


648496/2022/HPE-HPE41501

	<b>PRODUCT STANDARD</b> <b><u>HYDRO PROJECTS ENGINEERING</u></b>	<b>241515356</b>
		<b>Rev. 00</b>
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<b><u>PURCHASE SPECIFICATION OF LEVEL CONTROLLER FOR TGB AND PP SET (CAPACITANCE TYPE)</u></b>		

### 1. DESCRIPTION:

Level controller (capacitance type) is required for measuring the continuous oil level in the Turbine guide bearing sump and PP Set (Sump tank). The instrument should meet the highest standards of measurement technique.

### 2. APPLICATION:

The level controller with level switching contacts shall be used for measuring the oil level of Turbine Guide Bearing sump and PP set (sump tank). The level switching contacts shall be used for machine starting interlock, alarms in the SCADA system.

### 3. SPECIFICATION & SCOPE OF SUPPLY:

3.1) Each set of level controller for TGB shall consist of:

- |  |   |           |
|--|---|-----------|
| A. Level probe cum transmitter             | - | 1 No.     |
| B. Digital indicator cum power supply unit | - | 1 No.     |
| C. Screen cable                            | - | 50 Meters |

3.2) Each set of level controller for PP Set (Sump tank) shall consist of:

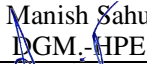


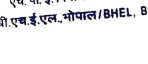
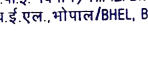
- |  |   |           |
|--|---|-----------|
| A. Level probe cum transmitter             | - | 1 No.     |
| B. Digital indicator cum power supply unit | - | 1 No.     |
| C. Screen cable                            | - | 10 Meters |


**Note:** For total quantity required, please refer Annexure-A to specification 241515356.

### 3. A) LEVEL PROBE CUM TRANSMITTER:

The probe cum transmitter shall measure the level in the Turbine guide bearing sump and PP Set (Sump tank) provide the corresponding level output to the indicator unit.

- |                               |   |   |
|-------------------------------|---|---|
| (a) Probe type                | : | Fully insulated (Teflon insulation) rod type probe                                      |
| (b) Probe transmitter housing | : | Weather proof cast aluminum housing with cable entry of 1/2" BSP / NPT with cable gland |
| (c) Material of probe         | : | Stainless steel   |

Rev. No.	Date of Rev.	Remarks	Approved	
			 Manish Sahu DGM, HPE	
Prepared			Prepared	Checked
Checked			 Vishal Namdeo Sr. Mgr / HPE	 Ankit Pandey Dy. General Manager
Approved			 Manish Sahu Sr. Mgr / HPE	 Ankit Pandey Dy. General Manager
			Date of issue (Rev 00) 15.01.2022	


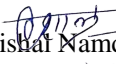
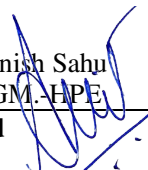
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- (d) Reference probe : Co-axial "Reference probe / Grounding Tube" (SS material) should be provided
- (e) **Probe length** : **Refer Annexure-A to specification 241515356**
- (f) **Process connection of Level Probe** : **Refer Annexure-A to specification 241515356**
- (g) **Process connection of Reference Probe / Grounding Tube** : **Refer Annexure-A to specification 241515356**
- (h) Application media : Turbine Oil (ISO VG-46 / ISO VG-68)
- (i) Media temperature : 0 to 70 Deg C
- (j) Ambient temperature : 0 to 50 Deg C
- (k) Level probe cum transmitter (electronic display unit) shall be part of level probe housing.
- (l) The housing of level probe cum transmitter shall have integral (LED /LCD) type electronic display unit with integrated push buttons for calibrating the range of level measurement. The display unit shall indicate the oil level of the tank in terms of "mm" / "Percentage".
- (m) Output signal : 4-20 mA DC corresponding to calibrated span (Adjustable) suitable for electrical load of minimum 500 Ohm.
- (n) Accuracy :  $\pm 0.5$  % or better, for calibrated span including linearity, hysteresis and repeatability.
- (o) Loop power supply : 24 VDC (Shall be derived from digital indicator cum power supply unit)
- (p) Connection : Two wire system
- (q) Protection class : IP67
- (r) The instrument shall work against oil charging (oil splashing) in the turbine guide bearing housing within accuracy.


