EKKI®
PUMPS I SYSTEMS



# INSTALLATION, OPERATION AND MAINTENANCE MANUAL

## PHM
Series


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(For Reference Only)

**DOMESTIC**
**PRESSURE BOOSTERS**

Dear customer,

Congratulations on purchase of “EKKI DOMESTIC PRESSURE BOOSTERS”.

The objective of this manual is to provide you with the installation, operation and maintenance details of the pressure boosting system.

The manual should be read before installing the pumpset.




**PHM SERIES Domestic Pressure Boosters**

1. PRE CHARGED AIR CHECK VALVE (TUBE TYPE)
2. HYDRO-PNEUMATIC PRESSURE TANK WITH DIAPHRAGM INSIDE
3. FIVE WAY CONNECTOR
4. PRESSURE SWITCH
5. PRESSURE GAUGE
6. NON RETURN VALVE
7. HM SERIES PUMPSET

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## PRIOR INSPECTION

Kindly check the Pressure Boosting System is delivered in two corrugated boxes -

i) Pressure Tanks with a spare-component's corrugated box inside,

ii) Horizontal multistage Pumpset.

After unpacking, kindly make sure the system consists of a Hydro-Pneumatic Pressure Tank, Pressure Switch, Pressure Gauge, 5-Way Connector, Non return Valve, Y-strainer and a Pumpset.

## PRODUCT OVERVIEW

**Domestic Pressure Boosters :**

EKKI provides Domestic Pressure Boosting system which ensures to deliver uniform water pressure in all outlets for Residential apartments, Hotels and Gardening applications. The system maintains steady water pressure; independent of flow and inlet pressure. The system is an assembly of a Pumpset, a NRV, a 5-way connector, a pressure switch, a pressure gauge, a hydro-pneumatic pressure tank and a Y-strainer.

**Horizontal Multistage Pumpset :**

The highly corrosive resistant; stainless steel (which includes the impellers, diffuser, and the shaft) multistage pumpset delivers water at its best efficiency point of 5$m^3$. The AC induction motor, TEFC type has built-in thermal overload protector with F class insulation for continuous duty.

**Before starting; pre-filling of the pump with water is mandatory, if not it will damage the mechanical seal and impeller.**

**Y-Strainer :**

Y-Strainers (with 0.5mm Stainless Steel Mesh) are devices for mechanically removing unwanted solids from liquid by means of a perforated or wire mesh straining element. They are used in pipelines to protect pumps from solid dust and waste materials entering the pump and the pressure tank.

**It is strongly recommended to install Strainers to avoid clogging, so it doesn't disturb the functioning of Pressure Boosters.**

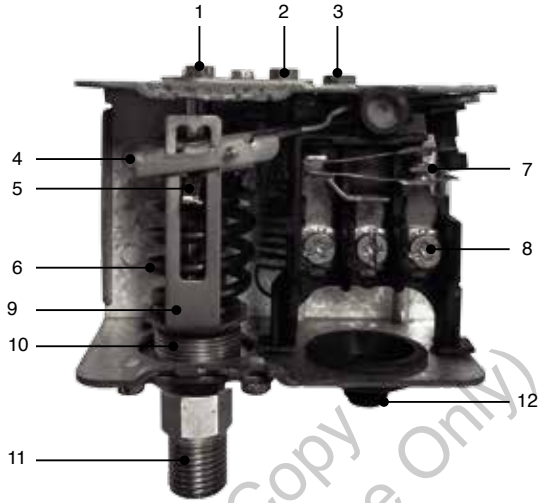
**Hydro-Pneumatic Pressure Tank :**

Water enters the pressure tank, designed with high grade butyl diaphragm; held to the wall of the tank with a steel clench ring and is engineered with virgin polypropylene liner to avoid direct contact with water. Pressure tank provides water quickly and on-demand, so as to limit the constant usage of pumps.

**Do not set pre charge air pressure in tank beyond cut-in pressure (Pumpset start pressure).**
**Failure to install a relief valve may result in tank explosion in the event of a system malfunction or over pressurization, resulting in property damage, serious personal injury or death.**

**Pressure Switch :**

EKKI provides Pressure Boosters with best grade; Danfoss - 'KP 35' Pressure Switch, which is fitted with single-pole changeover switch (SPDT) and works on snap action contact system. The snap action in the pressure switch works between the cut-in (pumpset start) and the cut-off (pumpset stop) and maintains pressure always within the preset level.




