The control units described in this leaflet are used for time- or pulse-dependent control of oil+air systems. The overview shows the available VOGEL control units for oil+air systems together with the scope of their functions.

**Function**
The task of the units is to trigger lubrication after a certain period of time has elapsed. The special feature of the control units described in this chapter is, however, their prelubrication function, which has been adapted to the special requirements of oil+air lubrication systems. The functions that come with this series of units will be explained in the following. The extent to which these functions are implemented will depend on the type of unit.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Brief description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IG54-20</td>
<td>Pulse generator with fixed prelubrication cycles, adjustable interval time and power-failure memory</td>
</tr>
<tr>
<td>IG54-20-S1</td>
<td>Pulse generator with freely selectable number of prelubrication cycles, interval time and delay time. Power-failure memory</td>
</tr>
<tr>
<td>IG54-20-S3</td>
<td>Like the IG54-20-S1, lubricant level switch configured as NC type</td>
</tr>
<tr>
<td>IG54-20-S4</td>
<td>Like the IG54-20-S3, with additional relay output for compressed-air valve</td>
</tr>
</tbody>
</table>

Our units comply with the generally applicable standards.

With all the units in this group the user can opt for a level switch with NC or NO contacts.
The lubrication cycle
A lubrication cycle consists of the contact time (lubrication routine) and the interval time (TP).

Prelubrication
Prelubrication is a contact time initiated right after the unit is powered up. If a fault occurs during prelubrication, an error message is emitted.

The prelubrication cycle
With some units a prelubrication cycle is triggered every time the unit is powered up. During the prelubrication cycle the pump motor is switched on and a number of contact times are executed with short respective intervals. The number of contact times can, depending on the type of unit, be preset or selected by the operator. An interval time is started at the end of the prelubrication cycle.

In the case of some units operated with a power-failure memory it is possible to suppress the tripping of a prelubrication cycle when the unit is powered by setting the number of prelubrication cycles (VZ) to 0.

During the prelubrication cycle faults are only signaled by the flashing of the symbol for the respective input on the display and by interruption of the functional sequence.

The interval time
The interval time is the time between two contact times. The length of the interval can basically be set in two ways, thus resulting in two different modes of operation (BA) for the control units (pulse generator and pulse counter). The mode of operation can be set on the unit by hand.

Pulse generator mode
In this mode the length of the interval is determined by the unit itself in as much as the unit starts a contact time at the intervals specified by the operator.

Pulse counter mode
In this mode the interval time is determined by the machine, which sends pulses to the control unit while it is in operation. The pulses received via the machine contact (MK) are counted by the control unit and lubrication triggered after a preset number of pulses. The number of pulses to be counted can be specified by the operator.

The contact time
After completion of the interval time, the control unit initiates the lubrication routine, which is also called the contact time. The contact time consists of the monitoring time (TU) and the pump delay time (TN).

Monitoring of oil pressure build-up
In the course of the contact time the pump motor is started to begin with, which builds up the pressure required in the lubricant lines for lubrication. This procedure is monitored by a pressure switch (DS). The respective pressure has to build up within a certain period of time, the monitoring time, as otherwise the pump will switch off and a fault signal will be emitted.

Monitoring time TU
The monitoring time is a time window for the pressure build-up by the pump. If the necessary pressure is reached within the monitoring time, the latter is terminated. The pump delay time is then started. As a rule, the monitoring time is fixed and cannot be changed by the operator.

Pump delay time
The pump delay time is a period of time in which the pump continues running after the necessary pressure is reached in the lubricant lines. This takes place in order to reliably supply lubricant to all the lube points in very large central lubrication systems.

Pump runtime limitation
The pump runtime (TL) is basically limited by the monitoring time.

Monitoring of air pressure
The pressure in the compressed-air line is monitored with another pressure switch (DS_L). If the pressure drops or if no pressure at all is built up, a fault signal is emitted and the sequence of functions stopped.

Monitoring of lubricant level
The level of lubricant in the reservoir is monitored with the help of a level switch (WS). This switch can either be an NC or NO contact, which has to be taken into account when selecting a control unit. If the level switch is the NC type, the signal cables leading to the level switch are monitored at the same time for wire breaks.

As soon as the reservoir drops below the minimum level the sequence of functions in the lubrication system is stopped and a fault signal emitted.

