

EWT  
EXZT  
IG  
IGZ  
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

Dipl.-Ing. S. Schlenzka

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WILLY VOGEL AKTIENGESELLSCHAFT

EG-Konformitätserklärung KE 000057

Für das folgend bezeichnete Erzeugnis: **Universalsteuergerät**  
 Bestellbezeichnungen **LC3000-E+471, LC3000-E+472, LC3000-I+471, LC3000-I+472**

wird hiermit bestätigt, daß es den wesentlichen Schutzanforderungen entspricht, die in der(n) Richtlinie(n) des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten ...

- Elektromagnetische Verträglichkeit 89/336/EWG**,  
geändert durch 92/31/EWG, 93/68/EWG
- Elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen (Niederspannungs-Richtlinie) 73/23/EWG**  
geändert durch 93/68/EWG
- Maschinen 98/37 EG**
- Kraftfahrzeug 72/245/EWG**  
geändert durch 89/491/EWG, 95/54/EG

... festgelegt sind.  
 Weitere Angaben über die Einhaltung dieser Richtlinie(n) enthält der Anhang zu dieser Erklärung. Diese Erklärung gilt für alle Produkte, die in der Tabelle als Anhang - Bestandteil dieser Erklärung - aufgeführt sind.

Diese Erklärung wird verantwortlich für den Hersteller / Importeur

WILLY VOGEL AKTIENGESELLSCHAFT

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

Vertreten durch

Heinz Gaub

Ulve Schumann

Berlin, den 19. Februar 2001

- Die Anhänge sind Bestandteil dieser Erklärung.
- Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, beinhaltet jedoch keine Zusicherung von Eigenschaften.
- Die Sicherheitshinweise in der dem Produkt beigelegten Dokumentation sind zu beachten.
- Die Inbetriebnahme der bescheinigten Produkte ist solange untersagt, bis sichergestellt wurde, das die Maschine, Fahrzeug o. ä., in welche(s) das Produkt eingebaut wurde, den Bestimmungen und Forderungen der anzuwendenden Richtlinien entspricht.
- Der Betrieb der Produkte an nicht normgerechter Netzspannung, sowie die Nichtbeachtung von Installationshinweisen kann Auswirkungen auf die EMV-Eigenschaften und auf die elektrische Sicherheit haben.



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Anhang zur EG-Konformitätserklärung KE 000057

Die Übereinstimmung wurde festgestellt

a) durch Anwendung folgender (harmonisierten) europäischen Normen bezüglich der Richtlinie(n)

**Elektromagnetische Verträglichkeit**  
EMV 89/336/EWG

EN 50081-1
EN61000-6-2

**Niederspannung 73/23/EWG**

EN50178

**Maschine 98/37/EG**  
(ggf. Herstellererklärung anfordern)


**KFZ 72/245/EG i. d. F. 95/54/EG**


Für folgende Geräte wird die Konformität mit den o.g. Richtlinien erklärt:  
 E/XZT2A02, E/XZT2A03, E/XZT2A05, E/XZT2A06, E/XZT2A07, E/WT2A01, E/WT2A02,  
 IGZ36-20, IGZ36-20-S..., IGZ38-30, IGZ38-30-S..., IGZ38-M2, IGZ38-M3, IGZ38-M4, IGZ38-  
 M...S..., IGZ51-20, IGZ51-20-S..., IG54-20, IG54-20-S..., IZ52-20, IZ52-20-S..., IZ361-30, IZ361-  
 30-S...



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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

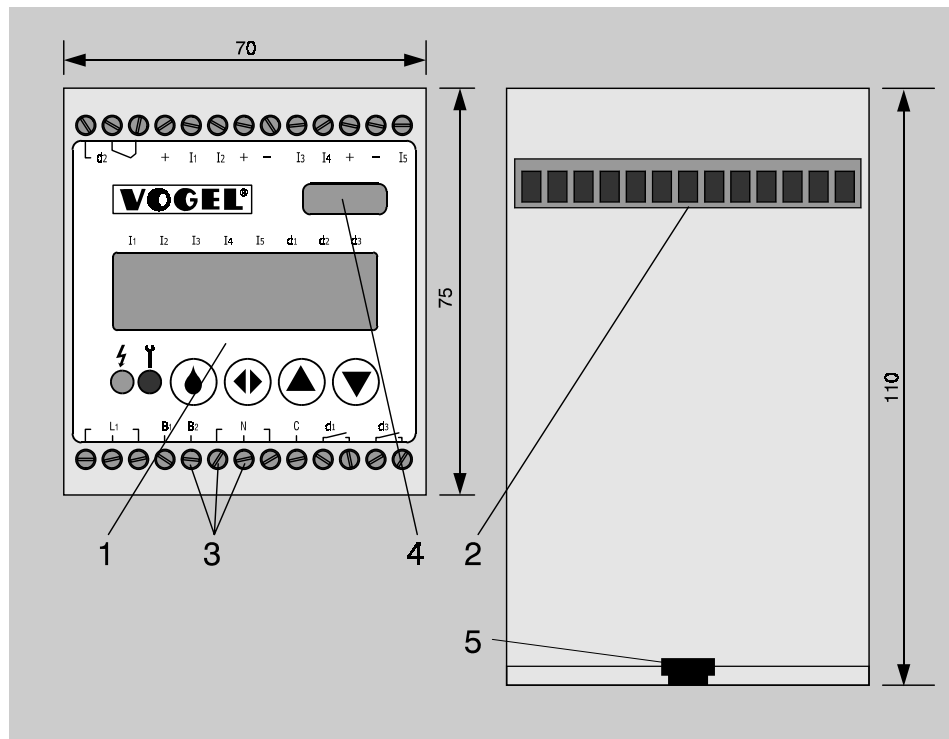
### Design

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.

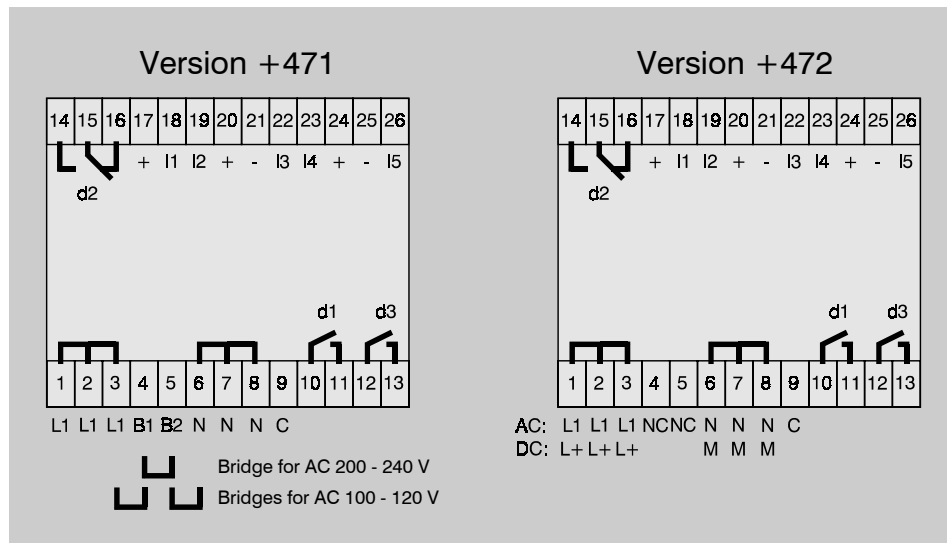


Figure 1 - 3. Terminal Assignment for Universal Controller

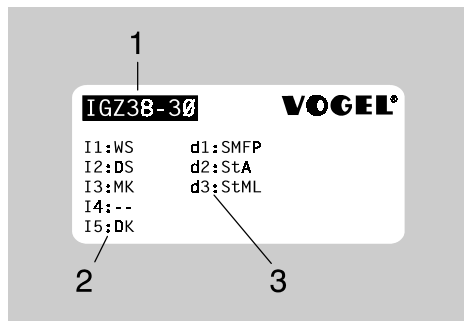
**Table 1 - 2. Overview of Terminal Assignment**

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.

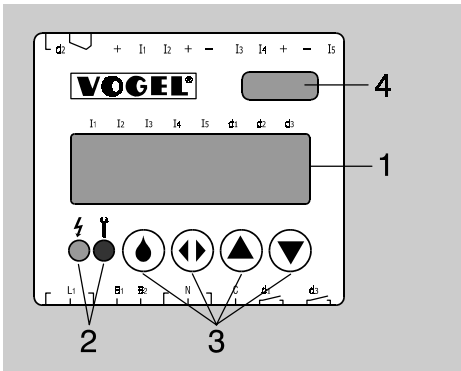


Table 1 - 4. Overview of Display and Operating Elements

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.

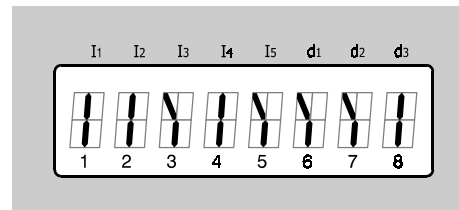
## The Info Display

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**

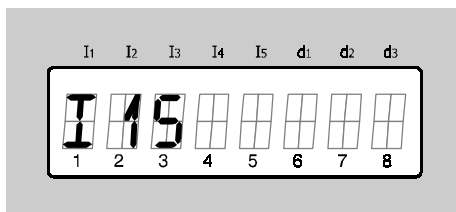
Status Display of Normally Open Contacts	
	normally open contact/normally closed contact - open
	normally open contact/normally closed contact - closed
Status Display of Change-Over Contacts	
	change-over contact in operating position
	change-over contact in resting position



### 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.

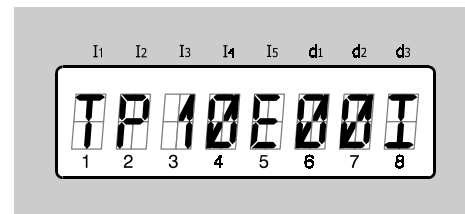
### The Parameter Display

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.









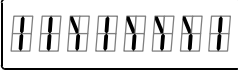
Select the desired value by pressing  or . Invalid parameter values, e.g. outside the admissible ranges listed in table 1 - 7, will not be accepted. Instead the default value will appear.

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)

EWT  
EXZT  
IG  
IGZ  
IZ

# Universal Controller for Industrial Lubrication Systems

Part 2: Device Descriptions

# Controllers for Single-Line Lubrication Systems

## Application

The devices described in this chapter are used for time or pulse control of intermittently operating single-line lubrication systems with piston feeders.

## Overview

Table 2 - 1 lists the available VOGEL controllers for single-line lubrication systems and their scope of functions.

## Function

The controllers trigger lubrication at certain time intervals. Additionally, the devices feature a number of functions required for control and monitoring of the lubrication system. The scope of functions depends on the device type.

### The Lubrication Cycle

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

### 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 op-

**Table 2 - 1. Overview of VOGEL Controllers for Single-Line Lubrication Systems**

Designation	Short description
EXZT2A02	Pulse transmitter/counter with adjustable pause time, pause time extension, pressure build-up and pressure build-down monitoring and level monitoring
EXZT2A05	Pulse transmitter/counter with adjustable pause time, pause time extension, pressure build-up monitoring and level monitoring
EXZT2A07	Pulse transmitter/counter with adjustable pause time, pause time extension, pressure build-up monitoring and level pre-warning
IGZ36-20	Pulse transmitter/counter with adjustable pause time, pressure build-up and pressure build-down monitoring as well as adjustable dwell time
IGZ36-20-S6	like IGZ36-20, level monitoring with normally closed contact (broken wire monitoring)
IGZ38-30	Pulse transmitter/counter with adjustable pause time, pressure build-up monitoring and level monitoring with normally closed contact (broken wire monitoring)
IGZ38-30-S1	like IGZ38-30, level monitoring with normally open contact
IG351-10	Pulse transmitter with adjustable pause time, adjustable pump run time and level monitoring with normally open contact
IGZ51-20-S3	Pulse transmitter/counter with adjustable pause time, pause time extension, pressure build-up and pressure build-down monitoring as well as adjustable dwell time and selectable power supply failure memory

erating modes (BA) of the controllers (pulse transmitter or pulse counter). The operating mode can be adjusted manually at the unit (see chapter Operation).

### Pause Time Extension

On some units operating as pulse transmitters, the input I3 can be used to stop and release the pause. As long as voltage is applied, the pause is interrupted.

### 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 or MKPV) 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.

### **Pulse Monitoring**

In devices with pulse monitoring (only in the impulse counter operating mode), a second machine contact (MKUE) is used in addition to the machine contact MK or MKPV. Both inputs are polled alternately. If there is no pulse at contact MKUE between two pulses at MK/MKPV, a failure message is output.

### **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**

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

Pressure build-up monitoring is deactivated by connecting the terminals "+" and I2. In this case the unit operates with a contact time that is identical with the pump dwell time.

### **Monitoring Time**

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.

### **Pressure Build-Down Monitoring**

Pressure build-down monitoring is performed in some controllers by means of a second pressure switch (DS2) that is polled at the end of the pause time. If the pressure switch is not yet activated or inactivated at that time, a failure message is output.

### **Level Monitoring**

In addition to the pressure build-up, the controller also monitors the lubricant level in the lubricant reservoir by means of a level monitoring switch (WS). This switch can be configured as a normally closed contact or normally open con-

tact; this must be considered when the device type is selected.

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

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.

### **Filling Level Pre-Warning**

Some devices in this group feature filling level pre-warning. If the lubricant level in the lubricant reservoir drops below „Reserve“, the pre-warning contact of the level monitoring switch (WS\_V) opens. The relay d3 picks up and reports the pre-warning; the other functions are not influenced, that is, the device remains in a ready state and keeps functioning.

### **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.**

### Prelubrication

Upon every power-up of the system a prelubrication is triggered (exception: units with power supply failure memory). The pump motor is

switched on and the failure message relay d2 is energised. Prelubrication is performed just like a standard contact time.

### Pause Time

After time-out of the prelubrication, the 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, the 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 no failure has occurred, the relay d2 is always energised.

### 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.



**After switch-off, the device must remain shut off for some time (see reclosing time in the specifications), to allow all internal voltages to be discharged.**

### 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.

A change of the operating mode will only become operative after the device is switched off and back on. Parameter changes, such as change of the pause time, will become operative with the beginning of the next pause.

## Failure Messages

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

### No Pressure Build-Up

With the beginning of the contact time, the monitoring time starts. If the pressure switch DS is not activated during this time, relay d1 and d2 are subsequently de-energised, shutting off the pump motor and switching on the failure LED. At the same time the symbol for input DS flashes on the display.

### No Pressure Build-Down

On some device types the pressure build-down is monitored by a second pressure switch (DS2). The sensor is polled at the end of the pause time. If the polling finds that pressure build-down has not occurred, the function sequence is stopped and a failure message output. At the same time the symbol for input DS flashes on the display.

### Filling Level Pre-Warning

When the level of the lubricant reservoir in devices with filling level pre-warning drops to „Reserve“, relay d3 is energised, causing the warning light connected to light up. The function sequence is not influenced, that is, the device remains in a ready state and keeps functioning.

### 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.

### Missing MK Pulses


On devices with pulse monitoring (only in operating mode pulse counter), the machine contacts MK or MKPV and MKUe are polled alternately. If no pulse is received at contact MKUe between two pulses received at MK/MKPV, a failure message is output and the symbol of input MKUe flashes on the display.


Conversely, the symbol of input MK/MKPV flashes when no pulse is received at MK/MKPV between two pulses received at contact MKUe.

### Relay d2 when Operation Fails

When a failure occurs, relay d2 is de-energised and the function sequence is stopped.

### Deleting a Failure Message

A failure message can be deleted by pressing the  button, causing intermediate lubrication to be triggered, or it may be deleted by removing the operating voltage.

On devices with power supply failure memory the failure message can only be deleted by pressing the  button.

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.**

# EXZT2A02

## Operating Modes

The controller EXZT2A02 can be operated as pulse transmitter (operating mode B) or pulse counter (operating mode D).

## Scope of Functions

The EXZT2A02 features the functions listed below. The default and the adjustable parameters are listed in table 2 - 2.

- adjustable pause time
- adjustable monitoring time
- adjustable pump dwell time
- pump run time limit
- pressure build-up monitoring
- pressure build-down monitoring (normally open contact)
- level monitoring (normally open contact)
- pause time extension

## Input functions

The standard settings for the input functions are listed in table 2 - 3. The input functions can be altered as described in section "Adjusting the input functions" in chapter "Operation" of the general section of this manual.

**Table 2 - 2. Parameters of EXZT2A02**

Designation	Abbreviation	Default setting	Unit	Adjustment range	Unit
operating mode	BA	B		B (pulse transmitter)	
				D (pulse counter)	
pause time	TP	10	seconds	01 E 00 - 99 E 04 (BA B)	seconds
				01 E 00 - 99 E 04 (BA D)	pulses
monitoring time	TU	60	seconds	01 E 00 - 99 E 04	seconds
dwell time	TN	15	seconds	01 E 00 - 25 E 00	seconds

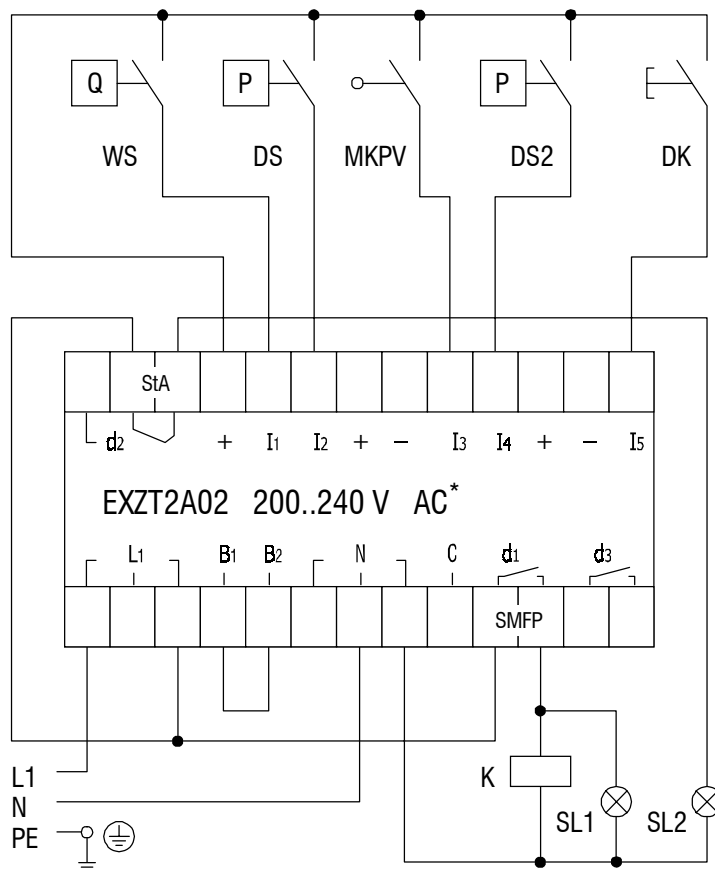
## Installation, First Operation

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 - 1).

If pressure build-down monitoring is not desired, you may connect the terminals "+" and I4. After installation, input of parameters and applying the operating voltage, the device begins its function sequence with prelubrication.

**Table 2 - 3. Input functions of EXZT2A02**

Input	Setting	Meaning
I1	S	normally open contact
I2	S	normally open contact
I3	S	normally open contact
I4	O	normally closed contact
I5	S	normally open contact



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

**Figure 2 - 1. Connection Diagram for EXZT2A02**

- 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)
- DS2 pressure switch (pressure build-down monitoring, here shown: without pressure)
- DK push-button
  1. intermediate lubrication
  2. delete failure
- MKPV machine contact/ pause time extension
  - + +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 (StA)
  - operating contact: operation OK
- SL1 signal lamp for „PUMP ON“
- SL2 signal lamp for „FAILURE“
- K pump motor contactor

# EXZT2A05

## Operating Modes

The controller EXZT2A05 can be operated as pulse transmitter (operating mode B) or pulse counter (operating mode D).

## Scope of Functions

The EXZT2A05 features the functions listed below. The default and the adjustable parameters are listed in table 2 - 4.

- adjustable pause time
- adjustable monitoring time
- adjustable pump dwell time
- pump run time limit
- pressure build-up monitoring
- level monitoring (normally closed contact)
- pause time extension
- pulse monitoring

## Input functions

The standard settings for the input functions are listed in table 2 - 5. The input functions can be altered as described in section "Adjusting the input functions" in chapter "Operation" of the general section of this manual.

