

ROCKLEA TRUCK ELECTRICAL

Sleeper Air NXT

Owner's Manual

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Rocklea Truck Electrical

Rocklea Truck Electrical is Brisbane's premier truck lighting and custom accessory manufacturer and installer, providing premium quality lighting, electrical and custom accessories to truck owners & operators. Based in Oxley, on the south side of Brisbane, RTE can design and fit accessories which will complement the look of your vehicle with our high quality creative design.

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Description

Sleeper Air is a diesel powered system to provide air conditioning and battery charging for long haul sleeper cab applications. The system is designed to be extremely easy to operate, economic to run and provide trouble free performance. There are four major components to the system:

- An engine unit containing the diesel engine, air conditioning compressor and battery charging alternator is attached to the truck chassis – this is the part that powers the system.
- An evaporator unit contains a variable speed fan and evaporator that is mounted inside the cabin – this is the part that keeps the cabin cool.
- A condenser unit has an electric fan and air conditioning condenser mounted outside the truck cabin – this is where the cabin heat goes.
- An Engine Control Unit (ECU) provides automatic control and safety supervision of the system.

Features and Specifications

FEATURES	SPECIFICATION
<ul style="list-style-type: none"> • Manual or automatic climate control operation • One press start and stop • Service interval and engine hour counter • Fully protected shutdown on low oil pressure and high engine temperature • Compressor cut-out on high refrigerant pressure • Diagnostic codes on any error condition • Battery maintenance when truck parked up • Electrical system back up in the case of truck alternator failure • Lightweight and compact in size • Alloy enclosure with sound insulation • Fuel from existing truck tanks 	<ul style="list-style-type: none"> • 310 CFM 18000 BTU cooling capacity • Kohler single cylinder air cooled diesel engine KD350S with full flow oil filter • Sanden SD7H13 Compressor • Remote mounted condenser with electric fan • Nippon Denso 12V/110A (24V/70A) alternator • Empirbus NXT Control System ECU • 0.7L per hour fuel consumption • 250 hour service interval • R-134a 550 +/- 50 gram refrigerant • 2 x 13A0990 belts • Length: 650mm • Width: 360mm • Height: 510mm • Weight: 130kg



Operation

A keypad located in the cabin area is used to operate the system. The bottom four keys control the operation mode while the top four keys are used to make adjustments.

There are four basic modes of operation – Off Mode, Charge Mode, Climate Air Conditioning Mode and Manual Air Conditioning mode. Each mode is represented by a key on the keypad. The system can switch from any operating mode to another by pressing the appropriate key.

Battery Charging Mode

The CHARGE key (shown as a lightning bolt) places the unit in battery charging mode. The engine will automatically start if the voltage is below 12.4 volts for longer than 30 seconds. The engine will stop after a 4 hour running period. When stopped for a minimum rest time of 10 minutes, the engine can restart if the battery voltage again falls below 12.4 volts. The air conditioning is not running in this mode.

- 1 press of the CHARGE key will activate this mode however the engine will only start if the battery voltage is below 12.4 volts. The status LED will indicate that the mode is activated as a continuous light with a short blink off.
- A press and hold of the CHARGE key for 3 seconds will immediately start the engine irrespective of battery voltage.
- Pressing the stop button at any time will stop the charge cycle (status LED will be off).
- When switching directly from either climate or manual air conditioning mode, the engine will first stop and then resume running when the battery voltage is less than 12.4 volts.
- In battery charge mode the controller LED display shows the battery voltage.

When in the CHARGE mode, the fan can be set to ventilate by pressing the fan UP or DOWN key.

Climate Control Air Conditioning Mode

Pressing the air conditioning CLIMATE key (shown as “C”) will start the engine (if not already running) and place the system in Climate Control air conditioning mode. The system will keep the evaporator inlet at a constant temperature as set by the TEMP up/down keys or by the temperature knob. The fan speed will be automatically adjusted to the lowest setting that will maintain the evaporator inlet temperature.

