Product Manual

Hydraulic Aggregate 2

Translation of the original product manual

English / 6000 0509 00

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Product Manual: Hydraulic Aggregate 2
Version: 1.0 English
Release date: 07/2014

We reserve the right to change the design and device for the improvement of the product.

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Outline of Product Manual

The entire documentation of the hydraulic aggregate includes:

Product Manual

- **Information Manual (IM)**
  - for the operator of the device
- **Operating Manual (OM)**
  - for the operator and
  - for the technical supervisor of the device

Outlined Overview of the Entire Documentation

Outlined Overview of the Information Manual (for the operator)

Information Manual (IM)

Chapter	Content
1	Introduction
2	Device Data Sheet
3	Technical Data
4	Instructions for Servicing, Maintenance and Repair
5	Information for Disposal
A	Appendix A – Signature List

Outlined Overview of the Operating Manual (for the operator and technical supervisor)

Operating Manual (OM)

Chapter	Contents
1	Introduction
2	Safety Instructions
3	Description of Device and Operations
4	Assembly / Disassembly
5	Commissioning / Shut-down Procedure
6	Hydraulic Aggregate Operation
7	Maintenance / Cleaning
8	Accessories
9	Disposal
10	Technical Data

Table of Contents (IM)

1 Introduction

1.1 Preface

Dear – Customer,
– Operator,

By acquiring a **hydraulic aggregate** from **Darda GmbH**, you are the owner of one of the latest generation of hydraulic devices. The hydraulic aggregates are setting new standards for performance, quality and use in the proven Darda tradition.

To ensure the technical possibilities of this device over the long term, it is necessary to familiarise the operating and maintenance personnel with the handling, conversion, maintenance, etc.

Staff is familiarised by

– a training session at the manufacturer and

– this product manual.

To exclude malfunctioning and damage to the device as much as possible, give the concerned personnel the option to participate in a training session and to familiarise themselves with the functions of the device by using this product manual.

Best wishes,
Darda GmbH

1.2 Product Identification / Product Information

Validity

The descriptions in this product manual refer solely to the hydraulic aggregates as they are described in the device data sheet **(➪ chapter 2)** and were developed and built by the manufacturer.

Please enter the name plate data of your hydraulic aggregate in the device data sheet, if the manufacturer has not already done this.

When making complaints or queries, please cite the data entered in the device data sheet.

Product information

The **hydraulic aggregates** from **Darda GmbH** are designed to supply hydraulic stone and concrete splitters and combination shears from **Darda GmbH**.

The engines/motors are available in various variants

- Petrol engine (BP2)
- Electric motor (EP2)
- Pneumatic motor (AP2).

1.3 Storage

This **information manual** is a component of the entire documentation for the device and must always be stored in the vicinity of the device so it is immediately available if need be.

1.4 Definition of Terms

In this product manual, the hydraulic aggregates are described as a device in the following sections.

1.5 Responsibility of the Operator

The operator is required to allow work with the device only by experts who

- were sufficiently trained in accordance with the activities to be carried out.
- know the fundamental requirements for work safety and the prevention of accidents and have been familiarised with the handling of the device by qualified staff.
- have read and understood the safety and warning information in this documentation.

Please heed the following instructions in the interest of all staff:

- Supplement this documentation with the generally valid, legal and otherwise binding regulations for work safety, accident prevention and environmental protection, and inform the personnel working with the device about this!
- Supplement this documentation with instructions taking into account specific operating features e.g. regarding the organisation of work, processes, personnel deployed (including duty of supervision and notification)!
- Clearly determine the responsibilities of the staff for operating, cleaning, maintenance, etc.!
- Check at regular intervals whether the personnel bears the danger and safety information in mind during work!
- Take measures to ensure the device is only operating when in safe and perfect operating condition!
- Have the device cleaned and serviced at regular intervals!
- Do not let any structural changes be made (with the exception of those described in the documentation) without written approval from the manufacturer!
- Ensure that persons who were not familiarised with the residual risks of the device via the safety information do not enter the danger zone of the device!
- The operator in charge or the construction management team is solely responsible for securing the construction site / demolition site and its surroundings. Before beginning work, the persons responsible for the construction site / demolition site must ensure that there are no dangers, particularly when cable networks for supplying energy or dangerous materials are present.

➪ **OM, 2 Safety Instructions**

1.5.1 Definition of specialists / authorised personnel

Physical or material damage can result from unqualified intervention in the device. Only qualified personnel may operate, clean and maintain the device for this reason.

Qualified personnel in this sense are persons who

- are familiar with the safety concepts of the hydraulic aggregates.
- are trained as operating personnel in handling hydraulic aggregates and know the content of the product manual related to operation and controlling.
- have received appropriate training from qualified personnel.
- were authorised – due to their schooling, experience and training as well as their knowledge of the relevant norms, conditions, accident prevention requirements, structural calculations and operating circumstances by the person in charge of the safety of the device – to carry out the required activities and can recognise and avoid possible dangers.

1.6 Intended Use

The hydraulic aggregate from **Darda GmbH** with pressure relief valve is designed solely for driving the Darda GmbH devices specified for it.

The hydraulic aggregate is only intended

- for use within fixed buildings,
- for use outdoors,
- for mobile use,
- for commercial use,
- for connecting to public supply networks,
- for use by persons aged 14 and over,
- for use by laymen.

All possible forms of device use that are not expressly described under intended use and the conditions thereof are not permitted.

The operator and maintenance staff must have sufficient knowledge of one official language.

The device may be used in the following places and surroundings:

- demolition sites within and outside fixed buildings.
- site traffic routes when used by construction machinery and vehicles directly at the installation site.
- environments with high levels of dust and splash water.

Interface:

The device's hydraulic connection takes the form of hoses with direct screw unions or quick-release couplings.
The nominal hydraulic rating is 50 MPa (500 bar), 1.6 l/min.

1.7 Limited Service Life

The service life of the hydraulic hoses is limited.

Regardless of the number of operating hours, have the hydraulic hoses replaced by the manufacturer or a person authorised by the manufacturer every 6 years. The date of manufacture is printed on the hoses.

Before using the device, always check its overall condition, safety and ability to operate.

1.8 Complaints

Damage claims arising from transport damage will only be honoured if the manufacturer and the delivery company are notified immediately.

- Fill out a damage report immediately for the returned shipment (due to transport damage / repairs) and send the parts back to the manufacturing plant in their original packaging, if possible.
- Record possible transport damage on the shipping documents upon receipt of the goods!
- Enclose the following details in the returned shipment:
  - Name and address of the sender and recipient
  - Type and serial number of the device **(➪ Chapter 2, Device Data Sheet)**
  - Description of the defect
  - In case of transport damage: name of the delivery company and, if possible, exact time of delivery, driver name and registration number of the delivery vehicle.

1.9 Guarantee and Liability

In principle, our **General Sales and Delivery Conditions** apply to the use of the devices.

Agreements which deviate from these have to be agreed in writing and confirmed by us!

The General Sales and Delivery Conditions are given to the operator together with the offer.

Guarantee and liability claims in respect of personal injury or damage to property will not be honoured if they arise from one or more of the following causes:

- use of the devices for purposes other than those for which it is intended.
- operation of the devices with defective safety equipment or incorrectly installed or non-functional protection and / or safety equipment.
- disregard of the instructions in this product manual in respect of safety, transportation, storage, assembly, commissioning, operation, maintenance and repair of the devices.
- improper assembly, commissioning, operation, maintenance and repair of the devices.
- deficient monitoring and maintenance of parts which are subject to wear (e.g. cutting heads, crushing tips, oil filter).
- unauthorised structural changes to the devices.
- natural disasters, foreign matter impacts and acts of God.

To ensure the functional safety, only original replacement parts from the manufacturer may be used.

1.10 Declaration of Conformity

You will find the Declaration of Conformity at our homepage under
http: //www.darda.de

2 Device Data Sheet

This product manual refers to the following device:

Hydraulic Aggregates from **Darda GmbH**

1 *Position of the name plate*

Fig. 2-1 Name plate

Please enter the name plate data of your device into the above illustration, if the manufacturer has not already done this.

3 Technical Data

3.1 Technical Data for Hydraulic Aggregates

Type	Type of drive	Perfor-mance kW	Weight kg	Weight lbs	L_{WA} dB	σ_T [dB(A)]
BP2	Petrol engine	2,1	40	88	101	1,08
EP2 400 V	Electric motor 400 V	1,1	40	88	92	1,36
EP2 230 V	Electric motor 230 V	1,1	50	110	92	1,36
EP2 110 V	Electric motor 110 V	1,1	50	110	92	1,36
AP2	Pneumatic motor	2,5	40	88	92	2,21

Low-pressure stage	8.5 MPa (85 bar)
Delivery volume for low-pressure stage	5.0 l/min
High-pressure stage	50 MPa (500 bar)
Delivery volume for high-pressure stage	1.6 l/min
Filling volume for oil tank	5 l
Devices which can be connected	max. 3
Length x width x height	600 mm x 398 mm x 426 mm
Speed	3,000 rpm

Hydraulic oil

Ambient temperature > 5 °C	ISO VG 22
Ambient temperature < 5 °C	ISO VG 10

Accessories	**Weight**
Storage box	3.8 kg
Carrier	2.7 kg

Contact the manufacturer before using biological hydraulic oil.

4 Instructions for Servicing, Maintenance and Repair

We call your attention expressly to the fact that servicing, maintenance and repair work may only be carried out by authorised and trained personnel!

This implies they have read and must have understood this product manual and in particular Chapter 2 Safety Instructions, and in addition, have completed occupational training which has provided them with the necessary technical background for their work!

The operator is responsible for the qualifications of his personnel.

For damage that results from insufficient knowledge and training of the personnel, the manufacturer does not assume liability.

5 Information for Disposal

5.1 General Information

The operator is responsible for the proper disposal of the device. The sector-specific and local conditions for the disposal of the various materials must be followed.

Disassembly and disposal of the device may only be handled by qualified personnel.

5.2 Disposal of Old Oil

Old oil is to disposed in an environmentally friendly way and under consideration of the regional and national requirements.

- Make sure that the old oil does not pollute the environment.
- Dispose of old oil in suitable containers that meet the requirements.

Appendix A – Signature List

Procedure / How to fill in the list of signatures

- Copy the following signature list below.
- Enter the address of your company / authority and confirm this by using the company stamp.
- Make any member of the staff enter their name and signature (who have been instructed on the devices either on your own or the manufacturer's premises).
- File this list with the other documents.