**Table 2 - 4. Parameters of EXZT2A05**

Designation	Abbreviation	Default setting	Unit	Adjustment Range	Unit
operating mode	BA	B		B (pulse transmitter)	
				D (pulse counter)	
pause time	TP	10	seconds	01 E 00 - 99 E 04 (BA B)	seconds
				01 E 00 - 99 E 04 (BA D)	pulses
monitoring time	TU	60	seconds	01 E 00 - 99 E 03	seconds
dwell time	TN	15	seconds	01 E 00 - 25 E 00	seconds

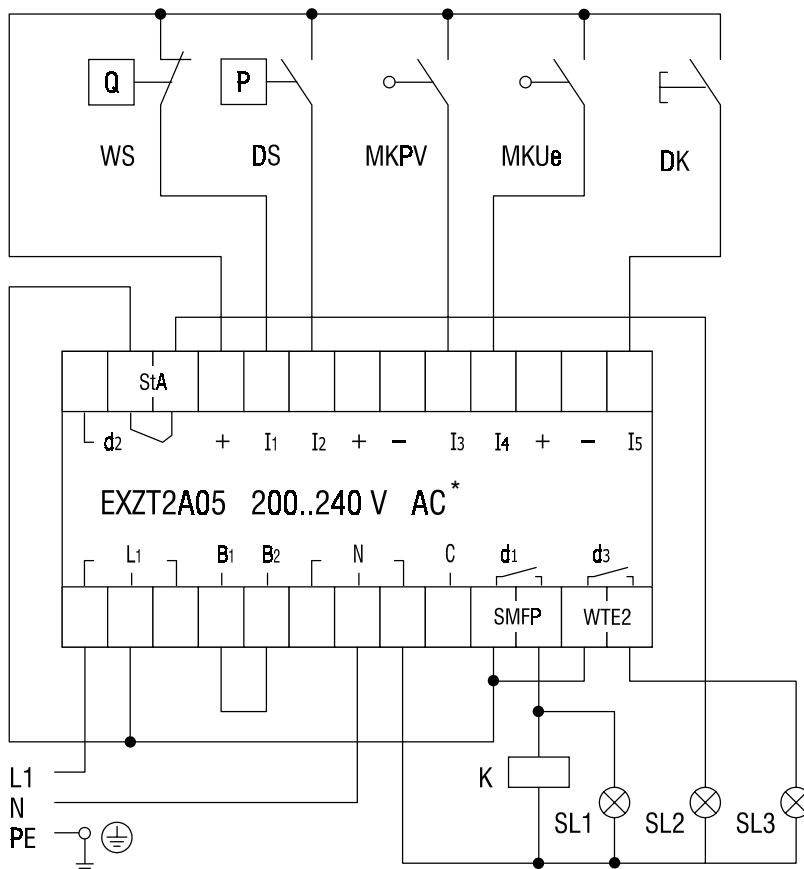
## Installation, First Operation

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 - 2).

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

**Table 2 - 5. Input functions of EXZT2A05**

Input	Setting	Meaning
I1	O	normally closed contact
I2	S	normally open contact
I3	S	normally open contact
I4	S	normally open contact
I5	S	normally open contact



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

**Figure 2 - 2. Connection Diagram for EXZT2A05**

- 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)
- MKPV machine contact/ pause time extension
- MKUe machine contact (pulse 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 (StA) operating contact: operation OK
- d3 operating contact for display of pulse errors (WTE2)
- SL1 signal lamp for „PUMP ON“
- SL2 signal lamp for „FAILURE“
- SL3 signal lamp for „PULSE ERROR“
- K pump motor contactor

# EXZT2A07

## Operating Modes

The controller EXZT2A07 can be operated as pulse transmitter (operating mode B) or pulse counter (operating mode D).

## Scope of Functions

The EXZT2A07 features the functions listed below. The default and the adjustable parameters are listed in table 2 - 6.

- adjustable pause time
- adjustable monitoring time
- adjustable pump dwell time
- pump run time limit
- pressure build-up monitoring
- level monitoring (normally closed contact)
- filling level pre-warning
- pause time extension

## Input functions

The standard settings for the input functions are listed in table 2 - 7. The input functions can be altered as described in section "Adjusting the input functions" in chapter "Operation" of the general section of this manual.

**Table 2 - 6. Parameters of EXZT2A07**

Designation	Abbreviation	Default setting	Unit	Adjustment range	Unit
operating mode	BA	B		B (pulse transmitter)	
				D (pulse counter)	
pause time	TP	10	seconds	01 E 00 - 99 E 04 (BA B)	seconds
				01 E 00 - 99 E 04 (BA D)	pulses
monitoring time	TU	60	seconds	01 E 00 - 99 E 04	seconds
dwell time	TN	15	seconds	01 E 00 - 25 E 00	seconds

## Installation, First Operation

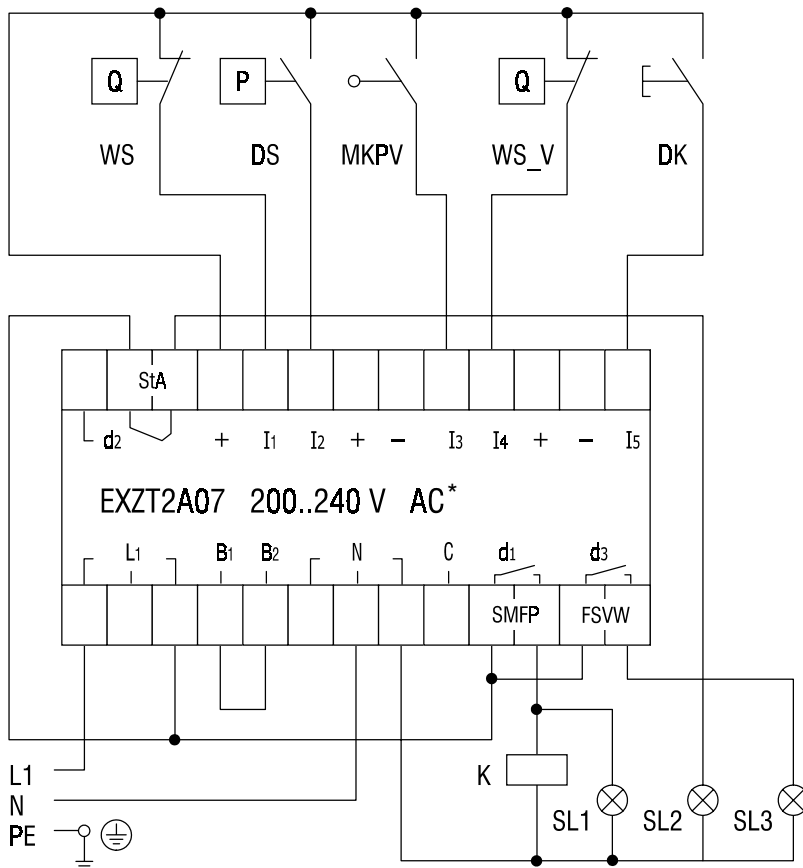
Install the device in the control cabinet of a VOGEL central lubrication system as described in chapter operation (general part of this manual). Observe the connection diagram (figure 2 - 3).

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

**Table 2 - 7. Input functions of EXZT2A07**

Input	Setting	Meaning
I1	O	normally closed contact
I2	S	normally open contact
I3	S	normally open contact
I4	O	normally closed contact
I5	S	normally open contact





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

**Figure 2 - 3. Connection Diagram for EXZT2A07**

- L1/N operating voltage
- B1/B2 jumper terminals for operating voltage (here shown: 200..240 V)
- WS level monitoring switch (here shown: reservoir filled)
- WS\_V level monitoring switch (filling level pre-warning, here shown: reservoir filled)
- DS pressure switch (pressure build-up monitoring)
- MKPV machine contact/ pause time extension
- 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 (StA) operating contact: operation OK
- d3 operating contact for display of filling level pre-warning (FSVW)
- SL1 signal lamp for „PUMP ON“
- SL2 signal lamp for „FAILURE“
- SL3 signal lamp for „LOW LEVEL“
- K pump motor contactor

## IGZ36-20, IGZ36-20-S6

### Operating Modes

The devices IGZ36-20 and IGZ36-20-S6 can be used as pulse transmitter (operating mode B) and pulse counter (operating mode D).

### Scope of Functions

The devices IGZ36-20 and IGZ36-20-S6 feature the functions listed below. The default and the adjustable parameters are listed in table 2 - 8.

#### IGZ36-20

- adjustable pause time
- adjustable pump dwell time
- adjustable monitoring time
- pump run time limit
- pressure build-up monitoring
- pressure build-down monitoring
- level monitoring (normally open contact)

#### IGZ36-20-S6

Like IGZ36-20, but:

- level monitoring (normally closed contact)

### Input functions

The standard settings of the input functions are listed in tables 2 - 9 and 2 - 10. The input functions can be altered as described in section

**Table 2 - 8. Parameters of IGZ36-20 and IGZ36-20-S6**

Designation	Abbreviation	Default setting	Unit	Adjustment range	Unit
operating mode	BA	B		B (pulse transmitter)	
				D (pulse counter)	
pause time	TP	10	minutes	01 E 00 - 99 E 04 (BA B)	minutes
				01 E 00 - 99 E 04 (BA D)	pulses
monitoring time	TU	60	seconds	01 E 00 – 10 E 01	seconds
dwell time	TN	15	seconds	01 E 00 – 30 E 00	seconds

“Adjusting the input functions” in chapter “Operation” of the general section of this manual.

### 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 diagrams (figures 2 - 4 and 2 - 6).

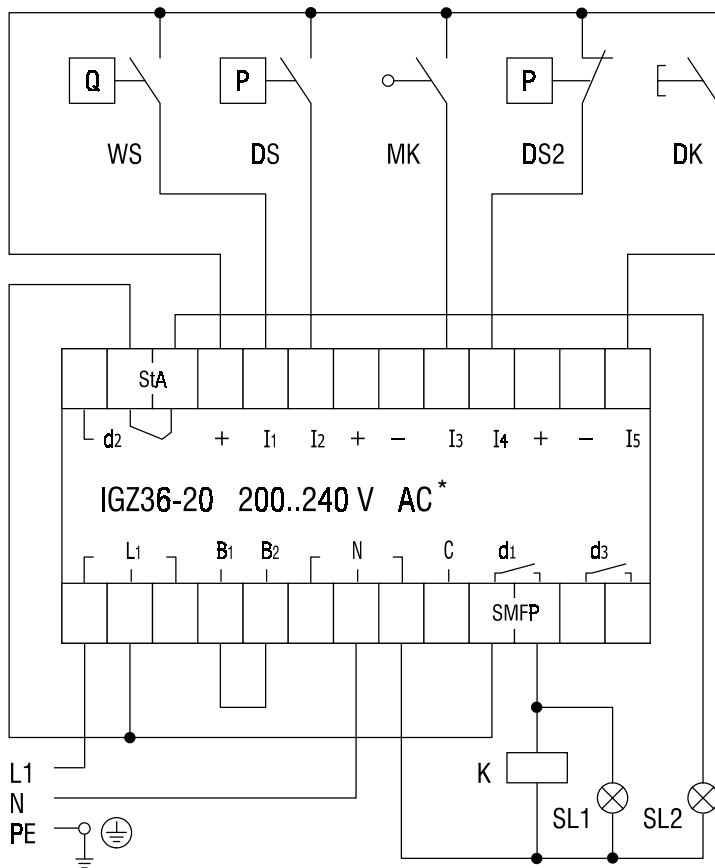
After installation, input of parameters and applying the operating voltage, the device begins its function sequence with prelubrication.

**Table 2 - 9. Input functions IGZ36-20**

Input	Setting	Meaning
I1	S	normally open contact
I2	S	normally open contact
I3	S	normally open contact
I4	S	normally open contact
I5	S	normally open contact

**Table 2 - 10. Input functions of IGZ36-20-S6**

Input	Setting	Meaning
I1	O	normally closed contact
I2	S	normally open contact
I3	S	normally open contact
I4	S	normally open contact
I5	S	normally open contact



**Figure 2 - 4. Connection Diagram for IGZ36-20**

- 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)
- DS2 pressure switch (pressure build-down monitoring)
- MK machine contact
- 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 (StA) operating contact: operation OK
- SL1 signal lamp for „PUMP ON“
- SL2 signal lamp for „FAILURE“
- K pump motor contactor

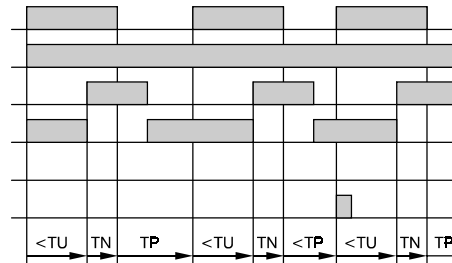
The input I4 (DS2) must be bridged, when the pressure build-down monitoring is not to be used.

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

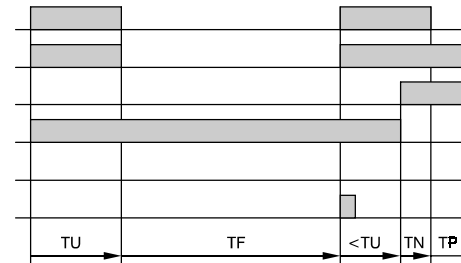
**IGZ36-20 Pulse Diagrams**  
(Time axis not true to dimensions)

Pump motor, relay d1  
 Command track, relay d2  
 Pressure switch (noc) DS  
 Pressure switch (ncc) DS2  
 Filling level switch (noc) WS  
 Push button DK

Normal process

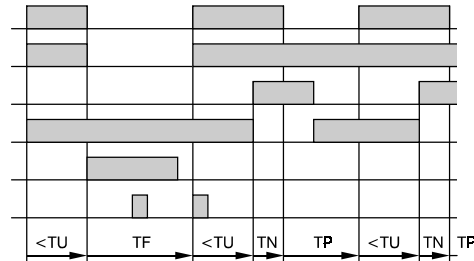


Process in case of pressure build-up failure



Process in case of filling level failure

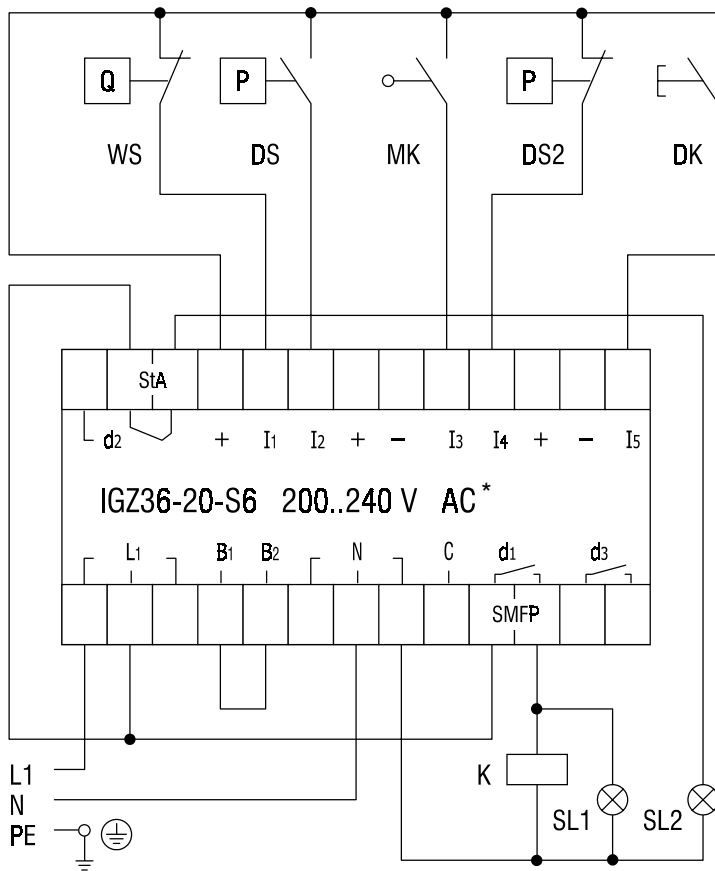
Pump motor, relay d1  
 Command track, relay d2  
 Pressure switch (noc) DS  
 Pressure switch (ncc) DS2  
 Filling level switch (noc) WS  
 Push button DK



Legend

- TU = monitoring time
- TN = pump dwell time
- TP = pause time
- TF = function sequence stopped

**Figure 2 - 5. Pulse Diagram for IGZ36-20**



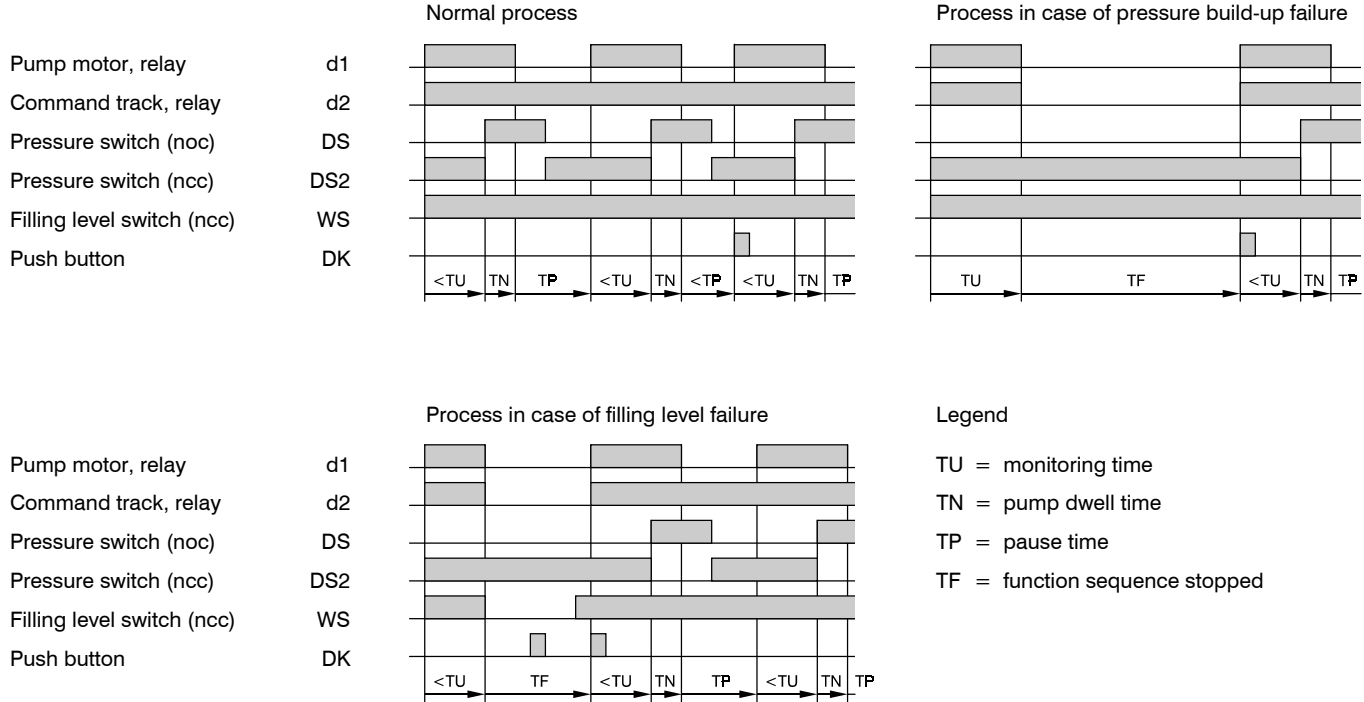
**Figure 2 - 6. Connection Diagram for IGZ36-20-S6**

- 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)
- DS2 pressure switch (pressure build-down monitoring)
- MK machine contact
- 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 (StA)  
operating contact: operation OK
- SL1 signal lamp for „PUMP ON“
- SL2 signal lamp for „FAILURE“
- K pump motor contactor

The input I4 (DS2) must be bridged, when the pressure build-down monitoring is not to be used.

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

**IGZ36-20-S6 Pulse Diagrams**  
(Time axis not true to dimensions)



**Figure 2 - 7. Pulse Diagram for IGZ35-20-S6**

## IGZ38-30, IGZ38-30-S1

### Operating Modes

The controller IGZ38-3 can be operated as pulse transmitter (operating mode B) or pulse counter (operating mode D).

### Scope of Functions

The devices IGZ38-30 and IGZ38-30-S1 feature the functions listed below. The default and the adjustable parameters are listed in table 2 - 11.

#### IGZ38-30

- adjustable pause time
- pump run time limit
- pressure build-up monitoring
- level monitoring (normally closed contact)

#### IGZ38-30-S1

Like IGZ38-30, but:

- level monitoring (normally open contact)

### Input functions

The standard settings of the input functions are listed in tables 2 - 12 and 2 - 13.

The input functions can be altered as described in section "Adjusting the input functions" in chapter "Operation" of the general section of this manual.

