

FrostBoss
Wind Machines
your frost fighting machine

Q u i e t

R e l i a b l e

E f f i c i e n t

PREMIUM

2 & 4 blade

FrostBoss. Lowest cost per hectare



New Zealand Designed & Manufactured

www.frostboss.co.nz

PREMIUM 2 & 4 blade



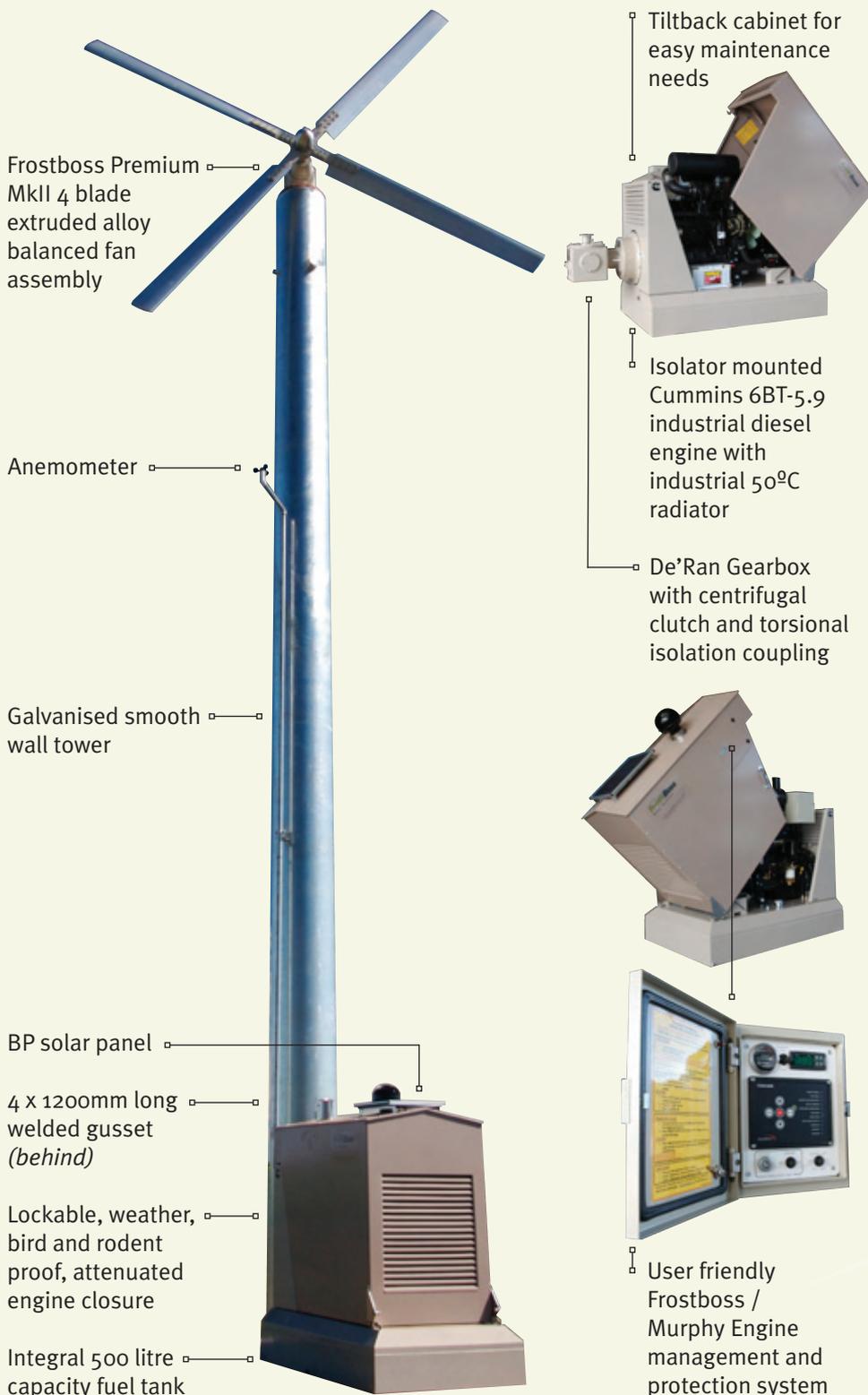
4 BLADE

- ▶ 4 extruded T6 alloy blades
- ▶ CNC machined taper locked hub (*no welding*)
- ▶ Balanced assembly for smooth running
- ▶ 4 blades pitched for maximum airflow at low operating speed (*1700rpm at engine*)



2 BLADE

- ▶ 2 extruded T6 alloy blades
- ▶ CNC machined pivoting hub (*no welding*)
- ▶ Balanced assembly for smooth running
- ▶ 2 blades pitched for maximum airflow at low operating speed (*2100rpm at engine*)



Frostboss Premium MkII 4 blade extruded alloy balanced fan assembly

Anemometer

Galvanised smooth wall tower

BP solar panel

4 x 1200mm long welded gusset (*behind*)

Lockable, weather, bird and rodent proof, attenuated engine closure

Integral 500 litre capacity fuel tank

Tiltback cabinet for easy maintenance needs

Isolator mounted Cummins 6BT-5.9 industrial diesel engine with industrial 50°C radiator

De'Ran Gearbox with centrifugal clutch and torsional isolation coupling

User friendly Frostboss / Murphy Engine management and protection system

FEATURES & BENEFITS OF THE FROSTBOSS PREMIUM MACHINE

- ▶ Cummins Industrial 6BT Diesel – with worldwide support
- ▶ High build quality giving reliability and longevity
- ▶ Heavy gauge, durable powder coated pest and rodent proof, noise attenuated, lockable engine enclosure, with stainless steel fittings
- ▶ Lifting cabinet top for easy access for maintenance and service
- ▶ Rubber isolation mounts for the engine and radiator
- ▶ Heavy duty radiator (*50 c*) for ancillary engine use (*e.g. irrigation or genset*)
