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EXZT  
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IZ

# Universal Controller for Industrial Lubrication Systems

Operating Manual  
Version V6



## Imprint

The operating manual is part of the scope of supply of VOGEL universal controllers for industrial lubrication systems.

The manual has been edited in conformity with applicable standards and rules for technical documentation.

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### Editor

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# Universal Controller for Industrial Lubrication Systems

General Operating Manual

## Introduction

The product described in this manual is a control and monitoring device for VOGEL central lubrication systems installed in stationary industrial plants. It is either supplied as a component of VOGEL compact lubrication systems or individually for installation in a control cabinet.

The universal controller is the basis of all new control and monitoring devices and can also be installed to replace any of the controllers for cabinet installation that were used so far. Since the control functions may differ greatly depending on plant and application, different device types based on the universal controller are offered. Functionally these correspond to the controllers so far employed. The previous designations for individual devices have to a large extent remained. Table A – 1 (appendix) contains a list of the available device types.

The VOGEL universal controller for industrial lubrication systems has been made in conformity with the generally recognized rules of technology and the applicable safe working practices and the rules for accident prevention. To ensure trouble-free operation and prevent hazard, we kindly ask you to read the present manual carefully and observe the notes contained in it.

## Safety Instructions

The VOGEL universal controller for industrial lubrication systems is designed for operation on industrial direct or alternating current supply (see Specifications). Other applications are not allowed.

Only trained specialists capable of recognizing the hazard in connection with touching of live components are allowed to install and connect the device. The local connecting conditions and the applicable rules (e. g. DIN, VDE standards) must be observed.



**If devices are improperly connected, substantial material and personal damage may be the consequence.**

All adjustments on the device must be performed exclusively by qualified personnel. Qualified personnel has been trained, instructed and specifically ordered by the owner to perform the work.

Unauthorised alteration of the device and use of unapproved spare parts and auxiliaries are not allowed.



**The housing of the device must not be opened.**

If the device is failing, turn to a VOGEL service station (see chapter Service).

## Notes Concerning this Manual

This operating manual is subdivided into three parts. The first part contains a general description of the universal controller as well as basic instructions for installation, operation and use as replacement. The second part contains information on the differences between the individual device types. The third part contains important tables providing an overview.

Use the table of contents to locate the desired information promptly and successfully.

Please take note of the symbol shown below. It calls attention to special situations:



**Text marked with this sign alerts to special hazard or work that must be performed with caution.**

Please consider that this manual is an integral part of the device and should be handed to the new owner if the device is sold.

## Applications

The universal controller is intended to control and monitor VOGEL central lubrication systems in stationary industrial plants. It must only be used for the purpose outlined in this manual.

We do not assume liability for damages resulting from unintended use of the device. The same applies if the device is used in faulty condition, or if the device is altered although WILLY VOGEL AG has not granted permission.

**Table 1 - 1. Versions of the VOGEL Universal Controller for Industrial Lubrication Systems**

Designation	Description
Device type E+471	Housing for installation in control cabinet, operating voltage selectable 100..120 V AC or 200..240 V AC
Device type I+471	Housing installed in compact system, operating voltage selectable 100..120 V AC or 200..240 V AC
Device type E+472	Housing for installation in control cabinet, operating voltage 20..24 V AC or DC
Device type I+472	Housing installed in compact system, operating voltage 20..24 V AC or DC

## Versions, Designation

The VOGEL universal controller for industrial lubrication systems is available in four versions (table 1 - 1). The designations E and I refer to the installation location of the unit, e.g. I(nternal) inside a compact lubrication system or E(xternal) for installation in a control cabinet.

The designations 471 and 472 indicate the operating voltage range (voltage code). Different from the designations previously used, only these two voltage codes are referenced. An overview of the voltage codes previously used and the new designations is found in table A - 2 in the appendix.

## Scope of Supply

The VOGEL universal controller is supplied either installed in a compact lubrication system (version I) or individually for installation in a control cabinet (version E).

The scope of supply of version E includes:

- a universal controller in the configuration ordered
- two jumpers for selection of the operating voltage range (only version E+471)
- an operating manual

## Design and Function

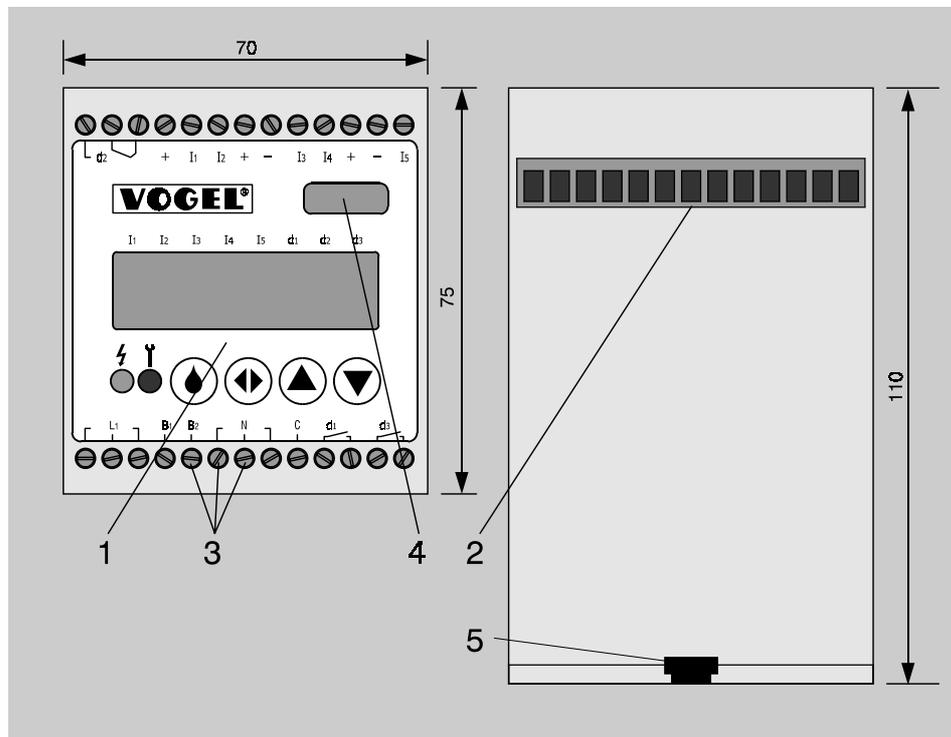
### Design

Figure 1 - 1 shows the design of the VOGEL universal controller, version E, with its installation dimensions.

On the front of the device, the operating display (1) and the service interface (4) are located. On the version I, the operating display is separated from the housing and connected to the device by means of a flat ribbon cable. The display and operating elements of the display are described in chapter Operation.

The terminal rails (2) for the electrical connections are located on top and underside of the unit. The screws (3) fastening the connecting cables are accessible from the front of the unit. The designations of the connections are printed on the display membrane.

