



**PORTABLE AIR COMPRESSOR
OPERATION AND MAINTENANCE MANUAL
DLQ185AC&DPQ185AC**

CAT ENGINE





**We appreciate that you have both purchased and are utilizing
this portable screw compressor made by
Shenzhen Sullair Asia Industrial Co., Ltd. and
Suzhou Sullair Air Equipment Co., Ltd.**

The various types of portable screw compressors made by Shenzhen Sullair Asia Industrial Co., Ltd. and Suzhou Sullair Air Equipment Co., Ltd. (hereinafter “Sullair”) are expected to work to your satisfaction.

Before operating and maintaining this portable screw air compressor from Sullair, please read this Operation and Maintenance Manual carefully.

Sullair reserves the right to make product improvements at any time without notice.

Compressor Model:	_____
Compressor Serial Number:	_____
Diesel Engine Model:	_____
Diesel Engine Serial Number:	_____



SULLAIR®

PREFACE

This Operation and Maintenance Manual describes in detail the safety precautions, design functions of each system, and operation & maintenance method for DLQ 185AC series portable screw air compressors driven by CAT2.2 diesel engine designed and produced by Sullair.

Operators should carefully read this Operation and Maintenance Manual and the CAT “CAT2.2 Diesel Engine Operator’s Manual” and may carry out machine operation and maintenance only after fully understanding the design functions and safety precautions of each system and component. Unless otherwise specified in this manual, if the user doesn’t operate and maintain the equipment in accordance with the operation and maintenance instructions of this manual, or disassembles / modifies the machine without authorization, or uses parts not designated by Sullair, then product warranty may be voided.

This manual does not include illustrated parts list. If you need to order parts from Sullair, please see Parts List (88292021-382). It is important to note that the actual condition of product may differ from the one described in this manual because Sullair upgrades and continuously improves its design. Consult Sullair After-sales Marketing Department before you order the parts.

If you encounter any problem that is not clearly described in this manual during operation, contact your local Sullair authorized dealer, Sullair branches or Sullair After-sales Marketing Department, whose addresses are shown at the back of this manual. Solution to your problems can be assured.

—Editor

October 2017



SAFETY PRECAUTIONS

Read carefully before operating the compressor

▲ WARNING

Compressed air and air compression system are dangerous!

Failure to follow the instructions, procedures and safety precautions in this manual may result in accidents and injuries to you or others!

Read this manual carefully and make sure you fully understand every part of this manual before operating and servicing the compressor!

The user is responsible for appropriate care for the machine!

For details of safety precautions and existing hazards when operating the compressor, refer to the **Safe Operation Precaution** section in this manual. Before shipment, warning labels have been attached on the locations where precautions and hazards should be taken into account.

In this manual, operations involving a safety issue will be in bold font and indicated as “**Caution**”, “**Warning**”, and “**Danger**” for your attention, depending on the severity and possibility of damage to the machinery or personal injury.

Caution indicates a potentially hazardous situation, which, if not avoided, may result in general damage to the machine.

Warning indicates a potentially hazardous situation, which, if not avoided, may result in damage to the machine or personal injury.

Danger indicates an imminently hazardous situation, which, if not avoided, may result in a major accident, personal injury or death.

1. You **must** read this manual carefully and fully understand the contents prior to operating and performing maintenance on the compressor.
2. **Never** operate the compressor when it exceeds the rated discharge pressure, otherwise, the engine may be damaged due to overload.
3. Each protection and control function has been properly installed and tested by the factory. **Never** modify or remove control parts of the machine, otherwise it may cause severe damage to machine or personal injury.
4. **Never** remove or loosen any piping components, connectors, plugs, and connections when the compressor is running. DO NOT operate the relief valve. The vessel contents are pressurized and may cause severe personal injury.
5. Prior to any maintenance, you **must** make sure:
 - The compressor is shut down;
 - LOTO procedure is followed; internal pressure of the compressor has been released completely.
6. **Only** use non-flammable, non-toxic solution to clean the compressor and accessories.
7. Any part that is found defective **must** be changed immediately to avoid further damage or injury.



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Chapter I SPECIFICATIONS

1.1 Technical Specifications

MODEL		DLQ185AC
Compressor Performance		
Rated Pressure - bar (psig)		6.9 (100)
Work Pressure Range (continuous) - bar (psig)		4.5-6.9 (65-100)
Working Pressure Maximum (intermittent duty) - bar (psig)		8.6 (125)
Nominal Capacity - m3/min (acfm)		5.2 (185)
Sound Noise Level at 7 Meter - dB(A)		77
Dimensions: L×W×H(mm)		2076x1159x1233
Weight, Wet (ATM) – kg (lbs)		918 (2020)
Weight, Net – kg (lbs)		848 (1866)
Max working angle – degrees		15°
Work Environment Temp. Range - °C		0~50°C
Max Work Altitude - m		3000
Discharge Connection (Qty)		NPT ¾" (x2)
Engine		
Manufacture		CAT
Model		C2.2
Rate Speed , Full load/Idle - rpm		2700/2200
Horsepower – kW (BHP)		44.2 (60.0)
Cylinders		4
Displacement - L		2.2
Fuel rate - L/h	100% load	11.47
Coolant Capacity – L		10
Engine oil Capacity - L		8.3
Fuel tank Capacity – L		75
Working Voltage - Volt		12
Battery Reserved Capacity (RC)- min		160
Battery Low-temperature Starting-up Current (CCA) -A		750
Unit		
Power at Rated Continuous Pressure - Shaft kW (BHP)		32 (43)
Air/Fluid Receiver		
Fluid Fill Capacity - Litre		18
A/O Separator Total Volume - Liter		26
Design Operating Pressure – bar (psig)		14.1 (204)

MODEL		DPQ185AC
Compressor Performance		
Rated Pressure - bar (psig)		6.9 (100)
Work Pressure Range (continuous) - bar (psig)		4.5-6.9 (65-100)
Working Pressure Maximum (intermittent duty) - bar (psig)		8.6 (125)
Nominal Capacity - m3/min (acfm)		5.2 (185)
Sound Noise Level at 7 Meter - dB(A)		80
Dimensions: L×W×H(mm)		3315×1582×1495
Weight, Wet (ATM) - kg		1090 (2403)
Weight, 10L Diesel (TARE) – kg		1040 (2292)
Max working angle – degrees		15°
Work Environment Temp. Range - °C		0~50°C
Max Work Altitude - m		3000
Discharge Connection (Qty)		NPT ¾" (x2)
Engine		
Manufacture		CAT
Model		C2.2
Rate Speed , Full load/Idle - rpm		2700/2200
Horsepower – kW (BHP)		44.2 (60.0)
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Power at Rated Continuous Pressure - Shaft kW (BHP)		32 (43)
Air/Fluid Receiver		
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A/O Separator Total Volume - Liter		26
Design Operating Pressure – bar (psig)		14.1 (204)

2 Dimensions

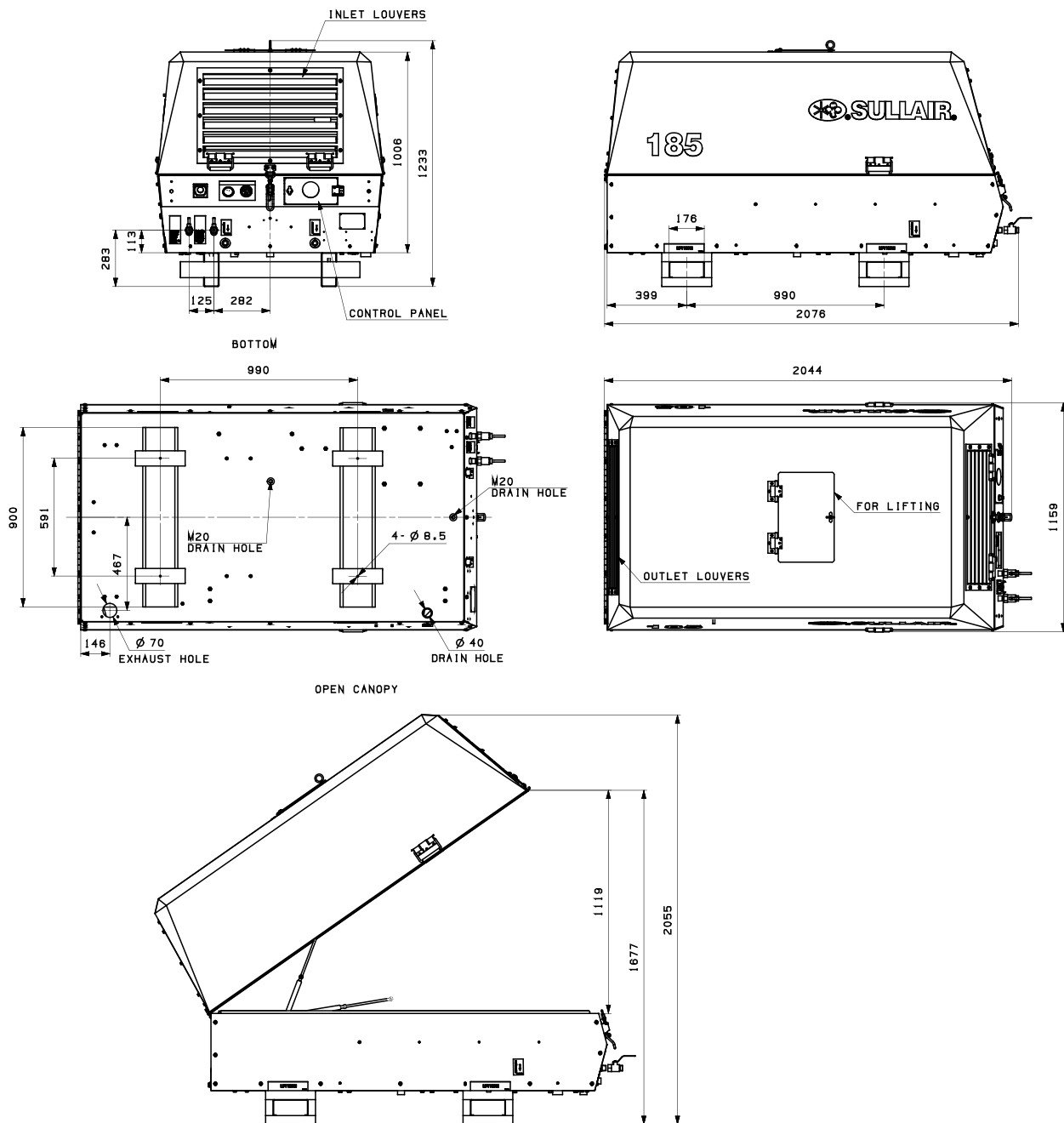


Figure 1-1 Dimensions of DLQ185AC

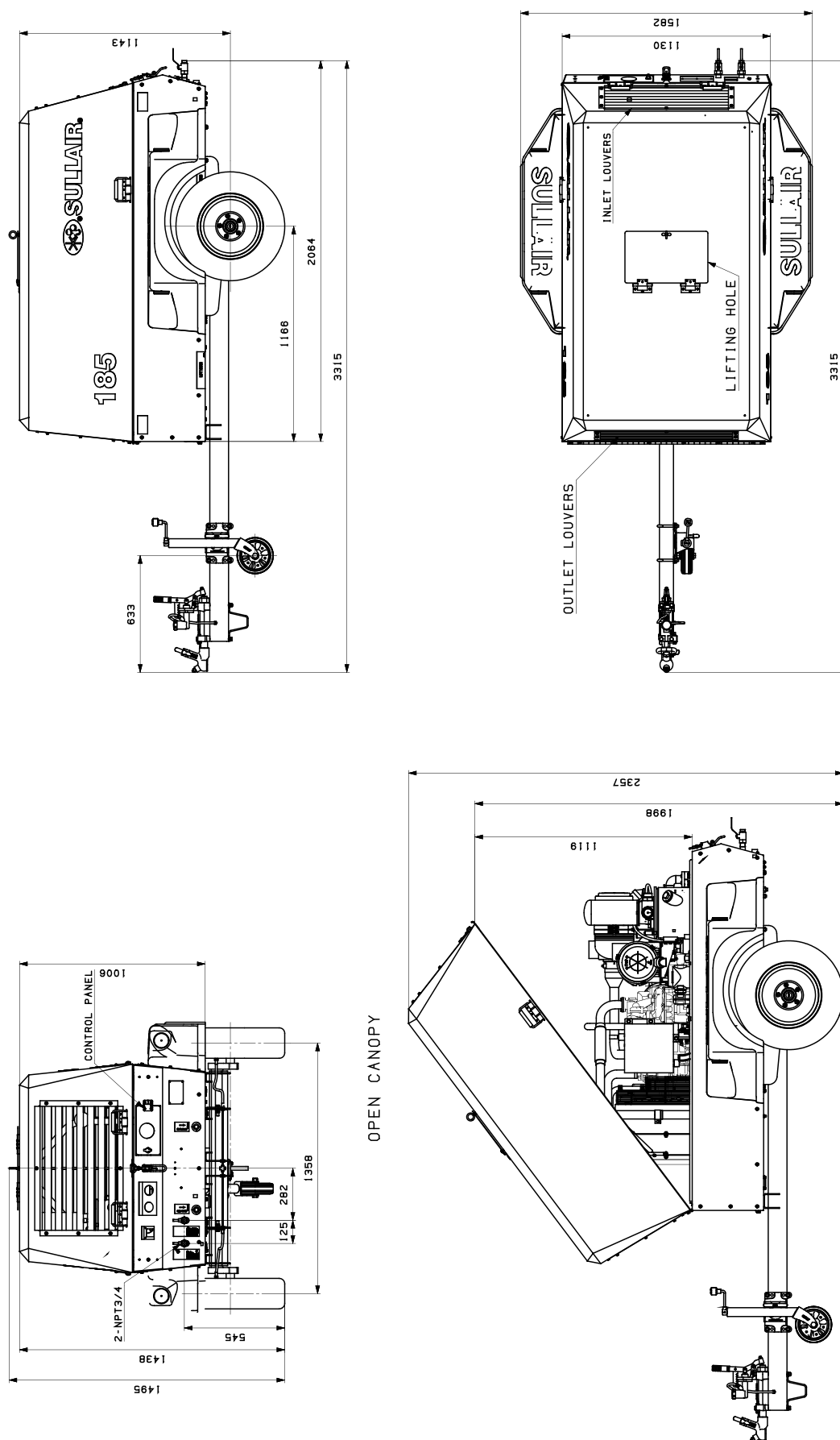


Figure 1-2 Dimensions of DPQ185AC

1.3 Compressor Fluid

The following approved compressor lubricant must be used. Please note that the lubricant's life is reduced as ambient operating temperature increases, please refer to the below table to determine the correct fluid change period for your application. The **Five-year air end warranty is only available when Sullair® AWF® fluid designated by Sullair is used.**

Fluid Type	Change Period(Hours)	Ambient Temperature °C
Sullair® AWF®	2500/1800/1200	-29~38/39~44/45~52

Note: Part numbers for Sullair® AWF® are 250030-757(5gal/19 liter package) and 250030-758(55 gal/208 litre package).

Periodically remove the condensate at the bottom of the fluid/air separator. In high ambient temperature and high humidity conditions, condensed moisture may emulsify with the fluid. The fluid should be changed if this condition develops severely.

DO NOT mix different types or brands of fluid. Mixing different fluids may lead to operational problems such as foaming, filter plugging, orifice or line plugging. If serious, it will cause cooler plugging or air end failure.

