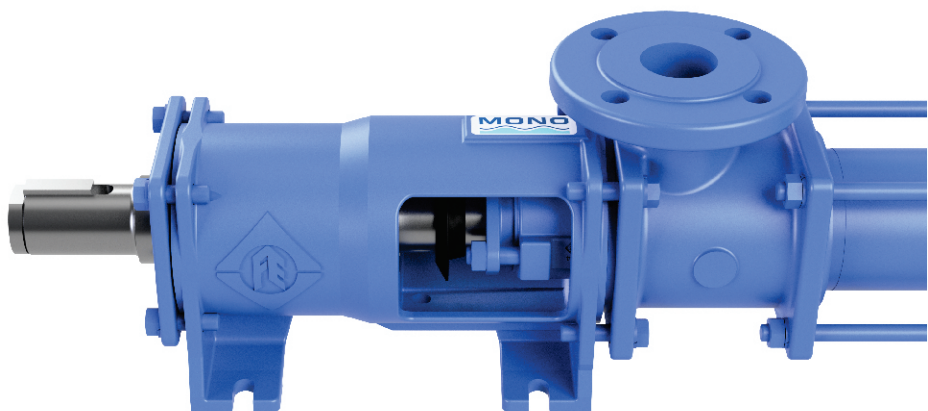




## HD-Range Agricultural Progressing Cavity Pumps

# Installation and Operating Instructions



Quality • Availability • Service • Innovation • Value





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## 1. SAFETY

Before installing and using the PC pump, carefully read the instructions provided below. This manual contains fundamental instructions that must be followed during installation, operation and maintenance. This manual must be consulted by all qualified personnel who will follow the pumps operation and installation. In addition, this manual must always be available at the location where the pump is used.

Failure to respect the safety rules may cause physical and material damage, failure of the installation or the pump's principal functions; compromised maintenance operations; mechanical or electrical damage; injury to people as well as environmental pollution. Failure to observe safety rules can void the warranty.



This is the safety alert symbol, take special note of literature in this manual highlighted with this symbol. This symbol warns about hazards that may cause serious personal injury, death or property damage if ignored.

## 2. GENERAL INFORMATION

This manual covers operation and important recommendations for the correct operation of the pump. It is necessary to respect these recommendations in order to maximize the pumps reliability, longevity, as well as to avoid the risk of accident resulting from improper use. The pump must never be used outside the limitations described in the technical specifications. It is necessary to respect the instructions regarding product nature; density; viscosity; temperature; flow rate; pressure; speed; direction of rotation; power of motor as well as all other instructions contained in this manual or in the documentation attached to the contract.

The manufacturer declines all responsibility in the case of accident or damage caused by negligence, Improper use of the pump or the failure to observe the instructions provided in this manual or use under conditions other than those stated in the name plate data.

### 3. INSTALLATION RECOMMENDATIONS

At the pumping system design stage, consideration must be given for the provision of dedicated gauges, filling or flushing connections, non-return, isolating or pressure relief valves. Due to the nature of a positive displacement pump, it is recommended a pressure relief valve is installed on the outlet side of the pump to prevent any danger and or damage in the event the flow out of the pump becomes blocked.

#### 3.1 IMPORTANT

- For ease of maintenance, the correct dismantling space must be provided (refer to the pump dimension sheet).
- All bolts and nuts securing flanges and base mounting fixtures must be checked for tightness before operation.
- All pipework should be independently supported.
- To eliminate vibration, the pump must be correctly aligned with the drive unit, all guards must be securely fixed in position, and mounted on a suitable baseplate.
- When commissioning the plant, all joints in the system must be thoroughly checked for leaks.
- Suction pipework must be clean to prevent trap material from damaging the pump. As an added precaution a temporary strainer may be fitted.

