

IG38-30-I
IZ38-30-I

Controller for Compact Units in Central Lubrication Systems

Operating Manual
Version V3



Imprint

The operating manual is part of the scope of supply of a controller for compact units in central lubrication systems

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Editor

Dipl.-Ing. S. Schlenzka

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IG38-30-I
IZ38-30-I

**Controller for
Compact Units
in Central Lubrication
Systems**

Part 1: General Operating Manual

Introduction

The product described in this manual is a controller for VOGEL central lubrication systems installed in stationary industrial plants. It is supplied as a component of compact lubrication systems.

The controller described is a basic unit, that may be modified to suit the control and monitoring task at hand. This results in different device types, that differ in function. An overview of the available device types is found in table 2 - 1 in part 2 of this manual.

The VOGEL controller for compact devices in central 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.

Notes Concerning this Manual

This operating manual is subdivided into two parts. The first part contains a general description of the controller as well as basic notes concerning assembly and operation.

The second part contains information on the differences between the individual device types.

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 in his language should the device be sold.

Safety Instructions

The VOGEL controller for compact units in central lubrication systems is designed for operation on industrial and small business AC current supply (see Specifications). Other applications are not allowed.

Only trained specialists capable of recognising 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.



DANGER, FATAL INJURY
The pause time settings must only be altered after switching the power supply to the unit off.

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

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

Application, Design and Function

Application

The control described in this manual is designed to control and monitor VOGEL central lubrication systems in stationary industrial systems. 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.

Design

Fig. 1 - 1 shows a VOGEL compact lubrication system with integrated controller.

Fig. 1 - 2 shows the design of the controller for central lubrication systems. The terminal rails for the electrical connections (2) and the service interface (4) are located on the rear of the circuit board (1). The rotary switch for the parameter settings (3) is located on the front side.

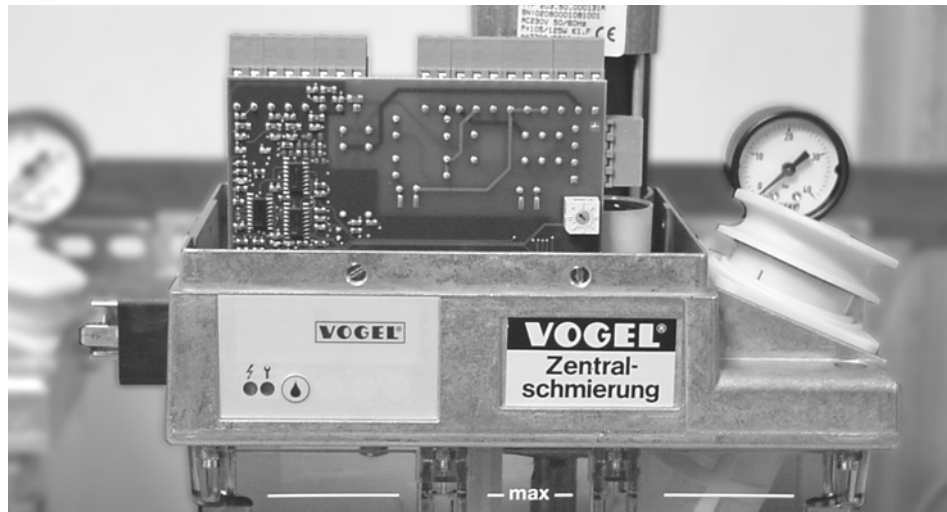


Figure 1 - 1. The controller for industrial lubrication systems, installed

Function

The 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.

