

SUBMERSIBLE VERTICAL OPENWELL- THREE PHASE



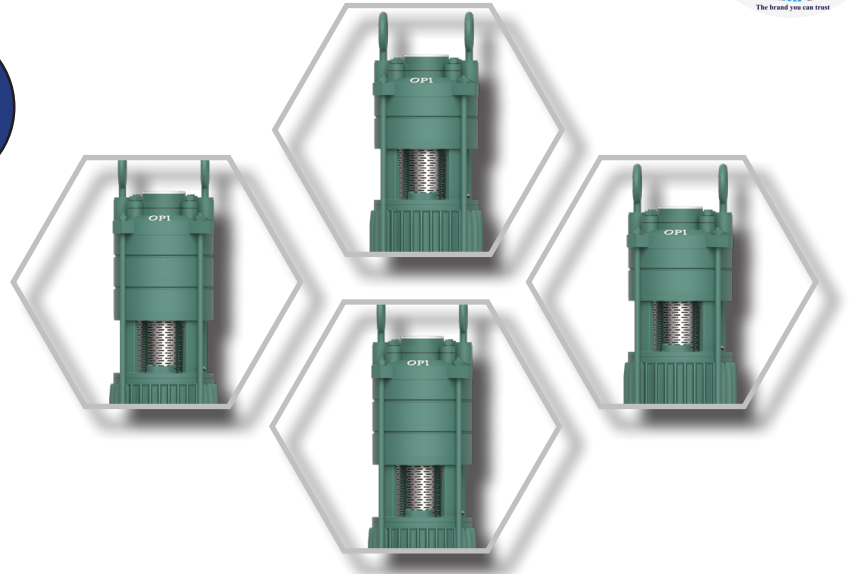
VERTICAL OPENWELL

TOOLS
REQUIRED

PRE
INSTALL

CABLE
JOINT

ERECTION
PROCESS



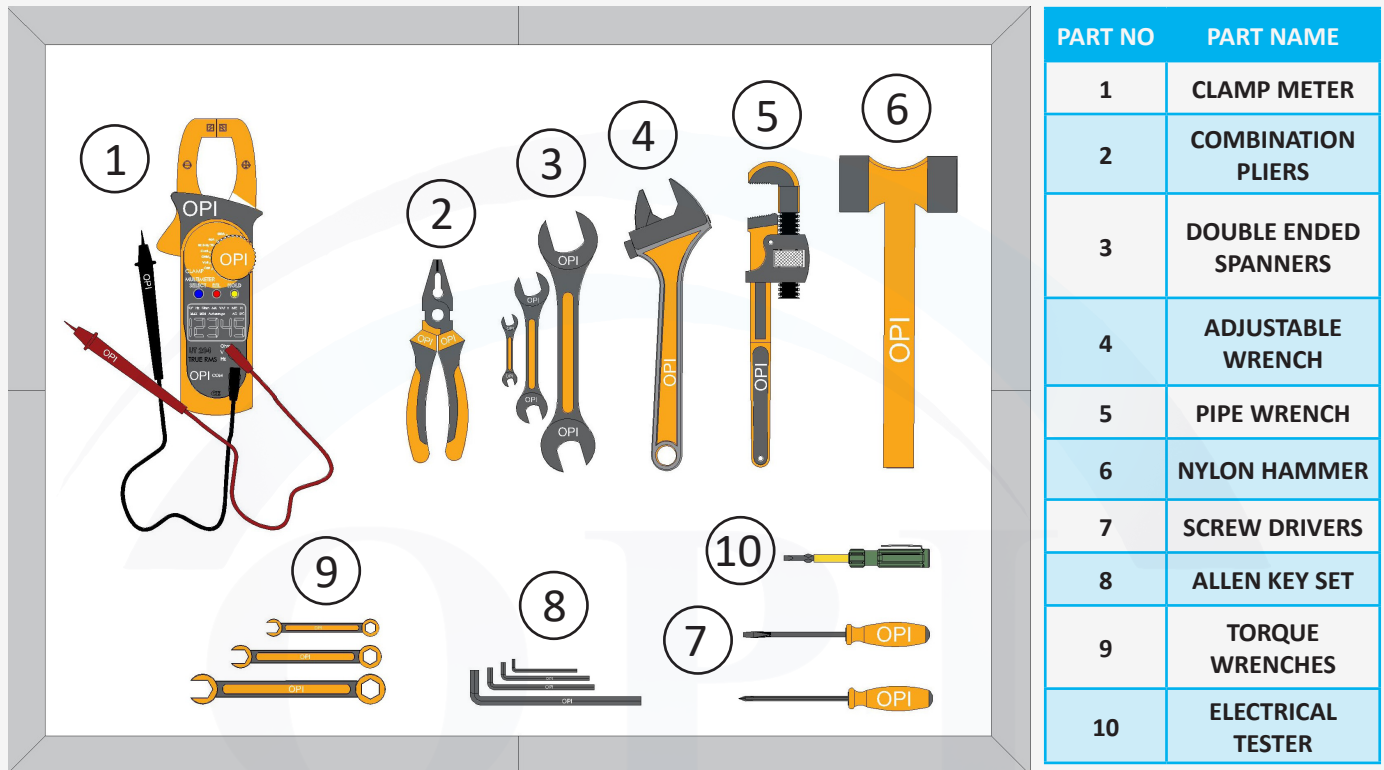
OPI INSTALLATION GUIDE

HOW TO INSTALL
SUBMERSIBLE VERTICAL
OPENWELL

OPI VERTICAL OPENWELL
INSTALLATION MANUAL

11. TOOLS AND THEIR USES IN SUBMERSIBLE PUMP ERECTION

The following tools play a crucial role in the erection process of a submersible pump. Each tool is designed to assist in specific tasks, ensuring proper installation, connection, and testing.



1. Clamp Meter

✓ Purpose:

- Measures electrical parameters such as current, voltage, and resistance during motor testing and setup.

✎ Notes:

Always use the clamp meter to verify electrical conditions for safe operation.

⚠ Caution:

Improper use can lead to incorrect readings or potential electrical hazards.

2. Combination Pliers

✓ Purpose:

- Used for cutting, bending, and securing electrical cables.
- Tightens or adjusts small fittings during assembly.

✎ Notes:

Ensure the pliers' grip is firm when tightening or cutting cables.

⚠ Caution:

Sharp edges or excessive force may cause injury or damage to components.

3. Open-End and Ring Spanners

✓ Purpose:

- Tightens or loosens nuts and bolts on flanges, clamps, and pipe joints.

✎ Notes:

Use the correct size spanner to avoid damage to bolts and nuts.

⚠ Caution:

Over-tightening can cause damage to the flanges or threads.

4. Adjustable Wrench

✓ Purpose:

- Provides versatility for applications where bolt sizes vary.
- Useful for assembling or disassembling delivery pipe joints.

✎ Notes:

Ensure the adjustable wrench is securely fitted before applying force.

⚠ Caution:

Misuse can cause slipping, leading to injury or damage to joints.

5. Pipe Wrench

✓ Purpose:

- Essential for gripping and tightening threaded pipe joints during delivery pipe assembly.

✎ Notes:

Make sure the wrench is properly adjusted to fit the pipe size.

⚠ Caution:

