Operation Manual

Self-recording Wave Height, Wave direction, and Current Speed Meter

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1－1. Summary

　　The combination of **WAVE HUNTER08－Σ**(wave height, direction and current speed meter) and **KOBANZAME08**
(data collection and communication device--optional) give you a substantial internet monitoring system (Web watch service).

　　Using this combination you can measure and process wave height, direction, current, depth, oxygen, temperature and wind
speed.

　　Web watch service is a network system of ocean measurement. Using this service you can check your observatory data at
anywhere and anytime with your cell phone or any internet services. You can also do the measurement － record －
transportation － Web control － processing － making table and graph.

1－2. Outline of operation

WAVE HUNTER08-Σ is controlled by command of **Wave Hnuter08 Explorer**2 (See below Figure).
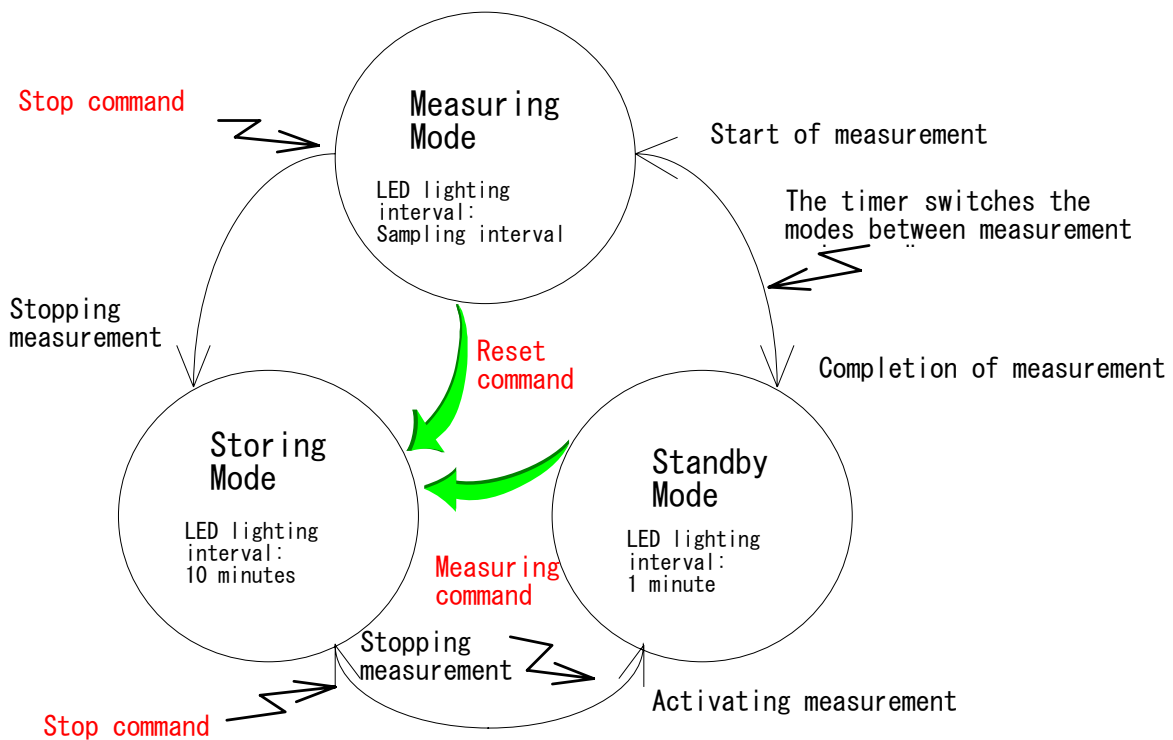
1－3. Data processing