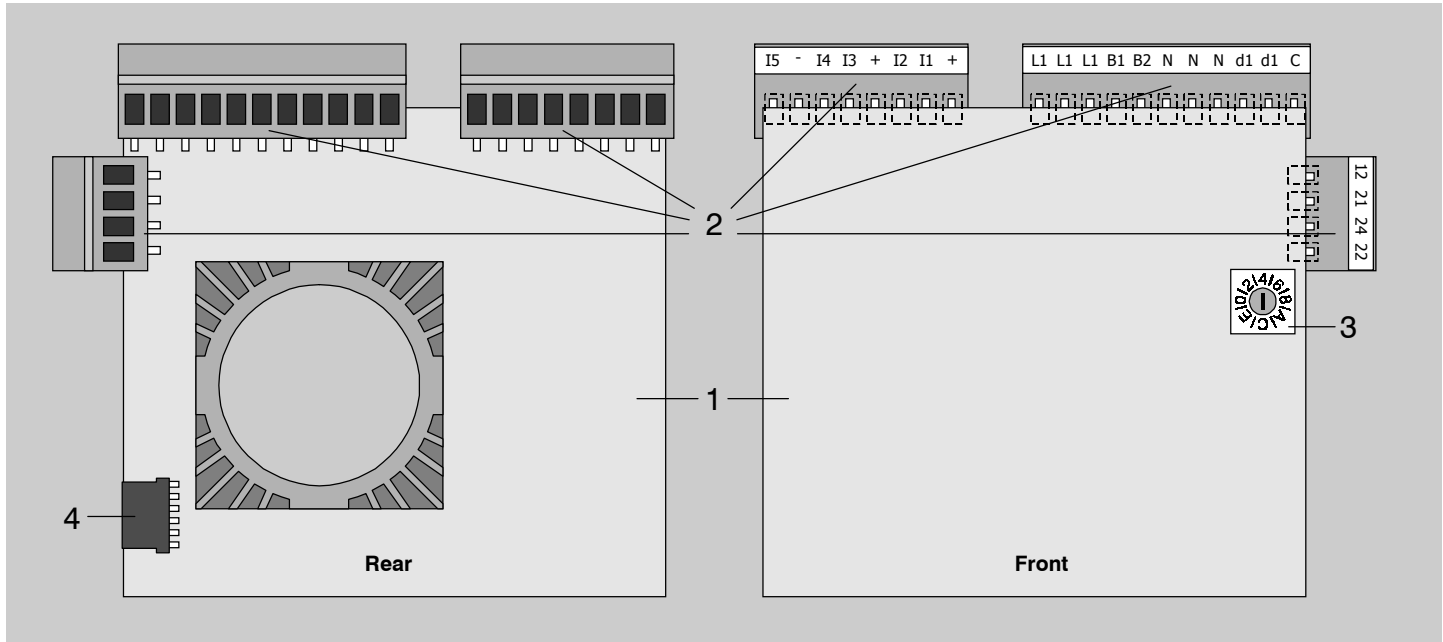


Figure 1 - 2. Design of the controller for industrial lubrication systems

- 1 circuit board
- 2 terminal rails with identifications
- 3 rotary switch for parameter settings
- 4 service interface

Terminal Assignment

Table 1 - 1. Terminal Assignment

| Designation | Function |
|-------------|--|
| L1 | Supply power, phase |
| B1 | Connection bridge terminal 1 100..120 V AC: bridge B1 – L1 200..240 V AC: bridge B1 – B2 |
| B2 | Connection bridge terminal 2 100..120 V AC: bridge B2 – N 200..240 V AC: bridge B2 – B1 |
| N | Supply power, neutral conductor |
| C | Support terminal for motor capacitor, potential-free |
| d1 | Potential-free normally open contact, relay d1 |
| + | Output electronic operating voltage +24 V |
| - | Reference potential of electronic operating voltage |
| I1 - I5 | Input terminals |
| 12 | Resting contact 1 of relay d2 |
| 21 | Potential-free change-over contact 2 of relay d2 |
| 24 | Potential-free operating contact 2 of relay d2 |
| 22 | Potential-free resting contact 2 of relay d2 |

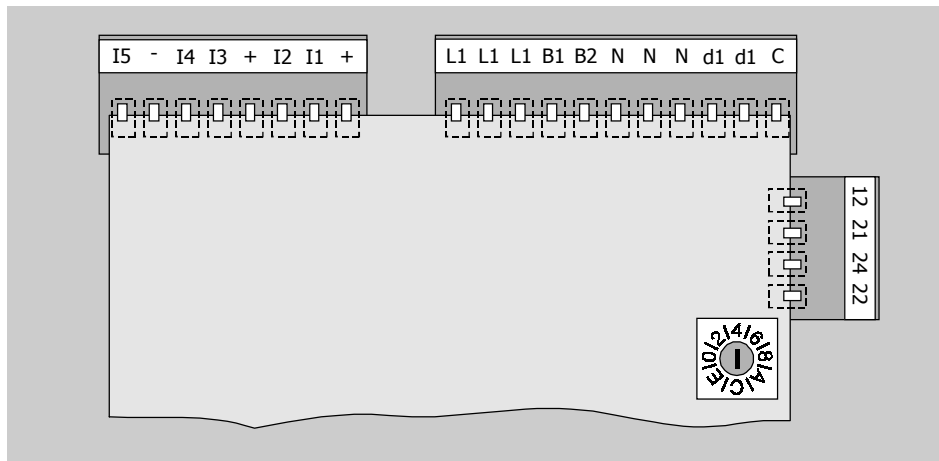


Figure 1 - 3. Terminal Assignment

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

24 V 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. Externe power supply is not allowed.

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 and d2.

