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INSTALLATION & OPERATING INSTRUCTIONS

A1 Smart Starter User Manual

Digital Starter - Models 1A/2A/1B/2B



| CONTENT | PAGE NO. |
|---|----------|
| Table of Contents | |
| Chapter 1 Safety & Introduction | |
| 1.1 Safety & Introduction..... | 1 |
| 1.2 Product Overview..... | 2 |
| 1.3 Specifications..... | 3-4 |
| 1.4 Package Contents..... | 5 |
| 1.4.1 Inspection..... | 5 |
| Chapter 2 Connection & Installation | |
|  WARNING | |
| 2.1 Installation..... | 6 |
| 2.1.1 Wall mount dimensions..... | 7-8 |
| 2.2 Connections..... | 9 |
| 2.2.1 Steps for connection..... | 10-15 |
| Chapter 3: Operation | |
|  CAUTION | |
| 3.1 Operating modes..... | 16 |
| 3.1.1 Automatic mode..... | 16 |
| 3.1.2 Manual mode..... | 16 |
| 3.1.3 Remote mode..... | 16 |
| 3.2 Display..... | 17 |
| 3.2.1 Features..... | 17 |
| 3.2.2 Four digit seven segment display..... | 18-20 |
| 3.2.3 Alarms and Indicators..... | 20-23 |

| CONTENT | PAGE NO. |
|---|----------|
| Chapter 4: Sensing Unit | |
| 4.1 Dry Contacts..... | 24 |
| 4.2 Sensor mode description..... | 24-25 |
| 4.2.1 Sensor mode 0:..... | 26 |
| 4.2.2 Sensor mode 1:..... | 26 |
| 4.2.3 Sensor mode 2:..... | 27 |
| 4.2.4 Sensor mode 3:..... | 28 |
| 4.2.5 Sensor mode 4:..... | 29-30 |
| 4.2.6 Sensor mode 5:..... | 31 |
| 4.2.7 Sensor mode 6:..... | 32-33 |
| 4.2.8 Sensor mode 7:..... | 34 |
| 4.2.9 Sensor mode 8:..... | 35 |
| 4.2.10 Sensor mode 9:..... | 36-37 |
| Mobile application installation and operation | |
| BT command and default current setting..... | 38-39 |
| Troubleshooting..... | 40-42 |
| Warranty..... | 43 |

CHAPTER 1: SAFETY & INTRODUCTION**1.1 Safety Instructions**

- Read the user manual before operating the product.
- Installation and maintenance of the product must be carried out by trained and qualified person.
- Starter must be disconnected from mains power supply 5 minutes before opening the cover.
- Ensure that polarity, tightness and wire size are correct, before energizing the starter.
- Starter must be connected to earth using minimum 4.0 mm² wire and earth wire diameter should not be less than input power supply wires (refer regional safety standard specific to your location).
- Ensure the motor, starter and power specifications are matching.

1.2 Product Overview

Shakti's new world class A1 Smart Starter provides intelligent functions using electronics, more protection functions and wireless connectivity. Considering harsh environmental conditions, IP54 rated environmental protection is provided. A seven segment display has been used in the starter for convenient monitoring of the unit. Development of electronic circuitry provides opportunity to add voltage, current, power measurements along with communication which makes the starter smart. The inbuilt energy measurement, Bluetooth and GPRS connectivity make it a next generation starter.

The basic function of a Digital Starter is to start and stop the motor based on user requirement. It also protects motor from potential failure causes like overload, under voltage, over voltage, dry run, etc. The motors draw high current at startup, which is typically, 5 to 6 times of the full load current. DOL type starters monitors starting current where as soft start version limits the starting current and gives soft start and stop.

There are four varieties of starter namely Model1A, Model1B, Model2A and Model2B. Model1A and Model1B operates on 230V three phase supply. Model2A and Model2B operates from 380 to 460V three phase supply. Both versions support 50Hz and 60Hz supply. Thus, these soft starters cover complete range of three phase motors from 1HP to 15HP.

INSTALLATION & OPERATING INSTRUCTIONS

| Specifications | 3 PHASE | | | |
|--------------------------------|--|----------|------|------------|
| | Model 1A / 2A | | | |
| Technical Data | | | | |
| Output Power | 0.5-1 hp | 1.5-2 hp | 3 hp | 4.5-5.5 hp |
| Rated Current (1A) | 3 | 6 | 9 | 16 A |
| Rated Current (2A) | 2 | 4 | 6 | 11 |
| Nominal Input voltage | Model 1A -230V 50/60Hz, THREE PHASE Model 2A - 380V/415V/60V, 50-60 Hz THREE PHASE | | | |
| Protection Functions | | | | |
| Dry Run | Programmable dry run setting. 30 min retry with Enable/Disable options | | | |
| Overload | Inverse thermal overload | | | |
| Transient Surge | 4 kV 8/10 uS Surge Protection by MOVs | | | |
| Under Voltage | Model 1A -Trip 130 V, Recovery 140 V Model 2A -Trip 290 V, Recovery 300 V [380 VAC MOTOR] Trip 310 V, Recovery 320 V [415 VAC MOTOR] Trip 340 V, Recovery 350 V [460 VAC MOTOR] | | | |
| Over Voltage | Model 1A -Trip 280V, Recovery 270 V Model 2A -Trip 460V, Recovery 450 V [380 VAC MOTOR] Trip 425 V, Recovery 485 V [415 VAC MOTOR] Trip 470 V, Recovery 540 V [460 VAC MOTOR] | | | |
| Pump Stalled Trip | By Measuring Current | | | |
| Installation Data | | | | |
| Working Temperature | -25°C to +55°C | | | |
| Working Humidity | 20% to 90% RH, non-condensing | | | |
| Altitude | Up to 1000 m above sea level | | | |
| Degree of Protection | IP 54 | | | |
| Type of Installation | Wall mount, Vertical | | | |
| Dimensions in mm (WxLxH) | 430(L) X 245 (W) X 76(H) | | | |
| Weight | 4 kg | | | |
| Special Functions | | | | |
| 3 Number of Dry-Contact Inputs | Programmable for Liquid level control, Pressure control | | | |
| Control Method | Manual/Auto/Remote | | | |
| Connectivity | GPRS and Bluetooth | | | |
| Energy measurement | Class 2 | | | |
| Relay operation | DOL TYPE | | | |
| Delay between each restart | 30 seconds | | | |

INSTALLATION & OPERATING INSTRUCTIONS



| Specifications | 3 PHASE | | | |
|--------------------------------|---|-------|---------|-------|
| | Model 1B / 2B | | | |
| Technical Data | | | | |
| Output Power | 7.5 hp | 10 hp | 12.5 hp | 15 hp |
| Rated Current (1B) | 22.5 A | 30 A | 32 A | 45 A |
| Rated Current (2B) | 15 | 20 | 25 | 30 |
| Nominal Input voltage | Model 1B -230V 50/60Hz, THREE PHASE Model 2B- 380V/415V/60V, 50-60 Hz THREE PHASE | | | |
| Protection Functions | | | | |
| Dry Run | Programmable dry run setting. 30 min retry with Enable/Disable options | | | |
| Overload | Inverse thermal overload | | | |
| Transient Surge | 4 kV 8/10 uS Surge Protection by MOVs | | | |
| Under Voltage | Model 1B -Trip 130 V, Recovery 140 V Model 2B-Trip 290 V, Recovery 300 V [380 VAC MOTOR] Trip 310 V, Recovery 320 V [415 VAC MOTOR] Trip 340 V, Recovery 350 V [460 VAC MOTOR] | | | |
| Over Voltage | Model 1B -Trip 280V, Recovery 270 V Model 2B -Trip 460V, Recovery 450 V [380 VAC MOTOR] Trip 425 V, Recovery 485 V [415 VAC MOTOR] Trip 470 V, Recovery 540 V [460 VAC MOTOR] | | | |
| Pump Stalled Trip | By Measuring Current | | | |
| Installation Data | | | | |
| Working Temperature | -25°C to +55°C | | | |
| Working Humidity | 20% to 90% RH, non-condensing | | | |
| Altitude | Up to 1000 m above sea level | | | |
| Degree of Protection | IP 54 | | | |
| Type of Installation | Wall mount, Vertical | | | |
| Dimensions in mm (WxLxH) | 465(L) X 295 (W) X 120(H) | | | |
| Weight | 7kg | | | |
| Special Functions | | | | |
| 3 Number of Dry-Contact Inputs | Programmable for Liquid level control, Pressure control | | | |
| Control Method | Manual/Auto/Remote | | | |
| Connectivity | GPRS and Bluetooth | | | |
| Energy measurement | Class 2 | | | |
| Relay operation | SOFT START TYPE | | | |
| Delay between each restart | 30 seconds | | | |

Table 1.1 Specification

* Power rating for indication only. Maximum motor current should be less than or equal to the rated current of starter

1.3 Package Contents

1.3.1 Inspection

Check the following items when unpacking the Digital Starter:

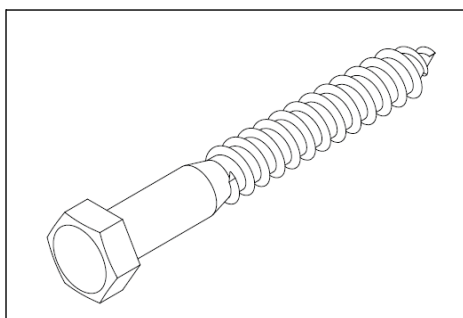
- Inspect the entire exterior of the Digital Starter to see if there are any scratches or other damage resulting from shipping.
- Ensure there is operation manual and warranty card in the packing box.
- Ensure the nameplate is correct as ordered.
- Ensure the optional parts are as per order, if ordered.

