

# **HIGRA**

## AMPHIBIOUS PUMP LINE



## Amphibious Pump Line

The amphibious pumping concept is a HIGRA's pioneer and exclusive development. The ability to operate inside and out of water with the same equipment results from its unique design, where the water flux is admitted through the flanged axial suction, passing through a centrifugal impeller and alongside the motor. This system ensures excellent thermal interchange, low noise emission, installation versatility, low maintenance and high energetic efficiency.

All company's activities are based on the sustainability pillars, from the moment the product is thought until it is running at the installation site. State-to-the-art softwares allow field conditions simulation to get their best performance. All products are strictly tested at the Hydropower Test Laboratory to get real performance test.

The use of the Amphibious Pump concept in pumping stations is a great alternative for return on investment.

## Features

### Sensors

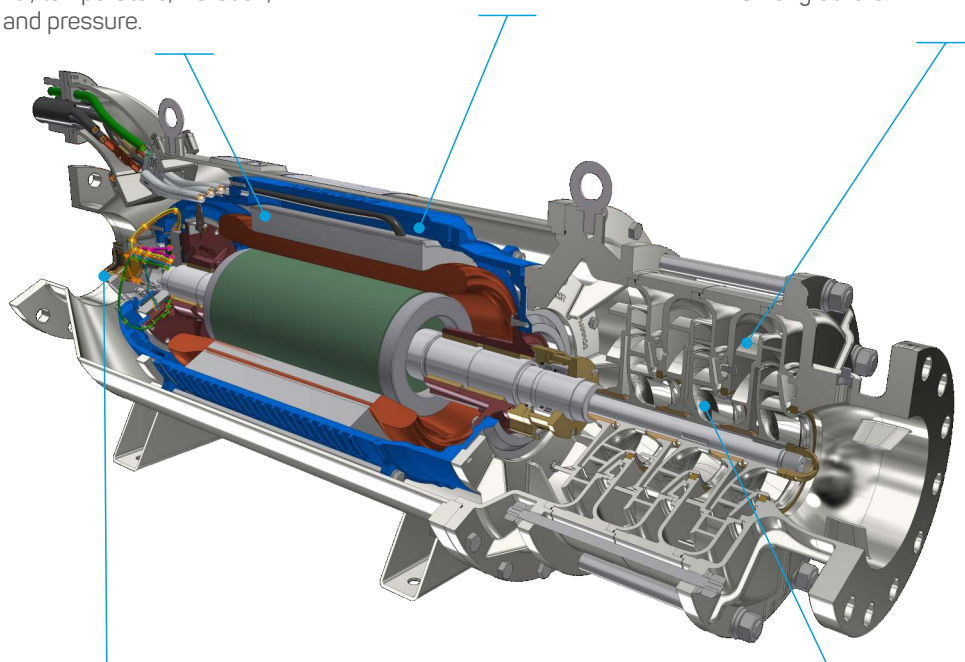
Possibility to equipping the pumps with sensor devices, which control conditions such as motor inner fluid level, temperature, vibration, speed and pressure.

### Low and Medium Voltages

Three-phase submersible IPW68 electric motors, available in both low and medium voltages.

### Materials

Different construction materials such as AISI 304, AISI 316L, CD4M, Brass and Chromium/Nickel, among others.



### Pressure Equalization

Pressure equalization filter that allows the equipment to work under high pressures without damaging inner components.

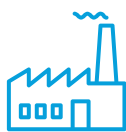
### Optimized Pumps

Impellers and diffusers designed with state-to-the-art softwares (Inventor & ANSYS CFX), through hydropower simulation that offers high hydropower efficiency.

# Markets & Application



Agriculture



Industry



Mining



Water



## Water

- Raw or Clear Water Harvesting for City Supply
- Pumping Stations (Raw and Clear Water)
- Water Distribution Pipeline Pressurization



## Irrigation System Feeding:

- Central Pivot
- Flood
- Linear Pivot
- Aspersion
- Sprinkling System



## Drainage Systems in:

- Cities
- Process Tanks and Reservoirs
- Open Pit Mines
- Fluids with Suspended Solids



## Water Circulation in:

- Cooling Towers
- Air Conditioner and Cooling Systems
- Waste Water or Reclaimed Water Systems
- Fire Fighting Systems on Ships
- Filters Washing in Compact Pumping Stations