**Table 2 - 11. Parameters of IGZ38-30 and IGZ38-30-S1**

Designation	Abbreviation	Default setting	Unit	Adjustment range	Unit
operating mode	BA	B		B (pulse transmitter) D (pulse counter)	
pause time	TP	10	minutes	01 E 00 - 99 E 04 (BA B) 01 E 00 - 99 E 04 (BA D)	minutes pulses
monitoring time	TU	60	seconds	not adjustable	
dwll time	TN	15	seconds	not adjustable	seconds

### 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 diagrams (figures 2 - 8 and 2 - 10).

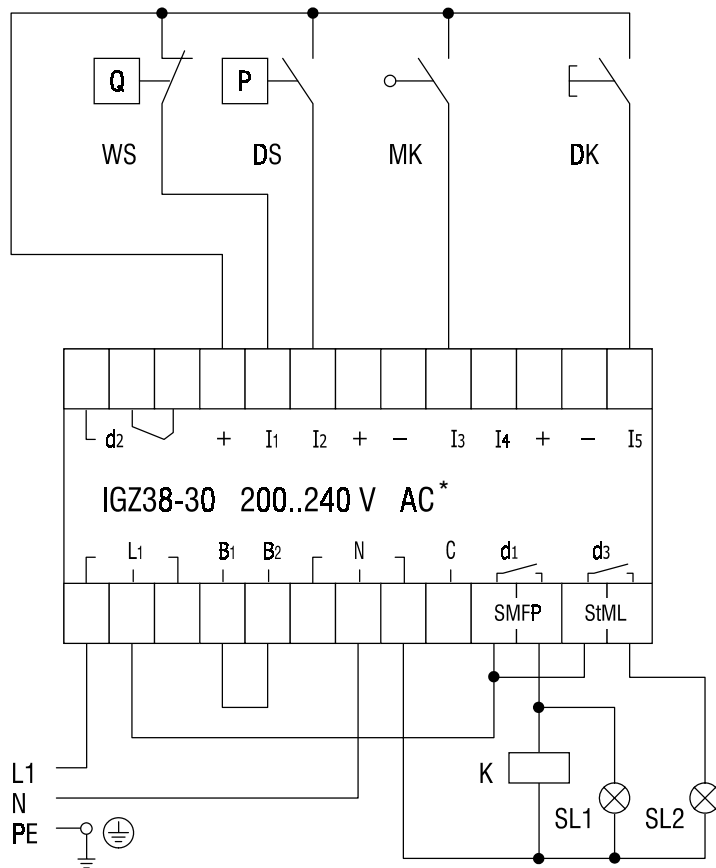
After installation, input of parameters and applying the operating voltage, the device begins its function sequence with prelubrication.

**Table 2 - 12. Input functions of IGZ38-30**

Input	Setting	Meaning
I1	O	normally closed contact
I2	S	normally open contact
I3	S	normally open contact
I4	-	not used
I5	S	normally open contact

**Table 2 - 13. Input functions of IGZ38-30-S1**

Input	Setting	Meaning
I1	S	normally open contact
I2	S	normally open contact
I3	S	normally open contact
I4	-	not used
I5	S	normally open contact



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

**Figure 2 - 8. Connection Diagram for IGZ38-30**

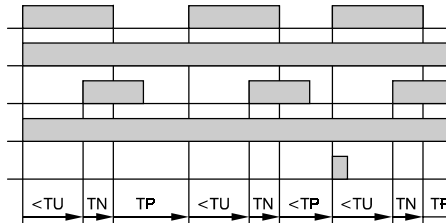
- L1/N operating voltage
- B1/B2 jumper terminals for operating voltage (here shown: 200..240 V)
- WS level monitoring switch (here shown: reservoir filled)
- DS pressure switch (pressure build-up monitoring)
- MK machine contact
- DK push-button
  - 1. intermediate lubrication
  - 2. delete failure
- + +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 display
  - operating contact: operation OK
- d3 operating contact for failure (StML)
- SL1 signal lamp for „PUMP ON“
- SL2 signal lamp for „FAILURE“
- K pump motor contactor



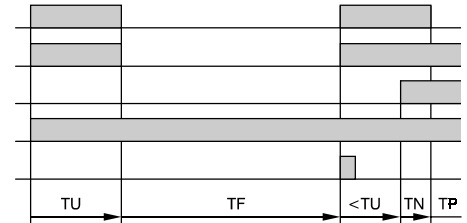
**IGZ38-30 Pulse Diagrams**  
(Time axis not true to dimensions)

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

Normal process

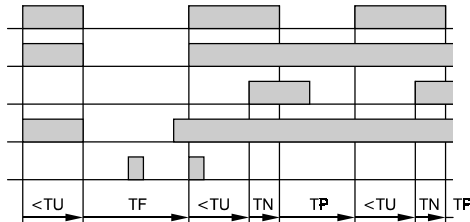


Process in case of pressure build-up failure



Process in case of filling level failure

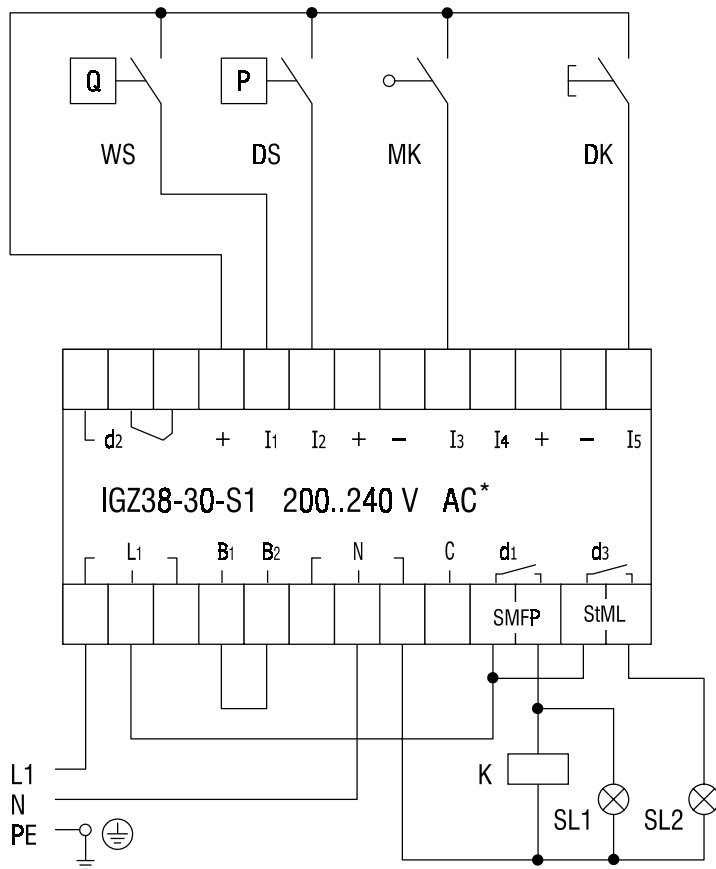
Pump motor, relay d1  
 Command track, relay d2  
 Pressure switch (noc) DS  
 Filling level switch (ncc) WS  
 Push button DK



Legend

- TU = monitoring time
- TN = pump dwell time
- TP = pause time
- TF = function sequence stopped

**Figure 2 - 9. Pulse Diagram for IGZ38-30**



**Figure 2 - 10. Connection Diagram for IGZ38-30-S1**

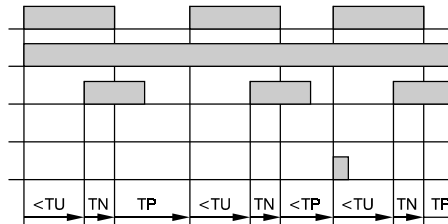
- L1/N operating voltage
- B1/B2 jumper terminals for operating voltage (here shown: 200..240 V)
- WS level monitoring switch (here shown: reservoir filled)
- DS pressure switch (pressure build-up monitoring)
- MK machine contact
- DK push-button
  - 1. intermediate lubrication
  - 2. delete failure
- + +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
  - operating contact: operation OK
- d3 operating contact for failure (StML)
- 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.

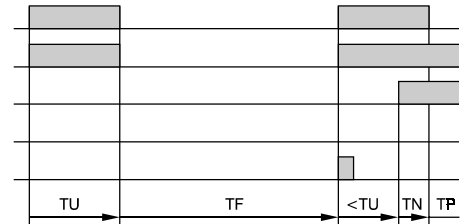
**IGZ38-30-S1 Pulse Diagrams**  
(Time axis not true to dimensions)

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

Normal process

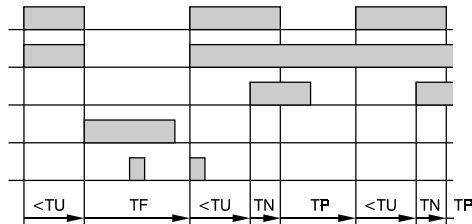


Process in case of pressure build-up failure



Process in case of filling level failure

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



Legend

- TU = monitoring time
- TN = pump dwell time
- TP = pause time
- TF = function sequence stopped

**Figure 2 - 11. Pulse Diagram for IGZ38-30-S1**

# IG351-10

## Operating Modes

The controller IG54-10 can only be used as pulse transmitter (operating mode A).

### Scope of Functions

The controller IG351 features the functions listed below. The default and the adjustable parameters are listed in table 2 - 14.

- adjustable pause time
- adjustable pump run time
- level monitoring (normally open contact)

## Input functions

The standard settings for the input functions are listed in table 2 - 15. The input functions can be altered as described in section "Adjusting the input functions" in chapter "Operation" of the general section of this manual.

## 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 - 12).

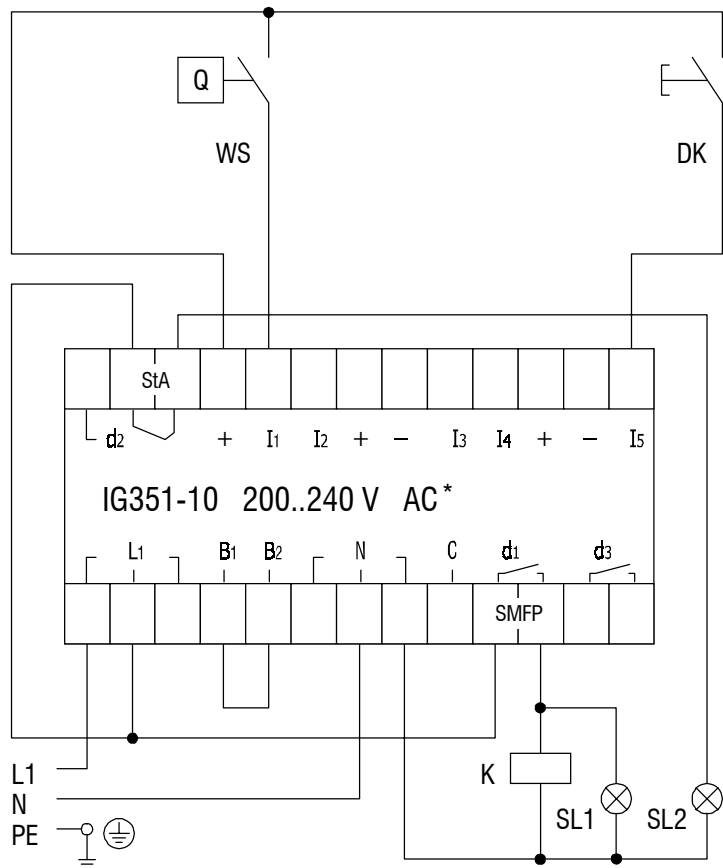
**Table 2 - 14. Parameters of IG351-10**

Designation	Abbreviation	Default	Unit	Adjustment range	Unit
operating mode	BA	B		not adjustable	
pause time	TP	10	minutes	01 E 00 - 99 E 04	minutes
pump run time	TL	5	seconds	01 E 00 - 99 E 03	seconds

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

**Table 2 - 15. Input functions of IG351-10**

Input	Setting	Meaning
I1	S	normally open contact
I2	-	not used
I3	-	not used
I4	-	not used
I5	S	normally open contact



**Figure 2 - 12. Connection Diagram for IG351-10**

- L1/N operating voltage
- B1/B2 jumper terminals for operating voltage (here shown: 200..240 V)
- WS level monitoring switch (here shown: reservoir filled)
- 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 (StA) 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.

## IGZ51-20-S3

### Operating Modes

The controller IGZ51-20-S3 features a selectable power supply failure memory (EEPROM). This results in the following operating modes:

- A - pulse transmitter with EEPROM
- B - pulse transmitter without EEPROM
- C - pulse counter with EEPROM
- D - pulse counter without EEPROM

### Scope of Functions

The controller IGZ51-20-S3 features the functions listed below. The default and the adjustable parameters are listed in table 2 - 16.

- adjustable pause time
- adjustable pump dwell time
- adjustable monitoring time
- pump run time limit
- pressure build-up monitoring
- pressure build-down monitoring
- level monitoring (normally open contact)
- pause time extension
- selectable power supply failure memory

**Table 2 - 16. Parameters of IGZ51-20-S3**

Designation	Abbreviation	Default setting	Unit	Adjustment Range	Unit
operating mode	BA	A		A (pulse transmitter with EEPROM))	
				B (pulse transmitter without EEPROM))	
				C (pulse counter with EEPROM))	
				D (pulse counter without EEPROM))	
pause time	TP	10	minutes	01 E 00 - 99 E 04 (BA A, B)	minutes
				01 E 00 - 99 E 04 (BA C, D)	pulses
monitoring time	TU	60	seconds	01 E 00 - 10 E 01	seconds
dwell time	TN	15	seconds	01 E 00 - 99 E 03	seconds

### Input functions

The standard settings for the input functions are listed in table 2 - 17. The input functions can be altered as described in section "Adjusting the input functions" in chapter "Operation" of the general section of this manual.

**Table 2 - 17. Input functions of IGZ51-20-S3**

Input	Setting	Meaning
I1	S	normally open contact
I2	S	normally open contact
I3	S	normally open contact
I4	S	normally open contact
I5	S	normally open contact

## Installation, First Operation

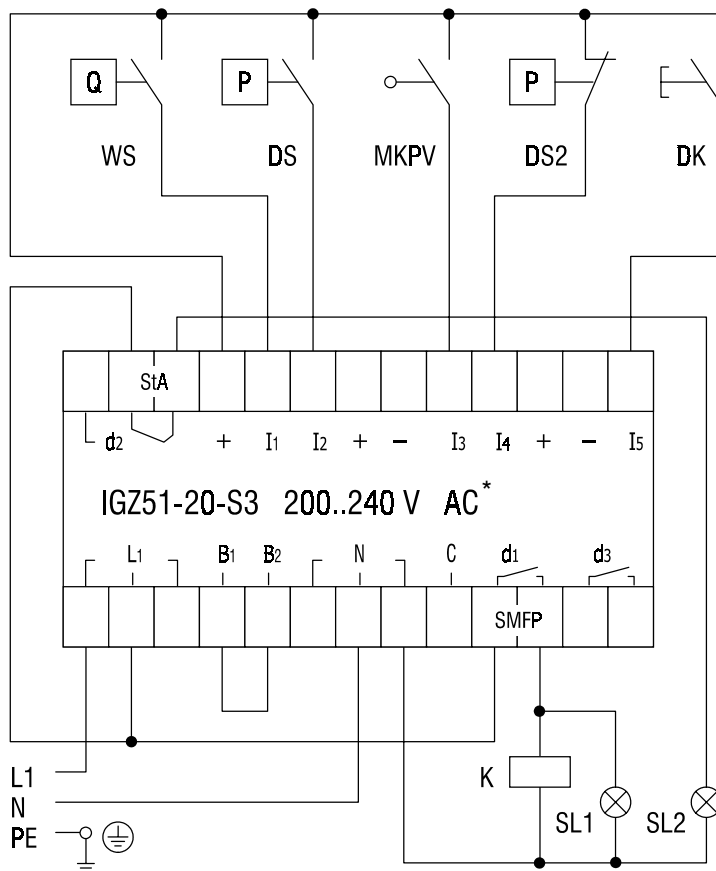
Install the device in the control cabinet of a VOGEL central lubrication system as described in chapter operation (general part of this manual). Observe the connection diagram (figure 2 - 13).

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

## Operation with Power Supply Failure Memory

In case of a power failure, the power supply failure memory saves the values for the remaining pause time or a failure message that may have occurred. When power returns, this enables the controller to resume the control process from where it was interrupted.

When the interruption occurs during the monitoring time or pump dwell time, the controller continues the process with a pause. An existing failure message is not deleted by the interruption of the power supply.



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

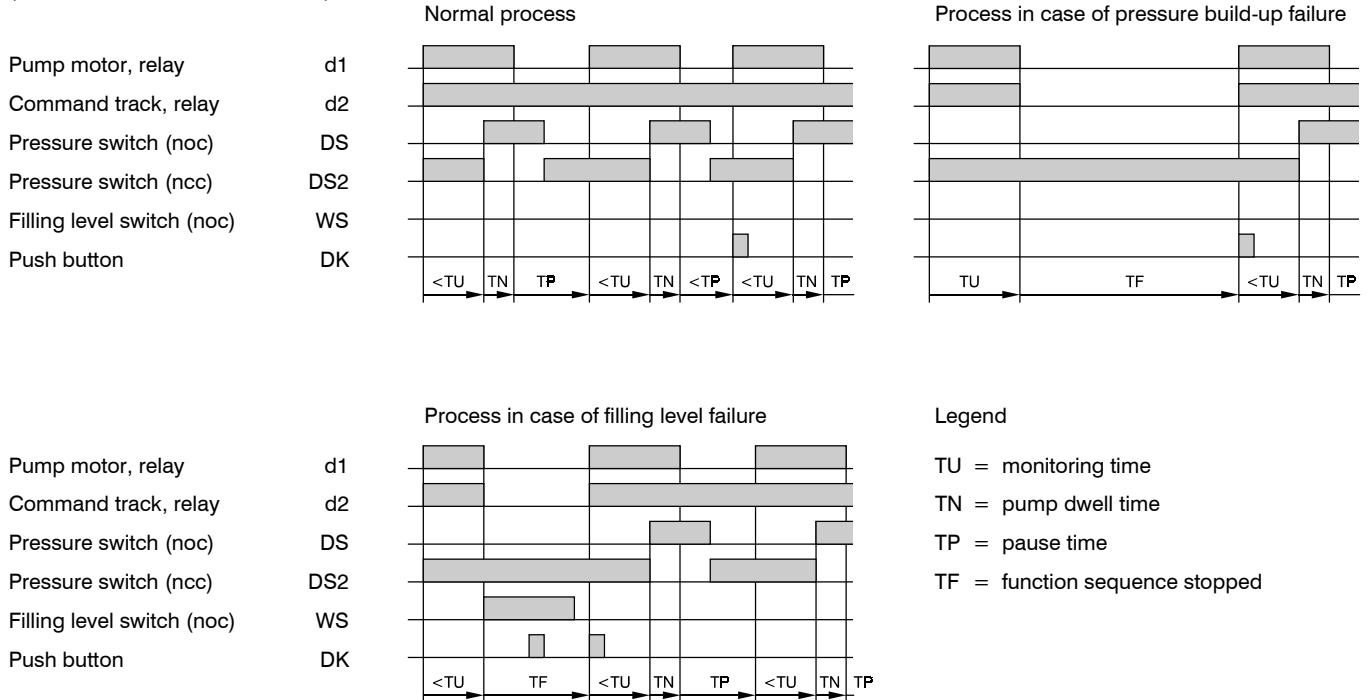
**Figure 2 - 13. Connection Diagram for IZ51-20-S3**

- 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)
- DS2 pressure switch (pressure build-down monitoring)
- MKPV machine contact/ pause time extension
- 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 (StA) operating contact: operation OK
- SL1 signal lamp for „PUMP ON“
- SL2 signal lamp for „FAILURE“
- K pump motor contactor

The input I4 (DS2) must be bridged, when the pressure build-down monitoring is not to be used.



**IGZ51-20-S3 Pulse Diagrams**  
(Time axis not true to dimensions)



**Figure 2 - 14. Pulse Diagram for IGZ51-20-S3**

# 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. Pre-lubrication 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)

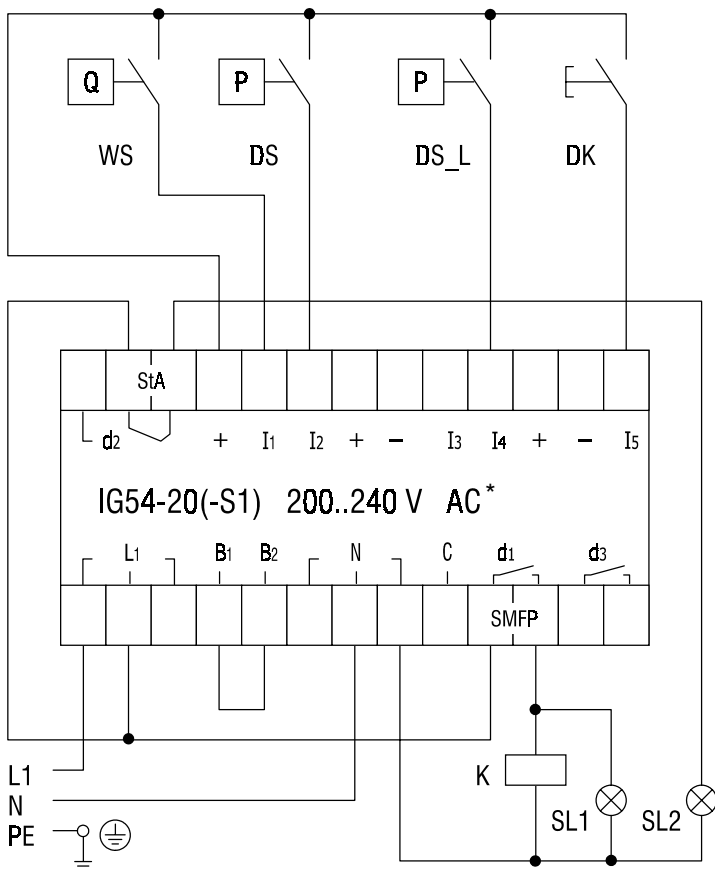
**Table 2 - 20. Parameters of IG54-20**

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.



