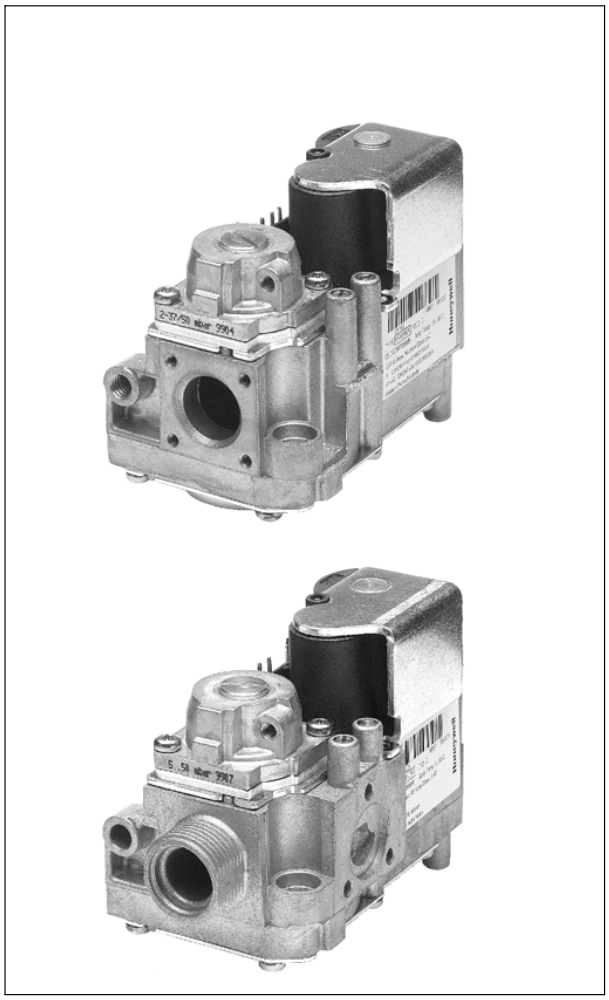
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VK41../VK81..SERIES

GAS CONTROLS FOR COMBINED VALVE AND IGNITION SYSTEM

PRODUCT HANDBOOK



APPLICATION

The Combined Valve and Ignition (CVI) system has been developed for application in gas fired domestic central heating boilers, combi boilers and warm air furnaces or water heater appliances with an automatic ignition system.

For this system, the VK41../VK81.. series gas controls have been designed to have the S4565/S4575/S4585 series ignition control attached directly on to the valve.

The combined system then provides programmed safe light up, flame supervision and regulation of gas flow to the main burner and/or pilot burner of the appliance.

The VK41.5/VK81.5 series gas controls (without pilot outlet) can also be used alone in direct burner ignition applications. A plug (order number 45.900.441-) with integrated rectifier circuit then has to be used on the gas control.

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DESCRIPTION

Valves

The **C**ombined **V**alve and **I**gnition (**CVI**) system controls and performs all the functions required for safe ignition, flame supervision and for safely regulating the gas flow to the pilot and/or main burner.

The **CVI** consists of a gas valve of the VK41../VK81.. series and a dedicated ignition control of the series S4565/S4575/ S4585 which is connected directly on to it.

The gas control comprises a standard body to which a range of features can be factory included to give various functional options. These functional options include: servo pressure regulation, throttle valve regulation, fully adjustable SOFTLITE, gas/air control 1:1 or amplified, electrical high-low or modulating control to fulfil the complete range of control applications.

The gas control has a first direct on/off operator for opening the safety valve of class B according to EN 161 and a second electric on/off servo operator for control of the main valve of class B,C or J according to EN 161 (for explanation class J, see chapter Standards and approvals page 30).

The pressure regulator is in accordance with class B requirements of EN 88

The gas control can handle the three gas families, manufactured gas, natural gas and LP gas.

General

All measurements are carried out under standard conditions listed below unless otherwise is indicated.

Standard conditions

- P_{inlet} 25 mbar nominal pressure, dry air of 20°C
- $P_{ambient}$ 1013 mbar
- $T_{ambient}$ 20°C
- Outlet orifice 2.8 mm
- Flow indication in $m^3/_h$
- Recording of outlet pressure with a transducer connected to a $^1/_2$" pipe with a length of 10 times the diameter of the pipe with a short hose at a length of 5 times the diameter of the pipe.
- Nominal voltage
- Upright position, i.e. the position when the operators are on top.

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FEATURES

General

- All burner control safety functions concentrated in one reliable and optimized system.
- Specially designed to provide the optimum system solution in gas appliances with a DBI or IP system to light the main burner.
- Both gas control and ignition control incorporate time proven design concepts assuring reliability.
- ON/OFF control of main burner by electric operator and electric servo operator directly energized from ignition control.
- Easy assembly of ignition control on gas control by plugging it on from the top.
- Mounting orientation may be within 90° in any direction from the electric on/off operator upright position.

Gas control

- Inlet ∅ 18.6 mm and outlet ∅ 18.6 mm connections are straight through and can receive flanges.
- The following closing force models are available: B + J; B + C; B + B.
- Servo pressure regulator provides stable outlet pressure.
- Pressure feedback ensures constant burner pressure in relation to combustion chamber pressure.
- All adjustments are accessible from the top.
- 9 mm diameter pressure taps on top face for checking inlet and outlet pressure
- An internal fine mesh screen is incorporated at the inlet of the gas control. This screen is not removable for cleaning.
- An outlet screen is optional.
- Two mounting holes for self tapping screws are at the bottom of the gas control for rigid attachment to the appliance.

Functional options

- Fast open and SOFTLITE versions
- Fully adjustable SOFTLITE option to facilitate the smooth light-up of burner and for changing over from one gas to another.

  NOTE: SOFTLITE opening is not always available when the second valve is classified as a class B valve.
- 100 mbar inlet pressure versions available on request
- Throttle valve versions
- Electrical modulation (Modureg) or CVI-m.
- Electrical High-Low control.
- Pilot outlet for IP system
- Gas/Air ratio version available.

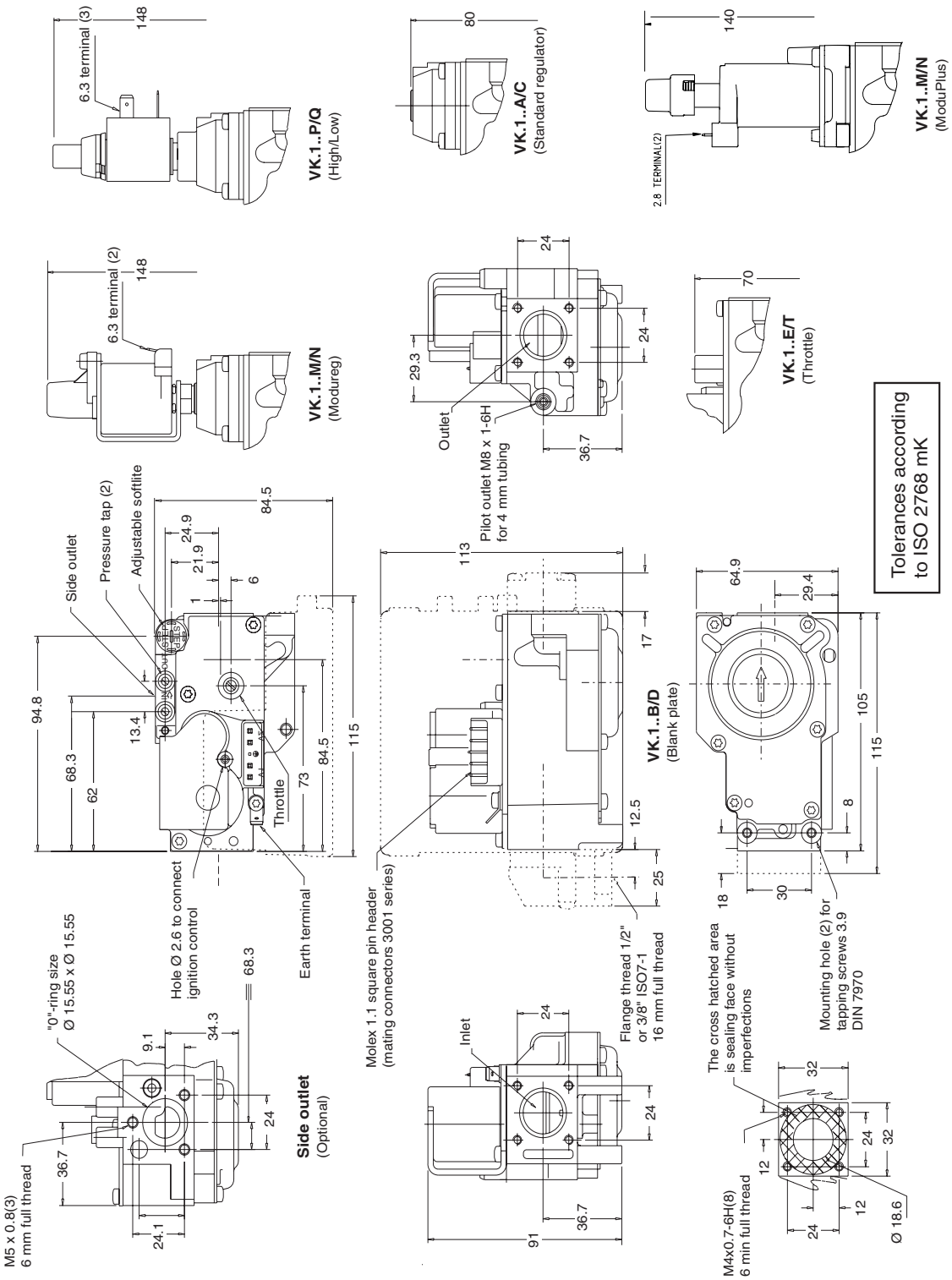
Gas connection options

- Internal thread (ISO 7-1), external thread (ISO-R228) or flanged connections. See table 4, 5, 6 and 7, page 9.
- Side outlet option for both main and pilot gas.
- The side outlet for pilot and main gas can only be connected to a flanged burner manifold.
- Pilot gas connection for tubing with 4 mm outer diameter is located at the outlet end of the gas control.
- Pressure feedback fittings for 4 or 6 mm silicon tube can be mounted.
- End outlet or side outlet
  Quick connection for Mini Venturi

