

3" BOREWELL SUBMERSIBLE PUMPSET - OPI V3



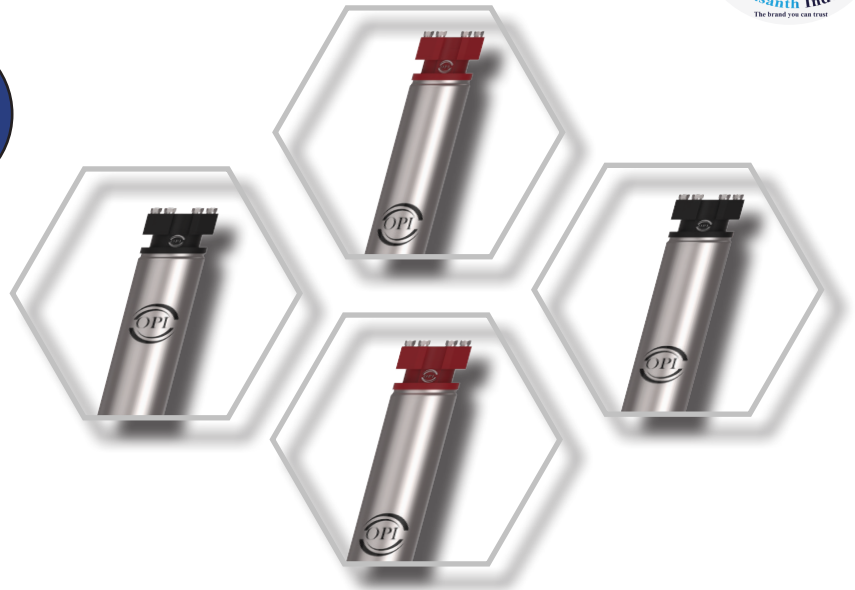
SUBMERSIBLE V3

TOOLS
REQUIRED

PRE
INSTALL

CABLE
JOINT

ERECTION
PROCESS



OPI INSTALLATION GUIDE

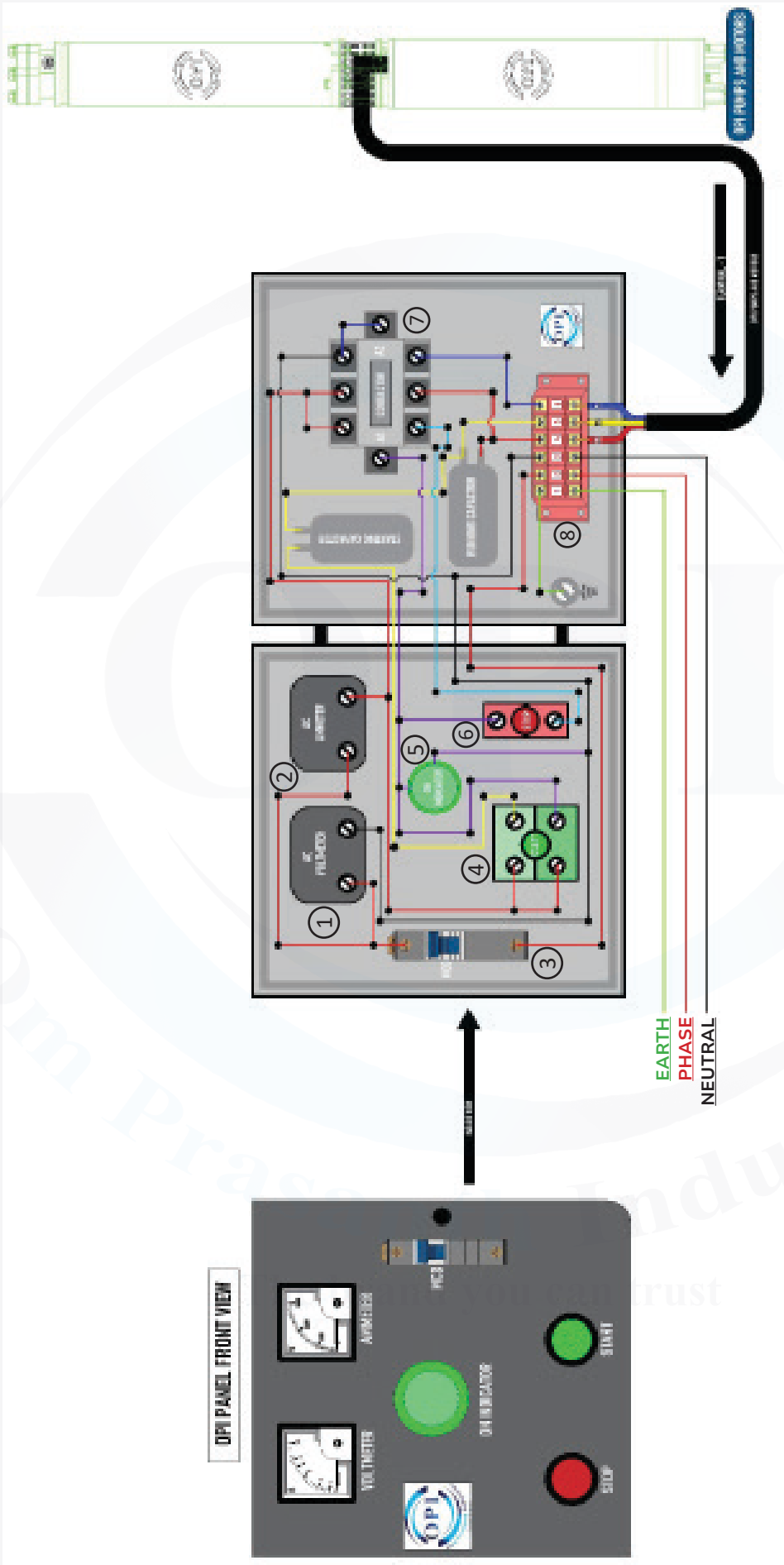
HOW TO INSTALL
V3 SUBMERSIBLE PUMP

OPI V3 INSTALLATION
MANUAL

3" BOREWELL SUBMERSIBLE PUMPSET -OPI V3



22. CIRCUIT DIAGRAM FOR SINGLE PHASE SUBMERSIBLE CONTROL PANEL



MOTOR CONNECTION	
CABLE	TERMINAL
RED	4
YELLOW	5
BLUE	6

MOTOR CONNECTION	
CABLE	TERMINAL
EARTH	1
PHASE	2
NEUTRAL	3

PART NO	PART NAME
5	ON INDICATOR
6	STOP SWITCH
7	CONTACTOR
8	CONNECTOR

PART NO	PART NAME
1	VOLTMETER
2	AMMETER
3	MCB
4	START SWITCH

■ 23. PROCEDURE FOR SUBMERSIBLE SINGLE PHASE CONTROL PANEL :

1. Overview of Components :

- Tools & Materials Required
- Single Phase Control Panel (as per the provided diagram)
- Voltmeter & Ammeter
- MCB (Miniature Circuit Breaker)
- Start & Stop Push Buttons
- Indicator Lamp
- Contactor with Coil (A1 & A2)
- Running & Starting Capacitors
- Electrical Wires (as per color codes)

Crimping Tool, Wire Strippers, and Screwdrivers

Wiring Procedure

1. Power Input Connection

1. Connect the incoming power supply (Phase & Neutral) to the MCB.
2. From the MCB output terminals, connect the phase wire to:
 - o Voltmeter (one terminal)
 - o Ammeter (one terminal)
 - o One side of the start and stop buttons
 - o One terminal of the contactor coil (A1)

2. Control Circuit Wiring

1. Indicator Wiring:

- o Connect a wire from the MCB output to one side of the ON indicator lamp.
- o The other terminal of the ON indicator goes to Neutral.

2. Push Button Wiring:

- o Connect one side of the START button to the phase output from MCB.
 - o Connect the other side of the START button to the contactor coil (A1).
 - o The STOP button is wired in series between the START button and contactor.
-

3. Contactor Wiring:

- o The other side of the coil (A2) is connected to Neutral.
- o Main contact terminals of the contactor connect the power supply to the motor.

3. Capacitor & Motor Wiring

1. Running Capacitor:

- o Connect one terminal of the running capacitor to the phase terminal of the motor.
- o The other terminal connects to Neutral.

2. Starting Capacitor:

- o Connected in parallel with the running capacitor but passes through the contactor to provide an initial boost.

