

VAG HYsec (F / E) Hydraulic Brake and Lift Unit



VAG HYsec with internal oil supply (E)



VAG HYsec with external oil supply (F)

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VAG reserves the right to make technical changes and use materials of similar or better quality without notice. The pictures used are typical and non-binding.

The actual scope of supply may deviate from the pictures shown on the title page and on the inside pages.

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1 General

These instructions provide information on the safety, assembly, function, operation and maintenance of the hydraulic unit of the type HYsec Hydraulic Brake and Lift Unit. Observing these instructions carefully should ensure long, trouble-free and safe operation.

The VAG HYsec Hydraulic Brake and Lift Unit have a modular structure and are available in two varieties:

Varieties:

- HYsec E (with internal motor driven oil supply)
- HYsec F (with external oil supply, supplied by others)

These instructions complete the operating instructions of valves to which the hydraulic brake-and-lift unit is assembled. The product-related technical documentation of the valve to be operated (KAT-B 1310 VAG EKN® Butterfly Valve and KAT-B 2014 VAG RIKO® Plunger Valve) must be observed.

1.1 Safety



This Instructions must be observed and applied at all times along with the general “VAG Installation and Operation Instructions for Valves” (see www.vag-group.com / Category: Installation and Operation Instructions).

Arbitrary alterations of this product and the parts supplied with it are not allowed. VAG does not assume any warranty or liability for consequential damage arising from non-compliance with these instructions. When using HYsec Hydraulic Brake and Lift Units, the generally accepted rules of engineering have to be observed (e.g. DIN standards, DVGW, VDI directives, etc.). The installation must only be carried out by qualified staff (see also Section 6.1 General safety instructions). For further technical information such as dimensions, materials or applications, please refer to the respective documentation (KAT-A 5512).

VAG actuators are designed and manufactured to the highest standards and their safety of operation is generally ensured. However, actuators may be potentially dangerous if they are operated improperly or are not installed for their intended use.

Anyone dealing with the assembly, disassembly, operation, maintenance and repair of the actuator in the operator's plant must have read and understood the complete Operating and Maintenance Instructions (Accident Prevention Regulations, local regulations).

The pressure in the pipeline section must be relieved and hazards must be eliminated before protective devices are removed and/or work is performed on the actuators and valves. Unauthorised, unintentional and unexpected actuation as well as any hazardous movements caused by stored energy (drop-weight, accumulator) must be prevented.

For equipment that must be monitored, the relevant laws and regulations such as the Industrial Code, Accident Prevention Regulations, Boiler Inspection Regulations, AD Data Sheets (AD = Boiler Study Group) etc. must be complied with. In addition to this, local accident prevention regulations apply.

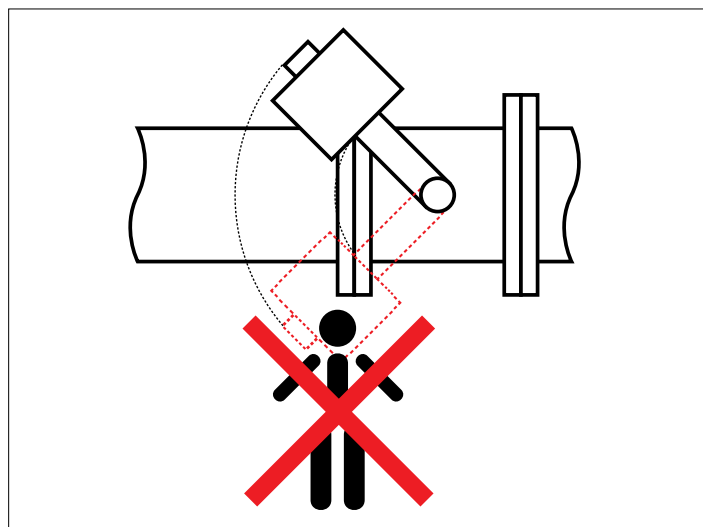
1.1.1 General safety instructions for Hydraulic Brake and Lift Unit

Through the installation of Hydraulic Brake and Lift Unit in the plant, the interaction between the hydraulic actuator and the entire plant will result in changes of the hazard potential, in particular the influence of the hydraulic and electric control on hydraulic actuators generating mechanical movements.

The following general safety instructions need to be complied with when VAG HYsec Hydraulic Brake and Lift Unit are used:



Picture 1: Example of safety equipment installed on site (wire guard, operator protection below the drop weight)



Picture 2: Danger area below the drop weight; staff must be protected by safety equipment

- Use the valve with the hydraulic brake-and-lift unit only in technically perfect condition of the equipment and the hydraulic.
- Defects of the hydraulic brake-and-lift unit and/or the valve have to be remedied immediately. Do not change or alter the valve and/or the hydraulic brake-and-lift unit in any way, as otherwise the installation instructions will become invalid and the operation permission will become void.
- You are not allowed to alter or rebuild the hydraulic brake-and-lift unit in any way.
- Use the valves equipped with a hydraulic brake-and-lift unit only within the capacity range of the valve. You can find this in the technical documentation (KAT-A) on the valve used (KAT-A 1310 VAG EKN® Butterfly Valve or KAT-A 2014 VAG RIKO® Plunger Valve).
- The hydraulic brake-and-lift unit is not suitable for use in potentially explosive atmospheres unless express permission has been given.
- People under the influence of alcohol, drugs or medication must not transport, erect, commission, operate or repair the valve and/or the hydraulic brake-and-lift cylinder. Staff intended for the operation of the equipment must be at least 18 years old.
- Always ensure that operating staff are instructed about all relevant issues pertaining to occupational safety, accident prevention and environmental protection at regular intervals and that operators

have understood and comply with these assembly instructions, in particular with the safety instructions contained therein.

