



a **EKKI**  Group brand

Installation, Operation and Maintenance Manual



GENERAL

Our monobloc pumps will give trouble free, satisfactory service if is properly installed and maintained. Follow the instruction in this manual carefully. Do not run the monobloc pump under operating condition which differs from those specified by us. The type, pump size, main operating data and pumps serial number are all stamped on the name plate attached to the monobloc pump. Please quote this information whenever you have queries or repeat orders and in particular when ordering spares.

PREPARATION OF THE MONOBLOC PUMP SET BEFORE INSTALLATION

Insulation Resistance test

Connect an earth lead of 500 volts, 100 mega Ohms megger to any suction or of any suction unpainted surface at the suction or the flange stud. Connect the line leads to the Red, Yellow and Blue lead of the motor connecting cable leads by turns. A minimum of 20 mega Ohms insulating resistance should be shown by the megger.

Earthing

Earthing of the motor shall be done in accordance with the IS : 3043 - 1966

The size of the earth continuity conductors should be co-related with the size of the current carrying conductors, that is the size of earth continuity conductors, should not be less than half of the largest current carrying conductors provided the minimum size of the earth - continuity conductor is not less than 1.5mm² for copper and 2.5mm² for aluminium conductor (IS:3043 - 1966).

Earth wire shall be protected against mechanical damage and possibility of corrosion particularly at the point of connection of earth. The frame of every motor shall be earthed by one separate connections with earth electrode.

3 Phase 415, 50Hz Pump sets

Monobloc Pump set rating		Cable size in sq.mm	Max. Permissible current Amps	Earth continuity conductor size in sq.mm	
kW	HP			Copper	Aluminium
0.37	0.5	1.5	1.3	2.5	2.5
0.75	1	1.5	2.1	2.5	2.5
1.1	1.5	1.5	2.9	2.5	2.5
1.5	2	1.5	3.9	2.5	2.5
2.2	3	1.5	5.2	2.5	2.5
3.7	5	4	8.3	2.5	2.5
5.5	7.5	4	11.4	2.5	2.5
7.5	10	6	15.6	2.5	2.5
9.3	12.5	6	19.5	2.5	2.5
11	15	6	23.5	4	4
15	20	10	30.2	6	6
18.5	25	16	37	10	10

Cable Selection

Cable for monobloc pump set must be suitable for adequate in size to operate within the rated temperature and maintain adequate voltage to the motor. Deccan cable selections maintain motor voltage at least 95% of supply voltage with maximum rated running amperes, and maintain acceptable starting voltage and cable temperature.

Installation

Auxiliary equipment required for installation.

For installing the monobloc pump a reliable lifting capacity and a chain with hooks to lift the monobloc pump using eye bolt. The lifting gear should be capable of handling the total weight of the pump set.

Pipe Fitting

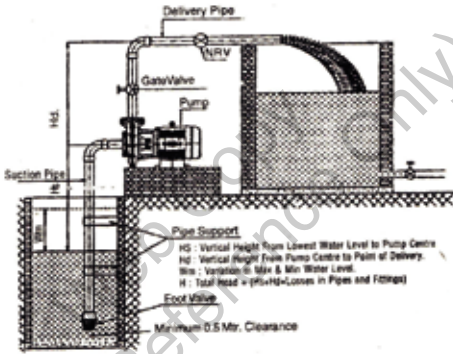
Please refer Figure no.1 for installation of monobloc pumps.

Always use pipe size as per the given suction and delivery sizes in the pump.

i.e., 65 x 50 indicates, 65 mm size for suction and 50 mm size for delivery.

Note : A pipe size higher than given can be used. Never use a pipe size lower than the pipe size of the pump.

Installation Diagram for Monobloc pump



Three Phase monobloc pump motor starter and overload protection relay selection.

DOL - Starting of Motor											
Motor Output	kW	1.5	2.2	3.7	5.5	7.5	9.3	11	15	18.5	22
	HP	2.0	3.0	5.0	7.5	10	12.5	15	20	25	30
Full load Current	A	3.7	4.8	7.8	11.2	15	18	21	27	33	39
Over load relay range	A	2-4	3-6	6-12	8-14	12 - 18	18 - 24	18 - 24	16 - 32	24 - 25	24 - 25
Backup protection fuse rating	A	10	16	16	25	25	32 / 35	32 / 35	50	63	63

Star Delta - Starting of Motor											
Motor Output	kW	2.2	3.7	5.5	7.5	9.3	11	15	18.5	22	
	HP	3	5	7.5	10	12.5	15	20	25	30	
Full load current	Line phase	A	4.8	7.8	11.2	15	18	21	27	33	39
		A	2.8	4.5	6.5	9	11	12.7	16.8	20.2	23.2
Over load relay range	A	2/4	4/7	6/9	9/14	9/14	12/16	13/19	14/24	22/30	
Backup protection fuse rating	A	10	16	16	25	25	25	50	50	63	

1 Phase, 220V, 50Hz Pump sets

Monobloc pumpset rating		Cable Size in sq.mm	Max. Permissible current Amps	Earth continuity conductor size in sq.mm	
kW	HP				
0.37	0.5	2.5	5.5	1.5	2.5
0.75	1	2.5	8.5	1.5	2.5
1.1	1.5	4	12	1.5	2.5
1.5	2	4	15	1.5	2.5

Electrical Connection to the Main and Switch Gear

The connection of the monobloc pump to the main must be done by a skilled electrician.