Automatic lubricant topping-up
Two lubricant level switches (WS_L and WS_H) can be connected to some units in order to control the automatic topping up of lubricant. If the level of lubricant in the reservoir drops below the minimum level, relay d3 actuates a valve or a pump that keeps on topping up new lubricant until the maximum level is reached. If the automatic topping up of lubricant should happen to fail, i.e. the lubricant drops below the critical level for an extended period of time, a fault signal is emitted.

Power-failure memory (EEPROM)
If the power for the control unit is interrupted, the power-failure memory stores important data like the remaining interval time or error messages. That means, depending on the type of unit, that the functional sequence can be continued and no error messages will be lost the next time the unit is powered up.

Installation
Install the control unit in the switchgear cubicle for a VOGEL central lubrication system.

Please also pay attention to the information contained in the description of your type of unit.

Operation

Powering up
The unit is powered up by switching on the operating voltage. If the proper voltage is applied, the green power LED lights up.

The power must be switched on and off abruptly.

After the unit is powered up it usually starts its functional sequence with a prelubrication cycle.
Prelubrication
With some units a prelubrication cycle is triggered when the units are powered up. The pump motor is switched on and fault signal relay d2 is energized. Prelubrication proceeds like normal contact time.

Prelubrication cycle
With some units a prelubrication cycle is triggered when the units are powered up. The pump motor is switched on and a number of lubrication operations are triggered with a fixed interval time. During this time relay d2 remains de-energized and the fault LED lights up, but that does not mean a fault is involved.

At the end of the prelubrication cycles an interval time is started. relay d2 is energized and the fault LED goes out.

Should a fault occur during the prelubrication cycle, relay d2 remains de-energized and the fault LED continues to burn (also see the chapter on fault displays).

Interval time
After prelubrication or after the prelubrication cycle is completed relay d1 is de-energized, which in turn switches off the pump's motor. The value set for the interval time is then read and the interval routine started. In the further sequence of operations the contact time and interval alternate with each other in constant order.

Contact time (lubrication routine)
The contact time is started after the interval time elapses. It is comprised of the time until the pressure builds up and the delay time. When the contact time begins relay d1 is energized, thus switching on the pump motor. As soon as the requisite pressure is reached in the lubricant lines the monitoring time is terminated and the pump delay time started. A new interval begins at the end of the delay time.

Relay d2 in normal operation
When the power is on and there are no malfunctions, relay d2 is always energized, an exception being made during the prelubrication cycle.

Intermediate lubrication
Intermediate lubrication can be triggered by briefly pressing the button during the interval. Intermediate lubrication follows the same routine as that of a normal contact time.

Switching off
The unit is switched off by disconnecting it from the power.

Recovery time
After the unit is switched off it has to remain off for a certain amount of time before it can be switched on again.

Changing parameters and the mode of operation
A change in parameters like, for instance, the interval time, takes effect when the next interval begins. A change in the mode of operation does not take effect until the unit has been switched off and then on again.

Operation with power-failure memory
When units are operated with a power-failure memory, important operating data like, for instance, the remaining interval time or an error message are stored if the power is interrupted.

After a power failure the unit usually begins with a prelubrication cycle. But if this function was off, the start, when the power is restored, will depend on the time the power failure occurred.

Fault displays
In the event of a fault, the fault LED lights up and the symbol for the respective input flashes on the display.

No oil pressure
If no pressure builds up in the main line during the monitoring time, i.e. if pressure switch DS does not respond, the fault LED will light up and the pump’s motor will be switched off. At the same time, the symbol for the DS input will flash on the display. Relays d1 and d2 will be or will remain de-energized. At the same time, the sequence of functions will be stopped.

No air pressure
A compressed-air fault is involved if pressure switch DS2 is de-energized during the monitoring, pump-delay or interval times or if it is not energized within 5 seconds after the power is applied or after the clearing of an error message. This leads to a fault signal and the sequence of functions is stopped. The symbol for input DS2 flashes on the display.

Low lubricant level
If the level of lubricant in the reservoir drops too far, level switch WS closes or opens, which leads to an interruption of the respective functional sequence. Relays d1 and d2 are de-energized and the fault LED lights up. At the same time, the symbol for the WS input flashes on the display.

