Archimedean Screw Turbine

Spaans Babcock
Hydro Power

Spaans Babcock

Renewable energy with a Screw

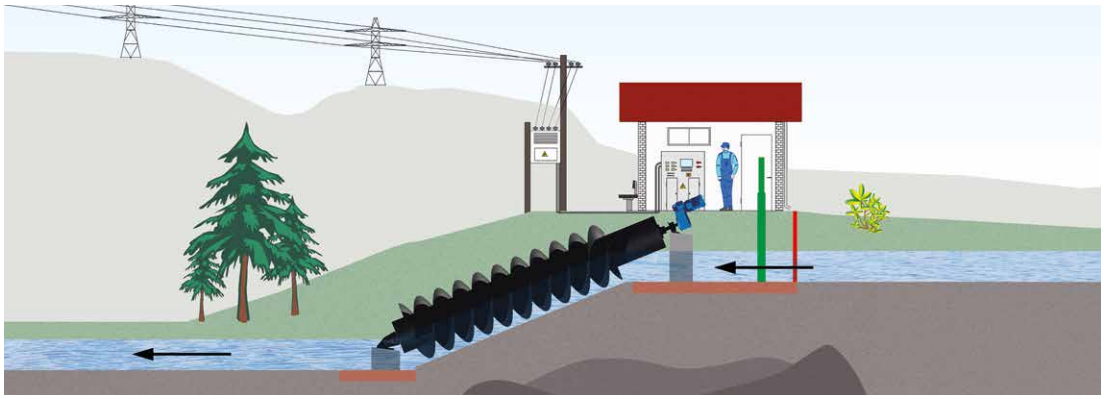
For more than 125 years Spaans Babcock has been known for being the world's largest high quality heavy duty Screw Pump and Screw Turbine manufacturer.

The head office and modern factory is based in The Netherlands. Other products in the portfolio are Screens and Aerators for water & waste water treatment plants. Spaans Babcock operates worldwide through a network of subsidiaries, agents and distributors.

The Screw Turbine is a further development of the Screw Pump. Whereas the Screw Pump pumps the water up, in the Screw Turbine the water flows down. The Turbine rotates due to the flow of the water and energy is transferred to the drive unit. The generated energy is transformed by a generator into electricity. A single Screw Turbine can produce up to 500 kW and a number of Screw Turbines can be placed parallel or in series. Project sizes typically vary between 50 and 2000 kW.

The Spaans Babcock Screw Turbine is probably the most efficient technology for low head hydropower sites. Unique is the fish friendliness, long lifetime and minimal operating costs. Spaans Babcock offers grid connected, off-grid and hybrid systems.

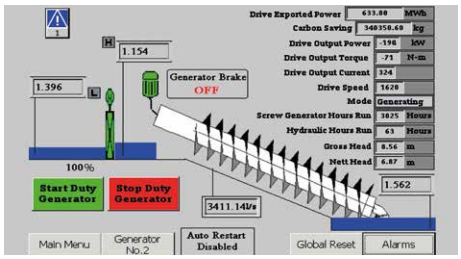
Spaans Babcock can offer the full solution, including gates, screens, remote monitoring and control and after-sales and spares supply.



View here the operation of the Spaans Babcock Screw Turbine.

