ecosense
ET/IT EXPERT GROUP

ECOSENSE Next-generation energy-saving technology

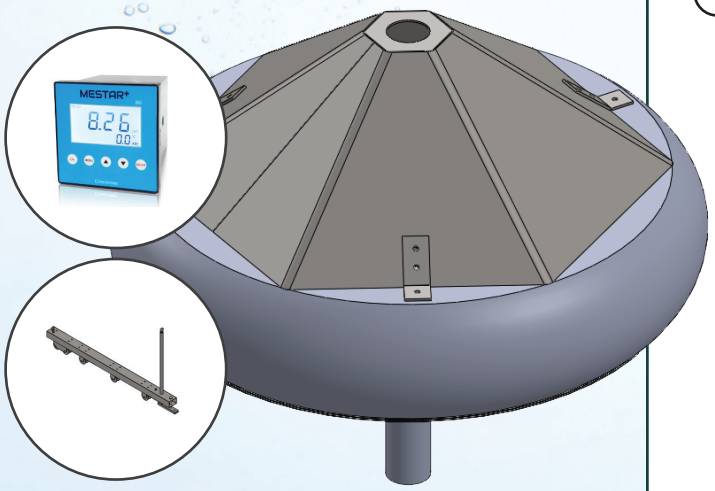
Using a floating type water quality measuring device

Next-generation Energy-saving ICT technology

Saving of 27.44% **KTC Verification**

Floating type water quality measuring device

ES - FWQM



RE100
Renewable energy

Response

Carbon neutral
NET ZERO

Energy - Saving

DOWN

27.44%

27.44% energy savings

Aeration tank of wastewater treatment plant

2024 ECOSENSE SLOGAN

Let's go to the future !

◎ Positive and Innovation [New Industry]

- ECOSENSE strives constantly to create and develop ideas such as Floating Water-quality Meter and SUNROBOT

◎ Constant Development [Advance Existing Business]

- Recognized as the No.1 Environment consulting in Korea in 2005 ECOSENSE has accumulated know-how on consulting for environment and EMS field for many years

◎ Challenge and Achievement [Expansion of Research Project]

- We will be a leader in the construction of zero-energy building and smart towns.
- Energy-saving activities using new and renewable energy.
- Technology development of GHG reduction systems in industrial complexes, as well as global trends toward climate change and GHG response.

History

2018 – Now

Obtained energy saving performance certification for ES-FWQM -
Modular solar panel cleaning robot selected as an excellent procurement product -
Received the Technology Management Award as the CEO -
Launched EMS for air pollution prevention facilities using IoT gateway and cloud -
Participated in a pilot project using IoT technology (Ministry of Environment) -
Certified of Off-gas measuring device using floating wired and wireless method -

2017

10 - Participated IGEM in Malaysia
09 - Participated in 2017 Energy Exhibition Fair
09 - Selected as the best company of Smart City Business
07 - Completed NET certification for SUNROBOT
07 - Established MOU with E-Solution
04 - Participated CIBES in China

2016

SUNROBOT(ES-SPCR) development - 12
Off-gas Analyzer development - 11
Completed NET certification for Off-gas Analyzer - 08
Industrial Complex GHG Reduction Program development - 08
Certified with 2016 Ministry of Employment Labor - 04
Youth-friendly enterprise certification
Established MOU with ENFORCE for Energy Reduce System - 03

