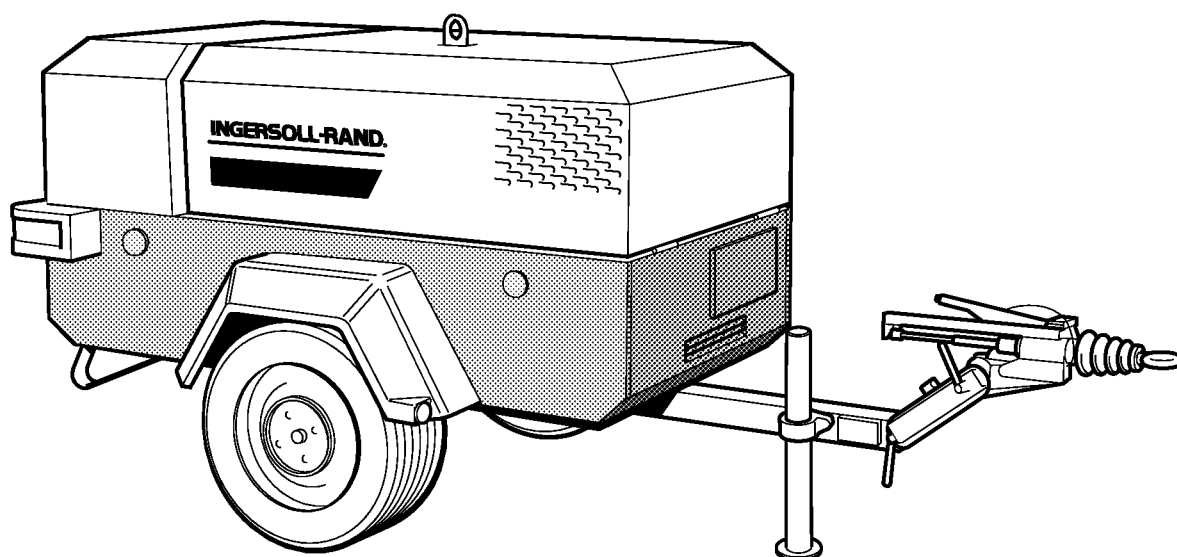




P90 P101 P110 P130
HP95 P150 P180
HP140 7/51

OPERATION AND MAINTENANCE MANUAL



This manual contains important safety information and must be made available to personnel who operate and maintain this machine.

P90	SERIAL No :	210000	->
P101	SERIAL No :	210000	->
P110	SERIAL No :	312200	->
P130, HP95	SERIAL No :	312200	->
P150	SERIAL No :	402000	->
P180, HP140	SERIAL No :	415000	->
7/51	SERIAL No :	415000	->

C.C.N. : 89297972 GB
DATE : JUNE 2001

Machine models represented in this manual may be used in various locations worldwide. Machines sold and shipped into European common market countries requires that the machine display the EC Mark and conform to various directives. In such cases, the design specification of this machine has been certified as complying with EC directives. Any modification to any part is absolutely prohibited and would result in the CE certification and marking being rendered invalid. A declaration of that conformity follows:



EC DECLARATION OF CONFORMITY WITH EC DIRECTIVES

98/37/EC, 93/68/EEC, 89/336/EEC

WE,

**INGERSOLL-RAND COMPANY LIMITED
SWAN LANE
HINDLEY GREEN
WIGAN WN2 4EZ
UNITED KINGDOM**

DECLARE THAT, UNDER OUR SOLE RESPONSIBILITY FOR MANUFACTURE AND SUPPLY, THE
PRODUCT(S)

P90 P101 P110 P130 HP95 P150 P180 HP140 7/51

TO WHICH THIS DECLARATION RELATES, IS (ARE) IN CONFORMITY WITH THE PROVISIONS
OF THE ABOVE DIRECTIVES USING THE FOLLOWING PRINCIPAL STANDARDS.

EN29001 : EN292, EN60204-1, EN1012-1, PN8NTC2, EN50081, EN50082

ISSUED AT HINDLEY GREEN ON 01/01/2001 BY H.SEDDON, QUALITY ASSURANCE
MANAGER.


H. SEDDON

1 CONTENTS & ABBREVIATIONS

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2	FOREWORD	–>#### Up to Serial No. ####–> From Serial No.
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7	SAFETY	† Option
		WDG Generator option
		AUS Australia
10	GENERAL INFORMATION	AR As required
	Dimensions	AUS Australia
	Data	D Germany
		DK Denmark
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18	OPERATING INSTRUCTIONS	F France
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The contents of this manual are considered to be proprietary and confidential to Ingersoll–Rand and should not be reproduced without the prior written permission of Ingersoll–Rand.

Nothing contained in this document is intended to extend any promise, warranty or representation, expressed or implied, regarding the Ingersoll–Rand products described herein. Any such warranties or other terms and conditions of sale of products shall be in accordance with the standard terms and conditions of sale for such products, which are available upon request.

This manual contains instructions and technical data to cover all routine operation and scheduled maintenance tasks by operation and maintenance staff. Major overhauls are outside the scope of this manual and should be referred to an authorised Ingersoll–Rand service department.

The design specification of this machine has been certified as complying with EC directives. As a result:

(a) Any machine modifications are strictly prohibited, and will invalidate EC certification.

(b) This machine must not be used in USA/Canada. (Where EC certification is not valid, and other certification will be required.)

All components, accessories, pipes and connectors added to the compressed air system should be:

- of good quality, procured from a reputable manufacturer and, wherever possible, be of a type approved by Ingersoll–Rand.
- clearly rated for a pressure at least equal to the machine maximum allowable working pressure.
- compatible with the compressor lubricant/coolant.
- accompanied with instructions for safe installation, operation and maintenance.

Details of approved equipment are available from Ingersoll–Rand Service departments.

The use of repair parts / lubricants / fluids other than those included within the Ingersoll–Rand approved parts list may create hazardous conditions over which Ingersoll–Rand has no control. Therefore Ingersoll–Rand cannot be held responsible for equipment in which non-approved repair parts are installed.

Ingersoll–Rand reserves the right to make changes and improvements to products without notice and without incurring any obligation to make such changes or add such improvements to products sold previously.

The intended uses of this machine are outlined below and examples of unapproved usage are also given, however Ingersoll–Rand cannot anticipate every application or work situation that may arise.

IF IN DOUBT CONSULT SUPERVISION.

This machine has been designed and supplied for use only in the following specified conditions and applications:

- Compression of normal ambient air containing no known or detectable additional gases, vapours, or particles
- Operation within the ambient temperature range specified in the *GENERAL INFORMATION* section of this manual.

- Generation of electricity at 110v (1ph), 230v (1ph), 230v (3ph) and 400v (3ph) / 230v (1ph) nominal at 50 Hertz with centre tap earth. (WDG)

The use of the machine in any of the situation types listed in table 1:–

- a) Is not approved by Ingersoll–Rand,**
- b) May impair the safety of users and other persons, and**
- c) May prejudice any claims made against Ingersoll–Rand.**

TABLE 1

Use of the machine to produce compressed air for: a) direct human consumption b) indirect human consumption, without suitable filtration and purity checks.
Use of the machine outside the ambient temperature range specified in the <i>GENERAL INFORMATION SECTION</i> of this manual.
Use of the machine where there is any actual or foreseeable risk of hazardous levels of flammable gases or vapours.
Use of the machine fitted with non Ingersoll–Rand approved components / lubricants / fluids.
Use of the machine with safety or control components missing or disabled.
WDG
Use of the generator to supply load(s) greater than those specified.
Use of unsafe or unserviceable electrical equipment connected to the generator.
Use of electrical equipment: (a) Having incorrect voltage and/or frequency ratings. (b) Containing computer equipment and/or similar electronics.

The company accepts no responsibility for errors in translation of this manual from the original English version.

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INGERSOLL–RAND COMPANY

EXTENDED LIMITED AIREND WARRANTY

Ingersoll–Rand Portable Compressor Division is pleased to announce the availability of extended limited airend warranty. Announcement of the extended warranty coincides with the introduction of Pro–Tec Compressor Fluid. Pro–Tec Compressor Fluid is an amber coloured fluid specially formulated for Portable Compressors and is being provided as the factory filled fluid for all machines.

All machines have the standard airend warranty – *The earlier of 24 months from shipment to, or the accumulation of 4000 hours of service by the initial user*.*

The warranty against defects will include replacement of the complete Airend, provided the original Airend is returned assembled and unopened.

The optional limited warranty is the earlier of 60 months from shipment to, or the accumulation of 10,000 hours of service. The optional warranty is limited to defects in major components (rotors, housings, gears and bearings), and is automatically available when the following conditions are met:

1. The original airend is returned assembled and unopened.
2. Submissions of proof that Ingersoll–Rand fluid, filters and separators have been used. Refer to the Operation and Parts manual for the correct fluids, filters and separator elements required.
3. Submissions of proof that maintenance intervals have been followed.

3 FOREWORD

WARRANTY	TIME	*BARE AIREND	**AIREND COMPONENTS
STANDARD	2YRS / 4,000HRS	100% PARTS & LABOUR	100% PARTS & LABOUR
OPTIONAL	5YRS / 10,000HRS	100% PARTS & LABOUR	0%

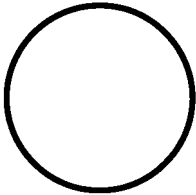
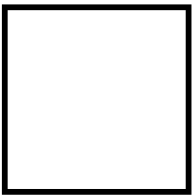
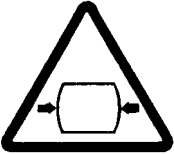
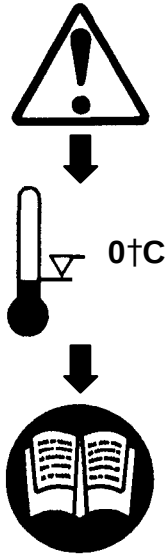
*BARE AIREND – pertains to major airend parts (rotors, housings, gears and bearings).

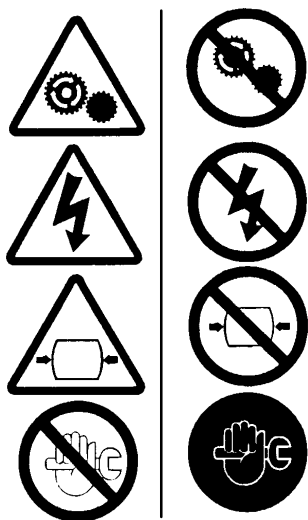
**AIREND COMPONENTS – pertains to auxiliary attachments to the bare airend (drive coupling, seals, pumps, valves, tubes, hoses, fittings and filter housing).

Pro-Tec Compressor Fluids are available from your local Ingersoll-Rand branch or distributor.

Where climatic conditions dictate that the other Ingersoll-Rand Compressor Fluids (XHP505 or Performance 500) must be used, the extended warranty will apply if the above conditions are met.

GRAPHIC FORM AND MEANING OF ISO SYMBOLS

 Prohibition / Mandatory	 Information / Instructions	 Warning
 WARNING: Electrical shock risk.	 WARNING – Pressurised component or system.	 WARNING – Hot surface.
 WARNING – Pressure control.	 WARNING – Corrosion risk.	 WARNING – Air/gas flow or Air discharge.
 WARNING – Pressurised vessel.	 WARNING – Hot and harmful exhaust gas.	 WARNING – Maintain correct tyre pressure. (Refer to the GENERAL INFORMATION section of this manual).
 WARNING – Flammable liquid.	 WARNING – Before connecting the tow bar or commencing to tow consult the operation and maintenance manual.	 WARNING – For operating temperature below 0°C, consult the operation and maintenance manual.



WARNING – Do not undertake any maintenance on this machine until the electrical supply is disconnected and the air pressure is totally relieved.



WARNING – Consult the operation and maintenance manual before commencing any maintenance.



Do not breathe the compressed air from this machine.



Do not remove the Operating and Maintenance manual and manual holder from this machine.



Do not stack.



Do not operate the machine without the guard being fitted.



Do not stand on any service valve or other parts of the pressure system.



Do not operate with the doors or enclosure open.



Do not use fork lift truck from this side.



Do not exceed the trailer speed limit.



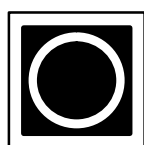
No naked lights.



Do not open the service valve before the airhose is attached.



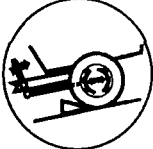
Use fork lift truck from this side only.



Emergency stop.



Tie down point

 Lifting point.	 On (power).	 Off (power).
 Read the Operation and Maintenance manual before operation or maintenance of this machine is undertaken.	 When parking use prop stand, handrake and wheel chocks.	 Compressor oil filling

WARNINGS

Warnings call attention to instructions which must be followed precisely to avoid injury or death.

CAUTIONS

Cautions call attention to instructions which must be followed precisely to avoid damaging the product, process or its surroundings.

NOTES

Notes are used for supplementary information.

General Information

Ensure that the operator reads and *understands* the decals and consults the manuals before maintenance or operation.

Ensure that the Operation and Maintenance manual, and the manual holder, are not removed permanently from the machine.

Ensure that maintenance personnel are adequately trained, competent and have read the Maintenance Manuals.

Make sure that all protective covers are in place and that the canopy/doors are closed during operation.

The specification of this machine is such that the machine is not suitable for use in flammable gas risk areas. If such an application is required then all local regulations, codes of practice and site rules must be observed. To ensure that the machine can operate in a safe and reliable manner, additional equipment such as gas detection, exhaust spark arrestors, and intake (*shut-off*) valves may be required, dependant on local regulations or the degree of risk involved.

Under no circumstances should volatile liquids such as Ether be used for starting this machine.

A weekly visual check must be made on all fasteners/fixing screws securing mechanical parts. In particular, safety-related parts such as coupling hitch, drawbar components, road-wheels, and lifting bail should be checked for total security.

All components which are loose, damaged or unserviceable, must be rectified without delay.

Compressed air

Compressed air can be dangerous if incorrectly handled. Before doing any work on the unit, ensure that all pressure is vented from the system and that the machine cannot be started accidentally.

Ensure that the machine is operating at the rated pressure and that the rated pressure is known to all relevant personnel.

All air pressure equipment installed in or connected to the machine must have safe working pressure ratings of at least the machine rated pressure.

If more than one compressor is connected to one common downstream plant, effective check valves and isolation valves must be fitted and controlled by work procedures, so that one machine cannot accidentally be pressurised / over pressurised by another.

Compressed air must not be used for a direct feed to any form of breathing apparatus or mask.

The discharged air contains a very small percentage of compressor lubricating oil and care should be taken to ensure that downstream equipment is compatible.

If the discharged air is to be ultimately released into a confined space, adequate ventilation must be provided.

When using compressed air always use appropriate personal protective equipment.

All pressure containing parts, especially flexible hoses and their couplings, must be regularly inspected, be free from defects and be replaced according to the Manual instructions.

Avoid bodily contact with compressed air.

The safety valve located in the separator tank must be checked periodically for correct operation.

Materials

The following substances *may* be produced during the operation of this machine:

- . brake lining dust
- . engine exhaust fumes

AVOID INHALATION

Ensure that adequate ventilation of the cooling system and exhaust gases is maintained at all times.

The following substances are used in the manufacture of this machine and *may* be hazardous to health if used incorrectly:

- . compressor lubricant
- . engine lubricant
- . preservative grease
- . rust preventative
- . diesel fuel
- . battery electrolyte

AVOID INGESTION, SKIN CONTACT AND INHALATION OF FUMES

Components of a non-metallic fibrous material may contain small quantities of white asbestos. When handling, dismantling or assembling these components, the following must be observed:

- . *Always operate in a well ventilated area.*
- . *Dispose of waste in a sealed container.*
- . *Use water to damp down dust.*
- . *Avoid inhalation of dust particles.*

Should compressor lubricant come into contact with the eyes, then irrigate with water for at least 5 minutes.

Should compressor lubricant come into contact with the skin, then wash off immediately.

Consult a physician if large amounts of compressor lubricant are ingested.

Consult a physician if compressor lubricant is inhaled.

Never give fluids or induce vomiting if the patient is unconscious or having convulsions.

Safety data sheets for compressor and engine lubricants should be obtained from the lubricant supplier.

Battery

Batteries contain corrosive liquid and produce explosive gas. Do not expose to naked lights. Always wear personal protective clothing when handling. When starting the machine from a slave battery ensure that the correct polarity is observed and that connections are secure.

DO NOT ATTEMPT TO SLAVE START A FROZEN BATTERY SINCE THIS MAY CAUSE IT TO EXPLODE.

Generator (WDG)

The generator set is designed for safety in use. However, the responsibility for safe operation rests with those who install, use and maintain it. The following safety precautions are offered as a guide, which, if conscientiously followed, will minimise the possibility of accidents throughout the useful life of this equipment.

Emergency Stop Controls

Important Note:— In addition to the key operated emergency stop control on the main control panel, a second control is provided at the socket control panel in the event of electrical hazards associated with generator operation. Use this second control to immediately isolate all electrical power to all sockets, then use the key control to stop the engine.

Operation of the generator must be in accordance with recognised electrical codes and local health and safety codes.

The generator set should be operated by those who have been trained in its use and delegated to do so, and who have read and understand the operator's manual. *Failure to follow the instructions, procedures and safety precautions in the manual may increase the possibility of accidents and injuries.*

Do not start the generator set unless it is safe to do so. Do not attempt to operate the generator set with a known unsafe condition. Fit a danger notice to the generator set and render it inoperative by disconnecting the battery and disconnecting all ungrounded conductors so others who may not know of the unsafe condition will not attempt to operate it until the condition is corrected.

An earth point is provided beneath the socket outlets.

The generator set should only be used with the earth point connected directly to the general earth/ground mass. An earth spike kit is available as an optional extra for this purpose (refer to the *parts catalogue*).

WARNING: DO NOT OPERATE THE MACHINE UNLESS IT HAS BEEN SUITABLY EARTHED.

Generator sets must be connected to the load only by trained and qualified electricians who have been delegated to do so, and when required by applicable regulations, their work should be inspected, and accepted by the inspection agency having authority, prior to attempting to operate the generator set.

Do not make contact with electrically energised parts of the generator set and/or interconnecting cables or conductors with any part of the body or with any non-insulated conductive object.

Make sure the generator set is effectively grounded in accordance with all applicable Regulations prior to attempting to make or break load connections and prior to attempting operation.

Do not attempt to make or break electrical connections to generator sets standing in water or on wet ground.

Prior to attempting to make or break electrical connections at the generator set, stop the engine, disconnect the battery and disconnect and lock out the ungrounded conductors at the load end.

Keep all parts of the body and any hand-held tools or other conductive objects, away from exposed live parts of the generator set engine electrical system. Maintain dry footing, stand on insulating surfaces and do not contact any other portion of the generator set when making adjustments or repairs to exposed live parts of the generator set engine electrical system.

Replace the generator set terminal compartment cover as soon as connections have been made or broken. Do not operate the generator set without the terminal cover secured firmly in place.

Close and lock all access doors when the generator set is left unattended.

Do not use extinguishers intended for Class A or Class B fires on electrical fires. Use only extinguishers suitable for class *BC* or class *ABC* fires.

Keep the towing vehicle or equipment carrier, generator set, connecting cables, tools and all personnel at least 3 metres from all power lines and buried power cables, other than those connected to the generator set.