When ambient temperature exceeds specification or if conditions require use of other extended life fluid, contact Sullair. Sullair encourages the user to participate in a fluid analysis program. This could result in an increased or decreased fluid change interval. Sullair offers analysis for Sullair® AWF®. Contact Sullair representative for details.

1.4 Diesel Engine oil

Diesel engine shall use multi-grade oil of API CH-4 above multi-grade fluid or EMA LRG-1 multi-grade fluid conforming to American Petroleum Institute (API). Using nonconforming engine oil will seriously affect the service life of the engine.

Fluid Brand	Ambient temperature
EMA LRG-1, API CH-4	
SAE 0W30	Engine oil for ultra-low temperature (-40°C~-25°C)
SAE 5W30	Engine oil for low temperature (-15°C~-30°C)
SAE 10W30	Engine oil for low temperature (-5°C~-20°C)
SAE 15W40	Engine oil for normal temperature (-10°C~+38°C)
SAE 20W40	Engine oil for high temperature (above +38°C) or under severe load condition

Caution: Using low-viscosity engine oil, e.g. 10W-30, will be helpful for engine startup and providing sufficient fluid volume under low ambient temperature. However, **continuous use of low-viscosity engine oil will reduce the engine service life.**

70506-J premium blue engine oil (equivalent to 15W-40 engine oil of CH-4 performance within API category), provided by Sullair can ensure normal operation of the diesel engine under normal operating temperatures. The Sullair part number for premium blue engine oil is: 88290003-329.

1.5 Engine Coolant

Anti-freeze & anti-rust coolant not only prevents the cylinder block/head water jackets and water tank from cracking due to freezing in winter, it also prevents rusting and removes internal scale. Moreover, the boiling point of the anti-freeze & anti-rust solution is higher than that of the ordinary water, which also improves the cooling systems capabilities. Therefore, this engine series **requires anti-freeze & anti-rust coolant throughout the year, the antifreeze & anti rust coolant should never be replaced with plain water.** Coolant also acts as lubricant in water pump of the engine.

Anti-freeze & anti-rust coolant normally consists of three compositions: water, additive and glycol (or ethylene glycol). The proportion must be controlled precisely, because different proportions will have different effects.

It is recommended to use distilled water or de-ionized water in engine cooling system. If there is no distilled water or de-ionized water, please use water that meets the requirements in the following table:

Minimum requirement of water acceptable to diesel engine	
Item	Upper limit
Chloride (CL^{-1})	40mg/l
Sulfate (SO_4^{-2})	100mg/l
Total hardness	170mg/l
Total solid	340mg/l
Acidity	Ph5.5~9.0

Sullair offers DCA60L-J anti-rust additive to supplement the concentration of anti-freeze & anti-rust solution, ensuring the service life of the diesel engine cooling system. No anti-rust additive is required for new machines. Only add when tests indicate that the SCA (supplementary coolant additive) concentration is lower than 6%. It is suggested to use 6%-8% SCA in the coolant. Sullair part number for DCA60L-J anti-rust water is: 88290002-597.

Sullair offers the concentrated anti-freeze liquid (glycols). Through different mixing ratio with water, it can improve the freezing point and boiling point of the cooling system. Glycol concentration in Sullair coolant is 50%.

Sullair's part number of concentrated anti-freeze anti-rust liquid is 88290002-598.

Glycol concentration		
Concentration	Anti-freeze protection	Boiling protection
50%	-32°C	106°C
60%	-50°C	108°C

▲Warning

● If the machine is intended to be stored or operated in a cold region, the lowest local ambient temperature should be determined to make sure the lowest anti-freeze protection temperature of coolant is lower than lowest ambient temperature so as to avoid damage to the diesel engine and cooling system.

1.6 Diesel Fuel

User can choose light diesel fuel based on the local atmospheric temperature:

0# light diesel fuel	Atmospheric temperature above 4°C
-10# light diesel fuel	Atmospheric temperature above -5°C
-20# light diesel fuel	Atmospheric temperature -14°C ~ -5°C
-35# light diesel fuel	Atmospheric temperature -29°C ~ -14°C

▲Warning

● Since diesel will separate out the paraffin crystal first causing solidification, the result being blocked fuel lines and fuel filter, which may prevent the diesel engine starting. Appropriate light diesel must be used at low temperature. Before the wax is formed from the diesel, thoroughly drain the diesel, including all diesel in the engine, fuel line and fuel filter.

Chapter II SAFETY

2.1 General

Sullair designs and manufactures its screw compressors so that they can be operated safely and reliably. However, the responsibility for safe operation rests with those who use and maintain these products. The following safety precautions, if consciously followed, will minimize the possibility of accidents.

Only those who have been trained and who have read and understood this manual should operate the air compressor. Failure to follow the instructions, procedures and safety precautions in this manual can result in accidents and personal injuries or even death.

NEVER start the compressor unless it is safe to do so. DO NOT attempt to operate the air compressor with a known unsafe condition. If a condition does occur, use lock out tag out procedures to render the compressor inoperative by locking off the power isolator. This action will prevent others who may not be aware of the unsafe condition operating the machine accidentally.

Compressed air is dangerous. Maintain or repair the air compressor unit only when all internal pressure has been drained from the unit.

DO NOT modify the control system of the compressor except with written approval from Sullair.

Perform daily maintenance of the air compressor and check for leaks, loose or missing parts, damaged parts or components out of adjustment. Correct any faults without delay.

2.2 Towing and Parking

2.2.1 Towing preparation

▲Warning

● **DO NOT tow the compressor should its weight exceed the rated limit of the towing vehicle, as the vehicle may not brake safely with excess weight. See rated limit in towing vehicle operation manual, and review its instructions and other requirements before towing.**

- 1) Prior to hitching the air compressor to the tow vehicle, check all attaching parts for: 1. signs of excessive wear or corrosion; 2. parts that are cracked, bent, dented or otherwise damaged; 3. loose nuts, bolts or other fasteners. Should any such condition be present, do not tow until the problem has been corrected.
- 2) During the coupling, adjust the jockey wheel such that the hitch has clearance above the vehicles tow ball.
- 3) Have the tow vehicle slowly backed to align the towball below the hitch. Lower the jockey wheel to engage the hitch with the ball.
- 4) Attach the chains, making sure the chain is through the linking hole of the tow vehicle.
- 5) After the machine has been properly coupled with the vehicle, the jockey wheel must be retracted before towing.
- 6) Once connected to the vehicle, the compressor handbrake can be released ready for towing.

▲Warning

Keep feet clear of drawbar. Retract the jockey wheel of the tow bar only when the compressor has been properly coupled with the vehicle.

- 7) Make sure the tyres are in good condition & wheel nuts are secured. Do not change the size of tyre.
- 8) Make sure the lights of towed vehicle are in good working condition. The reflective surface of compressor shall be clean and intact.
- 9) Make sure the air service hose has been stowed.
- 10) Make sure all doors of the machine are closed and secured. Make sure there is nobody inside the machine before closing doors.
- 11) Make sure the wheels of the machine are not blocked and the machine can move freely.
- 12) Test the performance of towing vehicle's brake before driving at rated speed.
- 13) **DO NOT** carry loose or inappropriate tools or equipment on or in the compressor unit.
- 14) **DO NOT** load this equipment with accessories or tools that is likely to cause unit unbalance. Such unbalance may reduce the tow-ability of this equipment and may increase the accident possibility of tipping, rolling over, jackknifing, etc.

2.2.3 Parking

- 1) Park or locate the compressor on a level and firm surface, if possible. Otherwise park or locate the compressor across grade.

Caution: DO NOT park or locate the compressor on grades in excess of 15° (27%).

- 2) Park or locate the compressor, taking the wind direction into account, in such a place that the exhausted hot air is away from the compressor air inlet openings. Avoid the compressor being exposed to an excessively dusty environment.
- 3) Pull on the compressors handbrake and block the front and back sides of the wheels if there is risk of rolling.
- 4) Remove the chain from the tow vehicle and store it to the tow bar. Don't let chain contact with ground to avoid damage & rust.

Caution: The jockey wheel shall be put on a solid ground.

- 5) The towing vehicle should be parked in a place that will not impact the operation of the compressor, preferably away from the compressor.

2.3 Pressure Release

- 1) Make sure the working pressures in pneumatic devices, hoses, lines, valves, filters, and other accessories are in good condition and the working pressure is not in excess of the rated pressure.
- 2) Make sure to shut down the compressor and **bleed the pressure to zero** before removing the cap of fluid/air separator tank.
- 3) **Make sure to bleed the internal pressure** when disconnecting any piping, connector, valve, oil drain plug, oil filter and components of fluid/air separator.
- 4) To prevent the loss of coolant fluid and potential personal injury, only after the temperature of the coolant in the radiator of the diesel engine is decreased to below 50 °C, should the cap of the radiator be slowly unscrewed.
- 5) Keep personnel out of line with and away from any discharge openings, including the venting of air supply pipe, compressor or pneumatic devices.
- 6) The pressure of air used for dust cleaning purposes should not be in excess of 2.1bar (30psi), and personal protective equipment (PPE) should be used.


2.4 Fire and Explosion Protection

- 1) **Allow** the compressor to cool before adding fluid. Ground the compressor and fluid/air separator together before adding fluid and keep sparks, flames and other sources of ignition away.
- 2) **Clean up spills of fluid immediately.** Do not allow fluid on acoustic material or the surface of other components. Wipe down using a cleaner or steam clean under normal circumstances. If necessary, replace contaminated acoustic material. Any acoustic material with a protective covering that has been torn or punctured should be replaced immediately to prevent accumulation of fluid within the material.

Caution: DO NOT use flammable solvents for cleaning purpose.

- 3) When cleaning or maintenance inside the unit, users should apply LOTO using the provided lockable battery isolator inside the compressor.
- 4) Make sure the electrical system is in good condition, i.e. the connections are clean and secure.
- 5) Keep grounded conductors (e.g. tools) away from exposed live electrical parts (e.g. terminals) to avoid arcing.
- 6) Disconnect charger before servicing or wiring the battery.
- 7) Change damaged fuel tank and pipes immediately.
- 8) If the fuel system is leaking, it **must** be corrected before starting the machine.
- 9) If welding is required during the repair, remove any acoustical material and other flammable materials or items vulnerable to heat.

▲ Warning

 **Do not weld near fuel or lubrication system.**

- 10) Keep sufficient and reliable fire extinguishers available and check regularly.
- 11) Oily rags, rubbish and other flammables must not be stored inside the canopy or near the compressor.
- 12) **DO NOT** operate the compressor under low over hanging leaves or permit such leaves to come in contact with hot surfaces of the compressor when working in forested areas.


2.5 Moving Parts

- 1) Keep body parts and clothing **away from** couplings, fans, belts and other moving parts.
- 2) **DO NOT** attempt to operate the compressor with the fan, coupling or other guards removed.
- 3) Wear snug-fitting clothes and confine long hair when working around the compressor, especially when exposed to hot surface or near moving parts.
- 4) Keep access doors closed except when performing maintenance.
- 5) **Make sure** all personnel are clear of the compressor prior to attempting to start the compressor.
- 6) **Do** shut down the engine prior to the following operations: adding fuel, coolant, fluid or changing electrolyte.
- 7) Sometimes it might be necessary to adjust the pressure regulation valve or engine speed when the compressor is running. In such a case, take care to not touch moving parts, the terminals of engine starter and hot exhaust components. All Other adjustments can only be carried out after the compressor is shut down.
- 8) Clean all fluid spills to avoid slipping.

2.6 Hot surfaces, sharp edges and sharp corners

- 1) **Avoid** body **contact** with hot fluid, hot coolant, hot surfaces and sharp edges and corners.
- 2) Wear personal protective equipment including gloves and head covering when working or servicing in, on or around the compressor.
- 3) Keep a first aid kit handy. Seek medical assistance promptly in case of injury. **DO NOT** ignore small cuts and burns as they may lead to infection.


▲ Danger

 **NEVER** remove the heat insulation sleeve of engine exhaust pipe. Replace immediately if damaged. Otherwise, it may cause serious accidents such as machine fire or burns!

2.7 Toxic and Irritating Substances

- 1) Do not use air from the compressor for respiration.

▲ Danger

 **Death or serious injury can result from inhaling compressed air without using proper safety equipment!**

- 2) Operate the compressor only in open or well-ventilated areas. If the compressor is operated indoors, fully discharge engine exhaust fumes outdoors.
- 3) Locate the compressor, taking the wind direction into account, so that personnel or compressor is not likely to ingest/intake exhaust fumes.
- 4) Care should be taken to avoid accidental ingestion and/or skin contact of fuel, lubricant and coolant. Wash with soap and water in the event of skin contact. In the event of ingestion, seek medical treatment promptly.
- 5) **Wear** an acid-proof apron and a face mask when servicing the battery. If electrolyte is spilled on skin or clothes, immediately flush with large quantities of water.
- 6) If eyes are splashed by anti-freeze coolant or irrigated by volatile gas, flush with water for 15 minutes and see a doctor, preferably ophthalmologist.
- 7) Do not store anti-freeze coolant in a closed space.
- 8) **Anti-freeze coolant is toxic.** Never swallow, contact with skin or inhale its volatile. If swallowed, call a doctor immediately.

2.8 Electrical Shock

- 1) Keep the compressor, towing vehicle and personnel at least 3m away from electric wire.
- 2) Keep all parts of the body and any hand-held tools or other conductive objects away from exposed live parts of electrical system. When servicing and adjusting these parts, stand on insulation surface, **do not** have wet feet, and do not contact other parts of the compressor.
- 3) Maintain the compressor at a clean, dry and well-lighted place.
- 4) Stay away from the compressor during lightning.

2.9 Battery

- 1) The battery may **contain hydrogen**. Since hydrogen is highly flammable and explosive, no sparks, flames and other sources of ignition shall be present near the compressor.
- 2) Electrolyte in battery is highly corrosive and toxic. **Never** contact it with eyes, skin or surface of fabrics. Otherwise, it may cause injury or loss of property. In case of electrolyte spill, flush with large amount of water immediately.
- 3) If the electrolyte is frozen or has ice in it, **never start** the compressor. Otherwise, the battery may explode.
- 4) Avoid contact of leads and wire clamp with other metal parts to prevent the electric arc, which may cause fire.

2.10 Lifting

- 1) Before lifting, inspect points of attachment, check for cracked welds and components for cracks, bent, corroded or loose fasteners.
- 2) Make sure the entire lifting, rigging performance has been inspected, is in good condition and has a rated capacity of at least the weight of the compressor.
- 3) Make sure lifting hook has a functional safety latch, and is fully engaged and latched on the lifting lug or slings during lifting.
- 4) Use guide ropes to prevent twisting or swinging of the compressor once it has been lifted.
- 5) Do not attempt to lift in high winds.
- 6) **Keep all personnel out from under the compressor whenever it is suspended.**
- 7) Keep lift operation in constant attendance whenever compressor is suspended.
- 8) Lift compressor no higher than necessary.
- 9) Do not drive the crane while lifting to avoid damage to compressor.
- 10) Set the machine down only on a surface capable of supporting the machine.
- 11) Block both directions of compressor's wheels before releasing the hook.

2.11 Miscellaneous

- 1) If it is necessary to enter the canopy to perform service adjustment, you **must** inform other personnel before doing so, and secure and tag the access door in the open position to avoid the possibility of others closing the door with personnel inside.
- 2) **Make sure** all personnel are out of the machine before closing the door.
- 3) Air cylinder used to support doors is a high air pressure product. **Never** put it over flame, bump or dismember it.

Chapter III SYSTEM FUNCTIONAL DESCRIPTION

3.1 Introduction

This series of diesel engine driven portable screw compressor designed and manufactured by Sullair will provide you with improved performance, high reliability and greatly reduced maintenance.