Improper handling can cause damage to pipe threads and fittings.

6. Nylon Hammer

✓ Purpose:

- Aligns flanges or gently taps pipe connections into position without causing damage.

✎ Notes:

Use controlled force to avoid damaging sensitive components.

⚠ Caution:

Excessive force can damage components or cause injury.

7. Screwdrivers (Flathead and Phillips)

Purpose:

- Secures screws in electrical terminals or flange covers.
- Used during control panel wiring and fastening.

Notes:

Ensure the screwdriver is in good condition to prevent stripping screws.

Caution:

Do not force a screwdriver into tight screws, as this can cause injury or damage.

8. Allen Keys

Purpose:

- Tightens or loosens hexagonal bolts, commonly used in motor mounts or coupling assembly.

Notes:

Ensure the Allen key fits snugly into the bolt to prevent damage.

Caution:

Over-torquing may cause bolts to break or deform the key.

9. Double-Ended Spanners

Purpose:

- Ideal for tasks requiring two different sizes of bolts or nuts during pump installation.

Notes:

Use the appropriate end for each bolt size to maintain proper torque.

Caution:

Incorrect use can damage bolts and nuts or cause injury.

10. Tightening Torque Wrenches

Purpose:

- Ensures precise tightening of bolts to avoid over-tightening or loose connections.

Notes:

Always follow the manufacturer's specified torque values.

Caution:

Failure to use a torque wrench properly can lead to under-tightening or over-tightening, both of which could impact the system's safety and performance.

12. SCHEMATIC INSTALLATION PROCEDURE :

Installation Guide: V6 Submersible Motor

The V6 submersible motor comes pre-filled with a mixture of clear cold drinking water and anti-corrosive liquid. To ensure proper operation and durability, follow the steps below before installation.

Step 1: Position the Motor

✓ **Action:** Place the motor vertically on a stable and level base.

✎ **Notes:**

- Ensure the motor remains upright during the entire installation process to avoid internal component damage.

