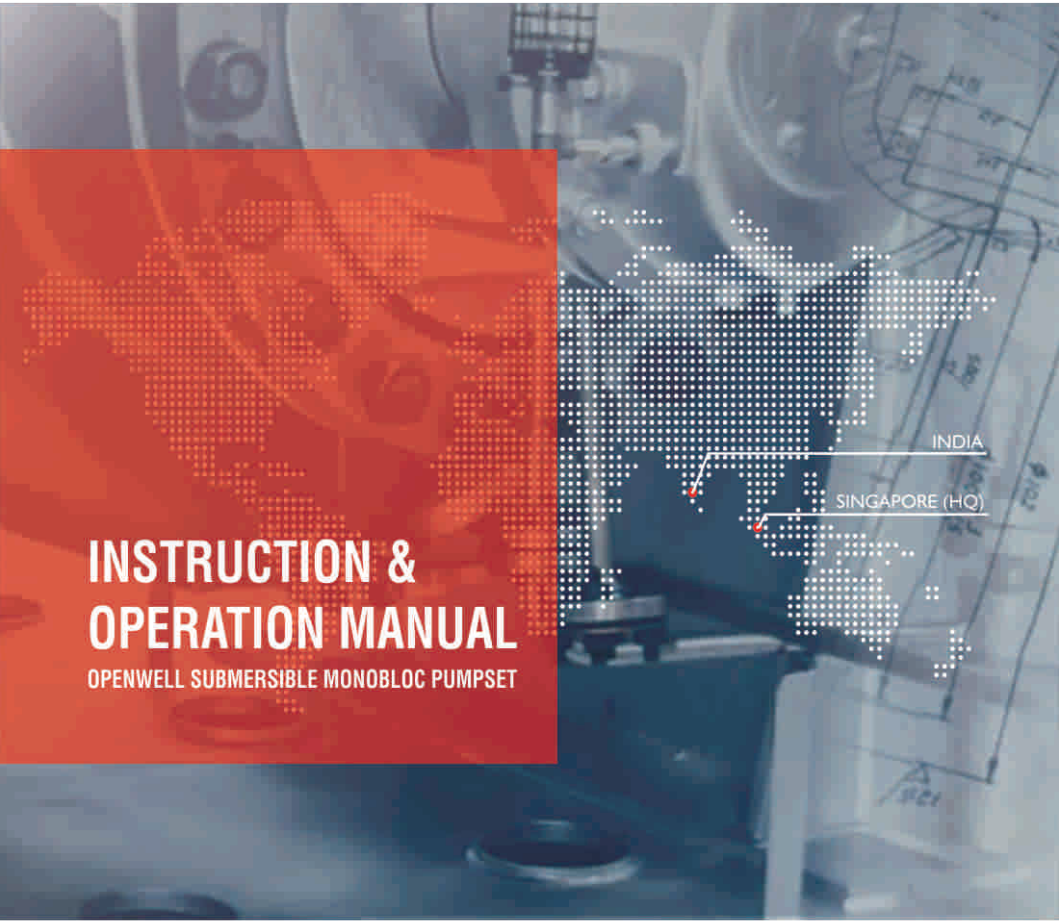
SAMUDRA



INSTRUCTION & OPERATION MANUAL

OPENWELL SUBMERSIBLE MONOBLOC PUMPSET

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1. WELCOME MESSAGE

Dear Customer:

Welcome to the Samudra family! Thank you for choosing products from Samudra. We congratulate you and value your decision made on choosing our products. You are entitled to enjoy the best in class product and service.

2. COMPLYING NORMS

IS 3043 : Code of Practice for Earthing-Specification

IS 9283 : Motors for Submersible Pumpsets-Specification

IS 13730 : Specifications for Particular Types of Winding Wires

IS 14220 : Open well Submersible Pumpsets-Specification

3. CONTENTS OF THE PACKING BOX

Based on model you have purchased, your Open Well Submersible Monoblocs is packed along with instruction manual in a Corrugated Box / Wooden Crate.

4. INTRODUCTION ABOUT PRODUCT AND BRIEFING

The discharge of a pump depends on the static suction lift. During summer, the static suction lift increases due to drop in water levels, and this results in reduced discharge. This will require frequent lowering of the pump to reduce the static suction lift. During monsoons, water levels can significantly rise. Under such conditions, there is a possibility that the pump can get submerged resulting in the motor getting damaged. To overcome the issue of varying static suction lifts, Open Well Submersible Monobloc (OWS) has been introduced. Such a pump operates submerged.

