

Controller for gas line leakage testers LK 2F/2

8.04

DUNGS®
Combustion Controls

neunovità
nouveau
new

- 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 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.

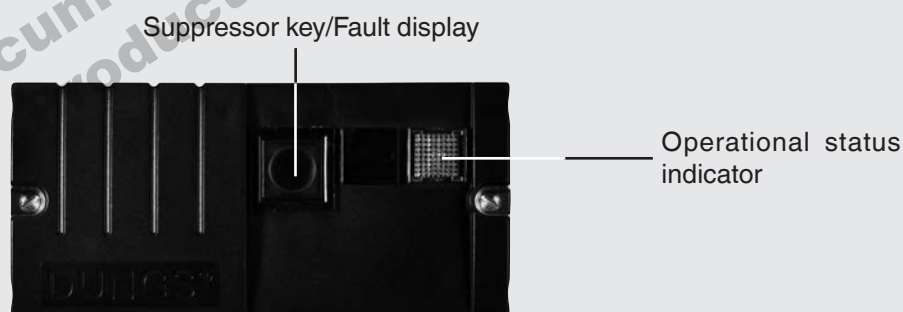
Application

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

Technical data

Nominal voltage	~(AC) 230 V (-15 % / +10 %), 50/60 Hz	
Leistungsaufnahme	ca. 5 VA	
Back-up fuse (to be provided by the customer)	10 A quick-acting or 6 A slow-acting fuse	
Load on contact	Operating output (terminal 15)	max. 4 A
	Fault output (terminal 5)	max. 1 A
	Pressure switch (terminals 1, 2, 11)	min. 1 A
	Fault unlocking (terminals 4, 7)	min. 1 A
	Valves (terminal 9)	max. 2 A
 The permissible breaking capacities must be observed! The current input of all solenoid valves, motors etc. which are switched via the controller circuit must not exceed 4 A.		
Degree of protection	IP 42	
Ambient temperature	0 °C bis +60 °C	
Test cycle with application	50 Hz: ca. 60 s	60 Hz: ca. 48 s
Valve opening times	50 Hz: max. 3 s	60 Hz: ca. 2,4 s
Test time V1 (valve on gas side)	ca. 55 s	ca. 44 s
Filling attempts (FV)	Version available with max. 10 or max. 3 filling attempts	
Switch-on duration of the control	100 % ED	
Installation position	any	
Weight	0,69 kg	

Aufbau Dichtheitskontrollgerät LK2F/2**LK 2F/2 gas line leakage tester**

The LK 2F/2 leakage testers are contained in a plastic housing with plug-in base. The illustration shows 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 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.

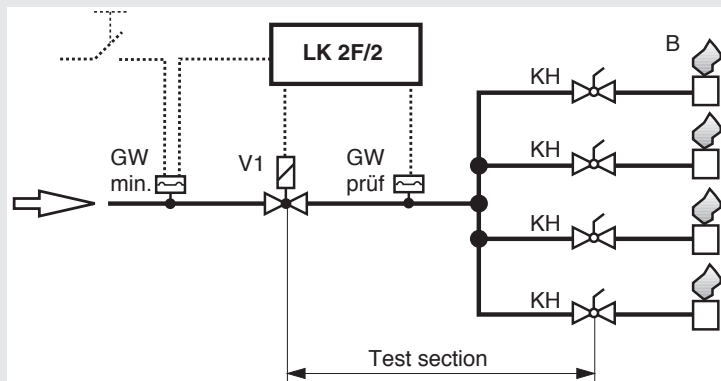
Fault interlock

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.

Schematic diagram:



V1 shut-off solenoid valve
GW pressure switch

KH shut-off device, manually activated
B gas-consuming facilities

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 %

Program flowchart LK2F/2	Normal start														
S1+GW1															
Fill	3s														
Test time															
GW2 Terminal 2-1															
GW2 Terminal 2-11															
Release, output terminal 15															
Fault, output terminal 5															
Time	0 s	10 s	20 s	30 s	40 s	50 s	60 s	70 s	80 s	90 s	...	s			

Program flowchart LK2F/2	Fault start during test time														
S1+GW1															
Fill	3s														
Test time															
GW2 Terminal 2-1															
GW2 Terminal 2-11															
Release, output terminal 15															
Fault, output terminal 5															
Time	0 s	10 s	20 s	30 s	40 s	50 s	60 s	70 s	80 s	90 s	...	s			

Program flowchart LK2F/2	Power failure during operation, e.g. GW1 switches														
S1+GW1															
Fill															
Test time															
GW2 Terminal 2-1															
GW2 Terminal 2-11															
Release, output terminal 15															
Fault, output terminal 5															
Time	0 s	10 s	20 s	30 s	40 s	50 s	60 s	70 s	80 s	90 s	...	s			

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.

