

Turbine Governors for Hydropower Applications



Hydrostatic pressure receiver probe
for **water level registration**

Support bracket with protective tube
for sensor probe, made of hot-dipped
galvanised steel, for installation
to the intake wall

Terminal box – protection class IP 66,
powder-coated, with integrated
over voltage protection
and sensor cable tension relief device

Over voltage protection with suppressor diode
and gas ignition gap for nominal leakage
current rating of 10 kA

Brushless hollow-shaft tach-generator for
speed registration, factory-mounted
to turbine shaft, with special bearing design
for maintenance-free operation



Control panel, Class IP 42, with door mounted operational devices and inside mounting panel

- Main switch
- Control transformer
- **Multifunction unit**, programmable for various regulating and control functions
- Sensor over voltage protection with suppressor diode and gas ignition gap for peak current rating of 10 kA
- Over voltage protection of control voltage system for peak current rating of 2.5 kA
- Operating mode selector switch

Optimising of cell sequence

- High efficient, short-circuit proof frequency clocked power unit for DC supply
- Motor protective starter for hydraulic pump
- Twin annunciators
 - ready for operation
 - generator on line
- Test terminals for easy testing and quick commissioning

Speed registration

- Brushless hollow-shaft tachogenerator, factory-mounted to turbine shaft
- special bearing design for maintenance-free operation

Opening feedback signal - Registration of guide vane positions:

- rotating angle transmitters with integrated electronic, factory-mounted to turbine.
- no wear due to contact free capacitive angular movement sensing
- no tolerance bellows couplings for high precision transfer of guide vane positions

Hydraulic power unit

- Aluminum die-cast casing of 40 litres capacity
- Motor-driven gear pump, motor 550 W, pump 2.7 lit/min
- Pressure accumulator with a “pressure-liter” number < 200 ⇒ no pressure testing required on site to comply with official technical regulations
- two adjustable pressure relief valves
- two pressure gauges 0 ... 40 bar for operating pressure
- 0 ... 100 bar for system pressure
- two direct controlled proportional valves with electric position feedback and integrated controls
- two seat valves for emergency shut-down without utilising the control valves
- return filter with by-pass and visual oil contamination display



Lever arms:

- Made of solid steel, destined for reliable stress-free opening of the turbine guide vanes and adapted to fit the assigned turbine guide vane opening angle
- dead weights to assure a reliable turbine closing without requiring auxiliary energy

Hydraulic cylinders:

- Low working pressures
- cylinder base plate with hinged bearing

PROGRAM

Type	A-2-H	A-2-ER	A-2-DR	S-2-DR	S-2-MK/R/So	S-2-MK	KL
Generator	Induction Generator			Synchronous Generator			
Operation	grid connected operation			stand-alone and grid		stand-alone operation	
Task	maximised annual production					demand control	



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