KFG, KFGS

Pump Unit

Operating Instructions

This Manual has been compiled in conformity with current standards and regulations of technical documentations, such as VDI 4500 and EN 292.

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Made by
MDC Marketing Design Chemnitz GmbH

Pump Units of the Series KFG, KFGS

Keep for future use!

CE Conformity marking
The pumps of the KFG and KFGS series are marked with the EC conformity sign.

Application of Technical Standards and Guidelines
72/245/EWG (Vehicles)
89/336/EWG (Electromagnetic Compatibility)
98/37/EG (Machines)

Service Center Berlin
✆ (++49) 30-7 20 02-180
✆ (++49) 30-7 20 02-212

Manufacturer's Declaration

We hereby declare that the units and pump units with reservoir of type

FLM, FLMF, M, ME, MF, MFE, MK, MKE, KFG, KFK, OLA, P, PF, PFH, PFP, PFM, PHU, PPU, PMA, PW, PEW, PFPW, ZAN, ZR, ZM, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 132, 133, 134, 142, 143, 149

are **designed as per the EC Machinery Directive 98/37/EC, Annex II B**
for incorporation into a machine / for assembly with other machines to form one machine. Their commissioning shall be prohibited until it is established that the machine into which this part has been installed or with which this part is to be assembled conforms to the provisions of the EC Directive 98 / 37 EC.
Harmonized standards used include, in particular, DIN EN 809, EN 292 Part 1 and EN 292 Part 2.

in respect of the **EC Pressure Equipment Directive 97/23/EC**
may be used exclusively in accordance with the intended purpose and in conformity with the information provided in the documentation. The following shall be, in particular, complied with:
VOGEL products are not designed and approved for use in connection with fluids of group I (Hazardous Fluids) as per the definition given in Article 2, para. 2 of directive 67/548/EEC of 27 June 1967.

VOGEL products are not designed and approved for use in connection with gases, gases dissolved under pressure, vapors and liquids, the vapor pressure of which is greater by more than 0.5 bar than the normal atmospheric pressure (1013 mbar).

When used in conformity with the intended purpose, the products supplied by us will not reach the limit values listed in Article 3, para. 1, clauses 1.1 to 1.3 and para. 2 of the directive 97/23/EC. Thus, they are not covered by the requirements of Annex I of the directive. Consequently, they are not marked with a CE marking in respect of the directive 97/23/EC. They are categorized by us in accordance with Article 3, para. 3 of the directive.

WILLY VOGEL
Aktiengesellschaft

Heinz Gaub
(Member of the Managing Board)

i.V. Ch. Brünner
Christoph Brünner
(Sales Management Industrial Lubrication Systems)

Berlin, 15th November 2002

Certificate of EC Conformation

It is hereby certified that the following product named

Piston pump with vessel

with the order codes:

KFGS 1-5, KFGS 3-5, KFGS 5-5

conforms to the essential protection requirements as laid down in the following directives for the harmonization of legal regulations of the Member States.

Electromagnetic Compatibility
89 / 336 / EWG,
amended by
92 / 31/ EWG, 93/68/EWG

Conformity has been verified by the application of the following (harmonized) European standards:

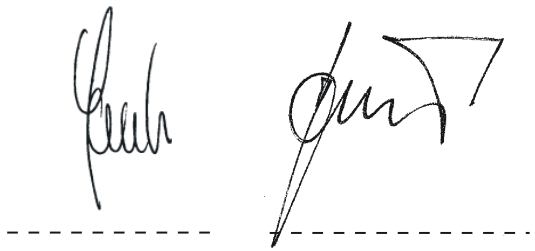
EN 50081-1
EN 50082-2

Motor vehicle 72 / 245 / EWG
amended by
89 / 491 / EWG, 95 /54 / EWG

This declaration has been made in reponsibility for the manufacturer/importer

WILLY VOGEL Aktiengesellschaft
Motzener Strasse 35 / 37, 12277 Berlin
Postfach 480149, 12251 Berlin

by the Members of the Board



Heinz Gaub Manfred Neubert

Berlin, 7th November 2000

- This Certificate testifies the conformation with the said Directives, but it does not include any warranty of qualities.
- The Safety Instructions referred to in the respective paragraphs of the annexed documentation have to be heeded.
- Commissioning of the certified products is prohibited until it has been ensured that the machine, vehicle or the like, where the product has been installed, conforms to the regulations and requirements of the applicable directives.
- Operation of the products with non-standard operating voltage and non-observance of installation instructions may affect the qualities of electromagnetic compatibility and electrical safety.

EC Declaration of Conformity

It is hereby confirmed for the product designated hereinafter:
Piston pump unit
type:
KFG(S)10 (30,50) - 5(W1,W2)+486

that it conforms to the essential safety requirements specified in the following directives of the Council for harmonizing the legal regulations of the Member States.

Electromagnetic Compatibility
89/336/EEC,
as amended by
92/31/EEC
93/68/EEC
91/263/EEC
93/97/EEC

Electrical equipment designed for use within certain voltage limits (Low Voltage Directive)
73/23/EEC
as amended by
93/68/EEC

.

Conformity has been established through the application of the following (harmonized) European standards:

Electromagnetic Compatibility
EMC89/336/EEC
EN 50081-1
EN 50082-2
EN 61000-3-2
EN 61000-3-3

Low Voltage 73/23/EEC
EN 60950
EN 60204-1

This declaration is made on behalf of the manufacturer/importer

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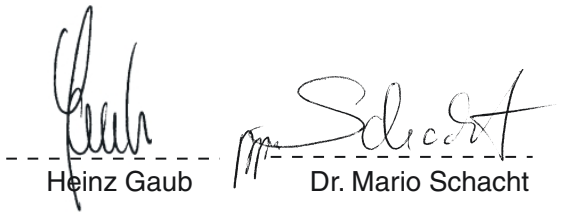
Motzener Straße 35/37, 12277 Berlin
Postfach 480149, 12251 Berlin

by the members of the managing board



Heinz Gaub Dr. Mario Schacht

Berlin, 27th November 2002

- This declaration certifies compliance with the indicated directives, it may not be construed as a warranty of any qualities, however.
- The safety hints contained in the documentation provided for an item shall be observed.
- The products covered by the declaration may not be commissioned unless it has been ensured that the machine, the vehicle or the like into which the product has been installed conforms to the provisions and requirements of the pplicable directives.
- Any use of the products with a mains voltage other than that required by the applicable standards as well as non-observance of installation hints may affect the EMC characteristics and electrical safety.

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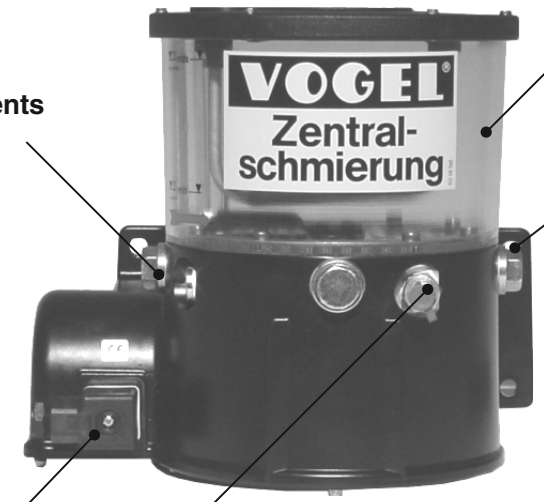
KFG



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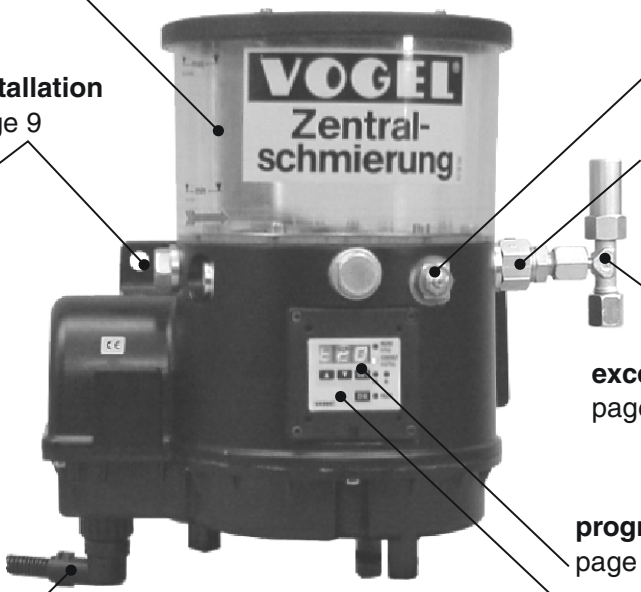

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1. Safety instructions

General

The components have been manufactured in compliance with the generally established rules of engineering as well as with regulations of labour safety and accident prevention. Their use may still provoke dangers, entailing physical harm to the user or third persons or damage to assets. Therefore, the components may be used only when they are in a proper technical state and with due adherence to the operating instructions. Any faults which, in particular, may affect safety have to be eliminated immediately.

Use in compliance with the intended purpose

The pump sets of the VOGEL KFG and KFGS series are applied for feeding centralized lubrication systems in vehicles, equipment and machines. They deliver grease of up to NLGI Class 2. Any use beyond the above purpose shall be deemed as not being compliant with the intended purpose.

Authorized staff

Only qualified staff shall be allowed to install, operate, maintain, and repair the components described in this Manual. Qualified staff shall mean persons who have been trained, commissioned, and instructed by the user of the equipment. Such persons, on account of their training, experience and instructions received, are familiar with the relevant standards, rules, accident prevention regulations and operating conditions. They are authorized to carry out the works required in each case and, when doing so, are aware of possible dangers and are able to prevent them. The definition of qualified staff and the prohibition of employing non-qualified staff is laid down in DIN VDE 0105 or IEC 364.