The compressor is a diesel engine driven air-cooled oil injected screw

The compressor is designed and manufactured by Sullair, offering great power performance, cost effectiveness and reliability. It can be operated 24×7 at full load.

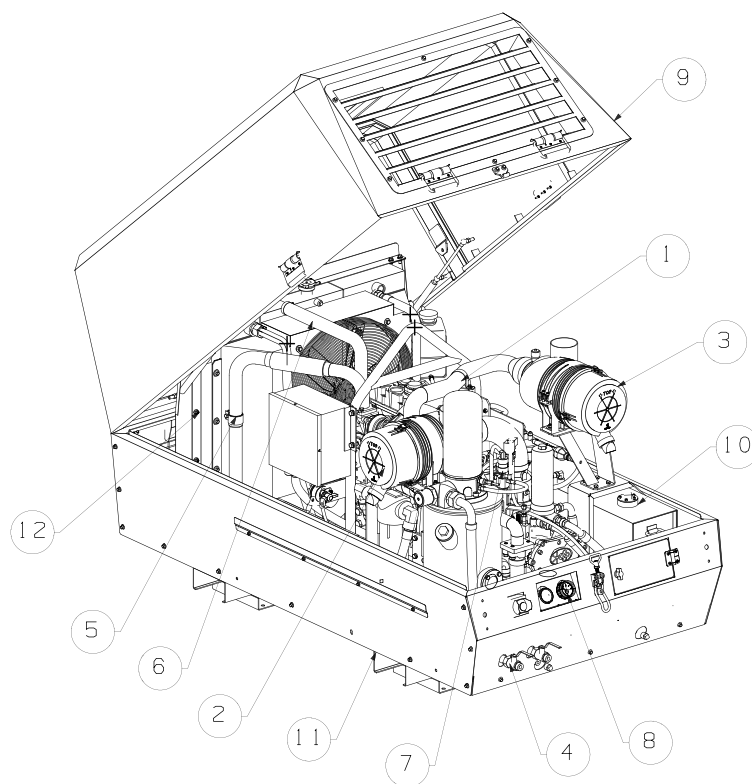
The diesel engine from CAT has excellent performance and fuel economy.

The compressor features a logical layout, comprehensive functions and is easy to use. The fully enclosed canopy minimizes noise of the compressor. Display instruments and indicators on instrument panel give convenient messages and diagnostic functions.

By reading this manual, you will know how to use and maintain the compressor.

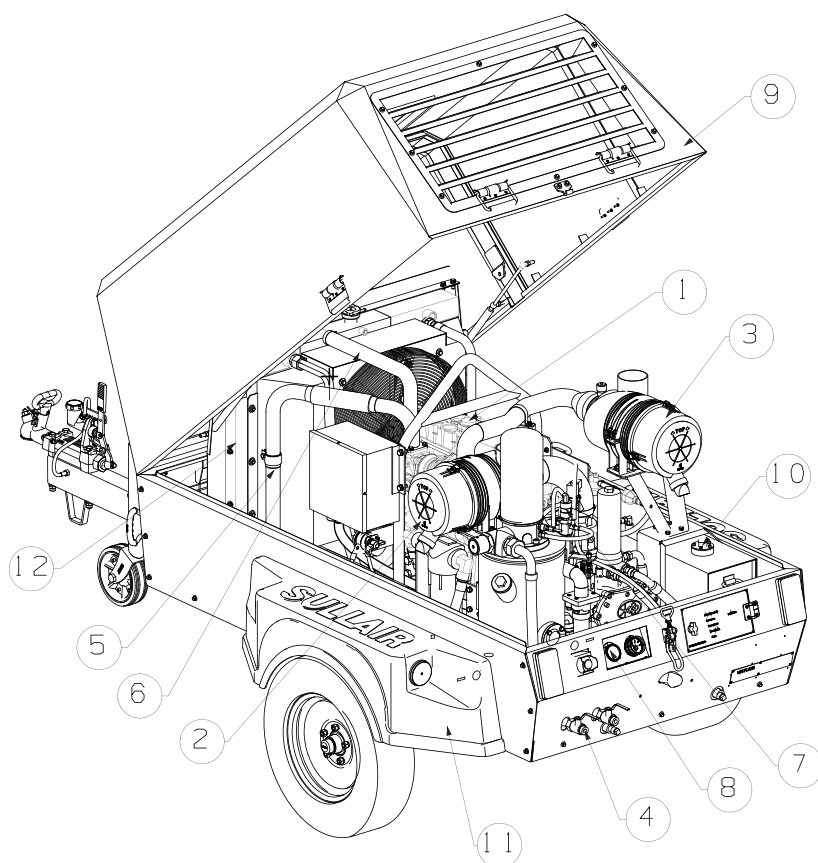
Read **Chapter V Maintenance** for guidance on how to maintain your portable compressor to ensure a long and trouble free life. Should any problem or questions arise which cannot be answered from reading this manual, please contact your local Sullair representative or Sullair After-sales Marketing Department.

3.2 Machine Layout



1	Compressor & Engine System	7	Pneumatic Control System
2	Compressor Air Inlet System	8	Electronic Control System
3	Engine Air Inlet System	9	Canopy System
4	Compressor Discharge System	10	Fuel System
5	Engine Exhaust System	11	Frame System
6	Cooler and Lubricant System	12	Assembly Cooler System

Figure 3-1 General Layout of DLQ185AC



1	Compressor & Engine System	7	Pneumatic Control System
2	Compressor Air Inlet System	8	Electronic Control System
3	Engine Air Inlet System	9	Canopy System
4	Compressor Discharge System	10	Fuel System
5	Engine Exhaust System	11	Frame-running System
6	Cooler and Lubricant System	12	Assembly Cooler System

Figure 3-2 General Layout of DPQ185AC

See Fig. 3-1 & Fig.3-2 for parts and layout of this series diesel engine driven portable screw compressor from Sullair. The machine consists of a compressor & engine system, inlet system, compressor discharge system, cooler component system, compressor cooling and lubrication system, engine cooling and lubrication system, control system, engine exhaust system, fuel system, electrical system, frame-moving system, etc.

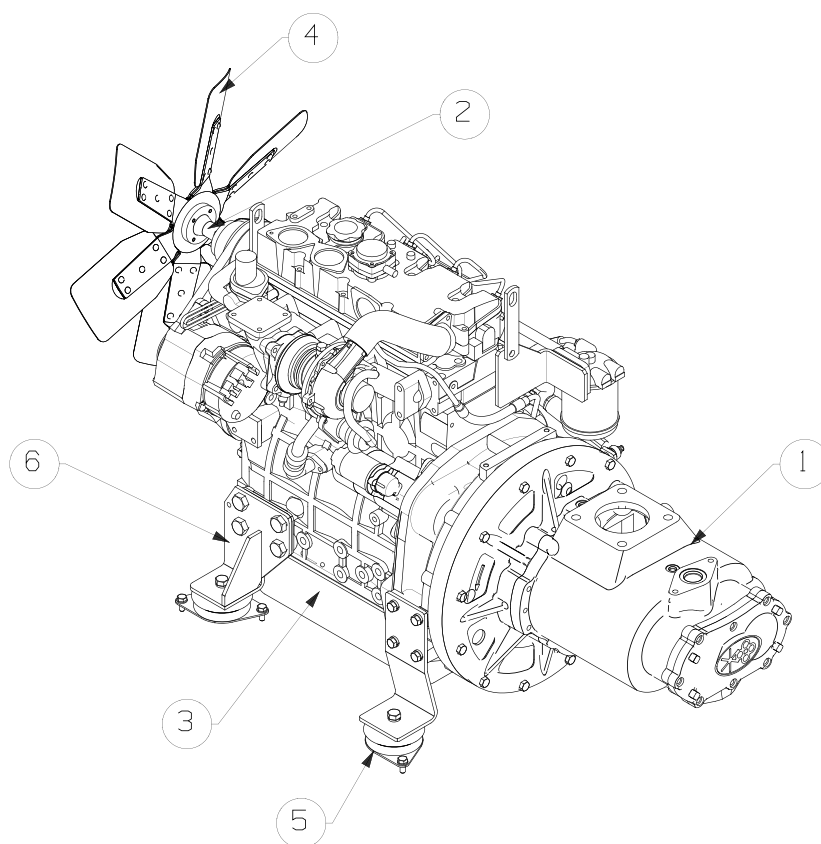
The enclosure of the machine is equipped with acoustic materials to minimize the noise of the compressor impacting on the surrounding environment.

The compressor is driven by the output shaft of the diesel engine through a coupling mounted on flywheel. The air filtered by the inlet filter enters the inlet chamber of the compressor through the inlet valve, it is then compressed by the rotors before being discharged from the outlet of the air end. The oil & air mix then enters the fluid/air separator for oil/gas separation. Separated compressed air goes through the minimum pressure valve, air service piping and service ball valve for customer use. Separated fluid drains to the bottom of fluid/air separator is cooled by the fluid cooler before going through an oil filter and then finally being re injected into the compressor unit to complete the cycle.

The diesel engine is fitted with an axial fan that blows air through the cooler pack. The fan is belt driven from the engine crank shaft.

3.3 Engine & Compressor System

See Fig. 3-3. Engine & compressor system consists of the air end, diesel engine, elastomer coupling, cooling fan, cylinder, isolator, engine support, etc. This assembly is the core of the entire machine.



1	Air end	4	Cooling Fan
2	Spacer	5	Isolator
3	Engine	6	Engine Support

Fig. 3-3 Engine & compressor system

3.3.1 Compressor Air End

The compressor air end features a US Sullair designed and manufactured oil injection, lubricated screw. This unit provides continuous gas (pulsation-free) compressed air to meet your needs. Compared to other compressors, the Sullair air end is unique in mechanical reliability and durability design. With its working parts meeting the “inspection free” process requirement, free of maintenance and internal inspection for normal operation.

Inside the casing of the compressor, there is a pair of parallel fine-machined rotors (male rotor and female rotor) with spiral grooves. Inlet and outlet are diagonally placed on the rotor case. The screw groove of the female rotor meshes with and is driven by the screw tooth of the male rotor. In a working cycle of inhaling, enclosing, compressing and exhaling, the revolving rotors enclose inhaled air in the closed screw groove space between rotors and case, and the volume of the screw groove space varies as the rotors are revolving. Rotors revolve to suck air; then a large amount of fluid is injected into the closed screw groove space between rotors and case through a specially designed injector and mix with the air directly. The fluid serves three main purposes:

- 1) As a coolant, the injected fluid controls the rise of compressed air temperature by absorbing the large amount of heat normally associated with compression.
- 2) Seals the leakage gap between the rotors and the case and also that between the rotors to reduce internal leakage of compressed air.

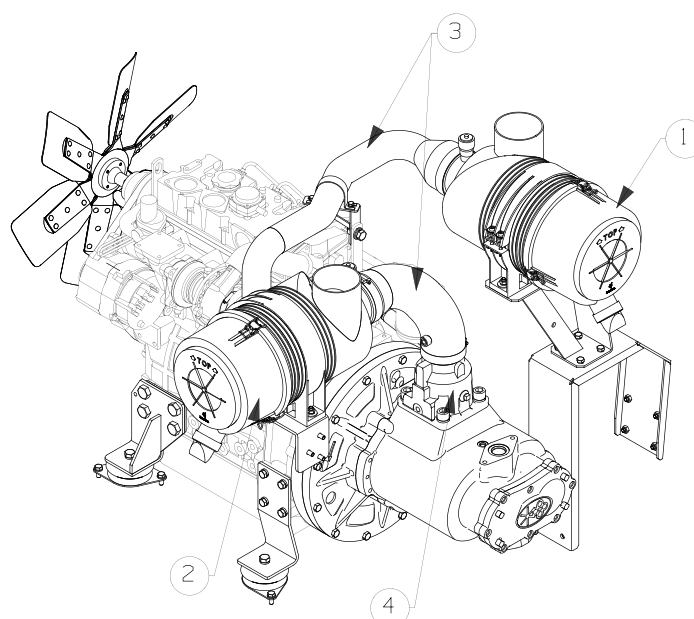
- 3) Acts as a lubricating film between the rotors, allowing the male rotor to directly drive the female rotor. It also absorbs part of the mechanical noise.

3.3.2 Diesel Engine

The Diesel engine is another crucial part of the portable screw compressor unit. This compressor uses an CAT C2.2 diesel engine to drive the portable screw compressor unit. The engine is a turbo charged direct injected 60HP engine that meets Tier 2 requirements.

3.4 Air Inlet System

See Fig. 3-4. The inlet system provides clean air to the compressor and diesel engine. It consists of one compressor air filter, one engine air filter, compressor air filter support, engine air filter support and inlet hoses.



1	Engine Air inlet Filter	3	Inlet Hose
2	Compressor Air inlet Filter	4	Air inlet Valve

Fig. 3-4 Air Inlet System

The Inlet system uses cyclonic action, capable of dealing with very dirty air. Operators should frequently clean the dust gathered in the dust pocket in the rear cover of air filter.

If the pressure drop alarm on the filter turns red, then the flow resistance in air filter is too high. A safety element is fitted within the main filter element which adds a second level of protection. The Safety filter element does not need maintenance and should be replaced together with the main element.

- Caution:**
- (1) The diameter of safety filter element is smaller than that of main element. It only provides temporary protection in case of main element failure (for 4 to 6 hours). Therefore a failed main element must be replaced immediately. Otherwise, air end rotor wear or bearing damage could occur.
 - (2) If the pressure drop alarm indicator of air filter turns red, service or replace the filter element promptly and then press the reset button on the end of pressure difference indicator to clear the alarm.

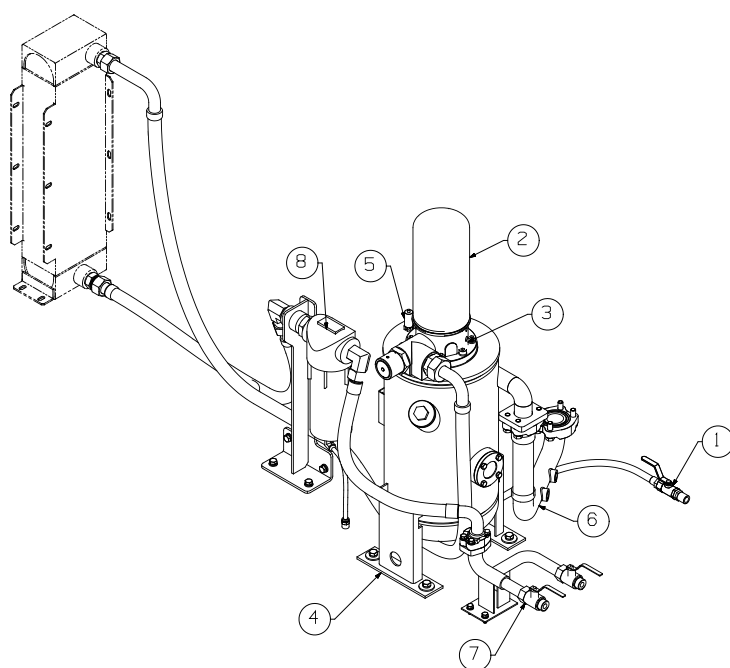
The piping of the compressor intake system is made of high quality rubber hoses, capable of resisting cold or hot environments and is highly durable. To ensure an air tight system and for reliability, stainless steel “T” screw-type clamps are used for connection of the intake system to the compressor unit.

