

DM-602 BRIEF OPERATING INSTRUCTIONS

1 WHERE TO PLACE

- (1) Winch unit Place the winch over the hole to position the sensor unit in the center of the drilled hole or excavated diaphragm.
- (2) Recorder unit Place the recorder unit in a place where the water will not splash on it.

2. CABLE CONNECTION AND SUPPLY VOLTAGE

- (1) Connecting cable Connect the cable to the recorder unit and the winch unit.
- (2) Power cable Prior to connecting the power cable to the recorder unit, make sure the following switch settings have been made.

[RECORDER POWER] switch: [OFF] [UP-DOWN] switch: [STOP]

Then, connect the power cable to the connector plug [POWER].

- (3) Power supply voltage Confirm the voltmeter pointer stays within the **90 - 110** volts scale.

NOTE: When the supply voltage is out of range due to the voltage fluctuation, the system will be automatically shut off to protect the unit. Turn off the power switch on the recorder unit and reset the line voltage to the above voltage range.

3. INITIAL SETTINGS

- (1) Recording range Select your desired range with [RANGE (m)] and [SHIFT (%)] switches.

EXAMPLE 1. [RANGE] switch: 2m [SHIFT] switch: 0 %

Measure up to 4m diameter (less than 2 m radius) of the hole. The measurement range is equal to the recording range.

EXAMPLE 2. [RANGE] switch: 2 m [SHIFT] switch: 50%

Measure up to 6m diameter (less than 3m radius) of the hole. Recording starts at 1m away from the center to the wall of the hole.

EXAMPLE 3. [RANGE] switch: 2m [SHIFT] switch: 100%

Measure up to 8m diameter (less than 4m radius) of the hole. Recording starts at 2m away from the center to the wall of the hole.

- (2) GAIN [GAIN] switch switches GAIN control type to AUTO (Automatic) or MAN (Manual) mode.

AUTO The receiver gain is expertly controlled to the best recording image.

MAN [GAIN ADJ] control becomes effective. Turning the control to the right increases the receiver gain and to the left decreases the gain.

- (3) Paper speed Select either [CONST(mm/min)] or [SYNC] mode with [PAPER SPEED(MENU)] switch.

The left scale [CONST] sets the paper speed per minute.

EXAMPLE 1. [CONST] [60] advances the paper 60 mm per minute.

The right scale [SYNC] sets the length of the recording paper per meter.

EXAMPLE 2. At [1/40], the 1 m depth is recorded as 25 mm on the paper.

NOTE: In [SYNC] mode, the paper stops when the sensor unit stops.

- (4) The measuring direction [DIR.CHANGE] switch to [X] or [Y].
- (5) The diameter mark of the hole Measure the diameter of the casing or the guide wall in centimeters. Set up the diameter in [X-X'] and [Y-Y'] directions using [SET(cm)] switch. EXAMPLE When the diameter of the hole is 185 cm, set "185" with [SET(cm)] switch.
- (6) The winch speed Turn [SPEED] control fully counterclockwise to [LOW].
- (7) Recording paper Install the specified recording paper. Refer to the operation manual.

4. OPERATION GUIDE

- (1) [RECORDER POWER] switch [ON]
- (2) [UP/DOWN] switch [DOWN]
- (3) To lower the sensor unit Gently turn the winch [SPEED] control clockwise.
- (4) To stop the sensor unit [UP/DOWN] switch to [STOP], when the sensor unit is positioned at the desired depth for calibration in the casing or the guide wall.
- (5) To start recording
 - a. [DATA PRINT/RECORD START & STOP] switch to [RECORD START]
 - b. Gently turn [GAIN] controls clockwise until the wall picture is recorded in good contrast.
 - c. In case the oscillation line and the picture of the wall are not well defined, gently turn [STC(ADJ)] controls clockwise to obtain better discrimination.
 - d. Turn [CALIBRATION] control to set the leading edge of the wall face picture coincides with the dashed line, that is set by [SET(cm)] switch.

NOTE: [CALIBRATION] control must be locked after use.

- e. [UP/DOWN] switch to [UP] to lift the sensor unit.
- f. [UP/DOWN] switch to [STOP], when the sensor unit is stowed in position.
- g. [DATA PRINT/RECORD START & STOP] switch to [RECORD STOP], turn off the recorder unit.
- h. Pull out the recording paper by hand.

5. MEASUREMENT (X-X' WALL)

Set each control as follows:

- (1) [DIR.CHANGE] switch [X]
- (2) [DATA PRINT/RECORD START & STOP] switch [RECORD START]
- (3) [DATA PRINT/RECORD START & STOP] switch [DATA PRINT]
- (4) [UP/DOWN] switch [DOWN]
- (5) [SPEED] control Gently turn the control clockwise to set an appropriate winch speed.
- (6) Definition control Adjust [GAIN (X)], [GAIN (X')] and [STC(ADJ)] controls to get the best picture.

NOTE: The picture may become extremely poor in contrast when the sensor unit passes the casing or the guide wall area. In such a case, turn [GAIN] control clockwise to recover the receiver gain. If the picture is still weak, check with the interference noise from outside, such as slurry.