### 3. B) **DIGITAL INDICATOR CUM POWER SUPPLY UNIT:**

Digital indicator cum power supply unit should supply necessary power to the level probe cum transmitter and 4-20 mA output signal of transmitter will be fed to digital indicator by screened cable. The Digital Indicator will show the reading in terms of mm. Digital indicator should have minimum 4 digit indications and should be flush panel mounting type.

- (a) **Mounting & cutout size** : **Refer Annexure-A to specification 241515356**
- (b) Display : 4/5 Digits LED / LCD type
- (c) Input signal : 4 -20 mA DC (From level transmitter)

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- (d) Transmitted power supply : 24 VDC loop power supply to level probe transmitter
- (e) Re-transmitter output : Separate one no. 4-20 mA output for retransmission
- (f) Scale reading : 0 to calibrated length (max. up to the probe length)
- (g) Configuration push buttons : Push buttons should be provided for configuration change, range setting and setting of relays set point in the display unit
- (h) Auxiliary power supply : 240 VAC  $\pm$  10%, 50 Hz
- (i) Relay output : 4 Nos. (Change over type, SPDT contacts), For Alarms and machine starting interlocks, Setting of each relay should be adjustable between the full calibrated range
- (j) Relay contact rating : 5A / 240 VAC, 0.2 A / 220 VDC
- (k) Relay indicating : LED indication for operation of each relay should be provided
- (l) Accuracy :  $\pm$  0.2 %
- (m) Ambient temperature : 0 to 50 Deg C
- (n) Description : “Digital indicator for Oil level in Turbine guide bearing” / “Digital indicator for Oil level in PP Set” [ As applicable ] should be provided on the indicator unit


**NOTE: - LEVEL PROBE CUM TRANSMITTER (3.A) & DIGITAL INDICATOR CUM POWER SUPPLY UNIT (3.B) MUST BE OF SAME MAKE.**

**3. C) SCREEN CABLE FOR LEVEL PROBE CUM TRANSMITTER:**

The screen cable is required for connecting the level probe cum transmitter with the digital indicator cum power supply unit.

1100/ 660 V, un-armoured, PVC insulated, multistrand, 2/3 core (whichever is applicable for connecting transmitter with digital indicator) 1.5 mm<sup>2</sup> screen cable.

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<b>Checked</b>		विशाल नाम्देो Sr. Mgr./ HPE वरिष्ठ प्रबंधक / Senior Manager एच. पी. ई. विभाग / HPE Division बी.एच.ई.एल., भोपाल / BHEL, BHOPAL	अमित पाण्डेय / AMIT PANDEY वरिष्ठ प्रबंधक / Dy. General Manager एच. पी. ई. विभाग / H.P.E. Division बी.एच.ई.एल., भोपाल / BHEL, BHOPAL	15.01.2022
<b>Approved</b>				

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#### 4. DOCUMENTS TO BE FURNISHED:

##### Along with offer:

- Catalogues giving all the technical particulars with model code and O & M manual of the Level probe cum transmitter and digital indicator cum power supply unit.
- 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 cum transmitter and digital indicator cum power supply unit [For TGB and For PP Set (Sump tank) ] for our approval within 4 weeks from the date of P.O. Revised drawing should be submitted within one week after the receipt of our comments. Manufacturing action shall only be started after approval of drawing.
- Supplier has to submit the O&M manual of level probe cum transmitter and digital indicator cum power supply unit for our reference.

##### At the time of supply:



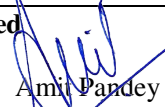
- 2 copies of test certificates / Calibration certificate and guarantee certificates should be submitted to indenter. One copy of the above documents shall be put inside the case/ package.
- Shipping / packing lists of the level controller unit should be submitted to indenter and put inside the case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

#### 5. TEST CERTIFICATES:


- Calibration certificates issued by an ISO 17025 accredited and certified Lab or Manufacturer calibration certificate for each level transmitter and digital indicator unit are required.

