1. GENERAL:

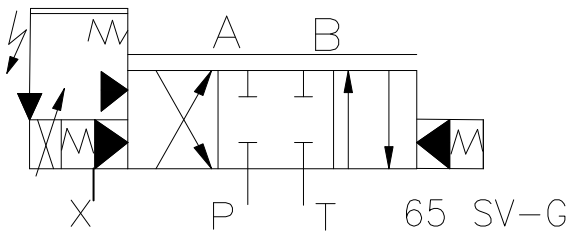
The function of Direct drive pilot operated two stage Servo Proportional valve is a electro hydraulic fine control of Hydro Turbine Guide vane & Runner servomotors (whichever is applicable based on the type of machine) which in turn regulate the flow of water with respect to frequency variation & power generation.

2. SPECIFICATION:

(A) Features: The Servo Proportional valve shall have the following features:-

- Valves shall be of 4 way, 3 position, high response valve, pilot operated with electrical position feedback and integrated analogue / digital electronics for closed loop position control.
- The spool drive device shall be a permanent magnet linear force motor dependent upon second stage spool which can actively stroke the spool from its centered position in both directions.
- It shall have **Fail Safe** provision in which spool returns to its end position passing a load position causing closing of hydraulic cylinder through connection of P port to B & A port to T due to loss of input supply voltage , loss of control signal , broken control cable or loss of pilot pressure .
- It shall have curvilinear characteristics.
- Valves shall be with External pilot oil supply and Internal pilot oil drain type.
- Second stage Hydraulically pilot operated valve shall hold the first stage Direct drive valve.
- Second stage valve shall have position transducer (LVDT) which shall be excited via an oscillator which measures the position of main spool. The signal shall be demodulated and fed back to controller in its integrated electronics where it shall be compared with command signal. This controller shall drive the direct drive pilot valve until the error between command signal and feedback signal is zero. This position of second stage main spool shall be proportional to the electric command signal.
- **Valves shall be supplied along with its cable connectors & mounting screw bolt kit.**

(B) Symbol of Servo Valve:



(C) Technical Data:

- Normal operating pressure : 60 Kg/cm² +10% overload
- Maximum operating pressure : 66 Kg/cm2 or more
- Main spool type : 4 way with 10% overlap curvilinear charcterstics
- External Pilot pressure (X) & internal pilot drain (Y)
- Seal material : NBR (Buna)
- Valve connector : 6+PE / 11+PE
- Input supply voltage : 24V DC ± 10%
- Command signal : 4-20 mA
- Null balance : 12 mA
- Spool output : 4-20 mA with null balance at 12 mA
- Ambient temperature range : -10 to +60º C
- Fluid temperature range : -10 to +80º C
- Operating fluid : Mineral oil based hydraulic fluid to ISO-VG-68
- Degree of protection : EN60529 Class IP65 with mating connector

3. Flow Capacity, Model:

Project	Valve Type	For Guide Vane control	For Runner control
KATENDE HEP	Flow Capacity	1000 LPM at 5 bar diff. pressure/Land or more	550 LPM at 5 bar diff. pressure/land or more
	Qty.	6 Nos.	6 nos.

4. DOCUMENTATION : -

Supplier has to supply exact drawing / catalogue mentioning full technical data & showing sectional view of the Servo valve with BOM, overall dimensions, mounting details along with the offer itself to access technical suitability & freeze our design of the control panel. With out these documents offer will be treated as incomplete and may be lead to rejection.

5. TEST AND GURANTEE CERTIFICATES :-

Supplier has to supply 2 copies of Inspection, Calibration, Test certificate, Compliance certificate & Guarantee certificates as well as 6 (six) copies of O & M Manual before dispatch of items.
Guarantee for supplies against bad workmanship and defective material for a period of 18 months from the date of supply or 12 months from the date of commissioning. Supplier is not absolved from his responsibly in case the valves mal operate or found defective at the site during operation.