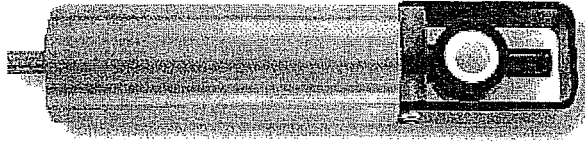
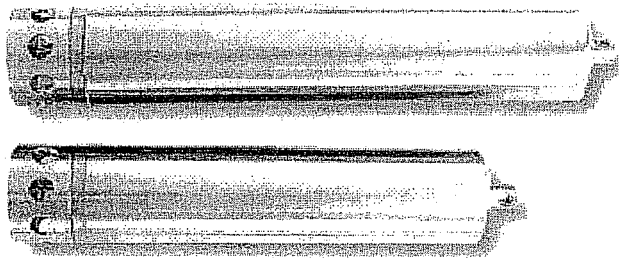


# *COMPACT-CT*



OPERATING MANUAL

# *COMPACT-TD*



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## 《Please read this instruction by all means.》

You may be required to read the following cautions well in order to avoid the handling mistake in chipping off the recorded data before you may use this instruments, COMPACT series.

### **CAUTION**

#### **CONFIRMATION OF MEASUREMENT START**

After the completion of "START" setup, please observe that the red operation lamp is lit and the instrument is in operation at the starting time of measurement and then, house the inner unit into the pressure case. (The lamp is repeated to be lit per measuring interval set up.)

COMPACT series basically makes you execute the easy setup of measurement by simple action. In case, however, the following wrong procedure is performed, any data cannot be recorded. Please pay your special attentions to those points.

1. In case a low battery is applied.
2. In case a communication cable is disconnected before the complete setup is not executed.
3. In case it takes more than 2 seconds for you to connect or disconnect a plug of communication cable.
4. In case the time is within 1 minute from the completion of program setup until the starting time of measurement.
5. In case the "start" setup is executed and then a communication cable is disconnected after passing away the starting time set up.
6. In case the "start" setup is executed and afterwards a communication cable is re-connected.
7. In case the "start" setup is executed and afterwards the battery is taken off.

In such a case of the above case 6, "the end of measurement" is determined when a communication cable is re-connected.

If a communication cable is re-connected after the setup procedure is completed, the measurement is recognized to be completely finished. The same judgment is applied when the said cable is re-installed even before the starting time of measurement. In such cases, the setup and re-start procedures are required.

# C O N T E N T S

1. Brief Description	1
2. Specifications	1
2-1 Sensor of COMPACT CT	1
2-2 Sensors for COMPACT TD	1
2-3 Data Logger	1
2-4 Communication	2
2-5 Hardware	2
3. Notes	2
4. Names and Functions	3
5. How to operate	4
5-1 Install the program	4
5-2 Set Battery	4
5-3 Connect Communication Cable	4
5-4 Start the program (on PC)	4
5-5 Start data transfer	4
5-6 Wake up the instrument	4
5-7 Monitor the operation in real-time	4
5-8 Stop real-time monitoring	4
5-9 Set the measurement configuration I (Erase stored memory)	4
5-10 Set the measurement configuration II (start time and interval setting)	4
5-11 Start measurement	4
5-12 End measurement	5
5-13 Transfer the data	5
6. Calibration Co-efficients	5
7. Power consumption of COMPACT CT	6
8. Power consumption of COMPACT TD	7

## 1. Brief description

The COMPACT series instruments are small and highly accurate two-channel recorders using a micro-controller. Its 16bit A/D converter gives digital resolution of 1/65000 of the measuring range. The 2MB non-volatile flash memory allows maximum 178439 data to be recorded and prevents data loss in case of power failure. No interface unit is required and direct connection to serial port of PC sets up such configuration as interval setting, data transfer, etc.

