DAYLIFF

DBE
Horizontal Multistage Pumps

DBE 5-40

DBE 12-40

Installation & Operating Manual

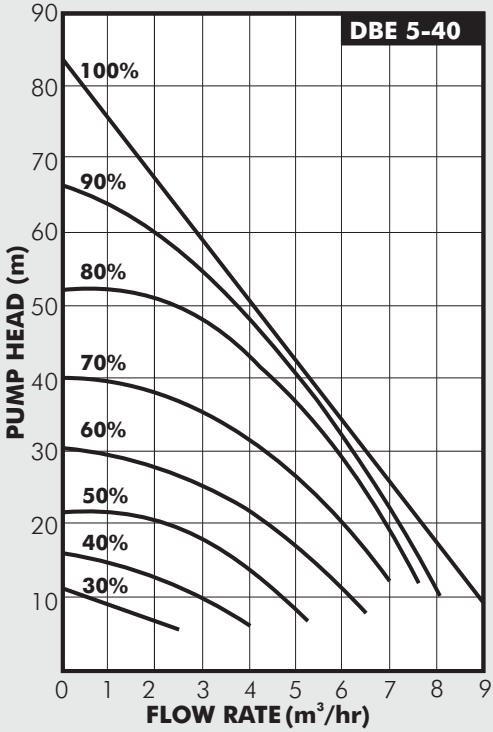
INDEX

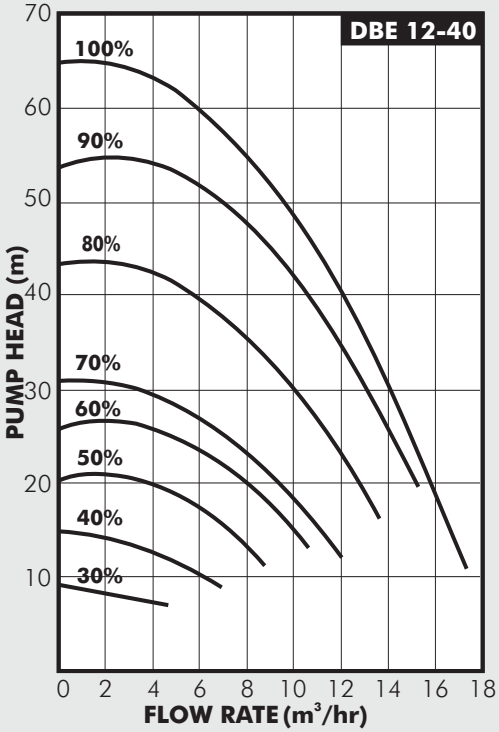
Congratulations on selecting a Dayliff DBE Pumps. They are manufactured to the highest standards and if installed and operated correctly will give many years of efficient and trouble free service. Careful reading of this Installation Manual is therefore important, though should there be any queries they should be referred to the equipment supplier.

1. PUMP SPECIFICATIONS

DBE 5-40

DBE 12-40





PUMP

The Dayliff DBE Booster is a compact water boosting unit for water supply in domestic and commercial applications for single and two booster pump systems. The pump is fitted with an integral variable speed controller that maintains pump output at constant pressure (adjustable up to 5bar) with varying demand. The pump is compact for simple installation, quiet with low operating noise level and of robust design for long life. The speed controller maintains pump performance at maximum efficiency thereby minimizing operating costs.

Particular features include:

- Booster output is adapted to demand by changing speed and number of pumps in operation.
- Automatic pump alternation in multi-pump setup to ensure uniform operating periods.

All hydraulic parts are made from AISI304 stainless steel, and the pump unit is supplied with a 5-way connector, non-return valve and integrated pressure sensor. For optimal operation, appropriately sized pressure tanks are required with 3L being the minimum recommended size.

MOTOR

The pump is fitted with high efficiency IE4 Permanent Magnet variable speed motor that incorporates thermal protection against motor overload and dry run protection with auto-restart. The motor can be directly connected to the mains power supply through appropriately sized FUSE or MCB.

