



Enriching Lives

PUMP AS TURBINE (PAT)



KIRLOSKAR BROTHERS LIMITED

A Kirloskar Group Company

Established 1888

ENERGY OUT LOOK –INDIA & WORLD.....AND THE WAY AHEAD

The developing countries have witnessed exponential economic growth over the past decade, and India is among the fore runners of them. However, like other developing countries India also is lurching with a huge burden of demand-supply gap. According to International Energy Agency (IEA) presently, In India, only about 64.5% have access to electricity. More than 18,000 villages (Approx 404.5 million people) live without electricity in India. The figure is darker for the African countries and under developed countries of Asia. The continent of Africa has only achieved energy access for 29% of its population so far.

In this scenario, it is imperative that India and other energy starved countries meet its growing energy demand in a self-reliant, decentralized and sustainable manner.

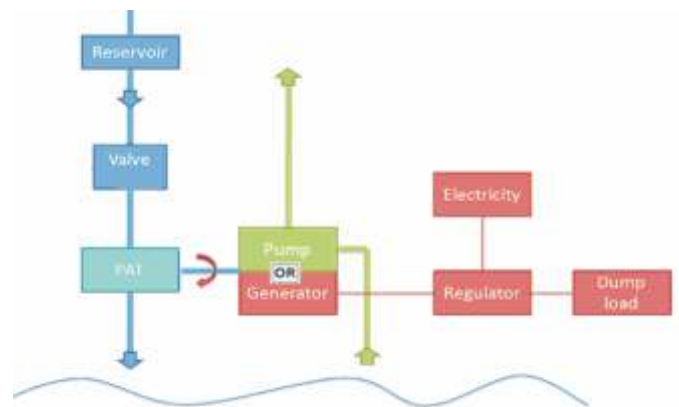
ROLE OF PUMP-AS-TURBINE IN MICRO-HYDRO-POWER APPLICATION FOR ENERGY SUSTAINIBILITY.

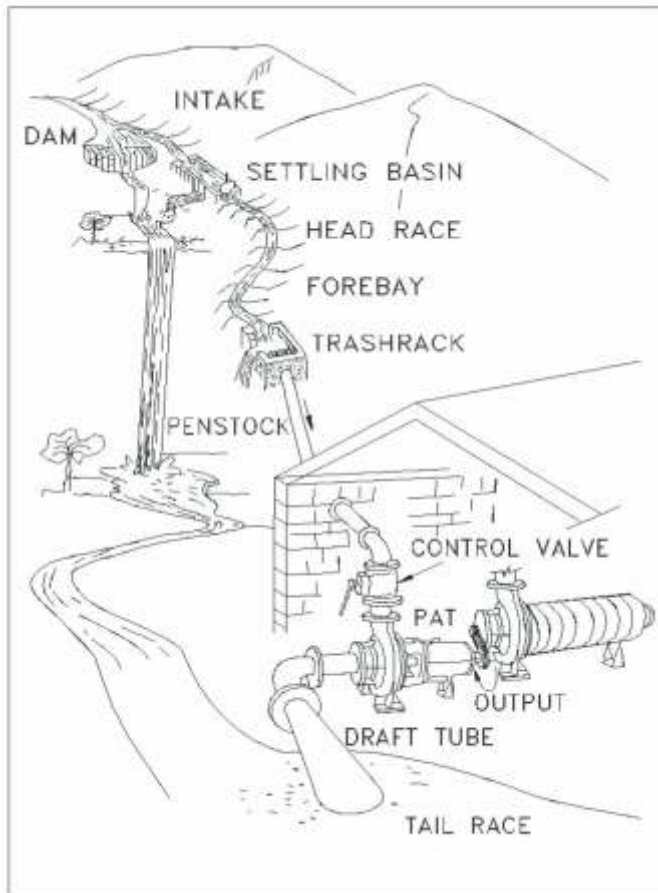
Decentralized small scale hydro electric power generating unit is one of the most techno-commercially feasible solution to the energy scarcity, In which a Pump-as –Turbine (PAT) can be employed as the prime mover of the generating or the pumping unit.

A centrifugal pump that operates in reverse mode as a turbine, works on the same principle as a Francis turbine. The energy is recovered from pressure differences (head); while flow is fed back into the existing system. Both, direct drives of machinery and electricity generation (grid connected or isolated) or combinations of both of these are possible using PAT just as with a conventional turbine.