## 2. Specifications

### 2-1 Sensors of COMPACT CT

	Temperature Sensor	Conductivity Sensor
Type	Thermistor	EM Inductive Cell
Range	- 5 ~ 40°C	0 ~ 60 mS/cm
Resolution	0.001°C	0.001 mS/cm
Accuracy	± 0.02°C	± 0.02 mS/cm

### 2-2 Sensors for COMPACT TD

	Temperature Sensor	Depth Sensor
Type	Thermistor	Semi-conductor
Range	- 5 ~ 40°C	40/100/200/500 m 1000/2000m (option)
Resolution	0.001°C	1/65000 FS
Accuracy	± 0.02°C	± 0.2% FS

### 2-3 Data Logger

Memory type : 2MB non-volatile flash memory

A/D Converter: 16bit A/D converter

Memory capacity : 178439 data

Sampling interval: 1 sec, 1, 2, 10 min

Power consumption: 42 mA (COMPACT CT) 35 mA (COMPACT TD)

Power Source : Lithium battery (CR2)

Battery capacity : 750 mAh

#### 2-4 Communication

Serial communication : RS232c (Direct to PC)

Set-up configuration : calendar correction, start time stting,  
interval setting, data transfer, data erasing

Software : Windows 95-98/NT

#### 2-5 Hardware

Material : Titanium

Dimensions and weight:

		COMPACT CT	COMPACT TD
Diameter		40 mm	40 mm
Length		193 mm	202 mm (40/100/200/500m) 244 mm (1000/2000m)
Weight	(in air)	500 g	500 g (40/100/200/500m) 700 g (1000/2000m)
	(in water)	265 g	265 g (40/100/200/500m) 395 g (1000/2000m)

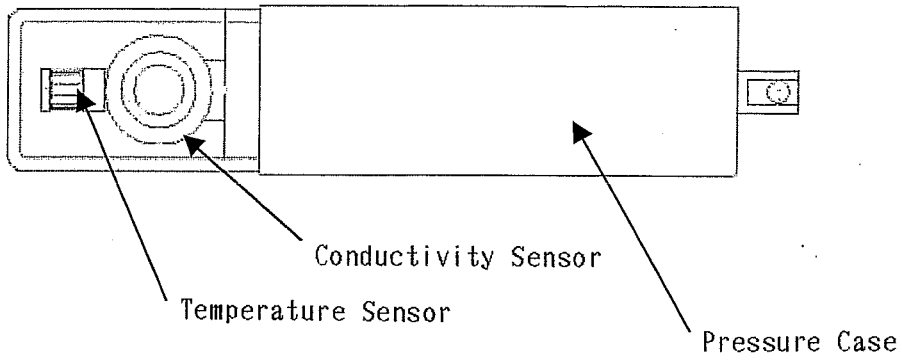
#### 3. Notes

- 1) Before deployment, check the system using the communication program.
- 2) Before deployment, erase the recorded data.
- 3) Use a new battery for every deployment.
- 4) Fill the pressure case with dry gas to avoid dewing inside.
- 5) Carefully check the O-ring which must be free from dust, hair, etc. and with no defect.
- 6) When removing the unit from the pressure case after retrieval, donot let water drops get inside the pressure case.