Outputs

All outputs are relay contacts. With the exception of terminal 12 they are potential-free and galvanically separated from the operating voltage. Relay d2 has a resting and change-over contact. Relay d1 has a normally open contact.

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 transformer 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.

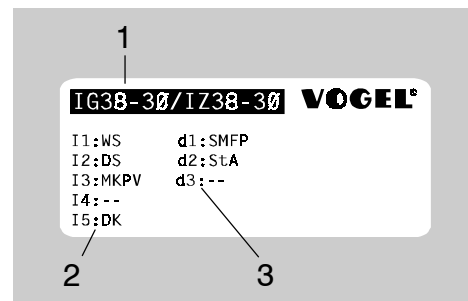


Figure 1 - 4. Sticker with information on assignment of inputs and outputs

- 1 device type**
- 2 assignment of inputs**
- 3 assignment of outputs**

Table 1 - 2. Explanation of Abbreviations in the Input and Output Assignments

| Inputs | | Outputs | |
|--------------|--|--------------|--------------------------------|
| Abbreviation | Meaning | Abbreviation | Meaning |
| DS | pressure switch (pressure build-up) | SMFP | lubricant supply (pump, valve) |
| DK | manual trigger, deletion of failure messages | StA | failure display |
| MKPV | machine contact/ pause time extension | -- | not used |
| -- | not used | | |

Connection

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

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

The controller is supplied as part of the compact unit, so only the following connections must be made if that is desired.

To make the connections, the cover of the compact unit must be removed.

! **DANGER FATAL INJURY!**
Switch off the power supply before removing the cover of the unit.

- Connection of an external failure display (StA),
- Connection of a contact for pause time extension (MKPV; only on IG38-30-I),
- Connection of an external push-button (DK) triggering an intermediate lubrication and deleting failure messages.

First check if the unit is correctly configured for the prevailing operating voltage range. For operation on 100 - 120 V AC, the connections L1 and B1 as well as B2 and N are bridged with jumpers. For operation on 200 - 240 V AC, the

connections B1 and B2 are connected by a jumper.


Connect the inputs and outputs according to the connection diagram of the selected device type. The connection diagrams are found in the individual chapters for the device types.

Set the operating parameters, such as the pause time, with the rotary switch on the rear of the circuit board. Note the following chapter - Operation.

! **While the operating parameters are set, the supply power must not be connected to the controller.**

Once more check all connections and reinstall the cover of the unit. Switch on the supply power.

After application of power, the device begins the control process with a pause.

You may check the correct function of the device by pressing the  push-button or the external push-button DK, if one is connected, this causes an intermediate lubrication. Also read the following chapter - Operation - concerning this and read the functional description of the selected device type.

Operation



DANGER, FATAL INJURY

The controller of the installed compact lubrication system must only be operated by trained personnel, who are capable of recognising the hazards involved in touching live components. Power supply to the device must be shut off before the parameters are set.

Display and Operating Elements

Fig. 1 - 5 shows the display and operating elements of the controller. Display elements are the two LED displays (1) on the operating display. Operating elements are the push-button (2) on the operating display and the rotary switch (3) on the circuit board.

Table 1 - 3 provides an overview of the elements.