- (7) When the sensor unit lands on the bottom of the trench, the limit switch is activated to automatically stop the sensor unit movement.

- (8) [UP/DOWN] switch [STOP]
- (9) [DATA PRINT/RECORD START & STOP] switch [RECORD STOP]
- (10) Roll down paper to resume [Y-Y'] measurement.

6. MEASUREMENT (Y-Y' WALL)

Set each control as follows:

- (1) [DIR.CHANGE] switch [Y]
- (2) [DATA PRINT/RECORD START & STOP] switch [RECORD START]
- (3) [DATA PRINT/RECORD START & STOP] switch [DATA PRINT]
- (4) [UP/DOWN] switch [UP]
- (5) [SPEED] control Keep the same knob position.
- (6) Definition control Adjust [GAIN (Y)], [GAIN (Y')] and [STC(ADJ)] controls to get the best picture.
- (7) [DATA PRINT/RECORD START & STOP] switch [RECORD STOP]

Once the sensor unit is stowed, the limit switch is activated to automatically stop the sensor unit movement.

- (8) [UP/DOWN] switch [STOP]
- (9) Pull out the recording paper by hand.

7. TIPS FOR BETTER RECORDING RESULTS

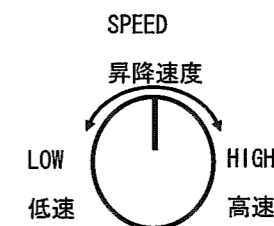
To obtain the best possible record, you should observe the following points each time you conduct the measurement.

- (1) Check if the recording stylus, current feed stylus and the recording belt are properly fitted, not loose. When checking the recorder unit, [RECORDER POWER] switch to [OFF].
- (2) Check if the line marker is properly drawn on the paper by pressing [MAN MARK] switch.
- (3) Stylus - If you find the line is faint, replace both the recording stylus and the current stylus with new ones. It is recommended to replace both stylus after three rolls. Refer to the operation manual to replace stylus.
- (4) Recording paper - When a red mark appears at the paper edge, replace the recording paper as soon as possible. Never run the recorder unit without the recording paper, otherwise the stylus may be seriously damaged.

8. MAINTENANCE AFTER MEASUREMENT

- (1) Splash the winch and the sensor unit with water to wipe off dirt, slurry, etc. At the time of cleaning by a high-pressure water gun, please clean these from topward to the bottomward. Don't do from the bottom for the equipment protection to the top.
- (2) Cables must be dried up before storage.
- (3) Wipe off dirt, slurry, etc. from the recorder unit with a damped soft cloth.
- (4) When transporting the winch unit, make sure the sensor unit is firmly tied with rope to the winch frame to avoid damage.

NOTE: The words in brackets are the names labeled on the Recorder unit.



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- (2) [UP/DOWN] switch [DOWN]

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d. Turn [CALIBRATION] control to set the leading edge of the wall face picture coincides with the dashed line, that is set by [SET(cm)] switch.

NOTE: [CALIBRATION] control must be locked after use.

e. [UP/DOWN] switch to [UP] to lift the sensor unit.

f. [UP/DOWN] switch to [STOP], when the sensor unit is stowed in position.

g. [DATA PRINT/RECORD START & STOP] switch to [RECORD STOP], turn off the recorder unit.

h. Pull out the recording paper by hand.

5. MEASUREMENT (X-X' WALL)

Set each control as follows:

- (1) [DATA PRINT/RECORD START & STOP] switch [RECORD START]

- (2) [DATA PRINT/RECORD START & STOP] switch [DATA PRINT]

- (3) [UP/DOWN] switch [DOWN]

- (4) [SPEED] control Gently turn the control clockwise to set an appropriate winch speed.

- (5) Definition control Adjust [GAIN] and [STC(ADJ)] controls to get the best picture.

NOTE: The picture may become extremely poor in contrast when the sensor unit passes the casing or the guide wall area. In such a case, turn [GAIN] control clockwise to recover the receiver gain. If the picture is still weak, check with the interference noise from outside, such as slurry

- (6) When the sensor unit lands on the bottom of the trench, the limit switch is activated to automatically stop the sensor unit movement.

- (7) [UP/DOWN] switch [STOP]

- (8) [DATA PRINT/RECORD START & STOP] switch [RECORD STOP]

- (9) Pull out the recording paper by hand.

6. STOWING THE SENSOR UNIT

- (1) [RECORDER POWER] switch [OFF]

- (2) [UP/DOWN] switch [UP]

Once the sensor unit is stowed, the limit switch is activated to automatically stop the sensor unit movement.

- (3) [UP/DOWN] switch [STOP]

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To obtain the best possible record, you should observe the following points each time you conduct the measurement.

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- (2) Cables must be dried up before storage.

- (3) Wipe off dirt, slurry, etc. from the recorder unit with a damped soft cloth.

- (4) When transporting the winch, make sure the sensor unit is firmly tied with rope to the winch frame to avoid damage.

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