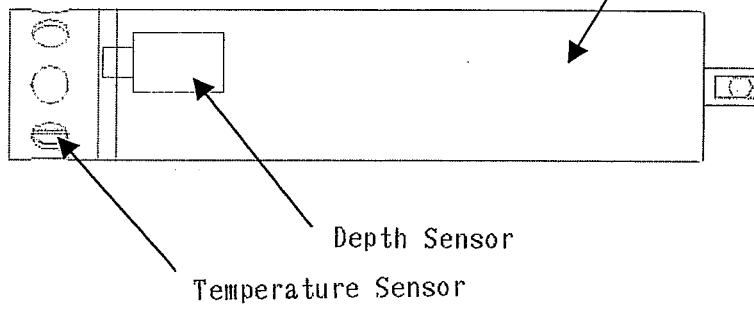
#### 4. Names and Functions

##### Names of External Components

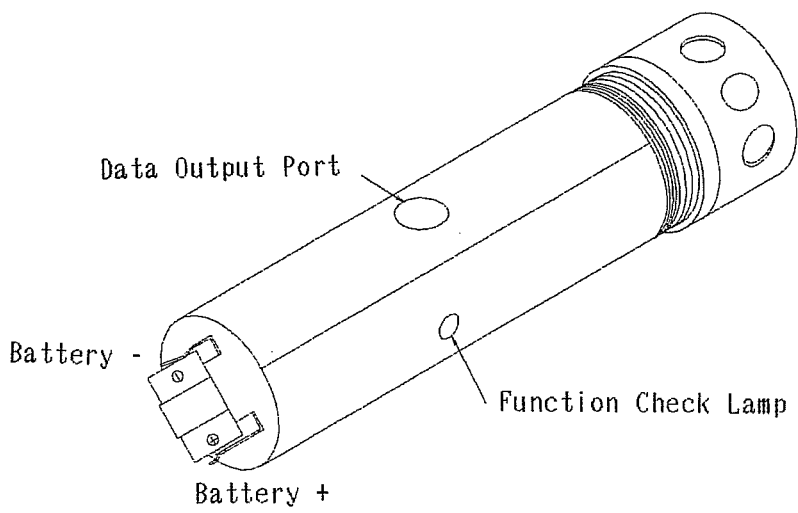
###### COMPACT-CT



###### COMPACT-TD



##### Names of Internal Parts



## 5. How to operate

All the set-up configuration can be done with the Communication Program. This manual describes only the procedures. The detailed explanation of the soft program is given in the Operating Manual of Data Processing.

### 5-1 Install the program

Install the Data Processing program on your PC.

### 5-2 Set Battery

- (1) Remove the instrument from the pressure case.
- (2) Set a new battery. Pay attention to the polarities.

### 5-3 Connect Communication Cable

Connect 9-pin connector to the serial port of PC and pin-connector to the instrument.

### 5-4 Start the program (on PC)

### 5-5 Start data transfer

### 5-6 Wake up the instrument

### 5-7 Monitor the operation in real-time

### 5-8 Stop real-time monitoring

### 5-9 Set the measurement configuration I (Erase stored memory)

### 5-10 Set the measurement configuration II (start time and interval setting)

### 5-11 Start measurement

Remove the communication cable BEFORE "start time" comes.

Check that Function Check Lamp flashes when the "start time" comes and at every interval onwards.

After checking the lamp, set the instrument into Pressure Case.

- (1) Check if the O-ring is clean and not defective.
- (2) Use Silicone Grease on the O-ring surface.
- (3) Carefully insert the instrument into the case.
- (4) Fill the case with dry gas to avoid dewing inside.

Now Start Measurement !!

#### 5-12 End measurement

When you have ended measurements, remove the instrument from pressure case. Make sure the water in O-ring groove does not come into case.

#### 5-13 Transfer the data

Follow the procedures 5-3 ~ 5-6 to wake up the system.

### 6. Calibration Co-efficients

All sensors of the instrument are calibrated before delivery from the factory. The co-efficients which are required for conversion from raw data (N-value) into physical units are obtained. (The results and co-efficients of calibration are described in the Examination Sheet).

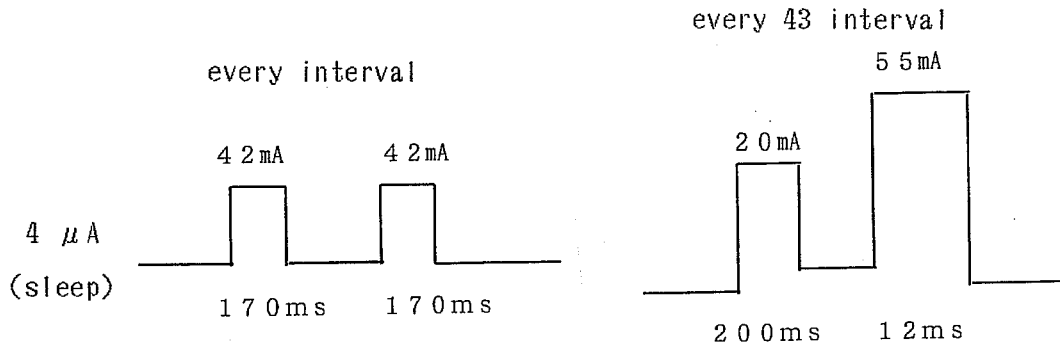
The calibration co-efficients are stored in the memory of instrument and when the data are transferred they are, also, transferred to the file.