Caution: Never install or operate any Digital Starter which is damaged or has missing components. Doing so can result in injury.

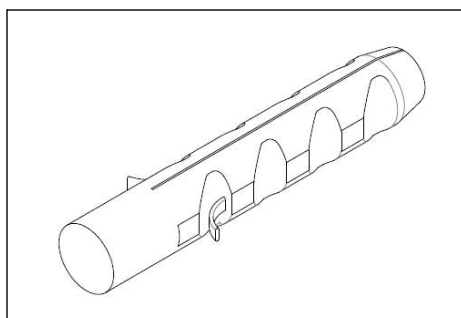
Contact the customer care if there is any damage to the Digital Starter or the optional parts.

All models

4 number hex head screw



4 numbers anchor /
expansion tube



CHAPTER 2: CONNECTION & INSTALLATION

2.1 Installation

WARNING

- Violation of these messages will cause severe injury or property damage.
- Untrained person should not work on any parts/systems of A1 Smart Starter.
- Only licensed person, who has been trained on design, installation, commissioning and operation of A1 Smart Starter, is permitted to operate / install this equipment.
- Input power cable must be connected tightly.
- Earth the equipment securely.
- Wait for 5 minutes after the power is switched off to install/service the A1 Smart Starter.
- The gauge of the grounding cable must be not be less than that of power supply cable.
- Use recommended circuit breaker for A1 Smart Starter input.
- Do not connect switch gears or capacitors in the A1 Smart Starter output.

2.1.1 Wall mount dimensions

Use the dimension given in the image to wall mount the Digital Starter.

Model 1A/2A

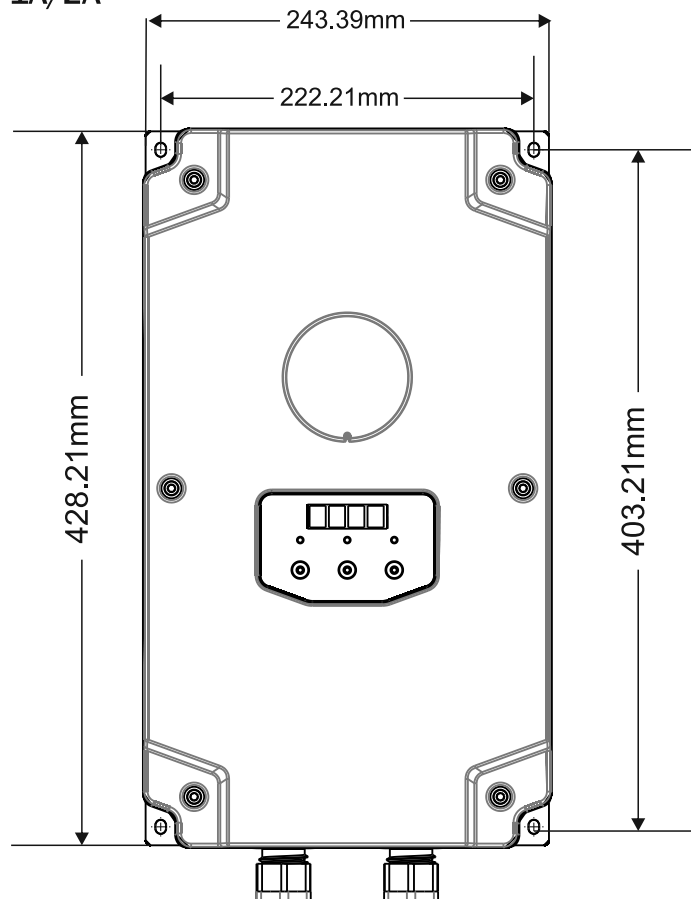


Fig 2.1: Mounting dimension for Model 1A/2A

Note: The dimensions are in mm and are not to scale.

Model 1B/2B

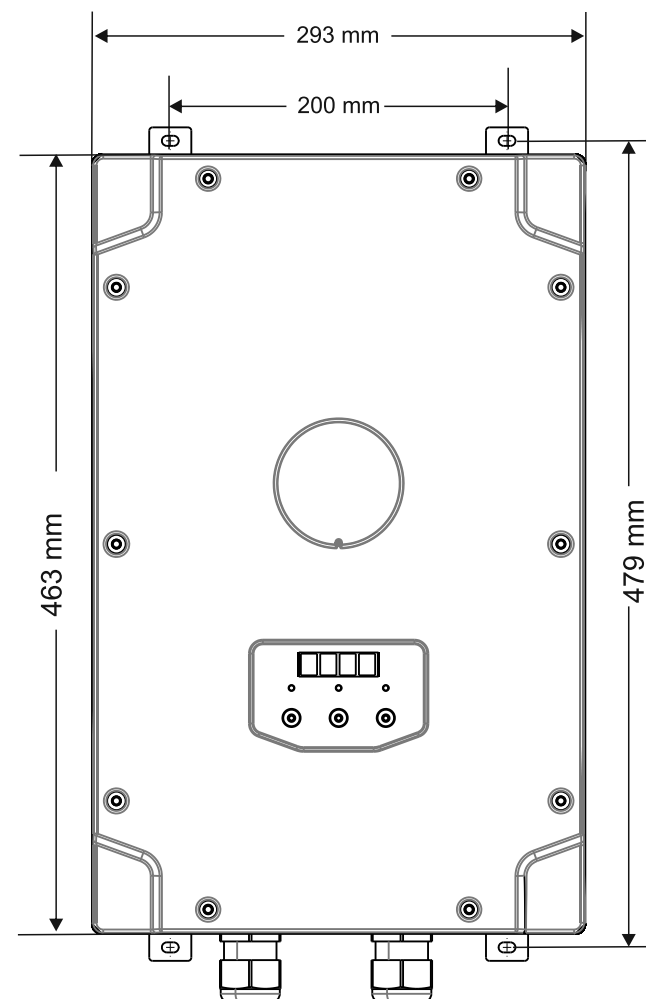


Fig 2.2: Mounting dimension for Model 1B/2B

Secure the wall mount brackets to the A1 smart Starter with 4 numbers of hex head screws for each model.

