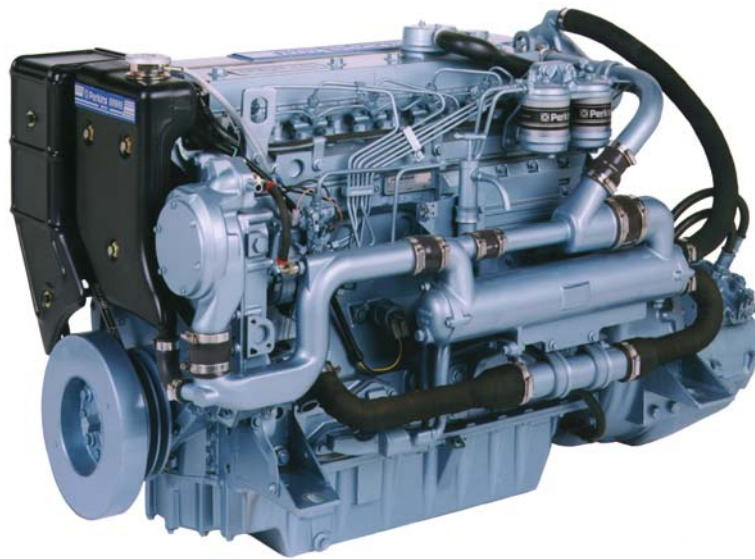




# Customer Information Pack

Perkins Sabre  
M135 / M130C



September 2008



# Perkins Sabre - M135/M130C

## Contents

- q In Response to Market Needs
- q Principle Aims
- q Specification Sheets
- q Installation Data
- q General Arrangement Drawings
- q Power Curve
- q Testimonial

# **Perkins Sabre - M135/M130C**

## **In Response to Market Needs**

- Premium features for reliability and durability
- Designed to supersede Perkins six cylinder Range 4 marine product - being fully interchangeable
- Excellent fuel economy
- Competitive price - not only do we offer a competitive price, but combined with exceptional low running costs the M135/M130C is the best value for money
- Marina friendly - low emissions both noise and vibration, combined with negligible white smoke during start-up and idling
- Unrivalled worldwide parts and service network
- Compact package assisting naval architects in allowing more flexibility in design and in tight gasoline repower opportunities

# Perkins Sabre - M135/M130C

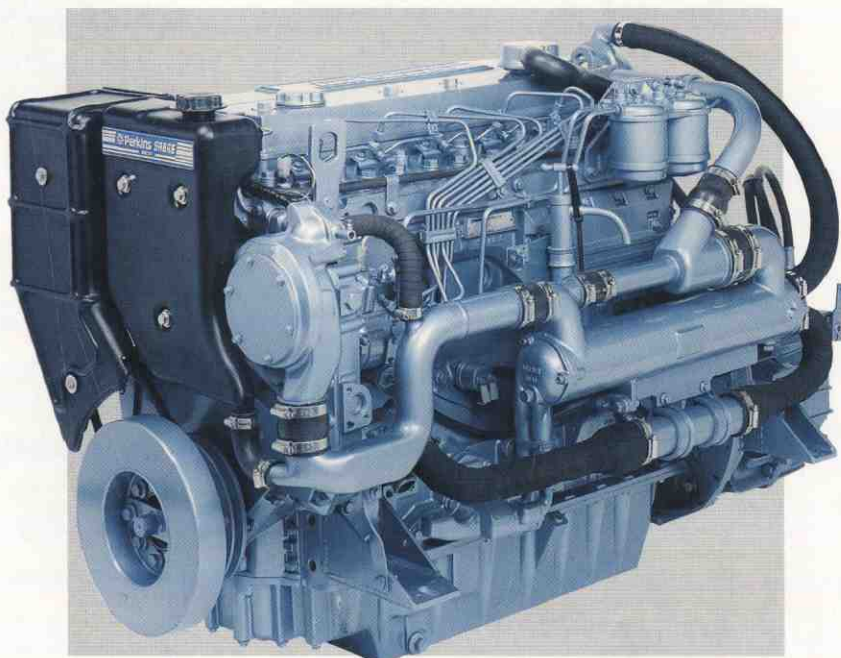
## Principle Aims

- Durability
- Reliability
- Compactness
- Lowest Possible Cost



## Propulsion Unit – Commercial Applications

- **Premium engine features for reliability and durability** – minimises engine down time and service costs
- **Lowest cost of ownership in its class** – it pays to compare running costs
- **Unrivalled worldwide parts and service network** – available wherever you are
- **One of the most compact packages in its class** – offers boat design flexibility with easier new boat and repower installation



### Reliable Power

- High capacity heat exchange equipment with cupro-nickel tube stack ensuring low component operating temperatures for exceptionally reliable and durable performance
- Developed to meet the arduous demands of the marine environment including worldwide cooling and starting requirements
- The M130C is a premium build specification and as such includes design features normally found on larger marine engines
- Perkins high manufacturing standards meet the rigorous quality standards of ISO 9000

### Ease of Installation

- Easy access to all routine servicing points in either single or twin installations
- Engine designed to permit a wide range of operating angles in both conventional shaft or vee-drive installations
- Support available from Sabre Engines Ltd and the Perkins global distributor network to advise on all aspects of power, performance and installation

### Durable Power

A long trouble free life is assured by using the highest quality components throughout the engine these include:

- Deep skirted cylinder block – designed using computer technology to provide rigid crankshaft support with minimum weight
- Dry cylinder liners – silicon carbide honed for high performance and low oil consumption
- Controlled expansion pistons – providing easier cold starting and reduced piston slap – an inserted top ring groove maintains performance and ensures reliable and durable operation in heavy duty applications
- Integral plate oil cooler – contributes to compactness, reduced leak potential and features a by-pass valve for start-up safety
- Gear driven engine water pump – provides water circulation independent of belt drives
- Viton crankshaft oil seals, positive location top cover joints and oil swell joints (they increase in efficiency as they absorb oil) bring real meaning to the 'dry engine' concept