- ▶ 500 litre integral fuel tank
- ▶ External engine air intake for maximum power with cold air
- ▶ Centrifugal clutch with torsional isolation coupling
- ▶ Galvanized tower to prevent internal and external rusting
- ▶ Balanced 3 piece driveshaft
- ▶ Intelligent controller to auto start and stop the machine by ambient temperature
- ▶ Anemometer to shut the machine down in winds above 10 KpH
- ▶ Engine protection for over-revs, low oil pressure, high temperature and low fuel level
- ▶ BP solar panel and heavy duty sunsaver voltage regulator, for prolonged battery life
- ▶ Simple operator controls
- ▶ Self contained engine assembly simple removal for ancillary use (*10 mins*)
- ▶ Quiet Blade assemblies optimized for running at low revs
- ▶ Coverage 6ha up to 10 ha on multiple installations (*less machines per hectare... less to purchase, less to maintain and less machines to operate*)
- ▶ Low running costs
- ▶ Two year warranty on all parts

FLEXIBLE OPTIONS TO ACQUIRE

FrostBoss Wind Machines may be acquired as a Capital or Operating Expense by a variety of options to suit the individual growers requirements

Options include:

- ▶ Cash purchase
- ▶ Financed purchased (*e.g. deferred payment*)
- ▶ Lease (*1 upfront payment then regular monthly payments*)
- ▶ Rental (*1 upfront payment the biannual payments based on the hours the machine runs*) Conditions apply

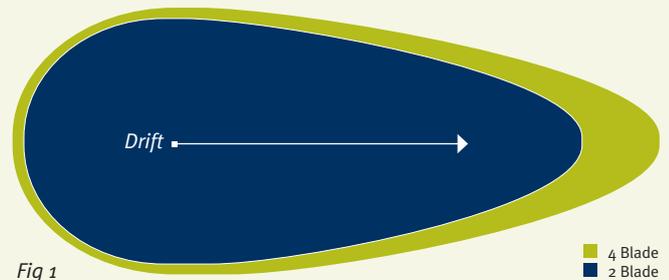
P E R F O R M A N C E

During a radiation frost, Wind Machines are used to draw the warmer inversion layer air, above the orchard and blow it down into the orchard. The wind machine fan needs to blow as much air as it can, to the greatest distance possible. This will give the most economical coverage for the wind machine.

