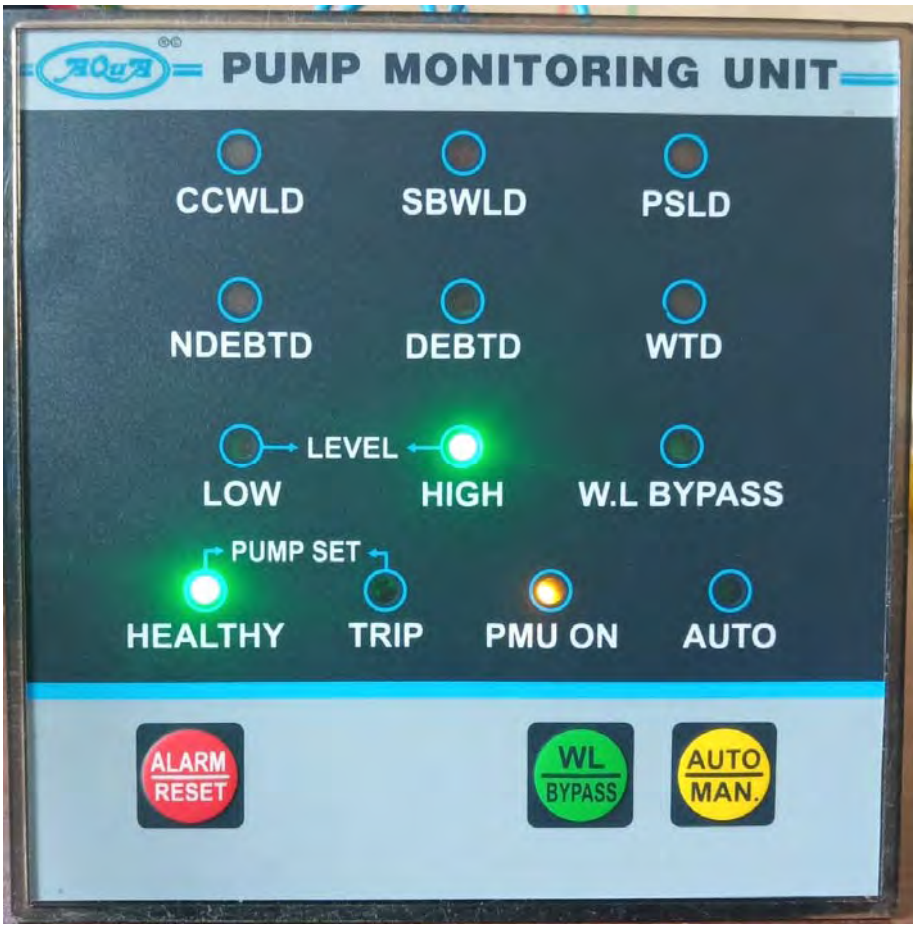
Aqua Machineries Pvt.Ltd

Product Manual

PUMP MONITORING UNIT



Aqua Machineries Pvt.Ltd
SURVEY NO. 442/2, 504/1 & 2
NEAR HARI DARSHAN ESTATE,RAMOL,
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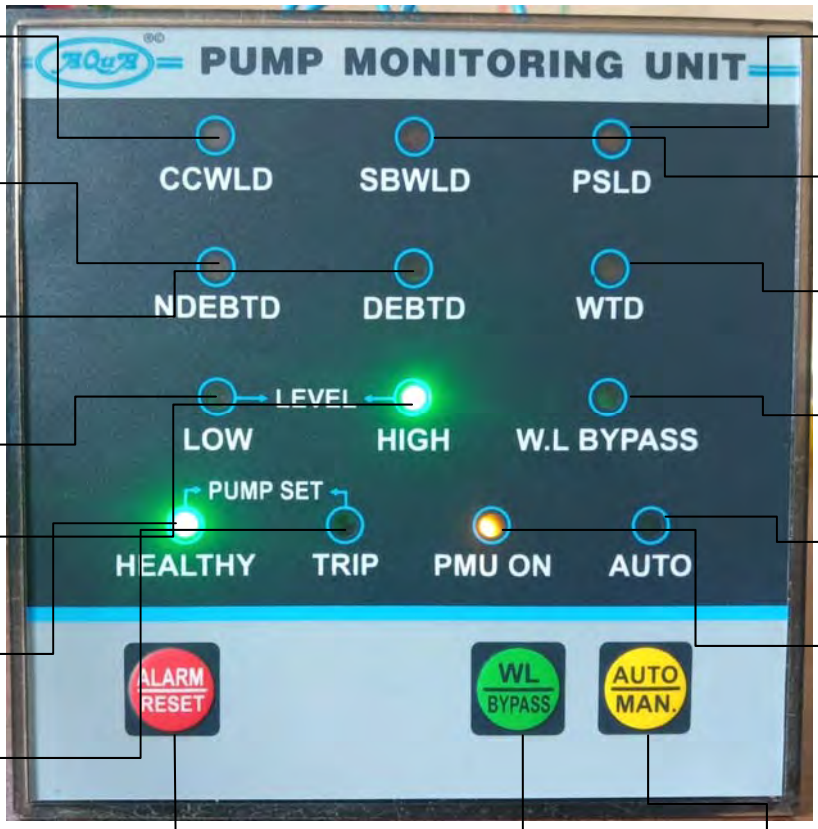
Product Inception :



