Controller for gas line leakage testers
LK 2F/2

Technical description
The LK 2F/2 leakage tester tests the tightness of a gas line between the central shut-off device (safety solenoid valve) and the gas of take points in conjunction with gas pressure switch in order to prevent uncontrolled escape of gas at the off take points after the central shut-off device is opened.

The LK 2F/2 program sequence controls a synchronous gear motor and switching cams by a microswitch.

LK2F/2 meets the requirements of the DVGW worksheet G621:Nov. 2009. The automatic mode complies with DIN EN 298 and DIN EN 1643.

Application
The LK 2F/2 line leakage tester can be used for every system in which a central shut-off fitting releases gas to a number of gas-consuming facilities and where the safety risk exists that one or even several gas tapping points are not shut off, as for example in
• process control systems
• chemical, physical and school laboratories
• hospitals
• hotels and service industries

• New design
• Display remains visible if there is loss of voltage
• Safety switch-off optionally after max. 10 or max. 3 unsuccessful filling attempts
• IP 40
**Technical data**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>~ (AC) 230 V (-15 % / +10 %), 50/60 Hz</td>
</tr>
<tr>
<td>Leistungsaufnahme</td>
<td>ca. 5 VA</td>
</tr>
<tr>
<td>Back-up fuse (to be provided by the customer)</td>
<td>10 A quick-acting or 6 A slow-acting fuse</td>
</tr>
<tr>
<td>Load on contact</td>
<td></td>
</tr>
<tr>
<td>Operating output (terminal 15)</td>
<td>max. 4 A</td>
</tr>
<tr>
<td>Fault output (terminal 5)</td>
<td>max. 1 A</td>
</tr>
<tr>
<td>Pressure switch (terminals 1, 2, 11)</td>
<td>min. 1 A</td>
</tr>
<tr>
<td>Fault unlocking (terminals 4, 7)</td>
<td>min. 1 A</td>
</tr>
<tr>
<td>Valves (terminal 9)</td>
<td>max. 2 A</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 42</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>0 °C bis +60 °C</td>
</tr>
<tr>
<td>Test cycle with application</td>
<td>50 Hz: ca. 60 s, 60 Hz: ca. 48 s</td>
</tr>
<tr>
<td>Valve opening times</td>
<td>50 Hz: max. 3 s, 60 Hz: ca. 2.4 s</td>
</tr>
<tr>
<td>Test time V1 (valve on gas side)</td>
<td>50 Hz: ca. 55 s, 60 Hz: ca. 44 s</td>
</tr>
<tr>
<td>Filling attempts (FV)</td>
<td>Version available with max. 10 or max. 3 filling attempts</td>
</tr>
<tr>
<td>Switch-on duration of the control</td>
<td>100 % ED</td>
</tr>
<tr>
<td>Installation position</td>
<td>any</td>
</tr>
<tr>
<td>Weight</td>
<td>0.69 kg</td>
</tr>
</tbody>
</table>

### LK2F/2 gas line leakage tester

The LK 2F/2 leakage testers are contained in a plastic housing with plug-in base. The illustrations show the component side with the hood removed. The controller with synchronous gear motor, switching cams and micro-switches are mounted on a PCB which controls and monitors the test sequence and releases operation. All safety-critical components are subjected to a self-monitoring procedure on startup.

**Visual operating and fault display**

Visual operating and fault display in the housing top part and connection for external alarm.

**Functional description**

When starting up the gas-consuming equipment, voltage is applied to the LK 2F/2 leakage tester via the main switch (keyswitch) and the closed gas pressure switch. The equipment opens the central solenoid shut-off valve V1 causing pressurisation of the line section under test.

The pressure switch monitors the gas pressure in the test section (line) for a test period of approx. 60 s. The test section is assumed to be tight if the gas pressure has not dropped below the switching pressure of the pressure switch. The LK 2F/2 then releases the gas flow to the gas offtake points or the gas-consuming facilities.
Program sequence
A program control unit controls the test program. After operating the main switch, voltage is applied to the LK 2F/2 and the program starts to run:

1. The solenoid valve (1) opens for approx. 2 s and the test section is placed under gas pressure. If the gas pressure has not been built up after the first time the solenoid valve is opened, the solenoid valve opens again for about 2 s after 60 s. If the requested pressure has not been built up in the line after max. 10 attempts, the LK 2F/2 switches to fault.

2. As soon as the minimum pressure set in the pressure switch has been built up in the test section, the pressure switch switches and thus releases the program sequence.

3. During the following test/waiting period of approx. 60 s, the requested minimum pressure must be maintained in the test section.

4. If the pressure set on the pressure switch is still present at the end of the test period, the LK 2F/2 applies voltage to terminal 15. The yellow operating lamp lights up and signals that the system is ready to operate.