MagicProcessorK (optional) is a data processing software. It can compute below items. And also, you can upload
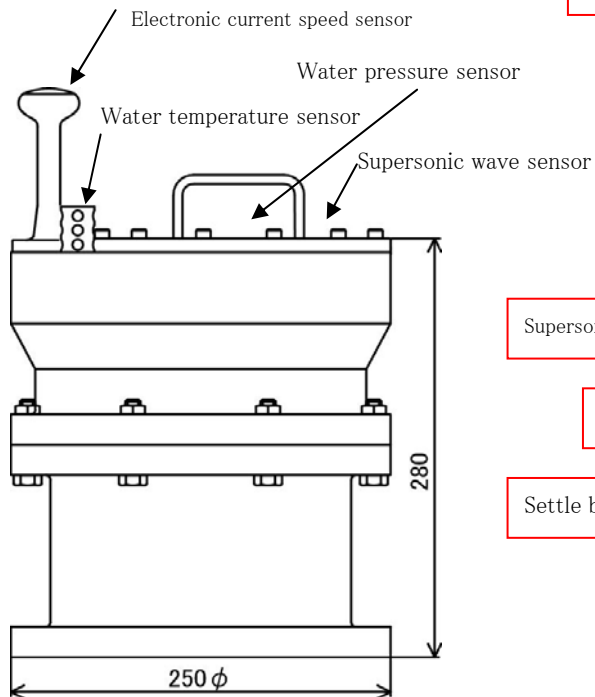processing result through the internet and LAN.

Table1-1 Items

Wave-height processing items	Maximum wave height and period, 1/10 of maximum wave height and period, significant wave height and period, average wave height and period, wave count, water depth, η rms, skewness, Kurtosis, water level, maximum long-period wave height and period, and significant long-period wave height and period.
Wave direction processing items	Average wave direction by covariance method, main wave direction, average angle of dispersion, directional concentration factor, and wave peak length parameter.
Current velocity processing items	Average current velocity, average current direction, average E-current velocity, average N-current velocity, and water temperature.
Meteorological data processing items	Maximum instantaneous wind velocity, average wind velocity and direction, atmospheric pressure, and atmospheric temperature,. Oxygen saturation level, Dissolved oxygen, Salinity

1－4. Composition and Specification of WAVE HUNTER08-Σ　WH-403

Table1-2 Composition and Specification

COMPOSITION AND NAME	TYPE	OUTLINE OF SPECIFICATION
WAVE HUNTER08-Σ	WH-403	Applicable depth: 1 to 60 m, range 20.5m, resolution 1 cm, precision ±1%/FS, frequency 200 kHz, radiation angle 3º Current speed: Range ±3m, precision ±1%/FS,resolution 1cm/s, response 40ms, door knob type X-Y electromagnetic current speed sensor Orientation:range0～359°、precision±3°、resolution1°、IC compass Water temperature :range-5～40℃、precision±0.1℃、resolution0.1℃、Platinum sensor Water pressure:range0～7kgf/cm², precision±0.5%/FS、resolution1gf/cm²、absolute pressure communication: COM port、communication speed:1200～912600BPS、Available SD card°:64MB～2GB(Windows format) dimention:280H×250φ(except projection parts)、weight:14kg、material :Duragon attachments:CA-410(PC connection cable)、SD card、control soft、implements etc.
MagicProcessorK	RA-622	This is processing and communication software. The calculation of the wave height, drawing in the graph, and file management are done.
Lithium battery pack	LB-406	3.6V 60AH
	LB-412	3.6V 120AH
	LB-421	3.6V 210AH
Dedicated rack	TB-321	This sets itself up at the sea bottom

1－5. Outline Drawing

2-1. How to open the Pressure Tank

You should avoid opening the Pressure Tank as much as possible. When you have to open it please follow below procedures.

1. You six hexagon bolt nuts (M10) of Pressure Tank are loosened and pulled out with attached two wrenches (Photo.1).

2. Then you should grave the handle and carefully pull it out. At that time, if inside of the tank is under negative pressure, you have to pull it with strong force. Measuring circuit and the battery pack are pulled out together (Photo2).