⚠ **Caution:** Tilting the motor can cause uneven water distribution and potential damage to internal parts.

Step 2: Check the Fasteners

✓ **Action:** Inspect all visible fasteners and screws on the motor.

✎ **Notes:**

- Tighten any loose bolts or screws using appropriate tools.
- Pay special attention to the top and bottom flanges to ensure they are securely fastened.

⚠ **Caution:** Loose fasteners can lead to vibrations and improper motor operation.

Step 3: Remove Threaded Plugs

✓ **Action:** Identify the two threaded plugs located on the top or circumference of the motor casing.

✎ **Instructions:**

- Carefully unscrew and remove the plugs using a wrench, as shown in Fig. 1 below.

⚠ **Caution:** Do not overtighten when removing plugs, as this may damage the threads.

Step 4: Top Up with Pure Drinking Water

◆ **Filling Process:**

- Using a clean funnel, pour clear cold drinking water into the motor through the plug openings.
- Gently rock the motor back and forth to release trapped air bubbles.
- Recheck the water level after air bubbles escape and top up if necessary.

✎ **Important Notes:**

- Always use clean, potable water to maintain internal motor integrity.
- Avoid overfilling the motor. The water level should just reach the recommended mark.

Step 5: Reassemble the Threaded Plugs

✓ **Action:** Once the motor is filled, reinsert the threaded plugs.

✎ **Notes:**

- Tighten the plugs securely to prevent water leakage.

⚠ **Caution:** Improper tightening of the plugs may cause leaks and reduce motor performance.

Step 6: Inspect for Leakage

✓ **Action:** Dry the motor's exterior with a clean cloth and inspect for water leakage.

✎ **Checklist:**

- If leakage is detected, recheck the threaded plugs and tighten as needed.
- Ensure no water escapes from any motor joints or seals.

⚠ **Caution:** Do not proceed with installation if leakage persists. This can compromise motor performance.

Step 7: Prepare for Coupling

✓ **Action:** Align the motor shaft keyway with the pump coupling.

✎ **Steps:**

- Carefully slide the coupling over the motor shaft until it rests securely on the sand guard.
- Ensure proper alignment for smooth operation.

⚠ **Caution:** Misalignment of the coupling may cause vibration and reduce system efficiency.

Final Checklist

Before proceeding to install the motor with the pump:

- ✓ Ensure the motor is upright and securely positioned.
- ✓ Verify that no water is leaking from the motor.
- ✓ Confirm that the coupling is properly aligned and tightly fastened.

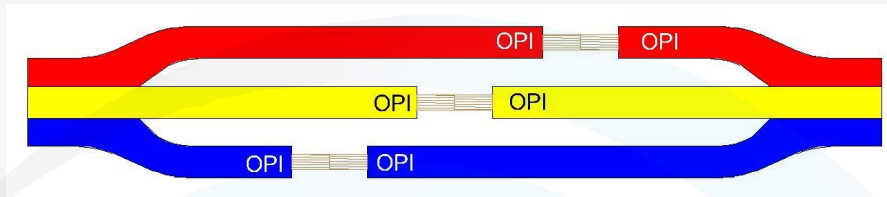
The brand you can trust

13. CABLE JOINT PROCEDURE :

Procedure for Joining and Insulating the 3-Core Conductors

This guide outlines the step-by-step process for securely joining and insulating 3-core conductors, ensuring long-term performance and safety in underwater applications. Each step includes precautions to maintain proper insulation and prevent water ingress.

Step 1: Conductor Preparation and Jointing



✓ Action:

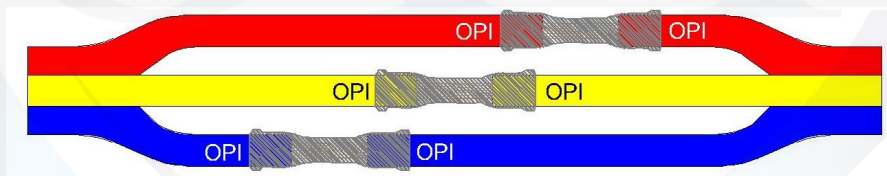
- Solder or knot the copper strands of each core to ensure a **solid electrical connection**.

✎ Notes:

- Align the cores properly to prevent overlapping or improper positioning.
- Use high-quality solder or secure mechanical knots for durability.

⚠ **Caution:** Poor alignment or weak soldering can lead to electrical failure or overheating.