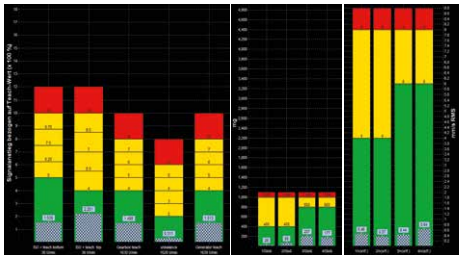
System monitoring & control

Live video streaming

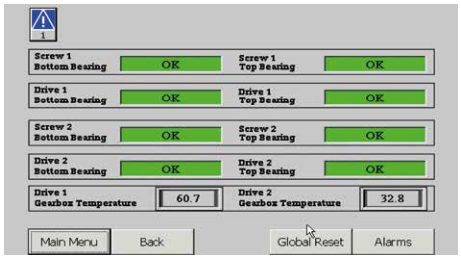


Overview Screw generator

Electrical control room



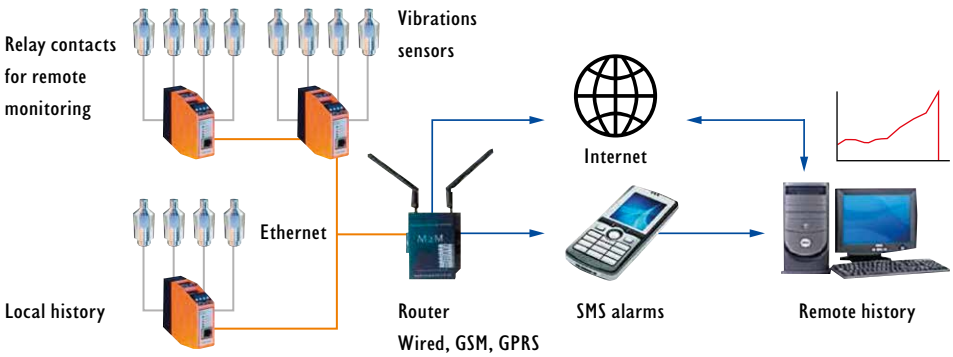
Bearing monitoring



Bearings and gearbox temperature

Generator room

Monitoring diagram



Advantages

1 Lifetime
The Spaans Babcock Screw Turbine is robust, extremely reliable and has a long life time.

The Spaans Babcock Screw Turbine consists of only a few wear parts. The low rotational frequency results in low wear and very low maintenance costs.
A lifetime exceeding 30 years is not an exception, whereas the efficiency stays constant over the years.

2 Low Head
The Screw Turbine is especially suitable for low heads, already starting from 1 m. This may go up to 12 m for a single stage, or 24 m for a two stage installation.

3 Efficiency
The efficiency curve shows a flat and high efficiency over a wide range of the capacity. Varying heads and capacity hardly have any effect on the efficiency.

4 Costs
The Screw Turbine does not need any grease pump for lubrication of the bottom bearing. This improves the efficiency and lowers the operational costs.

5 Other turbines
The Screw Turbine has a very high efficiency compared to other types of small turbines.

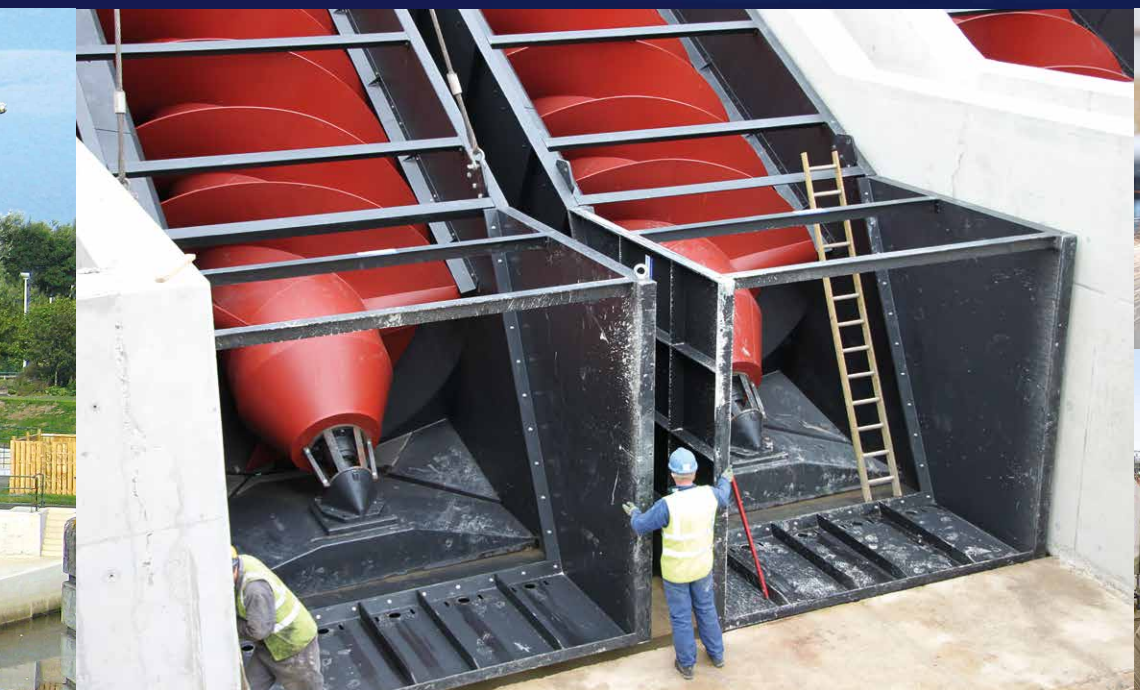
6 Fish friendly
Several tests have demonstrated the fish friendliness of the Screw Turbine and Screw Pump. The Screw Pump can also be used as a fish ladder by pumping the fish.