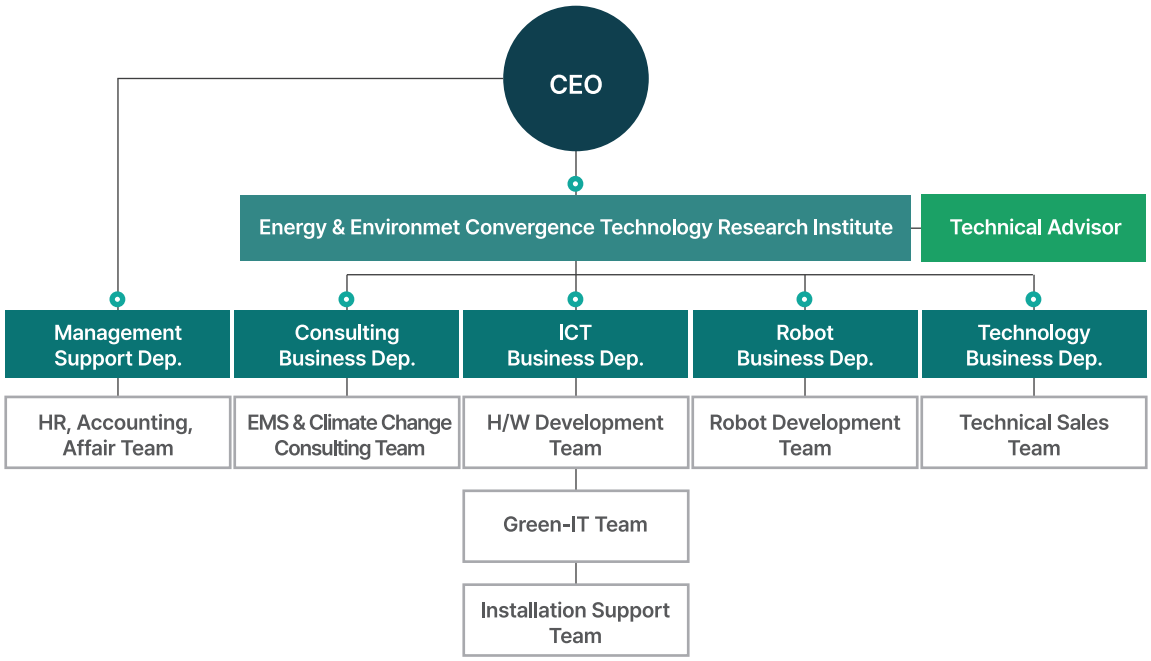
2015

09 - Participated Korea-China BEMS Workshop
09 - Busan City Hall BEMS development
05 - Awarded the Minister of the Future Creation Science Award
05 - Certified with Excellent Product(ES-WCTZ, ES-WCTN)
03 - Certified with Excellent Product(ES-MWCT)

About Company

Corporate name	ECOSENSE
CEO	Dong-myung Kwon
Date of establishment	January 10, 2005
Number of employees	22 people
Business field	Energy monitoring equipment, water quality analysis devices, solar panel cleaning robot manufacturing, software development, environmental consulting
Address	916~919, Ace Gasan Forhu, 225, Gasan digital 1-ro, Geumcheon-gu, Seoul, Republic of Korea, 08501
Contact information	Telephone : +82 (0)2-2088-1111 , Fax : +82 (0)2-850-3102
Hompage	www.ecosense.co.kr

Organization Chart



Energy-saving procedures

Optimal DO calculation

- NH_4-N Measurement → Optimal DO calculation
- OUR calculation → Caculation of the optimum amount of oxygen
- Reflects on-site experience value

Real-time water quality measurement and transmission

- anti-polluting water quality measurement device
- Floating type water quality measuring device
- Real-time transfer of measured data

PLC interworking and operation

- Water quality measurement data ↔ PLC
- Air blower, DO interworking

Air blower / Air diffuser management

- Determining when to replace the air diffuser
- Identify the efficiency of the blower

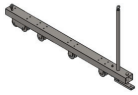
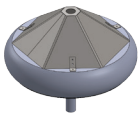
Water quality measurement

