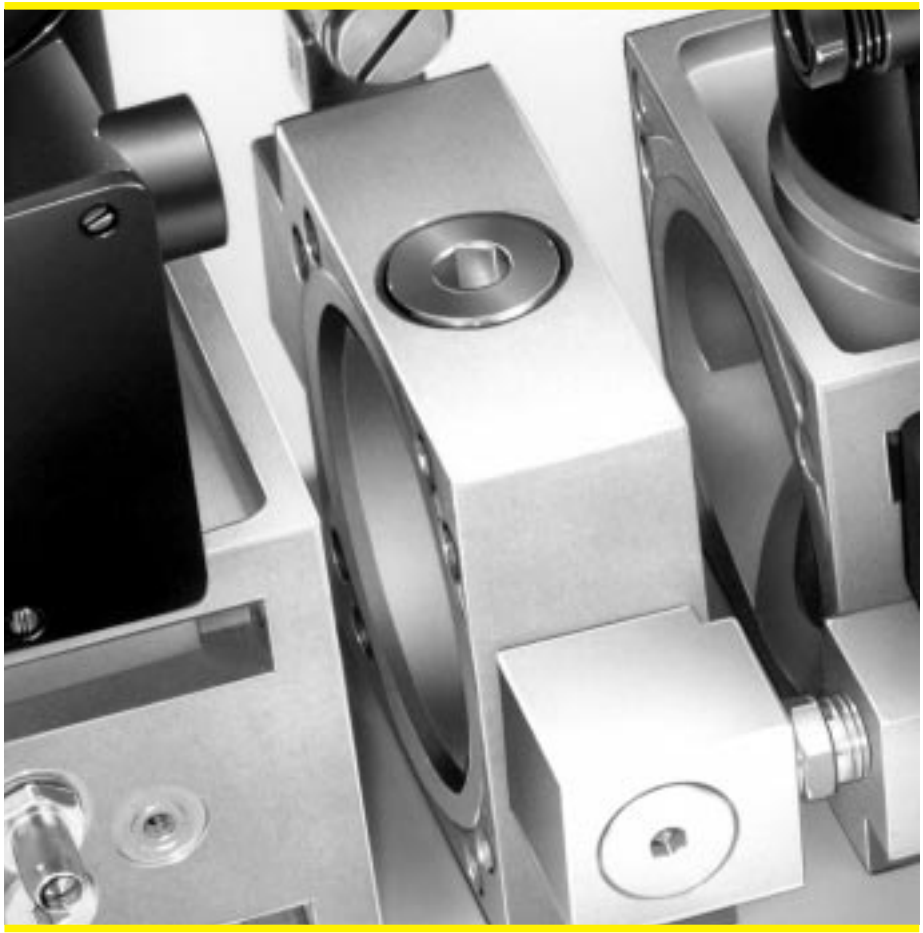
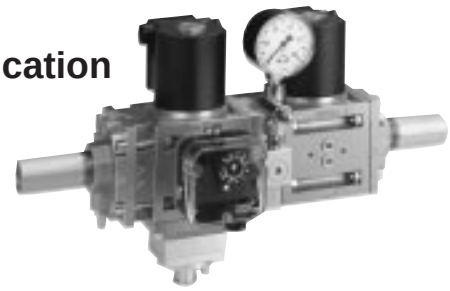


system gastechnic

MODULINE®

Examples of application

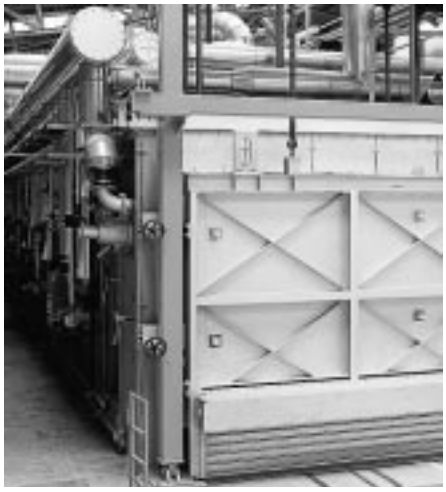
Gas control and safety lines

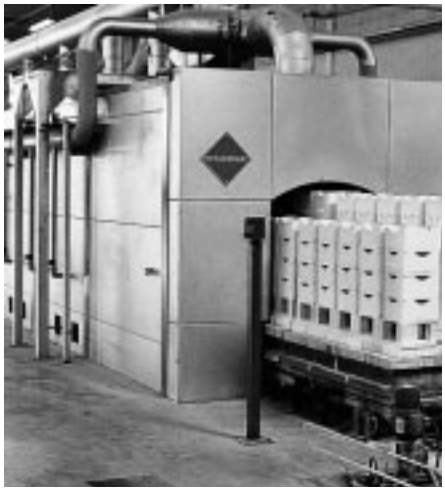


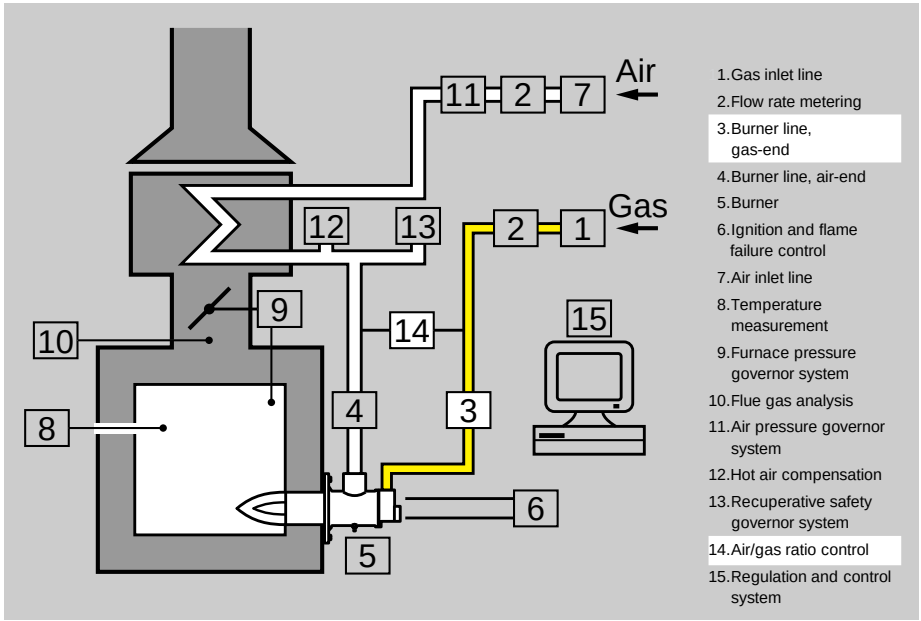
MODULINE®
system gastechnic

Mini gas control line with maxi capabilities

Gas is used as an environment-friendly source of energy in industry to produce and process aluminium, steel, ceramics, glass and foodstuffs. For decades now, Kromschröder has been constructing gas control and safety lines in order to use this gas safely.