Samudra OWS are manufactured using high quality raw materials and components using state-of-the-art manufacturing facilities and will give trouble-free performance if they are properly installed and maintained. The OWS are compact pumping systems with the pump and motor mounted on a common shaft. As a coupling is not required, alignment of the pump and motor is assured. Installation therefore becomes quick. OWS do not require frequent maintenance as packing rope and grease lubricated deep groove ball bearings are replaced by oil seals and water lubricated journal bearings respectively. OWS find application for pumping from wells, sumps, borewells, located at the bottom of the well, rivers, canals, lakes, etc..

Prior to installation, read this manual carefully and follow instructions for installation and maintenance of our OWS to ensure reliable operation. The OWS should be installed by technically qualified personnel in compliance with national and local electrical codes and as per our instructions in order to avoid electrical shocks, unsatisfactory performance, and equipment failure.

5. SCHEMATIC DRAWING AND INDICATION OF PARTS

Cross-sectional view of SSM-N Series Open Well Submersible Monobloc is shown below in Fig.1:

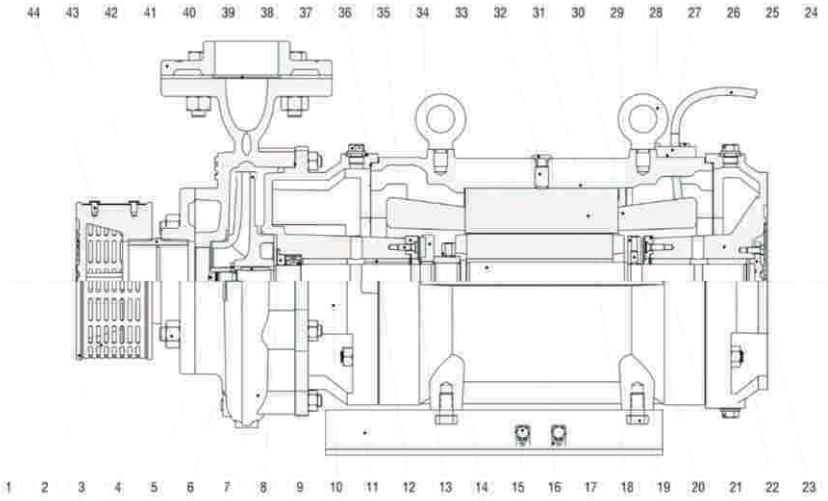

Fig. 1 Cross-Section View Of Open Well Submersible SSM-N Series

PART NO	PART NAME	PART NO	PART NAME	PART NO	PART NAME
1	STRAINER BRACKET	16	EARTH INDICATION PLATE	31	BODY
2	STRAINER	17	ROTOR WITH SHAFT	32	DUMMY CAP
3	STUD & BOLT	18	STATOR STACK	33	HEX. SOCKET SET SCREW
4	IMPELLER LOCK NUT	19	HEX. HEADED BOLT	34	THRUST COLLAR
5	WASHER	20	HEX. SOCKET SET SCREW	35	HEX. SOCKET CSK HEAD
6	PARALLEL KEY	21	COUNTER THRUST PAD		CAP SCREW
7	CASING	22	REAR COVER	36	GASKET IRREGULAR SHAPE
8	SAND GUARD	23	END COVER CAP	37	WASHER
9	OIL SEAL	24	PVC INSULATED CABLE	38	DRAIN PLUG
10	FRONT COVER	25	C.H. SCREW	39	GASKET CIRCULAR
11	BASE PLATE	26	CABLE GLAND HOLDER	40	GASKET- CIRCULAR NBR
12	BUSH	27	CABLE GLAND	41	IMPELLER
13	THRUST PAD	28	EYE BOLT	42	FLANGE-CIRCULAR
14	BALANCING COLLAR	29	BALANCING	43	STRAINER CONNECTOR
15	HEX. HEADED BOLT		COLLAR WITH CTR	44	FLAT HEAD SLOTTED
	& WASHER	30	COIL		CSK SCREW

6. KEY SPECIFICATIONS AND FEATURES

Standard Specification of OWS is shown below in Table 1:

TABLE 1

Power	3.0 - 15HP
Phase	3
Motor Type	Squirrel Cage Induction Motor - Wet type
Starting method	3.0-7.5 HP: DOL
	5.0-15.0HP: SD
Operating Voltage	SSM-N Series: 220-400V
Frequency	50 Hz
Speed	2850 rpm
Duty	S1 Continuous
Max. Fluid Temperature	33°C
Impeller Type	Radial
Copper rotor for improved performance	SSM NC Series

KEY FEATURES

MOTOR

- The motor, a wet type, is a squirrel cage induction motor.
- The stator winding is water cooled and is made from poly-wrapped copper wire.
- The motor houses water lubricated journal bearings to take up the radial loads.
- A water lubricated thrust bearing is provided to take up the thrust load generated by rotating impeller.
- A water lubricated counter thrust bearing is provided to limit movement of the shaft when the OWS is switched OFF.
- The rotors are dynamically balanced.
- Adequate motor surface area is provided for effective cooling.
- Earth screws are provided on the motor body leg.
- The water filled motor is provided with single lip oilseals to prevent pumped medium from entering the motor.
- To prevent sand/small stones from entering the seal chamber, a sand guard is provided.
- The motor body is provided with two eye bolts for lifting/lowering of the OWS.

PUMP

- The pump is designed for pumping clear, cold water with a maximum sand content of 50 grams in 1000 ml of water. For higher sand content, the pump hydraulics will wear out at a faster rate.
- The impeller is dynamically balanced.
- Both suction and delivery flanges with rubber gaskets are assembled on the volute casing.
- Strainer assembly, fitted on the pump suction flange, prevents entrance of large-sized debris into the pump.

ELECTRICAL CONNECTION

- OWS to be connected to a DOL starter are provided with a single 3-core PVC flat cable.
- OWS to be connected to a Star-Delta starter are provided with two separate 3-core PVC flat cables.

7. PRE-INSTALLATION REQUIREMENTS

ARRANGEMENT FOR INSTALLATION

- Use services of a professional and trained mechanic with experience in erecting OWS.
- Ensure proper safety during installation.
- Ensure that the bottom of the well/water source is fairly level before erection of the OWS.

GENERAL INSTALLATION PRECAUTIONS

- Open packaging and note down Serial number and Model for future reference.
- Ensure all fasteners are tightened properly.
- Use prescribed pipe sizes as mentioned on the product name plate.
- To prevent motor from getting exposed during pumping, ensure suction strainer is fitted above the level of the motor. This is done by fitting one end of the bend to the pump suction flange and the strainer to the other end of the bend, thereby ensuring that the level does not fall below the strainer.
- Use an NRV fitted on the delivery line when the OWS has high static delivery heads.
- Use a power cable without joints from OWS to Control Panel. It is not recommended to use a power cable with large number of joints as this can result in a significant voltage drop.

- Check for level of silt at the bottom of well. De-silt if necessary.
- Check availability of three-phase power.
- Ensure availability of Control Panel with inbuilt single-phase preventer, overload protection, and High-Voltage and Low-Voltage protection.
- Fill motor with pure drinking water before installation.
- In case of rapid rise of water levels during rainy season, provide a throttle valve in the delivery pipeline.
- While installing the OWS, ensure that it is not subject to shock loads which can damage OWS parts.

 CAUTION	☛ If you detect damage or discrepancy in the product, contact the dealer from whom the pump was purchased. ☛ Do not use this pump for oil or toxic, acetic, corrosive and flammable liquids. Pumping flammable liquids could cause explosion. ☛ Use eye bolts for lifting / lowering the OWS. Ensure suitable precautions are taken while lifting and lowering the product. ☛ Use trained professionals to install the OWS ☛ Use a power supply cable that has sufficient rating. Factor in low-voltage operation. ☛ Provide proper Earthing. Improper Earthing can cause electrical shock ☛ Use a Megger to verify insulation of the motor. Insulation resistance should be 20 MΩ minimum. ☛ Do not run OWS dry as it contains water lubricated bearings and oilseals. ☛ Mount the pump with its axis horizontal. ☛ It is recommended to use a starter. ☛ Check the bottom of the well. In case there is mud accumulated at the bottom, de-silt the well. ☛ Periodically de-silt the bottom of the well so that the OWS rests on the rocky bottom.