- By providing an appropriate emergency shut-off function make sure that the operated unit always be brought into a safe state (e.g. immediate stop).
- Observe the warning and information signs attached to the valve and the hydraulic brake-and-lift unit. Also ensure that these are not removed and remain legible at all times.
- Should it be necessary to shut off the safety devices (e.g. for commissioning or maintenance work) take adequate measures to ensure that no dangerous situations occur which may lead to physical injury or damage to the equipment. Comply with the higher-level operation instructions for the plant.
- Never leave the hydraulic brake-and-lift unit unattended during assembly and maintenance work.
- The hydraulic brake-and-lift unit must not be put into operation without the safety devices and protective covers installed by VAG or on site.
- When exchanging defective components, replace them by original parts with the same electrical and mechanical specifications only, as otherwise neither their safety nor their function can be maintained and the manufacturer's warranty will become void.
- The individual or entity putting the plant into circulation in which the valve with the hydraulic brake-and-lift cylinder is installed needs to provide an emergency shut-off device.
- All safety devices, attachments as well as electrical connections and cables must be checked for proper condition at regular intervals.

1.1.2 Residual hazards of hydraulic brake-and-lift cylinders

- Plugged connections (e.g. line sockets) must not be unplugged as long as they are energised and/or under load.
- Danger of accidents during transport, assembly and disassembly of the hydraulic brake-and-lift unit as a result of uncontrolled motion while the unit is lifted.
- Risk of environmental pollution (soil or groundwater) due to harmful media (e.g. hydraulic oil) if they escape through leaks at the hydraulic unit.
- Uncontrolled escape of the hydraulic oil: Hydraulic fluid may escape, if lines break, if connection elements are unfastened while they are still under pressure, if hydraulic hose assemblies are damaged or as a result of the impact of excessive forces.
- Inflammation of escaping hydraulic fluid near ignition sources with a surface temperature greater than the flash point of the hydraulic fluid used.
- Whipping of hose assemblies after they have torn off under pressure.
- Injuries caused to fingers and hands if they are squeezed between the pump assembly and the oil tank while the pump assembly is lowered.
- Danger of burns due to the surface temperatures of some components (e.g. valves, motors, pressure pipes etc.) and hydraulic oil temperatures exceeding 80° C.
- Conductive parts in which dangerous electrostatic charges may build up have to be connected and grounded.
- The hydraulic brake-and-lift unit must be grounded at the place provided for this purpose.
- When the operating pressure is adjusted at the pressure control valve, it must be ensured that the value does not exceed the admissible operating pressure of the entire machine.



The following work results in particular residual dangers from Hydraulic Brake and Lift Unit, so special care should be taken.

During assembly

- Always depressurise and de-energise the relevant plant section before connecting the hydraulic brake-and-lift unit.
- Secure the plant section against restart.
- Route the cables and lines in a way that ensures they are not damaged.
- Before putting the unit into operation, ensure that all seals and locks of the plugged connections have been properly installed and are not damaged. In this way you prevent fluids and foreign particles from penetrating into components of the hydraulic brake-and-lift cylinder.
- During assembly, take the utmost care for cleanliness to prevent welding beads or swarf from penetrating into the hydraulic hose assemblies as this would cause wear and tear and malfunction of the brake-and-lift unit.

During commissioning

- Before commissioning it, allow the hydraulic brake-and-lift cylinder to acclimatise for some hours as otherwise condensation water may deposit inside the body.
- Ensure that all electric and hydraulic connections are assigned or closed with plugs. Only put a completely installed hydraulic brake-and-lift unit into operation.

During cleaning

- Close all openings with appropriate protective devices to prevent detergents from penetrating into the system.
- Never use solvents or aggressive detergents.
- Clean the hydraulic unit using only a damp cloth made of a lint-free tissue. Use water only and a mild detergent, if necessary.
- Do not use a pressure washer for cleaning.

Disposal of the unit

- Dispose of the hydraulic unit in compliance with the national regulations of your country.
- Dispose of the hydraulic fluid in compliance with the national regulations of your country.
- Dispose of remainders of hydraulic fluid in compliance with the applicable safety data sheets for hydraulic fluids.

Notes on environmental pollution

- Work with the utmost care to ensure that no water pollutants can penetrate into the soil, water or the sewerage system.

- Always dispose of remaining lubricants and waste oil as well as, containers and cloths contaminated by these substances in compliance with the regulations.
- After removing the unit from service, take the components of the hydraulic unit to a recycling plant and/or dispose of them in compliance with the statutory provisions.
- For disposal the statutory provisions must be observed.

1.2 Proper use

VAG HYsec Hydraulic Brake and Lift Unit are used as electro-hydraulic braking and lifting units for shut-off, control and check valves with controlled closing operation.

In connection with a circuit-breaker and signalling unit, the VAG HYsec Hydraulic Brake and Lift Unit can also be used as a control actuator under certain conditions.

The technical application limits of the valve type to be actuated (e.g. operating pressure, fluid, temperature etc.) can be found in the product related valve documentation.

Any deviating operating conditions and applications require the manufacturer's prior written consent!

When the VAG HYsec E (with internal oil supply) is delivered, the pressure control valve of the hydraulic pump is sealed with adhesive labels and/or identified by colour markings. If these identifications are broken later on, this will result in the loss of the manufacturer's warranty.

This instructions contain important information on the safe and reliable operation of hydraulic actuators.

Observing this instructions helps you to:

- Prevent hazards
- Reduce repair costs and down-times of the valve and/or the entire plant
- Improve the operational safety and useful life of the plant.

1.3 Identification

The complete valve assembly (consisting of the valve and the assembled hydraulic brake-and-lift unit) is identified according to DIN EN 19.

A rating plate is attached to the VAG HYsec Hydraulic Brake and Lift Unit and contains at least the following information:

VAG	Manufacturer's name Name of the valve
DN	Nominal diameter of the valve
PN	Nominal pressure of the valve Date of manufacture Serial number

2 Transport and storage

2.1 Transport



For transportation to its installation site, the complete valve assembly must be packed in or on stable packaging material suitable for its size. The container also needs to ensure that the valve is protected against weather influences and damage. When the valve is transported over long distances (e.g. overseas) and exposed to special climatic conditions, it needs to be protected by sealing it in plastic wrapping and adding a desiccant.