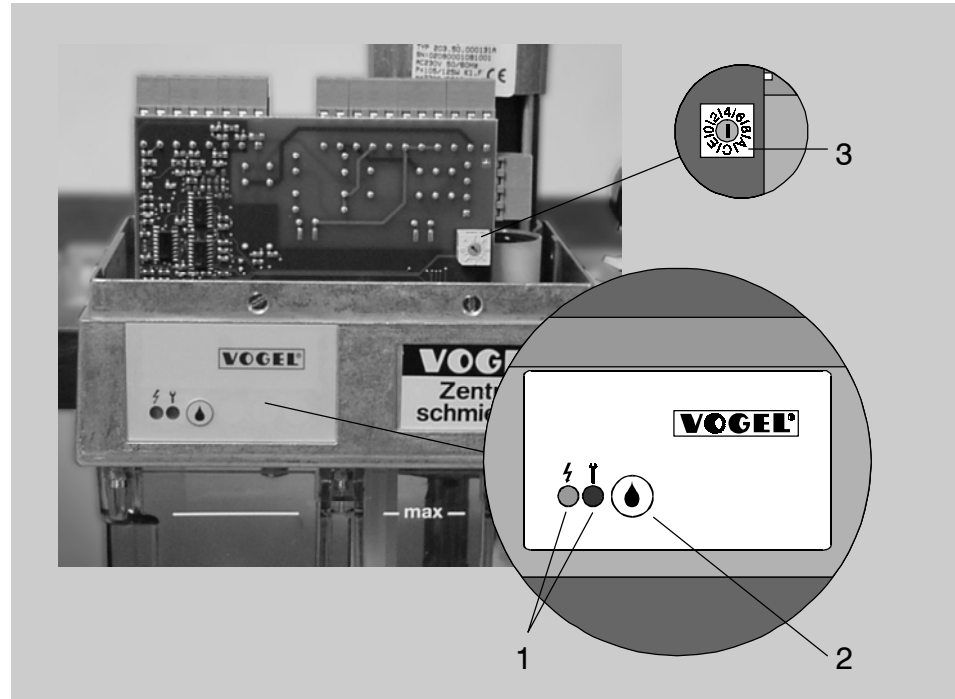


Figure 1 - 5. Display and operating elements


- 1 LED display and
- 2 push-button on the operating display
- 3 rotary switch on the circuit board

LEDs

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

If the red LED is on, an error has occurred.

Push-Button

The push-button  triggers an intermediate lubrication or resets a failure (also see chapter Failures).



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

Setting Parameters with the Rotary Switch



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



To set the parameters, the cover of the unit must be removed. Be sure that the power supply to the unit is disconnected.

Using a rotary switch on the front of the unit, the operating parameters, e. g. the pause time, are set. Which parameters must be set, depends on the device type. Explanations concerning this are found in the descriptions of the individual device type.

Table 1 - 3. Overview of Display and Operating Elements





| Illustration | Designation | Function |
|---|-----------------------|--|
|  | Operating voltage LED | Is on when operating voltage is applied to the unit. |
|  | Failure LED | Is on when a failure has occurred. |
|  | Push-button | 1. Triggers intermediate lubrication cycle. 2. Deletes a failure message. |
|  | Rotary switch | Sets the operating parameter. |

Table 1 - 4. Adjustable parameter values

| Switch position | Value | Unit | Switch position | Value | Unit |
|-----------------|-------|----------------|-----------------|-------|----------------|
| 1 | 1 | minutes/pulses | 7 | 64 | minutes/pulses |
| 2 | 2 | minutes/pulses | 8 | 128 | minutes/pulses |
| 3 | 4 | minutes/pulses | 9 | 256 | minutes/pulses |
| 4 | 8 | minutes/pulses | A | 512 | minutes/pulses |
| 5 | 16 | minutes/pulses | B | 1024 | minutes/pulses |
| 6 | 32 | minutes/pulses | C | 2048 | minutes/pulses |

The rotary switch can be set to 12 different positions. Each position represents a fixed parameter value in binary steps. Table 1 - 4 provides an overview of the adjustable values.


Set the rotary switch to the desired position, using a suitable tool, e. g. a screw driver.

Failures

Failure Messages

If an error should occur in the operation of the central lubrication system, the controller will display the failure by means of the red LED and, if connected, by means of an external failure 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.

Device Failures

If the controller does not function as described in the respective chapter for the device type, please first check all connections made.

To make the connections, the cover of the compact unit must be removed.



DANGER FATAL INJURY!
Switch off the power supply before removing the cover of the unit.



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




The controller may only be adjusted by trained specialists.

Next check the tightness of the lubricant lines.

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

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 functions of the controller by pressing the  button or the push-button DK, if connected.