OPERATION PRECAUTIONS

 CAUTION	☛ Switch OFF power before working on electrical lines. ☛ Do not use this pump for pumping liquid exceeding 33°C as this may lead to product failure. ☛ Do not switch ON pump if there is any human contact with pumped medium. If any electrical leakage occurs, this could prove fatal. ☛ The OWS has water lubricated journal and thrust bearings and therefore must not be run dry. Starting of OWS without water must be strictly avoided as it will cause damage to the bearings. Fill with pure drinking water. ☛ During monsoons, the pump will run with higher flooded suction resulting in the pump running with higher discharge. This results in increase in the current drawn being higher than that specified on the name plate. Fit a gate valve in the delivery line to throttle the discharge till the current is lower than that specified on the name plate. ☛ Ensure proper direction of rotation of the pump on powering up.

8. INSTALLATION PROCEDURE

Please follow the below procedure to install the OWS.

 CAUTION	☛ The supply voltage should be within the specified voltage range. ☛ Water temperature for operation of the pump should not exceed 33°C. ☛ Failure to observe precautions given above could cause pump to malfunction and may lead to current leakage or electrical shock. ☛ If you find any abnormalities like vibration, noise, smell, etc., from the pump during trial operation, switch OFF the pump and contact the dealer from whom this pump was purchased.

INSTALLATION

The following steps are to be executed prior to installation

- Open the filling plugs and top up if necessary, with pure drinking water.
- Measure Insulation Resistance using a Megger of 500 VDC.
- Ensure contact points are clean.
- Check direction of rotation.
- Connect measuring cable to ground conductor.
- Connect the other measuring cable to every core of the motor cable in succession.
- Ensure that insulation resistance as shown on the Megger is a minimum of 20MΩ.
- Use prescribed pipe sizes as mentioned on the product name plate.
- Refer Fig.2, shown below for locating the OWS for operation with flooded suction.

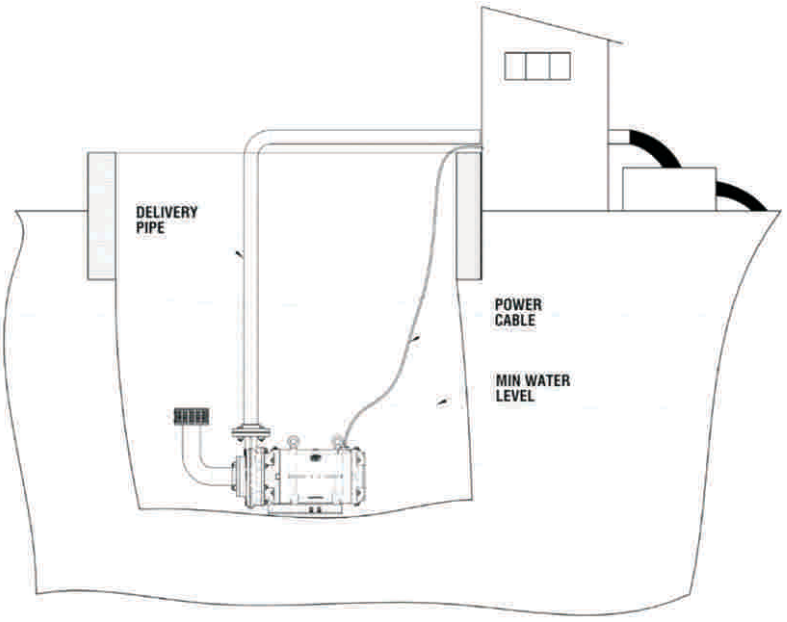

Fig.2 OWS With Flooded Suction

Prior to installation, unscrew the Brass Plugs 1 and 2 fitted on top of the motor as shown in Fig.3 below and fill the motor with pure drinking water until it overflows from the other filling hole. Gently rock the motor to release air bubbles and further top up if necessary. Then replace the two plugs.