5. If the pressure in the test section drops during the test period below the set minimum pressure, the pressure switch switches back. The LK 2F/2 interlocks in fault position. The red fault LED lights up, a voltage is applied to terminal 5 of LK 2F/2 for remote signalling of the fault.

Fault interlock
If the LK 2F/2 detects an unacceptable pressure loss during the test period, the program is aborted. The equipment interlocks in fault position and signals the fault at the same time.

Unlocking procedure
After eliminating the fault cause, the LK 2F/2 can be reset by pressing the red illuminated push-button on the housing top part or via an external closing contact from terminal 4 to terminal 7. The equipment then performs another leakage test and releases the gas supply only after successful completion of the leakage test.

Program sequence LK2F/2 with applications with 50 Hz
In case of applications with 60 Hz, the filling and test times are reduced by approx. 20%.

Schematic diagram:

Program sequence LC2F/2 with applications with 50 Hz
- In case of applications with 60 Hz, the filling and test times are reduced by approx. 20%.
**Installation and operating instructions**

**Installation**
The leakage tester LK 2F/2 can be installed in any position. Secure the plug-in base using two M4 screws. Electrical connection must comply with the locally prevailing regulations. Before startup, check all connections of the plug-in base for correctness.

**Electrical connection**
Execute connection and protective earth in accordance with the locally prevailing regulations and wiring diagram LK 2F/2. The wiring diagram is affixed to the cover plate of the equipment top part.

**Fuse protection**
The LK 2F/2 is protected using a max. 6A slow-blow and/or 10 A fast-blow fuse. Keep to the permissible switching capacities.

**Pressure switch selection**
For G 621, pressure switches class "S" must be used.

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**Setting the pressure switch**
Set the switching pressure of the GW pressure switch to a value which is approx. 2 mbar below backpressure (pressure with closed tapping points) prevailing in the test section.

**Maintenance**
The LK 2F/2 leakage testers are basically maintenance-free since all safety-critical parts are subjected to a self-monitoring procedure on startup.

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**Leakage gas rate on pressure drop Δp = 1 mbar**

<table>
<thead>
<tr>
<th>Pipe length in m</th>
<th>Leakage rate Qₗ in dm³/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>4.0</td>
<td>4.0</td>
</tr>
</tbody>
</table>

Gas temperature 20°C, Factor 3.5, Measuring time tₘ = 60 s

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**Wiring diagram LK 2F/2**

- **K1** = switch-on wiping relay with switch-on wiping time of 3 s
- **GW** = Min. pressure gas pressure
- **N** = 50 Hz, 220 V AC
- **L 1** = Keyswitch
- **6 A, tr** = Output
- **External solenoid valve control**
- **External fault display**
- **Remote unlock**
- **Gas supply**
- **Solenoid valve**
- **Pressure switch**
- **Manually activated shut-off element**
- **Gas-consuming facilities**

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⚠️ **Check the safety-related function of the leakage tester in case of defective fuse since contacts may fuse together in case of short-circuit.**

If you do not observe these installation and operating instructions, it may result in personal injury or material damage. For this reason, strictly keep to the instructions. The warranty for the equipment will expire on any attempt to access the electronic circuits, i.e. automatically when the seal is broken.

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**Recommendation:** For uncontrolled operation, we recommend to install a switch-on wiping relay according to the circuit diagram shown below.
Karl Dungs GmbH & Co. KG bescheinigt hiermit, daß die in dieser Übersicht genannten Produkte die Anforderungen des:

<table>
<thead>
<tr>
<th>DVGW Arbeitsblatt G 621 : November 2009 erfüllen</th>
<th>DVGW Process sheet G 621 : November 2009</th>
<th>LK2F/2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Die automatische Ablauf der LK2F/2 entspricht sinngemäß der DIN EN 298 und DIN EN 1643.</td>
<td>The automatic program run of the LK2F/2 applies analogously to DIN EN 298 and DIN EN 1643.</td>
<td></td>
</tr>
</tbody>
</table>

ppr. Dipl.-Ing. (FH) Harald Petermann
ppr. Dipl.-Ing. Gerd Mattes
Karl Dungs GmbH & Co. KG
Urbach, 12 January 2010

Konformitätserklärung
Conformity Certificate

Old documentation - Only for your information!
Controller for gas line leakage testers
LK 2F/2

Dimensions

Type overview/ordering data

<table>
<thead>
<tr>
<th>Order no.</th>
<th>LK2F 10 FV 230 V 50/60 Hz</th>
<th>LK2F 3 FV 230 V 50/60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>213 569</td>
<td>255 980</td>
</tr>
</tbody>
</table>

FV = Filling attempts

Accessories

Gas pressure switch depending on the operating pressure
LGW…A4 class "S" (5.08)
GW…A6 class "S" (5.01)

Solenoid valves
MV 502 (6.21)
MVD, MVD/5, MVDLE/5 (6.20)
DMV…/11

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Product is not available anymore!