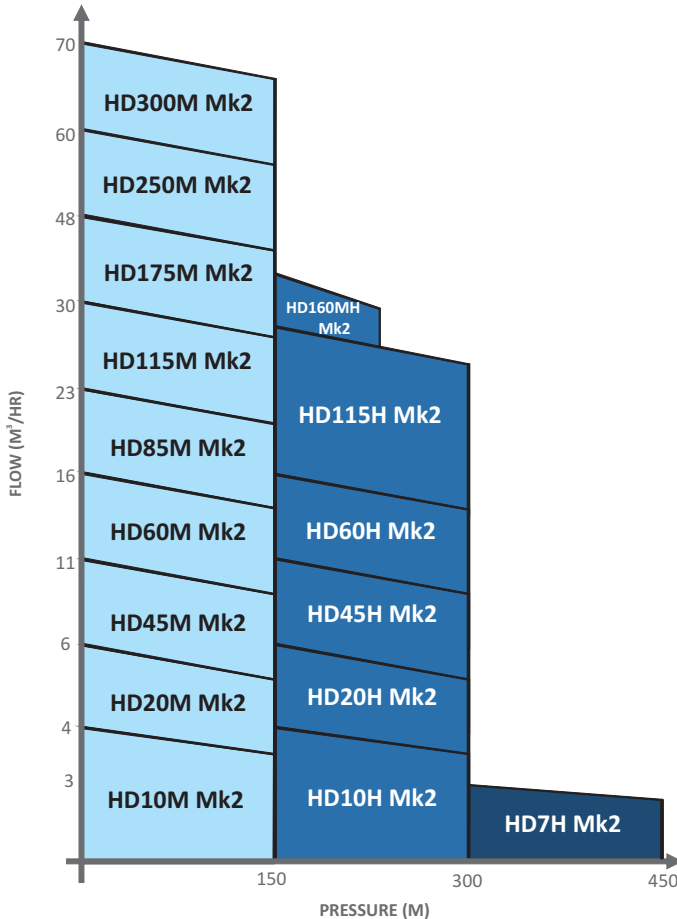


**NEVER RUN THE PUMP WITH A CLOSED INLET OR OUTLET VALVE.**

#### 4. DUTY CONDITIONS

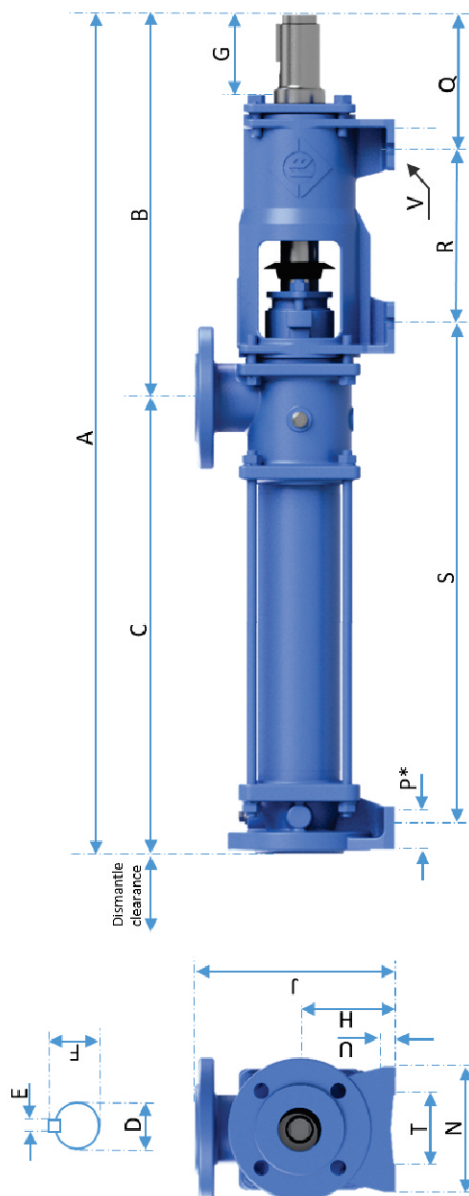
Pumps should be installed only in applications for which they were approved by Franklin Electric, having taken into account material compatibility, flow rates, temperature; solids handling; pressure; rotational speed and the environment. The performance capabilities of the Mono Agricultural pump range is shown on the chart below (based on water at 20°C).

Typical Performance Guide



Should any changes in the duty conditions be envisaged following pump selection / installation, Franklin Electric's recommendations should be sought in the interest of efficiency, safety and suitability.

## 5. PUMP DIMENSIONS



Pump Model	A	Dismantle Clearance	B	C	D	E	F	G	H	J
HD7 Mk2	1068	390	347	721	42	12	45	53	90	200
HD10M Mk2	854	390	346.7	507	42	12	45	53	90	200
HD10H Mk2	1068	390	347	721	42	12	45	53	90	200
HD20M Mk2	985	390	347	638	42	12	45	53	90	200
HD20H Mk2	1245	390	347	898	42	12	45	53	90	200
HD45M Mk2	1147	520	440	707	48	14	52	76	110	230
HD45H Mk2	1367	520	440	927	48	14	52	76	110	230
HD60M Mk2	1247	520	440	807	48	14	52	76	110	230
HD60H Mk2	1493	520	440	1053	48	14	52	76	110	230
HD85M Mk2	1333	520	440	893	48	14	52	76	110	230
HD115M Mk2	1507	665	603	904	60	18	64	116	160	320
HD115H Mk2	1816	665	603	1213	60	18	64	116	160	320
HD250M Mk2	1786	665	603	1183	60	18	64	116	160	320

Pump Model	N	P	Q	R	S	T	U	V	FLANGE	MASS (kg)
HD7 Mk2	125	30	146	165	757	90	10	M10	BS4504	42
HD10M Mk2	125	30	146	165	543	90	10	M10	BS4504	33
HD10H Mk2	125	30	146	165	757	90	10	M10	BS4504	39
HD20M Mk2	125	30	146	165	674	90	10	M10	BS4504	40
HD20H Mk2	125	30	146	165	934	90	10	M10	BS4504	57
HD45M Mk2	145	40	194	200	753	110	13	M12	BS4504	57
HD45H Mk2	145	40	194	200	973	110	13	M12	BS4504	64
HD60M Mk2	145	40	194	200	853	110	13	M12	BS4504	60
HD60H Mk2	145	40	194	200	1099	110	13	M12	BS4504	76
HD85M Mk2	145	40	194	200	939	110	13	M12	BS4504	67
HD115M Mk2	200	50	270	210	1027	150	20	M16	BS4504	141
HD115H Mk2	200	50	270	210	1336	150	20	M16	BS4504	145
HD250H Mk2	200	50	270	210	1306	150	20	M16	BS4504	193

## 6. MOTOR WIRING ARRANGEMENT

This PD pump requires a high starting torque to overcome the rotor stator friction fit. To achieve this the motor must be started direct on line (DOL) to realize maximum starting torque. Star-delta starting is not recommended. Higher power motors, requiring starting currents in excess of supply capability need to be powered using variable frequency drives (VFD).



Star-Delta and reduced voltage (soft starters) are not recommended for PD pumps.