## Water Harvesting or Distribution in Industries:

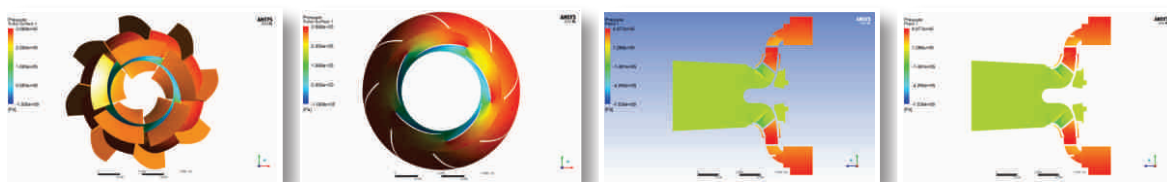
- Sugar & Alcohol
- Beverage
- Pulp & Paper
- Chemical & Petrochemical
- Steelmaker
- Thermoelectric Power Plants
- Slaughterhouses
- Tanneries
- Automotive
- Refineries
- Food

## Benefits / Solutions

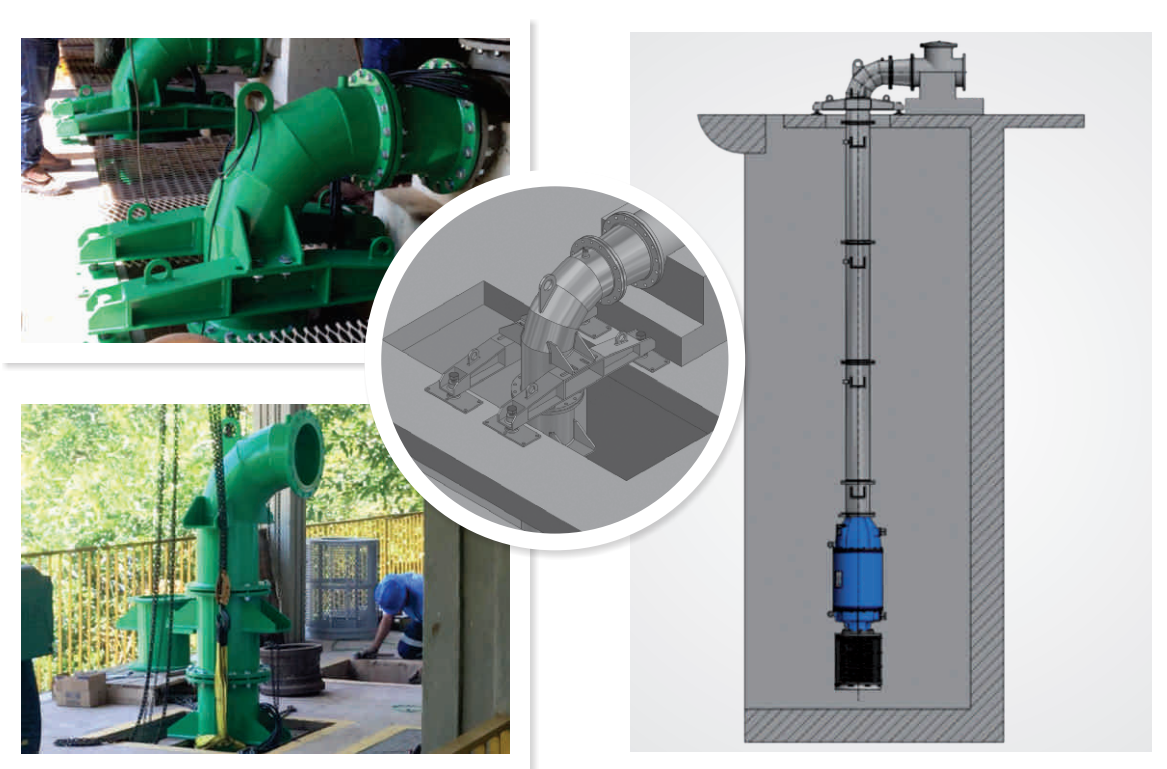
- **Amphibious ability:** work inside and out of water.
- **Versatility:** ability to be installed in any position (horizontal, vertical or inclined);
- **Simple Alignment:** monoblock equipment with single shaft (no need to level motor and pump shafts)
- **Reduced Civil and Hydraulic Installation Costs:** no need for engine room;
- **Mechanical and Electric Systems cooled with water:** there is no need to lubricate or grease;
- **Reduces the Risks of Leaking and Accidents:** totally hermetic, the moving parts are not exposed;
- **Minimum Environmental Impact:** the simplified installation allows reduced intervention in PPAs (Permanent Preservation Areas);
- **Low Noise Level:** approximately 60 Db.

## Computational Fluid Dynamic

Best efficiency assured by software with state-to-the-art CFD technology.



