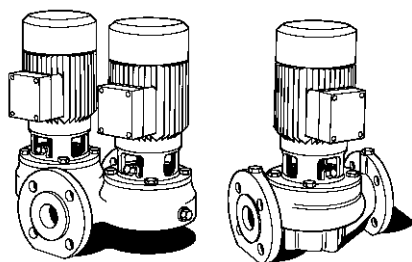


LINEFLO IN-LINE CENTRIFUGAL PUMPS



In-line centrifugal pumps for continuous service, handling non-abrasive hot and cold liquids in general pumping, water supply and building services applications.

OPERATING LIMITS

Code	BT/T	DT	DL/L
Temperature range Deg C		-15/+120	
Maximum pressure bar	6/10	6/10	10
Performance test standard	BS5316 part 1:1976/ISO2548		
Standard electric supply	380/415 V,3 Phase,50Hz-code E3 220/240 V,1 Phase,50Hz-code E1		

The maximum ambient temperature for standard motors is 40 Deg C.

INSTALLATION

LOCATION

The pump should be located in a clean, dry, ventilated environment and be easily accessible for servicing. Do not position near hot surfaces. Isolating valves should be fitted to the inlet and outlet of the pump.

TERMINAL BOX

To allow access to the motor terminal box it is possible to rotate the complete pump assembly by removing the fixing screws. It is advisable to carry out this operation before filling the system with water otherwise the pump should be isolated and drained of water. Take care not to damage the casing gasket.

! CAUTION - Water must not be allowed to enter the terminal box. Do not install on underside of motor.

INSTALLATION ARRANGEMENTS

- 1 - Before installing the equipment complete all necessary pipework and flush until clean.
- 2 - Single and twin pumps can be mounted in either vertical or horizontal pipework.
- 3 - Twin pumps mounted in horizontal pipe-runs should be positioned with the motor shaft vertical upwards.
- 4 - It is advisable to install secondary hot water pumps in a vertical pipe-run, pumping upwards.
- 5 - Do not allow the pump flanges to take the pipework weight. When installed in a horizontal pipe-run the motor must not point downwards.
- 6 - Avoid installing the pump in the lowest part of the system where sediment can collect. In atmospheric systems the pump must be positioned so that it does not pump over the feed and expansion tank vent or suck air down the vent.

ELECTRICAL

The operating voltage and electrical data are indicated on the motor nameplate and connection should be made as shown on the wiring diagram. **The equipment must be earthed.** A suitable starter with overload protection must be provided. Overloads should be set to the same value indicated on the motor nameplate.

OPERATION

! CAUTION - Do not run the pump dry - otherwise the mechanical seal will be damaged - and leak.

Open the isolating valves on the inlet and outlet of the pump.

Vent the pump by carefully slackening the vent plug until water is seen to escape. Tighten the vent plug.

Check the pump is free to turn by removing the motor fan cowl and carefully rotating the pump and motor rotating assembly using the fan motor.

Check rotation by quickly turning the pump on and off to see if the motor shaft turns in the correct direction. Rotation can be reversed on three phase motors by interchanging any two of the incoming phases.

Replace the motor fan cowl, the pump can now be started. Any initial noise may be due to air in the system and should cease provided the system is fully vented, and flooded.

When the pump is operating verify that the voltage and running amps are within the motor nameplate data.

! CAUTION - Do not vent the pump whilst hot.

MAINTENANCE

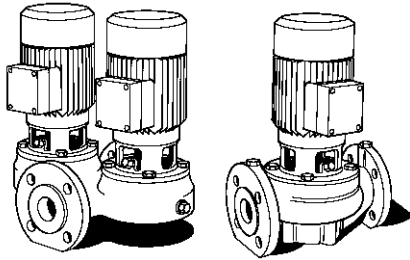
Generally, in-line centrifugal pumps do not require any special maintenance, periodic checks that the pump is operating satisfactorily is all that is required. Replace any worn or damaged parts when necessary - mechanical seals and motors bearings are normal wearing parts.

Any idle pump may tend to stick when it does not operate for prolonged periods, - test periodically.