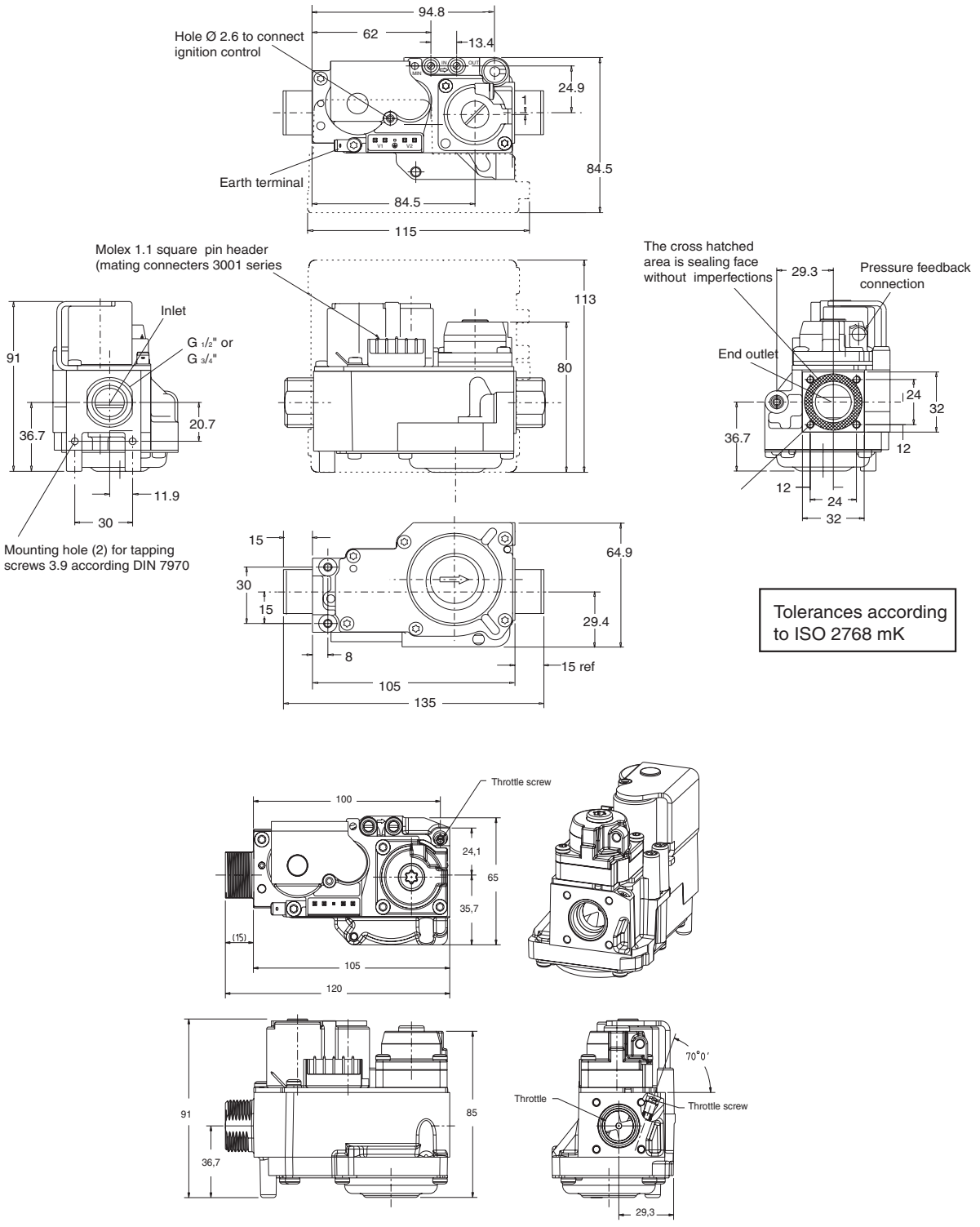
Electrical connection options

- The appropriate ignition control can be connected to the valve by plugging it on.
- Wired plug (IP 40) for connection with a remote ignition control.
- Rectifier plug (IP 40) for use with any standard DBI ignition system.
- 24 Volt versions available for use in conjunction with other ignition controls than S4565/S4585 series.

DIMESIONAL DRAWING STANDARD CONNECTION



DIMESIONAL DRAWING EXTERNAL THREAD CONNECTION



Dimensional drawing VK41.5VE/VK81.5VE (Throttle)

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APPLICATION

The VK41.. /VK81..series gas control have been specially developed for application in domestic appliances.

The VK41.. series gas control can be used in a system in conjunction with a S4565, S4575 or S4585 series ignition control to provide an optimised safety sub-system for programmed safe light-up and flame supervision of the main burner.

When connected with a Honeywell specified rectifier plug and lead the VK4105 series valve can be used with any standard 220/240 Vac DBI ignition system.

VK81.. series gas controls for 24 Vrac have been developed for application with other ignition controls with appropriate power supply.

SPECIFICATIONS

NOTE: Specifications for electrical modulation, electrical high low, gas/air and other features are available on request.

Models
See model number chart on page 31

Main gas connection
- Standard see table 4, page 9.
- Optional see table 5, page 9.
- Side outlet can be fitted direct to a flanged burner manifold.

Inlet and outlet with $^3/_8$" or $^1/_2$" ISO 7-1 internal pipe thread and straight or elbow flanges with $^3/_8$" or $^1/_2$" ISO 7-1 internal pipe thread are according to the torsion and bending stress of EN126 group 2

Connections with G $^1/_2$" or G $^3/_4$" external thread fitted with nuts according to ISO 228-1 in combination with applicable sealing(s) withstand the torsion and bending stress of EN 126 group 1

Ambient temperature
-15 ... 60°C

Humidity
95% RH max. at 40°C

Storage
- 30 ... 70°C

Pilot gas connection
Standard at end outlet: M8 x 1 for 4 mm outer diameter tubing.

Pressure feedback connection
The servo pressure regulator has an M5 thread connection for pressure feedback.
Pressure feedback fittings for 4 or 6 mm silicon tube can be mounted as option.

Dimensions
See page 4 and 5

Outlet pressure range for ON/OFF regulators
1.5 ... 20 mbar
2 ... 37 mbar
5 ... 50 mbar

Minimum regulation capacity
0.31 m^3/h air

Minimum differential pressure

Table 1: Minimum differential pressure

Model	ΔP min (mbar)
VK4105	2.5
VK4115	4
VK4125	4

Maximum operating pressure
The P_{max} indication on the housing of the gas control is the maximum pressure at which it functions safely.
However, the maximum inlet pressure is limited by the pressure range of the pressure regulator concerned.
(See table 2.)

Table 2: Operating pressure

Model	Pressure range (mbar)	Maximum inlet pressure (mbar)
with regulation	1.5 ... 20 2 ... 37* 5 ... 50*	30 45 60
without regulation	-	60

* This type can also be used for non regulation mode in LP applications when pressure regulator adjustment screw is clockwise turned down until it stops.

Versions up to 100 mbar maximum inlet pressure are available on request

Mounting holes

Two mounting holes for thread forming M4 screws are located on the bottom of the gas control.

For versions with external thread there are two additional mounting holes for thread forming screws at the inlet side of the gas control.

The four holes at inlet and outlet for mounting a flange on the gas control are provided with M4 thread with min. 6 mm full thread.

In case of side outlet the three holes for mounting the flange are provided with M5 thread with a minimum of 6 mm full thread.

Capacity
In m^3/h air at pressure drop as shown below. See also the capacity curves concerned.

Model	Extention	ΔP (mbar)	Capacity (m^3/h air)	Capacity curve	
				Number	Page
VK410X/VK810X	A, B, C, D, M, N, P, Q	3	3.4	H 10	13
	E, T	3	2.8	H 160	17
VK411x/VK811x	A, B, C, D, M, N, P, Q	5	4.4	H 20	14
	E, T	5	3	H 170	18
	V, VE	5	3.4	H 140	15
		10	5.1		
	VB	5	4.4	H 20	14
VK412X	A, B, C, D, M, N, P, Q	5	2.2	H 150	16
VK412X/VK812X	V	5	2.2	H 150	16
		10	5.1		

NOTE 1.: Versions with side outlet connection have a 0.2 $m^3/_h$ air lower capacity.
NOTE 2.: Increased capacity versions are optional for types with suffix letter E, T and V.
NOTE 3.: $^3/_4$“ external thread versions have a 0.3 $m^3/_h$ air lower capacity.

Table 3: Valve classification

Model	1st valve		2nd valve	
	Classification	Backpressure (mbar)	Classification	Backpressure (mbar)
VK4100/VK4105 VK8100/VK8105	B	50	J	0
VK4110/VK4115 VK8110/VK8115	B	50	C	10
VK4120/VK4125 VK8120/VK8125	B	50	B	50

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Table 4: Standard valve connection

Inlet	End outlet	Side outlet	Body length (mm)
Flanged	Flanged	--	105
Flanged	--	Flanged	105
Internal $^{3}/_{8}$" ISO 7-1	--	Flanged	115
Internal $^{1}/_{2}$" ISO 7-1	--	Flanged	115
Internal $^{1}/_{2}$" ISO 7-1	Internal $^{1}/_{2}$" ISO 7-1	--	115

Table 5: External valve connection (optional)

Inlet	End outlet	Side outlet	Body length (mm)
G $^{1}/_{2}$"	G $^{1}/_{2}$"	--	135
G $^{1}/_{2}$"	Flanged	--	120
G $^{3}/_{4}$"	G $^{3}/_{4}$"	--	135
G $^{3}/_{4}$"	Flanged	--	120
G $^{3}/_{4}$"	--	Flanged	120
G $^{3}/_{4}$"	Internal $1^{1}/_{2}$" ISO 7-1	--	120
G $^{1}/_{2}$"	--	Flanged	120
Flanged	G $^{1}/_{2}$"	--	120
Flanged	G $^{3}/_{4}$"	--	120

Table 6: Mini-Venturi valve connection

Inlet	End outlet	Side outlet	Body length (mm)
Flanged	Quick connect mini-venturi	-	120
Flanged	-	Quick connect mini-venturi	105
G $^{3}/_{4}$"	Quick connect mini-venturi	-	135
G $^{3}/_{4}$"	-	Quick connect mini-venturi	120

Table 7: Throttle valve (VK....VE only) connection

Inlet	End outlet	Side outlet	Body length (mm)
Flanged	Flanged	--	105
G $^{1}/_{2}$"	Flanged	--	120
G $^{3}/_{4}$"	Flanged	--	120

ELECTRICAL DATA

Table 8: Electrical connection for Direct Burner Ignition systems

Supply voltage	Coil indication	Rectifier circuit position	Coil connection (fig. 1)	Valve indication
24 Vac, 50/60 Hz	24 Vrac	External	Series connection pin1 and pin 5 or plug 45.900.441-029	VK 81.5
24 Vac, 50/60 Hz	24 Vrac	In plug	Select plug 45.900.441- with rectifier (See table 11)	VK 81.5
100 Vac, 50/60 Hz	100 Vrac	External	Series connection pin1 and pin 5	VK 41.5
110 Vac, 50/60 Hz	110 Vrac	In S4575	Select plug 45.900.441-033 without rectifier (See table 11)	VK 41.5
		In plug	Select plug 45.900.441-039 (See table 11)	VK 41.5
		External	Series connection pin1 and pin 5	VK 41.5
220 ... 240 Vac, 50/60 Hz	220 ... 240 Vrac	In S4565	Select plug 45.900.441-033 without rectifier (See table 11)	VK 41.5
		In plug	Select plug 45.900.441- with rectifier (See table 11)	VK 41.5
		External	Series connection pin1 and pin 5	VK 41.5

Table 9: Electrical connection for Intermittent Pilot ignition systems

Supply voltage	Coil indication	Rectifier circuit position	Coil connection (fig. 1)	Valve indication
24 Vac, 50/60 Hz	24 Vrac	External	Parallel connection pin1/2 and pin 4/5	VK 81.0
220 ... 240 Vac, 50/60 Hz	220 ... 240 Vrac	In S4565 and S4585 types	S4565 and S4585 types	VK 41.0
220 ... 240 Vac, 50/60 Hz	220 ... 240 Vrac	External	Parallel connection pin1/2 and pin 4/5	VK 41.0

Table 10: Power consumption (W) and current (mA)

