Operating and Service

750-125/S, 900-125/S
650-170/S, 750-170/S
Caterpillar 3306 DI-TA
Powered Compressors

GB

Publication No. CTP 539 - AUGUST 1998
(3rd. Issue)

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CALIFORNIA
Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

PRODUCT LIABILITY

CONSUMER PROTECTION ACT 1987
EEC DIRECTIVE COVERING PRODUCT LIABILITY

EEC Council Directive No.85/374/EEC has been adopted by HM Government and becomes effective in the United Kingdom from March 1988.

Not withstanding other and various legally binding requirements, the Directive specifically requires manufacturers of products to provide instructions for the safe use of such products.

CompAir Holman support all new products being supplied to their customers with a comprehensive Operator Manual which clearly defines mandatory instructions for the operation, safe use and maintenance of the product.

It is the responsibility of the owner or hirer of such products to ensure that operators are provided with the manual and are suitably instructed regarding the purpose of the Manual and its safety instructions. In addition operators should be suitably and adequately trained in the use of the product.

THIS IS AN IMPORTANT NOTIFICATION AND IN THEIR OWN INTEREST OWNERS AND HIRERS MUST COMPLY.

FOREWORD

In the design of CompAir Holman products every effort is made to make operation, maintenance and overhaul as simple as possible. To obtain reliable service from the machine correct and regular maintenance is essential.

This manual has been prepared to assist the user in caring for this machine and every effort has been made to provide sufficiently detailed information for a competent person to be able to do this properly. Provided the instructions are read carefully and followed by suitable trained persons the equipment will give long and trouble free service.

Similarly, if the instructions are followed, we cannot foresee circumstances in which this equipment will present a health or safety hazard. It is expected that users will observe normal safe practices when operating or working on the equipment such as the safe handling of compressed air, engine exhaust, fuels, oils, cleaning fluids, lifting and moving the machine, working inside it and security of the machine if working underneath. Take care of your machine, keep it clean and in good mechanical condition.

The standard build of all Compair Holman Limited products are not intended for use in either Explosive or Potentially Explosive Atmospheres as defined in Directive 94/9/EC.

An Explosive atmosphere is a mixture with air, under atmospheric conditions, of flammable gases, vapours, hazes or dusts in which, after ignition has occured, combustion propogates to the entire unburned mixture and may cause a hazard.

A Potentially Explosive atmosphere is an atmosphere which could become explosive due to local conditions.

Refer to the appropriate manufacturer’s publications for operating, maintenance and servicing instructions for engine or other major factored equipment fitted to this machine.

Where references are made in this book, the towbar end of the plant is the front, and left and right are as viewed from the rear.

As far as possible the information contained in this book was correct at the date of publication. The manufacturers reserve the right to modify specifications in accordance with new or improved designs. Whilst every effort is made to maintain accuracy in the data given all figures must be taken as typical and in no way binding.

CompAir Holman is a member of the SIEBE Plc Group of Companies. If assistance is required contact your nearest CompAir Holman Region, Company or Distributor or, if this is not practicable, contact directly CompAir Holman Limited, International Parts and Service Centre, Camborne, Cornwall TR14 8DS.

CONTROL OF SUBSTANCES HAZARDOUS TO HEALTH REGULATIONS (COSHH) (United Kingdom)

YOUR ATTENTION IS DRAWN TO THE FOLLOWING LISTS OF LIQUIDS AND SUBSTANCES USED IN OUR PRODUCTS WHICH MAY EXPOSE PERSONNEL TO RISK IF SWALLOWED OR IF SKIN OR FACIAL CONTACT IS ALLOWED.

1. PORTABLE AIR COMPRESSORS

Diesel fuel oil.
Compressor and engine lubricating oils and greases.
Anti-freeze agents and mixes (liquid cooled engines).
Corrosion inhibitors and conditioners (some cooling systems).
Battery acid.

2. PNEUMATIC TOOLS and ROCK DRILLS

Lubricating oils and greases.
Anti-freeze agents.

3. DRILL RIGS

Diesel fuel oil.
Anti-freeze agents and mixes — models incorporating diesel engines
Battery acid.
Corrosion inhibitors and conditioners (some cooling systems).
Lubricating oils and greases.
Hydraulic fluid.

4. DUMPERS and VIBRATING ROAD ROLLERS

Diesel fuel oil.
Lubricating oils and greases.
Anti-freeze agents and mixes (liquid cooled engines).
Corrosion inhibitors and conditioners (some cooling systems).
Hydraulic fluid.
Battery acid.

NOTE

Comprehensive maintenance instructions are contained in our operator manuals. In the interest of safety these should be strictly observed at all times.

OPERATING AND SERVICING

CONTENTS

OPERATING AND SERVICING

LIST OF ILLUSTRATIONS

1 GENERAL

1.1 SAFETY IN THE OPERATION, MAINTENANCE AND REPAIR OF COMPRESSORS

This machine is designed to compress air for powering tools and equipment mainly in the construction, mining and quarrying industries. Do not attempt to use it for compressing any other gas.
It is expected that users will employ safe working practices and will observe any related legal requirements when operating or overhauling this machine.
The following notes augment instructions given elsewhere in this publication and they are intended as a guide to the safe use of this machine and its associated compressed air supply under normal working conditions.
In the United Kingdom, your attention is drawn to the "Health and Safety at Work Act" and to relevant codes of practice.

THE USE OF COMPRESSED AIR
COMPRESSED AIR CAN BE DANGEROUS

1. Use only certified pressure vessels of adequate working pressure. OTHERS COULD EXPLODE.
2. Fit a non-return valve or a shut-off valve in the delivery line if the compressor is to be coupled in parallel with another compressor or connected to an air supply system.
3. Distribution pipework and hoses must be the correct size and suitable for the working pressure involved.

   If working pressures are above 7 bar (100 lbf/in^2) it is recommended that hoses incorporating safety wires are used.
4. Do not use frayed, damaged or deteriorated hoses. Always store hoses properly and away from heat sources or direct sunlight. A HOSE FAILURE CAN CAUSE INJURY.
5. Use only the correct type and size of hose end fittings and connections. Use clamps of robust construction especially made for compressed air.
6. If using compressed air for cleaning down equipment, do so with extreme caution. Take care not to blow debris at yourself or other persons or into machinery. Use eye protection.
7. When blowing through a hose or air line, ensure that the open end is held securely. A FREE END WILL WHIP AND CAN CAUSE INJURY. Open the supply air cock carefully and ensure that any ejected particles will be restrained. A BLOCKED HOSE CAN BECOME A COMPRESSED AIR GUN.
8. Never apply compressed air to your skin or direct it at another person. Never use compressed air to blow dust and debris from your clothing.
9. Do not use air directly from a compressor for breathing purposes, e.g. charging air cylinders, unless the compressor is specifically designed or equipped for this purpose.
10. Never operate a compressed air system, for example compressor pipework or pneumatic appliance, at a higher pressure than that for which it has been designed or rated.
11. Shut off the air cock at the compressor and release air pressure before disconnecting a hose or line unless there is an automatic valve to give protection at the upstream joint being separated.

TOWING THE COMPRESSOR

1. Check the towbar, braking system and coupling. Check that wheels are secure and that tyres are in good condition and inflated correctly.
2. Connect lighting cable to towing vehicle if applicable. Check correct operation of all lights.
3. On two wheel plant raise propstand/jockey wheel fully and lock.
4. Ensure breakaway cable is secured to towing vehicle (where fitted).
5. On four-wheel plant, ensure the reversing brake stop on towing eye shank is disengaged. Engage it again when reversing.
6. Release the handbrake (where fitted).

BEFORE STARTING THE COMPRESSOR ENSURE:

1. Plant is level and secure with brakes applied and, wherever possible, is sited with exhaust pointing down wind.
2. Plant is clean internally.
3. All air pressure is released from machine.
4. All hoses and tubing in good condition, secure and not rubbing.
5. No fluid leaks.
6. All fasteners tight.
7. Fluid levels correct. Top up only with specified oils/coolants. Filler caps must be tight.
8. All electrical leads secure and in good order.
9. Fan belt tension correct.
10. All guards in place and secure.
11. Engine exhaust system in good condition and no combustible material lying on or against it.
12. Start and stop procedures are clearly understood. Before starting close air discharge cocks. Refer to the operating instructions.

DURING OPERATION

1. Keep enclosure doors shut.
2. Check all pressures and temperatures are correct. Refer to the operating instructions.
3. Stop the plant if warning lights show or if gauges register outside normal limits. Untrained personnel must not attempt adjustments. Call in a Plant Fitter to investigate.
4. Do not refill with fuel while the plant is running. Keep fuel away from hot pipes.
5. Ensure that the engine exhaust is freely vented to the atmosphere.
6. Do not remove the oil filler cap.
7. Do not remove the radiator cap. (Liquid-cooled engines).
8. Do not carry out adjustments inside the canopy when the machine is running, other than where specifically instructed.
9. Do not disconnect the battery.
10. Do not remove guards.
11. Do not use the machine in a fire hazard area unless it is suitably equipped. Do not operate in the presence of toxic fumes.
12. Be aware that communication with people nearby will be impaired.

AFTER STOPPING

1. Ensure that the automatic blowdown valve has operated to release all air pressure from the system.
2. Allow radiator to cool before removing filler cap. Allow engine to cool before adding coolant (liquid-cooled engines).
3. Remove starting key if fitted.
4. Secure and lock all doors at the end of each working shift.

MAINTENANCE AND OVERHAUL

Before starting any work on the plant:

1. Ensure the appropriate “Maintenance Work in Progress” sign is prominently displayed on or near the machine.
2. Disconnect battery to ensure that machine cannot be started inadvertently.
3. Ensure that all air pressure is completely released from the system.
4. Stand the plant on level ground.
5. Apply the brakes if fitted. Securely fix the propstand/jockey wheel on two-wheeled plant.
6. Chock wheel or wheels securely if jacking-up or if working on the brakes. Support towbar on two-wheeled plant.
7. Support axle(s) securely if working underneath or removing a wheel. DO NOT RELY ON JACKS. Support towbar as 6.
8. Ensure that any door that opens upwards is securely fastened when open and that no door can slam shut and trap you.

When working on the plant:

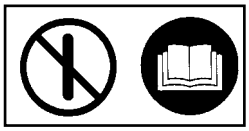
1. Use proper lifting gear of adequate capacity.
2. Examine condition of lifting bale before lifting plant by it.
3. Use the correct tools for the job.
4. When using a chemical or solvent cleaner, follow the manufacturer’s instructions.
5. Do not weld or perform any operation involving heat near the fuel or oil systems. Fuel and oil tanks must be completely purged, e.g. by steam cleaning, before such operations.
6. Do not weld or in any way modify any pressure vessel.
7. Before clearing the machine for use, check test that operating pressures, temperatures, and speed are correct and that the controls and shut-down devices work correctly.
8. Finally - remember that using any other than genuine CompAir Holman replacement parts will invalidate your guarantee.

DISPOSAL

When items of Holman construction equipment or tools are to be taken out of service for disposal it is recommended that the following instructions are adhered to:

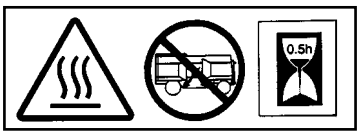
1. In order to prohibit ‘the bringing back in to service’ of such equipment or tools by persons unknown, they should be rendered unusable in order to avoid improper re-use.
2. Alternatively all such items of equipment or tools should be stripped into their component form for ‘material composition disposal’ e.g. base metals, plastics, fabrics, glass etc and be subject to normal industrial waste re-cycling process.
3. Bio-degradeable items should be subject to normal industrial waste disposal processes. Ensure that no plastic, rubber or composite materials are disposed of by incineration.
4. Ensure that all fluid waste e.g. diesel fuel, lubricating oils and greases, anti-freeze agents or mixes, refrigerant fluids, corrosive inhibitors and conditioners, any acids or alkalies should be kept separated and disposed of by authorised salvage disposal or re-cycling systems ensuring that none is permitted to enter either the industrial or domestic waste water system.

1.2 SIGNS AND SYMBOLS ON YOUR COMPRESSOR



DO NOT START UNTIL YOU HAVE READ
THE OPERATORS INSTRUCTION MANUAL

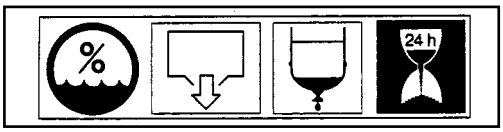
1400-13490



WARNING: HOT SURFACES.
DO NOT OPEN ENCLOSURE DOORS
UNTIL 30 MINUTES AFTER SHUTDOWN

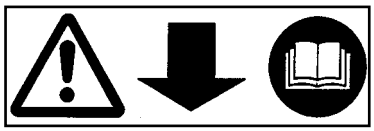
1400-12810

WARNING: WORKING PRESSURE
DO NOT OPEN THE DELIVERY VALVE UNLESS AIR HOSE IS ATTACHED
8.6 BAR **1400-12900 (Illustrated)**
12 BAR **1400-12840**



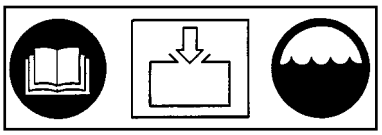
CONDENSATE DRAIN
IN CONDITIONS OF HIGH HUMIDITY, DRAIN CONDENSATE
FROM PRESSURE VESSEL EVERY 24 HOURS

1400-12950



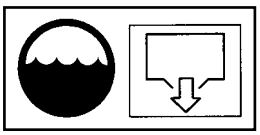
CAUTION
STEERING LOCK

1400-12960



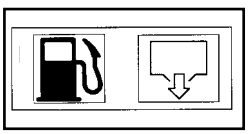
COOLANT FILL

1400-12970



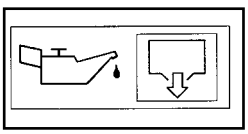
COOLANT DRAIN

1400-13000



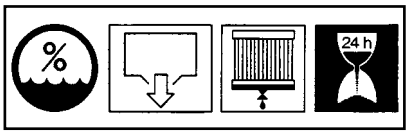
FUEL DRAIN

1400-13750



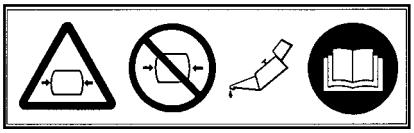
OIL DRAIN

1400-13010



CONDENSATE DRAIN
IN CONDITIONS OF HIGH HUMIDITY
DRAIN CONDENSATE FROM OIL COOLER EVERY 24 HOURS

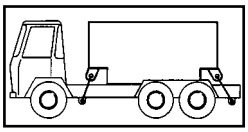
1400-13560



PRESSURE VESSEL.
RELIEVE ALL PRESSURE BEFORE TOPPING
UP WITH OIL. REFER TO OPERATOR MANUAL

1400-13460

1.2 SIGNS AND SYMBOLS ON YOUR COMPRESSOR



LASHING POINT

1400-12880

HOOK

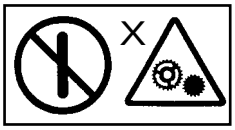
1284J03020

HOT SURFACE DO NOT TOUCH

1400-12190

WARNING
DIESEL ENGINE EXHAUST

1400-12200



DO NOT RE-EGAGE STARTER MOTOR
UNTIL ALL MOVING PARTS ARE STATIONARY

1400-12980

MAX SPEED 32 KPH

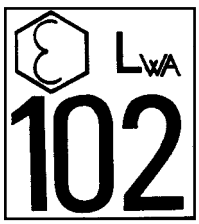
1400-13910

WARNING:
DO NOT USE ETHER AEROSOLS

1400-13310

FUEL FILLER

1400-11745

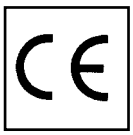


SOUND POWER

98381/5015

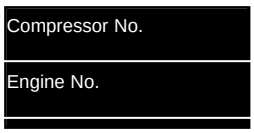
WARNING:
ROTATING MACHINERY

1400-13270



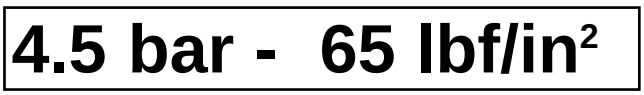
CE MARK

1400-13830



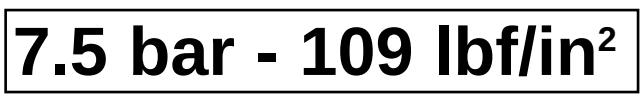
COMPRESSOR SERIAL No.
ENGINE SERIALNo.

1400-13760



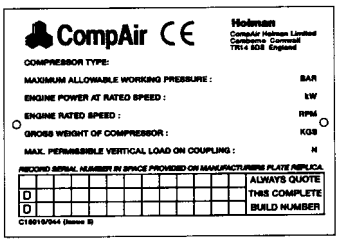
TYRE PRESSURE

C16025/007



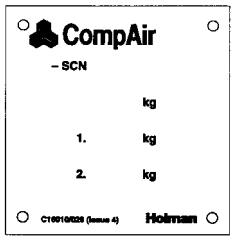
TYRE PRESSURE

C16025/016



SPECIFICATION PLATE

C16010-044 (ISSUE 1)



MANUFACTURER'S PLATE

C16010-029

2 PLANT INFORMATION

2.1 TECHNICAL DATA

	750-125	
Performance		
Free Air Delivered at 7.0 bar and max. rev/min to ISO 1217	368.2 lt/sec (21.9 m^3/min, 780 ft^3/min)	
Free Air Delivered at 8.6 bar and max. rev/min to ISO 1217 (T_1 measured at compressor inlet filter for application consistency).	368.2 lt/sec (21.9 m^3/min, 780 ft^3/min)	
	On Load	**Off Load**
Normal working pressure range (factory set)	7.0 bar (100 lbf/in^2)	7.7 bar (112 lbf/in^2)
Max. working pressure range	8.6 bar (125 lbf/in^2)	9.4 bar (137 lbf/in^2)
Engine speed range	2100 rev/min	1350 rev/min
Max. compressor air/oil discharge temperature (Temperature at manifold is approx. 10° lower)	120° C	
Max. permissible ambient temperature at 7.0 bar continuous full load	50° C	
at 8.6 bar	46° C	
Max. sound power level to 84/533/EEC Directive (silenced m/c's)	N/A	
Sound power level measured in accordance with 79/113/EEC Directive (un-silenced m/c's)	On Application	
Max. sound pressure level at Operator Position to PNEUROP PN8NTC2.2	On Application	
Compressor Unit Details		
Air inlet filter	1 x dry, heavy duty cylindrical	
Air delivery outlets	6 x 1 in BSP cocks	
Load control method	speed control and inlet throttling	
Oil filter	single 'spin-on' canister type	
Method of lubrication	oil fed to bearings, gears and rotors by air at working pressure	
Oil cooler	air blast (side-by-side rad/cooler)	
Approved lubricating oils	see General Information	
Engine Details		
Type	Caterpillar 3306DI-TA	
Electrical system	24 volt, negative earth	
Air inlet filter	1 x dry, heavy duty cylindrical	
Fluid Capacities		
Compressor oil system	145 lt. (31.9 U.K. gal)	
Engine oil system	27.5 lt. (6 U.K. gal)	
Engine coolant system	65 lt. (14.5 U.K. gal)	
Fuel (total)	488 lt. (107.6 U.K. gal)	
Dimensions		
Width	1.865 m (6 ft $1^1/_2$ in)	
Length, including towbar	5.595 m (18 ft $4^1/_4$ in)	
Length, towbar raised	4.170 m (13 ft $8^1/_4$ in)	
Height	2.195 m (7 ft $2^1/_2$ in)	
Wheel track	1.490 m (4 ft $10^1/_2$ in) - front 1.510 m (4 ft $11^1/_2$ in) - rear	
Ground clearance, minimum	260 mm ($10^1/_4$ in)	
Towing eye height, towbar horizontal	550 mm (1 ft $9^1/_2$ in)	
Tyre size	7.00 x 12, 12 ply - front 7.50 x 16, 8 ply - rear	
Tyre pressures	7.5 bar (109 lbf/in^2) - front 4.5 bar (65 lbf/in^2) - rear	
Tilt from horizontal, max. permissible any direction	10° continuous, 15° intermittent	
Turning circle	7.1 m (23 ft 3 in) diameter	
Weights (approx.)		
Compressor complete, wet	4666 kg (10,276 lb)	
Compressor unit and countershaft drive only	459 kg (1010 lb)	
Towing Speed		
Maximum	32 kph (20 mph)	

750-125S		900-125		900-125S	
368.2 lt/sec (21.9 m^3/min, 780 ft^3/min)		425 lt./sec (25.3 m^3/min), 900 ft^3/min)		425 lt./sec (25.3 m^3/min), 900 ft^3/min)	
368.2 lt/sec (21.9 m^3/min, 780 ft^3/min)		425 lt./sec (25.3 m^3/min), 900 ft3/min)		425 lt./sec (25.3 m^3/min), 900 ft^3/min)	
On Load	**Off Load**	**On Load**	**Off Load**	**On Load**	**Off Load**
7 bar (100 lbf/in^2)	7.7 bar (112 lbf/in^2)	7 bar (100 lbf/in^2)	7.7 bar (112 lbf/in^2)	7 bar (100 lbf/in^2)	7.7 bar (112 lbf/in^2)
8.6 bar (125 lbf/in^2)	9.4 bar (137 lbf/in^2)	8.6 bar (125 lbf/in^2)	9.4 bar (137 lbf/in^2)	8.6 bar (125 lbf/in^2)	9.4 bar (137 lbf/in^2)
2100 rev/min	1350 rev/min	2125 rev/min	1350 rev/min	2125 rev/min	1350 rev/min
120° C		120°C		120°C	
50° C		50°C		50°C	
46° C		46° C		46° C	
102 L_{WA}		N/A		102 L_{WA}	
N/A		On Application		N/A	
85 L_{PA}		On Application		85 L_{PA}	
1 x dry, heavy duty cylindrical		1 x dry, heavy duty cylindrical		1 x dry, heavy duty cylindrical	
6 x 1 in BSP cocks		1 x $2^1/_2$ in BSP wheel valve and		1 x $2^1/_2$ in BSP wheel valve and	
		5 x 1 in BSP capped outlets		5 x 1 in BSP capped outlets	
speed control and inlet throttling		speed control and inlet throttling		speed control and inlet throttling	
single ‘spin-on’ canister type		single ‘spin-on’ canister type		single ‘spin-on’ canister type	
oil fed to bearings, gears and rotors		oil fed to bearings, gears and rotors		oil fed to bearings, gears and rotors	
by air at working pressure		by air at working pressure		by air at working pressure	
air blast (side-by-side rad/cooler)		air blast (side-by-side rad/cooler)		air blast (side-by-side rad/cooler)	
see General Information		see General Information		see General Information	
Caterpillar 3306DI-TA		Caterpillar 3306DI-TA		Caterpillar 3306DI-TA	
24 volt, negative earth		24 volt, negative earth		24 volt, negative earth	
1 x dry, heavy duty cylindrical		1 x dry, heavy duty cylindrical		1 x dry, heavy duty cylindrical	
145 lt. (31.9 U.K. gal)		145 lt. (31.9 U.K. gal)		145 lt. (31.9 U.K. gal)	
27.5 lt. (6 U.K. gal)		27.5 lt. (6 U.K. gal)		27.5 lt. (6 U.K. gal)	
65 lt. (14.5 U.K. gal)		65 lt. (14.5 U.K. gal)		65 lt. (14.5 U.K. gal)	
488 lt. (107.6 U.K. gal)		488 lt. (107.6 U.K. gal)		488 lt. (107.6 U.K. gal)	
1.865 m (6 ft $1^1/_2$ in)		1.865 m (6 ft $1^1/_2$ in)		1.865 m (6 ft $1^1/_2$ in)	
5.740 m (18 ft 10in)		5.595 m (18 ft $4^1/_4$ in)		5.740 m (18 ft 10in)	
4.315 m (14 ft 2 in)		4.170 m (13 ft $8^1/_4$ in)		4.315 m (14 ft 2 in)	
2.210 m (7 ft 3 in)		2.195 m (7 ft $2^1/_2$ in)		2.210 m (7 ft 3 in)	
1.490 m (4 ft $10^1/_2$ in) - front		1.490 m (4 ft $10^1/_2$ in) - front		1.490 m (4 ft $10^1/_2$ in) - front	
1.510 m (4 ft $11^1/_2$ in) - rear		1.510 m (4 ft $11^1/_2$ in) - rear		1.510 m (4 ft $11^1/_2$ in) - rear	
260 mm ($10^1/_4$ in)		260 mm ($10^1/_4$ in)		260 mm ($10^1/_4$ in)	
550 mm (1 ft $9^1/_2$ in)		550 mm (1 ft $9^1/_2$ in)		550 mm (1 ft $9^1/_2$ in)	
7.00 x 12, 12 ply - front		7.00 x 12, 12 ply - front		7.00 x 12, 12 ply - front	
7.50 x 16, 8 ply - rear		7.50 x 16, 8 ply - rear		7.50 x 16, 8 ply - rear	
7.5 bar (109 lbf/in^2) - front		7.5 bar (109 lbf/in^2) - front		7.5 bar (109 lbf/in^2) - front	
4.5 bar (65 lbf/in^2) - rear		4.5 bar (65 lbf/in^2) - rear		4.5 bar (65 lbf/in^2) - rear	
10° continuous, 15° intermittent		10° continuous, 15° intermittent		10° continuous, 15° intermittent	
7.1 m (23 ft 3 in) diameter		7.1 m (23 ft 3 in) diameter		7.1 m (23 ft 3 in) diameter	
4886 kg (10,761 lb)		4666 kg (10,276 lb)		4886 kg (10,761 lb)	
459 kg (1010 lb)		459 kg (1010 lb)		459 kg (1010 lb)	
32 kph (20 mph)		32 kph (20 mph)		32 kph (20 mph)	

2.1 TECHNICAL DATA — 650-170

Performance	
Free Air Delivered at 11.7 bar and max. rev/min to ISO 1217 (T_1 measured at compressor inlet filter for application consistency).	307. lt/sec (18.3 m^3/min, 650 ft^3/min)
	On Load / **Off Load**
Normal working pressure range (factory set)	11.7 bar (170 lbf/in^2) / 12.5 bar (182 lbf/in^2)
Max. working pressure range	11.7 bar (170 lbf/in^2) / 12.5 bar (182 lbf/in^2)
Engine speed range	2020 rev/min / 1350 rev/min
Max. compressor air/oil discharge temperature (Temperature at manifold is approx. 10° lower)	120° C
Max. permissible ambient temperature at 11.7 bar continuous full load	50° C
Max. sound power level to 84/533/EEC Directive (silenced m/c's)	N/A
Sound power level measured in accordance with 79/113/EEC Directive (un-silenced m/c's)	On Application
Max. sound pressure level at Operator Position to PNEUROP PN8NTC2.2	On Application
Compressor Unit Details	
Air inlet filter	1 x dry, heavy duty cylindrical
Air delivery outlets	1 x $2^1/_2$ in BSP wheel valve and 5 x 1 in BSP capped outlets
Load control method	speed control and inlet throttling
Oil filter	single 'spin-on' canister type
Method of lubrication	oil fed to bearings, gears and rotors by air at working pressure
Oil cooler	air blast (side-by-side rad/cooler)
Approved lubricating oils	see General Information
Engine Details	
Type	Caterpillar 3306DI-TA
Electrical system	24 volt, negative earth
Air inlet filter	1 x dry, heavy duty cylindrical
Fluid Capacities	
Compressor oil system	145 lt. (31.9 U.K. gal)
Engine oil system	27.5 lt. (6 U.K. gal)
Engine coolant system	65 lt. (14.5 U.K. gal)
Fuel (total)	488 lt. (107.6 U.K. gal)
Dimensions	
Width	1.865 m (6 ft $1^1/_2$ in)
Length, including towbar	5.595 m (18 ft $4^1/_4$ in)
Length, towbar raised	4.170 m (13 ft $8^1/_4$ in)
Height	2.195 m (7 ft $2^1/_2$ in)
Wheel track	1.490 m (4 ft $10^1/_2$ in) - front 1.510 m (4 ft $11^1/_2$ in) - rear
Ground clearance, minimum	260 mm ($10^1/_4$ in)
Towing eye height, towbar horizontal	550 mm (1 ft $9^1/_2$ in)
Tyre size	7.00 x 12, 12 ply - front 7.50 x 16, 8 ply - rear
Tyre pressures	7.5 bar (109 lbf/in^2) - front 4.5 bar (65 lbf/in^2) - rear
Tilt from horizontal, max. permissible any direction	10° continuous, 15° intermittent
Turning circle	7.1 m (23 ft 3 in) diameter
Weights (approx.)	
Compressor complete, wet	4666 kg (10,276 lb)
Compressor unit and countershaft drive only	459 kg (1010 lb)
Towing Speed	
Maximum	32 kph (20 mph)