Consideration must be given to applications using electronic variable frequency drives, these systems:

1. Must make use of VFDs with full torque rating at start-up (as opposed to a square law drive) or
2. Use a larger motor than required according to selection (to offer greater starting torque at standstill) when operating direct online.

For applications where the motor will not be operating at full frequency, derating the motor must be accounted for to cope with torque demands within the required RPM range.

Test the motor rotation direction to ensure it is correct as required for pump operation.

Failure to follow this guidance may result in the pump not starting, not being capable of producing the required duties or lead to motor failure.

## 7. STARTING

Pumps must be filled with liquid / product before startup. This initial filling is not for priming purposes but to provide the necessary lubrication for the stator until the pump primes itself.

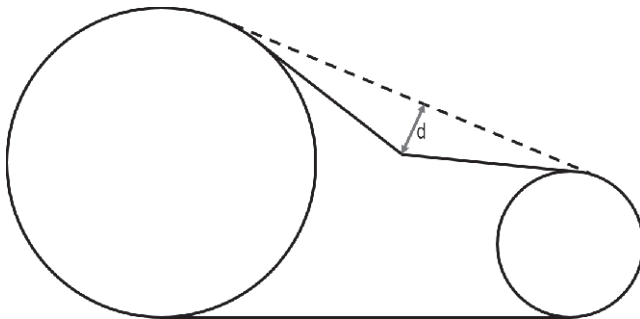
When the pump is stopped, sufficient liquid is normally trapped within rotor stator set to provide lubrication on following startup. If the pump has been standing for a long period of time, or has just been moved to a new location, or has been dismantled for examination it must be filled with liquid and be given a few turns by hand before starting. The pump is normally somewhat stiff (dependant on the model) to turn by hand on account of the close fit between the rotor and the rubber stator. If on start up, the pump does not operate correctly, the plant must be shut down immediately and the cause of the malfunction established before operations are recommenced.



Never run the pump in a dry condition, even for a few revolutions or the stator will be damaged.

Startup check list:

1. With the motor isolated from the pump, ensure that its rotation is the correct direction. These pumps rotate in one direction **ONLY**.
2. Are there any obstructions in the pipework or pump?
3. Are the pump connections and pipework points tight and leak free?
4. Have the inlet and outlet protective blanks been removed?
5. Is there lubrication in the drive unit / gearbox?
6. Is the gland follower loose (If packed gland version)?
7. Is motor voltage correct?
8. For V-belt arrangement, is belt tension correct? Rule of thumb is 16mm deflection ("d") per 1m belt length.



9. For coupling arrangement, are shafts aligned?
10. Are the pipework valves open?
11. Are all safety guards in place?
12. Is the pump filled with 'product' to provide lubrication between the rotor and stator on start up?
13. Start then stop the pump; is the pump rotating in the correct direction?



The pump speed / pressure settings must remain below the pumps maximum limitations. Consult Franklin Electric if you are unsure.

If the pump has never been run, it may be necessary to crank the pump through one revolution manually (with water/product present in the gland). This can be achieved by using an adjustable wrench fitted at the drive shaft.

## **8. GUARDS**



In accordance with the Health & Safety Act, all guards must be secured after installation, maintenance or any adjustments have been made to the pump.

## **9. ROTATION**



Do not run the pump in the incorrect direction, check pump nameplate on bearing housing for correct running rotation.

The HD Range rotates in ONE DIRECTION ONLY (counter-clockwise facing the drive end), which results in delivery on gland (D.O.G.). Incorrect rotation will unscrew the threaded flexshaft potentially causing damage to both the rotor and flexshaft as well as terminating flow from the pump.

## 10. DRAWING REFERENCE NUMBERS

ITEM NO.	DESCRIPTION	QTY PER PUMP
1	End Cover	1
2	Plug	2
3	O-ring Seal - Sealing Ring	2
4/5	Rotor/Stator Set	1
8	Gland Section / Porting Chamber	1
9	Packing Ring	1 set
10	Gland Follower	1
11	Thrower	1
12	Bearing Housing	1
13	Bearing Locknut	1
14	Bearing Lock Washer	1
16	Bearing Distance Piece	1
17	Bearing Taper Roller	2
18	Shaft Bearing Collar	1
19	Bearing Cover	1
21	Main Shaft	1
22	Key	1
29	Main Shaft Adaptor Nut	1
30	Rotor Adaptor Nut	1
31	Flexible Shaft Sealing Ring	1
32	Main Shaft Adaptor Nut - O Ring Seal	1
33	Flexible Shaft	1
34	Lip Seal - Drive End	1
34A	Lip Seal - Gland Side	1
35	Gland Stud	2
37	Loose Gland	1
39	Tie Rod	4
40	Stator Gasket	2
41	Sealing Ring	1 or 2
41A	Sealing Ring - Gland Side	1
42	Gasket - Sealing Ring	2
61/79	Hex Nut	12
62/82	Spring Washer	16
64	Hex Bolt Bearing Cover	4
65	Hex Bolt Gland Section	4
71	Hex Nut - Gland Stud	2
85	Subassembly (Bearing Housing incl. Internal Comp.)	1
88	Gasket - Loose Gland	1