Supply voltage	Power consumption				Current			
	Nominal voltage		110% nominal voltage		Nominal voltage		110% nominal voltage	
	1^{st} operator	$1^{st} + 2^{nd}$ operator	1^{st} operator	$1^{st} + 2^{nd}$ operator	1^{st} operator	$1^{st} + 2^{nd}$ operator	1^{st} operator	$1^{st} + 2^{nd}$ operator
DBI system								
24 Vac, 50/60Hz	--	9.2	--	11	--	424	--	466
100 Vac, 50/60Hz	--	9.75	--	11.9	--	105	--	115
110 Vac, 50/60Hz	--	8.8	--	10.8	--	89	--	98
220 Vac, 50/60Hz	--	9.4	--	11.4	--	48	--	52
240 Vac, 50/60Hz	--	11.2	--	13.6	--	52	--	57
IP system								
24 Vac, 50/60Hz	6.7	6.7 + 3.1	8.0	8.0 + 3.7	309	309 + 143	340	157
220 Vac, 50/60Hz	9.1	4.8	11	5.8	46	24	51	27
240 Vac, 50/60Hz	10.9	5.7	13.1	6.9	50	26	55	29
220Vac, 50/60Hz	7	7 + 2.2	8.3	8.3 + 2.7	31	31 + 11	35	35 + 12.2
240 Vac, 50/60Hz	8.0	8.0 + 2.6	9.6	9.6 + 3.2	35	35 + 12.1	38.4	38.4 + 13.3

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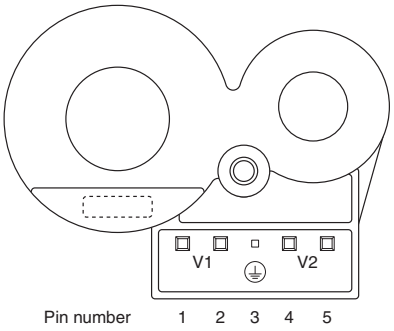


Fig. 1. Coil connection

Rectifier plug
The 220/240 V,110V and 24 V versions of the VK4105/ VK8105 series gas controls can be connected to any standard **DBI** control with a 220/240 Vac, 110V or 24 Vac output by using a rectifier plug 45.900.441- See table 11.

Electical protection of gas control with rectifier plug
IP 40

Mounting of rectifier plug
fig. 2 .

Mounting screw
Torque: 40 Ncm max.

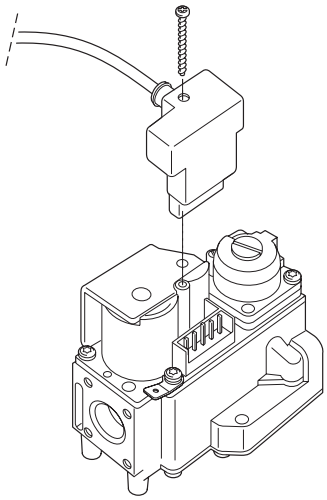


Fig. 2. Mounting of rectifier plug

IMPORTANT

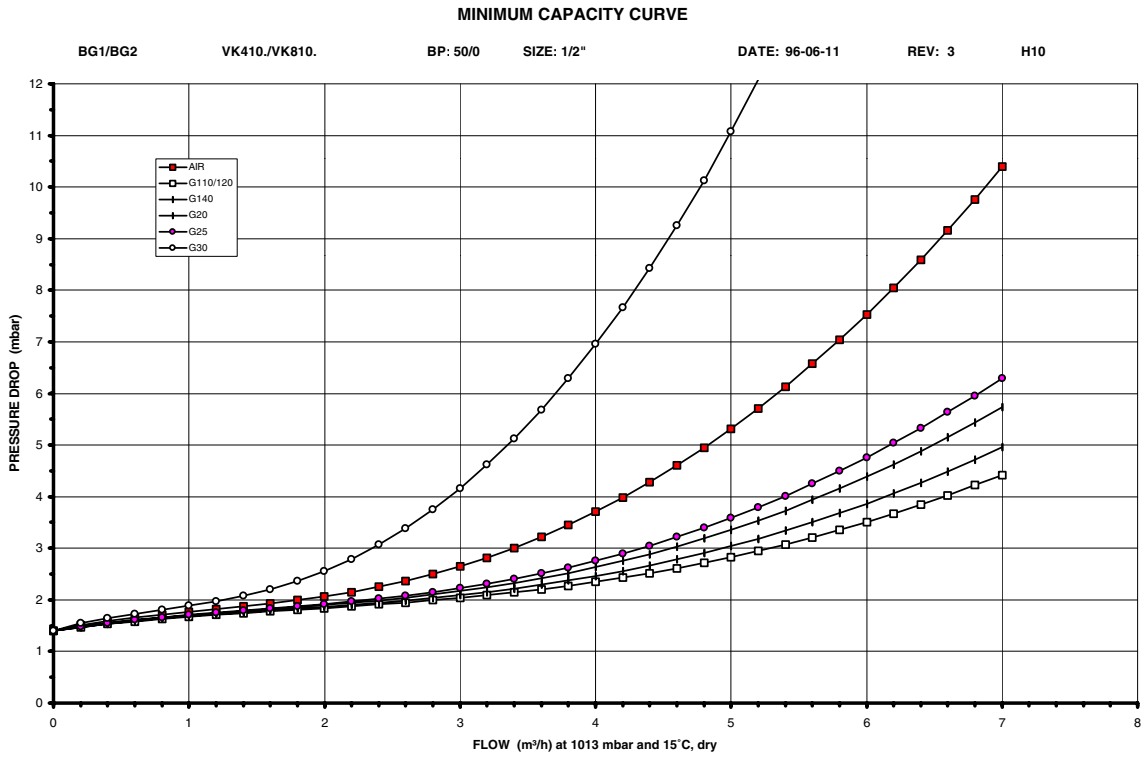
Warranty claims are not accepted if not the specified plug/rectifier circuit is used.

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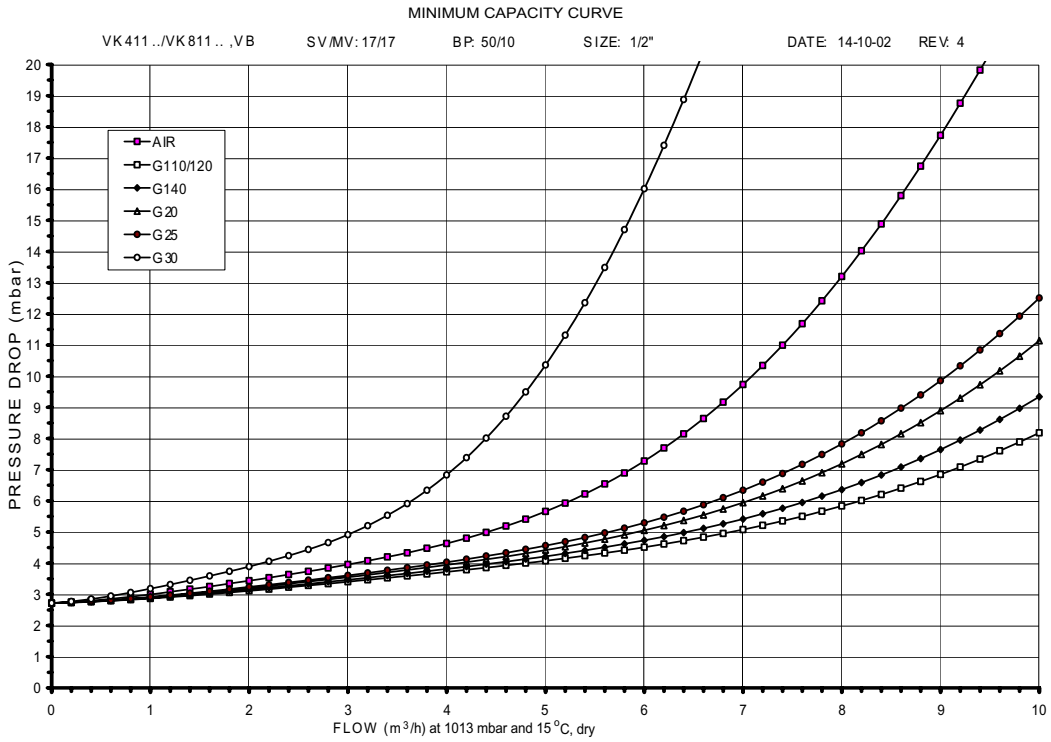
Table 11: Rectifier plugs

Order number	Supply voltage	Wires	Cable length	Plug			Cable end			
	Vac unless specified		(mm)	config	Rectifier	screw	config	strip length (mm)	Special	Finish
45.900.441-011	220/240	3	145	fig. 25	yes	in bag	fig 20	75		solder dip
45.900.441-012	24	2	500	fig. 25	yes	in bag	fig 22			
45.900.441-013	220/240	3	500	fig. 25	yes	in bag	fig 20	50		splices
45.900.441-014	220/240	3	620	fig. 25	yes	no	fig 20	80		solder dip
45.900.441-015	24	2	500	fig. 25	yes	in bag	fig 20	50		splices
45.900.441-016	220/240	3	240	fig. 25	yes	in bag	fig 20	150		solder dip
45.900.441-017	220/240	3	150	fig. 25	yes	in bag	fig 20	40		solder dip
45.900.441-018	220/240	3	800	fig. 25	yes	in bag	fig 20	75		solder dip
45.900.441-019	24	2	50	fig. 25	yes	inserted	fig 23			
45.900.441-021	24	2	720	fig. 25	yes	in bag	fig 20	80		solder dip
45.900.441-022	24	2	720	fig. 25	yes	inserted	fig 21			
45.900.441-023	24	2	1260	fig. 25	yes	in bag	fig 20	80		solder dip
45.900.441-024	24	2	1260	fig. 25	yes	inserted	fig 21			solder dip
45.900.441-025	220/240	3	600	fig. 25	yes	no	fig 20	130		solder dip
45.900.441-026	220/240	3	1500	fig. 25	yes	in bag	fig 20	50		solder dip
45.900.441-027	220/240	3	580	fig. 24	yes	inserted	fig 21 *		* earth wire = 6.5 faston female	
45.900.441-028 (as -027, but single packed in bag)	220/240	3	580	fig. 24	yes	inserted	fig 21 *		* earth wire = 6.5 faston female	
45.900.441-029	24 Vdc	2	500	fig. 24	no	in bag	fig 20	50		splices
45.900.441-030	220/240	3	500	fig. 25	yes	no	fig 20	50		splices
45.900.441-031 (for IP application)	220/240	4	700	fig. 25	double	in bag	fig 20	50		splices
45.900.441-032	220/240	3	1050	fig. 25	yes	no	fig 20	150		splices
45.900.441-033	220/240 Vdc	3	500	fig. 25	no	inserted	fig 20	50		splices
45.900.441-035	220/240	3	403	fig. 25	yes	inserted	fig 20	special	special earth wire	solder dip
45.900.441-036	220/240	3	570	fig. 25	yes	inserted			stocko connectors	
45.900.441-037	220/240	3	1800	fig. 25	yes	in bag	fig 20	50		solder dip
45.900.441-038	220/240	3	397	fig. 25	yes	inserted			stelvio connectors earth wire stripped	splices
45.900.441-039	110	3	500 mm	fig. 25	yes	in bag	fig 20	50		solder dip