650-170S		750-170		750-170S	
307 lt/sec (18.3 m^3/min, 650 ft^3/min)		354 lt./sec (21 m^3/min), 750 ft^3/min)		354 lt./sec (21 m^3/min), 750 ft^3/min)	
On Load	**Off Load**	**On Load**	**Off Load**	**On Load**	**Off Load**
11.7 bar (170 lbf/in^2)	12.5 bar (182 lbf/in^2)	11.7 bar (170 lbf/in^2)	12.5 bar (182 lbf/in^2)	11.7 bar (170 lbf/in^2)	12.5 bar (182 lbf/in^2)
11.7 bar (170 lbf/in^2)	12.5 bar (182 lbf/in^2)	11.7 bar (170 lbf/in^2)	12.5 bar (182 lbf/in^2)	11.7 bar (170 lbf/in^2)	12.5 bar (182 lbf/in^2)
2020 rev/min	1350 rev/min	2100 rev/min	1350 rev/min	2100 rev/min	1350 rev/min
120° C		120°C		120°C	
50° C		50°C		50°C	
102 L_{WA}		N/A		102 L_{WA}	
N/A		On Application		N/A	
85 L_{PA}		On Application		85 L_{PA}	
1 x dry, heavy duty cylindrical		1 x dry, heavy duty cylindrical		1 x dry, heavy duty cylindrical	
1 x $2^1/_2$ in BSP wheel valve and		1 x $2^1/_2$ in BSP wheel valve and		1 x $2^1/_2$ in BSP wheel valve and	
5 x 1 in BSP capped outlets		5 x 1 in BSP capped outlets		5 x 1 in BSP capped outlets	
speed control and inlet throttling		speed control and inlet throttling		speed control and inlet throttling	
single ‘spin-on’ canister type		single ‘spin-on’ canister type		single ‘spin-on’ canister type	
oil fed to bearings, gears and rotors		oil fed to bearings, gears and rotors		oil fed to bearings, gears and rotors	
by air at working pressure		by air at working pressure		by air at working pressure	
air blast (side-by-side rad/cooler)		air blast (side-by-side rad/cooler)		air blast (side-by-side rad/cooler)	
see General Information		see General Information		see General Information	
Caterpillar 3306DI-TA		Caterpillar 3306DI-TA		Caterpillar 3306DI-TA	
24 volt, negative earth		24 volt, negative earth		24 volt, negative earth	
1 x dry, heavy duty cylindrical		1 x dry, heavy duty cylindrical		1 x dry, heavy duty cylindrical	
145 lt. (31.9 U.K. gal)		145 lt. (31.9 U.K. gal)		145 lt. (31.9 U.K. gal)	
27.5 lt. (6 U.K. gal)		27.5 lt. (6 U.K. gal)		27.5 lt. (6 U.K. gal)	
65 lt. (14.5 U.K. gal)		65 lt. (14.5 U.K. gal)		65 lt. (14.5 U.K. gal)	
488 lt. (107.6 U.K. gal)		488 lt. (107.6 U.K. gal)		488 lt. (107.6 U.K. gal)	
1.865 m (6 ft $1^1/_2$ in)		1.865 m (6 ft $1^1/_2$ in)		1.865 m (6 ft $1^1/_2$ in)	
5.740 m (18 ft 10in)		5.595 m (18 ft $4^1/_4$ in)		5.740 m (18 ft 10in)	
4.315 m (14 ft 2 in)		4.170 m (13 ft $8^1/_4$ in)		4.315 m (14 ft 2 in)	
2.210 m (7 ft 3 in)		2.195 m (7 ft $2^1/_2$ in)		2.210 m (7 ft 3 in)	
1.490 m (4 ft $10^1/_2$ in) - front		1.490 m (4 ft $10^1/_2$ in) - front		1.490 m (4 ft $10^1/_2$ in) - front	
1.510 m (4 ft $11^1/_2$ in) - rear		1.510 m (4 ft $11^1/_2$ in) - rear		1.510 m (4 ft $11^1/_2$ in) - rear	
260 mm ($10^1/_4$ in)		260 mm ($10^1/_4$ in)		260 mm ($10^1/_4$ in)	
550 mm (1 ft $9^1/_2$ in)		550 mm (1 ft $9^1/_2$ in)		550 mm (1 ft $9^1/_2$ in)	
7.00 x 12, 12 ply - front		7.00 x 12, 12 ply - front		7.00 x 12, 12 ply - front	
7.50 x 16, 8 ply - rear		7.50 x 16, 8 ply - rear		7.50 x 16, 8 ply - rear	
7.5 bar (109 lbf/in^2) - front		7.5 bar (109 lbf/in^2) - front		7.5 bar (109 lbf/in^2) - front	
4.5 bar (65 lbf/in^2) - rear		4.5 bar (65 lbf/in^2) - rear		4.5 bar (65 lbf/in^2) - rear	
10° continuous, 15° intermittent		10° continuous, 15° intermittent		10° continuous, 15° intermittent	
7.1 m (23 ft 3 in) diameter		7.1 m (23 ft 3 in) diameter		7.1 m (23 ft 3 in) diameter	
4886 kg (10,761 lb)		4666 kg (10,276 lb)		4886 kg (10,761 lb)	
459 kg (1010 lb)		459 kg (1010 lb)		459 kg (1010 lb)	
32 kph (20 mph)		32 kph (20 mph)		32 kph (20 mph)	

2.2 TORQUE FIGURES

Component / Location	Nm	Lbf ft
Roadwheels:		
Wheel nuts	270	200
Leaf spring / axle beam plate nuts	90	66
Pressure Vessel:		
Cover bolts	410	300

2.3. APPROVED COMPRESSOR OILS

AMBIENT TEMPERATURE RANGE ˚C	OIL TYPE
- 20 to + 25	**CompAir SACO - 46**
- 5 to Plant maximum	**CompAir SACO - 68**

3. PLANT DESCRIPTION

3.1 Compressor Unit

3.1.1 The compressor is an oil flooded single stage, positive displacement rotary asymmetric screw compressor. Air flow is in the axial direction and the compressor has a built-in pressure ratio.

3.1.2 The compressor unit consists of two helical intermeshing rotors, male and female mounted within one casing. The male rotor has four lobes and the female rotor six flutes. The male rotor therefore revolves at one and a half times the speed of the female rotor. Each rotor is supported by a pair of combined journal and thrust bearings at the delivery end and a roller bearing at the inlet end. The combined journal and thrust bearings are fitted face to face thus providing accurate location of the rotors. The roller bearings allow expansion of the rotors to take place freely and cater for the radial loads at the inlet end. Fine clearances between the ends of the rotors and casing at the delivery end are accurately maintained under all conditions of operation.

3.1.3 The drive is transmitted from the engine flywheel through a countershaft drive arrangement and step-up gears to the male rotor. The helical engagement of the two rotors transmits the drive to the female rotor.

3.1.4 The oil which is used as a cooling and sealing medium also lubricates the bearings and driving gears. The oil injected to the rotors provides them with a constant film of oil which prevents contact and wear. The resultant final delivery temperature is related to the ambient temperature; refer to Technical Data. To maintain correct working temperatures the plant is designed to run with the enclosure doors closed.

3.2 Compression Cycle (Fig. 1)

3.2.1 As the rotors revolve, air enters the compressor unit by way of the air cleaner, unloader and the inlet port, filling the space between the lobes of the male rotor and the flutes of the female rotor (1). The air is carried around in the casing until a male lobe intermeshes with a corresponding female flute. When the air is trapped (2), compression commences and oil, which is being continuously injected, mixes with the air (3). Continued rotation of the rotors reduces the volume of the air/oil mixture until it is compressed to outlet pressure (4). At this point, the delivery port is uncovered and the mixture passes through a non-return valve and air delivery hose to the pressure vessel where the oil is separated from the air. The air then passes to the delivery via a minimum pressure and isolating valve.

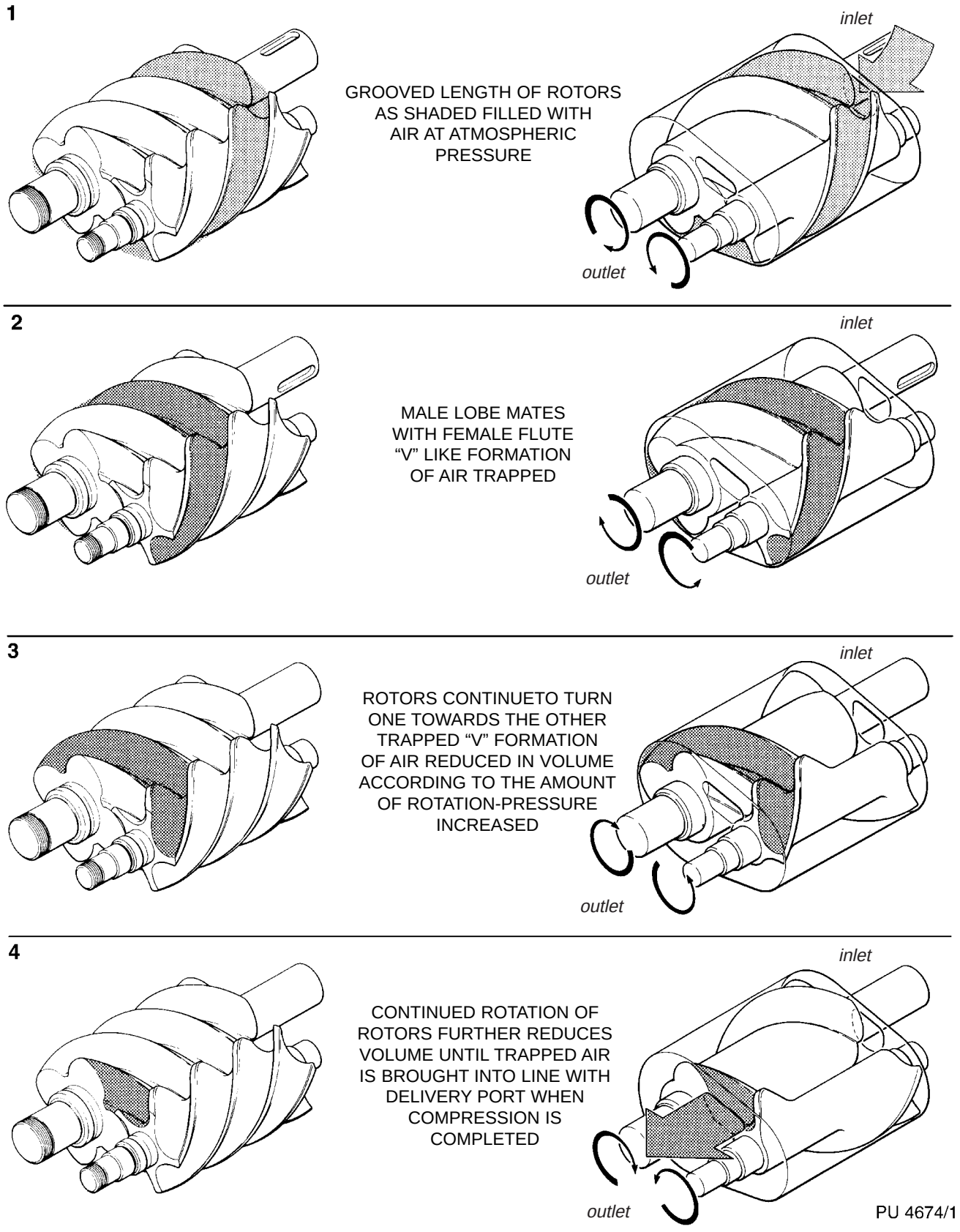


FIG. 1 COMPRESSION CYCLE

3.3 Lubrication System (Fig. 2)

3.3.1 The oil for cooling, sealing and lubrication is circulated through the system by air at working pressure; no oil pump is fitted. When the compressor is running the entire system is pressurised and oil is forced from the pressure vessel via the thermal by-pass valve (1). When starting from cold (or when operating in very low temperatures) this valve ensures that some oil (3) by-passes the oil cooler (15) thus preventing overcooling. When normal running temperatures are reached all the oil (2) flows through the cooler.

3.3.2 From the oil cooler oil passes through a single bowl oil filter (5) and control valve (7) where it is injected (8) on to the rotors. Here it mixes with the air at the commencement of compression and acts as a cooling medium.

3.3.3 The control valve prevents oil being syphoned from the pressure vessel into the rotor casing when the plant is shut down. Therefore the oil circuit becomes isolated immediately the rotors cease to rotate. After passing through the compressor delivery port the air/oil mixture is directed through a non-return valve (10). This valve prevents a feed back of the mixture into the rotor casing on shutting down the plant against a full delivery pressure.

3.3.4 From the non-return valve the air/oil mixture passes through a hose (11) to enter the pressure vessel where separation of the oil from the air takes place.

3.3.5 The inlet bearings and step-up gears are lubricated from a spray and the countershaft drive bearings via internal passages. This oil gravitates to the bottom of the countershaft drive casing where it is returned (4) by suction lift to the main oil flow through the inlet side of the rotors.

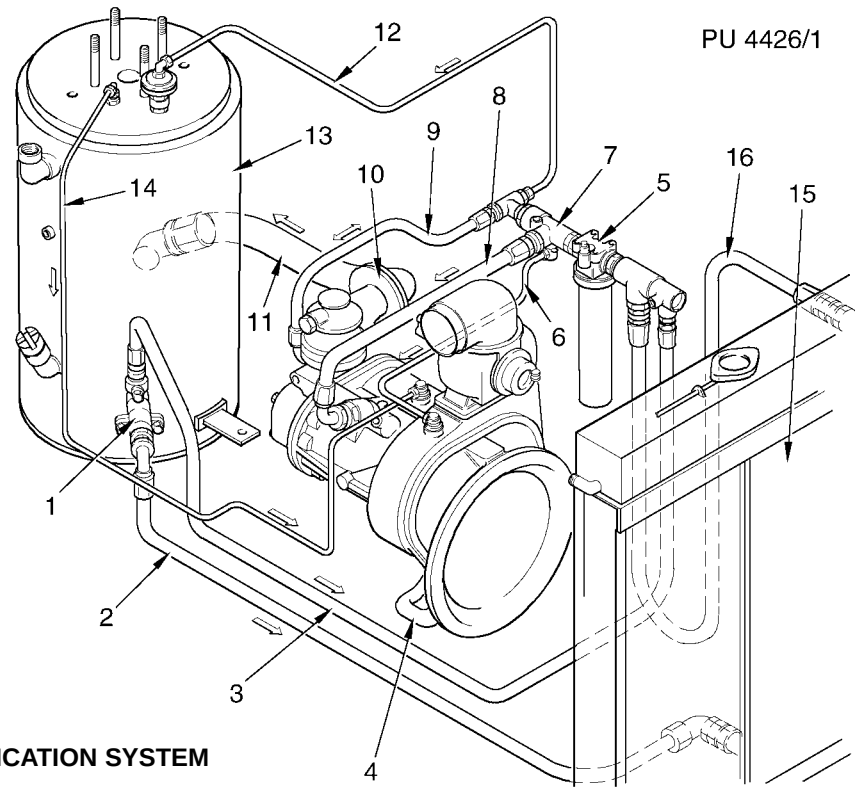


FIG. 2 TYPICAL LUBRICATION SYSTEM

1. THERMAL BY-PASS VALVE
2. HOSE (OIL TO COOLER)
3. HOSE (OIL COOLER BY-PASS)
4. HOSE (OIL SCAVENGE)
5. LUBRICATING OIL FILTER
6. PIPE (CONTROL VALVE VENT
7. OIL CONTROL VALVE
8. HOSE (OIL INJECTION)
9. HOSE (CONTROL VALVE OPERATING)
10. NON RETURN VALVE
11. HOSE (AIR DELIVERY)
12. PIPE (BLOWDOWN VALVE OPERATING)
13. PRESSURE VESSEL
14. PIPE (OIL RETURN)
15. OIL COOLER
16. HOSE (COOLER TO OIL FILTER)

3.4 Oil Separation and Recovery (Fig. 3)

3.4.1 The pressure vessel is mounted on the chassis at the front (towbar end) of the plant. Its purpose is to separate the oil from the air/oil mixture, after compression has taken place, by means of the separator element and to act as an oil reservoir.

3.4.2 The pressure vessel consists of a vertical steel casing (7) constructed in accordance with the appropriate Standards for fusion welded pressure vessels, which contains a separator element (4). A cover (3) at the top of the vessel provides access to the separator. Fitted to the cover is a minimum pressure and isolating valve (1) with air delivery pipe (10) terminating at the delivery manifold. Pressure vessel fittings include an oil filler plug, drain wheel valve with plug, pressure relief valve and blow down valve

3.4.3 As the air/oil mixture from the compressor enters the lower part of the pressure vessel (8) it is directed against the bottom of the separator element. The resulting sudden change in speed and direction of the flow causes the majority of the oil to drop out under gravity to the bottom of the vessel. The air, which now holds only a small amount of oil, flows through the separator element where almost all of the remaining oil is removed. Finally, the air passes to delivery via the minimum pressure and isolating valve and manifold. The oil reclaimed during final separation is collected by a scavenge tube and returned to the compressor unit (Fig. 2 (14)); its rate of return being controlled by a restrictor in the rotor casing.

3.5 Cooling System

3.5.1 Heat is extracted from the air during compression by the continuous injection of a controlled flow of cool oil onto the rotors. This contributes to efficiency and results in an acceptably low air delivery temperature without the need for an intercooler or aftercooler.

3.5.2 After separation from the discharged air, the oil is taken from the pressure vessel and cooled in a single-pass, air blast cooler mounted alongside the engine coolant radiator at the rear of the plant. The oil enters the bottom of the cooler and passes upwards to exit from a connection at the top. It then passes to the oil filter and rotors. A thermostatic valve is fitted in the oil circuit to maintain the oil at the optimum working temperature.

3.5.3 The air flow necessary for the radiator/cooler assembly is provided by a pusher fan which has aerofoil section blades pitched to obtain the optimum flow with the lowest possible noise level.

3.5.4 The radiator and oil cooler assembly is completely surrounded by the enclosure and is therefore protected from external damage.

CAUTION:

The engine cooling system thermostat should not be removed other than for the purposes of checking or replacement. Operation of the compressor without the thermostat will result in higher fuel consumption and therefore inefficient performance.

3.5.5 The plant must be run with the canopy doors closed to obtain the most efficient cooling. Always select the coolest place possible for the plant to operate in, refer to Technical Data for maximum permissible operating ambient temperatures.

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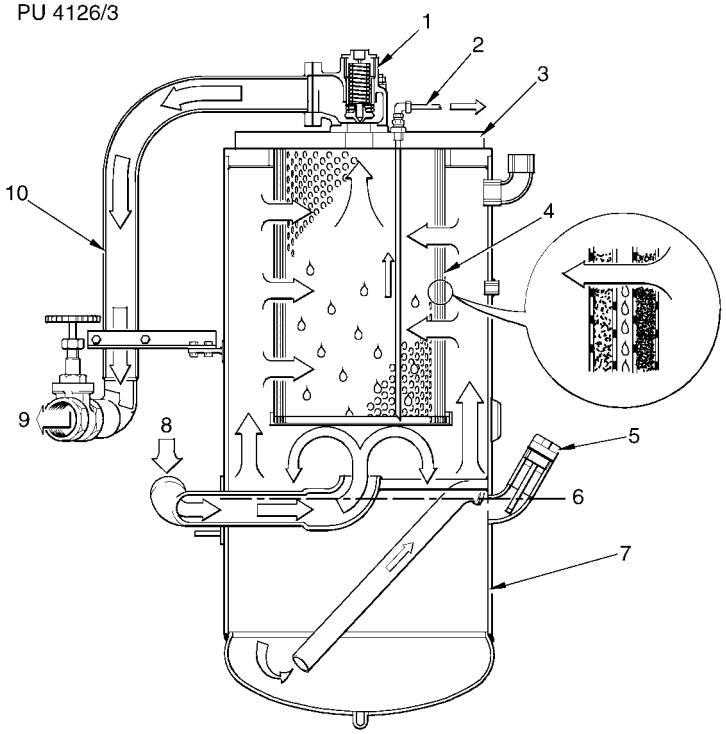


FIG. 3 OIL SEPARATION AND RECOVERY

1. MINIMUM PRESSURE AND ISOLATING VALVE
2. SEPARATOR SCAVENGE OIL RETURN
3. COVER
4. SEPARATOR
5. OIL FILLER PLUG AND DIPSTICK
6. OIL LEVEL
7. PRESSURE VESSEL CASING
8. AIR/OIL MIXTURE FROM COMPRESSOR
9. AIR DISCHARGE
10. AIR DELIVERY PIPE

3.6 Unloading and Speed Control System (Fig. 4)

3.6.1 The unloading system controls the output of the compressor unit entirely by the demand for air. The unloader regulates the volume of air admitted to the compressor unit and controls the speed of the engine by mechanical linkage connected to the engine speed control lever.

3.6.2 The unloader consists of a casing (2) which houses a valve (3) and spindle (7). At one end of the casing is fitted a spring retainer (6) which locates the spring (4) and supports one end of the spindle. The spring being in compression, tends to keep the valve towards the open position thus providing an unrestricted passage for inlet air to the compressor unit. The spindle is connected by a link (5) and linkage to the engine speed control lever.

3.6.3 At the opposite end of the casing a diaphragm body (11) is fitted; this provides location for the other end of the spindle and encloses the piston (15) and the diaphragm (13), the latter operating between the chambers (10) and (14).

3.6.4 The inner chamber (10) is maintained at a constant pre-set regulated pressure (12) by air from a regulator while the outer chamber (14) receives air at the varying pressure (16) from a tapping in the pressure vessel cover.

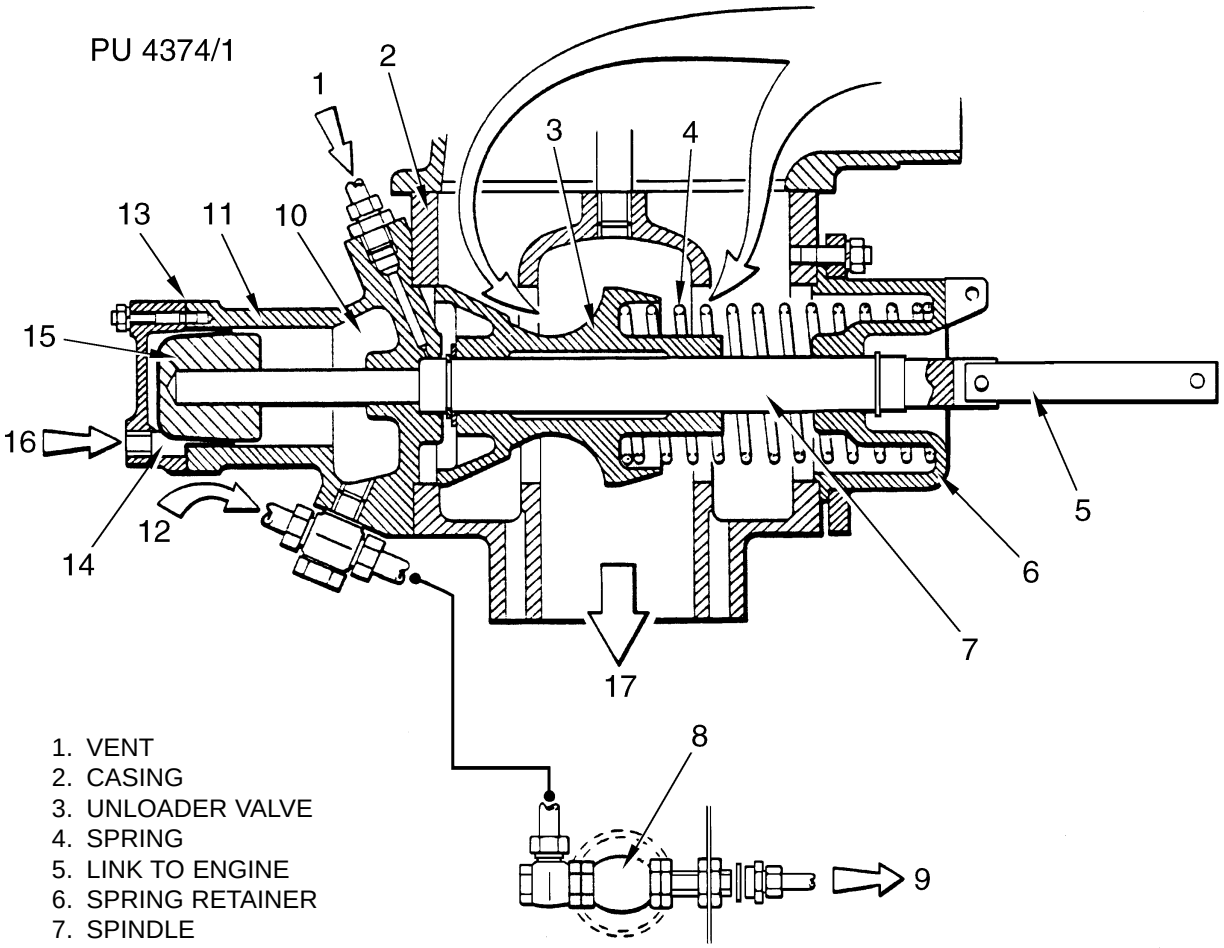
3.6.5 On start-up, the off-load control wheel (8) on the regulated pressure line must be turned anti-clockwise to the ‘Starting and Stopping’ position (wheel valve open (9)) so that there is no pressure in chamber (10). The engine will run up to approximately full load speed; when pressure builds up at (16) from compressor unit discharge, the valve will move to the right towards the shut position. The engine speed control lever will move on to the slow stop and the engine speed will be reduced; the plant is now running at a reduced pressure of approximately 3.4-5.5 bar (50-80 lbf/in^2). The plant will continue to run thus until after 3 minutes, the off-load control wheel on the regulated pressure line is turned clockwise to the ‘Running’ position. When closed, pressure will build up in chamber (10) which, with the loading from the spring, will move the piston and the valve to the left so permitting the compressor unit to draw in more air at the air inlet.

3.6.6 When the output of the compressor unit has matched the demand being made upon it, the valve is in a state of equilibrium and the engine will only run fast enough to maintain this condition.

3.6.7 As the demand on the compressor unit varies so will the pressure in chamber (14) vary and the valve will move accordingly. In this way the engine speed will be matched to the demand for air.

3.6.8 The valve, when in the shut position, does not make a positive seal with the casing and therefore a small amount of air is drawn into the compressor unit. To prevent an air pressure build-up, air is taken from a tapping in the pressure vessel cover and vented at port (1) back into the air inlet. When the valve is in the fully open position, the port is sealed by the spindle to prevent loss of air. To assist in the fine adjustment of the unloading system an adjustable bleedscrew is fitted in the unloader casing (see ‘Adjustments’).

3.6.9 When the plant is shut down, air pressure within the system is automatically released to atmosphere by the blow down valve (see para 3.15).



1. VENT
2. CASING
3. UNLOADER VALVE
4. SPRING
5. LINK TO ENGINE
6. SPRING RETAINER
7. SPINDLE
8. OFF-LOAD CONTROL WHEEL
9. REGULATED AIR TO ATMOSPHERE
   (*PIPED TO COMPRESSOR INLET CASING WHEN CONTROL WHEEL IN 'STARTING AND STOPPING'POSITION*)
10. INNER CHAMBER
11. DIAPHRAGM BODY
12. REGULATED AIR PRESSURE
13. DIAPHRAGM
14. OUTER CHAMBER
15. PISTON
16. VARYING (VESSEL) AIR PRESSURE
17. AIR TO COMPRESSOR UNIT

FIG. 4 UNLOADING SYSTEM AND SPEED CONTROL

3.7 Minimum Pressure and Isolating Valve (Fig. 5)

3.7.1 This valve is located on the pressure vessel cover and maintains a minimum delivery pressure of not less than 4.8 bar (70 lbf/in^2) in normal pressure machines or 9.6 bar (140 lbf/in^2) in high pressure units, when the compressor is operating with the air delivery cocks or wheel valve fully open. The increased velocity of the air flow produced by a lower pressure than this would result in oil being carried through the separator element.