7 Free passage
Large solid particles, such as plastic, wood or small stones, can pass the Screw Turbine, without having any effect on the Screw Turbine or its efficiency.

8 Bar screen
For safety reasons, only a simple static bar screen is required upstream of the Screw Tubine.
This saves costs, prevents head loss and allows fish to pass.

9 Speed
The Screw Turbine can be designed with variable and fixed speeds. Each system will be designed to match flow patterns and as such optimise revenue.

10 Power
The power production is up to 500 kW per Screw Turbine.



Teesside White Water Course, training facility for Olympic Games, London UK.

View here the Teesside BBC report.

11 Flow

The Screw Turbine can handle flows from 100 l/sec up to 15 m^3/sec per Screw Turbine.

12 Systems

Multi-Stage and parallel systems are possible. The system will be designed to maximise revenue from higher heads or larger flows than is possible with a single Turbine.

13 Cleaning

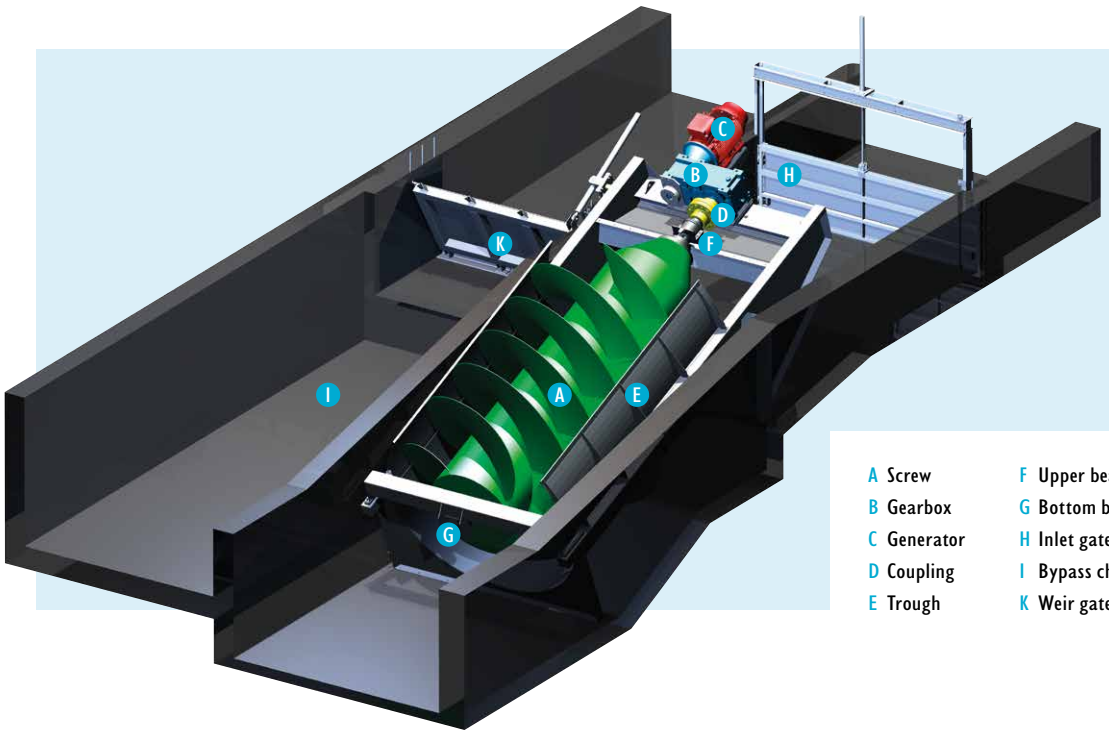
Cleaning of the Screw Turbine is not necessary. The Screw Turbine is self-cleaning. There will be no efficiency loss due to dirt build up.

14 Construction costs

Civil construction costs for the Screw Turbine are generally lower than for other types of turbines. Screw Turbine systems are specifically designed to suit existing civil layouts.

15 Quiet

Optimal design of the Turbine and control system helps to minimise or eliminate noise generation.