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

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

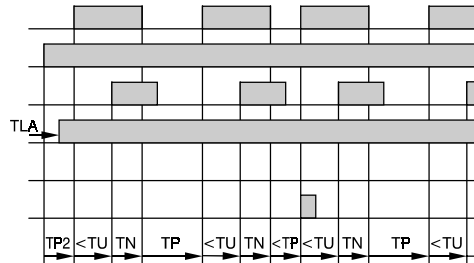
- L1/N operating voltage
- B1/B2 jumper terminals for operating voltage (here shown: 200..240 V)
- WS level monitoring switch (here shown: reservoir filled)
- DS pressure switch (pressure build-up monitoring)
- DS\_L pressure switch (air pressure monitoring)
- DK push-button
  1. intermediate lubrication
  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

### IG54-20 Pulse Diagrams

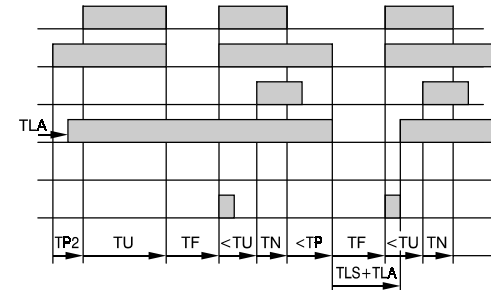
(Time axis not true to dimensions)

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

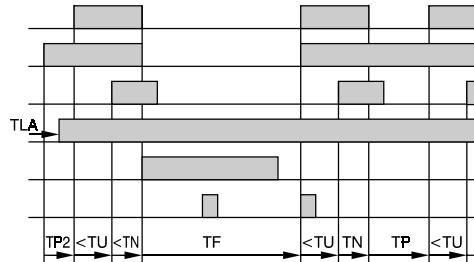


pressure build-up failure (DS or DS\_L)



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)

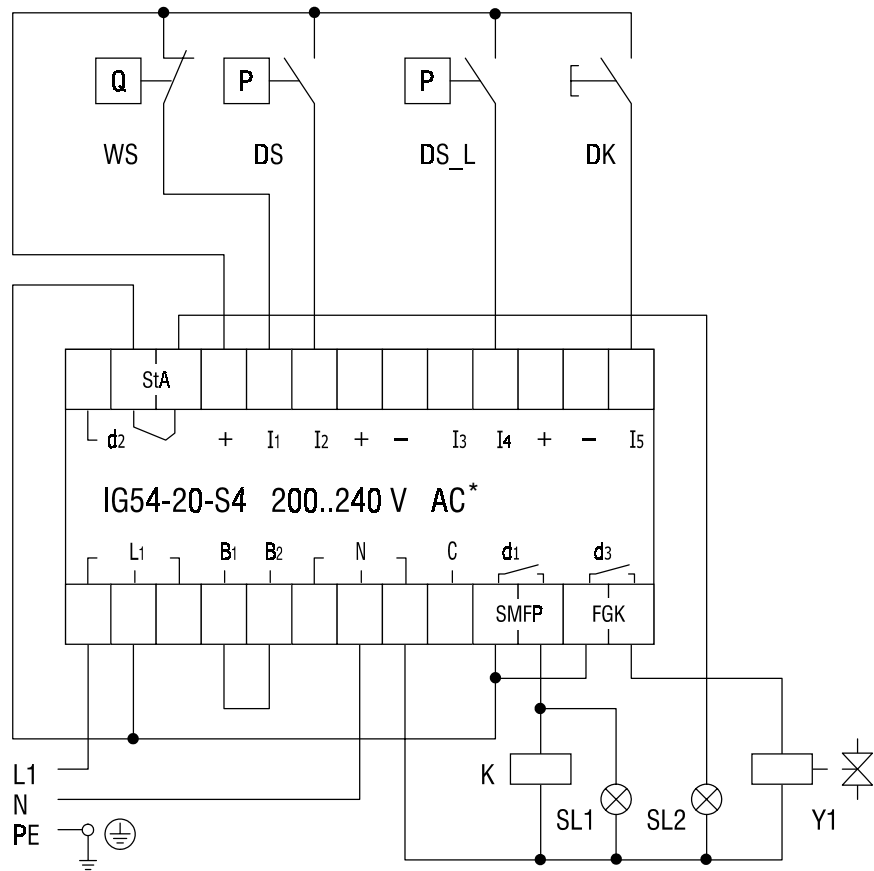
#### IG54-20-S4

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)

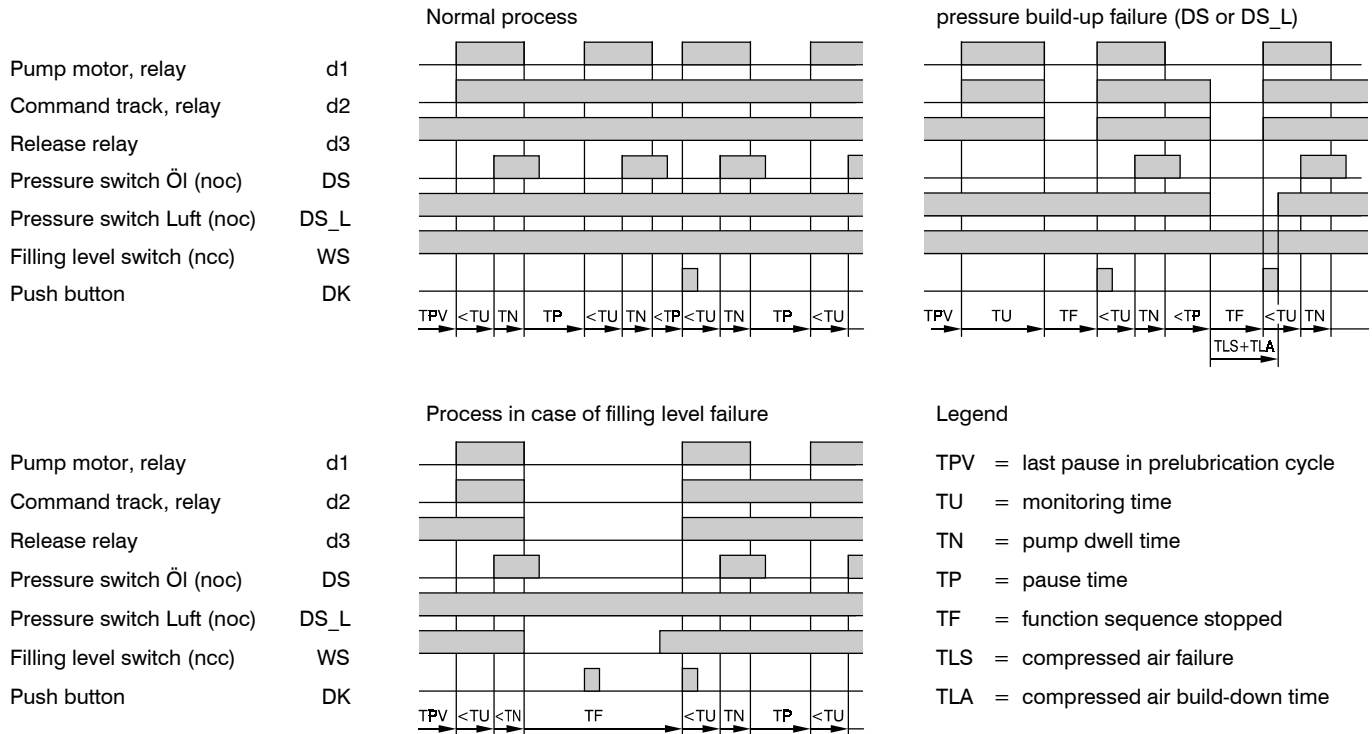


Figure 2 - 18. Pulse Diagram for IG54-20-S4

# Controllers for Systems with Progressive Feeders

## Application

The controllers described in this chapter are used for time or pulse-controlled central lubrication systems with progressive feeders.

## Overview

Table 2 - 22 lists the available VOGEL controllers for systems with progressive feeders 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 capability to monitor the strokes of feeder pistons and to have the pump run intermittently during the contact time. The pressure is not monitored.

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).

**Table 2 - 22. Overview of VOGEL Controllers for Systems with Progressive Feeders**

Designation	Short Description
EXZT2A03	Pulse transmitter/counter with selectable monitoring time, filling level and pump run time monitoring (stroke monitoring), adjustable dwell time and pause time extension
EXZT2A06	Pulse transmitter/counter with selectable monitoring time, filling level and pump run time monitoring (stroke monitoring), with adjustable dwell time, pause time extension and pulse monitoring
IGZ51-20	Pulse transmitter/counter with selectable intermittent or continuous pump operation, with adjustable stroke number, selectable pause and monitoring time as well as filling level and pump run time monitoring
IGZ51-20-S2	Like IGZ51-20, with power supply failure memory
IGZ51-20-S7	Like IGZ51-20-S2 with filling level switch as normally closed contact, pump run time = adjusted monitoring time
IGZ51-20-S8	Pulse transmitter/counter with selectable intermittent or continuous pump operation, prelubrication, selectable pause and monitoring time, with filling level and pump run time monitoring as well as power failure memory

### The Pause Time TP

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).

### 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 or MKPV) are counted by the controller. After a preset number of pulses, lubrication is triggered. The number of pulses to be counted can be set by the user.

### Pulse Monitoring

On devices with pulse monitoring (only in operating mode pulse counter), a second machine contact (MKUe) is used in addition to the machine contact MK or MKPV. Both inputs are polled alternately. If there is no pulse at contact

MKUE between two pulses at MK/MKPV, a failure message is output.

### The Contact Time

After time-out of the pause time, a lubrication cycle is triggered, that is, the pump is switched on and the monitoring time started. This is referred to as contact time. During the contact time, the strokes of a piston in one of the progressive feeders is monitored by a proximity switch - here referred to as cycle switch. It registers the piston movements. After a defined number of strokes, the contact time ends and the pump motor is shut off.

### Intermittent Operation

Since pneumatic pumps may be used in central lubrication systems with progressive feeders, the controllers can be set to intermittent pump control during the contact time to allow proper control of such pumps.

### The Cycle Switch

The cycle switch (ZS) controls the pump run time on the basis of the number of strokes of the progressive feeder. The pump is shut off after a defined number of switch actuations during the contact time.

The number of switching operations of the cycle switch corresponding to the number of piston strokes can be adjusted on some units. The parameter stroke number is abbreviated NH.

### Monitoring Time

The monitoring time (TU) is an adjustable time for the pump run time. If the monitoring time runs out before the expected number of operations of the cycle switch have been registered, the controller stops the pump at the end of the monitoring time and outputs a failure message.

### Pump Run Time Limit

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

### 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.

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.

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.

### 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 de-


vice type upon the next power-up and failure messages are not lost.

### The Prelubrication

Prelubrication is normally started after power-up of the operating voltage. Intermediate lubrication is performed just like a standard contact time. However, the failure message relay d2 remains de-energised and the failure LED is on.

This function is not available in all controllers of this series.

### The Intermediate Lubrication

An intermediate lubrication is triggered by pressing the  button. It is processed like a normal contact time.

### Pause Time Extension

On some units operating as pulse transmitters, the input I3 can be used to stop and release the pause. When the input is activated, the pause is stopped, when it is deactivated, the pause continues.

## 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 has been applied correctly, the green power LED is on and the status of the inputs and outputs is indicated on the display.

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

What time parameter is the first in the control sequence started upon power-up depends on the device type (see the chapters on the individual device types).

### Contact Time (Lubrication)

During the contact time, relay d1 is energised and the pump motor thereby switched on. At the same time, the monitoring time starts. After the last switching operation of the cycle switch, relay d1 is de-energised and the monitoring time terminated. Then a pause begins.


### Pause Time

At the beginning of the pause time, the adjusted pause time value is read and the pause then started. Subsequently contact time and pause time alternate.

### Relay d2 in Normal Operation


When the operating voltage is applied and no failure has occurred, the relay d2 is always energised.

### 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.

Which process is the first upon return of power depends on the situation at the time of the power failure and on the device type.

## Display of Failures


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

### Cycle Switch Failure

If the adjusted monitoring time runs out before all of the expected switching operations of the cycle switch ZS have been registered, the function sequence is terminated. The relays d1 and d2 are de-energised. The failure LED lights up and the symbol for the input ZS flashes on the display.

### Low Filling Level

The input of the level monitoring switch WS is continuously monitored as long as the operating voltage is applied. If too low filling level is detected for more than 1 s, the function sequence is terminated and relay d2 is de-energised. At the same time, the failure LED lights up and the symbol for the input WS flashes on the display.

As long as the input WS is de-energised, the failure message cannot be deleted. After the input WS is again energised, the failure message remains, until the  button is pressed to acknowledge the failure.

### Missing MK Pulses

On devices with pulse monitoring (only in operating mode pulse counter), the machine contacts MK or MKPV and MKUe are polled alternately. If no pulse is received at contact MKUe


between two pulses received at MK/MKPV, a failure message is output and the symbol of input MKUe flashes on the display.


Conversely, the symbol of input MK/MKPV flashes when no pulse is received at MK/MKPW between two pulses received at contact MKUe.

### **Relay d2 when Operation Fails**

If a failure occurs, relay d2 remains de-energised. The function sequence is interrupted until the error is resolved and the failure message deleted.

### **Deleting a Failure Message**

A failure message can be deleted by pressing the  button, causing intermediate lubrication to be triggered, or it may be deleted by removing the operating voltage.

On devices with power supply failure memory the failure message can only be deleted by pressing the  button.

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.**



## EXZT2A03

### Operating Modes

The controller EXZT2A03 can be operated as pulse transmitter (operating mode B) or pulse counter (operating mode D).

### Scope of Functions

The controller EXZT2A03 features the functions listed below. The default and the adjustable parameters are listed in table 2 - 23.

- adjustable pause time
- adjustable monitoring time
- adjustable pump dwell time
- pump run time limit by stroke monitoring
- adjustable stroke number
- level monitoring (normally open contact)
- pause time extension

### Input functions


The standard settings for the input functions are listed in table 2 - 24. The input functions can be altered as described in section "Adjusting the input functions" in chapter "Operation" of the general section of this manual.

**Table 2 - 23. Parameters of EXZT2A03**

Designation	Abbreviation	Default setting	Unit	Adjustment range	Unit
operating mode	BA	B		B (pulse transmitter) D (pulse counter)	
pause time	TP	10	seconds	01 E 00 - 99 E 04 (BA B) 01 E 00 - 99 E 04 (BA D)	seconds pulses
monitoring time	TU	60	seconds	01 E 00 - 99 E 04	seconds
dwell time	TN	15	seconds	01 E 00 - 25 E 00	seconds
stroke number	NH	3		01 E 00 - 25 E 00	

### 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 - 19).

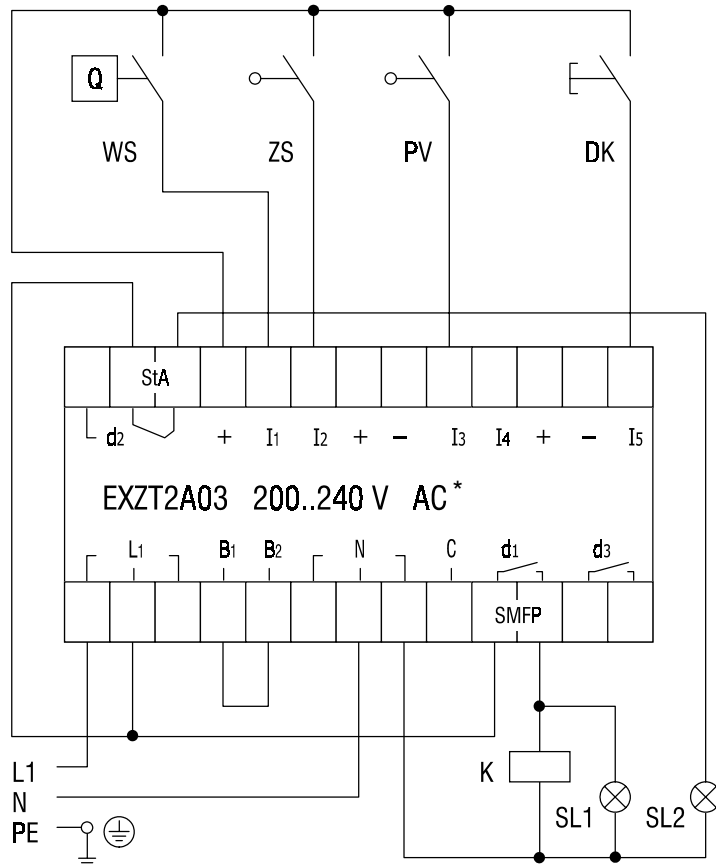
After installing the unit, trigger an intermediate lubrication by pressing the  button.

### Operation

The EXZT2A03 is supplied without power supply failure memory. If the device is shut off, the operating data such as remaining pause time and failure messages are lost. Upon return of power, the controller always starts with a contact time.

**Table 2 - 24. Input functions of EXZT2A03**

Input	Setting	Meaning
I1	S	normally open contact
I2	S	normally open contact
I3	S	normally open contact
I4	-	not used
I5	S	normally open contact



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

**Figure 2 - 19. Connection Diagram for EXZT2A03**

L1/N	operating voltage
B1/B2	jumper terminals for operating voltage (here shown: 200..240 V)
WS	level monitoring switch (here shown: reservoir filled)
ZS	cycle switch (stroke monitoring)
PV	pause time extension
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 (StA)
	operating contact: operation OK
SL1	signal lamp for „PUMP ON“
SL2	signal lamp for „FAILURE“
K	pump motor contactor

## EXZT2A06

### Operating Modes

The controller EXZT2A06 can be operated as pulse transmitter (operating mode B) or pulse counter (operating mode D).

### Scope of Functions

The controller EXZT2A06 features the functions listed below. The default and the adjustable parameters are listed in table 2 - 25.

- adjustable pause time
- adjustable monitoring time
- adjustable pump dwell time
- pump run time limit (stroke monitoring)
- adjustable stroke number
- level monitoring (normally closed contact)
- pause time extension
- pulse monitoring

### Input functions


The standard settings for the input functions are listed in table 2 - 26. The input functions can be altered as described in section "Adjusting the input functions" in chapter "Operation" of the general section of this manual.

**Table 2 - 25. Parameters of EXZT2A06**

Designation	Abbreviation	Default setting	Unit	Adjustment range	Unit
operating mode	BA	B		B (pulse transmitter)	
				D (pulse counter)	
pause time	TP	10	seconds	01 E 00 - 99 E 04 (BA B)	seconds
				01 E 00 - 99 E 04 (BA D)	pulses
monitoring time	TU	60	seconds	01 E 00 - 99 E 04	seconds
dwell time	TN	15	seconds	01 E 00 - 25 E 00	seconds
stroke number	NH	3		01 E 00 - 35 E 00	

### 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 - 20).

After installing the unit, trigger an intermediate lubrication by pressing the  button.

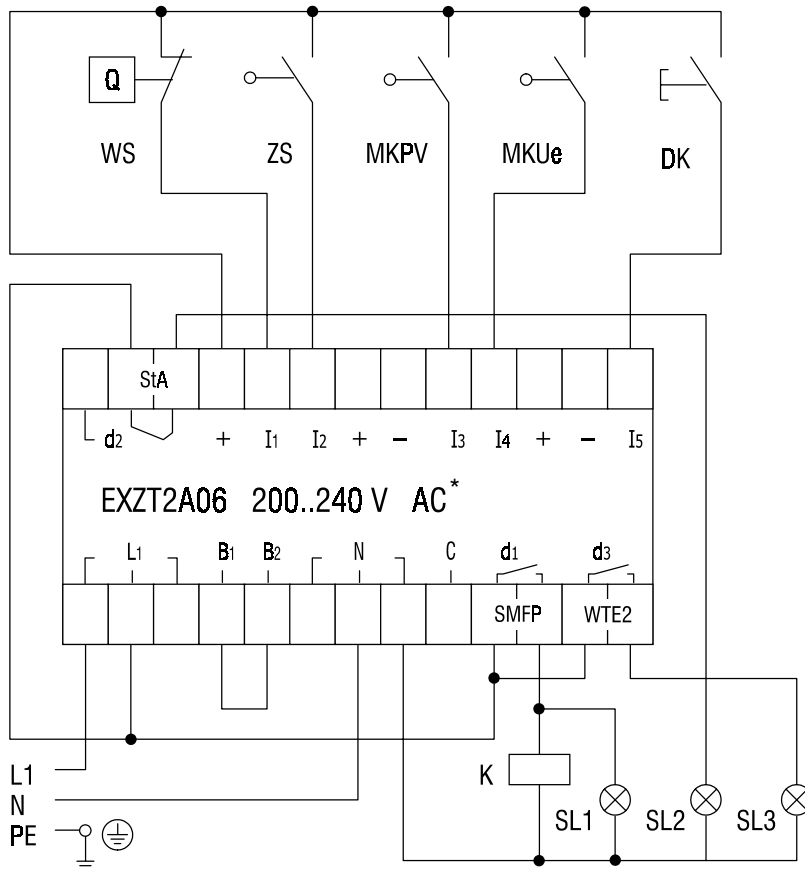
### Operation

The EXZT2A06 is supplied without power supply failure memory. If the device is shut off, the operating data such as remaining pause time and

failure messages are lost. Upon return of power, the controller always starts with a contact time.