- TOC and MLSS measurements
- Check for changes in water quality

Optimization of aeration wastewater treatment

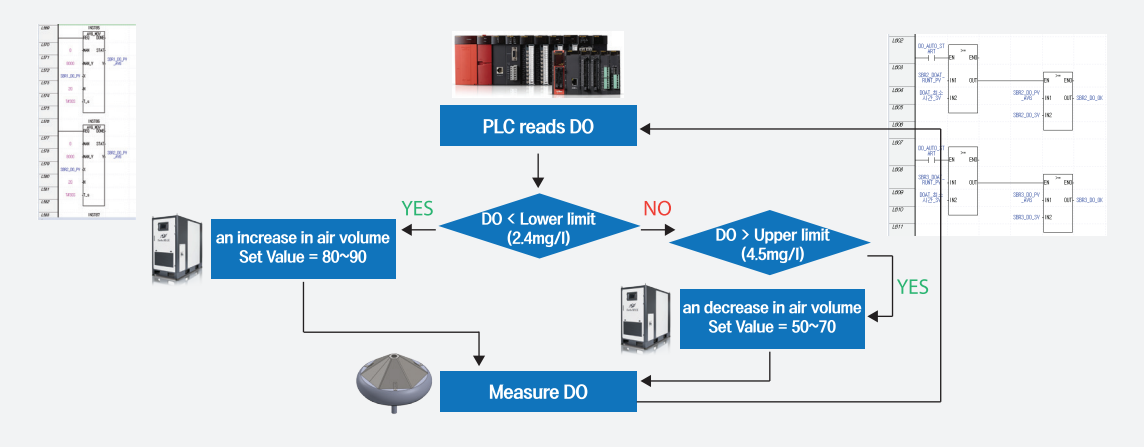
- Saving energy by automating and optimizing the aeration process at the treatment plant with reliable measurement technology
- Comply with environmental regulation's water quality standards through constant microbial monitoring
- Improvement of measurement reliability through mobile DO measurement according to water level change
- Monitor the microbial respiration process at all times by measuring the OUR through the respiration of the microorganism
- Determining the appropriate DO by measuring ammonia nitrogen and monitoring the nitrification process

Product specification (Floating type water quality DO measuring device)

Product	Category		Features
 Display	a display window		3inch LCD Segment Display (White light)
	Measurement range		0.00 ~ 20.00 mg/L/ -10.0 ~ 100°C
	Resolution		0.01mg/L/0.1°C
	Aanalog output		DC 4 ~ 2-mA 2channel - ppm measurement, temperature measurement
	Alarm Output		High, Low alarm output(1a1b)
	Case		Anti-electrification ABS
	Appearance dimensions		96mm(W)*96mm(H)*115mm(D)
	Power Specifications		AC85 ~ 245V, 50/60Hz, Power consumption 3W
	Weight		About 450g
 Sensor	quality of the material		Anti-electrification ABS
	Measurement range		0.00 ~ 20.00 mg/L
	Temperature of use		0 ~ 50°C
	thermosetting resistor		Pt 1000Ω
	the internal liquid		supplementary type
 Up and down autonomous mobility device	Weight		14kg
	Up and down movement width		4.5m
	Appearance	Height	552mm
		Width	60mm
		Breadth	1,010mm
 Floating device	Appearance	Diameter	450mm
		Height (width)	223.65mm
	quality of the material	Top	SUS
		Bottom	Polyurea
	Resilience Maximum Horizontal Angle		15°
	Static Resilience (maximum)		5.295kgG
	Buoyancy (maximum)		137.2kgG

PLC and Air blower interworking

Flow chart



Floating type water quality measuring device (DO, Temperature, etc) → Real-time measurement and transmission of water quality data → PLC and control system interworking → Automatic control of the aeration blower → Energy saving

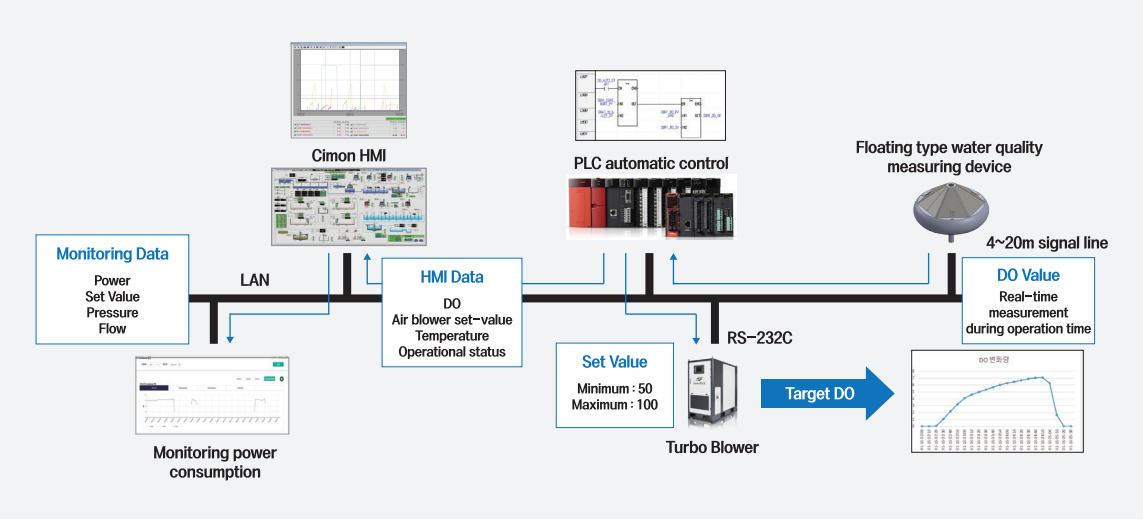
- **Technology for continuously transmitting water quality measurement data to PLC and control systems**
  → Based on continuous measurements of data, determine whether the aeration tank is overrun
- **Automatic control technology of aeration blower through PLC control**
  → Adjustment of the appropriate amount of air flow according to the optimal DO
- **Energy saving through automatic control of aeration blower based on measurement collection data**
  → Energy savings achieved through optimal air flow control