Attempt repairs only in clean, dry, well lighted and ventilated areas.

Connect the generator set only to loads and/or electrical systems that are compatible with its electrical characteristics and that are within its rated capacity.

Transport

When loading or transporting machines ensure that the specified lifting and tie down points are used.

When loading or transporting machines ensure that the towing vehicle, its size, weight, towing hitch and electrical supply are all suitable to provide safe and stable towing at speeds either, up to the legal maximum for the country in which it is being towed or, as specified for the machine model if lower than the legal maximum.

Where driver license restrictions apply, ensure that the maximum trailer weight does not exceed 750kg (by limiting the equipment load).

Note:

Gross mass (on data plate) is for the basic machine and fuel only, excluding any fitted options, tools, equipment and foreign materials.

Before starting the machine after installation, test the insulation resistance of the windings. The automatic voltage regulator (AVR) if fitted should be disconnected and the rotating diodes either shorted out with temporary links or disconnected. Any control wiring must also be disconnected.

(WDG)

Before towing the machine, ensure that:—

- . the tyres and towing hitch are in a serviceable condition.
- . the canopy is secure.
- . all ancillary equipment is stored in a safe and secure manner.
- . the brakes and lights are functioning correctly and meet necessary road traffic requirements.
- . break-away cables/safety chains are connected to the towing vehicle.

The machine must be towed in a level attitude in order to maintain correct handling, braking and lighting functions. This can be achieved by correct selection and adjustment of the vehicle towing hitch and, on variable height running gear, adjustment of the drawbar.

To ensure full braking efficiency, the front (towing eye) section must always be set level.

When adjusting variable height running gear:—

- . Ensure front (towing eye) section is set level

When raising towing eye, set rear joint first, then front joint.

When lowering towing eye, set front joint first, then rear joint.

When parking always use the handbrake and, if necessary, suitable wheel chocks.

Safety chains / connections and their adjustment

The legal requirements for the joint operation of the breakaway cable and safety chains are as yet unidentified by 71/320/EEC or UK regulations. Consequently we offer the following advice / instructions.

Where brakes only are fitted:

- a) Ensure that the breakaway cable is securely coupled to the handbrake lever and also to a substantial point on the towing vehicle.
- b) Ensure that the effective cable length is as short as possible, whilst still allowing enough slackness for the trailer to articulate without the handbrake being applied.

Where brakes and safety chains are fitted:

- a) Loop the chains onto the towing vehicle using the towing vehicle hitch as an anchorage point, or any other point of similar strength.
- b) Ensure that the effective chain length is as short as possible whilst still allowing normal articulation of the trailer and effective operation of the breakaway cable.

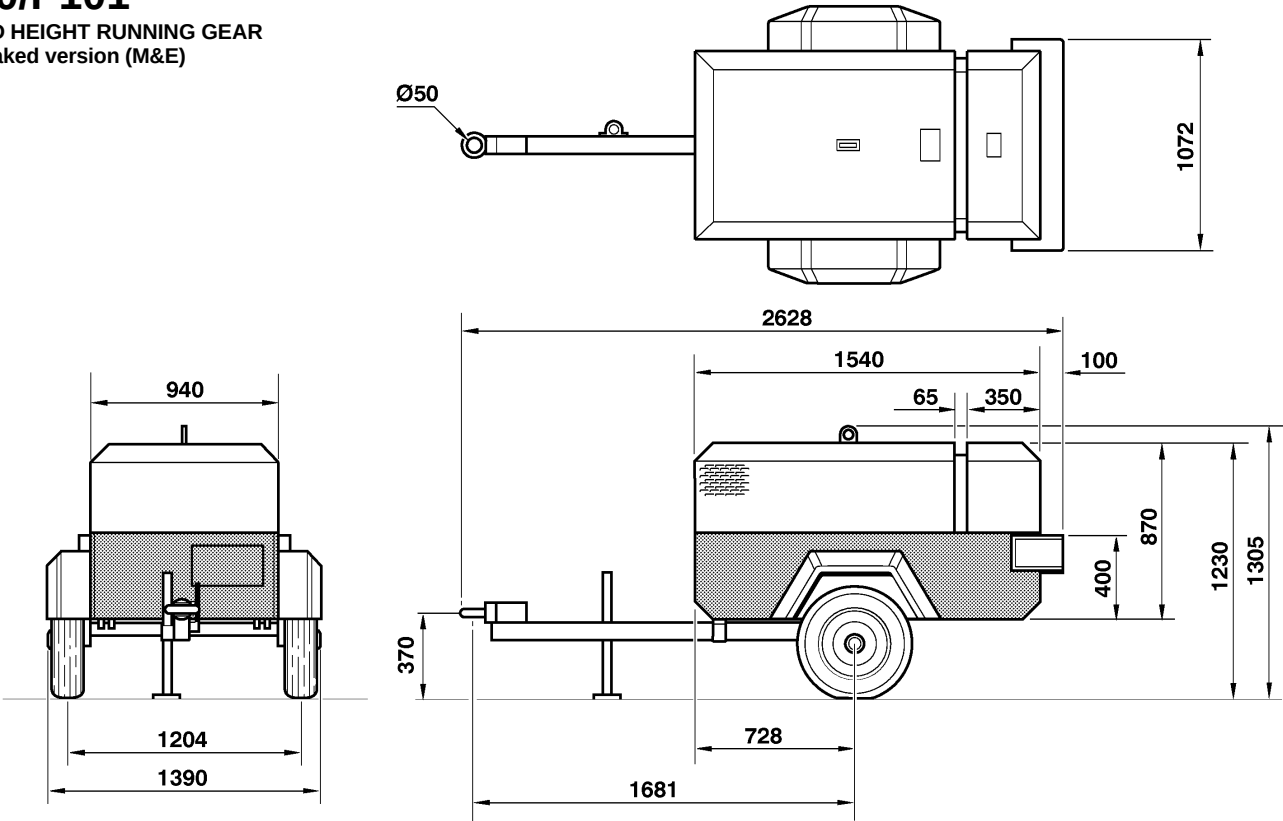
Where safety chains only are fitted:

- a) Loop the chains onto the towing vehicle using the towing vehicle hitch as an anchorage point, or any other point of similar strength.
- b) When adjusting the safety chains there should be sufficient free length in the chains to allow normal articulation, whilst also being short enough to prevent the towbar from touching the ground in the event of an accidental separation of the towing vehicle from the trailer.

P90/P101

FIXED HEIGHT RUNNING GEAR

Unbraked version (M&E)

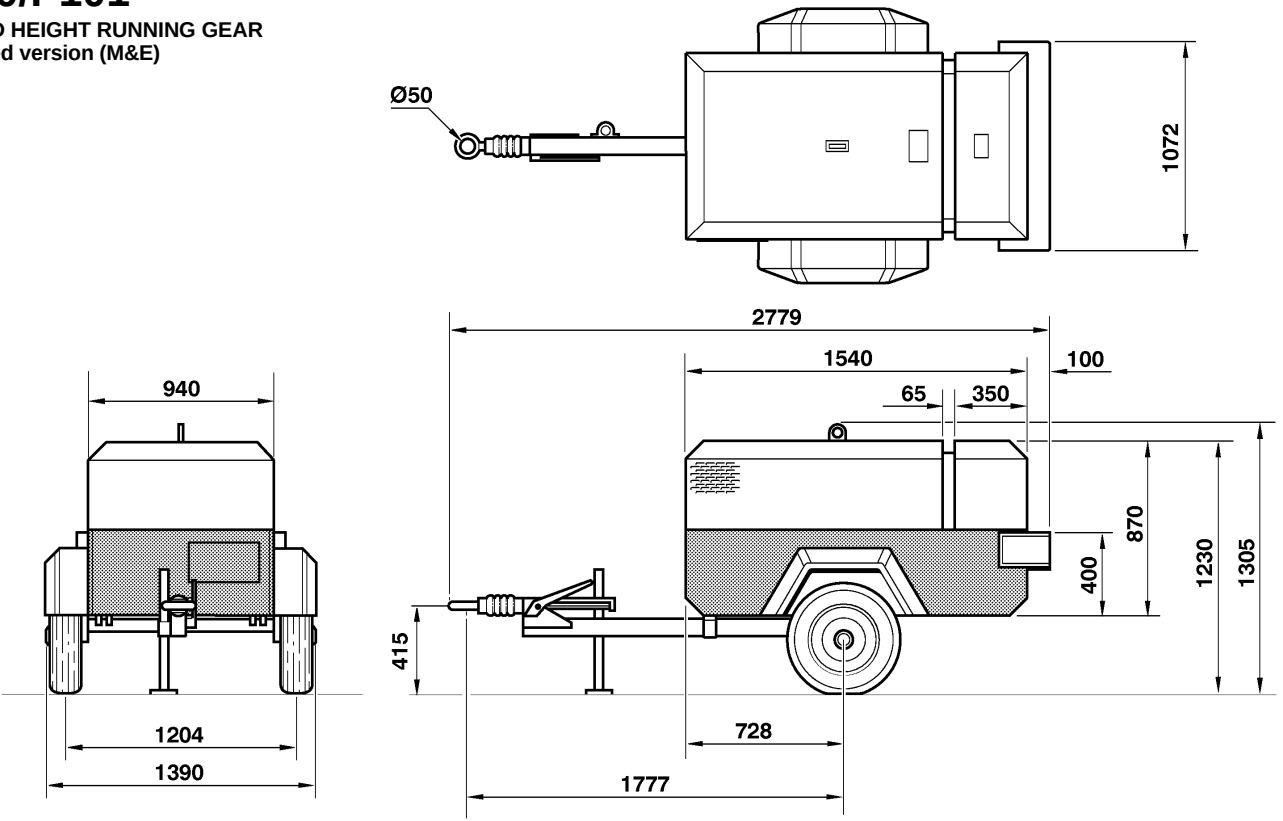


T2028
Revision 02
05/98

P90/P101

FIXED HEIGHT RUNNING GEAR

Braked version (M&E)



T1950
Revision 02
05/98

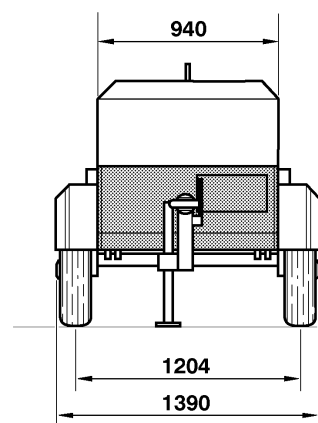
P90/P101

VARIABLE HEIGHT RUNNING GEAR
Unbraked version (M&E)

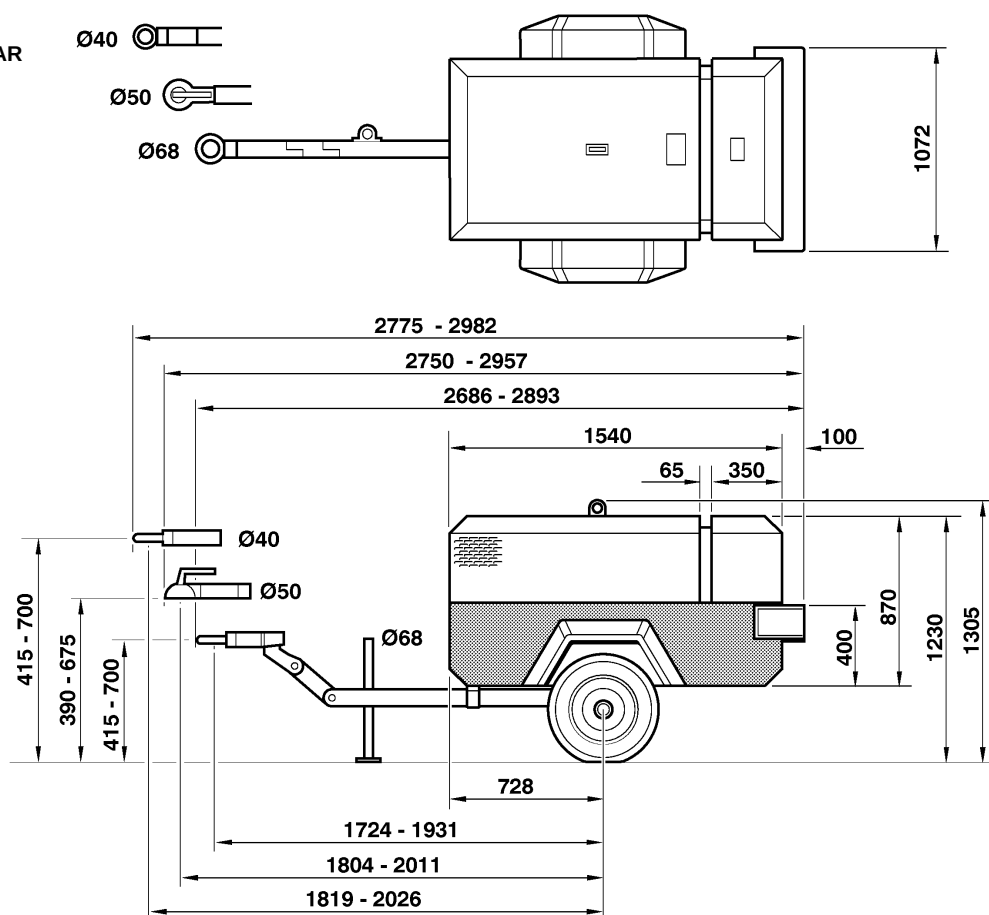
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T2029
Revision 02
05/98

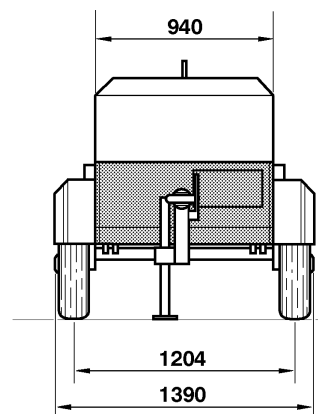
**P90/P101**

VARIABLE HEIGHT RUNNING GEAR
Braked version (M&E)

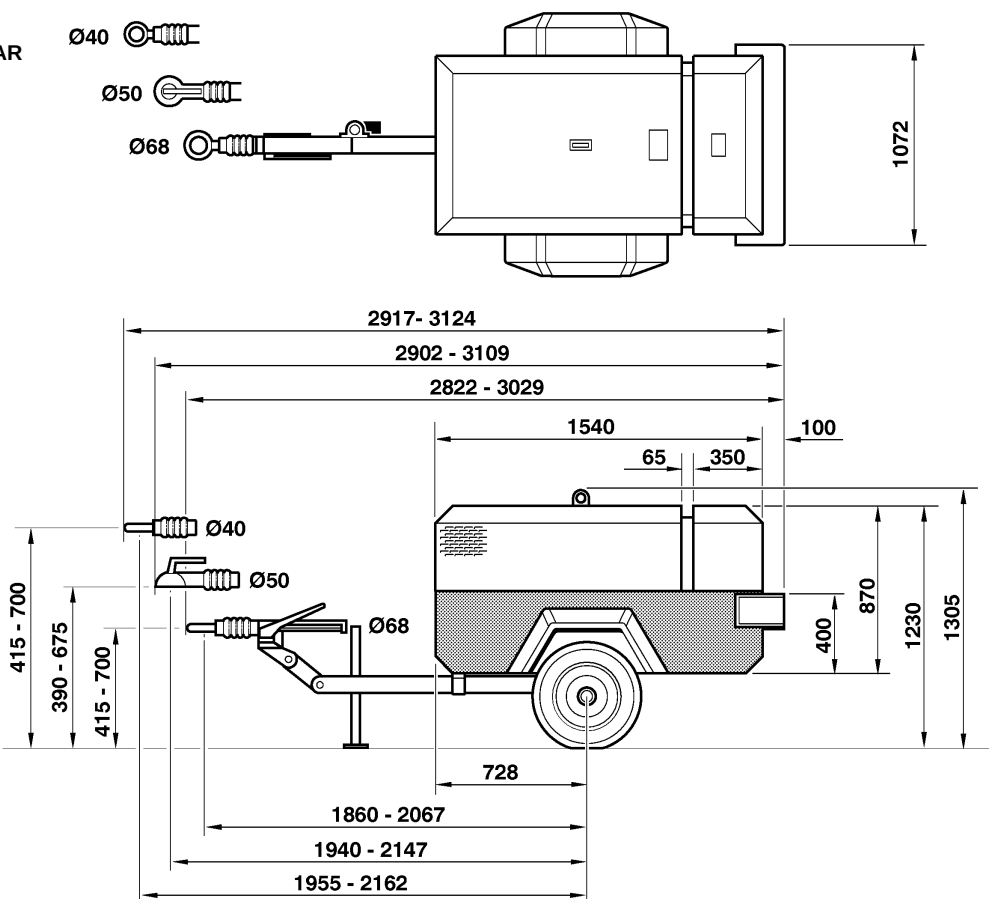
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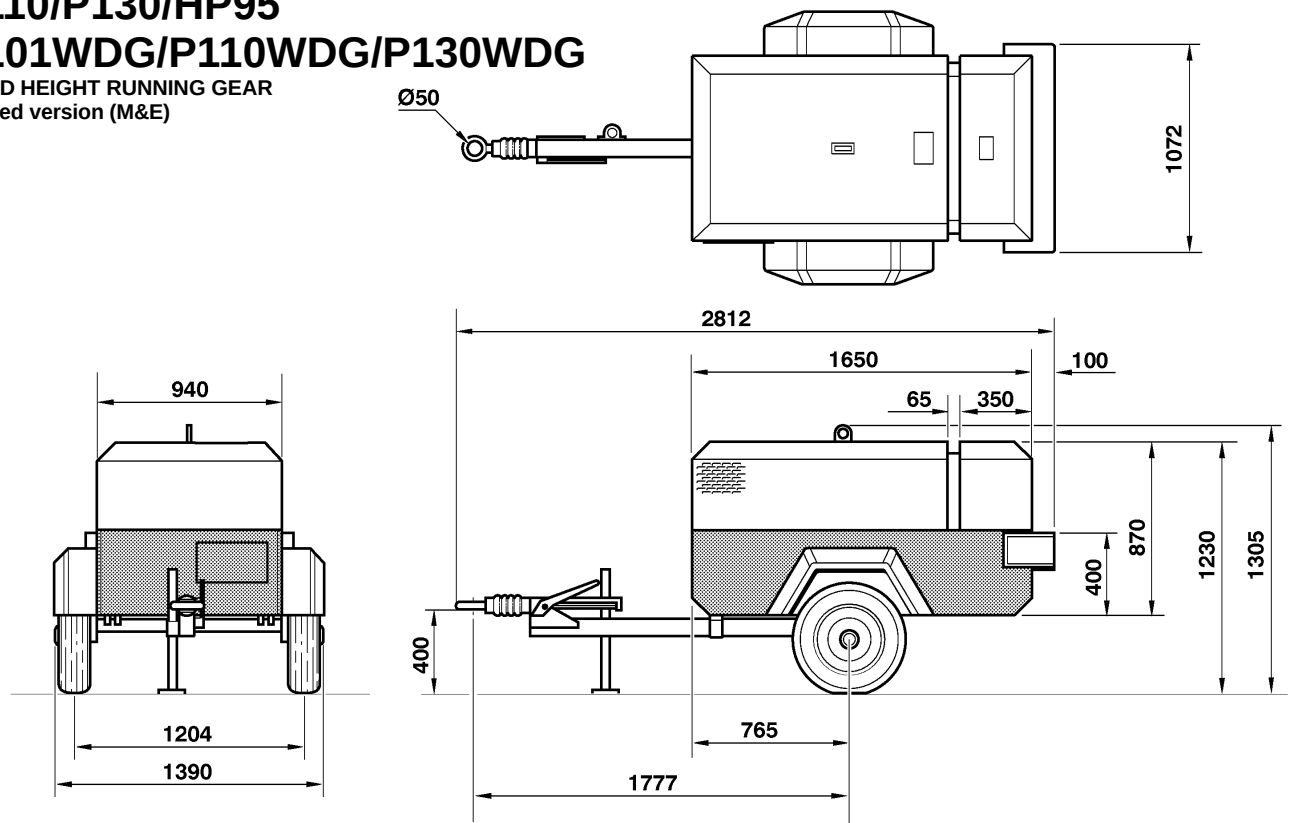


