

Compact Unit for Commercial Vehicles

For use in centralized lubrication systems

Product line:

KFU2(6)-...

KFUS2-...



Owner's Manual - Containing Installation, Operation and Maintenance Instructions

(Original installation instructions in accordance with EC-Machinery Directive 2006/42/EC)

Version 04



WARNING:

Read this owner's manual before installing, operating or maintaining the product. Failure to follow the instructions and safety precautions in this owner's manual could result in serious injury, death, or property damage. Keep for future reference.



Masthead

This owner's manual - containing installation, operation and maintenance instructions complies with EC-Machinery Directive 2006/42/EC and is an integral part of the described product. It must be kept for future use.

This owner's manual - containing installation, operation and maintenance instructions was created in accordance with the valid standards and regulations on documentation, VDI 4500 and EN 292.

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SKF Lubrication Systems Germany GmbH reserves the right to make content and technical changes.

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Information concerning EC Declaration of Incorporation

For the product(s) designated below:

Compact Unit

Product line:

KFU2(6)-...
KFUS2-...

SKF herewith certifies that it conforms to the pertinent safety requirements set forth in the following Council Directive(s) for the harmonisation of the laws of the Member States...

- **Machinery Directive 2006/42/EC**
- **Electromagnetic compatibility 2014/30/EU**
- **RoHS Directive 2011/65/EU**

SKF further declares that the above mentioned product is meant for integration into a machinery / for connection to other machinery according to the **EC-Machinery Directive 2006/42/EC, Appendix II Part B**. Starting up the product is not permissible until it is assured that the machinery, vehicle or the like in which the product was installed meets the provisions and requirements of the regulations set forth in the EC Directive 2006/42/EC.

Notes:

- (a) This declaration certifies conformity with the aforementioned directive(s), but does not contain any assurance of properties.
- (b) The safety instructions in the owner's manual must be observed.
- (c) The certified product must not be started up until it is confirmed that the equipment, machinery, vehicle or the like in which the product was installed meets the provisions and requirements of the national directives to be applied. This is in particular important for the implementation of the Use of Work Directive.
- (d) Operation of the products on non-standard main voltage as well as nonobservance of installation instructions can affect the EMC properties and electrical safety.

Notes on the Pressure Equipment Directive 2014/68/EU

Due to its performance characteristics, the product does not reach the limit values defined in Article 4, Paragraph 1, Subparagraph (a) item (i) and is, pursuant to Article 4, Paragraph 3, excluded from the scope of Pressure Equipment Directive 2014/68/EU.

The EC Declaration of Incorporation is part of the product documentation. This document is delivered with the product.





Safety information in owner's manual

Meaning of symbols and corresponding information

In this owner's manual, the symbols and words shown on this page are meant to communicate a particular risk to persons, material assets, or the environment.

Be sure all persons exposed to these risks read this manual. Keep it near the equipment for future reference.

Hazard symbols

Symbole	Standard	Use
	DIN 4844-2 W000	General risk of injury or damage
	DIN 4844-2 W008	Voltage
	DIN 4844-2 W026	Hot surface
	DIN 4844-2 W028	Slip hazard

Instructions attached directly to the equipment, such as rotational direction arrows and fluid connection labels, must be followed. Replace such signs if they become illegible.

-) Rotational direction arrow
-) Fluid connection label



Keywords in safety informations and their meanings

Keyword	Use
Danger!	Indicates a danger of injury to persons
Caution!	Indicates a danger of damage to property or the environment
Notice!	Indicates additional information

Read this Owner's Manual before installing, operating or maintaining the product. Failure to follow the instructions and safety precautions in this owner's manual could result in serious injury, death, or property damage. Keep for future reference.

Note: Not every symbol and corresponding information described in the Safety Information is used in this owner's manual.

Information symbols

Symbol	Use
	Prompts you to take action
•	Indicates other issues, causes or circumstances
)	Used for bulleted lists
→	Provides additional information
	Prompts you to take action

1. Safety information



These instructions must be read and understood by all persons who are involved with the installation, operation, maintenance, and repair of the product. These instructions must be kept close to the equipment for future reference.



Note that these installation instructions is an integral part of the product. It must be handed over to the new operator of the product if the product is sold.

The described product was manufactured in accordance with all generally acknowledged regulations pertaining to technology, occupational safety, and accident prevention. However, dangers that can cause physical injury to persons or damage to other material assets might still occur during the use of the product. This product should only be operated if it has been installed in accordance with these instructions and is safe to operate. In particular, malfunctions that might affect the safety of the product must be rectified immediately.



In addition to the information provided in the installation instructions, all generally applicable regulations on accident prevention and the environment must be observed.

1.1 Intended use



All SKF Lubrication Systems Germany GmbH products must only be used for their intended purpose and in accordance with the specifications of the installation instructions for the product in question.

The described product is for supplying centralized lubrication systems with lubricant and is intended for use in centralized lubrication systems. Any other use of this product constitutes improper use.

Hazardous materials of any kind, especially the materials classified as hazardous by CLP Regulation EC 1272/2008 may only be used to fill SKF centralized lubrication systems and components and delivered and/or distributed with the same after consulting with and receiving written approval from SKF.

None of the products manufactured by SKF Lubrication Systems Germany GmbH can be used with gases, liquefied gases, gases dissolved under pressure, steams or fluids that will reach a steam pressure of more than 0.5 bar above the normal atmospheric pressure (1013 mbar) in the permissible application temperature range.

Unless otherwise noted, products of SKF Lubrication Systems Germany GmbH must not be used in conjunction with explosive atmospheres according to the ATEX-Directive 94/9/EC.