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

Specifications

| Designation | Value |
|--|---|
| Rated input voltage U_n | AC (100..120) V or AC (200..240) V |
| Input voltage range | 0.85 U_n to 1.1 U_n (85..132 V / 170..264 V) |
| Rated frequency | 50..60 Hz |
| Frequency range | 49..61 Hz |
| Disengaging value | max. 10 % of U_n |
| Power consumption | 4 W |
| Reclosing time | 1 s |
| Max. fusing | 6.3 A |
| Max. switching current | 5 A AC |
| Max. relay switching voltage | 250 V AC |
| Overvoltage category to DIN VDE 0110 | III |
| Rated voltage of inputs | 24 V DC |
| Input impedance | 2.4 k Ω +/-10 % |
| Input level, low | 0 V..+4 V |
| Input level, high | +10 V..+24 V |
| Simultaneousness factor (input) | max. 0.8 |
| Output voltage for inputs and external consumers | 24 V DC +10% / -15% |
| Rated output current (outputs „+“) included for external consumers | 60 mA max. 20 mA |

| Designation | Value |
|--|--|
| 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 ² or 2*0.75 mm ² max. 2*1.5 mm ² 8 mm |
| Rated isolation voltage | 250 V AC |
| Contamination class | 2 |
| Operating temperature storage temperature | 0 °C to 60 °C -25 °C to 70 °C |
| 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 600068-2-27 | 10 – 57 Hz; 0.075 mm (amplitude) 15 g; 11 ms (half-sine) |

IG38-30-I
IZ38-30-I

Controller for Industrial Lubrication Systems in Compact Units

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 |
|-------------|---|
| IG38-30-I | Pulse transmitter with adjustable pause time, pause time extension, pressure build-up monitoring and level monitoring with normally closed contact (broken wire monitoring) |
| IZ38-30-I | Pulse counter with adjustable pause time, pressure build-up monitoring and level monitoring with normally closed contact (broken wire monitoring) |

erating 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 (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.

Pause Time Extension

When the controller is operating as pulse transmitter, the input I3 can be used to stop and release the pause. As long as voltage is applied, the pause is interrupted.

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 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 main 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.

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).

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.

The level monitoring switch is configured as a normally closed contact. That is, the signal lines leading up to the level monitoring switch are at

the same time monitored for breakage of the wires.

Installation

The controller is supplied as part of a compact lubrication system. Therefore, only some external display and control elements must be connected, if that is desired.

Also observe the chapter "Connections" in the general part of this manual as well as the notes in the description of the device type selected.

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. 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 re-closing time in the specifications), to allow all internal voltages to be discharged.

Changing Parameters

Changing of parameters is described in chapter Operation in the general part of the manual.

Parameter changes, such as change of the pause time, will become operative with the beginning of the next pause.

Failure Display

When an error occurs, the red failure LED at the unit lights up, and an external failure display, if connected, is activated.

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.

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.

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  or the external push-button (DK), if connected. At the same time, 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.

IG38-30-I

Operating Modes

The IG38-30-I is used as pulse transmitter.

Scope of Functions

The IG38-30-I has the following functions. The default and the adjustable parameters are listed in table 2 - 2.

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

Connection, First Operation

The controller is supplied as part of a compact lubrication system. Therefore, only some external display and control elements must be connected, if that is desired.

Also observe the chapter "Connection" in the general part of this manual.

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

Table 2 - 2. Parameters of IG38-30-I

| Designation | Default setting | Unit | Set with | Adjustment range | Unit |
|-----------------|-----------------|---------|---------------|-----------------------------|---------|
| pause time | 1 | minutes | Rotary switch | 1 - 2048 in binary steps | minutes |
| monitoring time | 60 | seconds | | not adjustable | |
| dwel time | 15 | seconds | | not adjustable | |