Figure 1 - 2 shows a VOGEL compact lubrication system with installed universal controller, version I. Only the operating display with the LCD display and the operating keys are accessible. The display and operating elements of the display are described in chapter Operation.



**Figure 1 - 1. VOGEL Universal Controller for Industrial Lubrication Systems, Version E**

- 1 Operating display**
- 2 Terminal rail**
- 3 Fastening screws**
- 4 Service interface**
- 5 Slot for assembly rail (assembly rail EN 50022-35 x 7,5)**



**Figure 1 - 2. Operating Display of VOGEL Universal Controller for Industrial Lubrication System, Version I, Installed in Compact System**

## Function

The VOGEL universal controller is equipped with high-performance electronics capable of handling diverse tasks in connection with the control of VOGEL central lubrication systems. Which functions the device will perform depends on the device type configured – please refer to the chapters for the device type used.

The manual settings that can be made also depend on the device type. The settings are saved in a non-volatile data memory; they are thus retained even if supply power fails or the unit is separated from the supply.

## Terminal Assignment

Figure 1 - 3 and Table 1 - 2 are providing an overview of the terminal assignment for the universal controller.

### 24 V Voltage outputs

The connections labelled + and - conduct 24 V direct current voltage generated in the controller. This voltage may be used to supply the inputs I1 through I5, or 3-wire initiators.

### 24 V Inputs

The inputs I1 through I5 are designed for control at 24 V. The direct current voltage generated by the controller is to be used.

### Inputs

All inputs as well as the 24 V supply connections are galvanically separated from the operating voltage (L1, N) and the relay outputs relay d1, d2, and d3.

### Outputs

All outputs are relay contacts. They are potential-free and galvanically separated from the operating voltage. Relay d2 has is an change-over contact, relays d1 and d3 are normally open contacts.

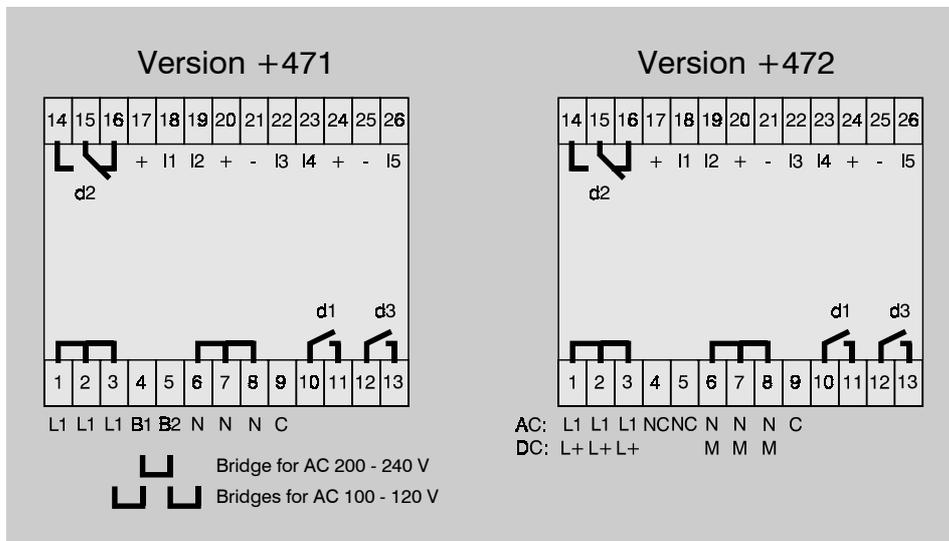


Figure 1 - 3. Terminal Assignment for Universal Controller

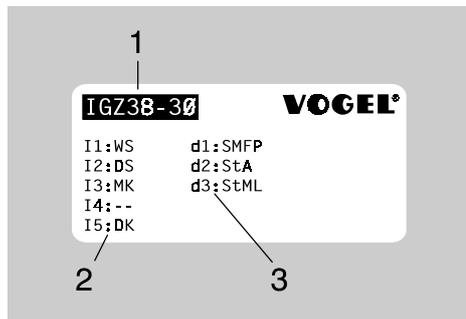
**Table 1 - 2. Overview of Terminal Assignment**

Version +471 (AC 100..120 V / 200..240 V)			Version +472 (AC/DC 20..24 V)		
Terminal	Designation	Function	Terminal	Designation	Function
1, 2, 3	L1	Supply power, phase	1, 2, 3	L1/L+	Operating voltage 1 +24 V
4	B1	Jumper 1	4	NC	not connected
5	B2	Jumper 2	5	NC	not connected
6, 7, 8	N	Supply power, neutral conductor	6, 7, 8	N/M	Operating voltage 2 M (0 V)
9	C	Support terminal for motor capacitor potential-free	9	C	Support terminal for motor capacitor potential-free
10, 11	d1	Potential-free normally closed contact, relay 1	10, 11	d1	Potential-free normally closed contact, relay 1
12, 13	d3	Potential-free normally open contact, relay 3	12, 13	d3	Potential-free normally open contact, relay 3
14	d2	Potential-free operating contact, relay 2	14	d2	Potential-free operating contact, relay 2
15		Potential-free change-over contact, relay 2	15		Potential-free change-over contact, relay 2
16		Potential-free resting contact, relay 2	16		Potential-free resting contact, relay 2
17, 20, 24	+	Output electronic operating voltage +24 V	17, 20, 24	+	Output electronic operating voltage +24 V
21, 25	-	Reference potential of electronic operating voltage	21, 25	-	Reference potential of electronic operating voltage
18	I1	Input terminals	18	I1	Input terminals
19	I2		19	I2	
22	I3		22	I3	
23	I4		23	I4	
26	I5		26	I5	

### Assignment of Inputs and Outputs

The assignment of the inputs and outputs depends on the device type. Information on this is found in the connection diagrams in the respective chapter for your device type.

Additionally, a sticker with information on the device type and the assignment of the inputs and outputs is affixed on the top of the controller. Figure 1 - 4 shows an example of such a sticker with explanations. Table 1 - 3 contains explanations of the abbreviations used on the sticker.



**Figure 1 - 4. Sticker with Information about the Input and Output Assignments**

- 1 Device type
- 2 Assignment of inputs
- 3 Assignment of outputs

**Table 1 - 3. Explanation of Abbreviations in the Input and Output Assignments**

Inputs		Outputs	
Abbreviation	Meaning	Abbreviation	Meaning
BK	operating contact	ASNT	display refill lubricant with timeout
DS	pressure switch (pressure build-up)	FGK	release contact
DS2	pressure switch (pressure build-down)	MKI	MK pulse-controlled lubrication
DS_L	pressure switch (air)	SMFP	lubricant supply (pump, valve)
DK	manual trigger, deletion of failure messages	StA	failure display
Gbr	transducer	StML	failure display, message LED
MK	machine contact	WTE2	warning machine contact 2
MKPV	machine contact/ pause time extension	--	not used
MKUe	machine contact monitoring		
PV	pause time extension		
ReSt	restart		
ZS	cycle switch		
S1E0	contact lubrication pause		
--	not used		

## Installation



**The controller may only be installed by trained specialists who are capable of recognizing the hazards in connection with touching life components.**



**The controller may only be adjusted by trained specialists.**

Since the controller version I is supplied as an integral part of a compact system, only the installation of the version E of the controller is described in the following.