1.2 Authorized personnel

The products described in the installation instructions may only be installed, operated, maintained, and repaired by qualified experts. Qualified experts are persons who have been trained, instructed, and familiarized with the end product into which the described product is installed. These persons are considered capable of such tasks due to their education, training, and experience with valid standards, conditions, accident prevention regulations, and installation measures. They should be able to carry out the required tasks and to recognize - and thus avoid - any dangers that might otherwise occur.

A definition of what constitutes a qualified person and who are unqualified persons are stipulated in DIN VDE 0105 and IEC 364.

1.3 Danger relating to electric current

The electrical connection for the described product may only be established by qualified, instructed persons who have been authorized by the operator or owner to carry out this task. All local electrical operating conditions and regulations such as DIN and VDE must be observed. Improperly connected products can result in considerable damage to property and serious injury to persons.

**Danger!**

Working on products that have not been disconnected from the power supply can cause serious injury or death to persons. Installation, maintenance, and repair work may only be carried out by qualified experts on products that have been disconnected from the power supply. The supply voltage must be turned off before any product components are opened.

1.4 Danger relating to system pressure

**Danger!**

Centralized lubrication systems are under pressure when they are being operated. Such systems must therefore be depressurized before starting installation, maintenance, or repair work and before making any changes to the system.

1.5 Warranty and liability

SKF Lubrication Systems Germany GmbH assumes no warranty and liability if one of the following circumstance should occur:

-) Not intended use
-) Improper installation/disassembly or improper operation of the product
-) Use of contaminated lubricants or lubricants which are not approved
-) Improper maintenance or repairing of the product
-) Using of unoriginal SKF Lubrication Systems Germany GmbH spare parts
-) Making alterations or modifications to the product, which are not approved and signed by SKF Lubrication Systems Germany GmbH
-) Non-observance of the advices about transport and storage

2. Lubricants

2.1 General information



All SKF Lubrication Systems Germany GmbH products must only be used for their intended purpose and in accordance with the specifications of the installation instructions for the product in question.

The intended use of this product is for the centralized lubrication/lubrication of bearings and wear points with lubricants. All physical limitations of use stipulated in the documentation of the product such as the owner's manual, technical drawings and catalogues must be observed.

Note that hazardous substances of any kind and - in particular - the substances that are classed as hazardous in accordance with EC-Directive 67/548/EC Article 2, Paragraph 2 may only be inserted into and conveyed/distributed by centralized lubrication systems and components following consultation with SKF Lubrication Systems Germany GmbH and with the express written permission of the company.

Products manufactured by SKF Lubrication Systems Germany GmbH are not approved for use in conjunction with gases, liquefied gases, gases dissolved under pressure, vapours, and fluids with a vapour pressure of more than 0.5 bar above

normal atmospheric pressure (1013 mbar) at the maximum permitted temperature.

Should there be a need to use the product to convey media other than lubricants or hazardous substances, this must be discussed with SKF Lubrication Systems Germany GmbH first and the company must give express written permission.

In the opinion of SKF Lubrication Systems Germany GmbH, lubricants constitute a design element that must be considered when selecting components and designing centralized lubrication systems. The lubrication properties of the lubricants in question must be considered.

2.2 Selection of lubricants



You must observe the machinery manufacturer's information on the lubricants to be used in the machinery.



Caution!

The manufacturer of the bearing or machinery to be lubricated will specify the lubricant requirements for each point to be lubricated. You must make sure that the required quantity of lubricant is provided to the relevant lubricating point. If a lubricating point is insufficiently lubricated, the bearing may become damaged or jammed.

While the machinery/bearing manufacturer usually specifies lubricants, it is the owner/operator (or maintenance person) who must finally select the appropriate lubricant, with the help of the lubricant supplier. When selecting a lubricant, the type of bearing/wear point, the stresses and strains to be expected during operation, and anticipated ambient conditions must be taken into account. All financial/economic aspects must also be considered.



If required, SKF Lubrication Systems Germany GmbH can help customers to select suitable components for the conveyance of the selected lubricant and to plan and design their centralized lubrication system.

If you have further questions, you can contact SKF Lubrication Systems Germany GmbH. We can test lubricants in our own laboratory to establish their suitability for conveyance (e.g. 'oil separation' behaviour) in centralized lubrication systems. You can request an overview of lubricant tests offered by SKF Lubrication Systems Germany GmbH from our Service department.

2.3 Approved lubricants

**Caution!**

Only lubricants that have been approved by SKF for use with the product may be used. Unsuitable lubricants can cause product malfunctions and damage to property.

**Caution!**

Different lubricants must not be mixed together. Doing so can cause damage and require extensive cleaning of the products/centralized lubrication system. To prevent confusion, we recommend that you attach information indicating the lubricant to be used on the lubricant reservoir.

The described product can be operated with lubricants that comply with the specifications in the technical data.

Note that some lubricants may have properties that lie within the permitted limit values and yet not be suitable for use in centralized lubrication systems for other reasons. For example, some synthetic lubricants are not compatible with elastomers.

2.4 Lubricants and the environment

**Caution!**

Lubricants can contaminate the ground and watercourses. Lubricants must be used and disposed of properly. Country specific regulations and laws on the use and disposal of lubricants must be observed.

Note that lubricants are harmful to the environment and flammable; their transportation, storage, and processing are subject to special precautionary measures. For specifications on transportation, storage, processing, and dangers to the use and the environment for the lubricant, refer to the material safety data sheet provided by or available from the lubricant manufacturer. You can ask the manufacturer of the lubricant for the material safety data sheet.

2.5 Danger relating to lubricants

**Danger!**

Centralized lubrication systems must be leak-tight. Leaking centralized lubrication systems can cause a slip hazard. When performing installation, maintenance, and repairs test the centralized lubrication system for leaks. Leaky parts of the centralized lubrication system or components of the lubrication equipment have to be sealed immediately.