- The compressor clutch is turned on and off to maintain the evaporator outlet temperature between 6 and 8 °C.
- The fan speed automatically adjusts to maintain a cabin temperature as set by the temperature adjustment (between 18 and 26 °C). As the cabin temperature reaches the set temperature, the fan speed will reduce to the lowest setting. At the lowest fan speed, temperature is regulated by turning the compressor on and off.
- The system will remember the last climate control cabin temperature setting.
- In climate mode, the ECU LED display shows evaporator air input temperature.



Manual Air Conditioning Mode

Pressing the air conditioning MANUAL key will start the engine (if not already running) and place the system in manual air conditioning mode. The air outlet temperature and fan speed is manually controlled by their respective up/down keys or knob..

- The evaporator temperature is set by the temperature up/down adjustment in 1 °C steps between 6 and 16 °C. The compressor clutch is turned on and off to maintain the evaporator temperature within a 2 °C differential.
- The fan speed can be manually adjusted between lowest and highest.
- In manual mode the ECU LED display shows evaporator air outlet temperature.

Off Mode

Pressing the OFF key will terminate any of the active modes. The ECU LED display will indicate total engine run hours. Successively pressing the OFF key will cycle the ECU display to indicate the following data.

- Hours since last service (press and hold FAN DOWN key for 5 seconds to reset)
- Total engine run hours / 10
- Compressor run hours / 10
- Software version number

The fan can be set to ventilate by pressing the fan UP or DOWN key.

Status LED

An LED indicates the current mode of operation and provides an error indication.

- Auto Battery Charging - solid with short blink off
- Climate Control Air Conditioning - Solid LED
- Manual Air Conditioning - Solid LED
- Error – Fast blink on and off – error number shown on ECU
- Service Due – short blink when system is OFF
- Service Overdue – .6 second blink on and off when system is OFF

Engine Starting

For all modes there is an engine start sequence. Before cranking, the unit will look for the oil pressure to indicate no oil pressure. It will crank for 1.2 seconds and then wait to see if the oil pressure is up. If the oil pressure is OK, the engine will go into run mode. If not, the sequence will repeat 4 times with a 10 second delay between attempts. If after 5 attempts the engine is still not running then a crank error condition exists. Pressing the stop button will acknowledge the error from which point another attempt can be made.

Start Error Override

For a pre-crank oil pressure error, the engine start sequence will abort and an E03 error will show on the ECU. After ascertaining that the error is an oil pressure switch failure and clearing the error by pressing the OFF key, it is possible to override the start sequence by holding in the CHARGE key until the engine cranks. The engine should start.

If the pre-crank error occurs during an air conditioning start up cycle, press the CLIMATE or MANUAL key after starting the engine using the CHARGE key as described above.

Service Warning

The status LED will flash briefly while in OFF mode and the ECU display will flash the service hours when a service is due. When the service is overdue by more than 25 hours the engine cannot be started until it is serviced and the service interval indicator reset.

Display Modes

The ECU has a 3 digit 7 segment display that is used to display system parameters and error codes. The display will show associated system parameters in context with the current operation mode. When in each mode, the displayed parameters can be scrolled by pressing the associated mode key. The data displayed is in the order shown below.

MODE	DISPLAY	EXAMPLE	NOTE
OFF	Service Hours	128	This is the time since last service. Display will flash if service hours is greater than 250.
	Total Engine Hours	78.6	The total engine hours (x10) since the engine was new.
	Compressor Hours	5.65	The total compressor hours (x10) since the compressor was new.
	Software Revision	101	The installed software revision.
CHARGE	Battery Volts	13.5	Measures the current battery volts.
CLIMATE	Cabin Temperature	24.4	Measures the cabin temperature at the return air inlet.
	Outlet Temperature	11.5	Measures the air conditioning outlet temperature.
MANUAL	Outlet Temperature	11.5	Measures the air conditioning outlet temperature.
	Cabin Temperature	24.4	Measures the cabin temperature at the return air inlet.

System Resets

The system hour counters can be reset as required. To reset service hours, press and hold the FAN DOWN key for 5 seconds while the system is displaying service hours in OFF mode. The hours will be reset to 0 and the blinking LED will go out.



Error Conditions

In the case of an error condition, the keypad status LED will blink. The LED display on the ECU will indicate an error number as shown in the table below. Most errors will shut down the engine. Pressing the stop key will clear any error condition and allow a new operation to start.

