

An ISO 9001:2008 certified company by 

Instruction Manual

HERCULES-27 SERIES Operation Manual



HERCULES-27



HERCULES-M27



HYDRAULIC-H27

Important - "Read" before installation

* We reserve the right to amend specification without prior notice.

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INDRA HYDRO TECH PUMPS PVT. LTD.

316, 1st Floor, 8th Cross, 4th Phase, Peenya Industrial Area, Bengaluru - 560 058, Karnataka, India
Tel.: +91 80 2836 2916, Fax: +91 80 2836 3048, Email: contact@ihpindia.in, www.ihpindia.in

Dear Customer,

Congratulations on having purchased Heavy Duty Water Transfer Pump, designed and manufactured by Indra Hydro Tech Pumps Pvt Ltd - HERCULES-27 Series.

We are certain that you will benefit from your purchase, however please note the following:

Warning:

You must read this instruction manual before attempting to install or use the pump.

It is set out in such a way that you can follow the simple steps to install and make use of your pump.

Warning:

Warranty entitlements may not apply if the pump is used or installed in a manner other than in accordance with the following instructions.

We wish you many happy years of operation with your product.

For more information talk to your local Dealer or contact:

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INTRODUCTION:

This manual explains how to use this equipment and gives instructions on the precautions to take during use. In order to understand all the features of the HERCULES-27 / HERCULES-M27 / HERCULES-H27 pumps and how to use it in the most effective manner, read this manual before using the equipment. This equipment should not be used for applications other than those listed in this manual.

We recommend that the manual be kept on hand so that you may be able to refer to it at a later date. Should the equipment be on sold or used by other personnel, please make sure that the manual is also passed on. In case this manual is lost or damaged, please contact the equipment dealer from whom you purchased the HERCULES-27 / HERCULES-M27 / HERCULES-H27 pump.

This manual was prepared with the utmost attention to detail. However, if you find any errors or omissions, contact the dealer from whom you purchased the equipment.

The HERCULES-27 / HERCULES-M27 / HERCULES-H27 pump, can be supplied as a bare shaft unit or mounted to a petrol or a diesel engine. Refer to page 14 for the different “standard” models offered. This type of HERCULES-27 / HERCULES-M27 / HERCULES-H27 pump is extensively used by commercial and industrial plant operators like builders, civil contractors, the hire industry and municipal services. This pump is a semi- open impeller, self priming with a suction check valve. The basic materials of construction is marine grade aluminium casing, with ductile iron impeller and bronze suction and discharge ports.

Our HERCULES-27 / HERCULES-M27 / HERCULES-H27 pumps have been designed and manufactured with safety in mind, however there are certain basic precautions which should be taken by the user.

CONDITIONS FOR USE:

- Maximum ambient temperature: 50 °C.
 - Maximum operating temperature: 35 °C.
 - Minimum operating temperature: -10 °C.
 - Maximum operating pressure: 10 bar
-
- Only operate the pump within the operating range as stated on the published pump curves, see pages 20 to 23— if ignored, serious engine or pump damage can occur.
 - Only to be operated by qualified personnel and in accordance with this manual.

SAFETY INFORMATION:

Operating Safety

Failure to follow instructions in this manual may lead to serious injury or even death!

This equipment is to be operated by trained and qualified personnel only! The following safety guidelines should always be used when operating any of the HERCULES-27 / HERCULES-M27 / HERCULES-H27 pumps:

- Never operate this machine in applications for which it is not intended or before reading the manual in full.
- It is important that no one is allowed to operate this equipment without proper training. People operating this equipment must be over 18 years of age and must be familiar with the risks and the hazards associated with it.

Never touch the engine or muffler while the engine is on or immediately after it has been turned off. These areas get hot and may cause burns and serious injury. Allow these parts to cool before servicing the engine or HERCULES-27 / HERCULES-M27 / HERCULES-H27 pump.

Never attempt to open the pump maintenance or priming covers while the pump is operating or immediately after it has been turned off. Make sure that all pressure is released from the casing before opening the pump maintenance or priming covers—note high system pressures can be dangerous and may lead to serious injury or even death!

Do Not use accessories or attachments that are not recommended by Indra Hydro Tech Pumps Pvt. Ltd. Damage to equipment and injury to the user may result. Indra Hydro Tech Pumps Pvt. Ltd. will not take any responsibility for any accident due to equipment modifications or misuse.

Always check the machine for loosened nuts or bolts and leaking fittings before starting the HERCULES-27 / HERCULES-M27 / HERCULES-H27 pump.

Make sure to store the equipment properly when it is not being used or when it is being transported. HERCULES-27 / HERCULES-M27 / HERCULES-H27 pump should be stored in a clean, dry location.

Never operate the machine in explosive atmospheres or near combustible materials.

Never operate the pump with volatile or flammable liquids.— otherwise dangerous working conditions will occur with the potential to lead to serious injury or even death and / or damage the pump!

Never operate this equipment in enclosed spaces.