T1951
Revision 02
05/98



P110/P130/HP95 P101WDG/P110WDG/P130WDG

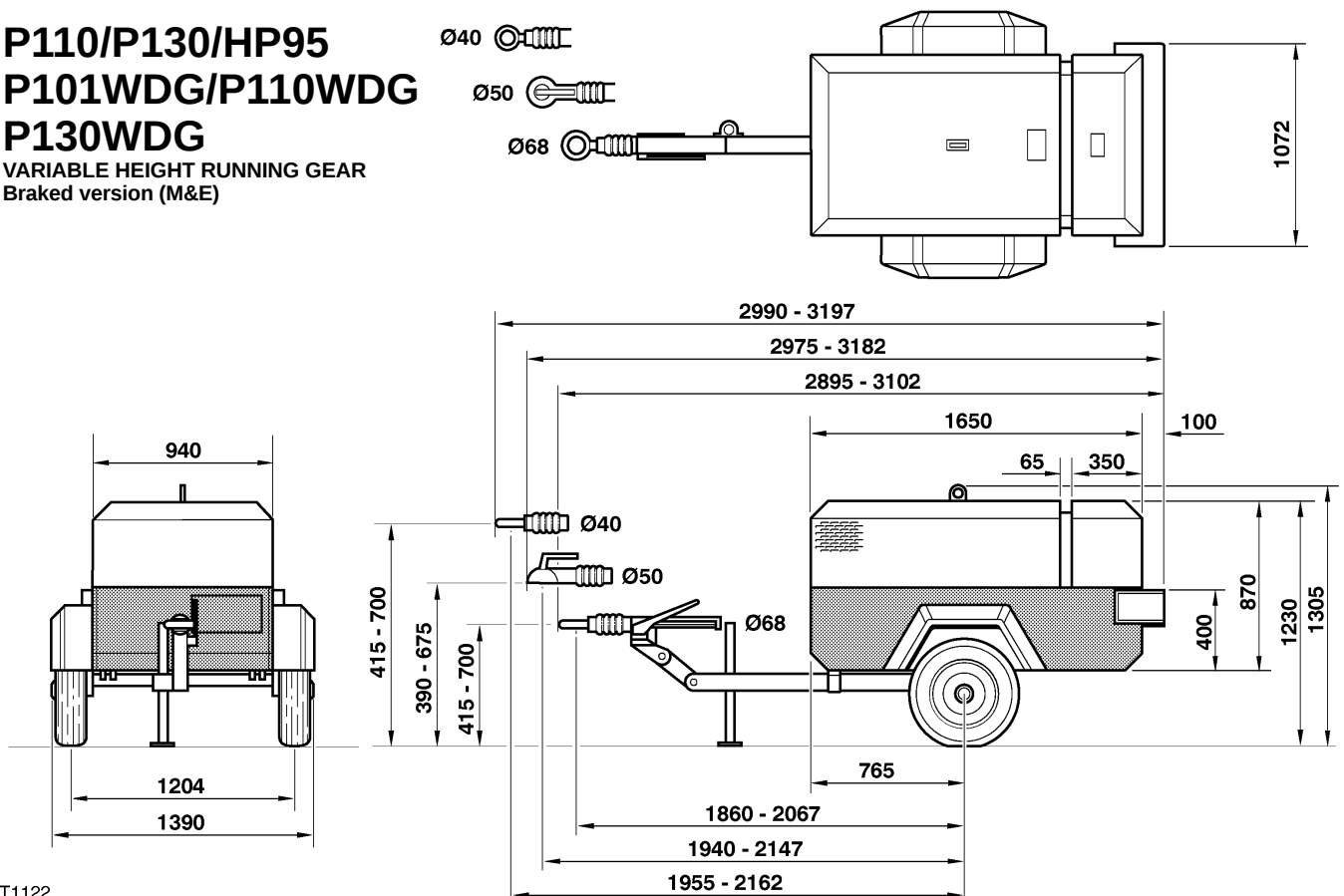
FIXED HEIGHT RUNNING GEAR
Braked version (M&E)



T1121
Revision 01
04/98

P110/P130/HP95 P101WDG/P110WDG P130WDG

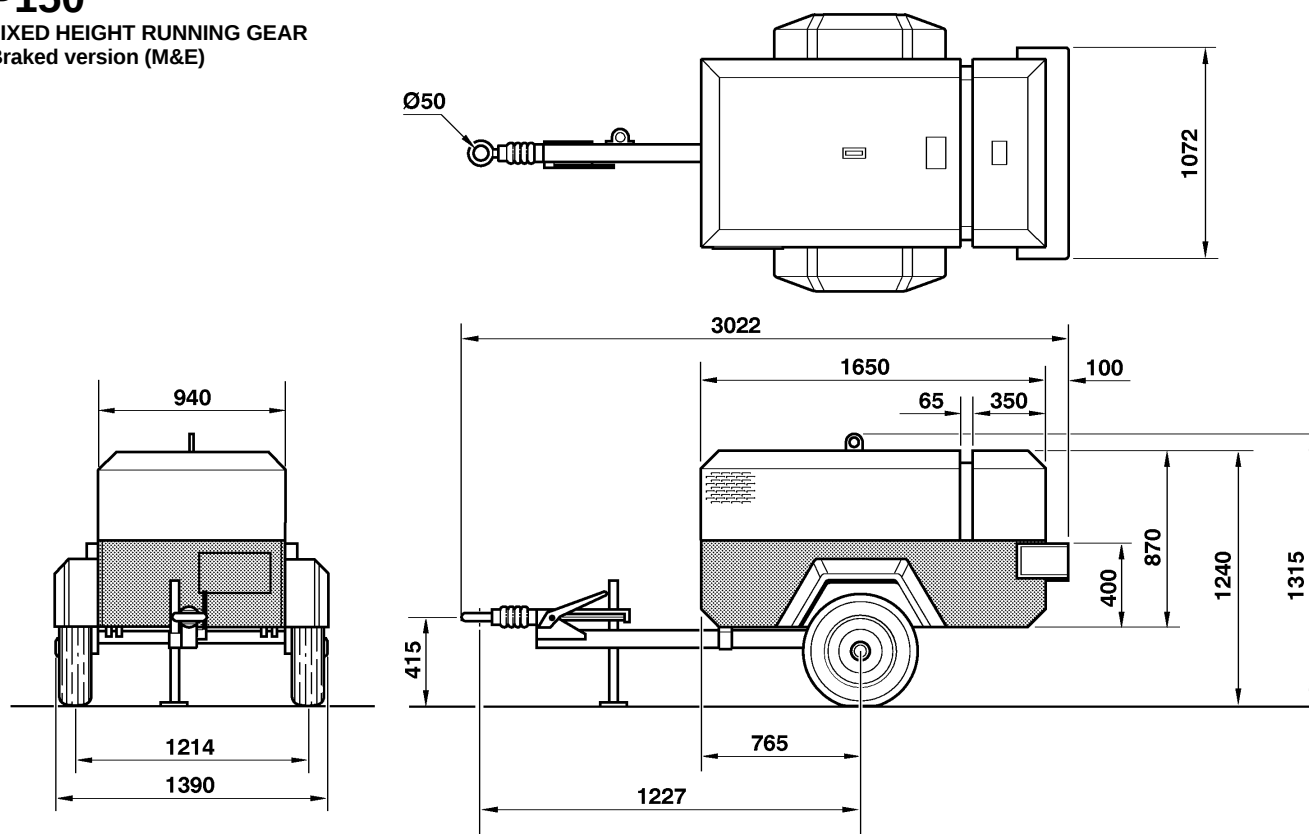
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Braked version (M&E)



T1122
Revision 01
04/98

P150

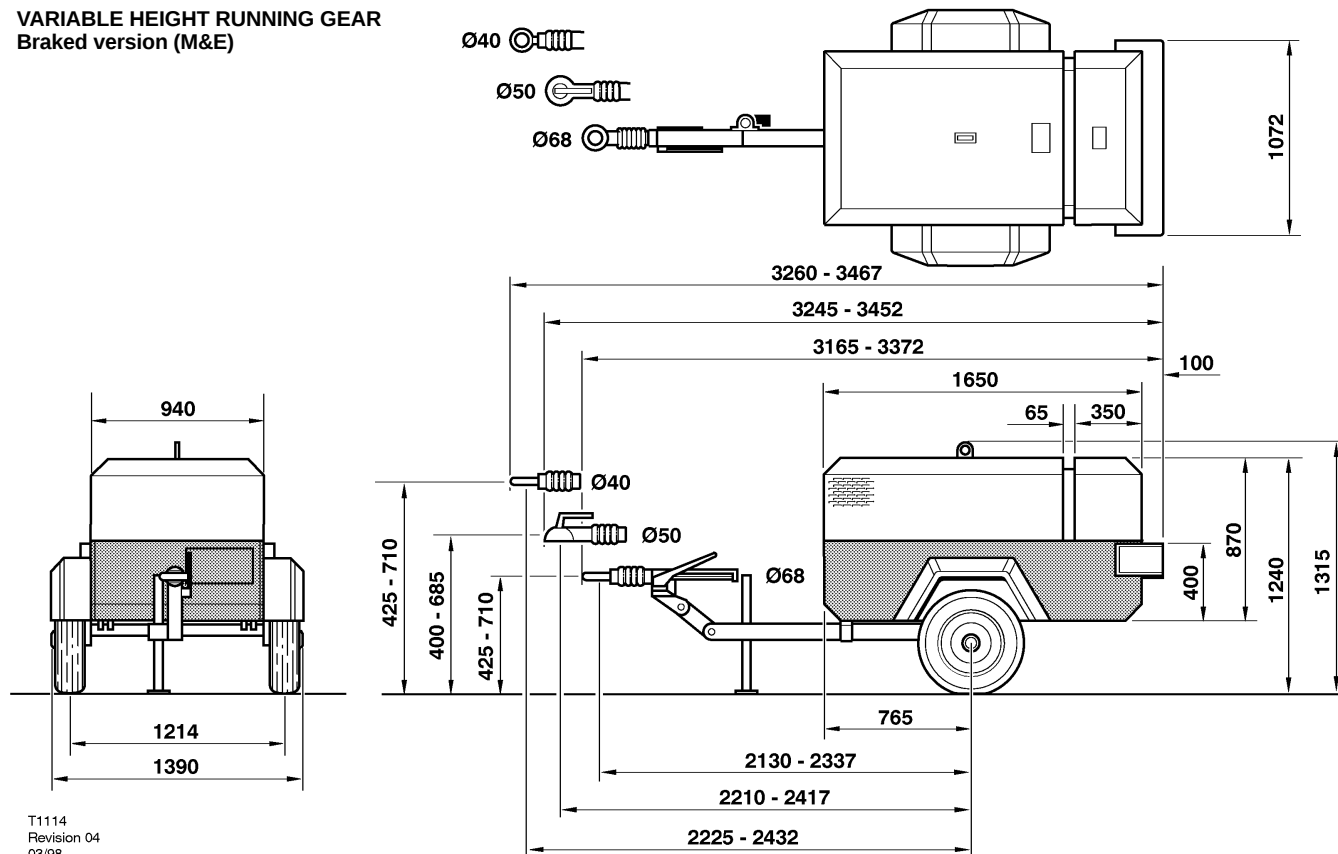
FIXED HEIGHT RUNNING GEAR
Braked version (M&E)



T1115
Revision 01
03/98

P150

VARIABLE HEIGHT RUNNING GEAR
Braked version (M&E)



T1114
Revision 04
03/98

15 GENERAL INFORMATION

COMPRESSOR

Actual free air delivery. (P90)	2,6 m ³ min ⁻¹
Actual free air delivery. (P101)	2,9 m ³ min ⁻¹
Actual free air delivery. (P110)	3,2 m ³ min ⁻¹
Actual free air delivery. (P130)	3,7 m ³ min ⁻¹
Actual free air delivery. (HP95)	2,7 m ³ min ⁻¹
Actual free air delivery. (P150)	4,25 m ³ min ⁻¹
Actual free air delivery. (P180, 7/51)	4,9 m ³ min ⁻¹
Actual free air delivery. (HP140)	3,8 m ³ min ⁻¹
Normal operating discharge pressure.	7 bar
Normal operating discharge pressure. (HP95 & HP140)	10,3 bar
Maximum allowable pressure.	8,6 bar
Maximum allowable pressure. (HP95 & HP140)	11,7 bar
Safety valve setting.	10 bar
Safety valve setting. (HP95 & HP140)	13 bar
Maximum pressure ratio (absolute).	7,5 : 1
Operating ambient temperature.	-10°C → +46°C
Maximum discharge temperature.	120°C
Cooling system.	Oil injection
Oil capacity.	7,0 litres
Oil capacity. (P150)	9,1 litres
Maximum oil system temperature.	120°C
Maximum oil system pressure.	8,6 bar
Maximum oil system pressure. (HP95 & HP140)	11,7 bar

Note:

To start the compressor in ambient temperatures below -10°C, the cold start kit option will be required.

In addition, to start the compressor in ambient temperatures between -15°C and -20°C, the engine oil must be changed to 5W40. It is essential that 15W40 oil is used in ambient temperatures above 0°C.

LUBRICATING OIL SPECIFICATION

(for the specified ambient temperatures).

ABOVE -23°C

Recommended: Pro-Tec

Approved: SAE 10W, API CF-4/CG-4

BELOW -23°C

Mandatory: IR Performance 500

Ingersoll-Rand Pro-Tec™ compressor fluid is factory-fitted, for use at all ambient temperatures above -23°C.

NOTE: Warranty may be extended only by continuous use of Pro-Tec and Ingersoll-Rand oil filters and separators.

No other oil/fluids are compatible with Pro-Tec™

No other oils/fluids should be mixed with Pro-Tec™ because the resulting mixture could cause damage to the aircend.

In the event that Pro-Tec™ is not available and / or the end user needs to use an approved single grade engine oil, the complete system including separator / receiver, cooler and pipework must be flushed clear of the first fill fluid and new Ingersoll-Rand oil filters installed. When this has been completed, the following oils are approved:

a) for ambient temperatures above -23°C,
SAE 10W, API CF-4/CG-4

b) for ambient temperatures below -23°C,
I-R Performance 500 only.

Safety data sheets can be obtained on request from the lubricant supplier.

For temperatures outside the specified ambient range, consult Ingersoll-Rand.

ENGINE

Type/model. Number of cylinders. (P90 & P101)	Deutz F2L1011F 2
Type/model. Number of cylinders. (P110, P130, HP95 & P150)	Deutz F3L1011F 3
Type/model. Number of cylinders. (P180, HP140 & 7/51)	Deutz F4L1011F 4
Oil capacity. (P90 & P101)	6,5 litres
Oil capacity. (P110, P130, HP95)	6,0 litres
Oil capacity. (P150)	5,5 litres
Oil capacity. (P180, HP140 & 7/51)	10,5 litres
Speed at full load. (P90, P101, P130 & HP95)	2900 revs min ⁻¹
Speed at full load. (P110)	2500 revs min ⁻¹
Speed at full load. (P150, P180, HP140 & 7/51)	3000 revs min ⁻¹
Speed at idle.	1800 revs min ⁻¹
Speed at idle. (P180, HP140 & 7/51)	1600 revs min ⁻¹
Electrical system.	12V negative earth
Power available at 2900 revs min ⁻¹ (P90 & P101)	20,5 kW
Power available at 2500 revs min ⁻¹ (P110)	30,5 kW
Power available at 2900 revs min ⁻¹ (P130 & HP95)	32,2 kW
Power available at 3000 revs min ⁻¹ (P150)	33,8 kW

Power available at 3000 revs min ⁻¹ (P180, HP140 & 7/51)	42,0 kW
Fuel tank capacity (P90, P101, P110, P130 & HP95)	42 litres
Fuel tank capacity (P150, P180, HP140 & 7/51)	70 litres

SOUND LEVEL DATA ('W' model)**A) To Pneurop code PN8NTC2.**

Equivalent continuous sound pressure level.*

Rated load	84 dB(A)
No load (P90 & P101)	81 dB(A)
No load (P110, P130 & HP95)	79 dB(A)
No load (P150, P180, HP140 & 7/51)	80 dB(A)

(Operator position :-1m from machine)

Sound power level (84/533/EEC)	100 dB(A)
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B) In compliance with 86/188/EEC.