## 11. EXPLODED VIEW

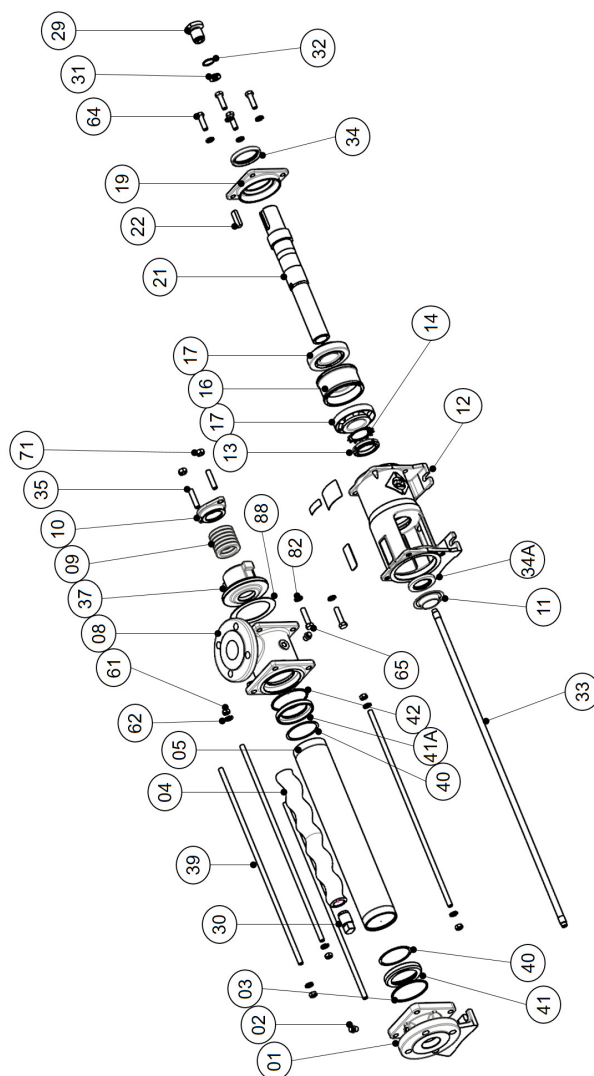


Figure 1 - Exploded view



## 12. DISMANTLING



Before any maintenance work is carried out on the pump, ensure that the pump is isolated from the electrical supply and that the pump's main isolating valves on the inlet and outlet are closed. Ensure that the system is de-pressurised.

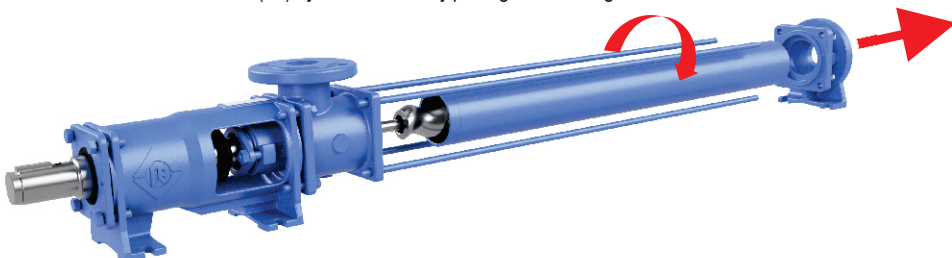


Where hazardous fluids are pumped, the pump must be flushed and drained before the dismantling. Personnel dismantling the pump must wear protective clothing throughout the dismantling procedure.

If the pump has been out of operation for more than one hour, it will assist dismantling if the rotor is given a slight turn, thereby breaking the rotor/stator seal. Where a pump has been out of operation for a longer period of time, dismantling can be facilitated by lubricating the rotor/stator assembly with water through the filling plug holes, and rotating the rotor.

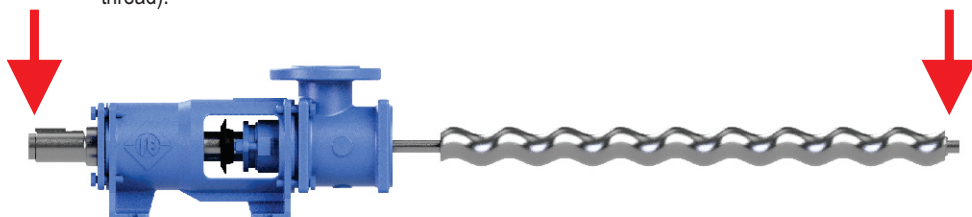
To dismantle the pump, follow the below sequence (reference to Figure 1 : Exploded view):

1. Remove suction end cover (01) holding down bolts.
2. Remove tie rod (39) nuts and washers (61 & 62) and end cover (01).
3. Remove stator (05) by simultaneously pulling and twisting.



4. To separate the flexshaft (33) and rotor (04) from pump, place suitable spanners on flats of mainshaft adaptor nut (29) and rotor adaptor nut (30). Adaptor nut (29) may need to be heated to degrade the thread bonding agent.

Hold mainshaft adaptor nut (29) stationary and unscrew rotor adaptor nut (30) clockwise (left hand thread).



5. Once the rotor (04) and flexshaft (33) have been withdrawn from the pump, the flexshaft must be held in wood or brass covered vice jaws and the rotor adaptor nut (30) rotated clockwise (left-hand thread) to be removed. Adaptor nut (30) may need to be heated to degrade the thread bonding agent.