2.2 Connections

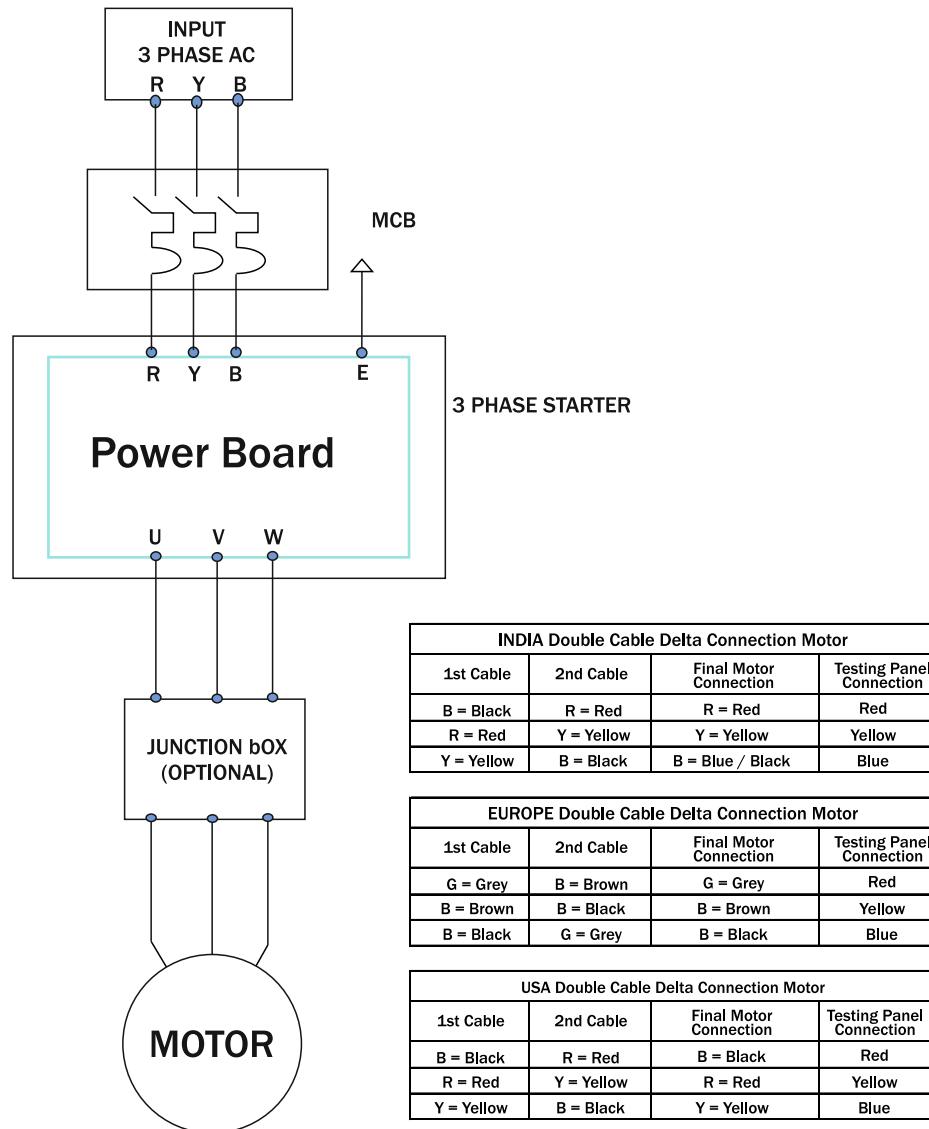


Fig 2.3 Connection Diagram

2.2.1 Steps for connection

1. Read and follow safety instructions.
2. Check the power supply compatibility.
3. Open front cover.
4. Do not disturb protective cover (warranty void).
5. Connect earthing wire to 'E' terminal of input terminal block.
6. Use minimum 4 mm² wire. The earthing wire size should not be less than power input wires. Connect earth wire directly to earth pit or main power earth bus-bar.
7. Connect motor windings in Delta.
8. Connect motor wires to U, V and W terminals.
9. Refer Motor 'Installation and Operating Instructions' for output wire size.
10. If intended wire size is higher than supported size of starter, use external junction box.
11. Connect input power supply to R, Y and B input terminal block.
12. Input wire size should be same as output wire.
13. To change motor direction, change the phase sequence of input or output.
14. Recommended MCB rating and reference part number (Schneider Electric make) for 3Phase models:
 - a. Model 1A: 3 pole, 32 A, Curve C MCB; ref part number: A9N3P32C
 - b. Model 1B: 3 pole, 63 A, Curve C MCB; ref part number: A9N3P63C
 - c. Model 2A: 3 pole, 16 A, Curve C MCB; ref part number: A9N3P16C
 - d. Model 2B: 3 pole, 40 A, Curve C MCB; ref part number: A9N3P40C

| Power Input, Output and Capacitor connection Terminal Blocks | Model 1A | Model 1B | Model 2A | Model 2B |
|--|---------------------|--------------------|---------------------|--------------------|
| Tightening torque | 3 Nm | | | |
| Screw thread | M4 | M5 | M4 | M5 |
| Stripping length | 8 mm | 12 mm | 8 mm | 12 mm |
| Conductor cross section stranded min. | 1.5 mm ² | 6 mm ² | 1.5 mm ² | 6 mm ² |
| Conductor cross section AWG/kcmil min. | 24 | 10 | 24 | 10 |
| Conductor cross section stranded max. | 6 mm ² | 16 mm ² | 6 mm ² | 16 mm ² |
| Conductor cross section AWG/kcmil max. | 10 | 6 | 10 | 6 |

Table 2.1: Terminal Block Connection

Step 1: Remove top cover

Models 1: Loosen 6 screws and remove top cover

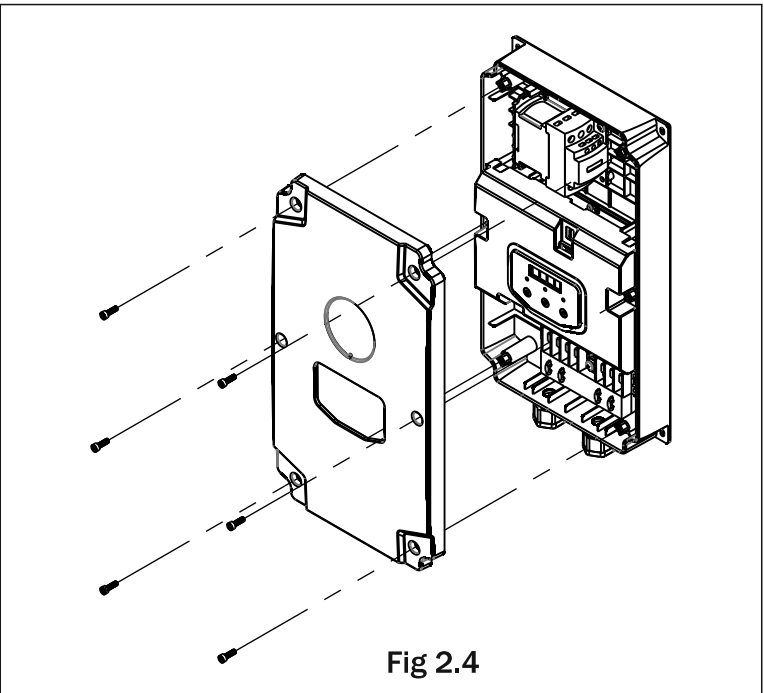


Fig 2.4

Models 2: Loosen 10 screws and remove top cover

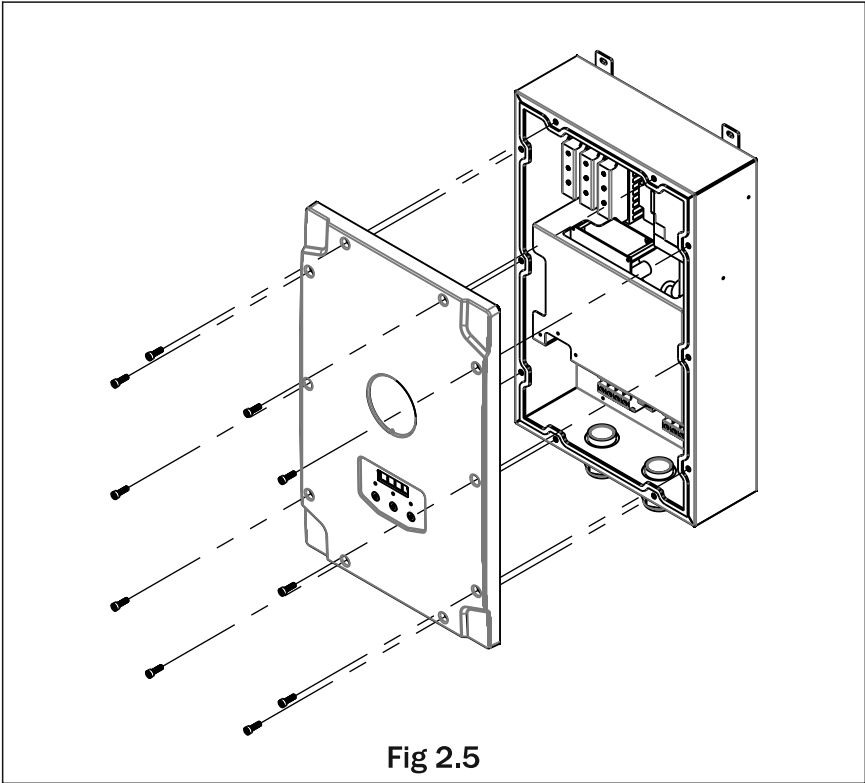
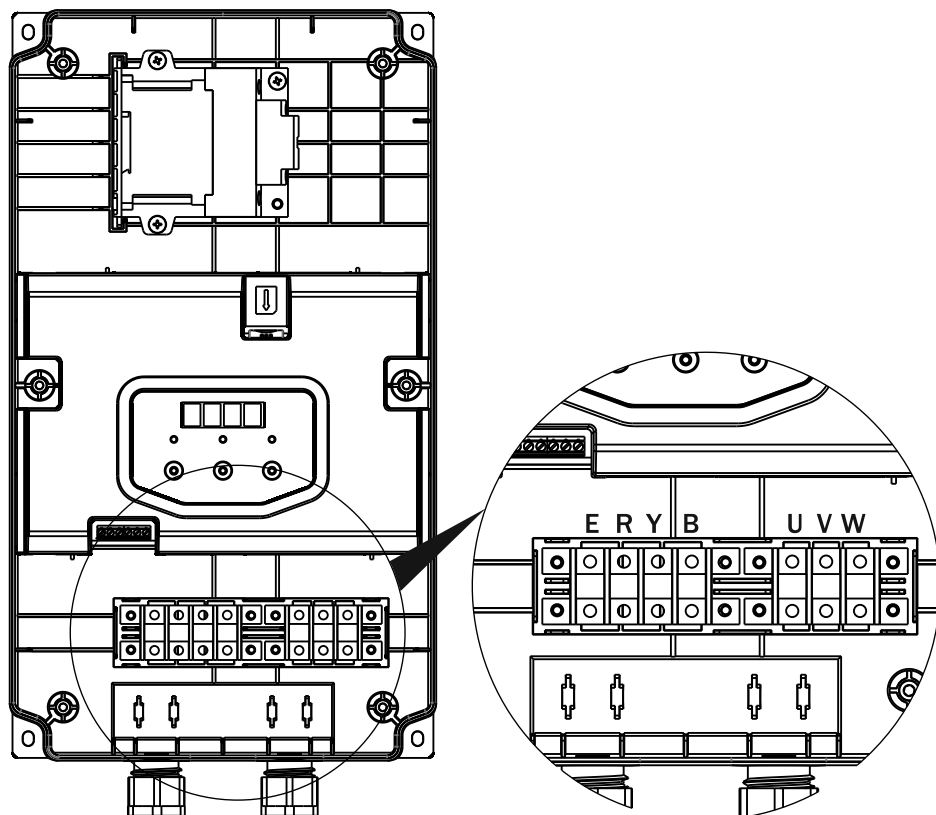