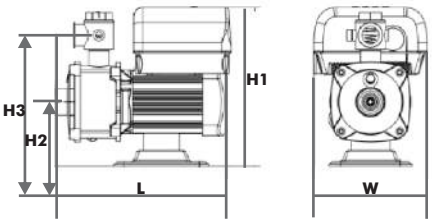
Enclosure Class: IP44 ***Insulation Class:*** F ***Voltage:*** 1x240V
Speed: 4200rpm(DBE5-40),
4400rpm(DBE12-40)

OPERATING CONDITIONS

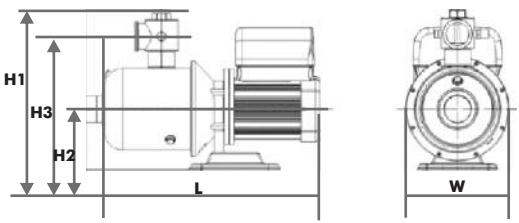
Pumped Liquids: Thin, clean non-aggressive and non-explosive liquids without solid particles or fibres
Liquid Temperature: 0 - 70^{0}C
Max. Ambient Temperature: +40^{0}C
Max. Suction Lift: 1m
Max. Suction Lift: According to NPSH curve plus a safety margin of 1
Max. Operating Pressure: 10 Bar up to 40^{0}C
6 Bar up to 90^{0}C
Water Inlet Pressure: More than 1.2 Bar less than 3.5 Bar

PUMP DATA

Model	Motor		Current (A)	A1 (")	A2 (")	Dimensions (mm)					Weight (kg)
	kW	HP				W	L	H1	H2	H3	
DBE 5-40	1.1	2	8.9	1¼	1	199	303	277	112	228	10
DBE 12-40	2.2	3	16	2	2	234	595	350	141	329	28



DBE 5-40



DBE 12-40

2. SYMBOLS & WARNINGS

Reliable ground connection is necessary before operating

Do not touch the pump when its is energized

In order to prevent electric shock, ensure the power switch is 'OFF' or remove the plug before maintenance and cleaning

When operating the pump, do not remove or open the safety protection device

In order to avoid overloading the pump should be operated within the scope of prescribed conditions

Do not run the pump without water inside pump, else damage of pump mechanical seal and sliding bearing will occur

3. INSTALLATION PRECAUTIONS

Power Requirements

Power supply voltage: should be within 220V-240V. When the voltage is too low, the pressure will be reduced.

Electrical Connection

Before installation and use, check whether the pump is damaged during transport and storage,
Check that the insulation resistance is greater than 50MΩ.

The pump should be properly installed complete with leakage protection device. The power outlet which connects to the plug should be reliably grounded.

If the power cord is extended, it should be appropriately sized as per table in this manual to minimise voltage drop

Pump Installation Environment Requirements

The water pump should not be installed in flooded conditions. When installed outdoors, ensure to protect against sun and rain.

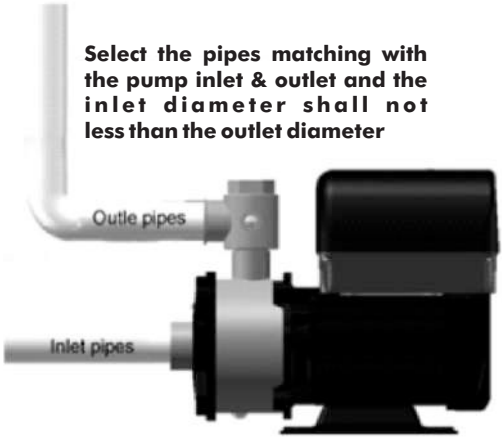
The pump should be installed in a convenient area so as to allow for maintenance and inspection of the pump. The place should be kept dry and well ventilated.

Ambient temperature allowable is -15°C to + 40°C. When temperature is below 4^{0}C, the water pump and the pipeline in the water will form ice causing the pump body and pipe to rupture.

It is important to install a drainage line so as to drain the water caused by the leakage.

Piping Requirements

The piping size should match pump inlet and outlet and shall not be less than the outlet piping diameter.



- For first time use, fill priming port with water in order to bleed air

Setting the Requirements

The pressure setting should not be less than the pressure of the outlet piping itself. The starting pressure value is set to about 80% of the constant pressure value.