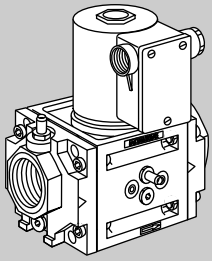


1. Gas inlet line
2. Flow rate metering
3. Burner line, gas-end
4. Burner line, air-end
5. Burner
6. Ignition and flame failure control
7. Air inlet line
8. Temperature measurement
9. Furnace pressure governor system
10. Flue gas analysis
11. Air pressure governor system
12. Hot air compensation
13. Recuperative safety governor system
14. Air/gas ratio control
15. Regulation and control system

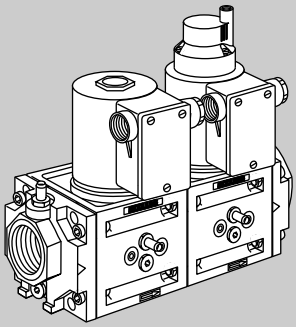
MODULINE®

as a modular system

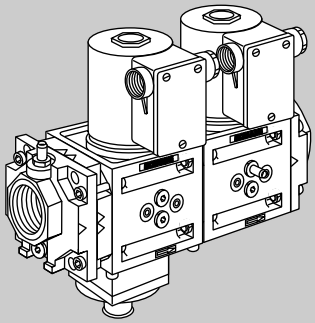
- Compact overall dimensions
- Easy operation
- Many combination options
- Easy interchangeability
- Easy expandability
- Value-for-money
- Compact system from one single source



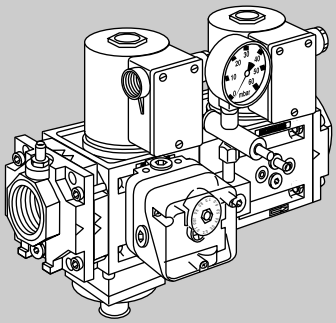
FL..E +
VS..N +
FL..A



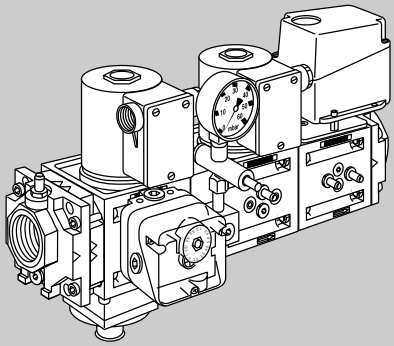
FL..E +
VS..N +
VS..L +
FL..A



FL..E +
FB +
GVS +
VS..N +
FL..A



FL..E +
FB +
GVS+DG +
BV+ Pressure gauge +
VS..N +
FL..A



FL..E +
FB +
GVS + DG +
BV + Pressure gauge+
VS..N +
LFC +
FL..A

The modules

The MODULINE system is a complete product line. It permits compact and customised gas lines to be configured. It can be used in all sectors of industrial and commercial heat generation. Each of the modules below is EC type tested and certified.

Caption

Inlet pressure	01	= 100 mbar
	02	= 200 mbar
	03	= 300 mbar
	05	= 500 mbar
	10	= 1000 mbar
Control ratio	F4	= set, 4:1
	A	= can be set
Mains voltage	T	= 220/240 V AC
	M	= 110/120 V AC
	K	= 24 V DC
	P	= 24 V AC
Connection	3	= with terminals
	6	= with standard plug
Acting time	07	= 7,5 s
	15	= 15 s
	30	= 30 s
	60	= 60 s
Position indicator	S	= position indicator
	G	= with gold contacts
Without non-ferrous metals	M	= without non-ferrous metals
Valve disk	V	= Viton
Control	E	= constant signal
●		= standard
○		= option
–		= unavailable

Solenoid valve VS

for safeguarding and controlling the gas supply to gas burners and gas devices. The valve is quick-opening (VS..N) or slow-opening (VS..L). This permits gas burners to start damped or undamped.

	02	T	M	K	3	6	S	G	M	V	V̇, Δp=5 mbar [m³/h]
VS 115..N	●	●	○	○	●	○	○	○	○	○	11
VS 115..L	●	●	○	○	●	○	-	-	○	○	11
VS 125..N	●	●	○	○	●	○	○	○	○	○	25
VS 125..L	●	●	○	○	●	○	-	-	○	○	25
VS 232..N	●	●	○	○	●	○	○	○	○	○	45
VS 232..L	●	●	○	○	●	○	-	-	○	○	45
VS 240..N	●	●	○	○	●	○	○	○	○	-	65
VS 240..L	●	●	○	○	●	○	-	-	○	-	65
VS 350..N	●	●	○	○	●	○	○	○	○	-	118
VS 350..L	●	●	○	○	●	○	-	-	○	-	118

Two-step solenoid valve VS..Z

for safeguarding and controlling the gas supply to gas burners and gas devices. The valve opens in two stages. The burner capacity can thus be selected in two stages.

	02	T	M	K	3	6	S*	G*	M	V	V̇, Δp=5 mbar [m³/h]
VS 115..ZN	●	●	○	○	●	○	○	○	○	○	18
VS 115..ZL	●	●	○	○	●	○	-	-	○	○	18
VS 125..ZN	●	●	○	○	●	○	○	○	○	○	27
VS 125..ZL	●	●	○	○	●	○	-	-	○	○	27
VS 232..ZN	●	●	○	○	●	○	○	○	○	○	45
VS 232..ZL	●	●	○	○	●	○	-	-	○	○	45
VS 350..ZN	●	●	○	○	●	○	○	○	○	-	125
VS 350..ZL	●	●	○	○	●	○	-	-	○	-	125

* Position indicator only for stage 2

Governor with solenoid valve GVS

for safeguarding and governing the gas pressure in gas inlet and burner lines. The set outlet pressure is maintained constant after opening the solenoid valve.

	02	T	M	K	3	6	S	G	V̇, Δp=10 mbar [m³/h]
GVS 115	●	●	○	○	●	○	○	○	21
GVS 125	●	●	○	○	●	○	○	○	30
GVS 232	●	●	○	○	●	○	○	○	78

Governor with solenoid valve GVD

Function as on GVS. Fields of application relate only to burner lines. The outlet pressure increases in two stages to the set value. Gas burners start damped in this way.

	01	T	M	K	3	6	S	G	V̇, Δp=10 mbar [m³/h]
GVD 115	●	●	○	○	●	○	○	○	21
GVD 125	●	●	○	○	●	○	○	○	30
GVD 232	●	●	○	○	●	○	○	○	78

Air/gas ratio control with solenoid valve GVI

for safeguarding and continuous control in burner lines. The gas outlet pressure is controlled after the solenoid valve opens. The gas outlet pressure follows the varying air control pressure. The ratio between gas flow rate and air flow rate remains constant (1:1).

	02	T	M	K	3	6	S	G	V̇, Δp=10 mbar [m³/h]
GVI 115	●	●	○	○	●	○	○	○	21
GVI 125	●	●	○	○	●	○	○	○	30
GVI 232	●	●	○	○	●	○	○	○	78

Air/gas ratio control with solenoid valve GVIB

Function as for GVI. The GVIB is used for High/Low/Off control.

	02	T	M	K	3	6	S	G	V̇, Δp=10 mbar [m³/h]
GVIB 115	●	●	○	○	●	○	○	○	21
GVIB 125	●	●	○	○	●	○	○	○	30
GVIB 232	●	●	○	○	●	○	○	○	78

Variable air/gas ratio control with solenoid valve GVR

Function as for GVI. The ratio between gas pressure and air pressure can be set in order to achieve a high gas outlet pressure with a low air pressure.

	01	F4	A	T	M	K	3	6	S	G	V̇,Δp=10 mbar [m³/h]
GVR 115	●	-	●	●	○	○	●	○	○	○	21
GVR 125	●	-	●	●	○	○	●	○	○	○	30
GVR 232	●	-	●	●	○	○	●	○	○	○	78

Variable air/gas ratio control with solenoid valve GVRH

for safeguarding and stabilising the gas/air ratio in installations with air-preheating. Heating the combustion air reduces the air flow rate. After the solenoid valve opens, the GVRH adjusts the gas flow rate to the air flow rate so as to maintain a constant ratio.