Fig 2.5

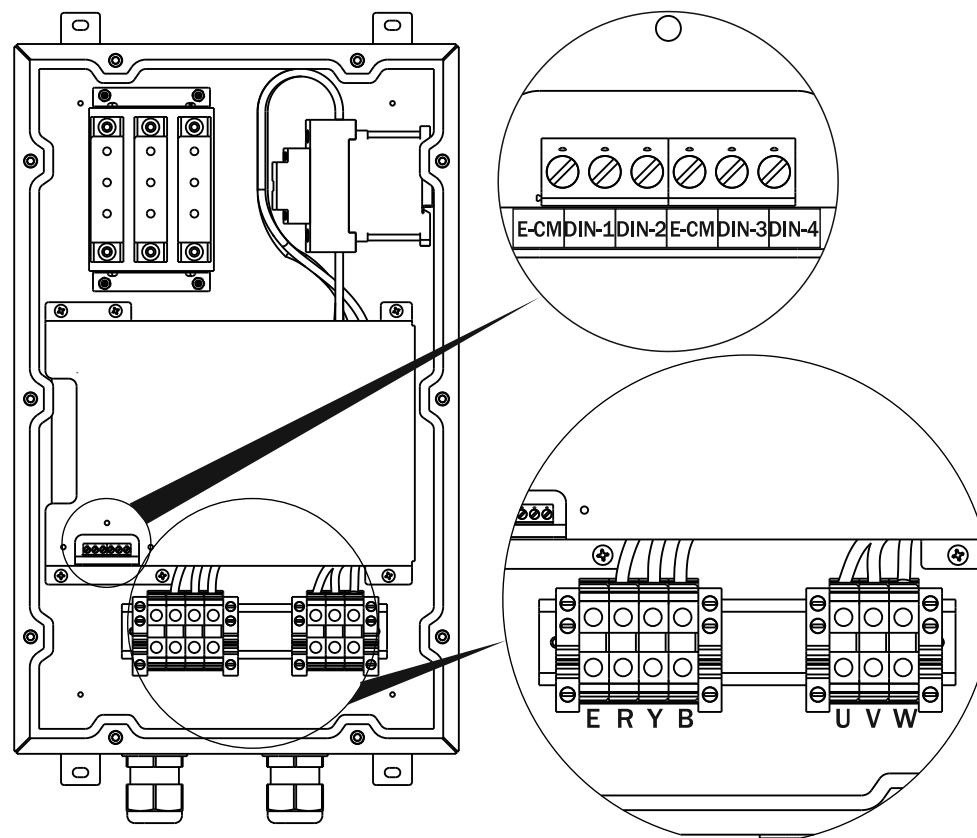
Step 2: Change input and output connections

Models 1A and 2A



Step 2: Change input and output connections

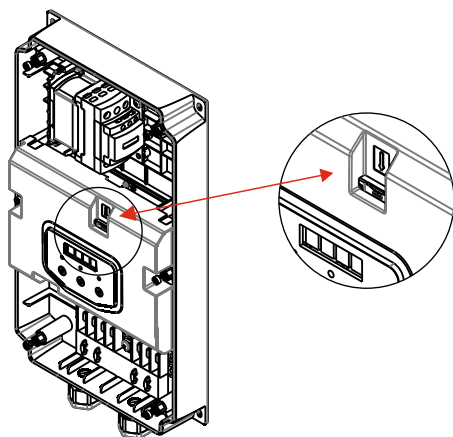
Model 1B/2B



Step 3: Insert Sim Card

1. Remove the top cover. See "Remove top cover" for details.
2. Insert the working Sim card into the slot. Ensure that the Sim is inserted into the slot correctly.
3. Close the top cover after the Sim card is inserted.

Models 1A & 2A



Models 1B & 2B

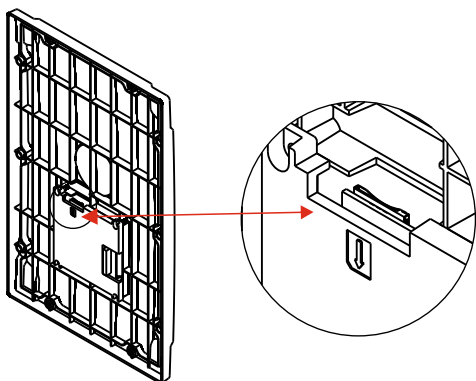


Fig 2.9

Note: Insert the Sim card only when the Digital Starter is in the power off condition

CHAPTER 3: OPERATION

⚠ CAUTION

- Verify that there is no physical damage to the module and terminal blocks.
- Ensure proper connection of start/run capacitors as per the motor data.
- All the input and output connections are properly tightened with required torque levels.
- Display shows correct ID on start-up.
- SIM Card is inserted and is ready to send/receive data.
- Ensure that all the parameters are set correctly before starting the motor during first installation.

3.1 Operating Modes

The starter operates in automatic mode, manual mode and remote mode.

3.1.1 Automatic mode

Press Auto button for automatic mode selection. Selection of automatic mode is indicated by turning ON the Auto LED. In automatic mode the motor start and stop depends on sensor feedback. See "Dry Contacts" for details.

3.1.2 Manual mode

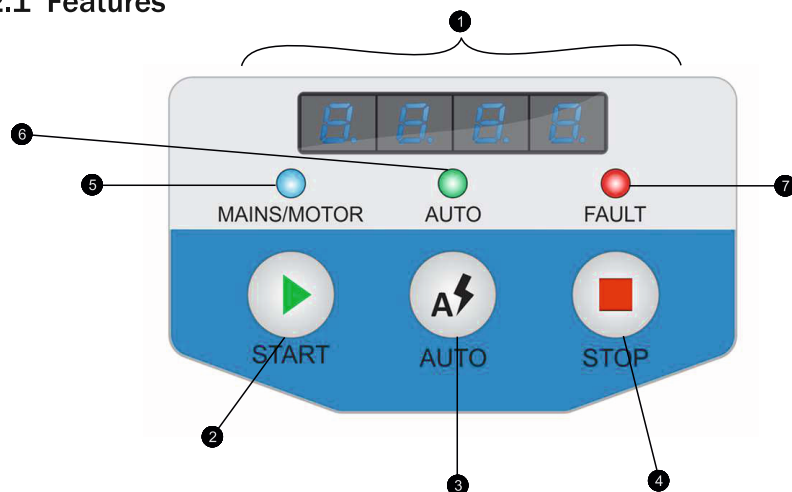
When starter is powered up and system is healthy, press Auto button to disable automatic mode. Auto LED turns OFF indicating that the starter is working in manual mode. In manual mode starter can be controlled manually by pressing START and STOP buttons.

3.1.3 Remote mode

The remote mode is an additional feature of the starter with enables user to control using mobile application. See mobile app for details.

3.2 Display

3.2.1 Features



| | |
|---|--|
| 1 | Four digit seven segment display |
| 2 | Start button: Press this button to start the motor in the Manual mode. |
| 3 | Auto button: Press this button to toggle between Auto and Manual modes. |
| 4 | Stop button: Press this button to stop the motor in the Manual mode. |
| 5 | Mains/Motor LED: Yellow LED On - Frequency and Voltage OK Yellow LED Flashes Fast - Under/Over Voltage fault. Yellow LED Flashes Slow - Frequency fault. Green LED On- Motor Runs at normal mode |
| 6 | Auto LED: Green LED On - Auto mode enabled Green LED Off - Manual mode |
| 7 | Fault LED: Red LED On - Temperature or SCR or Relay fault Red LED Blinking - Dry run or Communication error. Red LED Off - No fault. |

Fig 3.1

3.2.2 Four digit seven segment display

Seven Segment Display indicates the input voltage and output current during running.

