

Control unit for system leakage tests

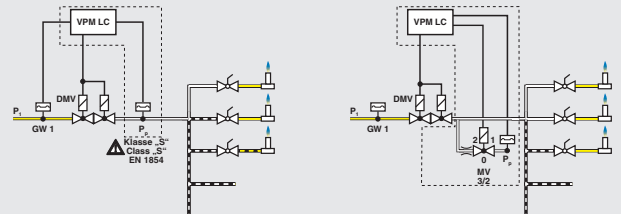
Type VPM-LC (Line Check)

8.30

DUNGS®
Combustion Controls

neulovità
nouveau new

- Test time to max. 1h
- Number of filling attempts adjustable
- LED display signals leaking system
- Multifunction (MFA) output for direct output of various device information
- Suitable for applications up to SIL 2. Meets the requirements according to DIN EN 61508:2011, Part 1-3. Certified by TÜV Süd



Description

The VPM-LC valve test module checks the tightness of the gas line between the central shut-off fitting (safety solenoid valve) and the gas extraction points. The number of filling attempts as well as program times can be adjusted by the user according to the system requirements.

Application

In laboratories, large-scale catering establishments and process engineering plants.

The leakage test is performed before opening a central gas shut-off valve that releases gas supply to several gas-consuming devices.

Uncontrolled escape of gas at the various extraction points is thus avoided.

Approvals

DVGW type examination certificate according to DIN EN 13611 and DIN EN 298:
DG-4115CM0413

VPM-LC meets the requirements of:

- DVGW worksheet G621:2009-11: Components of gas installations in laboratories and scientific classrooms.
- DVGW worksheet G634:1998-09: Installation of catering gas appliances in premises
- Machinery Directive 2006/42/EC
- Low Voltage Directive 2006/95/EC
- EMV 2004/108/EC

CSA approval on request

FM Approvals Class 7610

VPM-LC

Control unit for system leakage tests

Equipment: Depending on the chosen equipment option, two pressure switches, double solenoid valve and pilot valve.

VPM-LC checks the following parameters before starting:

- Tightness of the gas line system
- Closed position of shut-off devices (valves, manual valves/lab equipment)
- Inlet pressure

Monitoring during operation:

- Power failure
- Min. gas pressure

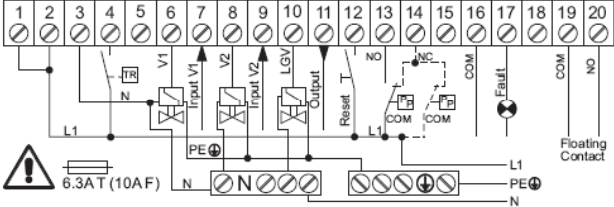


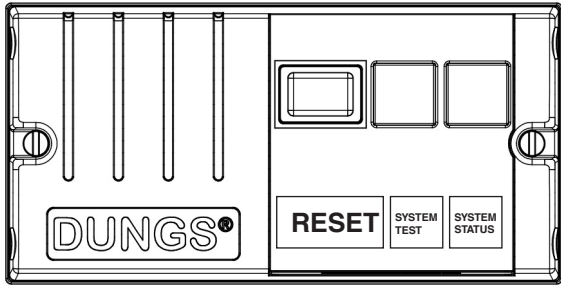
Pressure switches/valves/pilot valves are not part of the scope of delivery!

Technical data

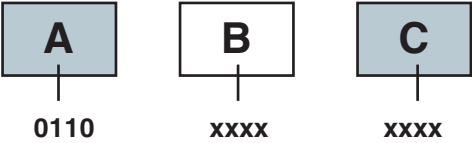
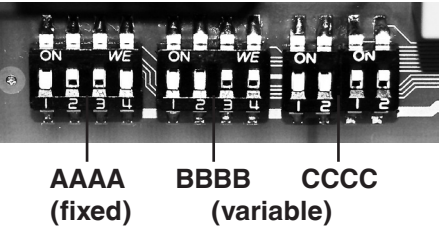
Rated voltage (depending on the model)	~ (AC) 230 V +10 % / -15 % 50-60 Hz ±5 % ~ (AC) 115 V +10 % / -15 % 50-60 Hz ±5 %
Power consumption	max. 10 W
Power consumption Typical	115 V: standby 2.6 W operation 4.6 W 230 V: standby 3.1 W operation 5.4 W
Backup fuse L1	6.3A T (10A F), integrated, replaceable
Humidity	DIN 60730-1, no dewing admissible
Type of protection	IP 42
Ambient temperature	-20 °C bis +60 °C
Storage temperature	-40 °C bis +80 °C
Switch-on duration	100 %
Test volume	Unlimited
Medium	Any; gas type depending on pressure switch and valve
Inlet pressure	Any; depending on pressure switch and valve
Multifunction output (MFA)	Number of operating cycles V1 > 100000 (terminal 19 + 20, potential-free). Further settings possible via VisionBox + parameter change: 1. Freely selectable number of operating cycles up to 6.5 million (standard 100,000) 2. Signal output while the test is running or while voltage is applied or release for water or power supply. 3. Signal after successful switch-off
Program sequence	Line check before start
Test times can be set	DIP switches can be used to select predefined test times of, enabling optimal setting in case of different test volumes, inlet pressures and leakage rates. Alternatively, individual test times, can be set via VisionBox.
Filling attempts	Depending on the test volume, different combinations can be selected using DIP switches.
Signalling	Red/green LEDs signal various information on the program and release states or error codes.
TWI interface	Plug-in connection for DUNGS VisionBox. The VisionBox can be used to access the VPM via a PC. The VisionBox is hardware and software for VPM parameter setting. Status information and error memory data can be read out.
Mounting position	As desired