CCWLD : Connection Chamber Water Leakage Detector - **RED LED**

NDEBTD : Non Drive End Bearing Temperature Leakage Detector - **RED LED**

DEBTD : Drive End Bearing Temperature Leakage Detector - **RED LED**

LEVEL LOW : Low Level Indication - **RED LED**

LEVEL HIGH : HIGH Level Indication - **GREEN LED**

PUMPSET HEALTHY : Pump set Healthy Indication - **GREEN LED**

PUMPSET TRIP : Pump set Trip Indication - **RED LED**

PSLD : Primary Seal Leakage Detector - **RED LED**

SBWLD : Stator Body Water Leakage Detector - **RED LED**

WTD : Winding Temperature Leakage Detector - **RED LED**

W.L BYPASS : Water Level Sensors Bypass - **GREEN LED**

AUTO : Auto Mode Indication - **GREEN LED**

PMU ON : PMU On Indication - **ORANGE LED**

ALARM RESET : Push Button for Alarm Reset

WL BYPASS : Push Button for Water Level Bypass

AUTO / MAN. : Push Button for Auto or Manual Mode

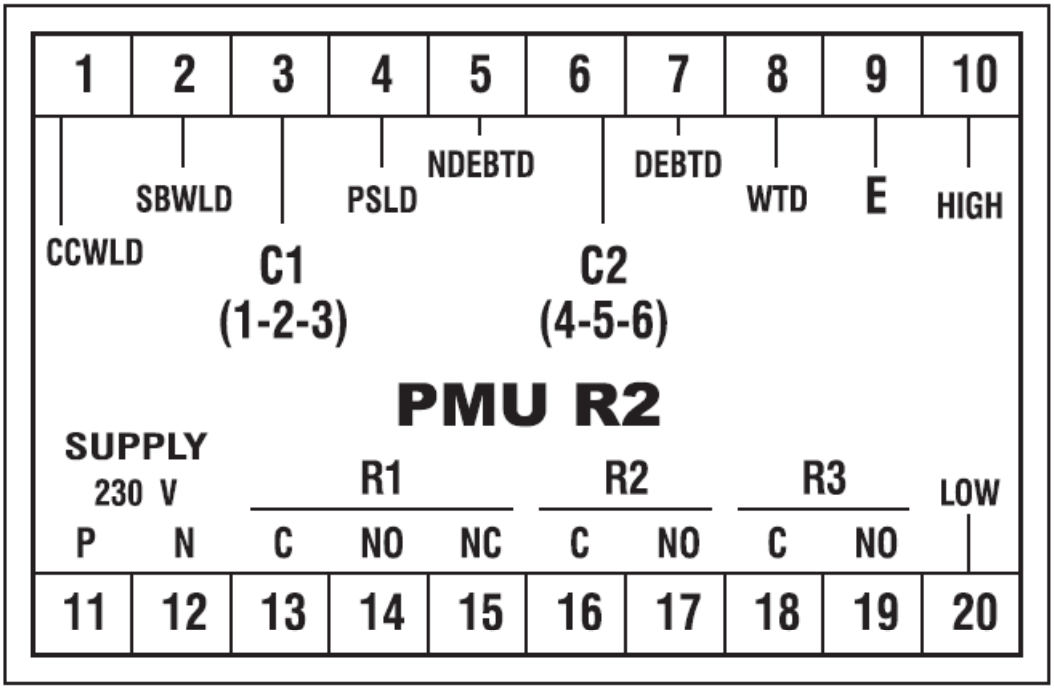
Technical Specification :