It also indicates starter type during power ON and fault status.

| Power ON | |
|-------------------------------------|-------------------------------------|
| 3-Phase SKU1A Model 3Ph 4 | 3-Phase SKU1B Model 3Ph 5 |
| 3-Phase SKU2A Model 3Ph 6 | 3-Phase SKU2B Model 3Ph 7 |

Table 3.1 Indication of starter type during power ON and fault status.

| Motor Starter Condition | Display |
|--|-----------|
| When in READY Mode, and RUN command is not available | 234V rdy |
| When motor is running, display alternates between voltage and current. Voltage for 3 seconds and Current for 2 seconds. | 234V 32 A |

| Motor Starter Condition | Display |
|--|---------|
| Under fault conditions the display alternates between input voltage and actual fault. | |
| In case starter is waiting for minimum dwell time / fault recovery time before next start, a countdown will be displayed before entering ready. START operation is prevented until countdown is completed. | |

Table 3.2 Seven segment display indicates the input voltage & output current during running

| Display | Description | Display | Description |
|---------|-----------------|---------|-----------------|
| 234V | Input Voltage | 32 A | Rated Current |
| -030 | Recovery Time | 0V | Under Voltage |
| 0V | Over Voltage | 0C | Over Current |
| OL | Over Load Fault | Fr | Frequency Error |
| Id | SKU ID Error | dry | Dry Run |

| Display | Description | Display | Description |
|---------|-------------------------|---------|------------------------|
| SEr | Sensor Error | uFPI | Temperature Error - HS |
| OTF | Temperature Error - AMB | EFLt | Earth Fault |
| EtY | Water Empty | Linn | Start Limit |
| rTC | RTC Error | ubAL | Voltage Unbalance |
| ibAL | Current Unbalance | SSF | Soft Start Fail |
| 0uF | Water Overflow | COnn | Communication Warning |

Table 3.3 Display & it's Description

3.2.3 Alarms and Indicators

| Display | Alarm | Description |
|---------|---------------------|--|
| Uu | Under Voltage Fault | If the Mains input voltage is less than set under voltage limit, starter trips with the alarm. This fault resets if the Mains voltage recovers from under voltage level. |
| 0V | Over Voltage Fault | If the Mains input voltage is more than set over voltage limit, starter trips with the alarm. This fault resets if the Mains voltage recovers from over voltage level. |
| 0C | Over Current Fault | If the actual motor current to the pump motor, goes beyond safe level starter trips with this alarm. Reset the alarm by pressing STOP button on the Digital Starter. |

| Display | Alarm | Description |
|---------|--------------------------|--|
| OL | Over Load Fault | Thermal Overload functionality prevents motor over load. If the current drawn by motor exceeds set value for certain time, starter trips with Overload alarm based on actual overload level. Higher the loading, starter trips faster. |
| Fr | Frequency Error | Mains frequency is sensed by the starter and in case Mains frequency deviates from set 50 Hz / 60 Hz, by ± 2.5 Hz, Frequency alarm is set. Alarm is automatically reset in case Mains frequency is within the ± 2.0 Hz range. |
| Id | Model ID Fault | Digital Starter module configuration is wrongly set. Module rating mismatch Error. |
| dry | Dry Run Warning | In Auto/Manual mode of operation, if the active power drawn by motor is less than the set Dry Run power value, alarm is set in 10 seconds. Alarm recovery depends on recovery time set value. |
| SEr | Sensor Error Warning | In Auto mode, if the connected sensors are wrongly configured or if there is sensor feedback error. This alarm is not set in Manual mode of operation. |
| dtPi | Device Temperature Error | Device temperature error occurs when the device temperature exceeds 90°C. Alarm recovers if the temperature drops below 75°C after 1 minute. |

| Display | Alarm | Description |
|---------|----------------------------------|---|
| dtP | Module ambient temperature Error | Module ambient temperature has exceeded 90°C. Alarm recovers if the temperature Error drops below 75°C after 1 minute. |
| EFLT | Earth Fault | In Auto/Manual mode of operation, if there is a difference in Line current to Neutral current. Press the STOP key to reset the alarm. |
| ETy | Empty Warning | In Auto mode, if the connector sensors indicate water level empty. This alarm is automatically reset in case the sensors indicate water availability. |
| Linn | Start Limit | If number of restarts per hour cross set limit, starter trip with this alarm. Automatically resets after permissible time. |
| rtc | RTC Error | Internal real time clock error. Automatically reset with proper RTC functionality. |

| | | |
|------|----------------------------|---|
| UBAL | Alarm Voltage Unbalance | Description If the Mains input voltage unbalance is greater than set limit, starter trips with this alarm. This fault resets if the Mains voltage recovers from unbalance voltage. |
| IBAL | Current Unbalance | If the output current unbalance is greater than set limit, starter trips with this alarm. Press the STOP key to reset the alarm. |
| SSF | Soft Start Fail | If motor failed to pick up speed during soft start period, starter will trip with this alarm. Press the STOP key to reset the alarm. |
| OvF | Overflow Warning | This is a warning message in Auto mode if the connected sensors indicate overflow. Alarm resets if the overflow condition is recovered. |
| Conn | Communication Error | There is communication error. This is a warning message. The pump motor can be manually started/ stopped with this alarm condition. |

Table 3.4 Alarm & Description

CHAPTER 4: Sensing Unit

4.1 Dry Contacts

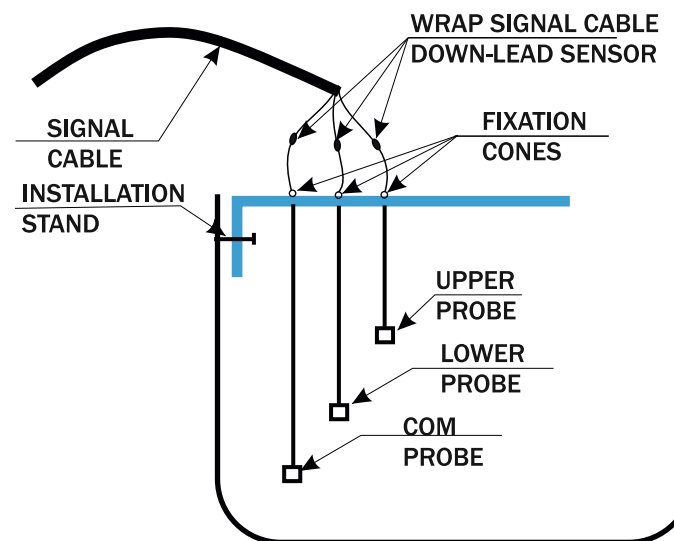
The starter has four feedback interface terminals.

- Di1
- Di2
- Di3
- Di4

Based on Sensor mode parameter selection the inputs can be configured to interface:

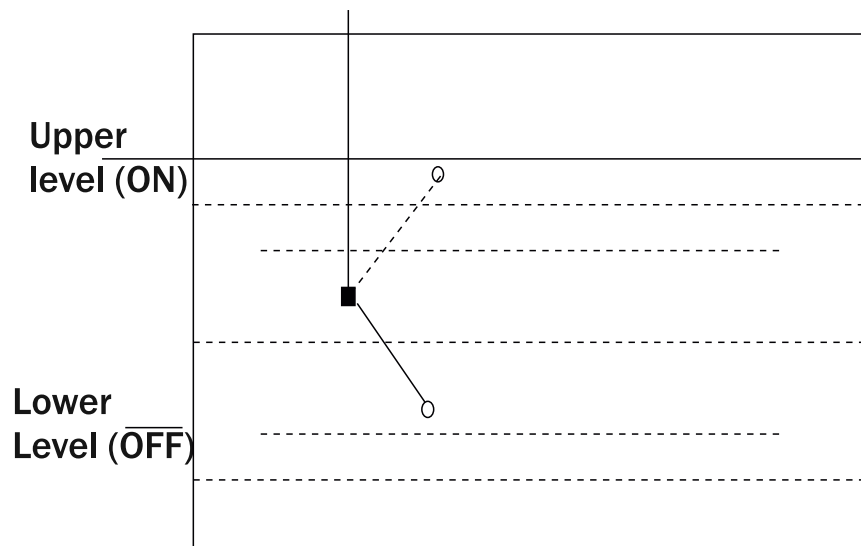
- Float Switch
- Pressure Switch
- Water Level Sensor

4.2 Sensor mode description



Liquid Probe Installation

Note: In the event of high risk of electric storms (lightening) or when liquid medium in well or tank or sump is dirty, it is recommended to use float switch.



Float Switch Installation

Note: Do not encase sensor leads, float switch wire or signal cables in metal pipes. Use PVC or PE tubing to encase.

Note:

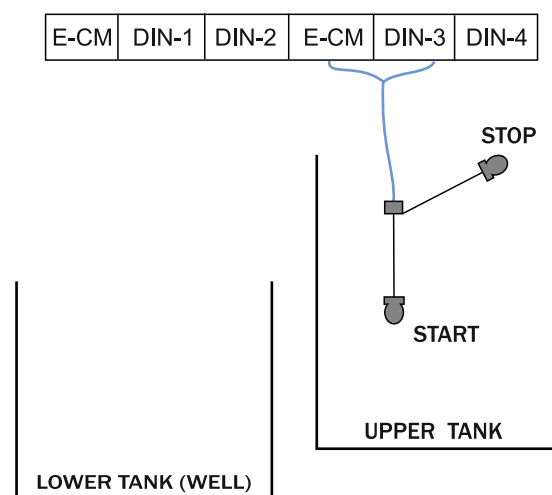
- Float and Pressure switched are assumed to be potential free.
- Float switch conducts [closed contacts] when in lower position and contact opens in upper position.
- Pressure switch conducts when pressure is low and opens when pressure reaches set value.
- All inputs are Active Low.
- Do not connect direct current [DC] type sensors.

4.2.1 Sensor mode 0:

No sensor interface

4.2.2 Sensor mode 1:

Single Float switch used for Upper Tank filling



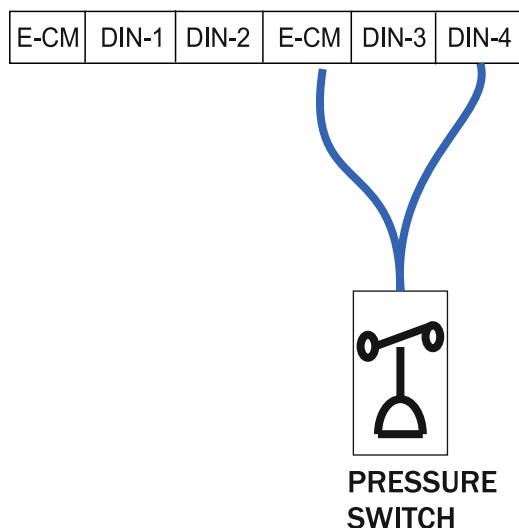
- E-CM: Common probe
- DIN-3: Lower probe
- DIN-4: Upper probe

| Tank Condition | Contact Condition | Action |
|---------------------------|-------------------|----------------|
| Water reached upper limit | Open | Pump turns OFF |
| Water reached lower limit | Close | Pump turns ON |

Table 4.1

4.2.3 Sensor mode 2:

Single Pressure switch used for pressure booster.