Average sound pressure level at 10m to 79/113/EEC.*	72 dB(A)
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(*Machine only :- at maximum load in open site conditions)

FIXED HEIGHT RUNNING GEAR**Unbraked version (M&E)**

(P90 & P101)

Shipping weight.	675 kg
Maximum weight.	700 kg
Maximum horizontal towing force.	865 kgf
Maximum vertical coupling load (nose weight).	75 kgf

VARIABLE HEIGHT RUNNING GEAR**Unbraked version (M&E)**

(P90 & P101)

Shipping weight.	740 kg
Maximum weight.	765 kg
Maximum horizontal towing force.	865 kgf
Maximum vertical coupling load (nose weight).	75 kgf

FIXED HEIGHT RUNNING GEAR**Braked version (M&E)**

(P90 & P101)

Shipping weight.	675 kg
Maximum weight.	700 kg
Maximum horizontal towing force.	865 kgf
Maximum vertical coupling load (nose weight).	75 kgf

VARIABLE HEIGHT RUNNING GEAR**Braked version (M&E)**

(P90 & P101)

Shipping weight.	755 kg
Maximum weight.	780 kg
Maximum horizontal towing force.	865 kgf
Maximum vertical coupling load (nose weight).	75 kgf

WHEELS AND TYRES

(P90 & P101)

Number of wheels.	2 x 4 ¹ / ₂ J
Tyre size.	145 R13
Tyre pressure.	2,4 bar (35 lbf in ⁻²)

FIXED HEIGHT RUNNING GEAR**Braked version (M&E)**

(P110, P130 & HP95)

Shipping weight.	735 kg
Maximum weight.	900 kg
Maximum horizontal towing force.	865 kgf
Maximum vertical coupling load (nose weight).	75 kgf

VARIABLE HEIGHT RUNNING GEAR**Braked version (M&E)**

(P110, P130 & HP95)

Shipping weight.	755 kg
Maximum weight.	900 kg
Maximum horizontal towing force.	865 kgf
Maximum vertical coupling load (nose weight).	75 kgf

WHEELS AND TYRES

(P110, P130 & HP95)

Number of wheels.	2 x 4 ¹ / ₂ J
Tyre size.	155 R13
Tyre pressure.	2,4 bar (35 lbf in ⁻²)

FIXED HEIGHT RUNNING GEAR**Braked version (M&E) (WDG)**

(P110WDG & P130WDG)

Shipping weight.	780 kg
Maximum weight.	1050 kg
Maximum horizontal towing force.	1228 kgf
Maximum vertical coupling load (nose weight).	75 kgf

VARIABLE HEIGHT RUNNING GEAR**Braked version (M&E) (WDG)**

(P110WDG & P130WDG)

Shipping weight.	800 kg
Maximum weight.	1050 kg
Maximum horizontal towing force.	1228 kgf
Maximum vertical coupling load (nose weight).	75 kgf

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GENERAL INFORMATION

FIXED HEIGHT RUNNING GEAR Braked version (M&E) (P150)

Shipping weight.	855 kg
Maximum weight.	1050 kg
Maximum horizontal towing force.	1228 kgf
Maximum vertical coupling load (nose weight).	75 kgf

VARIABLE HEIGHT RUNNING GEAR Braked version (M&E) (P150)

Shipping weight.	875 kg
Maximum weight.	1050 kg
Maximum horizontal towing force.	1228 kgf
Maximum vertical coupling load (nose weight).	75 kgf

FIXED HEIGHT RUNNING GEAR Braked version (M&E) (P180, HP140 & 7/51)

Shipping weight.	890 kg
Maximum weight.	1050 kg

Maximum horizontal towing force.	1228 kgf
Maximum vertical coupling load (nose weight).	75 kgf

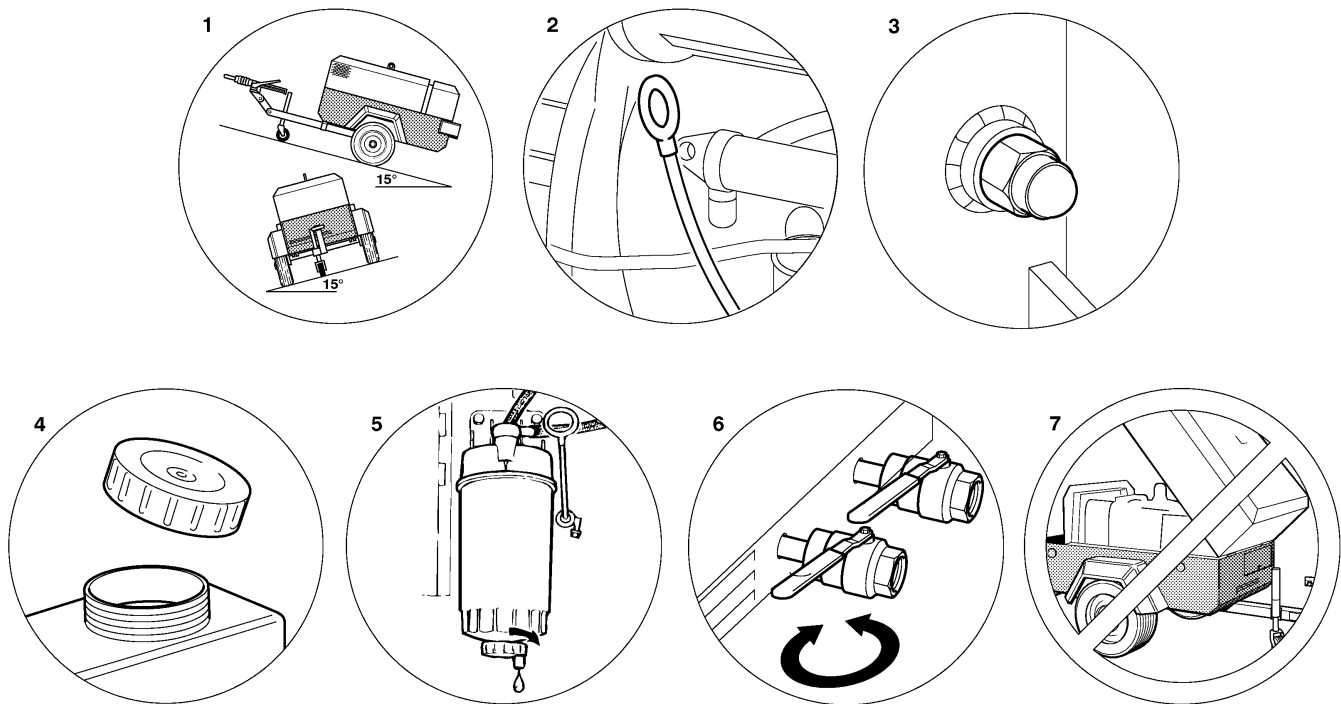
VARIABLE HEIGHT RUNNING GEAR Braked version (M&E) (P180, HP140 & 7/51)

Shipping weight.	910 kg
Maximum weight.	1050 kg
Maximum horizontal towing force.	1228 kgf
Maximum vertical coupling load (nose weight).	75 kgf

WHEELS AND TYRES (P180 HP140 & 7/51)

Number of wheels.	2 x 4 ¹ / ₂ J
Tyre size.	165 R13
Tyre pressure.	2,9 bar (42 lbf in ⁻²)

*Further information may be obtained by request through
Ingersoll-Rand customer services department.*



T1123
Revision 02
12/93

COMMISSIONING

Upon receipt of the unit, and prior to putting it into service, it is important to adhere strictly to the instructions given below in *PRIOR TO STARTING*.

Ensure that the operator reads and *understands* the decals and consults the manuals before maintenance or operation.

Ensure that the position of the *emergency stop* device is known and recognised by its markings. Ensure that it is functioning correctly and that the method of operation is known.

Before towing the unit, ensure that the tyre pressures are correct (refer to the *GENERAL INFORMATION* section of this manual) and that the handbrake is functioning correctly (refer to the *MAINTENANCE* section of this manual). Before towing the unit during the hours of darkness, ensure that the lights are functioning correctly (where fitted).

Ensure that all transport and packing materials are discarded.

Ensure that the correct fork lift truck slots or marked lifting / tie down points are used whenever the machine is lifted or transported.

When selecting the working position of the machine ensure that there is sufficient clearance for ventilation and exhaust requirements, observing any specified minimum dimensions (to walls, floors etc.).

Adequate clearance needs to be allowed around and above the machine to permit safe access for specified maintenance tasks.

Ensure that the machine is positioned securely and on a stable foundation. Any risk of movement should be removed by suitable means, especially to avoid strain on any rigid discharge piping.

Attach the battery cables to the battery(s) ensuring that they are tightened securely.

WARNING: All air pressure equipment installed in or connected to the machine must have safe working pressure ratings of at least the machine rated pressure, and materials compatible with the compressor lubricant (refer to the *GENERAL INFORMATION* section).

WARNING: If more than one compressor is connected to one common downstream plant, effective check valves and isolation valves must be fitted and controlled by work procedures, so that one machine cannot accidentally be pressurised / over pressurised by another.

WARNING: If flexible discharge hoses are to carry more than 7 bar pressure then it is recommended that safety retaining wires are used on the hoses.

19 OPERATING INSTRUCTIONS

PRIOR TO STARTING

1. Place the unit in a position that is as level as possible. The design of the unit permits a 15 degree lengthways and sideways limit on out of level operation. It is the engine, not the compressor, that is the limiting factor.

When the unit has to be operated out of level, it is important to keep the engine oil level near the high level mark (with the unit level).

CAUTION: Do not overfill either the engine or the compressor with oil.

2. Check the engine lubrication oil in accordance with the operating instructions in the *Engine Operator's Manual*.

3. Check the compressor oil level in the sight glass located on the separator tank.

4. Check the diesel fuel level. A good rule is to top up at the end of each working day. This prevents condensation from occurring in the tank.

CAUTION: Use only a No. 2-D diesel fuel oil with a minimum octane number of 45 and a sulphur content not greater than 0,5%.

CAUTION: When refuelling:—

- switch off the engine.
- do not smoke.
- extinguish all naked lights.
- do not allow the fuel to come into contact with hot surfaces.
- wear personal protective equipment.

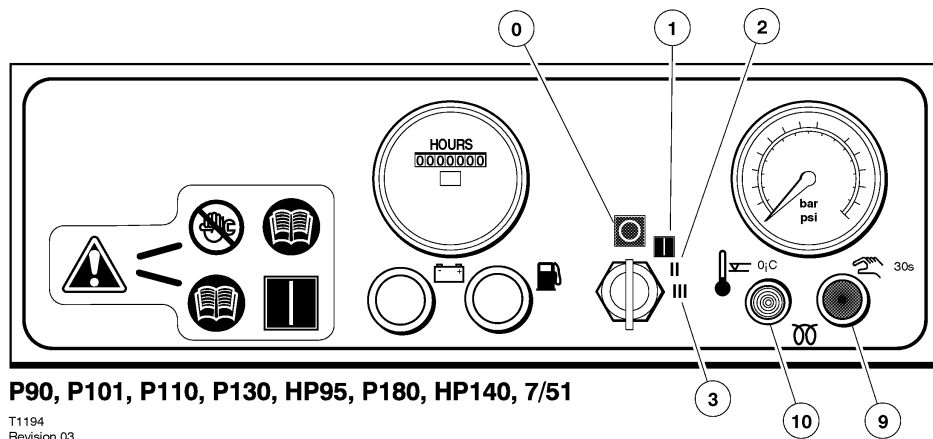
5. Drain the fuel filter water separator of water, ensuring that any released fuel is safely contained.

6. Open the service valve(s) to ensure that all pressure is relieved from the system. Close the service valve(s).

7. **CAUTION:** Do not operate the machine with the canopy/doors in the open position as this may cause overheating and operators to be exposed to high noise levels.

Check the air restriction indicator(s). Refer to the *MAINTENANCE* section of this manual.

When starting or operating the machine in temperatures below or approaching 0°C, ensure that the operation of the regulation system, the unloader valve, the safety valve, and the engine are not impaired by ice or snow, and that all inlet and outlet pipes and ducts are clear of ice and snow.



STARTING THE MACHINE

WARNING: Under no circumstances should volatile liquids such as Ether be used for starting this machine.

All normal starting functions are incorporated in the key operated switch.

- Turn the key switch to position 1, the alternator charge light will illuminate.
- Turn the key switch to position 3 (engine start position).
- Release to position 2 when the engine starts.
- Release to position 1 when the alternator charge light is extinguished.

At temperatures below 0°C or if there is difficulty starting first time:

- Open the service valve fully, with no hose connected.
- Complete starting sequence above.
- Close service valve as soon as engine runs freely.
- Do not allow machine to run for long periods with service valve open.
- Allow the engine to reach operating temperature.
- At this point in the operation of the machine it is safe to apply full load to the engine.

NOTE: Wear hearing protection at all times when the engine is started with the top open and air is flowing from the valve.

STOPPING THE MACHINE

- Close the service valve.
- Allow the machine to run unloaded for a short period of time to reduce the engine temperature.
- Turn the start switch to the 0 (off) position.

NOTE: As soon as the engine stops, the automatic blowdown valve will relieve all pressure from the system.

If the automatic blowdown valve fails to operate, then pressure must be relieved from the system by means of the service valve(s).

CAUTION: Never allow the machine to stand idle with pressure in the system.

EMERGENCY STOPPING

In the event that the unit has to be stopped in an emergency, **TURN THE KEY SWITCH LOCATED ON THE INSTRUMENT PANEL TO THE 0 (OFF) POSITION.**

RE-STARTING AFTER AN EMERGENCY

If the machine has been switched off because of a machine malfunction, then identify and correct the fault before attempting to re-start.

If the machine has been switched off for reasons of safety, then ensure that the machine can be operated safely before re-starting.

Refer to the *PRIOR TO STARTING* and *STARTING THE UNIT* instructions earlier in this section before re-starting the machine.

MONITORING DURING OPERATION

Should any of the safety shut-down conditions occur, the unit will stop. These are:

- Low engine oil pressure
- High air discharge temperature
- High engine oil temperature.
- Alternator not charging the electrical system.
- Low engine fuel level.

CAUTION: To ensure an adequate flow of oil to the compressor at low temperature, never allow the discharge pressure to fall below 3,5 bar.

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OPERATING INSTRUCTIONS

DECOMMISSIONING

When the machine is to be permanently decommissioned or dismantled, it is important to ensure that all hazard risks are either eliminated or notified to the recipient of the machine. In particular:–

- Do not destroy batteries or components containing asbestos without containing the materials safely.

- Do not dispose of any pressure vessel that is not clearly marked with its relevant data plate information or rendered unusable by drilling, cutting etc.

- Do not allow lubricants or coolants to be released into land surfaces or drains.

- Do not dispose of a complete machine without documentation relating to instructions for its use.

PERIOD	ITEM	MAINTENANCE
Initial/500 miles (850 km)	<i>Brakes.</i>	Check and adjust the brake linkage. Check and adjust the wheel brakes.
Daily	<i>Oil level.</i> <i>Air filter(s).</i> <i>Fuel tank.</i> <i>Emergency stop (Front panel).</i> <i>Lubricator (if fitted).</i> <i>Earth leakage circuit breaker (WDG)(Socket panel).</i> <i>Fixing screws</i>	Check and refill as required. Clean the dust collector box(es). Refill to prevent condensation. Test the operation of the device. Replenish the oil. Test the operation of the device. Check – (see “safety section”)
Weekly/50 hours	<i>Safety shutdown system.</i> <i>Engine.</i> <i>Compressor oil filter.</i> <i>Fan drive belt(s).</i>	Check the electrical connections. Refer to the <i>Engine Manufacturer's Manual</i> . Replace after the first 50 hours from new. Check for correct tension and excessive wear. Re-tension/replace as necessary.
Monthly/150 hours	<i>Oil cooler.</i> <i>Compressor oil filter.</i> <i>Hoses.</i> <i>Running gear.</i>	Check for the build up of foreign matter. Clean if necessary by blowing out with air or pressure wash. Replace after the first 150 hours from new. Inspect. Apply grease to the steering linkage grease points (If applicable).
3 months/250 hours	<i>Safety shutdown system.</i> <i>Safety valve.</i> <i>Brakes.</i> <i>Running gear.</i> <i>Earth leakage circuit breaker (WDG)(Socket panel).</i>	Test the operation of the switches. Operate the safety valve manually to verify that the valve mechanism is functioning correctly and that a small amount of air is released. Check and adjust the brake linkage at 3000 miles (5000 km) or 3 months (whichever is the sooner) to compensate for any stretch in the adjustable cables. Check and adjust the wheel brakes to compensate for wear. Check the bolts securing the running gear to the chassis and re-tighten where necessary (Refer to the <i>TORQUE SETTING TABLE</i> within this manual). Reset the tab washer. Check and adjust the brakes and brake cables. Adjust and grease the linkages. Check the towing eye bolts under the bellows cover (If applicable). Test the operation of the device.

PERIOD	ITEM	MAINTENANCE
3, 6, 30 months/250, 500, 2500 hours	<i>Engine.</i>	Refer to the <i>Engine Manufacturer's Manual</i> .
6 months/500 hours	<i>Compressor oil filter.</i> <i>Compressor oil.</i> <i>Hoses.</i> <i>Scavenge line.</i> <i>Fan drive belt(s).</i> <i>Pressure system.</i> <i>Running gear.</i> <i>Wheel bearings.</i>	Replace. Replace. Inspect. Clean if necessary. Replace. Inspect all components for damage, deterioration or leaks. Replace as necessary. Grease all nipples. Pack with grease.
1 year/1000 hours	<i>Air filter elements.</i> <i>Engine breather.</i> <i>Safety shutdown system.</i> <i>Compressor oil.</i> <i>Pressure gauge.</i> <i>Pressure regulator.</i>	Replace. Clean the element. Test the operation of the switches. Replace. Remove from the machine and check the calibration. Replace if necessary. Check that the regulator functions correctly.
1 year/1000 hours or as defined by local or national legislation	<i>Separator tank.</i> <i>Running gear.</i>	Fully inspect all external surfaces, welds and fittings. Report any excessive corrosion, mechanical or impact damage, leakage or other deterioration. Remove trailing arms and clean and grease bushes.
2 years/2000 hours	<i>Safety valve.</i>	Remove from the machine and check for the correct operating pressure. Adjust as necessary.
4 years/4000 hours	<i>Hoses.</i>	Replace.
6 years/6000 hours or as defined by local or national legislation.	<i>Separator tank.</i>	Remove the cover plate and any necessary fittings. Clean the interior thoroughly and inspect all internal surfaces and welds.
As required.	<i>Separator element.</i> <i>Battery.</i> <i>Fuel filter water separator.</i>	Replace if damaged. Clean and grease the terminals. Refer to the <i>Engine Manufacturer's Manual</i> .

ROUTINE MAINTENANCE

This section refers to the various components which require periodic maintenance and replacement.

The *SERVICE/MAINTENANCE CHART* indicates the various components' descriptions and the intervals when maintenance has to take place. Oil capacities, etc., can be found in the *GENERAL INFORMATION* section of this manual.

For any specification or specific requirement on service or preventative maintenance for the engine, refer to the *Engine Manufacturer's Manual*.

Compressed air can be dangerous if incorrectly handled. Before doing any work on the unit, ensure that all pressure is vented from the system and that the machine cannot be started accidentally.

If the automatic blowdown fails to operate, then pressure must be gradually relieved by operating the manual blowdown valve. Suitable personal protective equipment should be worn.

Ensure that maintenance personnel are adequately trained, competent and have read the Maintenance Manuals.

Prior to attempting any maintenance work, ensure that:–

- all air pressure is fully discharged and isolated from the system. If the automatic blowdown valve is used for this purpose, then allow enough time for it to complete the operation.

- The discharge pipe / manifold area must be kept depressurised by opening the discharge valve, whilst keeping clear of any airflow from it.
(P110, P130 & HP95)

NOTE: Pressure will always remain in the part of the system between the minimum pressure valve and the discharge valve after operation of the auto blowdown valve.

THIS PRESSURE MUST BE RELIEVED BY CAREFULLY:

(a) DISCONNECTING ANY DOWNSTREAM EQUIPMENT.

(b) OPENING THE DISCHARGE VALVE TO ATMOSPHERE.

(USE HEARING PROTECTION IF NECESSARY).

- the machine cannot be started accidentally or otherwise, by posting warning signs and/or fitting appropriate anti-start devices.

- all residual electrical power sources (mains and battery) are isolated.

Prior to opening or removing panels or covers to work *inside* a machine, ensure that:–

- anyone entering the machine is aware of the reduced level of protection and the additional hazards, including hot surfaces and intermittently moving parts.

- the machine cannot be started accidentally or otherwise, by posting warning signs and/or fitting appropriate anti-start devices.

Prior to attempting any maintenance work on a *running* machine, ensure that:–

- the work carried out is limited to only those tasks which require the machine to run.

- the work carried out with safety protection devices disabled or removed is limited to only those tasks which require the machine to be running with safety protection devices disabled or removed.

- all hazards present are known (e.g. pressurised components, electrically live components, removed panels, covers and guards, extreme temperatures, inflow and outflow of air, intermittently moving parts, safety valve discharge etc.).

- appropriate personal protective equipment is worn.