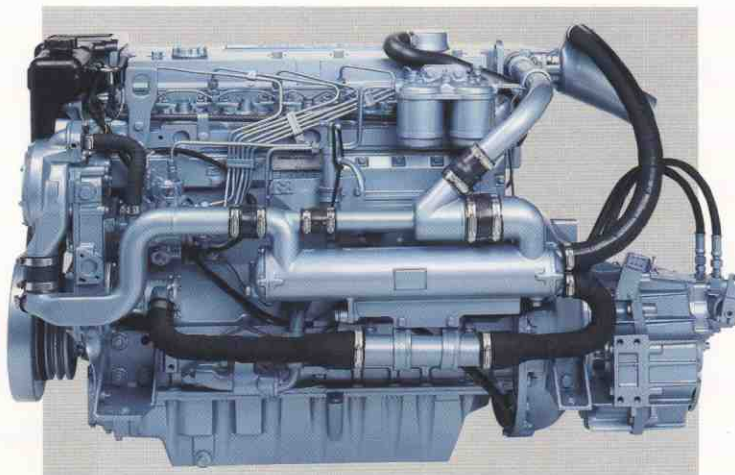
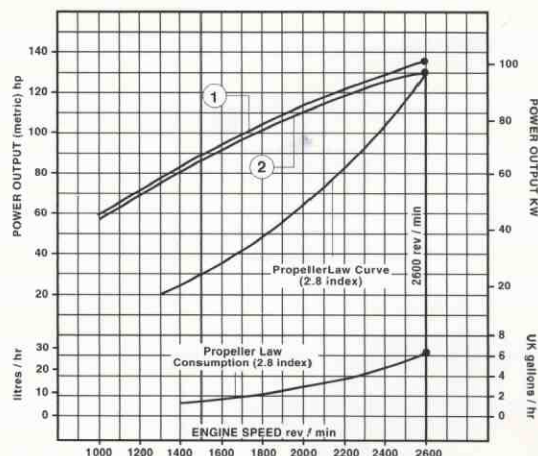
### Low Cost of Ownership

- Operator costs are a vital consideration when deciding which engine to purchase. This is a particularly important factor in commercial craft where operating hours can be significant
- The M130C offers long service intervals, excellent fuel economy and consistently lower parts prices. This makes the M130C a most cost effective choice providing significant owner savings

### Worldwide and Local Service

- Perkins unrivalled service network with over 4,000 distributors and dealers provides a fast, effective parts and after market support service essential to any commercial operator
- A genuine top quality warranty package offering a twelve month cover as standard (plus second year cover of major components)
- Extended service intervals including a 400 hour or once a season oil change period
- Specialist marine operator training packages are available





Propellers should be matched to achieve rated engine speed under fully laden boat conditions. Engine as delivered from factory will be set to produce gross (flywheel) power output within manufacturing tolerance and run-in allowance

## Commercial Craft Rating (Gross output rating standard BS AU141a : 1974 conditions)

● Gross (flywheel) power output of engine without gearbox – Curve 1	99 kW (135 hp)
● Nett shaft output with Newage PRM 500D gearbox – Curve 2	96 kW (130 hp)
● Rated engine speed	2600 rev/min

## Standard Engine Specification

- Fresh water heat exchanger cooled engine with gear driven self priming raw water and fresh water pumps or keel cooling adaption
- Fresh water cooled exhaust manifold
- Air intake with re-usable elements
- High inclination engine sump, top access dipstick and engine mounted sump drain pump
- Twin spin-on element lubricating oil filter
- Integral plate type engine lubricating oil cooler
- Closed breather system
- High mounted twin element fuel filter
- Thermostart cold start aid
- Manual control adaption parts
- Electric stop solenoid
- Alarm switches and warning siren

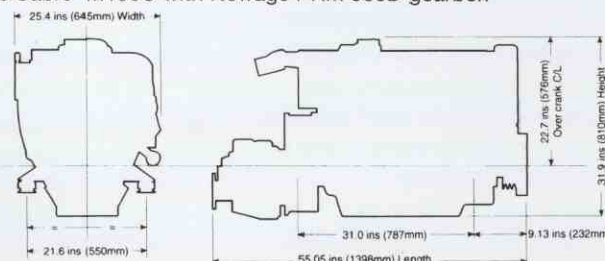
## Optional Equipment

- **Backends** – suitable for a range of transmissions
- **Marine Transmissions (standard)**
  - Hurth HSW 450A
  - Newage PRM 500D
- **Electrical** – 12 and 24 volt insulated marine electrics
- **Exhaust Outlets**
  - Water injected outlet including high rise option
  - Dry outlets with flexible expansion bellows
- **Instrumentation** – single and dual station instrumentation including audible/visual alarms and gauges complete with senders, switches, loom and varying lengths of interconnecting cables
- **Power Take Off** – crankshaft PTO extension shaft with pulley drive option
- **Mountings**
  - Solid mounting brackets
  - Flexible engine mountings with alignment shims
- **Miscellaneous**
  - Solid and flexible output couplings
  - Tool kit
  - On board parts kit
  - Electro-magnetic bilge pumps (engine mounted)
  - Calorifier connections
  - Fuel pre-filter with water alarm
  - Flexible fuel feed and return pipes