3.7.2 In addition, the valve isolates the plant from any mains pressure when the air flow ceases through the compressor unit and permits it to be restarted at a low pressure even though the mains pressure maybe higher. If two or more plants are coupled to a common mains it is important that a manually operated isolating valve is fitted between the mains and each plant. This will completely isolate a plant, which is not running, from feed back of mains pressure in the event of the minimum pressure and isolating valve not making a perfect seal.

3.7.3 On starting the plant, the valve (2) is closed and will remain closed until the air pressure (10) acting upon its face exceeds 4.8 bar (70 lbf/in^2) or 9.6 bar (140 lbf/in^2) at which time the pressure will overcome the spring loaded plunger (4). The valve will open allowing the air to pass to delivery. If pressure (9) falls below 4.8 / 9.6 bar because of an excessive air demand, the springs (8) acting on the plunger will partly close the valve so preventing an increased air velocity and retaining the minimum requirements of 4.8 / 9.6 bar at (10). In the case of high pressure plant, the springs (8) are assisted by an external air supply through a tapping in the centre of the retainer (6). If, however, the plant is stopped the air pressure (10) will drop and allow the spring (3) and air pressure (9) to close the valve (2). This prevents air re-entering the plant whilst maintaining any mains pressure. Air pressure within the plant is vented to atmosphere by the blow down valve.

FIG. 5 MINIMUM PRESSURE AND ISOLATING VALVE

1. ADAPTOR
2. VALVE
3. SPRING
4. PLUNGER
5. DELETED
6. RETAINER
7. HOUSING
8. SPRINGS (INNER AND OUTER)
9. AIR TO DELIVERY MANIFOLD
10. AIR FROM PRESSURE VESSEL

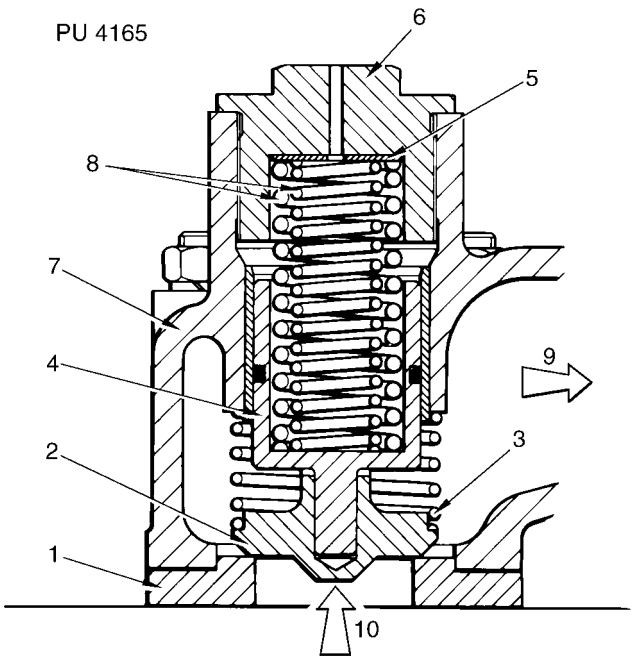
3.8 Non-Return Valve (Fig. 6)

3.8.1 The non-return valve prevents air in the pressure vessel from escaping to atmosphere back through the compressor unit when the plant is shut down against a full delivery pressure.

3.8.2 The valve is secured to the compressor unit delivery end casing and consists of a housing (6) containing a valve head (4), spring (5) and stem (2). The valve head is free to move on the stem. The valve assembly is enclosed at the top by a cover (1). The housing also accommodates the probe of the air delivery temperature switching gauge. A further temperature switch is located in the pressure vessel cover.

3.8.3 When the plant is discharging air, pressure from the compressor unit keeps the valve head open against vessel pressure and spring (5), thus allowing air to pass to the pressure vessel via the air delivery hose.

3.8.4 On shut-down, air delivery ceases and the valve head closes due to the pressure drop within the compressor unit and the influence of the spring, thus isolating the compressor from the pressure vessel.



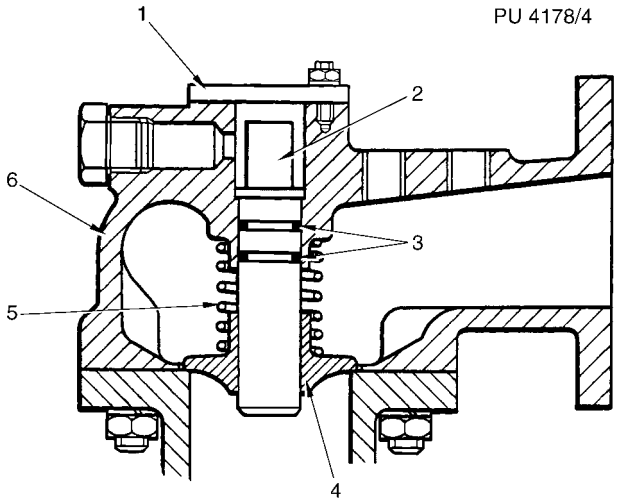


FIG. 6 NON-RETURN VALVE

1. COVER
2. STEM
3. 'O' RING
4. VALVE HEAD
5. SPRING
6. HOUSING

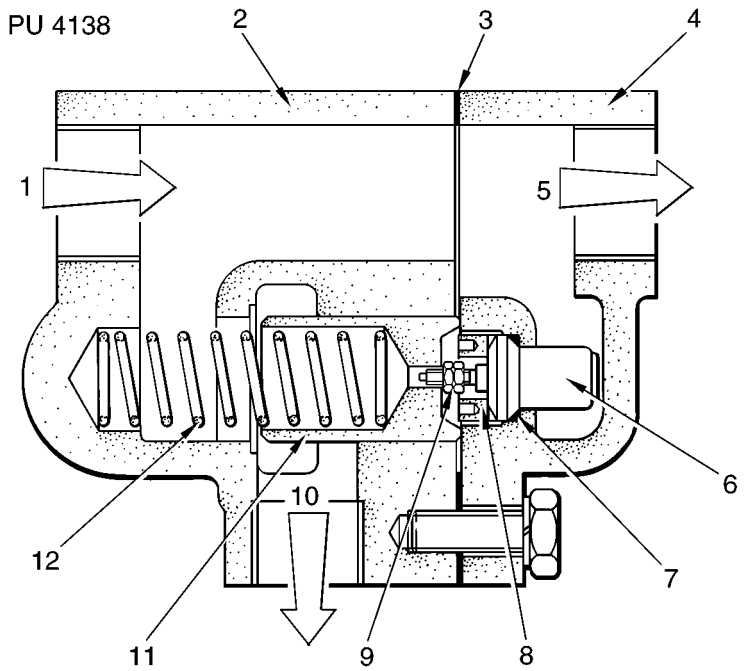
3.9 Thermal By-Pass Valve (Fig. 7)

3.9.1 The thermal by-pass valve is located at the bottom of the pressure vessel and is connected by hoses to the oil filter and oil cooler. The valve consists of a body and end cover which are bolted together enclosing a thermal motor (6), retainer (8), plunger (11) and spring (12).

3.9.2 On start up the plunger is in the open position and this provides, through port (10) a direct supply of oil to the oil filter but by-passing the oil cooler. Complementing this flow, some oil also passes through port (5) to the oil cooler and thence to the oil filter. The plunger is also in the open position when the plant is running in low ambient temperatures and/or under light load conditions. Therefore, as when starting up, some oil by-passes the cooler and this prevents overcooling. When the normal running operating temperature is reached the plunger closes due to the action of the thermal motor, the oil flow via the by-pass route ceases and all oil passes through the cooler.

FIG. 7 THERMAL BY-PASS VALVE

1. OIL FROM PRESSURE VESSEL
2. BODY
3. JOINT
4. END COVER
5. DIRECT FLOW TO COOLER
6. THERMAL MOTOR
7. 'O' RING
8. RETAINER
9. LOCKNUTS
10. BY-PASS FLOW TO FILTER
11. PLUNGER
12. SPRING



3.10 Oil Control Valve (Fig. 8)

3.10.1 The oil control valve is located adjacent to the oil filter, its purpose is to prevent pressurised oil in the pressure vessel and cooler from returning through the compressor when the plant is shut down. The non-return valve isolates the unit at the delivery end.

3.10.2 It consists of a body (3), one end of which is connected to the oil supply from the compressor oil filter (2). A cover (5) is connected to an operating air supply (6) from below the non-return valve on the compressor unit. The cover encloses a valve spool (4), the stem of which is hollow and contains four oil ports (7).

3.10.3 On starting up, immediate air pressure acts on the head of the valve spool (6). This moves the spool to the normal running position and allows oil from the filter (2) to flow through its hollow stem and out through the four ports to the compressor rotors (1). The valve body has an atmospheric vent to prevent pressure build up under the spool head.

3.10.4 On shut-down, the air pressure is immediately removed from the spool. Back pressure from the pressure vessel and cooler moves the spool to its shut-down position which closes off the ports (7), so preventing the oil from passing to the compressor unit

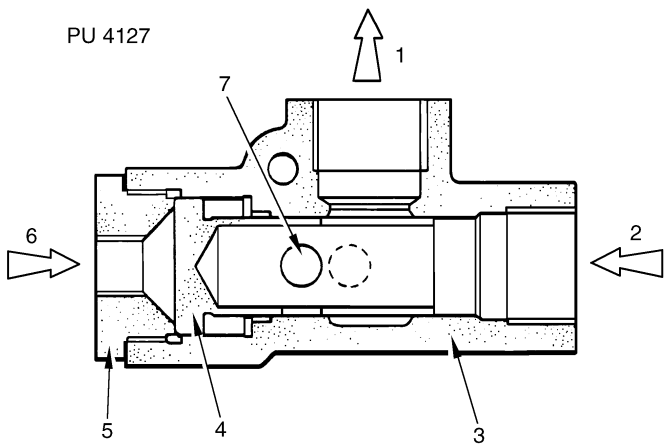


FIG. 8 OIL CONTROL VALVE

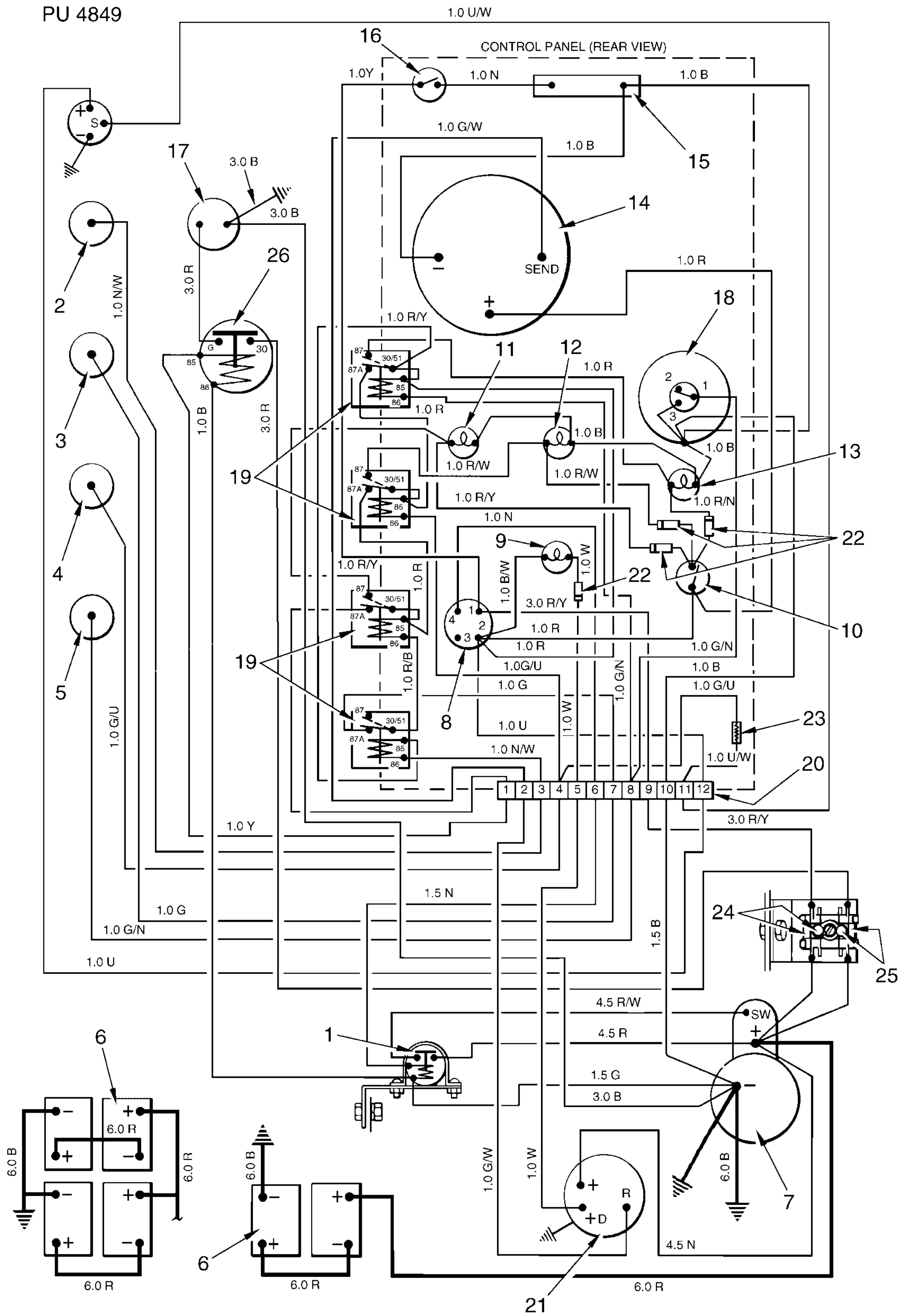
1. OIL SUPPLY TO COMPRESSOR UNIT
2. OIL FROM COMPRESSOR OIL FILTER
3. VALVE BODY
4. VALVE SPOOL
5. COVER
6. OPERATING AIR SUPPLY
7. OIL PORTS

3.11. Electrical Circuit (Fig. 9)

3.11.1 The equipment used in the 24 volt electrical circuit is connected by looms of coloured wiring to the back of the control panel and to two 12 volt batteries connected in series (temperate climate) or four 12 volt batteries connected in series parallel (cold climate). No trouble should be experienced with this equipment provided regular maintenance is given as described in the schedule. Whilst the engine is running do not disconnect the battery leads or wiring connections at the control panel and alternator, otherwise the latter will be damaged. The polarity of the battery leads must never be reversed. If an electric welding set is being used for repairs it is essential to totally disconnect all leads from the alternator as well as the battery, to prevent damage to the alternator. Use petroleum jelly on the battery connections to prevent corrosion.

FIG. 9 ELECTRICAL CIRCUIT

1. STARTER RELAY
2. PRESSURE SWITCH (COMPRESSOR OIL - FILTER MANIFOLD)
3. PRESSURE SWITCH (ENGINE OIL)
4. TEMPERATURE SWITCH (ENGINE COOLANT)
5. TEMPERATURE SWITCH (AIR DELIVERY - PRESSURE VESSEL)
6. BATTERIES
7. STARTER MOTOR
8. KEYSWITCH
9. WARNING LIGHT (BATTERY CHARGE)
10. TEST SWITCH
11. WARNING LIGHT (ENGINE OIL PRESSURE)
12. WARNING LIGHT (ENGINE COOLANT)
13. WARNING LIGHT (AIR DELIVERY TEMPERATURE)
14. TACHOMETER
15. PANEL LIGHT
16. SWITCH (PANEL LIGHT)
17. SHUT-DOWN (ENGINE FUEL)
18. SWITCHING GUAGE (AIR DELIVERY TEMP. COMPRESSOR UNIT)
19. RELAY - 28RA
20. TERMINAL BLOCK (PANEL)
21. ALTERNATOR
22. DIODE
23. RESISTOR
24. FUSE
25. FUSE
26. SHUT-DOWN RELAY



COLOUR CODE

B	-	BLACK	G/N	-	GREEN/BROWN
G	-	GREEN	G/U	-	GREEN/BLUE
N	-	BROWN	G/W	-	GREEN/WHITE
R	-	RED	N/W	-	BROWN/WHITE
U	-	BLUE	R/B	-	RED/BLACK
W	-	WHITE	R/N	-	RED/BROWN
Y	-	YELLOW	R/W	-	RED/WHITE
B/W	-	BLACK/WHITE	R/Y	-	RED/YELLOW

3.12 Chassis and Enclosure

3.12.1 The engine, compressor unit, radiator and oil cooler, pressure vessel and lifting bale are mounted on a fabricated steel chassis. Secured to the front of the latter is a steering turntable to which is attached the front axle and towbar. Lugs fitted to the front and rear of the chassis serve as anchorage points to aid low loader transportation and for easier handling on boggy or rough ground. In the interests of safety, the steering can be locked during the transfer of the plant onto a low loader vehicle. The chassis is supported on four semi-elliptical leaf springs on square section beam axles and four pneumatically tyred wheels. Internal drum brakes are fitted to the rear wheels and are controlled by a multi-stroke handbrake for parking purposes. Overrun braking is optional.

3.12.2 The whole plant is enclosed by bolted individual sheet metal panels. Four hinged lockable doors (double opening on one side) in the enclosure provide ample access to the engine and compressor unit for routine maintenance. Built into the back of the enclosure is a ladder which gives access to the roof and the radiator filler, lifting bale and pressure vessel access cover. Built into the front of the enclosure is the control panel which is protected by a hinged lockable glass window.

3.12.3 The fuel tanks, one on each side of the plant, are interconnected by a balance pipe. A filler is fitted to one tank and a breather to the other; both tanks incorporate drain plugs.

3.12.4 On silenced plants the enclosure is lined with an acoustic material, undershields are fitted to the chassis and the exhaust noise is controlled by the use of primary and secondary silencers positioned within the enclosure.

3.13 Protection Equipment

3.13.1 The engine is fitted with a fuel solenoid which controls the flow of fuel. When the engine is running the solenoid is energised through the start switch via the protection devices. Should a fault occur, the circuit is broken closing the solenoid and shutting down the engine. A warning light on the control panel will indicate the source of the fault.

3.13.2 Automatic shut-down protection covers the following:

(a) Low engine oil pressure 1.6 bar (23 lbf/in^2) min.

(b) Low engine coolant level.

(c) High engine coolant temperature 102°C (216°F) max.

(d) High air delivery temperature (compressor unit) - 115°C (239°F) max.

(e) High air delivery temperature (pressure vessel) - 120°C (248°F) max.

3.13.3 A switching temperature gauge on the control panel is set to shut the plant down when the compressor unit temperature reaches 115°C (239°F). However, to allow the machine to be operated FOR A SHORT PERIOD IN AN EMERGENCY, the gauge setting may be increased to a maximum of 120°C (248°F). Use the key supplied at the rear of the gauge to adjust the setting via the two holes in the centre of the dial. The cause of overheating should be diagnosed and corrected by reference to the Fault Finding Chart (para 7), and the gauge reset to 115°C (239°F) as soon as possible. The temperature probe is located in the non-return valve casing on the compressor unit, with the pressure vessel temperature switch being located in the vessel's cover.

3.13.4 Another switch, operated by compressor oil pressure (Fig. 9 (2)) is incorporated in the compressor oil filter inlet manifold. Its purpose is to energise the engine fuel solenoid (17) during starting until engine oil pressure has risen sufficiently to set the engine oil pressure switch in its normal running position. The compressor oil switch then breaks from the circuit until the next start-up.

3.13.5 Also on the control panel is a conventional charge lamp which will light should the alternator fail to charge the battery - the engine will continue to run if this fault occurs providing there is sufficient battery current to energise the fuel solenoid valve.

3.14. Cold Start Aid (if fitted)

3.14.1 The engine cold start aid (if fitted) is of the ether injection type. By operating a knob on the control panel, a measured amount of ether is injected into the intake manifold where it assists starting by lowering the combustion temperature of the fuel/air mixture. The ether cylinder is attached to the oil filter bracket and is connected to the knob on the control panel by a cable. This knob must be operated when the engine is running and it is protected by a cover to prevent such accidental operation.

COLOUR CODE

B	-	BLACK
G	-	GREEN
N	-	BROWN
R	-	RED
U	-	BLUE
W	-	WHITE
Y	-	YELLOW
B/W	-	BLACK/WHITE
G/N	-	GREEN/BROWN
G/U	-	GREEN/BLUE
G/W	-	GREEN/WHITE
N/W	-	BROWN/WHITE
R/B	-	RED/BLACK
R/N	-	RED/BROWN
R/W	-	RED/WHITE
R/Y	-	RED/YELLOW

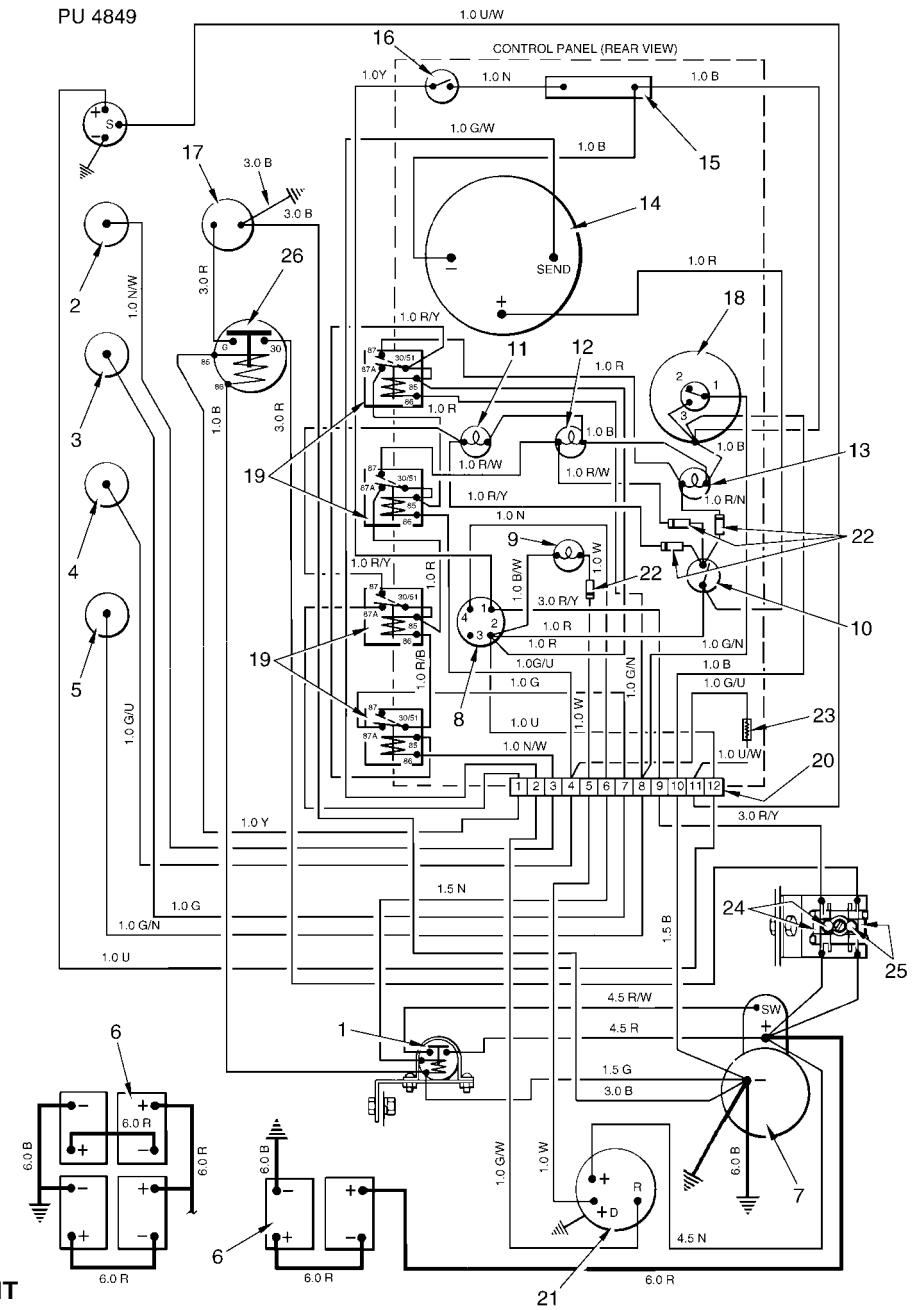


FIG. 9 ELECTRICAL CIRCUIT

1. STARTER RELAY
2. PRESSURE SWITCH (COMPRESSOR OIL - FILTER MANIFOLD)
3. PRESSURE SWITCH (ENGINE OIL)
4. TEMPERATURE SWITCH (ENGINE COOLANT)
5. TEMPERATURE SWITCH (AIR DELIVERY - PRESSURE VESSEL)
6. BATTERIES
7. STARTER MOTOR
8. KEYSWITCH
9. WARNING LIGHT (BATTERY CHARGE)
10. TEST SWITCH
11. WARNING LIGHT (ENGINE OIL PRESSURE)
12. WARNING LIGHT (ENGINE COOLANT)
13. WARNING LIGHT (AIR DELIVERY TEMPERATURE)
14. TACHOMETER
15. PANEL LIGHT
16. SWITCH (PANEL LIGHT)
17. SHUT-DOWN (ENGINE FUEL)
18. SWITCHING GUAGE (AIR DELIVERY TEMP. COMPRESSOR UNIT)
19. RELAY - 28RA
20. TERMINAL BLOCK (PANEL)
21. ALTERNATOR
22. DIODE
23. RESISTOR
24. FUSE
25. FUSE
26. SHUT-DOWN RELAY

3.15 Blow Down Valve (Fig. 10)

3.15.1 This valve is situated on top of the pressure vessel. It operates automatically to release all air pressure within the system on shutdown, thus ensuring that the plant is not started against delivery pressure.

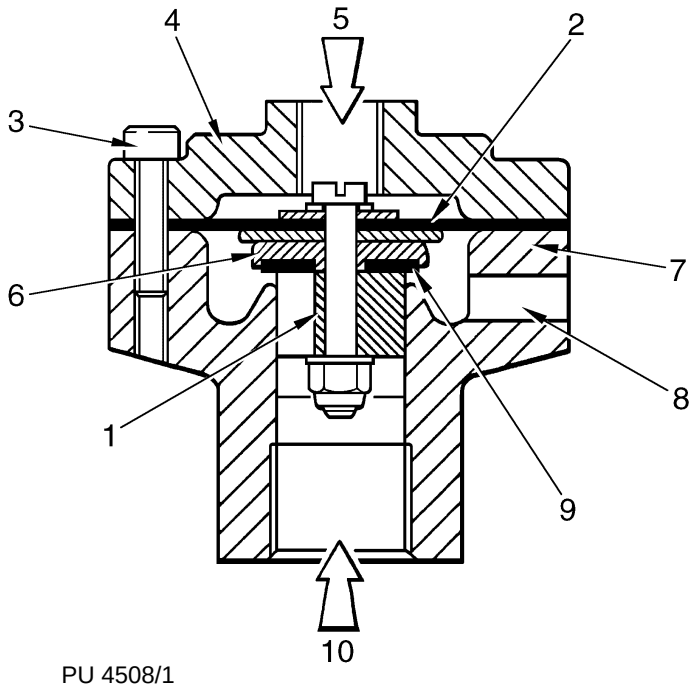
3.15.2 The valve consists of a body (7) which contains a fluted valve guide (1), valve (6) and valve seating washer (9). These components are attached to a diaphragm (2) and all are enclosed by a cap (4).

3.15.3 When the plant is running, pressure (5) from a tapping in the oil control valve operating pressure line is applied to the top of the diaphragm via a nylon pipe (Fig. 2 (12)). Vessel air pressure (10) acts simultaneously against the underside of seating washer (9). Pressure (5) on the large area of the diaphragm is sufficient to overcome the similar pressure (10) acting on the smaller area of the seating washer. The valve is held firmly shut, thus preventing the escape of air from the pressure vessel through ports (8) in the upper portion of the valve body.

3.15.4 On shut down the air delivery cocks/service valve are first closed, then the engine is stopped. Pressure (5) immediately ceases, so the residual vessel pressure (10) lifts the washer (9) from its seat and escapes to atmosphere through ports (8).