- loose clothing, jewellery, long hair etc. is made safe.

- warning signs indicating that *Maintenance Work is in Progress* are posted in a position that can be clearly seen.

Upon completion of maintenance tasks and prior to returning the machine into service, ensure that:–

- the machine is suitably tested.

- all guards and safety protection devices are refitted.

- all panels are replaced, canopy and doors closed.

- hazardous materials are effectively contained and disposed of.

PROTECTIVE SHUTDOWN SYSTEM

Comprises:

- Low engine oil pressure switch

- High discharge air temperature switch

- High engine oil temperature switch

- Alternator drive belt failure circuit.

- Low engine fuel level switch.

Low engine oil pressure switch.

At three month intervals, test the engine oil pressure switch circuit as follows:

- Start the machine.

- Connect a wire between the switch terminal and a suitable earth point. The machine should shutdown.

NOTE: Do not press the load button.

At twelve month intervals, test the engine oil pressure switch as follows:

- Remove the switch from the machine.

- Connect it to an independent low pressure supply (either air or oil).

- The switch should operate at 1,0 bar.
Replace the switch.

Temperature switch(es).

At three month intervals, test the temperature switch circuit(s) as follows:

- Start the machine.

- Disconnect each switch in turn. The machine should shutdown.

- Re-connect the switch.

NOTE: Do not press the load button.

High discharge air temperature switch.

At twelve month intervals, test the air discharge temperature switch by removing it from the machine and immersing in a bath of heated oil. The switch should operate at 120°C. Replace the switch.

High oil temperature switch.

At twelve month intervals, test the oil temperature switch by removing it from the machine and immersing in a bath of heated oil. The switch should operate at 130°F. Replace the switch.

Alternator drive belt failure circuit.

At twelve month intervals test the alternator drive belt failure circuit as follows:

- Remove the drive belt from the machine.
- Turn the key switch to position 1, the alternator charge light will illuminate.
- Turn the key switch to position 3 (engine start position).
- The machine should shutdown when the key switch is returned to position 1.

Low engine fuel level switch.

At three month intervals, test the low engine fuel level switch circuit as follows:

- Start the machine.
- Disconnect the switch, the machine should shutdown.
- Re-connect the switch.

At twelve month intervals, test the low engine fuel level switch by removing and operating the float manually.

CAUTION: Never remove or replace switches when the machine is running.

SCAVENGE LINE

The scavenge line runs from the combined orifice/drop tube in the separator tank, to the orifice fitting located in the airend.

Examine the orifice, check valve and hoses at every service or in the event of oil carryover into the discharge air.

It is good preventative maintenance to check that the scavenge line and tube are clear of any obstruction each time the compressor lubricant is changed as any blockage will result in oil carryover into the discharge air.

COMPRESSOR OIL FILTER

Refer to the *MAINTENANCE CHART* in this section for the recommended servicing intervals.

Removal

WARNING: Do not remove the filter(s) without first making sure that the machine is stopped and the system has been completely relieved of all air pressure. (Refer to *STOPPING THE UNIT* in the *OPERATING INSTRUCTIONS* section of this manual).

Clean the exterior of the filter housing and remove the *spin-on* element by turning it in a counter-clockwise direction.

Inspection

Examine the filter element.

CAUTION: If there is any indication of the formation of varnishes, shellacs or lacquers on the filter element, it is a warning that the compressor lubricating and cooling oil has deteriorated and that it should be changed immediately. Refer to *LUBRICATION* later in this section.

Reassembly

Clean the filter gasket contact area and install the new element by screwing in a clockwise direction until the gasket makes contact with the filter housing. Tighten a further $\frac{1}{2}$ to $\frac{3}{4}$ of a revolution.

CAUTION: Start the machine (refer to *PRIOR TO STARTING* and *STARTING THE UNIT* in the *OPERATING INSTRUCTIONS* section of this manual) and check for leakage before the machine is put back into service.

COMPRESSOR OIL SEPARATOR ELEMENT

Normally the separator element will not require periodic maintenance provided that the air and oil filter elements are correctly maintained.

If, however, the element has to be replaced, then proceed as follows:

Removal

WARNING: Do not remove the filter(s) without first making sure that the machine is stopped and the system has been completely relieved of all air pressure. (Refer to *STOPPING THE UNIT* in the *OPERATING INSTRUCTIONS* section of this manual).

Disconnect all hoses and tubes from the separator tank cover plate. Remove the drop-tube from the separator tank cover plate and then remove the cover plate. Remove the separator element.

Inspection

Examine the filter element. Examine all hoses and tubes, and replace if necessary.

Reassembly

Thoroughly clean the orifice/drop tube and filter gasket contact area before reassembly. Install the new element.

WARNING

Do not remove the staple from the anti-static gasket on the separator element since it serves to ground any possible static build-up. Do not use gasket sealant since this will affect electrical conductance.

Reposition the cover plate, taking care not to damage the gasket, and replace the cover plate screws tightening in a *criss-cross* pattern to the recommended torque (refer to the *TORQUE SETTING TABLE* later in this section).

Replace the drop-tube and reconnect all hoses and tubes to the separator tank cover plate.

Replace the compressor oil (refer to *LUBRICATION* later in this section).

CAUTION: Start the machine (refer to *PRIOR TO STARTING* and *STARTING THE UNIT* in the *OPERATING INSTRUCTIONS* section of this manual) and check for leakage before the machine is put back into service.

COMPRESSOR OIL COOLER

When grease, oil and dirt accumulate on the exterior surfaces of the oil cooler, its efficiency is impaired. It is recommended that each month the oil cooler be cleaned by directing a jet of compressed air, (carrying if possible a non-flammable cleaning solvent) over the exterior core of the cooler. This should remove any accumulation of oil, grease and dirt from the exterior core of the cooler so that the entire cooling area can radiate the heat of the lubricating and cooling oil into the air stream.

AIR FILTER ELEMENT

The air filter should be inspected regularly (refer to the *SERVICE/MAINTENANCE CHART*) and the element replaced when the restriction indicator shows red or every 1000 hours, whichever comes first. The dust collector box(es) should be cleaned daily (more frequently in dusty operating conditions) and not allowed to become more than half full.

Removal

CAUTION: Never remove and replace element(s) when the machine is running.

Clean the exterior of the filter housing and remove the filter element by releasing the nut.

Inspection

Check for cracks, holes or any other damage to the element by holding it up to a light source, or by passing a lamp inside.

Check the seal at the end of the element and replace if any sign of damage is evident.

Reassembly

Assemble the new element into the filter housing ensuring that the seal seats properly.

Secure the element in the housing by hand tightening the nut.

Reset the restriction indicator by depressing the rubber diaphragm.

Assemble the dust collector box parts, ensuring that they are correctly positioned.

Before restarting the machine, check that all clamps are tight.

NOTE: In the event that a new filter element is not readily available, the element can be re-used after cleaning. In this case the following procedure must be carried out:

Clean the element by directing a jet of clean, dry compressed air, no more than 5 bar, at an angle of 45 degrees to the outside of the element. Carefully blow any dust from each fold of the element.

Compressed air cleaning is only recommended when a new element is not available.

VENTILATION

Always check that the air inlets and outlets are clear of debris etc.

CAUTION: NEVER clean by blowing air inwards.

COOLING FAN DRIVE

Periodically check that the fan mounting bolt in the fan hub has not loosened. If, for any reason, it becomes necessary to remove the fan or re-tighten the fan mounting bolt, apply a good grade of commercially available thread locking compound to the bolt threads and tighten to the torque value shown in the *TORQUE SETTING TABLE* later in this section.

The fan belt(s) should be checked regularly for wear and correct tensioning.

FUEL SYSTEM

The fuel tank should be filled daily or every eight hours. To minimise condensation in the fuel tank(s), it is advisable to top up after the machine is shut down or at the end of each working day. At six month intervals drain any sediment or condensate that may have accumulated in the tank(s).

HOSES

All components of the engine cooling air intake system should be checked periodically to keep the engine at peak efficiency.

At the recommended intervals, (see the *SERVICE/MAINTENANCE CHART*), inspect all of the intake lines to the air filter, and all flexible hoses used for air lines, oil lines and fuel lines.

Periodically inspect all pipework for cracks, leaks, etc. and replace immediately if damaged.

ELECTRICAL SYSTEM

WARNING: Always disconnect the battery cables before performing any maintenance or service.

Inspect the safety shutdown system switches and the instrument panel relay contacts for evidence of arcing and pitting. Clean where necessary.

Check the mechanical action of the components.

Check the security of electrical terminals on the switches and relays i.e. nuts or screws loose, which may cause local hot spot oxidation.

Inspect the components and wiring for signs of overheating i.e. discolouration, charring of cables, deformation of parts, acrid smells and blistered paint.

BATTERY

Keep the battery terminals and cable clamps clean and lightly coated with petroleum jelly to prevent corrosion.

The retaining clamp should be kept tight enough to prevent the battery from moving.

PRESSURE SYSTEM

At 500 hour intervals it is necessary to inspect the external surfaces of the system (from the airend through to the discharge valve(s)) including hoses, tubes, tube fittings and the separator tank, for visible signs of impact damage, excessive corrosion, abrasion, tightness and chafing. Any suspect parts should be replaced before the machine is put back into service.

TYRES/TYRE PRESSURE

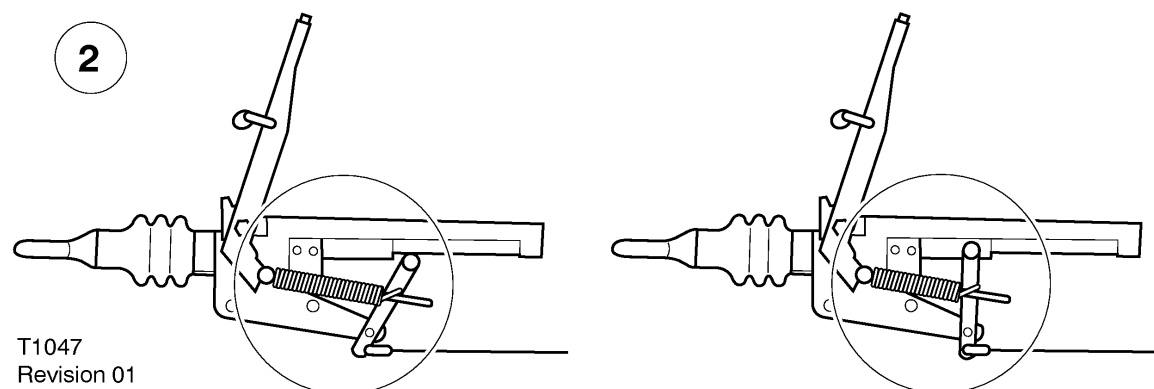
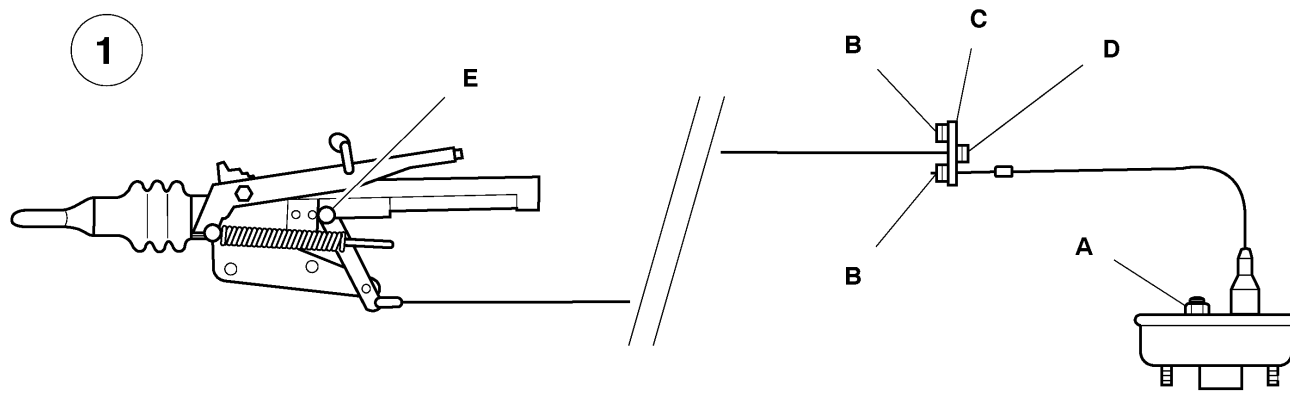
See the *GENERAL INFORMATION* section of this manual.

RUNNING GEAR/WHEELS

Check the wheel nut torque 20 miles (30 kilometres) after refitting the wheels. Refer to the *TORQUE SETTING TABLE* later in this section.

Lifting jacks should only be used under the axle.

The bolts securing the running gear to the chassis should be checked periodically for tightness (refer to the *SERVICE/MAINTENANCE CHART* for frequency) and re-tightened where necessary. Refer to the *TORQUE SETTING TABLE* later in this section.



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M&E

WHEEL BRAKE ADJUSTMENT

Ensure that the handbrake lever is fully released and that the coupling head is fully extended.

Each wheel brake must be adjusted in turn whilst rotating the wheel in the forward towing direction.

Refer to the diagram above.

1: Adjust the brakes until they *lock-up* by using adjuster **A**.

Release adjuster **A** until only a slight resistance is felt during wheel rotation.

Adjust nuts **B** and lock with the equaliser **C** parallel to the axle.

Take up the play with nut **D** behind the equaliser but without pre-loading the brakes (the wheels should rotate freely). Ensure that all locknuts are secured. The overrun lever play dimension **E** should not be greater than 14mm (fixed height running gear) or 16mm (variable height running gear). The spring free length dimension **F** should be 190mm.

2: When the unit is pushed backwards whilst parked, the brakes adopt their reverse mode and the spring store extends to maintain the parked condition. The handbrake will then feel less tensioned but the unit will remain stationary.

CAUTION: Check the wheel nut torque 20 miles (30 kilometres) after refitting the wheels (Refer to the *TORQUE SETTING TABLE* later in this section).

LUBRICATION

The engine is initially supplied with engine oil sufficient for a nominal period of operation (for more information, consult The *Engine Manufacturer's Manual*).

CAUTION: Always check the oil levels before a new machine is put into service.

If, for any reason, the unit has been drained, it must be re-filled with new oil before it is put into operation.

ENGINE LUBRICATING OIL

The engine oil should be changed at the engine manufacturer's recommended intervals. Refer to the *Engine Manufacturer's Manual*.

ENGINE LUBRICATING OIL SPECIFICATION

Refer to the *Engine Manufacturer's Manual*.

ENGINE OIL FILTER ELEMENT

The engine oil filter element should be changed at the engine manufacturer's recommended intervals. Refer to the *Engine Manufacturer's Manual*.

COMPRESSOR LUBRICATING OIL

Refer to the *SERVICE/MAINTENANCE CHART* in this section for service intervals.

NOTE: If the machine has been operating under adverse conditions, or has suffered long shutdown periods, then more frequent service intervals will be required.

WARNING: DO NOT, under any circumstances, remove any drain plugs or the oil filler plug from the compressor lubricating and cooling system without first making sure that the machine is stopped and the system has been completely relieved of all air pressure (refer to *STOPPING THE UNIT* in the *OPERATING INSTRUCTIONS* section of this manual).

Completely drain the receiver/separator system including the piping and oil cooler by removing the drain plug(s) and collecting the used oil in a suitable container.

Replace the drain plug(s) ensuring that each one is secure.

NOTE: If the oil is drained immediately after the machine has been running, then most of the sediment will be in suspension and will therefore drain more readily.

CAUTION: Some oil mixtures are incompatible and result in the formation of varnishes, shellacs or lacquers which may be insoluble.

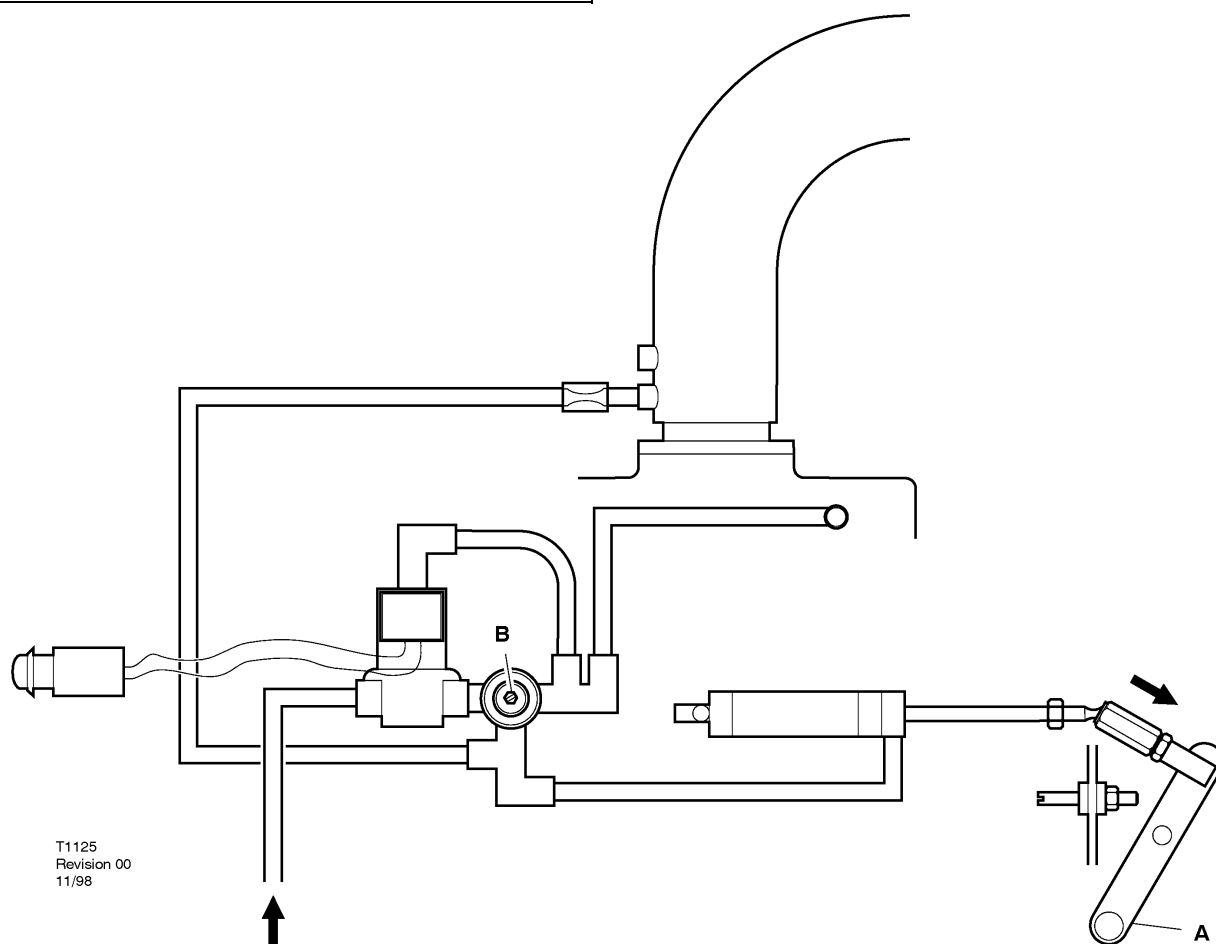
NOTE: Always specify INGERSOLL-RAND Pro-Tec™ oil for use at all ambient temperatures above -23°C.