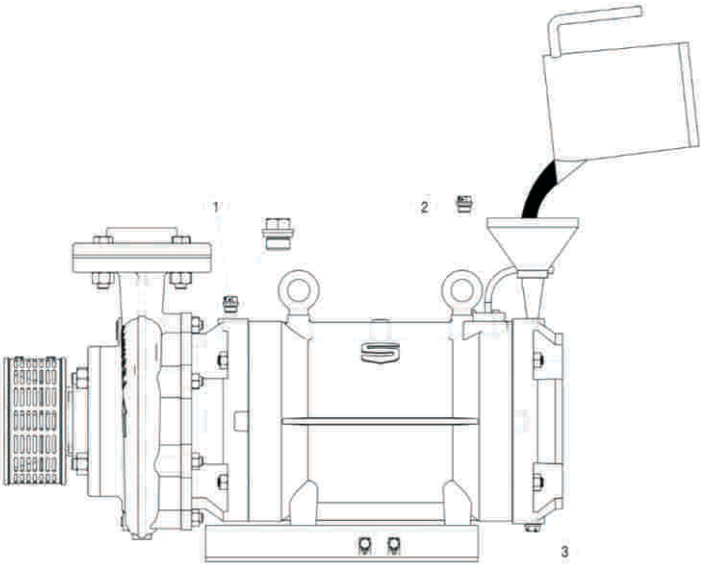

Fig.3 Filling the Motor of OWS With Pure Drinking Water

The Brass Plug 3 mounted on the bottom of the motor is used for draining the water from within the motor. Ensure all three Brass Plugs are tightened to prevent leakage of water from within the motor. Check for leakages before lowering the OWS.

WATERPROOFING THE SUBMERSIBLE MOTOR CABLE-SUPPLY CABLE JOINT

CAUTION	• Hazardous voltage-Will cause death, serious injury, electrocution. • Disconnect all power before working on this equipment and that it cannot be accidentally switched ON.

- DOL OWS Motors are supplied with a single 3-core PVC insulated flat cable of length 3 meters.
- The free end of 3-core cable of the motor needs to be connected to supply cable from the control panel.
- As this joint is always nearly submerged under water, the joint needs to be waterproof.

Refer to sequence shown in Fig.4 below for insulating the cable joint for under water application:

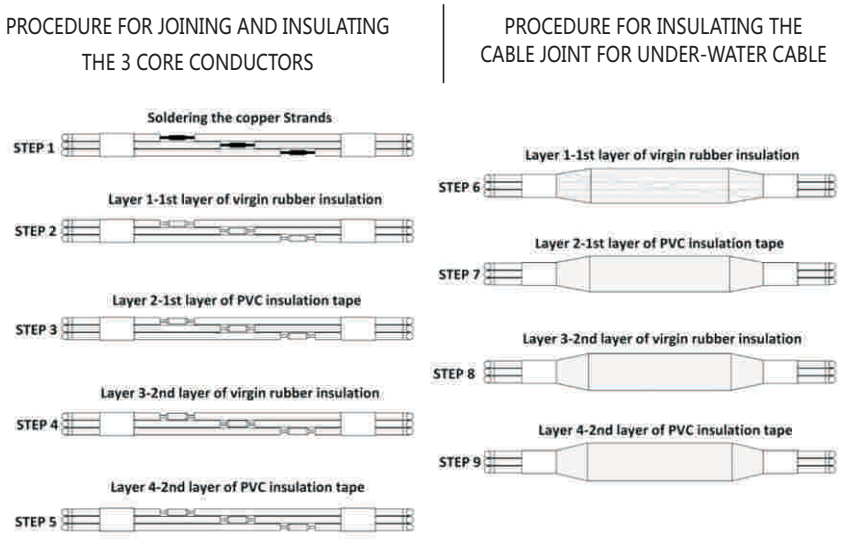

Fig.4 Cable Joints for Underwater Application

- SD OWS Motors are provided with two separate 3-core PVC insulated flat cable each of 3 meters length.
- Repeat procedure for both 3-core PVC flat cables from the motor to the two cables from the Control Panel.