Signature List

of the following company / authority / operator:

Address / Stamp

The persons listed below confirm by their signature that

- ❒ this product manual (IM and OM)
- ❒ a training / instruction session carried out by the manufacturer

has introduced them to

- ❒ the functions,
- ❒ the operation,
- ❒ the converting, maintenance, repair

of the devices, and that they have read and understood Chapter **2 Safety Instructions of the Operating Manual**.

Participant Name	**Date, Signature**	**Instructor (Date, Signature)**

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  - for the technical supervisor of the device

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Table of Contents (OM)

1 Introduction

1.1 Preface

Dear Operator,
Dear Technical Supervisor,

You are about to operate, convert, maintain or repair a **hydraulic aggregate**.

This operating manual is intended to support you with information for carrying out this important work.

Please read this operating manual carefully and pay special attention to the safety instructions!

If you have questions about the hydraulic aggregates or its components, our staff will be happy to assist you.

Best wishes,
Darda GmbH

1.2 Validity

The descriptions in this **operating manual** refer solely to the

Hydraulic Aggregates

as defined in the device data sheet as a whole, or to modules, components and individual parts that were developed and built by Darda GmbH.

➪ **IM, 2 Device Data Sheet**

1.3 Storage

This **operating manual** is a component of the entire documentation for the devices and must always be stored in the vicinity of the devices so it is immediately available, if need be.

1.4 Definition of Terms

In this product manual, the hydraulic aggregate is described as a device in the following sections.

1.5 Symbols in this Manual

1.5.1 Danger Warning Levels

DANGER!

Text that is marked with DANGER! provides a warning about exceptionally great, immediate dangers. If you do not take accident prevention measures, these hazards will lead with certainty to serious (irreversible) injuries or even death!
Please heed this text and take accident prevention measures!

WARNING!

Text that is marked with WARNING! provides a warning about exceptionally great, possible danger. If you do not take accident prevention measures, these hazards will lead with certainty to serious (irreversible) injuries or even death!
Please heed this text and take accident prevention measures!

CAUTION!

Text that is marked with CAUTION! provides a warning about possible dangerous situations. If you do not take accident prevention measures, these hazards will lead with certainty to slight or medium (irreversible) injuries!
Please heed this text and take the accident prevention measures!

NOTICE!

Text that is marked with NOTICE! contains very important instructions for situations that, if the accident prevention measures are not taken, may result in damage to the product and / or its functions or an object in its vicinity.
Please heed this text and take the accident prevention measures!

Text that is marked with this symbol contains very important instructions!
Please heed this text!

This symbol indicates text that contains important instructions / comments or tips.

1.5.2 Danger Symbols

1.5.2.1 General Danger Symbols

Warning about dangers that lead to serious (irreversible) injuries or even death!

1.5.2.2 Specific Danger Symbols

Warning about dangerous voltage and/or dangerous electricity!

Warning about dangerous hot surfaces!

Warning about mechanical movements or hand injuries!

Warning about crashing loads!

Warning about explosions!

Warning about lightning strikes!

Powerful water jets prohibited!

1.5.3 Instruction Symbols

- Heed the provided documentation and/or instructions!

- Switch off the device (disconnect)!

- Remove the plug from the electrical power supply!

- Use ear protectors!

- Wear protective gloves to protect against thermal risks according to EN 407. The gloves must offer protection against class 1 contact heat.

- Use safety shoes of protective class S1.

- Use a face mask for protection class 2 with a mechanical strength A.

1.5.4 General Symbols

● This dot marks the descriptions of activities which you should carry out.

– This dash marks specifications.

➪ This arrow marks a cross reference.

If a cross reference to another chapter is necessary in the text, this is shortened for clarity.

Example: **➪ OM, 2 Safety Instructions**

This means: Please refer to the Operating Manual, Chapter 2 Safety Instructions.

If the cross reference refers to a page, figure or position number, this information is added to the end of the cross reference.

Example: **➪ Fig. 4 - 4, Pos. 1**

This means: Please refer (in chapter 4 of this operating manual) to figure 4 and position number 1.

(3) Numbers in brackets refer to the positions in figures.

1.5.5 Product indication

These texts only relate to the hydraulic aggregate with a petrol engine.

These texts only relate to the hydraulic aggregate with an electric motor.

These texts only relate to the hydraulic aggregate with a pneumatic motor.

1.6 Responsibilities of the Personnel

Before beginning work, all persons entrusted with jobs using the devices are required

- to heed the fundamental regulations on industrial safety and accident prevention.
- to read the safety and the warning information contained in this product manual and to confirm with their signature that they have understood them.

(⇨ IM, Annex A – Signature List)

Please heed the following instructions in the interest of all staff:

- Refrain from any method of working which might present a safety risk!
- Follow all danger and warning instructions in this product manual!
- Please also heed in addition to this documentation the general, statutory and otherwise binding regulations on work safety, accident prevention and environmental protection!
- Heed the fire-alarm and fire-fighting possibilities and inform yourself about the location and operation of fire extinguishers!
- Wear the protective clothing that is appropriate for the work to be performed!
- Do not wear open long hair, loose clothing or jewellery (including rings)!
- Perform only work for which you have been sufficiently trained and instructed!
- Do not perform any repair work without prior consultation with the manufacturer and the operator!
- Do not make any structural changes without approval in writing from the manufacturer (except what is described in this product manual)!
- Ensure that other persons who do not work with the devices (and consequently do not know the residual risks of the devices) cannot enter into the danger zones.
- Shut down the devices when any safety hazards occur! Protect the devices against accidental start-up and notify the operator / construction management team immediately!

1.7 Limited Service Life

The service life of the hydraulic hoses is limited.

Regardless of the number of operating hours, have the hydraulic hoses replaced by the manufacturer or a person authorised by the manufacturer every 6 years. The date of manufacture is printed on the hoses.

Before using the device, always check its overall condition, safety and ability to operate.

1.8 Protection against Unauthorised Operation, Maintenance and Repair

The operation, maintenance and repair work on the devices may solely be performed by qualified personnel **(IM 1.5.1 Definition of Specialists / Authorised Personnel).**

The operator is to ensure that only he/she can operate the device and that it won't be used by others.

1.9 Personal Protective Gear

The personal protective gear in this product manual is solely recommended for use with the device. The risk assessment for this device requires the type of personal protective gear shown to be worn.

The requirements for personal protective gear resulting from the conditions at the site of use or other products or use of the device in combination with other products are not described in this product manual and must be handled by the operator and construction management team in accordance with the actual risks.

You will find specifications for the protective gear in **chapter 1.5.3 Instruction Symbols**.

2 Safety instructions

The device is a quality product manufactured according to state-of-the-art technology rules and was released from the manufacturing plant in perfect condition in respect of safety technology!

In spite of this, there are residual risks

– during assembly / disassembly,
– during commissioning / shut down procedure,
– during operation and
– during maintenance / cleaning.

When there is

– lack of knowledge of these residual risks,
– failure to heed the warning information in this product manual,
– work which is incorrectly implemented or
– use of the device for purposes for which it is not intended,

it could result in death or serious bodily injuries or damage to property!

As a result of these existing potential residual risks, it is the manufacturer's duty to inform the operator and user about these risks!

As the manufacturer we fulfil our duty to inform with the descriptions in this product manual in general and, in particular, in this chapter.

The hydraulic aggregate features products from other manufacturers that are fundamental to its use. The instructions provided by these manufacturers must therefore also be noted.

2.1 Danger Symbols / Signs on the Device

NOTICE!

All safety signs, such as warnings, instructions and prohibitions, must be checked at least once a year.

Missing, damaged, illegible or loose signs must be replaced. Please refer to replacement parts list for their location.

Safety sign sticker

Airborne noise sticker

The airborne noise depends on the drive motor. Note the replacement parts list.

Hampered communication and disorientation

Use ear protectors

Compressed air sticker

2.2 Intended Use

The hydraulic aggregate from **Darda GmbH** with pressure relief valve is designed solely for driving Darda GmbH devices specified for this purpose.

The hydraulic aggregate is only intended

for use within fixed buildings,

for use outdoors,

for mobile use,

for commercial use,

for connecting to public supply networks,

for use by persons aged 14 and over,

for use by laymen.

Please heed the technical data and the figures that explain the correct usage of the devices.

All options for using the device that are not expressly described under intended use and the conditions thereof are not permitted.

The operator and maintenance staff
must have sufficient knowledge of one official language.

The device may be used in the following places and surroundings:

- demolition sites within and outside fixed buildings.
- site traffic routes when used by construction machinery and vehicles directly at the installation site.
- environments with high levels of dust and splash water.

Interface:

The device's hydraulic connection takes the form of hoses with direct screw unions or quick-release couplings.
The nominal hydraulic rating is 50 MPa (500 bar), 1.6 l/min.

2.3 Safety Information for Certain Types of Use

2.3.1 Hazards caused by hot surfaces

Even after a short operation time or after longer idle times, the device parts may become or still be hot.

In case of skin contact, serious burns may be incurred!

- **Note that during normal operation the hydraulic oil may reach a temperature of up to 80 °C!**
- **Never open the screw connections of the hydraulic device parts that are hot (or highly pressurised)!**
- **Before starting work on hydraulic device parts, check whether you can work safely at the given temperature! Before starting work on hydraulic device parts, let them cool down sufficiently if need be!**
- **Wear protective gear that is appropriate for all the work with or on the devices!**

2.3.2 Hazards caused by oil particles in the exhaust air

DANGER!

The exhaust air from the hydraulic aggregate with a pneumatic motor may contain oil particles. The hydraulic aggregate with a pneumatic motor may therefore only be operated outdoors or in very well ventilated rooms.

The requirements stated on the safety data sheet for the oil used in the oil vaporiser must also be noted.

2.3.3 Hazards caused by misuse of cables

DANGER!

The cables or hoses for the electric power supply, pneumatic supply and hydraulics must not be used to move, lift or pull the device.

2.3.4 Hazards caused by unexpected actions

NOTICE!

The device's electric motor and pneumatic motor has a lock. Should the supply energy fail, the undervoltage / vacuum monitoring shuts down the device.

The device cannot start up automatically because the system remains shut down once the lock has engaged.

2.3.5 Hazards caused by insufficient securing of place of work

NOTICE!

The operator in charge is solely responsible for securing the place of work and its surroundings.

2.3.6 Hazards caused by electric shock

DANGER!

Touching live components may cause a life-threatening electric shock.

Work on electric device parts or operating equipment may only be undertaken by an authorised electrician according to recognised electrical regulations.

Only authorised specialists are granted access to the electric control cabinet. Covers on live parts must not be removed.