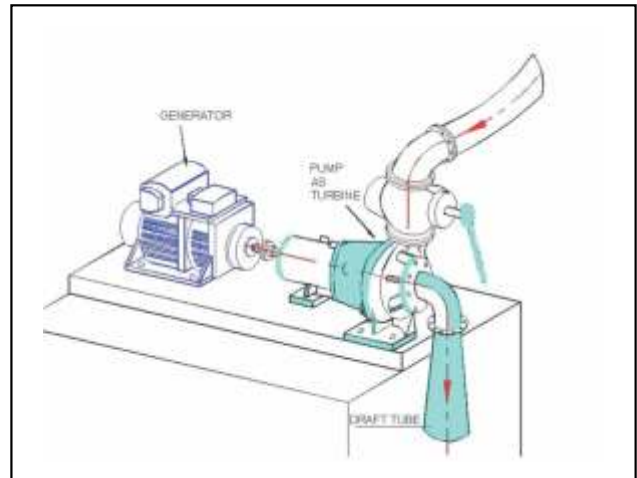
KEY BENEFITS PUMP AS TURBINE (PAT)

- Lower initial cost as it is a standard pump (almost half the cost of conventional hydro-turbine of equivalent size).
- Off the shelf product -Hence Economic
- Simple and sturdy construction.
- Easy maintenance, as pumps have fewer parts than turbines and maintenance personnel experience in pumps operation can as well be used for maintenance of pumps used as turbines.
- No special equipment or skill is required for maintenance.
- Spares are also easily available.
- The gestation period is relatively less.
- Direct drive of machinery, electricity generation (in parallel to a large grid or isolated) or combinations of these is possible just as with a conventional turbine.

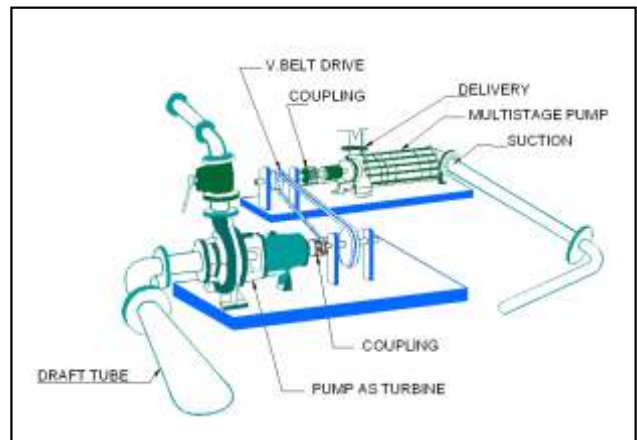




Typical project Layout-PAT Driven Micro Hydro



A Generator driven by a PAT



A Pump driven by a PAT

Some of the potential applications of Pump as Turbine (PAT)

(a) Domestic Water supply systems

- Damping excess pressure in system
- Balancing of pressure in supply lines/ tanks at different elevation
- Pressure control /Throttling in closed-loop systems
- Extraction of excess pressure at the outlet of a water supply line

(b) Extraction of hydro energy from natural resources:

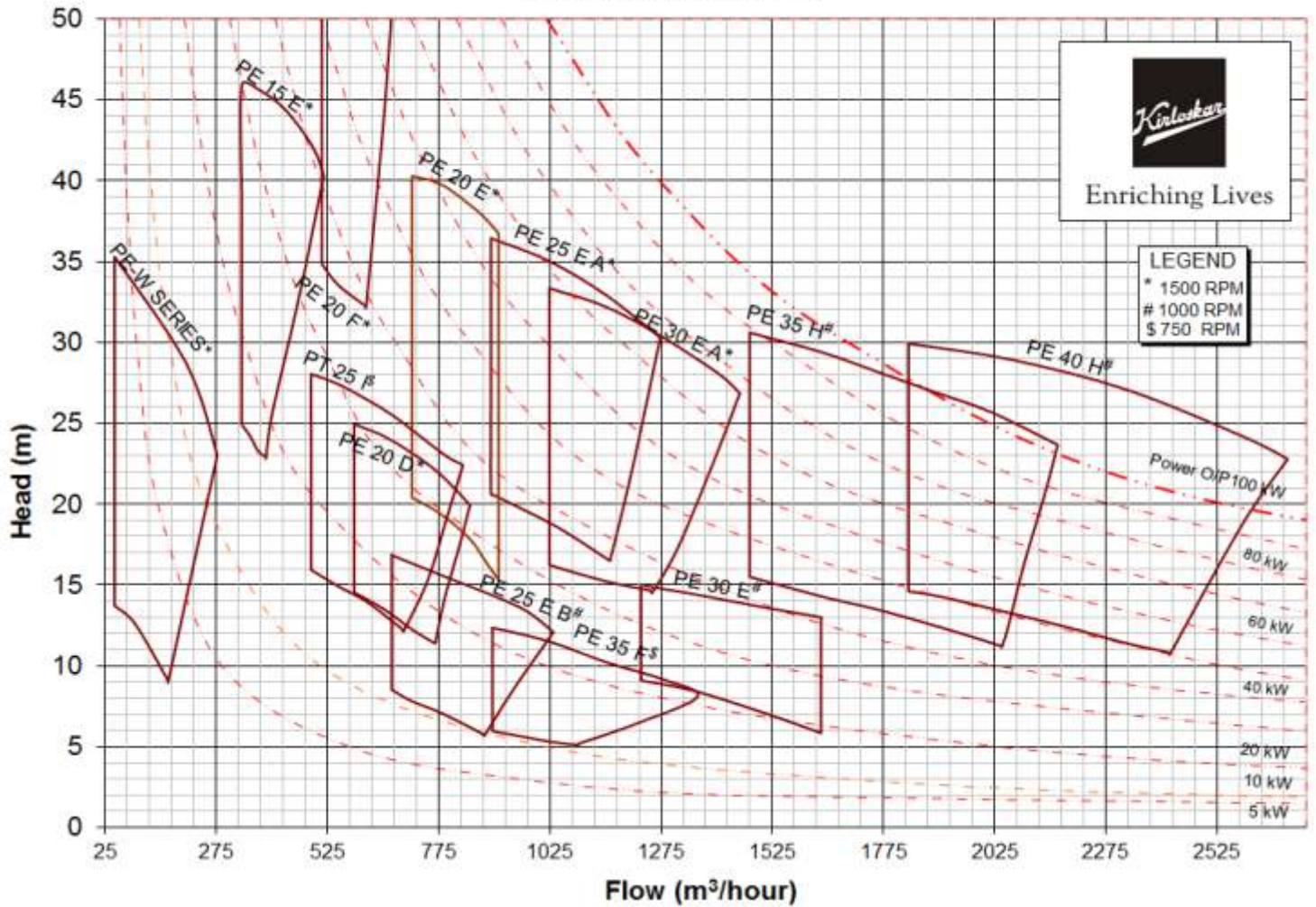
- Decentralized Micro Hydropower plants in natural streams in hilly areas.
- Irrigation barrages/dams.
- Drinking water supply schemes in hilly remote areas