▲ Warning

- **Never use** rubber hose with cracks. If a loose T clamp or hose damage is found, stop the machine immediately and take measures to ensure there are no air leaks.
- **Never attempt** to run the machine when the air filter element is not present in the air filter or if it is damaged, otherwise the air end of compressor may be seriously damaged.

3.5 Compressor Discharge System

The Compressor discharge system consists of the air/oil separator, separator element, min pressure valve, relief valve, ball valves, moisture drain, main discharge pipe and air service pipeline, etc. See Fig. 3-5.



1	Drain Valve	5	Relief Valve
2	A/O Element	6	Discharge Tube
3	Min Pressure Valve	7	Service Valve
4	A/O Separator	8	Moisture Drain

Fig. 3-5 Compressor Discharge System

In a working compressor, air trapped in the screw lobes is compressed constantly; meanwhile the fluid is continuously injected into screw lobes absorbs the heat created in compression. When the volume of screw groove drops to a certain value (designed value), the screw groove space is connected to a specifically designed outlet, and the oil/air mixture is discharged. Since there are multiple screw grooves between the rotor pair, and rotors revolve at high speed, compressed air is discharged continuously without surge.

The oil/air mixture discharged from air end then enters a specifically designed fluid/air separator. Oil/air mixture flows along the inside wall of the sump tank due to high speed. Most of the fluid is separated from air due to centrifugal effect and forms larger fluid droplets. Fluid droplets fall to the bottom of the sump under the effect of gravity. Baffles and isolation panels inside the separator make the air and fluid droplets spin and change direction, to separate more and more fluid from the compressed air. After the first stage of separation, only a tiny amount of fluid mist is left behind. As the air travels through the element of the separator, fine fluid droplets are condensed on the separator element's fiber due to collision, dispersion and interception. Droplets collected on the outer side of the fiber then fall to the bottom of sump tank under gravity. Droplets collected on the inner side of fiber converge at the bottom of separator element. A return line leads from the

bottom of separator element to the low pressure chamber of the compressor unit. Fluid collecting on the bottom of the separator is returned to the low pressure chamber of the compressor unit. The return line is equipped with an orifice (with filter) to ensure steady fluid return. A check valve is also provided in the return line to prevent fluid backflow from the compressor unit to the filter element, which may otherwise contaminate discharge air with the fluid content next time the machine is started.

A min pressure valve is positioned between the fluid/air separator and air service valve to establish a minimum tank pressure when the compressor unit is operating, this ensures adequate lubrication can be provided to the air end at all times. Triggering pressure of the min pressure valve is 4.5bar (65psi), which has been set before shipment. When the machine is not operating or unloaded, the min pressure valve acts as a check valve to prevent compressed air from backflow from the air system.

After separation, oil content in the compressed air is only a few PPM. Compressed air is available to the user through the min pressure valve. The package is provided with two air service valves to accommodate different needs of the user.

A relief valve is fitted to the separator vessel. When air pressure inside the tank exceeds the pressure setting of the relief valve, the relief valve opens automatically. The cracking pressure of the relief valve is preset at the factory and should not be adjusted. A temperature switch is positioned on the discharge pipe of the air end. If the compressor discharge temperature is above 121°C (250°F), the temperature switch shuts down the machine automatically.

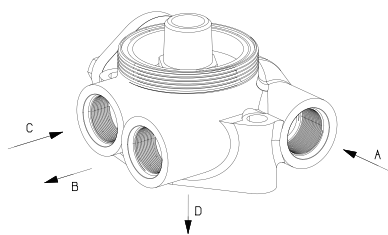
The separator fluid filling plug thread has been specially designed to discharge residual pressure within the tank when you start to loosen it. The sight glass on the separator vessel are used to observe fluid level inside the separator. For a machine not in operation, fluid level should be slightly above the center of sight glass.

▲Warning

- **DO NOT** remove nuts, oil filling plug, and other parts when the compressor is running or pressurized. **Shut down and bleed all internal pressure of the compressor prior to maintenance.**
- **NEVER** replace or use the relief valve of a different specification.

3.6 Cooling and Lubrication System

The cooling and lubrication system of the compressor consists of an oil cooler, radiator, after cooler, engine fluid recovery, oil filter base, oil filter element, thermal valve and piping. See Fig. 3-6.

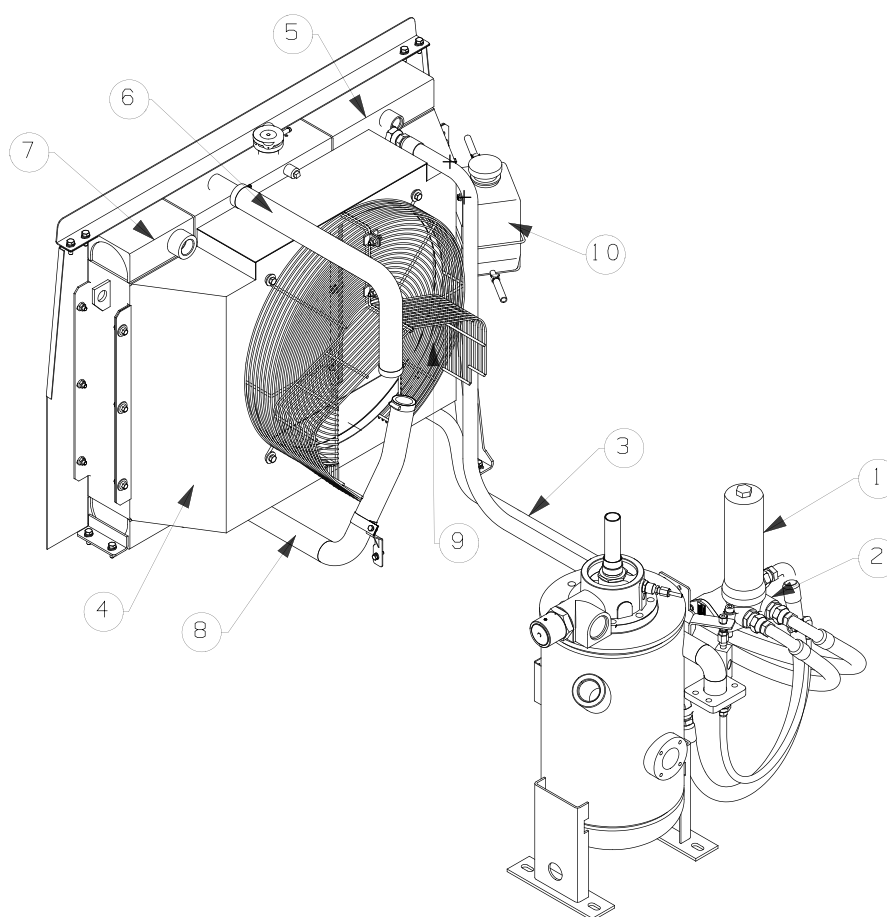


Compressor fluid not only serves as the coolant, absorbing heat generated in compression to control temperature rise of compressed air, but also as the sealant between rotors and case, and lubricant of moving rotors.

The thermal valve is a directional valve with thermostat. When the machine starts, fluid enters through A. During the start-up period, fluid temperature is not high enough to activate the thermostatic element, so the bypass valve remains open. Fluid flows to the fluid filter directly without passing through the fluid cooler, the fluid

leaves the valve through port D and is injected back into the air end at pressure.

When the temperature reaches 69°C (156°F), the thermal valve element starts to work by partly closing the bypass port. Some of the fluid flows to the fluid cooler and the remainder bypasses it to try maintain a steady running temperature. Cooled fluid is mixed with bypassed hot fluid before going through the fluid filter. If the fluid continues to heat up, eventually the bypass port shuts off at 79°C (174°F) and all of the fluid flows through B to fluid cooler. Cooled fluid returns to the valve through port C before being filtered and returning to the air end.



1	Oil Filter	6	Radiator
2	Thermal Valve	7	After Cooler
3	Oil Piping	8	Water Piping
4	Shield	9	Fan Guard
5	Oil Cooler	10	Engine Fluid Recovery

Fig. 3-6 Cooling & Lubrication System

The oil filter is composed of a filter base and a screw-type filter element with a build-in bypass valve to ensure the air end lubrication is maintained if the filter element is blocked or there is a high fluid viscosity.

Engine lubrication system provides pressurized lubricant to the moving parts of engine to create fluid friction (contact-free friction), and to cool those parts unable or difficult to be cooled by the cooling system. The system also cleans the surface of the engine parts. See **Chapter I.4 – Diesel Engine Oil** for details of engine oil.

The engine has two cooling systems, fluid cooling and air intercooling. The fluid cooling circuit is controlled via a thermostatic valve which maintains the engine temperature during varying loads. The air intercooler is used to cool the boosted induction air to improve the air density and therefore boost the output power of the diesel engine.

The radiator is an important component within the engine cooling system. It is an enclosed, direct flow, forced circulation tube-and-fin radiator with pressure retaining cap. The opening threshold of the pressure cap is 50kPa, which guarantees that water will not boil below 108°C and at an altitude of 1500m. The pressure cap not only enhances cooling performance of the radiator, but also reduces or even eliminates bubbles and air-locks in the coolant circulation. Pressure cap keeps pump inlet at positive pressure, reducing potential cavitation and therefore erosion on pump impeller and case. This ensures stable coolant flow and removes

heat from the engine

Use long-life antifreeze & antirust coolant for the diesel engine. See Chapter I.5 – Engine coolant. Antifreeze & antirust coolant helps protect metal and rubber materials, and can ensure that no scale will form in the water jackets of the cooling system to protect engine in extremely cold regions. Coolant should be changed every 2 years or 3000 hours. A properly sealed system should maintain its fluid volume and should not need topping up frequently. However, users should check and refill antirust in the coolant regularly to maintain the concentration. Fill the coolant slowly in order to release any air bubbles in the water system of the engine and vapor created at high temperature.

Caution: DO NOT MIX antifreeze & antirust of different brands.

3.7 Control System

Control system (see Fig. 3-7 Pneumatic and Illustrative Diagram) is capable of modulating the air end inlet air volume and engine speed automatically based on air demand, while maintaining a fixed service pressure. The system consists of the following components:

Inlet control valve, pressure regulation valve, start/run/stop switch, orifice, piping and connectors.

Normally the control system should not be adjusted. If adjustment is necessary, written approval from Sullair shall be obtained. Please refer to **Chapter IV.6 – Mode Setting Procedure**.

To modulate the capacity of the compressor is to modulate the inlet air volume by varying engine's speed and controlling the position of the inlet valve. The compressor has four working modes: A. Starting/warm-up mode; B. Loaded operating mode; C. Modulating mode; and D. Shutdown/cooldown mode.

3.7.1 Starting/warm-up Mode

Before starting up, set the start/run/stop switch to “Run” to power on the compressor. Observe the fuel level. Correct any abnormal condition. If the engine is cold, press and hold the glow plug button for 5 seconds. Then push the start/run/stop switch to “START” to start the machine. Under the action of vacuum at this time, the air inlet control valve is opened slightly and the system pressure will slowly rise. As the pressure in the sump rises, the controlling air slowly closes the inlet valve, at last reaching a balance point. The control air is also directed to the speed regulation cylinder of the diesel engine to have the diesel engine controlled at the idle speed (2200 rpm).

Once started, the unit goes into the warm-up cycle, the warmup cycle time has been factory preset.

3.7.2 Working conditions at loaded running

Once the diesel engine gets sufficiently preheated, the unit will go into the running state automatically, and the air inlet control valve fully opens, at the same time, the diesel engine runs at the full speed. When the system pressure reaches the set pressure of the minimum pressure valve, the minimum pressure valve will be opened, and the package can now provide compressed air for customer use.

3.7.3 Modulating Mode

If the demand of compressed air is lower than the machine's output capacity, system pressure will increase. As the system pressure rises to the regulation set point, a small amount of control air is directed to start closing the inlet valve. It is also sent to the speed regulation cylinder to reduce engine speed with an aim to match output capacity with the demand on the machine. If the system pressure further increases, the inlet valve will continue to close, and the speed of the diesel engine will also decrease until it runs at an idle speed (the idle speed is preset).

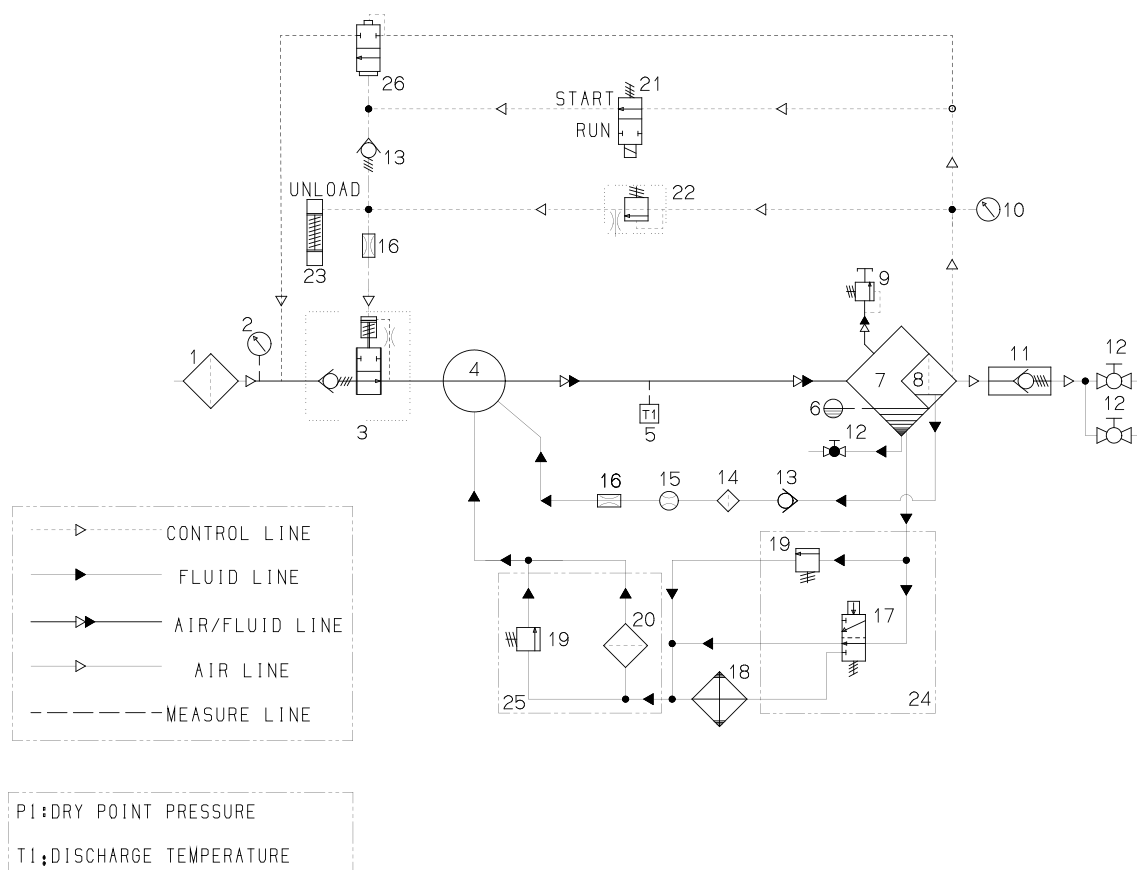
If the compressed air is not needed or the air supply valve is closed, the pressure regulation valve will be fully opened and the inlet control valve will be fully closed and the diesel engine will run at the idle speed.

If the demand for compressed air now increases, system pressure will drop. If the pressure drops below the modulation set point, the inlet valve will be fully open and the engine will be running at full speed.