Failure of automatic lubricant topping up
In the case of units that automatically top up lubricant a fault signal is issued if the lubricant drops below the minimum level for an extended period of time. Relay d2 is energized, the fault LED lights up and the symbol for input WS_L flashes on the display. The sequence of functions is stopped.

Relay d2 in faulty operation
If a fault occurs, relay d2 is or will remain de-energized. The sequence of functions is suspended until the fault has been remedied and the error message cleared by pressing the button.

Fault signal during the prelubrication cycle
If a fault should occur during the prelubrication cycle, the operation will be stopped and the symbol for the respective input will flash on the display. After the error message has been cleared, the unit will continue the prelubrication cycle.

Clearing an error message
An error message is cleared after the fault has been remedied by pressing the button, which triggers intermediate lubrication.

A level switch error message can only be cleared if enough lubricant has been topped up.

Do not clear an error message until its cause has been remedied.
Operation with power-failure memory – starting procedure after a power failure

<table>
<thead>
<tr>
<th>Time when power failure occurs</th>
<th>Procedure after restoration of power</th>
</tr>
</thead>
<tbody>
<tr>
<td>During the monitoring time</td>
<td>Contact time</td>
</tr>
<tr>
<td>(prior to energized DS1 input)</td>
<td></td>
</tr>
<tr>
<td>During the pump delay time</td>
<td>Interval time</td>
</tr>
<tr>
<td>(after energized DS1 input)</td>
<td></td>
</tr>
<tr>
<td>During the interval time</td>
<td>Interval continued after remaining</td>
</tr>
<tr>
<td></td>
<td>interval time is read out of the</td>
</tr>
<tr>
<td></td>
<td>power-failure memory</td>
</tr>
<tr>
<td>When fault pending, by</td>
<td>Prelubrication cycle</td>
</tr>
<tr>
<td>pressure switch DS or DS2</td>
<td></td>
</tr>
<tr>
<td>When fault pending, by level</td>
<td>Fault signal remains pending</td>
</tr>
<tr>
<td>switch WS</td>
<td></td>
</tr>
</tbody>
</table>

IG54-20

Modes of operation
The IG54-20 control unit can only be used as a pulse generator (mode A).

Scope of functions
The IG54-20 comes with the following functions:
- adjustable interval time
- pump runtime limitation
- oil-pressure monitoring
- air-pressure monitoring
- lubricant level monitoring
- power-failure memory (EEPROM)
The table shows the preset and adjustable parameters.

Adjustable and preset parameters

<table>
<thead>
<tr>
<th>Designation</th>
<th>Abbreviation</th>
<th>Presetting</th>
<th>Units</th>
<th>Setting range</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode of operation</td>
<td>BA</td>
<td>A</td>
<td>non-adjustable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interval time</td>
<td>TP</td>
<td>10</td>
<td>minutes</td>
<td>01 E 00 - 99 E 00</td>
<td></td>
</tr>
<tr>
<td>Monitoring time</td>
<td>TU</td>
<td>60</td>
<td>seconds</td>
<td>non-adjustable</td>
<td></td>
</tr>
<tr>
<td>Delay time</td>
<td>TN</td>
<td>5</td>
<td>seconds</td>
<td>non-adjustable</td>
<td></td>
</tr>
</tbody>
</table>
IG54-20 (-S1)

Wiring diagram IGZ54-20 (-S1)
in the case of the IG54-20-S3 level switch WS is configured as an NC type

L1/N = operating voltage
B1/B2 = jumper terminals for voltage range
WS = lubricant level switch
DS = pressure switch (monitoring of pressure build-up)
DS_L = pressure switch (monitoring of air pressure)
DK = pushbutton
  1. intermediate lubrication
  2. clear fault

+ = +24 V DC output
– = 0 V DC output
d1 = load contact for lubricant pump (SMFP)
d2 = changeover contact, command link
  break contact: fault display (StA)
  or prelubrication cycle
SL1 = indicator light for “PUMP ON”
SL2 = indicator light for “FAULT”
K = pump motor contactor

Pulse diagram
(time axis not to scale)

Normal routine

Fault, no pressure build-up (DS1 or DS2)

Routine with fault, lubricant level

TP2 = stored remaining interval time
TU = monitoring time
TN = pump delay time
TP = interval time
TF = functional sequence stopped
TLS = compressed-air fault
TLA = compressed-air build-up time
IG54-20-S1, IG54-20-S3, IG54-20-S4

Modes of operation
The IG54-20-S1, IG54-20-S3 and IG54-20-S4 control units can only be used as pulse generators (mode B).