**Table 2 - 26. Input functions of EXZT2A06**

Input	Setting	Meaning
I1	O	normally closed contact
I2	S	normally open contact
I3	S	normally open contact
I4	S	normally open contact
I5	S	normally open contact



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

**Figure 2 - 20. Connection Diagram for EXZT2A06**

- L1/N operating voltage
- B1/B2 jumper terminals for operating voltage (here shown: 200..240 V)
- WS level monitoring switch (here shown: reservoir filled)
- ZS cycle switch (stroke monitoring)
- MKPV machine contact/ pause time extension
- MKUe machine contact (pulse 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 (StA)
- d3 operating contact: operation OK
- d3 operating contact for display of pulse errors (WTE2)
- SL1 signal lamp for „PUMP ON“
- SL2 signal lamp for „FAILURE“
- SL3 signal lamp for „PULSE ERROR“
- K pump motor contactor

## IGZ51-20

### Operating Modes

The controller IGZ51-20 can be operated in the following operating modes:

- A pulse transmitter with continuous pump operation during the contact time
- B pulse transmitter with intermittent pump operation
- C pulse counter with continuous pump operation during the contact time
- D pulse counter with intermittent pump operation

### Scope of Functions

The controller IGZ51 features the functions listed below. The default and the adjustable parameters are listed in table 2 - 27.

- adjustable pause time
- adjustable monitoring time
- adjustable stroke number
- pump run time limit by stroke monitoring
- level monitoring (normally open contact)
- pause time extension

### Input functions

The standard settings for the input functions are listed in table 2 - 28. The input functions can be


**Table 2 - 27. Parameters of IGZ51-20**

Designation	Abbreviation	Default setting	Unit	Adjustment range	Unit
operating mode	BA	A		A (pulse transmitter with continuous pump operation) B (pulse transmitter with intermittent pump operation) C (pulse counter with continuous pump operation) D (pulse counter with intermittent pump operation)	
pause time	TP	10	minutes	01 E 00 - 99 E 04 (BA A, B) 01 E 00 - 99 E 04 (BA C, D)	minutes pulses
monitoring time	TU	60	seconds	01 E 00 - 99 E 03	seconds
stroke number	NH	3		01 E 00 - 30 E 00	

altered as described in section "Adjusting the input functions" in chapter "Operation" of the general section of this manual.

### 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). Figure 2 - 21 shows the connection diagram.

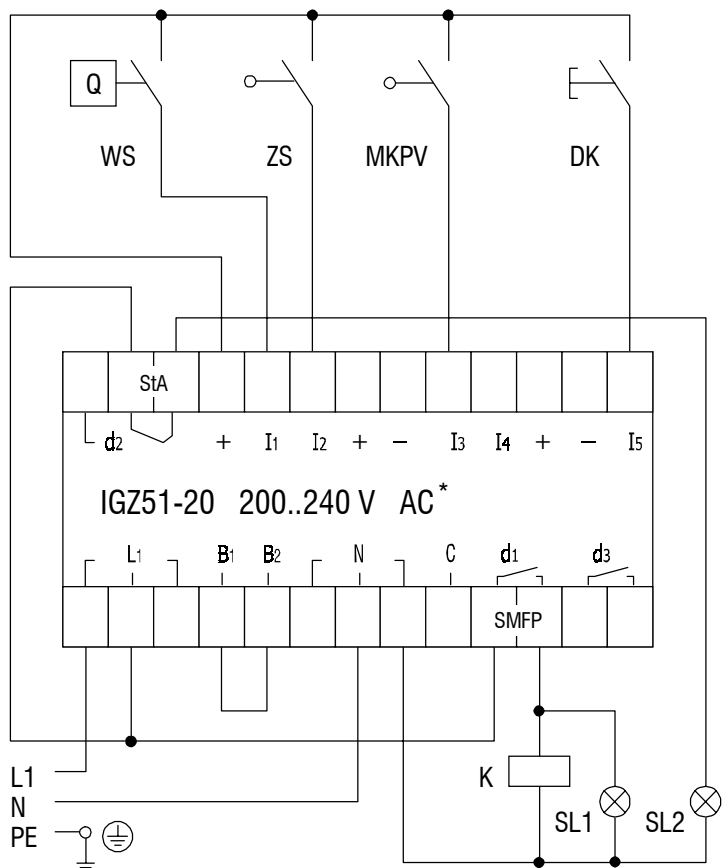
After installing the unit, trigger an intermediate lubrication by pressing the  button.

**Table 2 - 28. Input functions of IGZ51-20**

Input	Setting	Meaning
I1	S	normally open contact
I2	S	normally open contact
I3	S	normally open contact
I4	-	not used
I5	S	normally open contact

## Operation

The IGZ51-20 is supplied without power supply failure memory. If the device is shut off, the operating data such as remaining pause time and failure messages are lost. Upon return of power, the controller always starts with a new pause time.



**Figure 2 - 21. Connection Diagram for IGZ51-20**

- L1/N operating voltage
- B1/B2 jumper terminals for operating voltage (here shown: 200..240 V)
- WS level monitoring switch (here shown: reservoir filled)
- ZS cycle switch (stroke monitoring)
- MKPV machine contact/ pause time extension
- 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 (StA)
  - 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.

### IGZ51-20(-S2) Pulse Diagrams

(Time axis not true to dimensions, stroke preset = 3)

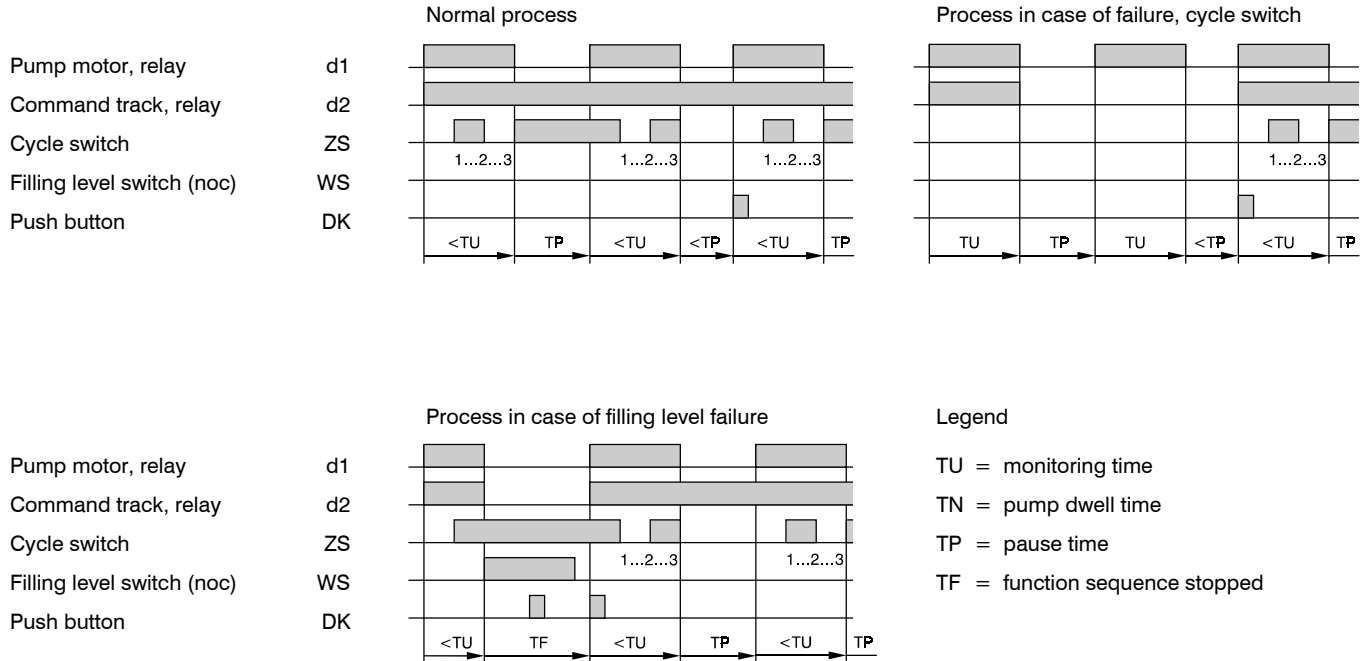


Figure 2 - 22. Pulse Diagram for IGZ51-20



# IGZ51-20-S2

## Operating Modes

The controller IGZ51-20-S2 can operate in the following operating modes:

- A pulse transmitter with continuous pump operation during the contact time
- B pulse transmitter with intermittent pump operation
- C pulse counter with continuous pump operation during the contact time
- D pulse counter with intermittent pump operation

## Scope of Functions

The controller IGZ51-20-S2 features the functions listed below. The default and the adjustable parameters are listed in table 2 - 29.

- adjustable pause time
- adjustable monitoring time
- pump run time limit (stroke monitoring)
- adjustable stroke number
- level monitoring (normally open contact)
- power supply failure memory
- pause time extension

**Table 2 - 29. Parameters of IGZ51-20-S2**


Designation	Abbreviation	Default setting	Unit	Adjustment range	Unit
operating mode	BA	A		A (pulse transmitter with continuous pump operation) B (pulse transmitter with intermittent pump operation) C (pulse counter with continuous pump operation) D (pulse counter with intermittent pump operation)	
pause time	TP	10	minutes	01 E 00 - 99 E 04 (BA A, B) 01 E 00 - 99 E 04 (BA C, D)	minutes pulses
monitoring time	TU	60	seconds	01 E 00 - 99 E 03	seconds
stroke number	NH	3		01 E 00 - 30 E 00	

## Input functions

The standard settings for the input functions are listed in table 2 - 30. The input functions can be altered as described in section "Adjusting the input functions" in chapter "Operation" of the general section of this manual.

## 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 - 23). After installing the unit, trigger an intermediate lubrication by pressing the  button.

**Table 2 - 30. Input functions of IGZ51-20**

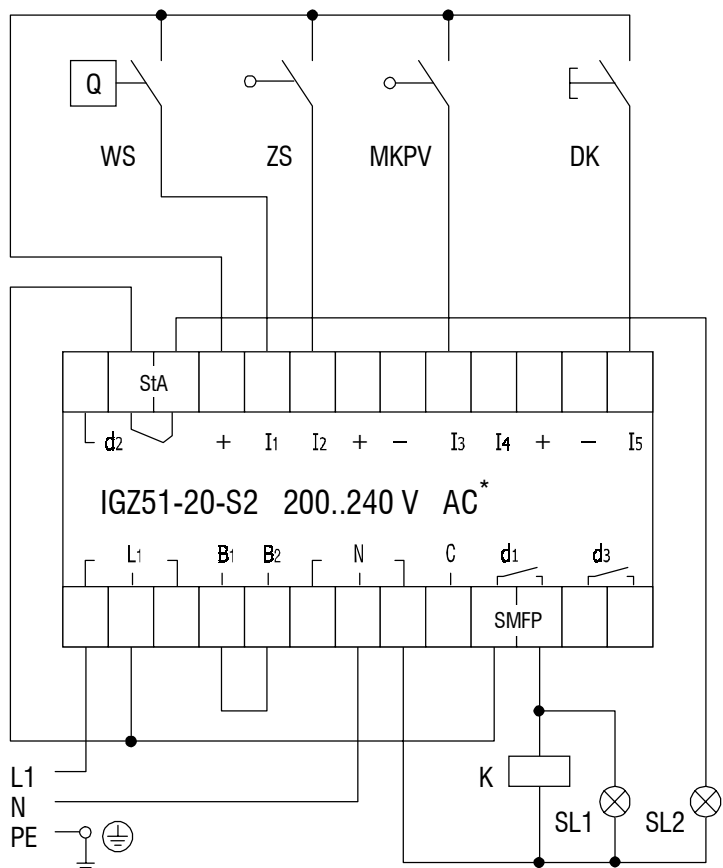
Input	Setting	Meaning
I1	S	normally open contact
I2	S	normally open contact
I3	S	normally open contact
I4	-	not used
I5	S	normally open contact

## Operation with Power Supply Failure Memory

When power fails, the power supply failure memory saves the remaining pause time and/or existing failure messages. Table 2 - 31 shows which time parameter is the first in the control sequence upon return of power.

**Table 2 - 31. Start upon Power Failure**

Situation at time of power failure	Procedure upon power-up
During monitoring time	pause time
During pause time	pause continues after reading of the remaining pause time from the power supply failure memory
During failure message	failure message remains saved



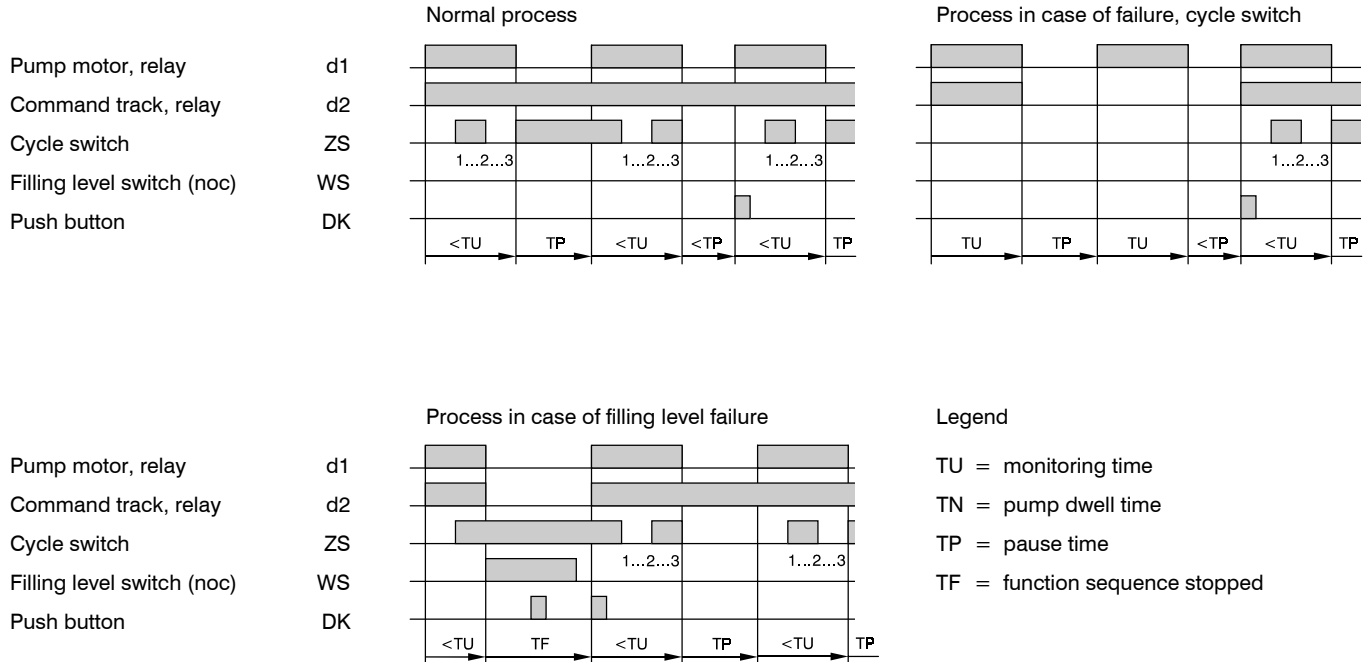
**Figure 2 - 23. Connection Diagram for IGZ51-20-S2**

- L1/N operating voltage
- B1/B2 jumper terminals for operating voltage (here shown: 200..240 V)
- WS level monitoring switch (here shown: reservoir filled)
- ZS cycle switch (stroke monitoring)
- MKPV machine contact/ pause time extension
- 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 (StA)
  - 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.

### IGZ51-20(-S2) Pulse Diagrams

(Time axis not true to dimensions, stroke preset = 3)



**Figure 2 - 24. Pulse Diagram for IGZ51-20-S2**

## IGZ51-20-S7

### Operating Modes

The controller IGZ51-20-S7 can be operated in the following operating modes:

- A pulse transmitter with continuous pump operation during the contact time
- B pulse transmitter with intermittent pump operation
- C pulse counter with continuous pump operation during the contact time
- D pulse counter with intermittent pump operation

### Scope of Functions

The controller IGZ51-20-S7 features the functions listed below. The default and the adjustable parameters are listed in table 2 - 32.

- adjustable pause time
- adjustable monitoring time
- adjustable minimum stroke number
- level monitoring (normally closed contact)
- power supply failure memory

On the controller IGZ51-20-S7 the pump run time is not controlled by the stroke number, but directly by the monitoring time. Therefore: pump run time = monitoring time.

During the monitoring time the adjusted minimum stroke number is monitored.

**Table 2 - 32. Parameters of IGZ51-20-S7**

Designation	Abbreviation	Default setting	Unit	Adjustment range	Unit
operating mode	BA	A		A (pulse transmitter with continuous pump operation) B (pulse transmitter with intermittent pump operation) C (pulse counter with continuous pump operation) D (pulse counter with intermittent pump operation)	
pause time	TP	10	minutes	01 E 00 - 99 E 04 (BA A, B) 01 E 00 - 99 E 04 (BA C, D)	minutes pulses
monitoring time	TU	60	seconds	01 E 00 - 99 E 03	seconds
minimum stroke number	NH	3		01 E 00 - 30 E 00	

### Input functions


The standard settings for the input functions are listed in table 2 - 33. The input functions can be altered as described in section "Adjusting the input functions" in chapter "Operation" of the general section of this manual.

**Table 2 - 33. Input functions of IGZ51-20-S7**

Input	Setting	Meaning
I1	O	normally closed contact
I2	S	normally open contact
I3	S	normally open contact
I4	-	not used
I5	S	normally open 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 - 25).

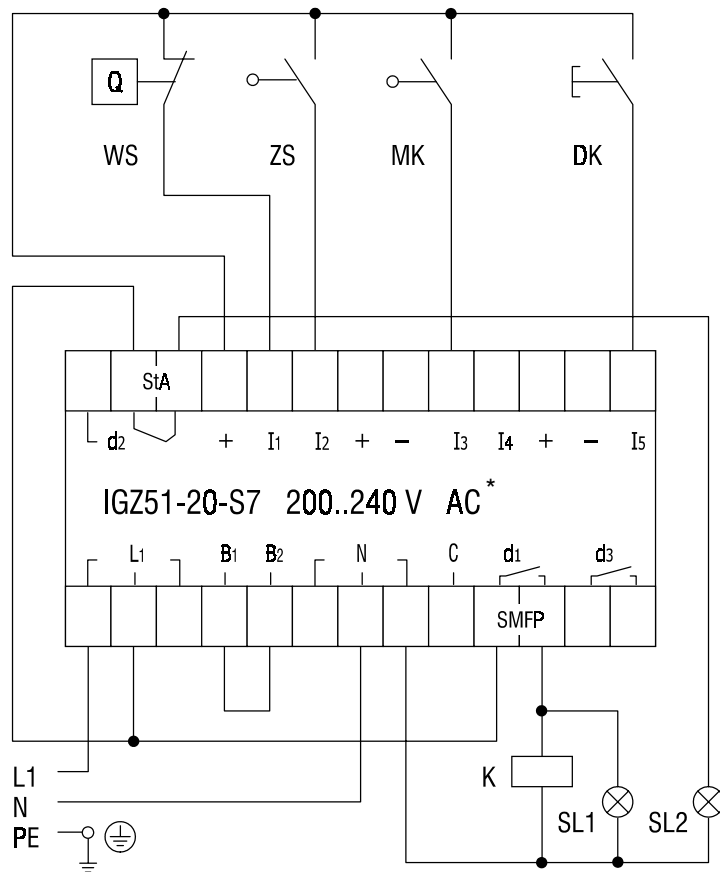
After installing the unit, trigger an intermediate lubrication by pressing the  button.

## Operation with Power Supply Failure Memory

When power fails, the power supply failure memory saves the remaining pause time and/or existing failure messages. Table 2 - 34 shows which time parameter is the first in the control sequence upon return of power.