First check in which operating voltage range the unit is to be operated. For operation on 100 – 120 V AC the two jumpers supplied must be used to connect L1 to B1 and B2 to N.

Fasten the controller to the assembly rail in the control cabinet and connect the inputs and outputs according to the connection diagram of the device type. The connection diagrams are found in the individual chapters for the device types.

To be able to enter control parameters such as operating mode or pause time via the operating display, the unit must be connected to power. Input of parameters is described in the following chapter.



**Note that the universal controller must be connected to power before you can change parameters.**



**Power must be switched on or off instantaneously.**

When power is applied, the unit starts a functional sequence depending on the device type. Notes on this sequence are contained in the chapters on the individual device types.

Check the function of the unit on the basis of the status messages appearing on the display.

# Operation

**!** The universal controller, version I, installed in the compact system must only be operated by trained specialists, who are capable of recognizing the hazards in connection with touching life components, unless the controller has a separate power supply that has been installed by a trained specialist for the purpose of programming, while all other components that could be touched are disconnected from power.

## Display Structure

Figure 1 - 5 shows the operating display with its display and operating elements.

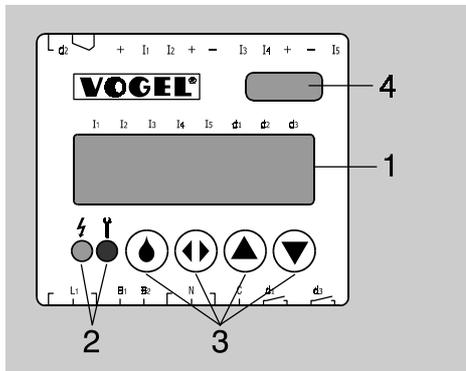


Table 1 - 4. Overview of Display and Operating Elements

Illustration	Designation	Function
	LCD display	Display function Status display: indicates conditions of inputs and outputs. Parameter display: indicates the set and changeable parameters. Info display: indicates device type loaded and software version.
	Operating voltage LED	Is on when operating voltage is applied to the unit.
	Failure LED	Is on when a failure has occurred.
	DK button	1. Triggers intermediate lubrication cycle. 2. Deletes a failure message.
	Select button	Change to parameter display, select parameter values to be displayed or changed.
	Up button	Change to info display, change parameter values.
	Down button	Change parameter values.

The display elements are the 8-digit LCD display (1) and the LEDs (2). Operating elements are the push-buttons (3). Table 1 - 4 provides an overview of the elements.

Figure 1 - 5. Operating Display

- 1 LCD display
- 2 Light emitting diodes (LED)
- 3 Push buttons
- 4 Service interface

## LEDs

If the green LED is on, operating voltage is present.

If the red LED is on, this generally indicates an error situation.

## LCD Display

The 8-digit LCD display serves several display functions:

### Status display:

Indicates conditions of inputs and outputs.

### Info display:

Indicates device type loaded and software version.

### Display of input functions:

In most device types, the functions of the inputs (normally open contact or normally closed contact) can be set here.

### Parameter display:

Indicates the set and changeable parameters.

The basic display function is the status display. From it, the parameter display or info display can be called up.

## The Status Display

In the status display, the conditions of the inputs and outputs of the controller are shown. It is the standard display and always active when operating voltage is applied.

Figure 1 - 6 shows the display structure for the status display. Only configured outputs or inputs are shown. The configuration of the inputs and outputs depends on the device type. The meaning of the symbols is explained in table 1 - 5.

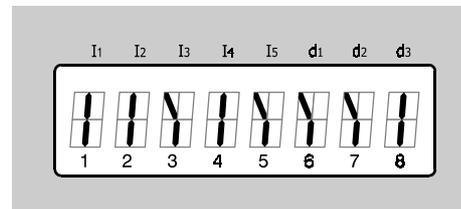
## The Info Display

The device type and firmware version of the controller can also be called up at the display.

Call up the info display by pressing the  button in the status display.

If a designation shown is more than 8 digits long, the remaining characters are shown, when you press the  button once more.

When you press  again, the program leaves the information display mode and the input functions are displayed.



**Figure 1 - 6. Structure of the LCD Display in the Status Display (Example)**  
**Pos. 1 - 5: Inputs I1 through I5**  
**Pos. 6 - 8: Outputs d1 through d3**

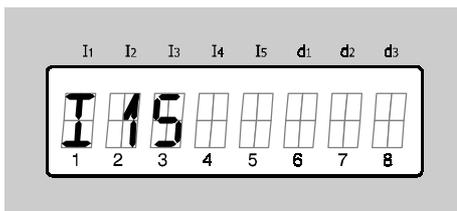
**Table 1 - 5. Symbols in the Status Display**

Status Display of Normally Open Contacts	
	normally open contact/normally closed contact - open
	normally open contact/normally closed contact - closed
Status Display of Change-Over Contacts	
	change-over contact in operating position
	change-over contact in resting position

### Display of input functions:

The display of the input functions is called up by pressing the  $\blacktriangle$  key in the information screen.

The designation of the first input that can be changed and the symbol for the function value appears (Fig. 1 - 7).



**Figure 1 - 7. Display of input functions**

**Pos 1 - 2: Designation of the input**

**Pos. 3: Function value:**

**S = normally open contact**

**O = normally closed contact**

**- = not used**

On some devices only the function of the filling level warning switch can be altered. The input designation "WS" is displayed in this case.

### Adjusting the input functions

In most device types, the function values of the inputs (normally open contact or normally closed contact) can be altered. To allow this,

first press the  $\blacktriangle$  key repeatedly to call up the display of the input functions. As soon as the first input function is displayed, the function value can be changed by pressing the  $\blacktriangledown$  key.

**! Altering the input functions may lead to malfunctions of the central lubrication system, causing substantial consequential damage.**

To change to the next changeable input function, press the  $\blacktriangle$  key again.

The basic setting of the input functions depends on the device type, this also applies to which input function can be altered. Further information is found in the corresponding chapters on the device types.

On some devices only the function of the filling level warning switch can be altered. The input designation "WS" is displayed in this case.

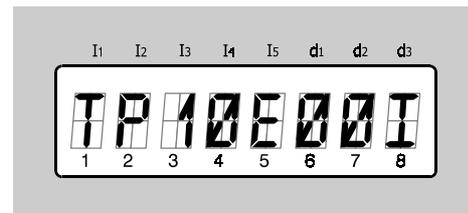
### The Parameter Display

You can call up the parameter display from the status display by pressing the  $\odot$  button. To save space, the parameter values are displayed in exponential format.

$$100 = 1 \cdot 10^2 = 1 \text{ E } 02$$

The following examples illustrate how to read the display.