Scope of functions
The IG54-20-S1, IG54-20-S3 and IG54-20-S4 units come with the following functions:

IG54-20-S1
- adjustable interval time
- adjustable number of prelubrication cycles
- adjustable pump delay time
- pump runtime limitation
- oil-pressure monitoring
- air-pressure monitoring
- lubricant level monitoring (NO type)
- power-failure memory (EEPROM)

IG54-20-S3
like the IG54-20-S1 but:
- monitoring of lubricant level (NC type)

IG54-20-S4
like the IG54-20-S3 but:
- additional output d3 for compressed-air valve

The table shows the preset and adjustable parameters.

Prelubrication cycles (setting "00")
If the "00" setting is preselected as the prelubrication cycle, the unit will run in the memory mode without a prelubrication cycle.

Pump delay time (setting "00")
If the value "00" is selected as the pump delay time, the unit will end the lubrication time without delay after the pressure has built up. Relay d1 is de-energized and the pump's motor switched off.

Adjustable and preset parameters

<table>
<thead>
<tr>
<th>Designation</th>
<th>Abbreviation</th>
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<th>Units</th>
<th>Setting range</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode of operation</td>
<td>BA</td>
<td>B</td>
<td></td>
<td>non-adjustable</td>
<td></td>
</tr>
<tr>
<td>Interval time</td>
<td>TP</td>
<td>10</td>
<td>minutes</td>
<td>01 E 00 - 99 E 00</td>
<td>minutes</td>
</tr>
<tr>
<td>Monitoring time</td>
<td>TU</td>
<td>60</td>
<td>seconds</td>
<td>non-adjustable</td>
<td></td>
</tr>
<tr>
<td>Delay time</td>
<td>TN</td>
<td>5</td>
<td>seconds</td>
<td>00 E 00 - 99 E 00</td>
<td>seconds</td>
</tr>
<tr>
<td>Prelubrication cycle</td>
<td>VZ</td>
<td>10</td>
<td></td>
<td>00 E 00 - 99 E 00</td>
<td></td>
</tr>
</tbody>
</table>
IG54-20-S4

Wiring diagram

L1/N = operating voltage
B1/B2 = jumper terminals for voltage range
(illustration: 200...240V)
WS = lubricant level switch
(illustration: reservoir full)
DS = pressure switch (monitoring of pressure build-up)
DS_L = pressure switch (monitoring of air pressure)
DK = pushbutton
  1. intermediate lubrication
  2. clear fault
+ = +24V DC output
– = 0V DC output
d1 = load contact for lubricant pump (SMFP)
d2 = changeover contact, command link
  break contact: fault display (StA)
  or prelubrication cycle
  make contact: operation OK
d3 = enable contact for compressed-air valve (FGK)
SL1 = indicator light for “PUMP ON”
SL2 = indicator light for “FAULT”
K = pump motor contactor
Y1 = compressed-air valve

Pulse diagram

(time axis not to scale; depicted after the prelubrication cycles have finished)

Normal routine

Fault, no pressure build-up (DS1 or DS2)

Routine with fault, lubricant level

TPV = last interval in prelubrication cycle
TU = monitoring time
TN = pump delay time
TP = interval time
TF = functional sequence stopped
TLS = compressed-air fault
TLA = compressed-air build-up time
Notice!

All products from VOGEL may be used only for their intended purpose. If operating instructions are supplied together with the products, the provisions and information therein of specific relevance to the equipment must be observed as well.

In particular, we call your attention to the fact that hazardous materials of any kind, especially the materials classified as hazardous by EC Directive 67/548/EEC, Article 2, Par. 2, may only be filled into VOGEL central lubrication systems and components and delivered and/or distributed with the same after consultation with and written approval from VOGEL.

All products manufactured by VOGEL are not approved for use in conjunction with gases, liquefied gases, pressurized gases in solution and fluids with a vapor pressure exceeding normal atmospheric pressure (1013 mbars) by more than 0.5 bar at their maximum permissible temperature.