The engine of the HERCULES-27 / HERCULES-M27 / HERCULES-H27 pump requires an adequate free flow of cooling air. Never operate the HERCULES-27 / HERCULES-M27 / HERCULES-H27 pump in any enclosed or narrow area where free flow of the air is restricted. If the air flow is restricted it will cause serious damage to the HERCULES-27 / HERCULES-M27 / HERCULES-H27 pump engine and may cause injury to the operator. Remember the HERCULES-27 / HERCULES-M27 / HERCULES-H27 pump's engine also gives off DEADLY carbon monoxide gas.

Never operate the pump with corrosive liquids — otherwise dangerous working conditions will occur with the potential to lead to serious injury or even death and / or damage the pump!

Warning-Do Not operate the pump with a closed discharge pipe otherwise the pumped fluid will quickly rise to boiling point, resulting in damage to many pump components, rise in pump casing pressure, with a potential pump body breakdown and / or explosion. During the self priming cycle, air from the suction line must be vented to atmosphere on the discharge side. If the discharge pipeline has a check valve installed, an air relieve pipe / valve must be installed. A self priming centrifugal pump will not prime if there is sufficient static liquid head to hold the check valve closed. This will mean that the pump operates in a “shut off head” condition, leading to boiling of the pumped liquid.

Make sure all appropriate safety guards around all the exposed rotating parts of the pump (shafts and couplings) are fitted.

Always shutdown the engine before transporting.

Always Drain fuel when transporting the HERCULES-27 / HERCULES-M27 / HERCULES-H27 pump over long distances or bad roads. Also drain the fuel if the machine is not to be used for long periods.

Never run the engine without an air filter or else severe engine damage will occur.

Never operate this pump unless there is liquid in the pump casing. The pump will not prime when dry. Extended operation of a dry pump will destroy the seal assembly.

Refuelling Safety

Petrol or diesel engines present special hazards during refuelling. Also read and follow the warning instructions in the engine owner's manual as well as the safety guidelines below.

Never smoke when refuelling the engine. Fire or explosion could result from fuel vapours.

Do Not refuel a hot or running engine. Allow the engine to cool before adding fuel. Fire or explosion could result if fuel is spilled on a hot engine.

Never refuel the engine near an open flame or any other potential hot source of combustion.

Do Not spill any fuel when refuelling the engine—use a funnel.

Always refill the fuel tank in a well-ventilated area and replace the fuel tank cap after refuelling.

Operating Instructions

Connect the suction hose to the inlet of the pump ensuring that an air-tight joint is obtained. The suction hose should be a non-collapsible type, such as wire reinforced 3-ply "armoured" type. Make sure to design the inlet pipework as not to create turbulence which can lead to pump cavitation at higher flows. Increasing the inlet pipework will help reduce cavitation problems, alternatively the HERCULES-27 / HERCULES-M27 / HERCULES-H27 with the larger 4" inlet will also assist. It is also recommended that a suitable strainer to be fitted to the "free" end of the suction hose. Immerse the strainer in the liquid to be pumped.

Connect the delivery hose to the outlet of the pump, again ensuring that the joint is air-tight (to prevent water spraying at this joint.)

When the pump is new, or has been drained remove priming cap in top of pump body and fill with liquid to be pumped. Replace the priming cap again making an air-tight joint.

Warning: Read the Engine Manufactures manual before attempting to start the unit. Obey any cautionary instructions appertaining to the power unit (such as checking fuel in tank, and oil levels etc.) Start the power unit.



HERCULES-27



HERCULES-M27

Service instructions

- 1 Remove inlet flange containing flap-valve and inspection cover plate containing drain plug by undoing all the nuts, removing washers and pulling off the above components with a steady pull.
- 2 Do not tear gasket.
- 3 Unscrew pump body fixing stud, tap body to loose. Remove pump body.
- 4 Unscrew the impeller fixing plate screw, and remove screw and fixing plate. Remove impeller.
- 5 Unscrew the yoke on HERCULES-27 / HERCULES-M27 / HERCULES-H27 pump or on the bare shaft HERCULES-M27 / HERCULES-H27 fixing stud nuts and remove the yoke. Lay yoke on flat surface and remove seal.
- 6 Note: If you have no need to inspect pump before renewing the mechanical seal or impeller, the pump body can be removed with inlet flange and inspection cover still assembled. This will speed up the operation.

Shaft keys

The HERCULES-27 series pump can be supplied with two types of key for your impeller (part number 34 - HERCULES-27 series) depending on what make engine that you use with your pump.

- ◆ Key part number No. 34, HERCULES-27 series has one end machined to half thickness for use in conjunction with all Honda, Vanguard or Subaru petrol or diesel engines.
- ◆ Key part number No. 34, HERCULES-27 series has both ends of the key square and is used in conjunction with all Yanmar and Hatz diesel engines.

Warning :

It is important that the right key is used and installed for the right engine.

All warranties will be void if the wrong key is used or is installed incorrectly.

Assembly

- A. Refer to the exploded view on page 10 to 13 for part numbers and details.
- B. Set the engine up on a bench for ease of assembly.
Aim to fit the key in the shaft and make sure that it slides in snugly, after applying minimal force by hand.

Warning:

It is of extreme importance that the HERCULES-27 Series key is fitted the right way around i.e. with the machined end of the key facing the engine so that the key matches into the curve of the keyway in the engine shaft. See Fig 1.