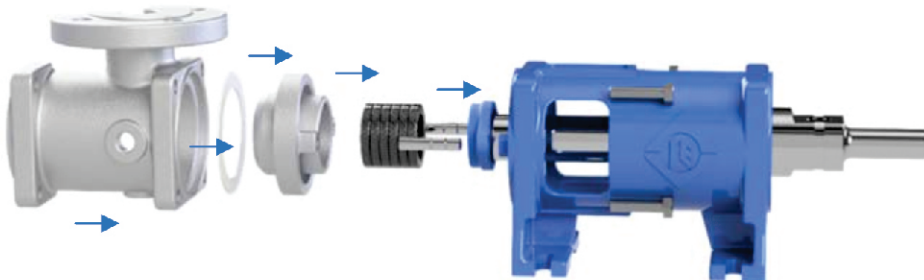
**N.B. DO NOT PLACE STILLSON WRENCHES OR EXPOSED VICE JAWS IN DIRECT CONTACT WITH THE FLEXSHAFT.**

6. Place the rotor in a suitably protected vice and remove the rotor adaptor nut (30) by rotating counter clockwise (right-hand thread).
7. Finally remove the mainshaft adaptor nut (29) (right-hand thread) and check condition of "O" Ring (32) and flexshaft seal ring (31). Replace if necessary.
8. Loosen 4 hex bolts (65) holding porting chamber (08) to bearing housing (12). Loosen gland hex nuts (71).
9. Porting chamber (08) and loose gland (37) can now be removed.
10. Loosen hex bolts (64) and remove bearing cover (19) at drive end.
11. Withdraw the mainshaft (21). Bearings (17) and lipseal (34) will pull-out with mainshaft (21).
12. Strip bearing lock nut (13) and bearing lockwasher (14) to replace bearings. Bearings (17) will have to be pressed off the mainshaft (21) to be removed.

### 13. RE-ASSEMBLY OF PUMP

Refer to Figure 1 : Exploded view :

1. Assemble bearings (17) on mainshaft (21) with bearing spacer (16) in between, and bearing lock washer (14) on open end. Bearings (17) will need to be heated to be assembled on mainshaft (21). Some models include a mainshaft bearing collar on which the lip seal (34) will seat.
2. Fasten bearings (17) on mainshaft (21) with bearing lock nut (13). See 14.2 BEARINGS for bearing settings. Ensure bearings (17) are greased liberally.
3. Insert the mainshaft assembly (21) into bearing housing (12).
4. Bolt bearing cover (19) to bearing housing (12) with hex bolts (64).
5. Install lip seal (34A) and drive end lip seal (34). Lip seal opening must face inwards.
6. Install thrower / flinger (11) on mainshaft.
7. Place gland follower (10), and then loose gland (37) with studs (35) onto mainshaft (21) from gland end.



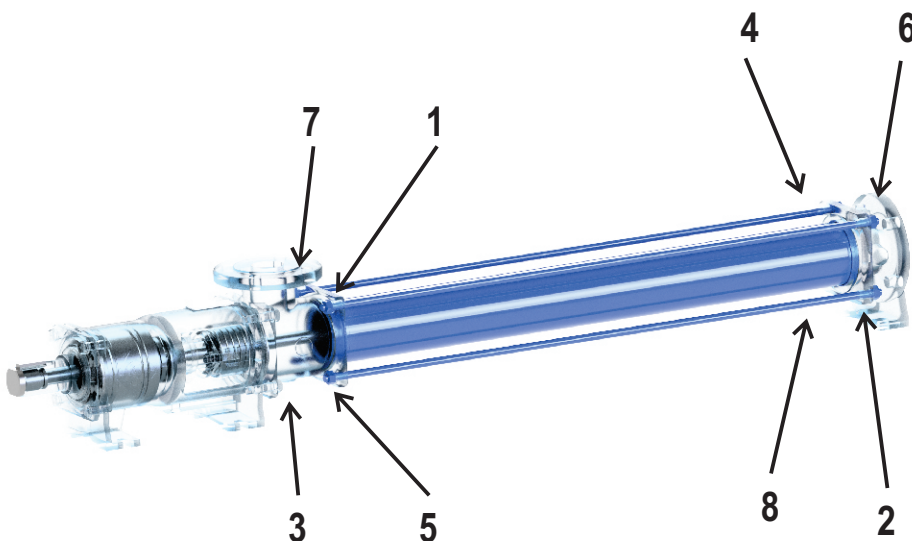
8. Place gasket (88) in gland section (08) recess, and bolt gland section to bearing housing (12). Flange can be positioned in any orientation.
9. Install gland packing (09) into loose gland section (37). Packing must be inserted with each consecutive packing rotated 180°.
10. Gland follower (10) can be tightened in place loosely using studs (35) and nuts (71). Gland follower (10) must be tightened once pump is running, it must be tightened such that the gland continues to drip (a drip a second). See 14.1 GLAND PACKING.
11. Fit rotor adaptor nut (30) to rotor (04) clockwise (right-hand thread).

Note: Loctite 577 or equivalent thread sealant must be applied to all threads on flexshaft (33) and adaptor nuts (29) (30) prior to assembly.

12. Insert flexshaft (33) into the hole in the rotor at opposite end to rotor adaptor nut (30) and tighten counter-clockwise (left-hand thread).
13. Insert opposite end of flexshaft (33) through mainshaft (21).
14. Insert flexible shaft sealing ring (31), into main shaft (21) open end.
15. Place main shaft adaptor nut - O-ring seal (32) on adaptor nut (29).
16. Tighten adaptor nut (29) counter clockwise (left-hand thread) into mainshaft (21).
17. Place suitable spanners on flats of main shaft adaptor nut (29) and rotor adaptor nut (30), and tighten.
18. Wet both the stator (05) and rotor (04) with a water-soap mixture and push stator onto rotor with a twisting motion.

N.B. ENSURE THAT GASKETS (40), SEAL O-RINGS (03/42) AND SEALING RINGS (41/41A) ARE CORRECTLY LOCATED.