3. Lay a tank down (Photo3).

4. Put something like sponge under the electromagnetic current speed meter to settle a tank (Photo4).

Photo.1 Bolt nuts (M10)

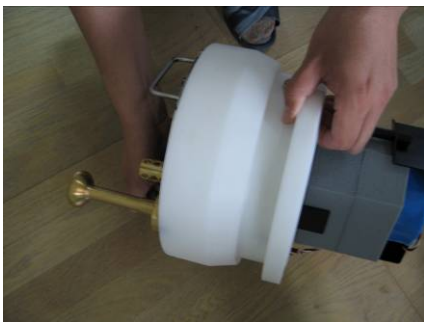
Photo.2 Pull it out slowlly

Photo.3 Lay a tank down

Photo.4 Put sponge under the electromagnetic current speed meter

2-2. Power switch ON OFF

Turning off the power, you should slide the switch for OFF side. Turning on the power, you should slide the switch for ON side. When you set the battery and turn on the power, function confirmation lamp will turn on about 10 seconds and turn off. After turning off the lamp, you can communicate with your PC.

Function confirmation lamp flashes on and off approximately 1.0 second interval at sub-measurement. Function confirmation lamp flashes on and off sampling interval as you set it up at the main-measurement.
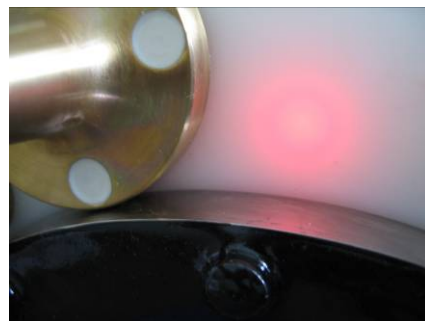

Photo.5 Power switch

Photo.6 Function confirmation lamp

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2－3. How to remove the Mini SD card and erase the data in the card.

WAVE HUNTER08-Σ record data within the MiniSD card. You can output data for your PC with card reader on the market. Push MiniSD card gently, you can take off the MiniSD card. When you insert the card, make sure it's inserted surely.

When you want to erase data, inset the card to wave height meter, then clear the memory with **Wave Hnuter08 Explorer**2 or you should format data with "FAT" of windows format. DO NOT FORMAT WITH "FAT32", you never write data again.

Without WAVE HUNTER08-Σ power off, you can take off the MiniSD card and insert a new card which has been already erased data. Then WAVE HUNTER08-Σ continues to record new data (but in same condition) in a new card without any set up. After out put data to your PC, you can inset same MiniSD card and use it too.

If you inset used MiniSD card to different serial number instrument, you should inset the card to wave height meter, then clear the memory with **Wave Hnuter08 Explorer**2 or you should format data with "FAT" of windows format. DO NOT FORMAT WITH "FAT32", you never write data again.

To avoid the problem, before starting WAVE HUNTER08-Σ, you should clear the memory from MiniSD card with **Wave Hnuter08 Explorer**2

Photo.7 Mini SD card

2－4. Battery Exchange

1. Loosen two bolts at a settle board of battery with attached a minus driver (Photo. 8, 9). When you re-settle the board, do not bolt it too tight, it might be broken.
2. Take off the battery connecter. It should be taken off with spongy (Photo.11). When you reattach the battery connecter, make sure it's attached surely (Photo.10). Exchange the battery, and load it along with reverse processes.

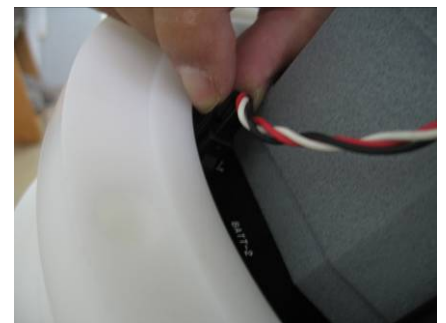Photo.8 Taking off a settle board.　　Photo.9 After taking off a settle board　　Photo.10 taking off the battery connecter

Photo.11　　　　　　　　　　5　　　　　　　　Photo.12

2－5. Wave height meter and Communication

1. Turn on the power when you exchange or put on a new battery。 Then function confirmation lamp flashes on and off for about 10 seconds. After turning off the lamp, you can communicate with PC. If it's already turn on, you can communicate immediately.