Step 2: Layer 1 – Virgin Rubber Insulation



✓ Action:

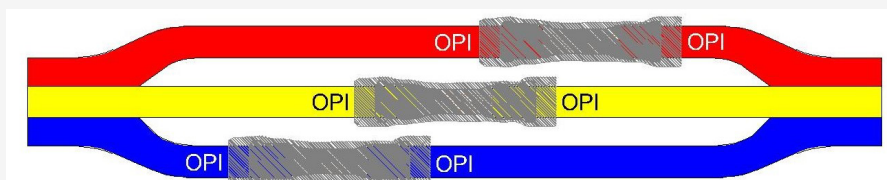
- Wrap the first layer of **virgin rubber insulation** tightly around each conductor joint.

✎ Notes:

- Ensure the wrapping **slightly overlaps** beyond the conductor's insulation ends to maintain uniform thickness.

⚠ **Caution:** Gaps in the rubber insulation can expose the joint, leading to water ingress or short circuits.

Step 3: Layer 2 – PVC Insulation Tape



✓ **Action:**

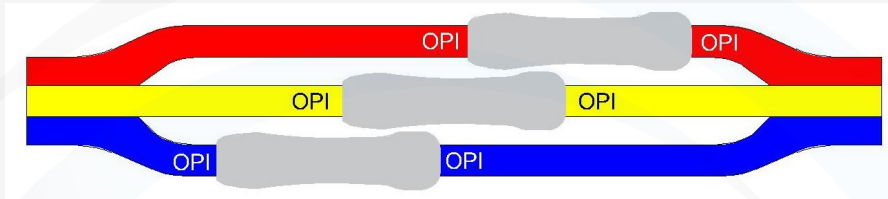
- Apply the first layer of **PVC insulation tape** over the virgin rubber insulation.

✎ **Notes:**

- Start wrapping from one end of the joint and overlap evenly to create a **seamless layer**.

⚠ **Caution:** Poor alignment or weak soldering can lead to electrical failure or overheating.

Step 4: Layer 3 – Virgin Rubber Insulation



✓ **Action:**

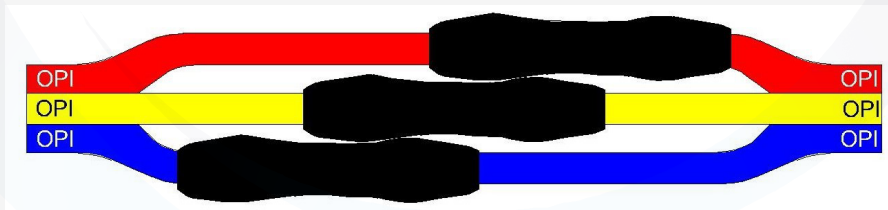
- Add a second layer of **virgin rubber insulation** over the PVC tape for **enhanced insulation**.

✎ **Notes:**

- Ensure complete coverage with no gaps or exposed areas.

⚠ **Caution:** Missing areas or inconsistent wrapping can compromise insulation quality.

Step 5: Layer 4 – PVC Insulation Tape



✓ **Action:**

- Apply a second layer of **PVC insulation tape** as the **final protective layer** for each core.

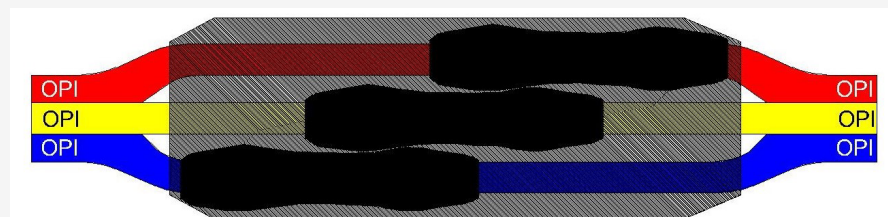
✎ **Notes:**

- Use consistent tension during wrapping to avoid wrinkling or loose sections.

⚠ **Caution:** Loose sections can allow moisture to seep into the joint, causing failure.

Procedure for Joining and Insulating the Cable Joint for Underwater Application

Step 6: Layer 1 – Virgin Rubber Insulation (Cable Level)



✓ **Action:**

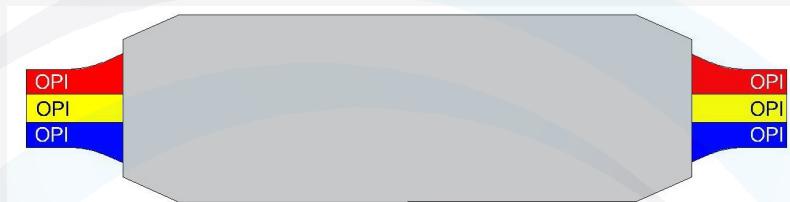
- Wrap a layer of **virgin rubber insulation** tightly around the **entire cable joint**, covering all cores.