- In the event of faults on the electric energy supply, immediately switch off the device using the main switch or disconnect the device from the power supply.
- Check the device's electrical equipment on a regular basis. In the event of damage to the electrical equipment, immediately switch off the device using the main switch. Have loose connections or charred / damaged cables replaced immediately.
- Switch the device off if there is a risk of electric shock.
- **Secure the device against accidentally starting up again.**

After the device has been disconnected from the electric supply using the main switch, there will still be a life-threatening voltage on the following parts:

- **the supply lines**
- **the input terminals in the control cabinet**
- **the main switch**

Five rules of safety before starting work:

- Isolate
- Secure against start-up
- Ensure device is not energised
- Ground and short circuit
- Cover or shut off adjacent, energised parts.

2.3.7 Hazards caused by pneumatic / hydraulic pressurised device parts

DANGER!

Pneumatic / hydraulic oil escaping at high pressure can permeate the skin and may cause poisoning, infections and other serious injuries to the eyes or other organs.

- **Wear safety gear for all work on pneumatic / hydraulic lines or device parts.**

2.3.8 Hazards caused by failure of safety functions

DANGER!

The separating equipment (switches, contactors) and protective equipment (fuses, residual current circuit breakers) may fail.

If the device continues to function after deactivation, the area around the device should be cordoned off and the responsible person informed.

Troubleshooting and repairs may only be carried out by trained electricians.

2.3.9 Hazards caused by contaminated pneumatic, hydraulic, electric plug connections

NOTICE!

- **Only plug connections and cables which are clean and intact may be used.**
- **The plug connections must be kept clean and intact. Always clean both parts of the plug connection (connector and bush) before connecting.**
- **Cables and plug connections which are damaged may no longer be used and must be replaced. Route the cables with care and avoid them being damaged by on-site conditions.**

2.3.10 Hazards caused by carrying the device

WARNING!

The hydraulic aggregate may weigh > 40 kg.

- **If the conditions allow, use the roller unit.**

Carrying the device on a frequent basis may damage the lumbar and cervical vertebra in both men and women.

- **Use a carrier to help carry the device. This accessory is available from Darda GmbH.**
- **At least two or four people should carry the device, depending on the employees' assessment threshold.**
- **Disconnect the supply lines and hydraulic hoses.**
- **Take away the storage box.**

2.3.11 Hazards caused by insufficient lighting

WARNING!

In the event of insufficient light when working with the device, there is a danger of bodily injury and / or material damage.

The person in charge of the demolition site is to ensure that minimum lighting power of 200 Lux is present in the work area of the device.

2.3.12 Hazards caused by meteorological impacts

DANGER!

Meteorological impacts can affect the device.

In the event of storms, there is a risk of a direct lightning strike or the indirect impact of a lightning strike in the hydraulic aggregate and its supply lines or a lightning strike nearby. Conductive parts, such as metals or wet floors, increase the risk of serious damage.

Stop work, disconnect the connecting cables from the power supply and move to a safe place.

When using the EP2 device, the lightning protection requirements, for example in IEC 62305-ff (VDE 0185-305-ff) and for such components in EN 50164-ff (VDE 0185200-ff), must be satisfied in the local electric installation.

2.3.13 Hazards caused by noise

NOTICE!

There is an immediate risk of airborne noise when the device is started up.

- **Use ear protectors!**

2.3.14 Hazards caused by the surroundings

DANGER!

There are dangers from the surroundings.

Surrounding dangers are dangers that can emerge at the site where the devices are being used, but are not caused by the devices.

- Observe the surroundings when working with the devices and stop your work immediately if you notice dangers and inform the operator / construction management team in charge.
- Evacuate the danger zone.

2.3.15 Hazards caused by operator with limited sensory perception

DANGER!

Operating the device with limited sensory perception can result in dangers for the operator, third persons and the surroundings.

- **Operating the device with limited sensory perception is strictly forbidden.**

2.4 Safety Instructions for the Different Tasks

2.4.1 Failure or Malfunctioning

DANGER!

If the device fails or malfunctions, it is to be taken out of operation immediately.

- **Block off the work area of the device.**
- **Secure the device against accidental start-up.**
- **Inform the operator immediately.**

2.4.2 Starting the petrol engine

CAUTION!

Before pulling the starter cord, make sure you have sufficient room.

As soon as you detect wear in the starter cord, have it replaced by a trained and authorised specialist with sound mechanical knowledge.

2.5 Safety Information for Maintenance

DANGER!

We would like to draw your attention to the fact that device maintenance may only be carried out by trained personnel with sound mechanical, hydraulic / pneumatic and if necessary electrical knowledge.

- **Depressurise all pneumatic / hydraulic device parts and disconnect these before working on the device.**
- **Take measures to avoid starting up the device by mistake.**
- **Carry out the maintenance work in accordance with the descriptions in this operation manual.**

2.5.1 Safety risk resulting from defective maintenance / servicing

DANGER!

Heed the information about the maintenance intervals.

Defective maintenance of the devices can lead to damage due to the high mechanical demands.

Defective maintenance / repair can represent dangers for persons.

2.5.2 Safety risk resulting from contaminated hydraulic oil

NOTICE!

- **Before starting up the devices, check the hydraulic oil for contamination.**

Contaminated hydraulic oil can lead to malfunctions.

The hydraulic oil must be replaced when the specified service life is reached.

2.5.3 Safety risk resulting from defective hydraulic hose maintenance

NOTICE!

The hydraulic hoses must be replaced when the specified service life is reached.

Regardless of the number of operating hours, have the hydraulic hoses replaced with new ones by the manufacturer or a person authorised by the manufacturer every 6 years. The date of manufacture is printed on the hoses.

2.5.4 Safety risk resulting from insufficient separator check

DANGER!

All equipment for disconnecting from the energy supply should be checked at an interval appropriate to the operating conditions.

These checks should involve comparing the actual effect with the described process and effect. If variance is found, the error must be eliminated before starting up again.

- The devices feature equipment for disconnecting from the electric and / or pneumatic energy supplies.
- An electric main switch disconnects from the electric energy supply.
- A ball cock disconnects from the pneumatic energy supply.

2.5.5 Safety risk resulting from insufficient electrical equipment check

Checks for electrical operating equipment are laid down by law. The operator is responsible for compliance.

Destination in European Economic Area not defined:

The EP2 device is electric work equipment as defined in EC Directive "2009 / 104 / EC concerning the minimum safety and health requirements for the use of work equipment by workers at work".

It is therefore subject to mandatory periodic testing. Also observe the legal requirements that apply at the operating site.

Applies to Germany only:

The EP2 device is electric work equipment as defined in EC Directive "2009 / 104 / EC concerning the minimum safety and health requirements for the use of work equipment by workers at work".

With regard to periodic testing, the requirements of the German "Ordinance on Industrial Safety and Health (BetrSichV) § 10" and the requirements of the "Technical Rules governing Health and Safety at Work (TRBS 1201)" must be noted.

2.5.6 Hazards caused by concealed dangers / residual risks

DANGER!

When working with the device, there are unforeseeable residual risks that can only be prevented by systematic work planning, working methods that take account of possible risks, experience, etc.

The following list is intended to draw your attention to some possible risks:

- **When demolishing supporting walls, steel beams or supporting pillars, building areas may collapse.**
- **Before starting work, discuss the procedure with the person in charge of the site.**
- **Wear appropriate personal protective gear for all work.**

2.6 Hazards caused by Operating Materials

Hazardous materials must be monitored at all times. Any new knowledge gained in this way is incorporated in new instructions (safety data sheets), requirements for safety gear and parameters for exposure volumes and times. The operator must therefore continually keep protective measures up-to-date.

The suggestions relating to use and handling of materials apply only in direct relation to the product described and in addition to the corresponding safety data sheets.

External requirements resulting from the ambient conditions at the place of use, or other products or mixes with other substances, preparations or products, are not taken into account.

These suggestions do not exempt the operator in any way from his duties under health and safety law relating to the health and safety of his employees.

The protective measures must be designed in line with the actual risks on site resulting from the conditions of use, all substances, preparations and products used, the work processes and the ambient conditions.

The operating materials are hazardous substances. Special requirements are in place to protect employees, environment and property when handling, storing, transporting and using these substances. These requirements are listed in the current safety data sheet (SDS).

The operator is obliged to put corresponding measures into place.

2.6.1.1 Hazards caused by hydraulic oil, engine oil and petrol

DANGER!

When working in the area of hydraulic supply lines, danger can result from

- **suddenly escaping hydraulic oil,**
- **contact with harmful hydraulic oil.**

- **Only perform work on the hydraulics**
  - **if the device has been separated from the power supply in advance.**
  - **if the hydraulic hoses are not pressurised.**
  - **Note that even if the hydraulic supply is deactivated, there still may be danger arising from any hydraulic oil remaining in the hoses and which may be pressurised.**
- **Regularly check that the hydraulic hoses and their connections are intact.**
- **Use appropriate personal protective gear for all work.**
- **If you have swallowed or inhaled hydraulic oil,**
  - **seek medical treatment immediately. Inform the doctor of emergency measures recommended by the hydraulic oil manufacturer.**
  - **If you have got hydraulic oil in your eyes, on your skin or clothing,**
    - **take the recommended emergency measures,**
    - **contact a doctor immediately.**

Please refer to the manufacturer's documentation for the engines/motors and maintenance unit for information relating to the dangers of lubrication oil and petrol.

2.7 Safety Instructions for Transport

DANGER!

When transporting the device, the applicable work protection measures should be observed.

- **Switch off the device before transport.**
- **Secure the device in accordance with the requirements for transport (e.g. with lashing straps) to prevent slippage.**
- **Use the optional carrier to carry the device.**
- **Never walk backwards when transporting the device.**

When pulling the device, never tilt it by more than 20°.

2.7.1 Safety instructions relating to your road safety duties

The operator or site manager is solely responsible for the road safety duty.

- The person responsible must ensure road safety.
- Access routes must be produced and / or cleared to allow the device to be transported safely.
- Access routes must be sufficiently well lit. The lighting intensity should be at least 200 Lux.
- Access routes must be of sufficient load-bearing capacity.

2.8 Safety Instructions for Commissioning

DANGER!

We would like to draw your attention to the fact that the conversion and the hydraulic installation of the device may only be carried out by trained personnel and authorised persons with profound mechanical, hydraulic / pneumatic and if necessary electric knowledge.

- **Make sure there are no potential hazards for persons or the environment when starting up the device.**
- **Make sure people do not linger in or enter the danger zone of the device or this area in general during start-up.**
- **Take measures that provide warnings before starting up the device.**
- **Before starting up, always check**
  - **that the device is functioning correctly.**
  - **whether the device and all its components are free from contamination, wear, deformation, damage and corrosion.**
  - **whether all parts and fixtures fit tightly.**
  - **hydraulic hoses and connections for leakage.**
- **Do not put into operation a device whose functional / operational safety is not ensured / present.**

2.9 Personal Protective Gear

When working on / with the device, wear the personal protective gear that the relevant safety instructions require.