19. Refit end cover (01) and tie rods (39). Tie rods must be tightened sequentially to ensure an even clamp between the stator and adjacent castings. Tighten rods according to sequence below repeating the cycle 3 times until the correct torque rating is achieved. See torque chart below.



MODEL	TIE ROD TORQUE (NM)
HD7 Mk2	12
HD10M Mk2	12
HD10H Mk2	12
HD20M Mk2	12
HD20H Mk2	12
HD45M Mk2	12
HD45H Mk2	12
HD60M Mk2	12
HD60H Mk2	12
HD85M Mk2	18
HD115M Mk2	25
HD115H Mk2	25
HD160MH Mk2	40
HD175M Mk2	40
HD250M Mk2	65
HD300M Mk2	65

## 14. ROUTINE MAINTENANCE

To ensure optimum pump life the following components should be routinely checked:

1. **Gland Packing** (refer to 14.1 GLAND PACKING).
2. **Bearings** - Bearings should be cleansed and regreased every 5,000 hours.
3. **Vee Drive** should be checked for belt tension and condition on a regular basis.

### 14.1 GLAND PACKING

The gland packing supplied as a standard in these pumps is manufactured from a non-asbestos cotton graphite. The gland will require adjustment during the initial running-in period. Under normal working conditions a slight drip from the gland is essential and assists in lubricating the packing.

It is usual to replace gland packing when re-assembling a pump. Clean the box and shaft thoroughly and examine mainshaft (21) for wear and scoring. Replace shaft if its wear is excessive. Install one ring at a time. Make sure it is clean, and has not picked up any dirt in handling. Joins of successive rings should be staggered and kept at least 90 degrees apart.

After the last ring is installed, take up bolts finger tight. Do not jam the packing into place by excessive gland loading. Start pump, allow packing to leak freely. Excessive leakage during the first hour of operation will result in a better packing operation over a longer period of time. Take up gradually on the gland as the packing seats, until leakage is reduced to a tolerable level, preferably 8-10 drops per minute per inch of shaft diameter. Stopping leakage entirely at this point will cause the packing to burn up. A gland which is too tight can be detected by insufficient leakage and excessive heat in gland area and should be slackened off.

### 14.2 BEARINGS

Bearings are removed from the shaft by following steps in 12. DISMANTLING.

#### RECOMMENDED PROCEDURE FOR SETTING THE CORRECT RUNNING CLEARANCES IN THE BEARINGS.

1. After assembling the bearings (17) and bearing spacer (16) onto the shaft, place the assembly in a vertical position and align the bearing cups and spacer to run concentric with the shaft axis (using straight edge or steel ruler).
2. Rotate the bearing cups and spacer by hand and tighten the locknut until resistance is felt in the bearing assembly. At this point all free running clearance is eliminated. (This operation should be carried out with bearings 'dry', i.e. no grease, only a protective coating).

3. The locknut should now be loosened to give correct running clearance (see table below).
4. The tab of the lock washer should now be bent into a corresponding slot on the locknut.
5. Bearing Lubrication - The taper roller bearings should be packed with Castrol Sphero EP2 grease or equivalent and the housing 1/3 filled.

Bearings should be cleaned and re-packed with grease every 5,000 hours.

Model	Bearing	Required Axial Clearance	Anti clockwise clearance locknut rotation for correct clearance
HD7 Mk2	31308	0.05mm-0.07mm	15°
HD10M Mk2	31308	0.05mm-0.07mm	15°
HD10H Mk2	31308	0.05mm-0.07mm	15°
HD20M Mk2	31308	0.05mm-0.07mm	15°
HD20H Mk2	31308	0.05mm-0.07mm	15°
HD45M Mk2	31310	0.06mm-0.08mm	15°
HD45H Mk2	31310	0.06mm-0.08mm	15°
HD60M Mk2	31310	0.06mm-0.08mm	15°
HD60H Mk2	31310	0.06mm-0.08mm	15°
HD85M Mk2	31310	0.06mm-0.08mm	15°
HD115M Mk2	30314	0.1mm-0.12mm	20°
HD115H Mk2	30314	0.1mm-0.12mm	20°
HD160MH Mk2	30314	0.1mm-0.12mm	20°
HD175M Mk2	30314	0.1mm-0.12mm	20°
HD250M Mk2	30314	0.1mm-0.12mm	20°
HD300M Mk2	30314	0.1mm-0.12mm	20°