Characteristics

- A water level adaptive measuring instrument capable of responding to sudden changes in water levels such as SBR
- Resolving the problem of pollution of the measuring instrument due to pollutants in the aeration tank
- Being able to transfer,store and analyze measured data
- Interworking the measuring instrument with PLC and blower

Interworking instrument with PLC and air blower

Flow chart



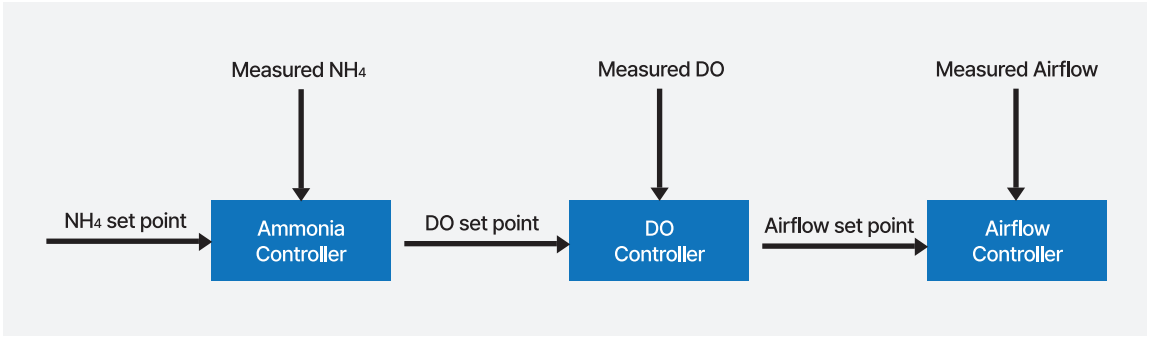
Characteristics

- Understand turbo blower operation information (power consumption, air pressure, and air volume) through PLC linkage

-A PLC and blower interworking program can be developed to control the amount of air blown

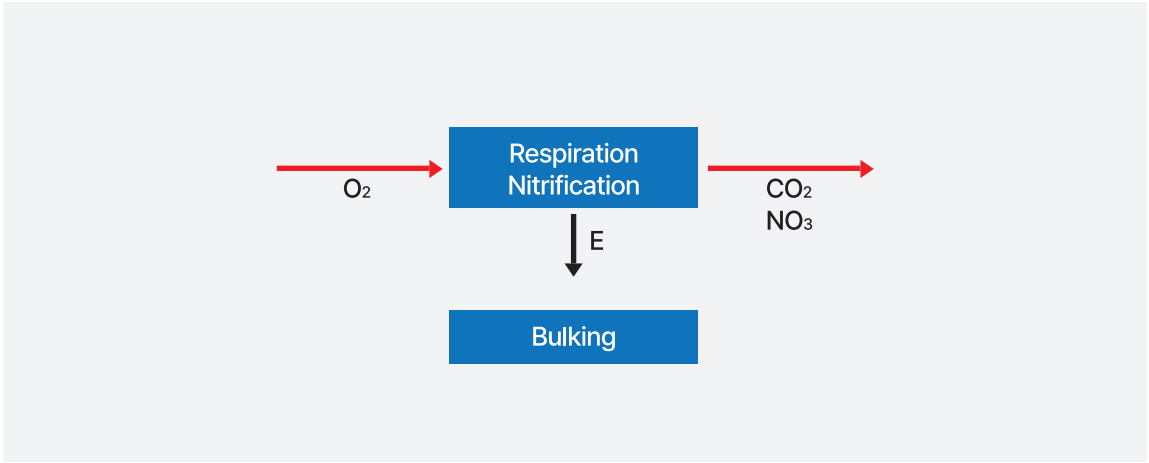
- Interwork DO instruments with PLC and SERVER data

