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TECHNOLOGIES

ABCD PUMPS - Model 2020

User and Maintenance Manual

Sample of Technical Documentation

- Technical Description
- Usage and Maintenance Instructions
- Parts Catalogue

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Introduction to Model 2020 pump

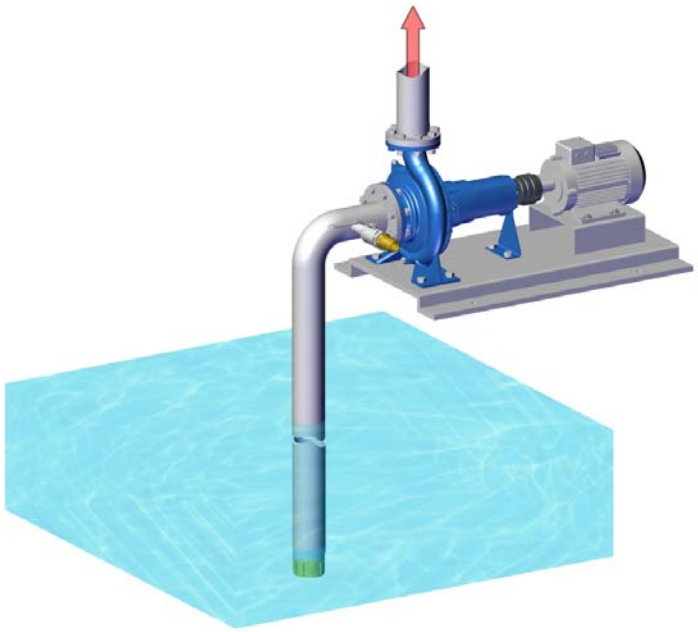
Model 2020 pump

Highlights

Model 2020 pump is an end suction, single stage, horizontal shaft, volute type pump.

ABCD Pumps' Model 2020 lifts clear and mildly turbid water over a maximum head of 30 meters.

- Helped by an advanced anti-cavitation design, the volute casing and impeller are designed for high efficiency and long life.
- The pump seals are made from a specially formulated alloy for a long service life and ability to withstand high volute pressures.
- The pump can handle water over a wide temperature range to suit varied applications.
- With best in class engineering, Model 2020 pump is backed by a responsive 24X7 service and spares network to ensure that your pump is always available for continuous duty.



Typical pump installation

Features

Parameter	Value
Head	30 meters
Delivery size	100 mm
Capacity	Up to 7000 m3/hour
Temperature	0 °C (without ice formation) to 90 °C
Motor	3.7 kW, 415 VAC, 3 phase
Weight	Only pump, 65 kgs
Volume	10% smaller than equivalent pumps
Nominal speed	1500 RPM

Construction

Pump casing

- Horizontal and vertical end suction.
- High efficiency volute type pump with top, side, and 45 degrees orientations.
- Integral casting of delivery flange and supporting feet with the pump casing.

- Precision dynamic balancing for rotating parts.

Impeller

- Standard impeller with enclosed type design option for pumping clean liquid.
- Optional impeller with non-clog or semi-open design option for pumping liquid with suspended solids.
- Hydraulic balancing by equalizing holes and back vanes.

Shaft

- Made from high-tensile steel.
- Accurately ground with complex profile.
- Precision bearing holder aligning the shaft with bearings holder

Stuffing box

- Normal temperature version: Standard stuffing box with polymer seals for handling liquid temperatures up to 65°C.
- High temperature version: Optional stuffing box with metal based mechanical seals for handling liquids with temperature up to 90°C.

Bearing

- Deep groove ball bearing and thrust bearing.

Lubrication

- Normal temperature version: Grease lubrication through grease nipple in the bearing holder.
- High temperature version: 20W40 mineral oil through an external lubrication cup and an adjustable drip-feed orifice.

Direction of rotation

- Clockwise, viewed from driving end.

Note

The direction of rotation is marked on the bearing lantern.

Drive

- Direct drive through a Lovejoy rubber bushed coupling.
- Powered by electric motor or diesel engine.

Flange size

- For models MF 17 1.2 - 20, MF 55-60, MF 60-65 pumps drill flanges as per BS10, table D.
- For all other models, drill flanges as per BSEN 1092, flat face PN.

Application

- The applications for model 2020 pump include:
- Water supply schemes
- Drainage and storm-water handling
- Irrigation systems
- Air-conditioning systems
- Industrial processes

Animation

Note

Animation will play only in the online version of this manual.

Delivery options

Basic pump

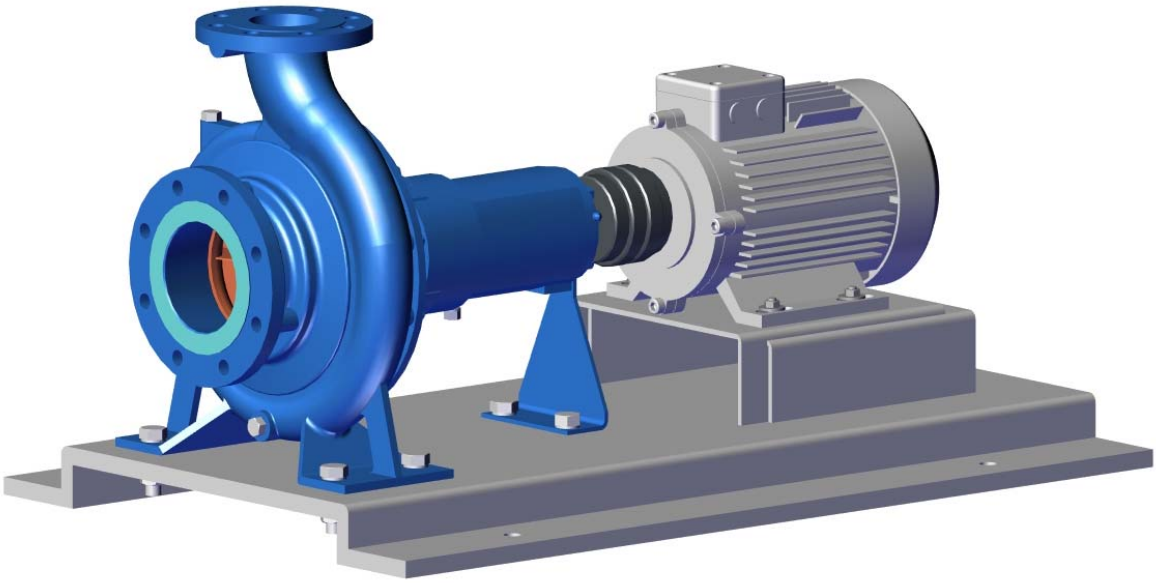
In this option, we offer only the basic model 2020 pump. You have to do the following tasks to make a functional pump-set. You may use the following drawing for manufacturing the base frame that mounts the pump and motor: "Foundation plate" on page 10

Basic pump

To commission a basic pump, you have to select and install the following sub-assemblies on the foundation plate:

- Motor
- Coupling
- Inlet and outlet flange
- Gasket for the flange
- Fasteners, and shims