#### 6. INSPECTION & TESTING:

Functional test of level transmitter and digital display unit is to be carried out and certificate for the same to be furnished.

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<b>Prepared</b>			<b>Prepared</b>	<b>Checked</b>
<b>Checked</b>			 Vishal Namdeo Sr. Mgr. / HPE वरिष्ठ प्रबंधक / Senior Manager एच. पी. ई. विभाग / HPE Division बी.एच.ई.एल., भोपाल / BHEL, BHOPAL	 Amit Pandey DGM.-HPE अमित पाण्डेय / AMIT PANDEY उप महाप्रबंधक / Dy. General Manager एच. पी. ई. विभाग / H.P.E. Division बी.एच.ई.एल., भोपाल / BHEL, BHOPAL
<b>Approved</b>				<b>Date of issue (Rev 00)</b>  15.01.2022

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7. **GUARANTEE:**

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



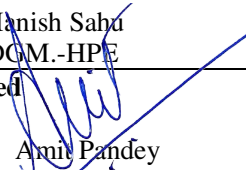
8. **PACKAGING:**

“Each level probe cum transmitter unit” and “Digital indicator cum power supply unit” 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.


9. **IDENTIFICATION:**

Each equipment shall be identified with the following information.

1. Manufacturer's name or identification.
2. Manufacturer's model no. or serial no.
3. Project Name

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<b>Prepared</b>			<b>Prepared</b>	<b>Checked</b>
<b>Checked</b>			 Vishal Namdeo Sr. Mgr./ HPE वरिष्ठ प्रबंधक / Senior Manager एच. पी. ई. विभाग / HPE Division बी.एच.ई.एल., भोपाल / BHEL, BHOPAL	 Amit Pandey DGM.-HPE अमित पाण्डेय / AMIT PANDEY उप महाप्रबंधक / Dy. General Manager एच.पी.ई. विभाग / H.P.E. Division बी.एच.ई.एल., भोपाल / BHEL, BHOPAL
<b>Approved</b>				<b>Date of issue (Rev 00)</b>  15.01.2022

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	<b>Bharat Heavy Electricals Limited, Bhopal</b> <b>Hydro Projects Engineering</b>	<b>ANNEXURE-A</b> <b>to Specification</b> <b>No. 241515356</b>
	<b>Level controller (capacitance type) for oil level measurement in TGB sump and PP Set</b>	

1. PI NO.: 24155356 dated 20.01.2022

2. PROJECT: KALWAKURTHY LIS STAGE -1


3. SCOPE OF SUPPLY:

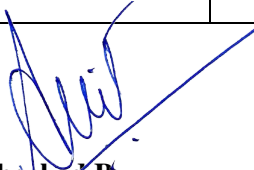
PI Item No. 1: Level controller for TGB (as per scope of supply) defined against clause 3.1 of specification 241515356.

Qty. (Set)	Level probe cum transmitter		Digital indicator cum power supply unit	Remarks
	Final Process connection of Level Probe & Coaxial Grounding Tube / Reference Probe (Assembly)	Probe length (From mounting surface)	Suitable for final Panel cutout size	
1 Set	External : 1-1/2" BSP (M)	530 mm	184 mm X 184 mm	a) Material Code – HT4315397040 b) Refer Sketch No. : HPE-GC-437 c) Cutout in the panel is 184 mm x 184 mm. The standard Digital indicator should be suitable for installing in cutout of 92 mm x 92 mm. An Adapting plate of Steel material with suitable hardware for installing the digital indicator in the panel of cutout of 184 mm x 184 mm should be supplied.

PI Item No. 2: Level controller for PP Set (Sump tank) (as per scope of supply) defined against clause 3.2 of specification 241515356.