**Table 2 - 34. Start upon Power Failure**

Situation at time of power failure	Procedure upon power-up
During monitoring time	pause time
During pause time	pause continues with saved remaining pause time
During failure message	failure message remains saved



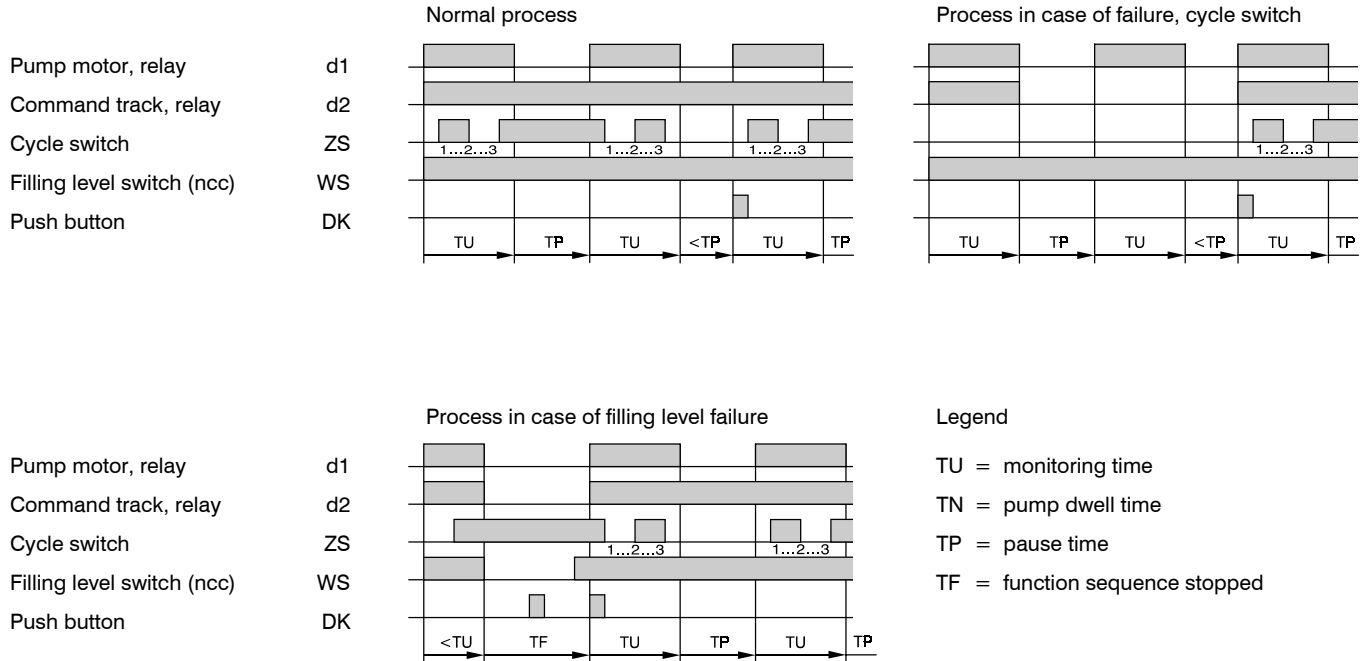
**Figure 2 - 25. Connection Diagram for IGZ51-20-S7**

- L1/N operating voltage
- B1/B2 jumper terminals for operating voltage (here shown: 200..240 V)
- WS level monitoring switch (here shown: reservoir filled)
- ZS cycle switch (stroke monitoring)
- MK machine contact
- 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 (StA)
  - 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.

### IGZ51-20-S7 Pulse Diagrams

(Time axis not true to dimensions, stroke preset = 3, monitoring time > 3 strokes))



**Figure 2 - 26. Pulse Diagram for IGZ51-20-S7**



# IGZ51-20-S8

## Operating Modes

The controller IG51-20-S8 can be operated in the following operating modes:

- A pulse transmitter with continuous pump operation during the contact time
- B pulse transmitter with intermittent pump operation
- C pulse counter with continuous pump operation during the contact time
- D pulse counter with intermittent pump operation

## Scope of Functions

The controller IGZ51-20-S8 features the functions listed below. The default and the adjustable parameters are listed in table 2 - 35.

- adjustable pause time
- adjustable monitoring time
- adjustable stroke number
- MK pulse monitoring
- pump run time limit (stroke monitoring)
- level monitoring
- prelubrication
- power supply failure memory

**Table 2 - 35. Parameters of IGZ51-20-S8**

Designation	Abbreviation	Default setting	Unit	Adjustment range	Unit
operating mode	BA	A		A (pulse transmitter with continuous pump operation) B (pulse transmitter with intermittent pump operation) C (pulse counter with continuous pump operation) D (pulse counter with intermittent pump operation)	
pause time	TP	10	minutes	01 E 00 - 99 E 04 (BA A, B) 01 E 00 - 99 E 04 (BA C, D)	minutes pulses
monitoring time	TU	60	seconds	01 E 00 - 99 E 03	seconds
stroke number	NH	3		01 E 00 - 30 E 00	

## Input functions

The standard settings for the input functions are listed in table 2 - 36. The input functions can be altered as described in section "Adjusting the input functions" in chapter "Operation" of the general section of this manual.

**Table 2 - 36. Input functions of IGZ51-20-S8**

Input	Setting	Meaning
I1	O	normally closed contact
I2	S	normally open contact
I3	S	normally open contact
I4	S	normally open contact
I5	S	normally open contact

## Installation

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 - 27).

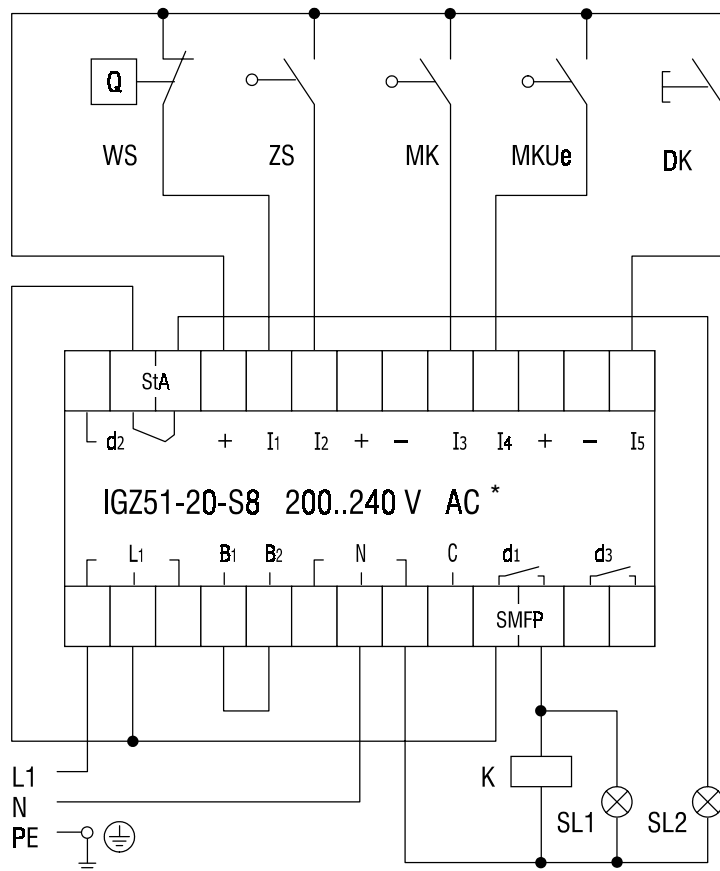
After installation and applying the operating voltage, the device begins its function sequence with prelubrication.

## Operation with Power Supply Failure Memory

The IGZ51-20-S8 is supplied with a power supply failure memory, that saves the current failure message if a power failure occurs. Table 2 - 37 shows which time parameter is the first in the control sequence upon return of power.

**Table 2 - 37. Start upon Power Failure**

Situation at time of power failure	Procedure upon power-up
During monitoring time	prelubrication
During pause time	prelubrication
During failure message	failure message remains saved



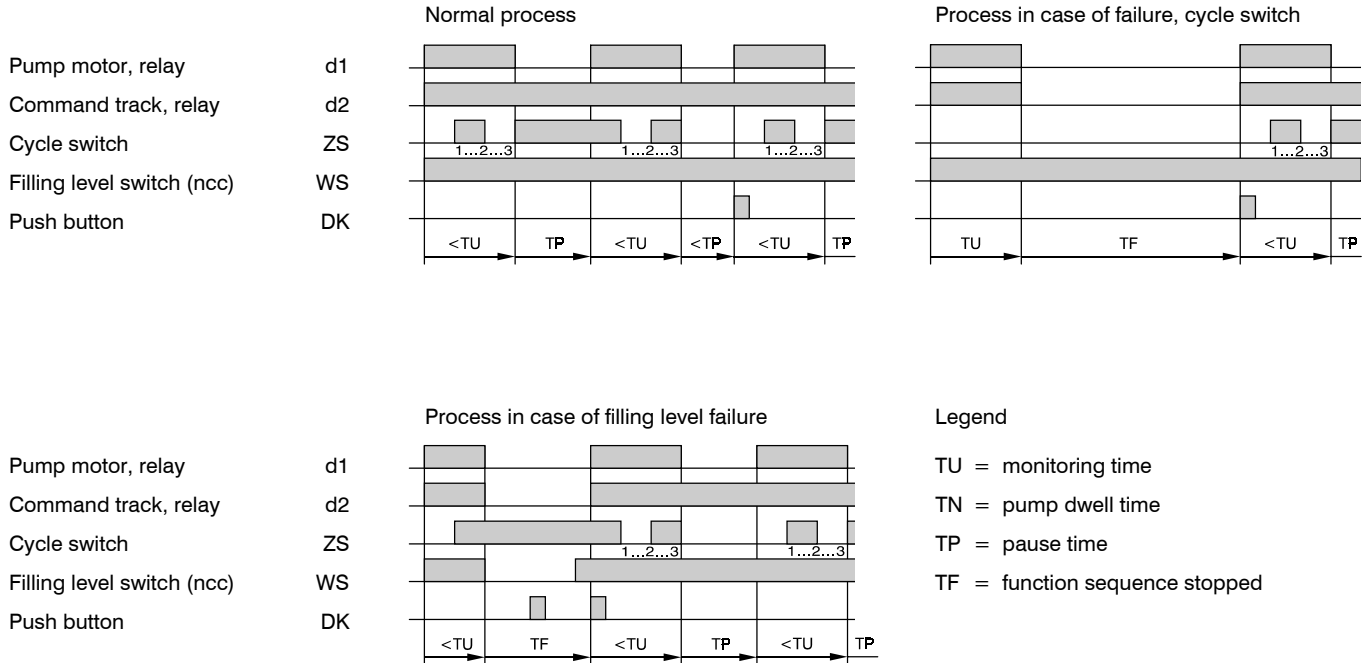
**Figure 2 - 27. Connection Diagram for IZ51-20-S8**

- L1/N operating voltage
- B1/B2 jumper terminals for operating voltage (here shown: 200..240 V)
- WS level monitoring switch (here shown: reservoir filled)
- ZS cycle switch (stroke monitoring)
- MK machine contact
- MKUe MK pulse 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 display (StA) or prelubrication
  - 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.

### IGZ51-20-S8 Pulse Diagrams

(Time axis not true to dimensions, stroke preset = 3)



**Figure 2 - 28. Pulse Diagram for IGZ51-20-S8**

# Controllers for Combined Circulation and Piston Feeder Systems

## Application

The controllers described in this chapter are used to control combined circulation and distribution lubrication systems with a single pump.

## Overview

The device described in table 2 - 38 is used by VOGEL to control combined circulation and distribution lubrication systems.

## Function

The controller is designed to monitor a circulation lubrication system and to control an intermittently operating distribution lubrication system at the same time, while both systems are supplied by the same pump. At defined intervals the controller switches over from the continuously operating circulation lubrication system to the distribution system and monitors the lubrication process.

### Lubrication Cycle (Distribution System)

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

**Table 2 - 38. VOGEL Controller for Combined Circulation and Distribution Lubrication Systems**

Designation	Short description
IZ361-30	Pulse counter with adjustable pause time, pressure build-up monitoring in circulation and distributor circuit, pressure build-down monitoring, pulse monitoring and power supply failure memory

### The Pause Time (Distribution System)

The pause time (TP) is the time between two contact times. The length of the pause is determined by the machine to be lubricated which sends pulses to the controller as operation continues. 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.

### Pulse Monitoring

An operating contact (BK) is used for pulse monitoring. When the machine requests lubrication, the operating contact is closed. When the contact BK is closed, a pulse must be received at the MK contact within a certain time, otherwise a failure message is output.

### The Contact Time (Distribution System)

After time-out of the pause time, the controller starts the lubrication process. This is referred to as contact time. The contact time is comprised of monitoring time (TU) and pump dwell time (TN). During the contact time, relay d1 is energised and the solenoid valve switching over

from circulation lubrication to distribution lubrication is activated.

### Pressure Build-Up Monitoring (Distribution System)

During the contact time, the pump builds up the pressure required for lubrication in the distribution circuit. This process is monitored by a pressure switch (DS). As soon as the required pressure is reached, the monitoring time is terminated and the pump dwell time started.

### Monitoring Time (Distribution System)

The monitoring time (TU) sets a time window for pressure build-up in the distribution system; monitored by the pressure switch DS. If the required pressure is not reached during the monitoring time (pressure switch DS is not activated), the pump is shut off and a failure message output.

The monitoring time is adjusted permanently and cannot be changed by the user.

### Pump Dwell Time (Distribution System)

The pump dwell time (TN) defines a time period following the monitoring time, during which the pump continues to operate for the distribution

circuit, to ensure all lubricating points are supplied with a sufficient amount of lubricant. At the end of the dwell time, relay d1 is de-energised and the system thereby reset to circulation mode. The pump keeps running.

**Pressure Build-Up Monitoring (Circulation System)**

To monitor the circulation lubrication, a second pressure switch DS2 operating in series with pressure switch DS is employed. DS2 is installed in the circulation circuit and closes e. g. at a pressure of > 1 bar.

**Monitoring Time (Circulation System)**

The monitoring time for pressure switch DS2 is approx. 2 minutes. It starts at the end of the dwell time and is terminated when the DS2 contact is closed (while the DS contact is open).

**Pressure Build-Down Monitoring**

If the pressure is not built down after the contact time, that is, if pressure switch DS remains activated or pressure switch DS2 does not close, a failure message is output after a defined time.

**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.

If power supply is shut of at any time during the function sequence, except during the pause time, the controller will start with a pre-run time and prelubrication as soon as power returns.

If power supply is interrupted during the pause, the number of MK pulses received is saved. After return of power, the controller remains in the pause function, until the further MK pulses required to trigger the next contact time have been received.

**Installation**

Install the device in the control cabinet of a VOGEL central lubrication system as described in chapter Installation (general part of this manual).

**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.**

**Pre-Run Time**

When power is applied, the pre-run time starts. During this time all other functions are locked. The failure message relay d2 is energised.

**Prelubrication**

After the pre-run time, the controller triggers a prelubrication in the distribution circuit. Prelubri-

cation is performed just like a standard contact time.

**Pause Time**

At the end of the dwell time, relay d1 is de-energised and the system thereby reset to circulation mode. Then the preset value for the pause time is read and the pause started. Subsequently the controller alternates between distribution lubrication and circulation lubrication at the interval defined by the set pause time.


**Contact Time (Distribution System)**

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 system thereby switched over to distribution lubrication. As soon as pressure switch DS is activated, 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 no failure has occurred, the relay d2 is always energised.

**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.



**After switch-off, the device must remain shut off for some time (see reclosing time in the specifications), to allow all internal voltages to be discharged.**

### Changing Parameters

Change of parameters is 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.

### Failure Messages

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

#### Pressure not Built Up in Circulation System

At the beginning of a distribution lubrication process, the monitoring time for pressure switch DS starts. If DS is not activated during this time, relays d1 and d2 are de-energised. The function sequence is stopped and the failure LED lights up. At the same time, the symbol for input DS flashes on the display.

#### No Pressure Built Up in the Circulation System

At the end of the dwell time, the controller switches over to circulation lubrication and the monitoring time for pressure switch DS2 starts. If DS2 is not activated during the monitoring time, relays d1 and d2 are de-energised. The function sequence is stopped and the failure LED lights up. At the same time, the symbol for input DS2 flashes on the display.

#### Pressure not Built Down

If the pressure is not built down after the contact time, that is, if pressure switch DS remains activated or pressure switch DS2 does not close, a failure message is output after a defined time. The function sequence is stopped and the failure LED lights up. At the same time, the symbol for input DS2 flashes on the display.


#### Missing MK Pulses

If the BK contact is closed and no pulse is received at the machine contact MK during a defined time, a failure message is output. The failure LED lights up and the symbol for the input MK flashes on the display.

#### Relay d2 when Operation Fails

When a failure occurs, relay d2 is de-energised and the function sequence is stopped.

### Deleting a Failure Message

A failure message can only be deleted by pressing the  button. This triggers an intermediate lubrication.



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

## IZ361-30

### Operating Modes

The controller IZ361-30 can only be used as pulse counter (operating mode C).

### Scope of Functions

The IZ361-30 features the functions listed below. The default and the adjustable parameters are listed in table 2 - 39.

- adjustable pause time
- pulse monitoring
- pressure build-up monitoring for distribution lubrication
- pressure build-up monitoring for circulation lubrication
- pressure build-down monitoring
- power supply failure memory (EEPROM)
- pre-run time

### Input functions

The standard settings for the input functions are listed in table 2 - 40. The input functions can be altered as described in section "Adjusting the input functions" in chapter "Operation" of the general section of this manual.

**Table 2 - 39. Parameters of IZ361-30**

Designation	Abbreviation	Default setting	Unit	Adjustment range	Unit
operating mode	BA	C		not adjustable	
pause time	TP	10	pulses	01 E 00 - 99 E 04	pulses
monitoring time	TU	60	seconds	not adjustable	
dwell time	TN	15	seconds	not adjustable	
prelubrication time	TV	60	seconds	not adjustable	

### Installation, First Operation

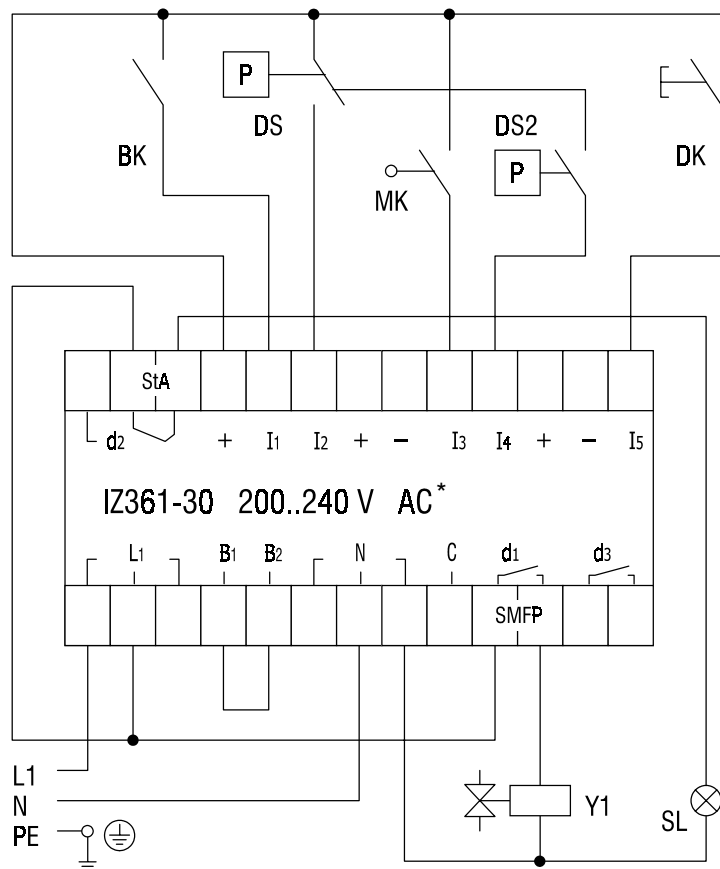
Install the device in the control cabinet of a VOGEL central lubrication system as described in chapter operation (general part of this manual). Observe the connection diagram (figure 2 - 29).

