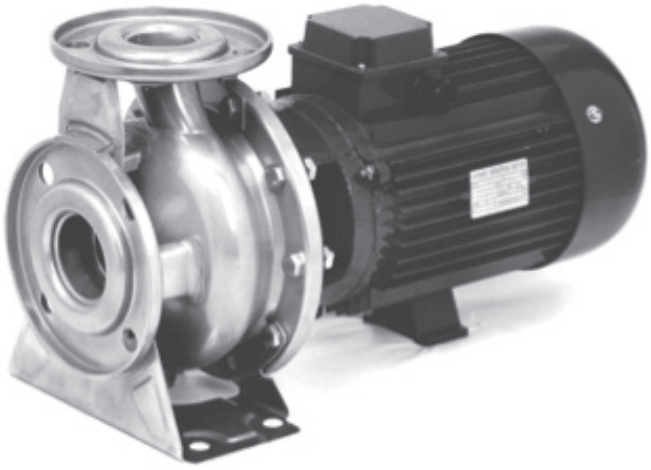
DAVEY

CS Series
Pressed Stainless Steel
Centrifugal Pump



Installation &
Operating Instructions

PLEASE READ
IMPORTANT
CAREFULLY

Please pass these instructions on to the operator of this equipment.

Introduction
Davey CS centrifugal pumps are made of 304 grade stainless steel using stamping and welding technologies which mean the pumps are compact, lightweight and efficient.

This pump is suitable for pumping clean, clear water with a temperature between -15°C to +80°C. The maximum working pressure for this pump is 1,000kPa.

Specifications
Model designation (example) :-

CS 65-50-160/4.0/3

- Three phase motor
- Motor power (kW)
- Nominal dia. of impeller (mm)
- Diameter of outlet (mm)
- Diameter of inlet (mm)
- Series code of pump

Inspection of Pump
Always check on receipt of delivery you have received the correct pump unit. To identify, see above specifications and label below. Check correct motor kW & speed on motor nameplate (attached to motor) prior to installation.

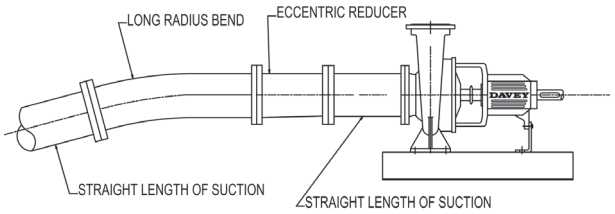
Delivery
Upon receipt the unit should be thoroughly inspected for any damage sustained during transit. Any equipment damage or shortfall should be immediately advised to your nearest Davey office or Davey customer service centre.

Storage
If the unit is not to be installed immediately, it should be stored in a clean, dry and preferably warm environment. Shafts of stored motors should be rotated occasionally. Specific vibration during storage may lead to “brinelling” of the bearings, therefore motors that are subject to extended storage where vibration exists, should be fitted with bearing locks.

Installation Location
The pump should be installed as close to the water source as possible to reduce the length of the suction pipe. You should always check the pump’s maximum permissible suction lift from its performance curve.

The pump should be installed in a place where it is well ventilated where the ambient temperature doesn’t exceed +50°C.

Foundations
The pump unit should be mounted on a foundation that is substantial enough to withstand the weight of the unit and large enough to accommodate all mounting feet so they can be securely fixed to avoid movement.

Suction Piping


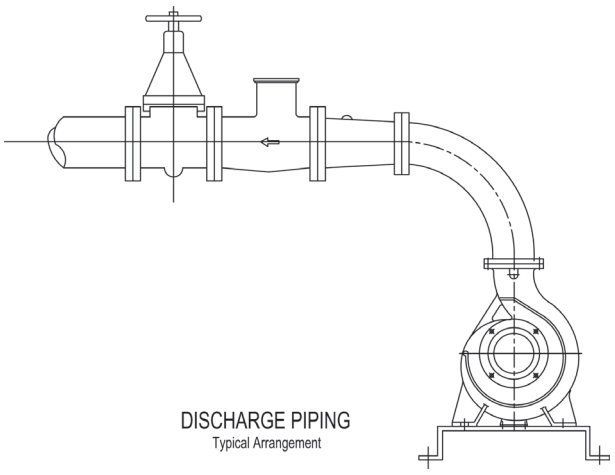
PREFERRED ARRANGEMENT FOR SUCTION LIFTS

All fittings & suction piping should be free of air leaks.

When a suction lift or long suction lengths are unavoidable, consideration should be given to over sizing the suction line to reduce suction losses.

On suction lifts a foot valve will be required, sized equal to the suction line size. For applications on creek beds or dams, please install a foot valve and strainer, well submerged below the surface, to reduce whirlpools and air inclusion. Air inclusion can result in cavitation reducing the pump performance and eventually destroying the pump or its components.

