Waterlock LP/LR/LSG/LSS

1 Introduction

The Vetus exhaust system components are especially suitable for use in **water-injected** exhaust systems.

The maximum continuous operating temperature of the plastic components of the exhaust systems is 70 degrees C (158-degrees F).

The LSG, LSL and LSS exhaust silencers have a very large capacity, so that they are exceptionally suitable for use in systems with extra long exhaust pipes. An extra large capacity waterlock is of vital importance for a sailing ship, which will roll and pitch in rough water with the engine off!

The LSG-type waterlock is also fitted with a non-return valve; this virtually prevents any water entering the exhaust system. Water entry can be caused by the ship pitching, waves from aft, or stopping the ship quickly.

- Fit a temperature alarm to warn of excessively hot exhaust system temperature.
- If the quantity of injected coolant water is reduced to in order to lower back-pressure in the exhaust system, check that there is still sufficient water injected when the engine is ticking-over. This will prevent excess temperatures in the exhaust system.
- Excess temperature can also be the consequence of insufficient mixing of coolant water with the exhaust gasses.

  In general, good mixing is obtained by a virtually vertically installed exhaust injection bend.

  Poor mixing can also occur with an engine on tick-over; especially when the coolant water injection bend is installed virtually horizontally.

  If necessary, take action. For example; by fitting a water vortex or a water splitter in the exhaust pipe, to improve the mixing of coolant water with the exhaust gasses.

With water-injected exhaust systems, fit a hose of suitable quality.

This hose must be reinforced, resistant to exhaust gasses, high temperatures (100 degrees C, 212 degrees F) and oil.

Easy flexibility is essential for installation, while the hose must not collapse when heated.

Vetus exhaust hose fulfils all the above requirements.

	Hose dia.:	Engine power to:
WLOCKLP30	ø 30 mm (1 3/16")	10 kW (13,6 hp)
WLOCKL40R / LSS40A	ø 40 mm (1 9/16")	18 kW (24,5 hp)
WLOCKL45R / LSS45A	ø 45 mm (1 3/4")	22 kW (30 hp)
WLOCKL50R(S) / LSS50A	ø 50 mm (2")	28 kW (38 hp)
WLOCKLP60 / LSL60	ø 60 mm (2 3/8")	39 kW (53 hp)
WLOCKLP75 / LSL75	ø 75 mm (3")	63 kW (86 hp)
WLOCKLP90 / LSL90	ø 90 mm (3 1/2")	89 kW (121 hp)
LSG60	ø 60 mm (2 3/8")	34 kW (46 hp)
LSG75	ø 75 mm (3")	55 kW (75 hp)
LSG90	ø 90 mm (3 1/2")	77 kW (105 hp)

⚠ Warning

If water enters the engine from the waterlock into the exhaust system (for example: under sail when the ship rolls or pitches heavily) this will lead to irreparable damage to the engine.

The overall dimensions drawing shows the maximum amount of water which can be contained in the exhaust silencer. Too much water in the silencer can effect engine starting; drain off this water first. Too much water in the silencer can be also caused by repeated starting attempts while the engine refuses to start.

2 Installation

2.1 Installing waterlock LP, LSG, LSL and LSS

Instal the waterlock as vertical as possible.

Position the waterlock **'back-to-front'** alongside the engine when there is insufficient space behind the engine.

Because the waterlock contains water during use, the weight increases significantly. Fit the waterlock with tension straps.

⚠ Note

Make sure the following conditions are met under all sailing conditions (e.g. heeling):

- The waterlock 'IN'-connection is located below the level of the exhaust injection bend.
- the distance between the bottom of the engine's cooling water outlet and the highest point of the waterlock is at least 5 cm (2").

For additional exhaust system information see chapter 3.

2.2 Installing the transom exhaust connection

Fit the transom exhaust connection at such a position that with the ship fully laden, the transom connection is still at least 10 cm (4") above the waterline.

In order to install the transom exhaust connection so that it remains watertight, apply marine adhesive sealant between the flange of the transom connection, and the transom.

The rubber transom exhaust connection TRCxxR, where xx stands for the diameters of 40 mm (1 9/16"), 45 mm (1 3/4"), 50 mm (2"), 60 mm (2 3/8"), 75 mm (3") and 90 mm (3 1/2"), requires a hose connector for fitting the exhaust hose.

The maximum thickness of the transom where the transom connection is fitted, can be 40 mm (1 9/16") with this type, with the exception of the TRC7590R. With these, the maximum transom thickness is 20 mm (13/16") .