3.7.4 Shutdown/cooldown Mode

Close all air service valves, set the Start/Run/Stop switch to “Stop”, the unit will enter its automatic shutdown cycle. It is important to allow the machine to run through this cycle to allow the turbo charger to cool before being stopped. An immediate stop with a hot turbo charger will reduce the life the turbo.

NOTE: Pressing Emergency Stop will instantly stop the compressor at any time.



No.	Name	Qty.	No.	Name	Qty.
1	Air filter	1	15	Sight glass	1
2	Indicator	1	16	Orifice	2
3	Inlet valve	1	17	Thermal valve	1
4	Air end	1	18	Oil cooler	1
5	Temperature switch	1	19	By pass valve	2
6	Sight glass	1	20	Oil filter	1
7	Air/oil separator	1	21	Start/run solenoid valve	1
8	Air/oil element	2	22	Pressure regulator	1
9	Relief valve	1	23	Cylinder	1
10	Pressure guage	1	24	Thermal valve assembly	1
11	Min pressure valve	1	25	Oil filter assembly	1
12	Ball valve	3	26	Blow down valve	1
13	Check valve	2	27	Fluid filter component	1
14	Filter	1			

Fig. 3-7 Pneumatic and Illustrative Diagram

3.8 Electrical System

See Fig. 3-8 Wiring Diagram. The electrical system is responsible for machine start/stop and automatic protection. The system consists of a battery, display instruments, sensors and switches.

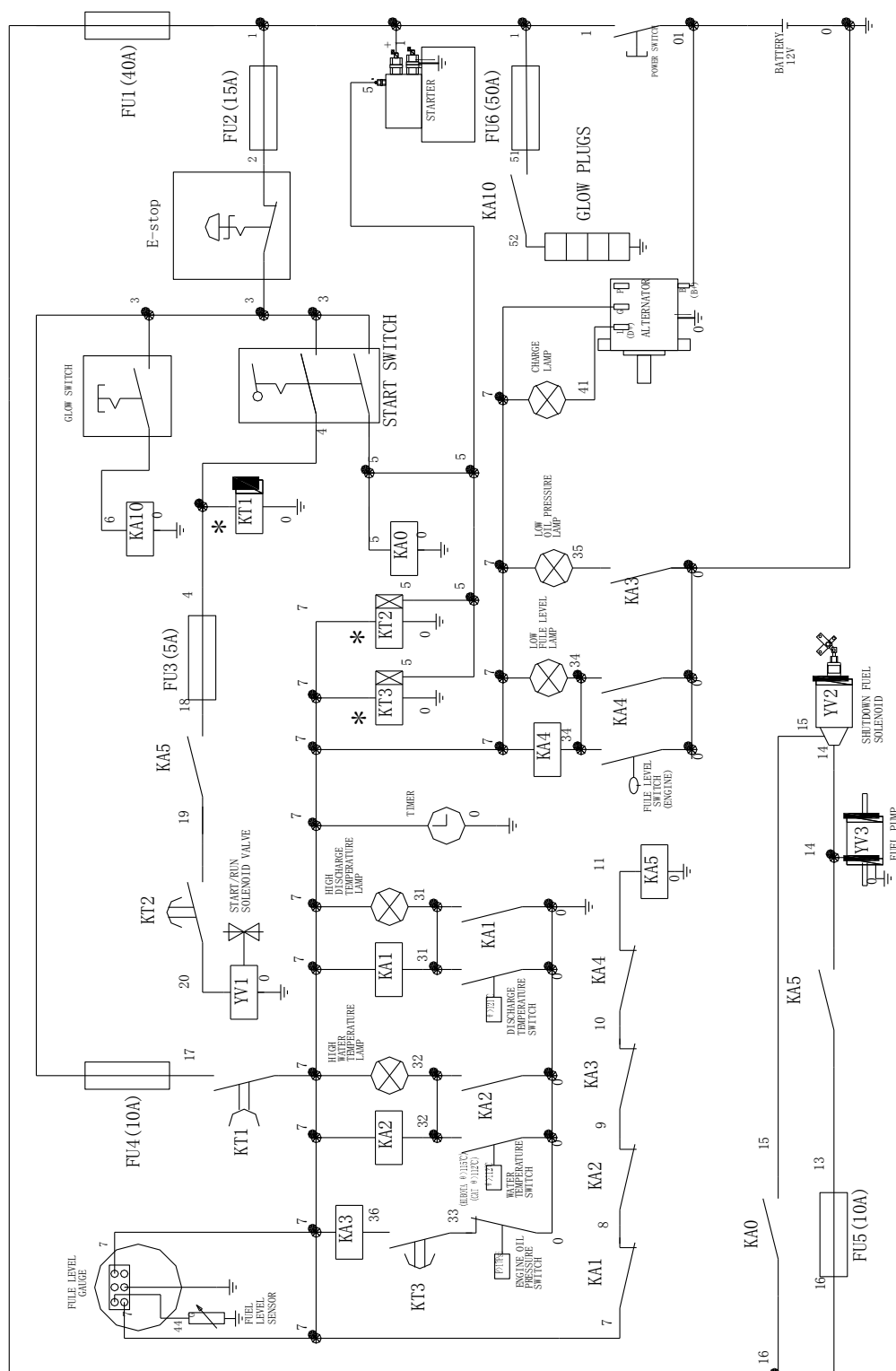


Fig. 3-8 Wiring Diagram

3.8.1 Instrument Control System

See Fig. 3-9. Instruments and controls on the panel include a discharge pressure gauge, start/run/stop switch, running hour meter, glow switch and alarm indicators. To ensure normal operation of the machine, operators shall be familiar with the function and use of each display and control in order to make correct judgment according to the readings.

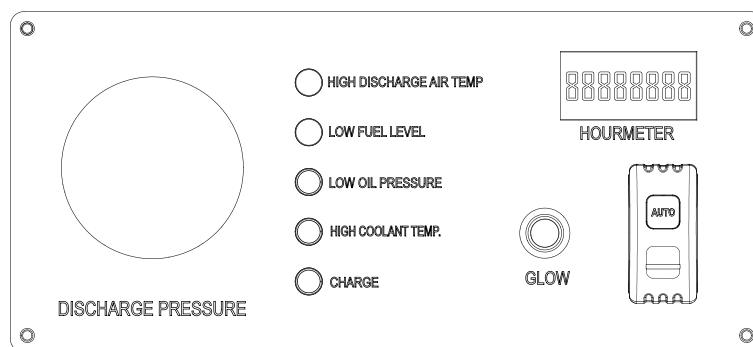


Fig. 3-9 Instrument & control panel

- Discharge pressure gauge: It displays pressure for compressed air provided by the unit.
- Start/run/stop switch: when “Start” on the switch is pressed, the unit is started and the diesel engine moves at no-load at the idle speed and, once the set time reaches, the unit will be automatically switched over to the running state, the diesel engine moves at the full speed, at this time, and the compressor works with the load under the rated pressure. When “Stop” is pressed, the unit will be stopped automatically.
- Running hour meter: record and display total running time of the unit.
- Alarm indicator lights:
 - 4 alarm lights: high compressor discharge temperature, high coolant temperature, low fuel level and low pressure of engine oil; the corresponding indicator will get lit and alarm once a fault occurs with the air compressor unit.
 - 2 indicators: indicators for diesel engine glow plug and alternator charging fault.

3.8.2 Protection System

The protection system is a very important part of the unit. It is designed to prevent running or starting of the compressor if a fault is present and ensures the engine goes through a warm up cycle and cooldown cycle. The system consists of compressor discharge temperature protection, diesel fuel protection, diesel engine coolant temperature protection, engine oil pressure protection and so on.

During unit operation, any protection triggered will lead to a unit shut down and may prevent it from being restarted. The following will introduce each protection in more detail.

- Compressor discharge temperature protection: there is a temperature switch on the discharge hose of air end, when the discharge temperature is higher than 121°C (250°F), the discharge temperature switch closes to stop the unit automatically, and **high discharge temperature** indicator on panel will be active.
- Diesel fuel protection: when fuel level is lower than set valve of fuel level sensor, the “**low fuel level**” indicator on the panel will be active.
- Diesel engine coolant temperature protection: Diesel engine coolant temperature switch is set on the main water jacket temperature of the diesel engine and, when the set temperature reaches 107°C (225°F), the diesel engine will be stopped automatically, and the “**high coolant temperature**” indicator on the panel will be active.
- Engine oil pressure protection: Engine oil pressure is very important for diesel normal operation, the normal pressure range is: 240kPa~480kPa, it is normal under idle speed that the oil pressure is low. In case of an extra-low pressure with the engine oil, the diesel engine will stop automatically, at the same time the “**low engine oil temperature**” indicator on the instrument panel will be active.

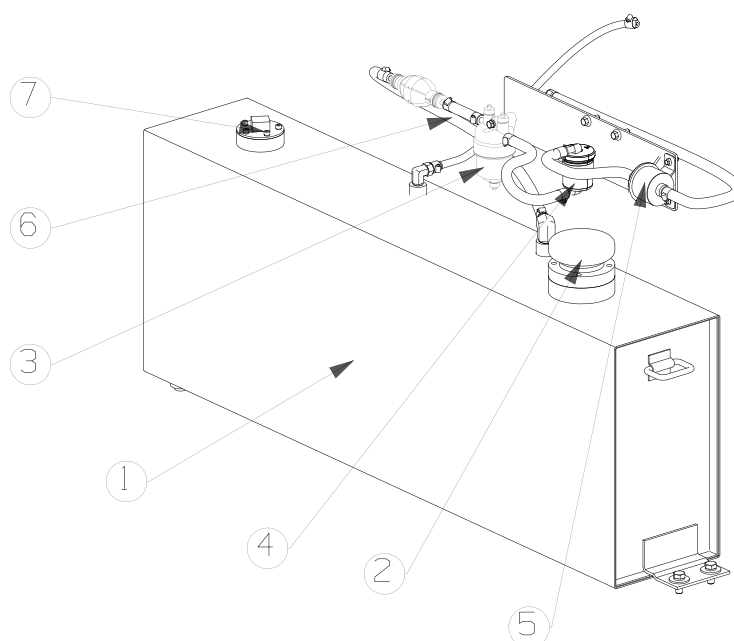
Caution: If there are any faults, remove all fault conditions before restarting the machine.

3.9 Engine Fuel System

The fuel supply system is an important system of a diesel engine. It significantly influences the power, cost effectiveness, reliability and durability of the engine. Fuel system provides sufficient clean fuel, free of dust, water and air, to meet the requirements of engine on power, torque, RPM, fuel consumption, noise, emission, start-up and idle speed etc.

The fuel system consists of a fuel tank, filling strainer, fuel filter (mounted on the diesel engine), fuel level switch and fuel piping. See Fig. 3-10.

The diesel fuel tanks filling filter in mounted on the top of the fuel tank. It is conveniently positioned and can prevent impurities from entering the system during filling.



1	Fuel Tank	5	Electric Oil Pump
2	Filling Filter	6	Fuel piping
3	Fuel/Water Separator	7	Fuel Level Switch
4	Line Fuel Filter		

Fig. 3-10 Fuel System

The fuel filter prevent impurities from damaging fuel injector and other parts of the fuel system.

Maintain the fuel system according to requirements¹,

Fuel tank capacity is 75L, this is typically sufficient for the operation of one shift. A drain valve under the bottom of the fuel tank is used to remove water and impurities accumulated at the bottom of tank regularly.

See **Chapter I.6 – Diesel Fuel** for details of fuel. See the **CAT Diesel Engine Operator's Manual** for details of the fuel system for the engine.

-
- 1) Use fuel manufactured by a reputable company. Fuel must be settled for at least 24 hours before using to fully separate water and impurities.
 - 2) Remove water from the water separator and fuel tank everyday before starting to work.
 - 3) Top up fuel tank with diesel after work every day to expel air and prevent condensate.
 - 4) Clean and service fuel system and fuel filter element as specified in time.

3.10 Engine Exhaust System

The Engine exhaust system operates to reduce exhaust noise and to ensure the exhaust gases are released outside of the compressor canopy. The system consists of an exhaust pipe, muffler, insulation cover, etc. See Fig. 3-11.

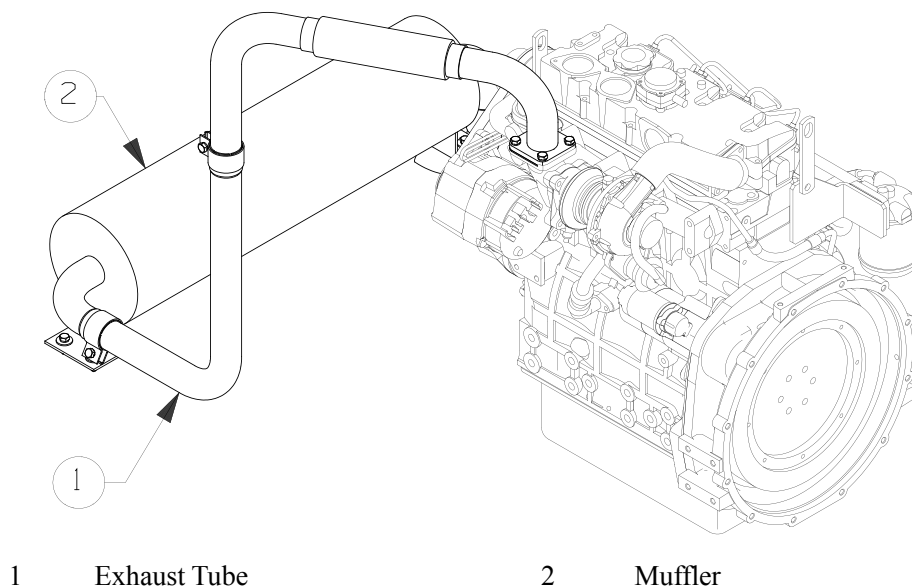


Fig. 3-11 Engine Exhaust System

To eliminate potential burns or fire caused by hot surface of the exhaust system, the exhaust pipe and muffler are covered with heat insulation.

3.11 Frame System

The DLQ185AC unit is mounted on a chassis with no running gear. A special mount is fitted to this frame for mounting the unit on level ground which also includes two fork lift slots to aid with transport.

3.12 Enclosure System

The canopy of the machine is elegant and conducive to ventilation. All the components that need to be serviced can be accessed through the clam shell opening design which is fitted with gas struts to aid lifting and to hold the canopy in the open position to ensure ease of access when servicing the machine. The canopy is designed to minimize the ingress rain. Heat-resisting, flame-retardant and acoustic material is arranged inside the enclosure to significantly reduce the noise of the machine.

Chapter IV OPERATION

While Sullair has built into this series screw compressors a comprehensive array of controls and displays/indicators to assure you that it is operating properly, you will want to recognize and interpret the readings or conditions displayed to determine the condition or malfunction of the machine. Before starting the machine, familiarize yourself with the controls and displays/indicators – their location, purpose and use.