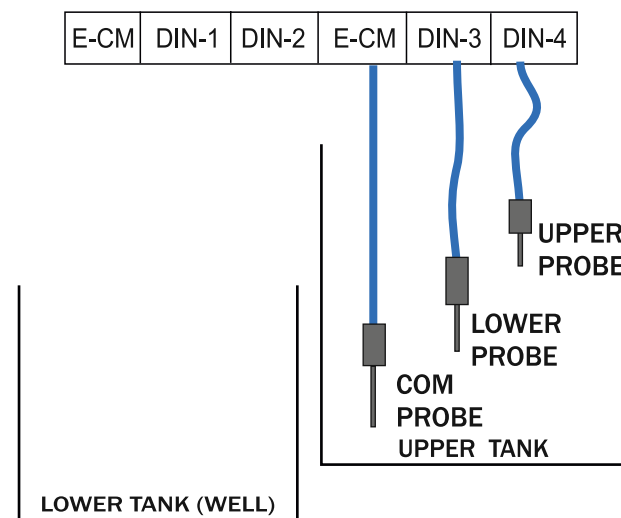
- E-CM: Pressure switch common
- DIN4: Pressure switch input

| Pressure Condition | Contact Condition | Action |
|---------------------------------|-------------------|----------------|
| Pressure has reached set value | Open | Pump turns OFF |
| Pressure is less than set value | Close | Pump turns ON |

Table 4.2

4.2.4 Sensor mode 3:

Upper tank filling using Liquid sensor probes



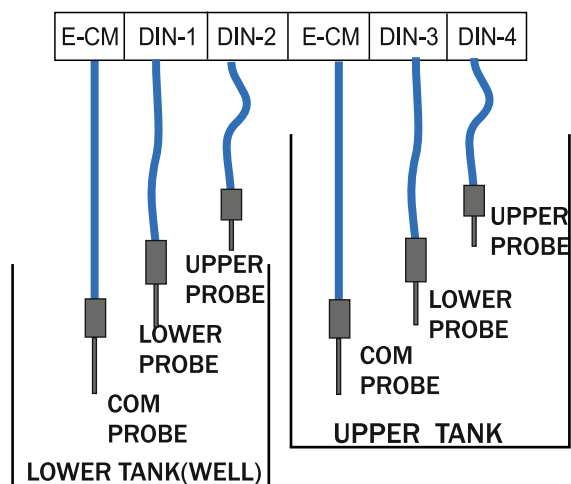
- E-CM: Common probe
- DIN-3: Lower probe
- DIN-4: Upper probe

| Tank Condition | Action |
|---|----------------|
| Water level lower than lower probe | Pump turns ON |
| Water level above lower probe and below upper probe | Previous state |
| Water level above upper probe | Pump turns OFF |

Table 4.3

4.2.5 Sensor mode 4:

Upper tank filling and lower tank monitoring using Liquid sensor probes



- E-CM: Lower tank (well) Common probe
- DIN-1: Lower tank (well) Lower probe
- DIN-2: Lower tank (well) Upper probe
- E-CM: Upper tank Common probe
- DIN-3: Upper tank Lower probe
- DIN-4: Upper tank Upper Probe

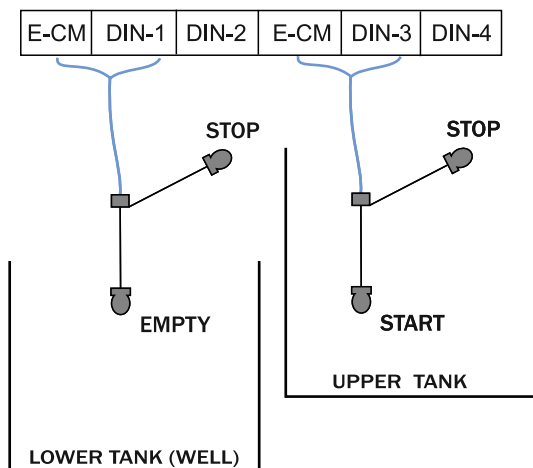
| Lower Tank (Well) | Upper Tank | Action |
|---|---|----------------|
| Water level above lower probe and below upper probe | Water level lower than lower probe | Pump turns ON |
| | Water level above lower below upper probe | Previous state |
| | Water level above upper probe | Pump turns OFF |

| Lower Tank (Well) | Upper Tank | Action |
|------------------------------------|---|-----------------------------------|
| Water level above upper probe | Water level lower than lower probe | Pump turns ON + Overflow warning |
| | Water level above lower below upper probe | Previous state + Overflow warning |
| | Water level above upper probe | Pump turns OFF + Overflow warning |
| Water level lower than lower probe | Water level lower than lower probe | Pump Turns OFF + Empty Warning |
| | Water level above lower below upper probe | |
| | Water level above upper probe | |

Table 4.4

4.2.6 Sensor mode 5:

Upper tank filling and lower tank monitoring using two Float switches



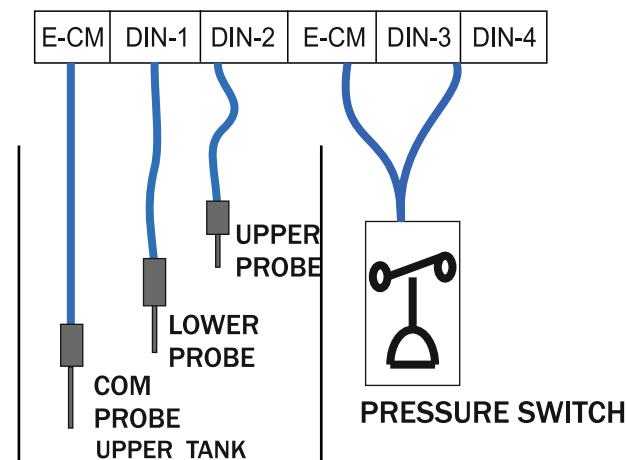
- E-CM: Lower tank (well) Float Switch common
- DIN-1: Lower tank (well) Float Switch input
- E-CM: Upper tank Float Switch common
- DIN-3: Upper tank Float Switch input

| Lower Tank (Well) | Lower Tank (Well) Float Switch Contact | Upper Tank | Upper Tank Float Switch Contact | Action |
|---------------------------|--|---------------------------|---------------------------------|-----------------------------------|
| Water reached upper limit | Open | Water reached upper limit | Open | Pump turns OFF + Overflow Warning |
| | | Water reached lower limit | Close | Pump turns ON + Overflow Warning |
| Water reached lower limit | Close | Water reached upper limit | Open | Pump turns OFF + Empty Warning |
| | | Water reached lower limit | Close | |

Table 4.5

4.2.7 Sensor mode 6:

Lower tank monitoring using Liquid sensor probes for pressure booster



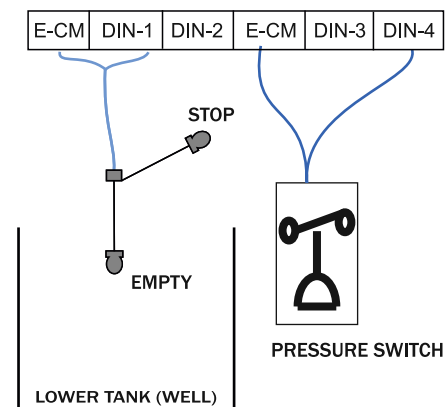
- E-CM: Liquid sensor probe common (in Lower tank)
- DIN-1: Lower probe (in Lower tank)
- DIN-2: Upper probe (in Lower tank)
- E-CM: Pressure switch common
- DIN-4: Pressure switch input

| Lower Tank Water Level | Pressure Condition Condition | Pressure Switch Contact | Action |
|---|------------------------------|-------------------------|----------------|
| Water level above lower probe and below upper probe | Pressure reached set value | Open | Pump turns OFF |
| | Pressure less than set value | Close | Pump turns ON |

| Lower Tank Water Level | Pressure Condition | Pressure Switch Contact Condition | Action |
|------------------------------------|------------------------------|-----------------------------------|-----------------------------------|
| Water level above upper probe | Pressure reached set value | Open | Pump turns OFF + Overflow warning |
| | Pressure less than set value | Close | Pump turns ON + Overflow warning |
| Water level lower than lower probe | Pressure reached set value | Open | Pump turns OFF + Empty Warning |
| | Pressure less than set value | Close | Pump turns OFF + Empty Warning |