## General Data

<b>Bore</b>	100mm (3.937 in)
<b>Stroke</b>	127mm (5.00 in)
<b>Cubic Capacity</b>	6.00 litres (365.0 in <sup>3</sup> )
<b>Cycle</b>	4 stroke
<b>No. of Cylinders</b>	6 in-line
<b>Aspiration</b>	Natural
<b>Combustion System</b>	Quadram direct injection
<b>Engine Rotation</b>	Anti-clockwise viewed from rear
<b>Fuel Pump</b>	Stanadyne rotary with electric stop solenoid
<b>Engine Operating Angles</b>	Maximum continuous operating angles: 20° engine front up, 8° engine front down (option kit) 30° sideways
<b>Power Take Off</b>	Available from front end drive (for drive limitations refer to Sabre Engines Ltd)
<b>Weight (Wet)</b>	595 kg (1312 lb) engine only 624 kg (1376 lb) with Hurth HSW 450A gearbox 672 kg (1481 lb) with Newage PRM 500D gearbox
<b>Application</b>	The Perkins Sabre M130C is approved for use in commercial applications with annual usage not exceeding 3,000 hours

Perkins Sabre M130C with Newage PRM 500D gearbox



Distributed by:

For more information regarding the product please contact:  
 Wimborne Marine Power Centre  
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 Fax: +44 (0) 1202 851700  
 Email: Wimborne\_MPC\_post@cat.com  
 www.perkins-sabre.com



# Perkins

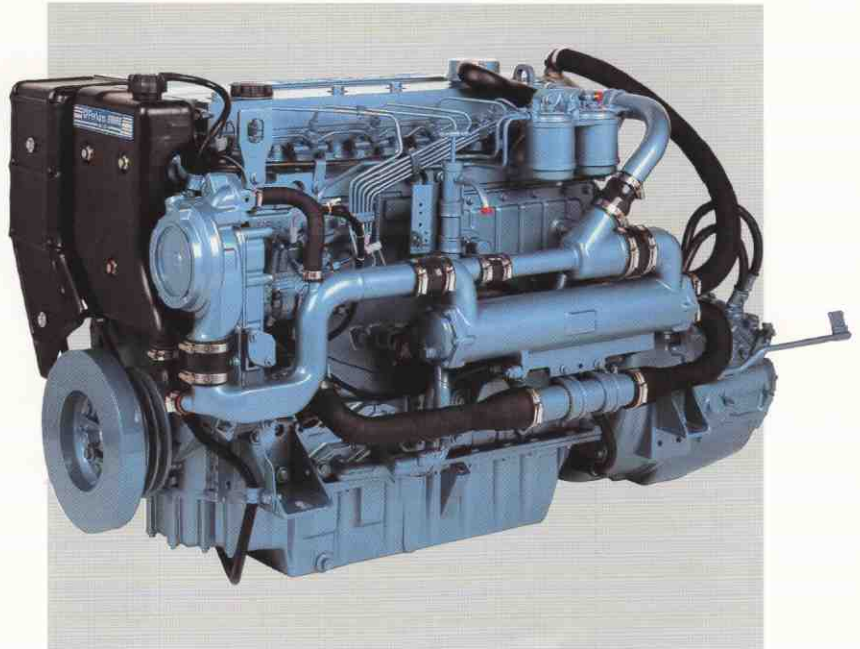
## M135

99 kW/135 hp



### Propulsion Unit – Pleasure Applications

- **Premium engine features for reliability** – minimises engine down time and service costs
- **Environmentally friendly** – developed with current and proposed emissions legislation in mind. Helping to keep the world environmentally safe
- **Unrivalled worldwide parts and service network** – available wherever you are
- **One of the most compact packages in its class** – offers boat design flexibility with easier new boat and repower installation



#### Reliable Power

- High capacity heat exchange equipment with cupro-nickel tube stack ensuring low component operating temperatures for exceptionally reliable and durable performance
- Leak free operation is ensured by an integral plate oil cooler and viton crankshaft seals giving protection in the toughest conditions
- Gear driven engine and raw water pumps with high quality silicone hoses for the ultimate in reliable cooling
- Developed to meet the arduous demands of the marine environment including worldwide cooling and starting requirements

#### Quiet Clean Power

- Operator and environmentally friendly with low noise, rapid startability and low emissions. Achieved with the new 'QUADRAM' combustion system and fully closed breather system

#### Cost of Ownership

- Competitive engine and parts pricing, extended service intervals and exceptionally low fuel consumption make the M135 a cost effective choice with significant owner savings over alternative engines

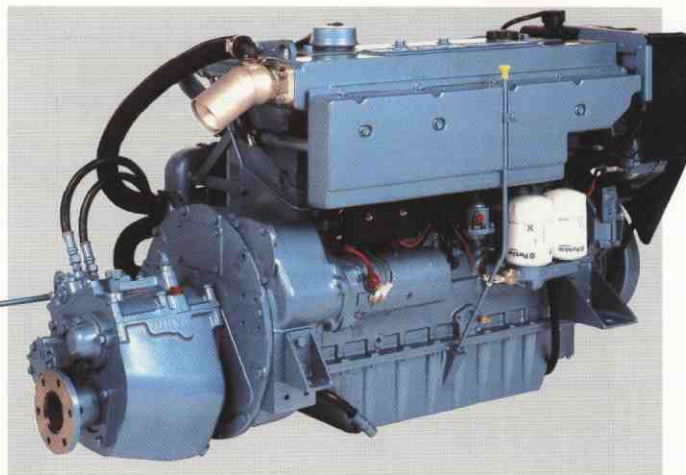
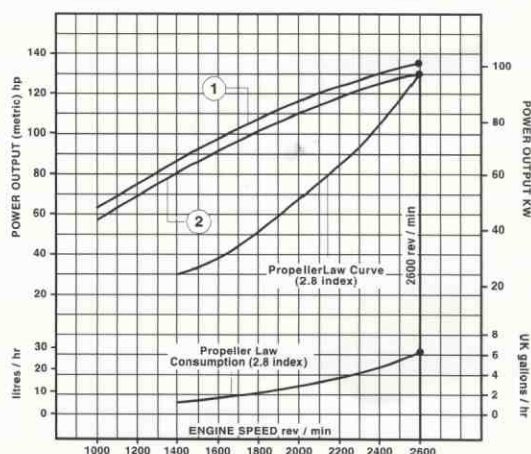
#### Ease of Installation