Monobloc Pump motor Starters

In all the cases we recommend the use of magnetic starters with motor overload protection, voltmeter and Ammeter. For motors upto 3HP we recommend the usage of Direct-On-Line (DOL) starters and Star Delta starters for all other higher HP.

Overload protection of Monobloc pump motors

The installer must provide special extra-quick trip protectors which are of ambient compensated type. Ambient compensation is necessary to provide adequate locked rotor protection at low temperatures and to avoid nuisance tripping at high temperatures. Other motor controls having three line protections in 5 - 50 degrees centigrade ambient air, 10 second maximum amps with actual trip to be no more than 120% of name plate maximum amps. For best protection mount controls for least possible ambient temperature variation.

COMMISSIONING START-UP AND SHUTDOWN

Checking direction of rotation

To ascertain the correct direction of rotation let the monobloc pump run in both direction. The direction in which the amount of water pumped out is more is the proper direction (As per Arrow).

Shutdown Periods

The monobloc pumps should not be allowed to remain idle for more than 14 days, as otherwise lime, iron other substances tends to settle in the impeller gaps and might block the pump impeller. If operating conditions require the pumps to remain stopped for a longer periods, it should be started up and allowed to run for at least 5 minutes once every 14 days, or preferable once in every 8 days. Only then can one be sure that the pump will be ready for instant resumption of service at any time.

Maintenance and Lubrication

Basically monobloc pump sets motor require no supervision maintenance during operation, however the current observed by the motor should be checked from time to time on the ammeter. Bearings are pre-packed with quality grease withstanding wide temperature limits. Depending upon environment and load conditions motor should be re-lubricated at intervals of time through grease nipple. We recommend the use of LANTHEX EP-2 grease for lubrication.

Operating troubles and Techniques

A list of possible operating troubles and their likely causes is given below. The code numbers listed under the heading "Cause" in the table are elaborated in detail in the following section "Code number of likely causes of Faults".

Nature of Operating trouble and Likely causes

Pump refuses to deliver water	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Pump refuses to deliver insufficient water	8, 9, 11, 12, 13, 15, 16, 17, 18, 19, 20
Total head is too low	8, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19
Absorbed power is excessive	7, 8, 16, 17, 21, 22, 23, 24, 25, 26
Pumps runs rough and noisily	6, 19, 20, 25, 26, 27, 28, 29, 30

Code Number of Likely caused of faults

1. Motor cannot start because of no voltage available (line dead)
2. One defective fuse; Motor cannot start.
3. Pump has been sorted under unfavourable conditions for a long time before installation, consequently the rotor has seized as a result of corrosion and oxidation at the impeller sealing gaps.
4. Rotor seizure as a result of prolonged shutdown caused by corrosion and oxidation at the impeller sealing gaps.
5. Pump choked with sand as a result of in rush of sand into the wall.
6. Defective motor winding.
7. Defective cable.
8. Rotation in reverse direction.
9. Defective rising main (Pipes or Gasket).
10. Dry running pump.
11. Water level has sunk too low during operation.
12. Rotational speed too low as a result of voltage of frequency drop.

13. The frictional losses in the piping are excessive (the calculated losses at the design stage do not correspond to the actual losses).
 14. Discharged valve throttled.
 15. Fouling of vane passages by deposition of solids.
 16. Abrasive wear of pump internals after prolonged operation, due to high sand content and aggressive water.
 17. Alteration for the actual difference in elevations to be overcome.
 18. Obstructions in rising main and discharge line.
 19. Excessive air or gas inclusions in the fluid pumped.
 20. Foreign bodies lodged in impeller.
 21. Voltage too low.
 22. One defective fuse (if one fuse blows while the pump is running) in a 3 phase motor it will continue running, but the motor will absorb up to 80% more current than normal.
 23. Defective Ammeter.
 24. Winding has an inadequate insulation co-efficient (Minimum co-efficient should be 100M Ohms).
 25. Faulty motor bearing.
 26. Gland too tight.
 27. Pumps runs in the CAVIATION region.
 28. Positive suction head is too low.
 29. Vibrations caused by the nature of the installation.
 30. The pumps operation on the falling leg of its characteristic curve.
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