Model	Pump Monitoring Unit
Display	Upper 6 LED : **RED** Lower 7 LED : **RED**,**GREEN**,**GREEN**,**GREEN**,**RED**,**ORANGE**,**GREEN** 3 PUSH BUTTON : **RED**,**GREEN**,**YELLOW**
Size (Cut Out Dimension in mm)	96 (H) x 96 (W) x 72 (D) mm
Input	Sensor Cable from Pump set
Output	Relay 1 : (C-NO-NC) , Relay 2 : (C - NO) , Relay 3 : (C - NO)
Power Supply	230 V AC, 50 Hz, Approx 5VA
Operating Temperature	0◦ C to 55◦ C
Relative Humidity	Up to 95% RH Non Condensing

Procedure :

1)Do all connection as per the wiring diagram.
2)In Healthy Condition (water level sensors installed), 3 LED should ON (PMU ON - Orange LED ,Pump set Healthy & Level High - Green LED).
3)If Water Level Sensors not installed & cables are not connected, press WL BYPASS Push Button (WL BYPASS - GREEN LED should ON).

Terminal Diagram :



All of the Pump set protective and monitoring sensors shall be connected to a PMU (Pump Monitoring Unit). Each Pump set shall be equipped with a PMU.

The PMU shall be a Single - piece product including the level sensors (3 wires). This Unit shall be mounted on the door of Panel/JB. The PMU shall include Three soft-touch type keypad for Alarm Reset, WL Bypass & Auto/Manual.

Total 8 - 1 no each Red LED for fault indication CCWLD,SBWLD,PSLD,NDEBTD,DEBTD,WTD, Level LOW, Pump set TRIP.

Total 4 - 1 no each Green LED for High Level Sensor, WL Bypass, Pump Set Healthy, Auto mode.

1 no Orange LED for PMU On.

Operation Philosophy :

Each pump sets shall be equipped with the following Base Level protection and monitoring sensors:

1. **CCWLD** : One (1) Conductivity - type Leakage Sensor shall be provided (which is normally NO) to detect water intrusion into the motor Connection chamber. If activated (NC), the Leakage Sensor will activate an alarm (Red LED will on) and stop the pump set.

2. **SBWLD** : One (1) Conductivity - type Leakage Sensor shall be provided (Which is normally NO) to detect water intrusion into the motor Stator Body. If activated (NC), the Leakage Sensor will activate an alarm (Red LED will on) and stop the pump set.

3. **PSLD** : One (1) Conductivity - type Leakage Sensor shall be provided (Which is normally NO) to detect water intrusion into the Oil Chamber. If activated (NC), the Leakage Sensor will activate an alarm (Red LED will on) and stop the pump set.