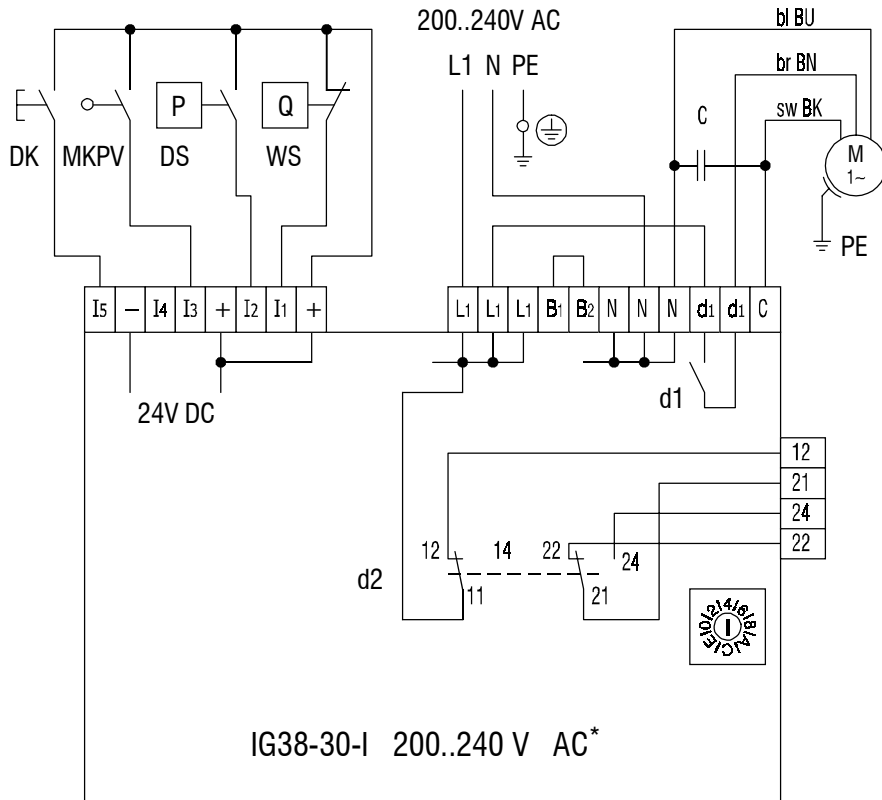


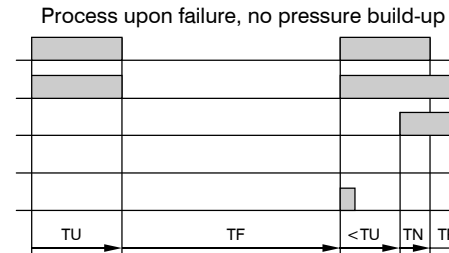
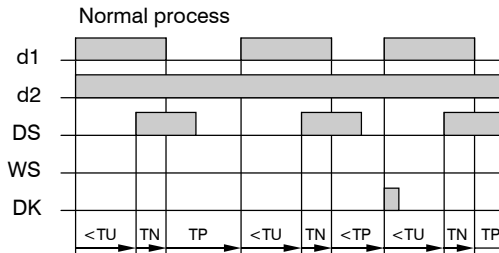
Fig. 2 - 1. Connection diagram for IG38-30-I

- 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
- 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 operating contact for failure display (StA)
- 12 failure
- 21 voltage input
- 24 operation OK
- 22 failure

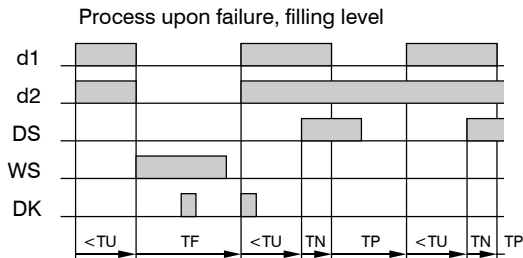
*For connection to a 100..120 V AC supply please note table 1 - 1 on page 1 - 4.

IG38-30-I Pulse diagrams
(time axis not true to dimensions)

Pump motor, relay
 Command line, relay
 Pressure switch (noc)
 Level monitoring switch (ncc)
 Push-button



Pump motor, relay
 Command line, relay
 Pressure switch (ncc)
 Level monitoring switch (noc)
 Push-button



Legend

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

Figure 2 - 2. Pulse diagram for IG38-30-I

IZ38-30-I

Operating Modes

The IZ38-30-I is used as pulse counter.

Scope of Functions

The IZ38-30-I has the following functions. The default and the adjustable parameters are listed in table 2 - 3.

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

Connection, First Operation

The controller is supplied as part of a compact lubrication system. Therefore, only some external display and control elements must be connected, if that is desired.

Also observe the chapter "Connection" in the general part of this manual.