You may not work with the device without personal protective gear.

The recommendations for personal protective gear only apply to the described product. External requirements resulting from the ambient conditions at the place of use or other products or linking with other products are not taken into account.

These suggestions do not exempt the operator in any way from his duties under health and safety law relating to the health and safety of his employees.

If the personal protective gear is damaged, it may no longer be used and must be replaced by intact gear.

The personal protective gear must be checked regularly at intervals appropriate to its use.

If subject to chemical or thermal loads, the personal protective gear may be damaged without this being obvious. Should such risks apply, the personal protective gear must be checked, at appropriate intervals or if you suspect damage, by appropriately qualified persons.

2.9.1 Class S1 safety shoes

When performing tasks such as

- transport
- commissioning
- operation
- maintenance, cleaning, repairing

wear safety shoes in class S1 according to IEC 61310.

2.9.2 Protective gloves

Wear protective gloves offering class 1 protection from contact heat during work.

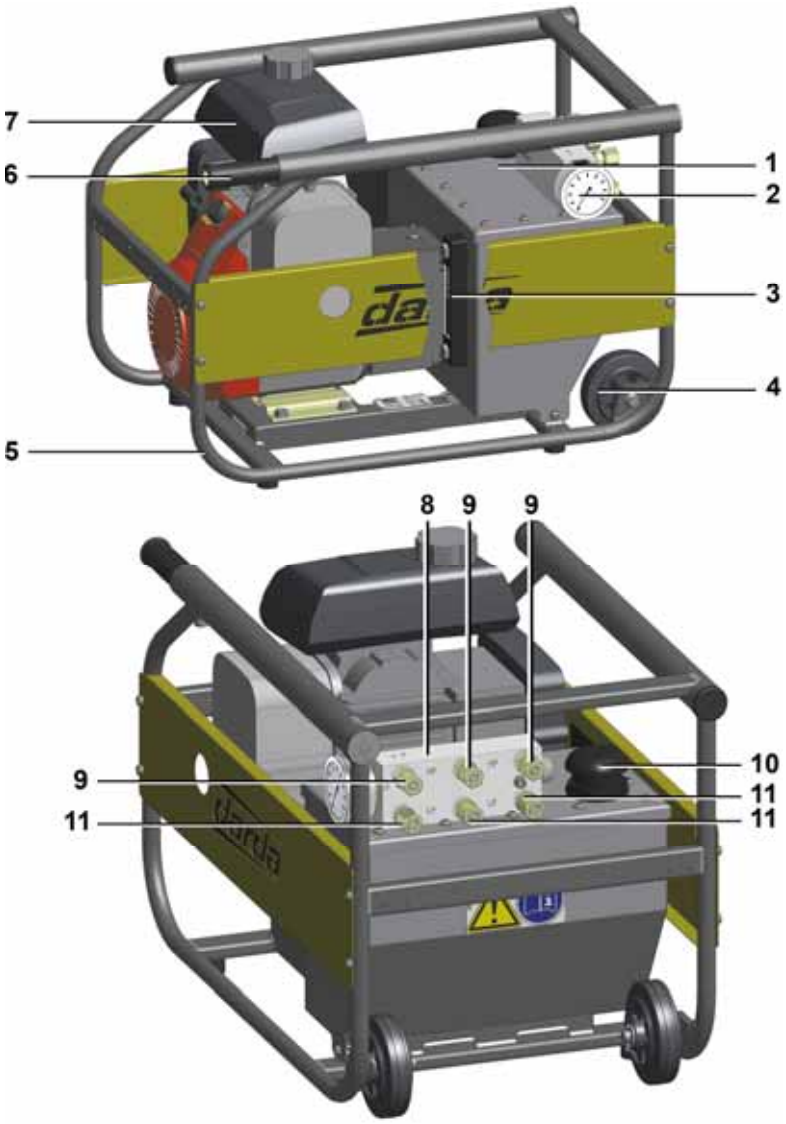
3 Description of Device and Operations

The hydraulic aggregates fall into three variants:

- Hydraulic aggregate BP2 (petrol engine)
- Hydraulic aggregate EP2 (electric motor)
- Hydraulic aggregate AP2 (pneumatic motor)

These variants are explained in the following chapters.

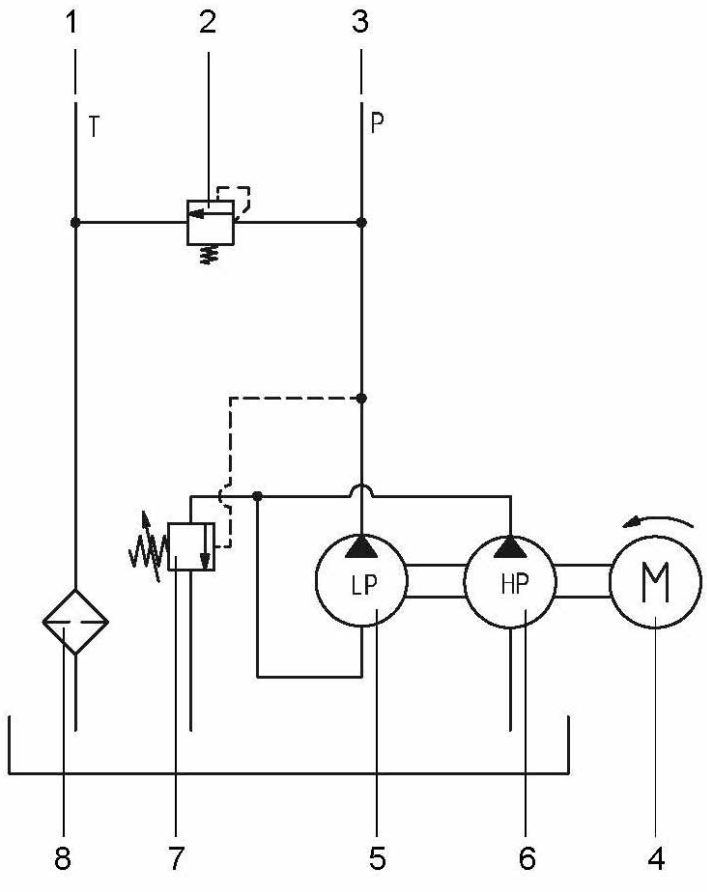
3.1 Hydraulic Aggregate in General



1 *Oil tank*
2 *Pressure gauge*
3 *Oil level indicator*
4 *Transport roller*
5 *Frame*
6 *Handle bar*
7 *Motor/engine (example: petrol engine)*
8 *Distributor block with pressure relief valve*
9 *High pressure connection*
10 *Oil filler neck*
11 *Low pressure connection*

Fig. 3-1 Hydraulic aggregate, general assemblies

Flow chart for hydraulic aggregate



1 *Return*
2 *Pressure relief valve*
3 *Feed*
4 *Drive motor*
5 *Low pressure pump*
6 *High pressure pump*
7 *Bypass valve*
8 *Return filter*

Fig. 3-2 Flow chart for hydraulic aggregate

3.1.1 Functional description of the general assemblies

The main components of each hydraulic aggregate are:

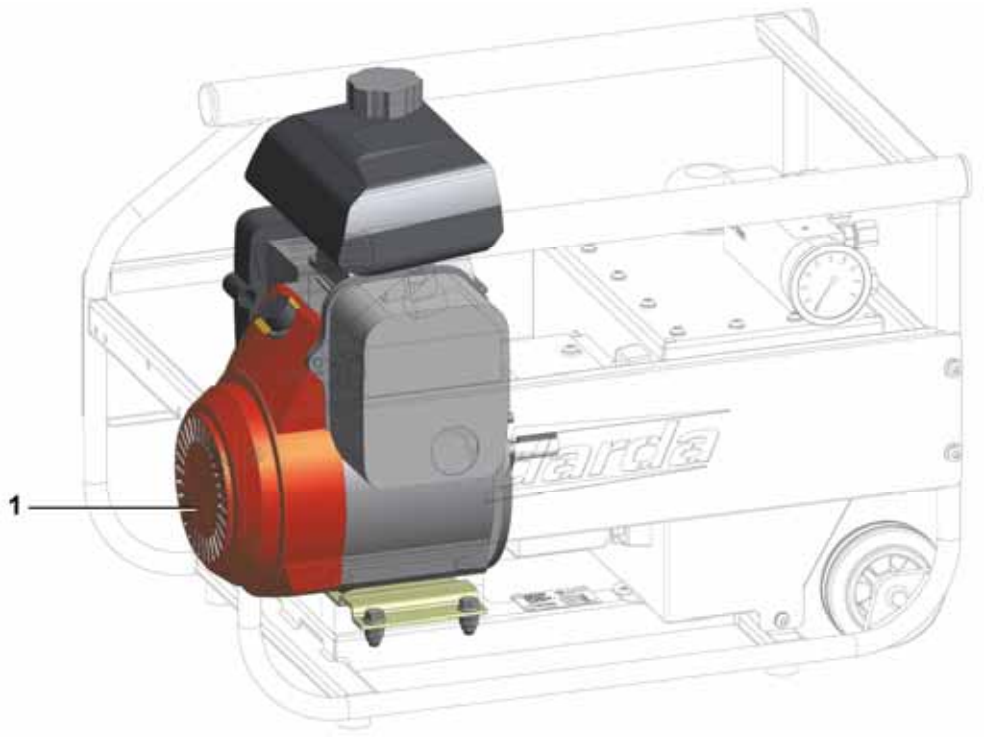
- Oil tank
- Engine/motor
- Pump
- Frame
- Distributor block with pressure relief valve and pressure gauge
- Handle bar
- Rollers for pulling the hydraulic aggregate.

A hydraulic pump in the devices is driven by a motor or engine.

The hydraulic pump transports the hydraulic oil out of the oil tank and builds up pressure.

Liquid is distributed via the distributor block. The pressure is limited by a pressure relief valve.