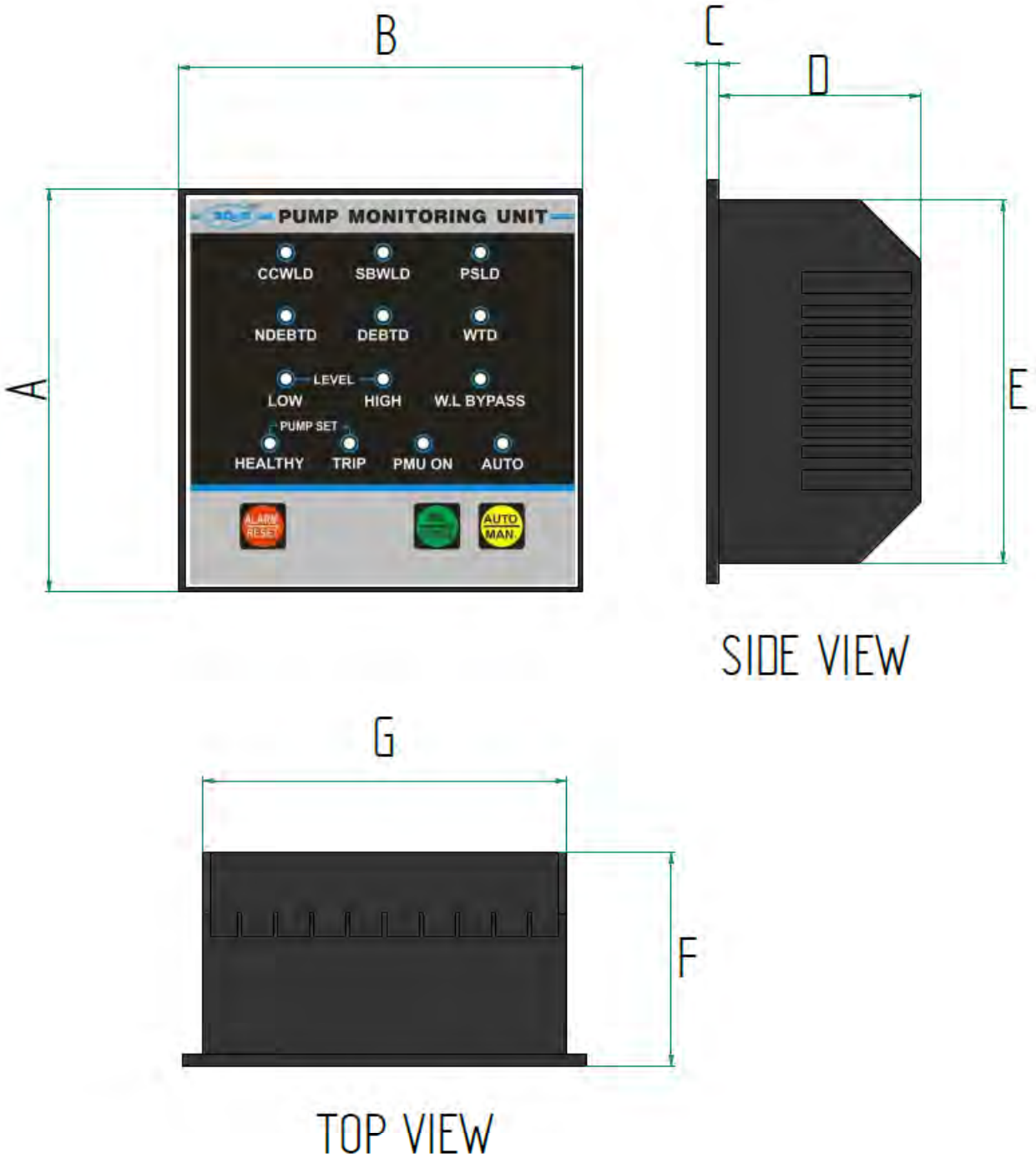
4. **NDEBTD** : One (1) NDE Bearing thermal switch installed in bearing housing, to monitor and protect the bearing from over temperature operation. The thermal switch shall open, activating an alarm (Red LED will on) and stopping the motor should a high temperature event occur.

5. **DEBTD** : One (1) DE Bearing thermal switch installed in bearing housing, to monitor and protect the bearing from over temperature operation. The thermal switch shall open, activating an alarm (Red LED will on) and stopping the motor should a high temperature event occur.

6. **WTD** : Three (3) Motor Winding Bi metallic strip / thermal switches, one installed in each motor phase winding, and connected in series to monitor and protect the winding from over temperature operation. The thermal switches shall open, activating an alarm (Red LED will on) and stopping the motor should a high temperature event occur.

7. Water Level Sensor is provided to detect level of water so that appropriate signal can be transmitted to PMU (Pump Monitoring Unit) for Liquid Level / Tripping / To stop the pump set for working under Lower Liquid Level. The pump set shall be working with Higher Liquid Level. Water level sensor provided with 3 wires for external connection to PMU.