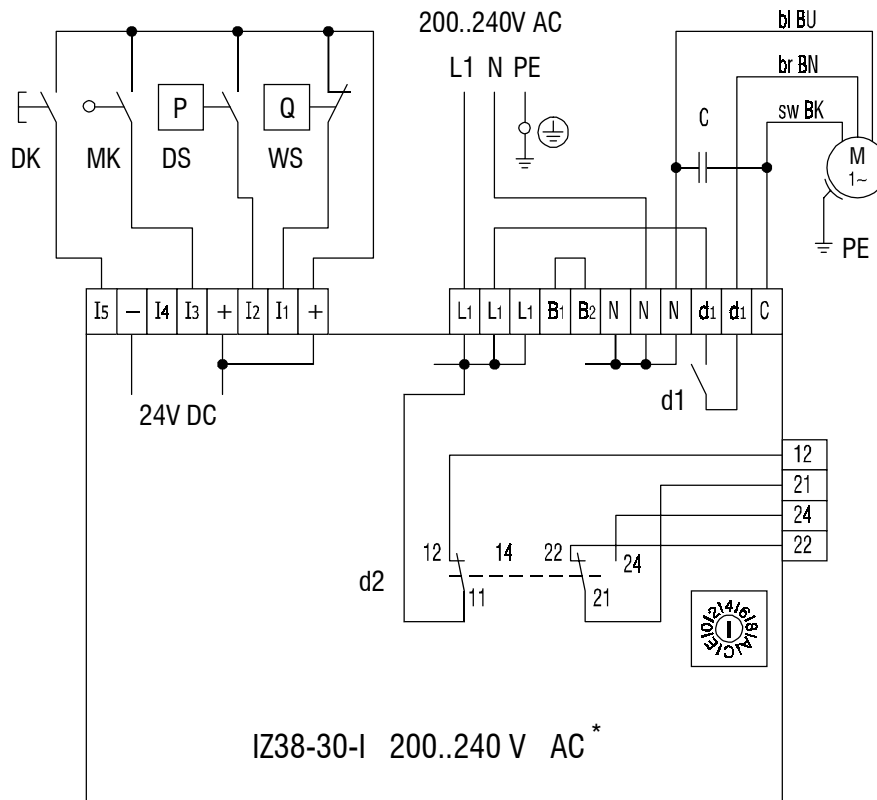
After connection of the external elements, input of parameters and applying the operating voltage, the device begins its function sequence with prelubrication.

Table 2 - 3. Parameters of IZ38-30-I

| Designation | Default setting | Unit | Set with | Adjustment range | Unit |
|-----------------|-----------------|---------|---------------|--------------------------|--------|
| pause time | 1 | pulses | Rotary switch | 1 - 2048 in binary steps | pulses |
| monitoring time | 60 | seconds | | not adjustable | |
| dwel time | 15 | seconds | | not adjustable | |

Fig. 2 - 3. Connection diagram for IZ38-30I

- 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 operating contact for failure display (StA)
- 12 failure
- 21 voltage input
- 24 operation OK
- 22 failure

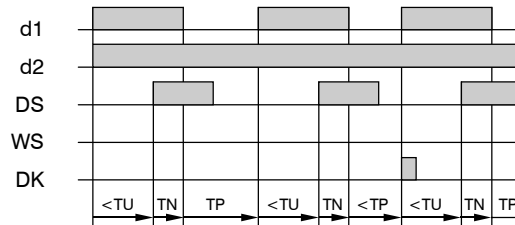


*For connection to a 100..120 V AC supply please note table 1 -1 on page 1 - 4.

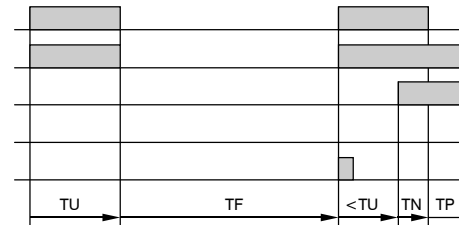
IZ38-30-I Pulse diagrams
(time axis not true to dimensions)

- Pump motor, relay d1
- Command line, relay d2
- Pressure switch (noc) DS
- Level monitoring switch (ncc) WS
- Push-button DK

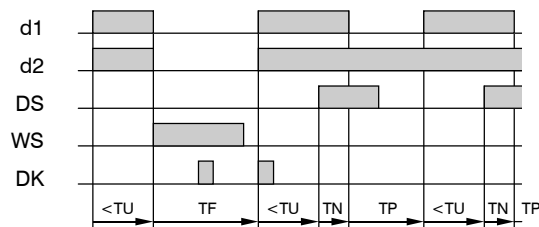
Normal process



Process upon failure, no pressure build-up



Process upon failure, filling level



Legend

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

Figure 2 - 4. Pulse diagram for IZ38-30-I