Exclusion of liability

Willy Vogel AG will not assume liability for damage:

- occurred due to lack of lubricant
- caused by soiled or improper lubricant
- caused due to the installation of non-original Vogel components or Vogel spare parts
- caused due to any use non-compliant with the intended purpose
- due to faulty installation and filling
- due to wrong electrical connection
- due to wrong programming
- due to improper reaction to failures

Installation

When carrying out any installation works on vehicles and machines, regional accident prevention regulations as well as relevant operating and maintenance specifications have to be observed.

Danger by electric current

Only properly trained specialist staff shall be allowed to carry out the electrical connection of the devices, taking into account local conditions for connection and regulations (e.g. DIN, VDE)! Considerable damage to material and persons may be provoked due to the improper connection of devices!

Danger by pressurized systems

Systems may be pressurized so that they have to be depressurized prior to commencing works for extension, modification, or repair of the systems.

Approved lubricants

Greases of up to NLGI Class 2, DIN 51818, and a max. flow pressure of 700 mbar.
The list of approved lubricants is permanently being updated and can be accessed via the following addresses:

„Schmierstoffe für Progressivanlagen“ on:
www.vogelag.com
or via the Service Center, Berlin
fax: ++49 -030 -7 20 02 -138

Note the lists of approved lubricants issued by machine or vehicle manufacturers!

Danger to the environment caused by lubricants

The lubricants as recommended by manufacturers correspond in their composition to current safety regulations. Nevertheless, oils and greases are basically substances endangering the ground water so that their storage, processing, and transport requires to take special safety measures.

Transport and storage

KFG and KFGS pump sets will be packaged as customary in trade, complying with the regulations of the receiving country and VDA 6-01 as well as DIN ISO 9001.
There are no restrictions as to land, air, or maritime transport.
Store in a dry place at a storage temperature from -40 °C to +70 °C.
Packages must be handled with care!

Text portions in this Manual marked with this symbol indicate particular dangers or important operations.

2. Installation

General

The pump sets of the KFG and KFGS series form part of centralized lubrication systems in vehicles, machines, and equipment, delivering greases of up to NLGI Class 2.

The pump sets differ in the size of their lubricant vessels, in their way of filling up lubricant, as well as in their control and monitoring of functions.

The installation of function-specific pump elements allows up to three independent lubricant circuits to be operated by only one pump set.
(see Chapters 2.2 and 2.3).

Installation

Installation of the pump sets KFG and KFGS shall be done on a vehicle or machine by means of 3 M8 bolts. The mounting should be in a place which is protected from outside influence as far as possible. Any bores required for installation shall be made according to the following diagram.
A boring jig can be ordered under article no. 951-130-115.

When carrying out boring operations, mind existing supply lines and other equipment as well as any further sources of danger, such as exhaust pipes or moving parts.
Observe safety distances as well as regional regulations for installation and accident prevention.

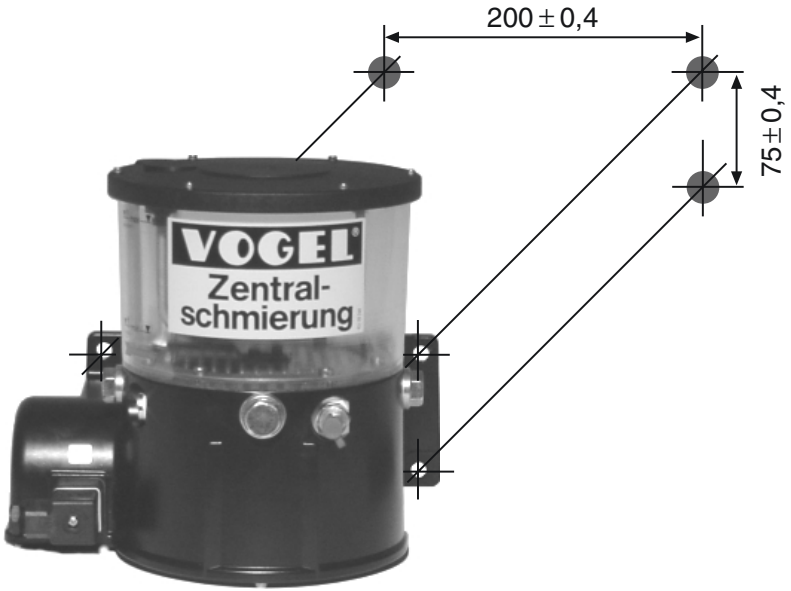
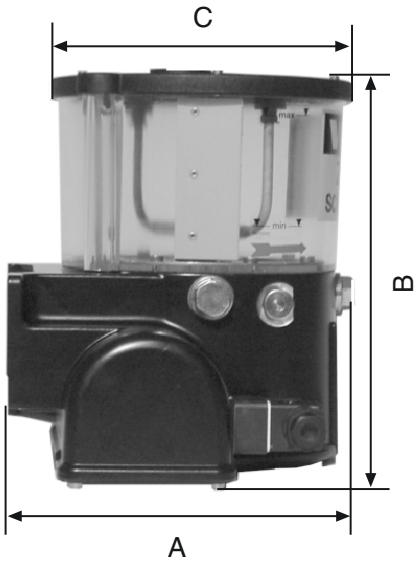


Fig. 1 Bores for installation

2.1 Fitting dimensions



	A (mm)	B (mm)	C (mm)	D (mm)	weight (kg) with filled lubricant vessel
KFG1-5	210	230	ø 180	266	7
KFG3-5	210	412	ø 226	266	11
KFG5-5	210	585	ø 205	266	15
KFGS1-5	210	282	ø 180	266	7
KFGS3-5	210	464	ø 226	266	11
KFGS5-5	210	637	ø 205	266	15
KFG(S)10-5	210	282	ø 180	266	7
KFG(S)30-5	210	464	ø 226	266	11
KFG(S)50-5	210	637	ø 205	266	15

2.2 Pump elements

The KFG and KFGS pump sets are provided with three lubricant outlets, to each of which a separate pump element can be connected for an independent progressively-acting distributor circuit. Where outlets are not required, a screw plug acc. to DIN 910-M20 x 1.5 - 5.8 with gasket ring acc. to DIN 7603-A20 x 24-Al will be inserted.
The pump elements shall be ordered in conformity with the necessary volumetric delivery.

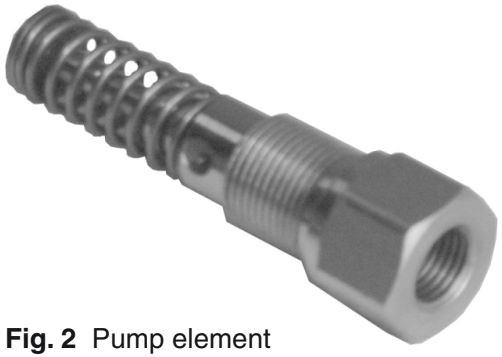


Fig. 2 Pump element

All pump elements are provided with an M14x1.5 internal thread for connecting an **excess pressure valve** with a pipe connector for steel pipes of 6 mm ø or 10 mm ø .

The pump elements are marked with grooves on the outer sides of the wrench contact surface.

Available pump elements

article code	volumetric delivery in cm^3/min	number of grooves
KFG1.U1	2.5	1
KFG1.U2	1.8	2
KFG1.U3	1.3	3
KFG1.U4	0.8	4

The values indicated apply to a temperature of 20 °C, a counterpressure of 50 bar, and greases of NLGI-Class 2.

Example for ordering:
KFG1-5 24 V DC assembled with
2 pcs. KFG1.U4 left-hand and right-hand
1 pc. KFG1.U1 centre

Pump element with constant volumetric delivery without excess pressure valve

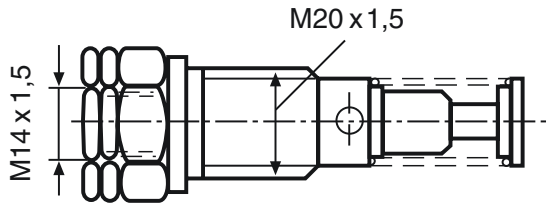
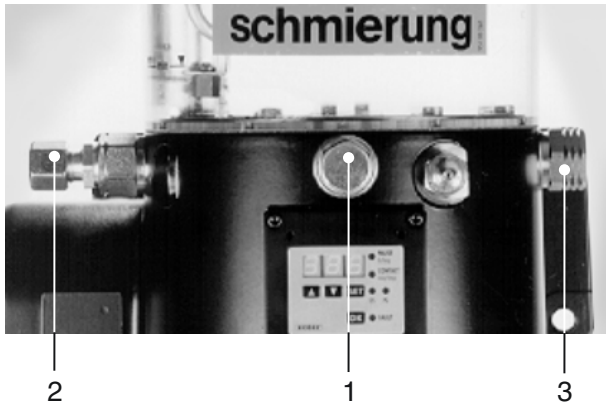


Fig. 3 KFG1.U2



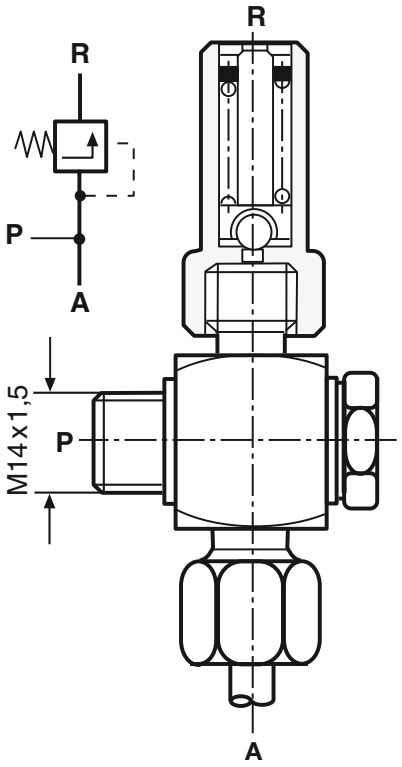
1 screw plug
2 pipe connector
3 pump element KFG1.U3