Table 4.6

4.2.8 Sensor mode 7: Lower tank monitoring using Float switch for pressure booster

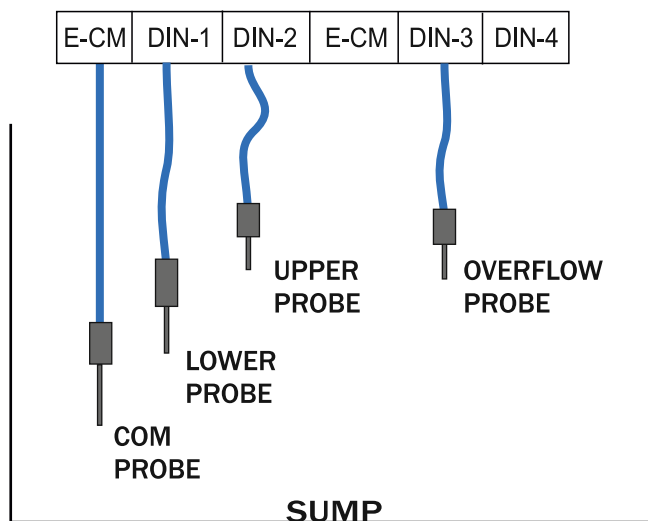


- E-CM: Float switch common
- DIN-1: Float switch input
- E-CM: Pressure switch common
- DIN-4: Pressure switch input

| Lower Tank (Well) | Lower Tank (Well) Float Switch Contact | Pressure Condition | Pressure Switch Contact Condition | Action |
|---------------------------|--|------------------------------|-----------------------------------|-----------------------------------|
| Water reached upper limit | Open | Pressure reached set value | Open | Pump turns OFF + Overflow Warning |
| | | Pressure less than set value | Close | Pump turns ON + Overflow Warning |
| Water reached lower limit | Close | Pressure reached set value | Open | Pump turns OFF + Empty Warning |
| | | Pressure less than set value | Close | |

Table 4.7

4.2.9 Sensor mode 8: Using Liquid sensor probes in Sump for Overflow detection

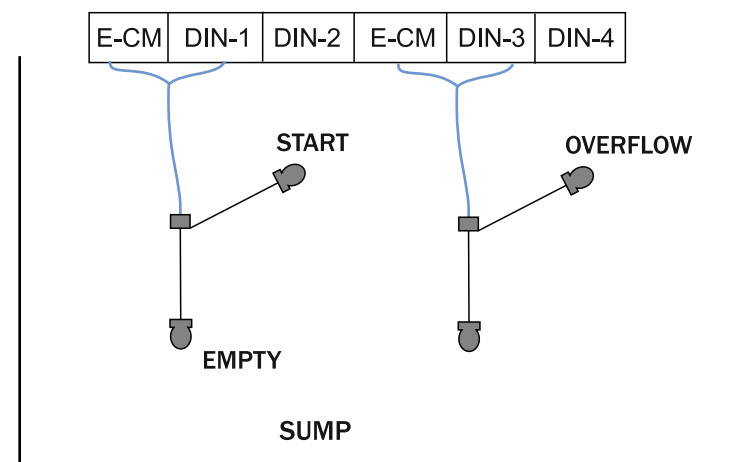


- E-CM: Common probe
- DIN-1: Lower probe
- DIN-2: Upper probe
- DIN-3: Overflow Probe

| Water Level In The Sump | Status | Action |
|---|------------------|------------------------------------|
| Below lower probe | Sump empty | Pump turns OFF + Empty Warning |
| Above lower probe and below upper probe | Sump filled half | Previous Status |
| Above upper probe and below over-flow probe | Sump full | Pump turns ON |
| Above over-flow probe | Sump over-flow | Pump turns ON and Overflow Warning |

Table 4.8

4.2.10 Sensor mode 9: Using two Float switches in Sump for Overflow detection



- E-CM: Lower Float Switch common
- DIN-1: Lower Float Switch input
- COM: Upper Float Switch (over flow detection) common
- DIN-3: Upper Float Switch (over flow detection) input

| Water Level in Sump | Lower Float Switch Contact | Upper (Over-Flow) Float Switch Contact | Status | Action |
|---------------------|----------------------------|--|------------------|----------------------------------|
| Below lower limit | Close | Close | Sump empty | Pump turns OFF + Empty Warning |
| Above lower limit | Open | Close | Sump filled half | Pump turns ON |
| Reached upper limit | Open | Open | Sump full | Pump turns ON + Overflow Warning |

Table 4.9

Dry-contact terminal block details

| Dry-contact Terminal Block | Model 1A | Model1B | Model 2A | Model 2B |
|--|---------------------------------------|---------|----------|----------|
| TB Part number | MKDSN 1,5/ 3-5,08 or equivalent | | | |
| Tightening torque, min. | 0.5 Nm | | | |
| Tightening torque max. | 0.6 Nm | | | |
| Screw thread | M3 | | | |
| Stripping length | 6 mm | | | |
| Conductor cross section stranded min. | 0.14 mm ² | | | |
| Conductor cross section AWG/kcmil min. | 26 | | | |
| Conductor cross section stranded max. | 1.5 mm ² | | | |
| Conductor cross section AWG/kcmil max. | 16 | | | |

Mobile application installation and operation procedure is given on website.

Go directly from <http://solar10.shaktisolarrrms.com> or from Shakti official website.



BT Commands For Three Phase A1SS

| Parameter Number (P) | Parameter Name | Description | Example | Default value | Min value | Max value |
|----------------------|---------------------------|---|---|---|---|---|
| 00 | Para Res_0 | Reserved / Not Used | Reserved / Not Used | 0 | 0 | 0 |
| 01 | Para GPRS_START1. | To Change start stop from GPRS | | Follow Current table for 3 phase | Follow Current table for 3 phase | Follow Current table for 3 phase |
| 02 | Para Rated_Cur. | To change the rated current based on Motor HP | | 0 | 0 | 0 |
| 03 | Para Res_1. | Reserved / Not Used | Reserved / Not Used | 0 | 0 | 0 |
| 04 | Para OLMAX_Percent. | To set the Max Over Load Trip Percentage during Starting increasing this results in increasing starting torque and starting current in soft start model | .SET 04=0460# for OL 460% of rated current | 460 | 150 | 600 |
| 05 | Para AUTO_Select. | To select Auto or Manual Mode | .SET 05=0001# for Manual / .SET 05=0001# for Auto | 0 | 0 | 1 |
| 06 | Para DRY_Power. | To set the Dry Run Power (Below this power Trip for Dry Run) | .SET 06=0300# for 300W | Follow Current table for 3 phase | Follow Current table for 3 phase | Follow Current table for 3 phase |
| 07 | Para DRY_Enable. | To Enable / Disable Dry Run Trip | .SET 07=0001# for Enable dry run trip | 1 | 0 | 1 |
| 08 | Para DRY_Restart_Minutes. | Set the restart time after dry run trip in minutes | .SET 08=0015# for 15Minutes | 30 | 0 | 600 |
| 09 | Para DRY_Restart_Enable. | To enable/disable restart after dry run trip | .SET 09=0001# for Enable restart after dry run | 1 | 0 | 1 |
| 10 | Para GPRS_START10. | To Change start stop from GPRS | | 0 | 0 | 1 |
| 11 | Para OV_Trip_Level. | To set the Overvoltage Trip Level | .SET 11=0256# for 255 Volts | 149 (Board 1) 149 (Board 1B) 258 (Board 2A) 240 (Board 2B) | 115 (Board 1) 115 (Board 1B) 250 (Board 2A) 290 (Board 2B) | 290 (Board 1) 290 (Board 1B) 290 (Board 2A) 290 (Board 2B) |
| 12 | Para MAX_Start_Time. | To set the Soft start time for (7.5 - 15 HP Three Phase Motor Only) | .SET 12=3000# for 3000 mSecs | 3000 | 100 | 9999 |
| 13 | Para Stop_Ramp_mS. | To set the Soft stop time for (7.5 - 15 HP Three Phase Motor Only) | .SET 13=3000# for 3000 mSecs | 3000 | 100 | 9999 |
| 14 | Para ONTIME_Min. | To set the on time (minutes) in manual mode | | 0 | 0 | 1440 |
| 15 | Para PUMP_Head_Mtr. | To set the pump head in liters | | 200 | 1 | 1000 |
| 16 | Para IOL_Multiplier. | To change OL trip time | .SET 16=0001# for 30 Minutes / .SET 16=0030# for 1 Minute | 30 | 1 | 30 |
| 17 | Para Res_2. | Reserved / Not Used | Reserved / Not Used | 0 | 0 | 0 |
| 18 | Para UV_Trip_Level. | To set the Undervoltage Trip Level | .SET 18=0175# for 175 Volts | 107 (Board 1) 107 (Board 1B) 185 (Board 2A) 185 (Board 2B) | 85 (Board 1) 85 (Board 1B) 150 (Board 2A) 150 (Board 2B) | 260 (Board 1) 260 (Board 1B) 260 (Board 2A) 260 (Board 2B) |
| 19 | Para UNBAL_Cur_Perc. | To set the current unbalanced percentage in three phase only | | 10 | 1 | 20 |
| 20 | Para VOLT_Unbal_Perc. | To set the Voltage unbalanced percentage in three phase only | | 10 | 1 | 20 |
| 21 | Para MAX_Start_Stop_1Hr. | Set the maximum allowed start and stop per hour | .SET 21=0015# for 15 Start and Stop | 30 | 10 | 50 |
| 22 | Para DEFAULT_Set. | Not used | | 0 | 0 | 1 |
| 23 | Para Log_interval. | Set the energy and parameter log interval in minutes | | 0 | 0 | 1 |
| 24 | Para OP_freq. | To set the Operating Frequency | .SET 24=0000# for 50Hz / .SET 24=0001# for 60Hz | 3 | 1 | 1000 |
| 25 | Para Sensor_mode. | To set Sensor Configuration as per manual | Please follow Manual | 0 | 0 | 9 |
| 26 | Para Sensor_Polarity. | To set Sensor Polarity as per manual | Please follow Manual | 0 | 0 | 15 |
| 27 | Para GrFault_Current. | Set reference current for ground leakage current (increase this to remove ground fault) | | 10 | 3 | 100 |
| 28 | Para OL_Percent. | To set the Over Load Trip Percentage | .SET 28=0110# for OL 110% of rated current | 110 | 30 | 250 |
| 29 | Para DWELL_Sec. | To set the Countdown time after healthy grille | .SET 29=0030# for 30 Sec | 30 | 5 | 600 |
| 30 | Para Flow_Calib. | Set this to change the pump flow calculation parameter | .SET 30=1300# for MD Sir 1300 factor | 1300 | 400 | 2000 |
| 31 | Para Res_4. | Reserved / Not Used | Reserved / Not Used | 0 | 0 | 0 |
| 32 | Para CAP_Volt. | | | 0 | 0 | 0 |
| 33 | Para Res_6. | Reserved / Not Used | Reserved / Not Used | 0 | 0 | 0 |
| 34 | Para Res_7 | Reserved / Not Used | Reserved / Not Used | 0 | 0 | 0 |