## Replacement of Vertical Shaft Pumps



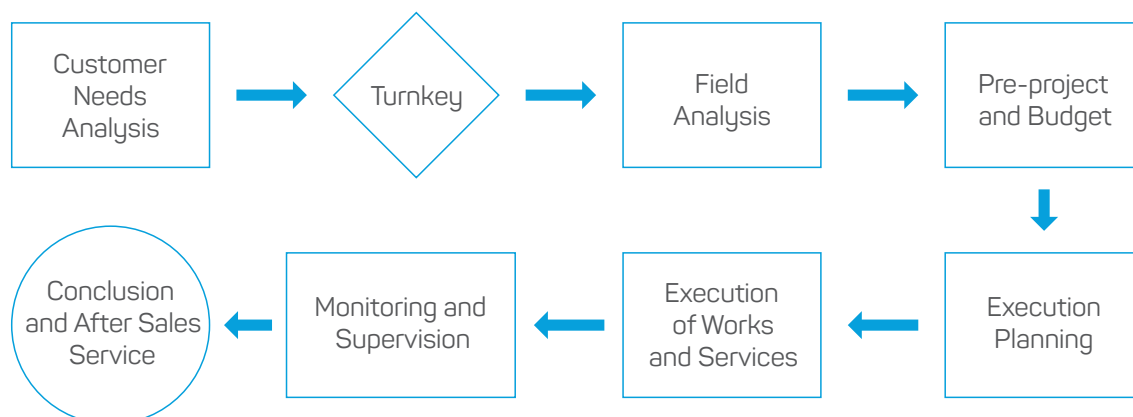


# The Turnkey Ideal Solution

Check availability in your region (country)

Aiming to serve the market in a complete way.

HIGRA Solutions offers full project and execution, performing all processes involved in delivering complete and 100% operative water pumping systems.



## Areas of Expertise



Advice and Consultancy



Project Development



Planning and Management



Supervision and Execution of works and Services



Development of Engineered Solutions

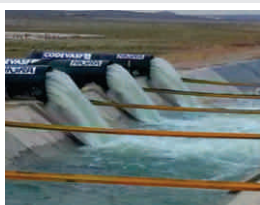
## Projects

In Petrolina/PE, Higma developed a project to serve the largest fruit producing region in Brazil that was in critical condition due to drought and the low volume of Sobradinho dam. HIGRA'S unique technology, 5 floating systems and 10 Amphibious Pumps were installed, achieving a yield of 87%.

Watch this video on your mobile phone through a QR CODE reader



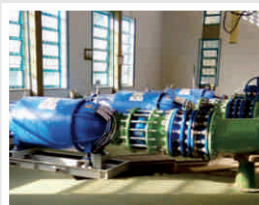
Check out these and other projects on our website.



