

FUJI METAL LOCATOR

F-90M

INSTRUCTION MANUAL



Instruments for the location of underground utilities and water leaks.

FUJI TECOM INC.

1. WARRANTY	2
2. CAUTIONS	3
3. STRUCTURE OF F-90M LOCATOR	4
4. NAME OF PART AND FUNCTION	5
5. EXAMINATION BEFORE USE	6
6. HOW TO OPERATE THE F-90M LOCATOR (1)	8
7. HOW TO OPERATE THE F-90M LOCATOR (2)	9
8. CUSTODY OF THE F-90M LOCATOR	10
9. CARE AFTER THE USE OF F-90M KOCATOR	11
10. FOR A SUCCESSFUL OPERATION IN SITE (1)	12
11. FOR A SUCCESSFUL OPERATION IN SITE (2)	14
12. TROUBLE SHOOTING	15
13. SPECIFICATION	16
14. FOR REPAIR WORK	17

1. WARRANTY

The warranty period is one year after the day when you have purchased the F-90M Locator from a Fuji distributor.

The Warranty Card attached to each F-90M Locator is indispensable when you will have the maintenance service in the future. You are required to keep it carefully.

When your F-90M Locator is malfunctioned during your ordinary use in site, you can have it repaired at free of charge within the warranty period.

You are suggested to send the malfunctioned F-90M Locator to a Fuji distributor without delay within the warranty period. In that case, you are suggested to mention the defective condition clearly preferably in writing.

After the warranty period, we or our distributor take the liberty to require the charge incurred to repair your F-90M Locator.

2. CAUTIONS

When you will operate the F-90M Locator in a survey site, you are required to keep the following matters strictly so as to use this Locator in a safety way.

CAUTION (1)

When operating the F-90M Locator, pay your special attention to the surrounding circumstances in site.

- * You are suggested to operate the F-90M Locator in the site where your assistant or a guard can assist you enough to take the safety measure to traffic accident. Such as the work protecting yourself from accident is required to be carried out under your own responsibility.

CAUTION (2)

The F-90M Locator has not the structure of waterproof. Do not operate it in the rain.

NOTE : The Antenna Disc and the part of adjusting Pipe Length are the waterproof.

- * When you will operate it in the rain, the rain will sink into the Amplifier Housing and cause a malfunction.

CAUTION (3)

The F-90M Locator has not the structure of shockproof. Do not drop it on the hard ground.

- * When you have given a strong shock to it, you are suggested to have it checked by our distributor. Otherwise you are suggested to send it to use here in Tokyo.

3. STRUCTURE OF F-90M LOCATOR

- Fuji Metal Locator Model : F-90M 1
- Soft Carrying Case 1
- English Operation Manual 1

4. NAME OF PART AND FUNCTION

① Speaker

The maximum speaker sound indicates the location of object right upon it.

② Re-set Switch

It controls the oscillation level to an object.

③ Headphone Jack

④ Amplifier Housing

⑤ Power and Sensitivity Control Switch

It switches ON and OFF and also controls the Sensitivity.

⑥ Indicator Meter

It indicates the residual battery power and the location of a buried Metallic Object.

⑦ Battery Cover

⑧ Length Adjustable Pipe

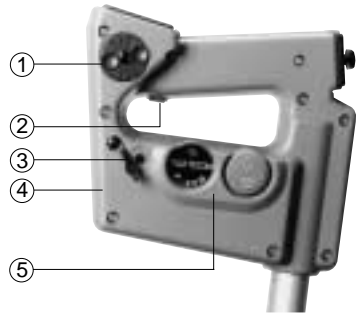
It adjusts the length to meet the requirement of operator.

⑨ Stopper

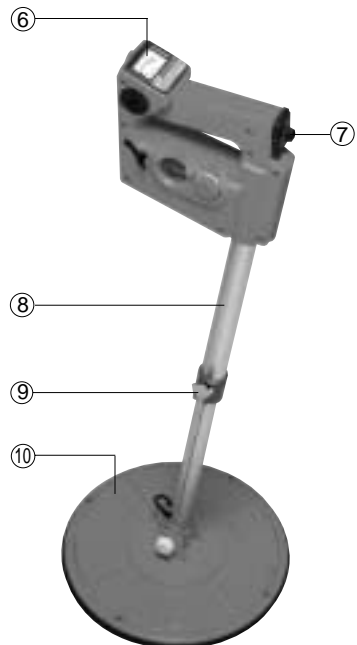
It fixes the pipe length.