On retrofit installations it is possible that the alternator lamp monitoring feature may not be installed. The system automatically detects if the wiring is installed by checking that the alternator lamp input is low at the beginning of engine crank. If the signal is not detected then the software will not monitor the input when the engine is running.

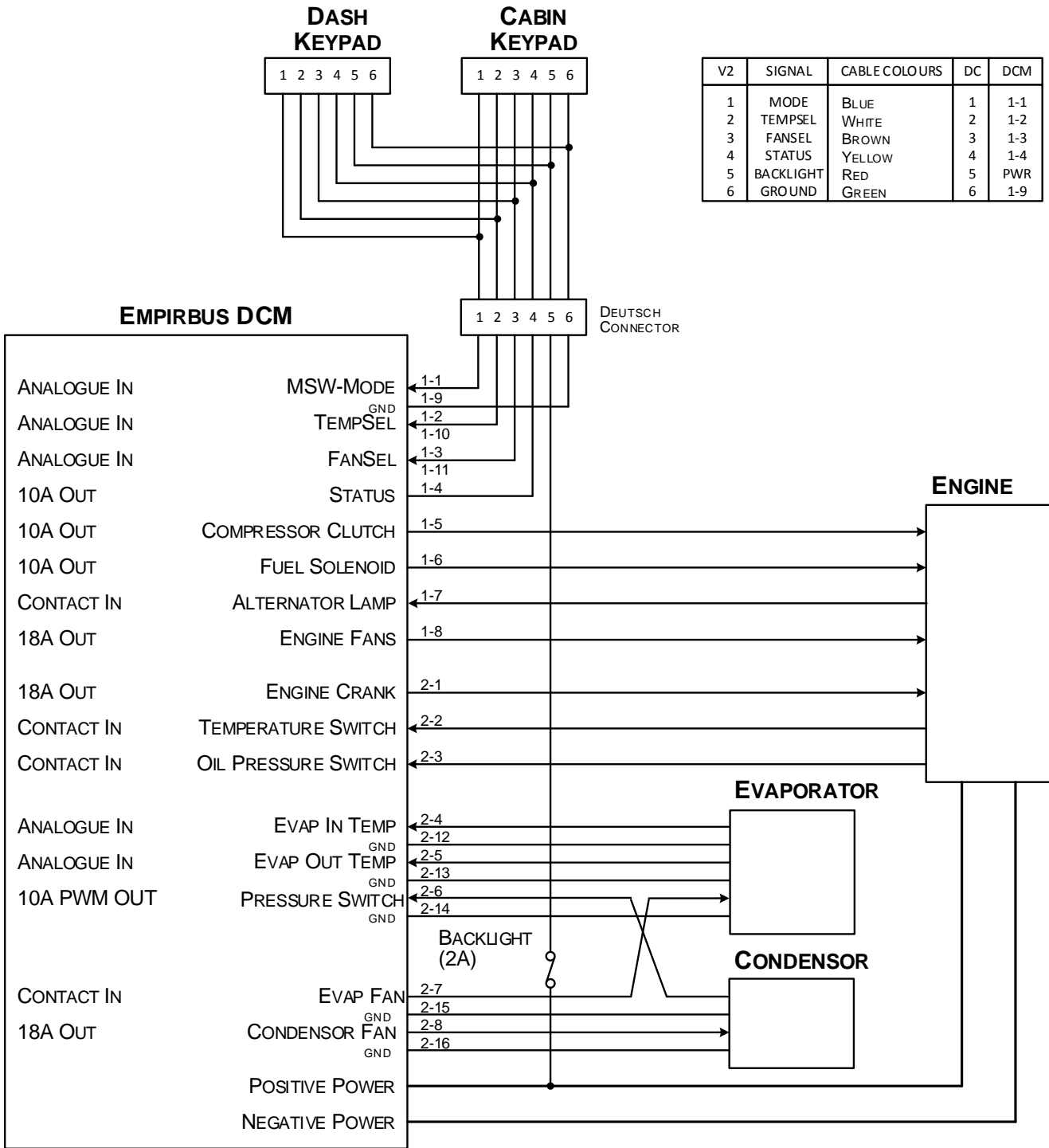
ERROR	ERROR NAME	NOTE
E01	High Temperature	The engine high temperature switch is activated causing the engine to stop.
E02	Low Oil Pressure	The engine oil pressure switch is activated causing the engine to stop.
E03	Pre-Crank Oil Pressure	The engine could not attempt a start because the oil pressure switch was indicating oil pressure OK when the engine was not running. Check oil level, pressure switch and wiring. Provided that everything checks out OK, it is possible to override this error. See "Start Error Override" above.
E04	Re-crank	The maximum number of crank attempts has been met. The engine did not start. Could be a fuel issue.
E05	High Voltage	The battery voltage has exceeded the high voltage set point (15 volts) causing the engine to shut down. Indicates a faulty alternator.
E06	Low Voltage	The battery voltage is less than the low voltage set point (12.2 volts) causing the engine to shut down. Indicates a faulty alternator.
E07	Reserved	Reserved
E08	Fuse Trip	A fuse has tripped on the system ECU. A red flashing LED on a ECU channel will indicate which fuse has tripped. Pressing the OFF key will clear the condition. Repeated tripping indicates a circuit problem which must be located and rectified.
E09	Engine Stopped	This is a special error condition whereby the engine stopped running without having a temperature or oil pressure alarm. The alternator lamp signal is used to initiate the error if it comes on (low signal) when the engine is running. When the engine stops (signalled by loss of oil pressure), an error condition is displayed. If the lamp signal is a result of the belt breaking or an alternator failure, the engine will continue running until a low voltage error occurs in which case a low voltage alarm will be generated.
SERVICE	Service Warning	When the 250 hour service interval is due, the service hour indicator will flash and the status LED will blink. If the service is more than 25 hours overdue, the status LED will flash and the engine cannot be started until the engine is serviced and the service interval is reset.