**Fundamentals of Pressure Switch**

1. Pressure Range scale nut
2. Differential scale nut
3. Spring tension adjustment knob
4. Main arm
5. Range setting spindle
6. Main spring
7. Snap contact system
8. Control terminals (4, 2 and 1)
9. Earth termninal
10. Bellow
11. Pressure switch connector
12. Cable entry : ½" Female cable gland

**Pressure Gauge :**

Pressure Boosters uses a bourdon tube pressure gauge (mechanical pressure measuring instrument), suitable for liquid media and can measure pressures from 0 to 10 bar (0 to 145 psi).

**5-way Connector :**

A high quality forged Brass - 5 way connector which consists of 5 ports, two 1" inside thread, one 1" outside thread, one ¼" inside thread, one ¼" outside thread which are used for connecting Pressure tank, Delivery Pipe, Non return Valve, Pressure switch and Pressure Gauge.

**Type Designation Code :**

**PHMAPTS20035FF02**

| | |
|---|---|
| **PHM** | Pressure Booster Horizontal Multistage |
| **A** | Aluminium Extrusion Motor body |
| **P** | Premium |
| **TS** | Monophase - MP, Threephase DOL (star) - TS |
| **2** | No. of poles : 2 |
| **003** | Motor Power rating : kW x 10 |
| **5** | Frequency : 50Hz |
| **F** | MOC : Diffuser - Fabricated Steel (F) |
| **F** | MOC : Impeller - Fabricated Steel (F) |
| **02** | No. of Impeller Stages |

**TECHNICAL DATA/OPERATIONAL LIMITS :**

Power Supply : Single Phase 230V, 50Hz
Three Phase 415V, 50Hz
Speed : 2900 rpm
Max. Flow rate : 5m³/hr
Max. Pressure : 6 bar
Liquid Temperature : Max. 35°C
Class of Insulation : F
Thermal overload protection : 145 ± 5°C

## SYSTEM ASSEMBLY

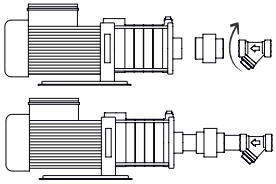
**Mechanical Assembly :**

Handling of the components should be done carefully while assembling. The components are in dismantled condition, so kindly follow the below procedure for proper assembly of the system.

**It is strongly recommended to use Sealant tapes during fitting to avoid pressure drop and make sure the assembly is done by hand, without using pipe wrench.**

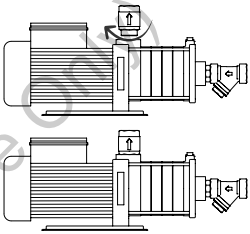
**STEP : 1**

Connect Y-Strainer (observe arrow symbol for water flow) to the inlet of the Pump using a union connected to a pipe.



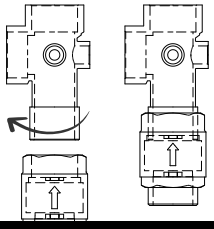
**STEP : 2**

Tighten NRV's bottom side (observe arrow symbol towards top) with Pump's outlet.



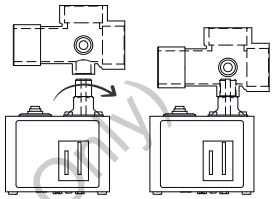
**STEP : 3**

Tighten 5-way connector (outside thread side) with top side of NRV.



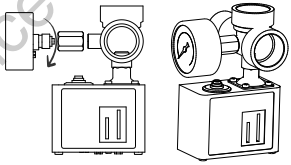
**STEP : 4**

Connect the Pressure Switch with the 5-way connector's ¼" BSP inside thread side.



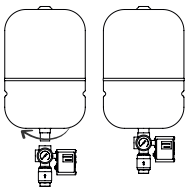
**STEP : 5**

Connect the Pressure Gauge with the 5-way connector's ¼" BSP inside thread.



**STEP : 6**

Fix the pressure tank at the top of 5-way connector.



