Source:JASE-W Japanese Smart Energy Products & Technologies
https://www.jase-w.eccj.or.jp/technologies/index.html

F-95	Keywords	Y2	Equipment	Z4	Power	E32	Other manufacturing industries

DMW Corporation

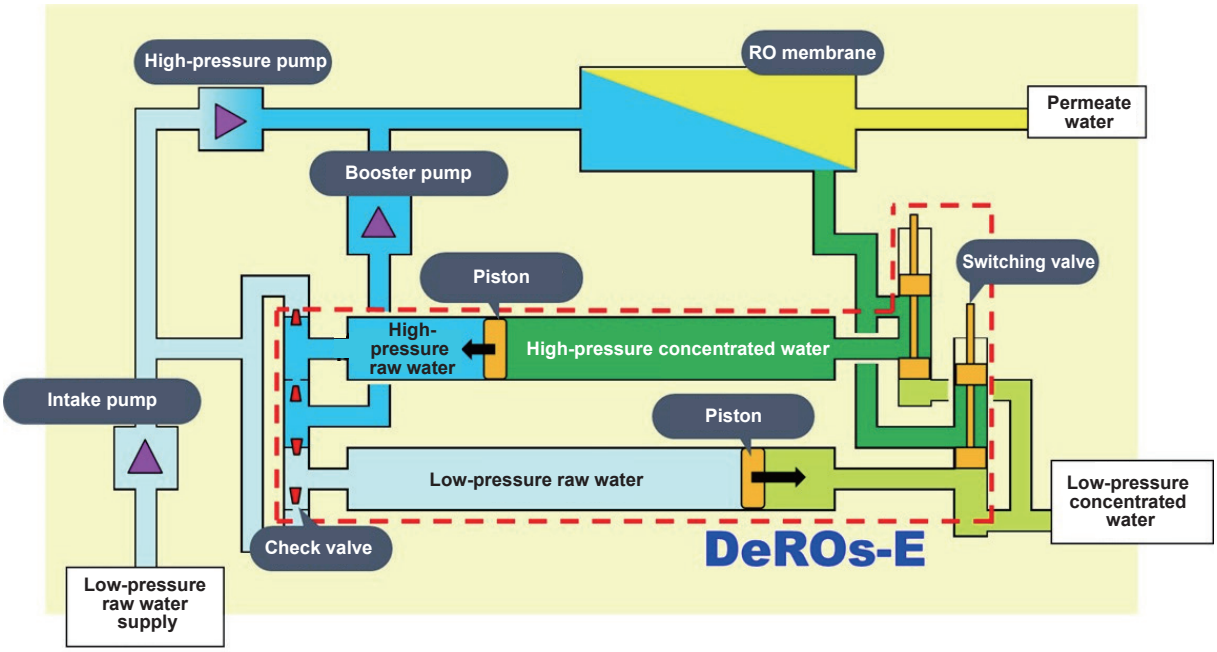
Energy Recovery Device for Water Treatment Facilities “DeROs-E”

Features

- The energy recovery device for water treatment facilities, “DeROs-E”, is an energy-saving device that efficiently recovers and reuses the pressure energy of wastewater, generated by semiconductor manufacturing processes and plants, etc.
- The maximum energy recovery efficiency is 99.9% and exceeds 98% with a wastewater flow rate of 20 m^3/h and an operating pressure of 2 MPa.
- The power consumption of high-pressure pumps used in facilities, can be reduced by 44.5%, when the “DeROs-E” is installed in a water treatment plant operating at the wastewater flow rate of 20 m^3/h and an operating pressure of 4 MPa.
- The proprietary valve of our development reduces the leaking of fluids to zero and the pressure difference inside the device is minimized to recover energy from a low pressure of 0.2 MPa.
- The noise value is 75 dB(A) or less, one meter from the device.