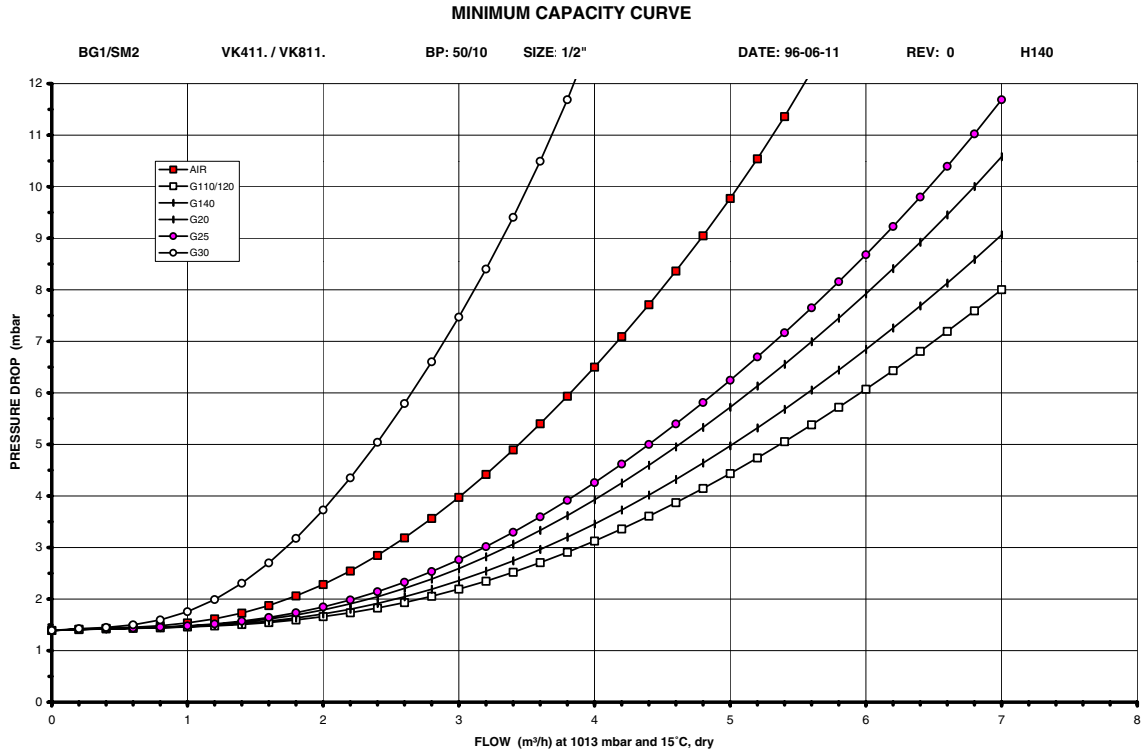
CAPACITY CURVE H10 (CVI)



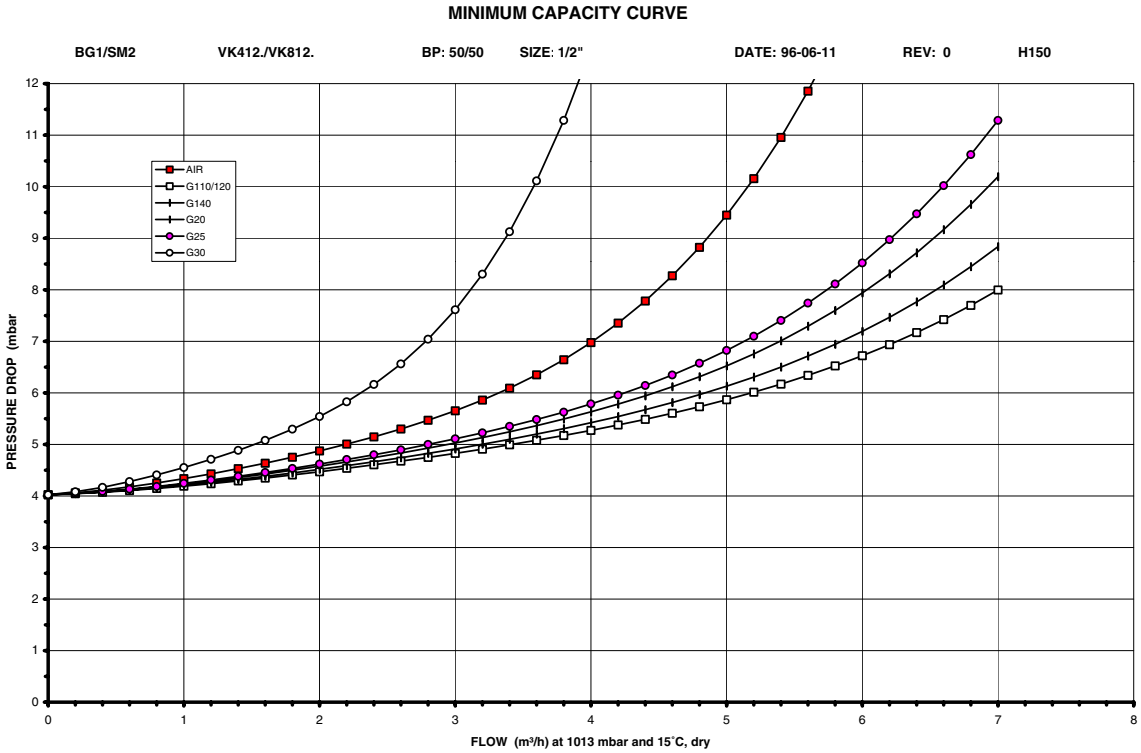
CAPACITY CURVE H20 (CVI)



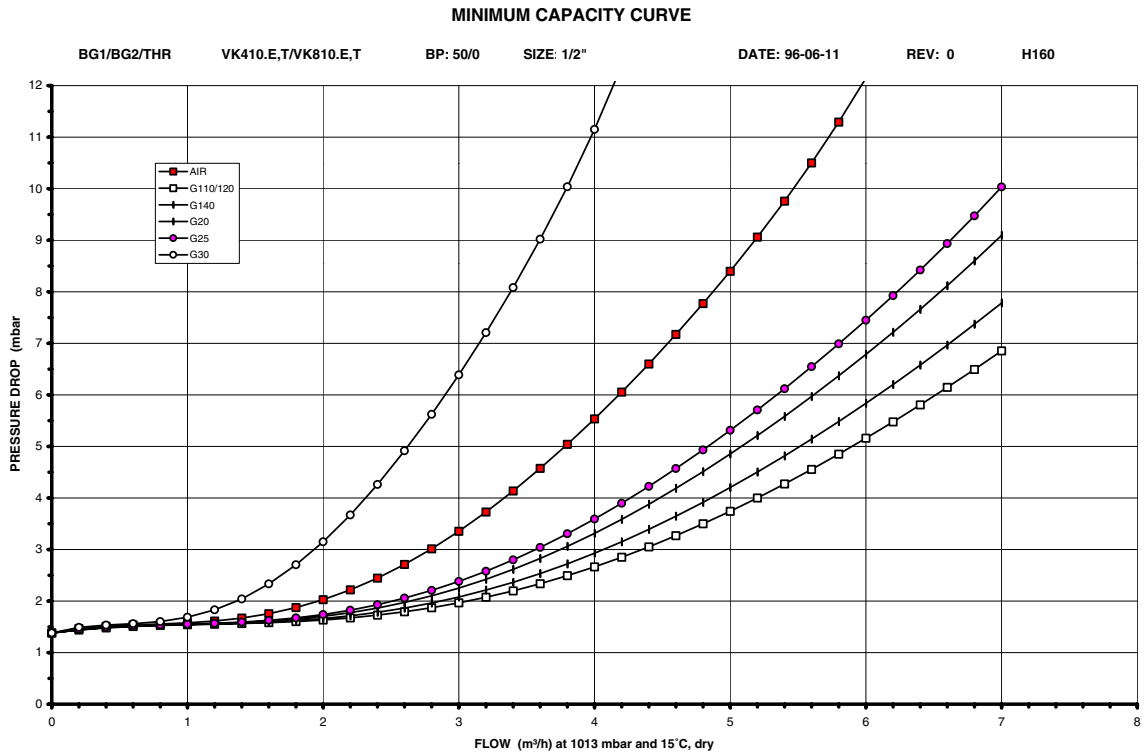
CAPACITY CURVE H140 (CVI)



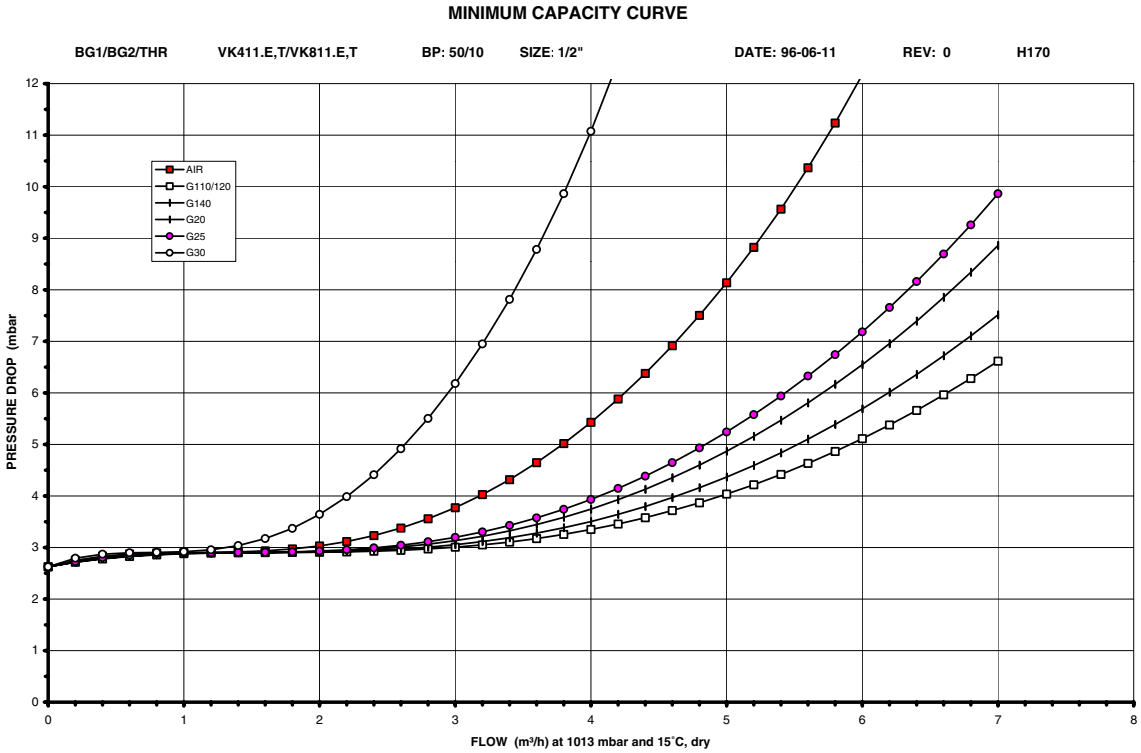
CAPACITY CURVE H150 (CVI)



CAPACITY CURVE H160 (CVI)



CAPACITY CURVE H170 (CVI)



PERFORMANCE CHARACTERISTICS

Maximum allowable leakage
Each gas control is factory tested to meet the following leakage requirements:
- outerwall: 50 cm^3/h at test pressure of 150 mbar.
- safety valve: 40 cm^3/h at test pressure of 6 and 150 mbar.
- main valve (plus operator inlet valve): 40 cm^3/h at test pressure of 6 and 150 mbar.