	01	F4	A	T	M	K	3	6	S	G	V̇,Δp=10 mbar [m³/h]
GVRH 115	●	●	-	●	○	○	●	○	○	○	21
GVRH 125	●	●	-	●	○	○	●	○	○	○	30
GVRH 232	●	●	-	●	○	○	●	○	○	○	78

Linear flow control and RV control valve LFC

for controlling continuously governed combustion processes. The unit sets the burner capacity exactly. It is controlled by a 3-point step control or by a constant signal (e.g. 4 - 20 mA). Ratio between input signal and flow rate is linear. Control range LFC: 25:1, RV: 100:1.

	05	T	M	P	07	15	30	60	M	G	E	V̇,Δp=5 mbar [m³/h]
LFC 108	●	●	○	○	●	●	●	●	○	○	○	2,4...6
LFC 115	●	●	○	○	●	●	●	●	○	○	○	9...17
LFC 120	●	●	○	○	●	●	●	●	○	○	○	20...35
LFC 232	●	●	○	○	●	●	●	●	○	○	○	48...67

Control valve with solenoid valve RVS

Function as on RV, with additional solenoid valve for safeguarding the gas supply.

	02	03	05	10	T	M	P	60	M	V	G	E	V̇,Δp=5 mbar [m³/h]
RV(S)..232/W	-	-	-	●	●	○	○	●	○	○	○	○	2
RV(S)..232/X	-	-	-	●	●	○	○	●	○	○	○	○	3,3
RV(S)..232/Y	-	-	-	●	●	○	○	●	○	○	○	○	5
RV(S)..232/Z	-	-	-	●	●	○	○	●	○	○	○	○	8
RV(S)..232/A	-	-	-	●	●	○	○	●	○	○	○	○	11
RV(S)..232/B	-	-	-	●	●	○	○	●	○	○	○	○	14,5
RV(S)..232/C	-	-	●	-	●	○	○	●	○	○	○	○	19,3
RV(S)..232/D	-	●	-	-	●	○	○	●	○	○	○	○	29
RV(S)..232/E	●	-	-	-	●	○	○	●	○	○	○	○	43

Accessories

FL connection flanges
SB and FB strainer and filter modules
BV orifice module
PB intermediate element
DG pressure switch
KP 63 pressure gauge
Manual cock for pressure gauge
Attachment bracket
Connecting set
These accessories permit combinations to be configured easily and quickly, from the single device through to the complex gas control and safety line.

		V̇, Δp=5 mbar Δp_{max} = 10 mbar [m³/h]
FB 1		24
FB 2		76
FB 3		109
		V̇, Δp=5 mbar
SB 1		79
SB 2		173
SB 3		267
BV 1		95
BV 2		286
BV 3		405

All flow rates apply to natural gas.

General technical data

Type of gas: natural gas, town gas, liquefied petroleum gas (LPG); biologically produced methane as a special version
Fitting position: vertical or horizontal

Overview of the most popular furnace/kiln installation and processes in the various industrial plants

The table below lists examples of application in the last column for each type of furnace or kiln. These examples relate to the burner line and air/gas ratio control. They are explained in further detail on the pages which follow.

Abbreviation	General designation	Abbreviation	General designation
NM	Nozzle-mixing burner	Man. Bu.	Manual burner
PM	Pre-mixing burner	Imp.	Impulse burner
Atm. Bu.	Atmospheric burner	Module	Continuous control
Inj. Bu.	Injection burner	A/Z	Stages, On/Off
Inj. Gas	Gas injection	A/K/Z	Stages, High/Low/Off
Recu	Recuperative burner	Direct	Incorporated ignition device
Recu-Rt	Recuperative radiant tube burner	Pilot	Separate pilot burner
Rt	Radiant tube burner		
Regener	Regenerative burner		

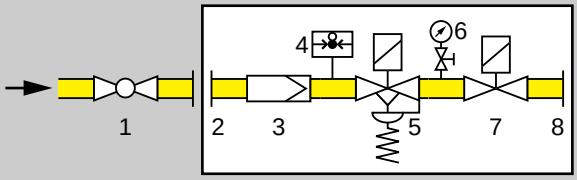
Branches of industry	Installation	Type of burner	Heating method	Shape of flame	P [kW]	Lambda [m^3G/m^3L]	Control range	Type of operation	Process temperature [˚C]	Air temperature [˚C]	Ignition	Example of appl.
Iron and steel, component supply industry (sheet metal)	Cupola furnaces	NM	Direct	Short	500-2000	~1.05	1: 5	Module	1350	20-200	Direct Pilot	5
	Crucibles	NM	Direct	Soft	50- 500	1.05	1:10	Module A/Z	1350		Direct Pilot	1,2,3,5
	Holding burners	NM	Direct	Soft	50- 500	... 1.0	1:10	Module	1350		Direct	5
	Manual burners	PM	Direct	Soft	50- 100	1-2	1: 2	Module	1350			1,2,3
	Forging furnaces	NM	Direct	Short	100- 300	1.05	1:20	Module	1150	450	Direct Pilot	1,3,5,7
		Recu	Direct	Short	- 200	1.05		A/Z	1150		pilot	3,8
		Regener	Direct	Short	~500	1.05		A/Z	1150		Direct	1
		NM	Direct	Flat	~500	1.05	1:1.5	A/Z	1150		Direct	1,7
		NM	Direct	Short	100- 300	1.05	1:20	A/K/Z	1150		Direct	7
	Heat treatment	NM	Direct	Long	100- 300	... 1.05	1:10	A/K/Z	<900	350	Direct	7
		Recu	Direct	Short	- 200	... 1.05		A/Z	<900		Direct	1,8
		NM	Direct	Flat	- 500	... 1.05	1:1.5	A/Z	<900		Direct	1,7
	Continuous furnaces, sheets	Rt	Indirect	Long	50- 200	1.05	1:10	Module A/K/Z	<900		Direct	5,7
	Protective atmosphere	Recu-Rt	Indirect	Long	25- 150	1.05	1:10	A/K/Z	<800		Direct	8
	Bell-type annealing	NM	Direct	Long	<=200	... 1.05	1:20	Module A/K/Z	<800	350	Direct	5,7,8
Non-ferrous metals, aluminium	Melting furnaces	NM	Direct	Imp.	50-2000	1.05	1:10	A/K/Z	=800	<300		7
	Pusher-type furnaces	NM	Direct	Imp.	50- 300	1.05	1:10	Module A/K/Z	<800	<350		5,7,8
	Annealing furnaces	NM	Direct	Imp.	100- 500	Excess air	1:10	Module A/K/Z	<300			5,7
	Continuous furnaces	Rt	Indirect	Long	50- 200	1.05	1:10	Module A/K/Z	<300			5,7
Heavy-clay and fine ceramics	Bogie hearth furnaces/kilns	NM	Direct	Short	20- 120	0.6-18	1:20	Module A/K/Z	1450	<200	Direct	4,7
	Tunnel furnaces/kilns	NM	Direct	Short	20- 120	0.6-6	1:10	Module A/K/Z	750	<200	Direct	4,7
	Roll-over-type furnaces/kilns	NM	Direct	Short	20- 120	0.5-3	1: 9	Module A/K/Z	1450	<200	None/Direct	4,7
		PM	Direct	Short	20- 50	0.6-1.6	1: 2	Module	750/1450	20	None/Direct	4
		Inj. Gas	Direct	Long	Approx. 30	–	1:	A/Z	1450	–	None	1
		Inj. Bu.	Direct	Long	< = 50	< 0.7	1: 2	Module	1450	–	None	1
		NM	Direct	Short	20- 120	0,6-6	1: 3	Module	1450	20	Direct	4
	Dryers	NM	Direct	Short	<500	Approx. 1	1:10	Module A/Z	<200	–	Direct	5,7
		NM	Direct	Long	<400	–	1:100	Module	<200	–	Direct	4,10
Glass	Melting-pot furnaces	NM	Direct	Long	<250	Approx. 1	1:10	Module	1500	<300	Direct	5,10
	Feeder heating	NM	Direct	Short	<250	Approx. 1	1:10	Module	1500	–	Direct	5,9,10
	Cooling	NM	Direct	Short	<100	Approx. 1	1:10	Module A/K/Z	<800	–	Direct	5,7
	Forming	NM	Direct	Short	<100	Approx. 1	1:10	A/Z	<800	–	Direct	6,7
	Cutting and parting	NM	Direct	Short	<5	Approx. 1	1:10	A/Z	<800	–	Direct	1,2
	Tempering	NM	Direct	Short	<4000	1:500	1:10	Module	60-1100	–	Direct	4
Cement, thermal afterburning and waste etc.	Basalt melting	NM	Direct	Short	<1000	Approx. 1	1:10	Module	<1300	<450	Direct	5,10
	Calcination	NM	Direct	Short	<1000	Approx. 1	1:10	Module	<1300		Direct	5,10
	Tubular rotary kilns	NM	Direct	Long	<8000	Approx. 1	1: 3	Module	<1300	–	Indirect	5,10
	Waste	NM	Direct	Short	<1000	Approx. 1	1: 3	Module	<1300	<450	Direct	5,10
	Crematoria	NM	Direct	Short	<100	Approx. 1	1: 3	Module	<1000	20	Direct	5
	Thermal afterburning	NM	Direct	Short	<1000	–	1:25	Module	<1200	20	Direct	4
	Excess gas burners	Atm. Bu.	Direct	Long		>>1	–	A/Z	<1200	–	Direct Pilot	1,3
	Digester gas burners	NM	Direct	Short	<500	Approx. 1	1: 3	Module	200	–	Direct	5
Packaging, paper, paint, films	Plastic surface coating	PM	Direct	Short	<100	Approx. 1	1: 2	Module	200	–	Direct	5,7
	Paint drying	NM	Indirect	Long	<100	Approx. 1	1: 2	Module A/Z	200	20	Direct	1,4,10
	Shrink-film systems	NM/VM	Direct	Short	<200	1 (5)	1: 4	Module	200	20	Direct	4,5,6
	Stenter frame textile drying	NM	Direct	Short	<500	1 (5)	1:40	Module	200	20	Direct	5,10
	Paper drying	NM	Direct	Short	Approx. 300	1 (5)	1:40	Module	200	20	Direct	5,10
Rubber	Vulcanisation plants	NM	Direct	Short	<100	1	1:10	Module	200	20	Direct	5,10
Chemicals, refineries	Heaters/treaters	NM	Direct	Short	<300	1	1: 4	Module	200-300	20	Direct	5
	Submerged burners	NM	Direct	Long	<500	1	1: 5	Module	100	20	Direct	5
Foodstuffs	Baking ovens	PM	Direct	Short	10	–	1: 2	Module	<300	–	pilot	3
		NM	Direct	Short	<100	1	1: 3	Module	<300	20	Direct	5
Soldering and brazing plants	Brazing installations	NM	Direct	Short	<200	1	1: 5	Module	>450	20	Direct	2,5,7
	Soldering installations	NM	Direct	Short	<200	1	1: 5	Module	<300	20	Direct	2,5,7