With the plastic transom exhaust connection TRCxxPV, xx stands for diameters of 40 mm (1 9/16"), 45 mm (1 3/4"), 50 mm (2"), 60 mm (2 3/8"), 75 mm (3") and 90 mm (3 1/2"), the exhaust hose can be fitted directly, without hose connector.

The maximum thickness of the transom at the place where the transom connection is fitted, can be 35 mm (1 3/8") for type TRCxxPV and TRCxxS.

2.3 Exhaust pipe

In order to ensure the proper drainage of the coolant water injected into the exhaust pipe, the pipe must be installed with a slope downward over its whole length from the water injection point to the exhaust silencer.

During operation, the exhaust pipe will contain water. This will increase its weight considerably, so support the exhaust pipe properly.

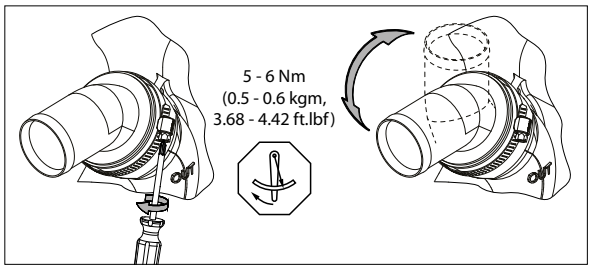
The exhaust pipe from silencer to transom connection must be installed in such a way that:

- The highest point in the exhaust pipe should not be more than 150 cm (60") above the underside of the exhaust silencer.
- The length of the section between the waterlock and the highest point, should not exceed 300 cm (120").

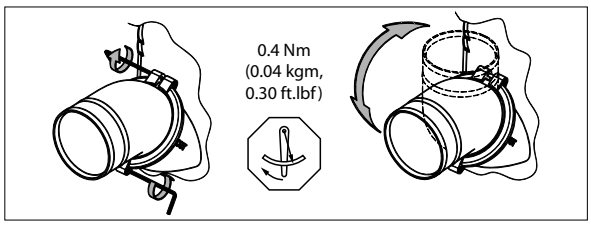
2.4 Hose connections

In order to achieve the ideal connection between the hoses and the exhaust silencer, both hose connections on type LSG and LSS turn through 360 degrees, while on types WLOCKL40/45/50R, the INPUT hose connection turns through 360 degrees.

LSS and WLOCKL40/45/50R:
Loosen the hose clamps before turning the hose connections!
Tighten up the hose connections to a torque of **5 - 6 Nm**.



LSG:
Loosen the bolts before turning the hose connections!
Tighten up the hose connections to a torque of **0,4 Nm**.



- To ease the fitting of the hose to the hose connector, use only water and/or soap, NOT grease or products containing oil.
- Fit each hose connection with 2 stainless steel 12 mm (1/2") wide hose clamps.

2.5 Sensor for temperature alarm

A sensor for a temperature alarm can be fitted in the exhaust pipe.

2.6 Waterlock type LSG

A sensor for a temperature alarm can also be fitted in the waterlock connector. The 'IN' connector on the waterlock has two circular areas. These are intended for fitting the temperature sensor. Drill in one of these areas a hole of the correct size. Fit the sensor with a lock nut and, after fitting, check that the waterlock is completely liquid and gas-tight.

3 Installation Examples

Exhaust systems with an waterlock type LP/LSG/LSL/LSS, and silencer type MP, goose neck type LT and a transom connection are shown on page 16.

Entry of water from the aft is almost completely prevented by the extra height difference in the goose neck.

When the engine is stopped, any water which is still in the exhaust pipe (between the highest point in the exhaust system and the exhaust silencer) will run back to the exhaust silencer.

To reduce the amount of this water as much as possible, the goose neck should be fitted directly above the exhaust silencer, if possible (see drawings 1 and 3).

When the goose neck is fitted directly to the transom (drawings 2 and 4), the maximum length of the exhaust pipe, between waterlock and the highest point, should be taken into account.

3.1 Prevention of syphoning (drawings 3 & 4)

If the water injection point 'C' is below, or less than 15 cm (6") above the waterline (also when the ship heels under sail), there is a risk that when the engine is stopped, the coolant water will enter the engine due to syphoning. This syphoning can be prevented in two ways:

① By creating an air vent system in the coolant water hose between engine block and water injection point 'C', by fitting an air vent with air vent pipe, for example.

② By fitting an air vent (with valve) in the coolant water hose between the engine block and water injection point 'C'.

4 Maintenance

- Check all hose connections for gas and water leaks regularly.
- Before the winter lay-up, drain the exhaust silencer. The waterlock has a drain plug for this purpose.