✎ **Notes:**

- Ensure the layer is smooth and free from gaps to **prevent water ingress**.

⚠ **Caution:** Inadequate insulation at this stage may lead to water penetration and system damage.

Step 7: Layer 2 – PVC Insulation Tape (Cable Level)



✓ **Action:**

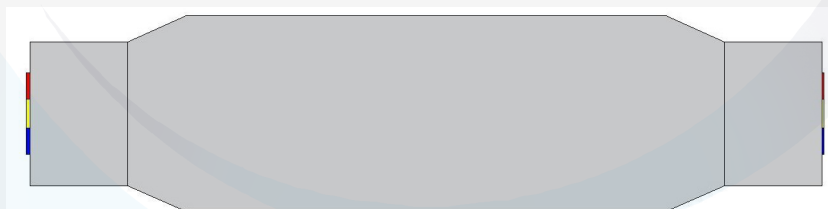
- Apply the first layer of **PVC insulation tape** over the virgin rubber insulation for **added strength and water resistance**.

✎ **Coverage:**

- Extend the wrapping slightly beyond the ends of the virgin rubber layer.

⚠ **Caution:** Overlapping inconsistently may leave weak spots in the insulation.

Step 8: Layer 3 – PVC Insulation Tape (Final Layer)



✓ **Action:**

- Add a **second layer of PVC insulation tape** to complete the joint insulation.