COMPRESSOR OIL FILTER ELEMENT

Refer to the *SERVICE / MAINTENANCE CHART* in this section for service intervals.

RUNNING GEAR WHEEL BEARINGS

Wheel bearings should be packed with grease every 6 months. The type of grease used should conform to specification MIL-G-10924.



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SPEED AND PRESSURE REGULATION ADJUSTMENT

Normally, regulation requires no adjusting, but if correct adjustment is lost, proceed as follows:

Refer to the diagram above.

A: Throttle arm
B: Adjusting screw

Start the machine (Refer to *STARTING INSTRUCTIONS* in the *OPERATING INSTRUCTIONS* section of this manual).

Inspect the throttle arm on the engine governor to see that it is extended in the full speed position when the engine is running at *full-load* speed and the service valve is fully open. (Refer to the *GENERAL INFORMATION* section of this manual).

Adjust the service valve on the outside of the machine to maintain 7 bar (HP95 = 10,3bar) without the throttle arm moving from the full speed position. If the throttle arm moves away from the full speed position before 7 bar (HP95 = 10,3bar) is attained, then turn the adjusting screw clockwise to increase the pressure. Optimum adjustment is achieved when the throttle arm just moves from its full speed position and the pressure gauge reads 7,2 bar.(HP95 = 10,5bar).

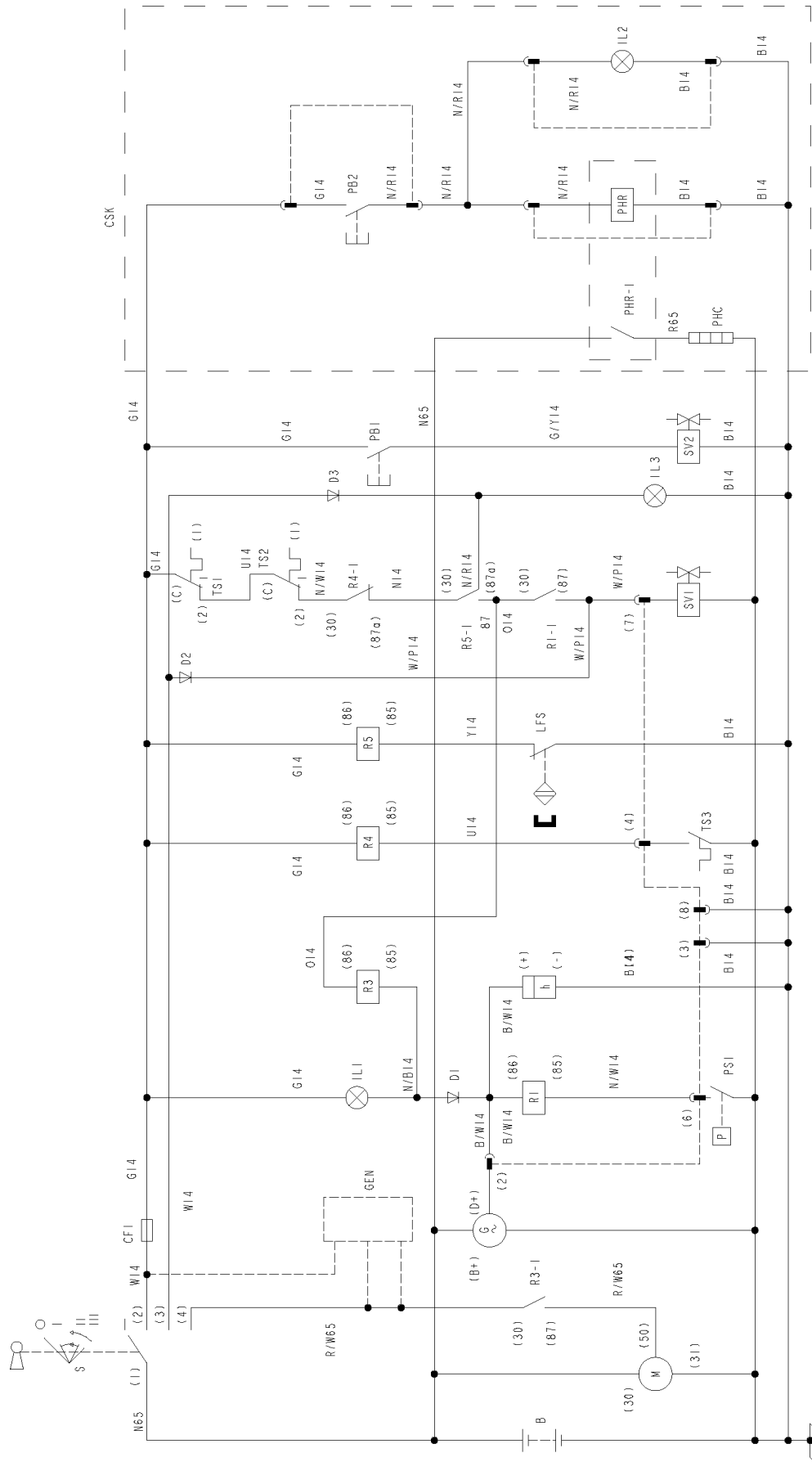
Close the service valve. The engine will slow to idle speed.

CAUTION: Never allow the idle pressure to exceed 8,6bar on the pressure gauge, otherwise the safety valve will operate.

TORQUE VALUES

	ft lbf	Nm
Airend to engine	29–35	39–47
Air filter to bracket	16–20	22–27
Autella clamp to exhaust	9–11	12–15
Baffle to frame	9–11	12–15
Blowdown solenoid valve	21–26	28–35
Discharge manifold to frame	29–35	39–47
Drive pins to engine flywheel	57–69	77–93
Drop Leg	53–63	72–85
Engine/airend to chassis	54–58	73–78
Euro-Loc adaptor to separator tank	58–67	78–91
Exhaust flange to manifold	17–21	23–28

	ft lbf	Nm
Fan guard	9–11	12–15
Fan to hub	12–15	16–20
Lifting bail bracket to engine	29–35	39–47
Oil pipe (–12jic)	71–88	96–119
Radiator/Cooler to baffle	9–11	12–15
Running gear front to chassis	63–69	82–93
Running gear rear to chassis	63–69	82–93
Separator tank cover	40–50	54–68
Separator tank to frame	18–22	24–30
Service pipe (–20jic)	106–133	143–180
Sight glass	40–50	54–68
Wheel nuts	50–80	67–109



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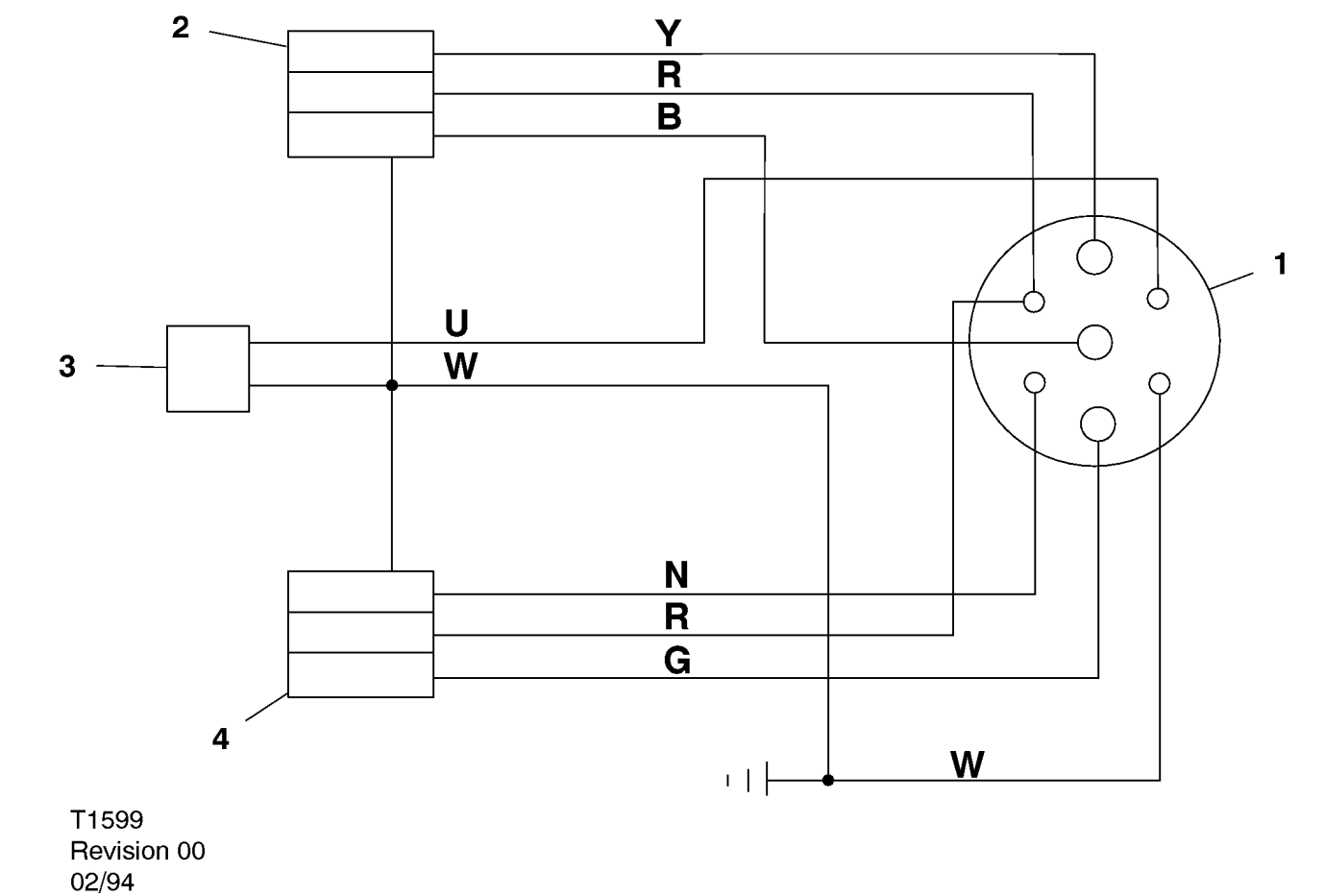
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KEY

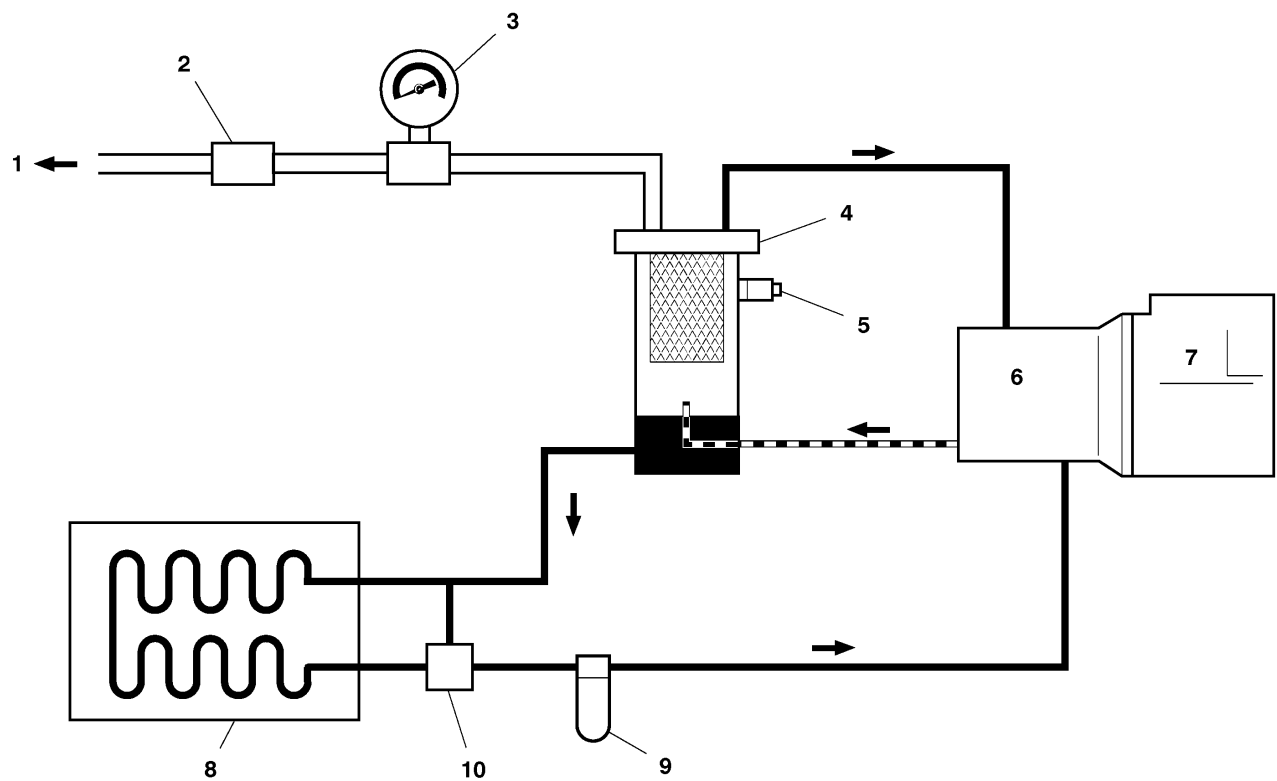
B	Battery 12 Volt	B	Black
CF1	Control fuse 5A	G	Green
D1-3	Diode	K	Pink
G	Alternator	N	Brown
h	Hour meter	O	Orange
IL1	Lamp, alternator charge	P	Purple
IL3	Lamp, Low fuel	R	Red
LFS	Low fuel level switch	S	Grey
M	Starter motor	U	Blue
PB1	Pushbutton, load	W	White
PS1	Oil pressure switch	Y	Yellow
R1	Relay, safety shut-down		
R3	Relay, start inhibit		
R4	Relay, oil temperature switch (engine)		
R5	Relay, low fuel		
S	Key-switch		
SV1	Solenoid, fuel		
SV2	Solenoid, load		
TS1	Air temperature switch (airend)		
TS2	Air temperature switch (discharge)		
TS3	Oil temperature switch (engine)		

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ELECTRICAL SYSTEM



KEY			
1	Plug	B	Black
2	Light (right hand)	G	Green
3	Fog light	K	Pink
4	Light (left hand)	N	Brown
		O	Orange
		P	Purple
		R	Red
		S	Grey
		U	Blue
		W	White
		Y	Yellow



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KEY

1	Air discharge	8	Oil cooler
2	Minimum pressure valve	9	Oil filter
3	Pressure gauge	10	Thermostatic valve
4	Separator tank		
5	Safety valve		
6	Compressor		
7	Engine		

	Air
	Oil
	Air/oil

FAULT	CAUSE	REMEDY
Engine fails to start.	<i>Low battery charge.</i> <i>Bad earth connection.</i> <i>Loose connection.</i> <i>Fuel starvation.</i> <i>Relay failed.</i> <i>Engine control not in 'run' position.</i>	Check the fan belt tension, battery and cable connections. Check the earth cables, clean as required. Locate and make the connection good. Check the fuel level and fuel system components. Replace the fuel filter if necessary. Replace the relay. Check the speed cylinder and stop position.
Engine starts but stalls when the switch returns to position I.	<i>Electrical fault</i> <i>Alternator light bulb failed or loose.</i> <i>Low engine oil pressure.</i> <i>Faulty relay</i> <i>Faulty key-switch</i>	Test the electrical circuits. Replace or re-tighten the bulb as appropriate. Check the oil level and the oil filter(s). Check the relays. Check the key-switch.
Engine starts but will not run or engine shuts down prematurely.	<i>Electrical fault.</i> <i>Loose light bulb.</i> <i>Low engine oil pressure.</i> <i>Safety shut-down system in operation.</i> <i>Fuel starvation.</i> <i>Switch failure.</i> <i>High compressor oil temperature.</i> <i>Water present in fuel system.</i> <i>Faulty relay.</i>	Test the electrical circuits. Check that all lights are lit when the ignition is switched on. Check that all lights are extinguished when the starter is operated. Check the oil level and oil filter(s). Check the safety shut-down switches. Check the fuel level and fuel system components. Replace the fuel filter if necessary. Test the switches. Check the compressor oil level and oil cooler. Check the fan drive. Check the water separator and clean if required. Check the relay in the holder and replace if necessary.
Engine Overheats.	<i>Reduced cooling air from fan.</i>	Check the fan and the drive belts. Check for any obstruction inside the cowl.
Engine speed too high.	<i>Incorrect throttle arm setting.</i> <i>Faulty regulator valve.</i>	Check the engine speed setting. Check the regulation system.

FAULT	CAUSE	REMEDY
Engine speed too low.	<i>Incorrect throttle arm setting.</i> <i>Blocked fuel filter.</i> <i>Blocked air filter.</i> <i>Faulty regulator valve.</i> <i>Premature unloading.</i>	Check the throttle setting. Check and replace if necessary. Check and replace the element if necessary. Check the regulation system. Check the regulation and the operation of the air cylinder.
Excessive vibration.	<i>Engine speed too low.</i>	See "Engine speed too low"
Leaking oil seal.	<i>Improperly fitted oil seal.</i>	Replace the oil seal.
Refer also to the <i>Engine Manufacturer's Manual</i>.		
Air discharge capacity too low.	<i>Engine speed too low.</i> <i>Blocked air cleaner.</i> <i>High pressure air escaping.</i> <i>Incorrectly set regulation system.</i>	Check the air cylinder and air filter(s). Check the restriction indicators and replace the element(s) if necessary. Check for leaks. Reset the regulation system. Refer to SPEED AND PRESSURE REGULATION ADJUSTMENT in the MAINTENANCE section of this manual.
Compressor overheats.	<i>Low oil level.</i> <i>Dirty or blocked oil cooler.</i> <i>Incorrect grade of oil.</i> <i>Recirculation of cooling air.</i> <i>Faulty temperature switch.</i> <i>Reduced cooling air from fan.</i>	Top up the oil level and check for leaks. Clean the oil cooler fins. Use Ingersoll-Rand recommended oil. Move the machine to avoid recirculation. Check the operation of the switch and replace if necessary. Check the fan and the drive belts. Check for any obstruction inside the fan cowl.
Excessive oil present in the discharge air.	<i>Blocked scavenge line.</i> <i>Perforated separator element.</i> <i>Pressure in the system is too low.</i>	Check the scavenge line, drop tube and orifice. Clean and replace. Replace the separator element. Check the minimum pressure valve or sonic orifice.

FAULT	CAUSE	REMEDY
Safety valve operates.	<i>Operating pressure too high.</i>	Check the setting and operation of the regulator valve piping.
	<i>Incorrect setting of the regulator.</i>	Adjust the regulator.
	<i>Faulty regulator.</i>	Replace the regulator.
	<i>Inlet valve set incorrectly.</i>	Refer to <i>SPEED AND PRESSURE REGULATION ADJUSTMENT</i> in the <i>MAINTENANCE</i> section of this manual.
	<i>Loose pipe/hose connections.</i>	Check all pipe/hose connections.
	<i>Faulty safety valve.</i>	Check the relieving pressure. Replace the safety valve if faulty. DO NOT ATTEMPT A REPAIR.