If bends are required, long radius bends should be used. To help ensure a less turbulent entry into the pump, a straight length of pipe should be installed between any bends and the pump inlet. This straight length should be at least 2.5 times the pump inlet diameter in length. Pipework supports should be installed to both inlet and outlet pipes to ensure that they are supported independently of the pump flanges.

Discharge Piping


DISCHARGE PIPING
Typical Arrangement

Discharge piping must be selected of a size that would equal the discharge of the pump. For long discharge lengths, consideration should be given to using larger diameter pipework. Larger size pipes have lower pressure losses for a given flow rate, and may help reduce the running costs for your pumping system.

Talk to your nearest Davey Dealer to calculate all system losses. To avoid air pockets in discharge lines at high points, vent cocks may be required to release air blocks accumulated within the system. Air pockets may affect the performance of the pump. A throttling valve should be installed in the discharge line to ensure the pump works within the performance curve.

Electrical Connection

WARNING: When installing, servicing or attending pump, always ensure power is switched off and lead unplugged. Electrical connections should be serviced only by qualified persons. If the electrical supply lead is damaged, it must be replaced.

Ensure all electrical connections are solid and continuous. Check motor starter and overloads for correct rating and trip setting. All circuit breakers, HRC fuses or protective devices associated with the motor must be rated to suit motor running current and starting characteristics.

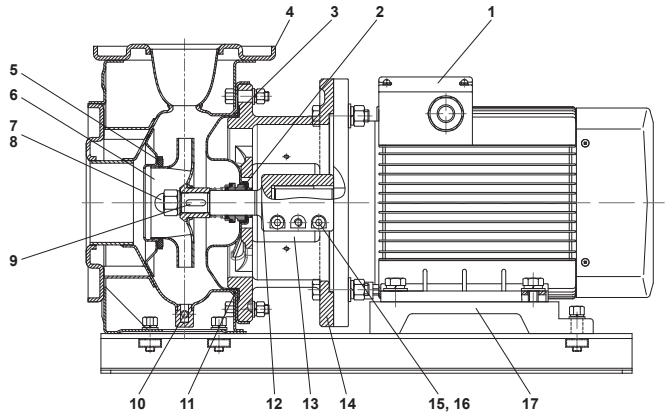
Starting

Caution: Do not attempt to run pump if it has not been filled with water (primed). Severe damage will result to shaft seal.

1) Ensure the suction line & pump casing is full of water open suction valve if fitted.
2) Check power is off & rotate the pump shaft slowly to release any trapped air within the pump casing.
3) Close the discharge valve.
4) Check the direction of rotation on the pump casing or motor cover.
5) Prior to initial start up, the following steps must be taken:
- Insulation resistance test. On machines up to 600 volt, the minimum value should be 1MΩ.
- Thermistors if fitted, should be checked for continuity with a multimeter and never mega-tested.
- Ensure supply voltage and frequency correspond to the motor nameplate ratings.
- Ensure shaft turns freely before initial start.
- Measure stator resistance and record in Log Book.

6) If this is correct you may now start the pump, when it reaches full speed you will see the pressure in the discharge line rise. Slowly open the discharge valve until the pump adjusts to maintain its duty point.

Structural Representation



1. Motor
2. Mech. seal
3. Back plate
4. Pump body
5. Float neck ring
6. Impeller
7. Impeller nut
8. Spring washer
9. Key
10. Drain plug
11. O-ring
12. Stub shaft
13. Coupling guard
14. Bell housing
15. Screw
16. Spring washer
17. Motor foot

Trouble Shooting

Pump is running but failing to deliver water or desired pressure.

1) ⚠ Turn the unit off.
2) Check suction line is free of debris or blockages and check that the pump has not lost its prime. If so, remove blockage & repeat Starting at step 1).
3) Check that the suction valve is open.
4) Check that the discharge valve is open.
5) Check for air leaks. These may not always be visible to the naked eye unless pressure is applied to the suction line.
6) Check that the suction line is not too long.
7) Is suction line to pump excessive?
8) Is the foot valve stuck open or undersized?
9) Is speed too slow?
10) Check motor direction rotation.
11) Check for possible clogging in impeller vanes
12) Is the discharge piping undersized for applications.

Excessive Vibration

1) ⚠ Turn the unit off.
2) Check the motor is rotating in correct direction.
3) Check both motor feet & pump feet are secured properly.
4) Check drive coupling is secured tightly to the motor shaft.
5) Check motor bearings are OK.
6) Impeller could be partially blocked causing imbalance.

Noisy Operation

1) ⚠ Turn the unit off.
2) Check motor bearings.
3) Check pump is primed.
4) Check suction line is not damaged, causing insufficient supply & resulting in cavitation.
5) Check you are not pumping solids.

High Power Consumption

1) Check direction of rotation.
2) Check operating speed on the motor matches the intended performance curve speed.
3) Check that the estimated head is correct, as pump may be running down on its curve, producing high flow and drawing more power. Throttle the pump back on to its curve via discharge gate valve or reduce impeller diameter.
4) The Specific Gravity or Density of the liquid is greater than 1kg/litre affecting power draw.
5) Check impeller diameter for the correct size, to establish maximum power requirement at duty point.