- Easy access to all routine servicing points in either single or twin installations

- Engine developed to permit a wide range of operating angles in both conventional shaft or vee-drive installations
- Support and advice on all aspects of power, performance and installation available from Sabre Application Engineers and global distributor network

#### Service

- Perkins unrivalled service network with over 4,000 distributors and dealers provides a fast and effective parts and after market support service
- A genuine top quality warranty package offering a full two year cover for engines operating less than 250 hours per year
- Extended service intervals including a 400 hour or once a season oil change period



Propellers should be matched to achieve rated engine speed under fully laden boat conditions. Engine as delivered from factory will be set to produce gross (flywheel) power output within manufacturing tolerances and run-in allowance

## General Pleasure Craft Rating (Gross output rating standards BA AU141a : 1974 conditions)

● Gross (flywheel) power output without gearbox – Curve 1	99 kW (135 hp)
● Nett shaft power output with Hurth HSW 450A gearbox – Curve 2	96 kW (130 hp)
● Rated engine speed	2600 rev/min

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- Fresh water heat exchanger cooled engine with gear driven self priming raw water and fresh water pumps or keel cooling adaption
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- Integral plate type engine lubricating oil cooler
- Twin spin-on element lubricating oil filter
- Closed breather system
- High mounted twin element fuel filter
- Thermostart cold start aid
- Manual control adaption parts
- Electric stop solenoid
- Alarm switches and warning siren

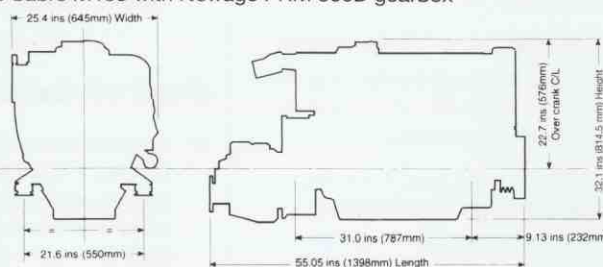
## Optional Equipment

- **Backends** – suitable for a range of transmissions
- **Marine Transmissions (standard)**
  - Hurth HSW 450A
  - Newage PRM 500D
- **Electrical** – 12 and 24 volt insulated marine electrics
- **Exhaust Outlets**
  - Water injected outlet including high rise option
  - Dry outlets with flexible expansion bellows
- **Instrumentation** – single and dual station instrumentation including audible/visual alarms and gauges complete with senders, switches, loom and varying lengths of interconnecting cables
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- **Mountings**
  - Engine mounting brackets
  - Flexible engine mountings with alignment shims
- **Miscellaneous**
  - Solid or flexible output couplings
  - Tool kit
  - On board parts kit
  - Electro-magnetic bilge pumps (engine mounted)
  - Calorifier connections
  - Fuel pre-filter with water alarm
  - Flexible fuel feed and return pipes

## General Data

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<b>Stroke</b>	127mm (5.00 in)
<b>Cubic Capacity</b>	6.00 litres (365.0 in <sup>3</sup> )
<b>Cycle</b>	4 stroke
<b>No. of Cylinders</b>	6 in-line
<b>Aspiration</b>	Natural
<b>Combustion System</b>	Quadram direct injection
<b>Engine Rotation</b>	Anti-clockwise viewed from rear
<b>Fuel Pump</b>	Stanadyne rotary with electric stop solenoid
<b>Engine Operating Angles</b>	Maximum continuous operating angles: 20° engine front up, 8° engine front down (option kit) 30° sideways
<b>Power Take Off</b>	Available from front end drive (for drive limitations refer to Sabre Engines Ltd)
<b>Weight (Wet)</b>	595 kg (1312 lb) engine only 620 kg (1367 lb) with Hurth HSW 450A gearbox 672 kg (1481 lb) with Newage PRM 500D gearbox
<b>Application</b>	The Perkins Sabre M135 is approved for use in non-revenue earning pleasure craft applications

Perkins Sabre M135 with Newage PRM 500D gearbox



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For more information regarding the product please contact:

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Email: Wimborne\_MPC\_post@cat.com  
www.perkins-sabre.com



# Installation Data - M135 / M130C



## Basic Technical Data

Rated power	130 PS (96 kW)
Rated engine speed	2600 rev/min
Number of cylinders	6
Cylinder arrangement	In-line
Cycle	4 stroke
Induction system	Naturally aspirated
Bore	100 mm (3.937")
Stroke	127 mm (5.00")
Compression ratio	16.5:1
Cubic capacity	6.00 litres (365.0 in <sup>3</sup> )
Valves per cylinder	2
Direction of rotation	Anti-clockwise viewed on flywheel
Firing order	1, 5, 3, 6, 2, 4
Total weight (wet)	595 kg (1312 lb) engine only including starter and alternator

## Cooling System

Recommended coolant	Sabre Extended Life Coolant 50/50 Mix
Fresh water flow	213 litre/min at 2600 rev/min
Coolant pump speed and method of drive	Gear 1:1
System capacity	25.3 litres
Pressure cap setting	48 kPa (7 psi)
Protection switch setting	96°C
Sea water pump type	Jabsco gear driven model 25.4mm (1 ") full cam
Sea water suggested inlet hose diameter	32 m (1.25")
Sea cock	Full flow 25.4 mm (1.00")
Strainer	A raw water strainer must be included in the suction side of the circuit
Maximum sea water temperature	38°C (100°F)
Sea water flow	107 litres/min (23.5 UK galls/min, 28.2 US galls/min)