Outlet pressure adjustment range capability
Manuf./Natural/LP gas:
1.5 ... 20 mbar
2 ... 37 mbar with block function up to 50 mbar
LP gas: 5 ... 60 mbar.

Minimum adjustable capacity
For versions with a throttle valve (suffix E/T/VE) the minimum adjustable capacity is 0.6 m3/h air at ΔP of 20 mbar.

Pilot flow
Pilot flow capacity is more than 0.1 m^3/h at 9 mbar pressure drop.

Recovery time of servo system
The recovery time of the adjustable SOFTLITE system in minimum position is within 15 seconds from operator de-energization and in maximum position the recovery time shall be within 30 seconds from operator de-energization.

High pressure test
In the ”OFF” condition, the gas control will withstand 3 bar (air) inlet pressure without damage. Attempts to operate the gas control, while in this fault condition will not damage it.

Operable voltage range
The gas control will function satisfactory between 85% and 110% of the rated voltage.

Table 12: Operable voltage range

Rated voltage	Operable voltage
24 Vac, 50/60 Hz	19.5 ... 27 Vac
100 Vac, 50/60 Hz	85 ... 110 Vac
220/240 Vac, 50/60 Hz	187 ... 264 Vac

Valve closing characteristics
The gas control will close within 1 second from operator de-energization, (at an inlet pressure of 22.5 mbar and minimal 2.5 mbar pressure drop).

Main valve opening characteristics (measured with gas)

Fast opening versions
Under conditions where the supply pressure is at least 2.5 mbar above the outlet pressure setting, the dead time shall be 0.5 s maximum.
The outlet pressure will reach 80% of the rated flow within 1 second from start of flow.
Full outlet pressure will be reached within 5 seconds.

SOFTLITE versions (See table 13)
The adjusted outlet pressure will be reached between 5 and 15 seconds from start of flow (for LP gas between 4 and 10 seconds)

Adjustable SOFTLITE
NOTE: For SOFTLITE versions the SOFTLITE pressure can be adjusted from the rated SOFTLITE up to the desired value.

Table 13: Main valve (class D only) opening characteristics SOFTLITE versions

SOFTLITE number	Inlet pressure (mbar)	Kind of gas	Dead time (s) max		Outlet pressure (mbar) 1.5 s after start of flow (in min. position)	Outlet pressure (mbar) 1.5 s after start of flow (in max. position)
			Upright positon	Horizontal position		
3	20	G 20/25	1.8	1.5	1 ... 3.5	> 12
5 7	20	G 20/25	1.2	1.0	2.5 ... 6.0 4.5 ... 7.5	> 12
7	37	G 30/31	1.5	1.2	2.5 ... 6.5	> 16
7	50	G 30/31	1.2	1.0	2.5 ... 6.5	> 19

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Oscillation
Maximum oscillation under all circumstances: ± 0.5 mbar.

Tap sensitivity of outlet pressure set point
For all gases the maximum deviation may be 1 mbar.

Repeatability of outlet pressure set point
For all gases the maximum deviation from set point is: ± 0.3 mbar or ± 3% of the set point value, whichever is the greatest.

Design life
500.000 cycles for safety and main valve operator.
Cycle frequency maximum 100 cycles /hour.

Total set point shift

Table 14: Total set point shift servo regulator on/off version*)

Pressure range	Tolerance
1.5 ... 20 2 ... 37	6% of the set point value or 1 mbar whichever is the greatest
5 ... 50	6% of the set point value or 1.5 mbar whichever is the greatest

*) For other versions see the applicable handbook

Temperature sensitivity VK41../81..VE type:
-15 ... 70°C : 4% of flow

INSTALLATION

IMPORTANT

Take care that installer is a trained experienced service man.

Turn off gas supply before starting installation.

Disconnect power supply to prevent electrical shock and/or equipment damage.

Do not remove seals over inlet and outlet until the device is ready to be installed.

Take care that dirt cannot enter the gas control during handling.

Mounting position

The gas control can be mounted 0 to 90 degrees in any direction from the upright position (from the position when the operators are on top).

Main gas connection

Gas controls with internal thread

- Take care that dirt cannot enter the gas control during handling.
- Use a sound taper fitting with thread according to ISO 7-1 or a piece of new, properly reamed pipe, free from swarf.
- Do not thread or tighten the pipe or pipe fitting too far (see table below). Otherwise distortion and malfunction could result.

Pipe size (inch)	Max. length of pipe thread (mm)
$^{3}/_{8}$	14
$^{1}/_{2}$	18.6

- Apply a moderate amount of good quality thread compound to the pipe or fitting only, leaving the two end threads bare. PTFE tape may be used as an alternative.
- Tighten gas control using the right open end wrench. fig. 3 .

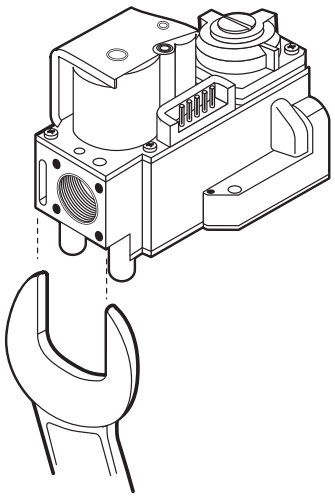


Fig. 3.

- Ensure the gas flows in the same direction as the arrow on the bottom of the gas control.

Gas controls for flange connection

- Insert ”O”-ring in the groove of each flange. If necessary grease ”O”-ring slightly to keep it in place.
- Mount gas control between flanges using the four screws for each flange.

Gas controls with external thread connection

IMPORTANT

Fastening torque flat sealing ring only applicable for type Klingersil C4324

Olives for this application are not supplied by Honeywell

Torque of olive applications may differ depending on olive dimensions.

❶ **With $^{1}/_{2}$” nut and flat sealing ring for pipe 14 mm (fig. 4 .)**
Nut: drawing: 45.006.583-005
Flat sealing ring according to DIN 3535-6 with size ∅18 x ∅12 x 1.5 mm
drawing..... 45.006.582-002
Fastening torque: maximum 40 Nm
minimum 25 Nm
Pipe end construction: see fig.: 7.

❷ **With $^{1}/_{2}$” nut and flat sealing ring for pipe 15 mm (fig. 4 .)**
Nut: drawing: 45.006.583-004
Flat sealing ring according to DIN 3535-6 with size ∅18 x ∅12 x 1.5 mm
drawing..... 45.006.582-002
Fastening torque: maximum 40 Nm
minimum 25 Nm
Pipe end construction: fig. 8 .

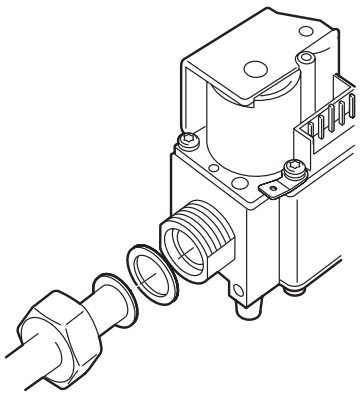


Fig. 4. External thread connection with nut and flat sealing ring

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❸ **With $^{3}/_{4}$" nut and olive (fig. 5 .)**
Pipe diameter: 15 mm
Nut: drawing:..... 45.006.583-003
Fastening torque: maximum 50 Nm
minimum 30 Nm
Pipe end construction: square off end of tubing and remove burrs.

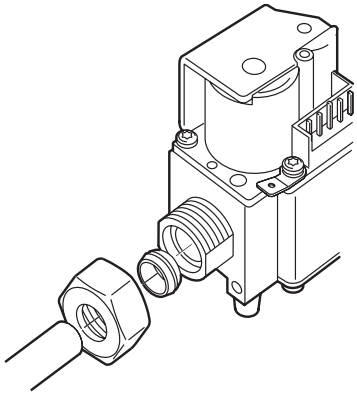


Fig. 5. External thread connection with nut and olive

❹ **With $^{3}/_{4}$" nut and "O"-ring (fig. 6 .)**
Pipe diameter: 15 mm
Nut: drawing:..... 45.006.583-003
"O"-ring size: ∅14.3 x ∅2.4 mm
drawing 45.001.583-003
Fastening torque: maximum 50 Nm
minimum 10 Nm
Pipe end construction: fig. 9 .

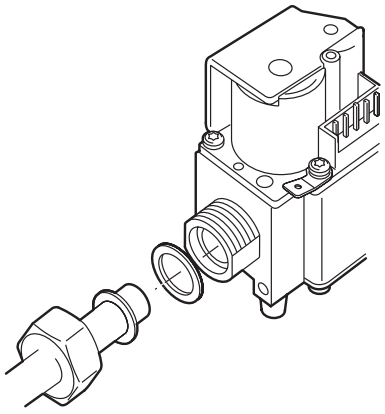


Fig. 6. External thread connection with nut and "O"-ring

❺ **With $^{3}/_{4}$" nut and flat sealing ring for pipe 15 mm (fig. 4 .)**
Nut: drawing:..... 45.006.583-003
Flat sealing ring according to DIN 3535-6 with size ∅24 x ∅16 x 1.5 mm:
drawing 45.006.582-001
Fastening torque: maximum 50 Nm
minimum 30 Nm
Pipe end construction: fig. 10 .

❻ **With $^{3}/_{4}$" nut and flat sealing ring for pipe 18 mm (fig. 4 .)**
Nut: drawing: 45.006.583-002
Flat sealing ring according to DIN 3535-6 with size ∅24 x ∅16 x 1.5 mm
drawing..... 45.006.582-001
Fastening torque: maximum 50 Nm
minimum 30 Nm
Pipe end construction: fig. 11 .

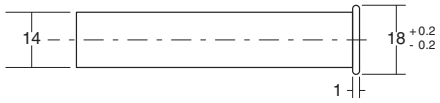


Fig. 7. Pipe (dia 14 mm) for flat sealing ring connection

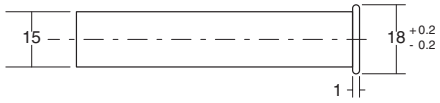


Fig. 8. Pipe (dia 15 mm) for flat sealing ring connection

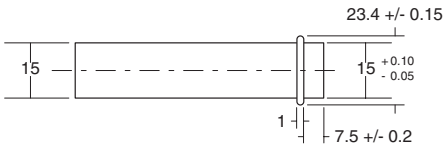


Fig. 9. Pipe end for "O"-ring connection

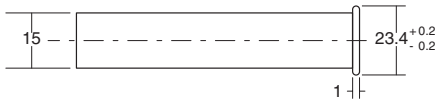


Fig. 10. Pipe (dia 15 mm) for flat sealing ring connection

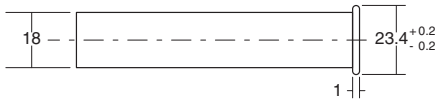


Fig. 11. Pipe (dia 18 mm) for flat sealing ring connection

Pressure feedback connection

⚠ WARNING

To avoid decreasing of performance of pressure regulator by pinching off the pressure feedback tubing, it is recommended to use a tube material which will not kink.

