

CPS 90 KD

Instruction Manual for Portable Compressors
English

Instruction Manual
for Portable Compressors

CPS 90

Identification (manufacturer plate)

IRMER+ELZE		
WJE	- 01802400	- 00590000
	750	kg
	750	kg
	50	kg
Model	CPS 90	
p max(e). working	Bar	7
Speed	Rpm	3600
P. engine	kW	18.5
Type	80NFR	
S/N WUX590000	Manuf. year	2008
IRMER+ELZE D-32547 BAD OEYNHAUSEN 1092049970		

In any request for further information and/or when ordering spare parts, always mention the following data:

- Compressor type.
- Manufacturing number.
- Delivery date.

In case of a request for technical information, also mention:

- the present conditions of operation.
- the exact location of the machine.
- the name and telephone number of the person in charge of the machine.

You can get the data regarding the compressor from the manufacturer plate on the machine.

Warranty and Liability Limitation

Use only authorized parts.

Any damage or malfunction caused by the use of unauthorized parts is not covered by Warranty or Product Liability.

The manufacturer does not accept any liability for any damage arising for modifications, additions or conversions made without the manufacturer's approval in writing.

While every effort has been made to ensure that the information in this manual is correct, CP does not assume responsibility for possible errors.

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This applies in particular to trademarks, model denominations, part numbers and drawings.

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1 Important advice

1.1 Updating

This user manual is not intended to be updated. We may introduce modifications or improvements at any time, especially regarding technical specifications, data and figures, as the result of new technical developments. Any claim to receive modifications or improvements free of charge, for compressors that have already been delivered, will not be considered.

1.2 Validity of regulations/standards

Laws, regulations, guidelines, standards etc. quoted in this manual, and those on which agreements are to be based, were valid at the time of editing the manual. The latest valid versions have to be considered, however, and it is the user's responsibility to keep track of the updates and to apply them always in their more restrictive (i.e. more demanding) version.

1.3 Copyright

CP retains the copyright for this user manual. All rights are reserved, especially regarding the issue of patents and/or the registration of designs.

1.4 Regarding this User Manual

For clarity's sake, this user manual does not contain all the details regarding all possible manufactured or equipped versions of the compressors. Neither do we cover all foreseeable cases of installation, operation and/or scheduled maintenance.

Should further information be needed or should specific problems arise, for which the information contained in this manual would not be deemed sufficient, please contact **CP** directly.

We would also like to point out that the contents of this manual are not intended as an upgrade or update of any previous agreement, commitment or contract. **CP's** obligations are exclusively those contained in the supply contract, which also includes terms and conditions regarding warranty. These terms and conditions are not extended or limited by any of the information contained in this manual.

The main purpose of this User Manual is safety "for man and machine" (as defined by the European Community Directives on Machinery 98/37/CEE). It is intended for all persons in charge of the compressors and their operation, particularly operators, supervisors and service engineers as well as the customer or user (retaining responsibility for supervision and liability).

- **Before putting the machine into operation, the operator should become familiar with this User Manual and with all the actions that need to be taken in order to operate the compressor safely. Learn the maintenance operations that need to be carried out according to safety and competence requirements.**
- **Your own safety, the quality of your environment and the safe operation of the machine, without any risk to other equipment, can be achieved only through a good knowledge of this Manual and full respect for all recommendations, e. g. accident prevention norms.**

The customer/user must make sure that the machine operators are acquainted with this User Manual before undertaking any kind of intervention on the compressor, and that the safety and accident prevention regulations are fully respected, together with all other guidelines and recommendations!

1.5 Scope of this manual

This User Manual is valid only for the compressors listed on the cover. It contains information on the compressor itself and on all ancillary equipment, insofar as the latter is part of the supplied goods.

Descriptions of any equipment that is not part of the supply are given for information only. They would not give matter to any claim on such equipment (e. g. options).

Any documentation from other suppliers that may be included (e. g. as an enclosure) is provided on the understanding that **CP** are not responsible for its contents, specifications, technical data, etc.

1.6 Scope of application

All accident prevention, environment protection and safety regulations are in accordance with with local regulations.

The customer/user carries full responsibility regarding:

- **Compliance to the laws, regulations, guidelines or standards listed or mentioned in the technical documentation, in order to achieve safe operation and maintenance of the equipment,**
- **Checking their scope and consistency with local or company rules,**
- **Installation and use of safety or add-on equipment as recommended by the responsible (local) Authority**

1.7 Warranty (General terms and conditions)

The scope and the warranty period are given by **CP** in their General terms and conditions, in the paragraph "General sale and supply conditions". The valid edition is the most recent one at the time of delivery.

Any condition not in accordance with the General terms and conditions should be notified in writing by **CP** in their order acceptance.

1.8 Disclaimer

CP does not assume any responsibility in the case of damages occurring for the following reasons:

- **Ignorance of or non compliance with this User Manual.**
- **Use of insufficiently qualified or trained personnel.**
- **Natural wear.**
- **Improper or careless use of the compressor. In particular, failure to perform any operation aimed at insuring installation, start up, operation or servicing according to safety and competence requirements.**
- **Effects of chemical, electrochemical and/or electrical agents.**

For third-party products, the warranty provided by **CP** is limited to transferring the warranty granted to **CP** by the original equipment manufacturer.

2 Safety and environmental protection standards/regulations

The person in charge of safety in the user's organisation must become familiar with this chapter before putting the system into operation for the first time and before undertaking any intervention on the system.

2.1 Laws, regulations and directives

2.1.1 Accident prevention standards

This User Manual does not replace the machine user's instructions. This User Manual has to be completed by the user with regards to existing national regulations concerning accident prevention and environmental protection. National regulations concerning accident prevention and environmental protection have to be observed and indicated by the machine user.

2.1.2 Transportation (Highway code)

During transportation or transfer on public roads, the user must comply with the Regulations and rules for road traffic (including the Highway code).

2.1.3 Water Conservation Laws

As regards handling and use of liquids that can be dangerous and/or harmful to water conservation - e.g. fuel, lubricants, solvents or detergents or other chemical products - the user must comply strictly with Water Conservation Laws.

Leakage of the above substances must be corrected immediately and without taking risks (in compliance with Accident Prevention Standard (1.0), they must be neutralised and disposed of according to the regulations). Never let these used substances (old oils) penetrate the ground or get into the drains.

2.1.4 Dangerous substances (Liquids)

When handling dangerous substances (cf. Law on Chemical Products, particularly Decree on Harmful Substances) e. g. battery acid, it is mandatory to use accident prevention measures and wear protective gear. The user has the obligation to provide information regarding the danger linked to the use of such substances (Decree on Dangerous Characteristics of Chemical Products)!

2.1.5 Protection against Immissions

During the use of the compressor and all operations described in this User Manual, the user must comply with the local laws for protection against immissions and associated decrees, as well as with laws on waste disposal.

2.2 General safety instructions regarding the compressor

This compressor is built according to state-of-the-art techniques in order to ensure safe operation, provided it is used according to its original purpose. However, if the compressor is operated improperly, used for purposes for which it was not intended or by insufficiently qualified or trained personnel, it may present a risk for the safety of personnel or third parties and cause damage to itself or other equipment. Using the compressor properly also means complying with normal technical rules, adopting safety oriented procedures and following the recommendations and advice provided by this User Manual, in the course of:

- transportation, installation, preparation before starting operation
- operation start-up and monitoring
- inspection, servicing and maintenance and
- repair.

For maintenance and repairs, use only qualified service personnel, who should have a good knowledge of accident prevention and safety standards, good knowledge of the machine and this User Manual and who are suitably aware of the potential hazards of the machine on the installation site.

CP will take no responsibility in the case of damages that are due to unsuitable use of the compressor. In this case full responsibility rests with the user.

2.2.1 User's obligations

The user must check the compressor before every start-up, assuming all responsibility in ensuring operation safety and/or traffic safety.

The user must immediately take all measures aimed at preventing risks to personnel and equipment, in compliance with accident prevention standards.

The user is responsible for a safe execution of all work carried out by his/her own service personnel or by third party contractors.

All personnel operating on the machine must receive instructions on the machine and/or the installation site potential risks from the user and operate in a technically safe way and in compliance with the protection measures. When charging his/her personnel with the execution of repairs and other work, the user must define clear responsibilities.

No risk should arise because of unclear responsibilities.

When handling a substance that could be dangerous and/or harmful to water conservation (law on Chemical Products, Law on Water Conservation), all personnel involved must receive the data sheet showing data concerning the use of the substance according to German Standard DIN 52 900¹. The user is responsible for the disposal of waste and all used substances that may be produced during operation and during maintenance jobs, in accordance with the regulations in force.

2.2.2 Personnel's obligations

Any person put in charge of any job described in this User Manual on the compressor installation site or at the workshop, must have read and fully understood the instructions for use, and particularly this chapter "Safety and environmental protection standards".

Once the compressor is operating, it is too late to do so!

Do not attempt any work method that could put the personnel and the machine at risk.

For transportation on public roads comply with the regulations in force (particularly the Highway Code).

Before starting any work with the machine, obtain all information regarding its devices and control means and pass this information to the other persons involved.

Handle fuel, minerals and easily inflammable substances with care and beware of the danger of fire and explosion. Make sure there are sufficient fire-fighting means available and learn the alarm procedures. Make the necessary regulations for first aid.