Display value	Meaning
TP10E00I	pause time 10 ( $10 \cdot 10^0$ ) pulses
TP01E02M	pause time 100 ( $1 \cdot 10^2$ ) minutes
TU15E01S	monitoring time 150 ( $15 \cdot 10^1$ ) seconds or 2.5 minutes



**Figure 1 - 8. Structure of the LCD Display for the Parameter Display**

**Pos. 1 - 2: Parameter designation**

**Pos. 3 - 4: Basic value**

**Pos. 5 Symbol E(xponent)**

**Pos. 6 - 7: Exponent**

**Pos. 8 Unit**

**Table 1 - 6. Overview of Display Options in the Parameter Display\***

Abbreviation	Parameter designation	Value range	Display View	Unit
BA	operating mode	A, B, C, D, E	A, B, C, D, E	
TP	pause time	1 - 990 000	01 E 00 - 99 E 04	M(inutes) S(econds) I (pulses)
TU	monitoring time	1 - 99 000	01 E 00 - 99 E 03	S(econds)
TN	dwelt time	0 - 99 000	00 E 00 - 99 E 03	S(econds)
TV	prelubrication time	1 - 990 000	01 E 00 - 99 E 04	S(econds)
I1	limit value 1	1 - 250 000	01 E 00 - 25 E 04	*0,01 I (pulses/minute)
I2	limit value 2	1 - 250 000	01 E 00 - 25 E 04	*0,01 I (pulses/minute)
I3	limit value 3	1 - 250 000	01 E 00 - 25 E 04	*0,01 I (pulses/minute)
TL	pump run time	1 - 15	01 E 00 - 15 E 00	S(econds)
TK	MK pulse monitoring time	1 - 120	01 E00 - 12 E 01	S(econds)
MI	MK pulse transmission	1 - 25	01 E 00 - 25 E 01	
NH	signal edge (number strokes)	1 - 30	1 - 30	
NI	number of lubrication pulses	1 - 99 000	01 E 00 - 99 E 03	I (pulses)
VZ	prelubrication cycles	0 - 99	00 E 00 - 99 E 00	

\* Type and size of the lubrication system must be considered when the parameter settings are determined.

## Setting Parameters

**!** Type and size of the lubrication system must be considered when the parameter settings are determined.

**!** For all settings influencing the pump run time, the maximum on-times of the motors and valves must be considered.

To set parameters, press the  button in the parameter display, until the value to be set flashes.

When the parameter displayed cannot be changed, the value does not flash on the display. Which parameters can be changed, depends on the device type.

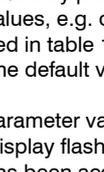
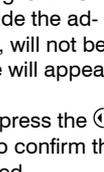
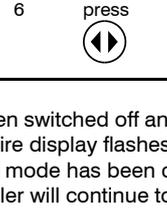
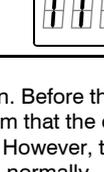
Select the desired value by pressing  or . Invalid parameter values, e.g. outside the admissible ranges listed in table 1 - 7, will not be accepted. Instead the default value will appear.

After entering the parameter value press the  button. The entire display flashes to confirm that the value entered has been accepted.

To quit the parameter display, keep pressing the  button, until the display changes to the status display. The new parameters generally are activated when the new pause begins.

An exception is change of the operating mode (BA). It is activated only after the controller has

**Table 1 - 7. Changing Parameters**

Step	Push-button	Display	Display
1	Press 		The parameter value to be changed flashes.
2	Press  or  until		the parameter value is reached.
3	Repeat steps 1 - 2, until all parameter values have been set.		
4	Press 		The entire display flashes.
5	Repeat steps 1 -4 until all parameter values have been set.		
6	press 		Change to status display.

been switched off and back on. Before that the entire display flashes to confirm that the operating mode has been changed. However, the controller will continue to function normally.

## Use as Replacement



**The controller may only be replaced by trained specialists who are capable of recognizing the hazards in connection with touching life components.**



**The controller may only be adjusted by trained specialists.**

If you wish to replace an existing controller with a universal controller, please observe the following notes.



**Before replacing the unit, check if the local supply voltage agrees with the voltage indicated on the new controller.**

Note the parameter values adjusted in the old controller. Which values must be noted, depends on the device type; please turn to the respective device type description. If necessary, label all wires to be disconnected and reconnected to the new unit, such as WS, DS, DS2, MK, DK, +, - etc.; on the wires to be connected to the relays d1, d2 and d3, also note the respective terminal numbers.

Now remove the old controller and replace it with the universal controller. Connect the inputs and outputs according to their previous functions. The assignment of inputs and outputs is indicated on the sticker on top of the device or is listed in the chapter on the respective device type.

Ensure that you have correctly adjusted the operating voltage as described in the chapter Assembly; then only connect the unit to power.



**Power must be switched on or off instantaneously.**

Subsequently adjust the parameter values noted from the old controller at the keypad of the universal controller.



**Note that the universal controller must be connected to power before you can change parameters.**

Check the function of the unit on the basis of the status messages appearing on the display.

## Failures

### Failure Messages

If a failure occurs in the operation of the central lubrication system that is traced by the monitoring sensors, the controller will indicate the failure: the red failure LED will be on and the symbol of the respective input will appear and flash on the display.

The type of failure depends on the device type. Further information is found in the corresponding chapters on the device types.

After resolving the failure, delete the failure message by pressing the  button.

 **Delete a failure message only after resolving the cause of the failure.**

**Table 1 - 8. Start Error**

Failure message on the LCD display	Meaning
ERR 1	no configuration has been loaded
ERR 2	checksum is faulty
ERR 3	wrong firmware

### Device Failures

Device failures refer to the controller itself.

#### Start Error

A start error has occurred when the controller displays any of the failure messages listed in table 1 - 8 after power has been applied. In this case please turn to a VOGEL service station (chapter Service).

#### Other Failures or Damages

If your controller should not function as described in the chapter on the respective device type, please first check the correct installation of the controller and all connections, as well as the tightness of all lubricant supply lines.

Also check if the unit employed is suitable for the existing operating voltage, or if the voltage adjustment described in chapter Assembly has been carried out properly.

If this does not resolve the failure, please turn to a VOGEL service station.

 **The housing of the device must not be opened.**

## Maintenance and Repair

The universal controller is maintenance-free. Nonetheless, you should perform the following checks, to ensure continued proper functioning of the controller:

- Check the basic functions of the controller by pressing the  button.
- Check the electrical connections.