## 15. PARTS VIEW: HD7 - HD20H

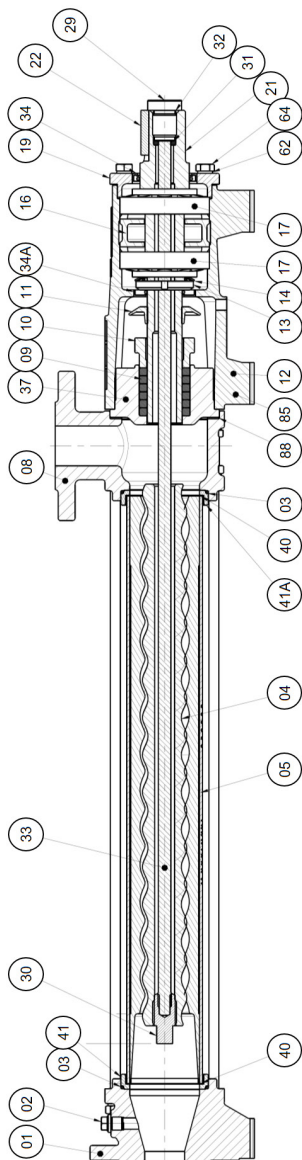


Figure 1

**16. PARTS VIEW: HD45M - HD85M**

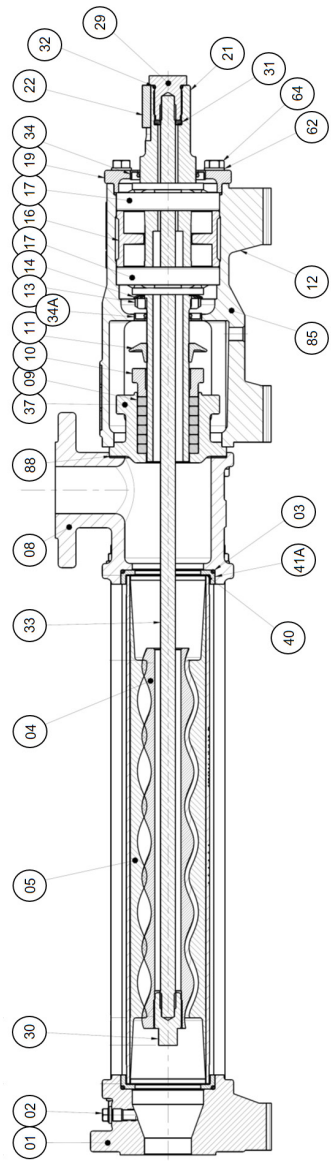


Figure 2

## 17. PARTS VIEW: HD115M - HD300M

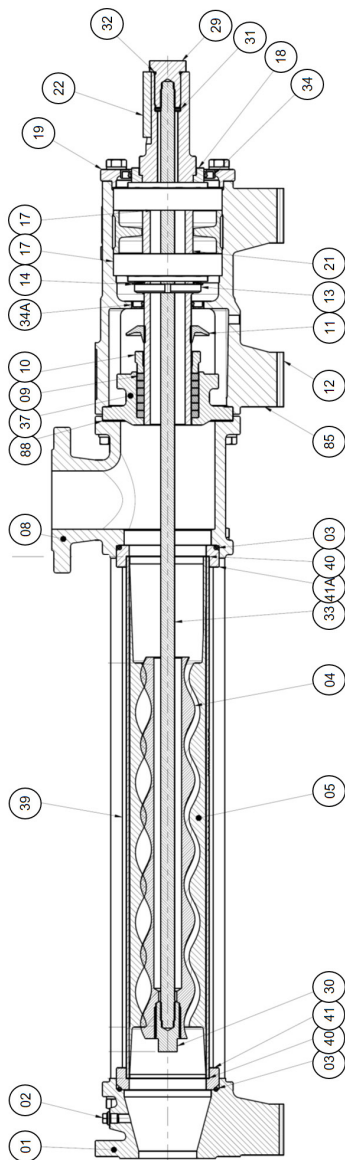


Figure 3

## 18. INSTALLATION DATA

Complete the installation data documentation for warranty purposes and for future referencing.

PUMP INSTALLATION DATA SHEET
<b>Customer :</b>
Date of installation
Pump size
Product pumped
Temperature. °C
Pump speed. rpm
Driver speed. rpm
Pumped capacity. m <sup>3</sup> /hr
Pressure at pump. kPa
Drive. motor/engine/tractor
Drive power rating
Relieve valve fitted. Yes/no
Method of starting. DOL/Star Delta
Altitude. m
Suction conditions
pH
Viscosity (cP)
Solids content. %
Solids detail
Specific Gravity
Materials of construction
Mech. seal or packed gland
Pump serial no
Stator serial no
Length and dia of suct. line. m / mm
Length and dia of del. line. m / mm
Suction or delivery on gland

## 19. TROUBLESHOOTING

Problem/Cause	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
No discharge	1	2	3			6		8											20						25				29
Under capacity			3	4	5	6	7	8		10	11			14	16			19	20	21							27		
Irregular discharge			3	4	5	6	7	8							16		18		20										
Prime lost after starting			3	4	5	6	7	8	9						16		18												
Pump stalls when starting									9			12		14			18												29
Pump overheats									9		11			14	15							22		24					
Motor overheats									9			12		14	15		18					22		24					29
Excessive power absorbed									9			12		14	15		18					22		24					29
Noise & vibration			3	4	5	6	7	8	9		11		13	14		16		18					22	23	24				
Pump element wear											11		13	14										24					
Excessive gland seal wear													13		15		17									26		28	
Product loss through gland													13			16	17												
Seizure											11		13	14	15									24					