¹ c.f. EC Conformity Declaration

Before start-up, make sure that the compressor is ready to operate, that all safety devices are installed according to safety standards and are in working order, that the machine cover is closed and that nobody is endangered by operation of the machine.

Never put the machine into operation if the safety devices are only partially effective. Make sure that nobody stops or works close to the machine or has undue access to the controls.

Check the compressor at least once per shift for external damage or defects.

If there are changes in the behaviour or performance of the compressor, immediately inform the appropriate person or office appointed by the user. In case of failure, stop the machine immediately, especially if safety could be put at risk!

Take all measures aimed at preventing any accidental or improper start-up while servicing the machine. Undertake any maintenance or repair job only when the compressor is clearly switched off and has already cooled down. Beware of the very hot surfaces of the machine during operation, or immediately after stopping the machine, if the cover is open.

Always make sure that the safety and accident prevention regulations, the warning signs and the manufacturer's plate are kept easily readable. Never introduce arbitrary modifications on the compressor, or worse still on its safety devices. Comply with environmental conservation regulations when disposing of used substances (namely oil!) and avoid any leakage. Ensure that the compressor installation site is clean and orderly.

Avoid any excess of force during operation, maintenance or repair.

It is forbidden to use excessive force when loosening or tightening screws, etc.; this could damage the equipment and jeopardise machine safety.

2.3 Potential risks - safety during transportation, operation and maintenance

All the following recommendations should be complied with, otherwise personnel could be put at risk and the compressor or other equipment could be damaged.

2.3.1 Transportation and unloading

To unload the machine, move it or assemble heavy parts, it is necessary to use a hoist and/or a crane. Only use suitable, well functioning hoists and lifting tools with the necessary load capacity.

The machine as a whole should only be suspended from its sling hook. Check sling gear for possible damage or wear before usage.

Suspending the machine may only be carried out by experienced personnel.

Never stop or work under hanging loads! Danger of death!

Before any transfer, check the frame and the lights to comply with road traffic regulations:

- Check the pressure of the tyres and their tread; check that all nuts or bolts are well set and if necessary tighten them.
- Check the towing gear and the hitch. The trailer hitch must move freely in the suspension pin. The towing device joints (adjustable in height) must be stretched, fastened and secured using a wrench.
- Check the brakes! Attach the safety chain to the trailer.
- Connect the trailer lighting system; check that all lights are in order.
- Never detach the trailer on the installation site, even if there is little available space. There is a high risk of it tipping and causing injuries.
- Check that screws frame/towbar are fixed tight with specified torque.
- Glue sealed screws should not be retightened or used again.
- Safety chain must be connected to the towing vehicle.

The compressor must be transported in idle state, with no pressure, the cover being closed and the compressed air pipes disconnected.

Before starting, check that the bearing wheel is lifted and secured. The compressor must always be connected horizontally to the draft gear.

With a trailer, never exceed the speed limit. While driving round curves or on a transversal slope, beware of it turning over.

Always make sure that steering and brakes are in perfect order.

2.3.2 Machine installation

Before installing the machine, draw out the bearing wheel and lock it in its extended position.

Always install the compressor horizontally on stable ground; engage the handbrake, if available.

Apply wedges under the wheels.

In the case of sloping ground, secure the compressor against rolling or turning over.

Do not obstruct exits! In a dusty environment, make sure that the machine does not suck up dust because of the wind. Bear in mind that for operation in a dusty environment, maintenance intervals should be made much shorter.

Never install the compressor close to explosive, inflammable or harmful gases or vapours. Engine exhausts produce carbon monoxide (CO) - **a deadly gas**. When operating in a closed room, exhausts should be connected directly to the outside through a duct or flexible pipe of 100 mm minimum diameter.

2.3.3 Machine start-up

Fill up only when the compressor is stopped.

- Do not spill the fuel. Bind up and/or soak up any leakage (Accident prevention standard 1.0). Keep the machine clean, neutralise the leakage, e.g. with water and vinegar (50/50).
- Fuel must not come into contact with the hot parts of the machine. There is danger of ignition.
- Smoking is forbidden while refuelling. Never refuel close to open flames or sparks.

If an electrical pump is used, a static charge may be produced. Connect a ground cable to the compressor to avoid sparking. The nominal diameter of the compressed air piping (DN) must be no less than that of the breathing nozzles and must be chosen according to operating pressure. Never use damaged piping! Use suitable connections, check seals before connection. When connecting, close air intakes.

Connect the piping carefully before blowing air. There is the risk of a "whip stroke" which could cause injuries to personnel.

Never move the compressor while the compressed air piping is connected!

Before connecting the compressed air piping, close air intakes.

Regarding safety measures for auxiliary engines, refer to the enclosed User Manual provided by the manufacturer. Be very careful when handling batteries. Battery acid is very corrosive (it contains sulphuric acid) and during battery charging, it produces an explosive gas mixture.

For industrial accident prevention, comply with the relevant standards and in any case wear protective glasses and gloves.

The use of naked flames is forbidden and so is smoking!

To connect the battery, follow this sequence:

- First connect the positive pole.
- Then connect the negative pole (earth).

Always comply with the regulations regarding the disposal of old batteries!

2.3.4 Control and operation of the compressor

The compressor is controlled exclusively through the control panel located under the door while the machine upper cover (hood) remains closed. During operation, the door must not be closed, to allow permanent access to the control panel.

Before putting the compressor into operation - particularly after servicing and repair - remove all tools, cleaning cloths, ancillary equipment or parts. Any foreign body getting accidentally into the machine can generate damage or induce malfunctioning! The compressor must be put into operation only once the protective cover (hood) is closed!

Non compliance with this rule will induce machine overheating and produce an unbearable noise level, besides putting the safety of personnel at risk!

Operating characteristics - such as pressure, speed and temperature - must always keep close to nominal values given in the Technical Specifications Table!

Tools (such as compressed air tools) connected to the compressor must have compatible specifications, particularly regarding operating pressure, which can be adjusted every time and air quality, which must be within tolerance range. During compressor operation, the operator must wear protective gear (particularly ear protection gear).

Noise, even at reasonable levels, can cause irritation and disturbance which, over a long period of time, may cause severe injuries to the nervous system of human beings.

When the sound pressure level, at any point where personnel normally has to attend, is:

below 70 dB(A):	no action needs to be taken,
above 70 dB(A):	noise-protective devices should be provided for people continuously being present in the room,
below 85 dB(A):	no action needs to be taken for occasional visitors staying a limited time only,
above 85 dB(A):	room to be classified as a noise-hazardous area and an obvious warning shall be placed permanently at each entrance to alert people entering the room, for even relatively short times, about the need to wear ear protectors,
above 95 dB(A):	the warning(s) at the entrance(s) shall be completed with the recommendation that also occasional visitors shall wear ear protectors,
above 105 dB(A):	special ear protectors that are adequate for this noise level and the spectral composition of the noise shall be provided and a special warning to that effect shall be placed at each entrance.

Never direct the air flow towards a person and never use it to clean clothes. Be careful when opening the air inlets! Always wear protective glasses while cleaning equipment! **Never breathe compressed air from the compressor!** In the case of compressor malfunction or abnormal noises, irregular motion and/or oscillations or vibrations, operating characteristics different from nominal specifications, stop the machine immediately and take all suitable safety measures! Never put the machine back into operation before finding the cause of the malfunction and correcting it.

2.3.5 Maintenance

Before starting any maintenance job, the compressor must be stopped, secured against any possibility of rolling or tilting and emptied completely. Total absence of residual pressure must be checked! Remove the battery connection to the ground to make it impossible to restart the machine accidentally! Wait until all machine parts, including the engine, have sufficiently cooled off. **Advice:** change oil while the machine is still warm after a normal working cycle, complying with safety standards and using all personal protection gear, as recommended.

To clean the inside of the machine, only blow compressed air; also refer to the Engine User Manual.

Keep all heat-transmitting surfaces (such as cooling fins, etc.) clean to prevent the machine from over-heating. Keep the machine clean with the utmost care during maintenance and repair operations. Cover or seal the removed parts as well as the openings left on the machine! Open oil fillers only immediately before filling. Dirt can induce malfunctions or damage. As used washing water and loose dirt are usually contaminated with service fluids (fuel, oil), collect washing water and residues and dispose of according to local laws. If required, convey them into an oil and petrol separator. Never let used washing water penetrate the ground or get into the drains.

While collecting hot lubricants (after operation), beware of scalding! Wear protective gear.

Never heat oil over 160° C and avoid oil leakage onto hot parts of the machine; should this happen, clean immediately. Oil and its vapours may ignite spontaneously. Collect used lubricants (used oil) only into suitable containers and dispose of them according to regulations!

Bind up any oil leaks immediately or at least never let it fall onto the ground or into the drains (Accident Prevention Standard 1.0).

Never mix different kinds of oil, in particular synthetic and mineral oils, oils with a different degree of viscosity or even oils from different suppliers.

Always discharge oil completely when changing it.

Always store lubricant tins appropriately. Never let synthetic, mineral oils or grease, detergent solutions or other chemical products drip onto non metallic parts (made of rubber or synthetic substances), e.g. hydraulic pipes, connection boxes, switches, seals, noise insulating material etc. Never tamper with compressor and engine noise insulators.