Petrolina/PE



Propria/SE



Catalao/GO



Parnaiba/PI



## Global Pump Sele

ection Chart - 50Hz

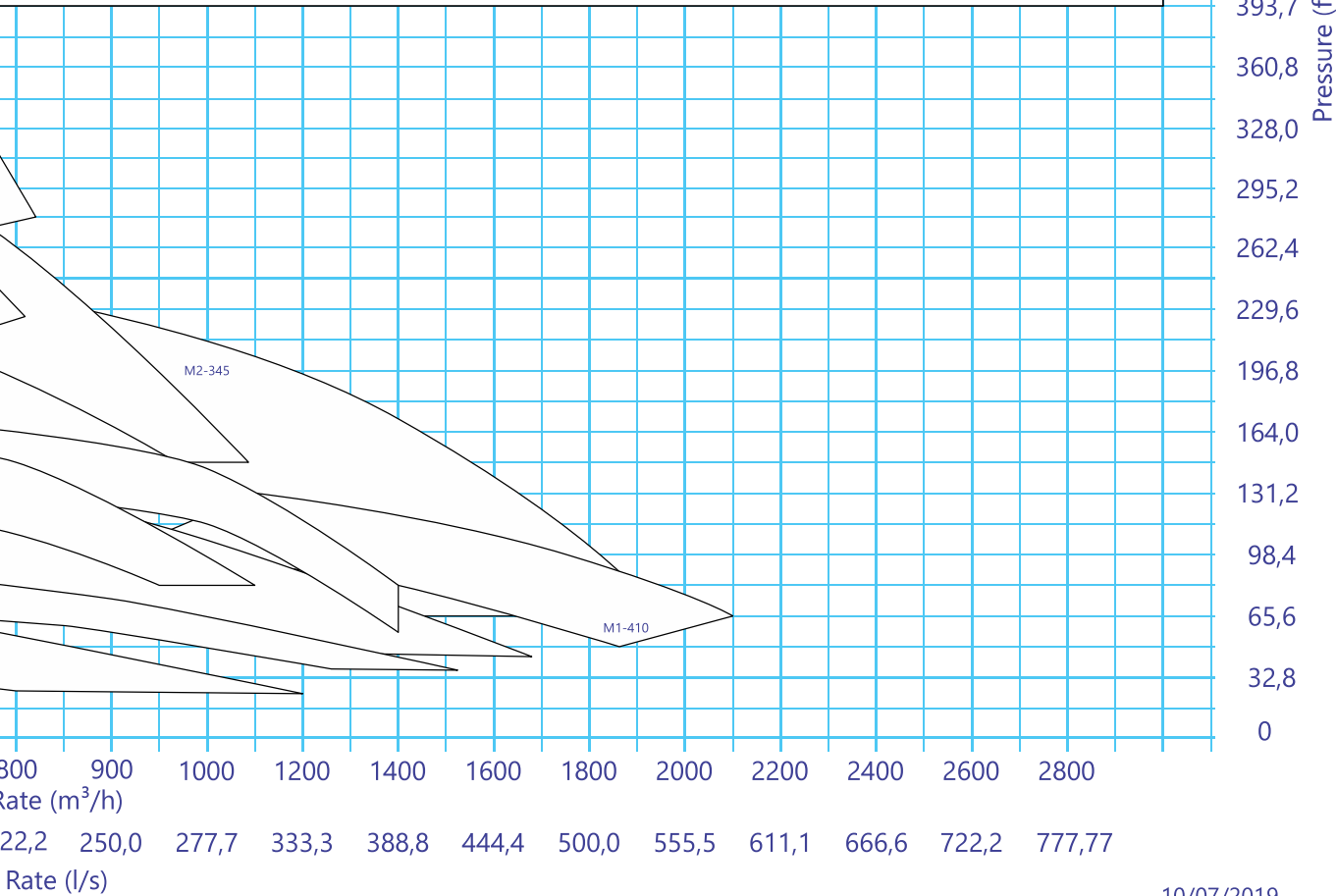
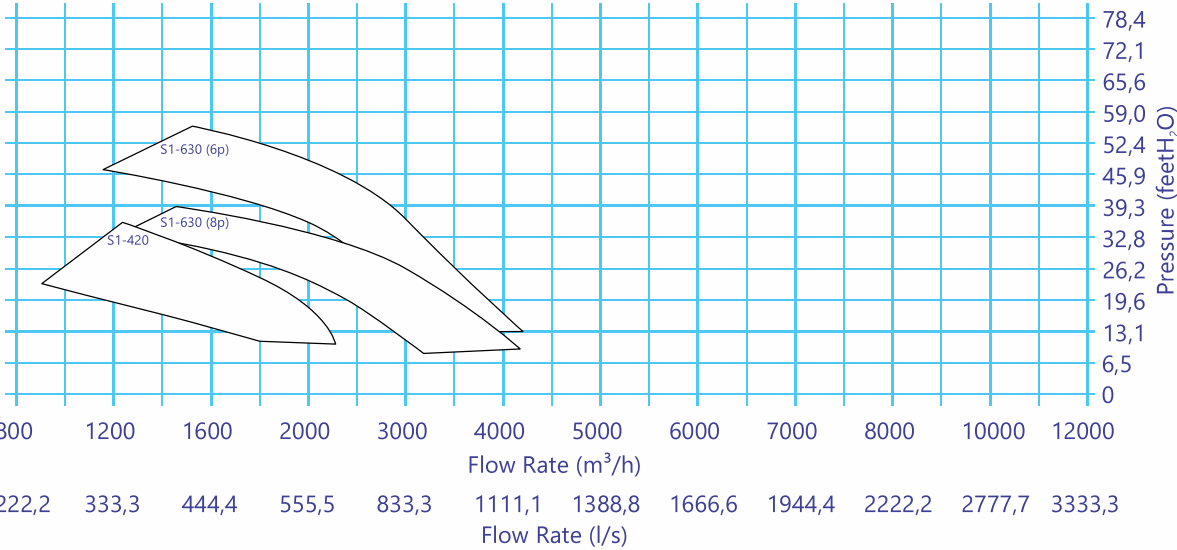
e (gallon/min)

22,2 3962,5 4402,8 5283,4 6164,0 7044,5 7925,1 8805,7 9686,3 10566,8 11447,4 12328,0

Axial Pumps

Flow Rate (gallon/min)

22,2 5283,4 7044,5 8805,7 13208,6 17611,4 22014,3 26417,2 30820,0 35222,9 44028,6 52834,4