Leaking centralized lubrication systems or components of the lubrication equipment are a source of danger in relation to slip hazard and the risk of injury. These dangers can cause physical injury to persons or damage to other material assets.



Lubricants are hazardous substance. Refer to safety precautions in the lubricant manufacturer's material safety data sheet.

You can ask the manufacturer of the lubricant for the material safety data sheet.

3. Design and function

3.1 General information

Compact units of the KFU(S)... series are reservoir units with electrically driven gear pumps that contain all hydraulic and electrical components required for the operation of a piston distributor system. Thanks to their compact construction, compact units can be used to set up piston distributor systems to lubricate commercial vehicles very easily with low mounting effort. In the standard design, compact units of the KFU(S)... series are designed for use with NLGI grade 00 and 000 fluid greases. Special designs for oil and for the lubrication of industrial machinery are available on request.

3.2 Design

In the basic design, compact units of the KFU(S)... series contain an electrically driven gear pump (power supply 12 V or 24 V DC), a lubricant reservoir made of plastic (3 and 6 liter rated capacity), and a pressure relief valve with a pressure-regulating valve mounted inside the compact unit. A filler coupling with integrated strainer is provided for the filling of the lubricant reservoir and can be accessed by removing the unit's cover cap. Special designs with filling covers are available on request. A fill level switch can optionally be installed to monitor the minimum fill level.

The plastic reservoirs consist of transparent plastic (3 and 6 liter rated capacity) that allows visual inspection of the fill level. Due to the components built into the reservoir, a maximum of 80% of the theoretical reservoir capacity (rated capacity) can be utilized.

The purpose of the pressure relief valve mounted within a compact unit is to reduce the system pressure that builds up during a lubricating cycle to a residual level of ≤ 0.5 bar once the motor is turned off. This is necessary for the operation of the piston distributors.

The purpose of the pressure-regulating valve mounted within the compact unit is to restrict the system pressure in the lubrication system to a maximum permissible value. The pressure-regulating valve within a compact unit of the KFU(S)... series is set for a maximum system pressure of 30 bar.

Compact units of the KFU(S)... series are available in models with or without a control unit. In models without a control unit (Commercial Vehicles and Industrial), the compact unit (and thereby the lubrication interval) is controlled by the control unit of the commercial vehicle/machine that the compact unit is mounted on. In models with a control unit (only commercial vehicles), the compact unit is equipped with an electronic control unit that controls the compact unit (and thereby the lubrication interval).

For models without a control unit, compact units of the KFU(S)... series are connected to a supply voltage of 12V or 24V DC using a 2-pin M24x1 circular connector with reverse voltage protection (positive and negative terminal). Models with a control unit use a 4-pin DIN 72585-A1-4.1-Ag/K1 circular connector (only PIN 1 and 2, PINs 3 and 4 are not used).

For both models, optional monitoring devices such as float switches can be connected directly through the electrical connection of the monitoring device.

Depending on the model, the compact unit may also have a pushbutton under the cover cap. The pushbutton is provided for manual interim lubrication.

Depending on the model, the hydraulic pressure connection to the main lubricant line is established through a connector for tube $\varnothing 10$ mm or via a pipe thread for a solderless tube connection for tube $\varnothing 10$ mm. The pipe thread for the solderless tube connection has a size of M16x1.5.

An overflow pipe is fitted on the left side of the compact unit for aeration of the reservoir and as a safeguard against overflow.

The standard design uses NLGI grade 00 und 000 fluid greases as lubricants. Special designs for oil are available on request.

For detailed information about the function and the electrical connection of the unit, consult the hydraulic layout and electrical circuit diagram of the compact unit's documentation.



If no documentation is available, you can request the documentation directly from SKF Lubrication Systems Germany GmbH.

3.3 IG490+924 Control Unit

Control unit IG490+924 (24V DC) is used in compact units of the KFU(S)... series that are equipped with control units. Control unit IG490+924 is designed as a PCB and is mounted on the compact unit under a separate cover cap. This control unit acts as a timer with four different interval times (6, 9, 11 and 20 hours). The lubrication time interval (pump cycle time) is fixed at 160 seconds. Different interval times can be configured by setting two jumpers directly on the compact unit board. The standard interval time is set at 9 hours.

3.4 Function

3.4.1 General

Compact units of the KFU(S)... series are generally used in single-line systems with piston distributors. Single-line systems with piston distributors are total-loss lubrication systems.

3.4.2 Total-loss lubrication systems

Total-loss lubrication systems feed clean lubricant (oil, liquid grease or grease) to one or more lubrication points at specific intervals (dependent on time or machine cycle) during the lubricating cycle time (contact time, pump cycle time). The quantity of lubricant fed is measured so that the lubrication points are supplied with adequate lubricant during the total-loss lubrication system's interval time to maintain a lubricant film between the friction partners. The lubricant fed to the lubrication point is partially consumed during operation due to aging, evaporation, and leaks. An interval-controlled supply of lubricant to the lubrication point is required in order to ensure that the lubrication point receives adequate lubrication. Such systems are referred to as intermittently operated centralized lubrication systems.

Lubrication points cannot be cooled when using a total-loss lubrication system.

3.4.3 Single-line systems with piston distributors

Single-line systems with piston distributors generally consist of a reservoir unit, and here include a compact unit, piston distributors, and lubrication lines. The pressure-regulating valve and pressure relief valve required for the centralized lubrication system's operation are mounted in the compact unit.