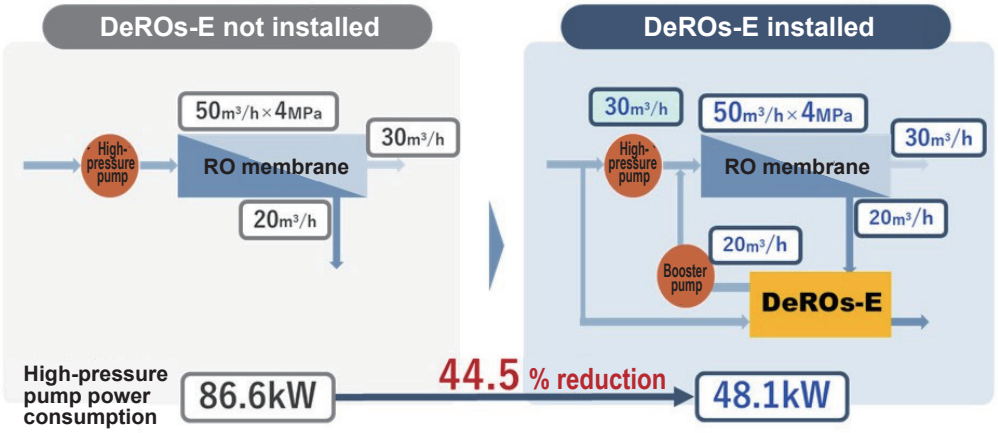
Overview & Principles

1. A pair of cylinders are set in parallel, and low-pressure raw water and high-pressure concentrated water are alternately supplied to the cylinders by switching the flow path inside the Switching Valve.
2. In the diagram above, cylinder B receives high-pressure concentrated water from the RO membrane unit, and undergoes the energy recovery process in which high-pressure energy is transferred to the low-pressure raw water inside the cylinder.
3. The other cylinder, A, receives low-pressure raw water from the intake pump and simultaneously performs a water supply process to discharge low-pressure concentrated water after energy recovery.
4. Each cylinder alternates between the energy recovery stroke and the water supply stroke to perform continuous energy recovery.
5. The booster pump increases the pressure to compensate for the pressure loss in the RO membrane, DeROs-E, and connecting piping.



Energy-Saving Effects & Special Remarks

◆ The power consumption of the high-pressure pump, prior to and after implementation of the "DeROs-E", is compared below.
The power consumption of high-pressure pumps used in facilities, can be reduced by 44.5% when the "DeROs-E" is installed in a water treatment plant operating at the raw water flow rate of 50 m^3/h, a drainage flow rate of 20 m^3/h and an operating pressure of 4 MPa. Therefore, it is possible to reduce CO_2 emissions by 136 tons annually.



Reduction of CO_2 emissions: 136(t/year)

	DeROs-E not installed	DeROs-E installed	Difference
High-pressure pump power consumption	86.6 kW	48.1 kW	**44.5% reduction**
Annual power consumption	720,685 kWh	400,288 kWh	320,397 kWh reduction
Annual CO_2 emissions	305 t	169 t	136 t reduction

*1: Annual power consumption, CO_2 emissions, are calculated based on an operating rate of 95%.
*2: Calculated based on the revised rate for Special High Voltage Power B of TEPCO Energy Partner, Inc., with 140 kV supply and a seasonal electricity charge of 16.53 yen per kWh. Furthermore, the annual electricity charges vary, depending on the power consumption of each business site, electricity companies and contract plans.
*3: The CO_2 emission factor is calculated based on the adjusted emission factor of 0.000423 (t-CO2/kWh), for TEPCO Power Grid, Inc., by the electric utility (FY2023 results) (published by the Ministry of the Environment and the Ministry of Economy, Trade and Industry on March 18, 2025).

External view of the energy recovery device for water treatment facilities "DeROs-E"

Track Record or Implementation Plans

Domestic Wastewater treatment facilities for semiconductor manufacturing and plants, etc.

Overseas Same as above

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