3.2 Hydraulic Aggregate BP2 (Petrol Engine)



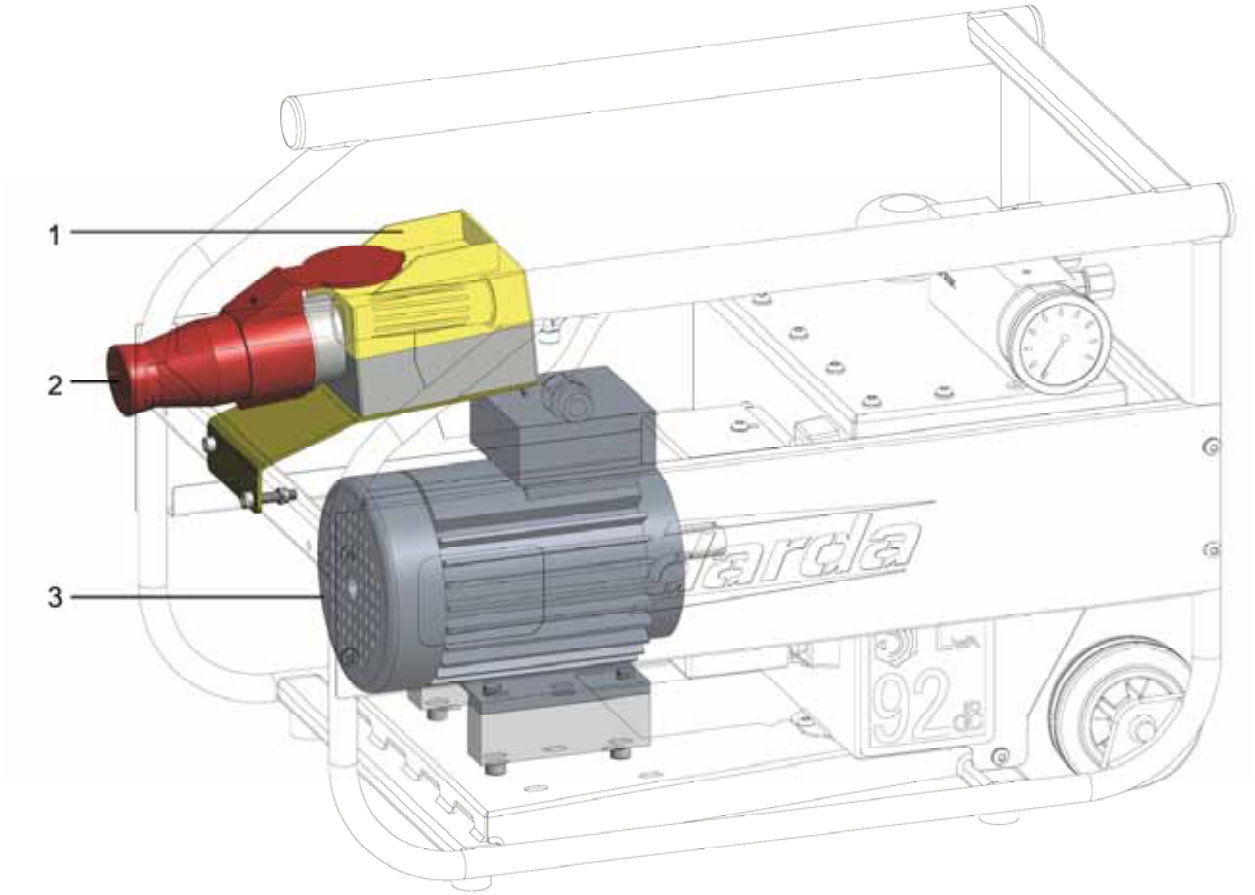
1 *Combustion engine*

Fig. 3-3 Hydraulic aggregate BP2 (petrol engine)

3.2.1 Functional description of petrol engine

Please refer to the enclosed manufacturer's documentation for information on the petrol engine.

3.3 Hydraulic Aggregate EP2 (Electric Motor)



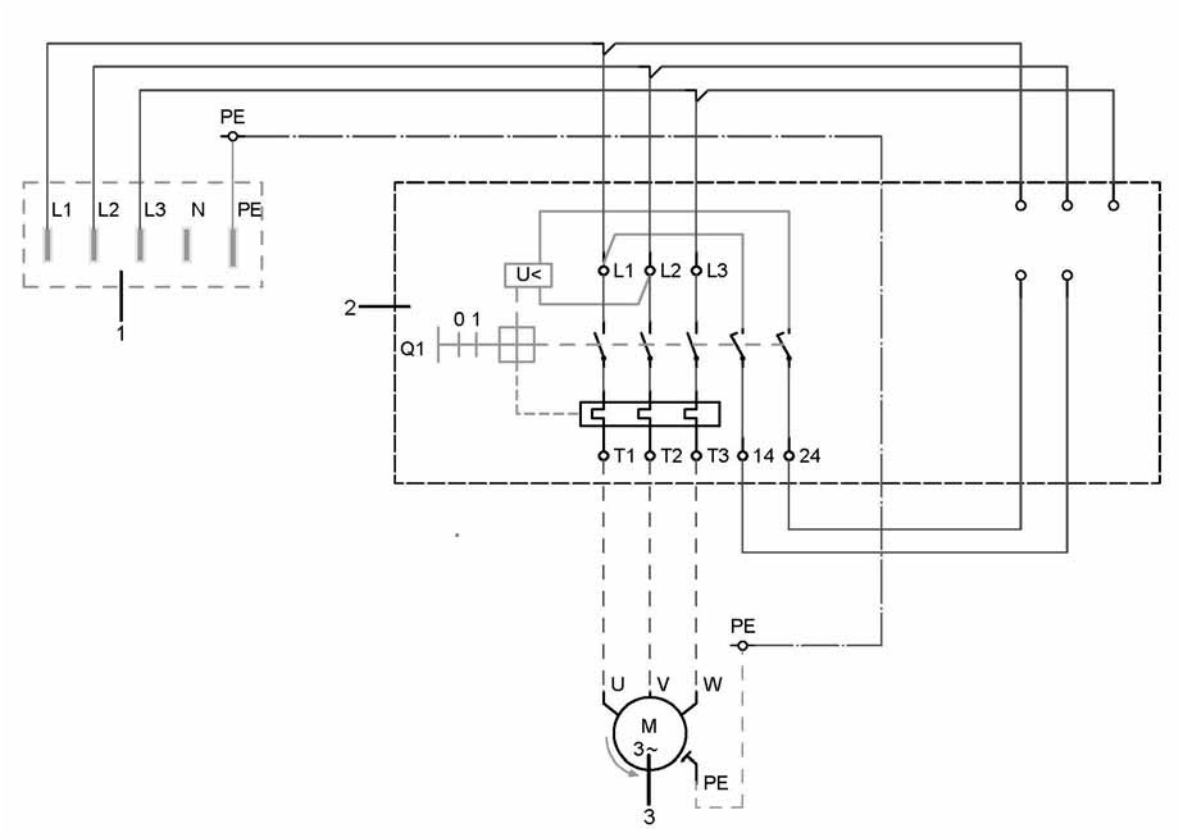
1 *Switch*
2 *CEE device plug*
3 *Electric motor*

Fig. 3-4 Hydraulic aggregate EP2 (electric motor)

3.3.1 Functional description of electric motor

Please refer to the enclosed manufacturer's documentation for information on the electric motor.

3.3.2 400 V circuit diagram



1 *Wall-mounted device plug*
2 *Motor protection switch Q1*
3 *Engine/motor*

Fig. 3-5 Circuit diagram

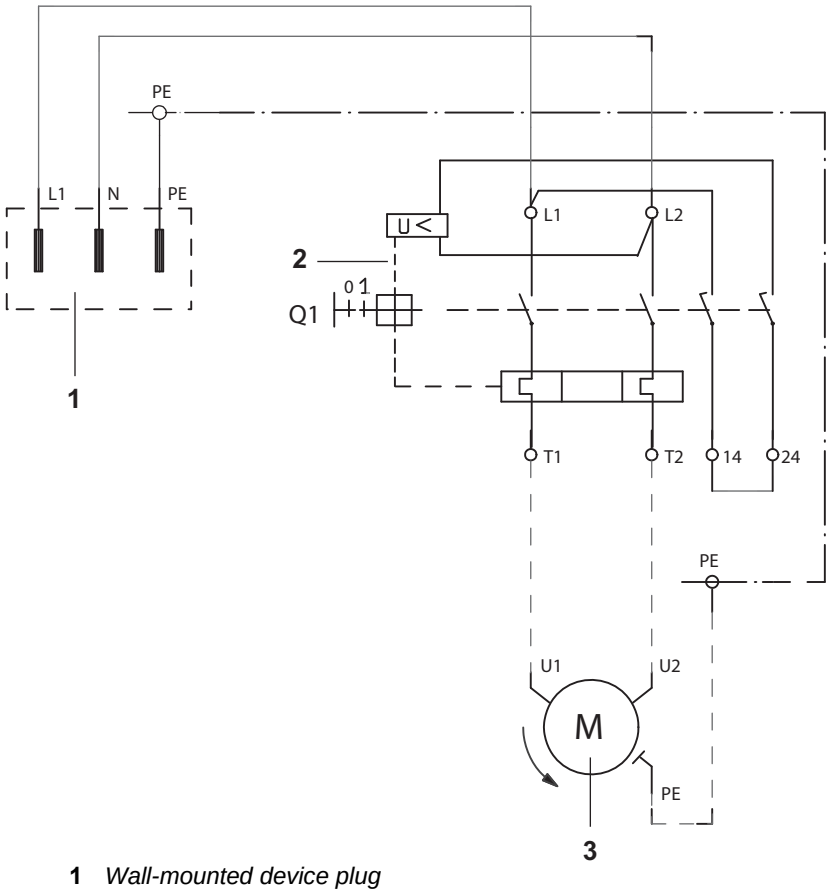
The electric connection (5) takes the form of a (CEE17) device plug (516 / 6h).

Please refer to the technical data for the mains voltage.

NOTICE!

Connection and protective measures should follow VDE 0100 and the requirements of the responsible energy supply company.