**STEP : 7**

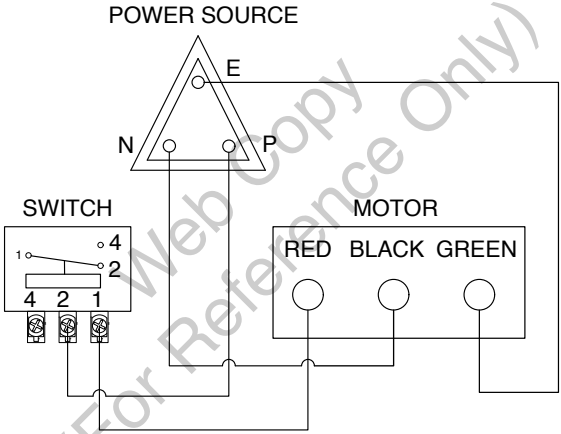
Connect the Delivery pipe with the 5-way connector's 1" BSP inside thread side.



**Electrical Connection :**

**Disconnect the pumpset from the power supply before wiring connections are made or during service to avoid possible electric shock or damage to equipment.**

- Verify that the supply voltage and frequency corresponds to the same as indicated on the pumpset name plate.
- The connections to done as shown in the Electrical Connection Diagram shown below






**Electrical Connection Diagram**

## PRESSURE SWITCH SETTING

**The parameters included in pressure switch setting :**

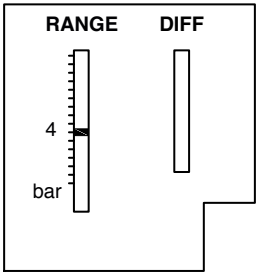
- Cut-in Pressure: The pressure at which the pumpset starts.
- Cut-out Pressure: The Pressure at which the pumpset stops.
- Differential Pressure scale value: Difference in cut-out and cut-in pressure.

The pressure settings differs with the pump and tank specifications. The pressure switch settings are to be done based on the requirement. Refer the example below to have a clear understanding.

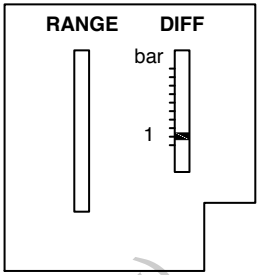
**For example :**

Pressure requirement at outlets = 3bar
Pumpset Cut-in Pressure (Pumpset start) = 3bar
Pumpset Cut-out Pressure (Pumpset stop) = 4bar
Differential Pressure Value = 4bar - 3bar = 1bar

**Adjust 'Range Scale' to 4 bar (cut-out pressure)**



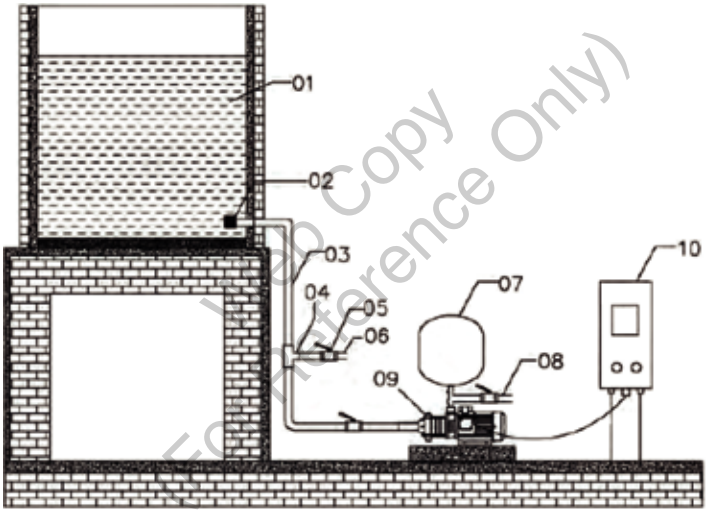

**Adjust 'Differential Pressure Scale' value to 1 bar**






## SYSTEM INSTALLATION : (Positive Suction Head)

For 24 ltr, 35 ltr tank models install the system as shown below. For 60 ltr tank model, provide separate piping for the tank. Kindly provide separate bypass connection at suction line, such that the power failure does not affect the flow of water. Avoid more number of bends and usage of different pipe sizes other than which is recommended.