Integrated pump-set

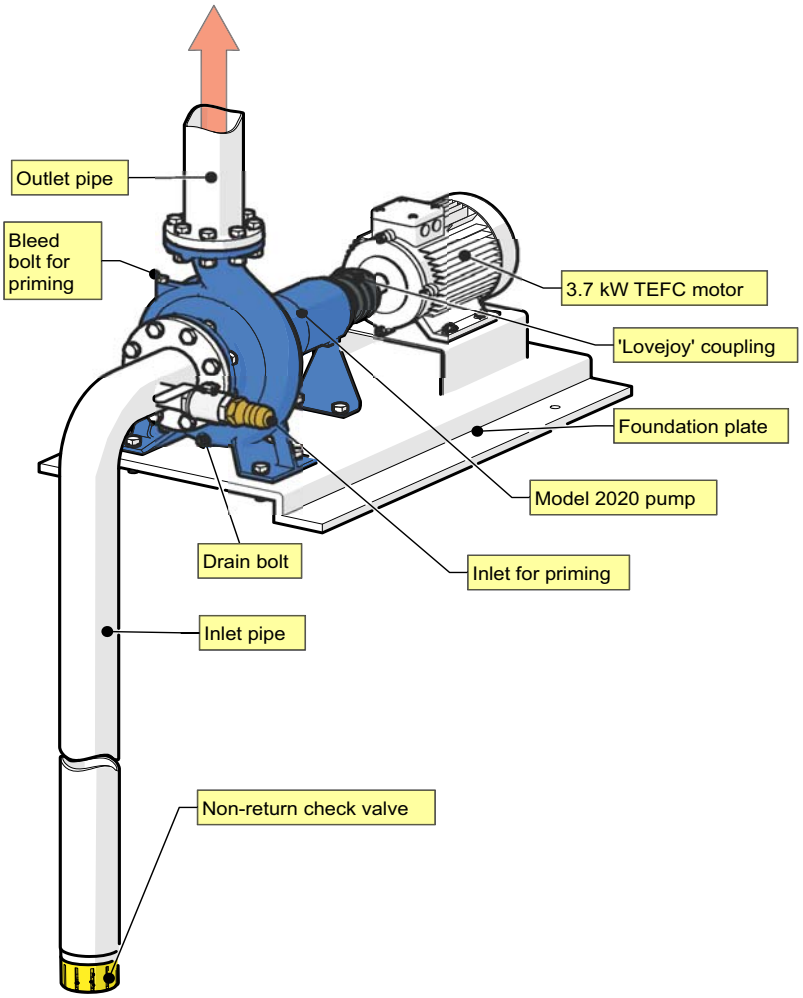


Integrated pump and motor combination

To save time and efforts for end user, model 2020 pump is available as a complete ready-to-use module with factory integrated and aligned sub-assemblies. The combination is supplied with comprehensive performance test certificate and integrated warranty.

This combination consists of:

- Model 2020 pump
- Siemens or Crompton make 3.7 kW, 415 VAC, 3 phase TEFC motor
- 'Lovejoy' coupling between pump and motor
- Mounting bracket for pump and motor
- Inlet and outlet flanges
- Inlet and outlet flange gaskets
- Set of suitable fasteners for mounting pump assembly and flanges
- Foundation bolts and grouting compound
- Cable glands for motor junction box
- Stencil to accurately locate holes for foundation bolts
- Suitable hand tools required for installation



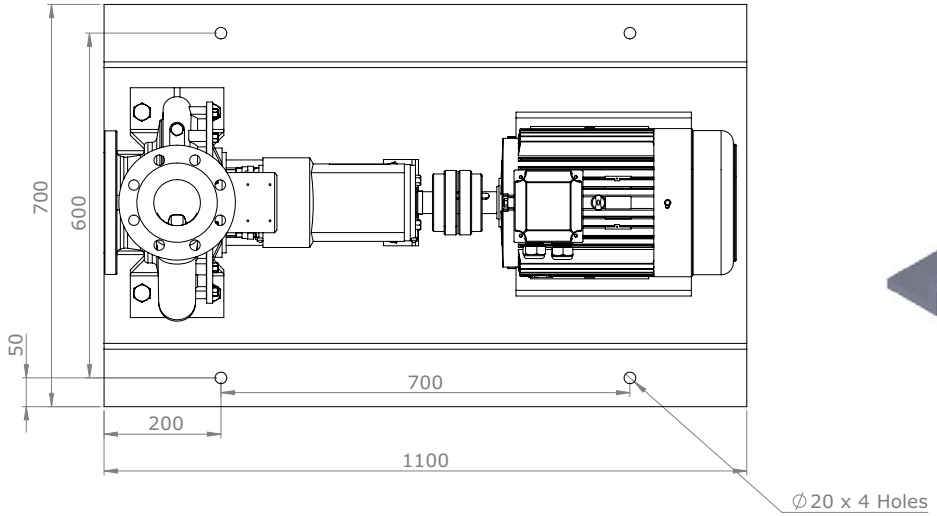
Parts of the pump-set

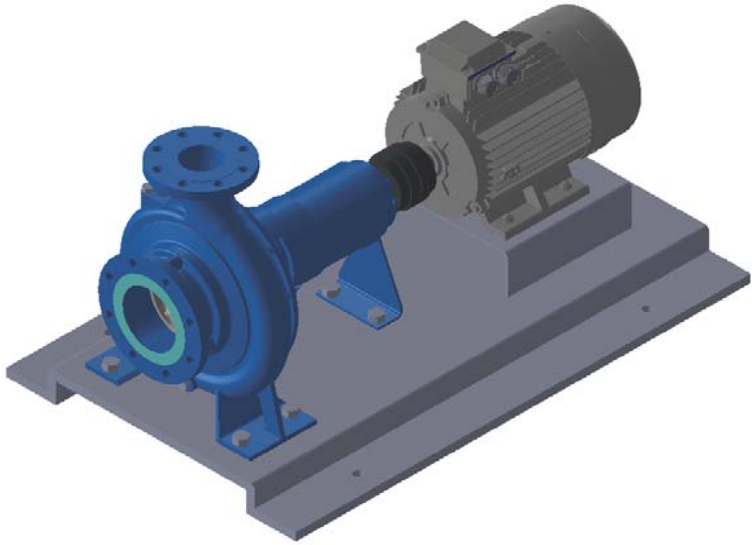
- Not included with the integrated pump-set option:
    - ◇ Inlet and outlet pipe
    - ◇ Non-return check valve
    - ◇ Priming arrangement
    - ◇ Electrical panel
    - ◇ Electrical wiring

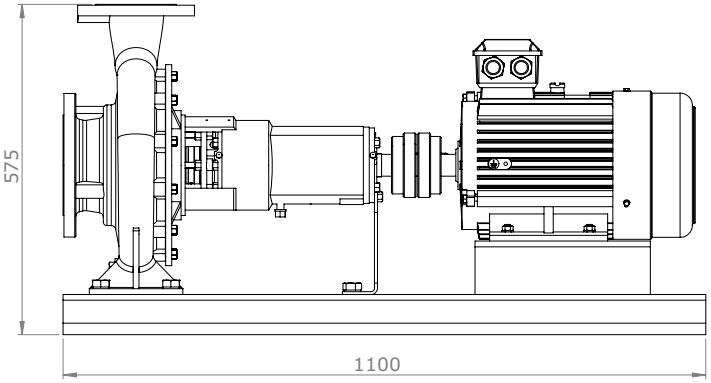
If required, our service team can arrange these parts and install them for you on a payment basis.

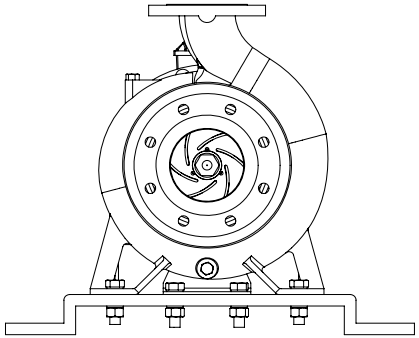
Dimensions

This drawing shows the dimension of pump from various views.