3.3.3 230 V circuit diagram



1 *Wall-mounted device plug*
2 *Motor protection switch Q1*
3 *Engine/motor*

Fig. 3-6 Circuit diagram

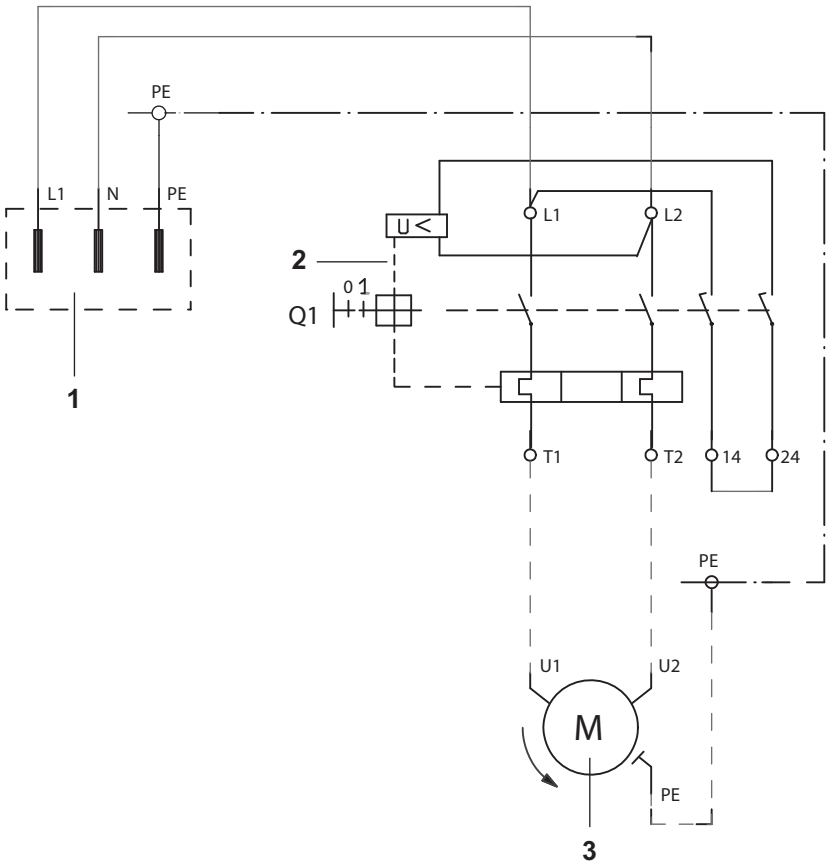
The electric connection takes the form of a (CEE17) device plug (316 / 6 h).

Please refer to the technical data for the mains voltage.

NOTICE!

Connection and protective measures should follow VDE 0100 and the requirements of the responsible energy supply company.

3.3.4 110 V circuit diagram



4 *Wall-mounted device plug*
5 *Motor protection switch Q1*
6 *Engine/motor*

Fig. 3-7 Circuit diagram

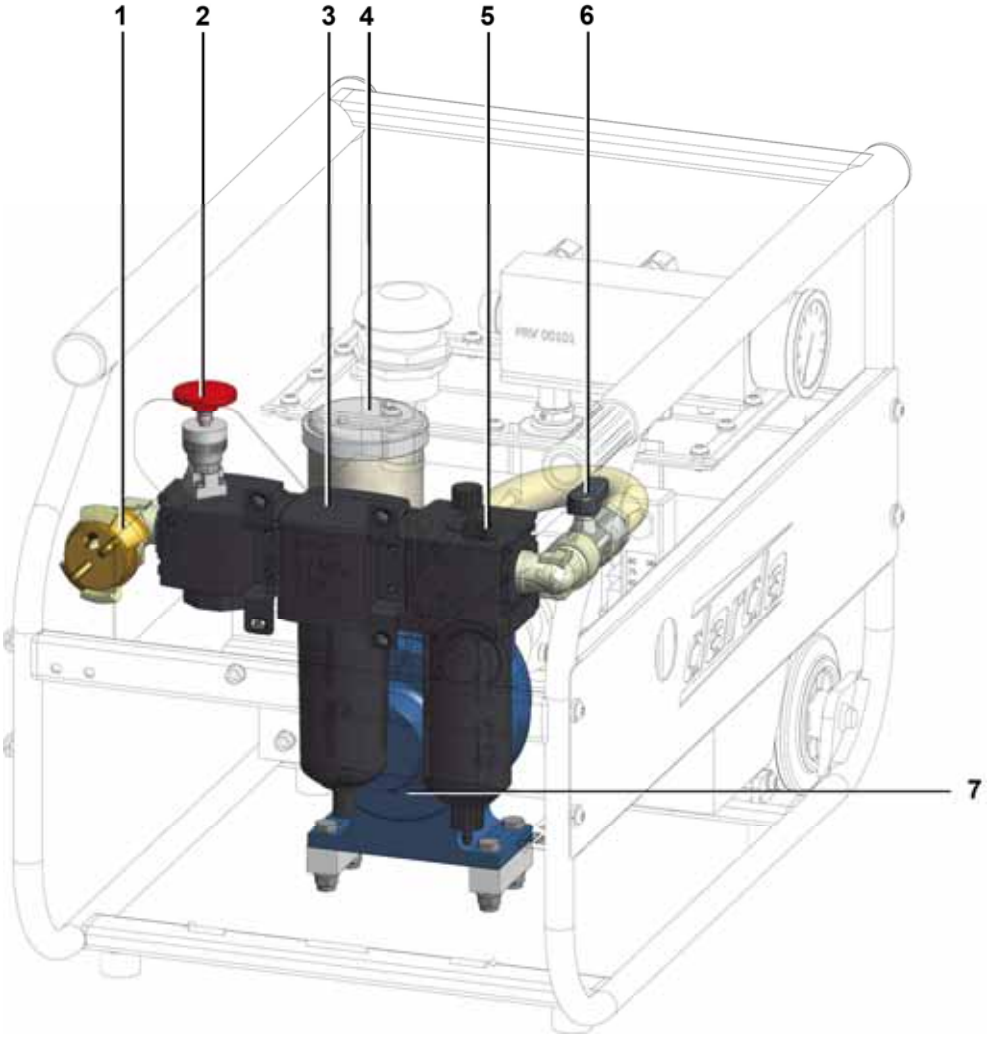
The electric connection takes the form of a (CEE17) device plug (316 / 4 h).

Please refer to the technical data for the mains voltage.

NOTICE!

Connection and protective measures should follow VDE 0100 and the requirements of the responsible energy supply company.

3.4 Hydraulic Aggregate AP2 (Pneumatic Motor)



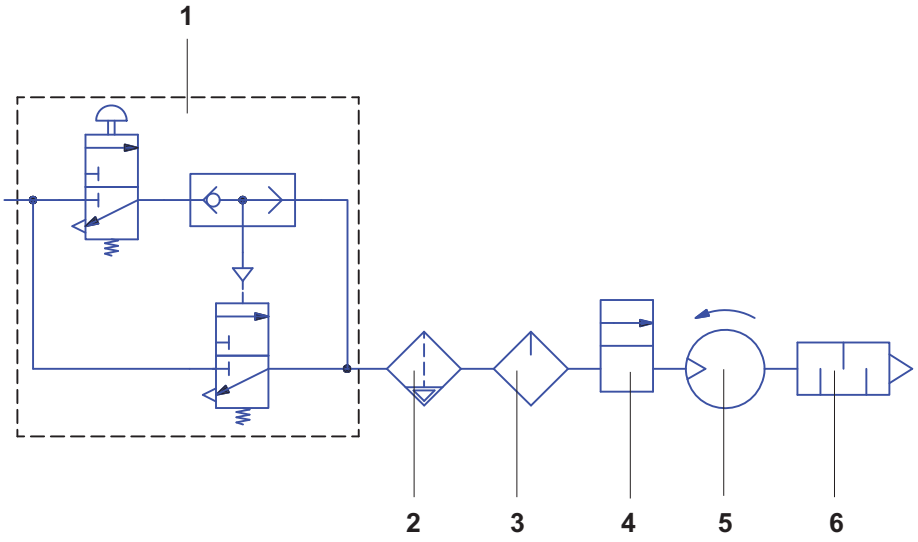
1 *Claw coupling*
2 *Vacuum trigger*
3 *Compressed air filter*
4 *Silencer*
5 *Oil vaporiser*
6 *Ball cock*
7 *Pneumatic motor*

Fig. 3-8 Hydraulic aggregate AP2 (pneumatic motor)

The maintenance unit consists of a vacuum trigger, compressed air filter and oil vaporiser.

3.4.1 Functional description of pneumatic motor

Please refer to the enclosed manufacturer's documentation for information on the pneumatic motor and associated components.



1 *Vacuum trigger*
2 *Compressed air filter*
3 *Oil vaporiser*
4 *Ball cock*
5 *Pneumatic motor*
6 *Silencer*

Fig. 3-9 Flow chart for AP2

Once the supply line is connected and pressurised, the vacuum trigger must be activated.

4 Assembly / Disassembly

We call your attention expressly to the fact that the conversion and the hydraulic installation of the device may only be carried out by trained personnel with a profound mechanical and hydraulic knowledge!

4.1 Connecting a Hydraulically Driven Device to the Hydraulic Aggregate

When connecting devices without quick-release couplings to the hydraulic aggregate, ensure that the high and low pressure hoses aren't mixed up.

The control valve of the device to be connected must be in the zero position.

5 Commissioning / Shut-down Procedure

5.1 Commissioning / Operation

We call your attention expressly to the fact that the conversion and the hydraulic installation of the device may only be carried out by trained personnel with a profound mechanical and hydraulic knowledge!

(⇨ 2.8 Safety Instructions for Commissioning)

- Before commissioning, ensure that the device is in a secure position.
- During operation, the device's own vibrations may cause it to move so it should be fastened down appropriately.
- During operation, the device must not be covered.
- When using a hydraulic aggregate with a pneumatic motor, the shut-off valve (ball cock) should be opened slowly.
- A hydraulically driven device may only be connected to the hydraulic aggregate when switched off.
- The control valve of the hydraulically driven device must be in the zero position.
- The control valve of the hydraulically driven device must be in the zero position in order to start the motor/engine.
- First connect the return and then the feed.
- Before commissioning, always check the oil level. Place the device on a level surface.

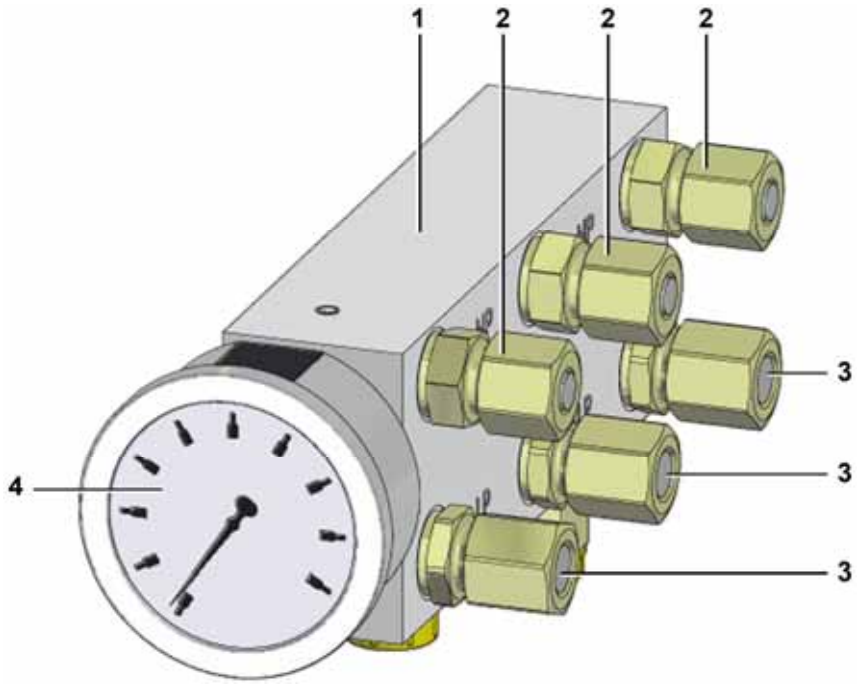
Oil level:

Minimum level:	the sight glass is 1/2 filled with oil.
Maximum level:	the sight glass is 2/3 filled with oil.