Fig. 4 Connection of pump elements

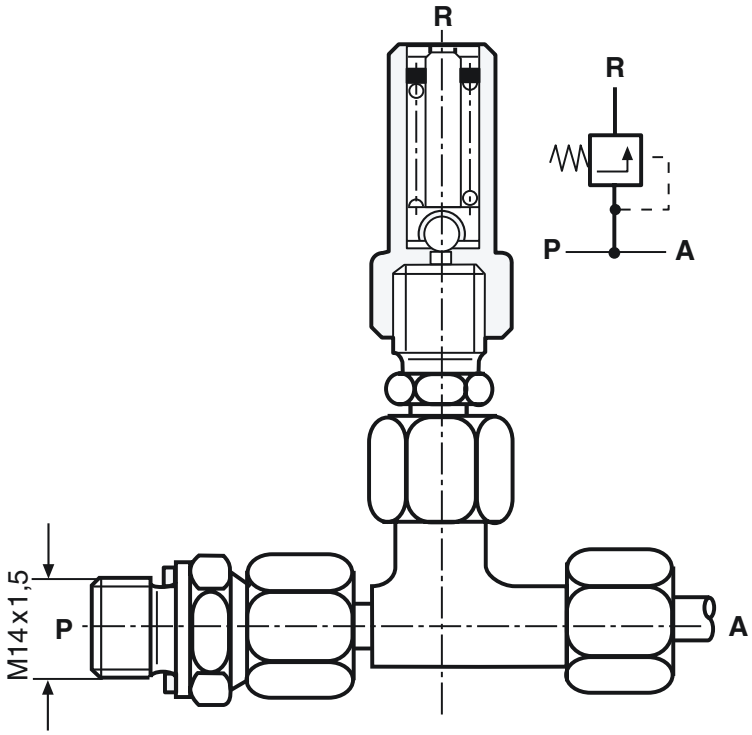
2.3 Excess pressure valve

An excess pressure valve protects the entire lubrication system against excessive system pressures. It is mounted directly on the pump element.
The opening pressure adjusted for this valve is 300 bar.
If any blocking in a progressively-acting distributor or lubrication point causes the operating pressure increase over 300 bar, the valve will open with grease clearly emerging.
This serves for visualized system control.

article code	pipe	opening pressure in bar
161-210-012	ø 6 mm	300 bar ± 20 bar
161-210-016	ø10 mm	



A connector for 6 mm ø pipe
P connecting thread for pump element
R grease outlet in case of fault



A connector for 10 mm ø pipe

Fig. 5 Excess pressure valves

2.4 Filling up lubricant

Cone-shaped grease nipple

Filling with lubricant shall be done through the cone-shaped grease nipple, DIN 71412 -AM10x1, by means of a common grease gun.

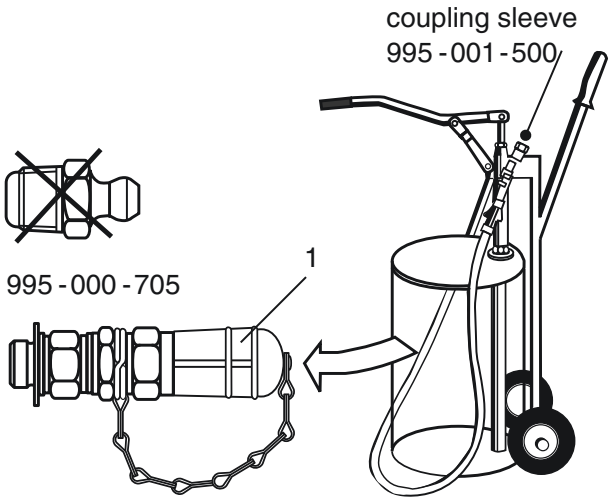
1 cone-shaped grease nipple
2 connection for installation

Fig. 6 Cone-shaped grease nipple

The positioning of the cone-shaped grease nipple may be changed by screwing it in at position 2. Alternatively, connection 2 may be used for fitting a lubricant return system, if any.

Filler coupling (fluid grease)

For single parts, see Vogel Catalogue 1 -9430, page 51. Remove grease nipple and replace it with filler 995 -000 -705. Mount the coupling sleeve 995 -001 -500 on the filling pump.



Remove protective cap 1 for filling operation

Fig. 7 Filling

Filling cylinder

For single parts, see Vogel Catalogue 1 -9430, page 15. Remove screw plug M20 x 1.5 and replace it with filler connector 169 -000 -170. For filling operation, remove protective caps 1 at connector and filling cylinder.

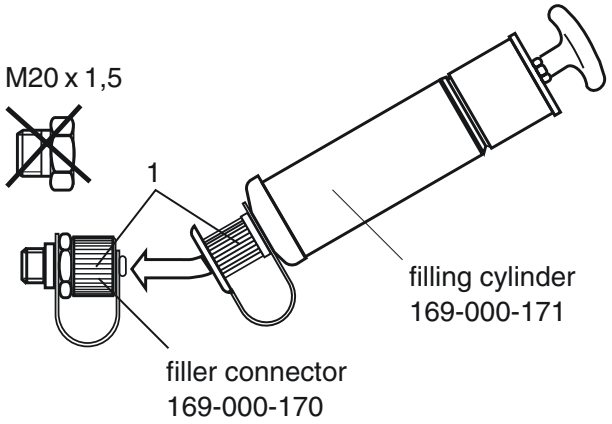


Fig. 8 Filling

Hinged lid

As special design in the KFG3-5, KFG5, KFGS3-5, KFGS5-5 series, lubricant can be filled up through a hinged lid.

KFG3-5
KFGS3-5

KFG5-5
KFGS5-5

Fig. 10 Hinged lid

Fill in only clean lubricant with the help of a suitable tool.
Soiled lubricant leads to serious system trouble!

2.5 Checking of filling level

Visual checking

The transparent lubricant vessel allows visual checking of the filling level. Such checking needs regularly to be carried out for safety reasons.

If the vessel was emptied below the „min“ mark, the entire system has to be vented.

Automatic checking

The pumps of the KFGS series are provided for automatic checking of the filling level. If the level falls below the „min“ mark, the lubrication process is stopped with the error message „FLL“ shown on the display.

2.6 Venting of the system

Take off the main lines at the pump set. Keep pumping until bubble-free lubricant emerges at the screw fitting. Fit the main lines.

Take off the main line at the main distributor. Keep pumping until there is no air in the line. Fit the main line.

Take off the branch lines at the main distributor. Keep pumping until bubble-free lubricant emerges from all connectors of the main distributor. Fit the branch lines.

Then vent the branch lines, branch distributors, lubricant lines and lubrication points and check for proper functioning.

3. Electrical connection

Compare operating voltage with the data on the rating plate.

3.1 General conditions of connection

	nominal voltage	power absorption (load-dependent)	power absorption (max.)	pump starting current (abt. 20 ms)	max. pre-connected fuse
KFG / KFGS application in vehicles	24 V DC	1,25 A [2)]	< 2,5 A	4,5 A	3 A [3) 4)]
	12 V DC	2,4 A [2)]	< 5 A	9 A	5 A [3) 4)]
KFG / KFGS application in the industrial sector	24 V DC [1)]	1,25 A [2)]	< 2,5 A	4,5 A	4 A [4)]
	12 V DC [1)]	2,4 A [2)]	< 5 A	9 A	6 A [4)]
	115 VAC	n.s.[5)]	1,5 A	20 A	C6A
	230 VAC	n.s.[5)]	0,9	40 A	C6A

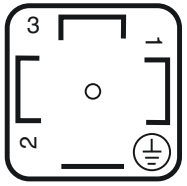
1) protective measures to be applied for the operation according to the intended purpose
„Function-specific extra-low voltage with safe circuit-breaking“
„Protective Extra Low Voltage“ (PELV)

Standards: EN 60204 Part 1:, 1992 /IEC 204-1: 1992, amended
DIN EDV 0100, Part 410 / IEC 364-4-41: 1992

2) typical value for ambient temperature = 25 °C and operating pressure = 150 bar
3) circuitbreaker acc. to DIN 72581 T.3
4) conductor: cross-section 1.5 mm^2, length ≤ 12 m
5) not specified

3.2 Series KFG

Electrical connection is via a pin-and-socket connector according to DIN 43650 type A.



X1 pin-and-socket connection

3.3 External control units

The following external control units are used for controlling the lubrication and pause times as well as for monitoring the lubrication process:

Vehicles	Industry
IG502-E	IGZ 51-2 IGZ 51-2-S2 IGZ 51-2-S7 IGZ 51-2-S8

Mind the operating instructions and functional description provided for the respective control units!

Vehicles

15	+ potential supply voltage (ignition switch ON)
31	- potential supply voltage (0 V, GND)
F	Fuse according to DIN 72581 T3

Industry DC

L+	+ potential supply voltage (machine main switch ON)
M	- potential supply voltage (0 V, GND)

Industry AC

L1/N	Supply voltage machine main switch ON
PE	Protective conductor
1)	External control unit relay contact "Pump ON"
2)	PIN without internal connection

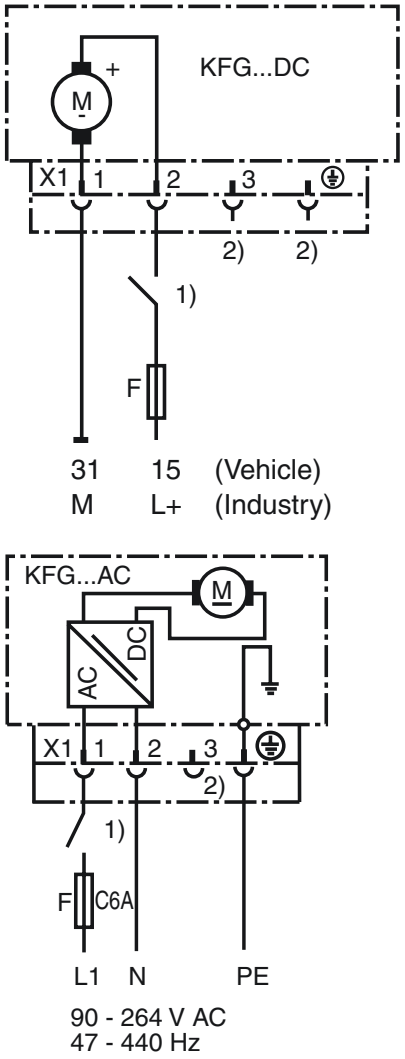


Fig. 10 Connector X1 and PIN assignment

3.4 Series KFGS 12/24 VDC

With integrated control

The electrical connection of the KFGS series is made at the bottom side of the set by means of a seven-pin plug.