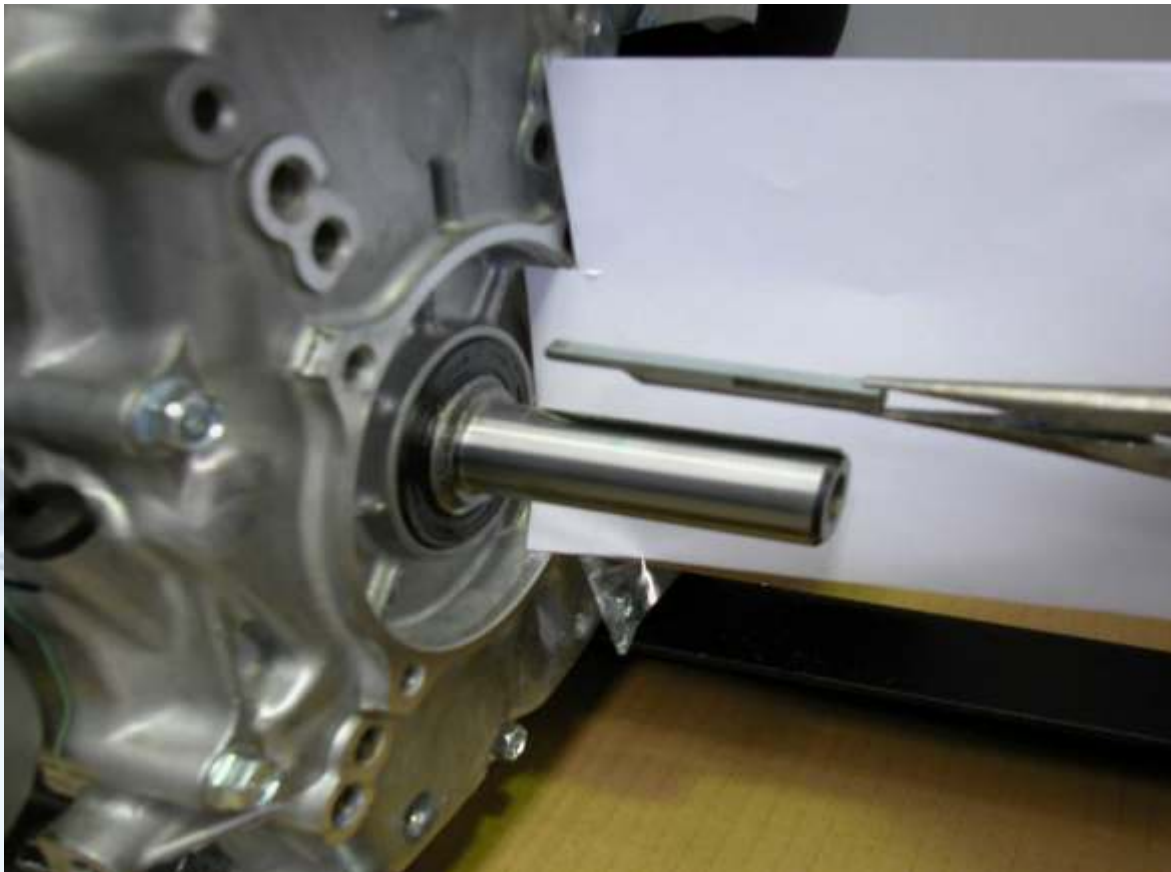


Figure 1

- C. Slide the impeller over the shaft and key to make sure that it slides on easily. Do not force the impeller onto the shaft and key. If it does not go on easily by hand, check if it is the shaft or the impeller that impedes the installation. If the key is the problem (slightly oversized), then use some emery paper or file to take a little off the width and height and refit.

Warning:

Make sure that it becomes a snug fit, do not over cut the key.

- D. Remove impeller.
- E. Bolt the yoke (item No. 39) to the engine. Refer Fig 2.