Application information (DVGW worksheet/Germany)	
G 621: 2009-11	Gas systems in laboratories and scientific classrooms, installation and operation
G 634: 1998-09	Installation of catering gas appliances in premises. Special requirements for combustion air supply and exhaust gas evacuation

Electrical connection	⊘	Outputs		Electrical data
Connection Diagram VPM  The sum of the currents of all safety-related consumers must not exceed 5 A! The sum of the currents of all consumers must not exceed 6.3 A (10 A).	11	 → V1	Release (bridged to 7)	115/230 VAC / 5 A cos φ = 1 Minimum load 0.5 W
	6		V1	115/230 VAC / 2 A cos φ = 1 Minimum load 0.5 W
	10		LGV	115/230 VAC / 2 A cos φ = 1 Minimum load 0.5 W
	16 17		External fault	115/230 VAC / 1 A cos φ = 1
	19 20		MFA	115/230 VAC / 1 A cos φ = 1
	⊘	Inputs		Electrical data
	4	TR	Test request	115/230 VAC
	13 14		Pp1 Pp2	115/230 VAC normally open 115/230 VAC normally closed
	12		Remote unlocking	115/230 VAC

Signalling unit			Error information		
			SYSTEM TEST	SYSTEM STATUS	Detailed error information via flash codes All LEDs are flashing: • when a key press is requested during a level change • when the VPM is ready for extended unlocking
MFT (RESET) = multifunction switch: Unlocking switch for error status ...max. 5x/15 min. Changeover switch to switch to the password-protected function level for service and OEM parameter setting via TWI interface by means of the VisionBox.	SYSTEM TEST two LEDs green / red	SYSTEM STATUS two LEDs green / red			
	Switch-on (mains): all LEDs light up as a functional test for approx. 1.5 s. Waiting for test request: Green LED's flashing slowly (4 s off, 0,125 s on). Depending on the states, the LED-V1 and LED-V2 indicators are flashing or lit constantly	Constantly red	Off	System leaking	
		Red flashing 1x	Red flashing 1x	Venting error	
		Red flashing 2x	Red flashing 2x	Filling error	
		Red flashing 3x	Red flashing 3x	Wrong position of DIP switch	
		Red flashing 4x	Red flashing 4x	Unlock failed	
		Red flashing 5x	Red flashing 5x	Power at V1.In or V2.In before test sequence completed	
		Constantly red	Constantly red	...all other errors	
	Constantly green	Constantly green	Release signal		

Modification of the program sequence by an application-specific setting of the B/C DIP switches



A Test sequence		B t_{test} test time		C Number of venting or filling attempts	
0110	1100	10 s			
	0110	55 s	0110	Filling 1	
	1001	30 s	1001	Filling 10	
	0011	55 s The following can be changed via the software: P23 for test time V2 If this switch position is used, parameter setting should be checked via the VisionBox.	0011	Filling 3 The following can be changed via the software: P31: Number of filling operations If this switch position is used, parameter setting should be checked via the VisionBox.	
	t_{test}	For the calculation of the test times, see p. 7 Setting must be higher than the calculated time. $t_{DIP} > t_{test}$ When the test times are long, a safety shutdown is already triggered at smaller leakage rates [Qp].		For more detailed explanations, see installation examples in the VPM-LC operating and mounting instructions.	
As-delivered configuration					
0110		0000		0000	