Example of application 1

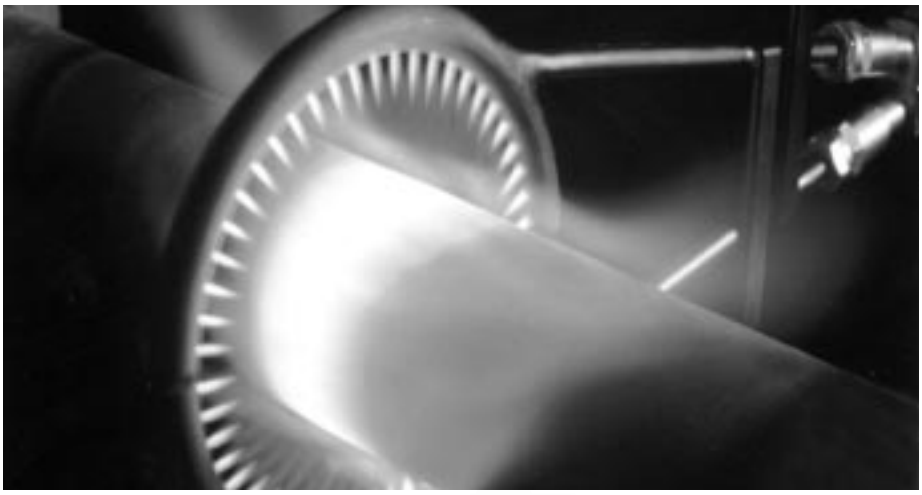
For safeguarding and controlling atmospheric burners, e.g. excess gas burners, flame curtains and one-stage burners, in addition to preheating burners.

One-stage control of atmospheric burners

Mode of operation: After checking the gas pressure, the automatic burner control unit opens the two solenoid valves for gas. The governor ensures a constant outlet pressure.
Governor version GVD reaches the set gas outlet pressure in two stages (damped).

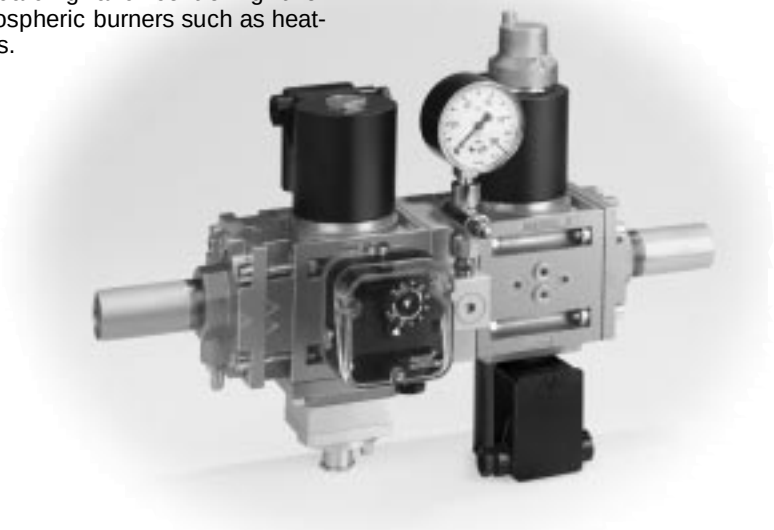


1 AKT manual valve
2 FL inlet flange
3 SB strainer module or FB filter module
4 DG pressure switch
5 Solenoid valve and GVS or GVD governor
6 PB intermediate element with manual cock and pressure gauge
7 VS solenoid valve
8 FL outlet flange



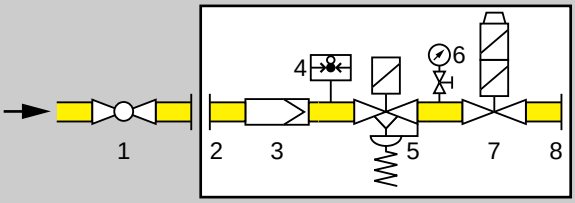
Example of application 2

For safeguarding and controlling two-stage atmospheric burners such as heating burners.