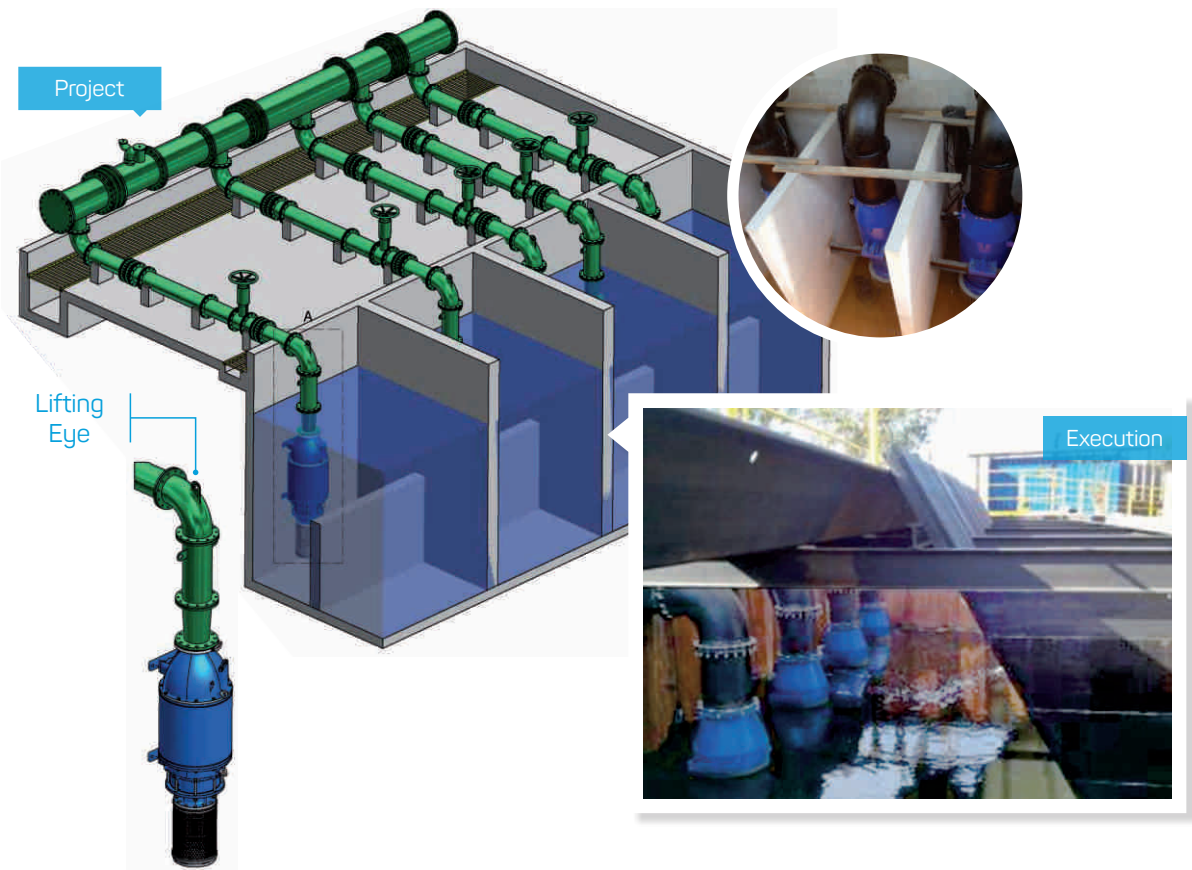


# Ways of Installation

## Submersed

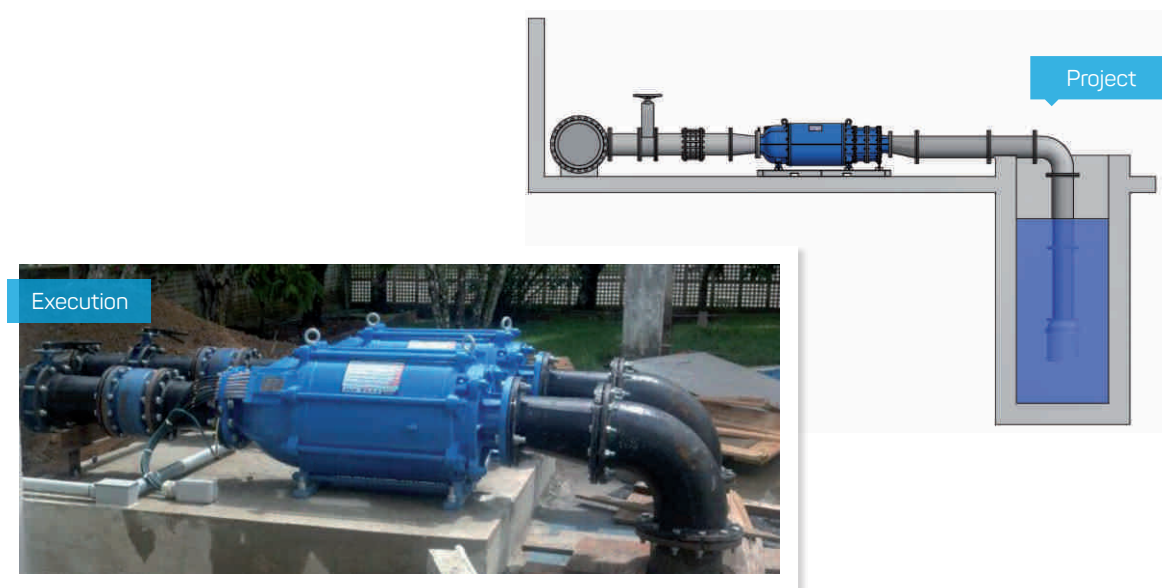


## Partially Submersed

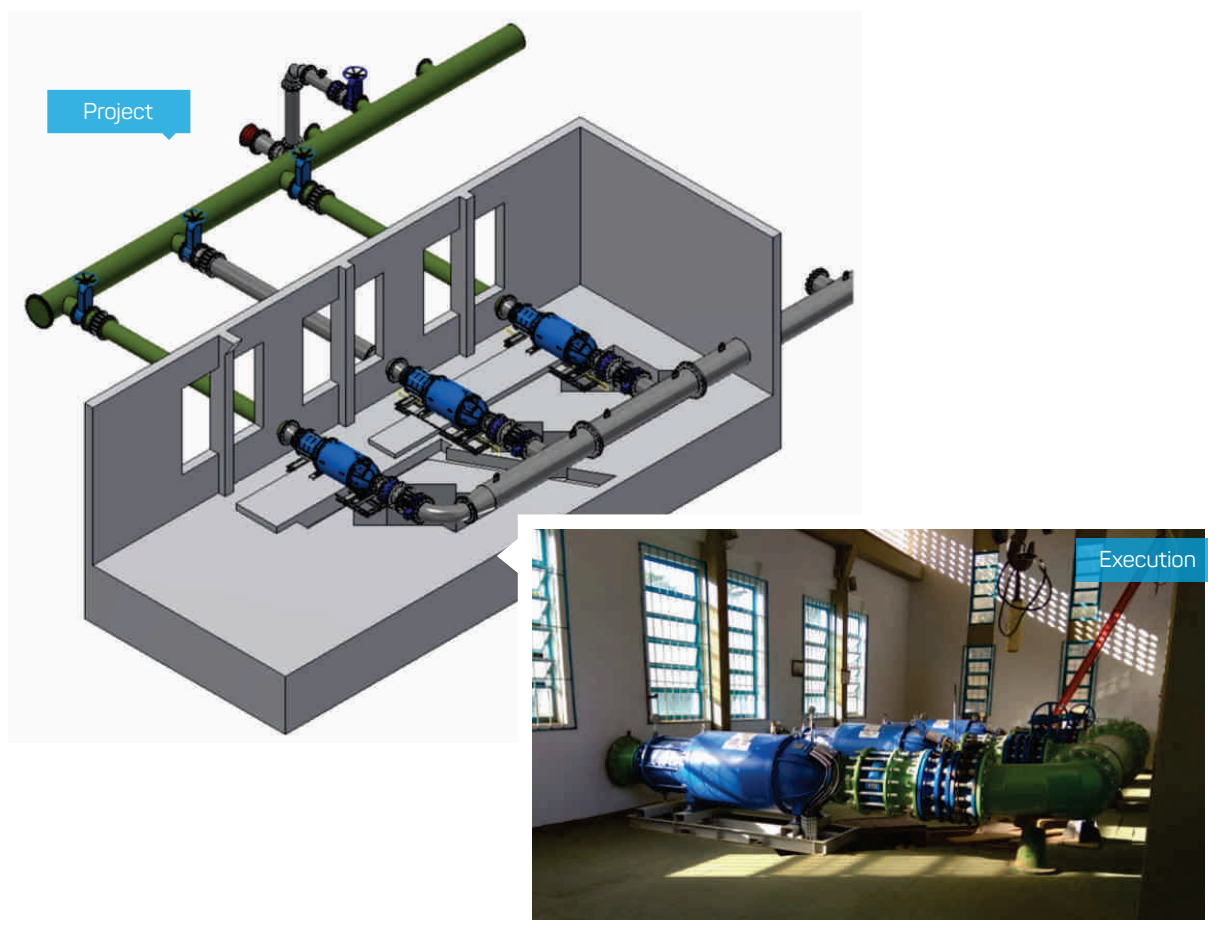




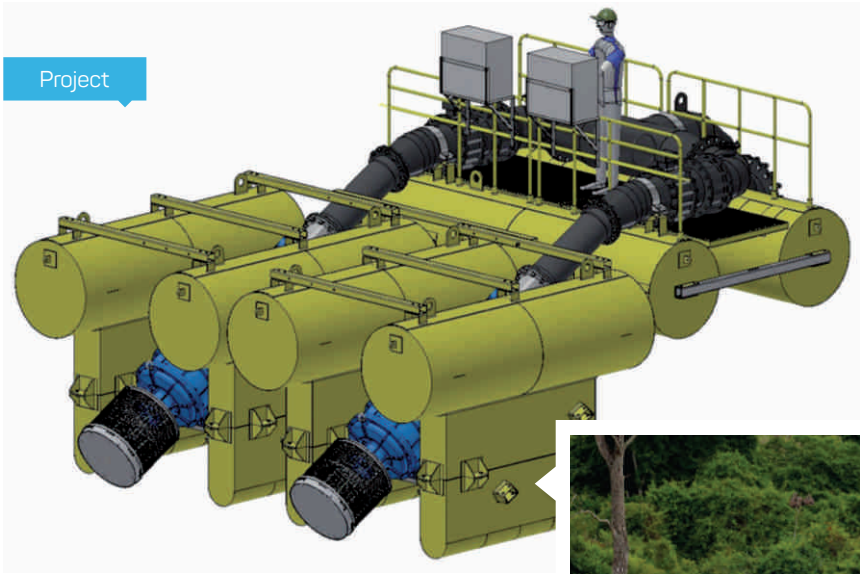