High Gas Pressure

The condenser high pressure switch opens when the condenser pressure is too high. The engine, condenser fan and evaporator fan will keep running but the compressor clutch will be disengaged. The compressor will come back on when the pressure is back to normal. There is a 1 second on and off delay for the pressure switch.

The LED associated with the high pressure switch channel 15 will be lit when a high pressure condition is active.

Schematic Diagram



ECU Connections

NAME	FUNCTION	FUSE RATING /NOTE	CONNECTOR	WIRE
MSW-MODE	Input for keypad OFF, CHARGE, CLIMATE and MANUAL keys.	Multiswitch	1-1 1-9 Gnd	3mm Blue
TempSel	Used on alternative keypad	Voltage In	1-2	3mm White
FanSel TempSel	Input for keypad temperature and fan UP/DOWN keys.	Multiswitch	1-3	3mm Brown
Status	Output for keypad status LED.	1 amp	1-4	3mm Yellow
Clutch	Output for compressor clutch.	10 amp	1-5	4mm Green
Fuel Solenoid	Output for fuel solenoid.	10 amp	1-6	4mm Yellow
Alternator Lamp	Signal from alternator lamp to determine if the engine has stopped for a reason other than temperature or oil pressure. System will auto detect lamp wiring on start-up.	Ground	1-7	4mm Grey
Engine Fans	Output for engine cooling fans.	18 amp	1-8	4mm Red
Engine Crank	Output for engine starter motor solenoid.	10 amp	2-1	5mm Pink
Temperature	Input for high temperature switch. Grounded when temperature is high.	Contact	2-2	4mm Orange
Oil Pressure	Input for oil pressure switch. Grounded when oil pressure is low.	Contact	2-3	4mm White
Evap In Temperature	Sensor input for evaporator return air temperature.	100Ω NTC	2-4 2-12 Gnd	3mm Red/White
Evap Out Temperature	Sensor input for evaporator outlet temperature.	100Ω NTC	2-5 2-13 Gnd	3mm Red/Black
Head Pressure	Input for high head pressure. Grounded when pressure is high.	Contact	2-6 2-15 Gnd	4mm Green/White
Evap Fan	Output for evaporator fan. 100 Hz PWM variable speed control.	10 amp	2-7	4mm Blue
Condenser Fan	Output for condenser fan.	15 amp	2-8	4mm Purple

Note: Evaporator Fan and Head Pressure channels were swapped to accommodate higher drive capability for evaporator fan. Firmware version 2.30 or later required.