During transport and installation of the pump, avoid carrying the pump using the power cord, else electric shock due to power cord damage may occur.

WARNING

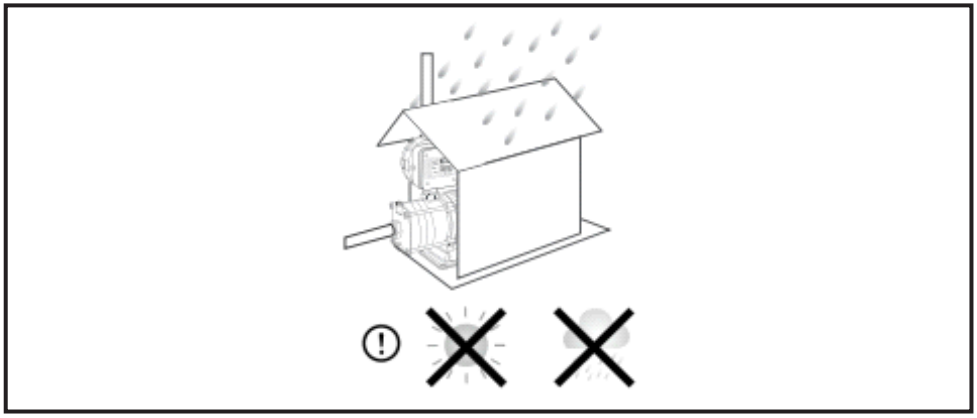
When the pump is in operation and needs to be moved, turn off the power first to avoid electric shock.

4. INSTALLATION & CONNECTION

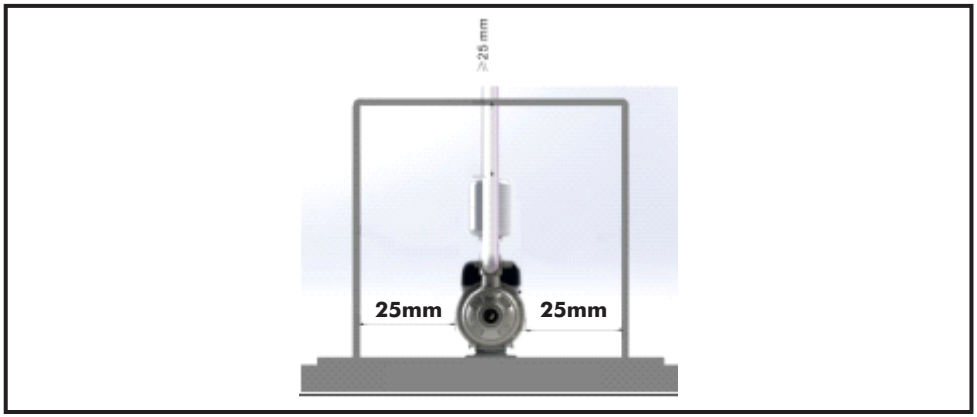
Before installing the water pump, check that the model and spare parts of the water pump are consistent with the purchase order

4.1 Pump Location

Install the pump in a well ventilated position with suitable cover to avoid exposure to direct sunlight or rain.

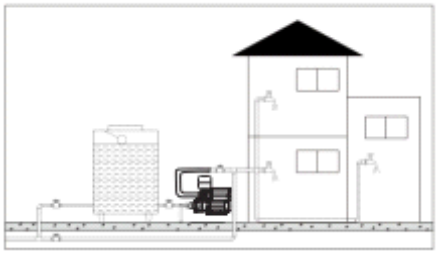


The pump should be installed in a convenient place for ease of service. When pump installed in a narrow place, refer to below figure for the reference spacing

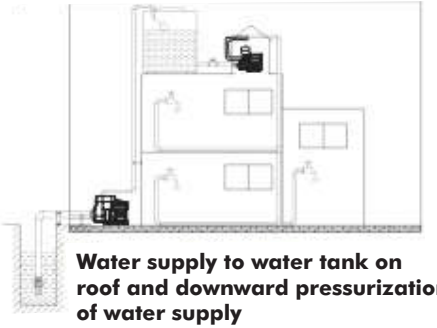


4.2 Pipe Installation

It is recommended to install isolation valves on both sides of the pump, so that the system will not be drained during pump maintenance. If the pump is installed above the water level, a foot valve must be installed on the suction pipe under the liquid level. The correct pipe size should be selected according to the inlet pressure of the pump.