The alteration of the co-efficients is done only by the factory. Do not touch them, unless specially indicated.



## 7. Power consumption of COMPACT CT

This instrument is equipped with non-volatile flash memory which enables recording of upto 178439 data sets. When set at 1 sec measuring interval, the maximum number of data can be recorded. When set at 1, 2 or 10 minutes interval, however, the number of stored data is limited by the capacity of battery. When the instrument is operating, power consumption is as follow:



The total power consumption is the sum of the current at every interval, current at every 43 intervals and the current during sleep mode.

Current consumption during measurements (D : number of data)

$$(42\text{mA} * 170\text{ms} * D) + (20\text{mA} * 200\text{ms} + 55\text{mA} * 12\text{ms}) * D / 43$$

Current consumption during sleep mode

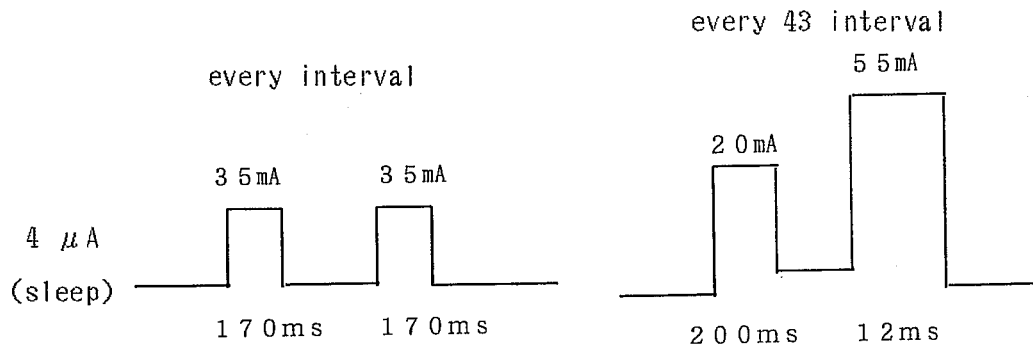
$$4 \mu\text{A} * (\text{sleeping time})$$

Interval	Max. data	Max. day	Current consumption		Total power consumption
			measurement	sleep	
1 sec	178439	2 days	359 mAh	0.20 mAh	359 mAh
60 sec	178439	123.9 days	359 mAh	12 mAh	371 mAh
120 sec	178439	247.8	359 mAh	24 mAh	383 mAh
600 sec	105120	2 years	212 mAh	70 mAh	282 mAh

The battery has a capacity of 750 mAh. The flash memory, however, requires approx. 55 mAh to be written. The capacity that can be used for measurements is approx. 650 mAh.

## 8. Power consumption of COMPACT TD

This instrument is equipped with non-volatile flash memory which enables recording of upto 178439 data sets. When set at 1 sec measuring interval, the maximum number of data can be recorded. When set at 1, 2 or 10 minutes interval, however, the number of stored data is limited by the capacity of battery. When the instrument is operating, power consumption is as follow:



The total power consumption is the sum of the current at every interval, current at every 43 intervals and the current during sleep mode.

Current consumption during measurements (D : number of data)

$$(35\text{mA} * 170\text{ms} * D) + (20\text{mA} * 200\text{ms} + 55\text{mA} * 12\text{ms}) * D / 43$$

Current consumption during sleep mode

$$4 \mu\text{A} * (\text{sleeping time})$$

Interval	Max. data	Max. day	Current consumption		Total power consumption
			measurement	sleep	
1 sec	178439	2 days	300 mAh	0.20 mAh	300 mAh
60 sec	178439	123.9 days	300 mAh	12 mAh	312 mAh
120 sec	178439	247.8	300 mAh	24 mAh	324 mAh
600 sec	105120	2 years	212 mAh	70 mAh	247 mAh

The battery has a capacity of 750 mAh. The flash memory, however, requires approx. 55 mAh to be written. The capacity that can be used for measurements is approx. 650 mAh.