Pilot gas connection (if applicable)

- Square off the end of tubing and remove burrs.
- Slip compression fitting over tubing.
- Insert tubing into gas control housing until it bottoms, slide fitting into place and turn finger tight.
- Use a wrench to tighten fitting about $1^{1}/_{2}$ turn beyond finger tight to shear of the olive. **Do not use jointing compound.**

Connect other end of tubing to pilot burner according to the manufacturer's instructions.

CAUTION

Do not bend tubing at gas control after compression fitting has been tightened, as this may result in gas leakage at the connection.

Perform gas leak test

WARNING

FIRE OR EXPLOSION HAZARD CAN CAUSE PROPERTY DAMAGE, SEVERE INJURY OR DEATH

Check for gas leaks with a rich soap and water solution any time work is done on a gas control.

Gas leak test

- Paint all pipe connections upstream of the gas control with a rich soap and water solution. Bubbles indicate a gas leak.
- If a gas leak is detected, tighten the pipe connection.
- Stand clear while lighting the main burner to prevent injury caused from hidden gas leaks, which could cause flasback in the appliance vestibule. Light the main burner.
- With the main burner in operation, paint all pipe joints (including adapters) and gas control inlet and outlet with with a rich soap and water solution an approved leak detection fluid.
- If another gas leak is detected, tighten adapter screws, joints and pipe connections.
- Replace the part if gas leak can not be stopped.

CAUTION

Keep soap and water solution away from electrical connecetions.

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ELECTRICAL CONNECTIONS AND WIRING

IMPORTANT

Wiring must be in accordance with local regulations.
The appliance manufacturer's instructions should always be followed.
Before installing or replacing any control check that type number is correct for the application.
Ensure combustion chamber is free of gas before start up.
Conduct a thorough check out when installation is completed.
At the first start the ignition control can be in lock out; depress reset button to free control.

⚠ WARNING

Take care that installer is a trained experienced service man. Turn off gas supply before starting installation. Disconnect power supply to prevent electrical shock and/or equipment damage.

IMPORTANT

Warranty claims are not accepted if the specified plug/rectifier circuit is not used.

Wiring

- Use cable which can withstand 105°C ambient.
- Use cable which is proven against moisture.
- Wiring between ignition control and spark sensing probe should have good quality insulation, suitable for the temperatures encountered.

Assembling of the cable connector(s) for IP 20 protection

Follow the sequence as mentioned under Assembling of the cable connector(s) for IP 44 protection" except the assembling of the grommet.

Assembling of the cable connector(s) for IP 44 protection (fig. 12 .)

- Use cable with Ø 5 ... Ø 7 mm.
- Strip length cable: 15 mm
- Grommet inlet numbers1, 2, 4 applicable for cable with Ø 5 ... Ø 7 mm.
- Grommet inlet number 3 applicable for cable with Ø 4 ... Ø 7 mm.
- Mount the connector(s) and bring the cable grommet in position over the cables and connector.

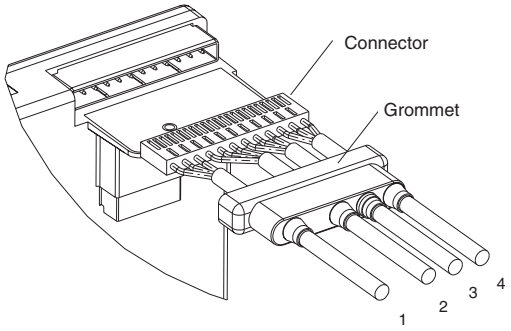


Fig. 12.

Assembly of cover with integrated strain relief (fig. 13 .)

Position the cover on the ignition control. Then, when holding the cover down (in direction A) rotate it to mount the cable(s) in the strain relief (in direction B).
Finally fix the whole assembly (ignition control and cover) with a screw on the gas control with a torque of 40 Ncm max.

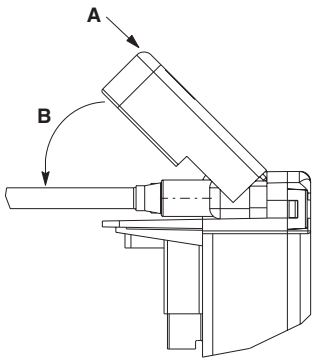


Fig. 13.

Disassembly of cover with integrated strain relief

- Loosen the cover screw.
- Pull up the cover screw by hand, lift the cover slightly and push it in the direction of the cables.

Fusing

In order to prevent unsafe conditions at too high current, the ignition controls S4565, S4575 and S4585 series have an integral non replaceable fuse.
This fuse will be blown long before the maximum 16 A external fuse switches off.

Spark gap

Max. allowable spark gap 3.5 mm

Supply voltage polarity

⚠ WARNING

If ignition control seems to operate normally but does not detect flame, check for right polarity of power supply (line, neutral).

Checking flame current

- The minimum value should be in accordance with specified value.
- To check flame current connect a DC micro-Ampèremeter between flame sensing wire and flame sensing rod.
- If flame current is insufficient check that flame sensing rod is fully enveloped by the flame and that burner is reliable grounded to ignition control.
- If there is no sufficient flame current due to phase-phase mains it is recommanded to use a AT7030A or AT7030B flame detection transformer. See also instruction sheet EN1R-9136 for AT7030 transformer.

⚠ WARNING

Short µA meter during ignition, to prevent damage of the µA meter in single rod application.

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ADJUSTMENTS AND CHECKOUT

IMPORTANT

Adjustments must be made by qualified persons only. If the appliance manufacturer supplies checkout and/or service and maintenance instructions carefully follow them. If these instructions are not provided then use the procedure outlined below.

Pressure tap

The gas control is provided with a pressure tap of 9 mm outer diameter at inlet and outlet side.
When checking the pressure undo the screw a half turn and slip tube over nipple.
Ensure that screw is retightened after making test.

Pilot flame (VK4100/VK8100 only)

⚠ WARNING

It should be noted, that after a long time of stoppage (summer) it can take up to 60 s to come to an ignition of the pilot burner.

Outlet pressure adjustment on/off versions (see page 4)

- Disconnect pressure feedback connection (if applicable)
- Start-up appliance in order to have gas input to burner.
- Check gas input to the appliance using a clocking gas meter or alternatively a pressure gauge connected to the outlet pressure tap.
- Remove cap screw to expose pressure regulator adjustment screw.
- Slowly turn adjustment screw with a small screw driver until the burner pressure required is recorded on the pressure gauge. Turn adjustment screw clockwise to increase or counter-clockwise to decrease gas pressure to the burner.
- For non-regulating mode (LP gas) turn adjustment screw clockwise until it stops.
- Replace pressure regulator cap screw.
- Connect pressure feedback connection (if applicable).

Outlet pressure adjustment throttle versions VK.1..E/T(see page 4)

- Energize electric operators in order to have gas input to burner.
- Check input to the appliance using a clocking gas meter or alternatively a pressure gauge connected to the oultet pressure tap.
- Turn the flow adjustment screw with a screw driver **in clockwise direction** to decrease and turn counter clockwise to increase the gas flow.

Check of SOFTLITE

The SOFTLITE pressure is factory set.
Check burner performance at this pressure observing burner ignition and flame characteristics. Burner should ignite promptly and without flash back to orifice and all ports should remain lit.
Cycle burner several times (wait 15 seconds between cycles to allow servo system to resume slow open action).
Repeat check of slow opening after allowing the appliance to cool down.

SOFTLITE adjustment (see page 4)

The SOFTLITE pressure can be increased from the rated SOFTLITE to optimise the ignition or to change over to another gas type.

- Check the ignition as described above.
- Turn the appliance off.
- Remove the dust cap. This can be done by turning it 45 degrees counter-clockwise and then lifting off the dust cap
- Turn the adjustment screw one step in the direction ”MAX” to increase or in the direction ”MIN” to decrease the SOFTLITE pressure.

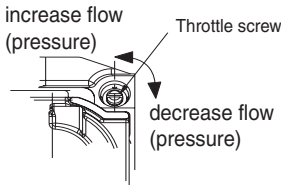
  NOTE: Change over from natural gas to LP gas by turning from mininimum to maximum.
- Start up the appliance and re check the ignition, and repeat the adjustment if needed.
- Replace dust cap.

Throttle adjustment ..VE types.

The position of the throttle screw can be found on page 5.
Apply a screwdriver to turn the screw.
To decrease the flow, turn screw clockwise.
To increase flow, turn screw counter-clockwise.

⚠ WARNING

Applied torque may not exceed 8 Ncm



Final checkout of the installation

Set appliance in operation after any adjustment and observe several complete cycles to ensure that all burner components function correctly and that cap screw and cover are fitted and secured.

Maintenance and service

Under normal circumstances no maintenance or service is required.
Screws on the gas control that have been sealed must never be removed.

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CONSTRUCTION AND WORKING PRINCIPLES

Servo pressure regulation

The VK4100/VK8100 series gas controls features the positive servo system, i.e. the main gas valve is closed by spring pressure in the normal shut down position and can only be opened when gas pressure is sufficient to overcome the spring force. This valuable built in safety feature ensures the main valve wil automatically close in the event of power or gas supply failure.

The heart of the system is the servo pressure regulator which consists of a pressure relief valve integrated in a regulator diaphragm which is fitted above and controls the main valve.

When the direct on/off operator and servo on/off operator are energized, inlet gas flows through the servo orifice and through the open operator valve into the servo system and the regulator. This servo gas moves the main valve diaphragm upwards enough to open the main valve. As soon as the main valve has opened, the outlet pressure will be sensed by the regulator diaphragm via the feedback channel.

When the force operated by the pressure is greater than that preset by the adjustment screw, the regulator valve opens relieving some of the working pressure. This reduces the force against the main valve spring allowing the main valve to close proportionately. Thus the main valve limits the outlet (or burner) pressure to the preset level.

As a result, outlet pressure is continuously maintained by comparing it to the preset pressure and adjusting the position of the main valve accordingly. This means that a constant outlet pressure is maintained regardless of inlet pressure variations.

At shut down, the small volume of working gas in the regulator and the diaphragm chamber is dumped into the main outlet chamber.

A reference pressure feedback connection further regulates the outlet pressure by compensating for differences in the air pressure in the combustion chamber and at the valve.

If pressure regulation is not needed, the regulator spring can be blocked by turning the adjustment screw down until it stops or the pressure regulation is removed. In these cases the full servo gas pressure opens the main valve as far as the pressure drop allows.

