

	HYDRO PROJECTS ENGINEERING DIVISION	SPECIFICATION NO.	REV 00
	TITLE : SPECIFICATION OF LEVEL CONTROLLER FOR TURBINE TOP COVER DRAIN PUMP & EJECTOR	241595783	Page 1 of 6

PROJECT: VISHNUGAD PIPALKOTI - HEP

1. APPLICATION:

The level controller shall be used to provide the level switching contacts for water level in the turbine top cover. The level controller shall be based on the principle of conductivity. The level probes shall be connected to the level controller. The level switching contacts of the level controller shall be used in the starter panels / SCADA system to control the water level in the turbine top cover.

2. SCOPE OF SUPPLY:

2.1 LEVEL CONTROLLER FOR TURBINE TOP COVER PUMPS: 4 Set

Each set shall consist of:

- a) Conductivity type Level Controller - 1 no.
- b) Level sensing probes - 1 no. LHS probe + 1 no. RHS probe

2.1 LEVEL CONTROLLER FOR TURBINE EJECTOR PUMP: 4 Set

Each set shall consist of:

- a) Conductivity type Level Controller - 1 no.
- b) Level sensing probes - 1 no.

3. TECHNICAL SPECIFICATION:

3.1 LEVEL CONTROLLER FOR TURBINE TOP COVER PUMPS

3.1.1) CONDUCTIVITY TYPE LEVEL CONTROLLER:

- i) Input supply to controller: 230V $\pm$ 10% AC 1 Phase. 50Hz.
- ii) Level controller shall have the single / double point level switch control units to provide the level switch contacts for each level probes (except reference probe) specified in the below table:

Sr. No.	Level switch description
1	High level probe contact
2	Pump-1 start level probe contact
3	Pump-1 stop level probe contact
4	Pump-2 start level probe contact
5	Pump-2 stop level probe contact

REV.NO.	00	DISTRIBUTION.	QTY.	APPROVED:			
PREPARED				(AP)			
CHECKED		HPE	01	PREPARED	CHECKED	ISSUED	DATE
APPROVED							07.01.19
DATE		MM(H)	06	(AKG)	(VKN)	(AP)	

	HYDRO PROJECTS ENGINEERING DIVISION	SPECIFICATION NO.	REV 00
	TITLE : SPECIFICATION OF LEVEL CONTROLLER FOR TURBINE TOP COVER DRAIN PUMP & EJECTOR	241595783	Page 2 of 6

- iii) The single / double point level switch control unit shall of enclosed modular type with suitable for Din-rail / Plate mounting type. These control units should be mounted inside the level controller box.
- iv) Level controller should provide separate 1NO + 1NC independent auxiliary contacts (SPDT) corresponding to each level probes (except reference probe) from control units. The contact rating of each level switches should be of 5A / 240V A.C, 0.2 A / 220 VDC.
- v) The level controller box shall be of wall-mounted type. It should be of rigid construction type having front door opening on with lock and handle.
- vi) The level controller box shall be of Cast Aluminum / M.S. Powder Coated / Sheet Metal housing Powder Coated / Sheet Steel stoving sheet steel / (CRCA) with minimum thickness of 1.6 mm. The class of protection of the enclosure shall be of minimum IP55.
- vii) Outgoing and internal control cable of controller shall be wired up to terminal blocks. Terminal blocks shall meet the requirements of IES-947-7-1 standards. Terminal blocks shall be suitable for 6 sq. mm. size of conductors. Terminals shall be with screw type connection.
- viii) Suitable cable glands plate (removable type) should be provided at the bottom of level controller box.
- ix) Necessary anchor fastener / bolts (4 Nos.) required to mount this enclosure on wall to be supplied by supplier as loose.
- x) Level controller shall have the lamp indication (LED type) for displaying the status of the level switch contacts for each level probes (except reference probe) on the modular control unit / front door of the controller as specified in the below table:

Sr. No.	Lamp indication description
1	High level alarm indication
2	Pump-1 start level indication
3	Pump-1 stop level indication
4	Pump-2 start level indication
5	Pump-2 stop level indication
6	Control supply on

- xi) Following description inscribed on a metallic plate should be provided on the level controller box.
Description – Level controller of Top cover drain pumps.
- xii) The instrument shall work satisfactorily against ambient temperature variation from **(+) 0° C to (+) 50° C.**

3.1.2) LEVEL SENSING PROBES:

- a. Each level controller box shall be connected with two nos. level sensing probes (LHS probe + RHS probe) as per sketch no. HPE-GC-390 Rev.00.
- b. The mounting process connection of level probe: **1-1/2" B.S.P (M).**
- c. The individual level sensing probe should be of rod type. The dia of each level-sensing probe should be as per manufacturer standard.
- d. Material :
 - Level sensing probe : Stainless steel
 - Process connection : Stainless steel
 - Rod probe housing : Weatherproof cast aluminum with cable gland for cable entry
- e. The individual level sensing probes should be partly insulated.

	HYDRO PROJECTS ENGINEERING DIVISION	SPECIFICATION NO.	REV 00
	TITLE : SPECIFICATION OF LEVEL CONTROLLER FOR TURBINE TOP COVER DRAIN PUMP & EJECTOR	241595783	Page 3 of 6

f. The purpose and lengths of level probes:

➤ Probe -1 : LHS side probe : Three in one type

Device No.	Description of level probe	Probe lengths from mounting surface	Remarks
71W-3	Pump-1 star level probe	90 mm	The reference probe of LHS shall be used for detection of water level
71W-5	Pump-1 stop level probe	140 mm	
71W-6	Reference probe	170 mm	

➤ Probe-2: RHS side probe : Three in one type

Device No.	Description of level probe	Probe lengths from mounting surface	Remarks
71W-1	High Level Alarm	50 mm	The reference probe of LHS shall be used for detection of water level
71W-2	Pump-2 start level probe	70 mm	
71W-4	Pump-2 stop level probe	120 mm	

3.2 LEVEL CONTROLLER FOR TURBINE EJECTOR PUMP

3.2.1 CONDUCTIVITY TYPE LEVEL CONTROLLER:

- Input supply to controller: 230V $\pm$ 10% AC 1 Phase. 50Hz.
- Level controller shall have the single / double point level switch control units to provide the level switch contacts for each level probes (except reference probe) specified in the below table:

Sr. No.	Level switch description
1	Ejector open
2	Ejector close

- The single / double point level switch control unit shall of enclosed modular type with suitable for Din-rail / Plate mounting type. These control units should be mounted inside the level controller box.
- Level controller should provide separate 1NO + 1NC independent auxiliary contacts (SPDT) corresponding to each level probes (except reference probe) from control units. The contact rating of each level switches should be of 5A / 240V A.C, 0.2 A / 220 VDC.
- The level controller box shall be of Cast Aluminum / M.S. Powder Coated / Sheet Metal housing Powder Coated / Sheet Steel stoving sheet steel / (CRCA) with minimum thickness of 1.6 mm. The class of protection of the enclosure shall be of minimum IP55.
- Outgoing and internal control cable of controller shall be wired up to terminal blocks. Terminal blocks shall meet the requirements of IES-947-7-1 standards. Terminal blocks shall be suitable for 6 sq. mm. size of conductors. Terminals shall be with screw type connection.

	HYDRO PROJECTS ENGINEERING DIVISION	SPECIFICATION NO.	REV 00
	TITLE : SPECIFICATION OF LEVEL CONTROLLER FOR TURBINE TOP COVER DRAIN PUMP & EJECTOR	241595783	Page 4 of 6

- vii) Suitable cable glands plate (removable type) should be provided at the bottom of level controller box.
- viii) Necessary anchor fastener / bolts (4 Nos.) required to mount this enclosure on wall to be supplied by supplier as loose.
- ix) Level controller shall have the lamp indication (LED type) for displaying the status of the level switch contacts for each level probes (except reference probe) on the modular control unit / front door of the controller as specified in the below table:

Sr. No.	Lamp indication description
1	Ejector open
2	Ejector close
3	Control supply on

- x) Following description inscribed on a metallic plate should be provided on the level controller box.
Description – Level controller of Top cover Ejector.
- xi) The instrument shall work satisfactorily against ambient temperature variation from (+) 0° C to (+) 50° C.