## Fuel System

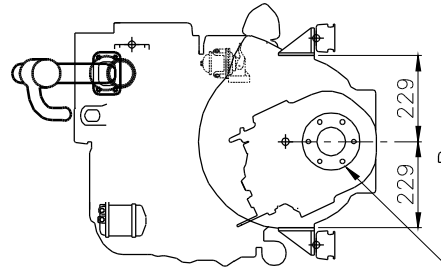
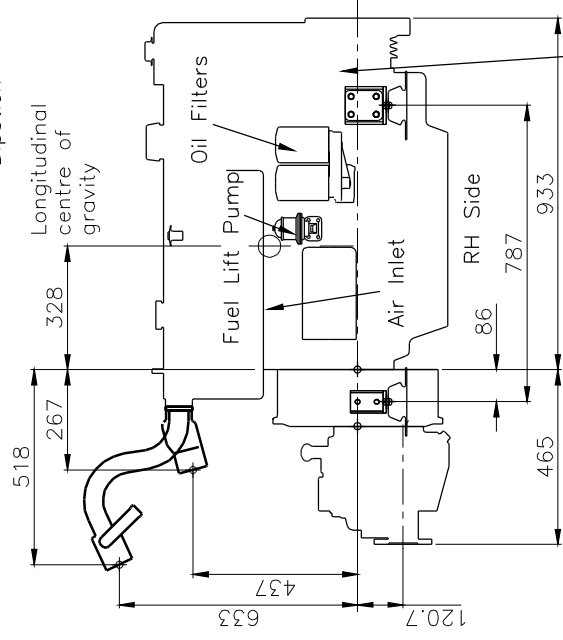
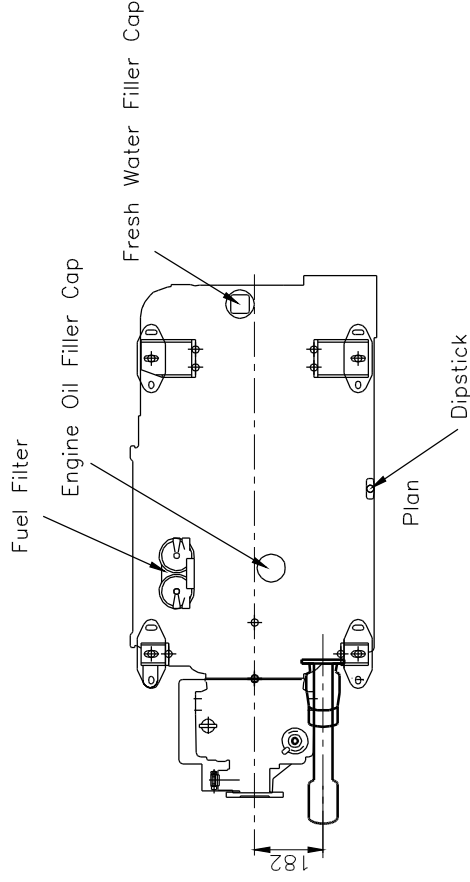
Recommended fuel specifications	BS2869 Class A2 ASTM D 975 Number 2D
Fuel injection pump	Stanadyne with electric stop
Fuel lift pump	AC Delco type LU
Fuel feed pressure (static)	35/55 kPa (5/8 psi)
Governor type	Mechanical
Pipe sizes:	
• Supply - Outside diameter	7.9 mm (0.315")
• Supply - Bore	6.53 mm (0.257")
• Return - Outside diameter	6.3 mm (0.25")
• Return - Bore	4.93 mm (0.194")
Maximum lift pump lift	1.8 m (6 ft) to bottom of tank suction pipe
Maximum fuel lift pump depression at inlet	127 mm (5") Hg
Fuel lift pump flow rate	14.37 ml/sec
Fuel consumption at full power	28 l/hr (6.2 UK galls/hr, 7.4 US gals/min)

<b>Air Intake</b>	
Combustion airflow	6.5 m <sup>3</sup> /min (231 ft <sup>3</sup> /min)
Maximum engine compartment air temperature	60°C
Maximum air temperature at engine inlet	52°C
Ventilation - maximum engine room depression	125 mm WG (5"WG)
Suggested ventilation airflow including combustion air	13 m <sup>3</sup> /min (520 ft <sup>3</sup> /min)
Minimum cross section of air duct (per engine)	320 cm <sup>2</sup> (50 m <sup>2</sup> )
<b>Exhaust</b>	
Exhaust gas flow	20 m <sup>3</sup> /min (706 ft <sup>3</sup> /min)
Maximum restriction measured within (305 mm) 12" of turbocharger outlet	10.1 kPa (3.0 Hg)
Recommended pipe bore (wet exhaust)	76 mm (3.0")
Recommended pipe bore (dry)	63.5 mm (2.5")
Minimum rise from sea water level to exhaust outlet centreline	203 mm (8.0")
<b>Lubricating System</b>	
Recommended lubricating oil	AP1 CD/SE CCMC D4
Sump capacity maximum	15 litres
Maximum installation angle plus planning angle for continuous operation	17° engine front up + 3° rise 5° nose down + 3° rise 30° heel
Oil pressure in operating speed range	280 kN/m <sup>2</sup> (40 psi)
Low oil pressure switch setting	83 kN/m <sup>2</sup> (12 psi)
<b>Electrical System</b>	
Alternator	Prestolite AS128e 55A (24V) or 90A (12V)
Starter type	Prestolite S115
Number of teeth in flywheel	126
Number of teeth on starter	10
<b>Cold Start Limits</b>	
Minimum cold start temperature (with aid)	-15°C (5°F)
Batteries	2 off - 315 Amps to BS3911, or 2 off - 535 Amps to SAE J537