Connection for cable set

The cable set is not part of the supplies!

article no.	length of corrugated sleeving	length of cores
997-000-630	12 m	12.2 m
997-000-650	16 m	16.2 m

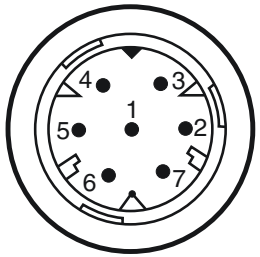


Fig. 11 seven-pin round plug

Colour marking

X1-Pin	Colour symbol	Colour of core
1	BN	brown
2	RD-BK	red/black
3	BU	blue
4	PK	pink
5	BK	black
6	BK	black
7	VT-GN	violet/green

Core ends of the cable set which are not required must be separately insulated and fastened so that there is no risk of short circuit to ground.

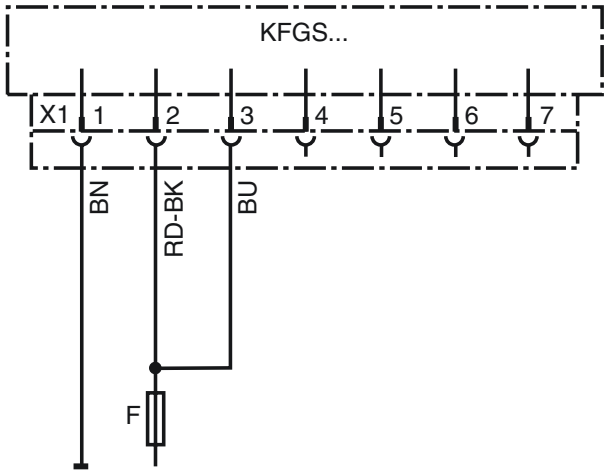
3.5 Connection possibilities

Trailer operation = counter operation without system monitoring

programming: cPA, tCO, COP = OFF
see Chapter 6

Cable set for trailer operation only!

article no.	length of corrugated sleeving	length of cores
997-000-760	12 m	12.2 m



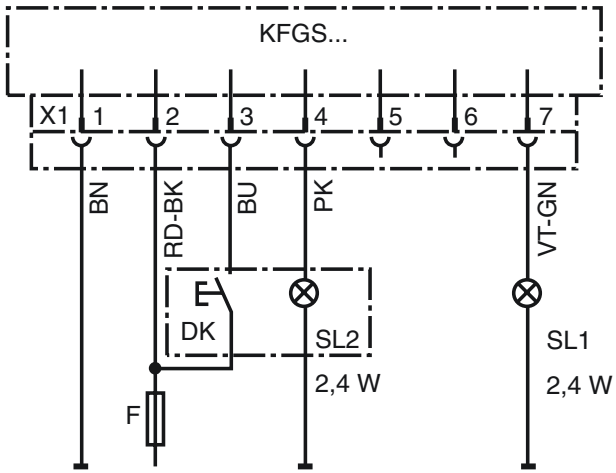
31 54 (from stop light switch)
(Note start-up current of pump!)

31 - Supply voltage potential (0 V, GND)
54 stop light switch signal

3.6 Timer operation

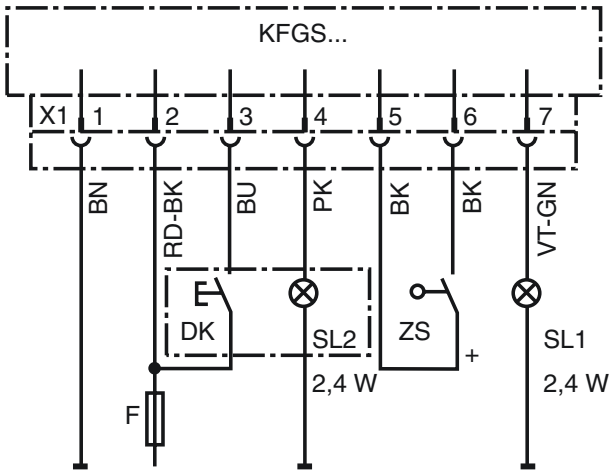
Timer operation without system monitoring

programming: tPA, tCO, COP = OFF



Timer operation with system monitoring

Programmierung: tPA, tCO, COP = CS



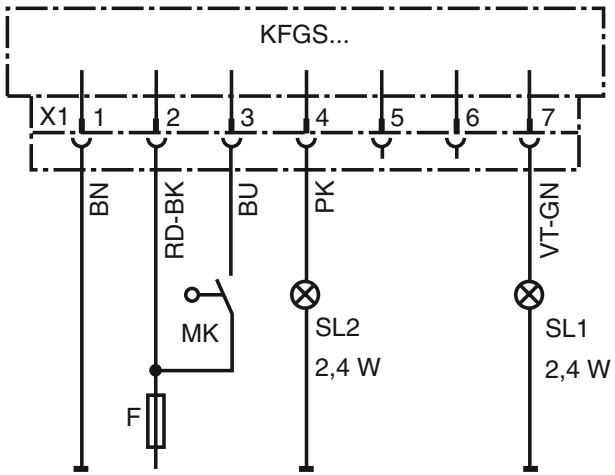
15	+	Supply voltage potential (ignition switch ON)	vehicle
31	-	Supply voltage potential (0 V, GND)	
L+	+	Supply voltage potential (machine main switch ON)	industry
M	-	Supply voltage potential (0 V, GND)	
DK		push-button 1. intermediate lubrication 2. delete fault message	general
SL1		signal lamp „pump ON“	
SL2		signal lamp „fault“	
ZS		cycle switch	colours of cores
X1		plug connection	table on page 17

Core ends of the cable set which are not required must be separately insulated and fastened so that there is no risk of short circuit to ground.

3.7 Counter operation

Counter operation without system monitoring

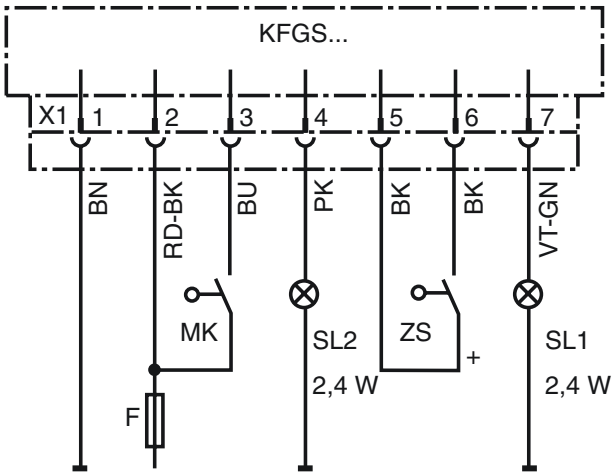
programming: cPA, tCO, COP = OFF



31 15 (vehicle)
M L+ (industry)

Counter operation with system monitoring

programming: cPA, tCO, COP=CS



31 15 (vehicle)
M L+ (industry)

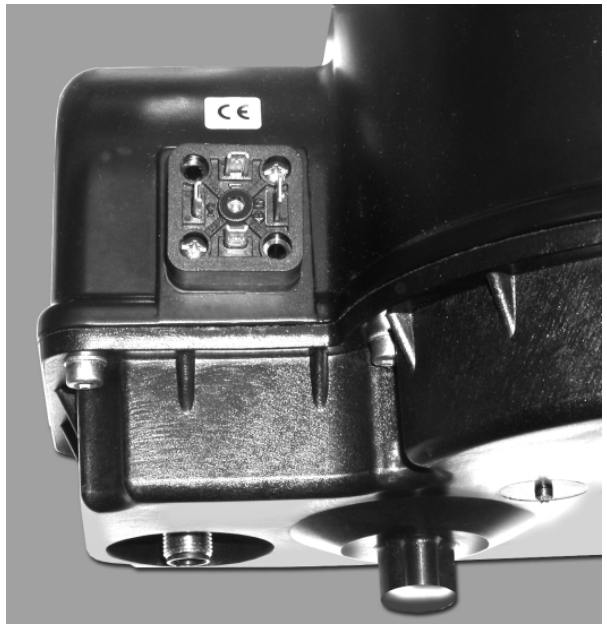
15 31	+ Supply voltage potential (ignition switch ON) - Supply voltage potential (0 V, GND)	vehicle
L+ M	+ Supply voltage potential (machine main switch ON) - Supply voltage potential (0 V, GND)	industry
MK SL1 SL2 ZS X1	machine contact signal lamp „pump ON“ signal lamp „fault“ cycle switch plug connection	general colours of cores table on page 17

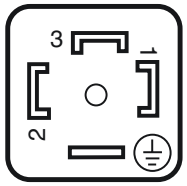
Core ends of the cable set which are not required must be separately insulated and fastened so that there is no risk of short circuit to ground.

Note:
In counter operation with the machine contact closed, 1 pulse will be counted each time the operating voltage is switched on.

3.8 Series KFGS 90-264 VAC

With integrated control
Electrical connection is via a pin-and-socket connector X1 to DIN43650 type A for voltage supply (on front side of unit) as well as a four-pole pin-and-socket connector X2 M12x1 to EN60947-5-2 (on bottom side of unit).





