinations. The nine Filter Combinations enable the operator to tell the fine difference of leak sound caused by the material of pipe.



HOW TO DETECT LEAKS (3)

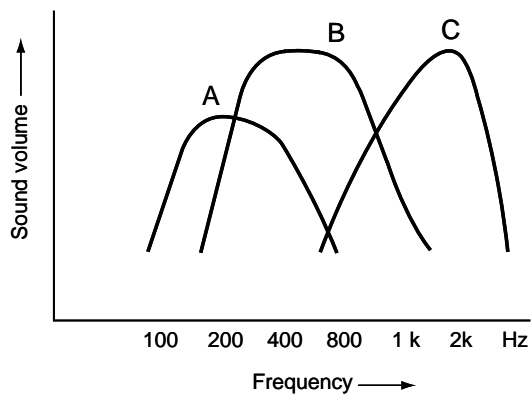
- The material of pipe causes the different characters of leak sound as shown by the following figure.

A : Vinyl Chloride Pipe.

B : Ductile Cast Iron Pipe.

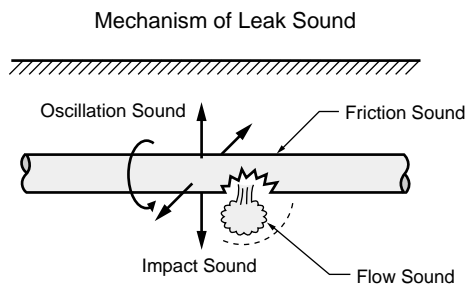
Asbestos Cement Pipe.

C : Metallic Pipes buried under a place in shallow ground.



CONDITIONS INFLUENCING THE LEAK DETECTION

1. Size of hole leaking water.
2. Water pressure.
3. Soil condition.
4. Material of pipe.
5. Condition of pavement.
6. Condition of water content.
7. Sound of using water.
8. Flow noise of drainage.
9. Noise of air-conditioning and heating.
10. Traffic noise.
11. Wind noise.
12. Noise of Electric Transformer and Vending Machine.
13. Noise of Power, Telephone Cable, Motor and Pump.
14. Leak noise in a cavity.



FILTER COMBINATION

Nine (9) different filter combinations can be selected by use of one each of Keys in the low frequency band and the high frequency band as shown by the following figure.

NOTE : The Filter Combination can be confirmed at night by use of the Back Light Switch Key.

LOW			HIGH			Filter Combination
100	200	400Hz	600	800	1200Hz	
<input type="checkbox"/>			<input type="checkbox"/>			100Hz ~ 600Hz
<input type="checkbox"/>				<input type="checkbox"/>		100Hz ~ 800Hz
<input type="checkbox"/>					<input type="checkbox"/>	100Hz ~ 1200Hz
	<input type="checkbox"/>		<input type="checkbox"/>			200Hz ~ 600Hz
	<input type="checkbox"/>			<input type="checkbox"/>		200Hz ~ 800Hz
	<input type="checkbox"/>				<input type="checkbox"/>	400Hz ~ 1200Hz
		<input type="checkbox"/>	<input type="checkbox"/>			400Hz ~ 600Hz
		<input type="checkbox"/>		<input type="checkbox"/>		400Hz ~ 800Hz
		<input type="checkbox"/>			<input type="checkbox"/>	400Hz ~ 1200Hz

FILTER BAND WIDTH MEETING THE MATERIAL OF PIPE

Each pipe generates its own leak sound within a certain range of frequency according to the material of pipe. The following examples would be convenient to know the filtered width.

Pipes	Hz	100	200	400	600	800	1200
Distribution Pipe	CIP		⊙ ←	-----	-----	→ ⊙	
Distribution Pipe	VP	⊙ ←	-----	-----	→ ⊙		
Service Pipe	VP		⊙ ←	-----	-----	→ ⊙	
Service Pipe	GP			⊙ ←	-----	-----	→ ⊙

PARTS LIST (1)

●AMPLIFIER

- ① Volume control knob
- ② Operation panel screws
- ③ Sound level meter
- ④ Front cover
- ⑤ P.C.B. mounting screws
- ⑥ Printed circuit board
- ⑦ Headphone jack
- ⑧ Sensor (Pick-up) cable connector
- ⑨ Chassis
- ⑩ Battery case chassis screws
- ⑪ Lock assembly
- ⑫ Operation panel
- ⑬ Key board mounting screws
- ⑭ Key board
- ⑮ Key board spacer
- ⑯ Operation panel chassis
- ⑰ Volume controller
- ⑱ Shoulder belt fittings
- ⑲ Shoulder belt fitting screws
- ⑳ Rear and front cover screws
- ㉑ Battery case chassis
- ㉒ Battery case
- ㉓ Battery case screws
- ㉔ Rear cover
- ㉕ Waist belt fittings
- ㉖ Waist belt fitting screws
- ㉗ Battery case cover
- ㉘ Lock mounting screws

PARTS LIST (2)

● SENSOR (PICK-UP) ASSEMBLY

- ① Plus-head screw M3×12
- ② Washers
- ③ Spacer
- ④ Panel
- ⑤ Element cover
- ⑥ Washer
- ⑦ Cord stopper
- ⑧ Seal
- ⑨ Terminal lug
- ⑩ Terminal lug screw
- ⑪ Element
- ⑫ Element plate(N)
- ⑬ Disc plate cover
- ⑭ Tentacle disc plate
- ⑮ Wind noise breaker
- ⑯ Noiseless cord
- ⑰ Hand-switch case(A)
- ⑱ Mute switch mounting plate
- ⑲ Hand-switch case screws
- ⑳ Hand-switch case(B)
- ㉑ Rubber bushing(A)
- ㉒ Cord length adjuster
- ㉓ Mute switch button
- ㉔ Connector
- ㉕ Rubber bushing(B)



Instruments for the location of underground utilities and water leaks.

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