⑩ Antenna Housing

It is the Waterproof Housing and has the Antenna in it to locate an object.



(Fig. 1)



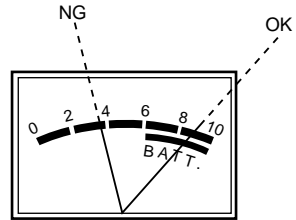
5. EXAMINATION BEFORE USE

When you are using the F-90M Locator in a site, check the battery power and the sensitivity to an object.

(1) To Check the Battery Power.

The battery power can be checked by the following way.

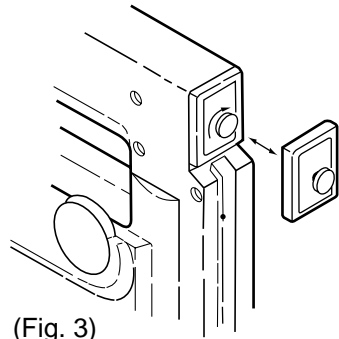
Switch ON by turning the Knob ⑤ clockwise to the mark ON "BATT" and confirm if the Meter Needle will move into the red line of BATT as shown by the figure 2. When the Meter Needle does not move into the red line, exchange it with the new Battery.



(Fig. 2)

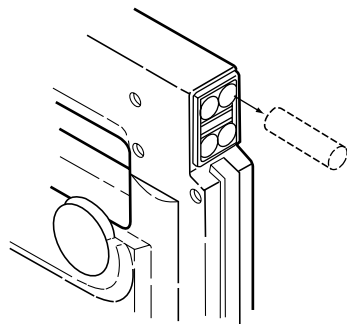
(2) How to exchange the Battery.

Turn the Knob on the Battery Cover shown by the figure 3.



(Fig. 3)

Pull out the used Battery as shown by the figure 4 and exchange it with the new Battery.



(Fig. 4)

- (3) To check the sensitivity to an object.
When you are using the F-90M Locator, check the sensitivity to an object.

Switch ON and then push the Re-set Switch Button.

(CAUTION)

In this case, pay your special attention to the fact that there is no Metallic Instrument or something near the Antenna Disc of F-90M Locator.

Try to bring a Test Piece to the Antenna Disc of F-90M Locator and confirm when the F-90M Locator will sound to the Test Piece.

Prepare a Test Piece such as a Coin and confirm in which distance the F-90M Locator will sound or show the maximum Meter Needle deflection.

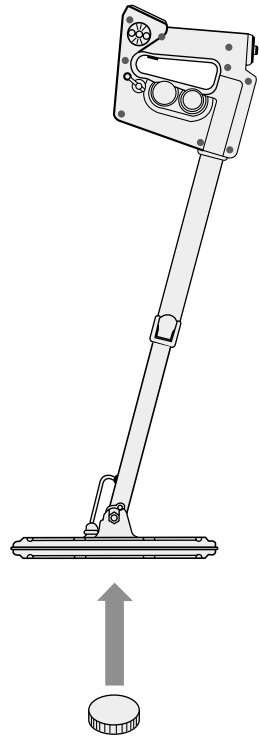
Test Pieces.

- (1) The Copper Test Piece of 25mm diameter and 1.5mm thickness.

In this case, the F-90M Locator will sound when the Test Piece is brought close to the Antenna Face within 10cm or so. You can confirm the good condition of F-90M Locator

- (2) The Aluminum Test Piece of 20mm diameter and 1.5mm thickness.

In this case, the F-90M Locator will sound in the distance of 6cm.

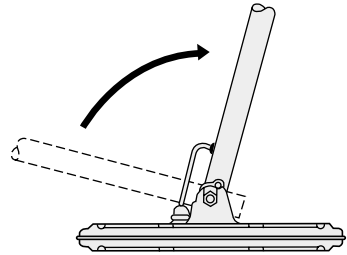


(Fig. 5)

6. HOW TO OPERATE THE F-90M LOCATOR (1)

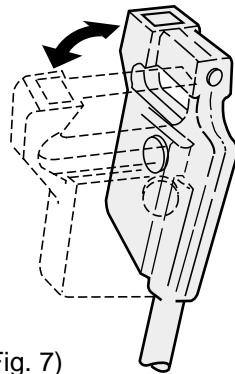
Extend the Telescopic Shaft up to the length so that the Antenna Disc will come to the height of your ankle when you have carried the F-90M Locator in your hand.