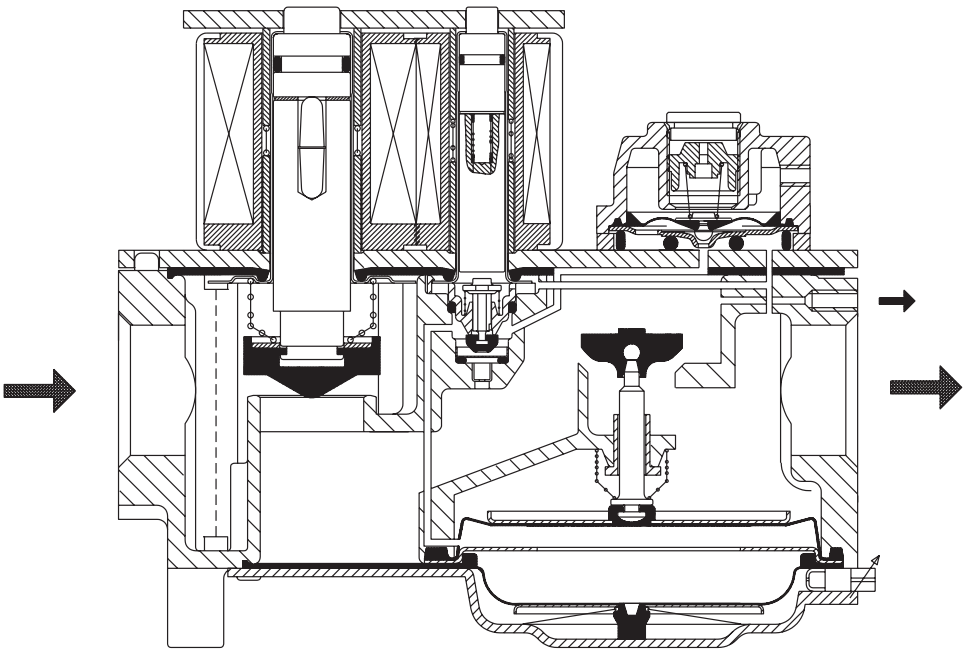


Fig. 14. Servo pressure regulation working

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SOFTLITE

Some burners function well using a fast opening valve with the pressure build up as shown in fig. 15. However, other burner/ appliance combinations need a means of improving their ignition characteristics by providing quieter ignition and reducing flame roll-out. The SOFTLITE mechanism achieves this by changing the profile of the outlet pressure curve as shown in fig. 15.

An extra diaphragm and spring are inserted below the main diaphragm. When the electric servo operator valve is opened, working gas enters the SOFTLITE chamber via the inlet orifice, and is fed into the space between the diaphragms. Working gas pressure rapidly increases to a preset level, partially opening the main valve (fig. 16 .).

As soon as it reaches the start level it overcomes the SOFTLITE spring pressure. The resultant move of the SOFTLITE diaphragm inhibits the increase of working gas pressure on the main valve diaphragm. Only when the SOFTLITE spring has been totally compressed does the working gas pressure increase rapidly once again until the regulator set point pressure is reached.

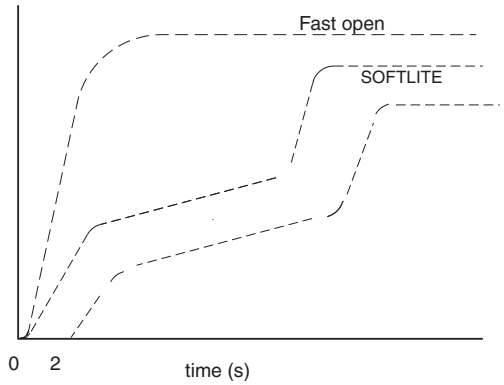
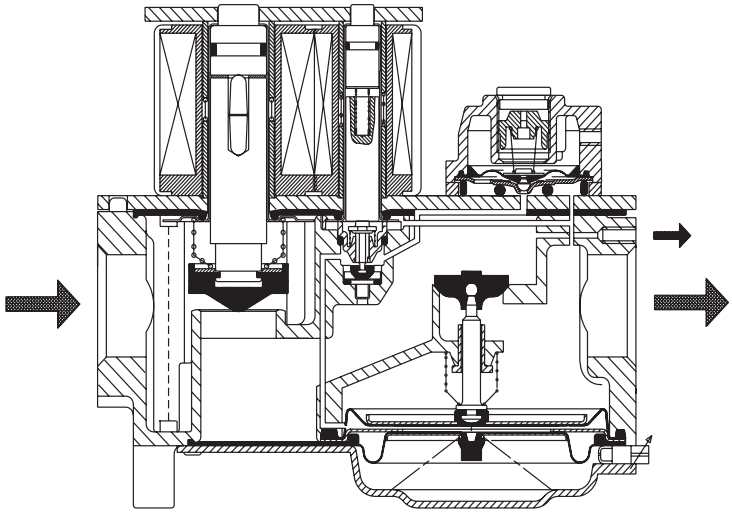


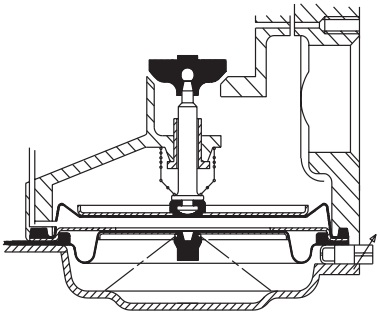
Fig. 15. Opening characteristics

SOFTLITE adjustment

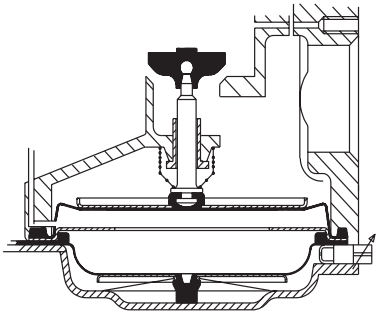
The adjustable SOFTLITE feature allows for individual SOFTLITE setting from the rated min. setting upwards and for switching over from natural gas to LP gas pressures.
An example is given in fig. 18.



Safety valve open



SOFTLITE ON position,
SOFTLITE gas only, main valve partially open



SOFTLITE ON position, main valve open

Fig. 16. Servo pressure regulation SOFTLITE models

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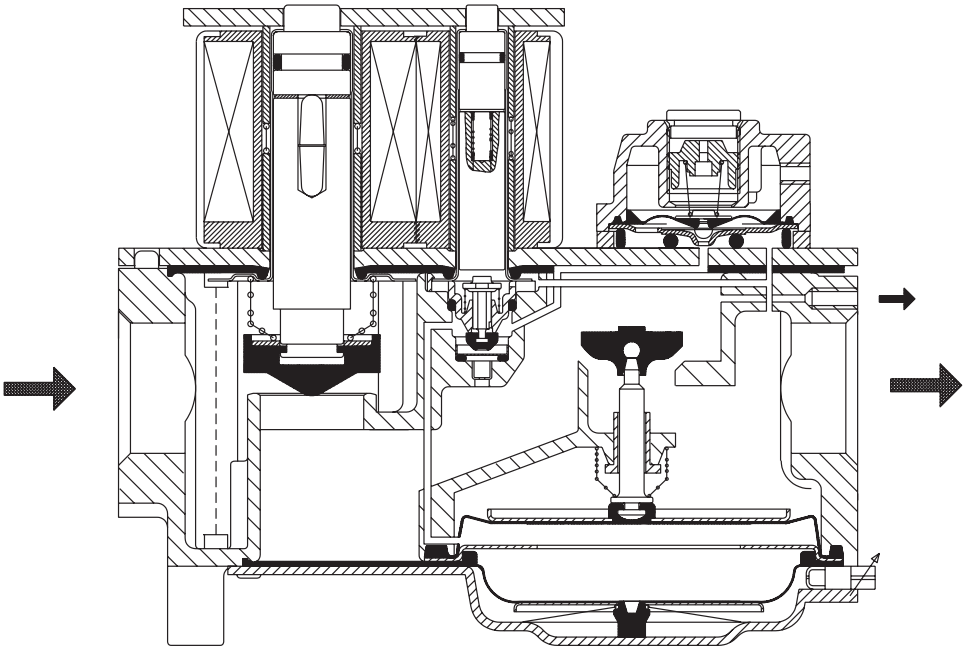
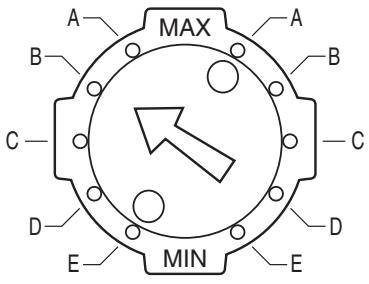


Fig. 17. Safety valve and main valve open position

Example:
SOFTLITE curve VK41../VK81..

SOFTLITE spring: 5 mbar
Gas family: LP Gas (G30, G31
Inlet pressure: 37 mbar
Adjustable SOFTLITE setting positioning



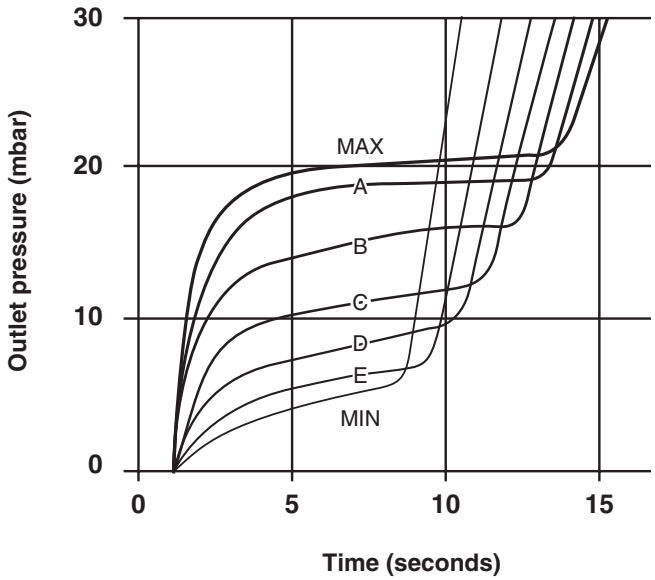


Fig. 18. Adjustable SOFTLITE

QUALITY ASSURANCE STATEMENT

Products are manufactured under an ISO 9001 (1994) based and certified Quality System.

The quality system is described in the Honeywell Combustion Controls Center Quality Assurance Programme and its related operational procedures and instructions.

The quality system is approved by Gastec against certificate number 9.302/2.

The quality organisation is responsible for defining, maintaining, improving and verification of the quality systems in the field of design, production process and field quality service.

Assembly processes are guided by work instructions. Patrol inspections form part of the assembly processes.

At the end of the assembly phase, **all** gas controls are leakage and performance tested/adjusted.

Assembly inspection is performed by employees of the quality control department, using their own authorised equipment.

All inspections (incoming and assembly) are performed by trained personel and according inspection procedures.

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STANDARDS AND APPROVALS

Standards

The gas control has been designed to meet the European Standards:
EN 88: Pressure govenors
EN 126: Multifunctional controls.
EN 161: Automatic shut off valves

The safety shut off valve meets class A or B requirements depending on model number.

The servo operated main valve meets **class J** requirements in case of: VK4100/VK4105

The servo operated main valve meets **class C** requirements in case of VK4110/VK4115

The servo operated main valve meets **class B** requirements in case of VK4120/VK4125

A class J valve as mentioned in EN 161; 1997 is equal or better than a class D' valve as mentioned in EN 297 and EN 483 and class D valves as mentined in other standards.

According to bending stresses the gas control meets the highest requirements (group 2).

The pressure govenor meets class B performance.

Regarding electric safety, the gas control can be used in appliances according to European Standard for household electrical requirements EN 60335 series.

The gas control also meets all Electro Magnetic Compatability standards for non-industrial appliances.

Approvals

The gas control conforms with the following EC - Directives:

- Gas Appliance Directive (90/396/EEC)
- Low Voltage Directive (73/23/EEC)
- Electro Magnetic Compatability Directive (89/336/EEC)

The fact that the gas control is certified to european standard EN 88 EN 126 and EN161 means that the gas control meets the requirements in all EC and EFTA countries.

Details per O.S. number can be found in the Approvals List.