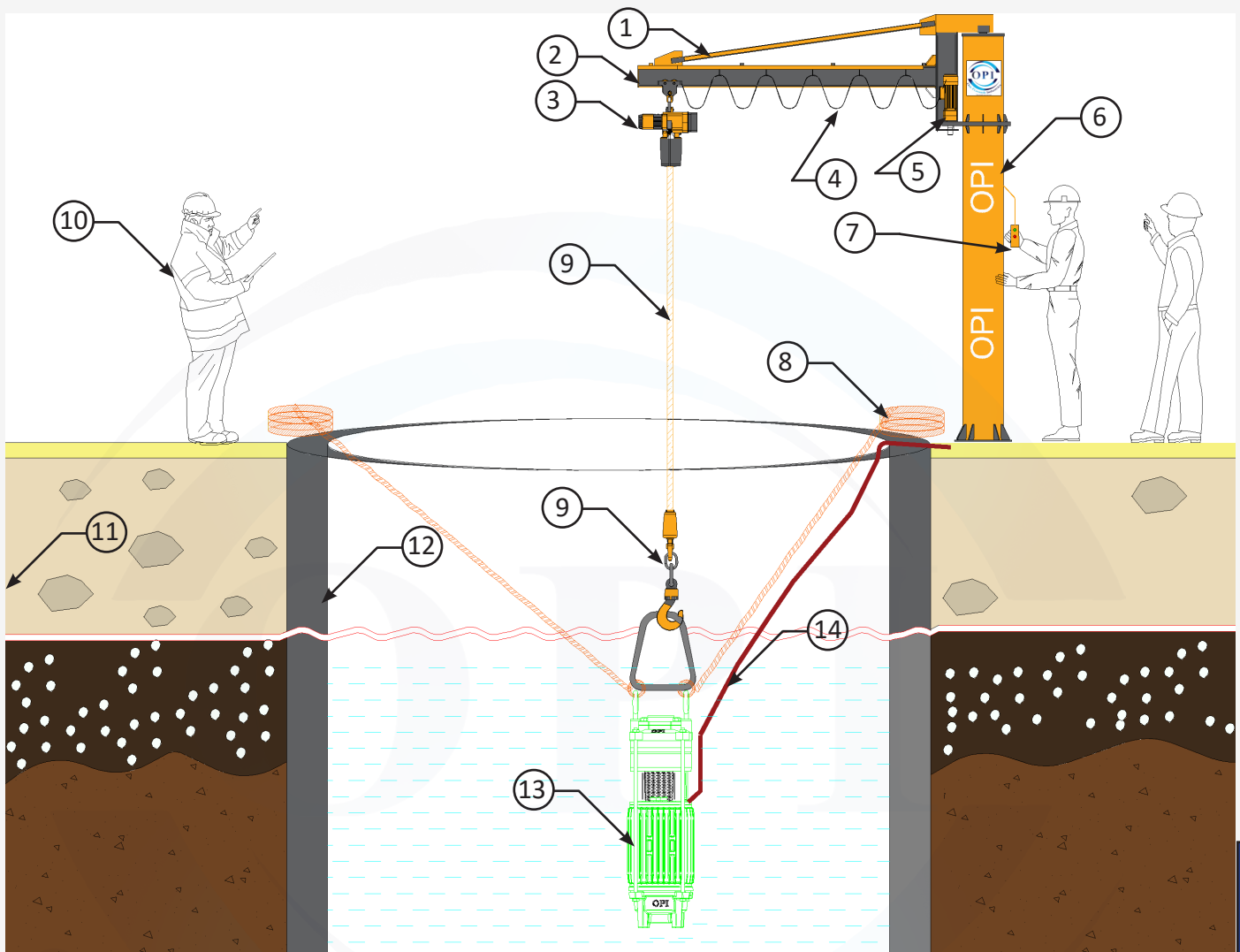
✎ **Notes:**

- Wrap tightly with adequate overlap to ensure a **secure seal**.

⚠ **Caution:** Improper sealing of the final layer can lead to insulation failure, especially in underwater applications.

SUBMERSIBLE VERTICAL OPENWELL- THREE PHASE

14. ERECTION DIAGRAM FOR SUBMERSIBLE HORIZONTAL OPENWELL



PART NO	PART NAME
1	JIB ARM
2	ELECTRIC HOIST WITH TROLLEY
3	ELECTRIC MOTOR
4	WIRE
5	ELECTRIC MOTOR
6	VERTICAL SUPPORT COLUMN
7	REMOTE CONTROL
8	NYLON ROPE
9	STEEL ROPE & HOOK ASSEMBLY
10	WORKERS WITH SAFETY GEARS
11	UNDER GROUND SOIL LAYERS
12	WELL CASING
13	OPI HORIZONTAL OPENWELL
14	MOTOR CABLE



15. ERECTION INSTRUCTUION FOR A HORIZONTAL OPENWELL :

Follow these steps to ensure the safe and proper erection of a submersible pump in an open well. Safety precautions and critical warnings are marked with a caution symbol (⚠).

Pre-Erection Preparations

1. Verify Components

✓ Inspect the Equipment:

- Check the pump, motor, hoist, delivery pipe, and all accessories for any signs of damage or defects.

✓ Ensure Tool Availability:

- Gather all necessary tools, including the hoist, lifting clamps, control panel, and safety gear.

⚠ **Caution:** Ensure all components are in working condition. Using defective equipment can cause failures.

2. Inspect the Open Well

✓ Check Dimensions:

- Measure the well's diameter and depth to confirm compatibility with the pump and motor assembly.

✓ Clean the Well:

- Ensure the well is free of debris or obstructions to avoid damage during installation.

⚠ **Caution:** Do not install the pump in a contaminated well, as it may affect performance.

3. Set Up the Lifting System

✓ Position the Jib Crane or Hoist:

- Install the jib crane or hoist securely at a stable location near the well.

✓ Ensure Load Capacity:

- Verify that the lifting system can handle the pump's weight safely.

⚠ **Caution:** An unstable hoist or crane may lead to accidents. Double-check mounting points.

4. Safety Measures

✓ Wear Protective Gear:

- Equip all personnel with helmets, gloves, and boots for safety.

✓ Assign a Team Leader:

- Designate a leader to coordinate the operation and ensure smooth execution.

⚠ **Caution:** Keep non-essential personnel away from the installation site.

Erection Process

Step 1: Assemble the Pump and Motor

✓ Connect the Pump and Motor:

- Securely couple the pump and motor following the manufacturer's instructions.

✓ Check Alignment:

- Ensure the pump shaft rotates freely and is properly aligned.

⚠ **Caution:** Improper alignment can cause vibration and reduce the pump's lifespan.

Step 2: Connect the Delivery Pipe and Cable

✓ Attach the Pipe Section:

- Connect the first section of the delivery pipe to the pump's discharge outlet.

✓ Secure the Electrical Cable:

- Fasten the cable along the delivery pipe using cable clips to prevent entanglement.

⚠ **Caution:** Ensure cable insulation is intact to avoid electrical hazards.

Step 3: Lower the Pump into the Well

✓ Attach Lifting Clamps:

- Secure the pump with a lifting clamp and attach it to the hoist.

✓ Lower the Pump Gradually:

- Use the hoist to lower the pump slowly, ensuring the cable and pipe remain aligned.

⚠ **Caution:** Avoid sudden movements or impacts that may damage the pump.

Step 4: Secure the System

✓ Fix the Delivery Pipe:

- Anchor the pipe securely at the well's surface using a flange or bracket.

✓ Arrange the Electrical Cable:

- Route the cable safely to prevent damage and tripping hazards.

⚠ **Caution:** Verify that all fastenings are tight before proceeding to electrical connections.