NH_4–N measurement and optimal DO automatic setting



- The proper DO of the aeration tank depends on the condition of the incoming water and the wastewater treatment plant.
- When controlling the blower in the first step, it is controlled based on the appropriate DO based on the experience of the person concerned.
- In the advanced step, an appropriate DO value is derived by installing an additional ammonia sensor.
- As nitrification progresses, the concentration of ammonia nitrogen decreases.
- Monitor and analyze the concentration of ammonia nitrogen after aeration to derive optimal DO.

Operation of bio-reactors through Oxygen Uptaken Rate(OUR) monitoring



- The degree to which the amount of oxygen consumed when microorganisms breathe and decompose organic matter is expressed as a ratio
- Analyzing OUR values to ensure reliability of the appropriate DO.
- The activity of microorganisms can be determined by monitoring the intake rate.

→ High oxygen intake = High microbial activity = Active decomposition of organic matter

→ Low oxygen intake = Low microbial activity = Poor decomposition of organic matter

Air blower interworking operation result

Energy saving

1-2) The amount of energy saved

(Report number:GT2024-01997)

24.04.01
16:09 KST

The results of an examination

27.44%
The amount of energy saved

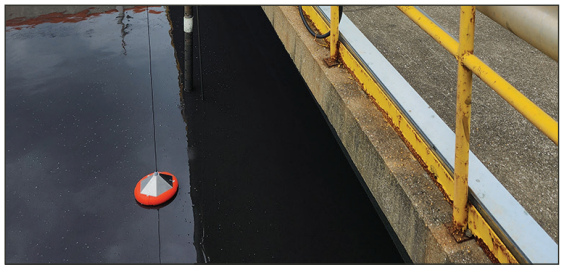
The results of an examination

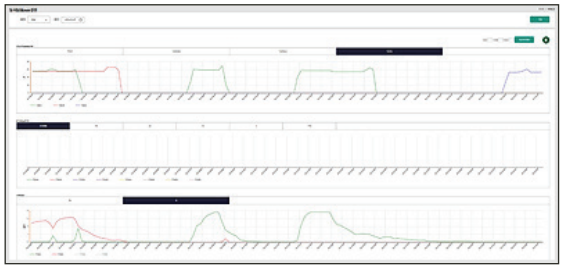
1-2) The amount of energy saved

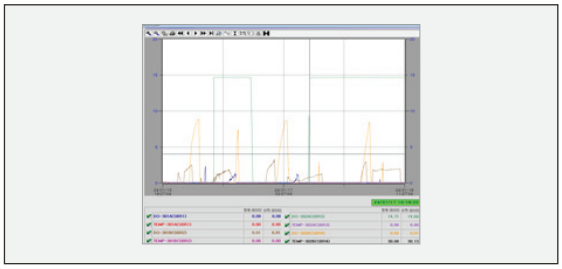
item	unit	method	result
The amount of energy saved	%	For 3 hours each in the same aeration tank, the saving ratio is calculated by measuring the energy consumption of the method of fixing the amount of air without linking the DO meter and the method of linking the DO meter and controlling the amount of air.	27.44

Note: 1) The test was measured for 3 hours on March 20 without linking the DO meter, and on March 21 with the DO meter linked.