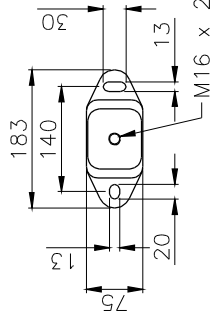
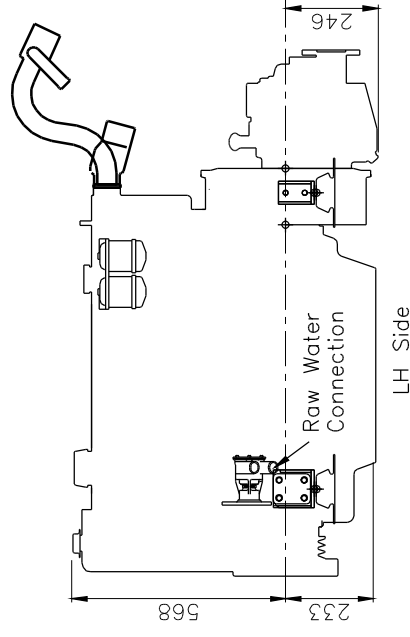
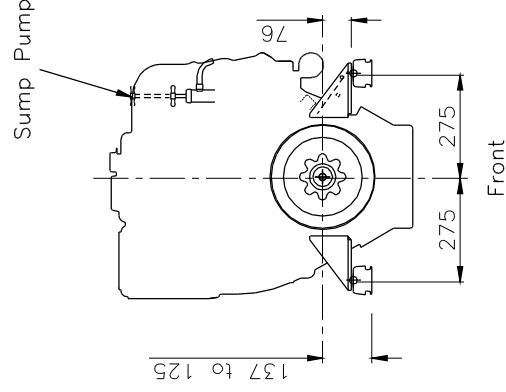
For general marine installation practice, refer to Perkins Marine Installation Manual.

# Perkins Sabre M130C and M135 Marine Diesel Engine shown with the PRM 500D gearbox (Ratios up to and including 2:1) (550mm transverse mounting centres)

SABRE ENGINES LTD  
Wimborne, Dorset, England.  
Tel. +44(0)1202 893720  
Fax. +44(0)1202 851700  
E-mail. Post@Sabre-engines.co.uk  
www.Perkins-Sabre.com



Gearbox output flange  
152.4 OD. 6 holes  $\phi$ 13.0  
equispaced on a 120.6 PCD  
Female location  $\phi$ 76.175/ $\phi$ 76.225



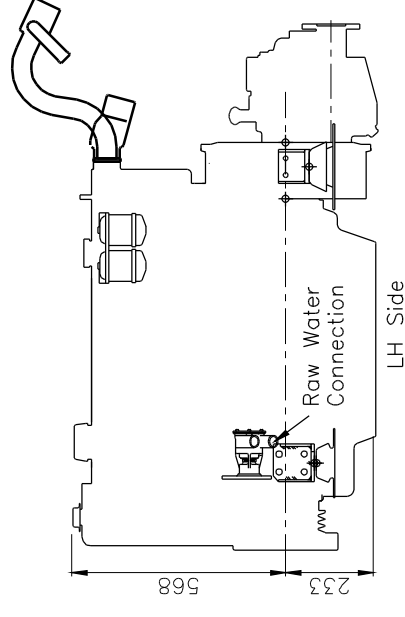
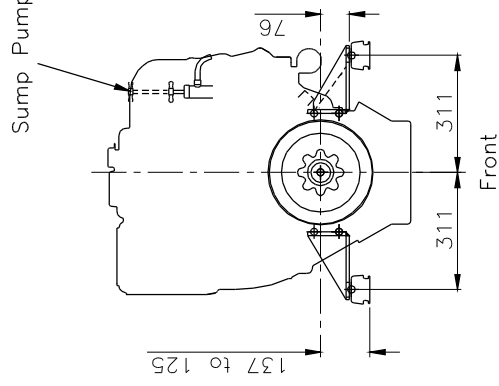
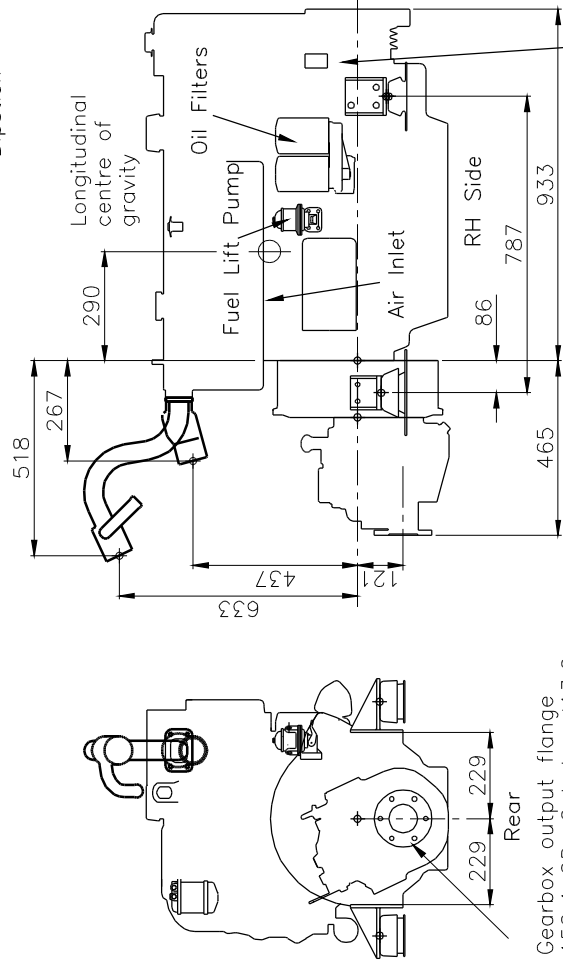
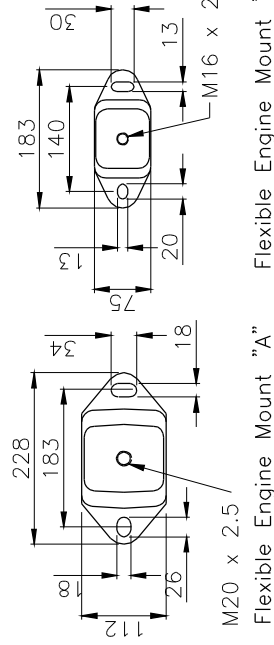
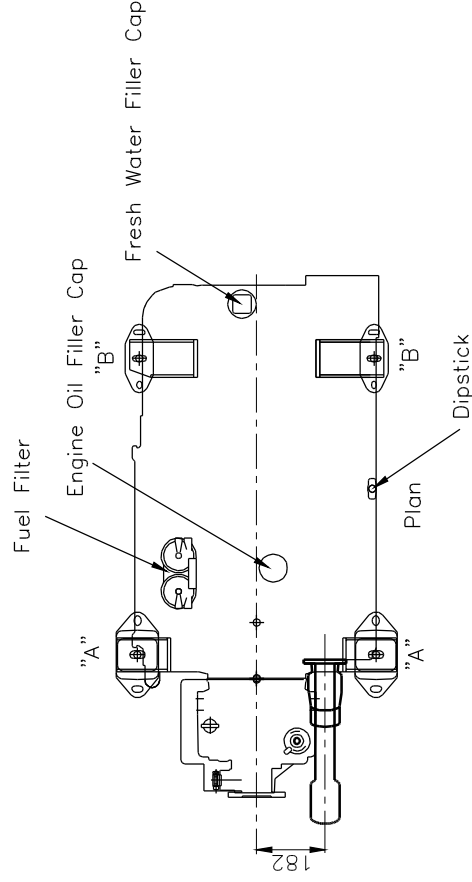
Flexible Engine Mount