If pressure losses of greater than 10 bar are expected in the centralized lubrication system, for example due to expansion of the system or due to the viscosity of the lubricant (depending on the ambient temperature), a pressure switch should be mounted to monitor the system, at the end of the main lubricant line if possible. The pressure switch monitors whether the required pressure build-up occurs in the centralized lubrication system during the pump cycle time.

The pump delay time specified by the control unit or machine control unit (8 - 15 seconds are recommended; other delay times are possible depending on the layout of the centralized lubrication system) ensures pressure build-up in the centralized lubrication system. Pressure in the main lubricant line must be relieved after the pump is switched off in order to ensure proper functioning of the piston distributors. This is performed by the pressure relief valve mounted in the compact unit. On centralized lubrication systems with extended main lubricant lines longer than 100 m, the main lubricant line must be designed as a ring line (use the second pressure port P) and the relief procedure in the centralized lubrication system must be facilitated using additional valves (using the return connection R).

3.4.4 Lubricating cycle sequence

The sequence of a lubricating cycle depends on the type of piston distributors in use. Piston distributors are differentiated into prelubrication distributors and relubrication distributors. Prelubrication distributors deliver the metered quantity of lubricant at the same time that pressure is built up in the lubricant line. Relubrication distributors supply the metered quantity of lubricant after the pressure relief procedure in the lubricant line.

3.4.4.1 Lubricating cycle of prelubrication distributor

After the electric motor is switched on, the lubricant is drawn out of the lubricant reservoir by the gear pump and fed through the lubricant line to the relubrication distributors via the pressure relief valve and the pressure-regulating valve. The pressure built up in the centralized lubrication system meters the lubricant separately for each lubrication point and feeds it to the consuming points. After the electric motor is switched off, the pressure is relieved in the centralized lubrication system. In this process, the lubricant is moved within the prelubrication distributor from the spring chamber into the metering chamber. The centralized lubrication system is ready for the next lubricating cycle.

3.4.4.2 Lubricating cycle of relubrication distributor

After the electric motor is switched on, the lubricant is drawn out of the lubricant reservoir by the gear pump and fed through the lubricant line to the relubrication distributors via the pressure relief valve and the pressure-regulating valve. The pressure built up in the centralized lubrication system feeds the lubricant into the storage chamber of the relubrication distributors. After the electric motor is switched off, the pressure is relieved in the centralized lubrication system. In this process, the lubricant is metered within the relubrication distributor and delivered to the lubrication point (relubrication effect). After the lubricant has been completely expelled to the lubrication point, the centralized lubrication system is ready for the next lubricating cycle.

4. Installation instructions

Compact units described in the installation instructions may only be installed by qualified experts.

Qualified experts are persons who have been trained, instructed, and familiarized with the end product into which the described compact unit is to be installed. These persons are considered capable of such tasks due to their education, training, and experience with valid standards, conditions, accident prevention regulations, and operating measures. They are entitled to carry out the required tasks and to recognize - and thus avoid - any dangers that might otherwise occur.

A definition of what constitutes a qualified person and who are unqualified persons are stipulated in DIN VDE 0105 and IEC 364.

Before installing/positioning the compact unit, remove the packaging material and any transportation safety devices such as sealing plugs. Keep the packaging material until you are sure that there are no delivery discrepancies that need to be clarified.



Caution!

Compact units must not be tipped up or dropped.

When performing any assembly work on commercial vehicles or machines, local accident prevention regulations as well as specific operational and maintenance instructions provided by the operator must be followed.

4.1 Positioning and mounting

Compact units should be mounted in a way that protects it from humidity and vibrations. It should also be easily accessible so that all other installation work can be carried out without problems. Make sure that there is a sufficient amount of circulating air to prevent the excessive heating of the compact unit. For information on the maximum permitted ambient temperature, see the technical data at the end of this owner's manual.



For the product-specific technical data on a specific compact unit, see the relevant documentation. If no documentation is available, you can directly request the documentation from SKF Lubrication Systems Germany GmbH.

The product must be mounted vertically in accordance with the specifications of the documentation.

Assembly holes for fastening the compact unit must be made according to the specifications in the chapter "Mounting dimensions".

**Warning!**

During assembly and especially when drilling, always pay attention to the following:

-) Existing supply lines must not be damaged by assembly work.
-) Other units must not be damaged by assembly work.
-) The product must not be installed within range of moving parts.
-) The product must be installed at an adequate distance from sources of heat.
-) Maintain safety clearances and comply with local regulations for assembly and accident prevention
-) Use existing bores on the vehicle frame or other parts of the vehicle.
-) Bridge larger bores with large diameter washers.
-) Pay attention to the steer angle and deflection, and look out for possible areas where chafing can occur during installation.

**Warning!**

For tankers and vehicles that transport hazardous goods, the provisions of the Ordinance on inland and transboundary transport of hazardous goods by road, by rail and by inland waterways (GGVSEB) must be complied with.

**Warning!**

All changes to motor vehicles, especially the installation of auxiliary equipment, such as centralized lubrication systems, must be examined and approved by the competent technical authorities in the country of the operator. Non-compliance can lead to termination of the operating license for the vehicle.

4.2 Mounting dimensions

Compact units of the KFU(S)...series are intended for wall mounting (industrial model) or for mounting on the vehicle (commercial vehicle model). They are attached to the intended mounting location using appropriate fastening materials (e.g., bolts, washers, and nuts).

For the dimensions and location of the fixing holes, see the documentation of the compact unit. If no documentation is available, the dimensions and location of the fixing holes for mounting the unit can be determined by taking measurements.



If no documentation is available, you can directly request the documentation from SKF Lubrication Systems Germany GmbH .

4.3 Electrical connection

4.3.1 Electric motor connection

Compact units of the KFU(S)... series are driven by DC motors. The DC motors used are designed to work with a voltage of 12V or 24V DC. For models with control units, compact units of the KFU(S)... series are designed for use with 24V DC alone.