FAULT	CAUSE	REMEDY
Oil is forced back into the air filter.	<i>Incorrect stopping procedure used</i>	Always employ the correct stopping procedure. Close the discharge valve and allow the machine to run on idle before stopping.
	<i>Faulty inlet valve.</i>	Check for free operation of the inlet valve(s).
	<i>Faulty discharge check valve.</i>	Remove the valve from the discharge pipe and check the operation.
Machine goes to full pressure when started.	<i>Inlet valve set incorrectly.</i>	Refer to <i>SPEED AND PRESSURE REGULATION ADJUSTMENT</i> in the <i>MAINTENANCE</i> section of this manual.
Machine fails to load when the load button is pressed.	<i>Faulty load solenoid.</i>	Replace the solenoid. Check the electrical circuit by feeling for movement whilst depressing the load button.

LUBRICATOR

SAFETY

WARNING: Ensure that the lubricator filler cap is re-tightened correctly after replenishing with oil.

WARNING: Do not replenish the lubricator oil, or service the lubricator without first making sure that the machine is stopped and the system has been completely relieved of all air pressure (Refer to *STOPPING THE UNIT* in the *OPERATING INSTRUCTIONS* section of this manual).

CAUTION: If the nylon tubes to the lubricator are disconnected then ensure that each tube is re-connected in its original location.

GENERAL INFORMATION

Oil capacity: 2 litres

Oil specification:
Refer to the *Tool Manufacturer's Manual*.

OPERATING INSTRUCTIONS

COMMISSIONING

Check the lubricator oil level and fill as necessary.

PRIOR TO STARTING

Check the lubricator oil level and replenish as necessary.

MAINTENANCE

Check the lubricator oil level and replenish as necessary.

FAULT FINDING

FAULT	CAUSE	REMEDY
No oil flow.	Incorrect connection.	Reverse the nylon tube connections to the lubricator.

COLD START AID

SAFETY

Refer to the *SAFETY SECTION* in this manual.

GENERAL INFORMATION

The Cold start aid is fitted to machines to assist in starting the engine in temperatures of between 0†C and –10†C.

OPERATING INSTRUCTIONS

STARTING THE UNIT

Refer to section 5 *PRIOR TO STARTING* and *STARTING THE UNIT*.

Follow the instructions given in section 5 *STARTING THE UNIT*, depressing the *Cold Start Button* for 30 seconds immediately prior to turning the keyswitch to position *III* (engine start position). The Cold Start indicator light will illuminate whilst the button is depressed.

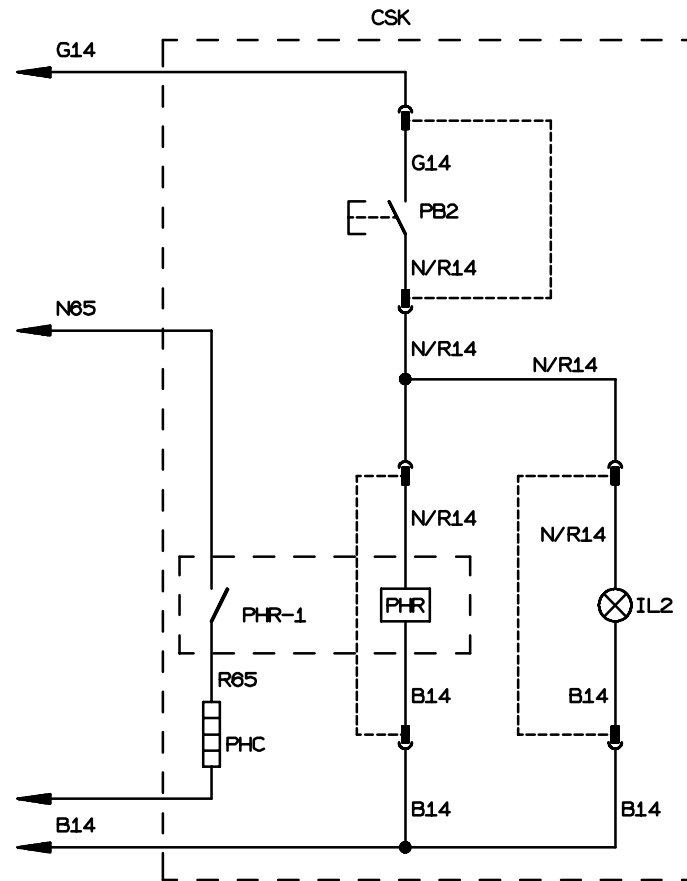
MAINTENANCE

Refer to the *MAINTENANCE* section of this manual.

FAULT FINDING

Refer also to the *FAULT FINDING* section in this manual.

FAULT	CAUSE	REMEDY
Engine fails to start.	Loose connections on the cold start harness/wiring	Check the connections and tighten as necessary.
Engine fails to start.	Cold start relay faulty.	Replace the relay.



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KEY	
CSK	Cold start device
IL2	Lamp, cold start
PB2	Pushbutton, cold start
PHC	Pre-heat coil
PHR	Pre-heat relay
	Option
B	Black
G	Green

K	Pink
N	Brown
O	Orange
P	Purple
R	Red
S	Grey
U	Blue
W	White
Y	Yellow

GENERATOR

(WDG)

SAFETY

Refer to the *SAFETY SECTION* in this manual.

GENERAL INFORMATION

Rated output.	4,8 kW @ 0,8 Power factor (PF) lagging
Rated voltage	110V 1ph or 230V 1ph or 230V 3ph or 400V 3ph + 230V 1ph @ 3000 rpm
Voltage regulation	+/- 6%
Maximum continuous output	6 kVA @ 0,8 PF
Rotor type	Brushless (110/230V 1ph)
Rotor type	Rotating armature with sliprings (230V 3ph / 400V 3ph + 230V 1ph)
De-rating factors at 0.8 pf continuous load:	
<i>Air in temp 20°C</i>	Continuous
<i>Air in temp 30°C</i>	5,7 KVA @ 0.8 p.f continuous
<i>Air in temp 46°C</i>	4,5 KVA @ 0.8 p.f continuous
De-rating factors for intermittent load:	
<i>Air in temp 20–35°C, 55 mins/hr @ 0.8, 5 mins off load</i>	
<i>Air in temp 35–40°C, 50 mins/hr @ 0.8, 10 mins off load</i>	
<i>Air in temp 40°C + ,45 mins/hr @ 0.8, 15 mins off load</i>	
Socket outlets:	
<i>110V 1ph & 230V 1ph</i>	1 x 32 amperes
	2 x 16 amperes
<i>230V 3ph</i>	1 x 16 amperes
<i>400V 3ph + 230V 1ph</i>	400V 3ph = 1 x 16 amperes
	230V 1ph = 2 x 16 amperes

Earth leakage protection is provided by a single residual current device. Miniature circuit breakers (MCB) are fitted to provide both overcurrent and short circuit protection for the generator.

Each socket outlet is protected by a spring loaded weather-proof cover.

OPERATING INSTRUCTIONS

A mode selector switch is provided to switch the machine between compressor and generator mode.

CAUTION: Do not start or stop the machine with the compressor/generator mode switch in the **Generator** position.

When the switch is in the *Generator* position the normally-open solenoid valve switches to the closed position and air in the line to the engine speed control cylinder vents to the atmosphere via the solenoid exhaust port. This causes the cylinder to move to its maximum speed position. The engine will now maintain maximum speed as the air line from the pressure regulator valve to the solenoid valve is now closed.

When the switch is returned to the *Compressor* position, the solenoid valve is de-energised thus returning it to its normally open position. The engine speed cylinder would then respond via the pressure regulator valve according to the air demand.

When connecting electrical equipment to any of the socket outlets, it is recommended that the appropriate MCB is in the *OFF* position before making the connection, switching the MCB to the *ON* position immediately prior to using the equipment.

PRIOR TO STARTING (GENERATOR) (WDG)

If the generator should become exposed or saturated with moisture/water deposits, it must be safely dried off before attempting to make any part or conductor electrically live. This should be done by wiping away excess water, then running the engine with no electrical loads connected, until the generator is completely dry.

Ensure all persons concerned are suitably competent with electrical installations.

Ensure that there is a safe working procedure which has been issued by supervisory personnel, and that it is understood by all persons concerned with the operation of the generator.

Ensure that the safety procedure to be applied is based on the appropriate national regulations.

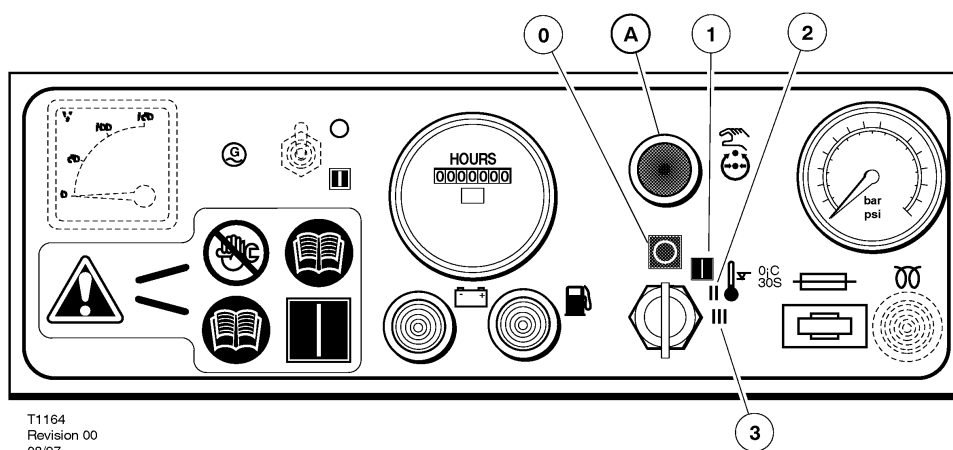
Ensure that the safety procedure is followed at all times.

Ensure that suitable guidance codes are available to indicate safe working practices, and any hazards to avoid.

Before starting the engine and switching in the generator load, ensure that :-

- The system has been inspected and earthed.
- No persons are in a hazardous position.
- Any warnings necessary have been suitably displayed (where applicable).

Ensure compressor / generator mode switch is set to compressor.



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STARTING THE MACHINE

WARNING: Under no circumstances should volatile liquids such as Ether be used for starting this machine.

CAUTION: Do not start or stop the machine with the compressor/generator mode switch in the **Generator** position.

All normal starting functions are incorporated in the key operated switch.

- Turn the key switch to position 1, the alternator charge light will illuminate.
- Turn the key switch to position 3 (engine start position).
- Release to position 2 when the engine starts.
- Release to position 1 when the alternator charge light is extinguished.

At temperatures below 0°C or if there is difficulty starting first time:

Push and release button 'A'.

- Allow the engine to reach operating temperature.
- At this point in the operation of the machine it is safe to apply full load to the engine.

NOTE: Wear hearing protection at all times when the engine is started with the top open and air is flowing from the valve.

STOPPING THE MACHINE

- Close the service valve.
- Allow the machine to run unloaded for a short period of time to reduce the engine temperature.
- Turn the start switch to the 0 (off) position.

NOTE: As soon as the engine stops, the automatic blowdown valve will relieve all pressure from the system.

If the automatic blowdown valve fails to operate, then pressure must be relieved from the system by means of the service valve(s).

CAUTION: Never allow the machine to stand idle with pressure in the system.

EMERGENCY STOPPING

In the event that the unit has to be stopped in an emergency, **TURN THE KEY SWITCH LOCATED ON THE INSTRUMENT PANEL TO THE 0 (OFF) POSITION.**

RE-STARTING AFTER AN EMERGENCY

If the machine has been switched off because of a machine malfunction, then identify and correct the fault before attempting to re-start.

If the machine has been switched off for reasons of safety, then ensure that the machine can be operated safely before re-starting.

Refer to the **PRIOR TO STARTING** and **STARTING THE UNIT** instructions earlier in this section before re-starting the machine.

MONITORING DURING OPERATION

Should any of the safety shut-down conditions occur, the unit will stop. These are:

- Low engine oil pressure
- High air discharge temperature
- High engine oil temperature.
- Alternator not charging the electrical system.
- Low engine fuel level.

CAUTION: To ensure an adequate flow of oil to the compressor at low temperature, never allow the discharge pressure to fall below 3,5 bar.

DECOMMISSIONING
When the machine is to be permanently decommissioned or dismantled, it is important to ensure that all hazard risks are either eliminated or notified to the recipient of the machine. In particular:– - Do not destroy batteries or components containing asbestos without containing the materials safely. - Do not dispose of any pressure vessel that is not clearly marked with its relevant data plate information or rendered unusable by drilling, cutting etc. - Do not allow lubricants or coolants to be released into land surfaces or drains. - Do not dispose of a complete machine without documentation relating to instructions for its use.

MAINTENANCE

General
Ensure all electrical equipment is properly maintained and controlled. Ensure all earth connections are secure and regularly maintained.

Earth leakage circuit breaker (ELCB)
The earth leakage circuit breaker must be mechanically tested daily by pushing the test button with the machine in its <i>no load</i> condition. The ELCB should trip to the <i>off</i> (down) position. The earth leakage circuit breaker should also be tested every 3 months. A proprietary test meter should be used to induce live to earth preset flow at each socket outlet. This current flow will produce the required earth fault check. The test should be conducted in accordance with appropriate national standards.
Instruments and controls
A Voltmeter is provided to indicate the output voltage. Miniature circuit breakers provide over–current protection. In the event of excess current the appropriate circuit breaker will trip to the <i>OFF</i> position Note: The current trip rating is quoted at a nominal 40°C ambient temperature. An earth leakage circuit breaker provides additional protection in the event of a leakage to earth in excess of 30 milliamperes on the connected appliance or in the connections to the generator. For alternator maintenance refer to Mecc Alte operation and maintenance manual.

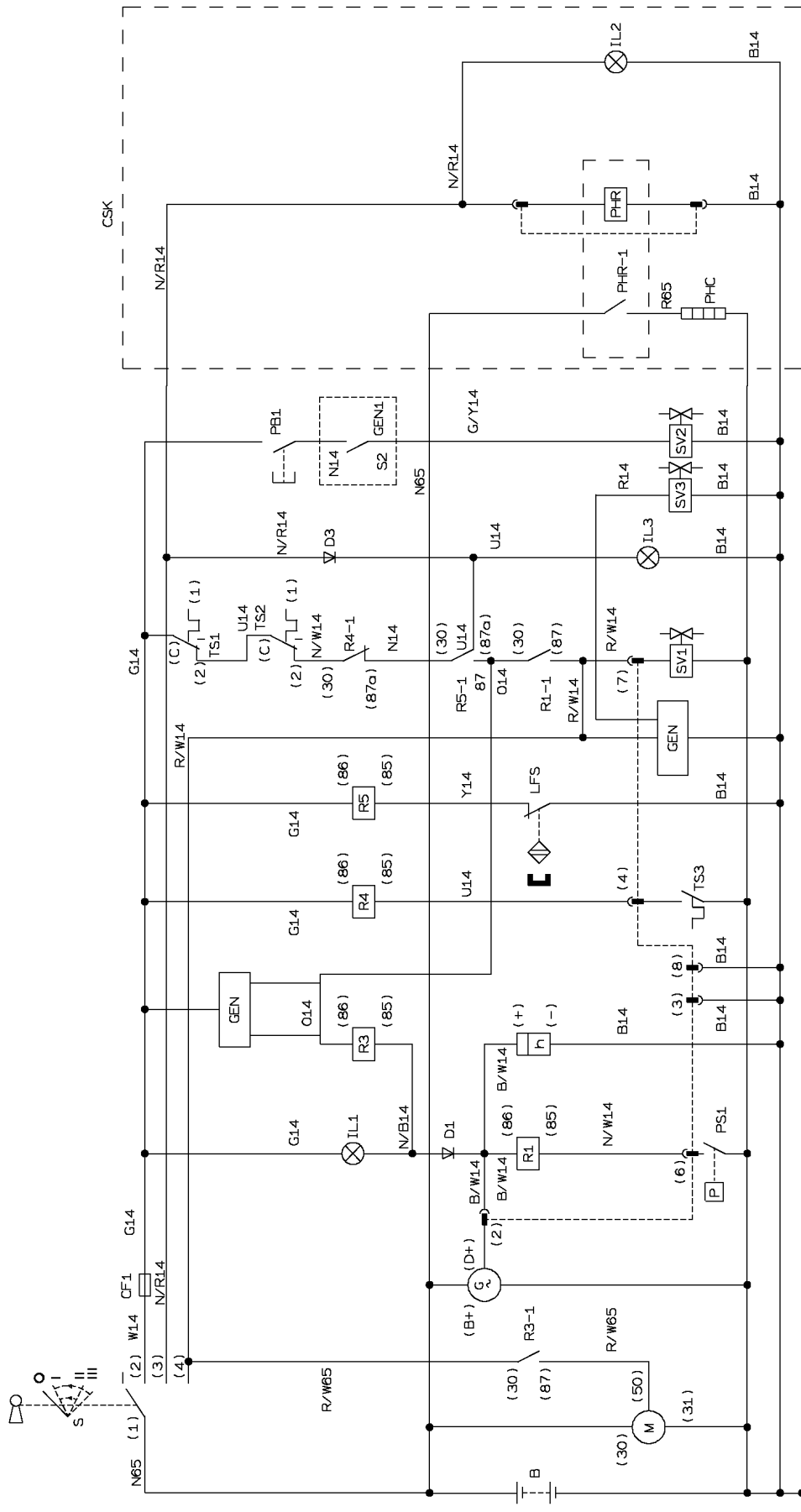
FAULT FINDING

FAULT	CAUSE	REMEDY
No output.	<i>Load plugs not fitted into socket outlets correctly.</i>	Ensure that the load plugs are fitted correctly into the socket outlets.
No output.	<i>Loose connection.</i>	Remove end cover and terminal box lid and check for loose connections. Rectify the fault as necessary.
	<i>Faulty rectifier.</i>	Check the rectifier bridge which is located inside the rear housing.
	<i>Faulty capacitor.</i>	Check the capacitors.
	<i>The No load voltage is low but increases when a load is applied.</i>	Check the capacitors and associated wiring.
	<i>The No load voltage falls when a load is applied.</i>	Check the current transformer and associated wiring.
No output.	<i>Loss of residual magnetic field</i>	Refer to Mecc Alte maintenance manual
	<i>Output winding(s) damaged.</i>	Measure the voltage across the winding(s). Replace the generator if damaged.
Generator fails to provide maximum output.	<i>Field winding damaged.</i>	Replace the generator.
	<i>Engine is not running at full speed.</i>	Check the engine speed with a tachometer. Consult Ingersoll-Rand if the engine is found to be running slow (Refer to section 4 <i>General Information</i>).
	<i>Drive belt is not tensioned correctly.</i>	Re-tension the drive belt.
	<i>Drive pulley is loose on the drive shaft.</i>	Check the drive pulley and tighten as required.