Two-stage control of atmospheric burners

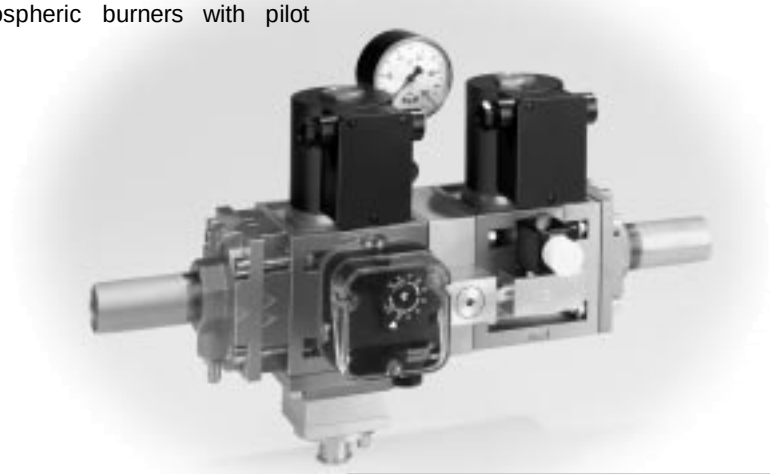
Mode of operation: After checking the gas pressure, the automatic burner control unit opens the first valve and the first stage of the second solenoid valve for gas. The governor ensures a constant outlet pressure. After the flame is produced, the second stage of the second solenoid valve for gas is opened when heat demand occurs, e.g. signalled by a temperature control.



1 AKT manual valve
2 FL inlet flange
3 SB strainer module or FB filter module
4 DG pressure switch
5 GVS governor with solenoid valve
6 PB intermediate element with manual cock and pressure gauge
7 VS..ZL two-step solenoid valve
8 FL outlet flange

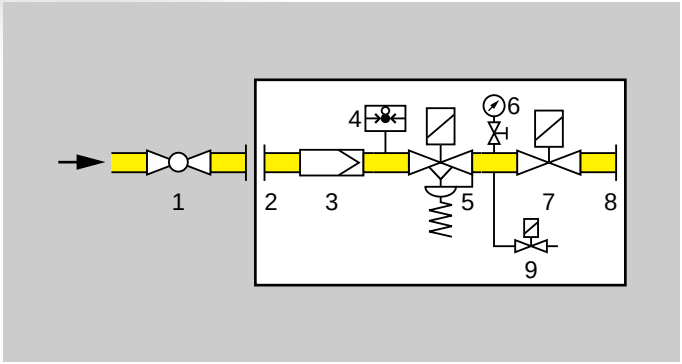
Example of application 3

For safeguarding and controlling one-stage atmospheric burners with pilot burner.

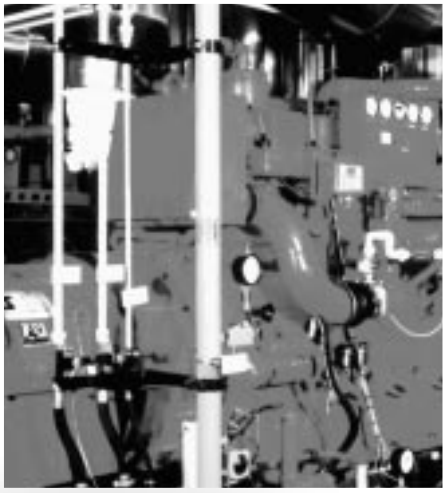


One-stage control of monitored atmospheric burners with pilot burner

Mode of operation: After checking the gas pressure, the automatic burner control unit opens the first solenoid valve for gas and the pilot solenoid valve for gas. The governor ensures a constant outlet pressure. After the flame is produced, the second solenoid valve for gas is opened on demand, e.g. signalled by a temperature control.

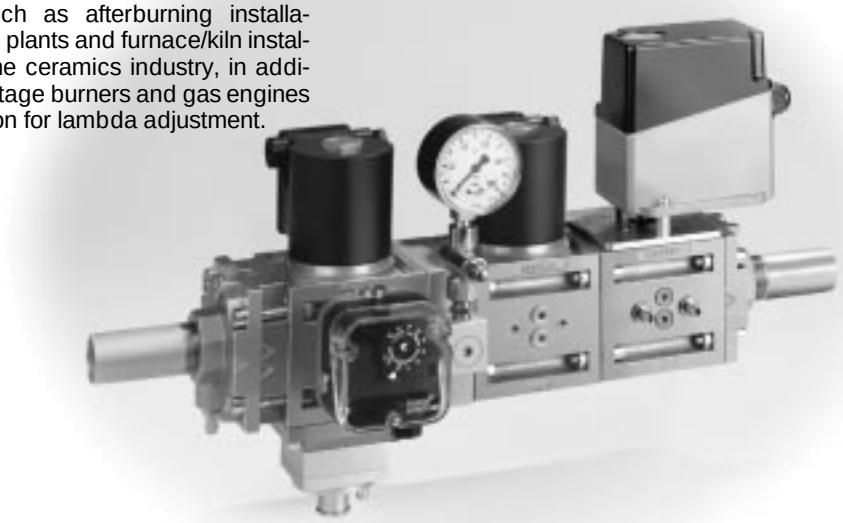


1 AKT manual valve
2 FL inlet flange
3 SB strainer module or FB filter module
4 DG pressure switch
5 GVS governor with solenoid valve
6 PB intermediate element with manual cock and pressure gauge
7 VS solenoid valve
8 FL outlet flange
9 MVB 4 or VG pilot solenoid valve for gas



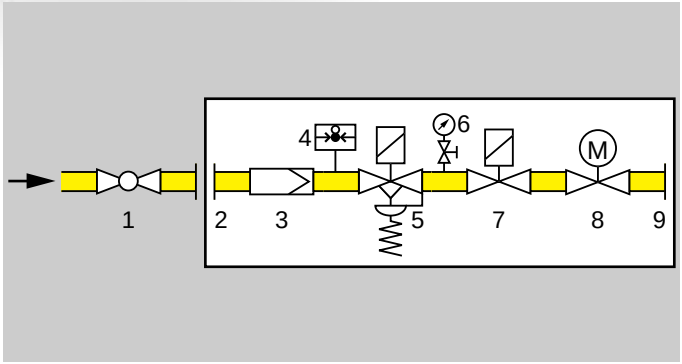
Example of application 4

For safeguarding and controlling process burners, such as afterburning installations, drying plants and furnace/kiln installations for the ceramics industry, in addition to one-stage burners and gas engines with an option for lambda adjustment.

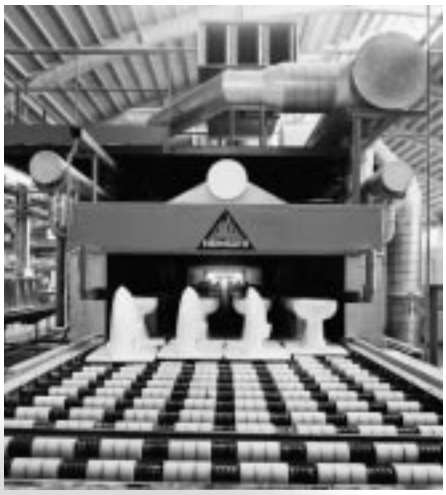


Continuous control of process burners

Mode of operation: After checking the gas pressure, the automatic burner control unit opens both solenoid valves for gas. The governor ensures a constant outlet pressure. The control valve for gas permits the amount of gas to be adjusted steplessly if using the LFC linear flow control (25:1) or the RV control valve (100:1). The combined control valve can be used with the RVS solenoid valve instead of a single VS solenoid valve and RV control valve.