Hydraulic connection

Direct connection

- Once switched off and depressurised, remove the lock nuts and plugs from the screwed insert and fit the hose.

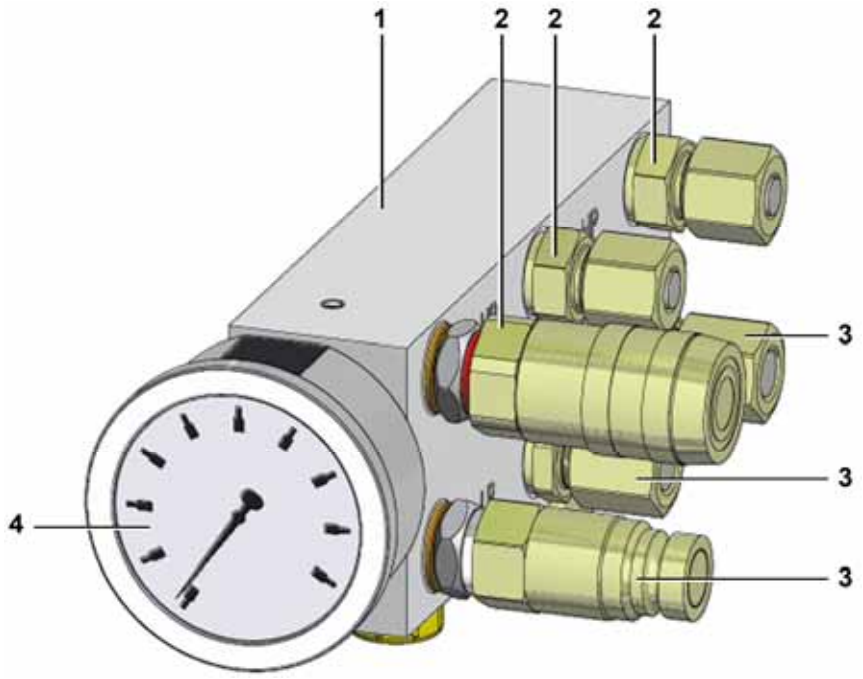


1 *Distributor block*
2 *High pressure connection*
3 *Low pressure connection*
4 *Pressure gauge*

Fig. 5-1 Direct connection

Quick-release coupling

- Once switched off and depressurised, remove the screwed inserts on the distributor block.
- Fit the screwed insert and/or quick-release coupling.
  Ensure that you use the right components for the high pressure circuit. Please refer to replacement parts list for the tightening torque.



1 *Distributor block*
2 *High pressure connection (red ring)*
3 *Low pressure connection (white ring)*
4 *Pressure gauge*

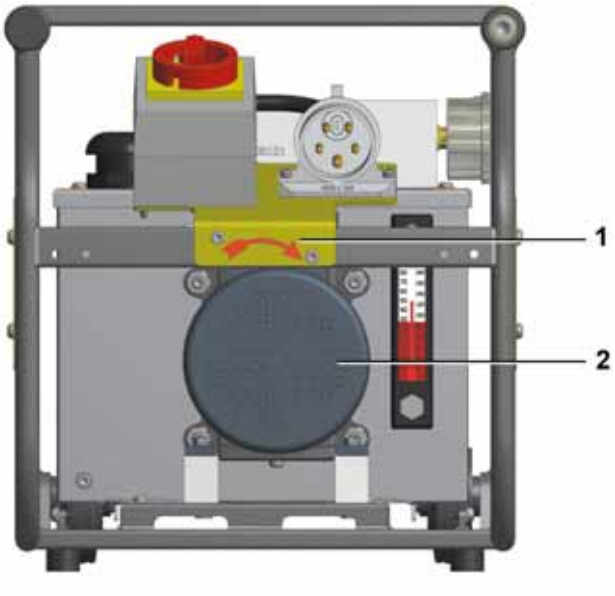
Fig. 5-2 Quick-release coupling

EP2

Electric motor EP2 direction of rotation

The electric motor's direction of rotation cannot be checked on the motor shaft because this is concealed. Use the electric motor's fan wheel to check its direction of rotation. It must be turning clockwise. If the motor is turning in the right direction of rotation, the pressure relief valve will audibly trigger just after the motor is switched on.

The direction of rotation can be changed using the phase changing switch in the device plug.



1 *Fan wheel's direction of rotation*

2 *Fan wheel*

Fig. 5-3 Fan wheel's direction of rotation

EP2

Electric energy supply

The device must be connected to a worksite distribution board that satisfies the requirements of IEC 60439-4 (EN 60439-4, VDE 0660-501).

The connection must be as follows:
TN-S system, 110 V / 230 V / 400 V AC, 50 Hz with a residual current device (RCD) triggered at 30 mA and overcurrent protection (OCP) with 16 A rated current and characteristics C according to IEC 60898-1 (EN 60898-1, VDE 0641-11).

The hydraulic aggregate has a plug according to IEC 60309-2 (CEE17) for 16 A.

If the cable length required between the worksite distribution board and device is more than 2 m, the S-Box protective equipment must be connected between this board and the device. The cable length required between the S-Box protective equipment and device must not exceed 2 m. Cable loops or windings are prohibited in both cases for distances of up to 2 m.

If a suitable worksite distribution board is not available, the S-Box protective equipment must be connected in the connection cable. The cable length required between the S-Box protection device and device must not exceed 2 m. Cable loops or windings are prohibited for distances of up to 2 m"

The S-Box protective equipment is available from Darda GmbH as an accessory.

Safety instructions

Connections to sockets with rated currents in excess of 16 A are prohibited.
Use of plug or cable adaptors, or connecting these in series (cascading) to reduce plug-in couplings, is strictly prohibited.
Such equipment brings with it the risk of electric shock“

If extension cables, cable drums or other equipment are used for the connection, the user information provided with them must also be observed.

Pneumatic motor AP2

Observe the information provided in the manufacturer's documentation for the pneumatic motor / silencer relating to ambient temperatures.

Temperatures that are too low will result in the silencer icing over.

5.1.1 Starting up after a power cut

Note the information provided in the product manual for the hydraulically driven device.

Please refer to the enclosed manufacturer's documentation for information on starting up the petrol engine.

The electric motor is started up by switching on the main switch.

The pneumatic motor is started up by activating the vacuum trigger.

5.1.2 Filling the oil tank with hydraulic oil

Only the hydraulic oils listed in the chapter Technical Data may be used.

When topping up hydraulic oil, note that the oil level may increase during operation if tools are connected.

5.2 Shut-down Procedure

- Secure the device from mistaken or unauthorised start-ups and disconnect it from the energy supply.

- Please also note the information in the relevant manufacturer's documentation for the drive motors.

The control valve of the hydraulically driven device must be in the zero position in order to switch off or disconnect the quick-release coupling. First disconnect the feed and then the return.

- Please also note the information provided in the manufacturer's documentation.

If the hydraulic aggregate is shut down for long periods, condensate may form in the oil tank. To counteract this, we recommend filling the oil level to its maximum once the device has cooled down. To secure against other people starting up the device, all users must use their own individual padlock.

Securing the petrol engine against accidental start-up

BP2

1 *Lock*

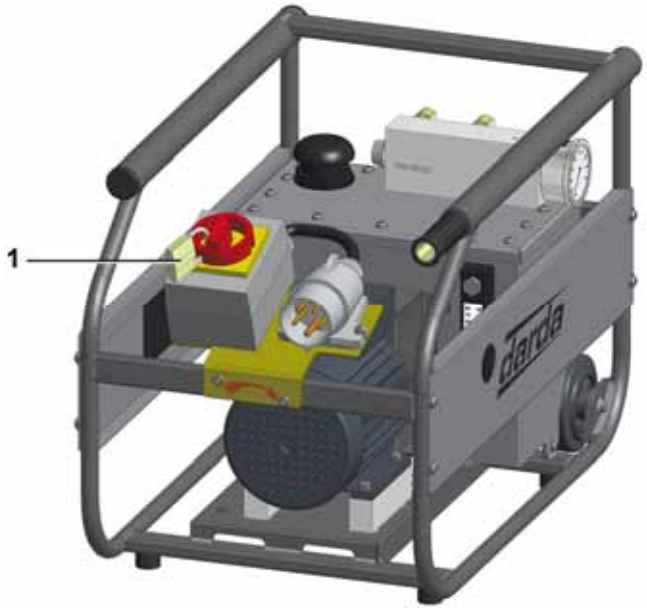
Fig. 5-4 Securing the petrol engine

NOTICE!

When replacing the starter handle or motor, these must be drilled with a hole for the padlock to secure against accidental start-up.

Fig. 5-5 Starter handle

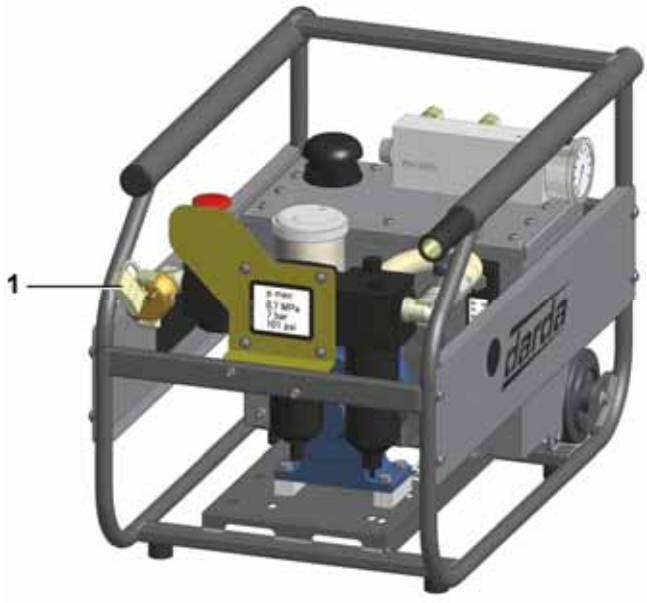
Securing the electric motor against accidental start-up



1 *Lock*

Fig. 5-6 Securing the electric motor

Securing the pneumatic motor against accidental start-up



1 *Lock*

Fig. 5-7 Securing the pneumatic motor

6 Operating the Hydraulic Aggregate

Before work, follow the safety instructions in chapter 2.