The factory-applied corrosion protection and any assemblies must be protected against damage by external influences during transport and storage.

When actuators are mounted, the safe bearing of the actuators must be ensured to prevent the joints from being exposed to transverse loads.

For transport purposes and also to support assembly, lifting devices such as cables and belts must always only be attached to the lifting lugs of the valve and the actuator.

The cylinder, the oil tank (only for type VAG HYsec E) or other functional parts are not suitable for this purpose. The length and positioning of the cables/belts must ensure that the complete valve assembly remains in a horizontal position during the entire lifting procedure.

For complete valve assemblies that have been factory-packed in transport crates (wooden crates), the centre of gravity of the entire unit must be taken into account. The centre of gravity is marked on each side of the crate at our factory and must be considered for all lifting operations.

2.2 Storage

Storage and operation of the hydraulic brake-and-lift unit are only admissible in places/positions where no oil can run out. The hydraulic brake-and-lift unit as it is delivered from our factory can be stored for up to six months if the following criteria are complied with. Please consult VAG if you want to store the unit for more than six months.

Store the valve in a dry and well-aerated place. The direct exposure of the unit to radiation heat emitted by sources of heat should be avoided. Protect assembly units important for the function such as the bracket, the cylinder and, if required, the hydraulic unit and hydraulic pump against dust and other dirt by adequate covering.

All connections on the hydraulic brake-and-lift cylinder must be closed with plugs.

Do not remove the protective caps of the connections / flanges and the packaging materials until immediately prior to assembly.

The complete valve assembly can be stored at ambient temperatures ranging from -20° C to + 50° C (protected by adequate covers). If the valve and the actuator are stored at temperatures below 0° C, they should be warmed up to at least +5° C before they are installed and put into operation.

3 Product features

3.1 Features and function description

VAG HYsec Hydraulic Brake and Lift Unit are operating elements for shut-off, control and check valves. They are used to ensure the controlled closing and/or opening operation.

Depending on the field of application, one distinguishes between:

- Turbine inlet valves
- Pump protection valves
- Pipe break safety devices.

The turbine inlet valve and the pump protection valve serve for the safety or the controlled start-up of plants.

When the valves are installed as pipe break safety devices or emergency shut-off valves, the mass flow is quickly stopped without the use of external energy and thus water hammers are prevented.

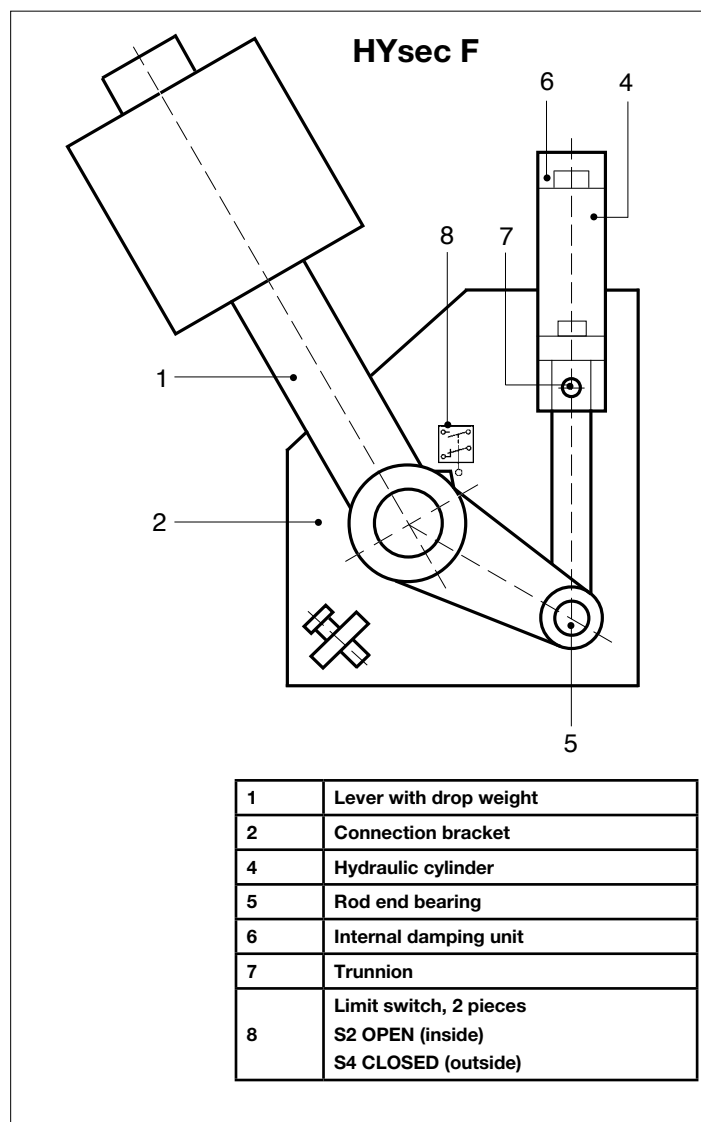
3.2 Design

In general, the following types are available (see pictures below):