Qty. (Set)	Level probe cum transmitter		Digital indicator cum power supply unit	Remarks
	Final Process connection of Level Probe & Coaxial Grounding Tube / Reference Probe (Assembly)	Probe length (From mounting surface)	Suitable for final Panel cutout size	
2 Set	Flange type (As per sketch)	1000 mm	184 mm X 184 mm	a) Material Code – HT4315397040 b) Refer Sketch No.: HPE-GC-438 c) Cutout in the panel is 184 mm x 184 mm. The standard Digital indicator should be suitable for installing in cutout of 92 mm x 92 mm. An Adapting plate of Steel material with suitable hardware for installing the digital indicator in the panel of cutout of 184 mm x 184 mm should be supplied.

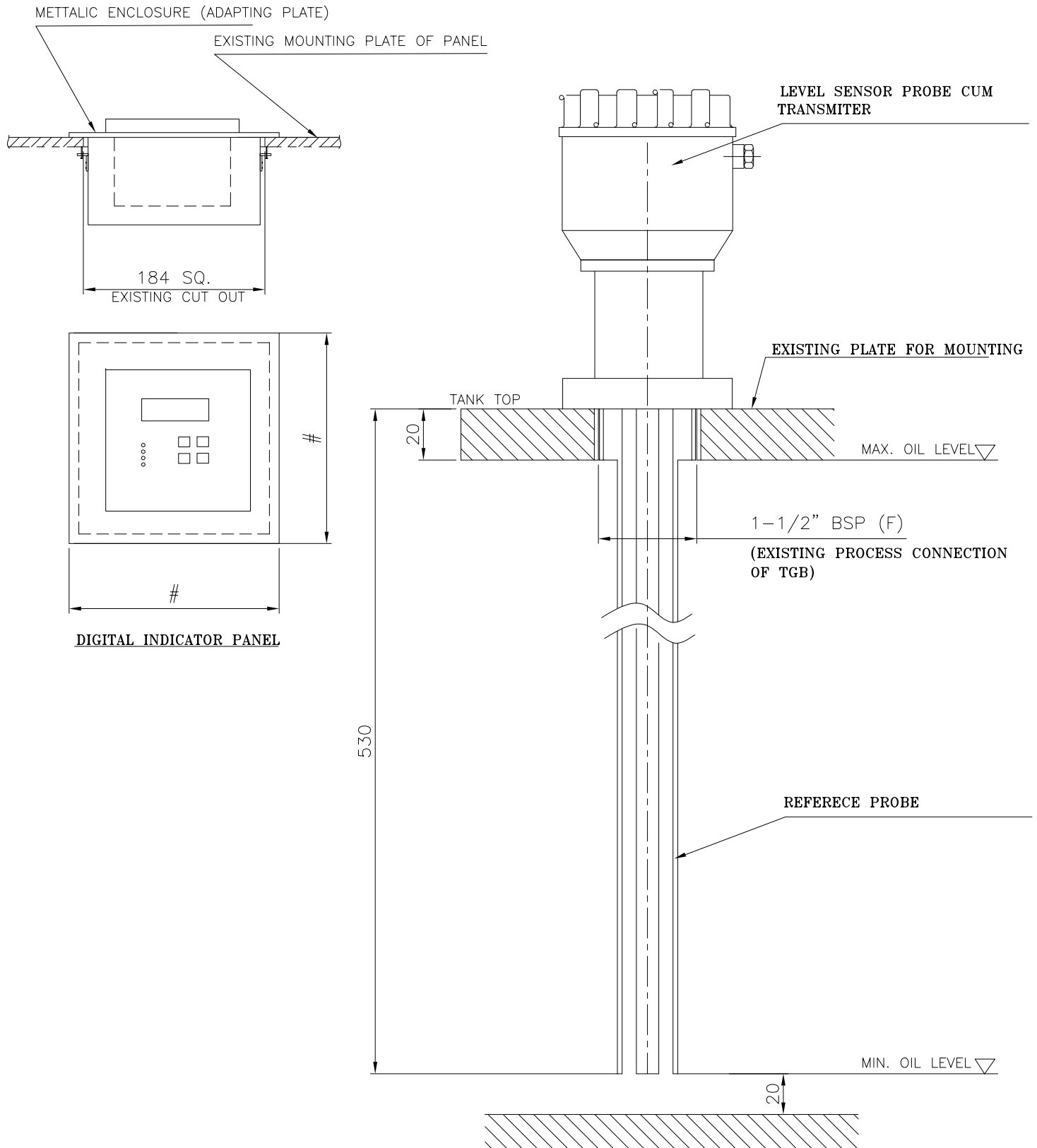
  
 विशाल कुमार नामदेव / V.K. NANDEO  
 Senior Manager  
 एच.पी.ई. विभाग / HPE Division  
 बी.एच.ई.एल., भोपाल / BHEL, BHOPAL

  
 Checked By  
 अमित पाण्डेय / AMIT PANDEY  
 उप महाप्रबंधक / Dy. General Manager  
 एच.पी.ई. विभाग / H.P.E. Division  
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 मनीष साहू / MANISH SAHU  
 बरिष्ठ उप महाप्रबंधक / Sr. Dy. General Manager  
 एच.पी.ई. विभाग / HPE Division  
 बी.एच.ई.एल., भोपाल / BHEL, BHOPAL

Approved By

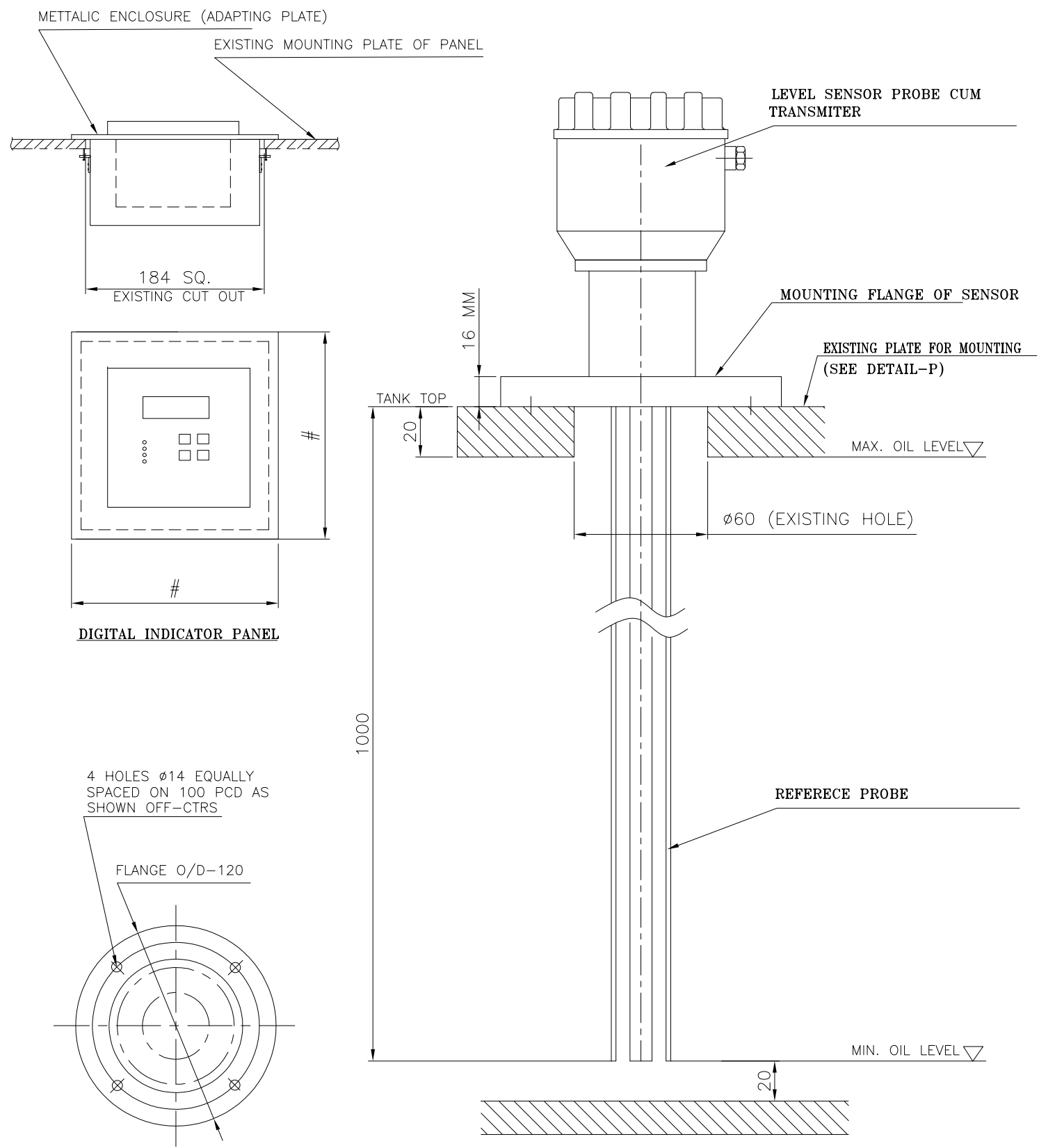
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LEVEL DETAILS OF TGB