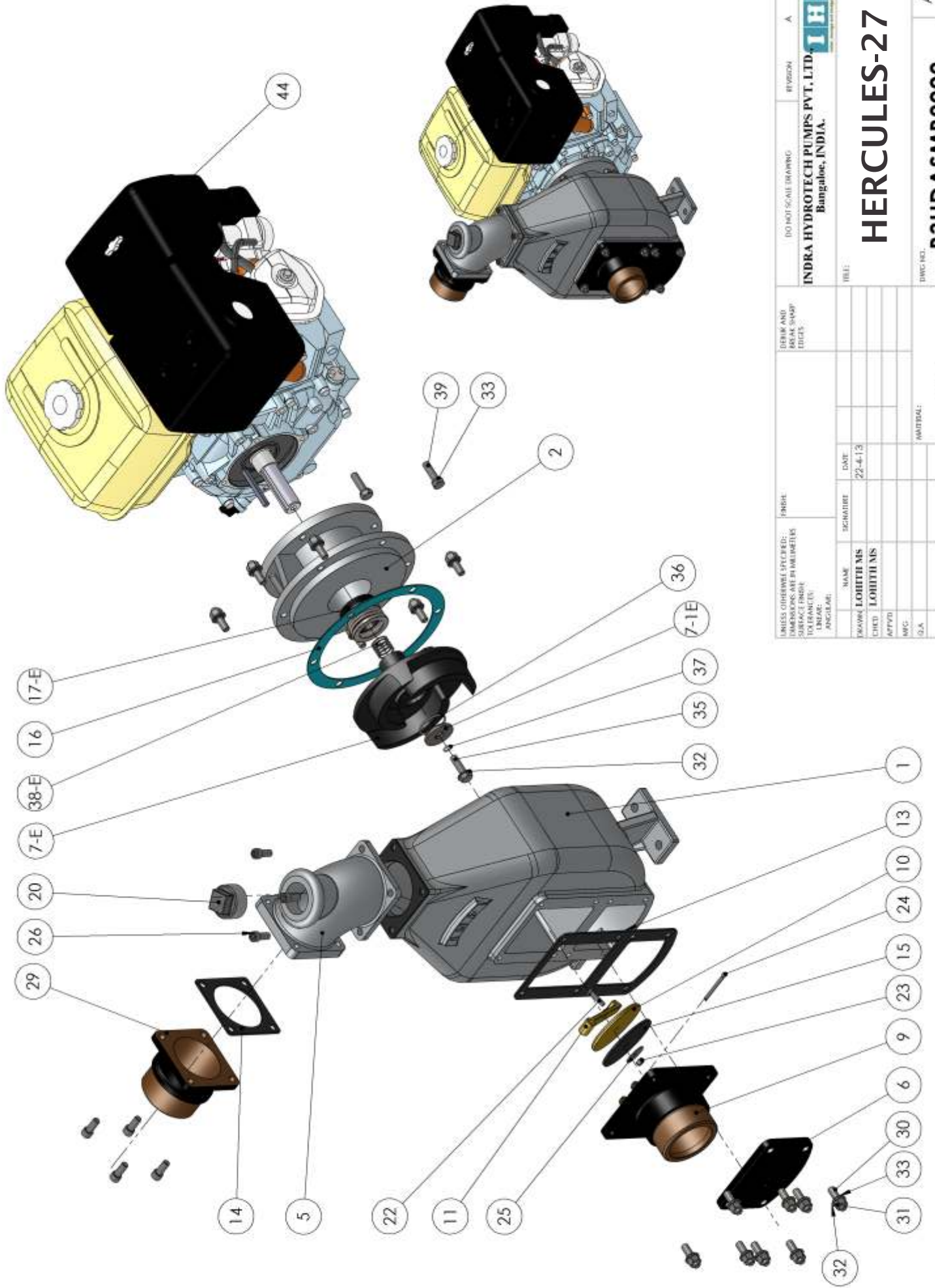
Figure 2

- F. Fit 6 or 7 shims (item number 38 - E) in the boss of the impeller (item number 7-E) and refit the impeller on the engine shaft and push it on as far as possible until the impeller bottoms out on the shaft and shims. Note: this should be a slide fit only.
- G. Use a feeler gauge and measure the gap between the back of the yoke (item 2) and the impeller (item no.7 or 7-E). For correct operation, this gap needs to be between 30 and 40 thou (thousands of an inch). Should you need to increase or decrease this gap to obtain the 30 to 40 thou spacing, increase or decrease the number of shims accordingly. Each shim is equivalent to 10 thou thick. Refer Fig 3.
- H. Once the correct gap clearance has been achieved remove the impeller.



Figure 3

- I. Remove the yoke from the engine. Fit the ceramic part of the mechanical seal (item no. 17 or 17-E) to the yoke. Apply some rubber lubricant (i.e. Molykote 111) to the rubber part of the ceramic half of the mechanical seal to assist fitting the part into the machined recess in the yoke. Make sure that you fit the ceramic part well down into the machined recess. Clean excess lubricant from the seal rubber and yoke. Make sure that the ceramic face of the mechanical seal remains spotlessly clean and is seated at 90 degrees to the shaft.
- J. Check to make sure that the key is fitted correctly in the motor shaft and has not moved. Refit yoke to the motor body, care should be taken not to damage the ceramic part of the mechanical seal.
- K. Lubricate the inside of the rubber bellows of the carbon part of the mechanical seal. Slide the carbon part of the mechanical seal over the long boss of the impeller (spring first). Carefully refit the impeller with the mechanical seal and shims.
- L. Apply some rubber lubricant to the O rings (items no. 36) and fit to the impeller end plate (item no. 7-1E). Bolt this assembly to the impeller with the impeller set screw and washer (items no.32 & 35).
- M. Now continue to assemble the remaining of the pump starting with the casing.
- N. Replace inspection cover and inlet.