4.1 Purpose of Controls and Indicators

Component	Location	Purpose and/or use
Start/Run/Stop switch	Instrument & control panel	When the machine is being started, turn the switch to “Start”. Now the engine may run with no load at idle speed only. Once the starting warmup cycle has elapsed, the machine will automatically go into run/loaded mode and the engine speed will increase
Running hour meter		Record and display the total running time of the unit.
Discharge pressure gauge		Service pressure of the machine.
Alarm indicator		Corresponding indicators will be on for alarm when there is a fault condition within the machine.
Air discharge temperature gauge	Optional instruments	Display the temperature of discharged compressed air provided by the unit.
Diesel engine oil pressure gauge		Display the pressure value of the engine oil of the diesel engine.
Diesel engine water temperature gauge		Display the temperature value of the coolant of the diesel engine.
Fuel level gauge		Display the percentage of the fuel level in the fuel tank.
Emergency stop button		For emergency stop of the unit, located above the customer compressed air connection points
Air inlet control valve	Inlet port of air end	Adjust inlet volume based on the demand for compressed air. It is controlled by a pressure regulator.
Sight glass	Fluid/air separator cylinder	It is used to check the fluid level and quality inside the separator. See Chapter III.6.
Thermal valve	Inside valve base	It is used to adjust the temperature of compressor fluid. It is closed when fluid temperature is low to bypass the fluid cooler.
Discharge temperature switch	Main discharge pipe	Stop the machine automatically when temperature reaches threshold.
Min pressure valve	On fluid separator base	It keeps the air pressure in fluid /air separator no less than 4.5bar (65psi).
Relief valve	Fluid/air separator cylinder	It ensures that the pressure vessel would work at safe operating pressure. When the pressure inside the fluid/air separator (wet side) exceeds pressure setting of relief valve, the relief valve will open to vent air.
Pressure regulator	Control pipeline	When line pressure reaches setting value, it sends control air to the inlet valve of compressor proportionately to adjust inlet volume.

4.2 Initial Start-up Procedure

- 1) Park the machine on a level Check coolant level in water tank (radiator) ¹. Add coolant as stated if the level is low.

¹ Coolant is 50:50 glycol solution and has been filled at factory.

- 2) Check fuel tank to see if diesel needs to be filled ¹.
- 3) Drain the water in the oil/water separator of fuel system.
- 4) Check engine to see if engine oil needs to be added ².

Caution: See **Chapter I** of this manual and the “**CAT Diesel Engine Operator’s Manual**” for details of engine coolant, fuel and engine oil.

- 5) Check compressor fluid level³. Normally the fluid level should fall slightly above the center of sight glass.
- 6) Close all service valves and the canopy
- 7) Put Start/Run/Stop switch to “Run”.
- 8) Check the condition of each instrument.
- 9) Press and hold the glow plug switch for 5 seconds
- 10) Put Start/Run/Stop switch to “START” to start the unit.
- 11) After the unit is started, the unit will switch to run status automatically once the warmup cycle has been completed - 3-5 min at 2200rpm idle speed.
- 12) Check the readings of instruments on instrument panel. See Chapter IV.5 – **Troubleshooting**.
- 13) After initial start-up, stop the compressor according to the procedure. Check water tank to see if additional coolant is required and if additional fluid is required in fluid/air separator. Check each point of connection to see if there is any leaks. Check the tension of fan belt.

▲Warning

- **Never** load the machine when it is cold.
 - **Never** let the engine run at idle speed for more than 10 minutes.
- Avoid continuous operation when coolant temperature is below 60°C or above 100°C.

4.3 Subsequent Start-up Procedure

- 1) Park the machine on a level surface.
- 2) Check fuel, coolant and engine oil. Add if necessary.
- 3) Check fluid level in fluid/air separator. Add if necessary.
- 4) Drain the water in the oil/water separator of fuel system. Drain the water separated from fuel tank. Drain the condensate in fluid/air separator sump.
- 5) Proceed with steps 6) to 13) of Initial Start-up Procedure.

Caution: Drain the condensate from fluid/air separator sump regularly before starting the machine for the first time every day.

4.4 Shutdown Procedure

Close all air service valves, set the Start/Run/Stop switch to “Stop”, the unit will be stopped automatically after the cool down cycle has been completed – 360seconds.

▲Warning

- **Never** shut down the machine directly during normal operation.

Caution: Each time after work, top up the fuel tank to avoid forming solid coagulant or condensate in the tank.

¹ Fuel tank capacity is 75L.

² Engine oil capacity is 10L and has been filled at factory.

³ Compressor fluid capacity is 18L (4.2 gallon) and has been filled at factory.

4.5 Mode Setting Procedure

Mode Setting Procedure including the setting of the no-load speed, rated speed of engine, and rated pressure of the machine. See **Chapter I – Specifications** for rated pressure of the compressor.

4.6.1 Setting the Rated Mode

- 1) Close all service valves.
- 2) Start the machine according to normal start-up procedure.
- 3) Slowly open the service valve (venting behind) to speed up the engine. Then adjust the opening of service valve to maintain system pressure (tank pressure) at rated operating pressure (see **Chapter I – Specifications**).
- 4) Slowly close the service valve. When system pressure reaches “rated operating pressure + (1 ~ 1.4bar)”, the pressure will not rise any more. Now the engine runs at idle speed and the machine stops to supply air. If the rated pressure is not achieved, adjust pressure regulation valve accordingly.
- 5) Open/close service valve repeatedly and check the system operating pressure setting. If the setting is incorrect, find out causes and re-adjust until the pressure setting is correct. Then lock the adjusting screw.

▲Warning

- The service valve should be opened slowly. Opening/closing service valve frequently or opening the service valve abruptly may introduce oil in compressed air or abnormal opening of relief valve.

4.6 Storage

If the machine is not operated for a few weeks, lubricated surfaces will tend to drain and dry. It is recommended that the compressor is run up under load and up to full operating temperature on a weekly basis. If a weekly test run is not possible then a maximum of one month between test runs is recommended. For machines in stand down mode:

- 1) Carry out maintenance as per instructions in this manual, and protect the machine with a plastic cover.
- 2) The machine storage place should be clean and dry, free of corrosive gas.
- 3) Start the machine once a week (or at least once a month), and carry out routine regular inspection. If the machine is not to be used for a long period of time, protect and keep the machine dry. For the requirements for safekeeping, please contact Sullair After-sales Service Department and After-sales Service Department of the engine manufacture.

Chapter V MAINTENANCE

5.1 General

Appropriate maintenance is crucial to the operation and lifespan of the machine. Therefore, the maintenance procedures for this rotary screw compressor must be followed. The service program given below will keep the machine at top performance. Besides this section, see “**CAT Diesel Engine Operator’s Manual**” for maintenance of diesel engine. Before any maintenance work, please read **Chapter II – Safety** of this manual.

▲ Warning

- Maintenance not only affects proper operation of the compressor but also the safety of the operators.
- Drain water in the fuel water separator and fuel tank every day before starting the machine to ensure proper operation of diesel engine.
- Do not remove nuts, oil filling plugs, and other parts when the compressor is running or pressurized.
- Shut down and bleed internal pressure of the compressor prior to maintenance.

5.2 Maintenance of Screw Compressor

Screw Compressor Maintenance Schedule describes the daily service of the compressor. Service the machine according to the Operating Hour or Maintenance Interval stated in the Schedule, whichever comes first.

Check fluid level before starting. If fluid level is low, refill. If the machine needs to be refilled frequently, the cause will need to be investigated. See the **Troubleshooting section of this manual**.

Once the machine is started, check instrument readings. After the machine is warmed up, check all instruments/gauges and check for oil/air leakage. Check for abnormal mechanical sounds. If abnormal items are identified, please stop and release pressure before taking further action.

Screw Compressor Maintenance Schedule:

Operating hours	Maintenance interval	Maintenance item	Maintenance description
10	Daily	Air filter	Clean the dust release valve. Service the filter element if there is an alarm of indicator.
		Fluid/air separator	Bleed condensate water entrapped before start up.
		Fuel/water separator	Bleed condensate water entrapped before start up.
		Fuel tank	Refill fuel every day after stopping the machine. Bleed water from tank drain before start up.
50	Weekly	Relief valve	Check if it is plugged or damaged.
		Fluid filter	Replace filter element after the first 50 operation hours.
		Return line	In 50 hours after initial start-up, clean return line orifice and strainer.
100	Half a month	Cooler component	Clean surface.
250	2 months	Fluid filter	Service the main filter element
500	4 months	Fluid filter	Change filter element if using AWF® fluid.
		Fuel line	Check, clean if dirty and plugging.
		Hose	Check, change if necessary
1000	8 months	Return line	Clean orifice and filter.
		Fluid filter	Change filter element if using AWF® fluid.
		Bearing of moving system	Add grease.

(Continued)			
Operating hours	Maintenance interval	Maintenance item	Maintenance description
2000	12 months	Air filter	Replace main filter element and safety element.
		Rubber hose	Replace the rubber hose in fluid line, control line and fuel line.
2500	15 months	Fluid filter	Change filter element if using AWF® fluid.
		Fluid/air separator element	Replace if damaged or clogged.
		Fluid	Change fluid if using AWF® fluid.
As required		Battery	Clean and apply grease to terminals to prevent corrosion.

5.2.1 Relief valve maintenance

A plugged relief valve may result in the valve failing to open in an overpressure situation, or it may not automatically close after opening. A relief valve failing to open will not provide protection against overpressure and could result in damaged components and personal injury. If the valve fails to close, fluid blowing out of the fluid/air separator may result in damage to components. Stop the compressor weekly and check the relief valve condition.

5.2.2 Fluid filter maintenance

After initial 50 hours operation, change the fluid filter element, and then after every 600 hours or four months of operation. For element change procedure see **Chapter V.4: Parts Replacement and Adjustment Procedures**. It is necessary to stop the machine before changing the element. Use appropriate LOTO procedures. Carefully wipe away dirty or oily foreign substances and avoid foreign substance entering the lubrication system.

5.2.3 Fluid maintenance

If AWF® fluid is used, change the fluid every 2500 operating hours or 15 months, whichever comes first.

Caution: Change interval of different types of fluid varies. Refer to detailed information in **Chapter I: SPECIFICATIONS**.

If the compressor is running in a bad environment the change interval will be shortened.

Some fluids are incompatible, if mixed, will lead to formation of laquer deposits, which may cause fluid filter blockages and other severe mechanical issues. Therefore, always avoid mixing different types of fluid and use a different type of fluid only after all fluid is drained.

The portable screw air compressor made by Sullair uses Sullair® AWF® fluid, which is availed from the After-sales Marketing Department of Sullair and the local branches.

If the fluid level in the fluid/air separator is below the middle position of the sight glass after the compressor is shut down, add fluid. However, this addition should be made only after the compressor is shut down, LOTO followed and all pressured is drained.

Caution: Formation of indiscernible sediment or laquer on the fluid filter element indicates that the compressor fluid requires changing immediately.

5.2.4 Return line maintenance

The purpose of the return line is to return fluid collected in the fluid/air separator element, back to the compressor low-pressure chamber of the air end through an orifice to minimize the losses. If the return line is blocked (orifice and strainer), the discharged air will contain excessive fluid. Check the return line regularly for fluid flow, and ensure the orifice and strainer are clean.

5.2.5 Fluid cooler maintenance

When oil, grease, dust and dirt collect on the cooler surface, the heat exchange efficiency will be reduced, ultimately leading to very high discharge temperatures and eventual shutdowns. For every 2 weeks or 100 hours, use a vacuum cleaner, detergent or low-pressure compressed air to clean the cooler surface.

5.2.6 Air filter maintenance

The air filter should be checked daily.

Clean the air filters dust collector daily. In a dusty environment, it may need to be cleaned more frequently. When the air filter alarm indicator is alarming, you should maintain the filter element. The air filter main element and the safety element should be replaced every 2000 operating hours or once a year, whichever comes first. See **Chapter V.4 – Parts Replacement and Adjustment Procedures** on how to maintain or change filter element.

5.2.7 Fluid/air separator maintenance

Generally, if the air filter and fluid filter are maintained properly, there is no need to reduce the service hours between separator element changes.

If the differential pressure over the oil /air separator has increased, or when foil carry over contained in discharged air increases, check the oil/air separator element, or change it as required in **Chapter V.4: Parts Replacement and Adjustment Procedures**.

When condensation mixes with the oil, the oil will become emulsified and deteriorated. Prior to a routine start, open the drain ball valve at the bottom of the oil/air separator tank to drain condensate water that was collected from previous day. If fluid emulsification is severe, change the fluid and run the machine on high load to remove remaining internal moisture.

5.2.8 Battery maintenance

Keep battery leads and connectors clean, and wipe with an oily cloth to prevent corrosion. Maintain proper electrolyte level in the battery.

When the compressor is working in a low temperature, to improve cold starting of the diesel engine, the following operations and maintenance method can be used:

1. Improve the working condition of the battery. Check the battery voltage before winter and heat the battery or use more batteries in an extremely cold environment.
2. Make sure the starting motor has sufficient starting torque before winter. Check all battery cable connections are clean and tight.

5.2.9 Wheel/tyre pressure

Inflate tyres to recommended tyre pressure.

Grease wheel bearings each year. To grease, remove end covers.

5.2.10 Hose maintenance

For every 600 hours or four months of operation, check inlet hose, fluid piping and flexible control lines. Change as required. At every 2000 hours or one year of operation, whichever occurs first, change the control and fuel lines.

5.3 Maintenance of Diesel Engine

Diesel Engine Maintenance Schedule:

Interval	Item
Every 50 hours	Check of fuel pipe and clamp bands
	Change of engine oil(initial) and oil filter
Every 100 hours	Cleaning of air cleaner element
	Cleaning of fuel filter
	Check of fan belt tightness
	Draining water separator
Every 200 hours	Check of radiator hoses and clamp bands
	Check of intake air line
Every 200 hours of operation or six months	Check of radiator hoses and clamp bands
Every 500 hours	Replacement of oil filter cartridge
	Replacement of fuel filter cartridge
	Cleaning of water separator
	Change of engine oil(routine)
	Removal of sediment in fuel tank
	Cleaning of water jacket(radiator interior)
	Replacement of fan belt
Every year	Replacement of air cleaner element
Every 800 hours	Check of valve clearance
Every 1500 hours	Check of fuel injection nozzle injection pressure
Every 3000 hours	Check of turbo charger
	Check of injection pump
Every two years	Change of radiator coolant
	Replacement of radiator hoses and clamp bands
	Replacement of fuel pipes and clamp bands
	Replacement of intake air line

Diesel Engine Maintenance Schedule describes the daily service work required for the diesel engine. Service the engine according to the Operating Hour or Maintenance Interval stated in the table, whichever comes first. The engine may need to be serviced more frequently in harsh environment. See the “**CAT Diesel Engine Operator’s Manual**” for other maintenance requirements and operation of the diesel engine.

5.3.1 Fuel tank

Fuel tank should be filled with diesel suitable for local ambient temperature. In order to prevent condensation accumulating in the fuel, it is recommended to refill the tank every day after work, and drain the condensate from the tank next day before starting the machine.

5.3.2 Engine oil/fluid filter

Check oil level dipstick every day. Oil level should be in the range between Max and Min mark. Drain some oil if oil level exceeds the Max mark and add oil if lower than the Min.

If API CH-4 oil with TBN minimum value of 11 is used, change the oil and fluid filter every 300 operating hours or 2 months, whichever comes first. See **Chapter V.4 – Parts Replacement and Adjustment Procedures** on how to change.

If oil is diluted (with fuel), a thorough check must be carried out to determine the cause. Otherwise, the diesel

engine may be seriously damaged.

5.3.3 Water tank radiator/ cooling system

Check coolant level every day. Add coolant if necessary.

If coolant needs to be added every day, please check cooling system for leaks.

▲Warning

- **Coolant is hot and pressurized when the machine is running.**
- **Hot coolant and vapor may cause injury.**
- **Check coolant level only when the diesel engine is not running and the radiator cap is not feeling hot.**
- **Screw off radiator cap slowly to release pressure.**
- **Antifreeze/antirust contains alkaline, which may cause injury if contacted with skin or eyes.**
- **Never use water as antifreeze/antirust coolant.**

The heat transfer performance of cooler will be impaired if cooler surface is covered by oil, grease, dust or contaminants. This could lead to coolant overflow due to the high temperature/pressure and the machine being unable to operate, it could also result in inadequate cooling of the charge air going into the engine. Clean the radiator surface with vacuum, detergent or low-pressure compressed air twice a month.