NOTE: DIMENSION MARKED AS # TO BE FURNISHED BY THE VENDOR.

ITEM : LEVEL CONTROLLER FOR TGB	
PROJECT : K'KURTHY LIS-STAGE 1	
SKETCH NO. HTE-GC-437	REV.00
DATE : 15.01.2022	



MOUNTING FLANGE DETAILS  
OF LEVEL SENSOR  
( DETAIL P)

LEVEL DETAILS OF SUMP TANK

NOTE: A) DIMENSION MARKED AS # TO BE FURNISHED BY THE VENDOR.  
B) 4 NOS. MOUNTING SCREW (M12 X 30) WITH EACH LEVEL PROBE TO BE SUPPLIED.

ITEM : LEVEL CONTROLLER FOR PP SET (SUMP TANK)	
PROJECT : K'KURTHY LIS-STAGE 1	
SKETCH NO. HTE-GC-438	REV.00
DATE : 15.01.2022	





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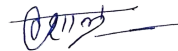
## QUALITY ASSURANCE PLAN

SHEET: 1 OF 1

PROJECT: KALWAKURTHY LIS STAGE -1 [ UNIT#2]

EQUIPMENT: LEVEL CONTROLLER FOR TGB AND PP SET (CAPACITANCE TYPE)

QA PLAN NO: 241515356-QAP DATE: 20.01.2022

SL NO	COMPONENT/ASSY/ OPERATION	CHARACTERISTICS	QUANTUM	REF. DOC. /ACCEPANCE NORMS	RECORD FORMAT	AGENCY		REMARKS
						OEM	BHEL QC/TPI	
1.	IN-COMING MATERIAL							
1.1	LEVEL CONTROLLER FOR TGB (CAPACIATNCE TYPE) and PP Set [Capacitance type level transmitter & digital indicator cum power supply]	1. Verifying Model No.. 2. Calibration certificate of transmitter 3. Calibration certificate of digital indicator cum power supply 4. Verification of serial No. as per calibration certificates	100%	Drg / Spec.	TC	P	V	TC
		1. Functional test of level probe cum transmitter for Accuracy & Operating Features 2. Functional test digital indicator cum power supply for Accuracy and Operating features	100%	Drg / Spec.	TC	P	W*	
CUSTOMER			<div> विशाल कुमार नामदेव / V.K. NAMDEO वरिष्ठ प्रबंधक / Senior Manager एच. पी. ई. विभाग / HPE BHEL BHEL</div>					

Note: 1. Packing of the each item should be as per clause no. 8 (Packaging) of our specification

2. \* Witness : Quantum of witness shall be "10% of total quantity or Minimum 1 No., whichever is more" to be witnessed by TPI / BHEL for each P.O. item.