## Suction



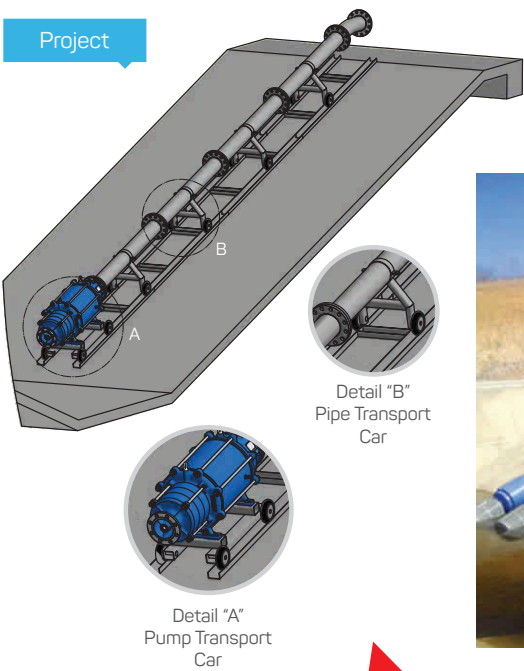
## Positive Pressure



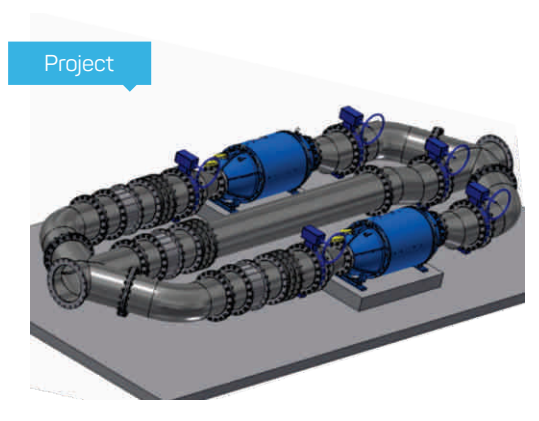
# On Floats



# Over Guide Rails



## Booster (in line)



## Amphibious Pumps Smart