Lubrication

Motor bearings are lubricated with lithium based rolling contact bearing grease, suitable for operation with-in the cooling air temperature range of -20°C to +55°C. For operation outside this temperature range, special lubricants are required.

Special lubricants or additional maintenance may be required in the case of motors exposed to comparatively high degrees of pollution, high humidity, increased or changed bearing loads, or prolonged continuous operation.

MOTOR OPERATION AND MAINTENANCE

Installation
All motors must be installed in such a manner as to ensure the air intake is not obstructed. Bed plates or slide rails should be firmly fixed to a solid, level foundation to ensure the motor remains rigid and vibration free. Shims or packers (if required) must be of adequate size and placed adjacent to and between base fixings.

Operation
Standard motors are designed for a 415 volt (±5%) 3 phase, 50 Hertz supply. Use of standard motors on other supply systems should be verified with our office prior to installation. All units are S1 rated to AS1359 and associated standards, for operation below 1000 metres at a maximum ambient temperature of 40°C.

For operation in conditions other than that above please contact Davey.

Electric motor starting imposes severe thermal stress on the motor, the frequency of starting should be minimized to ensure optimum machine life.

Number of Starts per hour
The number of starts per hour is dependant on the inertia of the driven load and the load torque demand. A guide to generally acceptable starts per hour would be as per table.

For greater number of starts per hour, please contact Davey.

STARTS PER HOUR	
Frame	**2 pole**
90	16
100	16
112	16
132	10
160	10
180	8

Permitted Starting Time
In respect to the temperature rise of the motor, starting time (i.e. from rest to operational speed) should not exceed the time indicated in the following table. Motor must be allowed to cool prior to each start.

MAXIMUM STARTING TIME (SEC)		
Frame	**Starting Method**	**2 pole**
71	D.O.L.	-
80	D.O.L.	15
90	D.O.L.	10
100	D.O.L.	12
112	D.O.L.	10
132	D.O.L.	14
160-355	D.O.L.	15
160-355	star-delta	45

Maintenance
To avoid damaging the mechanical seal, do not operate the pump without water in the pump casing. If the supply water is interrupted stop the pump immediately.

Do not set the water flow by partially closing off the suction valve as restricting the supply water can cause cavitation and severely damage the pump's components.

If the pump makes strange noises or vibrates, stop the pump and check for the cause/s.

It is not advisable to start and stop the pump frequently. If the power is interrupted during operation, turn the power switch off immediately.

If the pump is to remain inactive for a long period of time, wash the pump body and drain the water out of the pump casing completely.

When the air temperature drops below 0°C, drain the water from the pump casing as soon as it finishes operating.

Notes

Notes

Davey Repair or Replacement Guarantee

In the unlikely event in Australia or New Zealand that this Davey product develops any malfunction within one year of the date of original purchase due to faulty materials or manufacture, Davey will at our option repair or replace it for you free of charge, subject to the conditions below.

Should you experience any difficulties with your Davey product, we suggest in the first instance that you contact the Davey Dealer from which you purchased the Davey product. Alternatively you can phone our Customer Service line on 1300 367 866 in Australia, or 0800 654 333 in New Zealand, or send a written letter to Davey at the address listed below. On receipt of your claim, Davey will seek to resolve your difficulties or, if the product is faulty or defective, advise you on how to have your Davey product repaired, obtain a replacement or a refund.

Your Davey One Year Guarantee naturally does not cover normal wear or tear, replacement of product consumables (i.e. mechanical seals, bearings or capacitors), loss or damage resulting from misuse or negligent handling, improper use for which the product was not designed or advertised, failure to properly follow the provided installation and operating instructions, failure to carry out maintenance, corrosive or abrasive water or other liquid, lightning or high voltage spikes, or unauthorized persons attempting repairs. Where applicable, your Davey product must only be connected to the voltage shown on the nameplate.

Your Davey One Year Guarantee does not cover freight or any other costs incurred in making a claim. Please retain your receipt as proof of purchase; you **MUST** provide evidence of the date of original purchase when claiming under the Davey One Year Guarantee.

Davey shall not be liable for any loss of profits or any consequential, indirect or special loss, damage or injury of any kind whatsoever arising directly or indirectly from Davey products. This limitation does not apply to any liability of Davey for failure to comply with a consumer guarantee applicable to your Davey product under the Australian or New Zealand legislation and does not affect any rights or remedies that may be available to you under the Australian or New Zealand Consumer Legislation.

In Australia, you are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

Should your Davey product require repair or service after the guarantee period; contact your nearest Davey Dealer or phone the Davey Support Centre on the number listed below.

For a complete list of Davey Dealers visit our website (davey.com.au) or call:

DAVEY

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