FIG. 10 BLOWDOWN VALVE

1. VALVE GUIDE
2. DIAPHRAGM
3. SCREW
4. CAP
5. OPERATING PRESSURE
6. VALVE
7. BODY
8. PORT
9. SEATING WASHER
10. VESSEL PRESSURE



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3.16 Control Panel (Fig. 11)

3.16.1 The panel is arranged with the controls and indicators for the engine grouped on the right and those for the compressor on the left.

3.16.2 Gauges

(a) The panel carries an electrically - driven engine speed tachometer and integral hour counter (4). In addition, there are gauges for air delivery pressure (14) and air delivery temperature (13). The temperature gauge is a switching gauge and forms part of the protection equipment fitted to the machine.

3.16.3 Lights

(a) If the compressor shuts down automatically, a light (5, 6 or 12) will come on to indicate the type of fault which has occurred. A test switch (11) is fitted to check that the lights are operational.

(b) Battery charge warning light (7) will come on if the engine alternator fails to charge the batteries for any reason.

(c) Panel illumination for night-time operation is provided by light (1) and its switch (2).

3.16.4 Wheel Valve

(a) The wheel valve (10) must be turned fully anti-clockwise (open) when starting and stopping the compressor; turn fully clockwise (shut) for normal running.

3.16.5 Keyswitch

(a) This switch (9) is a 3-position switch:- turn fully clockwise to operate the starter motor; spring return to position 1 for normal running; turn fully anti-clockwise to stop the machine.

3.16.6 Air Filter Service Indicators

(a) These should be clear when the machine is running. If a red signal flag remains visible in either indicator with the machine stopped, the appropriate filter should be serviced.

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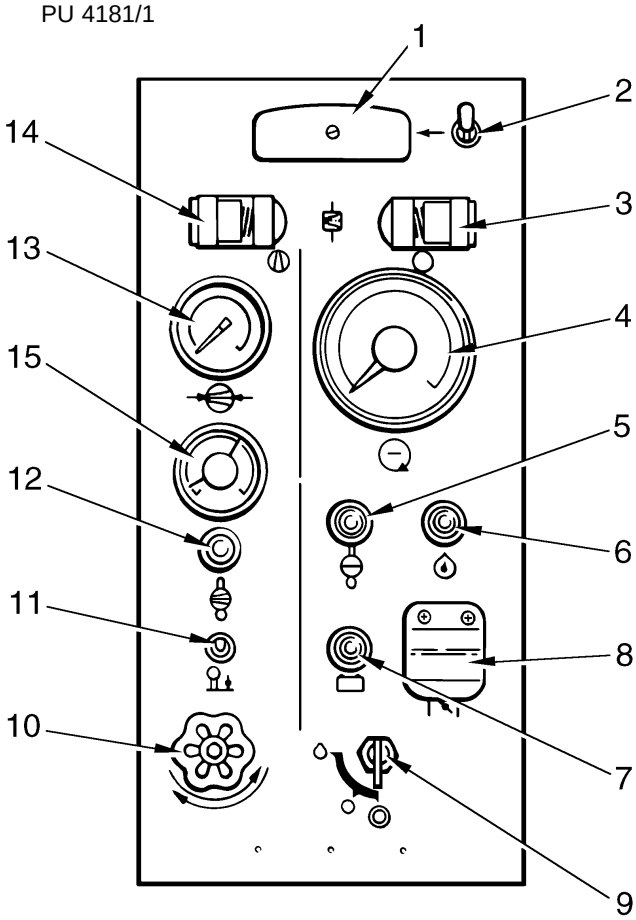

FIG. 11 CONTROL PANEL

1. PANEL LIGHT
2. SWITCH (PANEL LIGHT)
3. SERVICE INDICATOR (ENGINE AIR FILTER)
4. TACHOMETER
5. WARNING LAMP (ENGINE COOLANT TEMP./LEVEL)
6. WARNING LAMP (ENGINE OIL PRESSURE)
7. WARNING LAMP (ALTERNATOR)
8. COLD START AID (IF FITTED)
9. KEYSWITCH
10. START/RUN CONTROL WHEEL
11. TEST SWITCH (WARNING LAMPS)
12. WARNING LAMP (AIR DELIVERY TEMPERATURE)
13. GUAGE (AIR DELIVERY PRESSURE)
14. SERVICE INDICATOR (COMPRESSOR AIR FILTER)
15. SWITCHING GUAGE (AIR DELIVERY TEMPERATURE)

4. OPERATING INSTRUCTIONS

4.1. Plant Transportation and Handling (Fig. 12)

4.1.1 On plant prepared for export, the turntable steering is turned through 180° to minimise the overall plant length. The towbar is detached and stowed securely within the canopy. The turntable is locked in position using the pin (1) normally used for securing the towbar vertically against the front of the plant. On receipt, the pin should be removed and the turntable turned clockwise (looking from above) into the normal configuration, and the towbar attached.

CAUTION:

When completed, secure the removable stop (2) - supplied loose - in position before moving the plant. This is imperative to prevent oversteer and possible damage when manoeuvring.

WARNING:

Before hoisting the plant, lock the turntable against movement using pin (3) in stop (4) through the chassis. Remove the pin before towing.

4.1.2 Multi-Stroke Handbrake

Generally, 2/3 strokes of the handbrake will be sufficient to apply the brakes fully. The handbrake is released by pushing it firmly in the opposite direction, which will release the ratchet and pawl mechanism.

4.2 Initial Preparation

4.2.1 Refer to Technical Data or Engine Manual for fuel oil, lubricating oil and coolant capacities and specifications. Also for any fuel system alterations required for high altitude operation.

WARNING:

The 650-170/S and 750-170/S are high pressure plant which operate at 12 bar (170 lbf/in^2)

4.2.2 On receipt, check the plant for possible loss of, or damage to, parts. Report any such problem to your nearest CompAir Holman authorised dealer.

4.2.3 Plants despatched for service in the United Kingdom and Eire are filled with oil, fitted with maintenance free batteries, and the engine cooling system drained. Labels are attached to this effect. On receipt, the battery connections should be checked for security, and the engine and compressor oil levels checked.

Some lubricating oils may not be fully compatible with others and mixing them can result in the formation of lacquer type deposits or sludges. Avoid mixing oils of different brands, grades or types.

4.2.4 Check that the following are closed or tight as applicable; fuel tank drain plugs, radiator and oil cooler drain cocks, pressure vessel drain wheel valve and plug and compressor unit casing drain plug/pipe connector.

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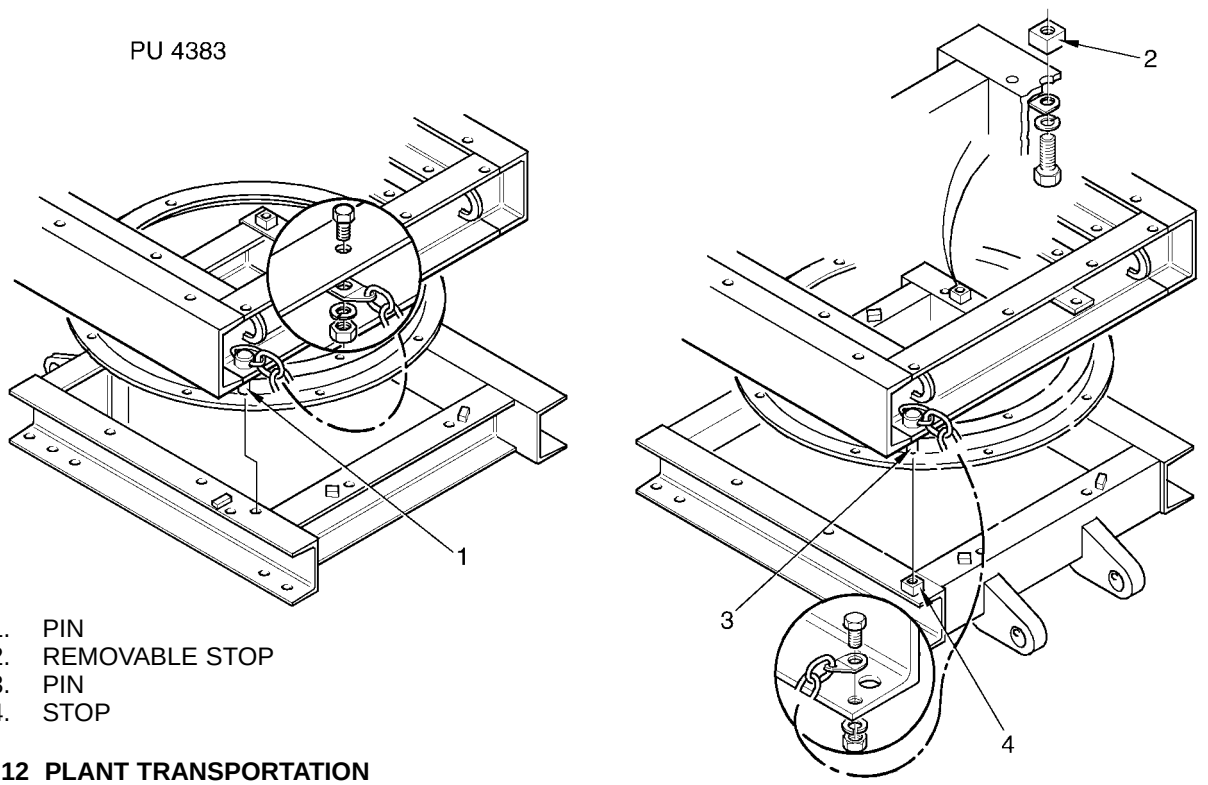


1. PIN
2. REMOVABLE STOP
3. PIN
4. STOP

FIG. 12 PLANT TRANSPORTATION

4.2.5 Fill the engine cooing system with inhibited water or an inhibited anti-freeze mixture in accordance with the instructions in the engine manual; do not exceed a filling rate of 23 litres/min (5 gallon/min). Refer to the Engine Manual for instructions concerning anti-freeze mixture compatibility with the engine corrosion resistor. The radiator should be filled to the bottom of the filler pipe only. This will prevent coolant being ejected from the over flow pipe as the system warms up. To ensure that air is not trapped in the engine cooling system, run the plant (refer to para 4.4) for two minutes with the radiator cap off and then shut down (refer to para 4.6); top up the radiator if necessary and replace the cap.

4.2.6 Plants despatched for export are delivered with the engine and compressor oils drained, fitted with maintenance free batteries, and the engine cooling system drained. Labels are attached to this effect.

4.2.7 Fill the engine with oil according to the instructions in the Engine Manual. Fill the engine cooling system as described in para 4.2.5. Fill the fuel tank and replace the cap. Check that the battery connections are tight.

4.2.8 Fill the compressor system with the approved grade of oil as follows:-

(a) Remove the filler cover (Fig. 13 (3)) from the pressure vessel and fill the casing to the 'MAX' mark on the dipstick. Replace and secure the filler cover and dipstick.

(b) Remove the banjo fitting and plug (Fig. 14 (1)) from the top of the inlet casing and pour into the latter 9 litres (2 UK gal) of oil. Replace and secure the washer, plug and banjo fitting.

(c) Run the plant (refer to para 4.4) for two minutes and then shut down (refer to para 4.6). Ensure that all air pressure is released from the pressure vessel. Wait three or four minutes for the lubricating oil to settle and then remove the filler cover. Top up to the 'MAX' mark on the dipstick if necessary. Replace and secure the filler cover.

4.2.9 Top up the radiator if necessary and replace the cap.

4.3 Before Starting

CAUTION:

If the plant is coupled in parallel with any other compressor or connected into an air supply system, a non-return valve must be fitted in the air delivery line from this plant.

WARNING

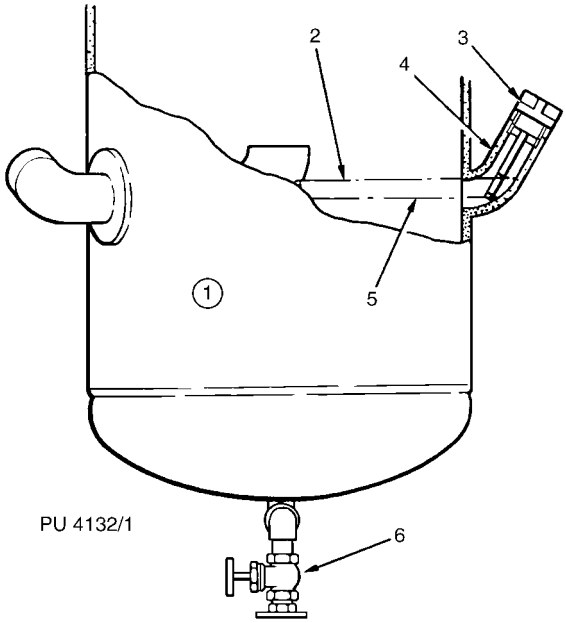
Engine exhaust extension pipes are a fire hazard and must not be fitted to the machine

4.3.1 Ensure that the plant is standing level with the handbrake applied.

4.3.2 Refer to the Engine Manual for engine information.

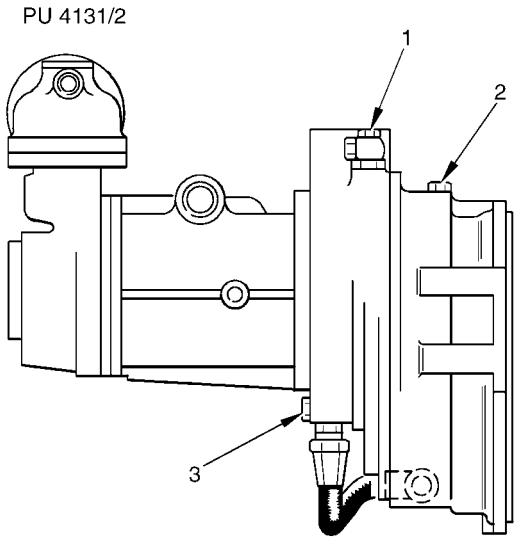
4.3.3 Check the compressor air pressure gauge to ensure that all air has been released from the pressure vessel; pressure registered indicates a faulty blow down valve.

4.3.4 Check the levels in engine sump, pressure vessel, fuel tank and radiator.



1. PRESSURE VESSEL
2. MAXIMUM OIL LEVEL
3. FILLER COVER
4. FILLER NECK
5. MINIMUM OIL LEVEL
6. WHEEL VALVE (OIL DRAIN) AND PLUG

FIG. 13 PRESSURE VESSEL FILLER AND DRAIN



1. BANJO AND PLUG
2. COUNTERSHAFT DRIVE OIL RESTRICTOR
3. INLET CASING DRAIN POINTS (2)

FIG. 14 COMPRESSOR UNIT OIL FILLER AND DRAIN

4.4 To Start

NOTE:

After a fuel filter change, or running out of fuel for example, it may be necessary to use the fuel priming pump on the front of the engine to prime the fuel system. Refer to the Engine Manual for further details.

4.4.1 Close the air delivery cocks/wheel valve. If starting the first workshift of the day, close the drain valve on the control line filter (Fig. 15 (5)).

4.4.2 Open the control panel door and close the doors of the enclosure.

4.4.3 Turn the control wheel (Fig. 11 (10)) anti-clockwise to the STARTING AND STOPPING position. This will off-load the compressor when a pressure of 3.4 to 5.5 bar (50-80 lbf/in^2) is reached, thus enabling the engine to start and run up to speed without the full load of the compressor unit.

4.4.4 Turn the keyswitch (Fig. 11 (9)) clockwise to the ON position (the battery charge warning light will come on). Operate test switch (11) to check that the three remaining warning lights are operative. Turn the keyswitch further clockwise to operate the starter. As soon as the engine starts release the key. The battery charge warning light will go out, indicating that the alternator is charging the batteries. If the engine fails to start within thirty seconds release the keyswitch and repeat the starting sequence after all moving parts have come to rest and air has been exhausted.

4.4.5 IN COLD CONDITIONS IF COLD START AID IS FITTED

Turn the keyswitch to the ON position (the battery charge warning light will come on). Operate test switch (11) to check that the three remaining warning lights are operative. Turn keyswitch further clockwise to operate the starter. With the engine cranking, operate the cold start aid control knob (Fig. 11 (8)) slowly IN and OUT until the engine fires, then release keyswitch.

Continue operating the cold start knob slowly until the engine is self sustaining. The starter key must be released when the engine fires.

4.4.6 Before proceeding, allow the machine to run for no less than 3 minutes.

4.4.7 Turn the control wheel (10) clockwise to the RUNNING position to operate the unloader. The engine will momentarily speed up and then settle at approximately 1350 rev/min with the compressor air delivery pressure gauge (13) registering about 7.7 bar (112 lbf/in^2), or 12.5 bar (182 lbf/in^2) on high pressure machines.

4.4.8 The plant is now ready for use; connect the hose and open the air delivery cocks/wheel valve. Close the control panel door.

WARNING:

If the foregoing or following conditions are not met, shut down the plant (refer to para 4.6) and consult the Fault Finding Chart or the Engine Manual.

4.5 During Operation

CAUTION:

It is essential that the wiring connections at the rear of the alternator and the control panel are not disconnected whilst the engine is running otherwise the alternator will be damaged. Do not disconnect the batteries when the engine is running for the same reason. The polarity of the battery leads should never be reversed.

4.5.1 Check that the warning lights for air delivery temperature, engine oil pressure, engine coolant temperature/level and battery charging are extinguished.

NOTE:

Should a fault develop in the battery charging circuit, the plant will continue to run while there is sufficient power in the battery to energise the engine fuel shut-off valve.

4.5.2 Check that the air delivery temperature does not exceed 110°C (230°F). If it does, shut down the plant and refer to the Fault Finding Chart.

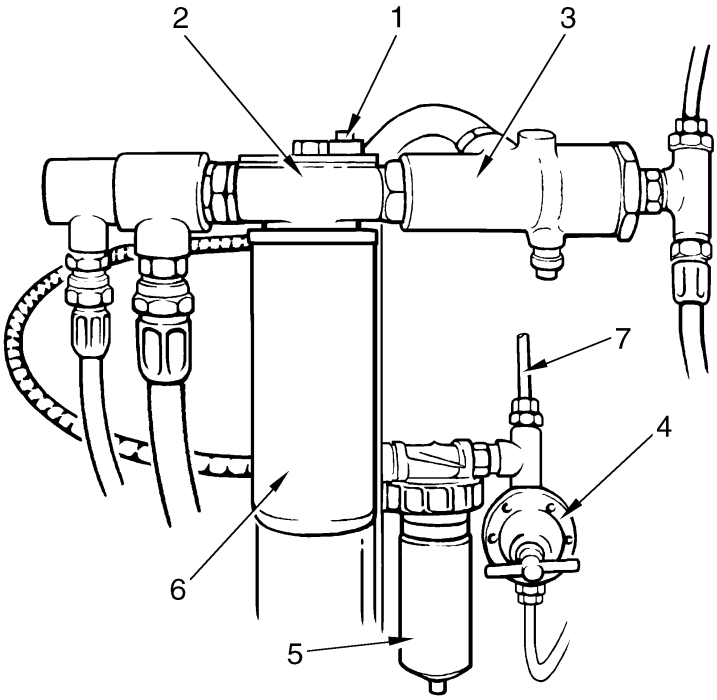
4.5.3 Check that the tachometer is indicating an engine speed within the correct range (see Technical Data) and that the hourmeter is recording.

4.5.4 Check that the compressor air delivery pressure gauge is registering between 7 and 7.7 bar (100 and 112 lbf/in^2), or 11.7 and 12.5 bar (170 and 182 lbf/in^2) for high pressure plant, depending on the demand for air. if an unloading system malfunction should cause air pressure to build up beyond pre-determined limits, the pressure relief valve will operate.

4.5.5 Check that both compressor and engine air filter service indicators are clear.

4.5.6 Ensure there are no oil, fuel or coolant leaks.

4.5.7 The plant is protected by an electrically-operated automatic shut-down system which will stop the machine in the event of a fault occurring. If the plant stops, check the following and refer to the Fault Finding Chart for a guide to corrective action.



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1. SERVICE INDICATOR (OIL FILTER)
2. HEAD (OIL FILTER)
3. OIL CONTROL VALVE
4. AIR PRESSURE REGULATOR
5. AIR LINE FILTER
6. BOWL (OIL FILTER ELEMENT)
7. TO AIR FILTERS
   (FARR FILTRATION OPTION ONLY)

FIG. 15 TYPICAL LUBRICATING OIL FILTER AND AIR PRESSURE REGULATOR/LINE FILTER

PU 4181/1

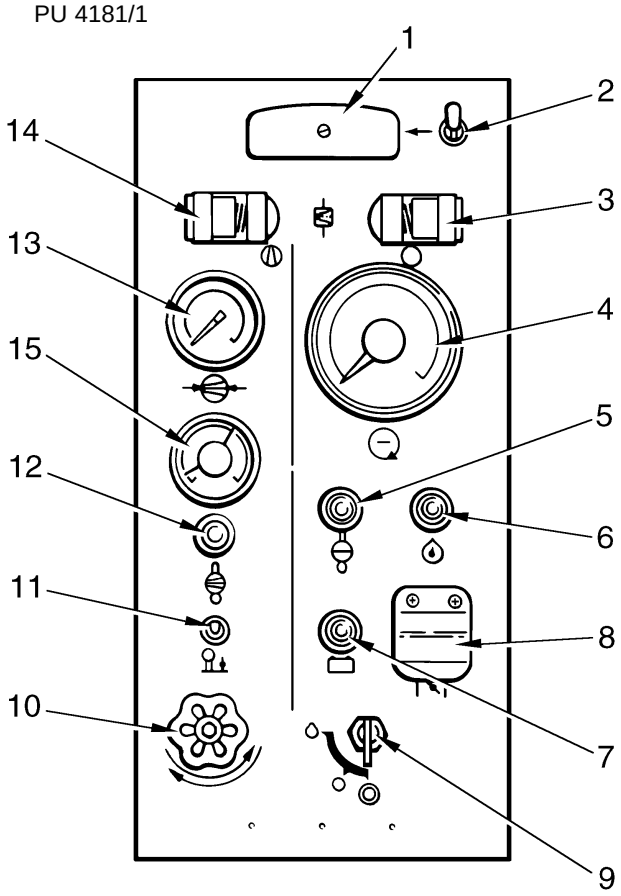


FIG. 11 CONTROL PANEL

1. PANEL LIGHT
2. SWITCH (PANEL LIGHT)
3. SERVICE INDICATOR (ENGINE AIR FILTER)
4. TACHOMETER
5. WARNING LAMP
   (ENGINE COOLANT TEMP./LEVEL)
6. WARNING LAMP (ENGINE OIL PRESSURE)
7. WARNING LAMP (ALTERNATOR)
8. COLD START AID (IF FITTED)
9. KEYSWITCH
10. START/RUN CONTROL WHEEL
11. TEST SWITCH (WARNING LAMPS)
12. WARNING LAMP
    (AIR DELIVERY TEMPERATURE)
13. GUAGE (AIR DELIVERY PRESSURE)
14. SERVICE INDICATOR
    (COMPRESSOR AIR FILTER)
15. SWITCHING GUAGE
    (AIR DELIVERY TEMPERATURE)

(a) Automatic shut-down system has operated.

WARNING:

Possible high temperatures.

Check the control panel lights (Fig. 11 (5), (6) and (12)) before the plant cools down. This is imperative as the temperature switches will reset themselves on cooling, thus extinguishing the lights.

(i) If light (5) remains lit, it indicates an engine coolant problem. To determine whether high temperature or low level has caused the shut-down, remove the electrical connection from the temperature switch on the engine (leave the keyswitch turned 'ON'). If the light remains on, it indicates a low coolant level. If it goes out, it indicates a high coolant temperature.

(ii) If light (12) remains lit, it indicates an air delivery temperature problem. The temperature gauge will normally give sufficient indication of whether the fault is in the compressor unit or pressure vessel. However, if in doubt, remove the electrical connection from the vessel temperature switch. If the light goes out, the problem is in the pressure vessel. If it remains on, the problem is in the compressor unit.

(iii) If no panel lights show after compressor air/oil pressure has reduced to zero on shut-down, it indicates that low engine oil pressure has caused the shut-down. With the keyswitch in the 'ON' position, remove the terminal from the compressor oil pressure switch on the compressor oil filter manifold whereupon the engine oil warning light should come on. If it does, suspect the engine oil pressure. After ensuring that nothing else has developed a fault (such as those detailed below), refer to the Engine Manufacturer's Handbook for a guide to corrective action.

(b) Fuel tank contains adequate fuel oil.

(c) Faulty electrical circuit which has caused the fuel shut-off valve on the engine fuel pump to operate.

(d) Faulty engine (see Engine Manual).

4.6. To Stop

4.6.1 Close the air delivery cocks/wheel valve; the engine will run at minimum speed.

4.6.2 Turn the control wheel (Fig. 11 (10)) anti-clockwise to the STARTING AND STOPPING position and allow the plant to run for no less than 3 minutes to dissipate the heat in compressor and engine. This is especially important if the machine has been working at full load for some time prior to shut-down.

4.6.3 Before stopping the plant after the final workshift of the day, drain any condensate from the control line filter (Fig. 15 (5)). Leave the drain valve open overnight.

4.6.4 Turn the keyswitch (9) anti-clockwise and remove the key if the machine is no longer required for use.

NOTE:

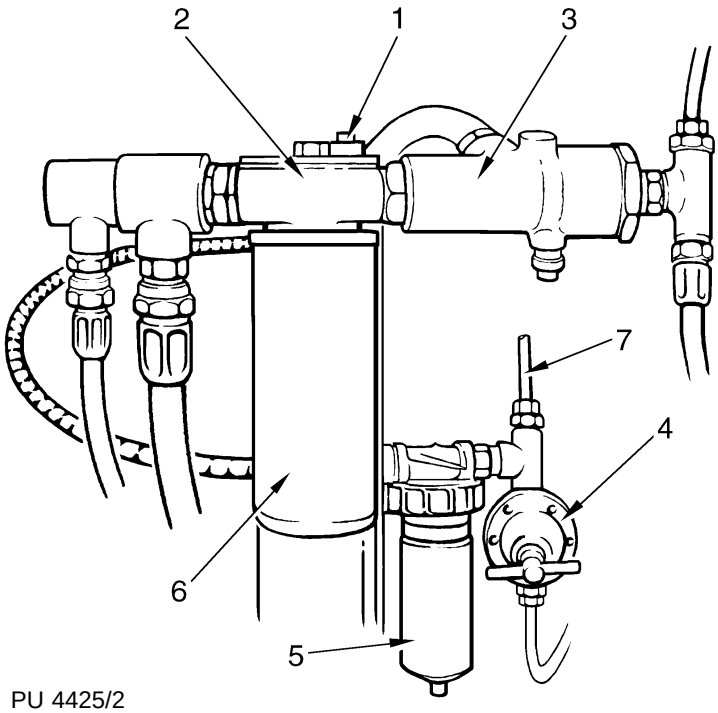
(I) This switch is also considered to be the emergency stop. No other means of stopping the plant is fitted.

(ii) The machine will stop but the tachourmeter will remain at the engine speed indicated immediately before shut-down. It will reset itself to zero on turning the keyswitch clockwise again.

4.6.5 After the plant has stopped all air will be released from the pressure vessel by the automatic action of the blow down valve.

WARNING:

It is imperative to ensure that all air pressure has been released by the blow down valve. Should this not happen, release the pressure by opening the air delivery cocks then determine the cause and rectify.