Installation examples

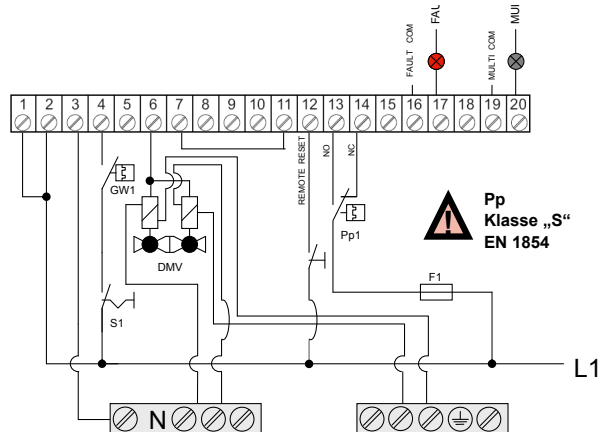
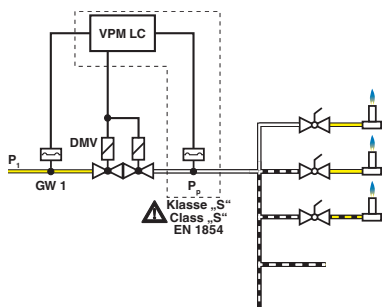


The functional principle must be selected in accordance with the local regulations!

1 Line check via gas pressure switch without idle state control, DMV

System component
Line check: VPM-LC, Pp according to DIN 1854, Class "S"

The manual valves are checked as to whether they are closed. If one of the manual valves is open, no pressure can be built up. Tightness of the DMV cannot be checked.



DIP-Mode:

A: 0110

B: xxxx

C: 0110

0011, ①

1001

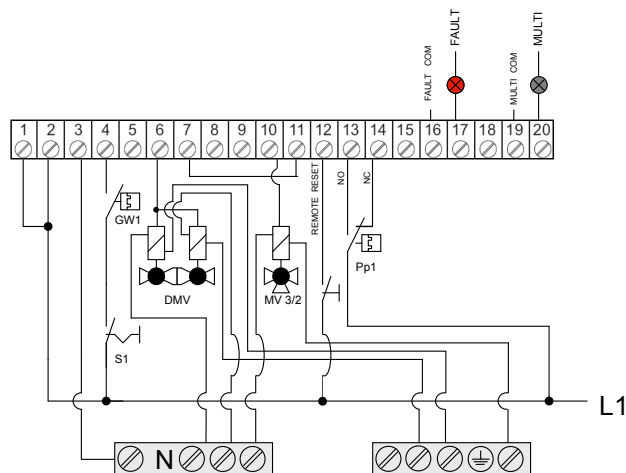
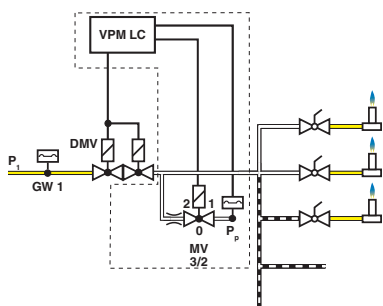
Parameter:

2 Direct line check via gas pressure switch with idle state control, MV

System component
Valve check: VPM-LC, Pp, shutter, MV 3/2
A shutter diameter of 0.3 mm and $p_e = 50 \text{ mbar}$ results in a leakage rate $Q_p = 16 \text{ L}_{\text{air}}/\text{h}$

The manual valves are checked as to whether they are closed.
If one of the manual valves is open, no pressure can be built up.

Leakage rate $Q_p = 16 \text{ L}_{\text{air}}/\text{h}$ with **shutter diameter 0.3 mm** @ $p_e = 50 \text{ mbar}$



DIP-Mode:

A: 0110

B: xxxx

C: 0110

0011, ①

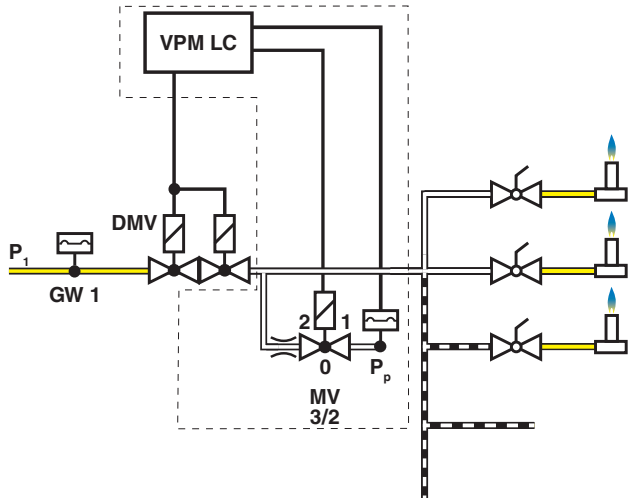
1001

Parameter:

P15 = 1

Attention ①: If this switch position is used, parameter setting should be checked via the VisionBox.