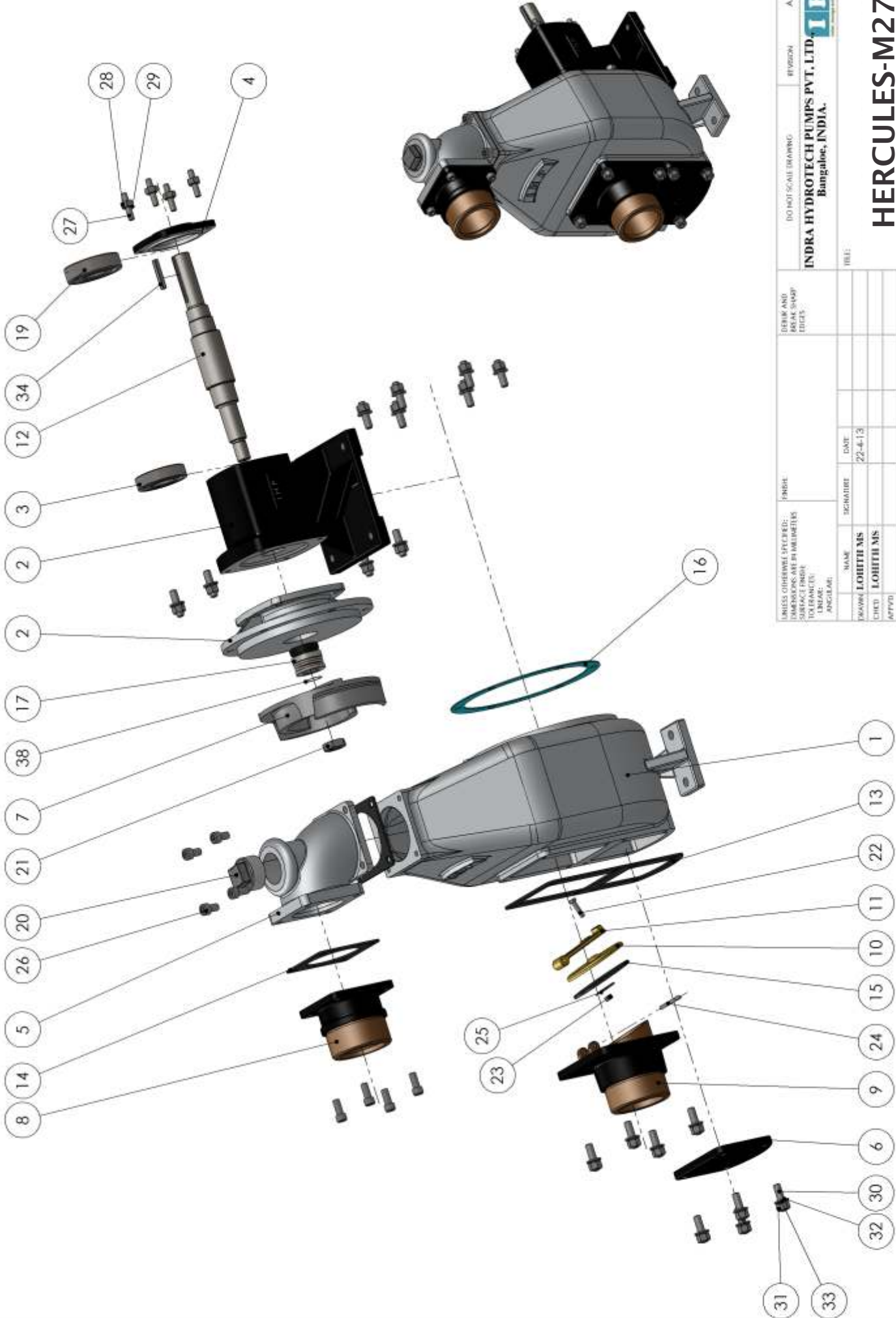


UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH TOLERANCES LINEAR: ANGULAR:		FIGURE	DATE	REVISION	A
NAME	LOHITH MS		22-4-13		
DRAWN BY	LOHITH MS				
CHECKED BY	LOHITH MS				
APPROVED BY					
MFG.	INDIA				
SCALE	1:1				
TITLE:		DRAWING AND PARTS LIST		INDRA HYDROTECH PUMPS PVT. LTD. Bangalore, INDIA.	
MATERIAL:		LM6		DWC NO. B3HDASMB9002	
WEIGHT:		24KGS		SHEET NO. A3	
SCALE		1:1		SHEET 1 OF 1	

HERCULES-27

B3HDASMB9002

A3



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: RA 0.8 TOLERANCES: LINEAR: ±0.1 ANGULAR: ±0.5		FINISH:		ITEM AND QUANTITY		DO NOT SCALE DRAWING		REVISION		A	
DESIGNED BY	DATE	SIGNATURE		ITEM NO.		REV		DESCRIPTION		QTY	
DRAWN: LOHITH MS	22-4-13										
CHECK: LOHITH MS											
APPROV:											
MFG:											
D.A.											
				MATERIAL:		WEIGHT:		SCALE(S)		SHEET 1 OF 1	
				LM6		30 KGS					

INDRA HYDROTECH PUMPS PVT. LTD.
Bangalore, INDIA.