Sensors

### Discharge Pressure

Instantaneous measurement of discharge pressure.

### Motor Internal Fluid Level

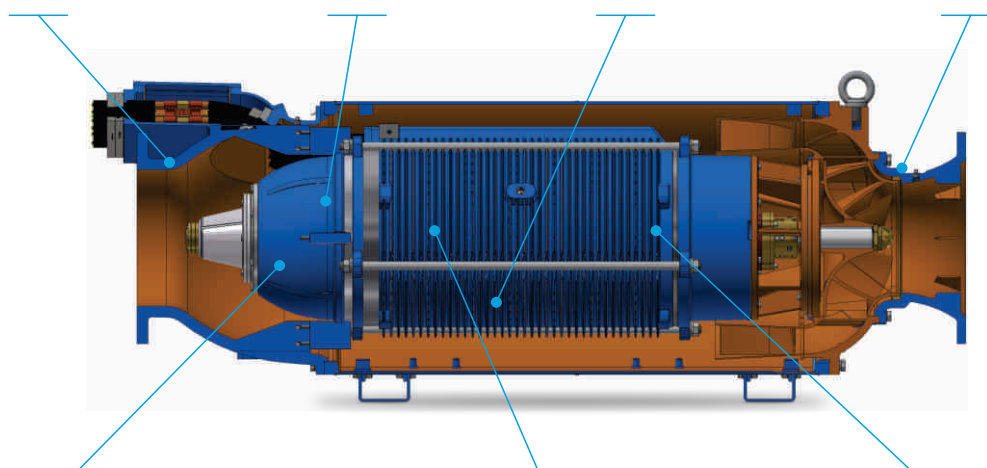
Protection of motor against overload for lack of its internal fluid.