No.	Cause	Remedy
1	Incorrect direction of rotation	Reverse the motor
2	Pump not primed	Expel gas from supply line and pumping chamber and introduce fluid.
3	Insufficient NPSH available	Increase supply line diameter. Increase suction head. Simplify supply line configuration. Reduce speed. Decrease product temperature - check effect on viscosity and power input.
4	Product vapourising in supply line	As 3 above.
5	Air entering supply line	Remake pipe joints. Adjust or repack gland.
6	Gas in supply line	Expel gas from supply line and pumping chamber and introduce fluid.
7	Insufficient head above supply vessel outlet	Raise product level. Lower outlet position. Increase submergence of supply line.
8	Foot valve strainer is obstructed or blocked	Service fittings.
9	Product viscosity above rated figure	Decrease pump speed. Increase product temperature.
10	Product viscosity below rated figure	Increase pump speed. Decrease product temperature.
11	Product temperature above rated figure	Cool the product pumping chamber.
12	Product temperature below rated figure	Heat the product pumping chamber - check with Franklin Electric.
13	Unexpected solids in product	Clean the system. Fit a strainer in the system.
14	Delivery pressure above rated figure	Check for obstructions. Service system and revise to prevent problem recurring. Simplify delivery line.
15	Gland over tightened	Slacken and re-adjust gland.
16	Gland under tightened	Adjust gland.
17	Gland flushing inadequate	Check that fluid flows freely into the gland. Increase flow rate.
18	Pump speed above rated figure	Decrease pump speed.
19	Pump speed below rated figure	Increase pump speed.
20	Stator turning	Replace worn parts. Tighten stator bolts.
21	Flexible coupling misaligned	Check flange alignment and adjust mountings accordingly.
22	Belt drive slipping	Re-tension to manufacturer's recommendations.
23	Insecure pump driver mountings	Fit lock washers to slack fasteners and retighten.
24	Shaft bearings worn/failed	Refer to Franklin Electric for advice and replacement parts.
25	Discharge blocked or valve closed	Relieve the pressure and clear the blockage.
26	Product entering packing area	Check packings condition and type
27	Worn pumping element	Fit new parts.
28	Shaft wearing the seals	Check for worn shaft and replace.
29	Frozen fluid in pump	Allow for pump to thaw slowly. Ensure pump is drained in future. Replace damaged parts.

## 20. WARRANTY

**This document contains Franklin Electric Co., Inc. and all of its subsidiaries (collectively, "Franklin Electric") standard limited warranty, general sales policies and controlling terms and conditions for Submersible Pump (the "Goods"). This document shall not be altered or amended except as provided by Franklin Electric.**

### Limited Warranty

Franklin Electric warrants that for a period of one (1) year from the date of delivery, the goods purchased will:

- (a) Be free from defects in workmanship and material at the time of shipment;
- (b) Perform consistently with samples previously supplied; and
- (c) Conform to the specifications published or agreed to in writing between the customer and Franklin Electric.

This limited warranty is in lieu of all other warranties, written or oral, statutory, express, or implied, including any warranty of merchantability or fitness for a particular purpose. Customer's sole and exclusive remedy for Franklin Electric's breach of its obligations hereunder, including breach of any express or implied warranty or in a written instrument made of this limited warranty, shall be for the purchase price paid to Franklin Electric for the non-conforming or defective product or for the repair or replacement of non-conforming or defective product, at Franklin Electric's election.

Any Franklin Electric product which Franklin Electric determines to be defective within the warranty period shall be, at Franklin Electric's sole option, repaired or replaced, provided that Franklin Electric's obligation to repair or replace shall be subject to the following conditions:

- (a) Any allegedly defective goods or parts shall have been returned to Franklin Electric at the customer's expense;
- (b) The customer shall establish in writing to the reasonable satisfaction of Franklin Electric that the goods have been properly used and applied for normal purposes;
- (c) No person, whether authorised by the customer or not, shall have tampered with the goods or parts or shall have attempted to rectify the alleged defect in the goods or parts in any way before the inspection thereof by representatives of Franklin Electric; and
- (d) Notwithstanding anything to the contrary contained herein, whether or not Franklin Electric has repaired or replaced alleged defective goods, Franklin Electric shall be entitled at any time to refund the purchase price of any allegedly defective goods to the customer and such refund shall be in full and final settlement of such customer's claim in respect of the allegedly defective goods.

Without limiting the generality of the exclusions of this limited warranty, Franklin Electric does not warrant the adequacy of any specifications provided directly or indirectly by a customer or that Franklin Electric's products will perform in accordance with such specifications.

This limited warranty does not apply to:

- (a) Any goods that have been subject to misuse (including use in a manner inconsistent with the design of the product), abuse, neglect, accident or improper installation or maintenance; and
- (b) Any goods that have been altered or repaired by any person or entity other than Franklin Electric or its authorised representatives;
- (c) Any goods not manufactured by Franklin Electric unless Franklin Electric is entitled to the benefit of the same or similar undertaking, mutatis mutandis from the supplier or manufacturer thereof. In such case, Franklin Electric's liability to the customer for such goods shall be limited to Franklin Electric's benefit from the supplier or manufacturer thereof.

Stated performance figures are based on Franklin Electric's testing experience. Franklin Electric shall not be liable for any loss or damaged incurred or sustained by the customer as a result of the customer's reliance on such figures unless Franklin Electric shall in writing, have:

- (a) Guaranteed such performance figures within specified tolerances; and
- (b) Agreed to pay a penalty or liquidated damages in the event of such performance figures not being achieved, in which event Franklin Electric's liability shall be strictly limited to the amount of such agreed upon penalty or damages.

Notwithstanding anything to the contrary, Franklin Electric shall not be liable, under any circumstances, for:

- (a) Any loss of trade or profit occurring to the customer in the event of the delivery of goods being frustrated or delayed by acts of God or force majeure such as, but not limited to, strikes, riots, lockouts, trade disputes, fire, war, mobilisation, military conscription, confiscation, uprising, trade embargoes, shortage of raw materials, or by any other cause beyond Franklin Electric's control, and
- (b) Loss of profit or any special, incidental or consequential damages whatsoever whether arising from breach of contract, delict, negligence, or from any other cause, even if Franklin Electric shall have been advised of the possibility of such potential loss or damage.











# Franklin Electric

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