 **Any further work must exclusively be performed by Vogel service technicians.**

## Specifications

	Version +471	Version +472
Rated input voltage $U_n$	AC (100..120) V or AC (200..240) V	DC 20..24 V or AC 20..24 V
Input voltage range	0.85 $U_n$ to 1.1 $U_n$ (85..132 V / 170..264 V)	0.85 $U_n$ to 1.1 $U_n$ (17..26.4 V)
Rated input current	70 mA / 35 mA	75 mA, at maximum output load: 250 mA
Power consumption	8 W	5 W
Rated frequency	50..60 Hz	DC or 50..60 Hz
Frequency range	49..61 Hz	DC or 49..61 Hz
Disengaging value	max. 10 % of $U_n$	max. 10 % of $U_n$
Reclosing time	1 s	1 s
Residual ripple of input voltage	not relevant	DC: max. 5 %
Max. fusing	6.3 A	6.3 A
Max. switching current	5 A AC	5 A AC
Max. relay switching voltage	250 V AC	250 V AC
Overvoltage category to DIN VDE 0110	III	III
Rated voltage of inputs	24 V DC	24 V DC
Input impedance	2.4 k $\Omega$ +/-10 %	2.4 k $\Omega$ +/-10 %
Input level, low	0 V..+4 V	0 V..+4 V
Input level, high	+10 V..+24 V	+10 V..+24 V
Coincidence factor for inputs	max. 0.8	max. 0.8

	Versions +471 and +472
Output voltage for inputs and external consumers	24 V DC +10% / -15%
Rated output current (outputs „+“ included for external consumers)	110 mA max. 60 mA
MK input max. input frequency pulse duty factor	30 Hz 1:1
Conductors connected (flexible) with terminal sleeves with Twin terminal sleeves length on which to remove insulation	max. 2.5 mm <sup>2</sup> or 2*0.75 mm <sup>2</sup> max. 2*1.5 mm2 8 mm
Enclosure type (Version E)	IP30, terminals IP20
Protection class (Version E)	II
Rated isolation voltage	250 V AC
Contamination class	2
Operating temperature storage temperature	0 °C to 60 °C -25 °C to 70 °C
Dimensions W x H x D (Version E)	approx. 70 mm x 75 mm x 110 mm
Voltage capacity to EN 61131-2 and EN 50178 supply voltage / relay contacts supply voltage / electronics relay contacts / electronics	1780 V 2830 V 2830 V
EMC noise resistance noise emission	EN 61000-6-2 EN 500081-1
Vibration resistance to EN 60068-2-6 Shock resistance to EN 60068-2-27	10 – 57 Hz; 0.075 mm (amplitude) 15 g; 11 ms (half-sine)

# Controllers for Oil+Air Lubrication System

## Application

The controllers described in this chapter are used for time or pulse-control of oil+air lubrication systems.

## Overview

Table 2 - 18 lists the available VOGEL controllers for oil+air lubrication systems and their scope of functions.

## Function

The controllers trigger lubrication at certain time intervals. The special feature of the controllers described in this chapter is their prelubrication function which has been adapted to the specific needs of oil+air lubrication systems. The functions available in this device series are outlined below. To which extent these functions are realized depends on the individual device type.

### The Lubrication Cycle

A lubrication cycle is comprised of contact time (lubrication) and pause time (TP).

### Prelubrication

A prelubrication is a contact time that directly follows power-up of the device. If a failure oc-

**Table 2 - 18. Overview of VOGEL Controllers for Oil+Air Lubrication Systems**

Designation	Short description
IG54-20	Pulse transmitter with fixed prelubrication cycles, adjustable pause time and power supply failure memory
IG54-20-S1	Pulse transmitter with freely selectable number of prelubrication cycles, pause time and dwell time, power supply failure memory
IG54-20-S3	Like S1, level monitoring switch as normally closed contact
IG54-20-S4	Pulse transmitter with freely selectable number of prelubrication cycles, pause time and dwell time, power supply failure memory as well as additional relay output for compressed air valve

curs during the prelubrication, a failure message is output.

### The Prelubrication Cycle

On some devices, a prelubrication cycle is triggered upon every power-up. During the prelubrication cycle the pump motor is switched on and several contact times are processed with short pauses in between. The number of contact times can be fixed or selected by the user, depending on the device type. At the end of the prelubrication cycle a pause time is started.

On some devices operating with power supply failure memory, triggering of a prelubrication cycle can be suppressed by setting the number of prelubrication cycles (VZ) to 0.

During the prelubrication cycle, failures are only indicated by flashing of the symbol of the respective input on the display and by interruption of the function (also see chapters Operation and Display of Failures).

### The Pause Time

The pause time is the time between two contact times. The length of the pause can be determined in two ways, resulting in two different operating modes (BA) of the controllers (pulse transmitter or pulse counter). The operating mode can be adjusted manually at the unit (see chapter Operation - general part of the operating manual).

### Operating Mode Pulse Transmitter

In this operating mode the controller determines the length of the pause by starting a contact time at an interval programmed by the user.

### Operating Mode Pulse Counter

In this operating mode the pause time is determined by the machine, sending pulses to the controller while it operates. The pulses received at the machine contact (MK) are counted by the controller, and the contact time is started after a preset number of pulses. The number of pulses to be counted can be set by the user.

### The Contact Time

After time-out of the pause time, the controller triggers the lubrication, also referred to as contact time. The contact time is comprised of monitoring time (TU) and pump dwell time (TN).

### Pressure Build-Up Monitoring Oil Pressure

During the contact time, the pump motor is first started and the pressure required for lubrication is built up in the lubrication lines. This process is monitored by a pressure switch (DS). The required pressure must be reached within a certain time, the monitoring time, otherwise the pump is switched off and a failure message is output.

### Monitoring Time TU

The monitoring time is a time window for pressure build-up by the pump. If the required pressure is reached within the monitoring time, the latter is terminated. Thereafter the pump dwell time is started. The monitoring time is generally adjusted permanently and cannot be changed by the user.

### Pump Dwell Time

The pump dwell time is the time during which the pump continues running after the required pressure has been built up in the lubrication lines, to ensure all lubrication points are supplied with lubricant even in very large central lubrication systems.

### Pump Run Time Limit

The pump run time (TL) is limited in principle by the monitoring time.

### Air Pressure Monitoring

With an additional pressure switch (DS\_L) the air pressure in the compressed air line is monitored. If the pressure drops or if no pressure is built up in the first place, a failure message is output and the function sequence stopped.

### Level Monitoring

The filling level of the lubricant reservoir is monitored by means of a level monitoring switch (WS). This switch can be configured as a normally closed contact or normally open contact; this must be considered when the device type is selected. If the level monitoring switch is configured as a normally closed contact, the signal lines leading up to the level monitoring switch are at the same time monitored for breakage of the wires.

As soon as the level in the lubricant reservoir drops below minimum, the function of the lubrication system is stopped and a failure message output.

### Automatic Lubricant Refill

To some of the controllers two level monitoring switches (WS\_L and WS\_H) can be connected to allow control of automatic lubricant refill. If the lubricant level in the lubricant reservoir drops below the minimum, the relay d3 activates a valve or pump refilling lubricant until the maximum level is reached. If automatic lubricant refill fails, that is, if the level remains below the minimum level for a prolonged period, a failure message is output.