700
600
50
700
200
1100
∅20 x 4 Holes




575
1100



Installation

Note

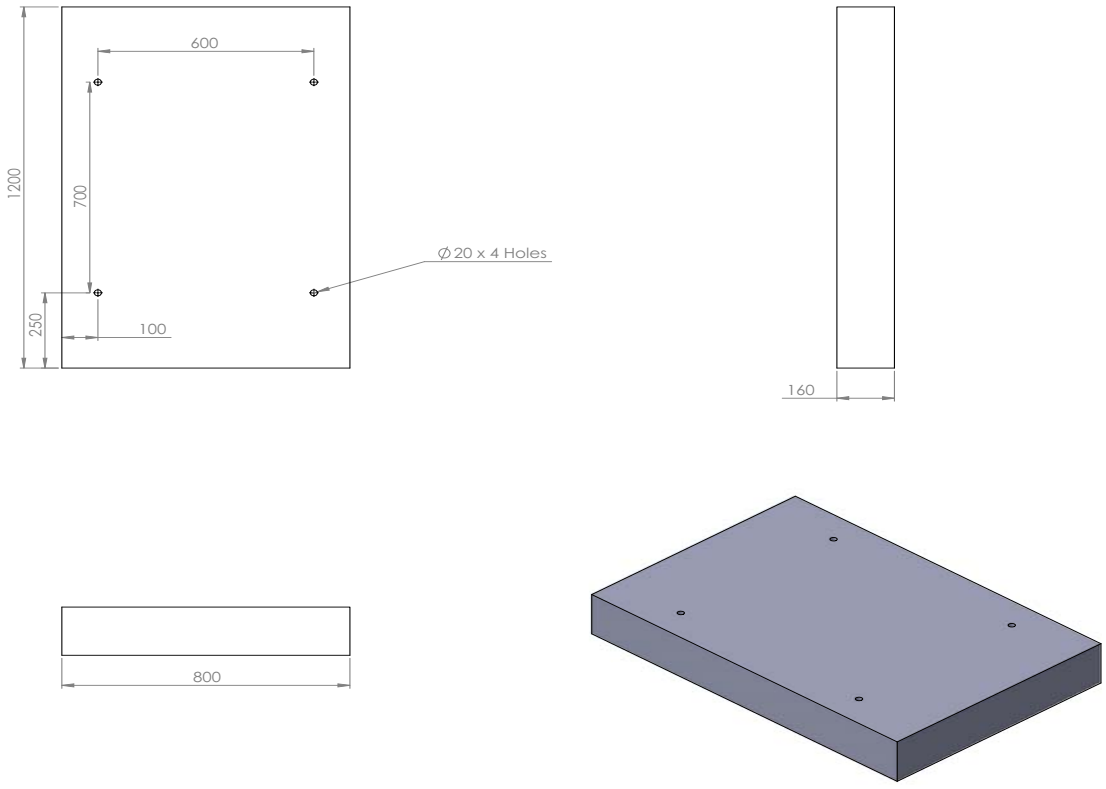
Only trained and qualified technicians should install the pump.

Order options

You have two options while placing an order:

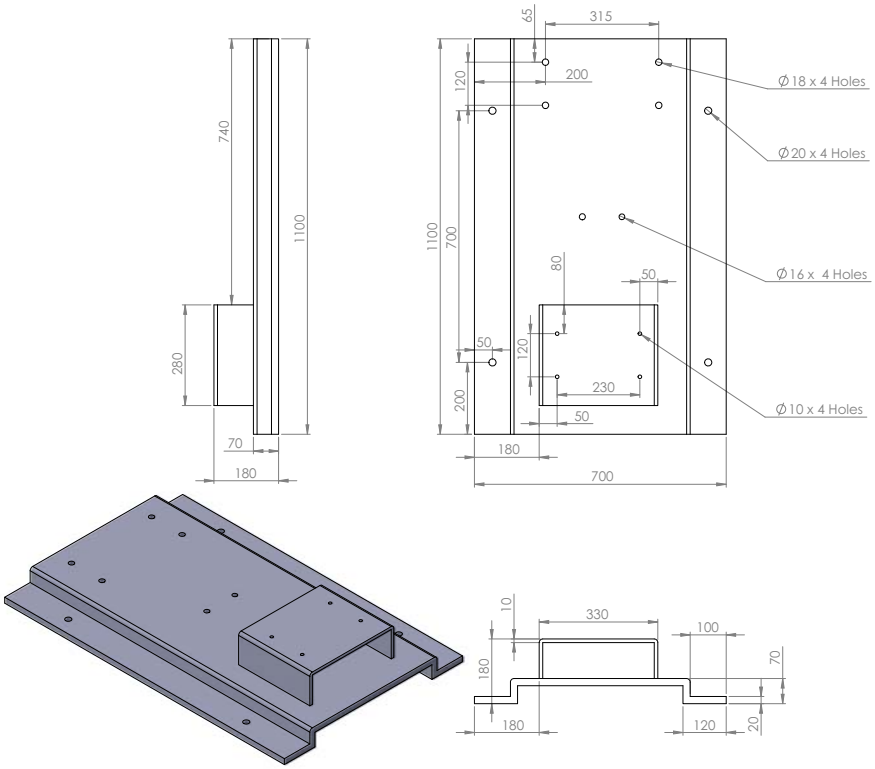
- Order only the basic model 2020 pump. See "Basic pump" on page 5.
- Order the factory assembled integrated pump-set. See "Integrated pump and motor combination" on page 6.

Installation of basic pump



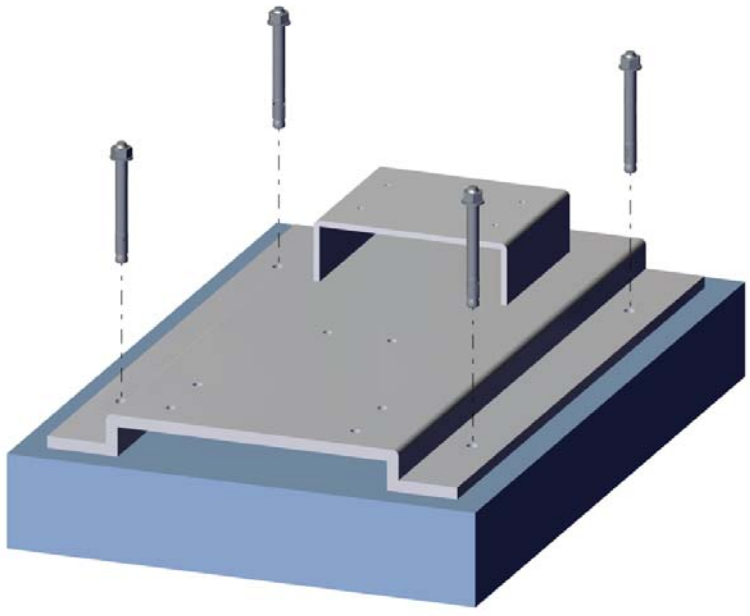
Concrete platform

1. Construct a concrete platform of 1200 X 800 X 160 mm adjacent to the water pick-up point. Ensure the platform capacity ≥ 250 kgs. Level the platform to ± 1 mm. See "Concrete platform" on page 9.



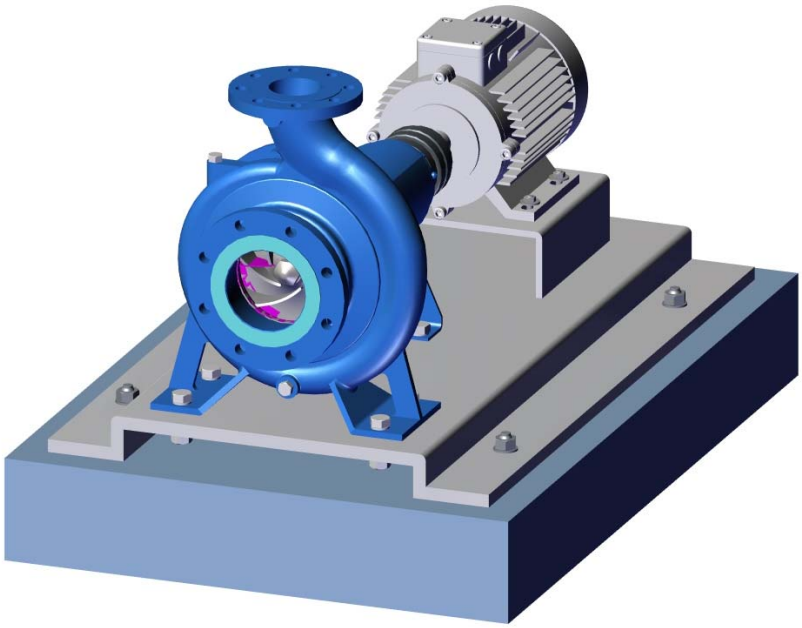
Foundation plate

2. Drill and insert M20 anchor bolts to the concrete for mounting the foundation plate. Use grouting compound for securing anchor bolts to the concrete.