Mechanical Installation :



Model	A	B	C	D	E	F	G
Dimensions (mm)	96	96	3	72	90	75	90

Water Level Sensors :

Water Level Sensor is provided to detect level of water so that appropriate signal can be transmitted to PMU (Pump Monitoring Unit) for Liquid Level / Tripping / To stop the pump set for working under Lower Liquid Level.

Now to detect water level –three different Sensors - called as

1. H-high level
2. L-low Level
3. E-sensor earth.

For level sensor position – Please refer schematic diagram.

WORKING :

- The System is design in such a manner that pump set work above Low Liquid level.
- If Liquid level is going down (Low Level), then pump will automatically stop.
- To restart the pump set – Liquid level must have to reach @ High Level.

Electrical Properties :

1. Water level sensor provided with 3 wires for external connection to PMU.
2. Cable length for all three sensor = 10m (Standard)

Technical Data :

Supply Voltage	From PMU
Wire Size	3R (1sqmm x 10 m)
Material	SS
Length	60mm
Diameter	20 mm

CAUTION : *Do not touch sensor when pump is under operation / in Running Condition.*

Schematic Diagram :

WATER LEVEL SENSOR POSITION

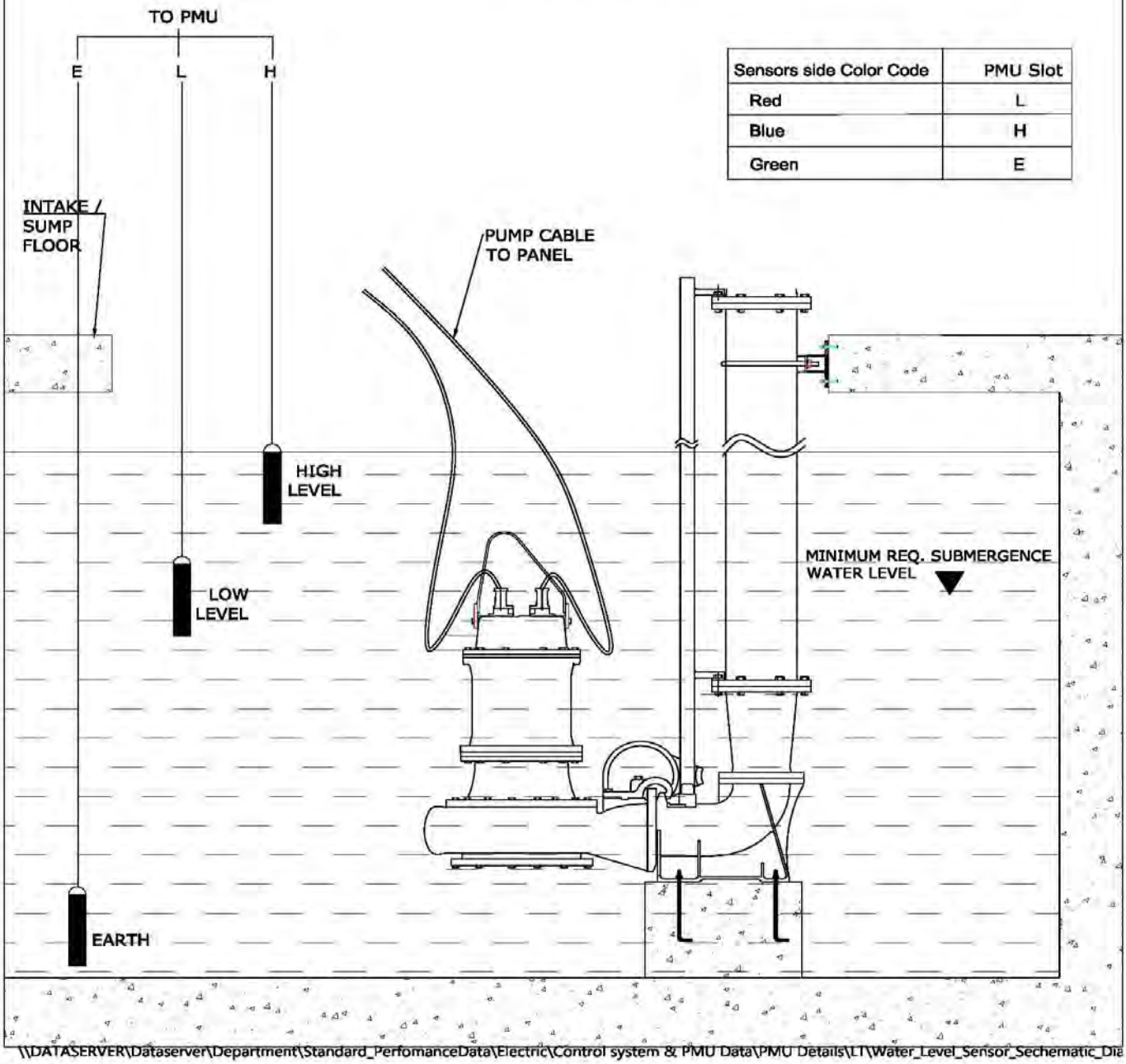
(1) While pump is working:-

- Level of water decrease from high level to low level.
- When it reaches to the Low Level, PMU send signal to electrical panel, which "STOP" the pump immediately to avoid dry run.

(2) While pump is stop:-

- Water reaches to high level from low level, immediately PMU send signal to panel to "START" the pump.

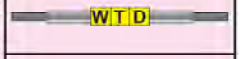
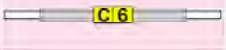
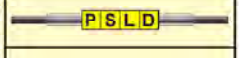
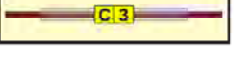
(3) Water level sensors are connected with PMU are provided by AQUA.