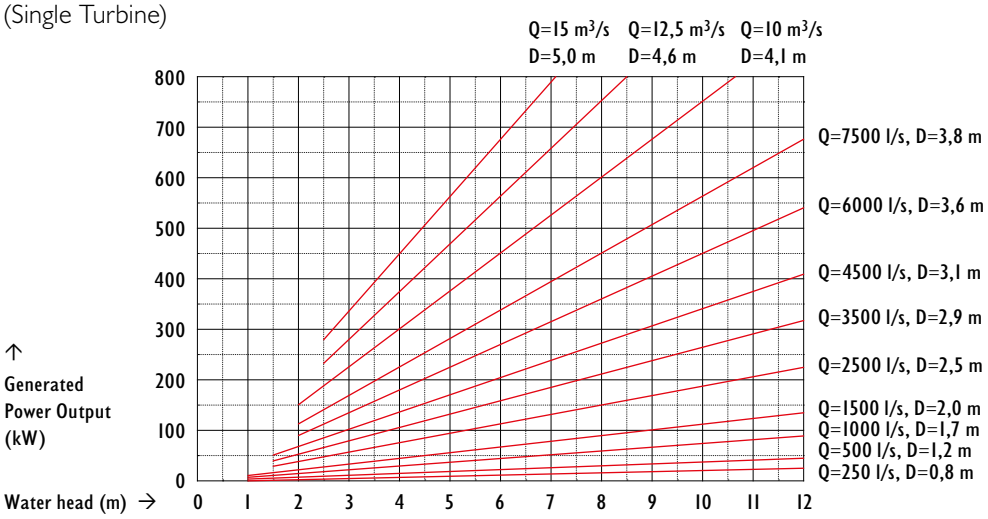


A Screw
B Gearbox
C Generator
D Coupling
E Trough
F Upper bearing
G Bottom bearing
H Inlet gate
I Bypass channel
K Weir gate

Design

Indicative sizes, flow, head and output

(Single Turbine)



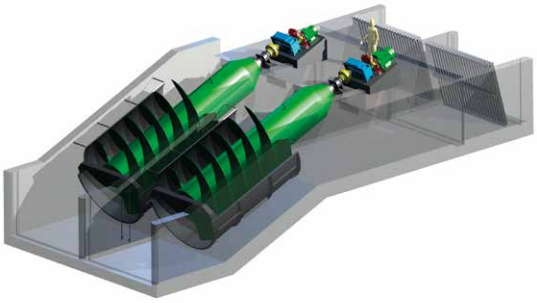
Applications

- Rivers
- Cooling water outlets from power stations
- Industrial process water (for example paper or steel mills)
- Water treatment inlets (municipal and industry)
- Water treatment outfalls (municipal and industry)
- Replacement of waterwheels and other types of generators
- Irrigation
- Residual water

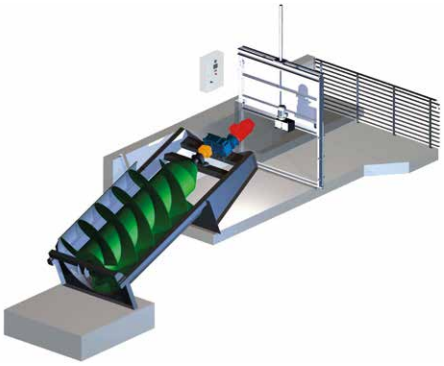
Electrification

- On grid systems
- Off grid systems
- Hybrid systems

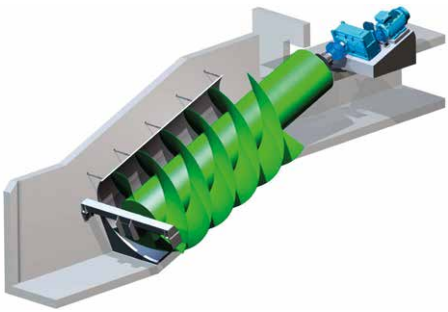
Steel trough
With a steel trough, the lifetime of the trough will be extended compared to a concrete trough, the adjustment with the Turbine is optimized as the steel trough is preassembled in our factory.



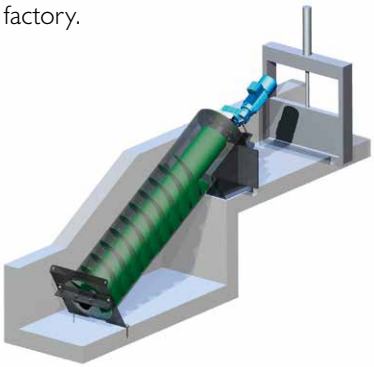
Compact type
This type has a self supporting trough with integrated drive unit. The advantage of this type is the very simple installation and the low civil costs. The complete unit is preassembled in our factory.