Inserting anchor bolts

3. Fabricate the foundation plate for mounting pump and motor. Use the drawing of "Foundation plate" on page 10 as a reference.
4. Mount the pump and motor on the foundation plate.
5. Align the motor shaft with the pump shaft using shims within ± 0.5 mm.
6. Add and tighten a 'Lovejoy' coupling between the motor and pump shaft.
7. Mount the foundation plate complete with pump, motor, and coupling on the concrete platform.



Mounting the complete pump on concrete platform

Note

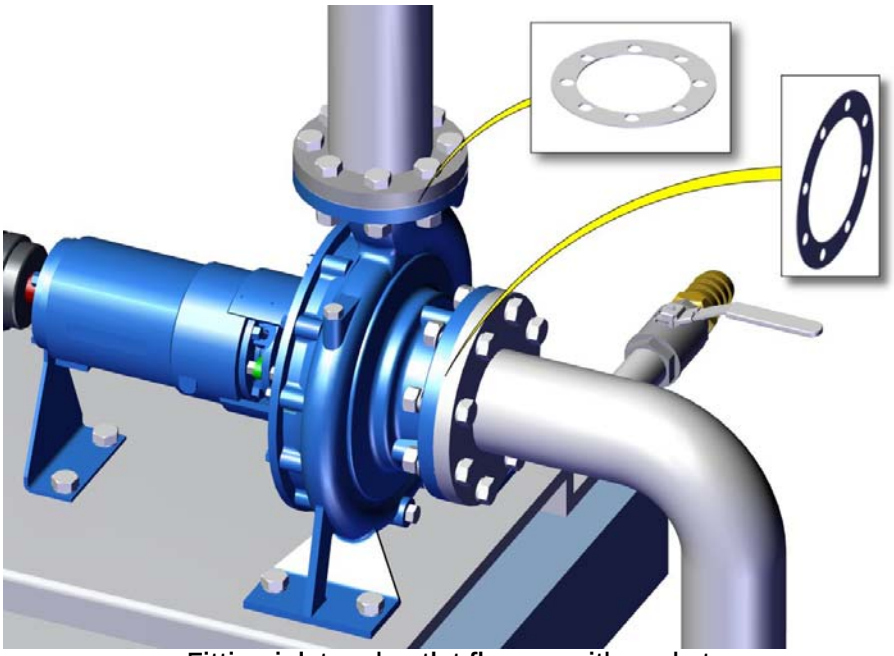
Use high-tensile fasteners. Use plain washers to spread the force. Use spring-washers to ensure fastener tightness under service conditions. As an alternate to spring-washers, use Nylock® nuts with plain washers.

8. Tighten the anchor bolts to 300 Nm torque.

Note

Use high-tensile fasteners with Nylock® nuts.

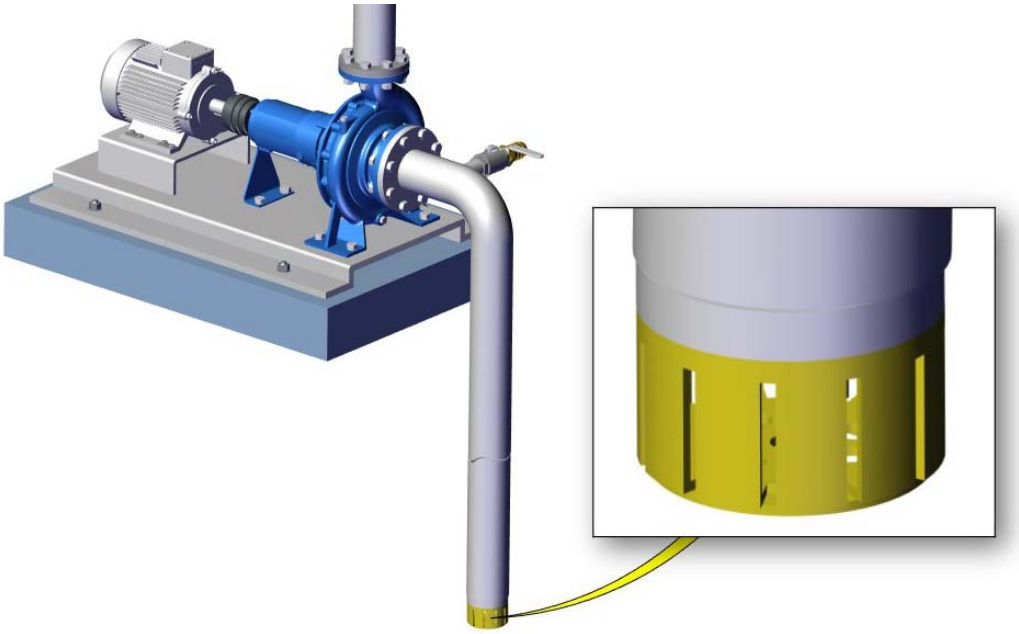
9. Couple the inlet and outlet pipes to the flanges. Use gaskets between the pump and pipe flanges. Tighten the fasteners to 125 Nm torque.



Fitting inlet and outlet flanges with gaskets

Note

If the water level is below the inlet flange, fit a non-return check valve at the bottom of inlet pipe.

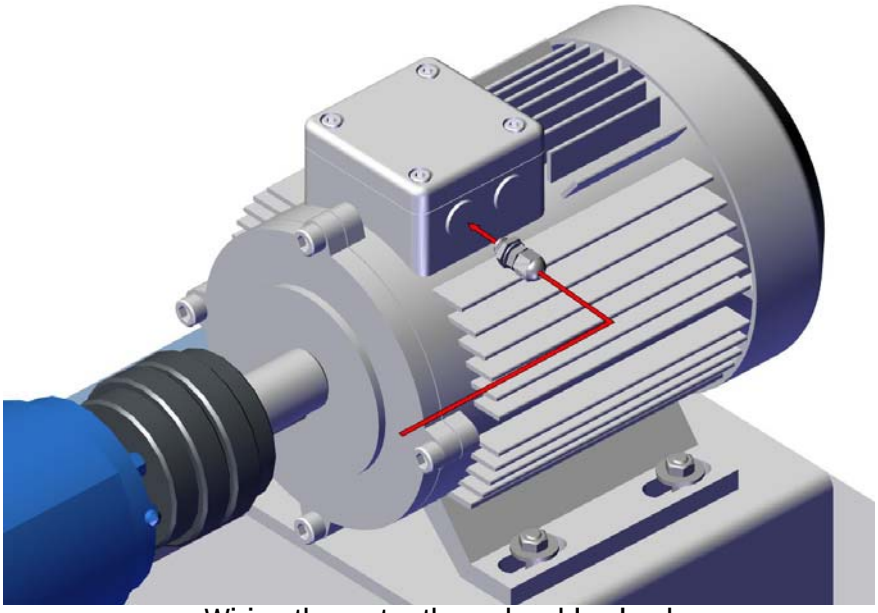


Non-return check valve at the bottom of the inlet pipe

Note

Ensure that the inlet pipe has provisions to connect external water supply to prime the pump, prior to starting.

10. Make electrical connections through properly rated switch gear and protective devices. Ensure that the pump is protected against loss of phase, reverse phase, under-voltage, over-voltage, over-loads, and dry-running.
11. Route the adequately sized cable rated for the installation environment. Ensure that through all holes, the cable is fitted with correct size of gland.



Wiring the motor through cable gland

12. Ensure that the motor rotates the pump in the marked direction. If the pump rotates in reverse direction, isolate supply from source and interchange any two of the phases.

Note

Power the pump only for a second to check the direction of rotation.

13. Prime the pump and check for leakages before powering the motor. See “Priming the pump” on page 16.

Installation of integrated pump-set

Installation of integrated pump-set is similar to that of the basic pump, except for skipping steps 3, 4, 5, and 6 from the previous instructions.
See “Installation of basic pump” on page 9.

Using the pump-set

In normal use, the pump-set starts working as soon as the motor is switched on.

Note

Only authorized and trained personnel should operate and maintain the pump.