### Power Supply Failure Memory (EEPROM)

In case the power supply fails, the power supply failure memory saves the most important data of the controller, such as remaining pause time and a failure message. This allows the controller to continue the function on the basis of the device type upon the next power-up, and failure messages are not lost.

## Installation

Install the controller in the control cabinet for a VOGEL central lubrication system as described in chapter Assembly in the general section of this operating manual.

Also please observe the notes in the description of the respective device type.

## Operation

### Switching On

The device is switched on, when the operating voltage is applied. When the operating voltage is present, the green operating voltage LED is on.



**Power must be switched on or off instantaneously.**

Upon power-up the device begins the function sequence, generally it starts with a prelubrication cycle.

### **Prelubrication**

On some devices prelubrication is started upon power-up. The pump motor is switched on and the failure message relay d2 is energised. Prelubrication is performed just like a standard contact time.

### **Prelubrication Cycle**

On some devices a prelubrication cycle is started upon power-up. The pump motor is switched on and a number of lubrication runs is started with fixed pause times in between. During this time relay d2 remains de-energised and the failure LED is on, however, this does not indicate a failure.

At the end of the prelubrication cycle, a pause time is started, relay d2 is energised and the failure LED shuts off.

If a failure occurs during the prelubrication cycle, relay d2 remains de-energised and the failure LED is still on (also see chapter Display of Failures).

### **Pause Time**

After time-out of the prelubrication, relay d1 is de-energised and the pump motor shut off. Then the preset value for the pause time is read and the pause started. Subsequently contact time and pause time alternate.

### **Contact Time (Lubrication)**

The contact time is started after time-out of the pause time. It is comprised of the time required for pressure build-up and the dwell time. At the

beginning of the contact time, relay d1 is energised and the pump motor thereby switched on. As soon as the required pressure is reached, the monitoring time is terminated and the pump dwell time started. At the end of the dwell time, the next pause time begins.

### **Relay d2 in Normal Operation**

When the operating voltage is applied and the device is operating without failures, relay d2 is always energised, except during the prelubrication cycle.

### **Intermediate Lubrication**

Short pressing of the  button during a pause triggers an intermediate lubrication. Intermediate lubrication is performed just like a standard contact time.

### **Switching Off**

The device is switched off by separating it from the operating power supply.



**Upon shut-off, the device must remain off for some time, before it can be switched on again (see reclosing time, specifications).**

### **Changing Parameters and Operating Mode**

The change of parameters and the selection of the operating mode are described in chapter Operation in the general part of this operating manual. Parameter changes, such as change of the pause time, will become operative with the beginning of the next pause. A change of the

operating mode will only become operative after the device is switched off and back on.

### **Operation with Power Supply Failure Memory**

In case the power supply fails, the power supply failure memory saves the most important data of the controller, such as remaining pause time and a failure message.

After a power failure, the device generally starts with a prelubrication cycle. If this function has been deactivated, however, the start after return of power depends on the situation prevailing when the power failure occurred (see table 2 - 19).

## **Display of Failures**

If a failure occurs, the red failure LED is on and the symbol for the respective input flashes on the display.

### **Oil Pressure Missing**

If the pressure required is not built up in the main supply line during the monitoring time, that is, if the pressure switch DS is not activated, the failure LED will switch on and the pump motor will shut off. At the same time the symbol for input DS will flash on the display. The relays d1 and d2 are or remain de-energised. At the same time the function sequence is stopped.

### **Air Pressure Missing**

An air pressure failure is present when the pressure switch DS2 is not activated during the

monitoring time, pump dwell time, or pause time, or if it is not activated within 5 seconds after power-up or after deletion of a failure message. A failure message is output and the function sequence is stopped. At the same time the symbol for input DS flashes on the display.

#### Low Filling Level

If the filling level in the lubricant reservoir drops too far, the level monitoring switch WS opens, causing an interruption of the current function sequence. The relays d1 and d2 are de-energised and the failure LED lights up. At the same time the symbol for input DS flashes on the display.

#### Failure of the Automatic Lubricant Refill

On devices with automatic lubricant refill, a failure message is output when the level remains below the minimum for a prolonged period. Relay d2 is energised, the failure LED lights up and

the symbol for input WS\_L flashes on the display. The function sequence is stopped.

#### Relay d2 when Operation Fails

If a failure occurs, relay d2 remains de-energised. The function sequence remains interrupted, until the error has been resolved and the failure message has been deleted by pressing the -button.

#### Failure Message during a Prelubrication Cycle

If a failure occurs during a prelubrication cycle, the process is stopped and the symbol of the respective input flashes on the display. After deletion of the failure, the device continues the prelubrication cycle.

#### Deleting a Failure Message

Delete a failure message by pressing the  button after the cause of the failure has been re-

solved. This triggers an intermediate lubrication.

A level monitoring switch failure message can only be deleted, when a sufficient amount of lubricant has been refilled.



**Delete a failure message only after resolving the cause of the failure.**

**Table 2 - 19. Operation with Power Supply Failure Memory – Start Procedure upon Power Failure**

Situation at time of power failure	Procedure upon power-up
During the monitoring time (before DS1 input is energised)	contact time
During the pump dwell time (after DS1 input has been energised)	pause time
During pause time	pause continues after reading of the remaining pause time from the power supply failure memory
During failure reported by pressure switch DS or DS2	prelubrication cycle
During failure reported by level monitoring switch WS	failure message remains stored

## IG54-20

### Operating Modes

The controller IG54-20 can only be used as pulse transmitter (operating mode A).

### Scope of Functions

The IG54-2 features the functions listed below. The default and the adjustable parameters are listed in table 2 - 20.

- adjustable pause time
- pump run time limit
- oil pressure monitoring
- air pressure monitoring
- level monitoring
- power supply failure memory (EEPROM)

### Input functions

On this device the input function of the level monitoring switch (WS) can be changed. The adjustment is described in section "Adjusting the input functions" in the chapter "Operation" of the general section of this manual.

Standard setting WS: S (normally open contact)