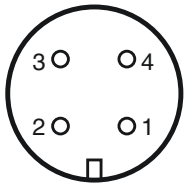


Figure 12 Pin-and-socket connector X1 to DIN43650 type A

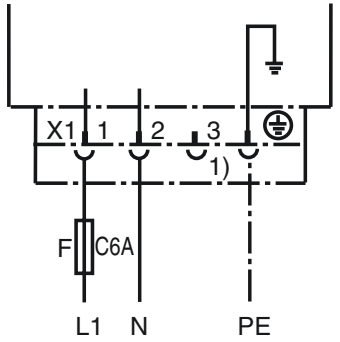
Pin-and-socket connector X2 to EN60947-5-2

Colour marking

X2-Pin	Colour symbol	Colour of core
1	BN	brown
2	WH	white
3	BU	blue
4	BK	black

3.9 Connection possibilities

Supply voltage



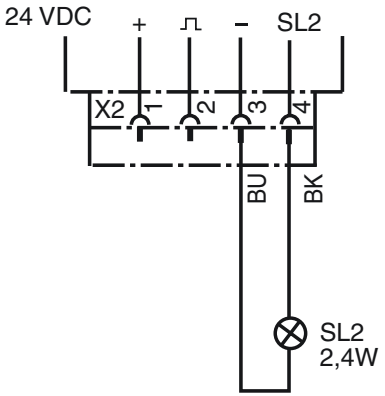
L1/N Supply voltage (machine main switch ON)
PE Protective conductor
F Fuse
1) PIN without internal connection

3.10 Timer operation

Timer operation without system monitoring

Programming: tPA, tCO, COP = OFF

Connection:
- Signal lamp "Fault" SL2 (optional)

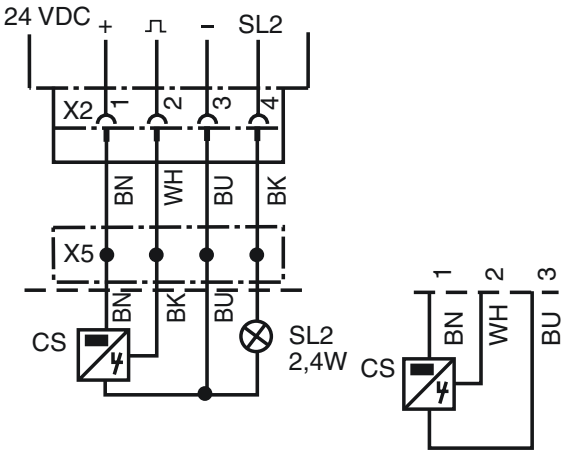


Timer operation with system monitoring

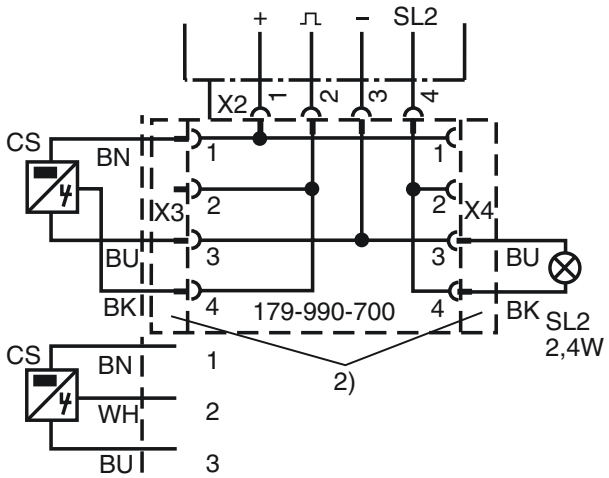
Programming: tPA, tCO, COP = CS

Connection:
- Cycle switch CS
- Signal lamp "Fault" SL2 (optional)

a) Connection via terminal box external



b) Direct connection of system components



Core ends of the cable set which are not required must be separately insulated and fastened so that there is no risk of short circuit to ground.

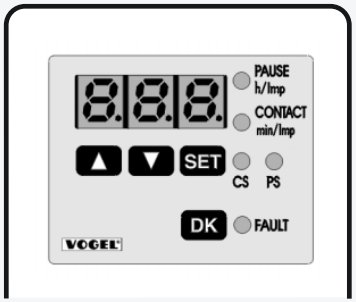
X3 Coupling (nickelized) cycle switch CS
X4 Coupling (black) signal lamp "Fault message" SL2
X5 Terminal box, Distributor 179-990-700
2) Distributor 179-990-700 and 2 cable connectors, e.g. 179-990-371, please order separately

4. Display and operating unit

KFGS series only

A transparent plastic screen protects the display and operating unit against splash water and mechanical damage.
For the purpose of programming, remove the screen with a screwdriver and fix it again afterward.

Fig. 13 Display and operating unit



LED display

- seven-segment display: values and operating conditions
- progression of pause — PAUSE h/Imp
- pump operation — CONTACT min/Imp
- monitoring of system functions by means of an external cycle switch
  CS = cycle switch — CS
- **Without function in progressively-acting systems** — PS
- fault message — FAULT

Push-button switches

- switching the display on
- displaying values and parameters
- setting values and parameters

▲ ▼

- changing between programming and display modes
- confirming values

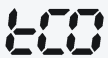
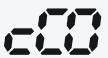
SET

- releasing intermediate lubrication
- deleting a fault message

DK

4.1 The three-digit LED display

In normal operation the display is switched off. It can be activated by shortly pressing one of the two push-buttons ▲▼. The display shows current values and preset parameters. Furthermore, the display serves for user prompting when operating parameters are programmed.

display	function	meaning	
	**t** = timer **PA** = Pause	The control device is working as timing pulse generator (TIMER) and is in the PAUSE mode.	• Part of lubrication cycle • Input and display values in hours
	**c** = COUNTER **PA** = PAUSE	The control device is working as pulse counter (COUNTER) and is in the PAUSE mode.	• Part of lubrication cycle • The device is counting the pulses of the external pulse generator and is comparing them with the preset values
	**t** = TIMER **CO** = CONTACT	The control device is working as timing pulse generator (TIMER) and is in the pump operating period (CONTACT)	• CONTACT = time while the pump delivers • Input and display values in minutes
	**c** = COUNTER **CO** = CONTACT	The control device is working as pulse counter and is in the pump operating period (CONTACT)	• CONTACT = time while the pump delivers • input and display values in pulses
	**C** = cycle **O** = OFF **P** = Pressure	Display of menu start „monitoring settings“	

display	meaning		
OFF	Monitoring OFF	PS and CS monitoring function is switched off	• No system monitoring
CS	**C**ycle **S**witch	Monitoring of cycle switch is activated	• During the CONTACT pump operating period, the cycle switch is monitored for pulse generation.
FLL	**F**ault: **L**ow **L**evel	Minimum filling level in storage vessel is reached	• The control device is in the FAULT mode. • The process of functions has been stopped.
FCS	**F**ault: **C**ycle **S**witch	No signal of cycle switch during pump operating period	• The control device is in the FAULT mode. • The process of functions has been stopped.
Oh	**O**peration **H**our Meter	The values displayed in the following are the operating hours of the control device.	
Fh	**F**ault **H**our Meter	The values displayed in the following are the fault hours which is the time while the vehicle or machine has been operated in the FAULT mode.	
bLo	**Blo**ck Operation	Signal from cycle switch not available. As opposed to normal operation, the control device is still in the monitoring process. If the fault continues over 3 pump periods, a fault message will be displayed.	

4.2 Display by light-emitting diodes

LED	LED is on = display mode	LED is flashing = programming mode
PAUSE h/Imp	The operating voltage is applied at the pump set and the control device. The system is in the PAUSE mode.	The value for PAUSE can be altered.
CONTACT min/Imp	The operating voltage is applied at the pump set and the control device. The system is in the CONTACT mode (pump motor is ON).	The value for CONTACT can be altered.
CS	For system monitoring, a cycle switch is used. Monitoring takes place at the progressively-acting distributor while the pump is in operation. (CONTACT)	This mode of monitoring can be switched off in the programming mode. COP = CS monitoring is active COP = OFF monitoring is switched off.
PS	Pressure switch monitoring is not possible in progressively-acting distributor systems. **LED must not be ON.**	**Monitoring by pressure switch must not be activated in progressively-acting systems.** **COP = CS or COP = OFF**
FAULT	The operating voltage is applied at the pump set and the control device. The control device is in the FAULT mode. The fault can be called via the LED display and be visualized as error code after pressing the DK push button. The process of functions is stopped.	

4.3 Operation by push-button switches

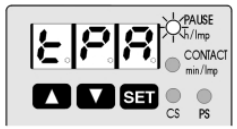
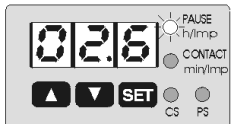
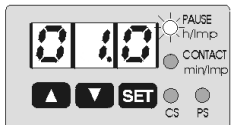
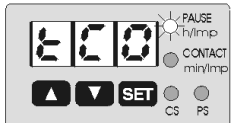
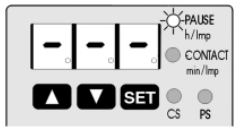
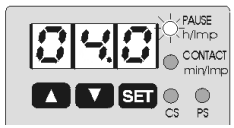
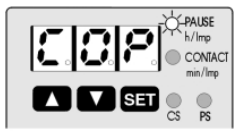
push-button switch	operating options
DK	• Actuation during PAUSE releases intermediate lubrication. • Fault messages are acknowledged and deleted
▲	• Switching on the display in the display mode • Calling the next parameter in the programming mode • Increases the displayed value by 1
▼	• Switching on the display in the display mode • Calling the previous parameter in the programming mode. • Decreases the displayed value by 1
SET	• Changes between programming mode and display mode • Confirms entered values

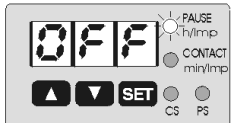
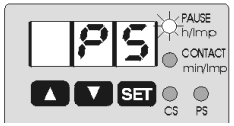
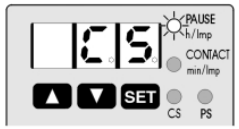
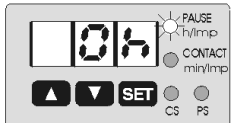
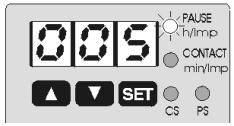
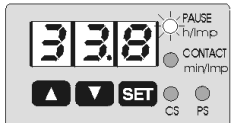
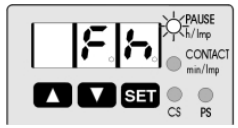
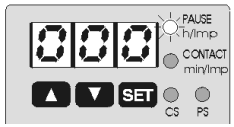
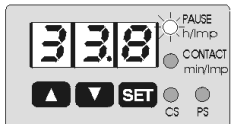

VOGEL
Zentral-
schmierung
max
min


PAUSE
CONTACT
SET
CS
PS
FAULT
VOGEL

5. Display mode

The display mode can be recognized by the lighted LED displays. The LEDs are not flashing!
This mode serves for the checkback of current settings and operating parameters.
Always start the display mode by briefly pressing one of the two keys ▲ ▼ .