Setting the pressure switch

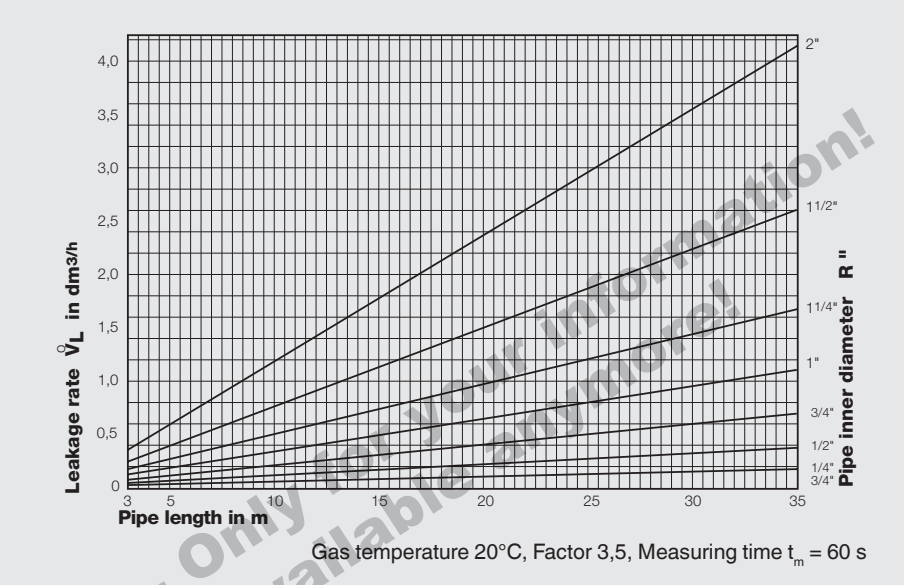
Set the switching pressure of the GW pressure switch to a value which is approx. 2 mbar below backpressure (pressure with closed tapping points) prevailing in the test section.

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.



Leakage gas rate on pressure drop Δp = 1 mbar



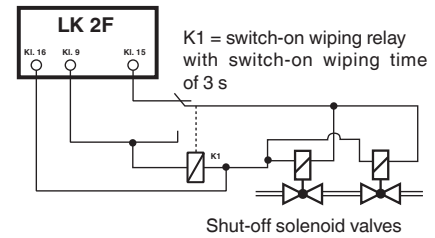


Check the safety-related function of the leakage tester in case of defective fuse since contacts may fuse together in case of short-circuit.

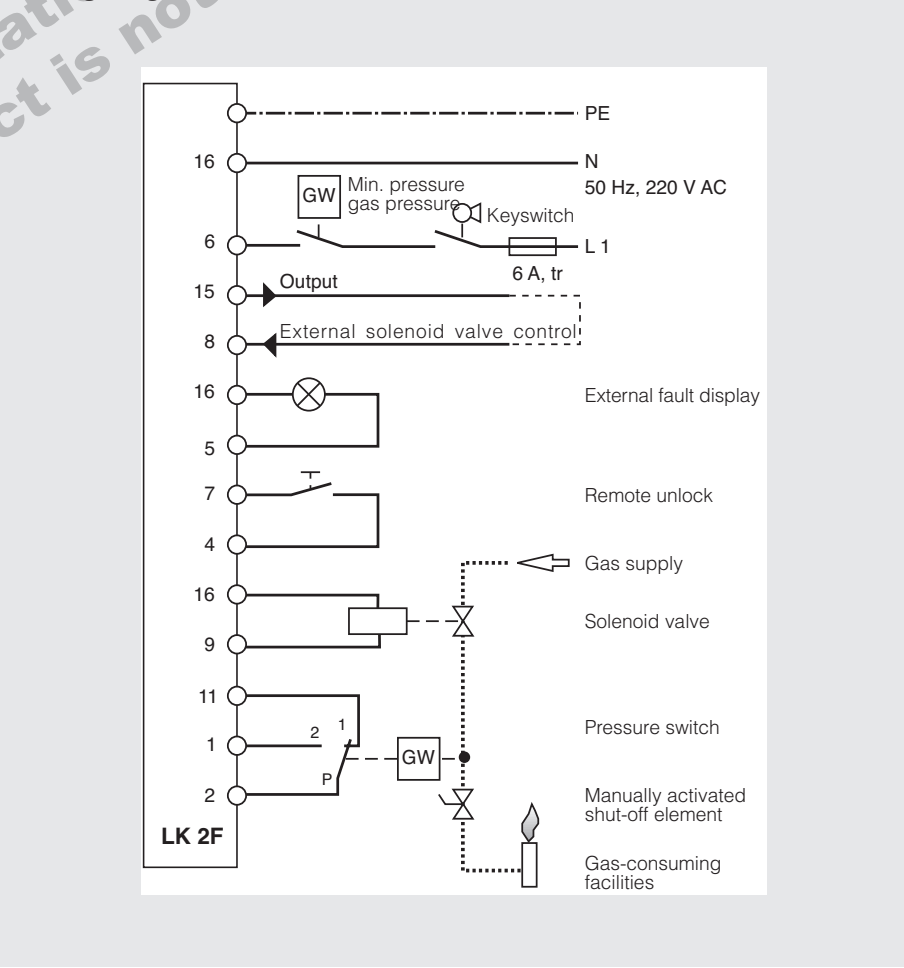
If you do not observe these installation and operating instructions, it may result in personal injury or material damage. For this reason, strictly keep to the instructions.