ORDERING INFORMATION

When ordering specify:

- Model number of CVI gas control component required: see model number chart below.
- The correct pilot burner for the installation concerned: refer to Honeywell ignition products guide EN0R-0038.

NOTE: Complete gas control, replacement parts and accessories will be available under ”TRADELINE” label. Ask your wholesaler for details.

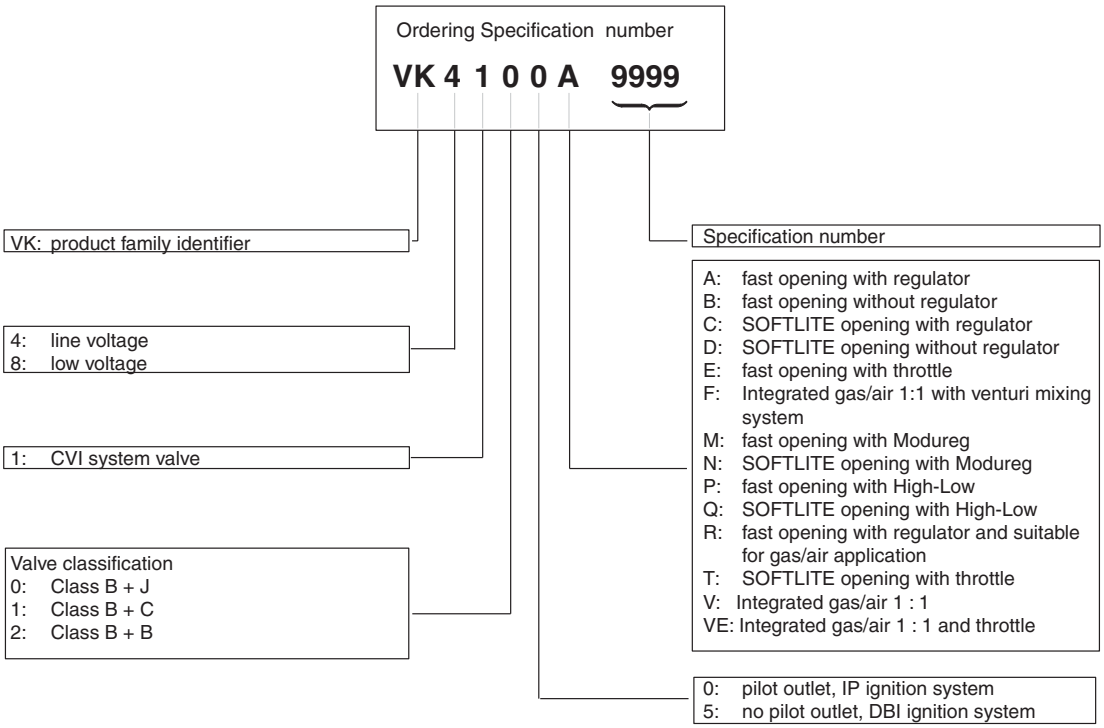


Fig. 19. Model number chart VK series gas controls

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REPLACEMENT PARTS AND ACCESSORIES

Contents

Replacement parts and accessories **page**

Flange assemblies....32
Fitting....32
Gas pressure switch....33
Miscellaneous....33
Plugs....33

FLANGE ASSEMBLIES

Connection size	Configuration		"O"-ring and screws	Packing quantity (pcs)	Order number
	Straight	Elbow			
3/8" BSP.Pl	X	-	YES	200	45.900.400-101
3/8" BSP.Pl[1)]	-	X	YES	200	45.900.400-103
3/8" BSP.Pl[1)]	-	X	Only "O"-ring	200	45.900.400-129
1/2" BSP.Pl	X	-	YES	200	45.900.400-102
1/2" BSP.Pl	X	-	NO	200	45.900.400-106
1/2" BSP.Pl	X	-	Only "O"-ring	200	45.900.400-131
1/2" BSP.Pl	X	-	YES	10	45.002.776-041
1/2" BSP.Pl[1)]	-	X	YES	200	45.900.400-104
1/2" BSP.Pl[1)]	-	X*	NO	200	45.900.400-108
1/2" BSP.Pl[1)]	-	X*	Only "O"-ring	200	45.900.400-130
1/2" BSP.Pl[1)]	X	-	YES	10	45.002.776-042
1/2" NPT	X	-	YES	200	45.900.400-122
3/4" NPT[1)]	-	X	YES	200	45.900.400-146
Ø 18.4 mm	X	-	YES	200	45.900.400-123

1) Not applicable for mounting over pilot outlet.
2) Applicable for mounting in all directions.
* Provided with 1/8" BSP. Tr pressure tap hole

FITTING

Description	Material	Packing quantity	Ordernumber
Compression fitting M8 x 1 for 4 mm pilot tube connection	Brass	200	45.900.402-019
Compression fitting M10 x 1 for 6 mm pilot tube connection[1)]	Brass	200	45.900.402-020
Compression fitting M11 x 1 for 6 mm pilot tube connection[1)]	Brass	200	45.900.402-002
Pressure feedback fitting for 4 mm tube	Brass	200	45.900.402-010
Pressure feedback fitting for 6 mm tube	Brass	200	45.900.402-011
Pressure feedback fitting for 4 mm tube	Polyamide 6.6	100	45.900.402-031
Pressure feedback fitting for 6 mm tube	Polyamide 6.6	100	45.900.402-034

1) Only applicable for VK41../VK81..R

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GAS PRESSURE SWITCH

Description	Packing quantity	Ordernumber
Switch point ON: 15.5 ± 1; switch point OFF: 13 ± 1, gold plated contacts, red sealing	48	45.900.438-107
Switch point ON: 15.5 ± 1; switch point OFF: 13 ± 1, AgNi contacts, blue sealing	48	45.900.438-109
Switch point ON: 12.5 ± 1; switch point OFF: 10 ± 1, AgNi contacts, green sealing	48	45.900.438-110
Switch point ON: 15.5 ± 1; switch point OFF: 13 ± 1, AgNi contacts, blue sealing	48	45.900.438-209[1)]

1) With cover mounted

MISCELLANEOUS

Description	Packing quantity	Ordernumber
Cap throtlle valve	1000	45.900.431-008
Gasket for mounting between the gas control and ignition control	2000	45.900.442-007
Gasket for mounting between the gas control and ignition control	192	45.900.442-011
Screw for plug rectifier (45.900.441-xxx)	8000	45.900.445-007
Plug for connecting on coil of the gas control	500	45.900.445-009

PLUGS

Cable wiring DBI applications
220/240 Volt applications: 3 x 0.75 mm^2
110 Volt applications: : 3 x 0.75 mm^2
24 Volt applications: 2 x 0.50 mm^2

Cable wiring IP applications
220/240 Volt applications: 4 x 0.75 mm^2

For details for specific plug codes, see table 11, page 12

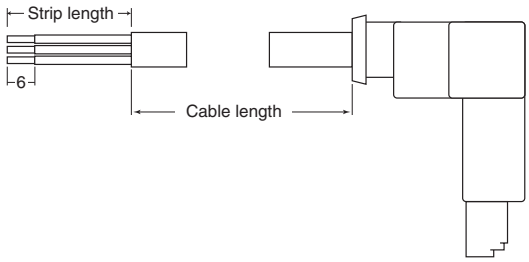


Fig. 20.

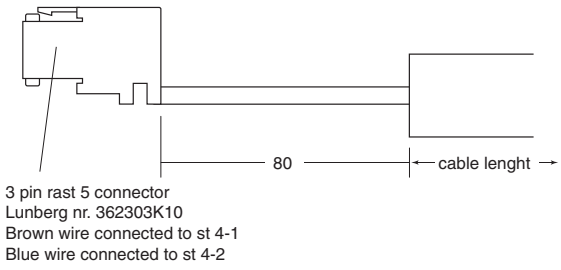


Fig. 21.

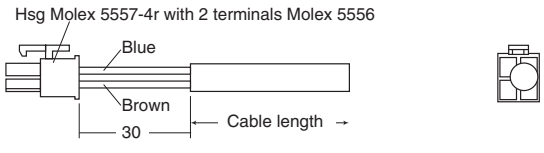


Fig. 22.

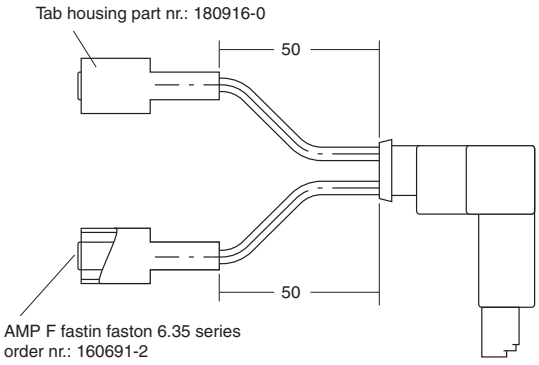


Fig. 23.

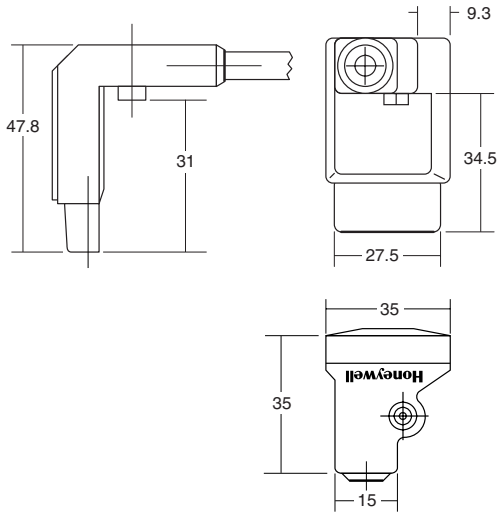

9.3
47.8
31
34.5
27.5
35
Honeywell
35
15

Fig. 24.

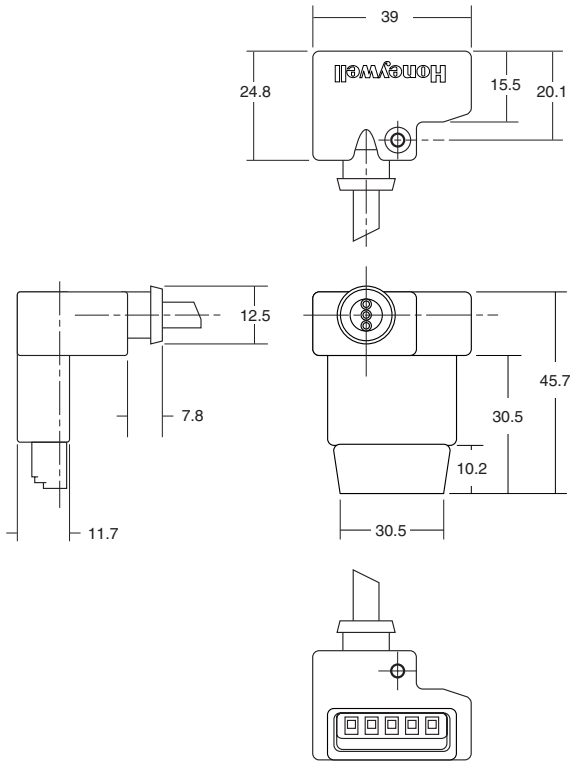

39
Honeywell
24.8
15.5
20.1
12.5
7.8
11.7
45.7
30.5
10.2
30.5

Fig. 25.