2. Connect attached PC connection cable (CA-410) to communication connecter (Photo.13, 14).
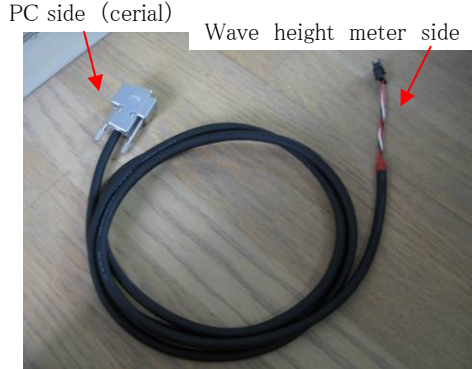
PC side（cerial）
Wave height meter side

Photo.13 PC connection cable
（CA-410）

Photo.14 Connect PC connection cable.

Table 2-1 is maximum operating time of **WAVE HUNTER08-Σ**. The total Measurement condition (see table2-1) cannot be over this time. You can calculate remaining amount of battery with this table.

Table2－1 Maximum operating time

Measurement items	Operating time (Battery LB－421　210H)	Operating time (Battery—LB－412 120ＡH)	Operating time (Battery LB－406 60ＡH)
Water pressure＋current speed	２２８０	１３４４	６７２
Water pressure＋current speed ＋ supersonic waves	１４４０	７６８	４０８

＊　Only for sample interval 0.5 seconds.

＊　See 9 pages about maximum measurement time table of lithium battery.

3. About measurement starting operation, see user's manual of **Wave Hnuter08 Explorer**2. 図2－1is Chart of operation time. CH1:water pressure CH2:E current speed CH3:N current speed CH4: water height （supersonic waves）

4. Close a pressure tank after turning on the power and checking connection between instrument and PC.
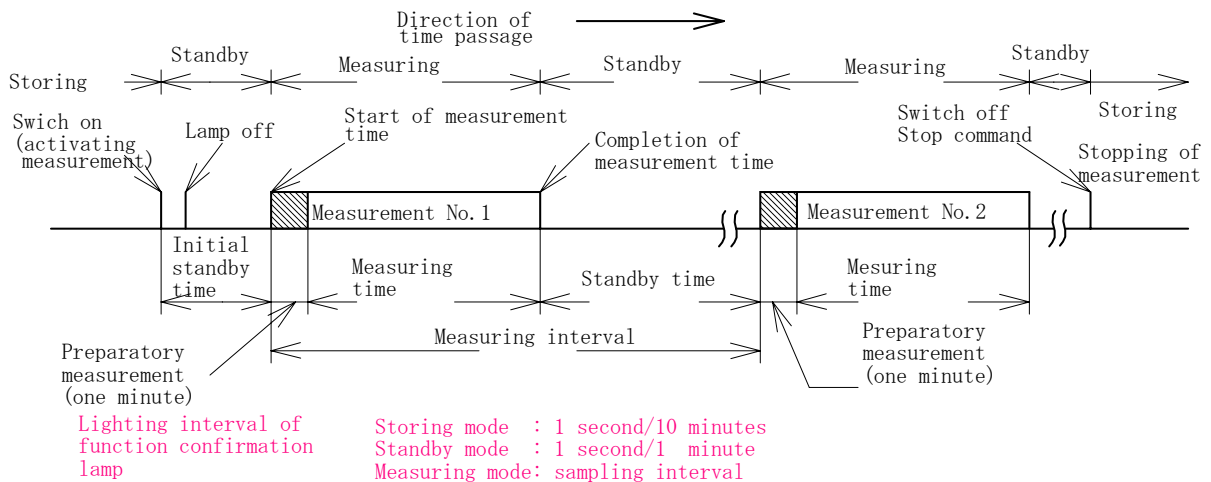
図2－1 Chart of operation time