Warranty

LIMITED 1 YEAR SLEEPER AIR WARRANTY

Rocklea truck electrical warrants to the original retail consumer that each new SLEEPER AIR will be free from manufacturing defects in materials or workmanship in normal service for a period of one (1) year or 1000 hours whichever occurs first from the date of purchase, provided it is operated and maintained in accordance with SLEEPER AIR instructions and manuals.

Our obligation under this warranty is expressly limited, at our option, to the replacement or repair at Rocklea Truck Electrical, or at a service agent designated by us of such parts as inspection shall disclose to have been defective. This warranty does not apply to defects caused by unreasonable use, including faulty repairs by others and failure to provide reasonable and necessary maintenance.

ROCKLEA TRUCK ELECTRICAL AND/OR THE SELLER SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND, including but not limited to labour costs or transportation charges in connection with the repair or replacement of defective parts. IMPLIED OR STATUTORY WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY LIMITED TO THE DURATION OF THIS WRITTEN WARRANTY. We make no other express warranty, nor is any one authorized to make any on our behalf.

To obtain warranty service Purchaser must bring the unit to an authorized Sleeper Air service facility. To locate the nearest facility, visit our website, www.rockleatruckelectrical.com, or ph 07 3716 0900

Maintenance

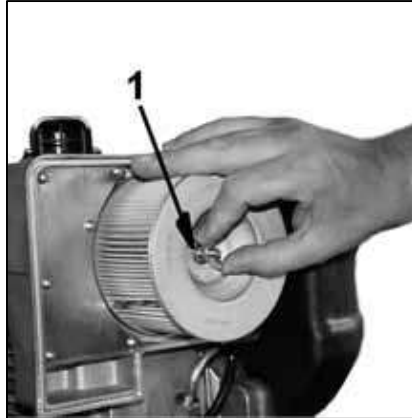
ITEM	EVERY 250 HOURS	EVERY 500 HOURS	EVERY 1000 HOURS
Change oil	X		
Inspect and/or clean filter	X		
Replace air filter		X	
Replace fuel filter		X	
Wash out condenser	X		
Replace oil filter		X	
Check electric fans	X		
Clean engine cooling fins		X	
Adjust rocker arm clearance			X
Check mounting bolt tension	X		
Check mounts serviceability	X		
Check belts	X	Replace	
Check wiring and fuel hoses for potential chaffing and security	X		
Replace receiver drier			X
Adjust engine speed		As Required	
Check refrigerant hoses for rub marks and oil seepage	X		

Air Filter

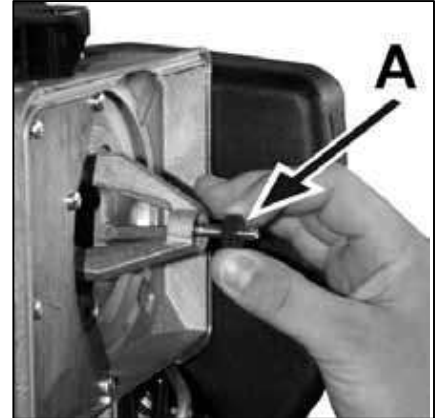
Do not reuse air filter or pre cleaner if any damage or deterioration has occurred. Replace with new. Use only genuine Kohler parts.



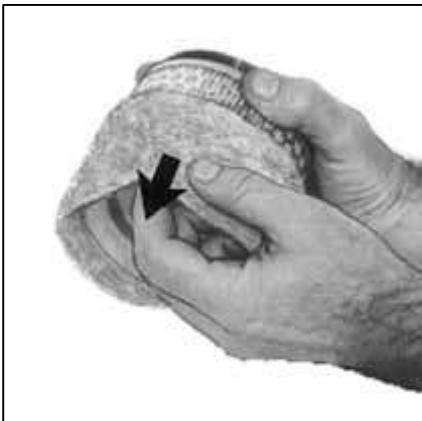
Open Air Cleaner Cover



Unscrew wing nut (1) and remove air filter



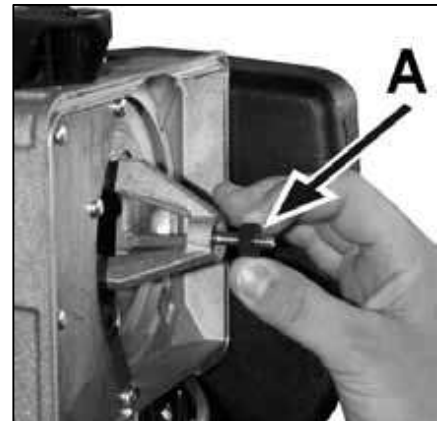
Check that rubber seal is in good condition (A)