Noise insulators (foam-rubber, insulating felt and cover seals) must always be kept clean and replaced if damaged. If there is a failure on the electric circuit, stop the compressor immediately. Restart it only after a specialist has corrected the problem.

If there is a safety device failure, replace the device with an original spare part only, with the proper voltage rating. You will find safety recommendations regarding the frame, the wheels and the brakes in the manufacturers' instructions for use. Check tyre pressure and wheel bolts regularly, especially after a long stay at the installation site. Tyre changing must be carried out only by specialised personnel using suitable tools.

Adjustment, maintenance and repairs to the brakes must be carried out only by specialised personnel or authorised workshops.

2.3.6 Repairs

Never tamper with the adjustment and safety devices during maintenance operations or repairs!

Repairs on the compressor must be carried out exclusively by personnel who are specially trained by **CP**.

Worn or damaged components, following safety intervention during operation, must be replaced immediately.

Spare parts, pieces of equipment and accessories not certified and approved by **CP** could jeopardise the active and passive safety of the machine.

Always use original spare parts!

For maintenance, removal and assembly, use only tools in perfect order - never use wrenches with blunt corners, chipped screwdrivers, hammers and chisels with broken tips. Use the tools according to usual rules, keeping in mind safety and accident prevention matters! To access high-positioned parts, use lifting means or scaffoldings that are clean and rust-free. Never climb onto the machine - especially never use the air inlets as climbing aids!

If jobs must be undertaken under the machine to replace tyres etc., the axle should be suitably shored and the machine should be secured to prevent it from colliding or tilting. Never leave the machine unguarded on the lifter. Loose screw couplings must be tightened immediately up to the recommended tightening torque using the standard tool (dynamometric wrench). Damaged screws and nuts, as well as components with worn threads, must be immediately replaced.

Pay attention to the strength rating of the screws!

Any screw assembly must include a screw retainer which should be reassembled after maintenance intervention.

Should a retainer be missing, this could induce operating problems and jeopardise the safety of machine operation.

Safety spring or resilient components (locking washers, spring washers, split pins, etc.) must not be reused after loosening the coupling. Always use new parts.

Never replace hexagonal self-locking nuts (complying with DIN 985) with standard nuts.

Never perform any welding operation on pressurised tanks.

During all welding jobs, keep the fire extinguishers at hand; comply with the fire prevention rules.

When performing a welding job or any other activity which may generate high temperatures or create sparks, adjacent parts should be protected by heat-shields made of fire-resistant insulating material.

Should you have to undertake a welding operation close to fuel or oil circuits, these must be emptied and freed from inflammable vapours, e. g. by injecting an inert gas.

For welding jobs in the yard or in closed rooms, abide by the relevant company rules. Obtain authorisation from the security guards.

2.3.7 Tool applications safety

Apply the proper tool for each job. With the knowledge of correct tool use and knowing the limitations of tools, along with some common sense, many accidents can be prevented.

Special service tools are available for specific jobs and should be used when recommended. The use of these tools will save time and prevent damage to parts.

1. Use only spanners or sockets whose opening fits the fastener.
2. Apply an open-end spanner only in the plane of the fastener head, square to the thread axis. Never cock an open-end spanner.
3. Do not use a pipe or other improvised leverage extensions on handles.
4. Do not hammer on spanners or other tools which are not specially designed therefore.
5. Do not use adjustable spanners to tighten or slacken fasteners; they are intended to hold the other end of the fastener.
6. Always support the ratchet head when using socket extensions.
7. Discard any spanner with broken or battered points or edges.
8. Never use hand type sockets on power or impact tools
9. Select only heavy-duty impact sockets for use with pneumatic or electric impact tools.
10. Replace sockets showing cracks or wear; keep sockets clean.
11. Never use screwdrivers for prying, punching, chiselling, scoring or scraping.
12. Use the correct type and size of screwdriver for the job. The bit must match the fastener.
13. A screwdriver with rounded edges will slip; it needs to be redressed or discarded.
14. Never use a screwdriver or any other tool near a live wire or electrical component. Plastic covering of handles is for comfort and grip only. They are not intended to act as insulation if such is not clearly marked by the manufacturer.
15. Never strike a hammer against a hardened object; use a soft drift against the object and strike against the drift.
16. Strike the object with the full face of the hammer.
17. Never use a hammer with a loose head.
18. Discard a hammer with chipped or mushroomed face.
19. Never use a chisel or punch with a chipped or mushroomed striking face.
20. Always pull on a spanner or socket handle, if possible, and adjust your stance to prevent a fall if something lets go.
21. Wear approved eye protection when using percussion tools or when scraping, chipping, shaving or grinding
22. Wear protective gloves when holding a chisel or punch.

2.4 Compressor safety devices

The compressor is shut off by turning the control panel ON/OFF switch (pos. 51, [Figure 2](#)) to the position 0=OFF. When doing this, make sure the air inlets are open (if a tool lubricator is used, oily vapours will always be produced).

A thermo switch protects the compressor from over-heating.

When the temperature exceeds the limit, the thermo switch stops the fuel supply, thus halting the machine.

The safety valve (pos. 19, [Figure 1](#)) protects the compressor by preventing the pressure from exceeding the maximum acceptable value.

The motor is protected from insufficient oil pressure, from too high oil temperature and from generator failures. In case of a fault, a safety switch will immediately stop the machine.

The protection device (upper cover), aimed at protecting against any contact with the machine's rotating parts, must always be kept closed during operation to avoid excess of noise and to allow a proper cooling of the machine.

The devices aimed at avoiding contact with rotating parts (e. g. the compressor engine, the fans, etc.) must never be removed and must be fastened accurately before the machine is put into operation for the first time.

The warning signs (placed on the compressor) must never be removed and must always be kept clean and easy to read. The same applies to the machine manufacturer plate.

2.5 Waste handling and disposal

During maintenance and repair operations, the following waste can be produced and then disposed of under the personal responsibility of the user:

- Fuel residues.
- Used substances, like lubricating oils and greases.
- Auxiliary substances, e.g. detergents and washing water.
- Expendable material: e.g. filter spares, cleaning cloths, etc.
- Other waste of any kind, including pieces from the machine itself.

When changing the battery, comply with the regulations in force. Dispose of the old battery safely; avoid acid leakage!

Any leakage or spilling of fuel, oil, solvent, detergent or other chemical substances must be suppressed immediately without taking risks (Accident prevention standard 1.0). Dangerous substances must be neutralised as prescribed, i.e. agglomerated and/or sucked up.

Substances which could be harmful or dangerous for water conservation (used oils) as well as contaminating solid waste (e.g. filter spares) must be collected in closed containers, certified for this purpose. Their disposal should be organised on a regular base while they should be stored safely in between.

Expendable material should never be disposed of in the ground or in the drains!

Disposal should be carried out according to local or regional laws for protection against immissions, laws for water conservation as well as laws on waste disposal. Furthermore, comply with company regulations!

3 Conditions of use and technical specifications

3.1 Use limitations - Allowed operating conditions

The compressor must operate in compliance with the technical specifications included in this User Manual, or with those stipulated when ordering, always according to its intended purpose.

Operation of the compressor can induce malfunctions or risks to personnel or other equipment in case of:

- Skipping recommended maintenance or repair operations or non compliance with the recommended timing
- Use of unsuitable expendable materials (fuel, oil, lubricant, etc ...) or insufficient supply of the same
- Use of unsuitable or defective spare parts or materials subject to wear. **Recommendation: Always use original spare parts.**

During operation, the cover must always be kept closed to ensure a correct cooling of the machine.

Technical specifications must not be exceeded but must be complied with (see [3.2](#) Technical Specifications Overview).

The compressor must use only air having a sufficient degree of purity, according to operating conditions.

The air must not contain explosive, flammable, harmful or corrosive gases or vapours.

Avoid absolutely air containing dust or solid particles. Using dirty air always means shorter maintenance intervals; these are heavily dependent on operating conditions.

Make sure that the floor on the installation site has a sufficient bearing capacity.

Never exceed speed limits during transportation. Always comply with local regulations (highway code, etc...).

The compressor is built with common materials and is protected against corrosion and made insensitive to environment conditions from the factory.

Technical characteristics, drawings and figures given in this user's manual are not binding and may not give origin to any claim. We keep the right to introduce modifications without any obligation to update this manual.