Waterlock LSG
Check the non-return valve for proper function at least once a year.

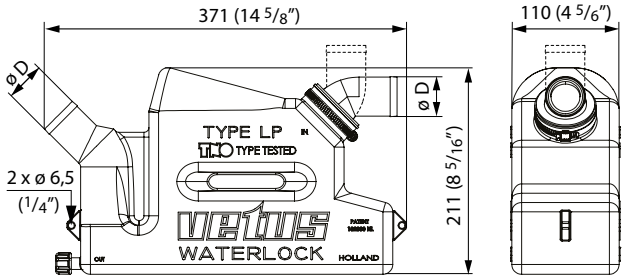
Waterlock LP/LR/LSG/LSS

5 Dimensions

WLOCKL40R
WLOCKL45R
WLOCKL50R

Volume: 4.25 l
(0.93 Imp. Gal.,
1.12 U.S. Gal)

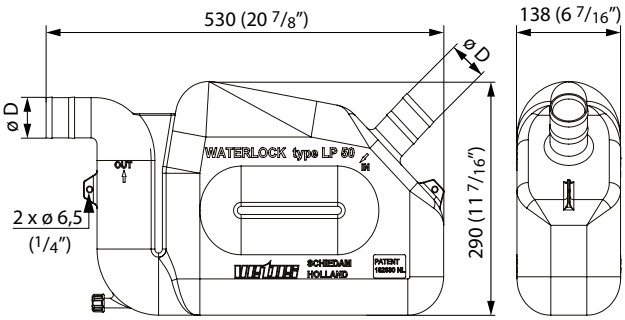
D	
ø 40 mm	(1 9/16″)
ø 45 mm	(1 3/4″)
ø 50 mm	(1 15/16″)



WLOCKL50S
WLOCKLP60
WLOCKLP75
WLOCKLP90

Volume: 10.5 l
(2.30 Imp. Gal,
2.77 U.S. Gal.)

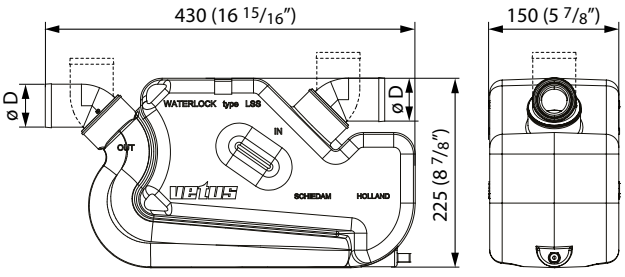
D	
ø 50 mm	(1 15/16″)
ø 60 mm	(2 3/8″)
ø 75 mm	(2 15/16″)



LSS40A
LSS45A
LSS50A

Volume: 5.7 l
(1.25 Imp. Gal., 1.51 U.S. Gal.)

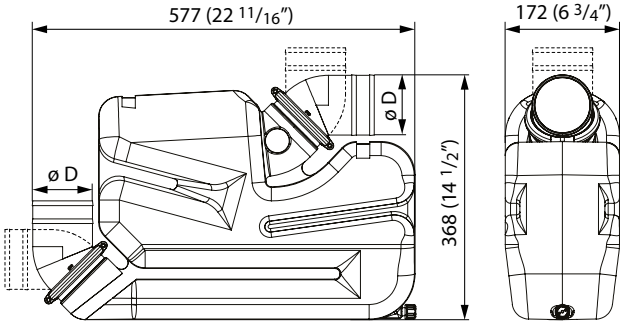
D	
ø 40 mm	(1 9/16″)
ø 45 mm	(1 3/4″)
ø 50 mm	(1 15/16″)



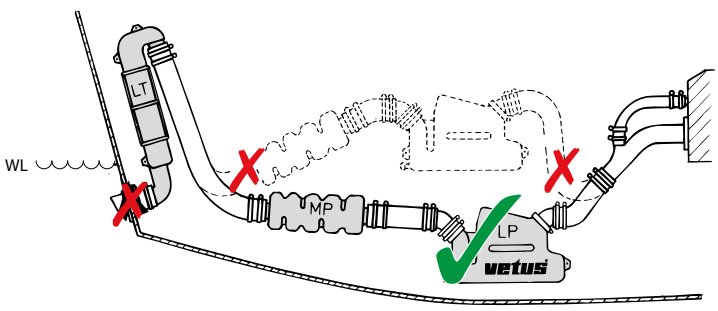
LSG60
LSG75
LSG90

Volume: 17.0 l
(3.70 Imp. Gal., 4.50 U.S. Gal.)