Starting the pump

1. Connect the incoming supply to the control panel by closing the circuit breaker.
2. Press the **Start** switch on the control panel to start the pump.
3. Wait for the pump speed to stabilize.
4. Monitor the electrical parameters for balanced load current on all phases.

Stopping the pump

1. Press the **Stop** switch on the control panel to stop the pump.
2. Disconnect the incoming supply to the control panel by opening the circuit breaker.

Pre-starting checklist

Note

The control panel should have protection for loss of phase, reversal of phase, under-voltage, over-voltage, overloads, and dry-running.

Check the following points before starting the pump:

1. Adequate water level in the sump tank.
2. Presence of 3 phase supply within accepted limits.
3. Pump is in a primed condition.

4. All guards are installed, control panel doors are closed, all inlet and outlet valves are in the open position.

Note

Pump seals and casing will get damaged if it runs with closed inlet and outlet valves.

5. Pump, motor, and coupling do have any obstruction.

During running checklist

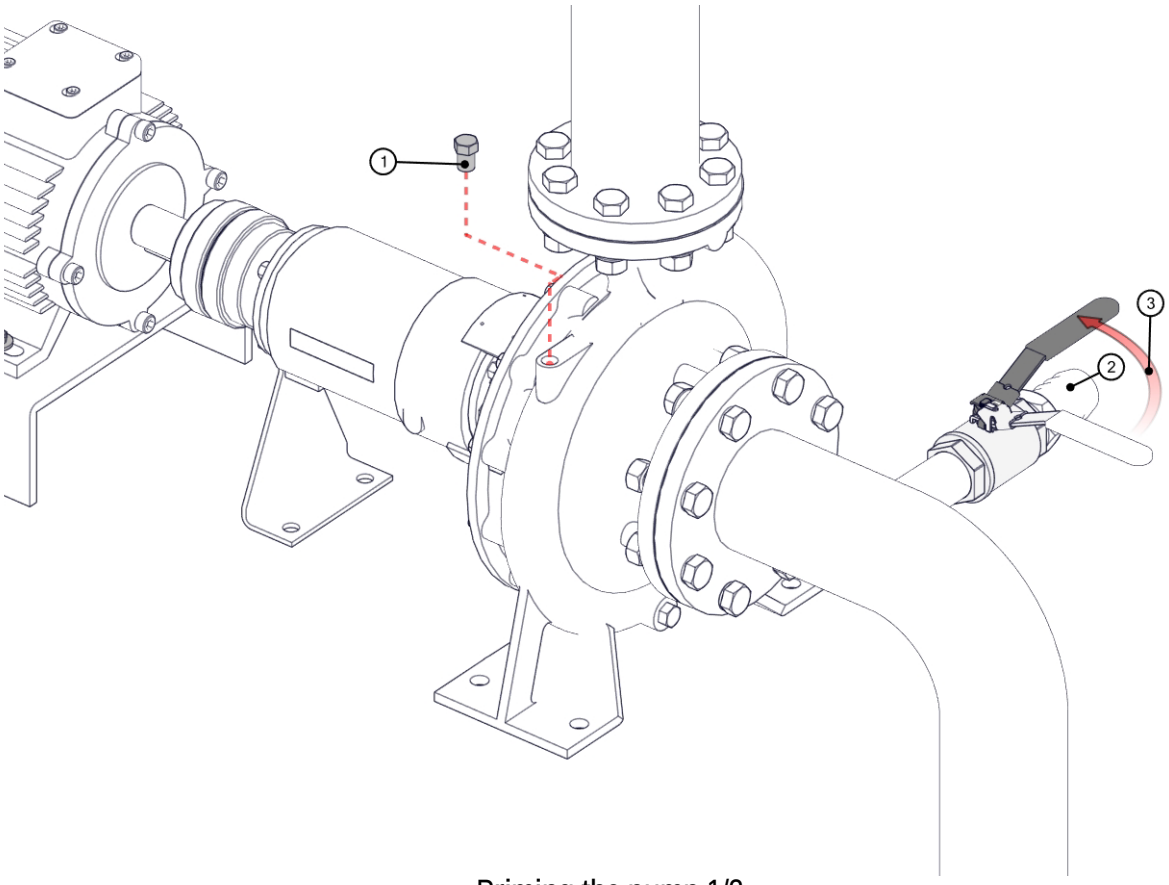
1. Ensure that the pump is running smoothly without any unusual sounds and vibrations.
2. Check water pressure on the delivery side. Ensure that the water pressure does not fluctuate excessively.
3. Check for current consumption in each phase and confirm that the three phase current readings are nearly the same.
4. Check that motor has a flow of cooling air over its frame and that it is not heating excessively.

Post-starting checklist

Perform the first procedure if the pump does not run regularly, or is started after a long time, or if you suspect that the non-return check valve at the bottom of the inlet pipe is defective.

1. After starting the pump, open the priming water inlet valve on the incoming flange.
    - ◇ Ensure that the water sprays under pressure from the priming inlet. The spray confirms that the pump is developing positive pressure.
2. Close the priming inlet valve.
3. While the pump is running, observe for any unusual sound or vibration.
4. Check the motor current in all three phases and ensure that the load is balanced.

Priming the pump



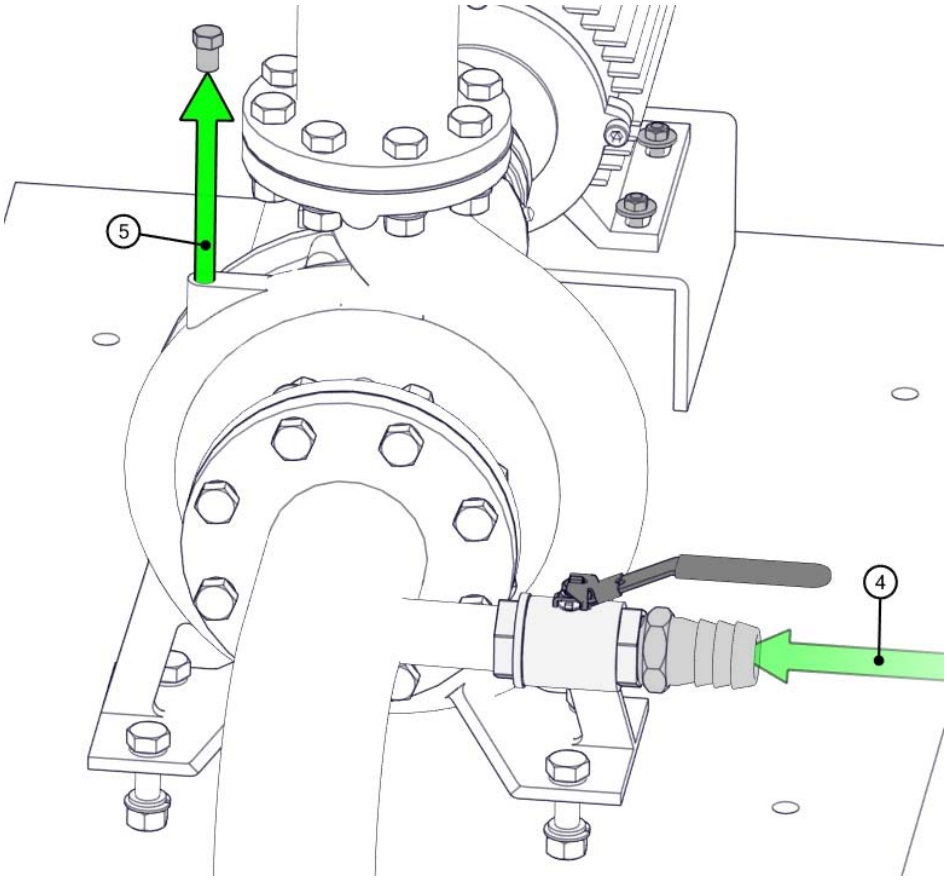
Priming the pump 1/3

To work efficiently, the pump casing has to be full of water before the impeller starts rotating.