3.2 Technical Specifications Overview

Model		CPS 90
Flow rate according to standard ISO 1217 at nominal speed and pressure	m ³ /min	2.5
Adjustable pressure range	bar	4-7
Rated operating pressure	bar	7.0
Air intake cocks		2x G3/4
Allowed noise level according to L _{wa} (EC)	db(A)	98 / 100
Length with raised towbar	mm	2729
Length with extended towbar	mm	2953
Width	mm	1310
Height	mm	1205
(Data with DIN-trailer coupling ring)		
Fuel tank capacity	l	32
Weight including fuel and oil	kg	580
Overall operating weight	kg	679
Diesel engine		
Kubota, water-cooled	Type	D1105
Power at nominal speed	kW (hp)	19.4
Nominal speed	rpm	3000/2400
Operating speed range	rpm	with continuous regulation
Air filter		dry air filter incl. precleaning
Oil capacity	l	5.1
Liquid coolant	l	4.5
other data		See engine user's manual
Battery		
Voltage	V	12
Capacity	Ah	45
Compressor		
Air filter		dry air filter incl. precleaning
Oil capacity	l	5.5
Single-axle carriage (compliant with road traffic regulations)		
Suspension		rubber
Maximum speed	km/h	140 / 20 (Comply with national regulations)
Brakes		
Tyres		155R13 79T
Tyre pressure	bar	3.0/3.2
Track	mm	1116
Use limitations		
Ambient temperatures	°C	-10/+45
Fuel consumption		
Full load 100 %	kg/h	4.74
No load running	kg/h	2.04

3.2.1 Available options

The compressors can be delivered with following options:

Chassis:	Vertically adjustable Section frame (stationary)
Towing eyes:	DIN (40 mm) [1.57 in] Passenger car (Ball 50 mm) [1.95 in] France (68 mm) [2.65 in] Italy (45 mm) [1.75 in] Nato (76 mm) [2.96 in]
Road lights system:	Full road signalisation 24 V Adapter
Air quality equipment:	Tool lubricator
Tool box:	Single
Air take off:	Hose reel
Safety:	Safety cartridge Non return valve Additional literature set
Cold start:	Cold start - 20 °C ¹⁾
Canopy colour:	single

¹⁾ Thermostatic by-pass valve, 10W40 engine oil, GENOIL S and battery with higher capacity.
Note: Options are available depending on the country. Please contact with the local CP dealer.

3.3 Torque values

3.3.1 For general applications

The following tables list the recommended torques applied for general applications at assembly of the compressor.

For hexagon screws and nut with strength grade 8.8

Thread size	M6	M8	M10	M12	M14	M16
Nm	9	23	46	80	125	205

For hexagon screws and nut with strength grade 12.9

Thread size	M6	M8	M10	M12	M14	M16
Nm	15	39	78	135	210	345

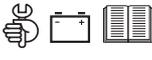
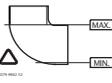
3.3.2 For important assemblies

Assemblies	Unit	Torque value		
Wheel nuts	Nm	90	+16/-0	
Bolts, axle/frame	Nm	73	+/-16	glue locked
Bolts, towbar/axle	Nm	73	+/-16	
Bolts, towbar/A-frame	Nm	73	+/-16	
Bolts, towing eye/towbar	Nm	80	+/-10	
Bolts, lifting eye	Nm	80	+/-10	
Bolts, engine/drive housing (M12)	Nm	80	+/-10	
Bolts, engine/drive housing (M14)	Nm	125	+/-10	
Bolts, compressor element/drive housing	Nm	80	+/-5	
Bolt, fan adapter	Nm	205	+/-10	glue locked
Safety switches	Nm	35	+/-5	

Note:

Secure the tankcap and drain cock of the fuel tank handtight.

3.4 Markings and information labels

	Compressor outlet temperature too high.
	Compressor outlet temperature.
	Compressor outlet pressure.
	Dangerous outlet.
	Danger, heat flat.
	Electrocution hazard.
	Engine oil.
	Engine oil. Use at temperatures under -10 °C
	Manual.
	Read the instruction manual before working on the battery.
	On / off button.
	Hours, time.
	Prohibition to open air valves without connected hoses.
	Compressor loaded.
	Runlamp.
	Airfilter.
	Compressor temperature too high.
	Compressor oil level.
	Rotation direction.

	Inlet.
	Outlet.
	Compressor oil drain.
	Read the instruction manual before starting.
	Service every 24 hours.
	Warning! Part under pressure.
	Do not stand on outlet valves.
	Start-Stop indication of switch.
	Do not run the motor with open doors.
	Lifting permitted.
	Service.
	Engine coolant.
	Use diesel fuel only.
3 bar / 43 psi	Tyre pressure.
	Sound power level in accordance with Directive 2000/14/EC (expressed in dB (A)).
	Horizontal towbar position required in case of coupling.

4 Operation description

4.1 Use of the compressor according to its intended purpose

The compressor, a transportable apparatus, is to be used for producing industrial compressed air. It compresses air with a normal degree of purity (atmospheric air) up to operating pressure, according to order stipulations, with the given flow rate.

As regards technical specifications, reference should be made to the data on the order (see also Technical Specifications Overview).

The statement regarding intended use defines this use in accordance with the intended purpose of the compressor.

Use of any other kind, the use of fluids other than atmospheric air (excepting inert gasses), use for non industrial purposes or conditions different from the functional specifications (pressure range, speed, temperature, etc...), as defined in the order, must be considered as inappropriate.

4.2 Design characteristics of the helical compressor

The transportable compressor system includes a helical one-stage compressor, cooled through oil spraying.

The heart of the helical compressor includes a pair of rotors, with a special profile ensuring a good yield and therefore an optimal cost-performance ratio. Its large fuel tank allows continuous availability of compressed air with limited downtime for refuelling.

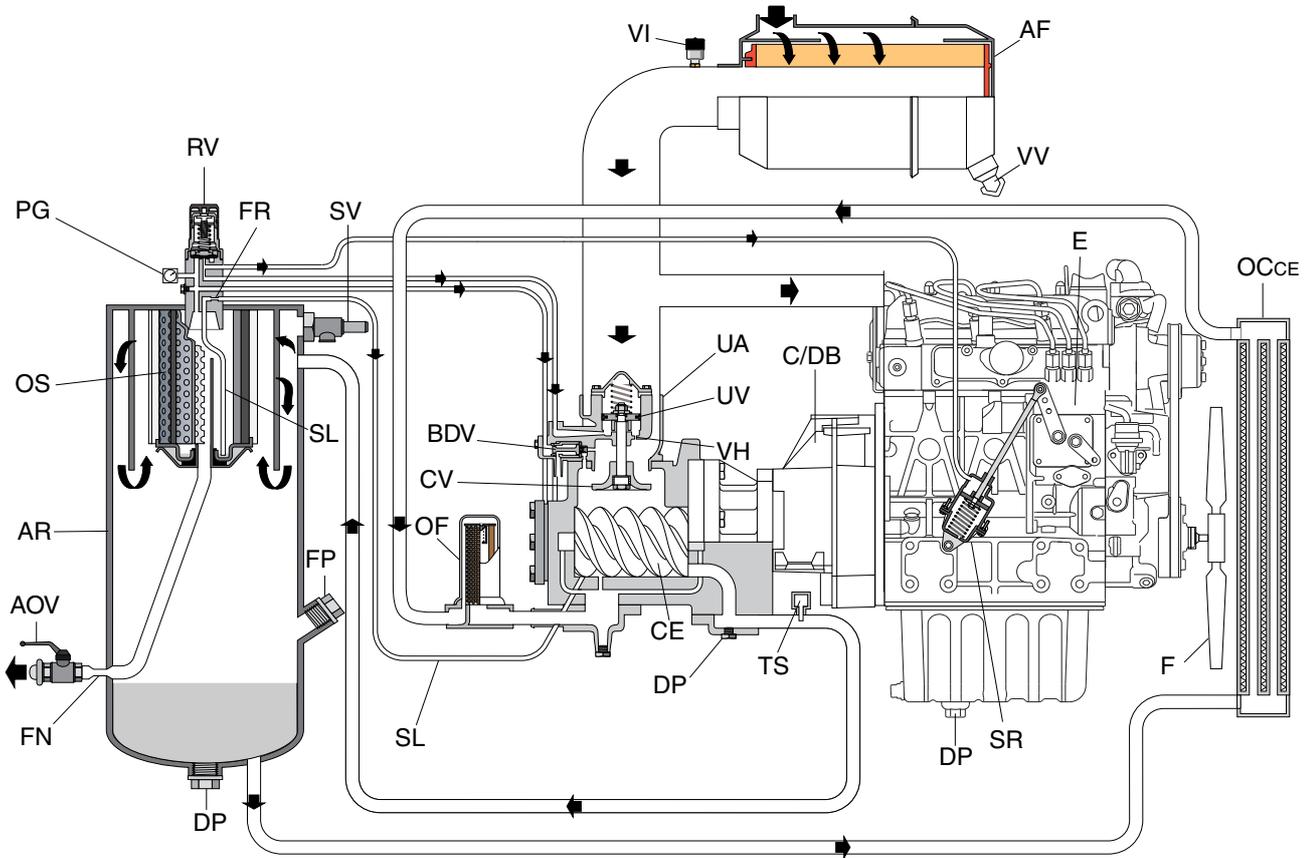
It is driven by a diesel engine, through a direct transmission by means of a toothed belt.

4.2.1 Operation

From the compressor air intakes, air is sucked in through the dry air filter and supplied to the rotor toothed cavities. Air intake takes place because the toothed cavities, connected to the air inlet, grow progressively during rotor rotation, until they are completely open. Filled cavities are then closed during rotation by separator walls mounted on the body towards the air intake. After a short displacement phase, compression starts in the lower side.

Through coupling of the main rotor teeth into the secondary rotor cavities, V shaped chambers are formed, which shrink continuously during rotation towards the delivery side. In this way, the air trapped in the system is compressed until the toothed cavities reach the delivery side. Toothed cavities keep shrinking until reaching zero volume on the front side, so that the compressed air is completely delivered. This cycle is performed four times for each main rotor turn thus ensuring that compressed air is delivered evenly.