Post-Erection Steps

1. Electrical Connections



Connect to the Control Panel:

- Wire the pump to the control panel and ensure proper grounding.



Test Motor Rotation:

- Briefly power the motor to check rotation direction.



Caution: Incorrect wiring may lead to motor damage.

2. System Testing



Check Water Flow:

- Start the pump and observe the discharge flow for consistency.



Inspect for Issues:

- Look for leaks, unusual noises, or excessive vibration.



Caution: Do not run the pump without sufficient water.

3. Final Adjustments



Secure All Components:

- Tighten all fittings and ensure stability of the installation.



Monitor Initial Operation:

- Observe the pump's performance for the first few hours.



Caution: Any unusual behavior should be addressed immediately.

Maintenance Tips

- Periodically check cable insulation and pipe joints for wear.
- Ensure the pump is not running dry to prevent motor damage.
- Clean the intake screen and replace worn components as needed.

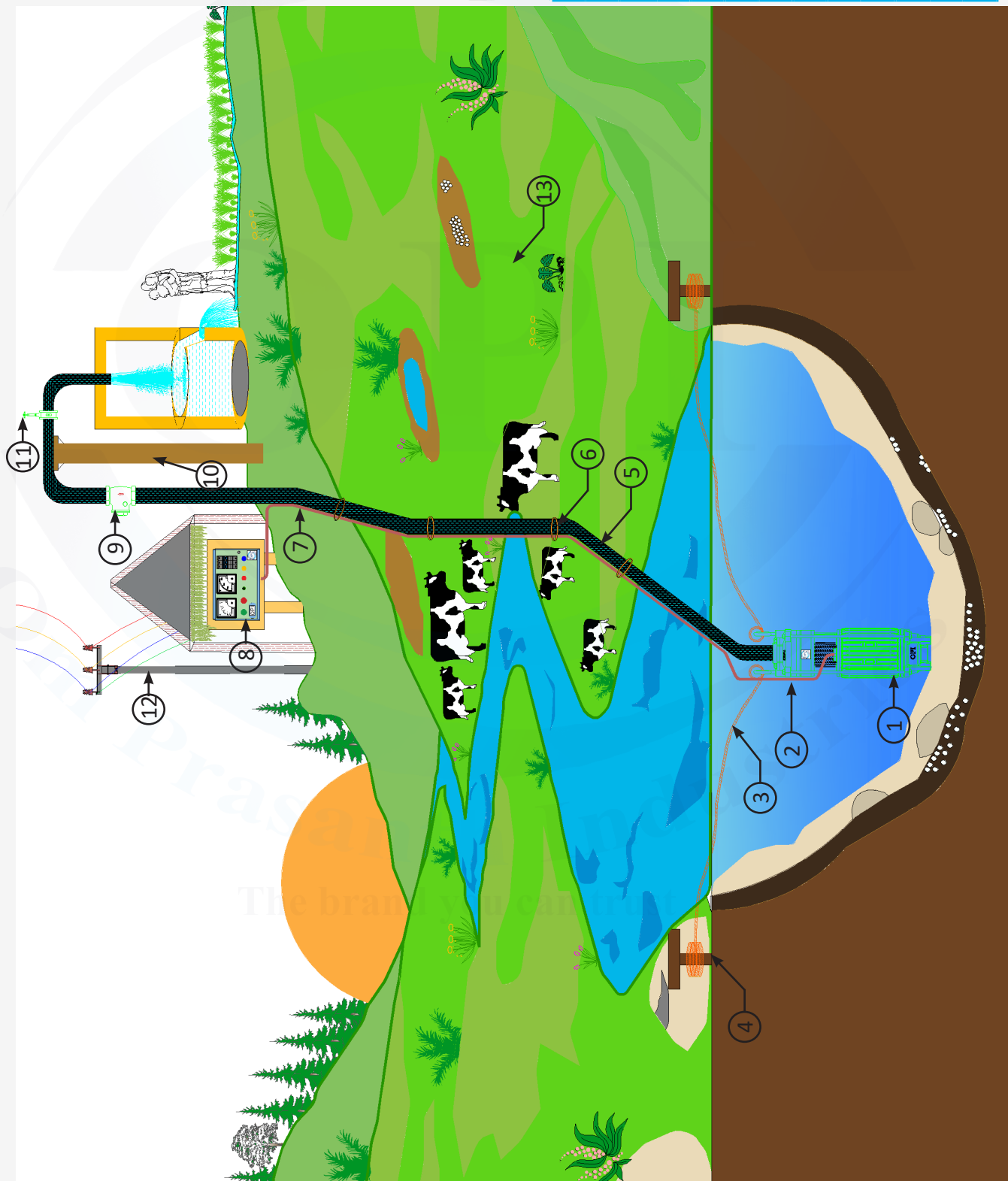


Caution: Routine maintenance extends the lifespan and efficiency of the pump.