Step	Key	Display	
1	▲ ▼ Press shortly		Current operating state is displayed **Example:** Timer operation pause
2	▲		Remaining time for pause of current lubrication cycle is displayed **Example:** 2.6 h
3	▲		Preset total time of pause is displayed **Example:** 1 h (setting by factory)
4	▲		Pump operation time is displayed **Example:** Timer operation
5	▲		**Example:** System is in the pause mode, current tCO display not possible
6	▲		Preset value is displayed **Example:** 4 min (setting by factory)
7	▲		System monitoring is displayed

Step	Key	Display		
8	▲	 Monitoring switched off (setting by factory)	 **or** Monitoring by pressure switch. **Not allowed for progressively-acting systems!**	 **or** Monitoring by cycle switch
9	▲		Display of hours run	
10 / 11	▲	 **Example:** Part 1 of the total value Write down !	 Part 2 of the total value Total value: 00533.8 h Maximum value: 99999.9 h	
12	▲		Display of fault hours	
13 / 14	▲	 **Example:** Part 1 of the total value Write down !	 Part 2 of the total value Total value: 00033.8 h Maximum value: 99999.9 h	
15	▲	**Display goes off** Oh and Fh values will unerasably be stored in the EEPROM.		

6. Programming

- **Programming always starts with the steps 1 – 2 !**
- The programming mode can be recognized by the flashing display.

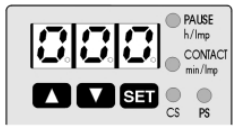
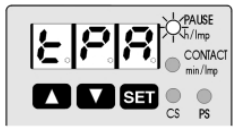
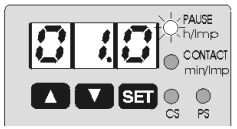
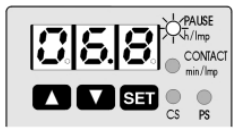
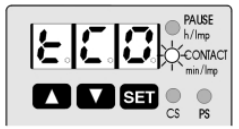
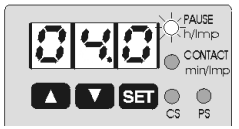
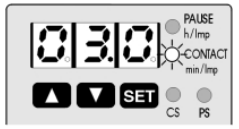
6.1 Start of programming mode

6.2 Alteration of times for lubrication interval

Carry out steps 1 to 2!

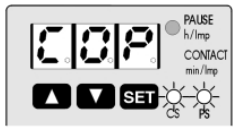
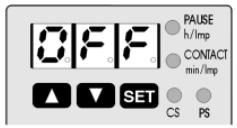
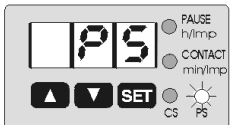
Note for step 2:

If the code 000 set by the factory was altered, then the altered code has to be selected with the ▲▼ keys and needs to be confirmed with the SET key.

Step	Key	Display	
1	SET Press SET longer than 2s		000 display is flashing (code 000 is the setting by the factory)
2	SET Press SET shortly (confirm code)		Automatic display of the first parameter, i.e. „pause in timer operation“. The „pause“ LED is flashing
3	SET Press SET shortly		Pause time 1 h (setting by factory)
4	▲ ▼		Set new value **Example:** 6.8 h = 6 h 48 min
5	SET Press SET shortly, confirm new value		Display of the next parameter, i.e. „pump operation time in timer operation“ The „Contact“ LED is flashing
6	SET Press SET shortly		Pump running time 4.0 min (factory setting), for permissible setting range for KFG(S) 90-264 VAC, s. Technical data, section 9
7	▲ ▼		Set new value **Example:** 3 min
8	SET Press SET shortly	Confirm new value	
9	SET Press SET longer than 2s	Alterations will be written into the memory and **the display will go off**.	

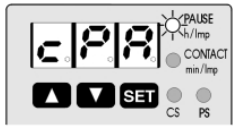
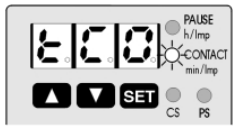
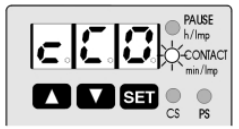
6.3 Alteration of system monitoring

Carry out steps 1 to 2!

Step	Key	Display	
3	▲▲▲ Press until:		Start of monitoring settings is displayed.
4	**SET** Press SET shortly		System monitoring is switched off (setting by factory)
5	▲ ▼ Press optionally until:		Monitoring by cycle switch, i.e. LED „CS“ is flashing.
			or Monitoring by pressure switch **Not allowed for progressively-acting systems !**
6	**SET** Press SET shortly		Confirm new settings
7	**SET** Press SET longer than 2s		New settings will be written into the memory and **the display will go off**.

6.4 Alteration of operating modes

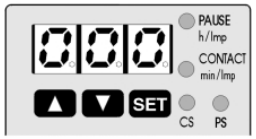
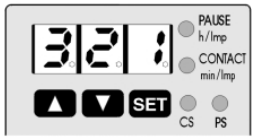
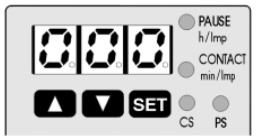
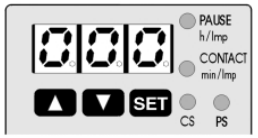
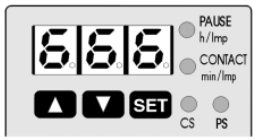
Carry out steps 1 to 2!

Step	Key	Display	
3	▲		Change from pause time to counter operation (only possible with external electric pulse generator Values in pulses
4	**SET** Press SET shortly to confirm counter operation		Display of pump operating time in timer operation
5	▲		Change from pump operating time to counter operation (special purpose function)
6	**SET** Press SET shortly		Confirm new settings
7	**SET** Press SET longer than 2s		New settings will be written into the memory and **the display will go off**.

6.5 Alteration of code

The code preset by the factory is now deleted and the new code is valid. Write down the new code and keep it in a safe place. If the code gets lost, programming of parameters will not be possible then. The pump set needs to be sent to the dealer or the authorized Vogel branch office.

Attention:
Do not enter the digits 321 as the new code.

Step	Key	Display	
1	SET Press SET longer than 2s		Display is flashing
2	▲ ▼ Operate appropriate key until		Select key number (setting by factory)
3	SET Press SET shortly (confirm key)		Display is flashing Code 000 (setting by factory)
4	SET Press SET shortly (confirm code)		Display is flashing
5	▲ ▼ Operate appropriate key until		New code **Example:** 666 **Attention! Do not enter 321**
6	SET Press SET shortly until	Confirm new code	
7	SET Press SET longer than 2s	New code will be written into the memory and **the display will go off**.	

6.6 Programming ranges

Function	Programming range[1)]
Pause time	0.1 h to 99.9 h
Pump operating time	0,1. min to 99.9 min
Pulses	1 to 999

6.7 Display ranges

Display	Display range
Fault hours	0.1 h to 99,999.9 h
Hours run	0.1 h to 99,999.9 h

1) for permissible setting range for KFG(S) 90-264 VAC, s. Technical data, section 9

7. Operating modes

7.1 Timer operation

Pause and pump operating time are time-dependent.

Set tPA and tCO in the programming mode.

The time-dependent, preset values for PAUSE and CONTACT control the lubrication cycle.

PAUSE: values in **hours**

CONTACT: values in **minutes**

7.2 Counter operation

Pause is dependent on number of pulses
Pump operation is time-dependent

Set cPA and tCO in the programming mode.
An external pulse generator needs to be connected as described in Paragraph 3.5, page 17.

PAUSE: values in **pulses**

CONTACT: values in **minutes**

Operation in machines

A switch is opened and closed in dependence of mechanical movements, revolutions, etc. When the preset value of the pulses **cPA** to be counted has been reached, lubrication will be released.

Operation in vehicles

only for trailers and semi-trailers

Lubricating operation without system monitoring
COP = OFF

The pump set is not equipped with permanent power supply.

The pump is electrically connected with the stop light circuit.
Please observe regional regulations for installation!

The control device counts the brake signals during the **PAUSE**. When the preset value of the pulses **cPA** to be counted has been reached, lubrication will be released.

Braking times of a vehicle are usually smaller than the set pump operating time **tCO** (the factory setting is 4 min).

During the following braking processes the control device will perform lubricating operations until the set pump operating time **tCO** is reached.

After that a new lubrication cycle will start with the pause **cPA**.

7.3 Without system monitoring

In this mode, the lubrication cycle is controlled only by the preset values for PAUSE and CONTACT.

Monitoring must be switched off.
COP = OFF
System trouble will not automatically be recognized and visualized.

7.4 With system monitoring

In this mode, additional monitoring of the system functions is performed by external switches.

Monitoring can take place for:

- the filling level of the lubricant vessel
- the function of the progressively-acting distributor by means of a cycle switch

System trouble will be recognized and visualized automatically.
Monitoring is switched on. COP = CS

7.5 Monitoring of filling level

If installed, monitoring of the filling level is active all the time.

If the level in the lubricant vessel falls below the minimum filling level, the lubrication cycle will stop and a fault message will be visualized on the display.