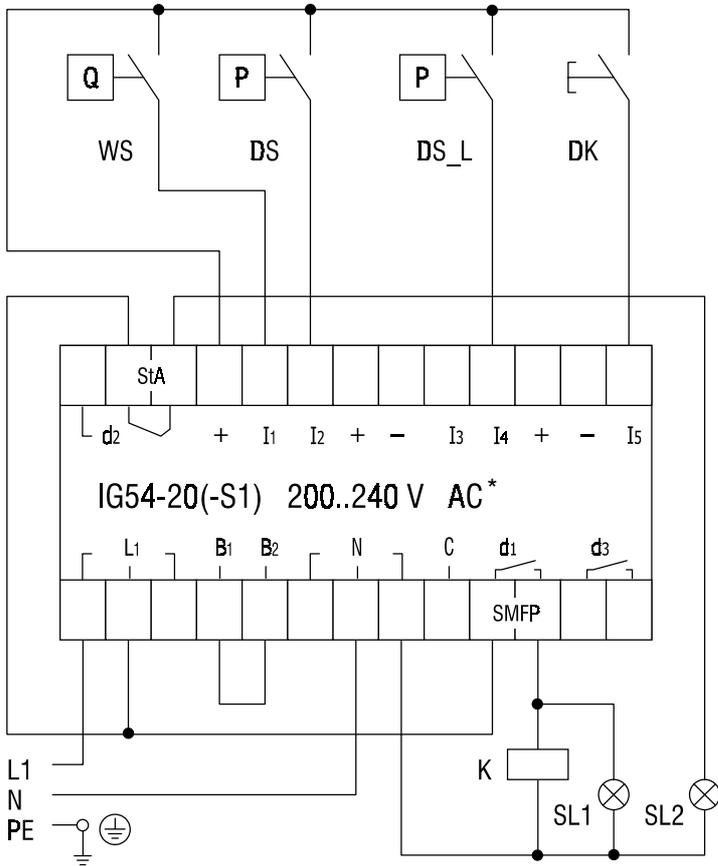
**Table 2 - 20. Parameters of IG54-20**

Designation	Abbreviation	Default setting	Unit	Adjustment range	Unit
operating mode	BA	A		not adjustable	
pause time	TP	10	minutes	01 E 00 - 99 E 00	minutes
monitoring time	TU	60	seconds	not adjustable	
dwel time	TN	5	seconds	not adjustable	

### Installation, First Operation

Install the device in the control cabinet of a VOGEL central lubrication system as described in chapter operation (general part of this manual). Observe the connection diagram (figure 2 - 15).

After installation, input of parameters and applying the operating voltage, the device begins its function sequence with prelubrication.



**Figure 2 - 15. Connection Diagram for IG54-20 and IG54-20-S1**

- L1/N operating voltage
- B1/B2 jumper terminals for operating voltage (here shown: 200..240 V)
- WS level monitoring switch (here shown: reservoir filled)
- DS pressure switch (pressure build-up monitoring)
- DS\_L pressure switch (air pressure monitoring)
- DK push-button
  - 1. intermediate lubrication
  - 2. delete failure
- + +24 V DC output
- 0 V DC output
- d1 operating contact for lubricant supply pump (SMFP)
- d2 change-over contact, command line resting contact: failure message (StA) or prelubrication cycle
- operating contact: operation OK
- SL1 signal lamp for „PUMP ON“
- SL2 signal lamp for „FAILURE“
- K pump motor contactor

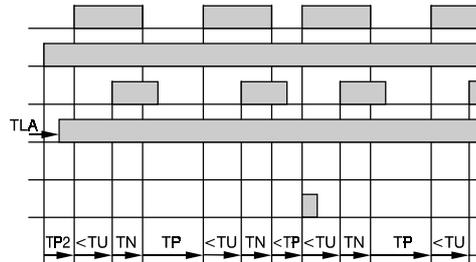
\*For connection to a 20..24 V AC supply please note fig. 1 - 3 on page 1 - 6.

### IG54-20 Pulse Diagrams

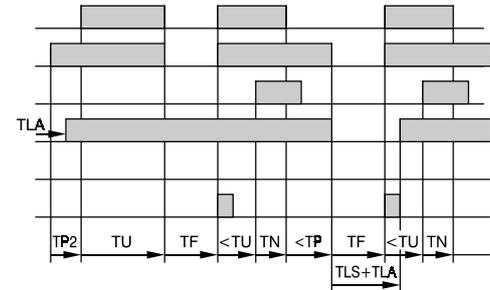
(Time axis not true to dimensions)

Pump motor, relay d1  
 Command track, relay d2  
 Pressure switch ÖI (noc) DS  
 Pressure switch Luft (noc) DS\_L  
 Filling level switch (noc) WS  
 Push button DK

Normal process

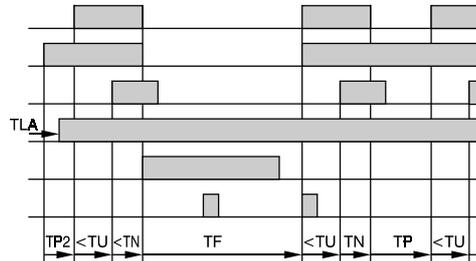


pressure build-up failure (DS or DS\_L)



Process in case of filling level failure

Pump motor, relay d1  
 Command track, relay d2  
 Pressure switch ÖI (noc) DS  
 Pressure switch Luft (noc) DS\_L  
 Filling level switch (noc) WS  
 Push button DK



Legend

- TP2 = saved remaining pause time
- TU = monitoring time
- TN = pump dwell time
- TP = pause time
- TF = function sequence stopped
- TLS = compressed air failure
- TLA = compressed air build-down time

Figure 2 - 16. Pulse Diagram for IG54-20

# IG54-20-S1, IG54-20-S3, IG54-20-S4

## Operating Modes

The controllers IG54-20-S1, IG54-20-S3, and IG54-20-S4 can only be used as pulse transmitters (operating mode B).

## Scope of Functions

The controllers IG54-20-S1, IG54-20-S3, and IG54-20-S4 feature the functions listed below. The default and the adjustable parameters are listed in table 2 - 21.

### IG54-20-S1

- adjustable pause time
- adjustable number of prelubrication cycles
- adjustable pump dwell time
- pump run time limit
- oil pressure monitoring
- air pressure monitoring
- level monitoring (normally open contact)
- power supply failure memory (EEPROM)

### IG54-20-S3

Like IG54-20-S1, but

- level monitoring (normally closed contact)

**Table 2 - 21. Parameters of IG54-20-S1, IG54-20-S3, and IG54-20-S4**

Designation	Abbreviation	Default setting	Unit	Adjustment range	Unit
operating mode	BA	B		not adjustable	
pause time	TP	10	minutes	01 E 00 - 99 E 00	minutes
monitoring time	TU	60	seconds	not adjustable	
dwell time	TN	5	seconds	00 E 00 - 99 E 00	seconds
prelubrication cycles	VZ	10		00 E 00 - 99 E 00	

### IG54-20-S4

Like IG54-20-S3, but

- additional output d3 for compressed air valve

### Prelubrication Cycles (Setting „00“)

If the prelubrication cycles have been set to „00“, the device operates without prelubrication cycles when it starts from the failure memory.

### Pump Dwell Time (Setting „00“)

If the pump dwell time has been set to „00“, the device terminates the lubrication time immediately upon successful pressure build-up. Relay d1 is de-energised and the pump motor shut off.

## Input functions

On these devices the input function of the level monitoring switch (WS) can be changed. The adjustment is described in section “Adjusting the input functions” in the chapter “Operation” of the general section of this manual.