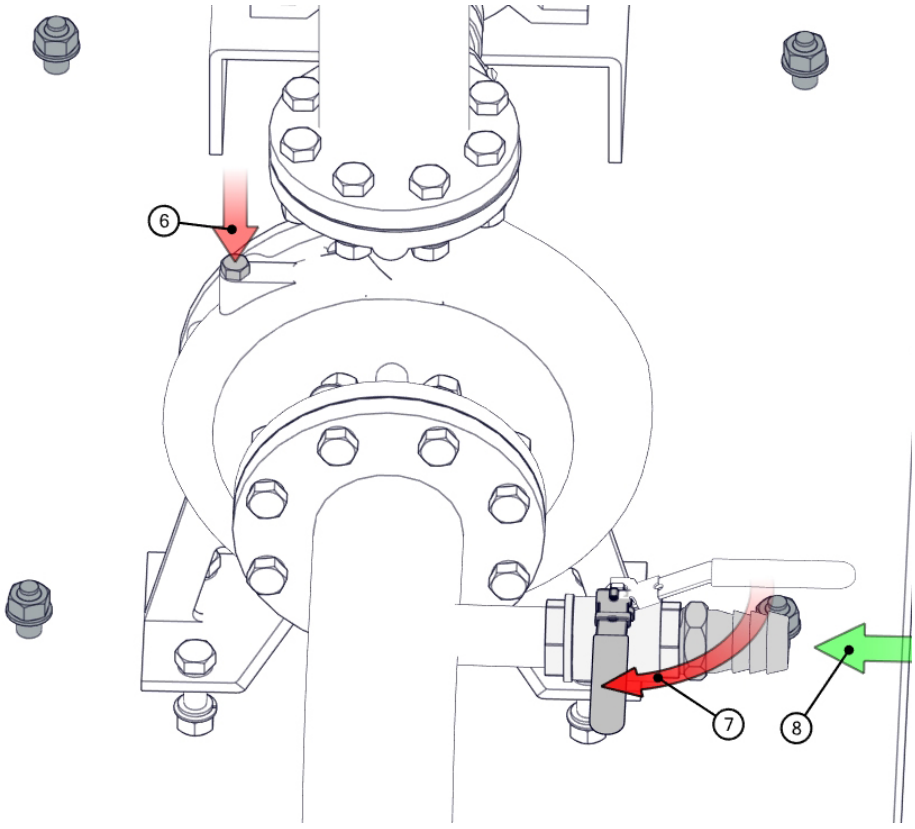
Note

The rotor seals will get permanently damaged if the pump runs without water. Prime the pump only when it is not running.

1. Open priming bleed bolt [1] on the pump casing.
2. Connect an external source of water to the priming inlet [2].
3. Open the priming inlet valve [3].
    - ◇ The external water fills up the inlet pipe and the pump casing [4].
    - ◇ Water overflows from the bleed hole in the casing [5].



Priming the pump 2/3



Priming the pump 3/3

4. Close and secure the priming bleed bolt trapping the water in the pump casing. [6]
5. Close the priming inlet valve [7].
6. Stop and disconnect the external source of water from the priming inlet [8].
7. Your pump is now primed and ready to move water from lower levels to full-head heights.

Draining the pump

You may need to drain the pump casing before doing maintenance on bearings or the seals.

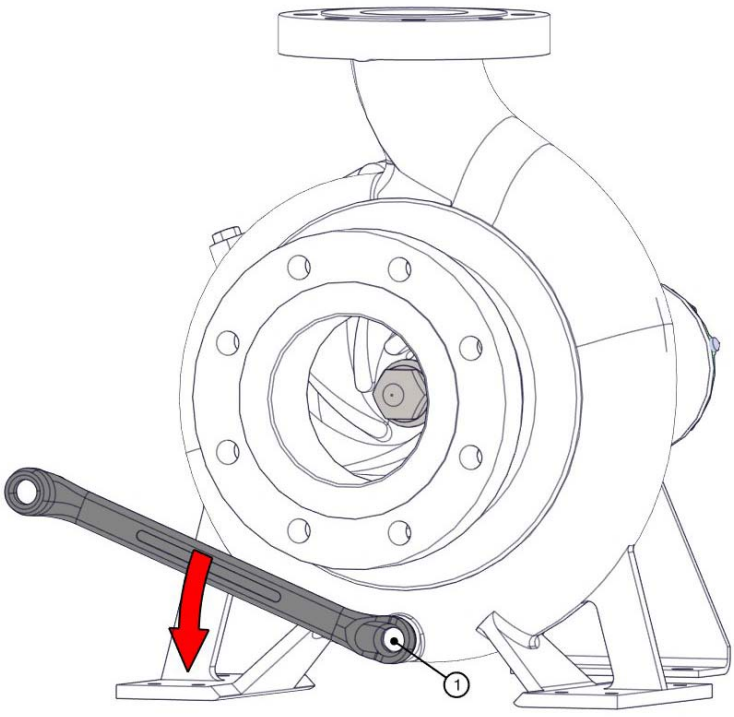
Note

Drain the pump only when it is not running.

1. Close inlet valve, if fitted.

Note

Be prepared to collect the water that may flow from pump casing after you open the drain hole.



Draining the pump

2. Close the outlet valve, if fitted.
3. Open the drain bolt [1].
4. Close the drain bolt after pump casing is empty of water.
5. Open the inlet and outlet valves. Prime the pump. Run to check that the pump casing does not have any leakages.

Maintenance

Perform the following tasks whenever you check the pump during routine inspections:

- Check the level and condition of the oil through the sight glass on the bearing frame.
- Check for unusual noise, vibration, and bearing temperatures.
- Check the pump casing, flanges, and piping for leaks.
- Monitor the vibrations, analyse, and rectify the reasons.
- Inspect the discharge pressure.
- Inspect the bearing, and seal temperatures.
- Check the seals, and stuffing box for leaks.
- Ensure that there are no leaks from the mechanical seal.
- Adjust or replace the packing in the stuffing box if you notice excessive leaking.

Daily maintenance

Perform the following tasks daily:

- Clean bearing bracket, inspect for leakage of oil or grease.
- Check that pump’s drain plug is tightly closed.
- Inspect suction and discharge flanges for any leaks.
- Inspect pump casing for any damage.
- Inspect the seal, paying attention to the lip for cuts or irregularities.
- Check the coupling for damage and bolts for tightness.

Note

Check coupling and bolts only if the pump is not running.

- Ensure that the coupling guard is present and secure to base plate.

- Check the alignment and tightness of pump mounting bolts.

Maintenance, every three months

Perform the following tasks every three months:

- Check that the foundation bolts are tight.
- Check the mechanical seal if the pump has sitting idle for some time. Replace if required.
- Top-up grease or oil for the bearings via external lubrication cup or grease nipple. Fill oil in cup to the maximum marking. Push grease into the nipple via a grease gun until the operating handle becomes tough to move.
- Lubricate the bearings more frequently if the pump runs continuously or if the ambient temperature is > 45 °C.
- Check the shaft alignment, and call ABCD service if alignment is > 100 uM.

Annual maintenance

Perform the following inspections once each year:

- Check the pump capacity.
- Check the pump pressure.
- Check the pump power.

If the pump performance does not satisfy your process requirements, and the process requirements have not changed, then do the following:

1. Disassemble the pump.
2. Inspect the pump.
3. Replace worn parts.

Note

If in doubt, always consult the ABCD Pumps' service department.

Spare parts

We offer the complete spare parts of the model 2020 pump. In case you order the integrated pump-set, the motor and coupling is available as complete assemblies.

For spares and service of the motor or coupling, inform their nearest authorized technical partners, whose details are available your local ABCD Pumps representatives.