The above length of Telescopic Shaft is suitable for operating the F-90M Locator on a site for a long time and minimize fatigue.



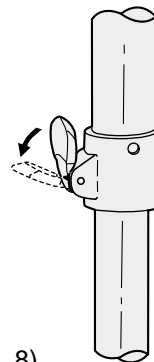
(Fig. 6)

Hold the Telescopic Shaft with your hand and turn the part Amplifier clockwise until it stops as shown by the figure 7. The F-90M Locator is set up for the operation in site.



(Fig. 7)

When you have adjusted the height of F-90M Locator to meet your operation, fix the length of Telescopic Shaft firmly. The figure 8 shows how to loosen the Length Adjustor ⑨ shown in the NAME OF PART AND FUNCTION.



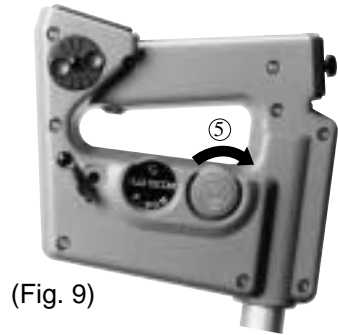
(Fig. 8)

7. HOW TO OPERATE THE F-90M LOCATOR (2)

Turn the Power and Sensitivity Control Switch ⑤ as shown by the figure 9 clockwise up to the mark "ON" or "Hi" or "Lo".

"ON" is the Middle Sensitivity.
"Hi" is the High Sensitivity.
"Lo" is the Low Sensitivity.

Turn the Knob ⑤ to the mark ON "BATT" and check the Battery Power by confirming if the Meter Needle will move into the red line or not.



(Fig. 9)

(CAUTION)

When the Meter Needle has moved into the red line, the Meter Needle returns the left side automatically after 4 Second indication of the residual battery Power.

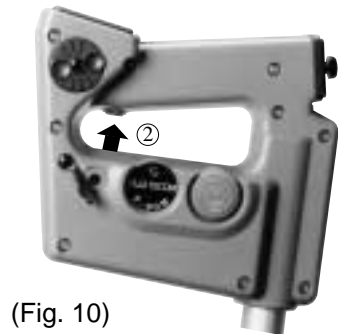
Push the Re-set Switch ② and set up the F-90M Locator to the position for locating an object.

(CAUTION)

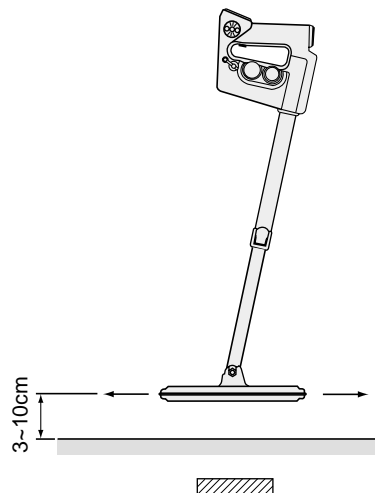
In this case, keep the Antenna Disc at the position higher than 30cm to the ground surface and confirm the fact that there is no Metallic Obstacle near the F-90M Locator. The Metallic Obstacle causes to reduce the Sensitivity of F-90M Locator.

Move the Antenna Disc as if it will sweep the ground surface by keeping the interval to the ground surface as shown by the figure 11.

When the Antenna Disc has come right upon a Metallic Object, the sound signal becomes the maximum and the Meter Needle deflects widely to the left side in its maximum. Those maximum sound and Meter Needle deflection show the point right upon the object to be located.



(Fig. 10)



(Fig. 11)

8. CUSTODY OF THE F-90M LOCATOR

When the F-90M Locator is not used for a long time, it is required to be kept in the following ways.

- (1) Check the structure of instrument including its instruction manual. The instruction manual will be needed someday in the future for a good operation.
- (2) Detach the Battery when the F-90M Locator is not used for a long time. The Battery solution may possibly cause a trouble of component.
- (3) Do not keep the F-90M Locator in the moistured place.

9. CARE AFTER THE USE OF F-90M LOCTOR

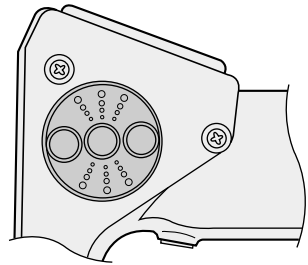
- (1) Wipe off the rain or soil before the custody of F-90M Locator.
- (2) Do not use its exclusive Carrying Bag to keep or carry the othre instrument or thing.