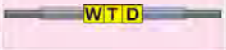
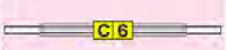
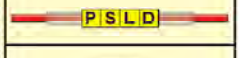
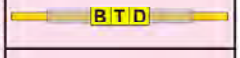
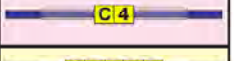
Sensors side Color Code	PMU Slot
Red	L
Blue	H
Green	E

\\DATASERVER\Dataserver\Department\Standard_PerfomanceData\Electric\Control system & PMU Data\PMU Details\LT\Water_Level_Sensor_Sechematic_Dia

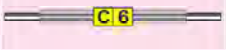
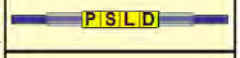
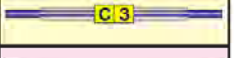
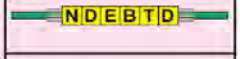
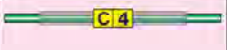
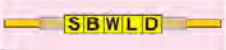
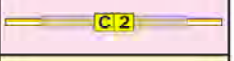
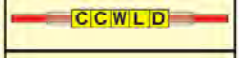
4 CORE (1R x 4C x 1.5 mm²)

Sensor Detail	Cable Colour	Ferrule Code	Description	Finished Look
WTD Winding Temperature Detector	GREY	WTD	Three (3) Motor Winding Bi-metallic strip / thermal switches ***(Winding Temperature Detector)*** are provided in winding. one installed in each motor phase winding, and connected in series to monitor and protect the winding from temperature over 130°C operation, which is Faulty Open ***(FO)*** at 130°C, activating an alarm and stopping the motor in high temperature event *(If PMU is connected)*. Winding Temperature Detector *(Bimetallic Switch is Normally Close (NC))*	
	WHITE	C6		
PSLD Primary Seal Leakage Detector	BLACK	PSLD	One (1) Conductivity- type Leakage Sensor ***(Primary Seal Leakage Detector)*** shall be provided to detect water intrusion into the Oil Chamber. which is Faulty Close ***(FC)***, the Leakage Sensor will activate an alarm and stop the pump set *(If PMU is connected)*. Lower Seal Leakage Detector is Normally Open ***(NO)***.	
	BROWN	C3		