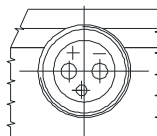


Danger!

Electrical connections for the product may only be established by qualified and trained personnel authorized to do so by the operator. The local conditions for connections and local regulations (e.g., DIN, VDE) must be strictly observed. Significant bodily injury and property damage may result from improperly connected products.

For models without a control unit, compact units of the KFU(S)... series connect to the 12V or 24V DC supply voltage using a 2-pin circular connector M24x1 with reverse voltage protection (positive and negative terminal). In the case of models with a control unit (only 24V DC), a 4-pin DIN 72585-A1-4.1-Ag/K1 circular connector is used (only PIN 1 and 2, PINs 3 and 4 are not used).

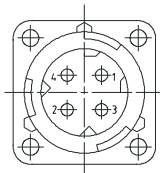
Fig. 1: 2-pin connection plug



Steckerbelegung/Connection terminal

Stift Nr. pin no.	Fkt. funct.	
+	+15	Plus-Potential/plus potential
-	-31	Minus-Potential/minus potential

Fig. 2: 4-pin connection plug



Steckerbelegung/Connection terminal

Stift Nr. pin no.	Fkt. funct.	
1	+15	Plus-Potential/plus potential
2	-31	Minus-Potential/minus potential
3		nicht belegt/ not used
4		nicht belegt/ not used

For models without control units, the electrical connection of the electric motor is established directly via the 2-pin plug (Fig. 1). In models with a control unit (only 24V DC), the electric motor is connected to electronic control unit IG490+924. The connection of the electronic control unit to the supply voltage is established via a 4-pin plug (Fig. 2, only pins 1 and 2, pins 3 and 4 are not used).



Danger!

The available mains voltage (supply voltage) must be in accordance with the specifications on the rating plate of the motor or of the electrical components. Check the fuse protection of the electrical circuit. Use only fuses with the prescribed amperage, else bodily injury and property damage may result.

Be sure to connect the motor so as to guarantee a continuously safe electrical connection (no protruding wire ends); use the assigned cable end fittings (e.g. cable lugs, wire end ferrules). Select connecting cables conforming to DIN VDE 0100 taking into account the rated current and the conditions of the specific system (e.g. ambient temperature, type of routing etc. in accordance with DIN VDE 0298 or IEC / EN 60204-1).

Details on the electrical connection of the compact unit to the power supply, especially the connector pin assignment, can also be found in the compact unit's documentation.

Consult the motor's rating plate or the documentation of the compact unit for the electrical characteristics of the electric motor, such as rated power and rated current.



If no documentation is available, you can request the documentation directly from SKF Lubrication Systems Germany GmbH .

4.3.2 Control unit IG490+924

Control unit IG490+924 (24V DC) is used in compact units of the KFU(S)... series that are equipped with control units. Control unit IG490+924 works independently and takes over control of the lubrication interval. It is designed as a PCB and is mounted on the compact unit underneath a separate cover cap. This control unit acts as a timer with four different interval times (6, 9, 11 and 20 hours). The lubrication time interval (pump cycle time) is fixed at 160 seconds. Different interval times can be configured by setting two jumpers directly on the compact unit board. The standard interval time is set at 9 hours.

Fig. 3: Board layout

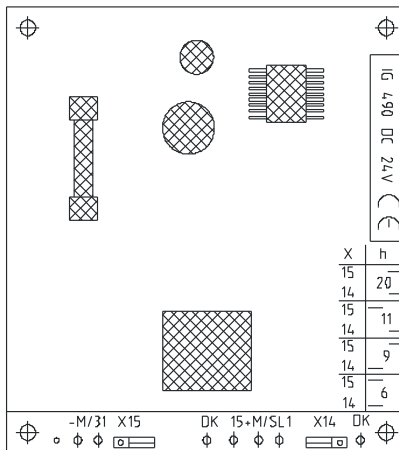
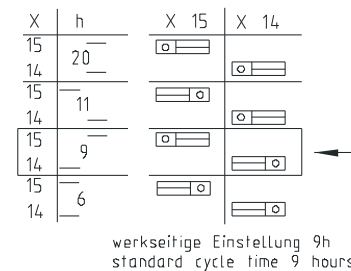


Fig. 4: Jumper settings

Pausenzeiteinstellung per Jumper
Setting of interval time with jumpers



Schmierzeiteinstellung 160 s.
Setting of lubrication time 160 s

The electrical connection of the control unit to the 24V DC power supply is established via a 4-pin plug as seen in Fig. 2

For details on the electrical connection of the control unit, consult the documentation of the compact unit.



If no documentation is available, you can request the documentation directly from SKF Lubrication Systems Germany GmbH .

4.4 Lubrication line connection

The lubrication line must be connected to the lubrication unit so that no forces can be transmitted to the lubrication unit once it is mounted (strainless connection).



Caution!

The fittings used for the lubrication line should be designed for use at the maximum operating pressure of the lubrication unit. Otherwise, the lubrication system must be protected against excessively high pressure by means of a pressure relief valve.

For operating pressures up to 45 bar - as are common on single-line piston distributor systems - SKF fittings for solderless tube connection (double or single tapered sleeves) can be used. For higher operating pressures of up to 250 bar - as are common on progressive centralized lubrication systems - SKF cutting sleeve screw unions as per DIN 2353 should be used. If using fittings produced by other manufacturers, the installation instructions and technical data of the manufacturer in question must be observed.

See the following advice for compact units of the KFU(S)... series fitted with quick connectors for tube \varnothing 10mm:



When inserting the main lubricant line into the plug-in connector, two notch steps should be clearly noticeable.