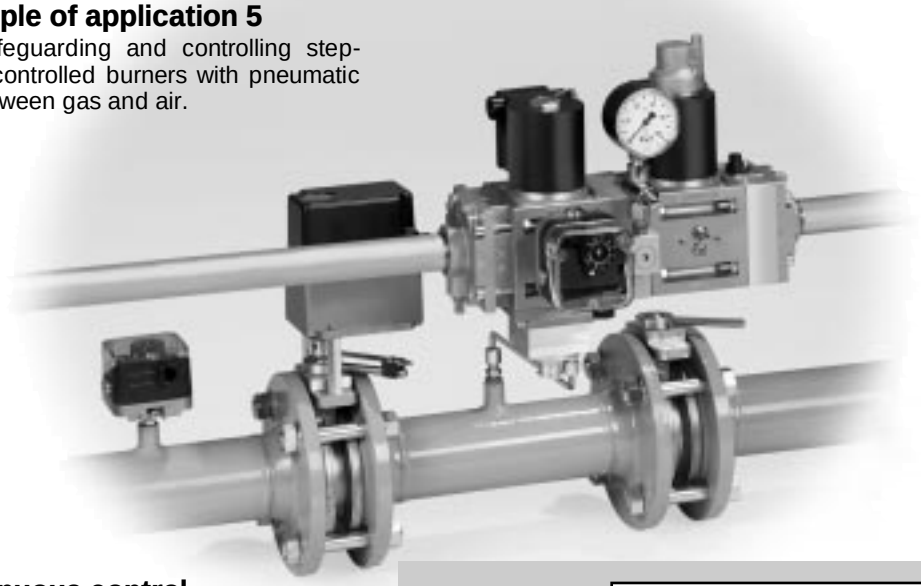


1 AKT manual valve
2 FL inlet flange
3 SB strainer module or FB filter module
4 DG pressure switch
5 GVS governor with solenoid valve
6 PB intermediate element with manual cock and pressure gauge
7 VS..N solenoid valve
8 LFC linear flow control or RV control valve
7/8 RVS control valve with solenoid valve
9 FL outlet flange



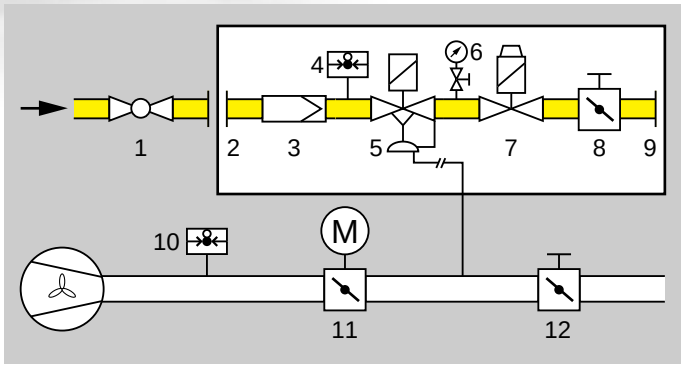
Example of application 5

For safeguarding and controlling steplessly controlled burners with pneumatic link between gas and air.

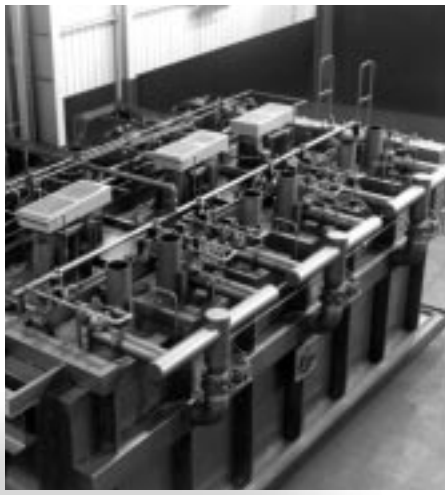


Continuous control of process burners with pneumatic link

Mode of operation: After checking the gas and air pressure and after completion of the purging process, the butterfly valve for air moves to ignition position. The automatic burner control unit opens the two solenoid valves for gas. A proportional outlet pressure is produced on the air/gas ratio control via the impulse line so that the correct quantity of pilot gas reaches the burner. When heat demand occurs, the butterfly valve for air opens steplessly. This causes the control pressure to increase and act via the impulse line on the air/gas ratio control which results in a higher gas outlet pressure. This maintains the ratio between amount of gas and amount of air constant at all operating points. Use of a motor-actuated adjuster downstream of the second solenoid valve for gas permits lambda adjustment.

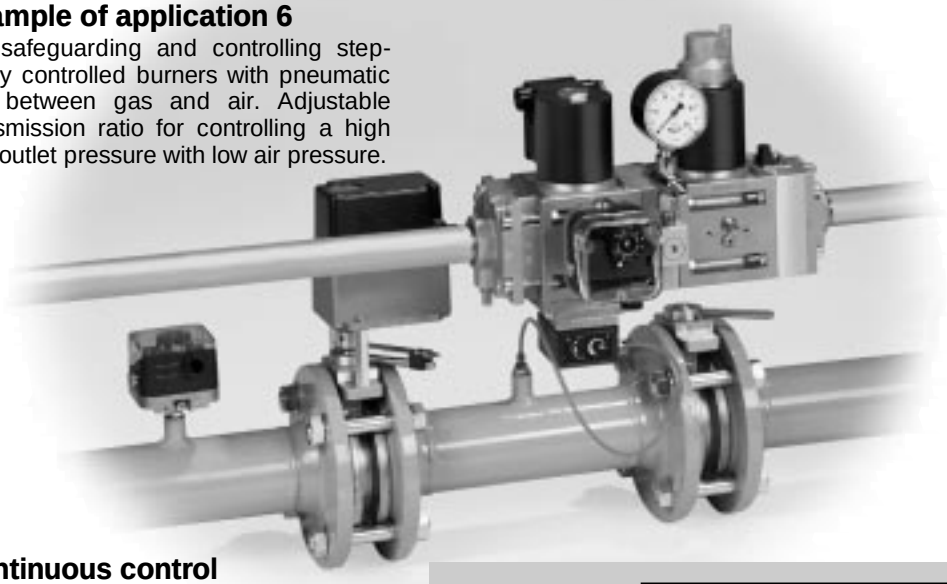


1 AKT manual valve
2 FL inlet flange
3 SB strainer module or FB filter module
4 DG pressure switch
5 GVI air/gas ratio control with solenoid valve
6 PB intermediate element with manual cock and pressure gauge
7 VS..L solenoid valve
8 BV orifice module or LFC linear flow control
9 FL outlet flange
10 DG pressure switch
11 DK ring butterfly valve with GT 31 gear motor
12 DK adjustment valve



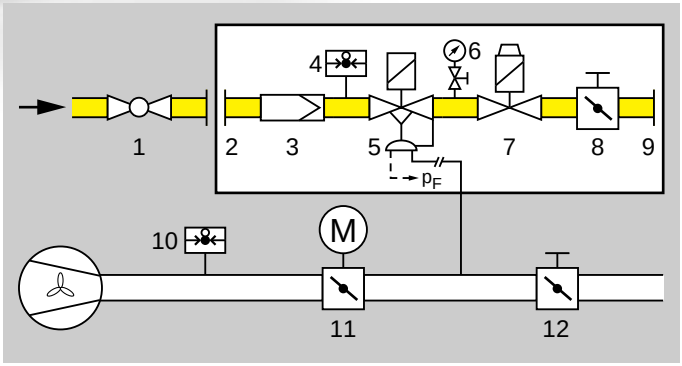
Example of application 6

For safeguarding and controlling steplessly controlled burners with pneumatic link between gas and air. Adjustable transmission ratio for controlling a high gas outlet pressure with low air pressure.