In order to reach the greatest distance, the fan needs to produce a strong, uniform wind. The distance the wind can penetrate into the orchard is proportional to the momentum of the wind. The momentum of the wind or "*wind momentum*" is the product of the wind flow rate (*or the volume of air*), the wind speed and the air density.

The coverage or effectiveness of a wind machine therefore depends not only on the machines ability to move air but also the degree of inversion that exists and the degree of frost that is being protected against.

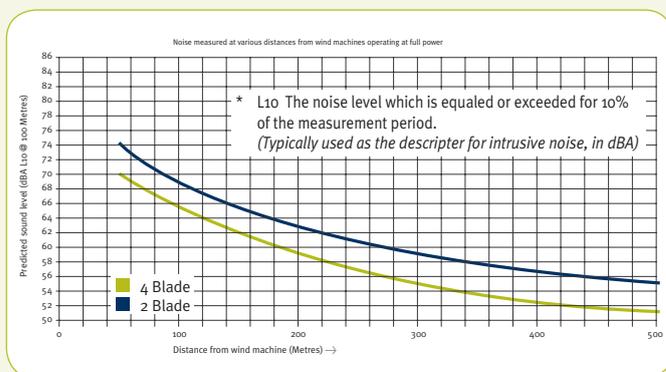
In typical radiation frost conditions of -2 to -3 degree frost with an inversion differential of 2-3 degrees the FrostBoss 4 blade premium will protect approximately 6 ha and the premium 2 blade approximately 5.5 ha. The coverage footprint forms an elliptical shape as shown in Fig 1 depending on the direction and strength of the "wind drift" associated with the frost. In situations of multiple machine placements with large inversions coverage up to 10 ha has been achieved.



N O I S E

Noise resulting from the operation of a wind machine is derived from two primary sources, the fan and the engine.

Noise from the fan results from the tip speed of the blades and the efficiency of the blade as it passes



through the air. By designing a more efficient fan pitched to the maximum torque of the engine, the FrostBoss 2 and 4 blade fan can be run slower producing a significantly lower noise profile than conventional wind machines.

The blade passage frequency of a conventional 2 blade machine produces a noise characterised by an audible "chop" whereas the FrostBoss 4 blade noise can be described as more of a "swish or flutter" and is generally considered to be less annoying. The FrostBoss 2 blade machine is somewhere between the two.

Noise from the engine in the FrostBoss premium wind machine has been minimized by efficient muffling of the exhaust and soft mounting the engine in a noise attenuated cabinet.

I N S T A L L A T I O N & M A I N T E N A N C E

We offer a complete 'turn-key' installation with backup and support service for every purchase. Consultation with the grower regarding placement options, installation and commissioning are all included in the purchase price.

The Wind Machines are guaranteed against defects in materials and workmanship for a period of 2 years from the date of installation when operated at rated capacity under normal service.

An annual servicing and safety check of the Wind Machine will be performed exclusively by FrostBoss Wind Machines Ltd or authorised agent during the warranty period to ensure effectiveness, reliability and longevity of the Wind Machine. A flat fee plus consumables (oil, filters etc) is charged for this service.