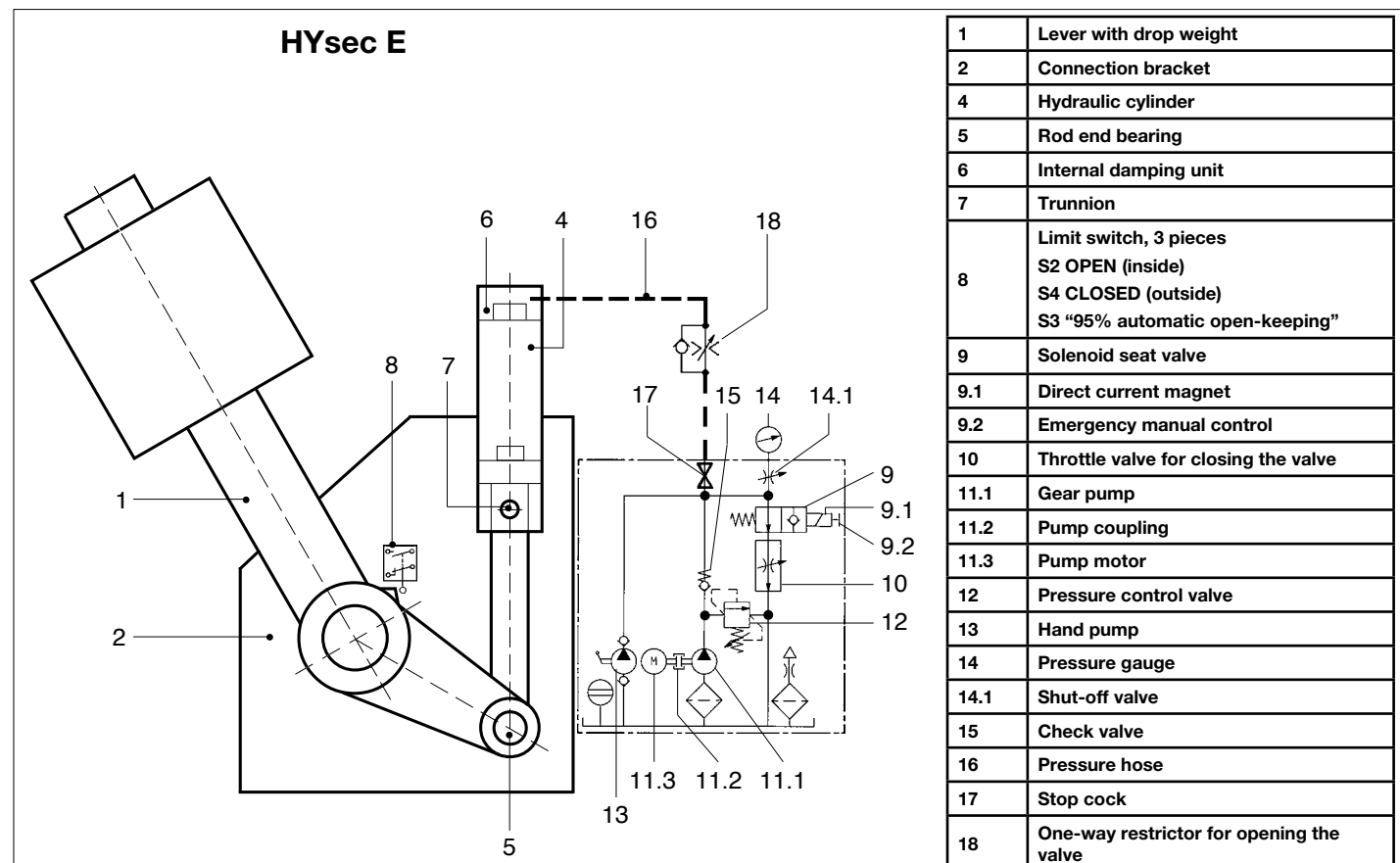
- HYsec F (with external oil supply, supplied by others)
- HYsec E (with internal motor driven oil supply)

3.2.1 HYsec F (with external oil supply, supplied by others)

The VAG HYsec F (with external oil supply, supplied by others) consists of a single-acting hydraulic cylinder whose piston per-



Picture 3: Assembly of the VAG HYsec F (with external oil supply, supplied by others)



Picture 4: Assembly of the VAG HYsec E (with internal motor driven oil supply)

forms the brake and lift function.

For the connection of the oil supply, a cutting ring fitting to ISO 8434-1 (DIN 2353) has been provided. The connection port on the rod side is closed by a vent screw. As an alternative, the connections of the hydraulic cylinder with pipe thread can be used after the removal of the screw fittings.

For the dimensions of the connections, please refer to the order-related specifications.

The hydraulic cylinder (4) is suspended via two trunnions (7) in the connection bracket (2).

The piston rod is connected by a rod end bearing (5) with the drop-weight lever (1) on the valve.

An internal damping unit (6) is installed in the bottom of the cylinder.

The damping path is about 5% of the cylinder stroke.

As a standard, at least two limit switches (8) to signal the end positions "OPEN" and "CLOSE" are mounted on the connection bracket (2).

3.2.2 HYsec E (with internal motor driven oil supply)

The VAG HYsec E (with internal motor driven oil supply) is the ready-for-service variety of the HYsec F (with external oil supply).

Here all actuation and control devices are combined in one unit.

To put it into operation, the HYsec E just has to be connected to the power system at the terminal strip.

The electric controller is not included in the scope of supply, but it can be installed as an accessory.

The elements required for control and regulation are integrated in the pump block and/or connected to the block by flanges.

The solenoid seat valve (9) controls the opening and closing movement of the valve.

As a standard, this valve is designed as "normally open" (zero-signal current), with a 24 V direct current magnet (9.1).

Conversion to "normally closed" (working current) as well as the use of other common DC voltages is possible by the correctly dimensioned replacement of the solenoid seat valve.

The seat valve can be operated manually via the emergency manual control (9.2).

Via the throttle valve (10) the closing time of the valve is adjusted by lowering the drop weight.

The pump unit is connected to the hydraulic cylinder (4) with a pressure hose (16).

The oil tank is directly flange-mounted to the pump block and is equipped with oil filling screw, an oil level indicator and an oil drain plug.

The pump unit consists of a gear pump (11.1), a pump coupling (11.2) and a pump motor (11.3).

This unit determines the opening time of the valve in dependence of the size of the actuator.