Continuous control of process burners with pneumatic link and adjustable transmission ratio

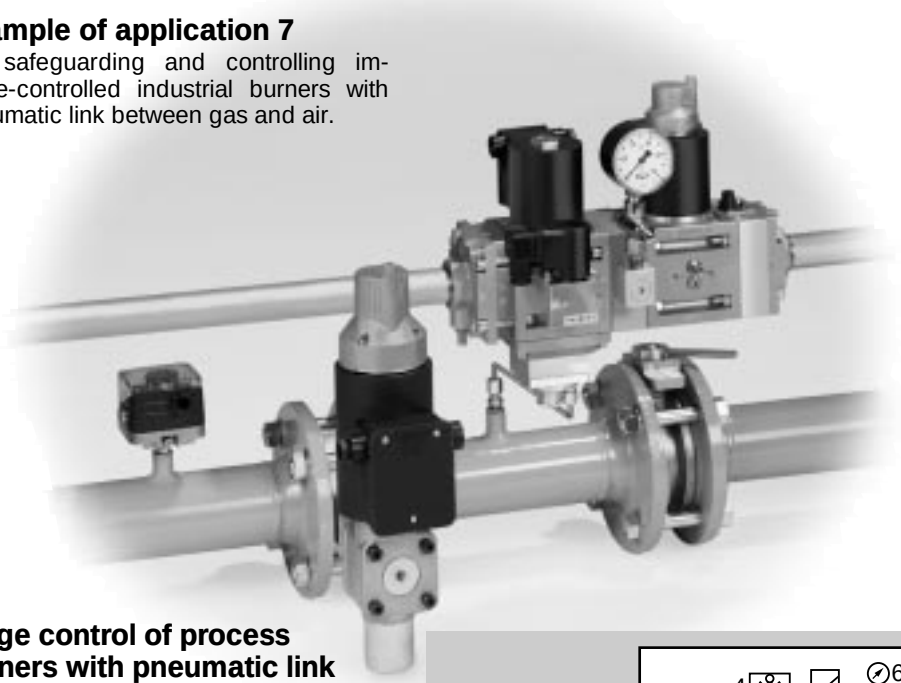
Mode of operation: After checking the gas and air pressure and after completion of the purging process, the butterfly valve for air moves to ignition position. The automatic burner control unit opens the two solenoid valves for gas. A proportional outlet pressure is produced on the variable air/gas ratio control via the impulse line so that the correct quantity of pilot gas reaches the burner. When heat demand occurs, the butterfly valve for air opens steplessly. This causes the control pressure to increase and act via the impulse line onto the variable air/gas ratio control which results in a higher gas outlet pressure depending on set transmission ratio. This maintains the ratio between the quantity of gas and air constant at all operating points. The combustion chamber pressure can be fed back to the control and used to correct the quantity of gas. Use of a motor-actuated adjuster downstream of the second solenoid valve for gas permits lambda adjustment.



1 AKT manual valve
2 FL inlet flange
3 SB strainer module or FB filter module
4 DG pressure switch
5 GVR variable air/gas ratio control with solenoid valve
6 PB intermediate element with manual cock and pressure gauge
7 VS..L solenoid valve
8 BV orifice module or LFC linear flow control
9 FL outlet flange
10 DG pressure switch
11 DK ring butterfly valve with GT 31 gear motor
12 DK adjustment valve

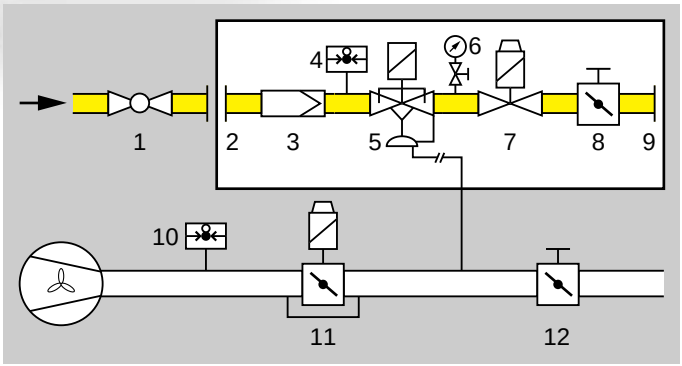
Example of application 7

For safeguarding and controlling impulse-controlled industrial burners with pneumatic link between gas and air.



Stage control of process burners with pneumatic link (impulse firing)

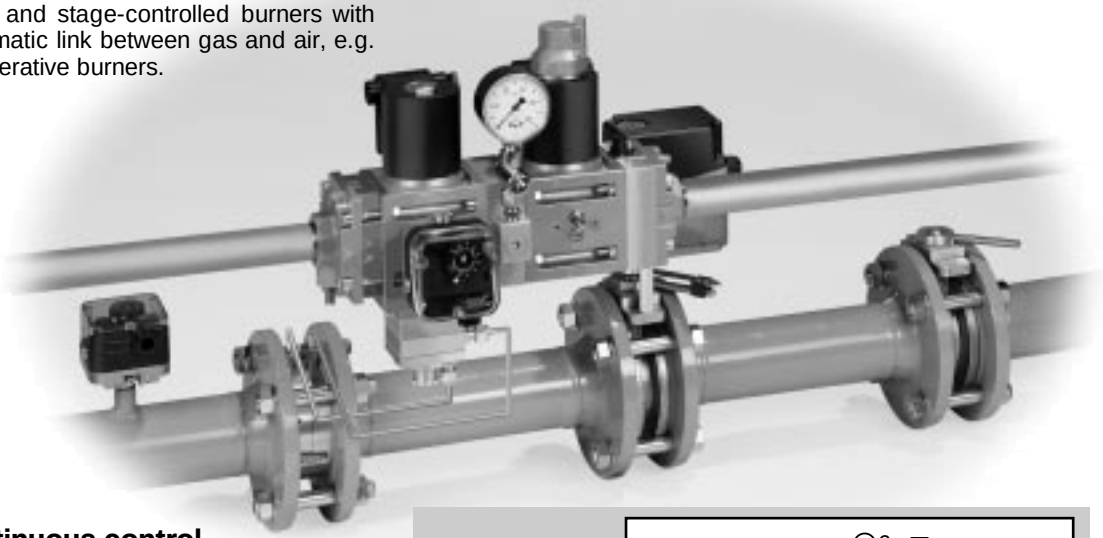
Mode of operation: After checking the gas and air pressure and after completion of the purging process, the automatic burner control unit opens the solenoid valves for gas. The air valve is closed. The minimum quantity of air reaches the burner via a bypass. Likewise, the minimum quantity of gas is supplied to the burner by a bypass on the air/gas ratio control.
When heat demand occurs, the air valve is opened via an impulse control. The increasing air pressure at the air/gas ratio control causes a proportional gas outlet pressure via the impulse line. The burner is then in high-load state. Use of a motor-actuated adjuster downstream of the second solenoid valve for gas permits lambda adjustment.



1 AKT manual valve
2 FL inlet flange
3 SB strainer module or FB filter module
4 DG pressure switch
5 GVIB air/gas ratio control with solenoid valve
6 PB intermediate element with manual cock and pressure gauge
7 VS..L solenoid valve
8 BV orifice module or LFC linear flow control
9 FL outlet flange
10 DG pressure switch
11 MK..R solenoid butterfly valve
12 DK adjustment valve

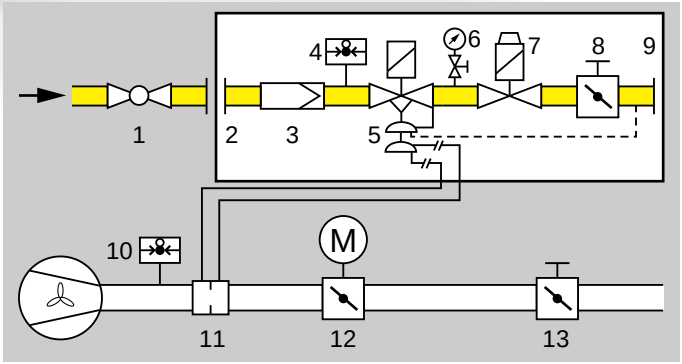
Example of application 8

For safeguarding and controlling steplessly and stage-controlled burners with pneumatic link between gas and air, e.g. recuperative burners.