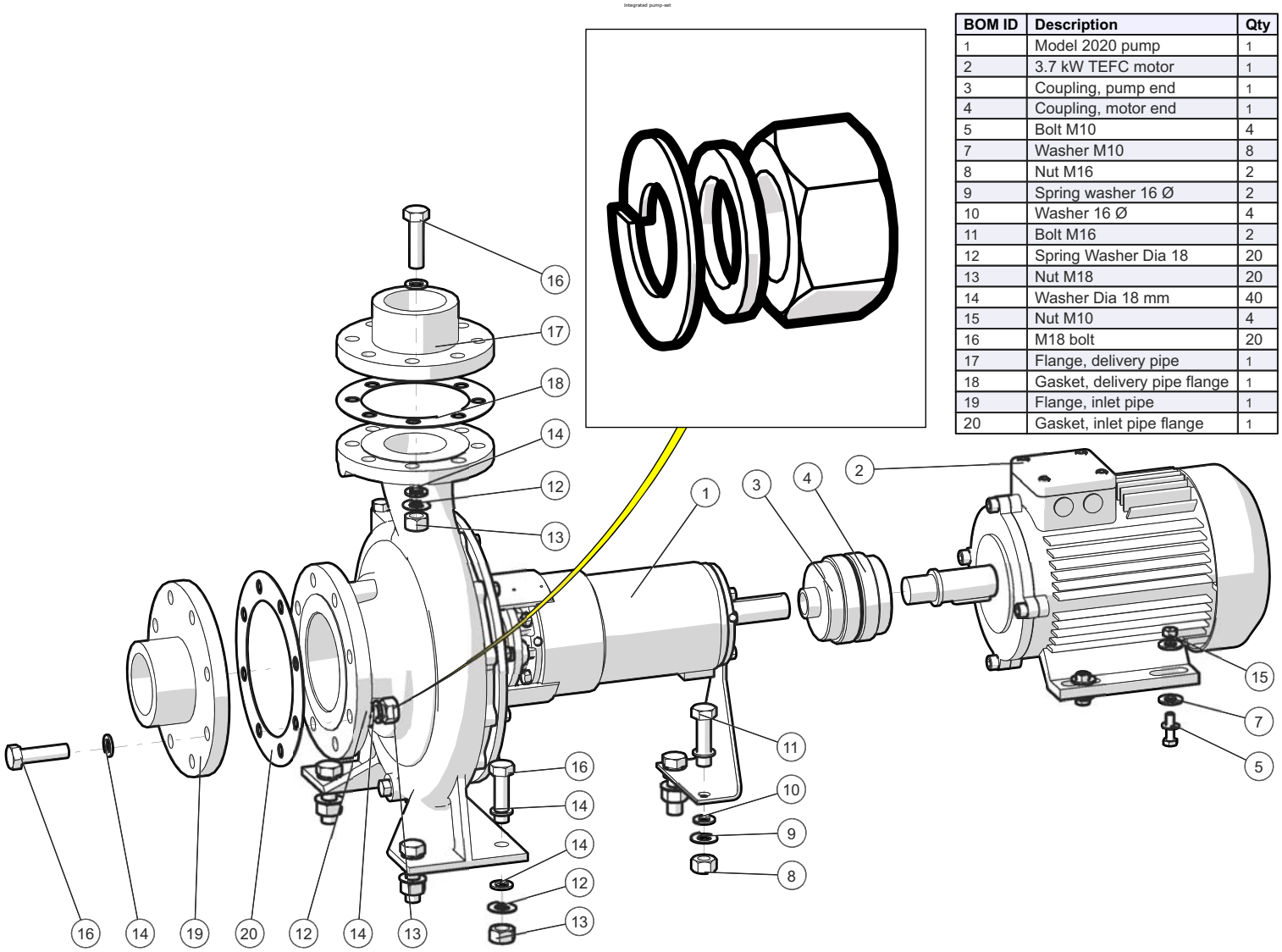
Views

The following pages contain illustrated spare list of the basic pump and the integrated pump-set.

Note

The active links between parts in the images and tabulated list will display only in the online manual.

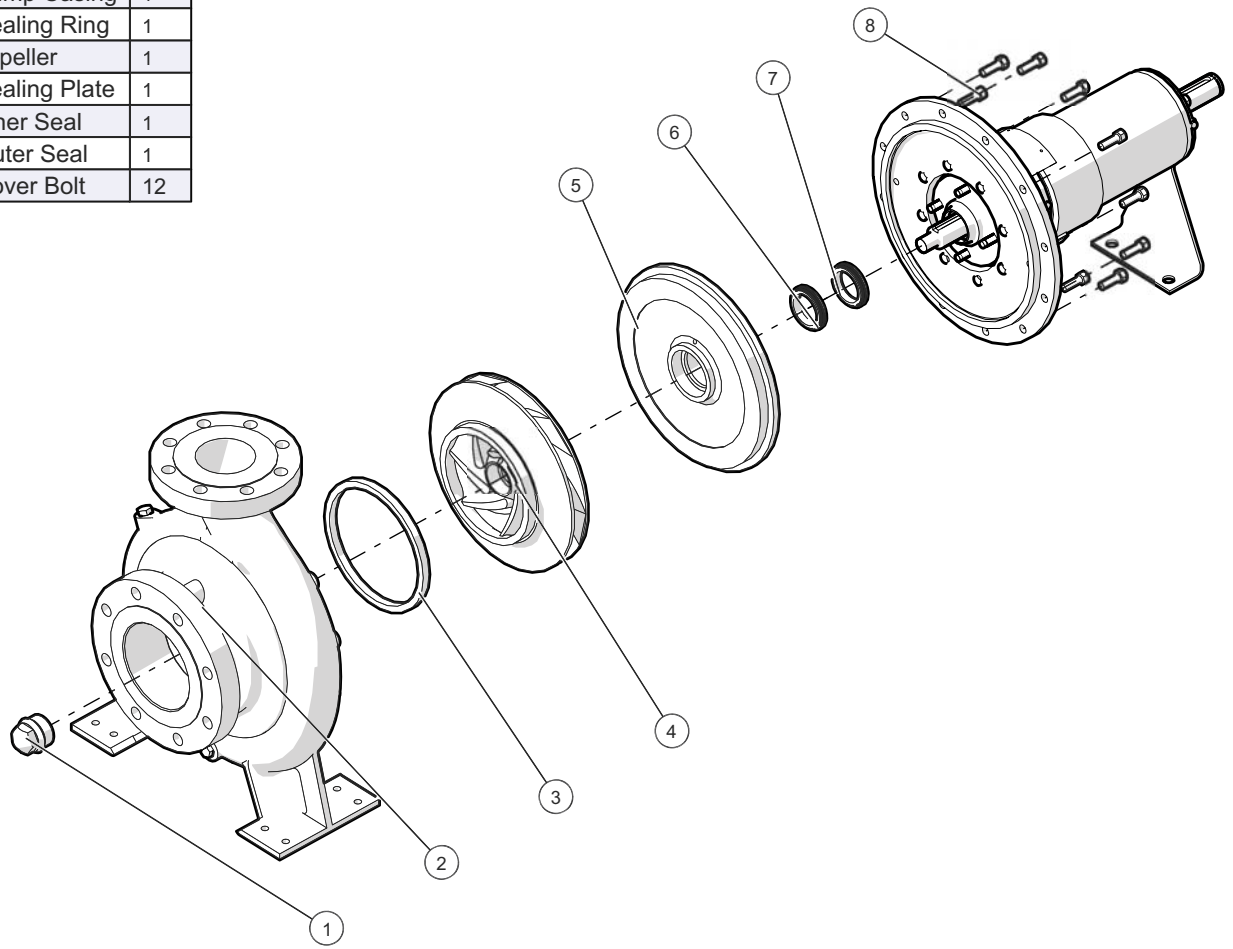
- Go to: "Integrated pump-set" on page 24.
- Go to: "Model 2020 pump, intake flange view" on page 25.
- Go to: "Model 2020 pump, driving shaft end view" on page 26.