Indirectly-pressurized supply of tap water



Water supply to water tank on roof and downward pressurization of water supply

Do not put the weight of the piping on the pump, else deformation will occur. When installing the inlet pipe, prevent air from being drawn in.

4.3 Pump Installation

- Pump should be installed in well ventilated cool place and away from direct sunlight for effective air flow around the cooling fan of the motor, ensure the pump is atleast 150mm away from obstacles.
- In order to minimize the inlet friction loss, the inlet pipe should be as short as possible.
- Before pump installation check that pipe system has check valve fixed to prevent water backflow.
- Pump should be installed on a rigid and level ground.
- Before pump installation, inlet pipes should be clean, and if need be a screen filter may be installed infront of the inlet 0.5 ~ 1 m.
- When installing the inlet pipe, ensure that air is not trapped inside.
- When pump is installed above water level (within allowable suction head), the suction pipe should be fitted with a foot valve to maintain prime.

4.4 Electrical Connections

The connection of the electrical circuit must be carried out by a qualified electrician in accordance with local regulations.

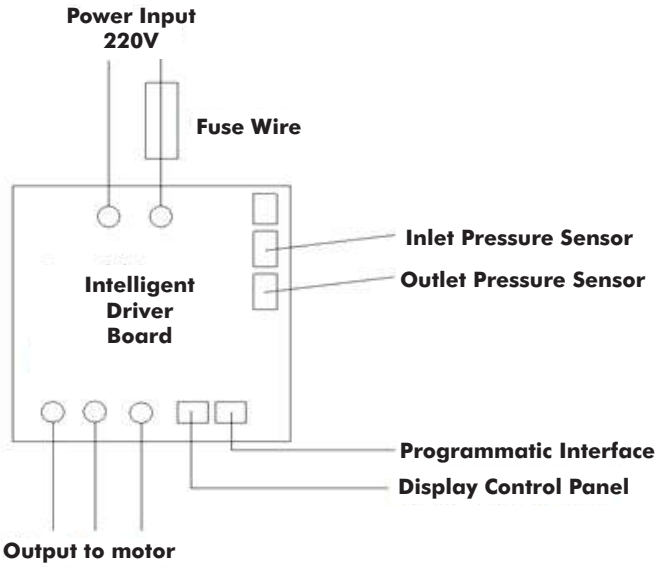
- Ensure that the motor lead wire is connected to the power supply in accordance to the wiring diagram provided in the terminal box and motor nameplate.
- The motor must be connected to power supply through appropriately sized fuse or breaker.

Before removing the motor terminal box cover and disconnecting the pump, make sure that the power supply has been switched off.

Pump Connection

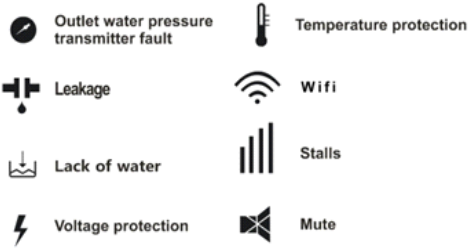
- Pump should be reliably grounded to prevent leakage, and should match the leakage protection switch; Electrical connections and protection should be performed accordingly; Working voltage is marked on the nameplate, ensure the supply power is matched with the motor power.
- If pump is installed far away from power supply , ensure correct selection of cable size to minimize power losses refer to table 1 for guidance.