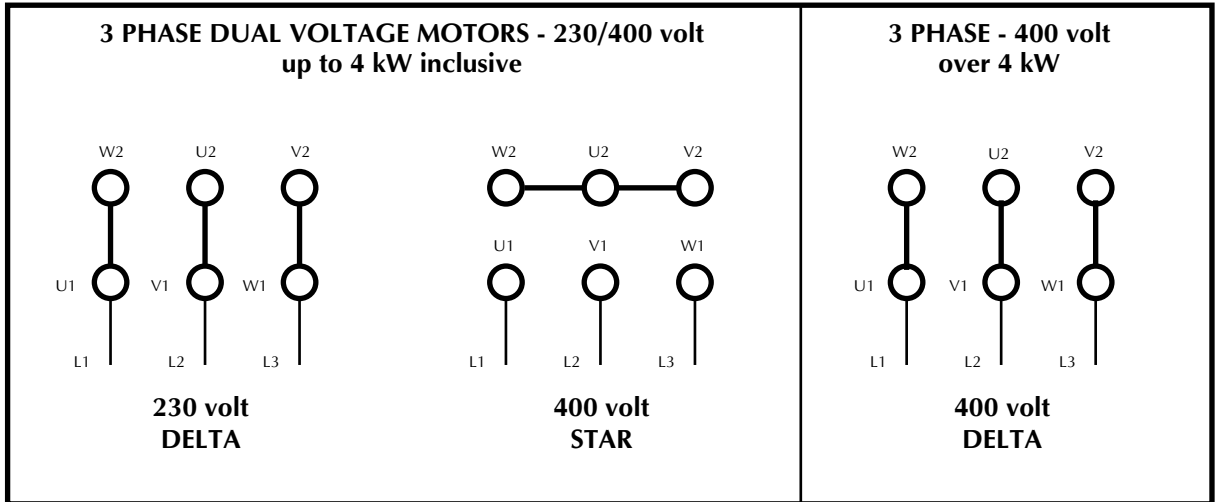
LUBRICATION

The motor bearings are correctly packed with grease on assembly, which is sufficient for an acceptable service life under normal conditions. The recommended standard grease is Shell Alvania RA or equivalent.

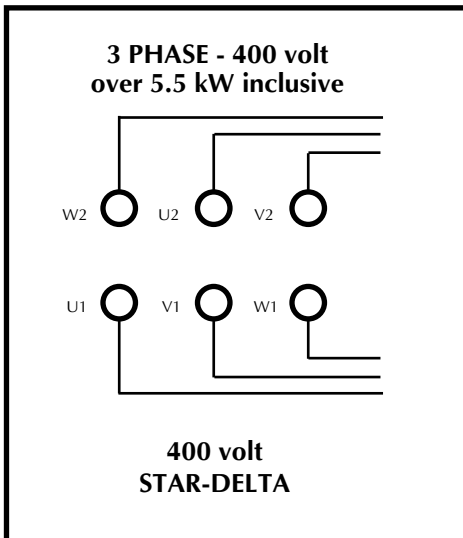
please consult Fluid Automation where extreme service conditions exist.



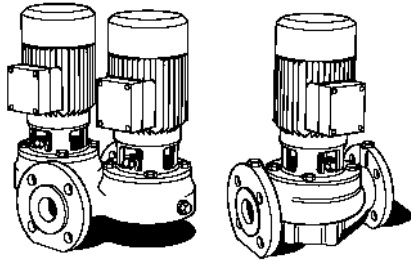
THREE PHASE MOTOR CONNECTION - DOL STARTING



THREE PHASE MOTOR STAR DELTA STARTING



LINEFLO TYPE ES VARIABLE SPEED SYSTEMS



OPERATION -LINEFLO TYPE ES

The Lineflo ES system comprises, a Single or Twin pumpset, a Differential pressure Transducer and Inverter control panel. The system differential head is maintained around the design set-point, whilst the duty pump speed modulates to suit variations in the system flow requirements.

WARNING !

ONLY SUITABLY QUALIFIED PERSONNEL SHOULD INSTALL OR MAINTAIN THE INVERTER CONTROL PANEL.

The components of the power unit of the frequency converter are live when connected to the mains. Coming into contact is extremely dangerous and may cause death or severe injury.

REFER TO THE FREQUENCY CONVERTER MANUAL BEFORE INSTALLATION AND OPERATION.

WIRING

Wiring should comply with local EMC requirements and as specified in the Drive user manual.

START-UP DATA GROUP

This is factory set to suit the unit supplied. It should not be altered without consulting Fluid Automation.

SET-POINT PARAMETER

The set-point is factory set to the design set-point differential head given by the customer. Whilst the set-point can be altered, within the pump performance, by an experienced operator at the Drive control panel it is advisable to seek advice from Fluid Automation on this, since it may be necessary to alter other set items on the unit.

AUTO-CHANGE-OVER INTERVAL

Auto-sequence control shares the duty pump running times. The change-over time interval is factory set at 50 hours, this can be altered by an experienced operator at the Drive control panel.

IMPORTANT

Whilst other Drive Parameters are factory set under test conditions, it may sometimes be necessary to fine-tune under site operating conditions. It is important that the system is fully complete and operating under final conditions to ensure that fine-tuning is effective. It is recommended that the equipment is commissioned under final operating conditions.

ROTATION

Rotation of each pumpset should be checked under Test and Auto Switch positions. See below -

SWITCH POSITION		ACTION (DOL)
TEST	AUTO	
CORRECT	CORRECT	NO ACTION
CORRECT	INCORRECT	INTERCHANGE ANY TWO MOTOR CABLES AT INVERTER - U2 V2 W2
INCORRECT	CORRECT	INTERCHANGE ANY TWO MOTOR CABLES AT MOTOR TERMINALS

FAULT TRACING

When a fault is dedected by the frequency converter control electronics, the Drive is stopped and a fault code displayed.