Figure 1
Compressor monitoring system



AF	Air Filter	DP	Drain Plug	OF	Oil Filter	TS	Temperature Switch
AR	Air Receiver	E	Engine	OS	Oil Separator	UA	Discharger
AOV	Air Outlet Valves	F	Fan	PG	Pressure Gauge	UV	Relief valve
BDV	Blow Down Valve	FN	Flow Nozzle	RV	Regulating Valve	VH	Vent Hole
C	Coupling	FP	Filler Plug	SL	Return pipe	VI	Vacuum Indicator
CE	Compressor Element	FR	Flow Restrictor	SR	Speed Regulator	VV	Dust Valve
CV	Check Valve	OC _{CE}	Oil Cooler (compressor element)	SV	Safety Valve		
DB	Drive Belt						

4.3 Instruction Manual

4.3.1 Air flow (see Figure 1)

The system comprises:

AF	Air filter
AR/OS	Air receiver/oil separator
CE	Compressor element
UA/UV	Unloader assembly with unloader valve
BDV	Blow-down valve
FN	Flow nozzle

Air drawn through the airfilter (AF) into the compressor element (CE) is compressed and cooled by oil, injected during the compressor stage. At the element outlet, compressed air and oil pass into the air receiver/oil separator (AR/OS).

The check valve (CV) prevents blow-back of compressed air when the compressor is stopped. In the air receiver/oil separator (AR/OS), most of the oil is removed from the air/oil mixture; the remaining oil is removed by the separator element.

The oil collects in the receiver and on the bottom of the separator element.

The air leaves the receiver via a flow nozzle (FN) which prevents the receiver pressure from dropping below the minimum working pressure, even when the air outlet valves are open. This ensures adequate oil injection and prevents oil consumption.

A temperature switch (TS) and a working pressure gauge (PG) are comprised in the system.

A blow-down valve (BDV) is fitted in the unloader assembly to automatically depressurise the air receiver (AR) when the compressor is stopped.

4.3.2 Oil system (see Figure 1)

The system comprises:

AR/OS	Air receiver/oil separator
OC _{CE}	Oil cooler
OF	Oil filter

The lower part of the air receiver (AR) serves as oil tank.

Air pressure forces the oil from the air receiver/oil separator (AR/OS) through the oil cooler (OC_{CE}) and oil filter (OF) to the compressor element (CE).

The compressor element has an oil gallery in the bottom of its casing. The oil for rotor lubrication, cooling and sealing is injected through holes in the gallery.

Lubrication of the bearings is ensured by oil injected into the bearing housings.

The injected oil, mixed with the compressed air, leaves the compressor element and re-enters the air receiver, where it is separated from the air. The oil that collects in the bottom of the oil separator element is returned to the system through a scavenging line (SL), which is provided with a flow restrictor (FR).

The oil filter by-pass valve opens when the pressure drop over the filter is above normal because of a clogged filter. The oil then bypasses the filter without being filtered. For this reason, the oil filter must be replaced at regular intervals.

When cold start equipment is installed; a thermostatic valve will bypass the compressor oil (oil will not pass through oil cooler OC_{CE}), until the working temperature is reached.

4.3.3 Continuous regulating system

The system comprises:

RV	Regulating valve
UA	Unloader assembly
SR	Speed regulator

The compressor is provided with a continuous regulating system. This system is provided with a blow-down valve which is integrated in the unloader assembly (UA). The valve is closed during operation by outlet pressure of the compressor element and opens by air receiver pressure when the compressor is stopped.

When the air consumption increases, the air receiver pressure will decrease and vice versa. This receiver pressure variation is sensed by the regulating valve which, by means of control air to the unloader, matches the air output to the air consumption. The air receiver pressure is maintained between the pre-selected working pressure and the corresponding unloading pressure.

When starting the compressor, the unloader valve (UV) is kept open by spring force, the engine runs at maximum speed. The compressor element (CE) takes in air and pressure builds up in the receiver (AR).

The air output is controlled from maximum output (100%) to no output (0%) by:

1. Speed control of the engine between maximum load speed and unloading speed (the output of a screw compressor is proportional to the rotating speed).
2. Air inlet throttling.

If the air consumption is equal to or exceeds the maximum air output, the engine speed is held at maximum load speed and the unloading valve is fully open.

If the air consumption is less than the maximum air output, the regulating valve supplies control air to unloader valve (UV) to reduce the air output and holds air receiver pressure between the normal working pressure and the corresponding unloading pressure of approx. 1.5 bar above the normal working pressure.

When the air consumption is resumed, the unloader valve (UV) gradually opens the air intake and the speed regulator (SR) increases the engine speed.

The construction of the regulating valve (RV) is such that any increase (decrease) of the air receiver pressure above the pre-set valve opening pressure results in a proportional increase (decrease) of the control pressure to the unloading valve and the speed regulator.

Part of the control air is vented to the atmosphere, and any condensate discharged, through the vent holes (VH).

Interconnected operation with several compressors is only possible when a check-valve is installed (optional).

4.3.4 Automatic operation control

In case of operation failure, an electrical safety circuit automatically disconnects the compressor. The motor stops due to fuel supply interruption and the starter red warning light 61 (Figure 2) lights up.

Both events occur when:

- the generator stops supplying current
- motor oil temperature exceeds the limit
- motor oil pressure is too low. **Important: Check oil level every day, top up if necessary,**
- fuse 62 (Figure 2) has blown
- a cable got loose or broke.

Safety thermo switch is part of the circuit, if temperature gets over the limit, it performs both previous functions and turns on compressor temperature red warning light 57 (Figure 2).

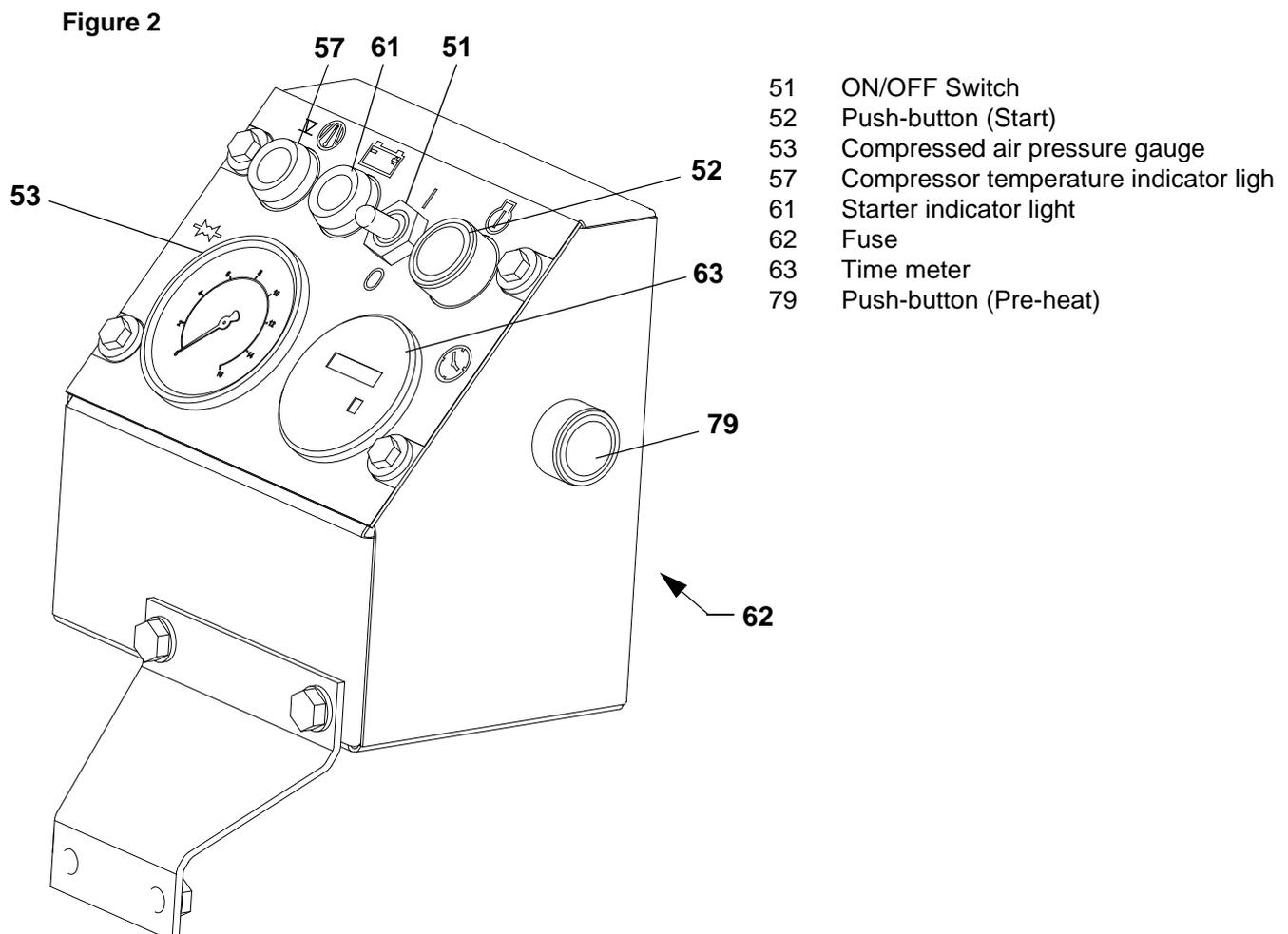
Before putting the system back into operation, you must:

- find the cause of the failure
- repair the failure
- check that temperature is now below the maximum limit
- check that the electrical circuit is restored.