10. FOR A SUCCESSFUL OPERATION IN SITE (1)

(1) To adjust the sound volume of Speaker.

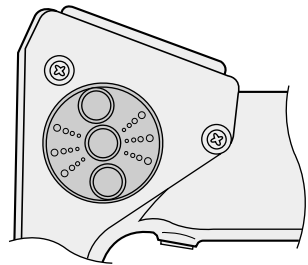
The sound volume of Speaker can be adjusted by means of turning the Speaker Cover as shown by the figure 12.

On the other hand, the sound signal can be listened with the Headphones. In this case, the Speaker does not sound.



(Maximum Sound)

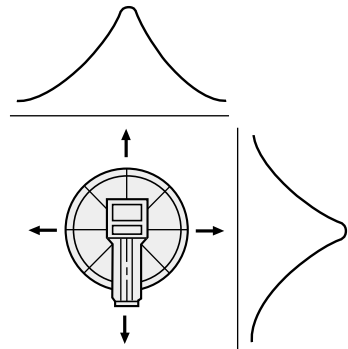
(Fig. 12)



(Minimum Sound)

(2) How to locate the central point of object.

Move the Antenna Disc toward the directions of right and left and then back and forth as shown by the figure 13. The peak point of sound signal obtained by the above two Antenna movements indicates the central point of object.



(Fig. 13)

(CAUTION)

When the peak point of sound signal is larger as shown by the figure 14, lift up the Antenna Disc higher as shown by the figure 15 and repeat the Antenna movements from right to left and then from back and forth. In this case the Sensitivity is required to be adjusted to "Lo" position.

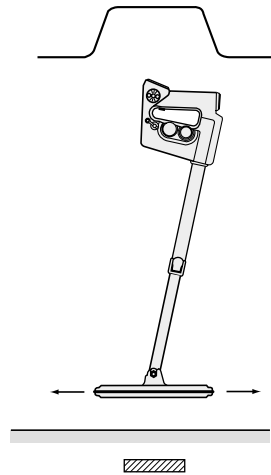
(3) Sensitivity Adjustment.

The maximum sensitivity can be obtained from the following examples.
The test piece is the case of size in 100mm diameter.

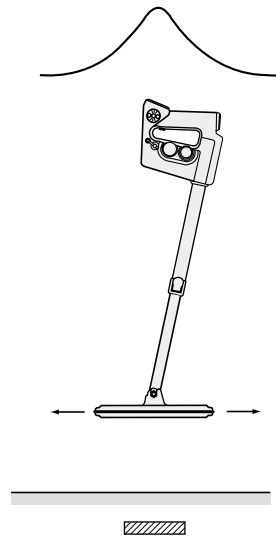
"ON" position = 30cm or so.

"HI" position = 40cm or so.

"LO" position = 15cm or so.



(Fig. 14)



(Fig. 15)

11. FOR A SUCCESSFUL OPERATION IN SITE (2)

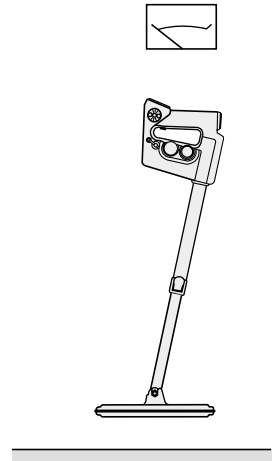
(4) How to operate the Re-set Switch.

The Re-set Switch is used when the point to locate was changed to other or when it takes time to locate on a same point on the ground.

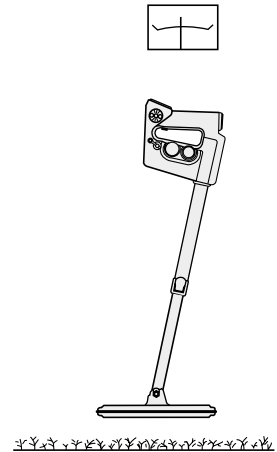
When the F-90M Locator is operated on the damp ground or lawn, it will have the case of being influenced by damp. In that case, the Re-set Function will display its good effect.

(CAUTION)

The Re-set Switch has the special function to fix the sensitive level to an object. The F-90M Locator detects only the object which has the strong reaction higher than the fixed sensitive level of F-90M Locator.



(Fig. 16)



12. TROUBLE SHOOTING

When the F-90M Locator malfunctioned during its work in site, the following Trouble Shootings are recommended.