Clean or replace air filter if necessary, remove pre cleaner and wash with water and soap. Dry pre cleaner carefully.



If the housing appears clogged, remove, clean, and reassemble



When replacing air filter, also replace the rubber seal (A), (a new seal is included in new air filter package).

Engine Oil



Remove drain plug and drain oil into an approved container. Reinstall drain plug.



Remove oil fill cap.



Fill to correct level with oil. Reinstall fill cap

Remove and Replace Oil Filter

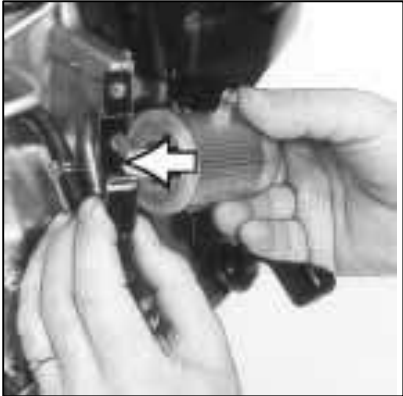
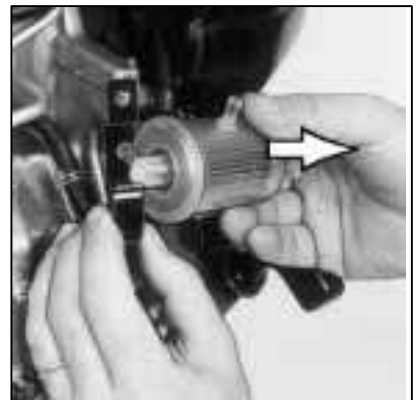


Remove oil filter cover

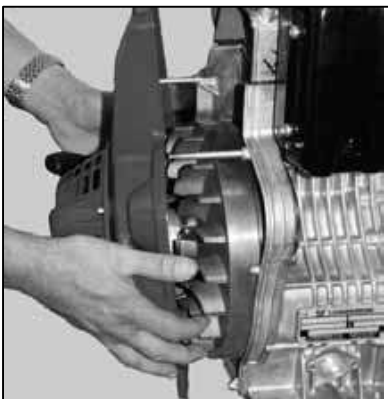


Remove and replace oil filter

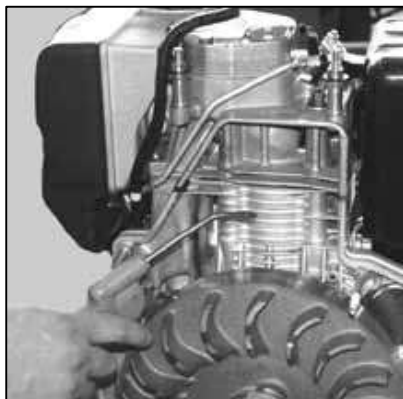
Remove and Replace Fuel Filter



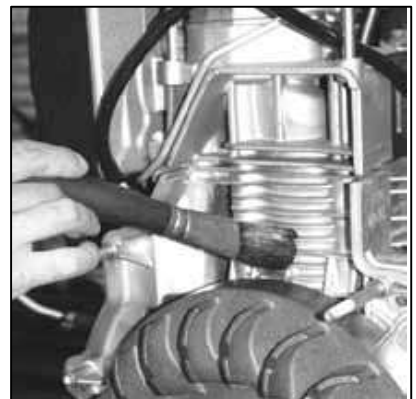
Clean Engine Cooling Fins



Remove air shroud mounting hardware and remove air shroud



Use compressed air on cylinder cooling fins and Flywheel



Clean with a brush soaked in detergent if really dirty.