4.3.5 System restoration

Such failure can be repaired only by qualified personnel, familiar with this User Manual. System restoration can be achieved as follows:

Disconnect terminal - (minus) from the battery and reconnect it. Compressor temperature warning light 57 (Figure 2) must not light on any more.

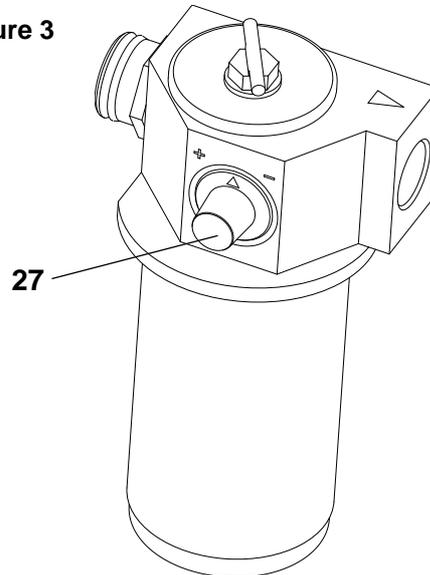


4.3.6 Tool lubricator for pneumatic tools

Compressors including a tool lubricator have the advantage to provide a centralised oil supply to all tools connected to the system. Oil consumption may be adjusted by means of the metering screw 27 (Figure 3). The oil tank is built in the system. Capacity: approx. 2.4 lt.

To prevent corrosion due to condensate collecting, the oil storage container must always be filled with oil.

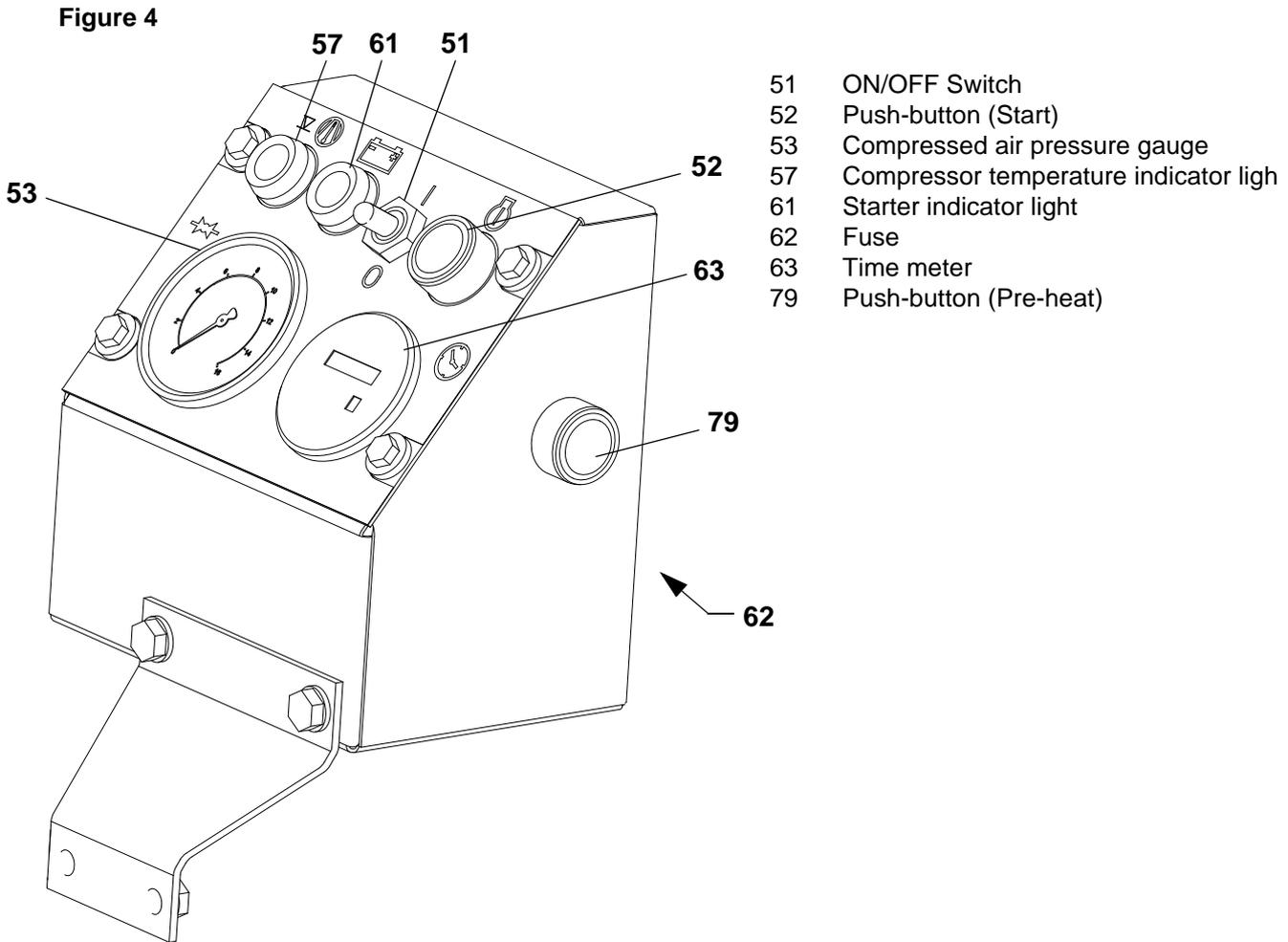
Figure 3



5 Operating instructions

5.1 General preliminary instructions

- During operation, the system must be kept level and far from heat and dust sources.
- The system must not operate in a working environment!
- The system must be installed in order to avoid sucking in dangerous substances or mixtures.
- **Warning!** The upper cover must be in place during operation.
- Check the oil level in the tank by unscrewing the tap and using the dipstick: Do not screw filler cap back on but place on filler opening and lift back off. Avoid exceeding the maximum level, if possible.
Warning: checking the level is meaningful only if the system has cooled down!
- Check the engine oil level (please refer to the Engine User's Guide).
- Check the fuel level. **The fuel tank must never be empty!**
- Open an air delivery cock slightly.
- For start-up operations, please refer to [5.2](#)



5.2 Instructions for starting up the compressor

- Open slightly an air delivery cock.
- Set on/off switch 51 (Figure 4) to "I", whereby the temperature compressor indicator lamp 57 (Figure 4) must light up.
- At low ambient temperatures, for approx. 10 seconds, press heater switch 79 (Figure 4).
- Press the push button 52 (Figure 4); the starter bars the motor. As soon as the motor ignites, release the push button; the temperature compressor indicator lamp must be off.
- When the engine is running, the pressure in the tank increases up to about 4 bar. This pressure will be reached when the engine warms up.
- If the delivery cocks are closed, the pressure keeps increasing, until reaching the operating pressure, set by the proportional regulator. It is now possible to connect the compressed air tools and start the operation.

5.3 Instructions for stopping the compressor

- Close the air delivery cocks.
- Place switch 51 (Figure 4) on "0".

6 Maintenance

Maintenance operations must always be carried out while the system is idle and after pressure is discharged.

Use of SERVICE PACKS:

SERVICE PACKS contain all the original spare parts needed for the regular maintenance on the compressor and engine.

They are specially matched to the maintenance intervals of your **CP** compressor plants and contain under one single part number all the wear parts required for each inspection.

You will find the part numbers in the maintenance schedule applicable to your compressor plant.

Order the SERVICE PACKS from your local **CP** dealer.

Refer to the maintenance plan in Chapter [6.1](#) for the parts numbers of the service packs.

6.1 Maintenance schedule

	Daily	Initially	Every 6 months	Yearly
Maintenance intervals:		50 hours after initial start-up	or every 250 hours	or every 500 hours
Service-Pack			1625 0010 41	1625 0010 42
Service-Kit Oil separator (8) 1625 0010 56				
I) Compressor				
Compressor oil level, if nec., replenish oil	●			
Test safety valve			●	
Air intake vacuum indicator	●			
Air filter elements (1)				■
Empty Air cleaner-Dust valve	●			
Cooler package (1)			▲	
Compressor oil				■
Compressor oil filter				■
Change oil separator element (7)	Exchange after 1000 operation hours or after max. 2 years			
Leaks in air/oil/fuel/coolant system		●	●	
Electrolyte conditions and Battery clamps		●	●	
Torque data wheel nuts		●	●	
Tyre pressure		●	●	
II) Motor				
Fuel tank, fill up every day	●			
Engine oil level, if nec. top up with oil	●			
Check fuel leakage oil line (2)				●
Activate water drain of the fuel filter	●			
Engine for leaks (Visual control)		●	●	
Engine bearings, if nec. retighten		●		●
Supervise cooling agent (4)				●
Engine oil (2) (3)		■	■	■
Engine oil filter (2)		■	■	■
Fuel-filter (6)			■	■
Fuelprefilter			■	■
V-belts (if nec. retighten or change)			■ (○)	
Fuel tank (6)			▲	
Motor min. and max. Numbers of revolutions		●	●	
Valve clearance (5)	Check after 800 operation hours			
III) Options				
Tool lubricator: Oil level (if nec. oil refill)	●		▲	

(1) More frequently when operating in dusty environment.

(2) Refer to the motor operation manual.

(3) Only valid when using SAE 15W40.

(4) Coolant for dirt means and freezing point examine.
Replace coolant at least after 5 years

(5) Check of valve clearance using following part numbers that can be ordered from CP:

2914 8668 00: rocker cover gasket CPS 90 with D1105 engine

(6) In case of poor fuel quality, change or clean more regular.