4.5 Laying of lubrication line

The following information should be observed for the laying of the main lubrication lines and lubricating point lines in order to ensure that the entire centralized lubrication system works smoothly.

The main lubrication line should be dimensioned in accordance with the maximum pressure and conveyance volume to which the lubrication unit is exposed. Where possible, the main lubrication line should climb from the lubrication unit and enable deaeration at the highest point of the lubrication line system.

Lubricant distributors at the end of the main lubricant line should be mounted so that the distributor outlets point upwards. If lubricant distributors have to be positioned below the main lubricant line for system design reasons, they should not be so placed at the end of the main lubrication line.

The pipes, hoses, cut-off valves, control valves, fittings, and so on must be suitable for the maximum operating pressure of the lubrication unit, the permitted temperatures, and the lubricants to be conveyed. In addition, the lubrication system must be protected against excessively high pressure by means of a pressure relief valve.

All components of the lubrication line system – including pipes, hoses, cut-off valves, control valves, fittings, and so on – must be carefully cleaned before installation. No seals on lubrication line systems should protrude inwards in a way that disrupts the flow of the lubricant and could allow contaminants to enter the lubrication line system.

Lubrication lines must be laid in a way that prevents air pockets from forming anywhere on the system. Cross section changes to the lubrication line from a small to a large cross section in the direction of flow of the lubricant are to be avoided. Transitions from one cross section to another should be smooth.

The flow of the lubricant in the lubrication lines should not be impeded through the incorporation of sharp bends, corner valves, or check valves. Unavoidable cross section changes in lubrication lines must have smooth transitions. Wherever possible, sudden changes of direction are to be avoided.

**Caution!**

Lubrication lines must be leak-tight. Lubricants can contaminate the ground and watercourses. Lubricants must be used and disposed of properly. Country specific regulations and laws on the use and disposal of lubricants must be observed.

**Danger!**

Centralized lubrication systems must be leak-tight. Leaking centralized lubrication systems are a source of danger in relation to slip hazard and the risk of injury. When making installation, maintenance, and repair work test the centralized lubrication system for leaks. Leaky parts of the centralized lubrication system or components of the lubrication equipment have to be sealed immediately.

Leaking centralized lubrication systems or components of the lubrication equipment are a source of danger in relation to slip hazard and the risk of injury.

These dangers can cause physical injury to persons or damage to other material assets.



Lubricants are hazardous substance. Refer to safety precautions in the lubricant manufacturer's material safety data sheet.

You can ask the manufacturer of the lubricant for the material safety data sheet.

5. Transport, delivery and storage

5.1 Transport

SKF Lubrication Systems Germany GmbH products are packaged in accordance with the regulations of the recipient country and in accordance with DIN ISO 9001. Our products must be transported with care. Products must be protected against mechanical influences such as impacts. Transport packaging must be labelled with the information 'Do not drop!'.



Caution!

The product must not be tipped up or dropped.

There are no restrictions relating to land, air, or sea transportation.

5.2 Delivery

Following receipt of the shipment, the product or products must be checked for damage and the shipping documents should be used to make sure that the delivery is complete. Keep the packaging material until you are sure that there are no delivery discrepancies that need to be clarified.

5.3 Storage

The following conditions apply to the storage of SKF Lubrication Systems Germany GmbH products.

5.3.1 Storage of lubrication units

-) Ambient conditions: Dry, dust-free environment; storage in well-ventilated, dry area
-) Storage time: 24 months max.
-) Permitted air humidity: < 65%
-) Warehouse temperature: 10 - 40°C
-) Light: Direct sunlight/UV radiation must be avoided; nearby sources of heat must be screened

5.3.2 Storage of electronic and electrical devices

-) Ambient conditions: Dry, dust-free environment; storage in well-ventilated, dry area
-) Storage time: 24 months max.
-) Permitted air humidity: < 65%
-) Warehouse temperature: 10 - 40°C
-) Light: Direct sunlight/UV radiation must be avoided; nearby sources of heat must be screened

5.3.3 Storage - general information

-) Ensure that no dust gets into stored products by wrapping them in plastic film
-) Store products on racks or pallets to protect them from damp floors
-) Before placing products into storage, protect uncoated metal surfaces - and drive parts and mount surfaces in particular - from corrosion using long-term corrosion protection
-) At 6-monthly intervals: Check products for corrosion. If signs of corrosion are found, remove the corrosion that has already resulted and improve the corrosion protection measures.
-) Drives must be protected against mechanical damage

6. Operation

The described compact units are operated automatically or manually depending on the design. The transport of lubricants through the lubrication lines should be subjected to regular visual checks.

6.1 Lubricant filling

The lubricant fill level in the lubricant reservoir should be subjected to regular visual checks. If the lubricant fill level is low, lubricant should be added up to the MAX mark.



You must observe the lubricant manufacturer's instructions and precautions on the lubricant to be used.



Caution!

Only clean lubricant may be added. Use the filler neck of the reservoir and fill in the lubricant with a suitable device. Contaminated lubricants can result in serious system malfunctions. The lubricant reservoir must be filled in a way that keeps it free from bubbles.



Caution!

Different lubricants must not be mixed together. Doing so can cause damage and require extensive cleaning of the compact unit/centralized lubrication system. To prevent confusion, we recommend that you fit an adhesive label on the reservoir with the information indicating the lubricant to be used on the lubricant reservoir.

6.2 Startup

Before starting up the compact unit, check all electrical, hydraulic, and - if appropriate - pneumatic connections.

The lubricant may only be conveyed if it is free from bubbles. Fill the lubricant reservoir - if used - with clean lubricant without allowing any bubbles to form. For deaerating the compact unit/centralized lubrication system, start running the compact unit until bubble-free lubricant escapes all lubricating points.