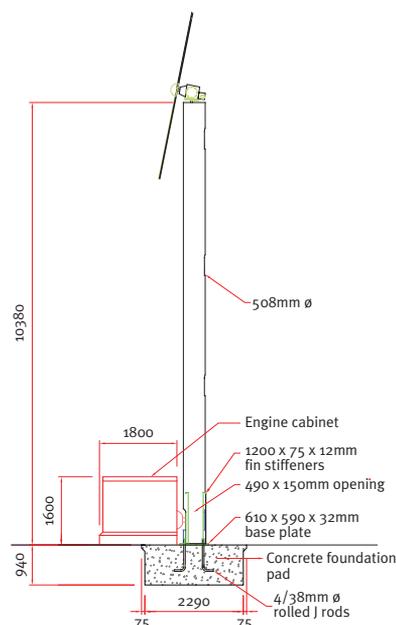
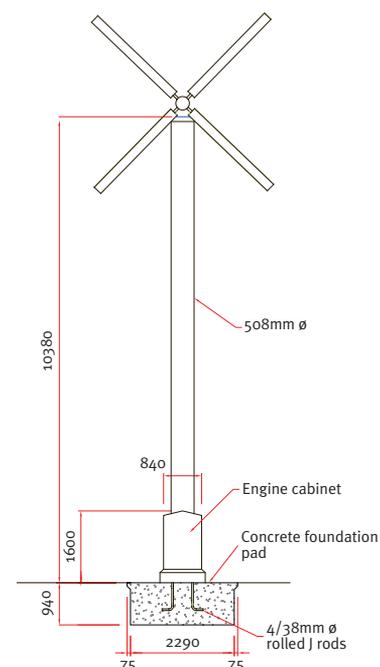
We recommend annual servicing even on low hour machines as lack of use can cause a number of minor issues that can eventually cause unreliable operation.



TECHNICAL SPECIFICATIONS

PREMIUM 2 & 4 BLADE WIND MACHINE

	4 BLADE	2 BLADE
FAN ASSEMBLY:		
Operating speed:	1700 rpm	2100 rpm
Fuel consumption:	22 litres per hour (approx)	24 litres per hours (approx)
Coverage	6ha +	5.5 ha
NOISE LEVELS: L10 dBA at 100 metres dBA at 300 metres	64.3 dBA 54.6 dBA	70 dBA 60 dBA
TOWER: Dimensions:	500mm diameter, 6.4 mm seamless smooth wall pipe with 32mm base plate & 1200mm gussets	
Height:	10.38 mtr	
Finish:	Hot dipped galvanized steel	
ENGINE ENCLOSURE: Type:	Fully enclosed, attenuated, lockable, weather, bird & rodent proof enclosure with in-base fuel tank	
Finish:	Powder coated	
Fuel Capacity:	500 litres approx	
ENGINE: Model:	Cummins 6BT-5.9	
Maximum Rating:	152 bhp @ 2500 rpm	
Type:	6 cylinder in-line, turbo charged, water cooled industrial diesel engine	
DRIVE LINE ASSEMBLY: Drive Shaft:	Balanced 3 piece drive shaft with industrial universal joints.	
Clutch:	Industrial 10" centrifugal clutch & torsional isolation coupling	
GEARBOXES: Top Box:	De'Ran gearbox, angle 96°	
Bottom Box:	De'Ran gearbox, angle 90°	
Lubrication:	Pumped lubrication system	
CONTROL PANEL: Functions:	Engine protection for over rev, high engine temperature, low oil pressure, low fuel level and high wind speed	
LED Indicators:	System on, low oil pressure, high engine temperature, failed start, low fuel, low battery voltage, over-speed and wind.	
Controls:	Optional manual or auto-assist operation Adjustable auto start temperature setting Adjustable temperature differential setting for auto shut down Plus separate emergency key start	
Enclosure:	IP65, weatherproof steel enclosure	
Power Supply:	12 volt battery supported by solar panel with heavy duty voltage regulator	
FOUNDATION DESIGN:	LHT specifications 11136, checked 1 November 2007 <i>Specifications subject to change without notice</i>	



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