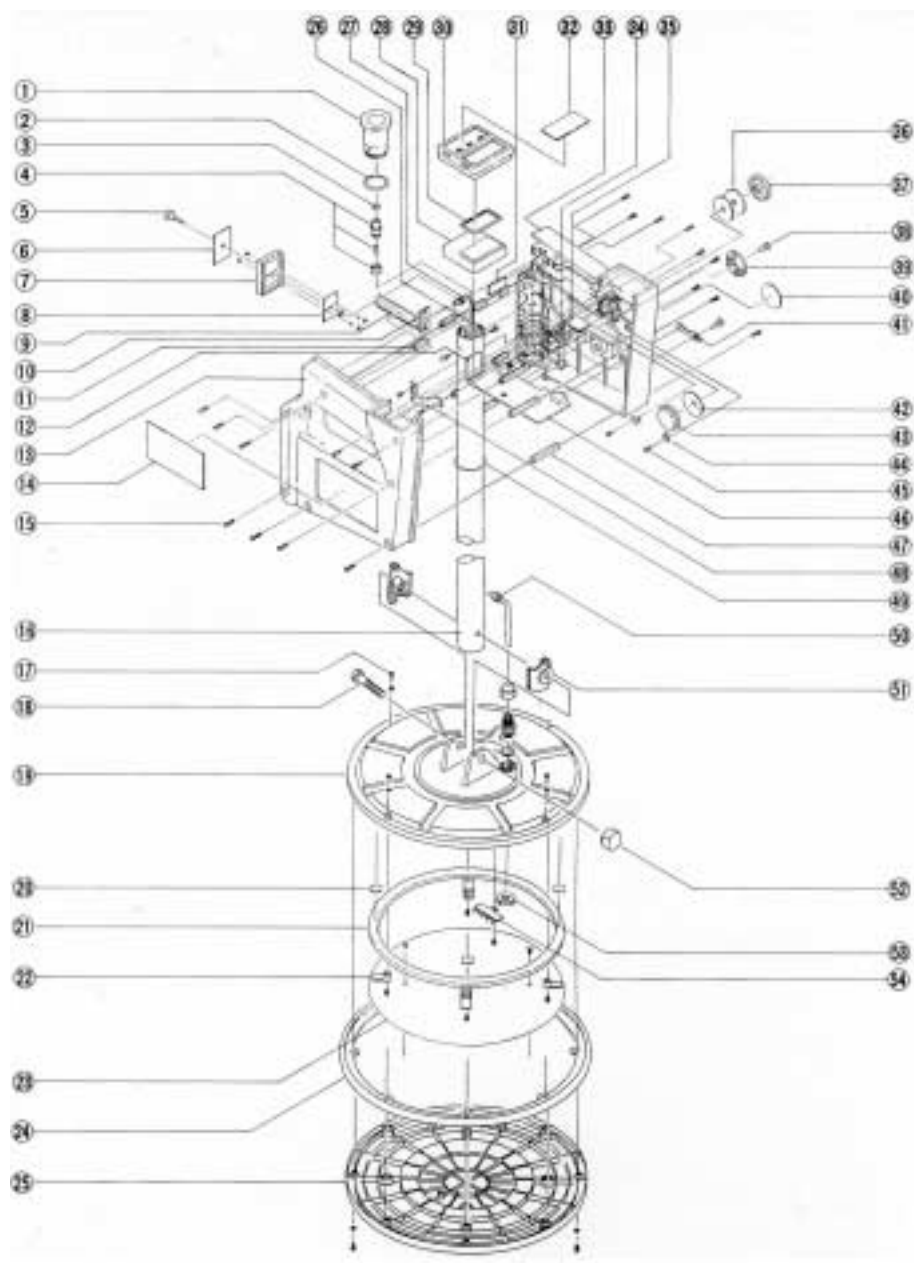
- (1) When the power Switch does not work.
 - a) When the F-90M Locator was stowed away, have you detached the Battery ???
 - b) Have you checked the residual battery power ???
 - c) Have you confirmed the polarity of Battery ???
- (2) The F-90M Locator does not react to the Metallic Object.
 - a) Have you confirmed the residual battery power by reading it on the Indicator Meter ???
 - b) Have you used the Re-set Function after switching on ???
- (3) The F-90M Locator is weak in sensitivity.
 - a) Have you checked the residual battery power ???
 - b) Have you operated the Re-set Function by means of avoiding the metallic facilities or equipments near the F-90M Locator ???
- (4) The F-90M Locator reacts in any place.
 - a) Adjust the sensitivity with its Control Knob to "LO" position.
- (5) The F-90M Locator reacts in a larger area.