FAULT	CAUSE	REMEDY
The output voltage collapses when a load is connected.	<i>Overload condition.</i>	Check and reset each circuit breaker. If the condition persists then investigate the cause and rectify the fault as necessary. (see also 'Circuit breaker trips')
	<i>Short circuit.</i>	Check for a short circuit and rectify the fault as necessary.
	<i>Incorrect wiring.</i>	Check the wiring and rectify the fault as necessary.
Circuit breaker trips.	<i>Overload condition.</i>	Check and reset each circuit breaker. If the condition persists then investigate the cause and rectify the fault as necessary. (see also 'Circuit breaker trips')
	<i>Short circuit.</i>	Check for a short circuit and rectify the fault as necessary.
	<i>Fault in appliance.</i>	Check the appliance and rectify the fault as necessary.
A circuit breaker fails to re-set whilst the machine running.	<i>Circuit breaker latching mechanism faulty.</i>	Repair or replace as necessary.
Refer to Engine Manufacturer's manual and Mecc Alte manufacturer's manual		

41 OPTIONS

P90, P101, P110, P130, P150, P180, 7/51 D.C. Control Circuit Schematic Diagram.



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P90, P101, P110, P130, P150, P180, 7/51
D.C. Control Circuit Schematic Diagram.

KEY

B Battery 12V

D1-3 Diode

CF1 Fuse, control
5A

CSK Kit-Cold start aid
(Option)

G Alternator

h Hourmeter

IL1 Lamp, alternator charge

IL2 Lamp, cold start

IL3 Lamp, Low fuel

LFS Switch, low fuel level

M Motor, starter

PB1 Pushbutton, load

PHR Relay, preheat (cold start)

PHC Coil, preheat (cold start)

PS1 Switch, oil pressure

R1 Relay, safety shutdown

R3 Relay, start inhibit

R4 Relay, oil temperature switch
Engine

R5 Relay, low fuel

S Switch, start

SV1 Solenoid, fuel

SV2 Solenoid, load

SV3 Solenoid, speed

TS1 Switch, air temperature
Airend

TS2 Switch, air temperature
Discharge

TS3 Switch, oil temperature
Engine

GEN Generator
(Option)

GEN 1 Generator
(Option)
(P101)

B Black

G Green

LG Light green

K Pink

N Brown

O Orange

P Purple

R Red

S Grey

U Blue

W White

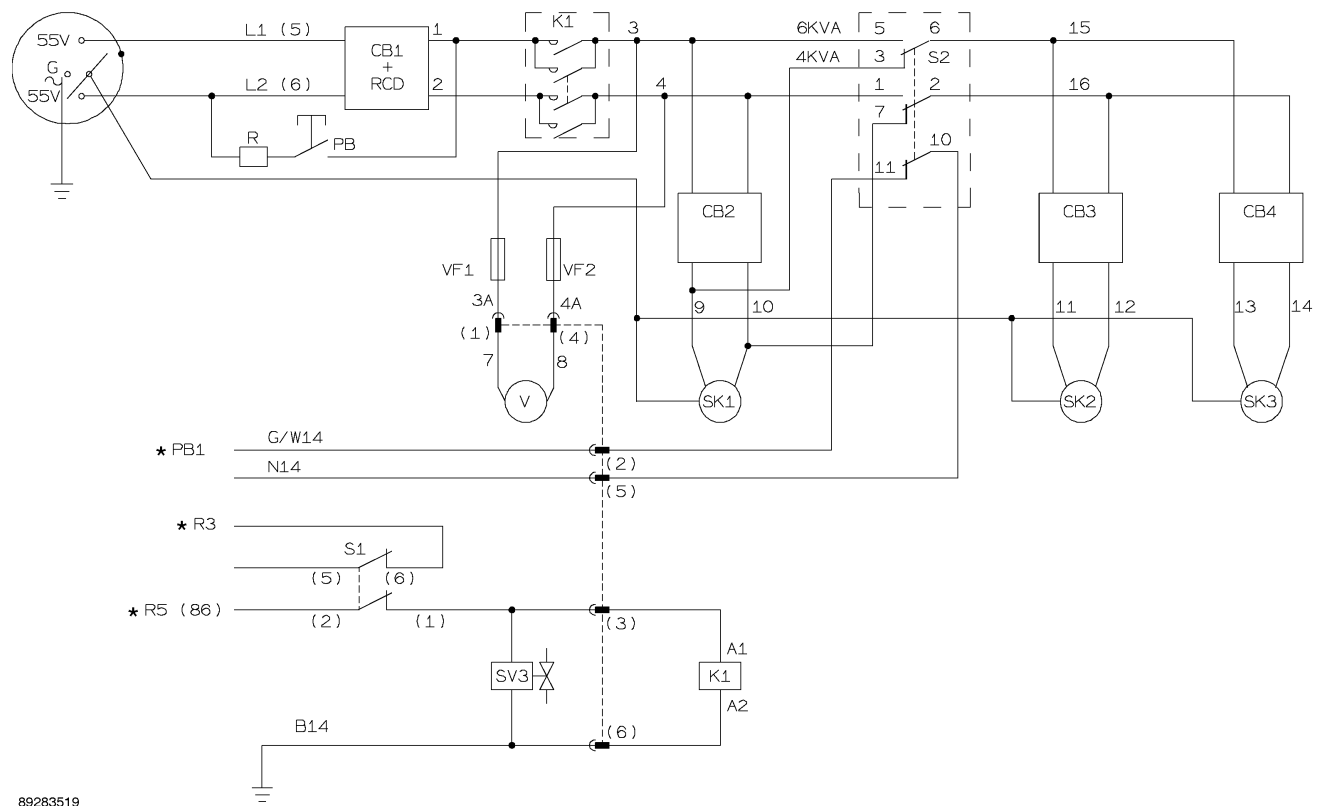
Y Yellow

***** See AC control circuit schematic

For details of interlock schematic, refer to respective
electrical power schematic diagram.

P90/101 110V 1ph

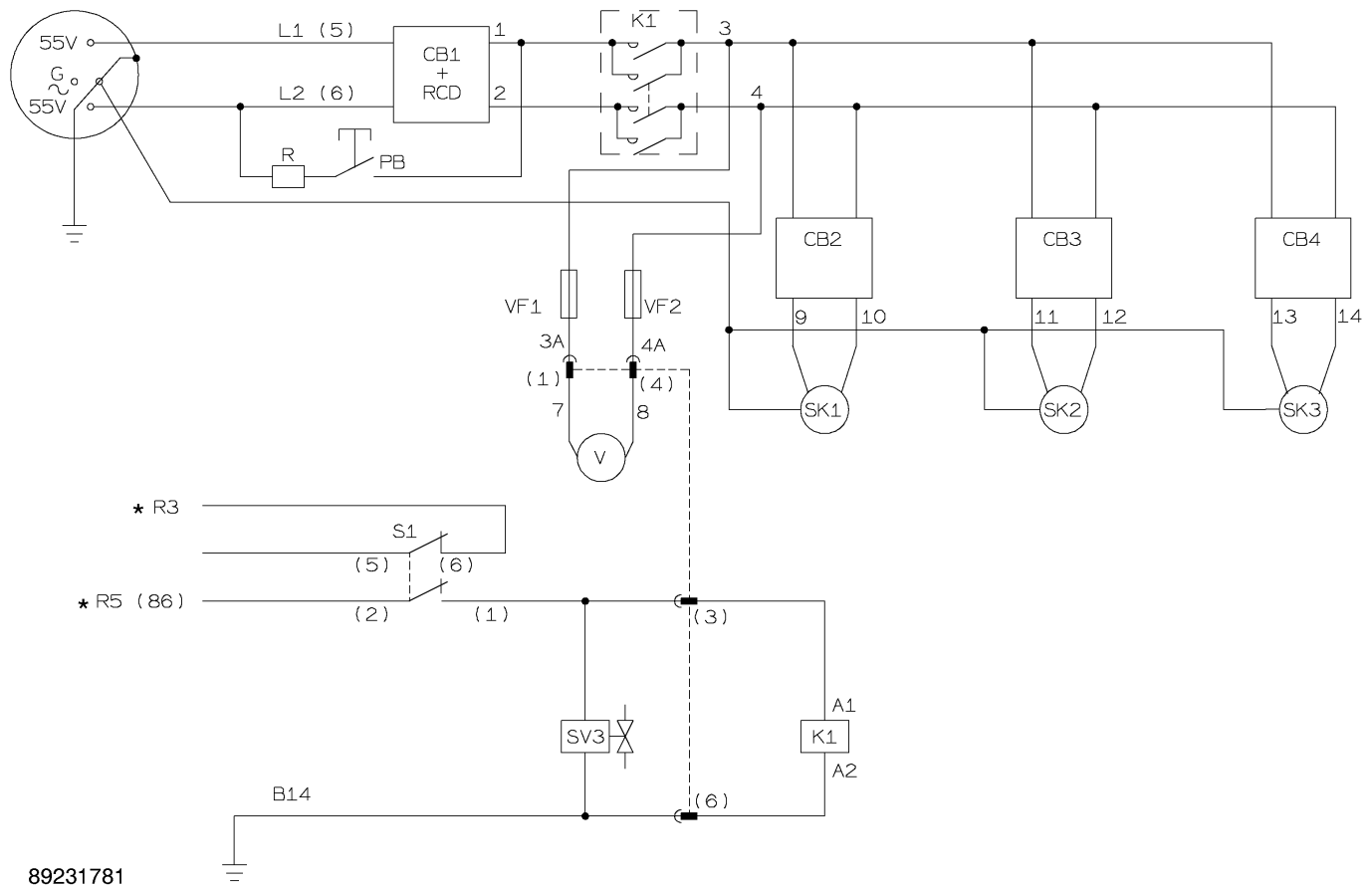
A.C. Electrical Power Schematic Diagram.



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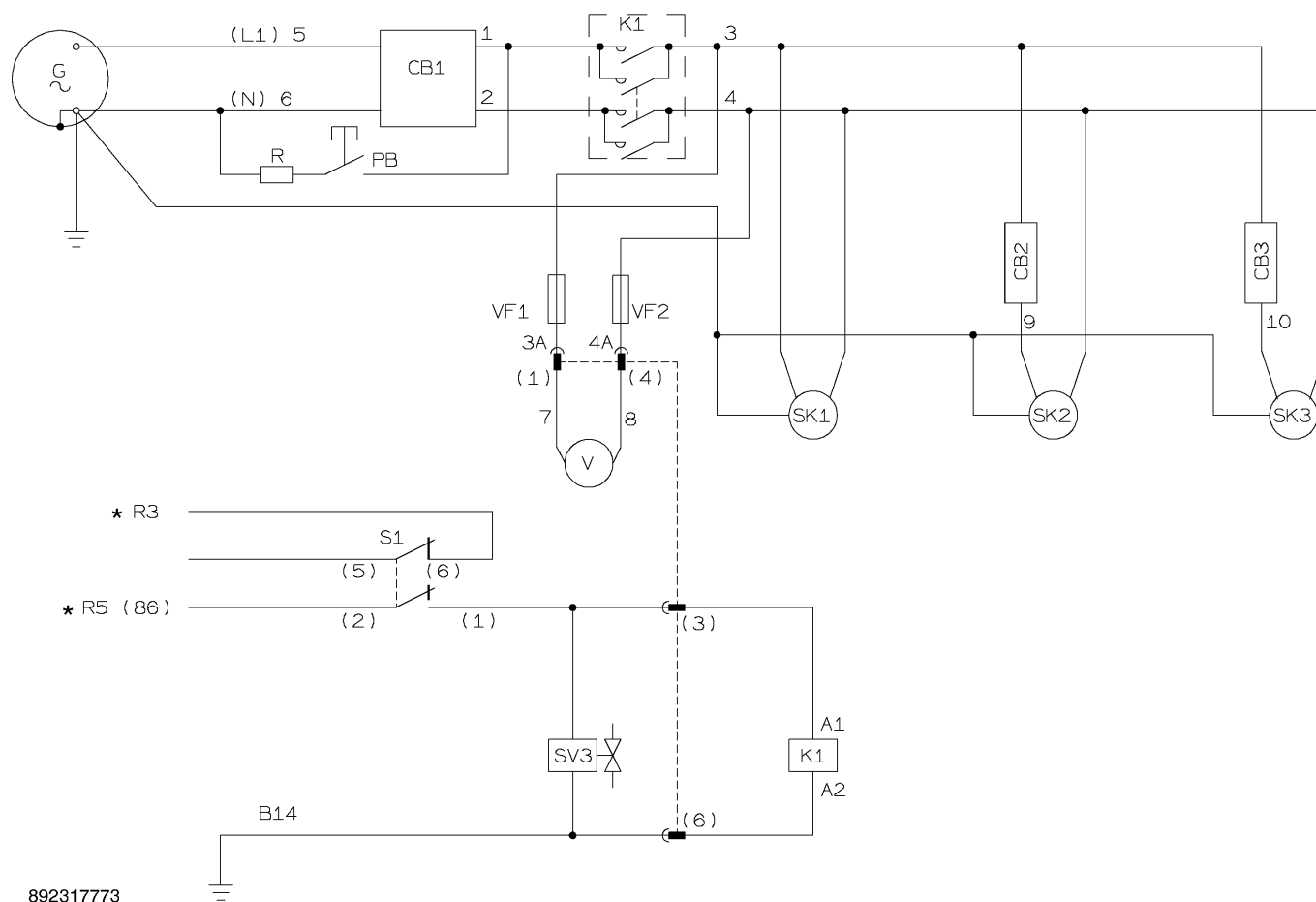
KEY		R	
CB1	Circuit breaker	S1	Switch, start
	63A	S2	Switch
CB2	Circuit breaker	SK1	Socket outlet 32A
	32A	SK2	Socket outlet 16A
CB3	Circuit breaker	SK3	Socket outlet 16A
	16A	SV3	Valve, solenoid
CB4	Circuit breaker	V	Voltmeter
	16A	VF1	Fuse Voltmeter
G	Alternator	VF2	Fuse Voltmeter
K1	Contactore	*	See DC control circuit schematic
PB	Pushbutton		

**P110, P130, P150, P180, 7/51 110V 1ph
A.C. Electrical Power Schematic Diagram.**



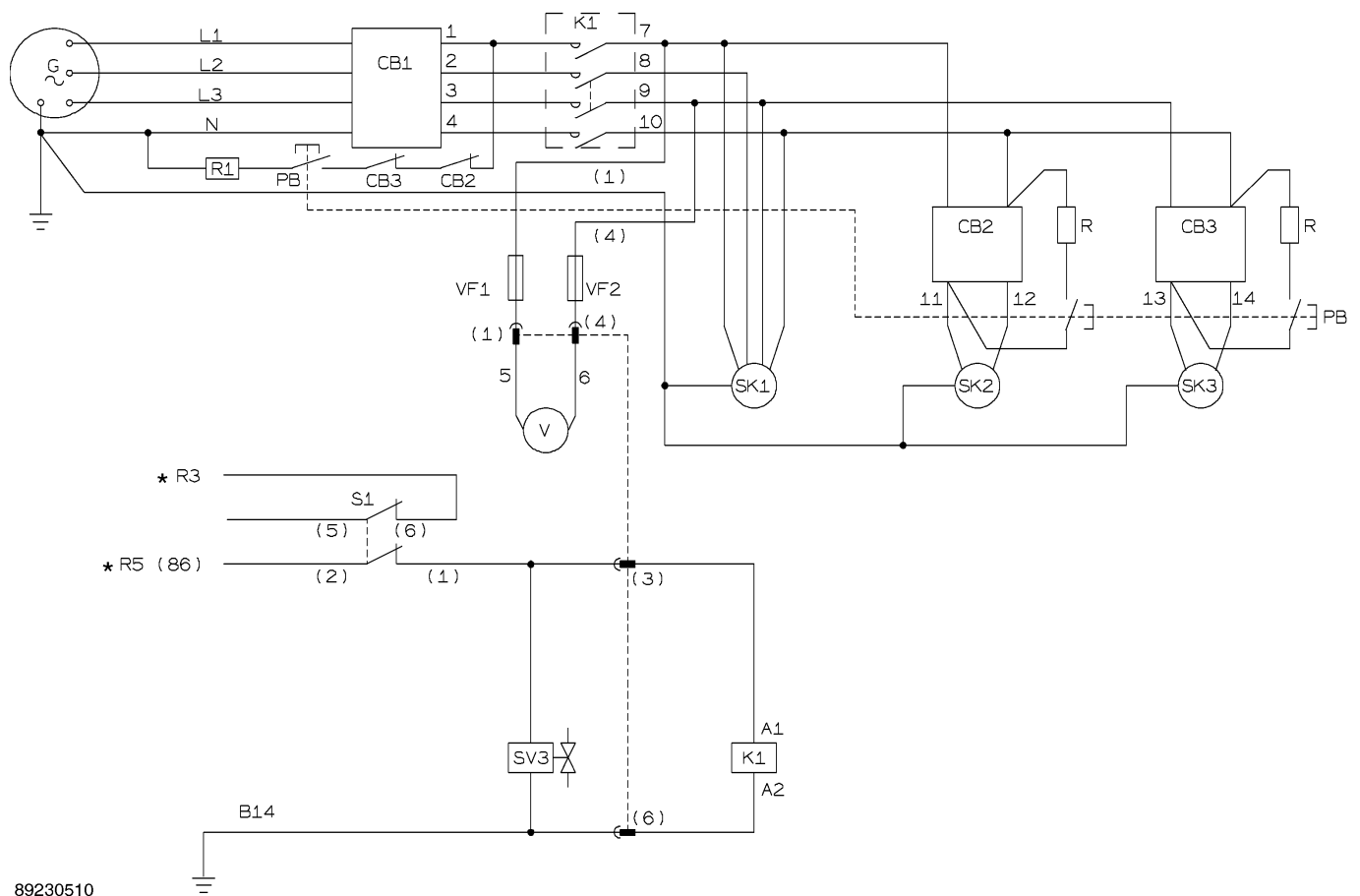
KEY			
CB1	Circuit breaker 63A	PB	Pushbutton
CB2	Circuit breaker 32A	R	Resistor
CB3	Circuit breaker 16A	S1	Switch, start
CB4	Circuit breaker 16A	SK1	Socket outlet 32A
G	Alternator	SK2	Socket outlet 16A
K1	Contactor	SK3	Socket outlet 16A
		SV3	Valve, solenoid
		V	Voltmeter
		VF1	Fuse Voltmeter
		VF2	Fuse Voltmeter
		*	See DC control circuit schematic

P110, P130, P150, P180, 7/51 230V 1ph A.C. Electrical Power Schematic Diagram.



KEY			
CB1	Circuit breaker 32A	S1	Switch, start
CB2	Circuit breaker 16A	SK1	Socket outlet 32A
CB3	Circuit breaker 16A	SK2	Socket outlet 16A
G	Alternator	SK3	Socket outlet 16A
K1	Contactor	SV3	Valve, solenoid
PB	Pushbutton	V	Voltmeter
R	Resistor	VF1	Fuse Voltmeter
		VF2	Fuse Voltmeter
		*	See DC control circuit schematic

**P110, P130, P150, P180, 7/51 400V 3ph + 230V 1ph
A.C. Electrical Power Schematic Diagram.**



	KEY		
		R1	Resistor
CB1	Circuit breaker	S1	Switch, start
	32A	SK1	Socket outlet 16A
CB2	Circuit breaker	SK2	Socket outlet 16A
	10A	SK3	Socket outlet 16A
CB3	Circuit breaker	SV3	Valve, solenoid
	10A	V	Voltmeter
G	Alternator	VF1	Fuse Voltmeter
K1	Contactora	VF2	Fuse Voltmeter
PB	Pushbutton		
R	Resistor	*	See DC control circuit schematic