3.2.2) LEVEL SENSING PROBES:

- a. Each level controller box shall be connected with one no. level sensing probe as per sketch no. HPE-GC-391 Rev.00.
- b. The mounting process connection of level probe: **1-1/2" B.S.P (M).**
- c. The individual level sensing probe should be of rod type. The dia of each level-sensing probe should be as per manufacturer standard.
- d. Material :
 - Level sensing probe : Stainless steel
 - Process connection : Stainless steel
 - Rod probe housing : Weatherproof cast aluminum with cable gland for cable entry
- e. The individual level sensing probes should be partly insulated.
- f. The purpose and lengths of level probes:

➤ **Probe : Three in one type**

Device No.	Description of level probe	Probe lengths from mounting surface	Remarks
EJ-1	Ejector open	110 mm	
EJ-2	Ejector close	160 mm	
EJ-3	Reference level probe	170 mm	

	HYDRO PROJECTS ENGINEERING DIVISION	SPECIFICATION NO.	REV 00
	TITLE : SPECIFICATION OF LEVEL CONTROLLER FOR TURBINE TOP COVER DRAIN PUMP & EJECTOR	241595783	Page 5 of 6

4. DOCUMENTS TO BE FURNISHED:

Along with offer:

- Catalogues giving all the technical particulars with model code.
- Outline general arrangement drawing of Level controller box, level control unit and level sensing rod probes.
- List of deviations, if any. Otherwise, it shall be understood that the vendor is meeting all the requirements specified by us.

Vendor to note that if above documents are not furnished along with the offer; the offer shall be liable for outright rejection.

After placement of order:

- Supplier has to submit the drawing showing over all dimensions, mounting details, sectional elevation and constructional details of level probe and level controller box for our approval.
- Wiring schematic diagram of level controller
- Q.A. Plan for our approval before start of manufacturing.
- Supplier has to submit the O&M manual level controller for our reference.

At the time of supply:

- 2 copies of test certificates / Calibration certificate and guarantee certificates of level controller, level control units and level probes should be submitted to indenter. One copy of the above documents shall be put inside the case / package.
- Shipping / packing lists of the level controller should be submitted to indenter and put inside the case / package.

5. INSPECTION & TESTING:

Functional test of level controller along with level probe units is to be carried out and certificate for the same to be furnished. The inspecting agency shall certify that the testing has been witnessed as per APPROVED Q.A. Plan supplied by the vendor. Acceptance or waiver of inspection does not absolve the supplier of his responsibility to rectify the instrument in case it does not perform satisfactorily at hydro site where it is actually used.

6. GUARANTEE:

The item must be guaranteed for trouble free operation, good workmanship for a period of 18 months from the date of dispatch.

7. PACKAGING:

Each "level probe unit" and each "Level controller box" shall be packed separately in individual carton with silica gel, adequate cushioning material and water proof cover to avoid the movement of the internals and ensure that the instrument is capable of withstanding the transit conditions without damages.

	HYDRO PROJECTS ENGINEERING DIVISION	SPECIFICATION NO.	REV 00
	TITLE : SPECIFICATION OF LEVEL CONTROLLER FOR TURBINE TOP COVER DRAIN PUMP & EJECTOR	241595783	Page 6 of 6

8. IDENTIFICATION:

Each packed unit of level probe and level controller box shall be identified with the following information.

1. Manufacturer's name or identification.
2. Manufacturer's model no. or serial no.
3. Project Name
4. Material code of the item as per enquiry description