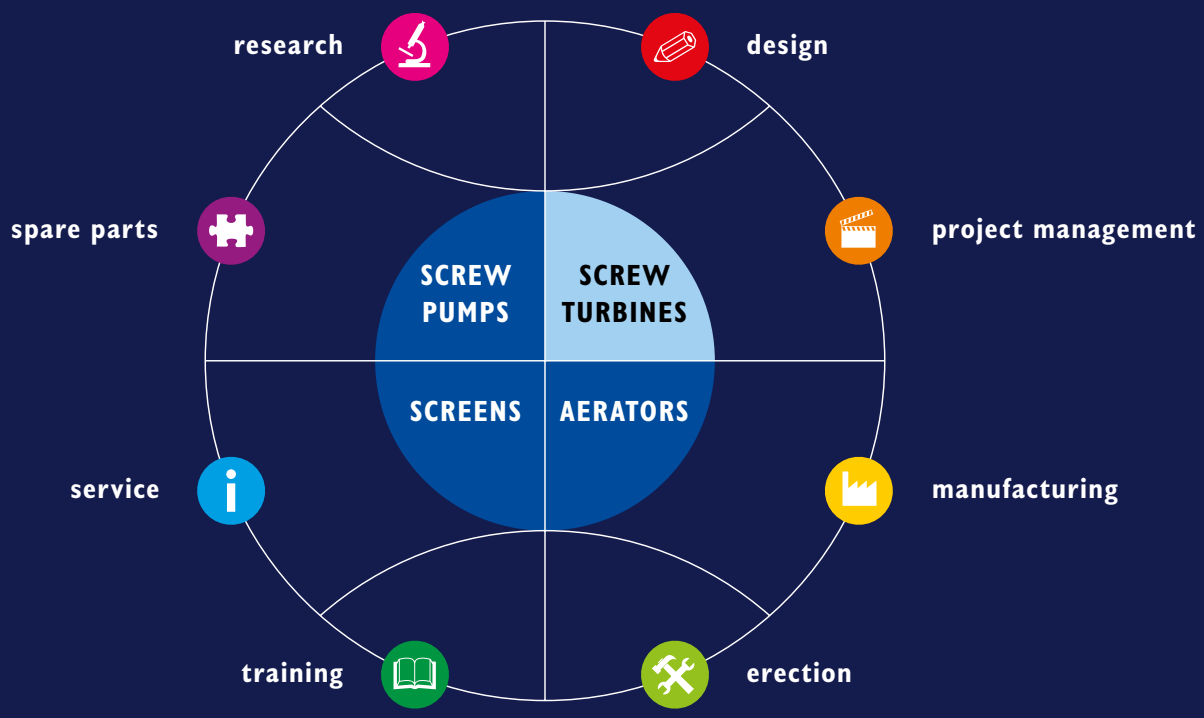


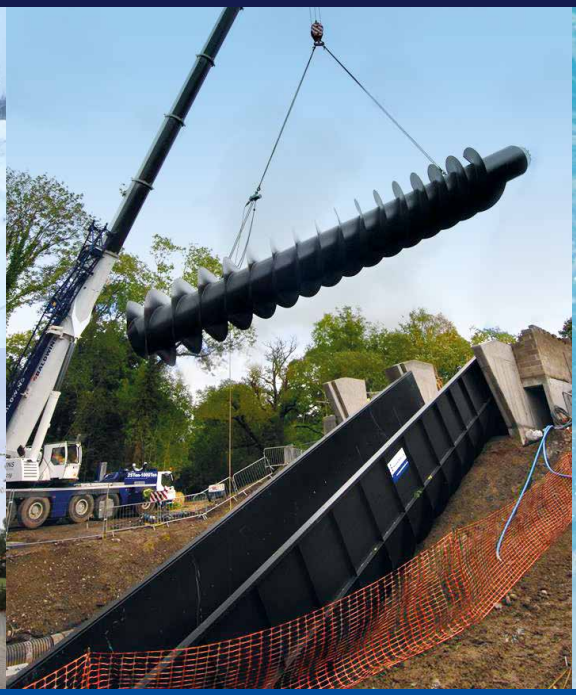
Concrete trough
For this type the concrete trough will be screeded by the Screw Turbine itself, the concrete is formed by the Screw Turbine.



Tube Screw Turbine
Similar advantages as the compact type but fully enclosed and preassembled in our factory.







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