HERCULES-M27

DWG. NO.: **B3HDASMB9001**

A3

HERCULES-27 / HERCULES-M27 - Part Numbers

HERCULES-27/HERCULES-M27

ITEM NO	PART NAME	DRAWING NUMBER	MATERIAL	QTY	
				ENGINE DRIVEN	MOTAR DRIVEN
1	Casing body	B3HD001	Aluminium	1	1
2	yoke bare shaft	B3HD002	Aluminium	1	1
2-E	yoke bare shaft	B3HD002-E	Aluminium	1	1
3	Pedastal bearing housing	B3HD003	Aluminium	0	1
4	End cover plate	B3HD004	Aluminium	0	1
5	Delivery head	B3HD005	Aluminium	1	1
6	Inspection plate	B3HD006	Aluminium	1	1
7	Impeller	B3HD007	Cast iron	1	1
7-E	Impeller	B3HD007-E	Cast iron	1	1
7-1E	Impeller sleeve	B3HD007-1E	SS 316	1	0
8	Delivery adaptor	B3HD008	Bronze	1	1
9	Suction adaptor	B3HD009	Bronze	1	1
10	NRV disc plate	B3HD010	Brass	1	1
11	NRV actuating arm	B3HD011	Brass	1	1
12	Shaft	B3HD012	MS	0	1
13	Gasket -Drain cover/suction adaptor	B3HD013	Nitrile	1	1
14	Gasket -Delivery adaptor	B3HD014	Nitrile	2	2
15	NRV rubber valve	B3HD015	Nitrile	1	1
16	Gasket - Yoke to Casting	B3HD016	Synthetic	1	1
17	Mechanical seal	B3HD017	Carbon cearmic/Nitrile	0	1
17-E	Mechanical seal	B3HD017-E	Carbon cearmic/Nitrile	0	1
18	Front bearing- 6207Z	B3HD018	Ball bearing	0	1
19	Rear bearing- 6307Z	B3HD019	Ball bearing	0	1
20	Priming plug	B3HD020	Galvanised	1	1
21	Impeller nut	B3HD021	SS	0	1
22	NRV brass set screw	B3HD022	Brass	1	1
23	NRV brass nut	B3HD023	Brass	1	1
24	NRV brass split pin	B3HD024	Brass	1	1
25	NRV Flat washer	B3HD025	Steel - Zinc Coated	1	1
26	Socket bolt	B3HD026	Steel -T. yellow	4	4
27	M8- Stud	B3HD027	ss	0	4
28	M8- Hexagonal nut	B3HD028	Steel - T.yellow	0	4
29	M8 - Spring washer internal lock	B3HD029	Steel - Zinc Coated	0	4
30	M10 - stud	B3HD030	ss	4	4
31	M10 - Hexagonal nut	B3HD031	Steel- T. yellow	14	18
32	M10 - Plane washer	B3HD032	Steel- T. yellow	15	18
33	M10 - Spring Washer	B3HD033	Steel- T. yellow	18	18
34	Shaft key	B3HD034	MS	0	1
35	Impeller lock bolt UNF	B3HD035-E	steel - T.yellow	1	0
36	O - ring for impeller spacer	B3HD036-E	NITRILE	1	0
37	O - ring impeller lock bolt	B3HD037-E	NITRILE	1	0
38	Impeller shim	B3HD038	STEEL	5	5
38-E	Impeller shim	B3HD038-E	STEEL	5	5
39	Hex headed bolt - yoke to engine	B3HD039-E	steel - T.yellow	4	0
40	packing box pedastral	B3HD040	corten/wood	0	1
40-1	HHS M12x40	B3HD040-1	steel - T.yellow	2	2
40-2	HHN M12	B3HD040-2	steel - T.yellow	2	2
40-3	plain washer M12	B3HD040-3	steel - T.yellow	2	2
40-4	cortan box pedastral	B3HD040-4	carton	0	1
40-5	pallet for pedastral	B3HD040-5	pine wood	0	1
40-E	packing box engine	B3HD040-E	corten/wood	1	0
40-E-4	cortan box engine	B3HD040-E-4	carton	1	0
40-E-5	pallet for engine	B3HD040-E-5	pine wood	1	0

Trouble shooting—pump

for any other HERCULES-27 / HERCULES-M27 / HERCULES-H27 pump problems,
contact Indra Hydro Tech Pumps Pvt. Ltd.

Trouble	Cause	Solution
Unable to self prime (suck) liquid	Pump casing with insufficient priming liquid	Add more priming fluid
	Inlet strainer or valve is fully or partially blocked	Clean or change the strainer or foot valve
	Leakage in the inlet pipe or hose	Eliminate the leakage
	Suction hose is broken	Change the suction hose
	Broken mechanical seal or gasket leak due to wear and tear	Check and change the mechanical seal or gaskets
	Undersized impeller	Fit with full size 177mm impeller. Smaller impellers to be used with flooded suction pumps only
	Priming hole inside sump is blocked	Unblock the 12mm priming hole between the front and back chamber inside the pump
	Suction head (friction losses) are too high	Re-calculate the pipe friction losses, fix suction pipe accordingly
Can not pump water or can not reach to rated capacity (flow) and head	Check all items above	Check all the items above
	Suction pipe is not immersed deep enough and is Vortexing	Check and submerge inlet deeper
	Impeller is damaged or worn	Change the worn parts
	Impeller is jammed	Clean impeller chamber
	Rotational speed is too low	Check the driver speed / rating
	Outlet head is too high	Reduce pump head or fit a bypass system in discharge pipework
	Suction head is too high	Check if the water level from the source has dropped