6.1 Connecting to the Supply

6.1.1 Fuelling the petrol engine

Please refer to the enclosed manufacturer's documentation for information on fuelling the petrol engine.

6.1.2 Connecting the electric motor

The rated energy supply value can be found on the motor type plate or in the technical documents.

Connection to the supply network takes the form of a CEE17 device plug. The mains for connecting to the energy supply must be a TN-S system. A connection cable with IEC 60309-2, CEE17 coupling socket, appropriate for the motor used, is required for the connection.

6.1.3 Connecting the pneumatic motor

There is a claw coupling (claw spacing of 40 mm) on the device.
The rated width of the device connection is 1/2 ". We recommend one rated width bigger for the supply cable.
Minimum input pressure > 3 bar. If pressure drops below 3 bar, the vacuum trigger trips.

For more detailed information, please refer to the manufacturer's documentation for the pneumatic motor.

6.2 Installing the Hydraulic Aggregate

The device must be installed on a level surface. When installing the device, it must not be tilted by more than 10° in any direction. During operation, the device must be secured against slipping with suitable equipment.
The stop point for the fastening must be on the frame.

6.3 Transporting the Hydraulic Aggregate

The handle bar must be extended to pull the device. After transport, the handle bar should be returned to its original position. Never walk backwards when carrying and pulling.

7 Maintenance / Cleaning

We would like to draw your attention to the fact that the conversion and hydraulic installation of the device may only be carried out by trained and authorised personnel with a profound mechanical, hydraulic / pneumatic and if necessary electric knowledge.

7.1 Maintenance

7.1.1 General maintenance

Please refer to the appropriate manufacturer's documentation for maintenance work for the engine/motor.

Maintenance every 4 operating hours

- Check the hydraulic oil level.
- Check all parts for damage and leaks.
- Check whether the pressure relief valve trips at the max. operating pressure stated in the technical data.
  To do this, allow the cylinder on the stone and concrete splitter to extend all the way or fully close the combination shears' insert.
  Observe the pressure gauge on the device. If the pressure exceeds the max. stated operating pressure, switch off the device and secure it from starting up again. Replace the distributor block with pressure relief valve. The operator must take appropriate organisational measures (operating procedures) for instances when the safety equipment fails.

Maintenance every 40 operating hours

Check

- all screw connections are tight.
- whether the type plate, notices and labelling are legible.
- whether there is still oil in the maintenance unit's oil vaporiser.

Maintenance when required

- Check whether the silencer for the pneumatic motor is iced over.
  Interrupt work if necessary.

Oil and filter changes

We recommend changing the hydraulic oil and filters after around 2000 operating hours or a maximum of 3 years. The oil should be at operating temperature for the change. Wear appropriate protective clothing.

Please refer to the technical data for our authorised hydraulic oil.

7.1.2 Maintaining the petrol engine

Please refer to the manufacturer's documentation for information on maintaining the petrol engine.

7.1.3 Maintaining the electric motor

Please refer to the manufacturer's documentation for information on maintaining the electric motor.

7.1.4 Maintaining the pneumatic motor / maintenance unit

Please refer to the manufacturer's documentation for information on maintaining the pneumatic motor / maintenance unit.

7.2 Cleaning

Only clean the device after shutting it down beforehand!

Before starting to clean, read the chapter about the shut-down procedure.

(⇨ 5.2 Shut-down Procedure)

At the engine/motor end, the device must not be cleaned directly with a high-pressure jet of water.

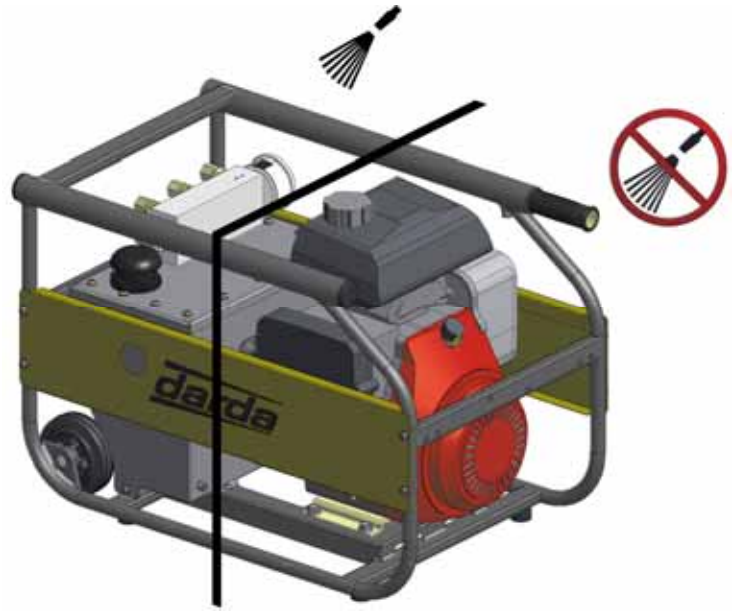


Fig. 7-1

The following components must not be cleaned with a high-pressure cleaner.

- Drive motor
- Electric components and connections
- Pneumatic filter and silencer

These components should be cleaned dry.

7.3 Repairs

We would like to draw your attention to the fact that repair work that is not described in the documentation is not allowed for reasons of safety.

Please refer to replacement parts list for further information on repairs.

The device must be disconnected from the energy supply before fault rectification, servicing and repair work.

➪ OM, 5.2 Shut-down Procedure

7.4 Troubleshooting

Cause	Error	Error rectification
Electric motor not starting.	Switch not pressed.	• Press switch.
	Mains cable not connected.	• Connect mains cable.
Electric motor shuts down during operation.	Undervoltage trigger has tripped.	• Check the power supply.
	Thermal fuse has tripped.	• Allow engine/motor to cool.
	Personal protection or short-circuit equipment has tripped.	• Secure against starting up again, task electrician with troubleshooting.
	Motor/engine defective.	• Replace motor/engine.
Electric motor turning anti-clockwise.	Supply line with anti-clockwise field of rotation.	• Change direction of rotation, e.g. using phase changing switch.
Petrol engine not starting, petrol engine shuts down during operation.	Petrol tank empty.	• Fill petrol tank, for more information, see manufacturer's documentation.
	Motor/engine defective.	• Replace motor/engine.
Pneumatic motor not starting.	Vacuum trigger not activated.	• Activate vacuum trigger.
	Supply pressure too low.	• Increase supply pressure according to technical details.

Cause	Error	Error rectification
Pneumatic motor shuts down during operation.	Energy supply failed.	● Check the energy supply.
	Leaks in pneumatic line.	● Replace defective lines.
	Motor/engine defective.	● Replace motor/engine.
Silencer iced over.	Ambient temperature too low.	● Shut down the device, note the details of the engine/motor manufacturer.
The drive motor is running but hydraulic pressure isn't building up.	Oil level too low.	● Top up oil.
	Pressure relief valve defective.	● Replace the pressure relief valve.
	Hose in oil tank defective.	● Replace the hose.
	Coupling defective.	● Replace the coupling.
	Pump defective.	● Replace the pump.
The engine/motor is running, the hydraulically driven device has too little power.	Hose between device and tool too long.	● Shorten hose.
	Pressure relief valve, pump or coupling defective.	● Replace the defective part.
The engine/motor is running, the hydraulically driven device is moving unevenly or slowly.	Too little oil in the tank.	● Top up oil.
	There is air in the hydraulic system.	● Bleed the system by activating the tool when device has zero load.
	Pressure relief valve defective.	● Replace the pressure relief valve.

Cause	Error	Error rectification
The engine/motor is running, the hydraulically driven devices are not moving to the limit position.	Too little oil in the tank.	● Top up oil. ⇨ **OM, 5.1. Commissioning / Operation**
	The oil volume is not sufficient for the connected tools.	● Reduce number of tools.
The engine/motor is running, the hydraulically driven devices are not moving.	Too little oil in the tank.	● Top up oil. ⇨ **OM, 5.1. Commissioning / Operation**
	Pressure relief valve, pump or coupling defective.	● Replace the defective part.
	Hydraulic lines not connected correctly or defective.	● Check the screw connections, couplings and lines.
Oil escaping from filler neck.	Too much oil in the tank.	● Drain oil from tank.
Oil in oil tank overflowing.	Seals leaking.	● Replace the defective seal.
A layer of water can be seen on the oil.	Formation of condensate.	● Oil and filter change.
Quick-release couplings cannot be connected.	Coupling defective.	● Replace coupling.
	The tool is loaded which produces a hydraulic pressure.	● Rectify the load acting on the tool.

8 Accessories

Storage box

The storage box has a load-bearing capacity of 20 kg.

The ropes for fastening must be placed around the frame and the straps connected with a carabiner.

Carrier

The carriers may only be used to carry the device.

9 Disposal

After shutting down the device correctly **(➪ 5.2 Shut-down Procedure)** and removing the hydraulic oil, it can be disassembled and recycled according to the materials used.

If contaminated with radioactive, toxic or other substances hazardous to persons or the environment, the devices must be disposed of in accordance with the applicable regulations.

9.1 Disposal of Old Oil

Old oil is to disposed in an environmentally friendly way and under consideration of the regional and national requirements.

- Make sure that the old oil does not pollute the environment.
- Dispose of old oil in suitable containers that meet the requirements.

10 Technical Data

10.1 Technical Data for Hydraulic Aggregates

Type	Type of drive	Perfor-mance kW	Weight kg	Weight lbs	L_{WA} dB	σ_T [dB(A)]
BP2	Petrol engine	2,1	40	88	101	1,08
EP2 400 V	Electric motor 400 V	1,1	40	88	92	1,36
EP2 230 V	Electric motor 230 V	1,1	50	110	92	1,36
EP2 110 V	Electric motor 110 V	1,1	50	110	92	1,36
AP2	Pneumatic motor	2,5	40	88	92	2,21

Low pressure stage	8.5 MPa (85 bar)
Delivery volume for low-pressure stage	5.0 l/min
High-pressure stage	50 MPa (500 bar)
Delivery volume for high-pressure stage	1.6 l/min
Filling volume for oil tank	5 l
Devices which can be connected	max. 3
Length x width x height	600 mm x 398 mm x 426 mm
Speed	3,000 rpm

Hydraulic oil	
Ambient temperature > 5 °C	ISO VG 22
Ambient temperature < 5 °C	ISO VG 10

Accessories	**Weight**
Storage box	3.8 kg
Carrier	2.7 kg

Contact the manufacturer before using biological hydraulic oil.

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