When the object is a big one, it reacts in a larger area. When the Antenna Disc was approached too close to the object, it reacts also in a larger area. In those cases, adjust the sensitivity to "LO" position and move the Antenna Disc at a higher position on the ground surface.

13. SPECIFICATION

Detectable Depth	: 42cm in case of the Iron Plate of 100mm diameter × 20mm thickness. 65cm in case of the Control Valve Cover of 180mm diameter.
Detection Circuit	: Campbell Bridge.
Oscillation Frequency	: 9.75 ± 15 kHz.
Oscillation Output	: 8.2 V/p-p.
Sound Frequency	: 0 ~ 2.5 kHz.
Output Impedance	: Low Impedance.
Power Consumption	: 7mA at the silent position. 45mA at the maximum sound signal.
Power Source	: SUM-3 (1.5 Volts) × 4 (6 Volts).
Battery Life	: Approx. 25 hours.
Sensitivity Adjustment	: 3 steps (M, Hi and Lo).
Size and Weight	: Main Unit = 195 (W) × 170 (H) × 60 (D)mm Antenna Disc = 270mm diameter × 30mm thickness. Weight = Approx. 1.7kg
Operation Temperature	: -5°C ~ +60°C

14. FOR REPAIR WORK



- | | | |
|--------------------------|------------------------|----------------------|
| ① Waterproof cap | ⑳ Antenna coil | ㉑ Waterproof cap |
| ② O-ring | ㉑ Coil clasp | ㉒ Speaker net |
| ③ O-ring | ㉒ Shield disc plate | ㉓ Speaker |
| ④ Top piece | ㉓ Waterproof ring | ㉔ Speaker holder |
| ⑤ Knob | ㉔ Under antenna cover | ㉕ Pan-head binder |
| ⑥ Battery cover plate | ㉕ Curl cord | ㉖ P.C.B. |
| ⑦ Battery case cover | ㉖ Battery holder plate | ㉗ Spacer (345) |
| ⑧ Battery terminal plate | ㉗ Meter | ㉘ Pipe holder (B) |
| ⑨ Battery slider plate | ㉘ Meter packing | ㉙ O-ring |
| ⑩ Stopper | ㉙ Meter panel | ㉚ Grommet |
| ⑪ Spacer (320) | ㉚ Dummy plate | ㉛ Pipe holder (A) |
| ⑫ Battery terminal plate | ㉛ Meter plate | ㉜ Round-head nut |
| ⑬ Right-half housing | ㉜ Left-half housing | ㉝ Nut |
| ⑭ Caution plate | ㉝ Re-set switch cap | ㉞ Lug terminal plate |
| ⑮ Plus-head binder screw | ㉞ Re-set P.C.B. | |
| ⑯ Length adjuster pipe | ㉞ Dustproof ring | |
| ⑰ Plus-head binder | ㉞ Knob | |
| ⑱ Hexagon-head bolt | ㉞ Clip | |
| ⑲ Upper antenna cover | ㉞ Volume controller | |
| ㉒ Coil cushion | ㉞ Model number plate | |

INSPECTION CERTIFICATE

MODEL: **F-90M** DATE: _____

SERIAL No: _____

We hereby certify that the undersigner checked the above instrument with careful attention under the Fuji interoffice inspection standard consisting of four main items as follows:-

(1) EXTERNAL APPEARANCE

(2) MECHANICAL WORK

* Knob, lever & key * Connector * Joint

(3) ELECTRIC FUNCTION

* Indicator & Display * Output * Sensitivity

* Frequency * Input * Power

(4) OPERATION ON TEST SITE

* Distance * Location * Level

* Depth * Flow

* Direction * Pressure

Inspected by: _____



Instruments for the location of underground utilities and water leaks.

FUJI TECOM INC.

Head office : 1-3-1, Kanda Izumi-cho, Chiyoda-ku, Tokyo 101-0024, Japan

TEL : +81-3-3862-3196 FAX : +81-3-3866-1979

Web Site : <http://www.fujitecom.co.jp/>

E-Mail : kaigai@fujitecom.co.jp

Branch office : Sapporo, Sendai, Tokyo, Shinetsu, Nagoya, Osaka
Hiroshima, Kyushu

Technical development & training center : Niiza