PU 4425/2

1. SERVICE INDICATOR (OIL FILTER)
2. HEAD (OIL FILTER)
3. OIL CONTROL VALVE
4. AIR PRESSURE REGULATOR
5. AIR LINE FILTER
6. BOWL (OIL FILTER ELEMENT)
7. TO AIR FILTERS
   (FARR FILTRATION OPTION ONLY)

FIG. 15 TYPICAL LUBRICATING OIL FILTER AND AIR PRESSURE REGULATOR/LINE FILTER

PU 4181/1

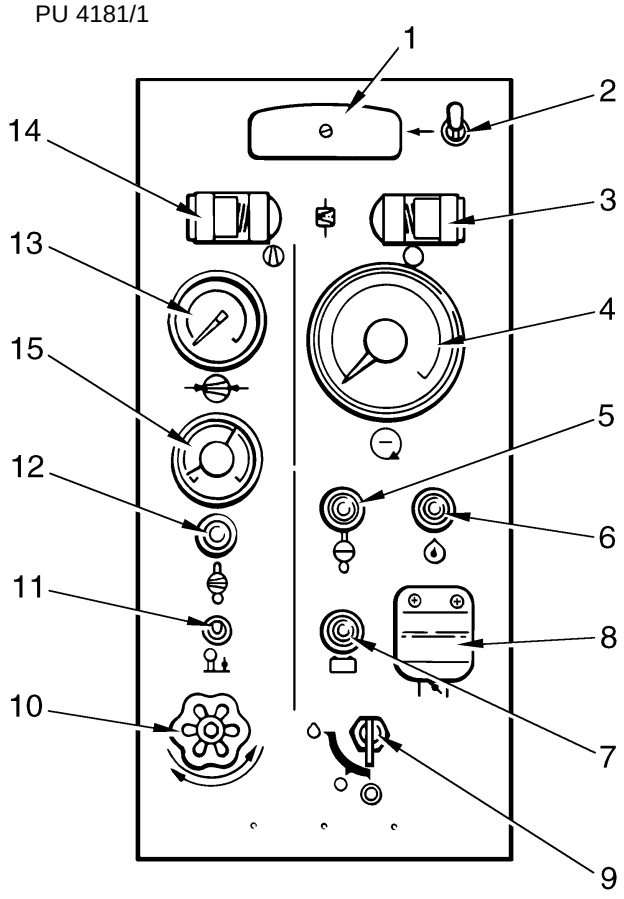


FIG. 11 CONTROL PANEL

1. PANEL LIGHT
2. SWITCH (PANEL LIGHT)
3. SERVICE INDICATOR (ENGINE AIR FILTER)
4. TACHOMETER
5. WARNING LAMP
   (ENGINE COOLANT TEMP./LEVEL)
6. WARNING LAMP (ENGINE OIL PRESSURE)
7. WARNING LAMP (ALTERNATOR)
8. COLD START AID (IF FITTED)
9. KEYSWITCH
10. START/RUN CONTROL WHEEL
11. TEST SWITCH (WARNING LAMPS)
12. WARNING LAMP
    (AIR DELIVERY TEMPERATURE)
13. GUAGE (AIR DELIVERY PRESSURE)
14. SERVICE INDICATOR
    (COMPRESSOR AIR FILTER)
15. SWITCHING GUAGE
    (AIR DELIVERY TEMPERATURE)

5. ROUTINE MAINTENANCE

5.1. General

5.1.1 This section of the Manual should be used in conjunction with the Planned Servicing Schedule and the Engine Manual. Maintenance periods listed should be carried out according to hours registered on the hourmeter. The use of unsuitable oil will cause problems such as overheating, inefficient lubrication and poor oil recovery. Air must not be compressed to a pressure greater than that stated in Technical Data. We recommend that a Maintenance Record Log be kept to assist in an accurate control of maintenance.

The acoustic foam fitted to all silenced machines must be kept free from damage and as clean as possible.

WARNING:

It is most important before commencing any maintenance work on the plant to adhere strictly to the following procedures:

(a) Locate the plant on firm level ground and apply the handbrake.

(b) Ensure that all compressed air has been released before working on the plant.

(c) Unless carrying out performance tests and running adjustments, the engine must be stopped.

(d) Prior to undertaking work on any electrical or associated circuit, the batteries must be disconnected.

(e) If repairs require the use of an electric welding set, it is essential that all leads from the alternator and batteries are disconnected to prevent damage to the alternator.

(f) If working on the roof of the machine, temporary handrails and toeboards should be erected.

5.2. Daily

5.2.1 Prior to the first start up, drain any condensate which may have accumulated in the pressure vessel and oil cooler. Remove the plug and carefully open the wheel drain valve (Fig. 13 (6)); close it when the flow becomes oil only and replace the plug. Repeat operation on the oil cooler by turning the drain tap (Fig. 16 (3)) clockwise (looking from below) to drain any condensate. Firmly close on completion.

5.2.2 Drain any condensate that may have accumulated in the control line filter (Fig. 15 (5)) by turning its knurled drain valve clockwise, i.e. upwards. Close the valve on completion.

5.2.3 Check compressor and engine oil levels and coolant level in the radiator. Check the engine fuel.

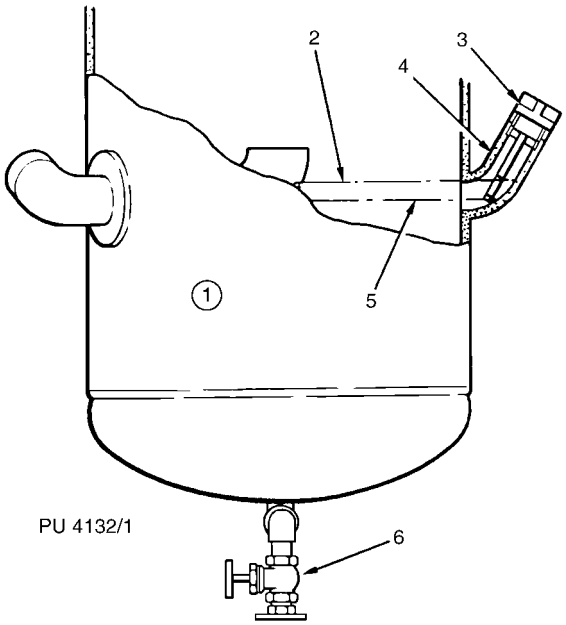
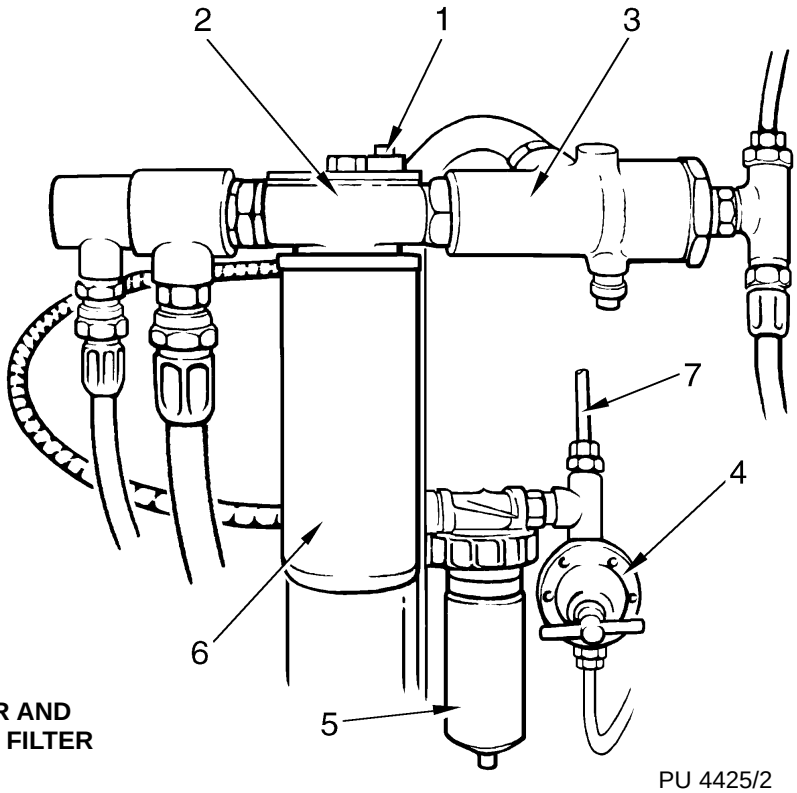


FIG. 13 PRESSURE VESSEL FILLER AND DRAIN

1. PRESSURE VESSEL
2. MAXIMUM OIL LEVEL
3. FILLER COVER
4. FILLER NECK
5. MINIMUM OIL LEVEL
6. WHEEL VALVE (OIL DRAIN) AND PLUG

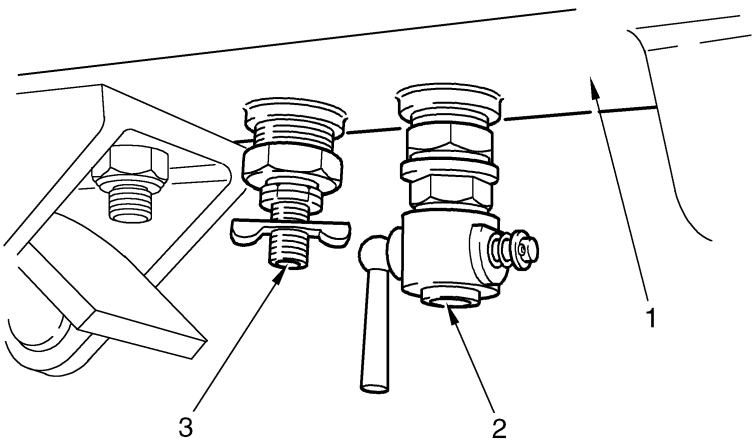


PU 4425/2

1. SERVICE INDICATOR (OIL FILTER)
2. HEAD (OIL FILTER)
3. OIL CONTROL VALVE
4. AIR PRESSURE REGULATOR
5. AIR LINE FILTER
6. BOWL (OIL FILTER ELEMENT)
7. TO AIR FILTERS
   (FARR FILTRATION OPTION ONLY)

FIG. 15 TYPICAL LUBRICATING OIL FILTER AND AIR PRESSURE REGULATOR/LINE FILTER

PU 4179/1



1. CHASSIS FRAME
2. COCK (RADIATOR DRAIN)
3. TAP (COOLER DRAIN)

FIG. 16 RADIATOR AND OIL COOLER DRAIN

5.2.4 Check the air filter service indicators (Fig. 11 (3) and (14)). If the red warning sleeve is in full view, service the element concerned. Reset the indicator by pressing its rubber button.

5.2.5 Check the indicator (Fig. 15 (1)) on the compressor lubricating oil filter; if the red signal ring is showing, re-new the spin-on canister. This is best done using a strap wrench. Follow the maker's instructions supplied with the canister.

5.2.6 Check the pipes and flexible connections of the air filters for damage or deterioration and tightness of clamps and clips; any ingress of dirt must be avoided.

5.2.7 Inspect the plant for fuel, oil and water leaks; report or rectify any defect.

5.2.8 With plant at rest but keyswitch turned to first position, operate test switch (Fig. 11 (11)) to ensure that warning lamps (5, 6 & 12) illuminate.

5.2.9 On silenced plant, inspect the acoustic foam for contamination or damage.

5.2.10 Refer to the Engine Manual Maintenance Schedule.

5.2.11 Make the appropriate entry in the Maintenance Record.

5.3 Every 50 Hours Running or Weekly

5.3.1 Carry out daily service.

5.3.2 Remove the engine and compressor air filter end covers by undoing the centre hand wheel. Wipe out the bowls and ensure that the rubber dust valve is in good working order. Do this daily if the plant is working in very dusty conditions.

5.3.3 Check the fan belt adjustment.

5.3.4 Check the radiator hoses for damage or deterioration and tightness of hose clips.

5.3.5 Inspect the enclosure, chassis and undercarriage; report or rectify any defect.

5.3.6 Check all tyre pressures (see Technical Data).

5.3.7 Test the pressure relief valve for freedom of movement by lifting top knob.

5.3.8 First 50 hours running only.

(a) Check countershaft drive oil restrictor and strainer (see 250 hours running, paragraph 5.4.3).

(b) Change the compressor lubricating oil filter element. Refer to para 5.5.2 for details.

(c) Check the pressure vessel cover bolts. Re-torque to 410 Nm (300 lbf/ft) if necessary.

5.3.9 Check the operation of the unloading and speed control system. Refer to para 8 for adjustment details if necessary.

5.3.10 Refer to the Engine Manual Maintenance Schedule.

5.3.11 Make the appropriate entry in the Maintenance Record.

5.4 Every 250 Hours Running

5.4.1 Carry out 50 hours service.

5.4.2 Clean the exterior surfaces of the radiator and oil cooler using a water jet, compressed air or low pressure steam. If heavily contaminated, the matrix can first be treated with an oil solvent. Access covers are fitted behind (or at each side of) the ladder to aid access to the radiator/cooler surfaces.

5.4.3 Check the countershaft drive oil restrictor and strainer (Fig. 14 (2)). Unscrew the restrictor and carefully remove it from the casing, together with its bonded seal washer. A strainer disc is fitted on the end of the restrictor and is normally removed with it. Should the disc remain in the casing, gently remove it, ensuring that any particles which may have accumulated on it do not enter the oilways. Check the holes in the strainer disc are clear. Refit the disc onto the restrictor, replace the restrictor and bonded seal washer and secure.

5.4.4 Lubricate the hinges of all enclosure doors.

5.4.5 Check the tightness of the oil circuit connections.

5.4.6 Check the pressure relief valve setting.

WARNING:

(i) This task must be carried out by experienced and competent personnel only.

(ii) BE AWARE OF THE ESCAPING AIR/OIL MIXTURE.

(iii) THE PRESSURE RELIEF VALVE IS PRESET AND SEALED AT THE MANUFACTURER'S AND SHOULD NOT BE TAMPERED WITH. IF THE PRESSURE RELIEF VALVE DOES NOT PERFORM SATISFACTORILY, IT MUST BE REPLACED BY A NEW ONE.

(a) Pressure relief valve leak pressures (i.e. the point at which the valve just begins to lift off its seat) are as follows:-

Normal pressure plant:-
9.6 bar (140 lbf/in^2)
High pressure plant:-
13.9 bar (202 lbf/in^2)

(b) Fit suitable silencer/s to the delivery service wheel valve/cocks if available.

(c) Start the plant in the normal manner (i.e. with delivery service wheel valve/cocks closed) and turn the control wheel valve to the 'RUNNING' position.

(d) Check the pressure relief valve is free to operate by lifting its top knob.

FIG. 11 CONTROL PANEL

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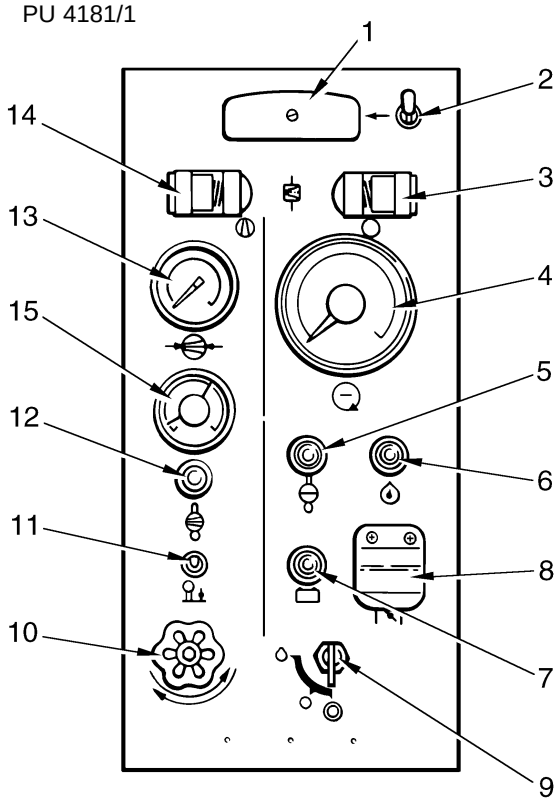

1. PANEL LIGHT
2. SWITCH (PANEL LIGHT)
3. SERVICE INDICATOR (ENGINE AIR FILTER)
4. TACHOMETER
5. WARNING LAMP (ENGINE COOLANT TEMP./LEVEL)
6. WARNING LAMP (ENGINE OIL PRESSURE)
7. WARNING LAMP (ALTERNATOR)
8. COLD START AID (IF FITTED)
9. KEYSWITCH
10. START/RUN CONTROL WHEEL
11. TEST SWITCH (WARNING LAMPS)
12. WARNING LAMP (AIR DELIVERY TEMPERATURE)
13. GUAGE (AIR DELIVERY PRESSURE)
14. SERVICE INDICATOR (COMPRESSOR AIR FILTER)
15. SWITCHING GUAGE (AIR DELIVERY TEMPERATURE)

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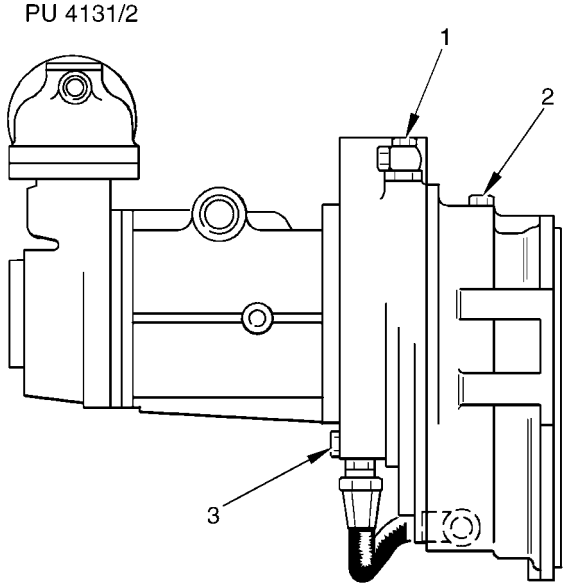
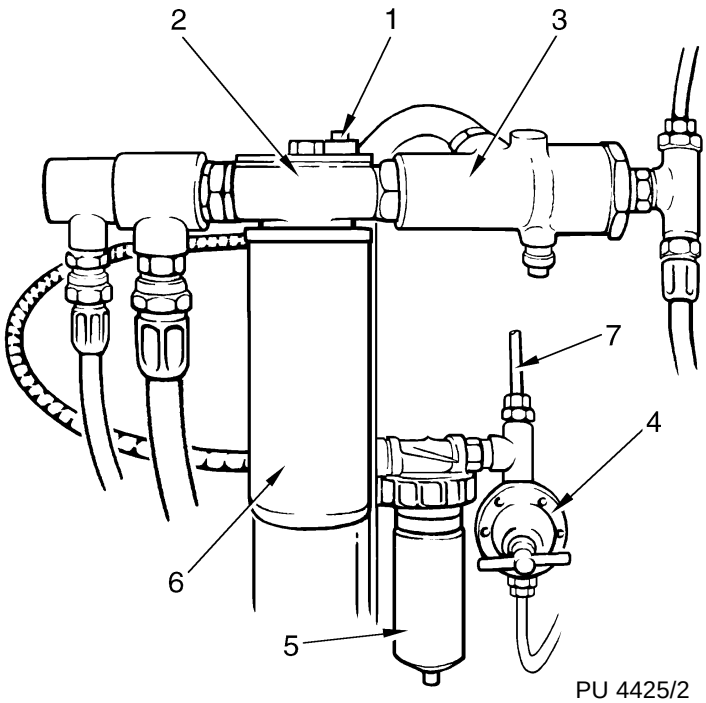


1. BANJO AND PLUG
2. COUNTERSHAFT DRIVE OIL RESTRICTOR
3. INLET CASING DRAIN POINTS (2)

FIG. 14 COMPRESSOR UNIT OIL FILLER AND DRAIN



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1. SERVICE INDICATOR (OIL FILTER)
2. HEAD (OIL FILTER)
3. OIL CONTROL VALVE
4. AIR PRESSURE REGULATOR
5. AIR LINE FILTER
6. BOWL (OIL FILTER ELEMENT)
7. TO AIR FILTERS (FARR FILTRATION OPTION ONLY)

FIG. 15 TYPICAL LUBRICATING OIL FILTER AND AIR PRESSURE REGULATOR/LINE FILTER

(e) Open the delivery service wheel valve/cocks fully. The engine speed will increase to maximum.

(f) Close the wheel valve situated behind the control panel. This will isolate the speed control system and ensure the plant runs at full output regardless of the air delivery pressure.

(g) Gradually close the delivery service wheel valve/cocks fully while carefully observing the air pressure gauge on the control panel. The air pressure will gradually increase until the pressure relief valve operates.

WITH THE AIR DELIVERY SERVICE WHEEL VALVE/COCKS SHUT AND THE PLANT AT FULL OUTPUT, THE FULL - FLOW AIR PRESSURE MUST NOT EXCEED THE ABOVE FIGURES BY MORE THAN 10% i.e.

Normal pressure plant:-
10.6 bar (154 lbf/in^2) max.
High pressure plant:-
15.29 bar (222 lbf/in^2) max.

If it does, immediately open the service wheel valve/cocks to reduce the pressure.

(h) On completion of the test, re-open the service wheel valve/cocks and open the wheel valve behind the control panel. Finally, shut the service wheel valve/cocks and stop the machine.

5.4.7 Refer to the Engine Manual Maintenance Schedule.

5.4.8 Make the appropriate entry in the Maintenance Record.

5.5 Every 500 Hours Running

5.5.1 Carry out 250 hours service.

5.5.2 Change the compressor lubricating oil filter element if not already changed prior to this service (refer to Maintenance Record), or if changing oil brands, grades or types. The element is of the 'spin-on' type and is best removed using a strap wrench. Fit the new element following the manufacturer's instructions.

5.5.3 Change the compressor system oil.

(a) Remove the filler cover (Fig. 13 (3)) from the pressure vessel casing.

(b) Drain the pressure vessel by removing the plug and opening the wheel valve (6), and the oil cooler by opening drain tap (Fig. 16 (3)). Drain the compressor unit inlet casing by removing the drain plug and nylon pipe connector (Fig. 14 (3)). After the oil has drained, close the wheel valve and the oil cooler tap. Replace plug in wheel valve. Replace and tighten the drain plug and pipe connector in compressor inlet casing.

(c) Fill the pressure valve casing with the approved grade of oil (refer to Technical Data) to the MAX mark on the dipstick. Replace and tighten the filler cover.

(d) Remove the banjo fitting and plug from the top of the inlet casing (Fig. 14 (1)) and pour approximately 9 litres (2 UK gals) of oil into the casing. Replace and tighten the banjo fitting and plug.

(e) Run the plant for approximately 2 minutes and then shut down. Ensure that all air pressure is released from the pressure vessel.

Wait 3-4 minutes for the lubricating oil to settle and then remove the filler cover. Check the dipstick and top up as necessary. Replace and tighten the filler cover.

5.5.4 Check the plant protection circuits are functioning correctly as follows:-

(a) Engine oil pressure, engine coolant temperature and pressure vessel temperature switches. For each switch:-

Start the plant, remove the electrical connection from the switch concerned and touch it onto a good electrical earth. The plant should shut down with the appropriate warning light on the control panel remaining lit while the connection is earthed. If not, refer to the Fault Finding Chart for a guide to corrective action. Replace the connection again before proceeding to the next switch.

NOTE:

The engine oil pressure warning light will glow only while there is more than 1.6 bar (23 lbf/in^2) in the compressor air/oil system on shut down.

(b) Compressor unit air delivery temperature switch gauge.

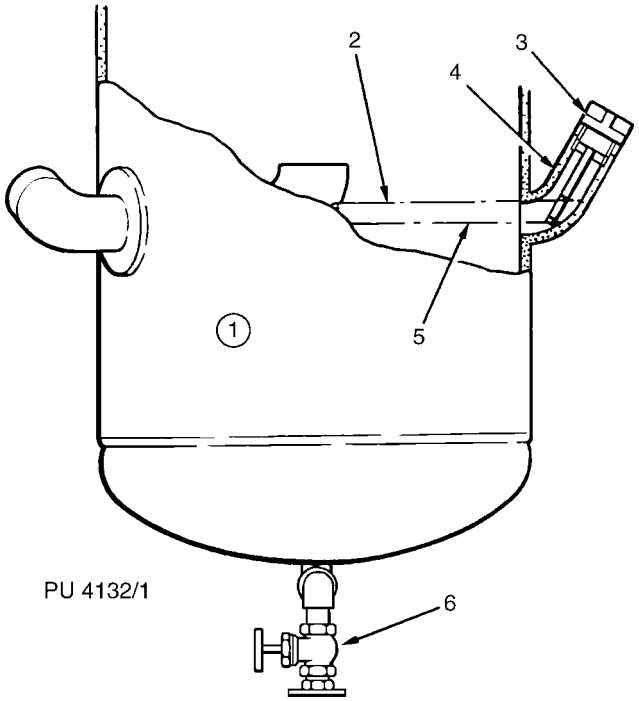
Start the plant and carefully adjust the gauge setting until the two needles contact one another. The plant should shut down with the appropriate lamp on the panel remaining illuminated. Reset the gauge to 115°C on completion

5.5.5 Refer to the Engine Manual Maintenance Schedule.

5.5.6 Make the appropriate entry in the Maintenance Record.

FIG. 13 PRESSURE VESSEL FILLER AND DRAIN

1. PRESSURE VESSEL
2. MAXIMUM OIL LEVEL
3. FILLER COVER
4. FILLER NECK
5. MINIMUM OIL LEVEL
6. WHEEL VALVE (OIL DRAIN) AND PLUG



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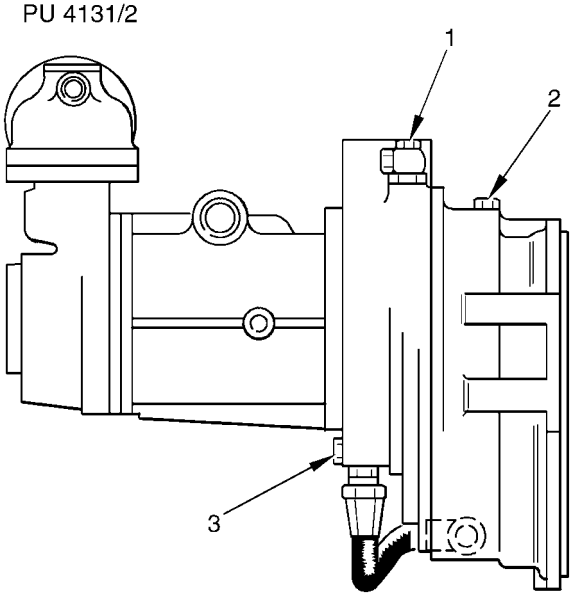
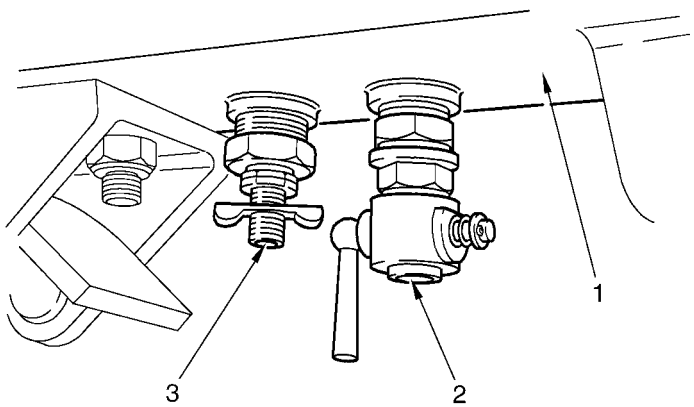


1. BANJO AND PLUG
2. COUNTERSHAFT DRIVE OIL RESTRICTOR
3. INLET CASING DRAIN POINTS (2)

FIG. 14 COMPRESSOR UNIT OIL FILLER AND DRAIN

PU 4179/1



1. CHASSIS FRAME
2. COCK (RADIATOR DRAIN)
3. TAP (COOLER DRAIN)

FIG.16 RADIATOR AND OIL COOLER DRAIN

5.6 Every 1500 Hours Running

5.6.1 Carry out 500 hours service.

5.6.2 Inspect the compressor system oil control valve (Fig. 15 (3)).

(a) When the plant has been drained of oil during the oil change detailed in the 500 hours service, disconnect the two hoses and nylon pipe and remove the control valve. Have a container ready for possible slight oil spillage.

(b) Unscrew the valve end cover, remove the valve spool and inspect it and the bore of the valve body for signs of lacquering or scoring. Lacquering indicates that overheating is occurring and further checks should be carried out on the remainder of the oil circuit, including the oil separator element.

(c) Ensure the valve spool and bore are clean and operating correctly. Reassemble the control valve and refit into the oil circuit. Reconnect the hoses and nylon pipe.

5.6.3 Check the settings of the protection equipment temperature switches.

WARNING:

High temperatures.

(a) Remove the coolant temperature switch and put a 24 Volt DC supply and max 3W bulb in series with it. Immerse the switch in a container of oil and raise the temperature. The bulb should illuminate at 102°C ± 3° (216°F ± 5°). If satisfactory, refit the switch, otherwise renew it.

(b) Repeat the above with the pressure vessel temperature switch. In this case, however, the bulb should illuminate at 120°C ± 3° (248°F ± 5°).