Calculation, individual setting of the test time or DIP switch group BBBB					
$t_{\text{test}} = \frac{p_e \cdot V_p \cdot \ln(p_e / (p_e - p_{s1}))}{p_{\text{atm}} \cdot Q_p} \cdot 3600 \text{ s/h} \cdot S$				$t_{p23} = t_{\text{test}} \cdot 16/\text{s}$	
xxxx 1100 xxxx xxxx 0110 xxxx xxxx 1001 xxxx	DIP mode for pre-defined test times. Setting must be higher than the calculated time: $t_{\text{DIP}} > t_{\text{test}}$	V_p	[dm ³]	Test volume between the valves to be monitored	
xxxx 0011 xxxx	Individual setting of the test time via the software: Select DIP mode xxxx 0011 xxxx. Enter the value calculated for t_{p23} in P23.	Q_p	[dm ³ /h]	Admissible leakage rate according to EN1643. The leakage rate corresponds to 0.1 % of the burner's gas consumption at maximum burner load, but at least 50 dm ³ /h. A limit value of 200 dm ³ /h is recommended by DUNGS!	
t_{test}	[s]	Test time for V2 (manual valves)	p_{s1}	[mbar]	Increasing switching pressure +15 %
t_{p23}	[]	To be entered in P23 Select higher value!	p_{atm}	[mbar]	Atmospheric pressure = 1013 mbar
			S	-	Safety factor: DUNGS recommends 3

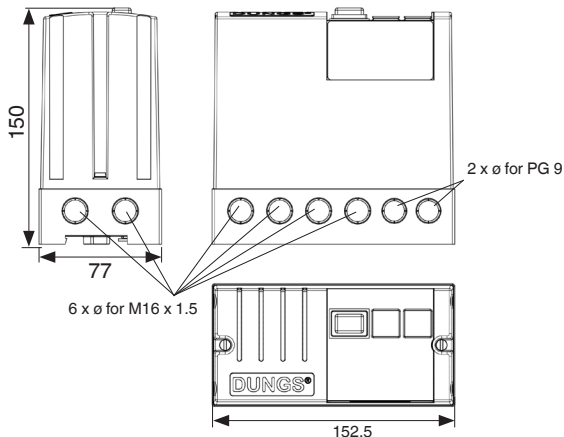
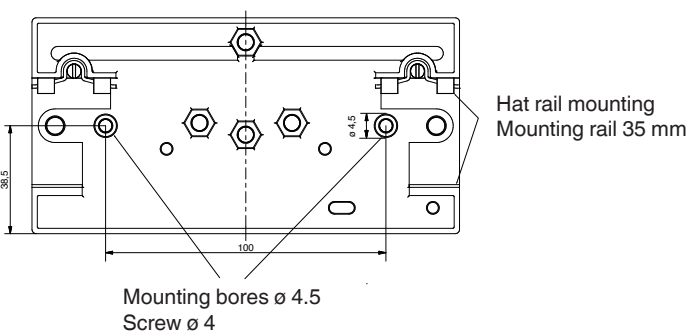
Vp determination of the test volume	
	Depending on the selected installation (for examples, see page 8) Include all valve and pipeline volumes of the test section.
Vp	1. Determine the DMV volume on the outlet side. For Rp 1/2 - DN 80, see operating and mounting instructions. 2. Determine the volume of the manual valves on the inlet side. For Rp 1/2 - DN 80, see operating and mounting instructions. 3. Determine the volume of all connecting pipe sections (3) For Rp 1/2 - DN 80, see operating and mounting instructions. 4. If present, determine the volume of the pilot valves. 5. $VP = \Sigma 1...4$
	

Control unit for system leakage tests

Type VPM-LC
(Line Check)



Version		Description	Order No.
Complete device		VPM-LC cpl. 230 VAC	259 146
		VPM-LC cpl. 115 VAC	259 147
Top part		VPM-LC 230 VAC	259 730
		VPM-LC 115 VAC	259 731
Base		1 piece	259 694
		48 piece	259 695

Dimensions	Installation
	

Accessories	
	Gas pressure switch Depending on the operating pressure, see data sheets LGW...A4 (5.08) GW...A6 (5.01) GW...A4 HP (5.04)
	Pilot solenoid valves see data sheets DMV... (7.30, 7.37, 7.38), MV 502 (6.21) MVD ... (6.20) Pilot valve 3/2 way solenoid valve/MV...
	MPA VisionBox As addition to MPA parameterisation and service box for setting VPM parameters via a PC/laptop.

Subject to technical modification in the interest of technical progress.



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