FLEXIBLE ENGINE MOUNT  
Weights on each mount  
Front 160kg  
Rear 176kg  
Total Wet Weight 672kg



Perkins Sabre M130C and M135 Marine Diesel Engine  
shown with the PRM500D gearbox (Ratios above 2:1)  
(622mm transverse mounting centres)

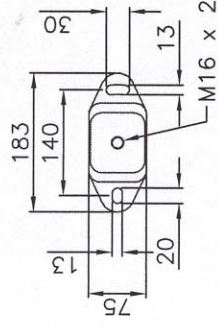
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Gearbox output flange  
152.4 OD, 6 holes  $\phi 13.0$   
equispaced on a 120.6 PCD  
Female location  $\phi 76.175/\phi 76.225$

Electrical Connection  
to Instrument Panel

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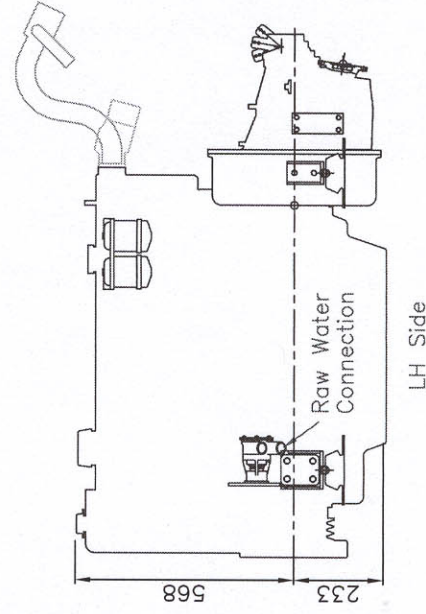
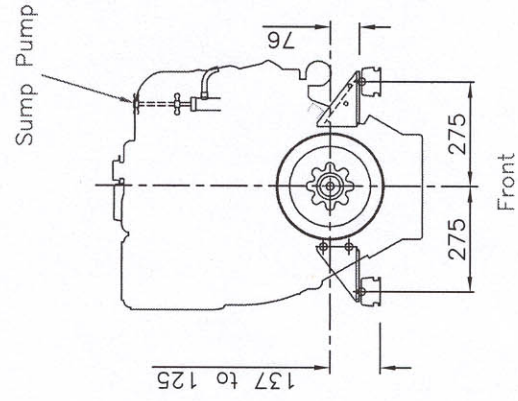


FLEXIBLE ENGINE MOUNT

Front kg

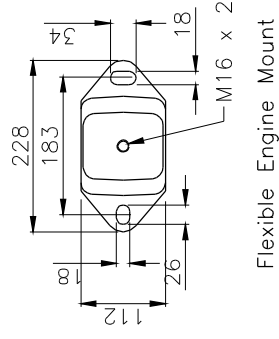
Rear kg

Total Wet Weight kg



### Electrical Connection to Instrument Panel

**SABRE ENGINES LTD**  
Wimborne, Dorset, England.  
Tel. +44(0)1202 893720  
Fax. +44(0)1202 851700  
E-mail. [Post@Sabre-engines.co.uk](mailto:Post@Sabre-engines.co.uk)  
[www.Perkins-Sabre.com](http://www.Perkins-Sabre.com)







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Proprietary information of  
Perkins Group Ltd.

ENGINE MODEL: PERKINS SABRE  
M135 AND M130C

CURVE: S5447

ISSUE: 3

DATE: 21 MAR'95

Prefix indicates:

S Special purpose

X Engineering release

A Production

O OIM net

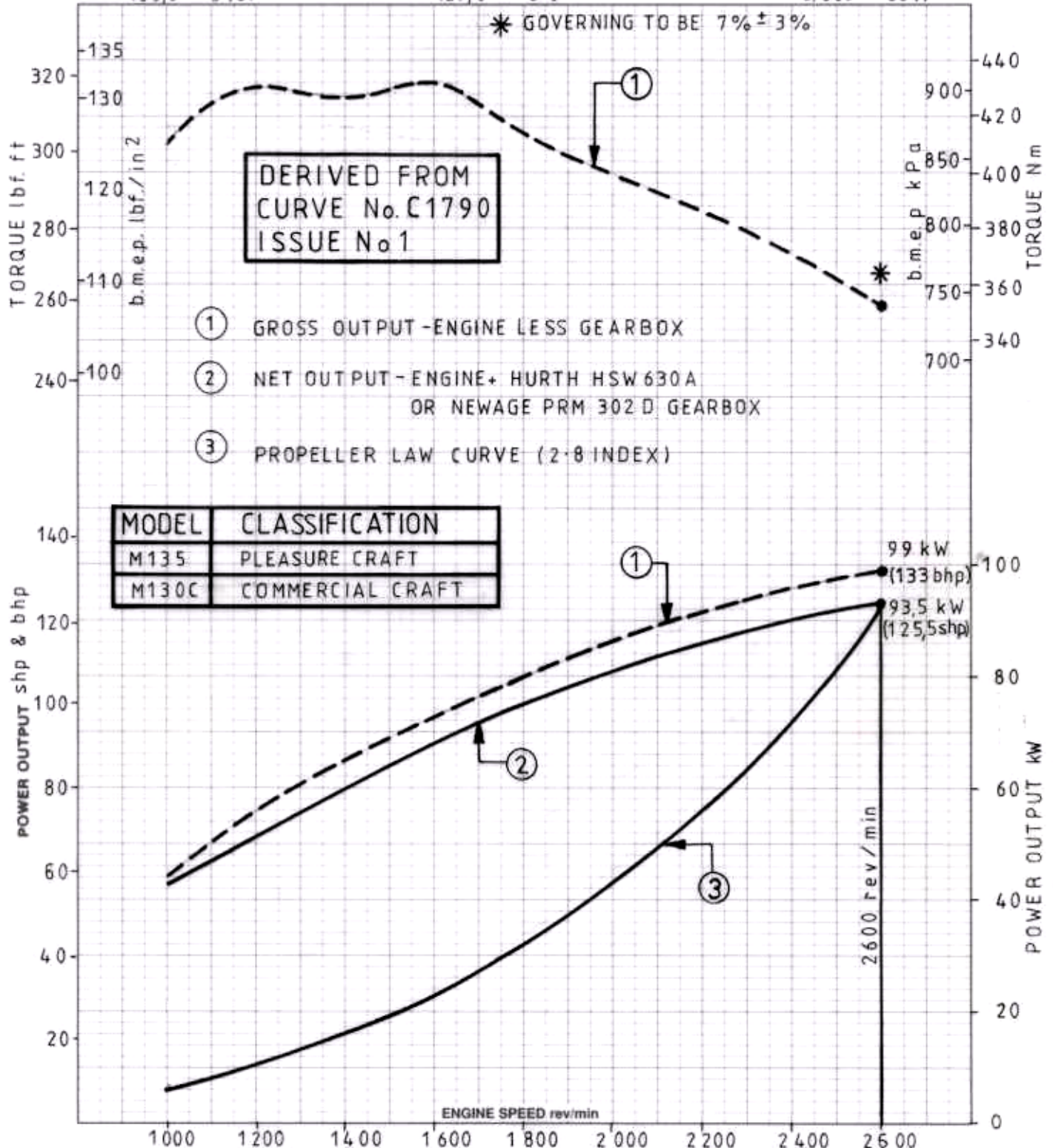
T Target

TYPE: ~~Supercharged~~/Naturally Aspirated  
BORE: 100,0 mm 3.937 in

CONFIGURATION: VERTICAL IN LINE  
STROKE: 127,0 mm 5.0 in

No. OF CYLINDERS: 6  
CUBIC CAPACITY: 5,985 litre 364.9 in<sup>3</sup>

\* GOVERNING TO BE  $7\% \pm 3\%$



Item	
Rating standard	B.S.AU.141a:1971
Total barometric pressure	101,3 kPa
Vapour pressure or relative humidity	—
Air inlet temperature	20 °C
Nominal tolerance on power output	+3%-5%
Maximum inlet restriction	3,0 kPa
Maximum exhaust back pressure	10,2 kPa

Auxiliaries fitted to engine  
ALTERNATOR - OFF LOAD.

Exhaust quality ~~target~~ achievement  
AT SABRE MARINE.  
SMOKE -  
MAX. 3.5 BOSCH  
100% LOAD AT 2600 rev/min

Raised by

*Shillock*

Date

4/10/93

Authorised by

*Adam*

Date

7.10.93

ISSUE No 3 DCP94C079  
ISSUE No 2 DCP94P012





# *Power Solutions*



## **'Shelley Taylor-Smith'**

### **Application**

- A repowered 148-seater ferry, used to take commuters across the Swan River in Perth, Western Australia.
- The ferry is operated on behalf of Transperth, Perth's integrated public bus, ferry and rail service.

### **Boat details**

Shelley Taylor-Smith was built in 1997 by SBF Shipbuilders at its Fremantle, Western Australia boatyard, and has been repowered with a pair of M130C engines coupled to Twin Disc MG5050 gearboxes. The new Perkins Sabre engines replaced a pair of older M130C engines that had clocked-up over 43,000 hours of service, and the decision to repower was taken to extend the life of the ferry.

- Length overall: ..... 21.7 metres
- Beam: ..... 5.5 metres
- Top speed: ..... 14 knots

### **Customer view**

Colin Brown, Captain Cook Cruises' Operations Manager.

"The new engines we have fitted to Shelley Taylor-Smith have the standard Perkins Sabre keel-cooled option. They deliver their maximum power output a very low-stressed 2,600rpm that, I am sure, accounts for how long the previous M130C engines lasted. It certainly was a major factor in our easily-reached decision to replace the old M130C engines with the same model. During their 43,000 hours of service, the original engines required nothing more than routine servicing."

"The ferry usually completes the 3.6km return trip between the Barrack Street jetty in Perth and the Mends Street jetty in South Perth at around eight knots. Depending on the time of year, it makes the Swan River crossing between 30 and 40 times a day."

### ***Total Marine Technology in Action***

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