In the event of a power failure, the valve can be opened with the help of the hand pump (13) which is flange-mounted to the pump block.

The integrated pressure control valve (12) protects the hydraulic system during pump operation.

The valve is factory-adjusted and locked. Later readjustment is not permissible.

The pressure gauge (14) monitors the control pressure and can be shut off with the help of the shut-off valve (14.1).

For the indication of the limit positions, two limit switches (8) for positions 'OPEN' and 'CLOSED' are mounted on the connection bracket (2). A third "95%" limit switch serves to control the valve's being kept open automatically in case of the VAG HYsec E version (see also performance data and appendix of your order-related documentation).

If the customer designs the control unit, we recommend providing the automatic return of the drop weight. Should the drop weight slowly sink during a longer period of standstill, the limit switch "95% automatic open-keeping" gives the start command to the pump and the drop weight is turned into open final position again.

3.3 Terminal box

In the terminal box, all connections of the electric devices installed at the VAG HYsec E are located on a terminal strip (see terminal diagram).

3.3.1 Technical specifications of the terminal box

- Dimensions: 200 x 200 x 80 (WxHxD)
- Material: Steel plate 1.5 mm
- Seal: Foam-embedded in the cover
- Degree of protection: IP 65
- Surface: Powder coating, slightly structured

3.3.2 Terminal diagram

For further information about the terminal connection diagram, please refer to the appendix to your order-related documentation.

4 Installation into the pipeline

4.1 On-site requirements

For installation of the complete valve assembly between pipeline flanges, the flanges must be plane-parallel and in true alignment. If the pipes are not in alignment, they must be aligned before installation of the valve, as otherwise this may result in impermissibly high loads acting on the valve body during operation, which may eventually even lead to fracture.



When installing the valve into the pipeline, make sure it is as tension-free as possible. The pipeline forces transmitted to the valve must not exceed the maximum forces specified by EN 1074-5. The space between the flanges must be wide enough to ensure that the coating of the raised faces of the flanges is not damaged while the valve is being inserted.

In case of works around the complete valve assembly causing dirt (e.g. painting, masonry or concrete work), the valve must be

protected by adequate covering.

For assembly in drinking water pipelines, suitable sealing materials, lubricants and process materials must be used which are approved for use in drinking water pipelines.

If the valve is stored for a long time, the seals may become brittle and the corrosion protection may resinify. Perform a visual inspection to check for transport damage and impurities.

Before putting the valve into operation, clean and purge the corresponding pipeline sections. For this operation, DVGW Instruction Sheets W 291 and W 346 must be observed.

4.2 Place of installation



The place of installation of the complete valve assembly must be selected to provide sufficient space for operation, function checks and maintenance works (e.g. dismantling and cleaning of the valve).

If the complete valve assembly is installed in the open, it must be protected against extreme atmospheric influences (e.g. formation of ice) by adequate covers.

The complete valve assembly must be protected against submersion.

4.3 Installation position



The complete valve assembly must be installed according to the order-related drawing.

For all other installation positions, in particular non-horizontal positions, the manufacturer cannot ensure the proper function of the valve and/or the equipment.

Any other, deviating installation conditions need to be specified when the order is placed and have to be agreed separately with the manufacturer.



Warning: The direction arrow on the complete valve must be observed.

Storage and operation of the hydraulic brake-and-lift unit are only admissible in places/positions where no oil can run out.

4.4 Assembly instructions

Check the complete valve assembly for any damage that it may have suffered during transport and storage. Protect the complete valve assembly against dirt from the construction site by adequate covering until installation. When installing the valve, thoroughly clean all components, this is important for proper function. VAG does not assume any liability for consequential damage caused by dirt, shot-blasting gravel residues etc..

When the hydraulic actuator and the valve are painted later on, the function parts and identification plates must not be painted over. If the equipment is sand-blasted to clean it prior to installation, these parts must be adequately covered. If solvents are used for cleaning, it must be ensured that the solvents do not destroy the seals of the pipeline or the valve.

When connecting the valve with the pipeline flanges, hexagon bolts and nuts with washers from flange to flange must be used in the through holes.

Fasten the bolts evenly and crosswise to prevent unnecessary tension and possibly resulting cracks or breaks. The pipeline must not be pulled towards the valve. Should the gap between valve and flange be too wide, this should be compensated by thicker seals.

We recommend using steel-reinforced rubber seals to DIN EN 1514-1 Shape IBC. If you use flared flanges, these seals must be used.

While the valve is being installed, you must ensure that the flanges of the pipeline it is connected to are aligned and level with each other. Welding works on the pipeline must be performed before the valves are installed to prevent damage to the seals and the corrosion protection. Welding residue must be removed before the equipment is put into operation.

The pipeline must be laid in a way that prevents harmful pipeline forces from being transmitted to the valve body. Should construction works near or above the valve not be completed yet, the valve must be covered to protect it from dirt.



4.5 Connection to the power supply

Risk of dangerous voltage!

Ensure all electrical work not described in this instructions is performed exclusively by a qualified and skilled person.

Lay the feeder cable in a way that is safe and prevents tripping, clinging, damage, jamming, detaching, dropping etc. (under the ground or at a sufficient height on buildings or poles).

Equip the plant with a residual-current circuit breaker (FI RCCB).

Danger of damage to the motor!

Always comply with the specifications on the rating plate of the motor.

Compare the type of current, mains voltage and frequency.

The type of current, system voltage and frequency are to be compared. The rated current for the setting of the protective circuit-breaker needs to be observed.

4.5.1 Grounding the hydraulic unit

Ensure that the hydraulic unit is properly grounded (equipotential bonding)!

4.5.2 Electrical connections

All electrical connections must be made by a skilled person in compliance with the applicable safety and accident prevention regulations. The relevant installation and operation regulations (e.g. for cable cross sections, fusing, connection of PE conductor and emergency shut-off) must be observed.