SUBMERSIBLE VERTICAL OPENWELL- THREE PHASE



17. INSTALLATION SCHEMATIC DIAGRAM FOR OPI SUBMERSIBLE HORIZONTAL OPENWELL



PART NO	PART NAME
1	OPI OPENWELL
2	MOTOR CABLE
3	NYLON ROPE
4	ROPE POST
5	DELIVERY PIPE
6	CABLE CLIP
7	MOTOR CABLE
8	OPI PANEL BOARD
9	NRV
10	SUPPORT POST
11	GATE VALVE
12	EB POST
13	HILLS

18. INSTALLATION CHECKLIST AND PROCEDURE :

Installation Instructions for a Horizontal Openwell System Follow these steps to ensure the safe and proper installation of the pump system. Safety precautions and critical warnings are marked with a caution symbol (⚠).

Pre-Installation Preparations

1. Verify Components

✓ Inspect the Equipment:

- Check the pump, motor, pipes, valves, and electrical accessories for any damage or defects.

✓ Ensure Tool Availability:

- Gather required tools: wrenches, clamps, pipe sealants, insulation tape, and safety gear.

⚠ **Caution:** Do not use damaged or incompatible components; this may lead to system failure.

2. Assess the Installation Site

✓ Check Well Dimensions:

- Measure the well depth and diameter to ensure compatibility.

✓ Ensure a Stable Foundation:

- Prepare a stable base for the pump unit to prevent vibrations and misalignment.

⚠ **Caution:** An unstable foundation may cause misalignment, leading to mechanical damage.

3. Electrical & Safety Preparations

✓ Ensure Proper Power Supply:

- Verify voltage, phase, and capacity of the electrical source as per pump specifications.

✓ Install Earthing System:

- Proper grounding is mandatory to prevent electrical hazards.

⚠ **Caution:** Incorrect wiring may lead to electrical failures or hazards.

Installation Process

Step 1: Position the Pump

✓ Place the Pump Unit:

- Install the pump on a solid, vibration-free foundation near the well.

✓ Align Properly:

- Ensure proper alignment between pump and suction pipe to prevent cavitation.

⚠ **Caution:** Misalignment can cause premature wear and operational issues.

Step 2: Connect the Suction Pipe

✓ Attach the Suction Pipe:

- Connect the suction pipe to the pump inlet using proper sealing materials.

✓ Prime the Pipe:

- Fill the suction pipe with water to remove air pockets.

⚠ **Caution:** Airlocks in the suction pipe can cause dry running and damage the pump.

Step 3: Connect the Delivery Pipe

✓ Secure the Delivery Pipe:

- Attach the delivery pipe to the pump's discharge outlet with leak-proof joints.

✓ Install a Check Valve:

- Position a non-return valve (NRV) to prevent backflow.

⚠ **Caution:** A missing NRV may lead to reverse water flow, causing damage.

Step 4: Install the Control Panel

✓ Mount the Panel:

- Secure the control panel in a dry, accessible location.

✓ Wire the Motor:

- Connect the submersible cable securely to the motor terminals.

⚠ **Caution:** Loose connections may cause voltage drops and motor failure.

Step 5: Secure the Cable & Pipes

✓ Fasten the Electrical Cable:

- Use clamps to secure the cable along the pipe at regular intervals.

✓ Check for Abrasions:

- Ensure the cable insulation is intact to prevent electrical hazards.

⚠ **Caution:** Unsecured cables can get damaged, leading to short circuits.

Step 6: Test the System

✓ Turn on the Pump:

- Start the motor and check for proper water discharge.

✓ Check for Leaks:

- Inspect pipe joints, NRVs, and seals for any water leakage.

⚠ **Caution:** Running the pump without water flow can overheat and damage the motor.

Post-Installation Checks

✓ Monitor Initial Operation:

- Observe performance for a few cycles to ensure smooth operation.

✓ Tighten Loose Connections:

- Recheck and secure any loose bolts, joints, and wiring.

⚠ **Caution:** Ignoring minor leaks or loose fittings may cause future system failures.

Maintenance Tips

- Conduct periodic inspections of pipes, cables, and control panels.
- Avoid dry running the pump to prevent motor burnout.
- Regularly clean filters and NRVs to maintain efficiency.

⚠ **Caution:** Lack of maintenance may lead to operational breakdowns.

Following these instructions ensures efficient and long-lasting performance of your pump system! ✂✓