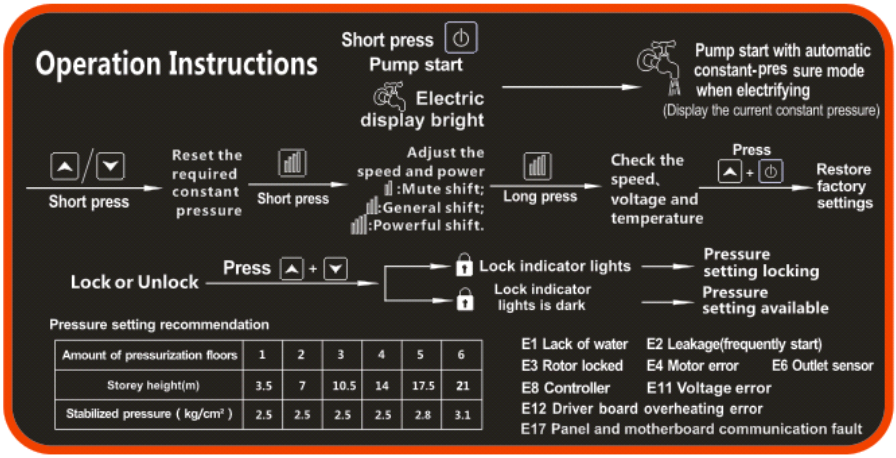
Power Wire Length / Model	0~50m	Fuse A	50~100m	Fuse A	100~150m	Fuse A
DBE 5-40	1.5mm^2	10	2mm^2	15	2.5mm^2	18
DBE 12-40	2.5mm^2	27	4mm^2	30	6mm^2	30



Intelligent Pump Electrical Schematic Diagram

Control Panel Operation Instructions





Function Introduction

The DBE pumps have the following features

1. High efficiency, energy saving, intelligent, constant pressure and frequency conversion; Water flow and pressure control; Manual, Automatic control; Water shortage, overload, locked-rotor protection.
2. Motor soft start and soft stop, effectively protecting and improving the service life of the motor.
3. Auto-start function: which ensures the pump runs for few seconds automatically every 12 hours to prevent the impeller from jamming.
4. Colorful panel which shows the error code with the indicator lights, if two or more errors are detected at the same time, the codes will be displayed alternately every 2 seconds.

Code	Function/ Alarm
E1	Lack of water
E2	Leakage (frequently start)
E3	Rotor Locked
E4	Motor Error
E5	Inlet Sensor
E6	Outlet Sensor
E8	Controller
E11	Voltage Error
E12	Driver board overheating error
E17	Panel and motherboard communication fault

5. OPERATION & MAINTENANCE

Do not run the pump without water, else may damage the mechanical seal and bearing.

1. The pump must be filled with water before starting. To do this,
   - Close the pump outlet valve, open the vent screw on the pump head, slowly open the inlet valve, until the water flows out of the vent plug screw.
   - Tighten the plug screw.
2. Check the rotation direction as follows
   Switch off the power supply and observe the direction of rotation (Reference fan). The correct rotation from the motor side should be counterclockwise rotation.
3. Before starting the pump, check the following
   - Pump is fixed firmly.
   - Pump is filled with water.
   - Grid voltage matches motor nameplate.
   - Motor rotation direction is correct.
   - All the pipes are tightly connected.
   - The inlet of the valve is fully open.
   - Outlet valve should be opened slowly once the pump is started.
   - If pressure gauge is installed, check the , working pressure of pump.
4. Control the operation of the pump
   - Limit pump starts to no more than 100 times per hour;
   - Note that when the flow is too small the pump will over-heat and if flow is larger, it will cause motor to overload.
   - During operation if the pump is noisy, stop and check it immediately.

Match pump selection to the duty required

5. For good maintenance, the pump should be regularly checked for the following
   - Work pressure and operation pressure;
   - Possible leakage;
   - Motor overheating;
   - Condition of inlet filter (if fitted);
   - The disconnection time of Motor overload;

- The disconnection time of motor overload;
- The frequency of starts and stops;
- All the control operations;

When pump is unused for a long time, it should be cleaned and stored properly.