Depending on the type of the hydraulic unit, it can be connected to the power system in one of the following ways:

- connection of the motor only
- connection of the motor and of some components
- connection of the motor and of the components of a terminal box
- connection of the hydraulic unit to the control cabinet (optional)

For further information on the individual varieties, please refer to the sections below.

For installation use adequate screwed connections suitable for the connection cables used. Properly close all screwed connections and/ or cable entries to the terminal box which are not needed. Protect the motor against overheating by a suitable protection device, e.g. a motor protecting switch with phase-failure protection. At standstill and when the switch has been triggered, the motor must be completely de-energised. By equipotential bonding it must be ensured that the grounding potentials and the equipotential bonding currents between the bodies of the equipment do not differ.

Connection of the motor

According to its degree of protection, the motor is dust-proof and splash-proof.

- Check whether the electrical specifications of the hydraulic unit and the control unit match.
- Connect the feed cable to the motor.

The terminal diagram can be found in the terminal box of the electric motor.

Connection of individual components (HYsec F)

Individual components are connected according to the operation instructions of the respective components.

Connection to the terminal box (HYsec E)

The individual components are connected centrally in the terminal box according to the terminal diagram (3.3.2).

Connection to the control cabinet (optional)

Components are connected in the control cabinet according to the circuit diagram.

4.5.3 Emergency-off

The individual or entity putting the machine / plant into circulation in which the hydraulic brake-and-lift unit is installed needs to provide an emergency shut-off device.

Parts of the hydraulic unit may still be pressurised after an emergency shut-down and must be depressurised. Lower the drop weight until it reaches its lower final position. Release the pressure by keeping the solenoid seat valve (9) and the stop-cock (17) open (check pressure on the pressure gauge 14). Switch off the electric unit.

4.5.4 Checking the sense of rotation of the motor

If the motor is connected directly, perform the test as described below:

- Identify the sense of rotation of the motor by switching it on shortly (test run) at the plant control unit.

- The sense of rotation must be identical with the direction arrow. If the sense of rotation is not identical with the direction arrow, the phases must be reversed.

4.6 Hydraulic connections

To avoid transverse forces and distortion on pipelines and devices do not use excessive force. Ensure that the pipes are properly supported.

For sealing only the common screwed connections and sealing systems for oil hydraulics lines must be used; never use hemp or adhesive cement. This may cause pollution and malfunctions as a result.

To prevent external leakage, the installation instructions of the manufacturers of the screwed connections must be complied with. We recommend using screwed connections with elastic seals.

For pipelines, seamless precision steel pipes to DIN 2391/Part 1 and 2 must be used.

Ensure that hose assemblies are properly routed to prevent the assemblies from chafing and hitting against other components.

All assembly work performed (including electrical installations) must be checked by an expert after completion and must be documented completely.

Always use your personal protective equipment (safety rope, safety shoes, protective gloves etc.) where and when required.

Prior to any work on the hydraulic unit and the electrical equipment switch off the mains switch and secure it against inadvertent switching on by a padlock (remove key) and attach a warning sign.

Mount the collection tank under the hydraulic unit to be able to collect the entire amount of fluid in the event of leaks. If the collection tank is not included in the scope of delivery, the individual or entity circulating the equipment must procure and attach a collection tank on site.



Warning: For the type HYsec F (with external oil supply, supplied by others) the installation and operation instructions of the manufacturer of the hydraulic unit must be observed.

4.7 After assembly

Re-fasten all screws and nuts on the device using a torque wrench. Comply with the standardised torques specified for each connection element.

Before putting the unit into operation, check the motor protection for proper function.

5 Set-up and operation

5.1 General

Before putting the hydraulic actuator, the valve and the equipment into operation, perform a visual inspection of all functional elements. Check all screwed connections for proper fastening. In addition to this, all safety instructions described in this manual must be observed.

Note: Running the pump in dry operation is not permissible as this may damage or even destroy the pump.

According to Directive 2006/42/EC the equipment must not be commissioned until it has been established that the machine/plant in which the valve with the hydraulic brake-and-lift unit is to be installed complies with the provisions of all relevant EU directives.

As a result of the assembly of components further / other types of danger may occur. It is therefore essential to observe the instructions given in the operation manual of the entire plant. This applies especially to "mechanical hazards" (EN 12100-1, DIN EN ISO 14121-1) which may arise due to the mechanical movements of the machine initiated by the hydraulic unit and the hydraulic actuator (cylinder, motor).

After the assembly has been properly completed, commissioning and the function check can begin.

5.2 Preparing the test run

- General visual inspection to identify damage caused in transit and impurities.
- Check whether the drop weight is firmly in place
- Additionally, the dimension from the centre of the driven shaft up to the centre of the drop weight must be checked based on the associated drawing.
- Check whether the pipes have been cleaned and properly mounted.
- Check whether the screwed connections and flanges have been fastened.
- Check whether the lines and cables and/or devices have been properly connected according to the installation drawings and/or circuit diagram.
- Check whether the drive motor has been properly connected.
- Check whether the prescribed hydraulic fluid has been filled up to the upper oil level mark.

5.3 Performing the test run

For the test run, all staff not in charge should leave the danger area!

Only the machine manufacturer's staff and, if applicable, maintenance and operating staff should be present. If required, suitable personal protective equipment such as goggles and a helmet should be worn.

Accident prevention:

If, in the drop weight area, no protective grating has been installed yet when the equipment is put into operation, it must be ensured that nobody is in the danger zone. If in case of larger nominal diameters people enter the pipeline while the valve is open, the drop weight must be secured mechanically in addition.

5.4 Opening of the Valve

- Open the shut-off valves completely
- Check whether the sense of rotation of the drive motor matches the prescribed sense of rotation of the pump

- Switch the motor on shortly and test!
- Close the solenoid seat valve
- Start the pump, run it up from zero and listen whether it makes any unusual noise
- The drop weight is lifted

Note:

When the final open position is reached, it must be ensured that the pump motor (11.3) is properly switched off via the limit switch.