### IG54-20-S1

Standard setting WS: S (normally open contact)

### IG54-20-S3

Standard setting WS: O (normally closed contact)

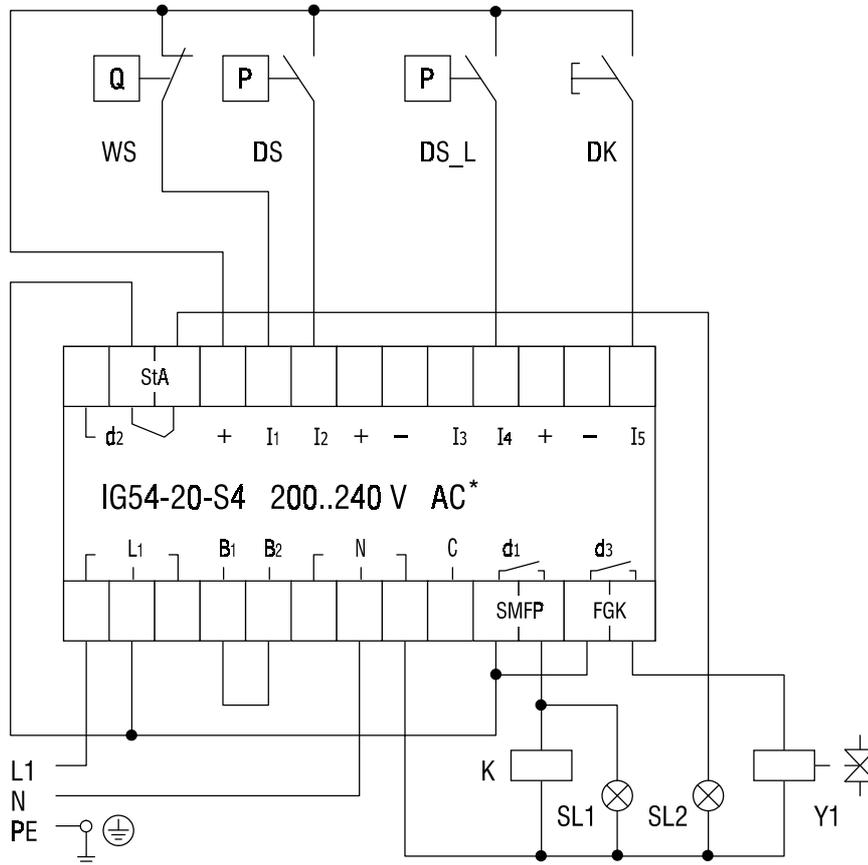
### IG54-20-S4

Standard setting WS: O (normally closed contact)

## Installation, First Operation

Install the device in the control cabinet of a VOGEL central lubrication system as described in chapter operation (general part of this manual). Observe the connection diagram (figure 2 - 17).

After installation, input of parameters and applying the operating voltage, the device begins its function sequence with prelubrication.



\*For connection to a 20..24 V AC supply please note fig. 1 - 3 on page 1 - 6.

**Figure 2 - 17. Connection Diagram for IG54-20-S4**

- L1/N operating voltage
- B1/B2 jumper terminals for operating voltage (here shown: 200..240 V)
- WS level monitoring switch (here shown: reservoir filled)
- DS pressure switch (pressure build-up monitoring)
- DS\_L pressure switch (air pressure monitoring)
- DK push-button
  - 1. intermediate lubrication
  - 2. delete failure
- + +24 V DC output
- 0 V DC output
- d1 operating contact for lubricant supply pump (SMFP)
- d2 change-over contact, command line resting contact: failure message (StA) or prelubrication cycle  
operating contact: operation OK
- d3 release contact for compressed air valve (FGK)
- SL1 signal lamp for „PUMP ON“
- SL2 signal lamp for „FAILURE“
- K pump motor contactor
- Y1 compressed air valve

### IG54-20 -S4 Pulse Diagrams

(Time axis not true to dimensions, Darstellung nach Ablauf der Vorschmierzyklen)

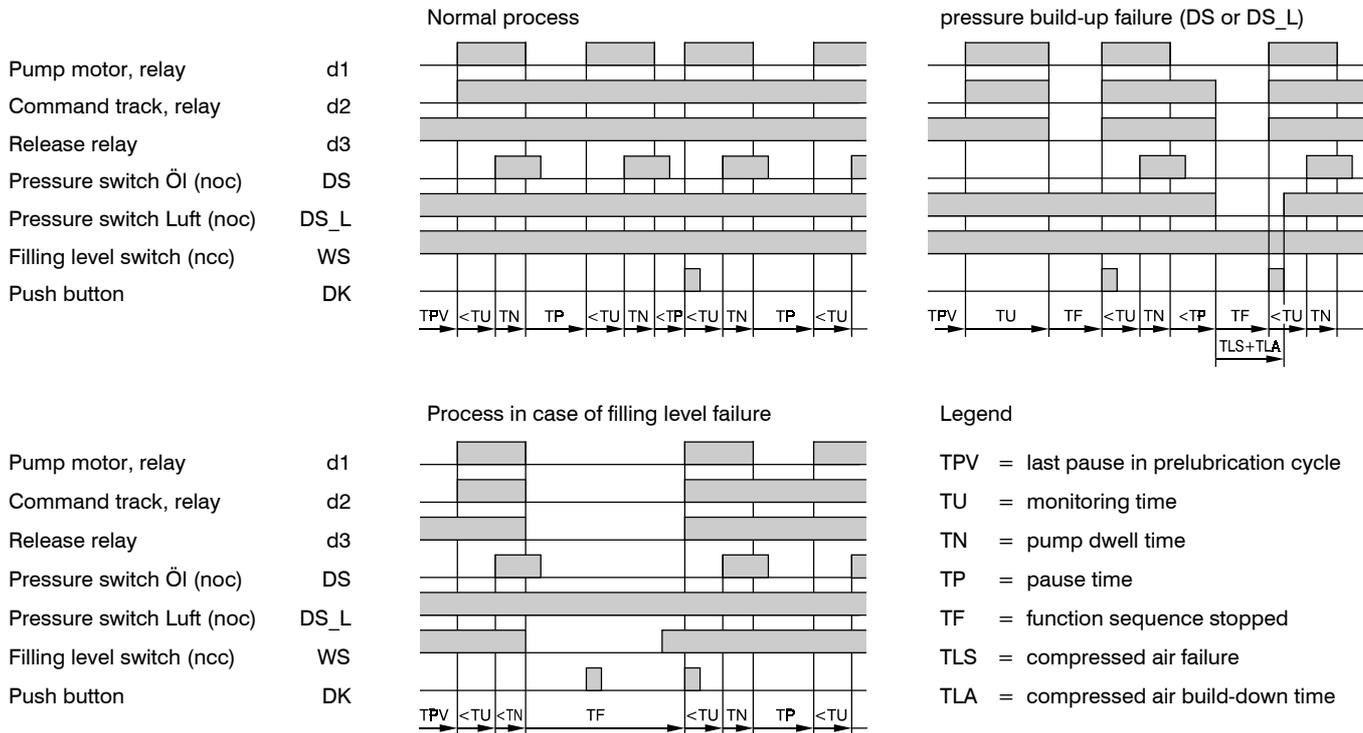


Figure 2 - 18. Pulse Diagram for IG54-20-S4