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

**Table 2 - 40. Input functions of IZ361-30**

Input	Setting	Meaning
I1	S	normally open contact
I2	S	normally open contact
I3	S	normally open contact
I4	S	normally open contact
I5	S	normally open contact





**Figure 2 - 29. Connection Diagram for IZ361-30**

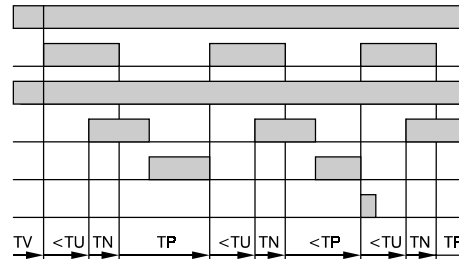
- L1/N operating voltage
- B1/B2 jumper terminals for operating voltage (here shown: 200..240 V)
- BK machine operation contact
- DS pressure switch for pressure build-up monitoring for distribution lubrication
- DS2 pressure switch for pressure build-up monitoring for circulation lubrication
- MK machine contact
- DK push-button for intermediate lubrication
- + +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 (StA)
- d3 operating contact: operation OK
- SL signal lamp for „FAILURE“
- Y1 solenoid valve for switch-over between circulation/distribution lubrication

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

**IZ361-30 Pulse Diagrams**  
(Time axis not true to dimensions)

Operating voltage L1/N  
 Solenoid valve, relay d1  
 Command track, relay d2  
 Pressure switch (noc) DS  
 Pressure switch (noc) DS2  
 Push button DK

Normal process

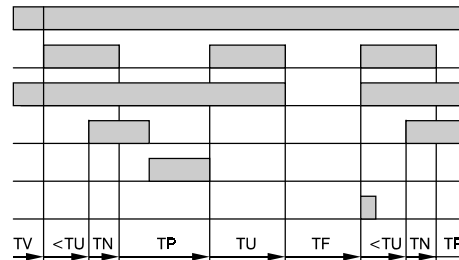


Legend

TV = pre-run time  
 TU = monitoring time  
 TN = pump dwell time  
 TP = pause time  
 TF = function sequence stopped

Operating voltage L1/N  
 Solenoid valve, relay d1  
 Command track, relay d2  
 Pressure switch (noc) DS  
 Pressure switch (noc) DS2  
 Push button DK

Process in case of pressure build-up failure, DS



**Figure 2 - 30. Pulse Diagram for IZ361-30**

# Pulse Monitors

## Application

The controllers described in this chapter are used to monitor lubrication with volume-flow controlled pulse transmitters.

## Overview

Table 2 - 41 lists the available VOGEL pulse monitors and their scope of functions.

## Function

These controllers monitor up to three signal sources for adherence to preset limit values. When the limit values are not reached or exceeded, a failure message is output.

### Monitoring Time

The monitoring time (TU) is the time period during which a defined number of pulses must be received at the sensor contacts of the controller. If this is not the case, the controller outputs a failure message.

On some devices, the monitoring time can be set by the user. If that is the case, it is important to ensure that at least two pulses can be received at each input during the monitoring time. Further information on this is found in the chapters on the respective device types.

**Table 2 - 41. VOGEL Pulse Monitors**

Designation	Short description
EWT2A01	Pulse monitor for up to 3 measuring spots
EWT2A01-S1	like EWT2A01 with lubrication pause function, outputs are normally closed (wire breakage protection)
EWT2A04	Pulse monitor with adjustable monitoring time and selectable monitoring of a high and low limit value or two low limit values
EWT2A04-S1	like EWT2A04 with lubrication pause function, outputs are normally closed (wire breakage protection)

### Limit Values

The limit value is the number of pulses that must be received at the sensor input (Gbrx) during the monitoring time. On some units there is a high and low limit value. High limit values must not be exceeded, low limit values must be reached.

### Lubrication pause

On some devices application of a 24 V signal to input I4 allows to start a lubrication pause.

The lubrication pause is a time period during which lubrication is interrupted. To ensure the controller will not output an error message due to the missing lubrication pulses, the number of pulses incoming at the transmitter contacts is not evaluated during the lubrication pause.

The lubrication pause will last as long as the voltage is applied to input I4.

## Installation

Install the device in the control cabinet of a VOGEL central lubrication system as described in chapter Installation (general part of this manual).

To prevent unintended failure messages from being output by unused inputs, we recommend to set the limit value for any unused input to the minimum value and short it to a neighbouring input that is in use.

## 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.**

### Monitoring Time

Upon power-up, the controller begins to monitor the transmitter contacts, the monitoring time is started.

During the monitoring time, the unit counts the number of pulses received at each transmitter contact. If the preset limit values are not exceeded, the monitoring time will elapse. Then all counters are reset and a new monitoring time is started.

If a high limit value has been set for a transmitter contact, the monitoring time is terminated as soon as this value is exceeded. A failure message is output and the output relay assigned to the transmitter contact is closed or opened depending on the device type.

If a low limit has been set for a transmitter contact, the monitoring time runs until its end. Then adherence to the limit value is checked immediately, and if it has not been reached, a failure message is output. At the same time, the output relay assigned to the transmitter contact is closed or opened depending on the device type.

### Lubrication pause

If a 24 V signal is applied to input I4 on pulse monitors with designation S1, the monitoring of the transmitter contacts is interrupted. As long as the voltage is applied to input I4, the pulses

incoming at the transmitter contacts are not evaluated. No error message is output.

### Restart

When the external push-button RS is pressed, the monitoring time is terminated and all counters are reset. Then the monitoring time is restarted. Possible failure messages are likewise reset.

A restart is also triggered when the user quits the parameter display after changing parameters.

### Switching Off

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



**After switch-off, the device must remain shut off for some time (see reclosing time in the specifications), to allow all internal voltages to be discharged.**

### Changing Parameters

Change of parameters is described in chapter Operation (in the general part of this operating manual). A change of parameters becomes operative when the user quits the parameter display and the next monitoring time starts.

### Failure Messages

In case of failures, that is, when a low limit is not reached or a high limit value is exceeded, the

output relay assigned the respective transmitter is closed.

### Insufficient Lubrication

The number of registered pulses falls short of the adjusted low limit.

### Excessive Lubrication

The number of registered pulses exceeds the adjusted high limit.

### Relays d1 through d3 during a Failure

If a failure occurs, the relay assigned the respective output is closed.

### Deleting a Failure Message

A failure message can only be deleted by pressing the external push-button RS.



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

## EWT2A01, EWT2A01-S1

### Operating Modes

The controllers EWT2A01 and EWT2A01-S1 can only be used in the operating mode pulse monitoring.

### Scope of Functions

The devices feature the functions listed below. The default and the adjustable parameters are listed in table 2 - 42.

#### EWT2A01

- 3 transmitter contacts
- adjustable limit values for each input
- monitoring time for the input defined on the basis of set limit values
- 3 failure outputs assigned to the 3 pulse inputs as normally open contacts

#### EWT2A01-S1

like EWT2A01 but:

- lubrication pause function
- failure outputs as normally closed contacts (wire breakage protected)

The adjustable limit values are low limits, that is, the controller monitors the system for insufficient lubrication.

**Table 2 - 42. Parameters of EWT2A01 and EWT2A01-S1**

Designation	Abbreviation	Default setting	Unit	Adjustment range	Unit
monitoring time	TU	depends on limit values	seconds	not adjustable	
limit value 1	I1	10 E 04	*0.01 pulses/minute	01 E 00 - 25 E 04	*0.01 pulses/minute
limit value 2	I2	10 E 04	*0.01 pulses/minute	01 E 00 - 25 E 04	*0.01 pulses/minute
limit value 3	I3	10 E 04	*0.01 pulses/minute	01 E 00 - 25 E 04	*0.01 pulses/minute

### Input functions

The standard settings for the input functions are listed in the tables 2 - 43 and 2 - 44. Except for EWT2A01-S1 the input functions can be altered as outlined in section "Adjusting the input functions" in chapter "Operation" of this general section of the manual.

### 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 diagrams (figure 2 - 31 and 2 - 32).

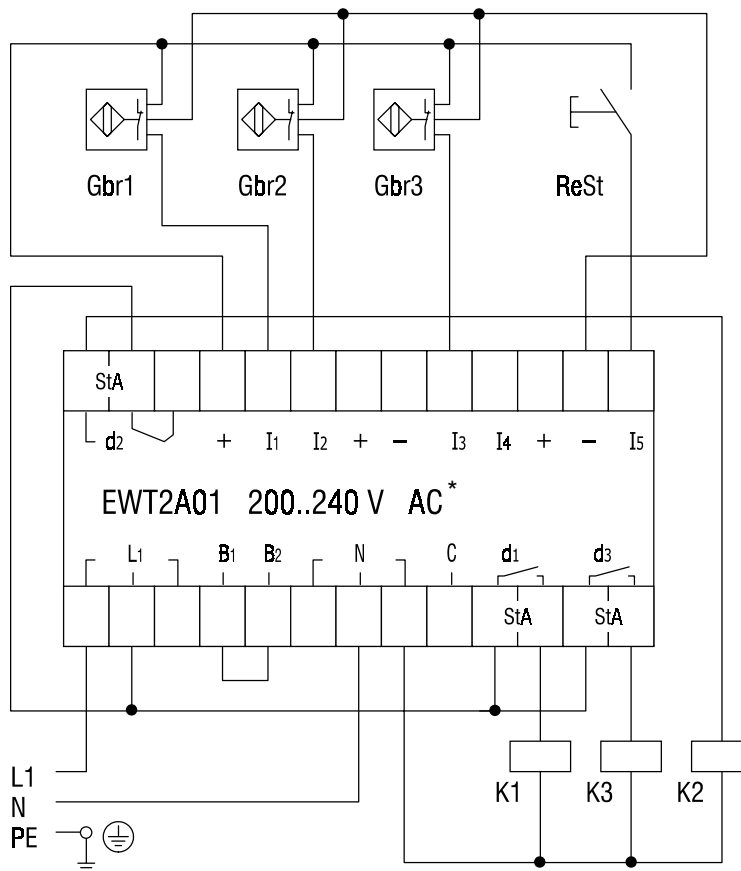
After installation and applying the operating voltage, the device begins its function sequence with the monitoring time.

**Table 2 - 43. Input functions of EWT2A01**

Input	Setting	Meaning
I1	S	normally open contact
I2	S	normally open contact
I3	S	normally open contact
I4	-	not used
I5	S	normally open contact

**Table 2 - 44. Input functions of EWT2A01-S1**

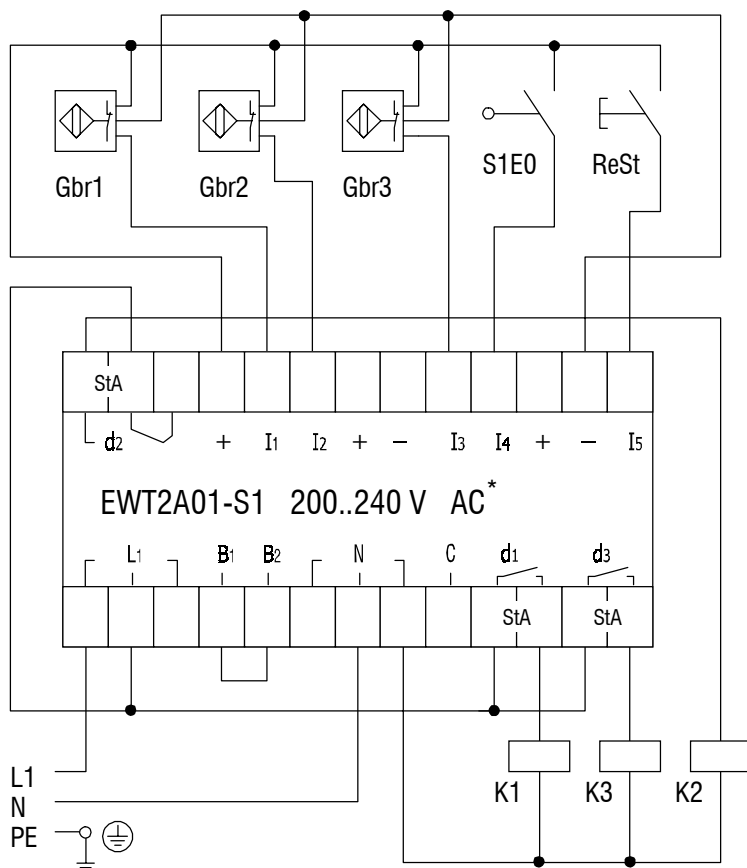
Input	Setting	Meaning
I1	S	normally open contact
I2	S	normally open contact
I3	S	normally open contact
I4	S	normally open contact
I5	S	normally open contact



**Figure 2 - 31. Connection Diagram for EWT2A01**

- L1/N operating voltage  
 B1/B2 jumper terminals for operating voltage  
 (here shown: 200..240 V)  
 Gbr1 transmitter contact 1  
 Gbr2 transmitter contact 2  
 Gbr3 transmitter contact 3  
 ReSt push-button  
 1. restart  
 2. delete failure  
 + +24 V DC output  
 - 0 V DC output  
 d1 operating contact for failure display  
 (StA), assigned Gbr1  
 d2 operating contact for failure display  
 (StA), assigned Gbr2,  
 change-over contact,  
 resting contact: failure  
 operating contact: operation OK  
 d1 operating contact for failure display  
 (StA), assigned Gbr3  
 K1 failure message Gbr1  
 K2 okay message Gbr2  
 K3 failure message Gbr3

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



**Figure 2 - 32. Connection Diagram for EWT2A01-S1**

- L1/N operating voltage
- B1/B2 jumper terminals for operating voltage (here shown: 200..240 V)
- Gbr1 transmitter contact 1
- Gbr2 transmitter contact 2
- Gbr3 transmitter contact 3
- S1E0 Contact lubrication pause
- ReSt push-button
  - 1. restart
  - 2. delete failure
- + +24 V DC output
- 0 V DC output
- d1 operating contact for failure display (StA), assigned Gbr1
- d2 operating contact for failure display (StA), assigned Gbr2, change-over contact, resting contact: failure operating contact: operation OK
- d3 operating contact for failure display (StA), assigned Gbr3
- K1 failure message Gbr1
- K2 okay message Gbr2
- K3 failure message Gbr3

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

# EWT2A04, EWT2A04-S1

## Operating Modes

The controllers EWT2A04 and EWT2A04-S1 can only be used in the operating mode pulse monitoring.

## Scope of Functions

The devices feature the functions listed below. The default and the adjustable parameters are listed in table 2 - 45.

### EWT2A04

- 2 transmitter contacts
- adjustable limit values for each input
- input of high and low limit values for input I2
- adjustable monitoring time
- 2 failure outputs assigned to the two pulse inputs as normally open contacts

### EWT2A04-S1

like EWT2A04 but:

- lubrication pause function
- failure outputs as normally closed contacts (wire breakage protected)

The devices can either monitor the two low limit values for two different transmitters or a high and low limit for a single transmitter. The function is selected by applying or removing power at input I3. When power is applied to input I3, limit value 2 is considered the high limit, that is,

**Table 2 - 45. Parameters of EWT2A04 and EWT2A04-S1**

Designation	Abbreviation	Default setting	Unit	Adjustment range	Unit
monitoring time	TU	60	seconds	06 E 00 – 90 E 03	seconds
limit value 1	I1	10 E 04	*0.01 pulses/minute	01 E 00 - 25 E 04	*0.01 pulses/minute
limit value 2	I2	10 E 04	*0.01 pulses/minute	01 E 00 - 25 E 04	*0.01 pulses/minute

input I2 is used to monitor the system for excessive lubrication.

If no power is applied to input I3, limit value 2 is considered the low limit for input I2, that is, the system is monitored for insufficient lubrication.

## Input functions

The standard settings for the input functions are listed in the tables 2 - 46 and 2 - 47. Except for EWT2A04-S1 the input functions can be altered as outlined in section "Adjusting the input functions" in chapter "Operation" of this general section of the manual.

## 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).

**Table 2 - 46. Input functions of EWT2A04**

Input	Setting	Meaning
I1	S	normally open contact
I2	S	normally open contact
I3	S	normally open contact
I4	-	not used
I5	S	normally open contact

**Table 2 - 47. Input functions of EWT2A04-S1**

Input	Setting	Meaning
I1	S	normally open contact
I2	S	normally open contact
I3	S	normally open contact
I4	S	normally open contact
I5	S	normally open contact

Observe the connection diagrams (figure 2 - 33 and 2 - 34).



After installation and applying the operating voltage, the device begins its function sequence with the monitoring time.

## Changing Parameters

### Setting the Monitoring Time, Input of Limit Values

The monitoring time must be selected long enough to allow at least two pulses to be received at each input during the monitoring time. However, we recommend to adjust a much longer monitoring time, to ensure only substantial deviations are reported as failures, because the occurrence of pulses may be rather irregular.

### Calculation Example for Oil Lubrication (Monitoring of High and Low Limit Value)

A progressive feeder with  $n = 8$  distribution outlets and an output volume of  $V_{\text{spec}} = 0.13 \text{ cm}^3$  per outlet and cycle is supplied with a volume flow of  $Q = 20 \text{ cm}^3/\text{min}$ . The strokes of the feeder pistons are counted as pulses.

The number of pulses then is:

$$I = \frac{Q}{n \cdot V_{\text{spez}}} = \frac{20}{8 \cdot 0,13} = 19 \frac{\text{pulses}}{\text{min}}$$

The controller is to report a failure, when the number of piston strokes is exceeded or falls short of the limit value by more than 20 %.

$$I_{\min} = I1 = I - (I \cdot 0.2) = 15 \frac{\text{pulses}}{\text{min}}$$

$$I_{\max} = I2 = I + (I \cdot 0.2) = 23 \frac{\text{pulses}}{\text{min}}$$

$$TU_{\min} = \frac{2}{I_{\min}} = \frac{2}{15} = 0,133 \text{ min}$$

Selected monitoring time  $TU = 1$  (min)

Setting:  $TU = 60 \text{ E } 00$  (seconds)

Parameter  $I1 = I_{\min} = 15$  (pulses/min)

Setting:  $I1 = 15 \text{ E } 02$  (\*0.01 pulses/min)

Parameter  $I2 = I_{\max} = 23$  (pulses/min)

Setting:  $I2 = 23 \text{ E } 02$  (\*0.01 pulses/min)

### Calculation Example for Grease Lubrication (Monitoring of two Low Limit Values for two Different Transmitters)

A progressive feeder with  $n = 12$  distribution outlets and an output volume of  $V_{\text{spec}} = 0.13 \text{ cm}^3$  per outlet and cycle is supplied with a volume flow of  $Q = 1 \text{ cm}^3/\text{min}$ .

The number of pulses  $I_A$  then is:

$$I_A = \frac{Q}{n \cdot V_{\text{spez}}} = \frac{1}{12 \cdot 0,13} = 0,64 \frac{\text{pulses}}{\text{min}}$$

The controller is to report a failure, when the number of piston strokes falls short of the limit value by more than 30 %.

A progressive feeder with  $n = 6$  distribution outlets and an output volume of  $V_{\text{spec}} = 0.13 \text{ cm}^3$  per outlet and cycle is supplied with a volume flow of  $Q = 3 \text{ cm}^3/\text{min}$ . Its pulse frequency  $I_B$  is 3.85 pulses/min and the actual number may be max. 40 % lower.