### Motor Temperature

Measurement of motor internal operating temperature.

### Intake Pressure

Instantaneous measurement of intake pressure.



### Vibration

Measurement of vibration at the hydrodynamic bearings.

### Bearings Temperature

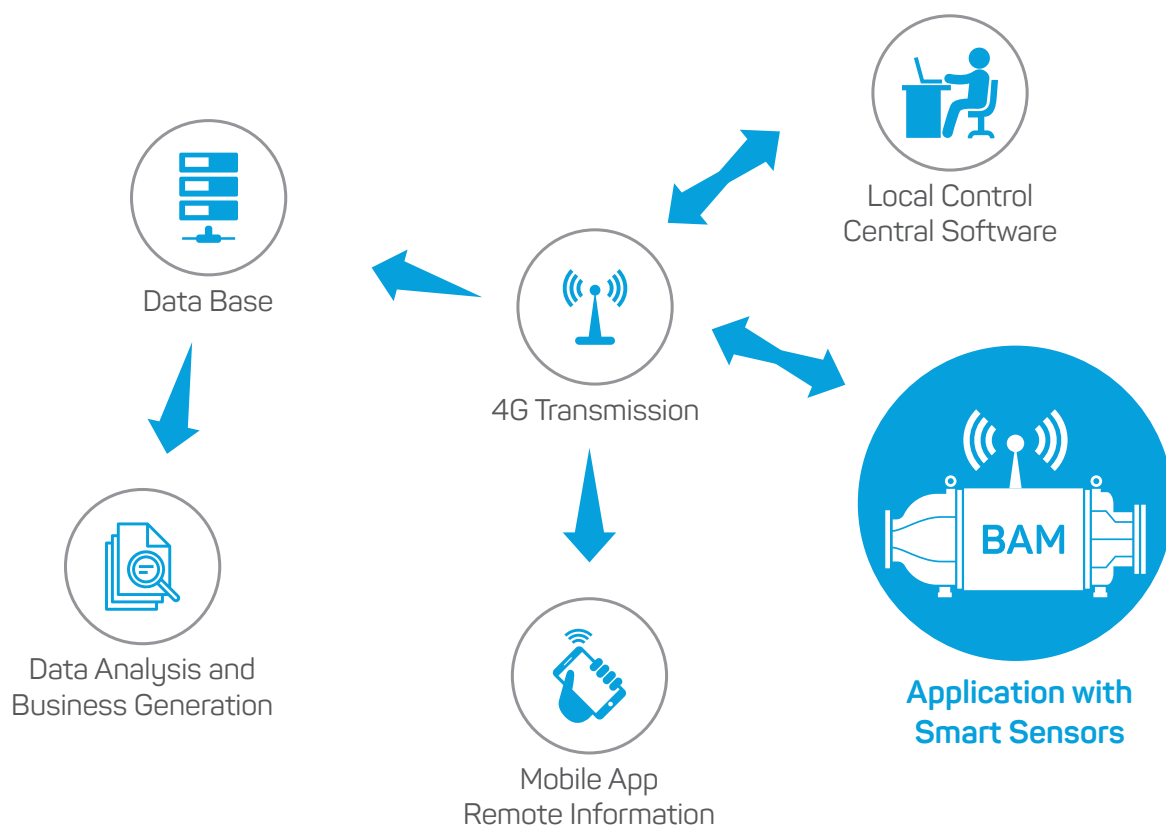
Measurement of temperature at the hydrodynamic bearings.

### Speed

Measurement of effective speed of the drive shaft with load.

Sensors are set according to customer's need and availability for the pump model. Contact HIGRA's local representative for further details.

# Connecting the Amphibious Pump to the Industry 4.0



## Test Laboratory

Every single pump is tested at HIGRA's Hydropower Test Laboratory and/or CFD (Computational Fluid Dynamics) in order to confirm hydraulic, electric and efficiency parameters.

\*There are test limitations regarding flow rates.



# HIGRA

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