CABLE LEAD WIRE CONNECTION TO STARTER

DIRECT ONLINE STARTER

CABLE	TERMINAL
RED	U
YELLOW	V
BLUE	W

STAR DELTA STARTER

CABLE 1	TERMINAL 1
RED	U1
YELLOW	V1
BLUE	W1

CABLE 2	TERMINAL 2
RED	U2
YELLOW	V2
BLUE	W2

CAUTION

- Hazardous voltage-Will cause death, serious injury, electrocution.
- All electrical work must be performed by an authorized electrician in compliance with local electrical equipment standards and internal wiring codes

CHECKING DIRECTION OF ROTATION OF OWS

- In case the OWS is used to lift water from a borewell located at the bottom of a well first prime the pump.
- Connect the OWS to Control Panel, power up the OWS, and observe the discharge from the pump.
- Next interchange any two-phase wires, power up the OWS, and observe the discharge from the pump.
- In case the discharge is more after interchanging any two-phase wires, then the impeller is rotating in the correct direction within the volute casing.
- If the discharge after interchanging any two-phase wires is lower, then the previous phase wire connection was correct. Now revert to the old phase wire connection.

ELECTRICAL INSTALLATION

- Check power supply voltage and frequency and compare with product requirements specified on the name plate.

- Observe relevant EB regulations while providing power supply to the motor.
- As far as possible, do not use multiple joints in the electrical cabling while connecting the Control Panel to the OWS.
- Ground the OWS using the two earth screws provided on the leg of the motor body.
- Ensure electrical joints, if any, are properly and adequately insulated.
- Connect the cable properly to starter terminals to avoid loose connections.
- Factor in low-voltage operation while selecting cable size.

 CAUTION	☛ All electrical work must be performed by an authorized electrician in compliance with local electrical equipment standards and internal wiring codes ☛ Improper wiring can lead to current leakage, electrical shock, or fire.

ELECTRICAL WIRING WORK

 CAUTION	☛ Be sure to install the ground wire securely. Failure to observe this precaution could damage the pump and cause current leakage, which may lead to electrical shock. ☛ Do not connect the ground wire to a gas pipe, water pipe, lightning rod, or telephone ground wire. Improper grounding could cause electrical shock.

EARTHING

CONNECTING THE POWER SUPPLY

 CAUTION	☛ Observe relevant Electricity Board regulations while powering up the Pumpset. ☛ Before inserting the power plug or connecting the wires to terminal board, make sure that the power supply is properly disconnected. Failure to do so may lead to electrical shock, short circuit, or injury caused by unintended starting of the pump. ☛ Do not use damaged cables, power plugs, or loose power outlets. Failure to observe this precaution could lead to electrical shock, short circuit, or fire.

Only qualified personnel should be involved for inspection, maintenance, and repairs. The successful and safe operation of such a product depends on proper handling, installation, and maintenance. It is suggested that in case of non-functioning of the product, the customer is requested to contact the dealer through whom the purchase was made.

9. IMPORTANT SAFETY INSTRUCTIONS

Only qualified personnel should be involved for inspection, maintenance, and repairs. The successful and safe operation of such a product depends on proper handling, installation, and maintenance. It is suggested that in case of non-functioning of the product, the customer is requested to contact the dealer through whom the purchase was made.

 CAUTION	☛ Hazardous voltage-Will cause death, serious injury, electrocution. Disconnect all power supply before working on this equipment. Maintenance should be performed only by qualified personnel.

10. STORAGE AND HANDLING

- The OWS are supplied from the factory in proper packing in which they should remain until they are ready to be installed.
- The product should be stored in a closed, dry, and well-ventilated room.
- Do not store the product under direct sunlight.
- Handle the pump with care and do not expose the product to unnecessary impact and shocks.
- During unpacking and prior to installation, care must be taken while handling the pump to ensure that the product is not subjected to shock loads.
- If the product has been stored for a very long period, check the condition of the rubber gaskets, free rotation of the shaft, and level of water inside the motor.

 CAUTION	• If the motors are stored, the shaft must be turned by hand at least once a month. • If the motor has been stored for more than one year before installation, dismantle the motor and check rotating parts before use. • After a long period of storage, the pump should be inspected before it is put in operation. Ensure impeller can rotate freely. • Oilseals in back-to-back configuration are provided to prevent water inside the motor from escaping. Do not attempt to run the pump dry. If used to lift water from borewells, ensure the pump is primed and then only run it.

Headquarters :
1 Keong Saik Road,
Unit 10 - The Working Capitol
Singapore 089109
Tel. +65 6813 2111
Email. info@samudra.net

India Operations :
Office Block 1, Ground Floor,
Senthil Towers, 1078 Avinashi Road,
Coimbatore - 641 018, Tamilnadu, India.
Tel. +91 422 498 22 55
Email. info@samudra.net