(c) Industrial Application:

- Pressure damping in cooling water circulation systems
- Reduction of process water pressure

FAMILY CURVES

FAMILY CHART FOR PUMP-AS-TURBINE (PAT)
KIRLOSKAR BROTHERS LTD.



NOTES

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ABOUT KBL

Kirloskar Brothers Limited (KBL) is a world class pump manufacturing company with expertise in engineering and manufacture of systems for fluid management. Established in 1888 and incorporated in 1920, KBL is the flagship company of the \$ 2.1 billion Kirloskar Group. KBL, a market leader, provides complete fluid management solutions for large infrastructure projects in the areas of water supply, power plants, irrigation, oil & gas and marine & defence. We engineer and manufacture industrial, agriculture and domestic pumps, valves and hydro turbines.

In 2003, KBL acquired SPP Pumps, United Kingdom and established SPP INC, Atlanta, USA, as a wholly owned subsidiary of SPP, UK to expand its international presence. In 2007, Kirloskar Brothers International B.V., The Netherlands and Kirloskar Brothers (Thailand) Ltd., a wholly owned subsidiary in Thailand, were incorporated. In 2008, KBL incorporated Kirloskar Brothers Europe B.V. (Kirloskar Pompen B.V. since June 2014), a joint venture between Kirloskar International B.V. and Industrial Pump Group, The Netherlands. In 2010, KBL further consolidated its global position by acquiring Braybar Pumps, South Africa. SPP MENA was established in Egypt in 2012. In 2014, KBL acquired SyncroFlo Inc., the largest independent fabricator of commercial and municipal domestic water booster pumps.

To further strengthen its global position, in 2015, Kirloskar Pompen B.V. acquired Rodelta Pumps International, The Netherlands.

KBL has joint venture cooperation with Ebara, Japan since 1988 for the manufacture of API 610 standard pumps. Kirloskar Corrocoat Private Limited is a joint venture cooperation with Corrocoat, UK since 2006. KBL acquired The Kolhapur Steel Limited in 2007 and Hematic Motors in 2010.

KBL has eight manufacturing facilities in India at Kirloskarvadi, Dewas, Kondhapuri, Shirwal, Sanand, Kaniyur, Kolhapur and Karad. In addition, KBL has global manufacturing and packaging facilities in Egypt, South Africa, Thailand, The Netherlands, United Arab Emirates, United Kingdom and United States of America. KBL has 12,700 channel partners in India and 80 overseas and is supported by best-in-class network of Authorised Centres and Authorised Refurbishment Centres across the country.

All the manufacturing facilities at KBL are certified for ISO 9001, ISO 14001, ISO 50001, BS OHSAS 18001 and SA8000. In addition, the Kirloskarvadi plant is also certified for N & NPT Stamp. KBL's corporate office in Pune is certified for ISO 9001 & Sa8000.

The factories deploy Total Quality Management tools using European Foundation for Quality Management (EFQM) model. The Kirloskarvadi plant of KBL is a state-of-the-art integrated manufacturing facility having Asia's largest hydraulic research centre with testing facility upto 5000 kW and 50,000 m³/hr.

KBL is the ninth pump manufacturing company in the world to be accredited with the N and NPT certification by American Society of Mechanical Engineers (ASME).

Pumps | Valves | Hydro Turbines | Turnkey Projects

Water Resource Management | Irrigation | Power | Industry | Oil & Gas | Marine & Defence | Building & Construction |
Distribution (Small Pumps) | Valves | Customer Service & Spares

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Established 1888

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OUR COMPANIES