Check SCA content (see the table below) in antifreeze & antirust coolant every 300 operating hours or 2 months whichever comes first, in order to protect engine cooling system from being damaged by coolant contamination, weld point yellowing and general erosion. Add according to procedures if SCA content in the antifreeze & antirust coolant is low.

SCA content check table

Spec.	Color	Freezing point °C	Specific gravity	PH
-50	Blue	-50	1.070~1.060	7.5~9
-40	Blue	-40	1.060~1.055	7.5~9
-35	Blue	-35	1.055~1.050	7.5~9
-30	Blue	-30	1.050~1.040	7.5~9
-20	Red	-20	1.030~1.035	7.5~9
-10	Red	-10	1.020~1.025	7.5~9

Caution: Before adding antirust to cooling system, you may need to discharge some coolant from the plug valve at the bottom of radiator.

Check radiator pressure cap sealing gasket. Replace immediately if damaged.

Coolant of cooling system should be replaced every 3000 operating hours or two years, whichever comes first. See **Chapter V.4 – Parts Replacement and Adjustment Procedures**.

5.3.4 Air Inlet System

Air filter should be checked every day.

Clean the air filters dust collector and collector cap every day. Do it more frequently in dusty environment.

When the air filter alarm indicator turns red, you should maintain the filter element. Check air filter for damage and leaks in the intake system every 300 operating hours or two months, whichever comes first. The air filter element should be replaced every 2000 operating hours or once a year, whichever comes first. See **Chapter V.4 – Parts Replacement and Adjustment Procedures** on how to service or change the filter element.

5.3.5 Fuel Filter and Strainer

Discharge the water in strainer every day.

Replace the fuel filter (including strainer) every 300 operating hours or two months, whichever comes first.

If air exists in the fuel system, it will be hard to start the engine or the engine may not run smoothly. In such a case, vent the system manually.

▲Warning

- Do not vent the air while engine is hot. It may cause fire if fuel is spilled on the hot exhaust manifold.

5.3.6 Fuel Suction Filter

Check or clean suction filter weekly to clean dirt collector and sieve mesh.

5.3.7 Belt Tension

Check belt tension after the first 20 to 40 operating hours. Check belt tension as follows every 300 working hours or two months thereafter, whichever comes first. Check the followings:

- Check belt for damage. See if there is wear or crack. Replace worn or damaged belt.
- Check fan belt tension. Apply a vertical force of 110N in the mid-point between the belt wheels. Properly adjusted belt shall have a belt deflection of 9 to 15 mm. If the tension is not correct, adjust belt tension by re-positioning the alternator.

5.3.8 Valve Clearance

Check valve clearance after initial 300 operating hours or two months, or every 600 operating hours or 4 months, whichever comes first. For a new engine, it is recommended to check valve clearance at the first oil change. Only qualified person should perform this task.

5.4 Parts Replacement and Adjustment Procedures

5.4.1 Changing Compressor Fluid

Run the compressor for 5 to 10 minutes warm up the fluid. Stop the machine and release all internal pressure. Use LOTO procedure. Open the drain ball valve at the bottom of fluid/air separator to drain the fluid. Close the drain ball valve, refill fluid and replace filter element. See **4.2 – Changing Fluid Filter** and **Chapter I – Specifications**.

Caution: Do not allow fluid to contact skin. Hot fluid may cause scalding.

5.4.2 Changing Fluid Filter

- 1) Stop the machine and release all internal pressure. Use LOTO procedure.
- 2) Use belt wrench to remove used filter element and gasket.
- 3) Clean gasket mounting surface.
- 4) Apply a thin layer of silicone grease to the new gasket.
- 5) Fill the new fluid filter with clean fluid.
- 6) Turn the filter element with hand or a belt wrench until the seal ring just touches the filter seat and then continue to tighten the filter until an increase in torque is sensed, then tighten it a further 1/2~3/4 of a turn.
- 7) Restart the machine and check for leaks.

▲Warning

- In order to minimize damage to the filter element, use Sullair approved parts only

5.4.3 Servicing and Changing Air Filter Element

Clean the air filters dust collector every day. When the air filter indicator turns red, service the filter element. Check the air filter for damage and leaks in the intake system every 300 operating hours or two months; the air filter element should be replaced every 2000 operating hours or once a year, whichever comes first. The safety filter element does not need maintenance normally and should be replaced together with the main element.

Servicing and replacing procedure of air filter element:

- (1) Stop compressor and release all pressure. Follow LOTO procedure.
- (2) Remove rear cap and clean dust from the dust collector.
- (3) Remove main filter element carefully. Use a light to look for holes or damage. Replace if necessary.
- (4) Use a clean wet rag to clean the inner side of air filter. **Do not use compressed air.**
- (5) If the original element is in good condition, lightly tap the end of the filter element on a flat board. Use dry compressed air not exceeding 2.1bar (30psi) to blow off the dust in the folds from inside in a direction 45° to the main filter; **from inside to outside**;
- (6) Reinstall the cleaned or new filter element;
- (7) Install dust collector and rear cap of the air filter with opening of dust collector in correct direction.

Caution: Do not disassemble and replace air filter element when compressor is running.

Never clean filter element with oil, water or compressed air that contains water.

Filter element with damaged filter paper or gasket **must** be replaced immediately.

Apply a small amount of silicone grease to the surface of gasket before installing the filter element to prevent adhesion between gasket and air filter canister.

Inferior / non-standard air filter elements may reduce diesel engines output power, may result in the oil needing to be replaced more frequently, and may result in early serious wear of the diesel engine

5.4.4 Changing Fluid/air Separator Element

If oil is detected in service air while return line strainer, check valve and orifice are working properly, the fluid/air separator element should be changed as follows:

- (1) Stop compressor and release all pressure. Follow LOTO procedure.
- (2) Use belt wrench to remove used filter element.
- (3) Clean the mounting surface.
- (4) Apply a thin layer of silicone grease to the rubber sealing ring of the new element.
- (5) Turn the replacement element by hand or a belt wrench till the seal ring just touches the filter seat and then continue to tighten the filter until an increase in torque is sensed, then tighten a further 1/2~3/4 of a turn.
- (6) Restart the machine and check for leakage.

5.4.5 Changing Fuel Water Separator/Fuel Filter

- 1) Use belt wrench to remove used filter element and gasket.
- 2) Clean gasket mounting surface.
- 3) Apply a thin layer of oil on the new gasket.
- 4) Fill the new fuel water separator/fuel filter with clean fuel.
- 5) Turn the filter element by hand or belt wrench till the seal ring just touches the filter seat and then continue to tighten the filter until an increase in torque is sensed, then tighten it a further 1/2~3/4 of a turn

- 6) Restart the machine and check for leaks.

Caution: Fill up fuel filter when new element is installed. If air exists in fuel, it will be hard to start the engine or engine will not run smoothly

5.4.6 Changing Coolant

▲Warning

- **Coolant is hot and pressurized when the machine is running.**
 - **Hot coolant and vapor may cause injury.**
 - **Check coolant level only when the diesel engine is not running and the radiator cap is not hot.**
 - **Screw off radiator cap slowly to release pressure.**
 - **Antifreeze/antirust contains alkaline, which may cause injury if contacted with skin or eyes.**
 - **Never use water as antifreeze/antirust coolant.**
- 1) After the machine has stopped and coolant is cool, screw off radiator cap slowly to release pressure.
 - 2) Release the drain valve in the radiator to discharge coolant from radiator and engine.
 - 3) Close the drain valve.
 - 4) Refill coolant as described in **Chapter I.5**.
 - 5) Fasten radiator cap.

5.4.7 Changing Engine oil

Run the compressor for 5 to 10 minutes to warm up the oil. Stop the machine and use LOTO procedure. Open the drain valve at the bottom of oil sump to drain oil. Refill fluid and replace the oil filter element. See **Chapter V.4.2 – Changing Fluid filter** and **Chapter I – Specifications**.

Caution: Do not allow fluid to come in contact with skin. Hot fluid may cause scalding.

5.4.8 Adjusting Regulation System

If the compressor cannot reach rated operating pressure or speed, the regulation system needs to be adjusted. See **Chapter IV.6 - Mode Setting Procedure** for details.

5.5 Troubleshooting

The troubleshooting table is based on practical application and extensive testing by the manufacturer. It illustrates common faults that may happen to the machine and general causes and resolutions of the faults. It may not cover all possible faults and resolutions.

Before repairing or replacing any part, please analyze all possible causes thoroughly. When a problem is encountered, observe carefully to identify fault and rectify to avoid unnecessary damage to the machine.

Always keep the following in mind:

- a. Check for loose electrical wires;
- b. Check for damaged piping;
- c. Check for component part damage caused by overheating or short circuit (normally accompanied by color change or burnt smell).

If the fault condition cannot be resolved according to the recommended method, please consult local representative of Sullair or Sullair After-sales Marketing Department.

TROUBLESHOOTING

Symptom	Probable cause	Remedy
1. Insufficient air discharge	Air demand is excessive	Check to see if the air equipment matches compressor delivery.
	Engine speed low	Adjust speed or check engine fuel filter.
	Air filter plugged	Check if there is any service indication on instruments. Replace filter element if necessary.
	High pressure air leakage	Check air service pipe and valve for leakage.
	Pressure regulation valve failure or damaged	Adjust pressure regulator as described in Chapter IV - Operation. Check regulator diaphragm and replace if necessary (spare parts provided).
	Fluid/air separator element plugged	Replace fluid separator element, fluid filter element and fluid.
	Compressor rotor wear	Contact Sullair technician for further investigation.
2. Low service pressure	Air demand is excessive	Check to see if the air equipment matches compressor delivery.
	Air filter plugged	Check if the pressure difference indicator turns red. Clean/replace.
	Pressure regulation valve failure or damaged	Check/replace (spare parts provided).
3. Compressor overheating	Fluid level of fluid/air separator is low	Add fluid. Check for leakage.
	Oil cooler is dirty or clogged	Clean fluid filter fin.
	Fan belt loose or damaged	Adjust tension wheel or replace belt.
	Thermal component of thermal valve failure	Replace thermal component.
	Fluid filter plugged.	Replace filter element.
	Return line plugged.	Clean return line strainer and orifice.
	Hot air circumfluence	Move the machine or change direction to avoid circumfluence.
4. Excessive fluid consumption of compressor	Modulation set point too high	Adjust pressure regulator as described in Chapter IV - Operation. Check regulator diaphragm and replace if necessary (spare parts provided).
	Clogged return line	Clean return line strainer and orifice.
	Leakage in lubrication system	Check all pipes, connections and components. Repair or replace.
	Fluid/air separator element damaged	Replace the element.
	Low system pressure	Check min pressure valve and orifice of silencer.
5. Relief valve opened	Fluid/air separator fluid level too high	Check fluid level from sight glass. Drain excess fluid if the level is too high.
	Pressure setting of pressure regulation valve is high	Adjust pressure setting.
	Control air leakage	Check control line.
	Inlet valve will not close (stuck)	Service or replace inlet valve.
	Control system clogged	Check control line.
	Pressure regulation valve failure or damaged	Adjust or replace (spare parts provided).
6. Compressor shuts down with load	Relief valve failure	Replace.
	Out of fuel	Check fuel level and fuel system.
	Discharge temperature switch activated	Activation of discharge temperature switch may be caused by overheated compressor. See item 3.

	Coolant overheat	Check coolant level, thermostat and fan.
	Low coolant level	Check coolant level.
	Low engine oil pressure	Check oil level of dipstick and fluid filter
	Switch failure	Test the switch.
	Electric circuit system failure	Test electric circuit system.

(Continued)

7. Excessive machine vibration	Engine speed low	Check speed adjustment and check fuel filter.
	Fixed bolts of pulley or isolator loose	Fasten bolts or nuts.
	Pulley or isolator imbalance	Replace with new pulley or isolator.
	Fan impeller imbalance.	If the vibration is eliminated by detaching the belt, replace with a new fan.
	Machine frame loose or wear	Fasten fixed bolts. Replace parts if necessary.
	Engine ignition problem or speed unstable	See item 13 to 15.
8. Engine can be cranked but cannot be started – no fume in exhaust pipe	No fuel in tank	Add fuel.
	Fuel line plugged	Check/purge fuel line.
	Fuel pump failure	Check or replace fuel pump.
	Fuel filter plugged	Check and replace fuel filter. Check if the fuel is suitable for local ambient temperature and change thoroughly if not.
	Fuel injector unit failure	Remove, adjust and repair or replace.
9. Engine is hard to be or cannot be started – with fume in exhaust pipe	Low crank speed	Check if battery, starter and cable terminals are secured.
	Cold starter is needed or does not work with cold starter	Check for correct operation of glow plug
	Inferior fuel	Drain fuel completely and flush fuel system.
	“Cloud point” of fuel is higher than ambient temperature	Replace fuel and fuel filters.
	Air filter plugged	Check air filter. Clean or replace.
	Air in fuel system	Vent the fuel system.
	Timing problem of fuel injection	Check and adjust injection timing.
	Valve clearance problem	Readjust valve clearance.
10. Engine will stop after starting	Low idle speed	Check idle speed adjusting screw.
	Engine is loaded	Start machine without load.
	Inferior fuel	Drain fuel completely and flush fuel system.
	Air in fuel system	Vent the fuel system.
11. Low engine speed	Wrong speed system setting	Check and adjust speed system setting.
	Fuel filter plugged	Check fuel filter. Replace if necessary.
	Air filter plugged	Check air filter. Clean or replace.
	Pressure regulation valve failure	Check, adjust or replace.
12. Engine vibrates at idle speed	Low idle speed	Check idle speed adjusting screw.
	Air in fuel system	Vent the fuel system.
	Low fuel level in the fuel tank	Add fuel in the fuel tank.
	Fuel line and filter plugged	Purge fuel line and replace filter.
	Fuel injector unit failure	Remove, adjust and repair or replace.
13. Idle speed of heat	Low idle speed	Check idle speed adjusting screw.

engine is unstable	Air in fuel system	Vent the fuel system.
	Timing problem of fuel injection unit	Check and adjust injection timing.
	Fuel injector unit failure	Remove, adjust and repair or replace.
14. Engine ignition problem or speed unstable	Inferior fuel	Drain fuel completely and flush fuel system.
	Air in fuel system	Vent the fuel system.