(c) To check the operation of the air delivery temperature switch gauge, the machine's 'as fitted' circuitry is used, so ensure that the keyswitch is turned clockwise to first position (ON) for this test. Remove the switch gauge temperature probe and its pocket from the compressor unit. (The probe must be assembled in its pocket during testing). Adjust the gauge setting to its maximum (120°C) and immerse the probe in the oil. Check that the bulb on the control panel illuminates at 120°C ± 3°) (248°F ± 5°). Renew the gauge and probe if readings are outside these limits. Finally, reset the gauge to 115°C and refit the pocket and probe in the compressor unit.

5.6.4 Check the operation of the minimum pressure and isolating valve. The minimum permitted air pressures are as follows:-

Normal pressure plant:-

4.8 bar (70 lbf/in^2).

High pressure plant:-

9.6 bar (140 lbf/in^2)

With the plant running and control wheel (Fig. 11 (10)) in the 'RUNNING' position, slowly open the air delivery cocks/wheel valve fully. Check the reading on the air pressure gauge (13). If the pressure is less than those given above, refer to paras. 8.3. and 8.4 for adjustment details.

5.6.5 Check the battery electrolyte levels and remove any deposits from the battery tops and terminals. Coat the terminals with petroleum jelly. The batteries supplied with your machine are of the maintenance-free type and should require only infrequent attention.

5.6.6 Refer to Engine Manual Maintenance Schedule.

5.6.7 Make appropriate entry in the Maintenance Record.

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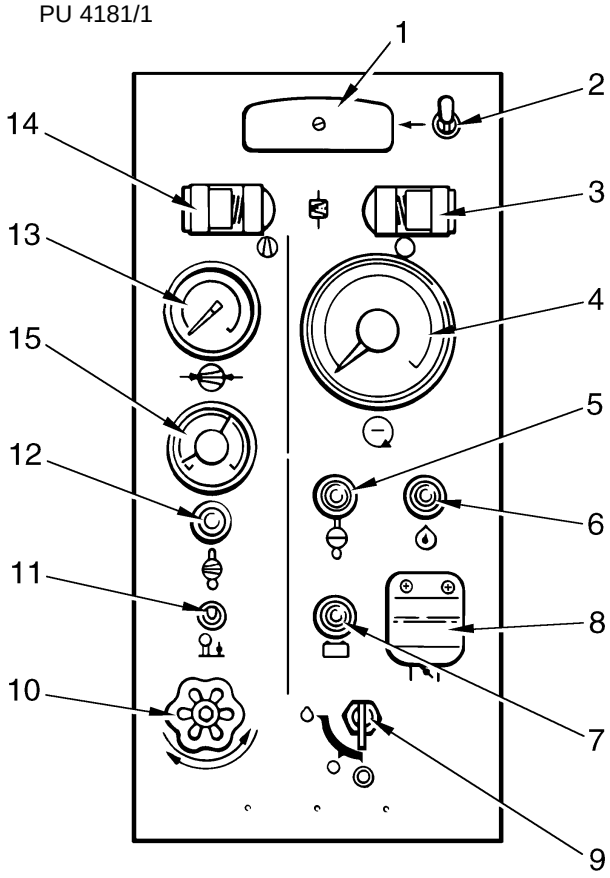
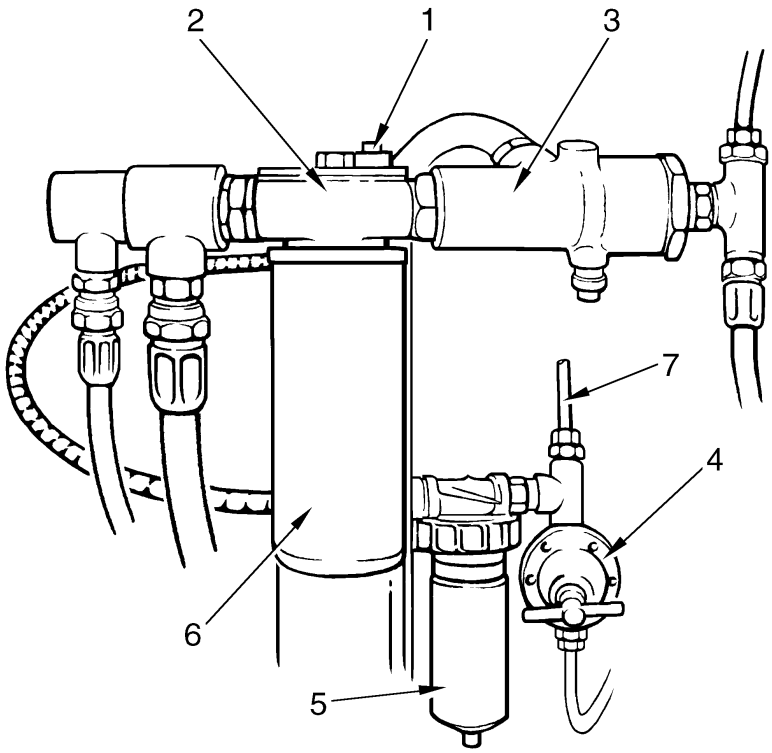


FIG. 11 CONTROL PANEL

1. PANEL LIGHT
2. SWITCH (PANEL LIGHT)
3. SERVICE INDICATOR (ENGINE AIR FILTER)
4. TACHOMETER
5. WARNING LAMP (ENGINE COOLANT TEMP./LEVEL)
6. WARNING LAMP (ENGINE OIL PRESSURE)
7. WARNING LAMP (ALTERNATOR)
8. COLD START AID (IF FITTED)
9. KEYSWITCH
10. START/RUN CONTROL WHEEL
11. TEST SWITCH (WARNING LAMPS)
12. WARNING LAMP (AIR DELIVERY TEMPERATURE)
13. GUAGE (AIR DELIVERY PRESSURE)
14. SERVICE INDICATOR (COMPRESSOR AIR FILTER)
15. SWITCHING GUAGE (AIR DELIVERY TEMPERATURE)



1. SERVICE INDICATOR (OIL FILTER)
2. HEAD (OIL FILTER)
3. OIL CONTROL VALVE
4. AIR PRESSURE REGULATOR
5. AIR LINE FILTER
6. BOWL (OIL FILTER ELEMENT)
7. TO AIR FILTERS (FARR FILTRATION OPTION ONLY)

PU 4425/2

FIG. 15 TYPICAL LUBRICATING OIL FILTER AND AIR PRESSURE REGULATOR/LINE FILTER

The use of parts or lubricating oil not supplied or approved by CompAir, or failure to observe the maintenance instructions, may have serious SAFETY and/or WARRANTY implications. CompAir accept no responsibility for damage or injury caused by use of non-approved parts or failure to comply with maintenance instructions.

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6. PLANNED SERVICING SCHEDULE

SERVICING TASK	Para	RUNNING				
		Daily	50 Hours	250 Hours	500 Hours	1500 Hours
Drain any condensate from pressure vessel	5.2.1	★	★	★	★	★
Drain any condensate from oil cooler	5.2.1	★	★	★	★	★
Drain any condensate from control line filter	5.2.2	★	★	★	★	★
Check compressor oil level	4.2.8(a)	★	★	★	★	★
Check engine oil and coolant levels	5.2.3	★	★	★	★	★
Check engine fuel oil level	5.2.3	★	★	★	★	★
Check air filter service indicators	5.2.4	★	★	★	★	★
Check compressor oil filter service indicator	5.2.5	★	★	★	★	★
Check pipes and connections of air filters	5.2.6	★	★	★	★	★
Inspect plant for leaks	5.2.7	★	★	★	★	★
Operate test switch to ensure warning lights serviceable	5.2.8	★	★	★	★	★
Check acoustic foam for contamination or damage (silenced plant only)	5.2.9	★	★	★	★	★
Remove and wipe out air filter end covers	9.1		★	★	★	★
Check fan belt adjustment	5.3.3		★	★	★	★
Check radiator hoses and clips	5.3.4		★	★	★	★
Inspect enclosure, chassis and undercarriage	9.4		★	★	★	★
Check tyre pressures	2.1		★	★	★	★
Check pressure relief valve not stuck	5.3.7		★	★	★	★
Check unloading and speed control system	8		★	★	★	★
Clean exterior of radiator and oil cooler	5.4.2			★	★	★
Check countershaft drive oil restrictor and strainer	5.4.3			★	★	★
Lubricate enclosure door hinges	5.4.4			★	★	★
Check tightness of oil circuit connections	5.4.5			★	★	★
Check pressure relief valve setting	5.4.6			★	★	★
Change lubricating oil filter element	5.5.2				★	★
Change compressor system oil	5.5.3				★	★
Test protection circuits	5.5.4				★	★
Inspect compressor system oil control valve	5.6.2					★
Check temperature switch settings	5.6.3					★
Check minimum pressure and isolating valve operation	5.6.4					★
Check batteries	5.6.5					★

For additional engine servicing tasks refer to Engine Manual.

For undercarriage and brakes maintenance periods and instructions, refer to Para 9.4.

7. FAULT FINDING CHART

FAULT	POSSIBLE CAUSE	REMEDY
1. Engine fails to crank	(a) Flat batteries, faulty starter, loose or dirty connections	Recharge or replace batteries over-haul starter, tighten or clean connections (refer to Engine Manual).
	(b) Electrical system, circuit fuse blown (warning lamps do not illuminate on operating test switch)	Renew fuse and check circuit
	(c) Faulty starter relay switch	Renew relay switch
	(d) Faulty keyswitch	Renew keyswitch
2. Engine cranks but fails to start	(a) Flat batteries, faulty starter, loose or dirty connections	Recharge or replace batteries, over-haul starter, tighten or clean connections (refer to Engine Manual)
	(b) Fuel tank empty or air, water or dirt in system	Fill fuel tank or clear and bleed fuel system (refer to Engine Manual)
	(c) Faulty engine	Refer to Engine Manual
	(d) Pressure in pressure vessel	Renew or overhaul blow down valve
	(e) Temperature surge after closing down a hot engine has operated engine coolant temperature switch (warning lamp on)	Allow engine to cool before attempting to start
3. Plant starts and stops	(a) Fuel tank empty or air, water or dirt in fuel system	Fill fuel tank or clear and bleed fuel system (refer to Engine Manual)
	(b) Low engine oil pressure	Check engine oil level and refer to Engine Manual
	(c) Faulty engine oil pressure switch	Renew switch
	(d) Electrical system circuit fuse blown (warning lamps do not illuminate on operating test switch)	Renew fuse and check circuit
	(e) Engine coolant problem or faulty coolant level or temperature switch (warning lamp on)	Refer to Fault 9 or check the switch (see para 5.6.3)
	(f) Compressor air delivery temperature too high or faulty compressor air delivery temperature switch (warning lamp on)	Refer to Fault 8 or check the switch (see para 5.6.3)
	(g) Faulty engine	Refer to Engine Manual
4. Plant fails to stop when keyswitch turned to STOP position	(a) Faulty engine fuel solenoid	Renew solenoid
	(b) Faulty keyswitch	Renew keyswitch
	(c) Faulty relay switch	Renew relay switch
5. Compressor fails to build up to working pressure	(a) Faulty air delivery pressure gauge	Renew or repair gauge
	(b) Control wheel in ‘Starting and Stopping’ position	Turn control wheel clockwise to ‘Running’ position
	(c) Pressure regulator needs adjustment	Adjust to give normal working pressure
	(d) Unloader valve stuck across inlet	Inspect and release valve
	(e) Faulty blow down valve	Overhaul or renew valve
	(f) Choked air filter. Service indicators showing red	Service/renew element
6. Compressor fails to off-load (pressure relief valve blowing	(a) Unloader isolating wheel valve closed (situated behind control panel)	Open wheel valve
	(b) Unloader/compressor joint leak	Tighten nuts or renew joint
	(c) Unloader valve stuck open	Inspect and release valve
	(d) Unloader diaphragm punctured	Renew diaphragm
	(e) Pressure regulator faulty or punctured diaphragm	Inspect and rectify
	(f) Faulty pressure relief valve	Test pressure relief valve (refer to para 5.4.6)

7. FAULT FINDING CHART (Continued)

FAULT	POSSIBLE CAUSE	REMEDY
7. Plant not operating at correct maximum or minimum speed	(a) Plant operating at incorrect pressure	Adjust pressure regulator
	(b) Speed control linkage worn or out of adjustment	Renew faulty parts or adjust
	(c) Engine air filter choked. Service indicator showing red	Service/renew element
	(d) Engine maximum/minimum speed out of adjustment	Adjust
	(e) Faulty engine	Refer to Engine Manual
8. Compressor air delivery temperature too high	(a) Slack or broken fan belts	Refer to Engine Manual
	(b) Exterior surface of oil cooler clogged	Clean exterior surfaces of oil cooler
	(c) Plant badly sited	Resite plant for maximum air flow
	(d) Insufficient oil in lubricating system	Fill pressure vessel to correct level
	(e) Faulty thermal by-pass valve allowing oil to by-pass oil cooler	Check by feeling if the temperature of the by-pass pipe is high. If so, examine by-pass valve for jamming or failure of the thermal motor or its spindle nuts out of adjustment. The valve is located at the pressure vessel oil outlet
	(f) Plant operating above the permitted maximum pressure	Adjust pressure regulator
	(g) Poor oil circulation	Check condition of lubricating oil filter service indicator and for clogging of oil circulating system
	(h) Incorrect grade of oil	Drain and refill with correct grade after checking for lacquering
9. Engine temperature too high	(a) Slack or broken fan belts	Refer to Engine Manual
	(b) Exterior surface of radiator clogged	Clean exterior surface of radiator
	(c) Plant operating above the permitted maximum pressure	Adjust pressure regulator
	(d) Incorrect grade of oil	Drain and refill with approved grade
	(e) Insufficient coolant in radiator	Fill radiator
	(f) Faulty engine	Refer to Engine Manual
10. Excessive compressor oil consumption (oil carried over with air)	(a) Incorrect grade of oil	Drain and refill with approved grade (see para 5.5.3)
	(b) Separator scavenge oil restrictor blocked ★	Remove and clear
	(c) Minimum air pressure falling below permitted figure	Inspect minimum pressure and isolating valve (see para 10.3)
	(d) Too much oil in the system	Drain oil to correct level
	(e) Air/oil separator faulty	Clean or renew
11. Emission of oil from compressor air inlet after machine has stopped	(a) Oil control valve stuck open	Examine and clean the oil control valve. If there is evidence of lacquer around the valve check the condition of the oil and the cooling system for any sign of overheating
12. No air available at manifold although machine has built up to working pressure (high pressure machines only)	(a) Faulty minimum pressure valve regulator	Inspect, rectify or renew

★ Situated in rotor casing beneath separator scavenge oil return pipe coupling and has a smooth bore hole 1.6 mm diameter.

8. ADJUSTMENTS

8.1. Load Control (Fig. 15)

8.1.1 The compressor output is progressively controlled to match the demand for air through a range of approximately 0.8 bar (12 lbf/in^2). The maximum permitted working pressure at full speed is 8.6 bar (125 lbf/in^2) for normal pressure plant or 12 bar (170 lbf/in^2) for high pressure plant.

8.1.2 However by adjusting the pressure regulator (4) the working air pressure at full speed can be varied between the following figures:

Normal pressure plant - 4.8 bar (70 lbf/in^2) to 8.6 bar (125 lbf/in^2)

High pressure plate - 9.6 bar (140 lbf/in^2) to 12 bar (170 lbf/in^2).

8.1.3 Release the locknut on the pressure regulator and turn the handle/knob clockwise to increase, or anti-clockwise to decrease the pressure (see para 8.2. Unloading and Speed Control).

8.2. Unloading and Speed Control (Fig. 17)

8.2.1 Disconnect the ball joint of the speed control rod (1) from the lever (2). Unscrew completely the pressure regulator (4).

8.2.2 Release the locknut on the unloader adjustable bleed (Fig. 18) and screw home the needle finger-tight; then slacken it back half a turn. Tighten the locknut temporarily.

8.2.3 Close the air delivery cocks/wheel valve, check the control wheel on the control panel is in the “Starting and Stopping” position and start the engine.

8.2.4 Hold the engine speed control rod to give 1350 rev/min, ensuring that the ball joint of the rod is in the same hole previously used on the fuel pump lever.

8.2.5 When the engine has been running for at least 3 minutes, turn the off-load control wheel clockwise to the “Running” position.

FIG. 15 TYPICAL LUBRICATING OIL FILTER AND AIR PRESSURE REGULATOR/LINE FILTER

1. SERVICE INDICATOR (OIL FILTER)
2. HEAD (OIL FILTER)
3. OIL CONTROL VALVE
4. AIR PRESSURE REGULATOR
5. AIR LINE FILTER
6. BOWL (OIL FILTER ELEMENT)
7. TO AIR FILTERS
(FARR FILTRATION OPTION ONLY)

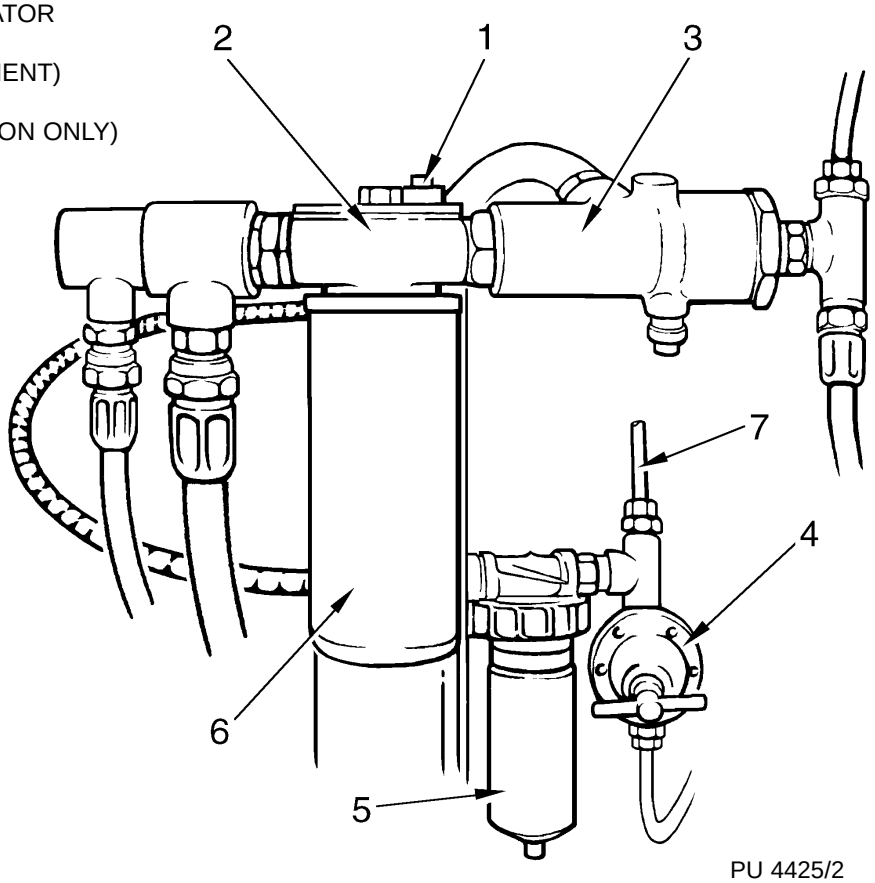

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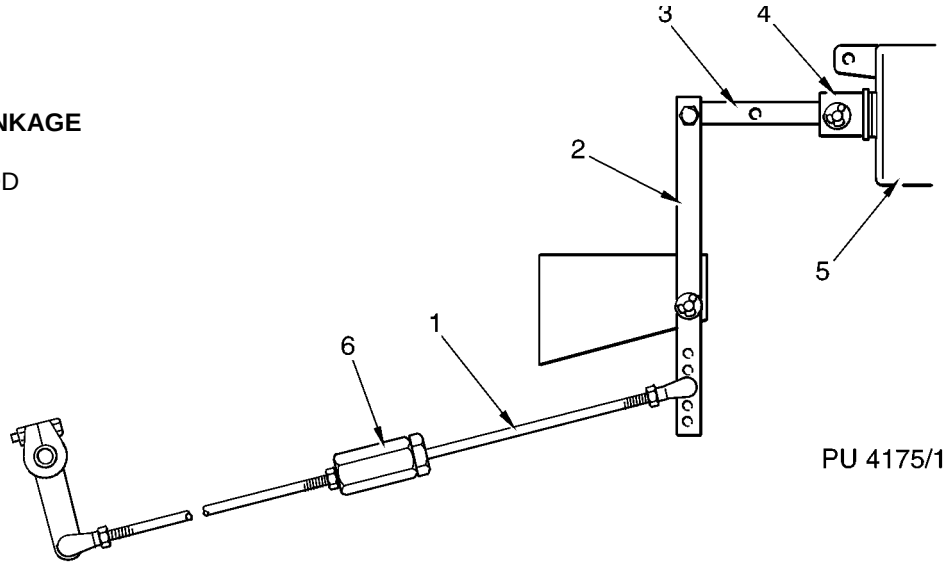
FIG. 17 SPEED CONTROL LINKAGE

1. SPEED CONTROL ROD
2. LEVER
3. LINK
4. UNLOADER SPINDLE
5. UNLOADER
6. SPRING CHAMBER



8.2.6 Turn the pressure regulator handle clockwise until the correct off-load air pressure is reached, which is 0.8 bar (12 lbf/in^2) above the required working pressure. So, for normal pressure plant, the off-load pressure should be 7.7 bar (112 lbf/in^2) or 12.5 bar (192 lbf/in^2) for high pressure plant.

8.2.7 Re-adjust the idling speed to 1350 rev/min, noting the position of the pump mounted lever.

8.2.8 Adjust the length of the control rod (Fig. 17 (1)) to enable its ball joint to be connected to the third hole from the lever pivot. Ensure the rod is not extended against its spring in the spring chamber. Make the connection.

8.2.9 Slowly open the air delivery cocks/wheel valve until the unloader spindle is fully retracted. This will drop the air pressure to 6.9 bar (100 lbf/in^2) or 11.7 bar (170 lbf/in^2) for high pressure plant, and increase the engine speed.

8.2.10 If the engine speed does not reach its maximum (see Technical Data), close the air delivery cocks/wheel valve and move the rod (1) one hole outwards on the lever (2), adjusting the length of the rod so that the ball joint slips easily into the hole. Alternatively, if the maximum speed is exceeded, move the rod one hole inwards. In either case, check afterwards that the idling speed remains at 1350 rev/min without the rod extending from the spring chamber. If this occurs it may be necessary to reposition the control lever ball joint in another hole in the engine fuel pump lever to obtain the same lever angle noted in para 8.2.7. The pump lever can also be drawn off its splined shaft and repositioned as an aid in achieving the correct speed range, but only in exceptional circumstances is this done.

8.2.11 Repeat paras 8.2.9 and 8.2.10 until the correct speed range is obtained. An alternative working pressure may be set if required (refer to para 8.1. Load Control).

NOTE:

The sudden closure of the air delivery will cause the unloader to momentarily move beyond its normal off-load position. The spring chamber protects the speed control linkage when this occurs.

8.2.12 With the plant running and air delivery shut, release the locknut on the unloader adjustable bleed. Slowly unscrew the needle until the air delivery pressure begins to rise, then screw in until it stops rising and begins slowly to fall. Tighten the locknut.

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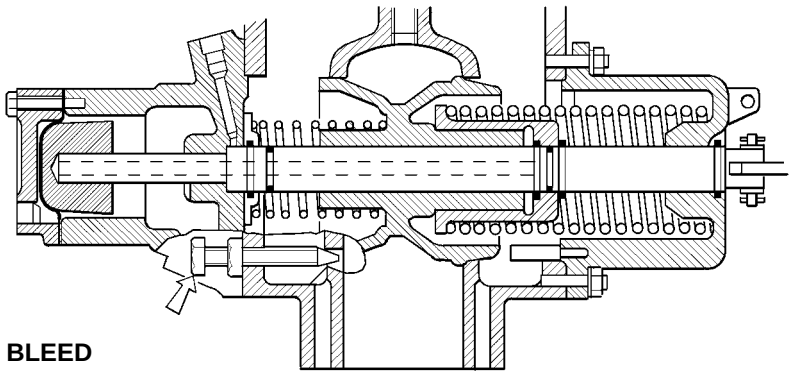

FIG.18 TYPICAL UNLOADER ADJUSTABLE BLEED

8.3. Minimum Pressure and Isolating Valve (Normal Pressure Plant) Fig. 5

8.3.1 The minimum air pressure for these plants is 4.8 bar (70 lbf/in^2).

8.3.2 With the plant running and control wheel (Fig. 11 (10)) in the 'RUNNING' position, slowly open the air delivery cocks/wheel valve fully. Check the reading on the air pressure gauge (13).

8.3.3 If it is any lower than 4.8 bar (70 lbf/in^2) close the cocks and stop the plant. Ensure all air pressure is exhausted and unscrew the retainer from the Minimum Pressure Valve.

8.3.4 Check the springs for their correct free length of 145 mm (5.70 in) and if unsatisfactory, they should be renewed.

8.4. Minimum Pressure and Isolating Valve (High Pressure Plant) Fig. 5

8.4.1 The minimum air pressure for these plants is 9.6 bar (140 lbf/in^2).

8.4.2 Check the pressure as detailed in para 8.3.2 above. If unsatisfactory, adjustment is carried out via the regulator situated behind the control panel. Similar in appearance to the delivery pressure regulator (Fig. 15 (4)), release the locknut and turn the handle clockwise to increase, or anti-clockwise to decrease the pressure.

CAUTION:

On no account must the Minimum Pressure be set any lower than the figures given above.