Trouble shooting—pump

Increase in Power absorbed (engine struggling).	Rotary speed is too high	Check the driver power output or the coupling or belt system
	Head is too low (flow too high)	Throttle the discharge valve to reduce flow
	Liquid is too thick	Dilute liquid if necessary
	Bearing failing	Check and replace bearings
Pump jammed	Liquid is too viscose	Dilute liquid pumped if necessary
	Flow is too low	Increase the flow from the pump through the throttle valve or increase the pump speed
	Foot, check valve or strainer is blocked	Clean valves and strainer
Excessive noise	Pump is cavitating	Reduce suction head and suction pipeline friction losses by increasing the pipe sizes
	Air leakages in suction	Check and eliminate leakage points
	Faulty pump — motor / engine coupling or undersized	Correct with right coupling
	Impeller blocked or damaged	Eliminate blockage or replace impeller
Pitting of impeller and or casing	Pump is cavitating	Reduce suction head and suction pipeline friction losses by increasing the pipe sizes
Bearing is getting hotter (for HERCULES-27 / HERCULES-M27 / HERCULES-H27)	Bearing temperature rise	Test bearing temperature on a regular basis to ensure that bearing remains within normal temperature range
	Insufficient bearing lubrication	Check and correct
	Engine / motor shaft vibration	Correct vibration
	Presence of water in pump bearing housing	Contact authorized service agent or Indra Hydro Tech Pumps Pvt. Ltd.
Difficult to start	Engine problems No fuel in the engine Low engine oil level Engine On/Off switch off Spark plug fouled (petrol) Injectors blocked (diesel)	Check engine manufacturers manual Refuel tank Refill to correct oil level Turn switch on Clean sparkplug and reset gap Clean injectors, replace filter

Trouble shooting-pump

The engine operates but pressure not to capacity	Pump sucking air Pump is blocked Strainer is dirty / blocked	Check that all hoses / pipes and fittings on the inlet side of pump are airtight Check and clean pump Check and clean strainer
Presence of water in engine gearbox oil		Contact authorized engine service agent
Fuel leaking from fuel tank or lines	Fuel leaks	Fix fuel leaks or Contact authorized service agent or Indra Hydro Tech Pumps Pvt. Ltd.
Oil dripping from engine gearbox	Oil leaks in engine	Consult the engine manual or contact the authorized engine service agent or Indra Hydro Tech Pumps Pvt. Ltd.

Maintenance Schedule

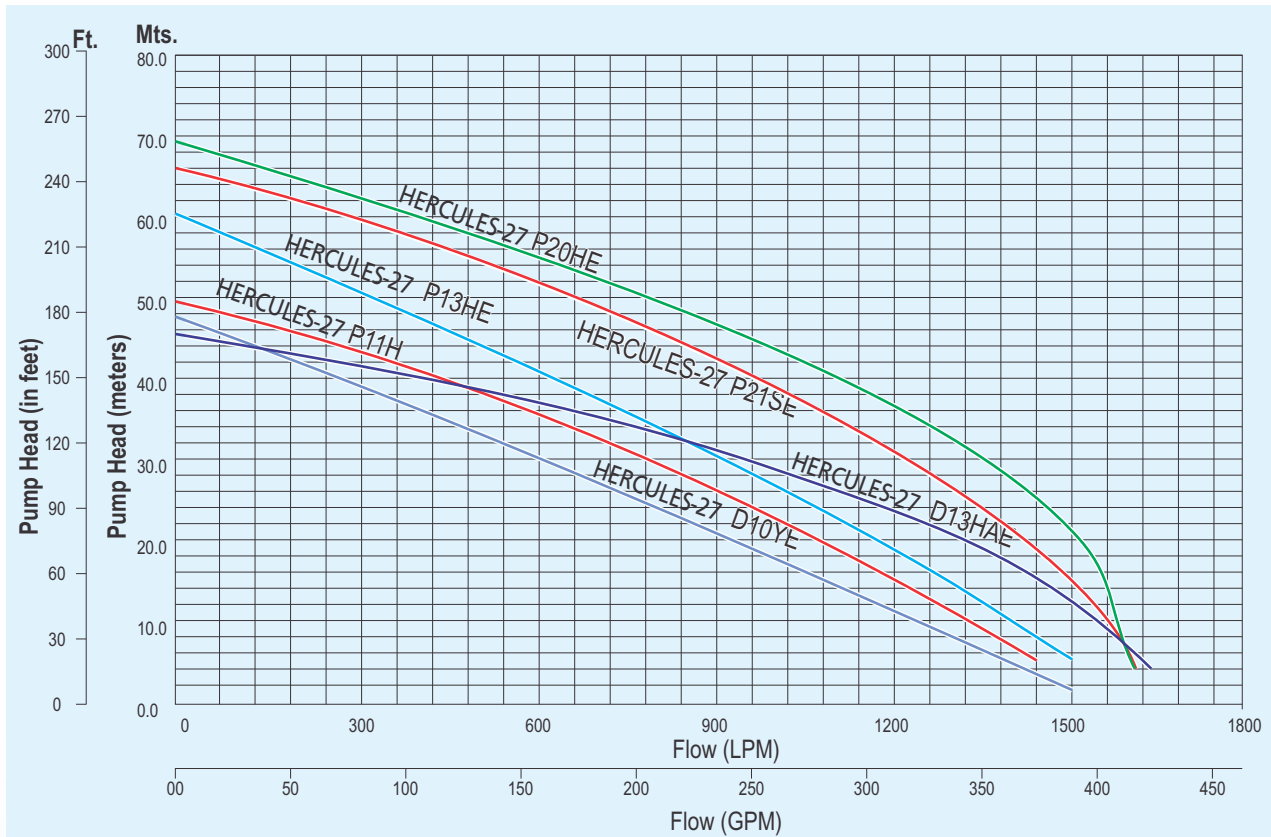
The following regular maintenance schedule is recommended as a minimum to keep your pump in top condition.