- Vent the plant. While doing so, carefully unfasten screw connections or venting plugs located in a high position. Proper venting is ensured if no oil foam is present in the tank, no abrupt movements occur at the consumer and no unusual noise can be heard.
- After the filling procedure, firmly refasten the screwed connections.

5.5 Closing the valve

For safety reasons, the actuation of the valve by the drop weight must be checked via the stop-cock (17) during commissioning and after repair work, i.e. this stop-cock must be closed. When the unit is now activated via the solenoid seat valve (9), the drop weight remains in its upper final position.

Now the closing movement is initiated by slowly opening the stop-cock (17).

If the hydraulic brake-and-lift cylinder functions trouble-free, the stop-cock can be fully opened now.

The stop-cock then remains open. The closing time is adjusted via the throttle valve (10).



Warning: Before the automatic control is switched on, the stop-cock (17) must be open.

Note:

- Monitor the control and measuring devices
- Check whether there are unusual noises
- Monitor the oil level and refill oil, if necessary
- Tightness check
- Refasten all screwed connections, even if they are tight



Warning: Only refasten the screwed connections when the plant is depressurised

5.6 Function check and pressure test

Before installation, the function parts of the complete valve assembly have to be opened and closed completely at least one time and their operability has to be checked.



Warning: The pressure exerted on the closed valve must not exceed its nominal pressure (see technical data sheet of the valve documentation). When a pressure test is performed on the pipeline during which the test pressure exceeds the permissible rated pressure in the closing direction of the valve, pressure compensation must be ensured via a bypass.

Prior to any tests, newly installed pipeline systems should be carefully purged to remove all foreign particles. If residue or dirt particles are left in the pipeline, they may clog the installations during the purging procedure. This may impair or even block the function of the hydraulic actuator and the valve.

Especially after repair work but also during the set-up of new equipment, the pipeline system must be purged again with the valve fully open. When using detergents / disinfectants, make sure they do not attack any of the materials.

5.7 Safety instructions for operation

The hydraulic unit must not be operated if:

- maintenance and repair work is being performed
- the hydraulic unit is damaged or suspected to be damaged during operation
- the hydraulic unit is not or incompletely filled with oil.

Should any damage or destruction be detected at the hydraulic unit, at the places where it is attached or at the supply lines or should safe operation be impossible for other reasons (bearing slackness, defect seals), the hydraulic unit must be shut off immediately and be secured against inadvertent operation and/or must not be put into operation at all.

6 Maintenance and repair

6.1 General safety instructions

Prior to the performance of inspection and maintenance work on the valve or its assemblies, shut off the pressurised pipeline, depressurise it and secure it against inadvertent activation. Depending on the type and risk of the fluid conveyed, comply with all required safety regulations!

After completing the maintenance works and before resuming operation, check all connections for tightness. Perform the steps described for initial set-up as described under Section 5 "Set-up and operation".

Statutory and local provisions as well as the safety and accident prevention regulations must be observed and complied with at all times.

Any damage that may be caused by electric current and current flow must be prevented. Couplings and connections must never be disassembled when they are under pressure or current-bearing.

Servicing, maintenance and inspection work as well as the replacement of spare parts must only be done by qualified staff. The plant operator is responsible for determining the suitability of the staff and/or for ensuring the relevant qualifications.

In case the operator's employees do not have the qualifications required, they need to attend a training course before performing

any work. This training course can e.g. be held by VAG Service employees.

In addition to this, the plant operator needs to ensure that all employees have understood this instruction as well as all further instructions referred to in them.

Protective equipment such as safety boots, safety helmets, protective clothing, goggles, protective gloves etc. must be worn at all times for work requiring such protective equipment or for which such protective equipment is prescribed.

Improper, wrong and abrupt use of the valve should be avoided. Prior to the performance of any work on the valve and equipment, it must be ensured that the relevant pipeline section has been depressurised and/or de-energised.

6.2 Inspection and operation intervals

The VAG HYsec brake-and-lift unit should be checked monthly for proper function.

The drop weight lowers when the solenoid seat valve (9) is opened for a short time. In automatic mode the valve returns to open position immediately. In addition to this, the following inspections have to be performed monthly:

- Oil level: When the valve is open (drop weight in top position) up to the middle of the oil inspection glass
- Pressure at the pressure gauge: When the valve is open (drop weight in top position) the pressure at the pressure gauge should not drop below 10 bar.
- Automatic return to open position: The pump motor should not switch more frequently than once per hour.

In case of extreme operating conditions, inspections should be performed more frequently.

6.3 Maintenance work and replacement of parts

The schematic representation in Section 3.2 serves as a parts overview for the descriptions and working steps given below.



6.3.1 Recommendation for the replacement of parts

- Change the oil every four years or more often if this should become necessary due to the operating conditions and the condition/pollution of the oil (see also Section 6.3.2).
- Replace the seals every five years.
- Replace the hose assemblies after a service period of six years maximum including a storage time of two years maximum (see also Section 6.3.4)

In case of extreme operating conditions, replacement intervals may be shorter than the recommended replacement intervals.

6.3.2 Oil change

Lower the drop weight until it reaches its lower final position. Release the pressure by keeping the solenoid seat valve (9) and the stop-cock (17) open. Check pressure at the pressure gauge (14). Switch off the electric unit. Remove the oil filler plug. Remove the oil drain plug on the oil tank and drain the waste oil into a collecting basin provided for this purpose. Always drain and refill the oil when it is warm from operation.

Filling the hydraulic system

Screw in all oil drain plugs. Fill in the oil passing it through a fine sieve. The oil level should be in the middle of the oil inspection glass when the piston rod is extended. To vent the system, open and close the valve several times. Add more oil, if necessary.



Warning: Very old oil cannot be improved by refilling fresh oil. The oil must be replaced completely.