(7) If pressure drop exceeds 0.8 bar, replace earlier.

For interventions on the engine on running hours above 800 h we refer to the engine operation manual.

Preservation stage: check = ● adjust = ○ clean = ▲ exchange = ■

Maintenance operations must always be carried out while the system is idle and after pressure is discharged.

For engine and chassis maintenance, refer to relevant operating manual!

6.2 Engine and compressor dry air filters

Please refer to the appropriate User's Guide.

6.3 Compressor oil change

For new machinery the first oil change should take place after 50 hours of operation. After this, oil changes should be carried out every 1000 hours of operation, but in any case at least once a year. To drain the oil, open the caps on the radiator and the pressurised tank. This must be done whilst the machine is still warm. Please only use the genuine compressor oil GENOIL. After filling with new oil up to the maximum level, perform a brief test run (for about 1 minute). Then stop the compressor, and after 15 minutes, top up to the maximum level once more. Final level check should be made once oil has cooled off.

6.4 Compressor oil filter change

Servicing includes oil filter replacement - element 15 (Figure 1). The filter must be replaced about every 500 operation hours. No maintenance is required in between.

6.5 Final oil separator

The fine oil separator 12 (Figure 1) must be replaced when oil separation is no more satisfactory, i. e. when the compressed air is saturated with oil. Before replacing the oil separator, check the following:

- the flow indicator must be working properly
- metering on the built-in tool oiler must not be too high

According to experience, the oil separator must be replaced every 1000 hours of operation.

6.6 Oil radiator

The oil radiator 14 (Figure 1) may get very dirty if operating in a dusty environment. It is therefore necessary to clean the air intake slots regularly with compressed air. In case of heavy clogging, it is necessary to wash up the slots and then dry them up with compressed air.

6.7 Fuel tank

Fill the fuel tank only up to 3/4 of its capacity. In this way, there is not risk of fuel spilling from the tank, which is otherwise possible because of heating and fuel expansion or when the ground is not level.

6.8 Safety valve

Safety valve 19 (Figure 1) in the pressure tank avoids exceeding maximum pressure. Normally, no servicing is needed; however, from time to time, vent it manually during operation.

7 Faults

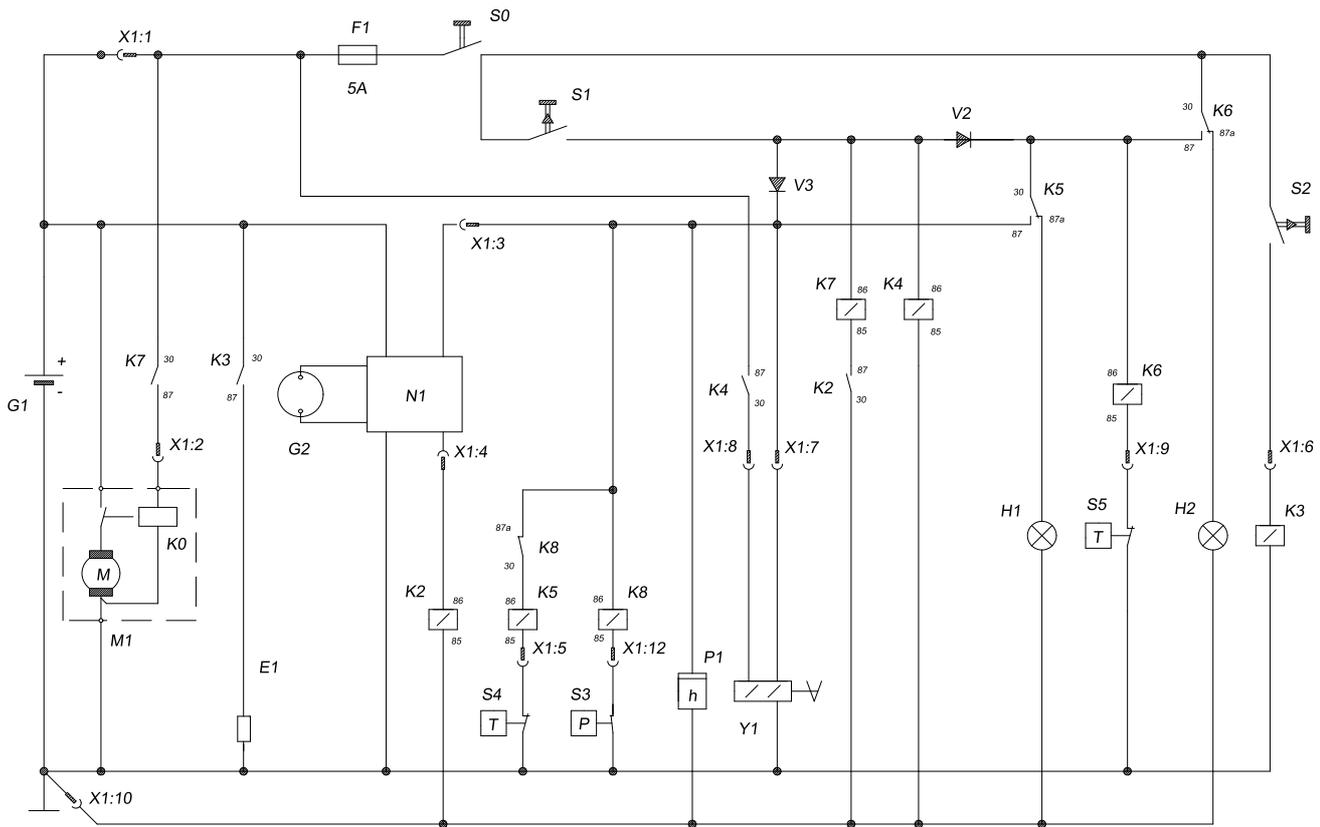
7.1 Troubleshooting and remedying faults

Fault	Possible cause	Remedy
1. Control lamp temp.- compressor does not come on when main switch turned to "1", engine cannot be started.	a. Discharged or defective battery.	a. Check electrolyte level and charge battery, if nec. replace.
	b. Loose battery connection or oxidised terminals.	b. Check and repair.
	c. Loose connection or damaged wiring.	c. Check wiring and connections, if nec. repair.
	d. Main switch defective.	d. Turn main switch to "1". There must now be voltage between each of the terminals and mass. If not, replace main switch.
2. Starter does not turn engine over when the starting knob is pressed.	a. Low battery power.	a. See remedy 1 a.
	b. Starting knob defective.	b. Turn main switch to "1", keep starting knob depressed. There must now be voltage between each of the terminals and mass. If not, replace starting knob.
	c. Starter starting relay defective.	c. Replace relay board.
	d. Starter solenoid or starter defective.	d. Check starter solenoid. Have starter repaired.
3. Starter turns engine over when the starting knob is pressed but the engine does not start.	a. Fuel solenoid valve defective.	a. Check mechanical and electric components of valve, if nec. repair or replace.
	b. Low battery charge.	b. see 1 a.
4. Engine starts up but cuts out again immediately after the starting knob is released.	a. Starting knob released too quickly.	a. Only release starting knob when the engine is running properly.
	b. Engine oil pressure too low.	b. Stop immediately, study engine operating manual.
	c. Not enough fuel in the tank.	c. Top up fuel.
	d. Engine oil pressure switch or engine temperature switch defective.	d. Remove switches and check, if nec. replace.
5. Duty hour counter does not run.	a. Hour counter defective.	a. Replace.
6. Compressor is not regulated, engine runs at max. revs, safety valve blows out.	a. Proportional controller defective or clogged.	a. Clean or replace.
	b. Safety valve opened too quickly.	b. Replace safety valve.

Fault		Possible cause		Remedy
7. Capacity or pressure of the compressor below normal value.	a.	Air consumption exceeds capacity of the compressor.	a.	Check consumption point downstream of the compressor.
	b.	Compressor air filter clogged.	b.	Replace.
	c.	Engine does not run at max. speed.	c.	Check engine speed controller, service fuel filter.
8. Delivery of the compressor low, pressure is excessively high.	a.	Oil separator cartridge clogged.	a.	Replace.
9. Excessive compressor oil consumption, oil mist escapes from withdrawal taps.	a.	Compressor oil level too high.	a.	Correct oil level.
	b.	Wrong compressor oil grade used.	b.	Change oil with correct oil grade.
	c.	Drainage line of the oil separator clogged, non-return valve defective.	c.	Clean line, if nec. replace non-return valve.
	d.	Oil separator defective.	d.	Replace.
	e.	Suction control valve leaking internally.	e.	Replace.
10. Air and oil flow out of the compressor air filter after engine switched off.	a.	Non-return valve of the suction control valve leaking.	a.	Replace seal of the non-return valve.
11. Compressor is automatically switched off.	a.	Overheating of the compressor - is indicated by pilot light.	a.	See condition 14.
	b.	Engine oil pressure too low.	b.	Check lubrication system, call in DEUTZ service.
	c.	Engine temperature too high.	c.	Check engine oil system, see engine operating manual.
	d.	Cable breakage at one of the protective devices.	d.	Replace defective cable.
	e.	Fuse blown.	e.	Replace. If it recurs, establish cause.
	f.	Not enough fuel.	f.	Replenish fuel, if nec., vent fuel line.
12. Overheating of the compressor.	a.	Inadequate compressor cooling.	a.	Adjust plane.
	b.	Oil cooler clogged externally.	b.	Thoroughly clean cooler.
	c.	Oil system clogged internally.	c.	Consult CP dealer.
	d.	Compressor oil level too low.	d.	Correct oil level.
	e.	Cooling fan defective.	e.	Replace.
	f.	Oil separator clogged.	f.	Replace.
	g.	Compressor oil filter clogged.	g.	Replace.
13. Toothed belt of the compressor drive	a.	Drive belt broken.	a.	Consult CP dealer.