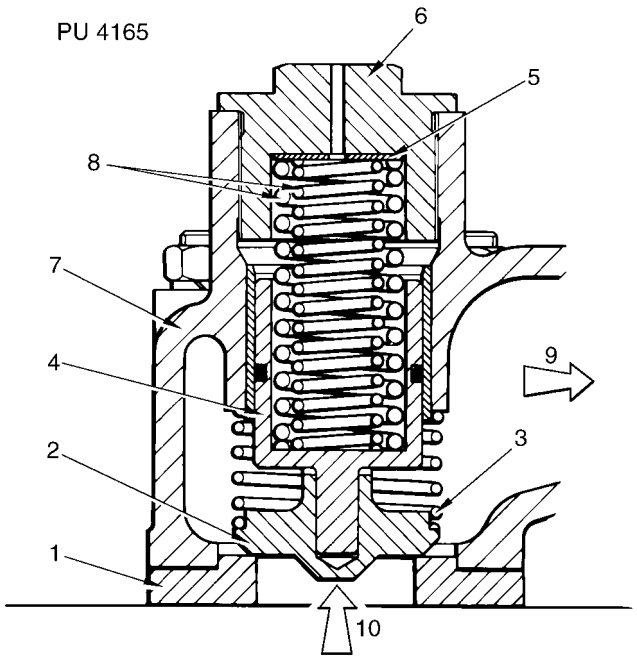

FIG. 5 MINIMUM PRESSURE AND ISOLATING VALVE

1. ADAPTOR
2. VALVE
3. SPRING
4. PLUNGER
5. DELETED
6. RETAINER
7. HOUSING
8. SPRINGS (INNER AND OUTER)
9. AIR TO DELIVERY MANIFOLD
10. AIR FROM PRESSURE VESSEL

FIG. 11 CONTROL PANEL

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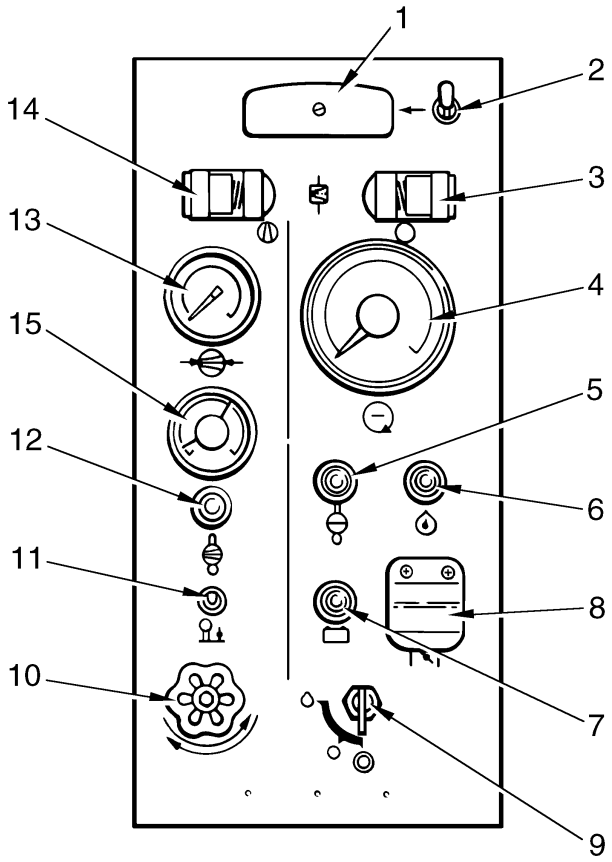

1. PANEL LIGHT
2. SWITCH (PANEL LIGHT)
3. SERVICE INDICATOR (ENGINE AIR FILTER)
4. TACHOMETER
5. WARNING LAMP (ENGINE COOLANT TEMP./LEVEL)
6. WARNING LAMP (ENGINE OIL PRESSURE)
7. WARNING LAMP (ALTERNATOR)
8. COLD START AID (IF FITTED)
9. KEYSWITCH
10. START/RUN CONTROL WHEEL
11. TEST SWITCH (WARNING LAMPS)
12. WARNING LAMP (AIR DELIVERY TEMPERATURE)
13. GUAGE (AIR DELIVERY PRESSURE)
14. SERVICE INDICATOR (COMPRESSOR AIR FILTER)
15. SWITCHING GUAGE (AIR DELIVERY TEMPERATURE)

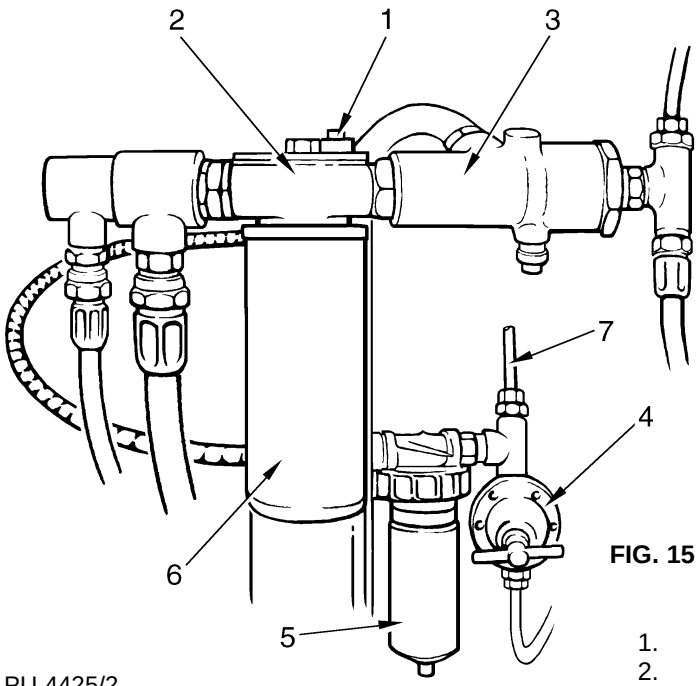

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FIG. 15 TYPICAL LUBRICATING OIL FILTER AND AIR PRESSURE REGULATOR/LINE FILTER

1. SERVICE INDICATOR (OIL FILTER)
2. HEAD (OIL FILTER)
3. OIL CONTROL VALVE
4. AIR PRESSURE REGULATOR
5. AIR LINE FILTER
6. BOWL (OIL FILTER ELEMENT)
7. TO AIR FILTERS (FARR FILTRATION OPTION ONLY)

9. DETAILED SERVICING

9.1. Air Filters (Fig. 19)

9.1.1 These are of the dry, 2 stage type, cylindrical in shape. Each contains a large main filter element and smaller safety filter element housed within the filter body. Air filter elements need only be checked when the red field in the service indicator remains locked in view with plant stopped.

9.1.2 SAFETY ELEMENT

This must be renewed at least every third main element service. Do not attempt to clean or re-use a safety element.

9.1.3 MAIN ELEMENT

This must be renewed after a maximum of six cleanings as detailed below, or annually - whichever occurs first.

9.1.4 Remove filter end cover by unscrewing the centre handwheel. Empty the dust collected in the cover and wipe clean. Ensure rubber dust valve is correctly fitted and in good working order; replace it if worn or damaged.

9.1.5 Unscrew the main element securing nut and seal and remove main element. Element damage will be indicated by areas of concentrated dust on the clean side of the element. In such instances, the damaged element must be replaced immediately.

9.1.6 Service the element by directing a jet of compressed air through it in the reverse direction to the normal flow. Move the jet slowly up and down the pleats while slowly rotating the element. Keep the nozzle at least 25 mm from the pleated paper.

CAUTION:

Air pressure must not exceed 5.5 bar (80 lbf/in^2) or damage will result.

9.1.7 After cleaning, inspect the element for damage by placing a bright light inside. Thin spots, pin holes or the slightest break will make the element unfit for further use.

9.1.8 RE-ASSEMBLING

Check that replacement elements are in good condition and free from storage or transport damage. Do not fit an imperfect element; this could result in costly engine/compressor damage.

9.1.9 Clean the inside of the filter body and pay particular attention to the area where the element gaskets have to seal. Check for cracks or other damage.

9.1.10 Re-assemble the safety and main elements inside the filter body and secure with their nuts and seals. Ensure the element gaskets are located correctly.

9.1.11 Replace and secure the ‘O; ring and cover and reset the service indicator on the control panel.

9.1.12 SYSTEM CHECKS

Following re-assembly of the air filters and before starting the engine, check all pipework from filters to engine and compressor for possible defects to ensure a good, leak-free condition. Also check that the filter mounting fixtures are secure.

FIG. 19 HEAVY DUTY AIR FILTERS

1. FILTER BODY
2. ‘O’ RING
3. SAFETY ELEMENT
4. MAIN ELEMENT
5. END COVER
6. DUST VALVE

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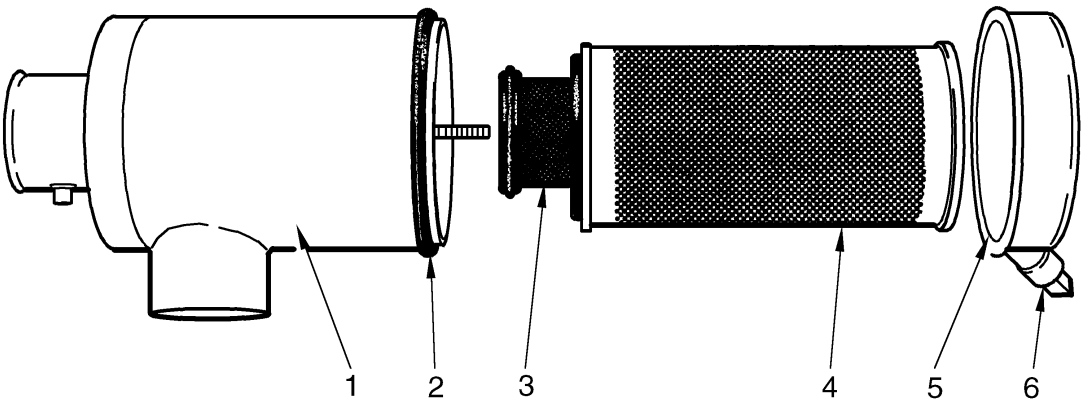


9.2 Hi-Dust Filters (Fig. 20)

9.2.1 These are of the dry two stage type, rectangular in shape, for both compressor unit and engine air intakes. The first stage is a pre-cleaner panel containing cyclone tubes which spin the intake air. This separates out a large proportion of the dust which is then discharged into a dust bin at the bottom of the pre-cleaner panel. The pre-cleaned air is then drawn, via tubes located down the centre lines of the cyclone tubes, into the second stage cartridge where almost all the remaining particles of dust are removed. The pleated paper cartridge is an integral unit that combines cartridge and sealing gasket as one component. The dust bin contains an aspirator which automatically expels the dust to atmosphere through a hose. The aspirator uses a small quantity of compressed air which passes through a jet to induce the negative pressure required for aspiration.

9.2.2 Under extreme conditions of plant operation the pre-cleaner panel should be removed and cleaned with the use of high pressure water, steam, or an immersion bath in order to dislodge contaminants which may be collected on the interior of the panel. When cleaning the plant care should be exercised not to direct a stream of water at the face of the cleaner.

(a) Removing the operating air feed pipe and flexible dump hose at the bottom of the first stage pre-cleaner panel (4).

(b) Remove the four nuts (5) and the pre-cleaner panel.

(c) Loosen all four corners of the pamic cartridge (2). It may be necessary to break the seal along the edges also. Remove the cartridge by pulling it straight out. DO NOT clean; replace with a new cartridge.

(d) Clean the inside of the housing (1) and check for cracks or other damage.

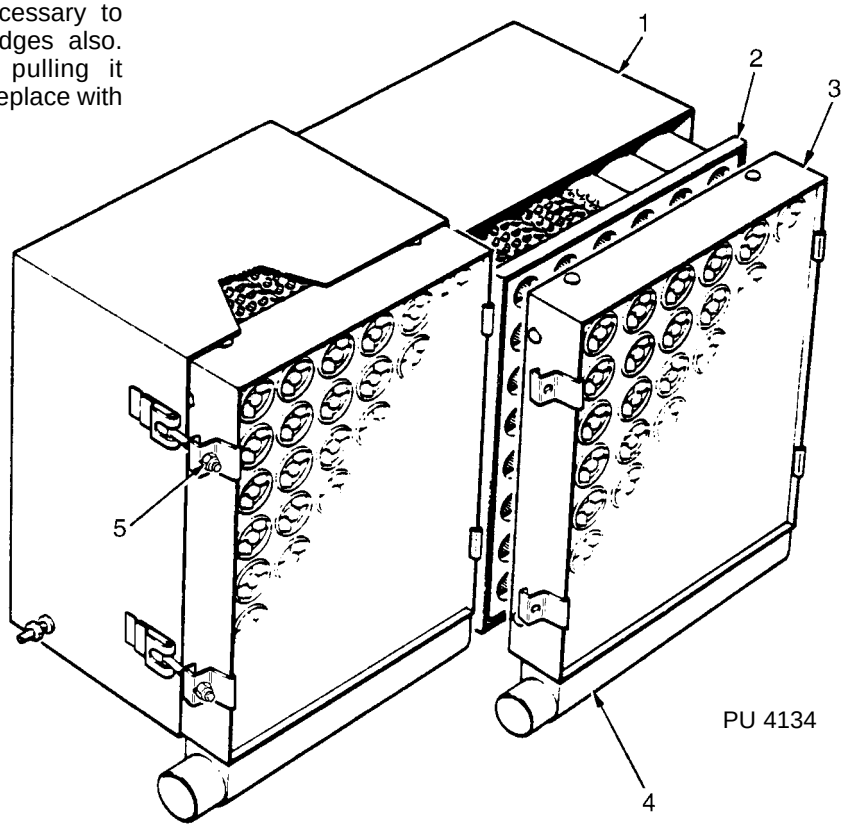
(e) Clear the pre-cleaner openings of any accumulated debris.

(f) Insert a new cartridge into the housing avoiding damage to the cartridge tubes or the sealing flange on the housing. Ensure the corners and edges of the cartridge seal accurately on the housing flange. If difficulty is experienced during fitting DO NOT use force; withdraw the cartridge, check for irregularities and repeat operation.

(g) Replace the pre-cleaner panel with its dust bin at the bottom, position the four clamps and tighten the nuts (5), ensuring all edges of the cartridge are sealed against the housing. Tighten the nuts again after two or three days.

(h) Finally, replace the air feed pipe and dump hose and reset the service indicator on the control panel.

9.2.3 **System Checks.** Following reassembly of the air cleaners and before starting the engine, check all cleaners to engine and compressor pipe work for possible defects to ensure a good and leak-free condition. Also check that the cleaner mounting fixtures are secure.



1. HOUSING
2. PAMIC CARTRIDGE
3. PRE-CLEANER PANEL
4. DUST BIN
5. SECURING NUT

FIG.20 HIGH DUST FILTERS

9.3. Air/Oil Separator Element (Fig. 21)

9.3.1 With normal operation, renewal of the separator element should only be required infrequently. It should, however, be renewed when the final oil separating efficiency fails to such an extent that the lubricating oil consumption rises unduly. This is indicated by heavy oil vapour or oil droplets passing with the air to delivery. Other possible causes of an unduly high oil consumption should be checked by reference to the Fault Finding Chart.

9.3.2 Renewing the separator element.

(a) Remove the access cover at the front of the enclosure roof.

(b) Ensure that all air pressure has been released from the system then detach the delivery manifold and pipe from the minimum pressure valve and the pipe supporting bracket.

(c) Disconnect all pipes and connections from the pressure vessel cover and withdraw the oil bleed tube. Label the pipes to assist in reassembly.

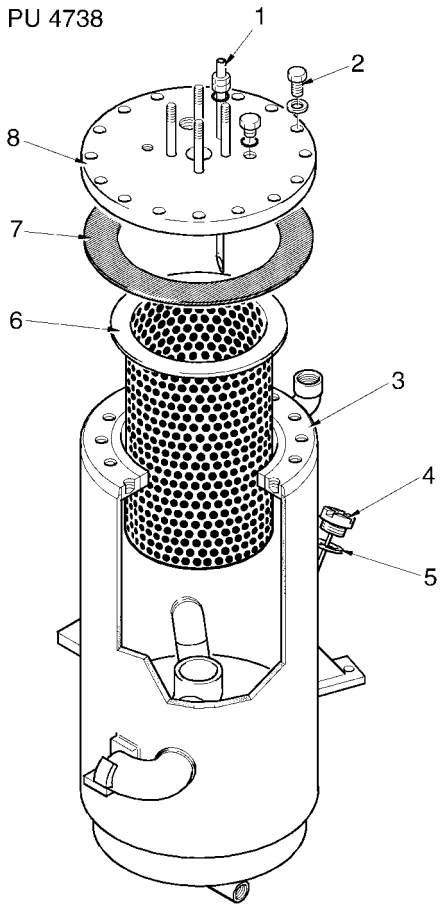
(d) Remove the sixteen bolts securing the cover to the vessel body and lift the cover clear. If necessary, use lifting tackle.

(e) Withdraw the separator element (6) and discard.

(f) The new air/oil separator element should be assembled in the reverse order to dismantling and a new cover joint fitted.

CAUTION

Ensure that any new cover joint incorporates static earthing staples as specified by CompAir Holman.



1. OIL BLEED TUBE
2. COVER SECURING BOLT
3. PRESSURE VESSEL
4. FILLER COVER AND DIPSTICK
5. SEALING WASHER
6. SEPARATOR ELEMENT
7. COVER JOINT
8. COVER - PRESSURE VESSEL

FIG. 21 AIR/OIL SEPARATOR ASSEMBLY

9.4. Undercarriage and Brakes

9.4.1 Wheels

(a) Periodically investigate the conditions of the tyres. Check for tread damage and side-wall cracks. Replace any tyre found to be defective or excessively worn. In latter case, check for reasons for wear e.g. bent axle, incorrect tyre pressures etc. and rectify.

(b) Every year, or after 6,500 Km (4,000 miles) if sooner, raise each wheel clear of the ground and check for bearing end play by rocking the wheel in a vertical plane. To adjust the wheel for end play, remove the split pin and tighten the axle nut until bearing resistance is felt, then slacken the nut one slot.

(c) This adjustment should allow the required clearance. If the wheel is still tight to revolve, slacken the nut another slot. After correct adjustment, replace the split pin and hub grease cap.

WARNING:

Chock the front and back of wheels not being raised. Support the chassis frame directly with axle stands or similar supports before working under a jacked-up plant. Renew any defective or worn parts to avoid a possible serious accident.

9.4.2 Brakes

(i) General

(a) To avoid damage to the brake drums (Fig. 22 (1)) do not allow the brake shoe linings (2) to wear right down. Periodically check the linings for irregular wear. If necessary, replace with genuine factory lined shoes. The brake linings should be kept clean. Do not over-stretch the brake shoe pull off springs when removing or fitting.

(b) Do not attempt to adjust the brakes by altering the effective length of the brake operating rods (3). A brake shoe adjuster (4) is fitted to each brake and is the only correct means of adjustment. When the brakes are off, the transverse or longitudinal brake operating rods should have no influence on the brake shoes; this is essential if efficient braking is to be obtained.

(ii) Adjustment

(a) Lock the turntable and chock the front wheels. Release the handbrake then jack up the rear left hand side of the plant and support it with axle stands.

(b) At the rear of the back plate, turn the brake shoe adjuster until it is no longer possible to turn the wheel by hand; then slacken the adjuster until the wheel can be rotated freely or with only light rubbing of the brake shoes.

(c) Reposition the jack and axle stands and repeat the adjustment procedure on the rear right hand wheel.

(d) Remove the jack and axle stands. Apply the handbrake, remove the wheel chocks and unlock the turntable steering.

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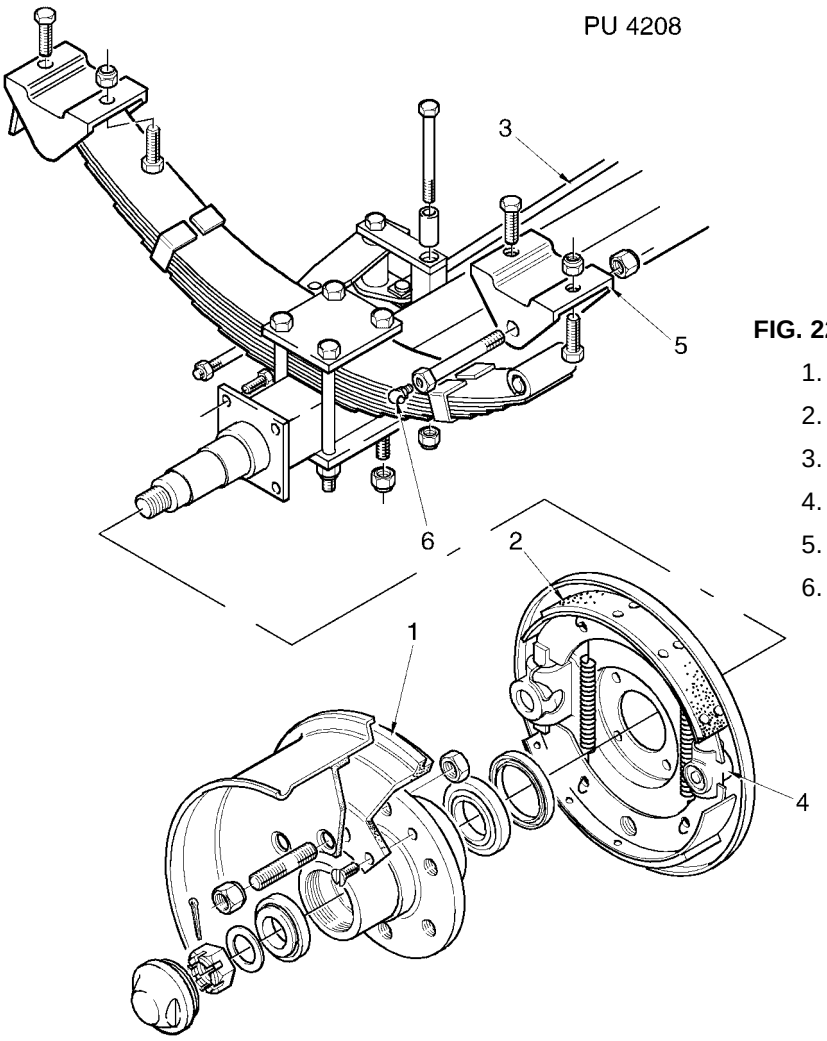


9.4.3 Maintenance

(i) Every month

(a) Grease the undercarriage turntable bearing and leaf spring shackles (Fig. 22 (5)) via the lubricator nipples.

(b) Check that the handbrake and, if fitted, the overrun brake functions correctly and lubricate their mechanism.

(c) Check the brakes for correct operation, see 9.4.2 Adjustments.

(d) Lubricate the brake operating linkage and inspect the brake rods, clevises and cable.

(ii) Every six months

(a) Carry out the monthly service.

(b) Check that the brake backplates are secure; tighten if necessary.

(iii) Every two years

(a) Carry out six months service.

(b) Remove brake drums, clean and check for signs of scoring; renew if necessary.

(c) Check the brake shoes for wear, damage and grease contamination; renew if necessary.

NOTE:

Brake shoes, when changed due to wear, should be changed, where possible, as matched pairs within each drum and across each axle. In the unlikely event that a single brake needs replacement shoes, do not mix linings within the drum and certainly do not change only one shoe.

FIG. 22 REAR AXLE AND BRAKE ASSEMBLY

1. BRAKE DRUM
2. BRAKE SHOE AND LINING
3. BRAKE ROD
4. BRAKE SHOE ADJUSTER
5. SPRING SHACKLE
6. LUBRICATOR NIPPLE

10. INSPECTIONS

10.1. Unloader (Fig. 23)

10.1.1 After examination or the refitting of any part of the unloader, check that the machine is operating within the correct speed and pressure ranges (see Technical Data).

10.1.2 Dismantling

(a) Remove the cover (1) from the body (3).

(b) Gently remove the diaphragm (12) taking care not to damage it in the process. Inspect the diaphragm for signs of puncturing; if in doubt about its condition fit a new one. Withdraw the piston (2).

(c) At the opposite end disconnect the link from the spindle (11).

(d) Remove the nuts securing the clamping ring (4) and spring retainer (6) to the casing (8); circlip (5) prevents the spring (7) from forcing the spring retainer off the spindle. Withdraw the spring retainer spring and valve assembly complete from the casing.

(e) Press down on the valve (9) to compress the spring and remove the circlip and spacer (10); do not over-expand the circlip. Take care in releasing the load in the spring.

(f) Slide the valve, the spring and its retainer from the spindle.

(g) Check the spring for free length which should be 286 mm (11.25 in).

10.1.3 Assembling

(a) Lightly oil the spindle and slide it through the spring retainer. Replace the spring over the spindle and slide the valve on its spindle ensuring that it is correctly positioned in relation to the spring. Compress the spring enough to allow the spacer to be repositioned and the circlip to be fitted in its groove.

(b) Oil the valve assembly and slide it into place in the casing. Position the clamping ring over the spring retainer and on the studs. Replace the spring washers and nuts and tighten evenly.

(c) Connect the speed control link to the spindle.

(d) Assemble the piston and diaphragm onto the spindle.

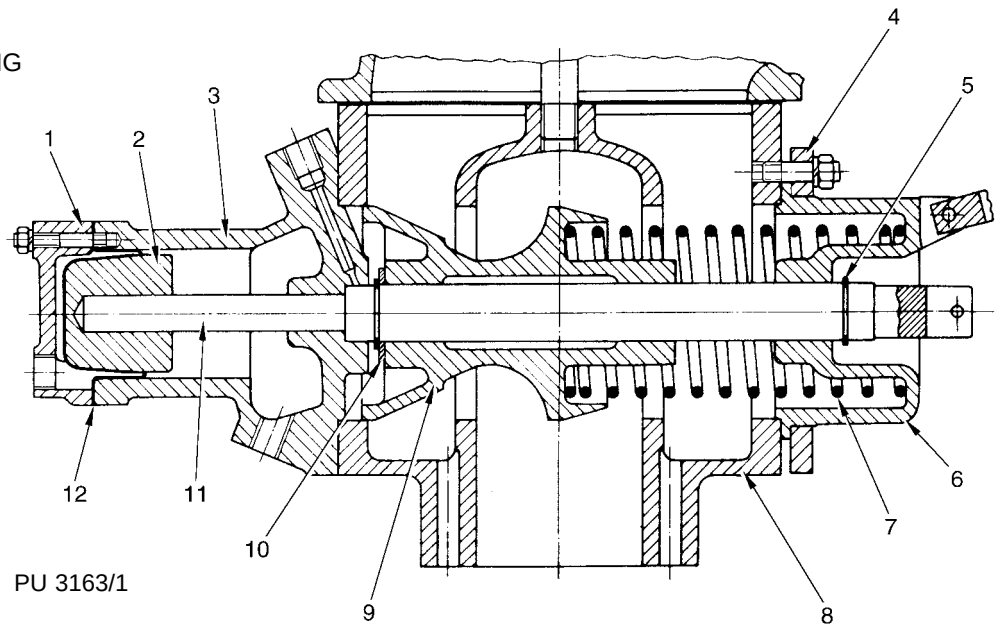
NOTE:

Before fitting a new diaphragm, it is essential to turn it inside out. When the diaphragm and piston are brought together, the smooth rubberised surface of the diaphragm must be outside and the fabricated side in contact with the piston.

(e) Replace the cover and secure.

FIG. 23 UNLOADER

1. COVER
2. PISTON
3. BODY
4. RING (CLAMPING)
5. CIRCLIP
6. RETAINER - SPRING
7. SPRING
8. CASING
9. VALVE
10. SPACER
11. SPINDLE
12. DIAPHRAGM



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10.2. Thermal By-Pass Valve (Fig. 7)

10.2.1 Dismantling

(a) Ensure that the system is completely vented of oil/air pressure.

(b) Place a suitable receptacle under the pressure vessel drain valve and drain off about 23 litres (5 imp. gal) of oil. Close the drain valve.

(c) Disconnect the two hoses from the thermal by-pass valve. Keep a receptacle handy to catch any oil from them.

(d) Use a spanner on the reducer between by-pass valve and pressure vessel, and remove it, complete with by-pass valve from the vessel.

(e) Hold the body (1) in a vice with the three end cover screws uppermost. Release the screws and remove the end cover (3).

(f) Remove the plunger (5) and spring (4) from the body.

(g) Position two pins in the retainer (7) and unscrew it from the end cover.

(h) Remove the thermal motor (9) complete with 'O' ring (8).

10.2.2 Assembling

(a) Hold the end cover in a vice, machined face uppermost. Replace the thermal motor complete with 'O' ring and the retainer in the end cover; secure the retainer but do not overtighten.

(b) Press the stem of the thermal motor fully in and check the distance 'A' between the machined face of the end cover and the face of the outer locknut. This must be between 4.2 mm (0.165 in) and 4.9 mm (0.193 in). Adjust the locknuts if necessary.

(c) Pull the stem away from its position at the bottom of the thermal motor. Place the plunger over the locknuts in its normal operating position and push the stem down into the motor. Ensure that the plunger contacts the face of the end cover before the stem reaches the end of its travel in the motor.

(d) Position the body in a vice with the machined face uppermost. Replace the spring and plunger in the body.

(e) Fit a new joint and replace the end cover. Secure with the three washers and screws tightened to 29 Nm (21 lbf/ft).

(f) Refit the thermal by-pass valve to the pressure vessel and connect the two hoses.

(g) Before operating the plant it is essential to refill the pressure vessel. Refer to para 4.2.8.

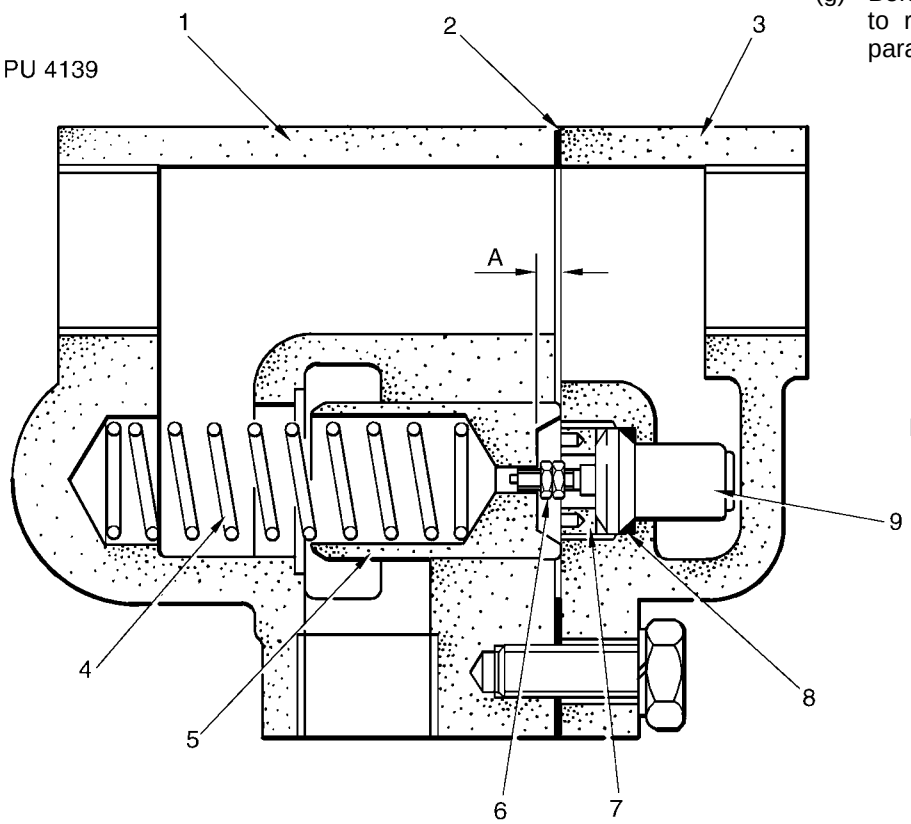


FIG. 7 THERMAL BY-PASS VALVE

1. BODY
2. GASKET
3. END COVER
4. SPRING
5. PLUNGER
6. LOCKNUTS
7. RETAINER
8. 'O' RING
9. THERMAL MOTOR

10.3 Minimum Pressure and Isolating Valve (Fig. 5)

10.3.1 Dismantling

(a) Ensure the plant is relieved of air/oil pressure.