The warranty for the equipment will expire on any attempt to access the electronic circuits, i.e. automatically when the seal is broken.

Recommendation: For uncontrolled operation, we recommend to install a switch-on wiping relay according to the circuit diagram shown below.



Wiring diagram LK 2F/2



Konformitätserklärung Conformity Certificate



Die **Karl Dungs GmbH & Co. KG** bescheinigt hiermit, daß die in dieser Übersicht genannten Produkte die Anforderungen des:

Karl Dungs GmbH & Co. KG certify that the products specified in this overview fulfil the basic requirements of the:

Produkte_Products

**DVGW
Arbeitsblatt
G 621 : November 2009
erfüllen**

**DVGW
Process sheet
G 621 : November 2009**

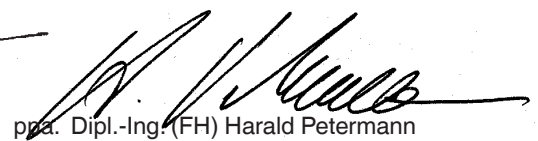
LK2F/2

**Der automatische Ablauf
der LK2F/2 entspricht sinn-
gemäß der DIN EN 298 und
DIN EN 1643.**

**The automatic program
run of the LK2F/2 applies
analogously to DIN EN 298
and DIN EN 1643.**



ppa. Dipl.-Ing. Gerd Mattes



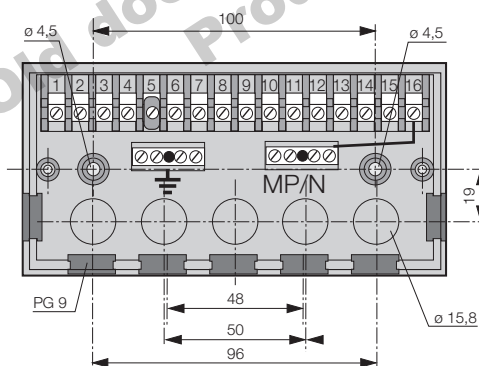
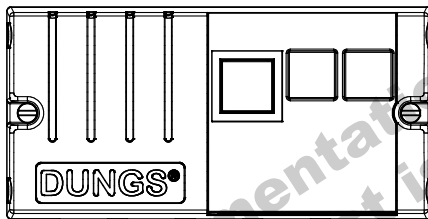
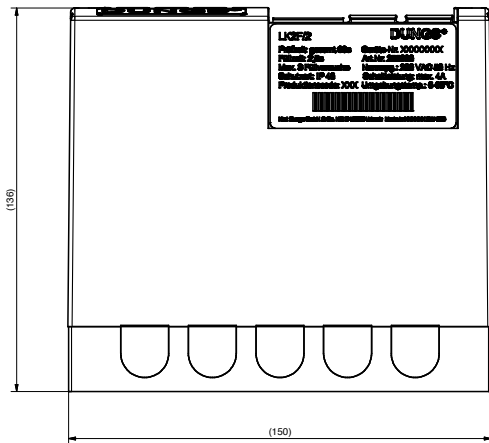
ppa. Dipl.-Ing. (FH) Harald Petermann

Karl Dungs GmbH & Co. KG
Urbach, 12 January 2010

**Controller for gas line
leakage testers
LK 2F/2**

DUNGS®
Combustion Controls

Dimensions



Type overview/ordering data

LK2F 10 FV 230 V 50/60 Hz
LK2F 3 FV 230 V 50/60 Hz

Order no.
213 569
255 980

FV = Filling attempts

Accessories

Gas pressure switch
see datasheets

depending on the operating
pressure,
LGW...A4 class "S" (5.08)
GW...A6 class "S" (5.01)

Solenoid valves
see datasheets

MV 502 (6.21)
MVD, MVD/5, MVDLE/5 (6.20)
DMV.../11

We reserve the right to make any changes in the interest of technical progress.

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