BOM ID	Description	Qty
1	Model 2020 pump	1
2	3.7 kW TEFC motor	1
3	Coupling, pump end	1
4	Coupling, motor end	1
5	Bolt M10	4
7	Washer M10	8
8	Nut M16	2
9	Spring washer 16 Ø	2
10	Washer 16 Ø	4
11	Bolt M16	2
12	Spring Washer Dia 18	20
13	Nut M18	20
14	Washer Dia 18 mm	40
15	Nut M10	4
16	M18 bolt	20
17	Flange, delivery pipe	1
18	Gasket, delivery pipe flange	1
19	Flange, inlet pipe	1
20	Gasket, inlet pipe flange	1

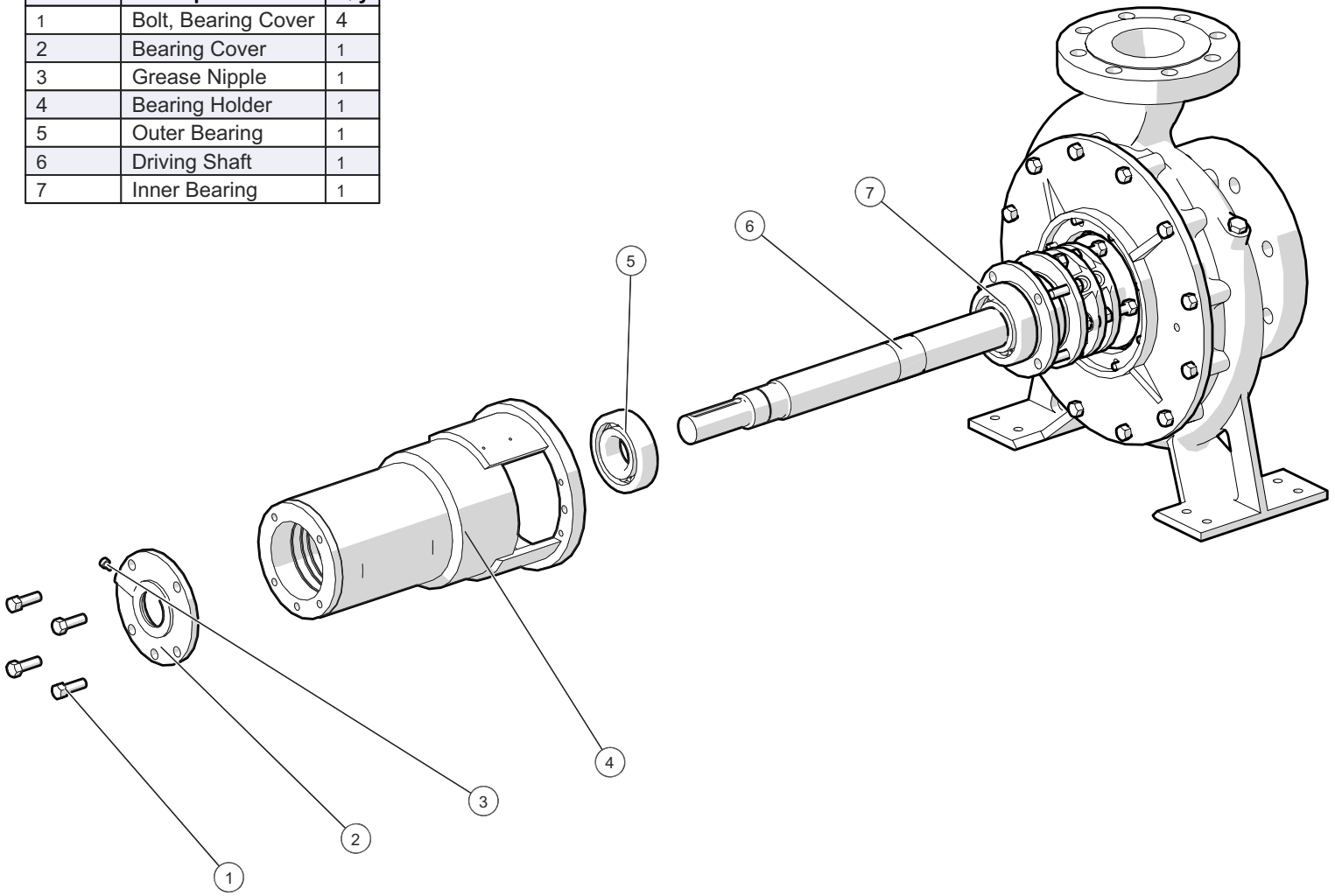
Model 2020 pump, intake flange view

BOM ID	Description	Qty
1	Impeller Nut	1
2	Pump Casing	1
3	Sealing Ring	1
4	Impeller	1
5	Sealing Plate	1
6	Inner Seal	1
7	Outer Seal	1
8	Cover Bolt	12



Model 2020 pump, driving shaft and view

BOM ID	Description	Qty
1	Bolt, Bearing Cover	4
2	Bearing Cover	1
3	Grease Nipple	1
4	Bearing Holder	1
5	Outer Bearing	1
6	Driving Shaft	1
7	Inner Bearing	1



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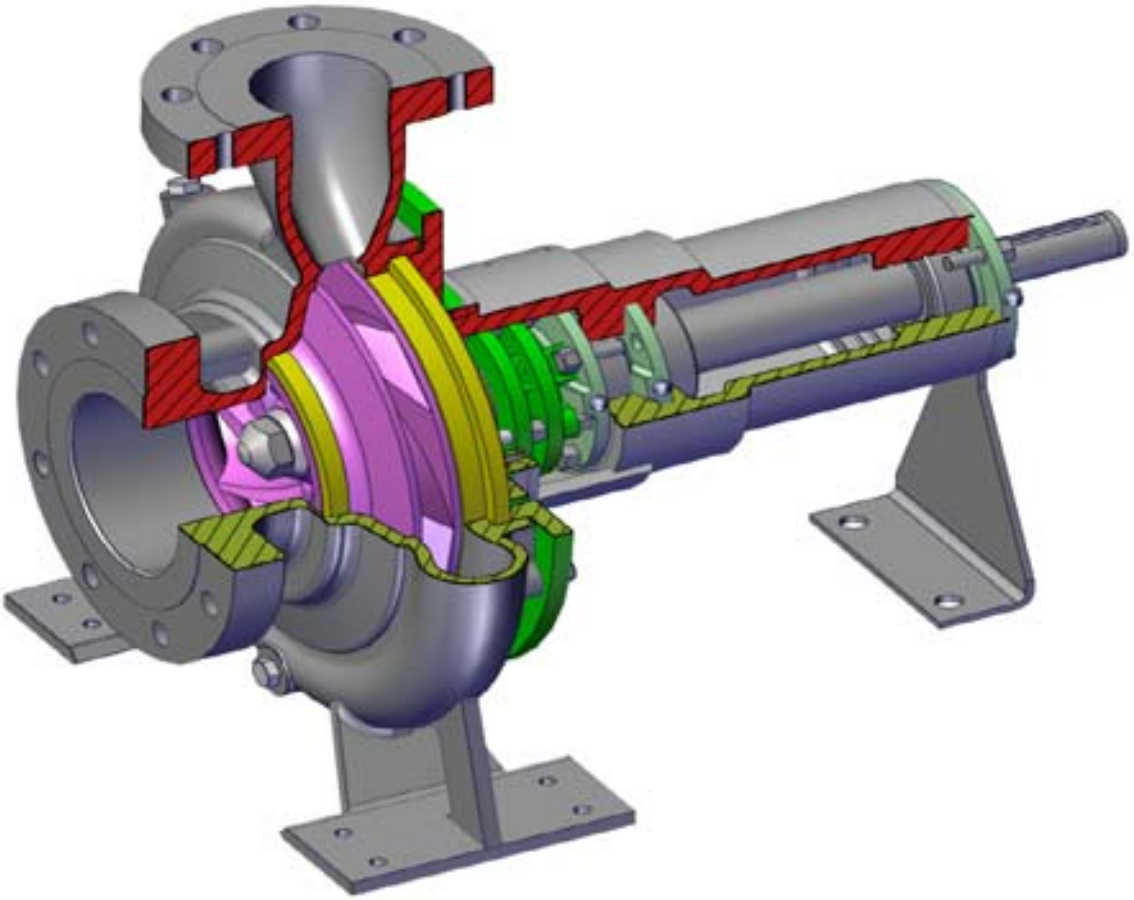

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