Current and Dry Run Power Table for 3 Phase

| Model Number | Frequency | Power | Default Value of Current | Min Current | Max Current | Dry Run Power |
|--------------|-----------|---------|--------------------------|-------------|-------------|---------------|
| 33 | 50/60HZ | 0.5-1HP | 4.0 Amps | 2.0 | 6.0 | 300 |
| 34 | 50/60HZ | 1.5-2HP | 8.0 Amps | 2.0 | 12.0 | 600 |
| 35 | 60HZ | 3.0HP | 12.0 Amps | 2.0 | 18.0 | 900 |
| 36 | 60HZ | 5.5HP | 22.0 Amps | 2.0 | 33.0 | 1650 |
| 37 | 60HZ | 7.5HP | 30.0 Amps | 10.0 | 45.0 | 2250 |
| 38 | 50/60HZ | 10HP | 40.0 Amps | 10.0 | 60.0 | 3000 |
| 39 | 50/60HZ | 12.5HP | 50.0 Amps | 10.0 | 75.0 | 3750 |
| 40 | 50/60HZ | 15HP | 60.0 Amps | 10.0 | 90.0 | 4500 |
| 41 | 50/60HZ | 0.5-1HP | 2.0 Amps | 0.5 | 2.5 | 300 |
| 42 | 50/60HZ | 1.5-2HP | 4.0 Amps | 0.5 | 5.0 | 600 |
| 43 | 50/60HZ | 3HP | 6.0 Amps | 0.5 | 7.5 | 900 |
| 44 | 50/60HZ | 4-5.5HP | 11.0 Amps | 0.5 | 13.8 | 1650 |
| 45 | 50/60HZ | 7.5HP | 15.0 Amps | 5.0 | 18.8 | 2250 |
| 46 | 50/60HZ | 10HP | 20.0 Amps | 5.0 | 22.5 | 3000 |
| 47 | 50H/60Z | 12.5HP | 25.0 Amps | 5.0 | 31.3 | 3750 |
| 48 | 50/60HZ | 15HP | 30.0 Amps | 5.0 | 37.5 | 4500 |

Troubleshooting

| Display | Description | Fault Clearing Method | Fault Reset |
|---------|---|---|---|
| UU | Under Voltage Fault. Input voltage Low. | Fault automatically clears when input voltage become healthy. If fault not cleared contact customer care. | Automatic |
| OU | Over Voltage Fault. Input voltage High. | Fault automatically clears when input voltage become healthy. If fault not cleared contact customer care. | Automatic |
| OC | Over Current Fault. Fault may occur due to pump jam, motor problem or use of oversized pump set. | Press STOP button to reset the fault. If fault not cleared contact customer care. | Manual |
| OL | Over Load Fault. Fault may occur due to pump jam, motor problem or use of oversized pump set. | Press STOP button to reset the fault. If fault not cleared contact customer care. | Manual |
| Fr | Frequency Error. Input supply frequency out of range. | Select input frequency 50 Hz or 60 Hz. Fault automatically clears when input supply become healthy. If fault not cleared contact customer care. | Automatic |
| Id | Model ID Fault. Module rating mismatch error. | Module configuration is wrongly set. | Contact customer care. |
| dry | Dry run fault | Wait for 30 min to 1 hour for the water to recharge in case of pump system. If fault not cleared contact customer care. | Automatic Time depends on set value. |

| Display | Description | Fault Clearing Method | Fault Reset |
|---------|---|--|-------------|
| SEr | Water level Sensor error. Water lever sensors are wrongly configured. | Configure the water level sensors as per recommendation and select respective mode or run in the manual mode. If fault not cleared contact customer care. | Automatic |
| OTPI | Device Over Temperature Fault. Over temperature may occur due to frequent restart or high ambient temperature. | Fault automatically clears when device temperature reaches healthy level. If fault not cleared contact customer care. | Automatic |
| DTP | Over Temperature inside module. Over temperature may occur due to frequent restart or high ambient temperature | Fault automatically clears when device temperature reaches healthy level. If fault not cleared contact customer care. | Automatic |
| EFLt | Earth leakage fault Earth leakage due to faulty output cable or motor. | Press STOP button to reset the fault. If fault not cleared contact customer care. | Manual |
| EtY | Empty warning | Automatically resets when water level goes above empty level. Check the configuration of sensors. | Automatic |
| OvF | Overflow warning | Automatically resets when water level goes below overflow level. Check the configuration of sensors. | Automatic |
| COnn | Communication Error This is communication error warning message. | Clears when communication is established. If fault not cleared contact customer care. | Automatic |

| Display | Description | Fault Clearing Method | Fault Reset |
|---------|--|---|-------------|
| ubAL | Voltage Unbalance. Input voltage unbalance. Fault may occur due to input loose connection. | Automatically resets if the Mains voltage recovers from unbalance voltage. | Automatic |
| ibAL | Current Unbalance. Fault may occur due to loose connection or faulty motor. | Press the STOP key to reset the alarm. If fault not cleared contact customer care. | Manual |
| SSF | Soft start fail Fault may occur due to pump jam, motor problem or use of oversized pump set. | Press STOP button to reset the fault. If fault not cleared contact customer care. | Manual |
| Linn | Start Limit More number of reset per hour. | Automatically resets after permissible time. | Automatic |
| rtc | RTC Error Internal real time clock error. | Automatically reset with proper RTC functionality. If fault not cleared contact customer care. | Automatic |

WARRANTY CERTIFICATE

Dear Customer. Congratulation. for purchasing our product.

Pump and Motor are warranted against defects in workmanship and material under normal use, service & specified duty conditions. We provide one time warranty service for twelve months from the date of purchase by the first user. Shakti Pumps (India) Limited warrants this product to be free from damage/ defects in material and workmanship under normal use and service for Twelve Months from the date of purchase by the first user. The user shall produce valid and original copy of invoice for availing warranty. The user shall carry defective pump set to nearest authorized service center .

This warranty does not cover any loss or damage/ defect of any nature resulting from wrong product selection/ improper installation or installation by unauthorized/ untrained person/ sandy condition/ dry running and improper use of the pump sets. The warranty also does not cover consequential losses/ damages arising due to failure of pump/ motor. No warranty will be provided on mechanical seal, rubber parts, fasteners, cables in pump. motor / pump sets. Our obligation is limited t to recycling or repairing or replacing product/ parts ex•factory. Equipment for repairs should be returned free of cost to us. The forgoing is subject to the provision that the user does not open the unit and make any change or repair without prior approval of authorized service center during the warranty period. This warranty excludes every condition whether statutory or otherwise, whatsoever not herein expressly set out.

WARRANTY CARD

Customer to fill following details

Name :
Address :
City/Village :
District :
State :
Country :
Pin Code :
Mobile no. :
Email id :

Information on Device:

Model no :
Serial no. :
Invoice no. :
Commissioning date :
Fault date and time :
Message related to fault on display :
Brief fault description and photo of display :
Sign :
Date :
Place :

Installer to fill following details

Modules Used :
Modules per string :
Number of strings :
Dealer license Number :
Company :
City/Village :
State :
Country :
Pin Code :
Mobile no. :
Email id :
Sign :
Date :
Place: :

INSTALLATION & OPERATING INSTRUCTIONS

BOOK-POST

To,
SHAKTI PUMPS (INDIA) LIMITED
Plot No. 401, 402, & 413, Industrial Area, Sector - 3, Pithampur - 454774,
Dist. - Dhar, (M.P.) - INDIA, Fax: +91-7292 410645,
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Stamp