The process of deaerating the centralized lubrication system is facilitated by:

-) Opening the ends of the main pipe until bubble-free lubricant escapes
-) Filling longer pipe sections before connecting the system to the lubricating point

A coupling socket is required for the filling of compact units of the KFU(S)... series. Coupling sockets can be obtained from SKF Lubrication Systems Germany GmbH using order number:

-) **995-001-500**

7. Shutdown

7.1 Temporary shutdown

You can temporarily shut down the described product by disconnecting the electrical, pneumatic, and/or hydraulic supply connections. For more information, see the section 'General information' in this installation instructions.

If you wish to shut down the product temporarily, refer also to the instructions in the section 'Transport, delivery, and storage' of this owner's manual.

When placing the product back into operation, refer to the information in the sections 'Installation' and 'Startup' of this owner's manual.

7.2 Permanent shutdown

All country specific legal guidelines and legislation on the disposal of contaminated equipment must be observed when shutting down the product for the final time.



Caution!

Lubricants can contaminate the ground and watercourses. Lubricants must be used and disposed of properly. Country specific regulations and laws on the use and disposal of lubricants must be observed.

SKF Lubrication Systems Germany GmbH will take back the product and arrange for its legal disposal. Costs to the customer will be limited to SKF's incurred costs.

8. Maintenance

**Danger!**

To prevent chance of serious injury or death, disconnect the product from main power supply before working on it. Installation, maintenance, and repair work may only be carried out by qualified experts on a product that is not connected to a power supply.

**Danger!**

Centralized lubrication systems are under pressure when they are being operated. Centralized lubrication systems must therefore be depressurized before starting installation, maintenance, or repair work and before making any changes to the system.

**Danger!**

The described product may be under pressure when it is being operated. The product must therefore be depressurized before starting installation, maintenance, or repair work and before making any changes to the system.

SKF Lubrication Systems Germany GmbH products are low-maintenance. However, to ensure that they function properly and to avoid risks right from the startup, all joints and connections should be checked to make sure that they are properly fitted.

If necessary, you can clean the product using gentle, material-appropriate cleaning agents (no alkalis, no soap). For safety reasons, the product should be disconnected from the hydraulic and/or compressed air supplies before cleaning.

During cleaning, it is important to make sure that no cleaning agent enters the inside of the product.

If the system is operated normally with intercompatible lubricants, the inside of the product does not need to be cleaned.

If you accidentally fill the product with an incorrect or contaminated lubricant, the inside of the product does have to be cleaned. If this occurs, contact SKF Lubrication Systems Germany GmbH Services for more information on cleaning procedures



You must not dismantle the product or parts of the product during the warranty period. Doing so invalidates all warranty claims.



Only original SKF Lubrication Systems Germany GmbH spare parts may be used. You must not carry out alterations to the product or use non-original spare parts or resources. Doing so invalidates the warranty.

SKF Lubrication Systems Germany GmbH is not liable for damage caused by improper installation, maintenance, or repair work.

9. Faults

Table 1 gives an overview of possible malfunctions and their causes. If you are unable to rectify the malfunction, please contact SKF Lubrication Systems Germany GmbH Service.



You must not dismantle the product or parts of the product during the warranty period. Doing so invalidates all warranty claims.



All other work relating to installation, maintenance, and repair must only be carried out by SKF Lubrication Systems Germany GmbH Service.



Only original SKF Lubrication Systems Germany GmbH spare parts may be used. It is prohibited for the operator to make alterations to the product or to use non-original spare parts and resources.

Table 1: Fault analysis and rectification

Malfunction	Possible cause	Rectification
Motor fails to start when the operating voltage is applied	No operating voltage on motor	Check mains connection. Check mains plug/cable and connect properly if necessary. Check operating voltage on motor. Check fuse. Check motor circuit breaker.
	Pump blocked	Measure motor current. If current is impermissibly high: Dismantle pump, crank by hand: If resistance is high, replace the pump.
	Motor jammed	Measure motor current. If current is impermissibly high: Dismantle motor, crank by hand: If resistance is high, replace the motor.
Motor runs with difficulty and at a low speed	Sluggish pump	Measure motor current. If current is impermissibly high: Dismantle pump, crank by hand: If resistance is high, replace the pump.
	Sluggish motor	Measure motor current. If current is impermissibly high: Dismantle motor, crank by hand: If resistance is high, replace the motor.
	Impermissible lubricant (see technical data)	Remove lubricant from entire system and dispose of lubricant in the proper manner; fill system with suitable lubricant.
	Pressure too high, pressure-regulating valve is jammed or defective	Check pressure-regulating valve and replace if necessary.
	Ambient temperature too low (see technical data)	Increase ambient temperature.

**Danger!**

Working on products that have not been disconnected from the power supply can cause serious injury or death to persons. Installation, maintenance, and repair work may only be carried out by qualified experts on products that have been disconnected from the power supply. The supply voltage must be turned off before any product components are opened.

**Danger!**

Hot surfaces of an electrical motor can cause burn injuries. The surfaces of a motor should only be touched with protective gloves or when motor is no longer hot.

**Danger!**

Centralized lubrication systems are under pressure when they are being operated. Centralized lubrication systems must therefore be depressurized before starting installation, maintenance, or repair work and before making any changes to the system.