(Continued)

14. Engine ignition problem or speed unstable	Wrong valve clearance	Check pushrod, spring and adjust valve clearance.
	Fuel injector unit failure	Remove, adjust and repair or replace.
	Timing problem of fuel injection unit	Adjust injection timing if necessary.
15. Engine temperature will not rise	Thermometer failure	Adjust or replace.
	Thermostat does not work or failure	Test or replace.
16. Rough combustion of engine	Poor fuel quality.	Discharge fuel, replace with new filter element and refill with clean quality fuel.
	Air in fuel system	Vent the fuel system.
	Timing problem of fuel injection unit	Check and adjust injection timing.
	Fuel injector unit failure	Use ET to find out failed injector unit through cylinder isolation test.
17. Engine speed will vary at full-load/no-load	Engine speed regulator or fuel injection pump failure	Check if speed limit screw and speed regulation cylinder are in proper location and length.
	Speed regulation cylinder failure	Check speed limit screw or reset spring.
	Control line failure	Check if the control line connected to regulation cylinder is clogged or is leaking.
18. Low engine power	Speed regulator not set properly	Check/adjust regulation pushrods.
	Poor fuel quality	Drain fuel and purge fuel line.
	Air filter plugged	Check, clean or replace.
	Air or fuel line leaking or throttled	Fasten connectors. Replace if necessary.
	Air in fuel system	Vent the fuel system.
	Fuel line and fuel filter plugged	Purge fuel line and replace fuel filter.
	High engine oil level	Drain excess oil to normal level.
	Fuel return line clogged.	Clean obstruction.
	Leakage in turbocharger or intake manifold	Check intake manifold pressure. Clean, repair or replace.
	Carbon accumulation or damage on turbocharger	Check turbocharger. Clean, repair or replace.
	Timing problem of fuel injection pump	Check injection pump timing.
	Valve position error	Check pushrod and spring.
	Timing problem of fuel system injection	Remove, test, clean and repair.
	Fuel injector unit failure	Remove, test, clean and repair.
19. Engine overheat	Fan belt loose or damaged	Adjust tension or replace belt.
	Fan pulley installation position problem	Adjust pulley installation.
	Low coolant level	Add coolant.
	Radiator fin clogged	Clean fin surface.
	Low oil level	Add oil to normal level.
	Water pump failure	Replace pump.

	Water tank pressure cap failure	Check pressure cap. Replace if necessary.
	Thermostat failure or not working	Check or replace thermostat.
	Fuel quantity high or bad injection timing	Check/replace fuel injection pump.
	Overloaded	Check pressure setting. Adjust if necessary.

(Continued)

20. Black smoke or dense gray smoke	Insufficient air for combustion	Check if air filter is plugged. Check if intake manifold pressure and turbocharger are working properly.
	Fuel injector unit failure	Test all injectors. Replace if necessary.
	Timing problem of fuel system injection	Check and adjust injection timing.
	Air in fuel system	Discharge air.
	Fuel quantity high	Check/adjust fuel injection pump.
	Engine temperature will not rise	Check thermostat and cooling system.
21. White smoke or dense blue smoke of engine	Too much engine oil	Drain excess oil.
	Engine ignition problem or speed unstable	See item 15.
	Timing problem of fuel system injection	Adjust timing.
	Turbocharger oil seal damaged	Check intake manifold for oil. Repair if necessary.
	Valve guide wear	Check/repair cylinder head.
	Piston ring wear	Replace piston ring.
22. High fuel consumption	Fuel system leakage	Check fuel system. Repair or replace parts.
	Injection timing problem	Adjust injection timing.
23. Low engine oil pressure	Engine oil insufficient	Add oil to normal level. Check for leakage.
	Pressure gauge or sensor failure	Check/replace.
	Engine oil is diluted (with diesel or water)	Find out causes. Change engine oil and engine oil filter element.
	Wrong engine oil viscosity	Check and change with right oil.
	Oil filter or oil cooler clogged	Check/clean. Change oil filter and oil.
	Oil pressure regulation valve failure	Check, repair or replace.
	Oil pump, bearing wear or other reasons	Contact service department of engine manufacturer to repair or replace parts.
24. Engine early wear	Dirty oil	Change dirty oil and oil filter.
	Intake piping leakage	Check all intake piping components. Repair if there is a leakage.
	Air filter or gasket damaged	Check air filter. Replace filter element.
	Fuel in oil	Find out causes. Repair/change oil and oil filter.
25. Coolant in oil	Oil cooler core damaged	Replace with new cooler core.
	Cylinder head gasket damaged	Replace with new gasket and fasten fixed bolts as specified.
	Cylinder head cracked or defect	Replace with new cylinder head.
	Cylinder block cracked or defective	Replace with new cylinder block.
	Cylinder jacket gasket damaged	Replace with new gasket.
26. Oil in fume	Too much oil in air port	Contact service department of engine manufacturer to check and repair.
	Valve guide wear	Check/repair cylinder head.
	Piston ring wear	Replace with new piston ring.

	Engine runs at idle speed without load for too long	Do not let engine run at idle speed without load for too long.
27. Abnormal mechanical noise in engine	Connecting rod bearing liner damaged	Check connecting rod bearing liner and neck surface of crankshaft.
	Timing gear damaged	Replace with new parts as required.
	Crankshaft damaged	Repair or replace crankshaft.

(Continued)

28. Abnormal noise in air valve or air valve driving parts	Air valve spring damaged	Replace damaged air valve spring.
	Camshaft damaged	Replace the camshaft and clean thoroughly the engine thoroughly.
	Air valve pushrod damaged	Replace camshaft and pushrod, and clean the engine thoroughly. Check if air valve moves freely.
	Air valve damaged	Replace air valve. Adjust if necessary.
29. Motor starter does not start	Low battery output power	Check battery. Charge or replace the battery accordingly.
	Circuit or switch failure	Repair. Replace if necessary.
	Starter's magnetic switch failure	Replace with new magnetic switch.
	Starter failure	Repair or replace.
30. Alternator does not charge	Alternator belt loose	Adjust belt to proper tension.
	Charging circuit, grounding circuit or battery terminal failure	Check all guide lines and terminals. Fasten all termination nuts and clean terminals. Replace failed parts.
	Rotor winding failure	Replace with new winding.

Chapter VII PARTS ORDERING

Procedure for Ordering Parts

Parts should be ordered from the nearest branch of Sullair or your Sullair Representative. If for any reason parts cannot be obtained in this manner, contact Sullair Parts Department directly at the address listed at the back cover of this manual.

When ordering parts, you should always indicate the model and serial number of the compressor. Since Sullair constantly improves its products, the content in the manual may differ from the actual assembly after a period of time. Model and serial number can be obtained from the serial number plate located on the compressor.

When ordering parts, you should read carefully the Illustrations and Parts List. See Parts List, P/N: 88292021-382.

SULLAIR AUSTRALIA WARRANTY POLICY

A.C.N. No 006732332

Hereinafter the word "Seller" refers Sullair Australia Proprietary Limited. "Purchaser" refers to the person or company invoiced for the goods. This warranty policy is in addition to any rights or obligations of the Seller or Purchaser under law that cannot be excluded or modified. In circumstances where the Australian Consumer Law ("ACL" - as set out in Schedule 2 to the Competition and Consumer Act 2010 Cth) applies to any product sold, supplied or manufactured by the Seller, the provisions of this policy shall apply to the extent permitted by the ACL, and nothing in this policy shall be construed as excluding, restricting or modifying any provision of the ACL.

1. SCOPE

The Seller warrants that product of its manufacture and supply shall be free from defects in material and workmanship. Where the Seller supplies goods that are not of its manufacture then the warranty that applies shall be the warranty, if any, extended by that Manufacturer. Where the Seller accepts liability for warranty then it may, at its option either:

- a) Repair or replace the product, or the supply of equivalent goods.
- b) Supply replacement parts on an ex-works basis, supply the service again or, subject to the conditions hereunder, reimburse the customer for the costs of locally purchased materials and subcontract services.

NOTE: No claim will be accepted by the Seller unless notified in writing prior to any works being undertaken on its behalf. The Claimant must obtain a written order from the Seller before proceeding.

2. ESTABLISHMENT OF BONA FIDES

For every warranty claim request the onus lies with the Claimant to establish its validity. The Seller will not proceed with the repairs unless a customer order has been provided.

3. TIME HORIZON FOR WARRANTY LIABILITY

Any request, claim, or action from warranty liability must be commenced within 45 days of the event occurring - or the claim may be disallowed.

4. CONDITIONS AND LIMITATIONS

a) PAYMENT IN FULL

No warranty claim will be considered unless the Claimant has fully complied with the terms of payment as set down in the conditions of sale or in the quotation for supply of the goods concerned.

b) INSTALLATION / ENVIRONMENT

The warranty is conditional upon the correct and proper installation and application of the product. No claim will be allowed where the environment is hostile to the product and no warranty is given in respect of the suitability of materials of construction of the product unless specifically so stated, in writing, by the Seller.

c) PROPER COMMISSIONING AND OPERATION

Warranty is subject to and conditional upon the equipment having been installed, commissioned and maintained in accordance with the Seller's recommendations as set down in the appropriate instruction manual. Service work may only be carried out by parties authorised by the Seller and using only genuine Spare Parts.

d) UNAUTHORISED MODIFICATIONS

Any alterations or modifications to the equipment carried out by any party, without the express written approval of the Seller, will render the warranty null and void.

e) MISUSE

Warranty expressly excludes damage as a result of accident, abuse, misuse, negligence or incorrect operation by the Claimant or his agent

f) LABOUR CHARGE

The Seller will provide labour free-of-charge (subject to further conditions hereunder) during the nominated warranty period only, and during normal working hours, Monday to Friday (Public Holidays excepted).

g) TRAVEL TIME AND COSTS

Time to travel to site will be charged at current hourly rates to the Claimant.

Mileage, accommodation, meals and any other costs associated with effecting warranty repairs will be charged to the Claimant.

h) WARRANTY WORK OUTSIDE NORMAL HOURS

For work required outside normal working hours the differential penalty rates applicable will be charged to the Claimant.

NOTE: Our "Out of Hours" call out fee is charged where work is required on that basis.

5. WARRANTY PERIOD

-Equipment Manufactured by the Seller

- One (1) year from date of delivery from the Sellers works.
- A further Twelve (12) months extended warranty is granted in respect of the Rotary Screw Element contained within the "Oil Flooded" rotary screw compressors manufactured by the Seller.

-Equipment and Assembly Components not manufactured by the Seller

In accordance with Clause 1, the Seller extends to the Purchaser the warranty so provided by the equipment or component Manufacturer.

NOTE: No extension of the initial warranty period will be provided by the Seller as a consequence of any work carried out under the Warranty Policy.

Spare Parts Warranty:

Warranty period on 'Spare Parts', irrespective of whether the parts are sold over the counter or as part of a service job. Replacement of 'Spare Parts' is accepted within the normal warranty guidelines if the replaced failed part is not the original component of the machine but the machine is still within the warranty period, and providing recurrent faults found are not a result of customer or technician intervention. If the replaced failed part is not the original component of the machine and the machine is out of the warranty period, the component is covered for 90 days only from date of sale, labour or travel charges are not accepted.

6. CONSEQUENTIAL COSTS

The Seller will not be liable under any circumstances, for any costs incurred by the Purchaser, as a consequence of the failure of the product. Furthermore the Seller will not be liable for any damages which may follow as a consequence of the product failure.

7. ADMISSION OF LIABILITY

Acknowledgement and / or investigation initiated or actioned by the Seller for any product failure does not admit its liability or acceptance of any claim.

8. TOTALITY OF THE POLICY

No departure from this policy is granted by the Seller unless it is approved in writing by the Seller.

9. GENERAL TERMS AND CONDITIONS OF BUSINESS

This warranty policy is to be read in conjunction with Sullair Australia Pty. Ltd. "General Terms and Conditions of Business".



SULLAIR AUSTRALIA NETWORK

SULLAIR AUSTRALIA HEAD OFFICE
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Toll free contact: 1300 266 773
www.sullair.com.au

AUSTRALIAN SALES AND SERVICE LOCATIONS

New South Wales - Sydney

Sullair Australia Pty. Ltd.

21 Garner Place,
Ingleburn, NSW, 2565

New South Wales - Newcastle

Sullair Australia Pty. Ltd.

21 Ayrshire Crescent,
Sandgate, NSW, 2304

Queensland - South

Sullair Australia Pty. Ltd.

8 Prospect Place,
Berrinba, QLD, 4117

South Australia

Sullair Australia Pty. Ltd.

50 – 52 Magazine Road,
Dry Creek, SA, 5094

Victoria

Sullair Australia Pty. Ltd.

7 Bazalgette Crescent,
Dandenong, VIC, 3175

Queensland - North

Sullair Australia Pty. Ltd.

36 Caterpillar Drive,
Paget, Mackay, QLD, 4740

Western Australia

Sullair Australia Pty. Ltd.

46 Sorbonne Crescent,
Canning Vale, WA, 6155



INTERNATIONAL DISTRIBUTORS AND SERVICE LOCATIONS

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7 Bazalgette Crescent Dandenong,
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Tel: (+613) 9703 9000 Fax: (+613) 9703 9053
Toll free contact: 1300 266 773
www.sullair.com.au

New Zealand

Secair N.Z. Ltd.

287 Church Street, Onehunga,
Auckland, New Zealand

Telephone: +64 9 634 4211
Facsimile: +64 9 634 4212

Contact: Mr. Kerry Waugh
Email: campbell@secair.co.nz

Thailand

Integrated Industrial & Engineering Co.

1122 Sol Vachirathamsathit 57,
Sukhumvit 101/1 Road, Bangchak, Prakanong,
Bangkok 10260, Thailand

Telephone: +66 2 746 3400
Facsimile: +66 2 746 4440

Contact: Mr. Chaiyaporn (CK) Keawsiriwattana
Email: iiacobkk@ksc.th.com

Indonesia

P.T. Kompresindo Utamajaya

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Contact: Mr. Arief Eko
Email: arief.eko@kompresindo.co.id

Global Sales and Services



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Division of Accudyne Industries
3700 East Michigan Boulevard
Michigan City, Indiana 46360 U.S.A.
Telephone: 001-219-879-5451 or 1-800-Sullair (U.S.A. only)
Fax: 001-219-874-1273

Sullair Asia:

SULLAIR ASIA website: <http://www.sullair-asia.com> Hotline: 800-830-3977

Sullair Singapore: 510 Thomson Road, #13-01, SLF Building, Singapore 298135. New - Tel (65) 6568 2800

Sullair Taiwan: No. 1, 3/F., No.248 Zhongshan Road, Linkou Village, Taipei County

Tel: 02-26013500 Fax: 02-26013032

Shenzhen Factory: Zuopaotai Road, Chiwan, Shekou, Shenzhen 518068

Tel: 0755-26851686 Fax: 0755-26835157

Suzhou Factory: No.266 Changyang Street, Singapore Industrial Park, Suzhou 215024

Tel: 0512-87162388 Fax: 0512-87162389, 87162387

Shanghai Branch: Room 2903, Raffliers Plaza, No.268 Xizang Middle Road, Shanghai 200001

Tel: 021-53852036, 53852038 Fax: 021-53852035

Beijing Branch: Room 1415, Block B, Xingfu Building, No.3 East 2nd Ring Road, Beijing 100027

Tel: 010-64629770, 64629768 Fax: 010-64629773

Chengdu Branch: Room 1102, Block T2, Office Building of Raffliers Plaza, No. 3 Section 4 of Renmin South Road, Wuhou District, Chengdu City 610041

Tel: 028-65112864/65112865 Fax: 028-65112866

Shenyang Branch: Room 906, Block 2, City Plaza, No.206 Nanjing North Street, Heping District, Shenyang 110001

Tel: 024-22818450, 22818550 Fax: 024-23342452

Xi'an Branch: Room 701A, Jinxin International Building, No.99 Heping Road, Xi'an 710001

Tel: 029-87206201, 87206202 Fax: 029-87206204

Wuhan Branch: Room 1805, Wuhan Wanda Center, No.96 Linjiang Avenue, Wuchang District, Wuhan City 430060

Tel: 027-87322745 Fax: 027-87322546

Xinjiang Branch: Unit J, 9/F., China Development Bank Tower, No.339 Zhongshan Road, Urumqi City 830002

Tel: 0991-2308451, 2308452 Fax: 0991-2308450

**Sullair Means Quality
Sullair Means Service**

Global Service Support and Worldwide Parts Availability

**P/N: 88292021-381
E/N: 01**