6. TROUBLE SHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Motor won't start	Power Source Error	Check the power source
	The fuse is broken	Replace the fuse
	Motor overheating protection (display E13)	After cooling, pump will automatically start
	Motor damaged	Consult service provider or maintenance service
	Motor lead plug is not inserted or lead is loose(display E4)	Connect the lead-wire to re-plug the plug
	Dry run protection (display E1)	Pump will restart every 30 minutes and when water is available the pump will resume operation
	Inlet pressure sensor is damaged (display E5) or plug is not inserted	Replace the inlet pressure sensor or re-plug
	Outlet pressure sensor is damaged (display E6) or plug is not inserted	Replace the sensor or re-plug the plug again
	Voltage operating range is outside limit, motor will be protected. (display E6)	Adjust the voltage or wait for supply to stabilize then restart the pump
	Motor is stalled (display E3)	Check whether the pump has a foreign body stuck and clear
	Drive error (display E8)	Long press the set button to switch between Manual / Auto , if the error is not resolved, repair or change.
	Drive board overheat error (display E12)	The pump will stop and automatically troubleshoot after cooling

PROBLEM	POSSIBLE CAUSE	SOLUTION
Uneven water flow	The inlet pipe is too small	Increase the inlet pipe
	At the pump inlet, there is not enough water	Increase water or switch off until correct level is attained
	Inlet pressure is too small compared to water temperature, pipe loss and flow	Improve the system, increase inlet pressure
	Part of pipe is clogged	Check and clean
The pump is running but the water output is low and the pressure insufficient	Pump rotating in wrong direction	Correct motor rotation by changing any two cables
	Inlet pipe, filter, bottom valve or pump body is clogged	Clean the pipe, bottom valve, filter or pump body to remove debris
	Low motor voltage or the wire is too long	Check the motor voltage or increase the wire cross section
	Incorrect model selection	Select the suitable model
	Impeller worn out	Replace the impeller
	Mechanical seal leaking	Clean or replace mechanical seals
	Outlet pipe leak	Check and repair the outlet pipe

PROBLEM	POSSIBLE CAUSE	SOLUTION
The motor is running but no water output	Pump body is not full filled with water	Open the vent screw, expel the air front pump chamber and inlet pipe
	Impeller damage	Replace the impeller
	Water level is low	Adjust the inlet pipe to immerse the foot valve into the water
	Suction pipe air leakage	Check the inlet pipe and the connections 's sealing.
	The inlet pipe is clogged	Check and clean up
	Bottom valve or check valve is in the closed position	Open the valve
Pump has abnormal vibration and noise	Inlet pipe leaking	Check and correct the water inlet pipe
	The inlet pipe is too small or part is clogged	Increase and/or repair the inlet line
	The inlet pipe or pump has air	Fill water again and remove the air
	The mechanical part of the pump is rubbing against hard surface	Check and repair the pump
	Base is not stable	Sturdy the base, tighten the bolts
Pump starts frequently	Water flow is too small	Increase water flow
	Outlet pipe leaking or faucet drip (display E2)	Check the water pipe, repair/replace the faucet

7. TERMS OF WARRANTY

i) General Liability

- In lieu of any warranty, condition or liability implied by law, the liability of Dayliff (hereafter called the Distributor) in respect of any defect or failure of equipment supplied **is limited to making good by replacement or repair** (at the Distributors discretion) defects which under proper use appear therein and arise solely from faulty design, materials or workmanship within a specified period. This period commences **immediately after the equipment has been delivered to the customer** and at its termination all liability ceases. Also the warranty period will be assessed **on the basis of the date that the Distributor is informed of the failure.**
- This warranty applies solely to equipment supplied and **no claim for consequential damages,** however arising, will be entertained. Also the warranty specifically excludes defects caused by fair wear and tear, the effects of careless handling, lack of maintenance, faulty installation, incompetence on the part of the equipment user, Acts of God or any other cause beyond the Distributor reasonable control. Also, any repair or attempt at repair carried out by any other party **invalidates all warranties.**

ii) Standard Warranty

General Terms

If equipment failure occurs in the normal course of service having been competently installed and when operating within its specified duty limits warranty will be provided as follows:-

- **Up to two years - The item will be replaced or repaired at no charge.**
- **Over two years, less than three years - The item will be replaced or repaired at a cost to the customer of 50% of the Davis & Shirtliff market price.**

The warranty on equipment supplied or installed by others is conditional upon the defective unit **being promptly returned free to a Davis & Shirtliff office** and collected thereafter when repaired. No element of site repair is included in the warranty and any site attendance costs will be payable in full at standard chargeout rates.

DAYLIFF is a brand of **Davis & Shirtliff**

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