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2－6. Closing pressure tank and Cleaning O ring

1. Taking off an O ring and wiping off old silicon grease from O ring and ditch. And also, wiping off grease at tank side which connected with O ring.
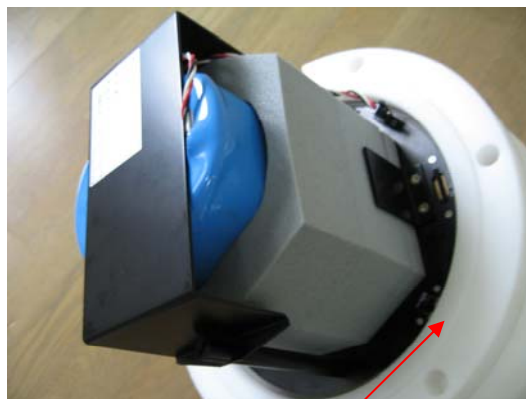

Photo.5 O ring（tank side）

Photo.6 Connection side of O ring

2. Wiping attached silicon grease on O ring and putting it on ditch.

3. Putting machine's body, same way as 2－1. Then bolt it tighter.

2－7. Stopping Measurement

Send the stop command to **Wave Hnuter08 Explorer**2. When PC is not available at hand, turn off a power of main body. Recorded data is not erased, if you turn off the power or take off a battery.

2－8. Data Collection

There is only way to collect data from **WAVE HUNTER08-Σ**. First, take off the MiniSD card. Use card leader and read file (smNNN000p.k02 NNN is serial number of the third place from the bottom). Save it at the same folder as **Wave Hnuter08 Explorer**2. Uncompress compressed file with **Wave Hnuter08 Explorer**2.

2－9. Operation in the Storing Mode

WH-403 is in operation even while in the storing mode shown in Fig.2-1, with function confirmation lamp lighting at the interval of one second per 10 minutes. If lamp is not flashing after sending command, main body is not received command.

2－10. Voltage Drops

Sometimes you cannot recover WH-403 for a long time for some reason. To avoid abnormal system operation caused by voltage drops, **WAVE HUNTER08-Σ** automatically stops a measurement and be storing mode when battery voltage become under certain level (3.0V).

3－1. Maintenance of Main Body

After you have recovered WH-303 from the sea, remove shells, seaweeds, and dirt. Wash it thoroughly under the tap water and completely dry it before putting it in the storage case. Replace the corrosion proof zinc before it wears out.

3—2. Maintenance of Current Speed Sensor

Salt and shells solidified on the electrode worsen the precision and affect the zero drift of the current speed sensor. Regularly clean it with ♯400 to ♯600 sand paper in running water.

4—1. Maximum measurement Time of Lithium Battery

There are three kinds of lithium battery, LB-406、LB-412 and LB-421. You can choose it depend on what you measure. See following table.

Wave measurement
unit：day

Measurement items	Serial measurement								
	LB-406			LB-412			LB-421		
	0.5s	0.2s	0.1s	0.5s	0.2s	0.1s	0.5s	0.2s	0.1s
Water pressure + Current speed	28	24	18	56	48	37	95	85	66
Water pressure＋current speed + supersonic waves	17	15	13	34	31	26	60	54	45

Measurement items	20min./60,min.mesurment								
	LB-406			LB-412			LB-421		
	0.5s	0.2s	0.1s	0.5s	0.2s	0.1s	0.5s	0.2s	0.1s
Water pressure + Current speed		69	54	160	138	108	280	242	189
Water pressure＋current speed + supersonic waves		44	37	98	88	74	173	152	130

Measurement items	20min./120min.measurment								
	LB-406			LB-412			LB-421		
	0.5s	0.2s	0.1s	0.5s	0.2s	0.1s	0.5s	0.2s	0.1s
Water pressure + Current speed		138	107	320	276	214	560	484	376
Water pressure＋current speed + supersonic waves		88	74	196	176	148	346	308	260