The fault can be reset with the Reset Button on the control keypad or by turning the power supply off for around 10 seconds.

The faults are stored in the fault history menu which can be browsed. Refer to the Drive user manual for fault codes, their causes and corrective action.

MAINTENANCE

WARNING ! Read the Drive manufactures Safety instructions before performing any maintenance procedures on the Drive.

If installed in an appropriate environment, the frequency converter Drive requires very little maintenance.

Refer to the Drive user manual for any routine maintenance intervals recommended by the Drive manufacturer.

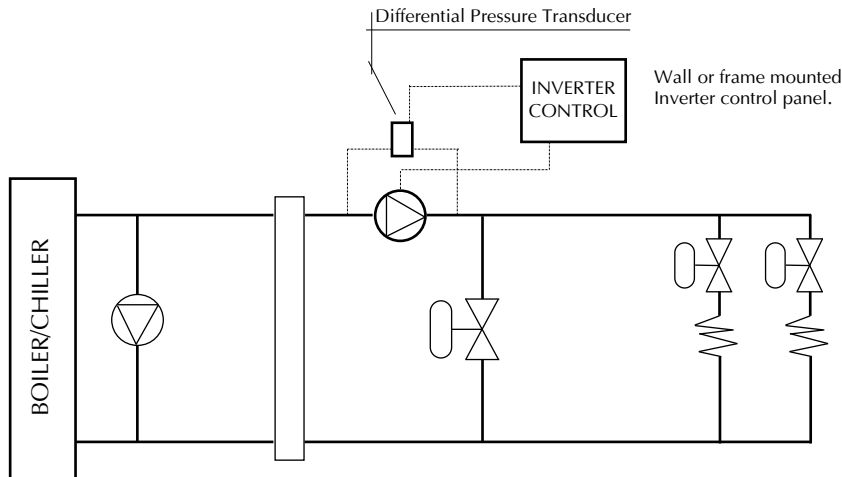
When cooling fans are fitted to the control panel they include a filter element under the air intake louvre. The filter element should be checked for dirt and cleaned periodically, depending on the dustiness of the enviroment, but a least every 3 months.

For Lineflo maintenance also refer to OM002-001.

LINEFLO ES VARIABLE SPEED CENTRIFUGAL PUMPS

with Separate Inverter controller and dp transducer

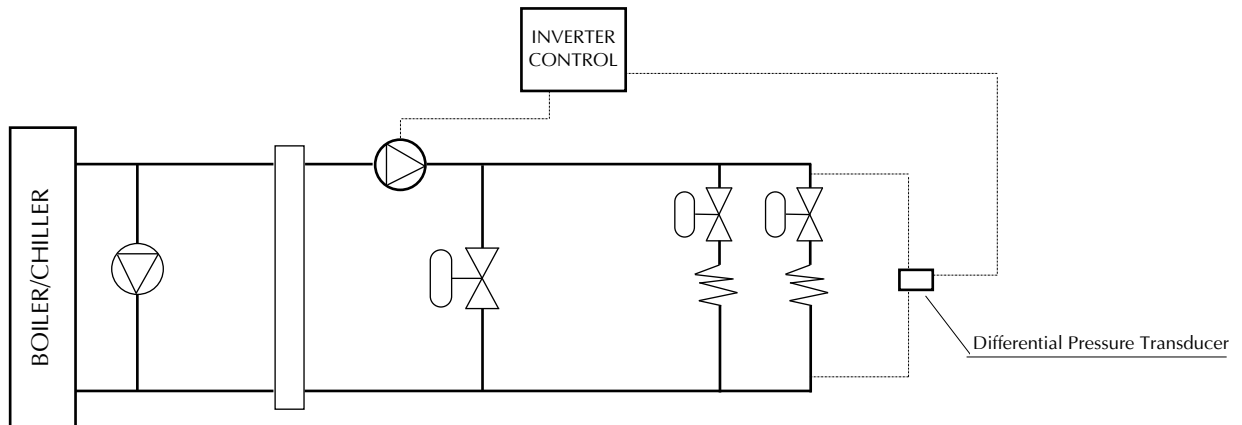
CONSTANT DIFFERENTIAL PUMP HEAD



In a typical system using 2-port valves, with the differential pressure transducer arranged about the main pump and set at the design system head, the pump will maintain a constant head against variable flow conditions by adjusting the pump speed. The absorbed energy will be reduced in accordance with the speed reduction.

TYPICAL ONLY ! NOT INTENDED TO COVER ANY PARTICULAR SYSTEM.

CONSTANT DIFFERENTIAL HEAD at INDEX CIRCUIT



In a typical system using 2-port valves, with the differential pressure transducer arranged about the index circuit and set at the minimum system head, the pump will follow the system head against variable flow conditions by adjusting the pump speed. The absorbed energy will be reduced in accordance with the speed reduction. This will result in a greater energy saving than the constant differential pump head system.