The two low limit values  $I_{A\min}$  and  $I_{B\min}$  are calculated as follows:

$$I_{A\min} = I_A - (I_A \cdot 0.30) = 0.45 \frac{\text{pulses}}{\text{min}}$$

$$I_{B\min} = I_B - (I_B \cdot 0.40) = 2.31 \frac{\text{pulses}}{\text{min}}$$

The lower of the two values is used to determine the minimum monitoring time:

$$TU_{\min} = \frac{2}{I_{A\min}} = \frac{2}{0,45} = 4,4 \text{ min}$$

Selected monitoring time  $TU = 60$  min

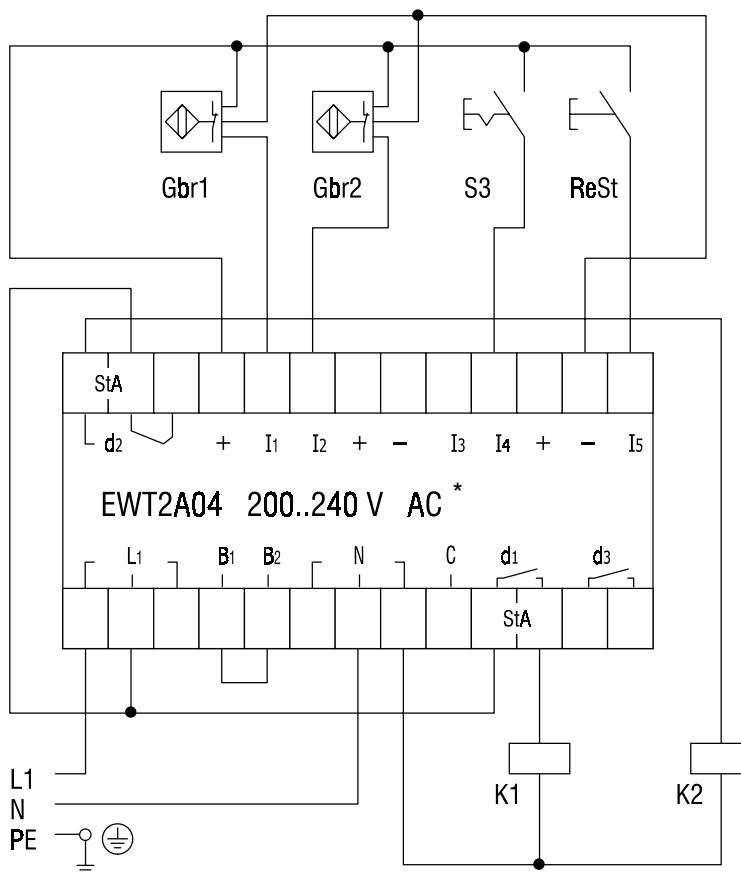
Setting:  $TU = 36 \text{ E } 02$  (seconds)

Parameter  $I1 = I_{A\min} = 0.45$  (pulses/min)

Setting:  $I1 = 45 \text{ E } 00$  (\*0.01 pulses/min)

Parameter  $I2 = I_{B\min} = 138$  pulses

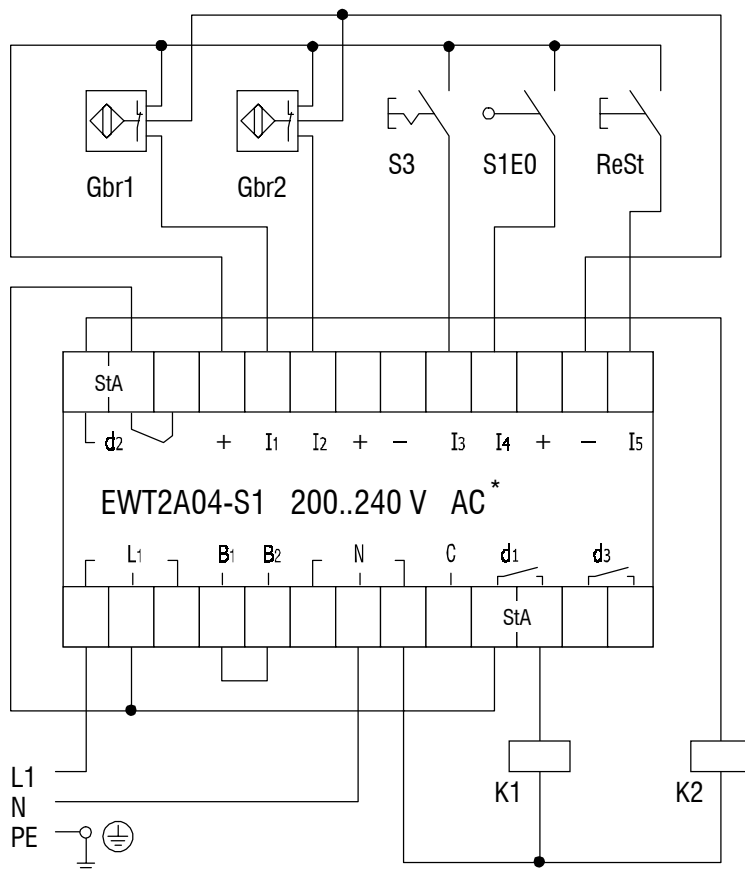
Setting:  $I2 = 23 \text{ E } 01$  (\*0.01 pulses/min)



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

**Figure 2 - 33. Connection Diagram for EWT2A04**

- L1/N operating voltage
- B1/B2 jumper terminals for operating voltage (here shown: 200..240 V)
- Gbr1 transmitter contact 1
- Gbr2 transmitter contact 2
- S3 select contact for excessive/insufficient lubrication
  - opened: insufficient lubrication
  - closed: excessive lubrication
- ReSt push-button
  - 1. restart
  - 2. delete failure
- + +24 V DC output
- 0 V DC output
- d1 operating contact for failure display (StA), assigned Gbr1
- d2 operating contact for failure display (StA), assigned Gbr2, change-over contact, resting contact: failure
- operating contact: operation OK
- K1 failure message Gbr1
- K2 okay message Gbr2



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

**Figure 2 - 34. Connection Diagram for EWT2A04-S1**

- L1/N operating voltage
- B1/B2 jumper terminals for operating voltage (here shown: 200..240 V)
- Gbr1 transmitter contact 1
- Gbr2 transmitter contact 2
- S3 select contact for excessive/insufficient lubrication
  - opened: insufficient lubrication
  - closed: excessive lubrication
- S1E0 Contact lubrication pause
- ReSt push-button
  - 1. restart
  - 2. delete failure
- + +24 V DC output
- 0 V DC output
- d1 operating contact for failure display (StA), assigned Gbr1
- d2 operating contact for failure display (StA), assigned Gbr2, change-over contact, resting contact: failure
  - operating contact: operation OK
- K1 failure message Gbr1
- K2 okay message Gbr2

# Controllers for Chain Lubrication Systems

## Application

The controller described in this chapter is used to control and monitor central lubrication systems for lubrication of conveyor chains.

## Overview

The device described in table 2 - 48 is supply by VOGEL to control chain lubrication systems.

## Function

The device is designed to control a solenoid valve to supply lubrication systems for chains with the required lubricant amounts. The lubricant supply is controlled at intervals based on the running speed of the chain. An interval time and a pause time can be set; standstill times are considered by monitoring of incoming pulses.

### The Lubrication Cycle

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

### The Pause Time

The pause time (TP) is the time between two contact times. The length of the pause time is determined by the number of pulses sent by the system to be controlled. The pulses received at

**Table 2 - 48. VOGEL Controller for Chain Lubrication Systems**

Designation	Short description
IZ52-20	Pulse counter with adjustable pause time, adjustable number of lubrication pulses, with pump run time limit, pressure build-up monitoring, MK pulse monitoring and power supply failure memory

the machine contact MK are counted by the controller; the pause time is terminated and the contact time started after a preset number of pulses has been received. 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 starts the lubrication process. This is referred to as contact time. During the contact time, relay d1 is energised, switching the pump on.

### Monitoring Time, Pressure Build-Up Monitoring

The monitoring time (TU) is a time window within the contact time, during which the pressure build-up in the lubricant supply lines is monitored. This is achieved by means of the pressure switch (DS). If the required pressure is not reached during the monitoring time (pressure switch DS is not activated), the pump is shut off and a failure message output.

If the required pressure is reached during the monitoring time, it is terminated and relay d3 is released. At the same time the monitoring time for MK starts.

The monitoring time for pressure build-up is adjusted permanently and cannot be changed by the user.

### MK Pulse Monitoring, Pump Run Time Limit

The duration of the contact time and thereby the pump run time is limited by the monitoring time for pressure build-up and the MK monitoring time.

The MK monitoring time starts after successful pressure build-up. If no pulse is received at the MK input within this time, the contact time is terminated and the pump shut off. The contact time continues as soon as the next MK pulse is registered.

If a pulse is received at the MK input during the MK monitoring time, it is terminated and a new MK monitoring time is started.

This allows to register and consider standstill of the chain.

### MK Pulse Transmission Ratio Counting of Lubrication Pulses

To control the solenoid valve via relay d3, the controller generates lubrication pulses on the

basis of the MK pulses received at the MK input. Output of a lubrication pulse energises relay d3.

To prevent a lubrication pulse to be issued upon every MK pulse received, the MK pulse transmission ratio allows to determine after how many MK pulses a lubrication pulse is output.

After a certain number of lubrication pulses has been output (parameter NI), the contact time is terminated, the pump is shut off and a new pause time started.

The number of lubrication pulses until the end of the contact time and the MK pulse transmission ratio can be set by the user.

### Level Monitoring

The filling level of the lubricant reservoir is monitored by means of a level monitoring switch (WS). This switch is configured as a normally closed contact. This allows simultaneous monitoring of the signal cables to the level monitoring switch, to detect breakage of 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 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 sequence and possible failure messages are not lost.

## Installation

Install the device in the control cabinet of a VOGEL central lubrication system as described in chapter Installation (general part of this manual).

## 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.**

### Contact Time (Lubrication)

Upon power-up, the controller generally begins its function sequence with a contact time (also see subheading Operation with Power Failure Memory). Relay d1 is energised and the pump thereby switched on. At the same time the monitoring time starts.

As soon as pressure switch DS is activated, the monitoring time is terminated and relay d3 released. The pulses received at the input of the machine contact MK are counted and a lubrication pulse is output when the required number

of MK pulses is reached. Relay d3 is thereby energised and the solenoid valve opened.

Possibly, the frequency of the pulses incoming at the machine contact MK is higher than the frequency of the output d3. This is indicated by flashing of the symbol for output d3 on the display. In this case the parameter MI (MK pulse ratio) must be set to a suitable value which is higher than 1. Changing of parameters is described in chapter Operation (general section) of this manual.

When the preset number of lubrication pulses is reached, the contact time is terminated and the pump shut off.

### Stand Still Times

Stand still of the conveyor chain during the contact time is recognised, since the MK pulses incoming at the MK input are monitored. If no MK pulses are received at the input during the MK monitoring time, the contact time is interrupted. It is resumed as soon as pulses are again registered at the MK input.


### Pause Time

At the end of the contact time, the adjusted pause time value is read and the pause then started. Subsequently contact time and pause time alternate.

### Relay d2 in Normal Operation

When the operating voltage is applied and no failure has occurred, relay d2 is always energised.

### Intermediate Lubrication

Short pressing of the  button during a pause triggers an intermediate lubrication. Intermediate lubrication is performed just like a standard contact time. Thereafter the device returns to the normal operating cycle.

### Switching Off

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



**After switch-off, the device must remain shut off for some time (see reclosing time in the specifications), to allow all internal voltages to be discharged.**

### Operation with Power Supply Failure Memory

When power fails, the power supply failure memory saves important data such as the remaining pause time or a current failure message. This allows to resume the function sequence upon return of power. Depending on the situation prevailing at the time of power failure, the controller resumes the function sequence as listed in table 2 - 49.

### Changing Parameters

Change of parameters is 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.

## Failure Messages

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

### No Pressure Build-Up

At the beginning of a contact time, the monitoring time for pressure switch DS starts. If DS is not activated during this time, relays d1 and d2 are de-energised. The function sequence is stopped and the failure LED lights up. 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. 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.

### Relay d2 when Operation Fails

When a failure occurs, relay d2 is de-energised and the function sequence is stopped.

### Deleting a Failure Message

A failure message can only be deleted by pressing the  button. This triggers an intermediate lubrication.



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

**Table 2 - 49. Start upon Power Failure**

Situation at time of power failure	Procedure upon power-up
During monitoring time	new contact time
After monitoring time	pump is switched on and the contact time continues with the remaining lubrication pulses
During pause time	pause continues with saved remaining pause time
During failure message	failure message remains saved

## IZ52-20

### Operating Modes

The controller IZ52-20 can only be used as pulse counter (operating mode C).

### Scope of Functions

The IZ52-20 features the functions listed below. The default and the adjustable parameters are listed in table 2 - 50.

- adjustable pause time
- adjustable monitoring time
- adjustable number of lubrication pulses
- adjustable pulse monitoring time for MK
- adjustable MK pulse transmission
- pressure build-up monitoring
- MK pulse 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:  (normally closed contact)

**Table 2 - 50. Parameters of IZ52-20**

Designation	Abbreviation	Default setting	Unit	Adjustment range	Unit
operating mode	BA	C		not adjustable	
pause time	TP	10	pulses	01 E 00 - 99 E 07	pulses
monitoring time	TU	60	seconds	05 E 00 - 12 E 01	seconds
MK pulse monitoring time	TK	120	seconds	01 E 00 - 99 E 01	seconds
MK pulse transmission	MI	1		01 E 00 - 25 E 00	
number of lubrication pulses	NI	10		01 E 00 - 99 E 03	

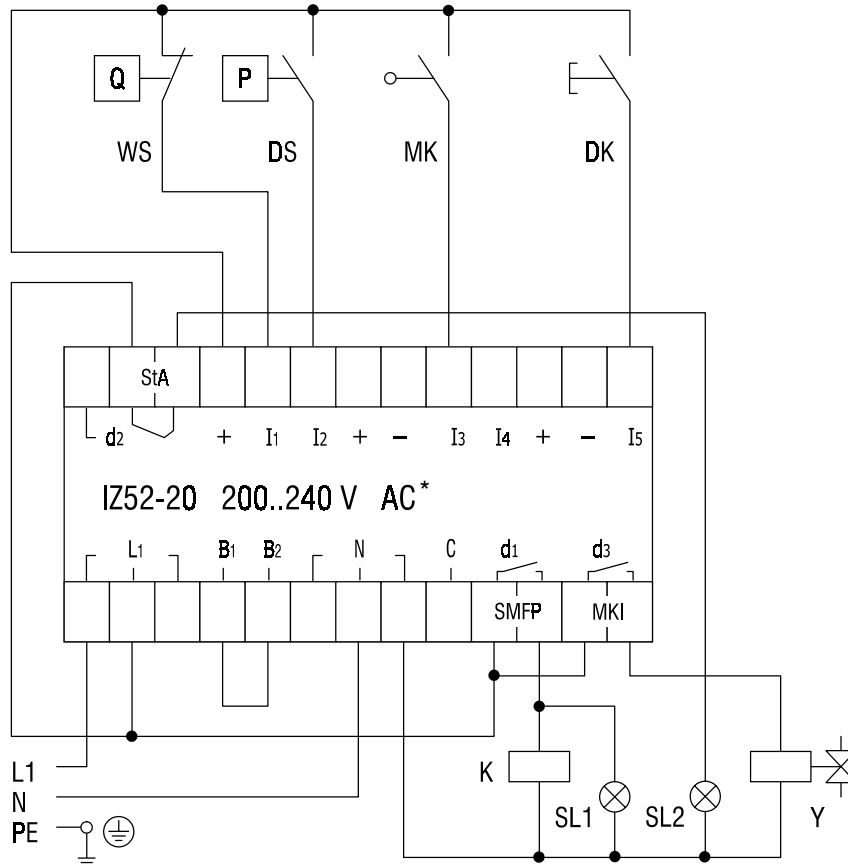
### Further information

#### Cycle time output d3:

- on-time: 0.4 s
- off-time:  $\geq 0.4$  s
- maximum frequency: 1 Hz

### 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 - 35).



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

**Figure 2 - 35. Connection Diagram for IZ52-20**

- 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
- MK machine contact
- 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 (StA)
  - operating contact: operation OK
- d3 operating contact for solenoid valve or machine contact for pulse-controlled lubrication (MKI)
- SL1 signal lamp for „PUMP ON“
- SL2 signal lamp for „FAILURE“
- Y solenoid valve for lubricant supply



### IZ52-20 Pulse Diagrams

(Time axis not true to dimensions, MK pulse transmission ratio = 2, lubrication pulses = 2)

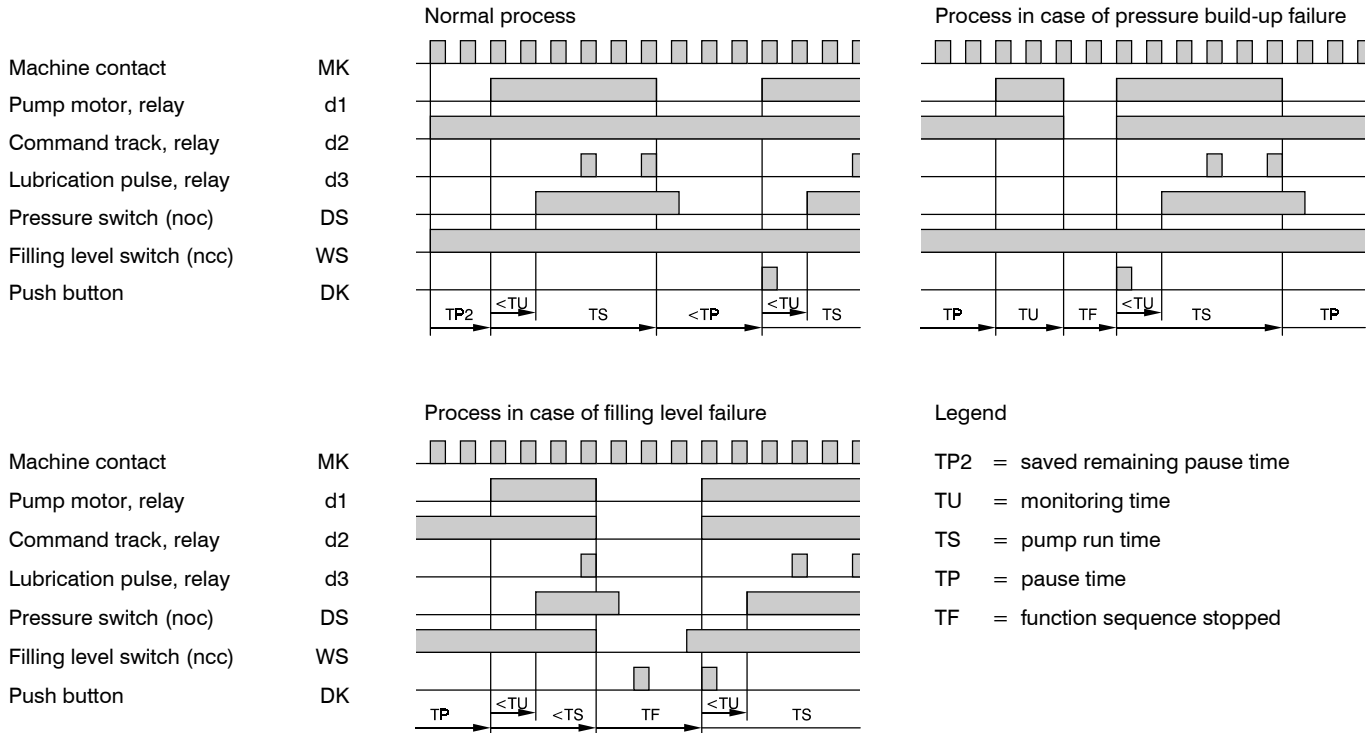


Figure 2 - 36. Pulse Diagram for IZ52-20

EWT  
EXZT  
IG  
IGZ  
IZ

# Universal Controller for Industrial Lubrication Systems

Part 3: Appendix

**Table A - 1. Overview of Available VOGEL Controllers**

Former designation	New designation	Application
EWT2A01 voltage	EWT2A01-E	Pulse monitor
EWT2A04 voltage	EWT2A04-E	Pulse monitor
EXZT2A02 voltage	EXZT2A02-E EXZT2A02-I	Single-line systems Piston feeders
EXZT2A03 voltage	EXZT2A03-E EXZT2A03-I	Single-line systems Piston feeders
EXZT2A05 voltage	EXZT2A05-E EXZT2A05-I	Single-line systems Piston feeders
EXZT2A06 voltage	EXZT2A06-E EXZT2A06-I	Progressive feeder systems
EXZT2A07 voltage	EXZT2A07-E EXZT2A07-I	Single-line systems Piston feeders
IG351	IG351-10-E IG351-10-I	Electronic pulse transmitter for central lubrication systems
IG38-3	IG38-30-I IG38-30-E IGZ38-30-I	Single-line systems Piston feeders
IG38-3-S1	IGZ38-30-E IGZ38-30-i	Single-line systems Piston feeders
IG54-2	IG54-20-E IG54-20-I	Oil air lubrication

Former designation	New designation	Application
IG54-2-S1	IG54-20-S1-E IG54-20-S1-I	Oil air lubrication
IG54-2-S3	IG54-20-S3-E IG54-20-S3-I	Oil air lubrication
IG54-2-S4	IG54-20-S4-E IG54-20-S4-I	Oil air lubrication
IGZ36-2	IGZ36-20-E IGZ36-20-I	Single-line system Piston feeders
IGZ36-2-S6	IGZ36-20-S6-E IGZ36-20-S6-I	Single-line system Piston feeders
IGZ38-M	IGZ38-M2-E IGZ38-M2-I IGZ38-M3-E IGZ38-M3-I	Oil air lubrication
	IGZ38-M4-E IGZ38-M4-I	Single-line system Piston feeders
IGZ51-2	IGZ51-20-E IGZ51-20-I	Progressive feeders
IGZ51-2-S2	IGZ51-20-S2-E IGZ51-20-S2-I	Progressive feeders

Table A – 1. continued

Former designation	New designation	Application
IGZ51-2-S3	IGZ51-20-S3-E IGZ51-20-S3-I	Single-line systems Piston feeders
IGZ51-2-S7	IGZ51-20-S7-E IGZ51-20-S7-I	Progressive feeders
IGZ51-2-S8	IGZ51-20-S8-E IGZ51-20-S8-I	Progressive feeders
IZ361	IZ361-30-E IZ361-30-I	Circulation and distribution lubrication systems
IZ38-3	IZ38-30-I IGZ38-30-E IGZ38-30-I	Single-line systems Piston feeders
IZ38-3-S1	IGZ38-30-E IGZ38-30-I	Single-line systems Piston feeders
IZ52-2	IZ52-20-E IZ52-20-I	Chain lubrication

Table A - 2. New Voltage Codes

Designation	Description
+471	100..120 V / 200..240 V AC
+472	20..24 V AC / DC

Table A - 3. Comparison of Former and New Voltage Code

Former	Voltage code		New
	Operating voltage range		
250	220 V	50/60 Hz	471
410	220 V	50/60 Hz	471
411	110 V	50/60 Hz	471
423	24 V	50/60 Hz	472
426	20 V	50/60 Hz	472
428	230 V	50/60 Hz	471
429	115 V	50/60 Hz	471
447	110 V – 120 V	50/60 Hz	471
924	24 V	DC	472
MAN	220 V – 240 V	50/60 Hz	471