If there is any doubt about the cause or remedy of a fault, it is imperative to consult an CP dealer!

8 Wiring diagram



Wiring diagram CPS 90

Pos.	Description	Remarks
E1	Glow pin motor	
F1	Fuse	5A
G1	Battery	12V-44Ah
G2	Generator	Motor
H1	Control lamp	Motor
H2	Control lamp	Compressor
K0	Starter-Lifting Magnet	
K2	Relay	Load control
K3	Relay	Pre-heat
K4	Relay	Lifting Magnet
K5	Relay	
K6	Relay	
K7	Relay	Start
M1	Starter	
N1	Voltage regulator	Generator
P1	Time meter	
S0	ON/OFF Switch	
S1	Push-button switch	Start
S2	Push-button switch	Pre-heat
S3	Pressure switch	Motor
S4	Temp.-switch	Motor
S5	Temp.-switch	Compressor
V2	Diode	
V3	Diode	
X1	Plug	12terminal

9 Recommendations concerning oil

- May we draw your attention to the importance of a proper lubrication of our high-value machines. A right choice of the oils to be used will greatly contribute to reach high performance operation and prevent operation failures.

9.1 Lubrication oils

High-quality, mineral, hydraulic or synthesized hydrocarbon oil with rust and oxidation inhibitors and anti-foam and anti-wear properties is recommended. The viscosity grade should correspond to the ambient temperature and ISO 3448, as follows:

Type of lubricant	Compressor**	Engine*
between -25°C and -10°C	GENOIL S	GENOIL 5W40
between -10°C and +50°C	GENOIL M	GENOIL 15W40

GENOIL is the ONLY oil tested and approved for use in all engines built into CP compressors.

Extensive laboratory and field endurance tests on CP equipment have proven GENOIL to match all lubrication demands in varied conditions. It meets stringent quality control specifications to ensure your equipment will run smoothly and reliably.

The quality lubricant additives in GENOIL allow for extended oil change intervals without any loss in performance or longevity.

GENOIL provides wear protection under extreme conditions. Powerful oxidation resistance, high chemical stability and rust-inhibiting additives help reduce corrosion, even within engines left idle for extended periods.

GENOIL contains high quality anti-oxidants to control deposits, sludge and contaminants that tend to build up under very high temperatures.

GENOIL's detergent additives keep sludge forming particles in a fine suspension instead of allowing them to clog your filter and accumulate in the valve/rocker cover area.

GENOIL releases excess heat efficiently, whilst maintaining excellent bore-polish protection to limit oil consumption.

GENOIL has an excellent Total Base Number (TBN) retention and more alkalinity to control acid formation.

GENOIL prevents Soot build-up

GENOIL is optimized for the latest low emission EURO -3 & -2, EPA TIER II & III engines running on low sulphur diesel for lower oil and fuel consumption.

GENOIL 5W40 is a Synthetic ultra high performance diesel engine oil with a high viscosity- index. GENOIL 5W40 is designed to provide excellent lubrication from start-up in temperatures as low as -25°C.

GENOIL 15W40 is a mineral based high performance diesel engine oil with a high viscosity- index. GENOIL 15W40 is designed to provide a high level of performance and protection in 'standard' ambient conditions as from -15°C.

- **If you want to use another brand of oil, consult the Engine Operation Manual.**
- **Never mix oils of different brands or types.**
- **Use only non-toxic oils where there is a risk of inhaling delivered air.**

Mineral compressor oil GENOIL M:

- 5 liter can: order number **1626 2260 00**
- 20 liter can: order number **1626 2261 00**

Mineral engine oil GENOIL 15W40:

- 5 liter can: order number **1626 2262 00**
- 20 liter can: order number **1626 2263 00**

Synthetic engine oil GENOIL 5W40:

- 5 liter can: order number **1626 2258 00**
- 20 liter can: order number **1626 2259 00**

Synthetic compressor oil GENOIL S:

- 20 liter can: order number **1626 2264 00**

- **Never mix synthetic with mineral oil.**

Remark:

When changing from mineral to synthetic oil (or the other way around), you will need to do an extra rinse:

After doing the complete change procedure to synthetic oil, run the unit for a few minutes to allow good and complete circulation of the synthetic oil. Then drain the synthetic oil again and fill again with new synthetic oil. To set correct oil levels, proceed as in normal instruction.

10 Coolant

10.1 Coolant specifications

- **Never remove the cooling system filler cap while coolant is hot.**
- **The system may be under pressure. Remove the cap slowly and only when coolant is at ambient temperature. A sudden release of pressure from a heated cooling system can result in personal injury from the splash of hot coolant**

The use of the correct coolant is important for good heat transfer and protection of liquid-cooled engines. Coolants used in these engines must be mixtures of good quality water (distilled or de-ionised), special coolant additives and if necessary freeze protection. Coolant that is not to manufacturer's specification will result in mechanical damage of the engine.

The freezing point of the coolant must be lower than the freezing point that can occur in the area. The difference must be at least 5 °C (9 °F). If the coolant freezes, it may crack the cylinder block, radiator or coolant pump. Consult the engine's operation manual and follow the manufacturer's directions.

- **Never mix different coolants and mix the coolant components outside the cooling system.**

10.2 GENCOOL EG

GENCOOL EG is the only coolant that has been tested and approved by all engine manufacturers currently in use in CP compressors .

GENCOOL EG extended life coolant is the new range of organic coolants purpose designed to meet the needs of modern engines. GENCOOL EG can help prevent leaks caused by corrosion. GENCOOL EG is also fully compatible with all sealants and gasket types developed to join different materials used within an engine.

GENCOOL EG is a ready to use Ethylene Glycol based coolant, premixed in an optimum 50/50 dilution ratio, for antifreeze protection guaranteed to -40°C (-40°F).

Because GENCOOL EG inhibits corrosion, deposit formation is minimized. This effectively eliminates the problem of restricted flow through the engine coolant ducts and the radiator, minimizing the risk for engine overheating and possible failure.

It reduces water pump seal wear and has excellent stability when subjected to sustained high operating temperatures.

GENCOOL EG is free of nitride and amines to protect your health and the environment. Longer service life reduces the amount of coolant produced and needing disposal to minimise environmental impact.

GENCOOL EG

- 5 liter can: order number **1626 2255 00**
- 20 liter can: order number **1626 2256 00**

To ensure protection against corrosion, cavitation and formation of deposits, the concentration of the additives in the coolant must be kept between certain limits, as stated by the manufacturer's guidelines. Topping up the coolant with water only, changes the concentration and is therefore not allowed.

Liquid-cooled engines are factory-filled with this type of coolant mixture.

GENCOOL EG Concentrate

- 5 liter can: order number **1625 2257 00**

10.3 Handling GENCOOL EG

GENCOOL EG should be stored at ambient temperatures, while periods of exposure to temperatures above 35°C (95°F) should be minimized. GENCOOL EG can be stored for a minimum of 5 years in unopened containers without any effect on the product quality of performance.

GENCOOL EG is compatible with most other coolants based on ethylene glycol, but you only get the benefits of 5 years protection when its used on its own. Exclusive use of GENCOOL EG is recommended for optimum corrosion protection and sludge control.

For simple density-measuring of Ethylene Glycol and Propylene Glycol in general the standard available 'density' measuring devices are used to measure the concentration of EG. In case a device is used to measure EG, no PG can be measured afterwards as a result of the difference in the density. More specific measurements can be done

by the use of a refractometer. This device can measure both EG and PG. A mix of both products will be show unreliable results!

Mixed EG coolants with identical glycol type can be measured by use of a refractometer as well as the 'density' system. The mixed coolants will be considered as one product.

The use of distilled water is recommended. If you have exceptionally soft water it would be acceptable, as well. Basically, the engine metals are going to corrode to some extent no matter what water you use, and hard water will encourage the resulting metal salts to precipitate.

GENCOOL EG comes as a pre-mixed coolant to safeguard the quality of the complete product.

It is recommended that topping up of the cooling system is always done with GENCOOL EG.

10.4 Replacing the coolant

Drain

Completely drain the entire cooling system.

Used coolant must be disposed or recycled in accordance with laws and local regulations.

Flush

Flush twice with clean water. Used coolant must be disposed or recycled in accordance with laws and local regulations.

From the CP Instruction book, determine the amount of GENCOOL EG required and pour into the radiator top tank.

It should be clearly understood that the risk for contamination is reduced in case of proper cleaning.

In case a certain content of 'other' coolant remains in the system, the coolant with the lowest properties influences the quality of the 'mixed' coolant.

Fill

To assure proper operation and the release of trapped air, run the engine until normal engine operation temperature is reached. Turn off the engine and allow to cool.

Recheck coolant level and add if necessary.

- **In case of a mix of different coolant products this type of measurement might provide incorrect values.**