D	
ø 60 mm	(2 3/8″)
ø 75 mm	(2 15/16″)
ø 90 mm	(3 9/16″)



Warning



Waterlock LP/LR/LSG/LSS

6 Installation example

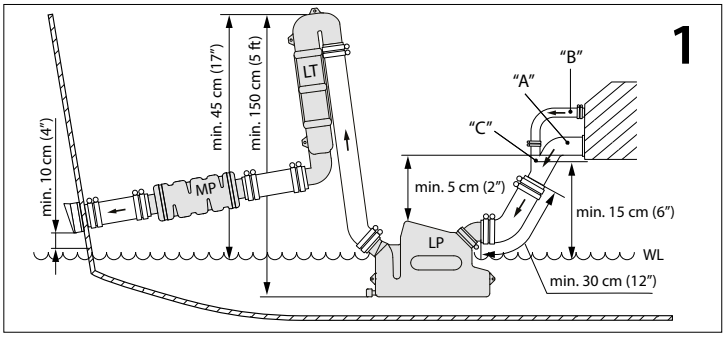
A Exhaust manifold

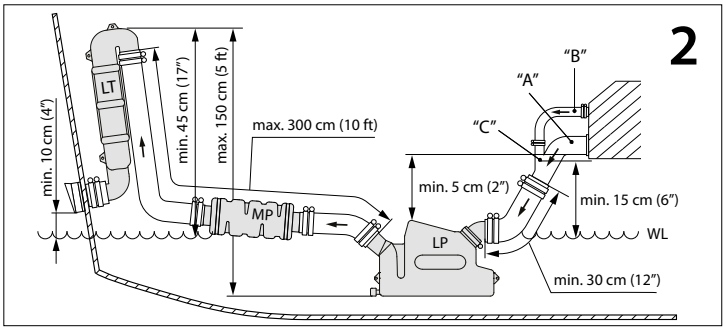
B Cooling water

C Water-injection point

1 & 2:

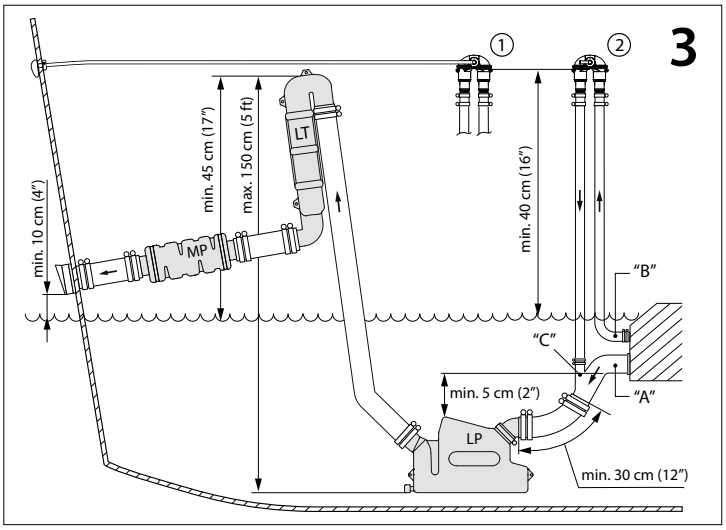
Exhaust systems with water-injection point 'C' 15 cm or more above the waterline

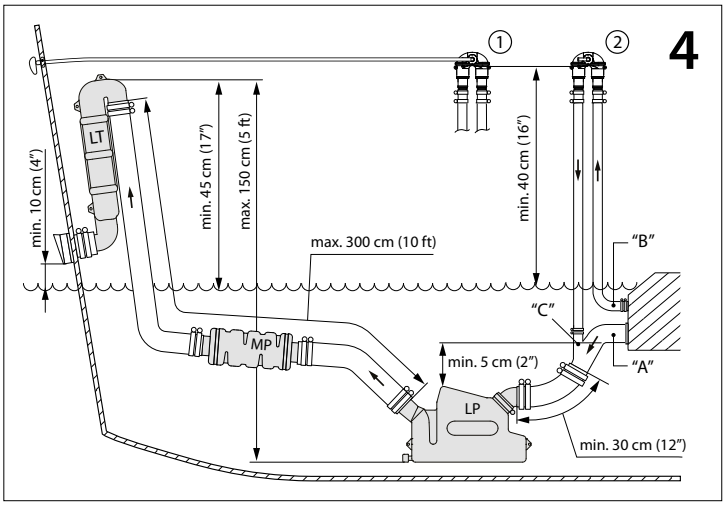




3 & 4:

Exhaust systems with water-injection point 'C' below or less than 15 cm above the waterline





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