2) Picture







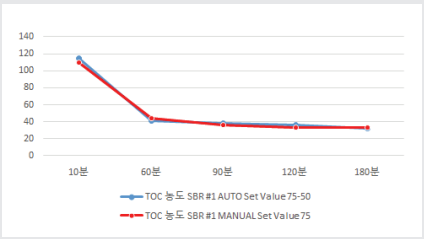
Air blower interworking operation result

Impact on water quality

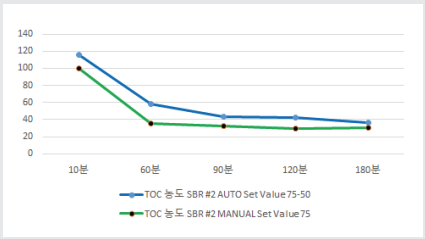
aeration elapsed time	TOC Concentration SBR #1		TOC Concentration SBR #2	
	AUTO*	MANUAL	AUTO*	MANUAL
	Set Value 75–50	Set Value 75	Set Value 75–50	Set Value 75
10 minutes	115	110	116	100
60 minutes	41	44.4	58	35
90 minutes	38	36	43	32
120 minutes	36	33	42	29
180 minutes	32.1	32.8	36	30
Processing efficiency	72%	70%	69%	70%

*AUTO:Automatic operation of air blower interworking using floating type water quality measuring device

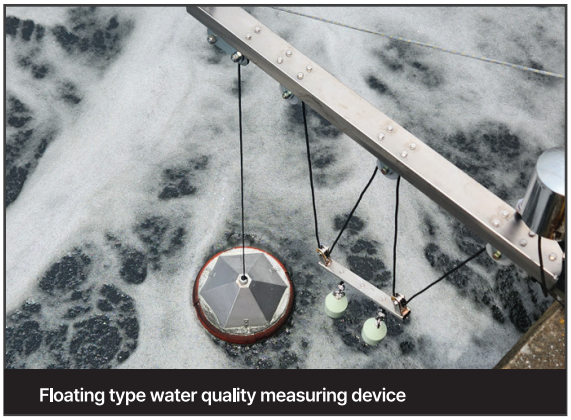
TOC Concentration SBR #1



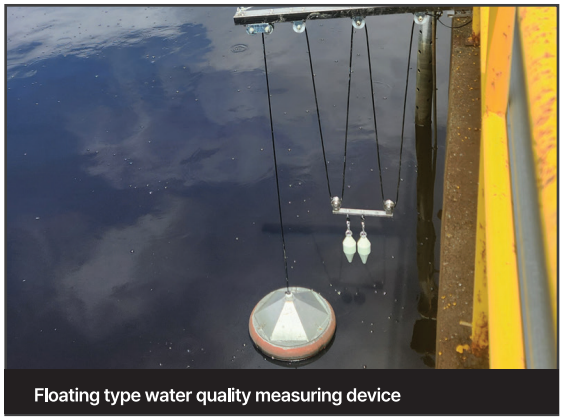
TOC Concentration SBR #2



*Treatment efficiency may vary depending on the water quality of the influent.



Floating type water quality measuring device



Floating type water quality measuring device

Floating type DO sensor test report

(Report number:DYT2400110-001)

시 험 성 적 서

(주) 대영씨앤티

시 험 결 과

(주) 대영씨앤티

Examination procedure

1. Test procedure for water level change floating function

a) The target part shall be a buoyancy device.

b) Install a buoyancy device containing a DO electrode rod on the surface of the SBR aeration tank.

c) Check whether the buoyancy device moves up and down according to the ch ange in the SBR aeration tank water level.

d) Since the water level changes once or twice a day, it is verified with videos recorded for 3 days. (There should be no missing time for the video.)

2. Test procedure for energy consumption and savings before and after DO meter interlocking

a) Progress in the same aeration tank (water tank). Compare and analyze the energy consumption of the method of fixing the amount of air blown (operating in the conventional method) without linking the DO meter and the method of controlling the amount of air blown by linking the DO meter.

b) The aeration tank operation time is fixed at 3 hours.

c) Calculate the savings rate with the energy consumption when linked to the energy consumption when not linked.

$$\text{savings rate}(\%) = \left(\frac{\text{Air blown fixed operation power consumption - DO measurement interworking automatic operation power consumption}}{\text{Air blown fixed operation power consumption}} \right) \times 100$$

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Saving of 27.44% | **KTC Verification**

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Floating type water quality measuring device catalog v.1.2 / 2024.9.3