7 CORE (1R x 7C x 1.0 mm²)

Sensor Detail	Cable Colour	Ferrule Code	Description	Finished Look
WTD Winding Temperature Detector	GREY	WTD	Three (3) Motor Winding Bi-metallic strip / thermal switches ***(Winding Temperature Detector)*** are provided in winding. one installed in each motor phase winding, and connected in series to monitor and protect the winding from temperature over 130°C operation, which is Faulty Open ***(FO)*** at 130°C, activating an alarm and stopping the motor in high temperature event *(If PMU is connected)*. Winding Temperature Detector *(Bimetallic Switch is Normally Close (NC))*	
	WHITE	C6		
PSLD Primary Seal Leakage Detector	RED	PSLD	One (1) Conductivity- type Leakage Sensor ***(Primary Seal Leakage Detector)*** shall be provided to detect water intrusion into the Oil Chamber. which is Faulty Close ***(FC)***, the Leakage Sensor will activate an alarm and stop the pump set *(If PMU is connected)*. Lower Seal Leakage Detector is Normally Open ***(NO)***.	
	GREEN	C3		
BTD Bearing Temperature Detector	YELLOW	BTD	Two (2) Bearing thermal switch ***(Bearing Temperature Detector)*** are provided one installed in each *(NDE & DE)* bearing housing, to monitor and protect the bearing from over temperature operation, which is Faulty Open ***(FO)***. The thermal switch shall open, activating an alarm and stopping the motor in high temperature event. *(If PMU connected)*. Bearing Temperature Detector (Bimetallic Switch is Normally Close ***(NC)***).	
	BLUE	C4		
SPARE	BLACK	-	SPARE	

12 CORE (1R x 12C x 1.5 mm²)

Sensor Detail	Cable Colour	Ferrule Code	Description	Finished Look
WTD Winding Temperature Detector	GREY	WTD	Three (3) Motor Winding Bi-metallic strip / thermal switches ***(Winding Temperature Detector)*** are provided in winding. one installed in each motor phase winding, and connected in series to monitor and protect the winding from temperature over 130°C operation, which is Faulty Open ***(FO)*** at 130°C, activating an alarm and stopping the motor in high temperature event *(If PMU is connected)*. Winding Temperature Detector *(Bimetallic Switch is Normally Close (NC))*	
	GREY with White Line	C6		
PSLD Primary Seal Leakage Detector	BLUE	PSLD	One (1) Conductivity- type Leakage Sensor ***(Primary Seal Leakage Detector)*** shall be provided to detect water intrusion into the Oil Chamber. which is Faulty Close ***(FC)***, the Leakage Sensor will activate an alarm and stop the pump set *(If PMU is connected)*. Lower Seal Leakage Detector is Normally Open ***(NO)***.	
	BLUE with White Line	C3		
NDEBTD Non Drive End Bearing Temperature Detector	GREEN	NDEBTD	One (1) NDE bearing thermal switch ***(Non Drive End Bearing Temperature Detector)*** installed in bearing housing, to monitor and protect the bearing from over temperature operation which is Faulty Open ***(FO)***. The thermal switch shall open, activating an alarm and stopping the motor should a high temperature event occur *(If PMU is connected)*. Bearing Temperature Detector *(Bimetallic Switch is Normally Close (NC))*	
	GREEN with White Line	C4		
DEBTD Drive End Bearing Temperature Detector	BLACK	DEBTD	One (1) NDE bearing thermal switch ***(Drive End Bearing Temperature Detector)*** installed in bearing housing, to monitor and protect the bearing from over temperature operation which is Faulty Open ***(FO)***. The thermal switch shall open, activating an alarm and stopping the motor should a high temperature event occur *(If PMU is connected)*. Bearing Temperature Detector *(Bimetallic Switch is Normally Close (NC))*	
	BLACK with White Line	C5		
SBWLD Stator Body Water Leakage Detector	YELLOW	SBWLD	One (1) Seperator-type Leakage Sensor ***(Stator Body Water Leakage Detector)*** shall be provided in Stator Body *(Which is Normally Open (NO))* to detect water intrusion into the motor Stator Body. If activated, the Leakage Sensor will activate an alarm and stop the pump set, which is Faulty Close ***(FC)***) *(If PMU is connected)*.	
	YELLOW with White Line	C2		
CCWLD Connection Chamber Water Leakage Detector	RED	CCWLD	One (1) Separator-type Leakage Sensor ***(Connection Chamber Water Leakage Detector)*** shall be provided in Stator Body *(Which is Normally Open (NO))* to detect water intrusion into the motor Stator Body. If activated, the Leakage Sensor will activate an alarm and stop the pump set, which is Faulty Close ***(FC)***) *(If PMU is connected)*.	
	RED with White Line	C1