The maintenance should be undertaken by suitably qualified staff. ** If you are unsure about how to undertake the maintenance, we suggest that you get in contact with your dealer or Indra Hydro Tech Pumps Pvt. Ltd. It is important to use original spare parts to maintain the unit in a safe working order and also to maintain your Indra Hydro Tech Pumps Pvt. Ltd. warranty. **

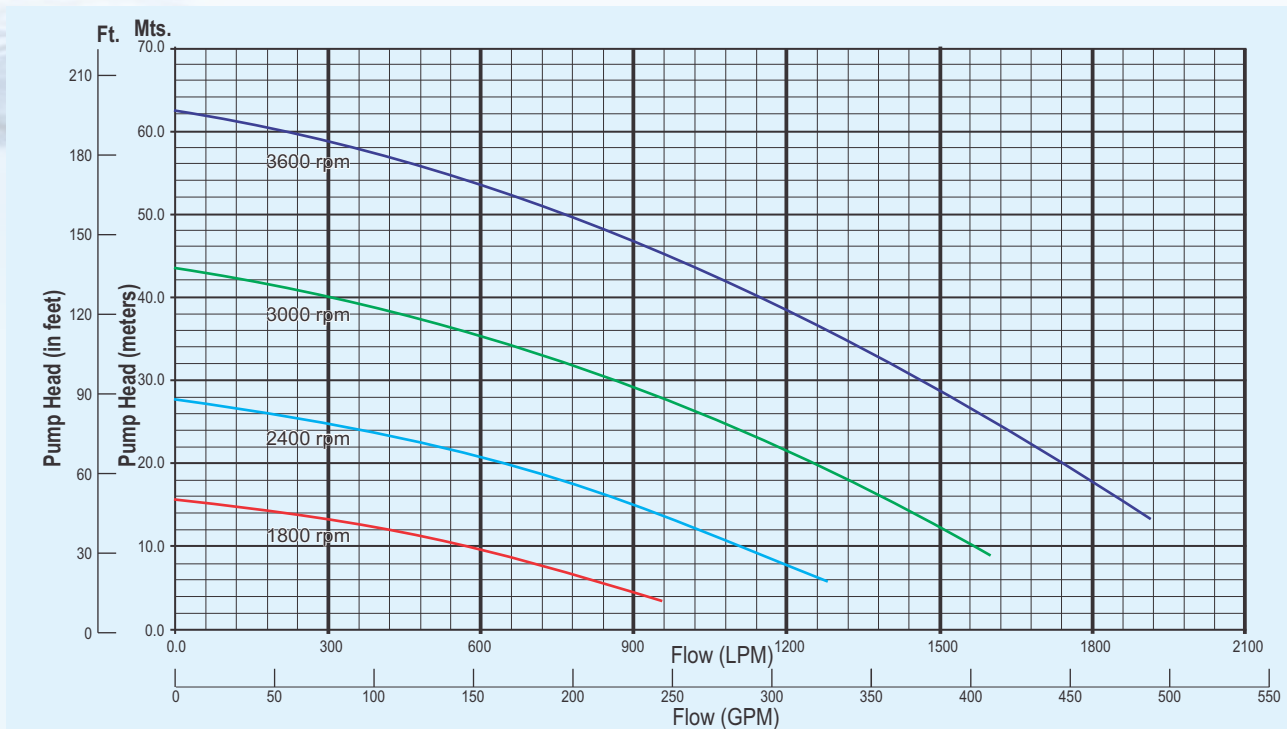
	Daily	Weekly	Quarterly	Annually
Check hose and water connections for leaks	*	Replace any leaking seals or gaskets		
Check and clean inlet water strainer		*		
Check bearing temperatures on HERCULES-M27 / HERCULES-H27			* or every 500 hours	
Inspect the pump casing for leaks	*			
Inspect the condition of wear on the impeller (measure wear gap)				* or every 2000 hours
Replace mechanical seal	When water is leaking from the seal chamber (i.e. water will be coming out of the bottom of the seal chamber or yoke).			

** Indra Hydro Tech Pumps Pvt. Ltd.'s warranty may be void if not complied with.

HERCULES-27 - Performance Curves



HERCULES-M27 / HERCULES-H27 - Speed Curves





water, sewage and sludge technology
pumps for life ...

An ISO 9001:2008 certified company by 



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