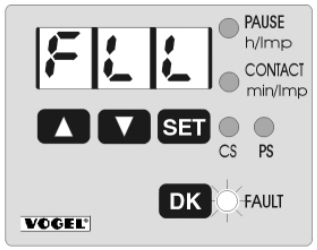


Fig. 14 Fault message

FLL: Fault Low Level

Retrofitting of a pump set with the „Filling level monitoring“ feature, which did not have this feature before, is possible only in the factory. The set needs then to be sent to the factory.

7.6 Monitoring by cycle switch

Possible only for centralized lubrication systems with progressively-acting distributors.
For greases up to NLGI Class 2.

The cycle switch monitors the movement of the pistons in the progressively-acting distributor during the CONTACT time.
In the programming mode, the following monitoring feature must be activated: **COP = CS**

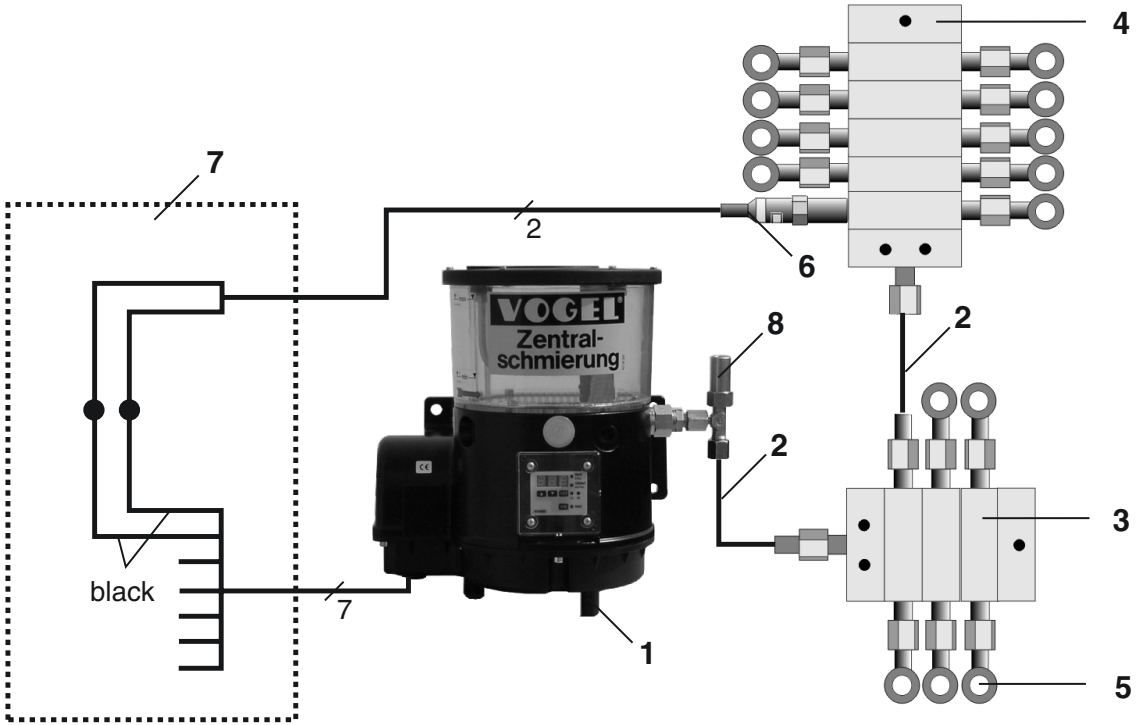


Fig. 15 Electrical connection of cycle switch

1 set KFGS1-5
2 lubrication line
3 main distributor
4 sub-distributor
5 friction points
6 cycle switch
7 electric compartment
8 excess pressure valve

8. Operating trouble

Check the filling level of the lubricant vessel in regular intervals.
If the vessel was emptied, the entire system has to be vented after filling up.

All fault messages are visualized as collective fault message by means of the FAULT light-emitting diode. When a fault message is displayed the normal process of functions is stopped by the control device and the fault occurred will be stored and displayed.
The cause of the fault can be read on the display.This makes the fault diagnosis considerably easier, but it requires system monitoring.

8.1 Display of faults

Start the display mode with the ▲ or ▼ key

Press until the fault display is reached:

Display	Explanation
FCS	Cycle switch fault: Signal from cycle switch not available during pump operating time. (See Chapter 8.5. Block operation)
FLL	Fault: Low level The filling level in the storage tank has fallen below the minimum level. The further process of functions is stopped.

8.2 Deletion of fault messages

All fault messages can be acknowledged and deleted with this DK key. In timer operation, deletion is possible also with an external push-button switch, if installed.

Identify and eliminate the cause of fault before deleting the fault message.
The user shall be held liable for damage from vehicle operation without lubrication.

The time, during which the control device and pump set have been run without lubrication, will unerasably be stored in the EEPROM als fault hours Fh.

8.3 Storage of fault times

Faulty-state counter

The time passed from the generation of a fault message till its acknowledgement is added in hours.
After acknowledgement, this value will automatically be recorded by the fault hour meter.

Fault hour meter

The fault hour meter adds all fault-state times occurring during the total operation time of the set. The current result of metering can be read in the display mode in two blocks of three digits each after calling the parameter Fh (see Chapter 5).

The maximum display capacity of the meter is 99,999.9 hours. The smallest interval storable is 0.1 hour = 6 minutes.
The memory cannot be erased.

8.4 Maintenance and repair

The following maintenance works and checks have to be carried out in regular intervals:

- Checking of filling level in the lubricant vessel
- Regular checking of tightness in the system components
- Visual checking of lubrication state in bearings
- Checking of electric cables for damage
- Checking of electrical connections and contacts
- The basic function of the control device and of the system components can be verified by releasing an intermediate lubrication process.
- Checking of electrical connections in the case of fault messages
- Replace defective fuses only with new fuses of identical performance

Any works beyond the above scope need to be done by authorized Vogel Service establishments.

The service life of the pump elements decisively depends on the purity of the lubricants used.

8.5 Block operation

Block operation is the reaction of the control device to the absence of signal from the cycle switch. Possible causes:

- Defective lubricant lines
- Blocked progressively-acting distributor
- Faulty cycle switch
- Lack of lubricant

No signal available from the cycle switch during the pump operation period:

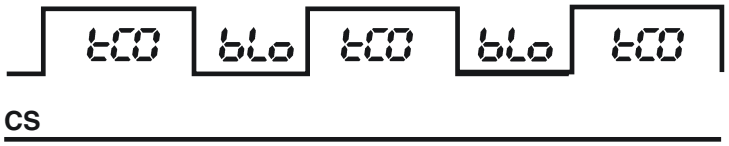
- Abortion of normal operation
- Start of block pause with checkback of cycle switch

No signal available from the cycle switch during the block pause:

- Start of second lubrication cycle in block operation

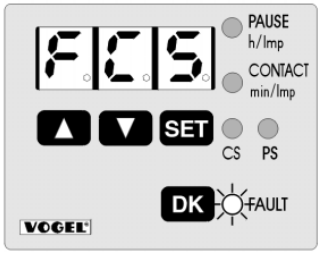
As soon as the signal is received from the cycle switch, block operation will be aborted and a normal lubrication cycle will start with a pause.

A total of three lubrication cycles will be performed with checkback of the cycle switch.

Device	Display on the control device
	

Three pump operation periods and two block pauses without signal from the cycle switch! → **Abortion of block operation, display of fault message!**

Device display



Duration of block pause

Pause in normal operation tPA	Block pause blo
0.1 h = 6 min	6 min
0.2 h = 12 min	12 min
0.3 h and longer	15 min

Identify and eliminate the cause of fault!

8.6 Pump trouble

Fault	Cause	Remedy
Pump Stirring arm in the grease storage vessel does not rotate during the activated pump operation period	● Mechanical damage, e.g. faulty motor.	● Replace pump Take off the lubricant main line at the outlet of the excess pressure valve. Loosen the electrical connection. Loosen the three fixing screws. Demount the faulty pump. Mount the new pump and connect the lubricant line as well as the electrical cable. **Start the system up and carry out function test.** **Mind the correct values for pause and contact times.**
	● Electrical connection interrupted	● Check or replace fuse. ● Check electrical connections. **Check cable set for damage!**
Pump without function when pressing the DK key, although all the electrical connections are in order	● Electrical control has failed ● Pump drive / motor is faulty	Replace the pump
Pump is not delivering lubricant, although the stirring arm is rotating	● Lubricant level in the vessel is below minimum	Fill lubricant vessel up to „max“
	The non-return valve in the pump element does not close. (Indication: The outlet can be kept closed with your fingers when the main line is taken off.)	Replace the pump element **Note:** Dosing marks with grooves
	● Suction problems due to air inclusions in the grease	Dismantle the pump element and operate the pump by pressing the DK key until grease emerges at the outlet of the casing.