(b) Release the bracket securing the air delivery manifold to the pressure vessel.

(c) Remove the access cover in the roof over the pressure vessel and remove the delivery manifold securing nuts. Slide the manifold clear of the studs.

(d) On high pressure plant remove the banjo and nylon pipe from the tapping in the centre of the retainer (6). Unscrew the retainer and remove the inner and outer springs (8).

(e) Remove the four nuts and washers securing the housing and adaptor (1) to the pressure vessel cover.

(f) Lift off the housing and adaptor.

(g) Remove the valve (2), spring (3) and plunger (4).

(h) Check the inner and outer springs for their correct free length of 145 mm (5.70 in).

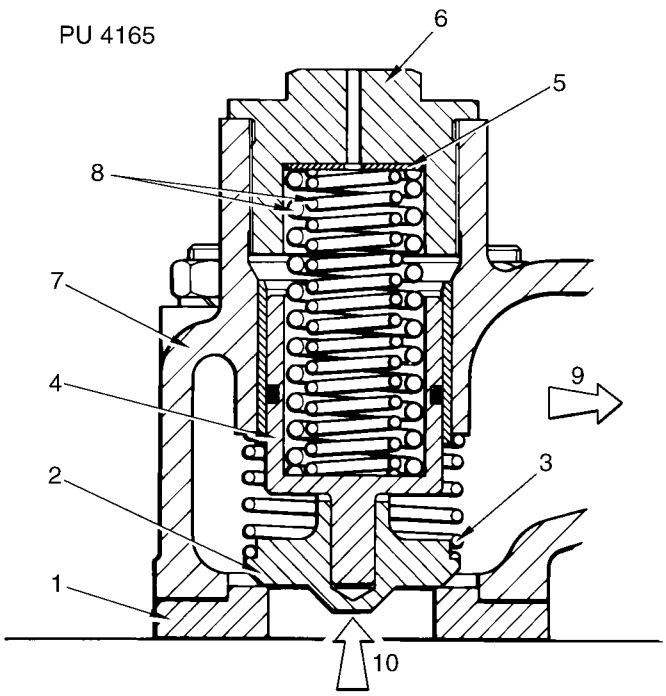
10.3.2 Assembling

(a) Replace the plunger (4), spring (3) and valve (2) into the housing, followed by the joint and adaptor (1).

(b) Position a joint onto the pressure vessel cover, lower the assembly into position and secure with the four washers and nuts.

(c) Position the inner and outer springs in the plunger; replace and secure the retainer. On high pressure plant, reconnect the nylon pipe to the retainer.

(d) Replace the joint and air delivery manifold and secure the access cover in the roof.



1. ADAPTOR
2. VALVE
3. SPRING
4. PLUNGER
5. DELETED
6. RETAINER
7. HOUSING
8. SPRINGS (INNER AND OUTER)
9. AIR TO DELIVERY MANIFOLD
10. AIR FROM PRESSURE VESSEL

FIG. 5 MINIMUM PRESSURE AND ISOLATING VALVE

10.4. Non-Return Valve (Fig. 6)

10.4.1 Dismantling

(a) Detach the necessary pipework from the valve housing and remove the temperature gauge probe.

(b) Remove the valve housing from the delivery bearing housing and lift out the valve head (4) and spring (5) from the housing.

(c) Remove the cover (1) and push out the stem (2).

(d) Inspect the valve head and stem for any signs of wear.

NOTE:

If the valve stem and 'O' rings alone are to be examined, it is only necessary to remove cover (1). Then use the M8 x 1.25 tapping in the top of the valve stem to help withdraw the stem.

10.4.2 Assembling

CAUTION:

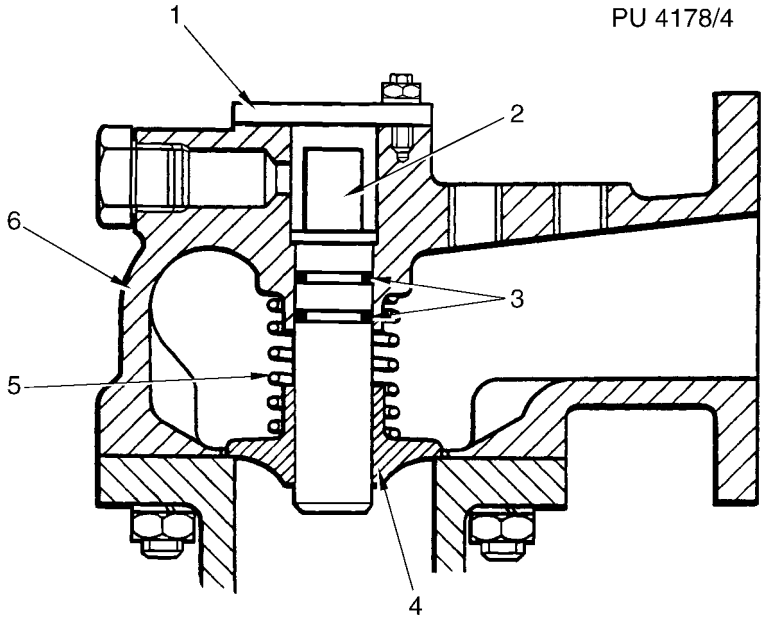
Ensure the valve head does not drop out when assembly is inverted for re-positioning on the delivery bearing housing.

(a) Grease the stem and its bore in the housing with Castrol MS 3 Moly Grease or similar and replace the stem complete with 'O' rings (3).

(b) Replace the cover and secure.

(c) Check the spring for its correct length of 65 mm ($2^{9}/_{16}$ in). Position the spring in the housing and replace the valve head.

(d) Reposition the assembly on the delivery bearing housing and secure. Reconnect the hoses and replace the temperature gauge probe.



1. COVER
2. STEM
3. 'O' RING
4. VALVE HEAD
5. SPRING
6. HOUSING

FIG. 6 NON-RETURN VALVE

11. ON-HIGHWAY BRAKING OPTION (AIR BRAKES)

11.1 GENERAL DESCRIPTION

11.1.1 This option consists of a two-line, air braking system (Fig. 24) which uses air from the towing vehicle to apply the compressor brakes to all four wheels in the same proportion as the driver's pressure on the towing vehicle's footbrake.

11.1.2 Two flexible air lines are fitted on the compressor towbar.

The yellow line carries a pilot signal from the driver's footbrake to the relay/emergency valve (4).

The red line feeds air from the towing vehicle's system to the relay/emergency valve for brake operation and to charge the compressor braking system air reservoir (6). Should there be an emergency such as a compressor breakaway, the relay/emergency valve will automatically apply the brakes using air from this reservoir.

11.1.3 The manoeuvering valve (5) is also fitted on the compressor towbar to allow the plant to be moved with the red and yellow air lines disconnected from the towing vehicle. Pushing the button on the manoeuvring valve will exhaust the air from the brake actuators, so releasing the brakes to allow manoeuvring of the trailer. Pulling the button will restore the actuator pressure and brakes.

11.1.4 The manoeuvring valve can be operated up to six times before the stored air in the reservoir falls too low to allow the brakes to be manually released. The reservoir must then be re-charged by the towing vehicle.

11.1.5 The manoeuvring valve will automatically return to the out, normal run position, when the trailer is re connected to the towing vehicle. The trailer brakes may also be released by draining all the air pressure from the reservoir.

WARNING:
The stored energy in the trailer air pressure reservoir must NEVER be used for permanently parking the trailer and a handbrake is fitted to the turntable which operates on the two front wheels by means of flexible cables. Wheel chocks are also provided as standard and MUST be used for additional parking safety.

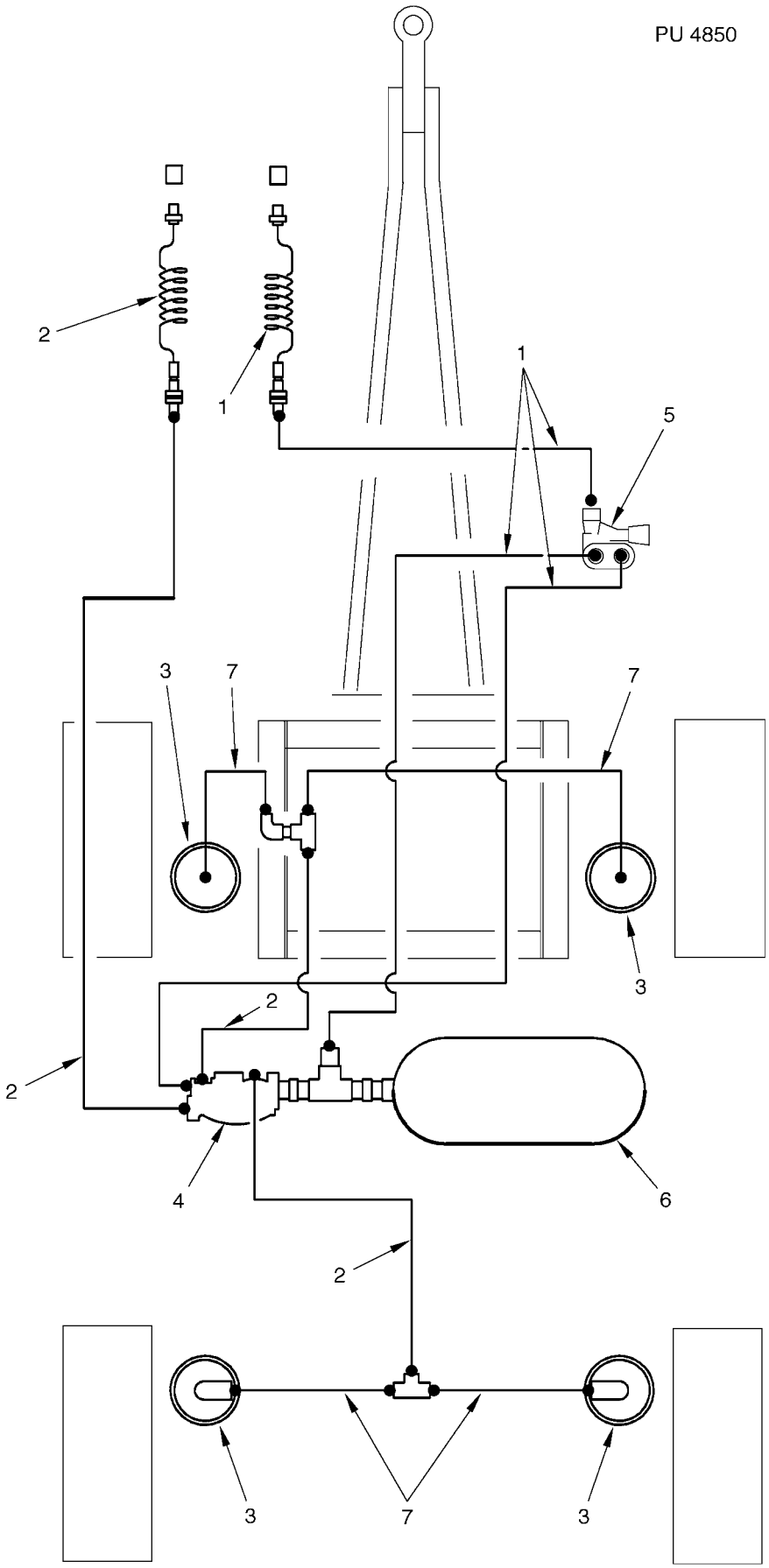
11.2 WHEEL BRAKES

11.2.1 General description

All four wheels incorporate drum braking with automatic adjustment for brake lining wear. Brake lining thickness can be checked using the two hemispherical inspection holes on the periphery of the back plate.

FIG. 24 COMPRESSOR 2-LINE AIR BRAKING SYSTEM (Diagrammatic)

1. NYLON AIR HOSE - RED
2. NYLON AIR HOSE - YELLOW
3. BRAKE ACTUATORS
4. RELAY / EMERGENCY VALVE
5. MANOEUVERING VALVE
6. AIR RESERVOIR
7. RUBBER AIR HOSE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11.3 MAINTENANCE - BRAKING COMPONENTS

11.3.1 Every 6 months or sooner, depending on usage.

11.3.1.1 Check brake lining thickness via the two inspection holes in each back plate. Linings/shoes must be changed when they reach a thickness of 2-2.5 mm.

11.3.1.2 If it is necessary to remove the brake shoes/linings, pull off the sealing cap and turn the brake adjuster anti-clockwise until the brake shoes have reached their minimum diameter (see para 11.3.2.2 (c)).

11.3.2 Every 12 months or every brake lining change if sooner.

11.3.2.1 Check for wear/deformation at brake actuator fork head (Fig. 26 (2)).

Missing or damaged sealing caps (3 and 4).

11.3.2.2 Re-grease the linkage controller (Fig. 25 (2)) on each wheel as follows:-

(a) Remove sealing caps (Fig. 26 (3 and 4)) and clean out the exposed housing to reveal the hexagon-headed adjuster (6).

(b) Using a grease gun on nipple (3) and special BPW long-life grease ECO-LI91 (approx 80 gr.), re-grease the linkage controller until sufficient new grease emerges from the adjuster. Remove any surplus grease.

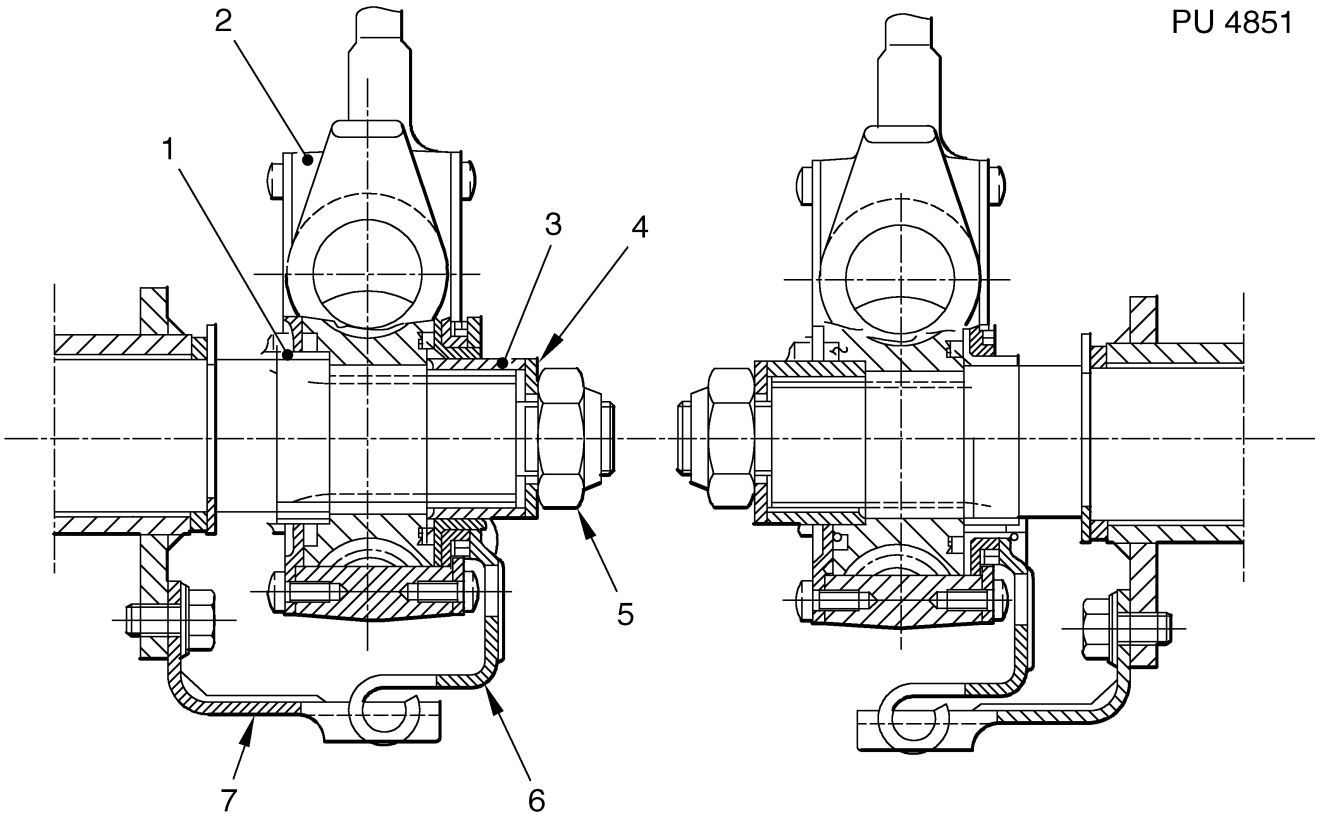
(c) Check the automatic brake adjuster is working correctly. Push a 19 mm socket onto the hexagon head of the adjuster (6) against the spring pressure of the clutch sleeve (5) and turn the adjuster $^{1}/_{2}$ - $^{3}/_{4}$ turn anti-clockwise. Actuate the brake lever several times by hand. You should hear the clicking of the mechanism as it re-adjusts and you should see the adjuster head turning clockwise slightly at each stroke. If necessary, repeat this process several times.

(d) Finally, re-grease to fill the adjuster housing and fit new sealing caps on adjuster and grease nipple.

(e) Check idle stroke. See para 11.4.1.6.

Fig. 25 AUTOMATIC LINKAGE CONTROLLER

1. BUSHING
2. AUTOMATIC LINKAGE CONTROLLER
3. SPACER
4. WASHER
5. LOCKNUT
6. CONTROL LEVER
7. LOCKING PLATE



11.4 INSTALLATION and SET-UP

11.4.1 Automatic Linkage Controller.

11.4.1.1 After changing or exchanging the brake cylinder, brake cam shaft or the automatic linkage controller, install and set up the linkage controller as follows:-

11.4.1.2 Smear the splines of the brake cam shaft with copper paste Molykote CU-7439 plus. Slide the bushing (Fig. 25 (1)) onto the splines. Install the linkage controller (2) with spacer (3) or optionally parking lever and washer (4). Tighten locknut (5) to 60-70 Nm.

11.4.1.3 Pull open sealing cap (Fig. 26 (4)). Depress and hold in the clutch sleeve (5) and align the hole in the brake lever with the hole in the actuator fork head (2). Release the clutch sleeve. Insert pin and secure with new split pins.

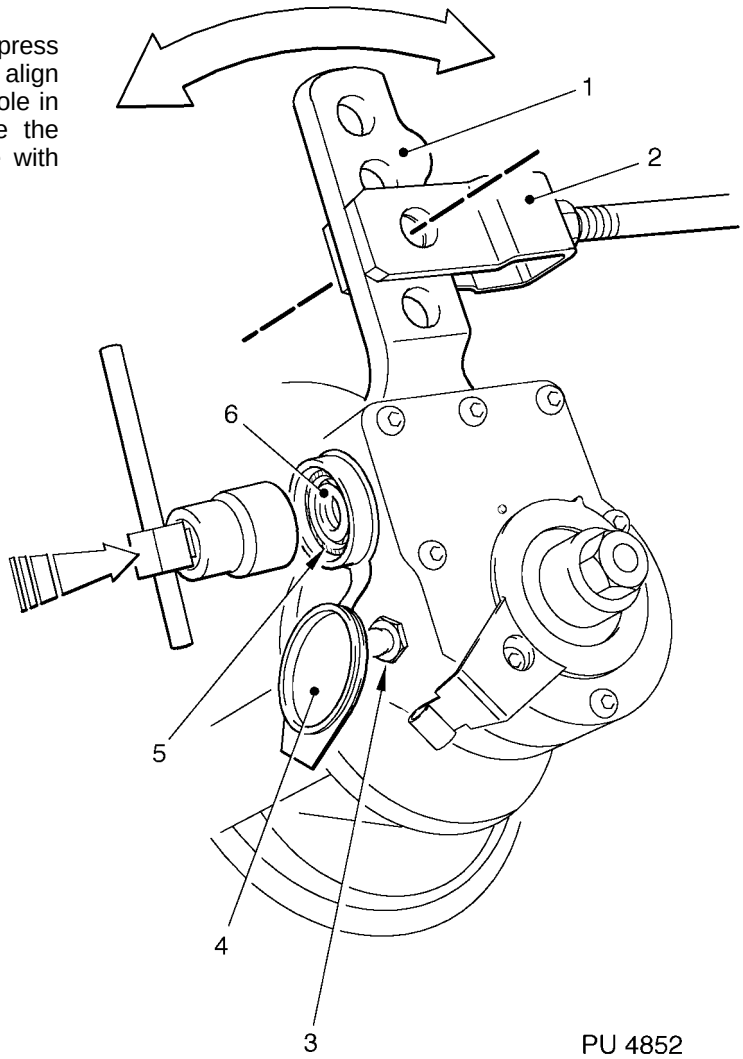


Fig. 26 BRAKE LEVER / ACTUATOR ROD ALIGNMENT

1. BRAKE LEVER
2. ACTUATOR FORK HEAD
3. GREASE NIPPLE WITH SEALING CAP
4. SEALING CAP
5. CLUTCH SLEEVE
6. ADJUSTER

11.4.1.4 Attach the tension spring to the outermost hole in the brake lever. Depress the clutch sleeve again and turn the control lever (Fig. 27 (4)) in the direction of the arrow as far as it will go. The indicator on the control lever (2) will then line up with the control point (1). Release the clutch sleeve.

11.4.1.5 In this position, fit the control lever locking plate (3) onto the control lever (note the difference between left and right hand versions). Secure the locking plate in position using two M8 x 14 screws on the inside of the support plate (5).

CAUTION
On completion, check that control lever indicator (2) is still aligned with the control point.

11.4.1.6 Set idle stroke

When the brake is applied, the brake lever (Fig. 28 (1)) and actuator rod (2) must form an angle of approx 90°. Set the idle stroke (A) to 10-12% of connected length (B) by depressing the clutch sleeve (Fig. 27 (8)) and turning the hexagon-headed adjuster (Fig. 27(9)).

For example, connected length (B) 125 mm = idle stroke of 15-18 mm.

11.4.1.7 Finally, press on the sealing cap (Fig. 27 (7)).

11.4.2. Handbrake Adjustment

11.4.2.1 The hand parking brake should be fully applied on or before the 5th notch. Adjustment is carried out at the compensator on the handbrake lever and on the outer cable attachment point on the turntable frame.

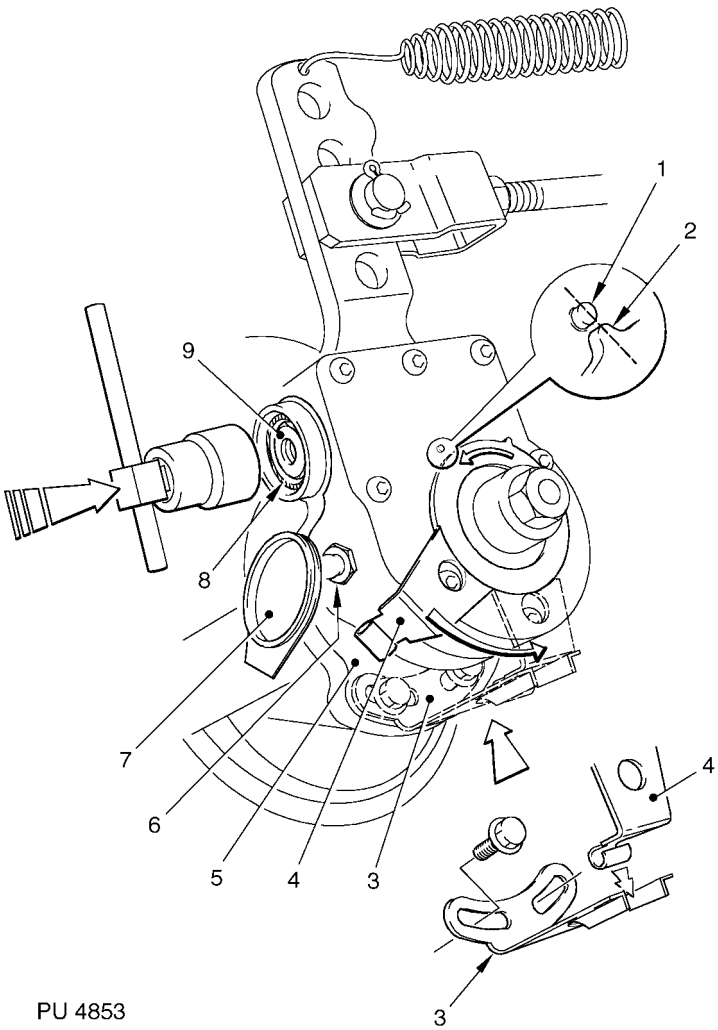


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Fig. 27 SETTING UP CONTROL LEVER

1. CONTROL POINT
2. INDICATOR - CONTROL LEVER
3. LOCKING PLATE - CONTROL LEVER
4. CONTROL LEVER
5. SUPPORT PLATE
6. GREASE NIPPLE WITH SEALING CAP
7. SEALING CAP
8. CLUTCH SLEEVE
9. ADJUSTER

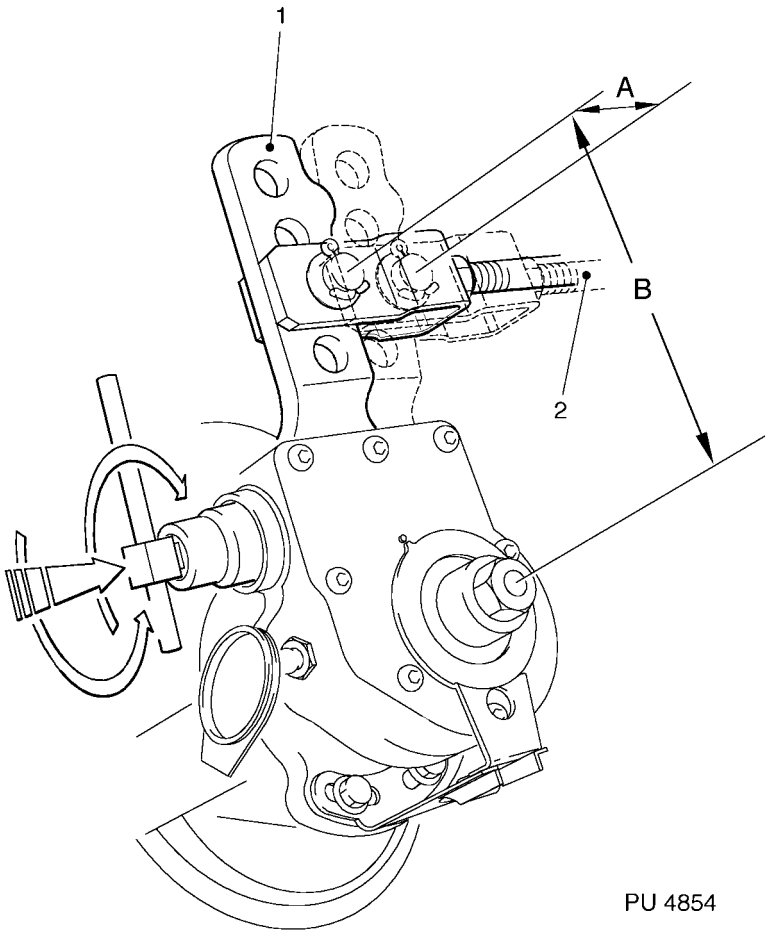

Fig. 28 SETTING IDLE STROKE

1. BRAKE LEVER
2. ACTUATOR ROD
A. IDLE STROKE
B. CONNECTED LENGTH