3. Motor Terminal Connections:

- o Wire the output from the contactor to the submersible pump motor via the terminal block.
- o Ensure that the phase, neutral, and ground connections are secure.

4. Final Testing & Safety Checks

- ✓ Ensure all connections are properly insulated.
- ✓ Tighten all screws and terminals to avoid loose connections.
- ✓ Check with a multimeter for continuity and proper voltage.
- ✓ Power on the panel and test the start/stop function.
- ✓ Verify that the voltmeter and ammeter are displaying correct values.
- ✓ If everything is working correctly, the pump should start and run smoothly

Pre-Start Inspection

- ✓ Ensure all electrical connections are properly secured.
- ✓ Check that the power supply is stable and matches the panel rating.
- ✓ Verify that the MCB is in the OFF position before powering up.
- ✓ Ensure the submersible pump is properly installed and submerged in water.

Emergency & Safety Measures

- ⚠ If an **overload or fault** occurs, the MCB will trip. Investigate and reset it only after identifying the cause.
- ⚠ In case of **low voltage or high current**, switch off the panel immediately.
- ⚠ If the pump fails to start, check wiring, capacitors, and contactor operation.

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24. CABLE SELECTION CHART :

Select the appropriate cables for connecting the strater to submersible motor

Motor Rating		Cable size in Sq.mm								
		1.5	2.5	4	6	10	16	25	35	50
KW	H P	Maximum Length of Cable in Metres								
1	0.75	262	437	705						
1.5	1.1	222	370	596	895					
2	1.5	160	267	430	646					
3	2.2	111	185	298	447	773				
4	3	84	141	228	342	590	933			
5	3.7	72	120	193	290	502	793			
6	4.5	60	100	161	242	426	661			
7.5 DOL	5.5		82	133	200	346	547			
7.5 SD	5.5	86	143	231	347	600	947			
9	6.7	89	115	186	279	483	763			
10	7.5	69	106	172	258	446	704			
12.5	9.3	64	83	134	201	348	549	852		
15	11		71	155	173	300	473	735		
17.5	13			98	148	256	404	626	822	
20	15			87	129	223	352	546	769	
25	18.5			78	117	202	319	495	697	
30	22.5				96	167	264	409	577	828
35	26					145	229	355	500	717
40	30					133	211	327	461	662

1. Voltage and Current Basis

The table provides the maximum allowable length of submersible cables for the specified full load current at a nominal voltage of 415 V.

Symbol: $V = 415 \text{ V}$

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2. Adjustments for Different Voltages

For systems operating at voltages other than 415 V, the cable size and length must be adjusted using the formula:

$$\text{Calculated Length} = \left[\frac{V_{\text{nominal}}}{V_{\text{actual}}} \right] \times \text{Actual Length}$$

3. Special Consideration for SD Motors (7.5 H.P and Above)

- For motors with 7.5 HP and above (SD motors), the actual current is assumed to be $1 / \sqrt{3}$ of the full load current.
- Cable size and maximum allowable length are calculated accordingly.

$$I_{\text{actual}} = (1 / \sqrt{3}) \times I_{\text{FL}}$$

4. Derating Factors

- The cable length values in the table consider typical derating factor such as :
 - Ambient Temperature
 - Voltage drop limits (typically set to 3%)
 - Real- World resistance variations.

Symbol : K_{derating}

5. Permissible Voltage Drop

- The maximum allowable length is based on voltage drop not exceeding 3% of 415 V (approximately 12.45 V)
- For applications requiring stricter limits (eg: 2% voltage drop), length should be recalculated accordingly

Symbol : $V_d \leq 3\% \times V_{\text{nominal}}$

6. Copper Cables:

- The resistance values used in calculations assume annealed copper conductors with standard resistivity values (e.g.. 0.0172 $\Omega/\text{mm}^2/\text{km}$)

Symbol : R_{Copper}

7. Safety Margins:

- The lengths in the table are conservative, ensuring compliance with safety standards and accounting for installation variations (e.g.. cable bundling or aging).

Symbol : $S_{\text{safety margin}}$

Disclaimer:

- The above shown selection chart is for general applications. For specific condition we recommend you to consult us or manufacturer for proper selection.
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