Fault	Cause	Remedy
	● The pump element does not build up pressure. The pump element is worn out. (Indication: The outlet can be kept closed with your fingers when the main line is taken off.)	Replace the pump element **Note:** Dosing marks with grooves
Excess pressure valve on the pump opens and lubricant is emerging	● System pressure is over 300 bar, e.g. due to distributor blocking or blocked lubrication point	Check the system and repair or convert the system so that the maximum system pressure is 200 bar at 20 °C.
	● Valve damaged or soiled, therefore no proper closing	Replace the excess pressure valve

9. Technical data

	12/24 VDC	90...264 VAC
Weight	see page 10	
Electrical specification	see page 15	
Max. back pressure	300 bars	
Permissible operating pressure	-25 °C to +75 °C	-25 °C to +60 °C

Type	KFG(S) 1-5	KFG(S) 3-5	KFG(S) 5-5
Reservoir volume	2 l	6.3 l	10 l
Reservoir material	PA6i	PMMI	PMMA

Type of protection to DIN 40050, T9	IP 5K6K	IP 5K6K
Operating mode/operating time to VDE0530/ DIN 41756	S1 continuous operation	at -25 °C...40 °C S1 continuous operation at 40 °C...60 °C running time 0...10 min min. pause time = 4 x running time (20 % ED) running time 10...15 min minimum pause time = 2h
Expected motor life		typically 3000h

Number of outlets (if fewer than 3 outlets are required, screw plugs must be used in place of the pump elements)	max. 3
Outputs	see page 55

Conforms to EC directives	see page 46/47/48

Lubricant	
Greases NLGI grade 1 to 2 with EP additives	plastics, NBR elastomers
compatible with	copper and copper alloys
Flow pressure	up to max. 700 mbars

Electrical data	see section 3 (page 59)

Protective measures to be applied for appropriate operation in the machine area KFG(S) 12/24 VDC:

- “Functional extra-low voltage with protective separation” according to standards EN 60204 Part 1 1992 DIN VDE 0100T410 A2
- Disconnect unit for performing insulation and voltage test to EN 60204-1 1992

Service in Germany

WILLY VOGEL AG
Vertriebs- und Service-Center
Sinstorfer Kirchweg 74-92
21077 Hamburg
(++49) 40-76 10 28 74 / 75
(++49) 40-76 10 28 96

WILLY VOGEL AG
Vertriebs- und Service-Center
Duisburger Straße 44
90451 Nürnberg
(++49) 911-6 42 70 94
(++49) 911-6 49 15 70

WILLY VOGEL AG
Vertriebs- und Service-Center
Möddinghofe 19
42279 Wuppertal
(++49) 202-64 10 81
(++49) 202-64 97 29

WILLY VOGEL AG
Vertriebs- und Service-Center
Otto-Schmerbach-Straße 30
09117 Chemnitz
(++49) 371- 8 81 20 61 / 62
(++49) 371- 8 81 20 63

WILLY VOGEL AG
Vertriebs- und Service-Center
2. Industriestraße 4
68766 Hockenheim
(++49) 62 05-27 586
(++49) 62 05-27 587

WILLY VOGEL AG
Motzener Straße 35 / 37
12277 Berlin
(++49) 30- 7 20 02-184
(++49) 30- 7 20 02-111

WILLY VOGEL AG
Vertriebs- und Service-Center
Nürtinger Straße 46
72622 Nürtingen
(++49) 70 22-5 67 36
(++49) 70 22-5 53 32

Service worldwide

AUSTRALIA

Centralised Lubrication Systems PTY LTD
1/29 Collinsvale Street
Rocklea Queensland
AUS-4106 Australien
(7) 32 77 62 33
(7) 32 77 64 33
E-mail: peter.woodford@vogel.net.au

BELGIUM and LUXEMBOURG

WILLY VOGEL BELGIUM BVBA
Drevandaal 5
B-2860 Sint-Katelijne-Waever
(++32) 15-30 69 20
(++32) 15-30 69 29
E-mail: info@vogel-belgium.be

DENMARK

POVL MØLLERS
MASKINFABRIK A/S
Kimmerslevvej 3
DK-4140 Borup
(++45) 57-52 62 62
(++45) 57-52 64 70
E-mail: pmb@pmb-dpf.dk

FINLAND

LAHTINEN & RIKSMAN OY
Säynäslahdentie 6
FIN-00560 Helsinki
(++358) 9-55 70 41
(++358) 9-55 21 45

FRANCE

VOGEL France SAS
Rue Robert Amy
F-49400 Saumur
(++33) 2-41 40 42 00
(++33) 2-41 40 42 42
E-mail: info@VogelFrance.com

UNITED KINDOM and NORTHERN IRELAND

STERLING HYDRAULICS LTD.
Sterling House
Crewkerne
GB-Somerset TA 18 8LL
(++44) 14 60-7 22 22
(++44) 14 60-7 23 34, 7 64 02
E-mail: pmartin@sterling-hydraulics.co.uk

HONG KONG, CHINA

WEARMAX HOLDINGS LTD.
Room 18-20, 2nd Floor, Newport Centre,
116-118 Ma Tau Kok Road
HK-Kowloon, Hongkong
(++852) 23 34 87 91
(++852) 27 65 05 29
E-mail: wxhlhk@netvigator.com

ITALY

BERGER VOGEL s.r.l.
Via Mambretti, 9
I-20157 Milano
(++39) 02-3 32 11 51
(++39) 02-33 21 15 20
E-mail: schmier@tin.it

JAPAN

VOGEL JAPAN LTD.
16-20, Hishie 2-chome.
J-Higashi-Osaka City
Osaka 578-0984
(++81) 729- 64 50 55
(++81) 729- 65 12 58
E-mail: center@vogel-japan.co.jp

KOREA

WOO NAM INDUSTRIAL CO. LTD.
88B-9L Namdong Industrial Complex
Namdong-ku
J-Inchon City
(++82) 32-815 28 00
(++82) 32-819 64 66
E-mail: WNI6464@chollian.net

CROATIA, SLOWENIA

INGENIEURBÜRO R. KROPEJ
Schloßmühlstraße 16
A-2320 Wien-Schwechat
(++43) 1-707 36 58
(++43) 1-707 73 69 13

NEW ZEALAND

TRANSCONSULT LTD.
P.O. Box 38955
Howick
NZ-Auckland
(++64) 9-576 96 28
(++64) 9-576 96 08

THE NETHERLANDS

VOGEL NEDERLAND B.V.
Buurserstraat 218
NL-7544 RG Enschede
(++31) 53-4 76 51 65
(++31) 53-4 77 34 35
E-mail: info@vogel-benelux.nl

NORWAY

SHELBY TEKNIKK AS
Postboks 230
Strandgaten 55
N-4379 Egersund
(++47) 51-49 18 00
(++47) 51-49 18 01

AUSTRIA

HAINZL INDUSTRIESYSTEME
GmbH. & Co. KG
Industriezeile 56
Postfach 100
A-4040 Linz
(++43) 732-78 92
(++43) 732-78 92-12
E-mail: info@hainzl.at

KARL HALWACHS
GES.M.B.H. & CO. KG
Scheibelgarten 533
A-2870 Aspang
(++43) 26 42-525 24, 529 52
(++43) 26 42-521 63

Service worldwide

POLAND
Voith Turbo sp. z.o.o.
Majkòw Duzy 74
PL-97-371 Wola Krzysztoporska
(++48) 44-6 46 88 48 bis -53
(++48) 44-6 46 85 20
E-mail: voith.polska@voith.pl

SWEDEN

SOMMERS INDUSTRITEKNIK AB
Box 110 20
Lasbomsgatan 9
S-58011 Linköping
(++46) 13-15 80 30
(++46) 13-15 05 45
E-mail: info@sommers-ind.se

SWITZERLAND

MAAG TECHNIC AG
Sonnentalstrasse 8
CH-8600 Dübendorf 1
(++41) 1-8 24 91 91
(++41) 1-8 21 59 09
E-mail:
zentralschmierung@maagtechnic.ch

O. MENG
FAHRZEUGTECHNINK
Florastrasse 5
CH-3005 Bern
(++41) 31-3 52 64 26
(++41) 31-8 19 53 23

H. SCHUOLER
FAHRZEUGTECHNIK AG
Postfach
Birsstrasse 54
CH-4028 Basel
(++41) 61-3 12 37 08
(++41) 61-3 12 70 03

ROTECH AG
Ebriststrasse 4
CH-8102 Oberengstringen
(++41) 1-7 75 26 26
(++41) 1-7 50 02 64

SINGAPORE, INDONESIA, MALAYSIA, THE PHILIPPINES

OSA Industries Pte. Ltd.
63 Jalan Pemimpin # 03-08
Pemimpin Industrial Building
SGP-Singapore 577219
(++65) 258-1100
(++65) 258- 2525
E-mail: osa@pacific.net.sg

SPAIN, PORTUGAL, MAROCCO

WILLY VOGEL IBERICA, S.A.
Avd. de Suiza n° 3
Poligono de actividades logisticas
E-28820 Coslada (Madrid)
(++34) 91-6 70 78 00
(++34) 91-6 70 78 42
E-mail: javier.halffter@voithiberica.com

SOUTH AFRICA

IMS
INDUSTRIAL PRODUCTS (PTY) LTD.
P.O.Box 1976
ZA-Alberton, 1450
(++27) 11-3 89 53 00
(++27) 11-3 89 53 10
E-mail: led@ims-i.co.za

Glory Way Industrial Co., LTD.
3FL. No. 82, Section1,
Chung Cheng Road,
Shih Lin District
TW-Taipei/Taiwan/R.O.C.
(++886) 2-28 35 02 49 / 50
(++886) 2-28 36 01 61
E-mail: gloryway@tpts5.seed.net.tw

CZECH REPUBLIC, SLOVAK REPUBLIC

LUBTEC s.r.o.
Opolany 4
CZ-28907 Libice nad Cidlinou
(++420) 325-63 75 45
(++420) 325-63 71 84
E-mail: lubtec@lubtec.cz

TURKEY

HIDROPAK
Hidrolik-Pnomatic Aksam
Sanayi ve Ticaret AS
Perpa Is Merkezi K 11 No. 1620
TR-80270 Okmeydani
(++90) 212-2 21 12 27/28/29
(++90) 212-2 21 74 88
E-mail: hidropak@superonline.com

HUNGARY, RUMANA, BULGARIA, EX-YUGOSLAVIA, ALBANIA

WILLY VOGEL HUNGARIA Kft.
Felvèg u. 4.
H-2051 Biatorbàgy
(++36) 23-312-431
(++36) 23-310 441
E-mail: voith@voith.hu

STATES, CANADA and MEXICO

VOGEL LUBRICATION, INC.
1008 Jefferson Avenue
USA-Newport News, VA 23607
(++1) 757-380-8585
(++1) 757-380-0709
E-mail: vogel@vogel-lube.com

Willy Vogel Aktiengesellschaft

Motzener Straße 35 / 37
12277 Berlin
97 04 44, 12704 Berlin
(++49) 30-7 20 02-227
(++49) 30-7 20 02-111
info@vogel-berlin.de

951-130-184 Z000 03/2003