**System Installation Diagram**

1. Over head tank
2. Strainer
3. Suction pipe
4. Tee joint
5. Check Valve
6. Bypass pipeline (incase of power failure time)
7. Pressure tank
8. Delivery pipe
9. Pumpset
10. Control panel

## MAINTENANCE

No regular maintenance is required for the pumpset. Only Y-strainer should be cleaned every 3 months to remove away the sediments. For any other maintenance, it should be carried out by the skilled technicians.

**Disconnect the power supply before carrying out any maintenance work.**

## TROUBLE SHOOTING

| S.No | PROBLEM | POSSIBLE CAUSE | CORRECTIVE ACTION |
|---|---|---|---|
| 1 | Pumpset delivers no water | • No power supply<br>• Impeller jammed- Foreign particles clogged in impellers<br>• Non-return valve jammed | • Provide separate bypass connection<br>• Clean the impellers |
| 2 | Pumpset delivers insufficient water/ insufficient pressure | • Foreign particles clogged in impellers/ pipes<br>• Improper pipe size<br>• Pumpset jammed with sediments | • Clean the impellers/ pipes<br>• Pipe size to be checked as per req.<br>• Clean entire pumpset, install strainer |
| 3 | Pumpset works continuously, even at no demand | • Cut-off pressure setting too high | • Reset pressure setting-within max. operating pressure |
| 4 | Pumpset starts at short intervals | • Abnormal air-preloading in tank<br>• Pressure switch setting may be wrong | • Check pre-loading pressure<br>• Reset pressure switch setting |
| 5 | Pumpset runs with noise and excess vibration | • Bearings worn out | • Replace motor bearings |
| 6 | Water leakage in pumpset | • Mechanical seal damaged | • Replace mechanical seal |
| 7 | Low pressure at outlet | • Cut-in pressure setting too low<br>• Water leakage in pipes and fittings | • Cut-in pressure to be optimized<br>• Use sealant tapes at joints<br>• Reduce the no. of elbows and turns |




## Exploded View of HM Series Pumpset

| Part No | Part Name | Qty | Material |
|---|---|---|---|
| 1 | SUCTION CHAMBER | 1 | CAST IRON |
| 2 | M6 ALLEN STUD | 4 | SS 410 |
| 3 | M6 NUT | 2 | SS 304 |
| 4 | IMPELLER | 1/STAGE | SS 304 |
| 5 | DIFFUSER | 1/STAGE | SS 304 |
| 6 | BUSH | 1/STAGE | SS 410 |
| 7 | DELIVERY CHAMBER | 1 | CAST IRON |
| 8 | DRAIN PLUG | 2 | SS 410 |
| 9 | DRAIN PLUG 'O' RING | 2 | NITRILE RUBBER |
| 10 | FLAT RING | 1/STAGE | NITRILE RUBBER |
| 11 | SEAL LOCKING COLLAR | 1 | SS 410 |
| 12 | MECHNICAL SEAL ASSEMBLY | 1 | - |
| 13 | WATER CUTTING RING | 1 | NITRILE RUBBER |
| 14 | BUSH | 1 | SS 410 |
| 15 | IMPELLER LOCK NUT | 1 | SS 410 |

| Part No | Part Name | Qty | Material |
|---|---|---|---|
| 16 | FLAT ROTOR SHAFT | 1 | SS 410 |
| 17 | CIRCLIP | 1 | SS 304 |
| 18 | FRONT BEARING 6203/Z2 | 1 | SS |
| 19 | BACK BEARING 6202/Z1 | 1 | SS |
| 20 | MOTOR BODY | 1 | ALUMINIUM |
| 21 | CAPACITOR | 1 | - |
| 22 | TERMINAL BOARD | 1 | BAKELITE |
| 23 | TERMINAL BOX COVER | 1 | ABS |
| 24 | TERMINAL BOX COVER SCREW | 4 | SS 410 |
| 25 | END COVER | 1 | CAST IRON |
| 26 | COOLING FAN | 1 | NYLON |
| 27 | COTTER PIN | 1 | MS |
| 28 | COOLING FAN COVER | 1 | MS POWDER COATING |
| 29 | COVER SCREW M5 x 6 | 4 | SS 304 |