The maintenance intervals between the oil changes mainly depend on the condition of the hydraulic fluid (e.g. water or particles present in the hydraulic fluid), the operating temperature and the filling amount. By laboratory tests and adequate care the replacement intervals can be considerably increased as a rule.

The following overview provides information on the condition of the hydraulic fluid by simple visual inspection. However, accurate information can only be provided by a laboratory test.

Findings	Impurities	Possible cause
Oil has darkened	Oxidation products	Overheating, failure to change oil (possibly penetration of external oil)
Milkiness	Water or foam	Water or air have entered
Separation of water	Water	Water has entered, e.g. from coolant
Air bubbles	Air	Air has entered, e.g. due to lack of oil or leaky suction line
Suspended or deposited particles	Solid foreign matter	Abraded particles, dirt, ageing products
Odour of burnt oil	Ageing products	Overheating

Recommended oil:	RENOLIN MR 520 (or equivalent)
Manufacturer:	Fuchs Eu rope Schmierstoffe GmbH Mannheim
Oil quantity:	Described in the customer's or der-related technical specifications

6.3.3 Replacement of seals

When the oil is exchanged, all soft seals exposed to dynamic stress should also be replaced.

6.3.4 Replacement of hose assemblies

We recommend replacing all hose assemblies when the oil is changed.

Fatal accidents, physical injury and damage to property may be caused by improper selection or use of hose assemblies. Do not use hoses or hose assemblies of unknown origin or with incomplete identification!

Defective hose assemblies must be replaced immediately!

According to EN 982, hose assemblies must meet all the requirements specified in the relevant European and/or international standards.



Warning! Reinforced hose assemblies must only be replaced by equivalent hose assemblies.

Test/Inspection

Unless otherwise provided, hose assemblies should be checked for safe working condition by qualified staff before they are put into service and not later than six months afterwards.

The instructions of the hose manufacturers with regard to storage time must be complied with. The storage room should be cool (up to 25° C), dry and protected against direct sunlight. Avoid ozone emitting sources as ozone will shorten the useful life of the hose.

Storage time and time of use



A hose assembly should not be used for more than six years, including a storage period of two years maximum (extract from DIN 20066). Time of use means the time during which a hose assembly is in service and stored, beginning on the date of manufacture.

When the hose assembly is produced, the hose (bulk hose) should not be older than four years. VAG will not assume any warranty for consequential damage resulting from aged pipelines.

For the procurement of spare parts, the DIN 20066 standard "Hose assemblies" contains information on: Dimensions, requirements, tests and identification.

Replacement of hose assemblies

Hose assemblies must be replaced if the following defects are identified during inspection:

- Cover damaged down to the reinforcement (e.g. abraded cover in some places, cuts or cracks)
- Hose cover has become brittle (formation of cracks in the hose material)
- Deformation which does not correspond to the natural shape of the hose assembly, both in the depressurised and in the pressurised state (see also DIN 20066)
- Leaks on the hose, hose assembly or hose fitting
- Damage or deformation of the hose fitting which reduces the function and the resistance of the hose fitting or the connection between hose and fitting
- Hose moves out of the fitting (screwed connection)
- Corrosion of the hose fitting impairing its function and resistance
- Failure to observe the requirements for installation (see DIN 20066)
- Storage time and time of use exceeded.

6.3.5 Test and inspection reports

The inspection and maintenance work as well as the leakage tests performed must be documented continuously. The associated test reports and the VAG maintenance booklet can be ordered directly from the VAG Service Department.

Service hotline: +49 621-749 2222

Service by email: service@vag-group.com

7 Trouble-shooting

For all repair and maintenance work, please observe the general safety instructions described in Section 6.1!

Problem		Possible causes		Remedial action	
The motor pump (11.3) is switched on, but the drop weight does not move up from closed position.	Solenoid seat valve (9) not closed.		Magnet voltage not OK.	Zero-signal current: Check whether required voltage is available.	
				Working current: Check whether magnet is currentless.	
			Magnet defective.	Exchange magnet.	
			Solenoid seat valve defective.	Replace seat valve.	
	After test-closing the stop-cock (17) the pressure at the pressure gauge does not rise.	Motor pump (11.3) does not deliver oil.	Motor voltage not OK.	Check motor voltage.	
			Motor defective.	Exchange motor.	
			Pressure control valve (12) defective.		Exchange pressure control valve.
	Pressure at pressure gauge increasing but the drop weight does not moving upwards.	Value set at pressure control valve (12) too low.		Set pressure control valve to a higher value (220 bar max.)	
		Actuating forces have changed.	Frictional forces have increased.	Eliminate stiffness.	
			Operation conditions have changed.	Recheck the operating torques conditions.	
The motor pump (11.3) is switched on, but the drop weight moves up from closed position too slowly.		Pump defective.		Replace defective pump.	
		Not enough oil in the upper tank.		Refill oil.	
When valve is kept open automatically, motor pump (11.3) starts too often.		Solenoid seat valve (9) leaking		Disassemble the solenoid seat valve, clean it and replace it, if necessary.	
		Check valve (15) leaking.		Disassemble the check valve, clean it and replace it, if necessary.	
		Piston in cylinder (4) leaky.		To exchange the piston seal, the brake-and-lift cylinder must be disassembled.	
Drop weight does not lower after quick-closing operation has been activated.	After the activation of the quick-closing operation the pressure at the pressure gauge does not drop.	Stop-cock (17) closed.		Open stop-cock by turning it to the left.	
		Flow at throttle valve (10) shut-off.		Release throttle cross section by turning the rotary knob to the right.	
		Solenoid seat valve (9) not open.	Magnet voltage not OK.	Zero-signal current: Check whether magnet is energised.	
	Working current: Check whether required voltage is available.				
		After the activation of the quick-closing operation the pressure at the pressure gauge drops.	Drop weight torque too low	Frictional forces have increased.	Eliminate sluggishness. As above .

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