Table 1 (cont.): Fault analysis and rectification

Malfunction	Possible cause	Rectification
Pump does not convey lubricant; no pressure build-up	Pump blocked	Measure motor current. If current is impermissibly high: Dismantle pump, crank by hand: If resistance is high, replace the pump.
	Motor jammed	Measure motor current. If current is impermissibly high: Dismantle motor, crank by hand: If resistance is high, replace the motor.
	Incorrect rotational direction of motor	Check whether rotational direction corresponds to direction indicated by arrow, change rotational direction if necessary.
	Pressure-regulating valve does not close	Check pressure-regulating valve to make sure that opening pressure is correct and that there is no contamination or damage. If opening pressure is incorrect or if the pressure-regulating valve is damaged, change the valve. Only use original SKF spare parts. If contaminated, clean the pressure-regulating valve.
No pressure build-up in the centralized lubrication system	Air in the centralized lubrication system	Vent centralized lubrication system.
	Centralized lubrication system leaky or break in line	Repair centralized lubrication system.
	Pressure-regulating valve does not close	Check pressure-regulating valve to make sure that opening pressure is correct and that there is no contamination or damage. If opening pressure is incorrect or if the pressure-regulating valve is damaged, change the valve. Only use original SKF spare parts. If contaminated, clean the pressure-regulating valve.
	Pressure relief valve does not close	Clean or replace pressure relief valve. Only use original SKF spare parts.
	Impermissible lubricant (see technical data)	Remove lubricant from entire system and dispose of lubricant in the proper manner; fill system with suitable lubricant.
	Fill level too low	Top up lubricant.

Table 1 (cont.): Fault analysis and rectification

Malfunction	Possible cause	Rectification
Lubrication points are insufficiently supplied or not supplied with lubricant during operation.	Metered quantity too small.	Adjust metered quantity (metering) to match requirements at lubrication points.
	Air in the main line.	Vent the main line.
	Main line leaky; break in line or main line clogged.	Repair/replace the main line; clean main line.
	Lubrication point line leaky; break in line or lubrication point line clogged.	Repair/replace the lubrication point line; clean lubrication point line .
	Feeder defective.	Replace feeder.
	Fill level too low.	Top up lubricant.
Lubrication points over-lubricated during operations.	Metered quantity too large.	Adjust metered quantity (metering) to match requirements at lubrication points.

10. Technical data

Compact unit	Unit	KFU2-40+912/924	KFU6-20+912/924	KFUS2-64+924	KFUS2-60-...+924
General					
Flow rate ^{1.)}	l/min	0.14	0.14	0.14	0.14
Connection rating, max.	cm ³	80	80	80	80
Ambient temperature	°C	-25 to +75	-25 to +75	-25 to +75	-25 to +75
Rated capacity of reservoir	liter	3	6	3	3
Reservoir material	-	Plastic	Plastic	Plastic	Plastic
Pressure-regulating valve	bar	38	38	38	38
Pressure relief valve	-	Included	Included	Included	Included
Protection class	-	IP 5K 9K	IP 5K 9K	IP 5K 9K	IP 5K 9K
Operating mode	-	S1	S1	S1	S1
Weight	kg	Around 5.5	Around 7.5	Around 5.5	Around 5.5
NLGI Grade for fluid grease	-	000, 00	000, 00	000, 00	000, 00
Motor					
Rated voltage	Type V DC	Brushed motor 12/24	Brushed motor 12/24	Brushed motor 24	Brushed motor 24
Rated current	A	3.6/1.8	3.6/1.8	1.8	1.8
Current, max.	A	5.3/2.65	5.3/2.65	2.65	2.65
Starting current	A	21/10.6	21/10.6	10.6	10.6
Required fuse	A	16/8	16/8	/8	/8
Rated speed	RPM	1940	1940	1940	1940
Service life	h	3000	3000	3000	3000
Electrical connection					
Type	-	Circular connector -	Circular connector -	Circular connector DIN72585-A1-4.1- Ag/K1	Circular connector DIN72585-A1-4.1- Ag/K1
Number of pins	-	2-pin	2-pin	4-pin	4-pin
Pipe thread	-	M24x1	M24x1	Bayonet	Bayonet
Reverse voltage protection	-	Yes	Yes	Yes	Yes

1.) Based on a back pressure of $p = 38$ bar and ambient temperature of 25°C

10. Technical data (cont.)

Compact unit	Unit	KFU2-40+912/924	KFU6-20+912/924	KFUS2-64+924	KFUS2-60-...+924
Control unit Interval time, adjustable Lubrication time, fixed Pushbutton for manual interim lubrication	h s -	Without - - No	Without - - No	IG490+924 6, 9 ^{2.)} , 11, 20 160 Yes	IG490+924 6, 9 ^{2.)} , 11, 20 160 Yes
Lubrication line connection Tube Ø Pipe thread	mm -	Solderless tube fitting 10 M16x1.5	Solderless tube fitting 10 M16x1.5	Plug-in Connectors 10 Without	Plug-in Connectors 10 Without

2.) Factory setting

Order No. 951-170-006

SKF reserves the right to make content and technical changes!

Last change: 2016-12-21

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Important product usage Information

All SKF Lubrication Systems Germany GmbH products may only be used as intended and as described in the installation instructions. If the installation instructions are delivered with your product, read them carefully and follow them.

Not all lubricants can be conveyed with centralized lubrication systems. If required, SKF Lubrication Systems Germany GmbH can check the lubricant selected by the user to make sure that it is suitable for conveyance in centralized lubrication systems. All lubrication systems and components that are manufactured by SKF Lubrication Systems Germany GmbH are not approved for use in conjunction with gases, liquefied gases, gases dissolved under pressure, vapours, and fluids with a vapour pressure of more than 0.5 bar above normal atmospheric pressure (1013 mbar) at the maximum permitted temperature.

Hazardous materials of any kind, especially the materials classified as hazardous by CLP Regulation EC 1272/2008 may only be used to fill SKF centralized lubrication systems and components and delivered and/or distributed with the same after consulting with and receiving written approval from SKF.

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