Continuous control of hot-air burners with pneumatic link

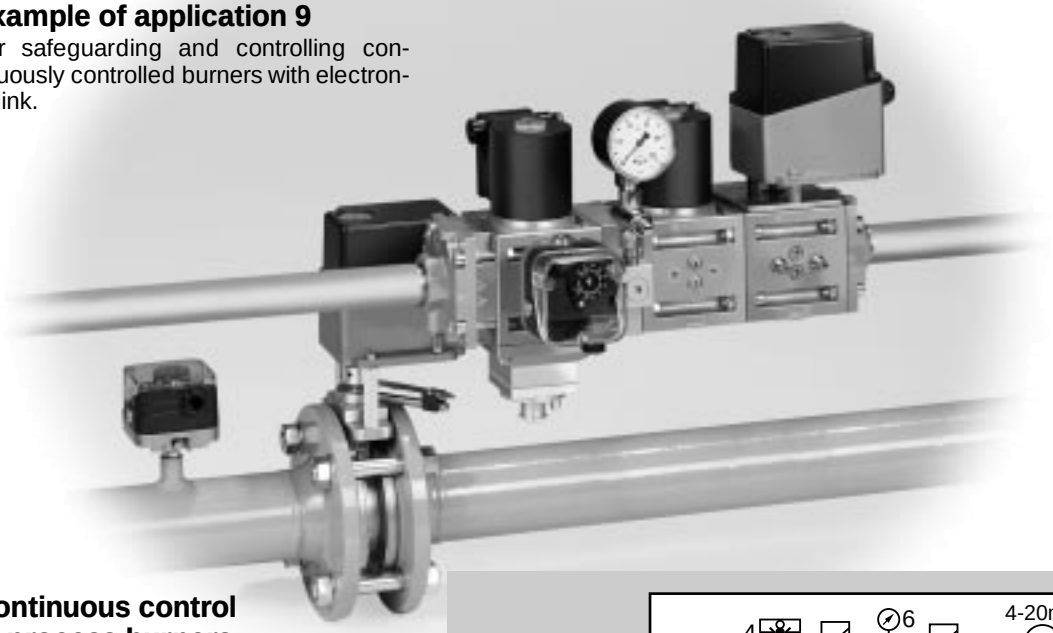
Mode of operation: After checking the gas and air pressure and after completion of the purging process, the butterfly valve for air moves to ignition position. The automatic burner control unit opens the two solenoid valves for gas. A proportional gas outlet pressure is produced at the variable air/gas ratio control as the result of the differential pressure at the air orifice so that the quantity of pilot gas reaches the burner. When heat demand occurs, the butterfly valve for air opens. This causes a higher differential pressure to act on the variable air/gas ratio control which results in a higher gas outlet pressure. When the combustion air is heated in the recuperative burner, the air flow rate is reduced and, thus, so too is the differential pressure of the air orifice. The gas outlet pressure is reduced accordingly. If the second pulse connection at the gas end is used, the gas flow rate is controlled proportionally to the air flow rate. This guarantees the same ratio between gas and air under all operating states.



1 AKT manual valve
2 FL inlet flange
3 SB strainer module or FB filter module
4 DG pressure switch
5 GVRH variable air/gas ratio control with solenoid valve
6 PB intermediate element with manual cock and pressure gauge
7 VS..L solenoid valve
8 BV orifice module
9 FL outlet flange
10 DG pressure switch
11 Orifice plate
12 DK ring butterfly valve with GT 31 gear motor
13 DK adjustment valve

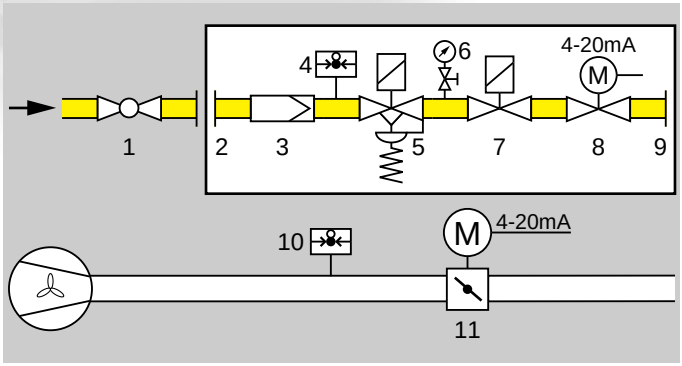
Example of application 9

For safeguarding and controlling continuously controlled burners with electronic link.



Continuous control of process burners with electronic link

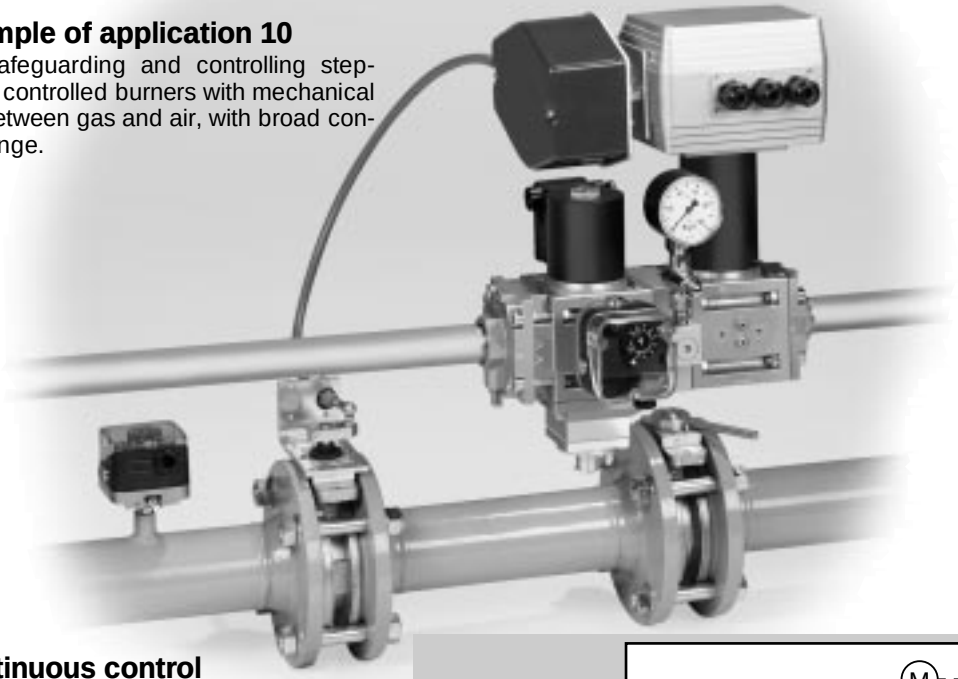
Mode of operation: After checking the gas and air pressure and after completion of the purging process, the ring butterfly valve and the gas control valve move to ignition position. The automatic burner control unit opens the solenoid valves for gas. The gas pressure is maintained constant by the gas governor. When there is a demand for capacity, the gas control valve and the ring butterfly valve are opened.
Internal feedback determines the correct position.
Fail-safe measurement for monitoring the quantity of gas and quantity of air with suitable measuring instruments is required.
Independent control of the two media permits lambda adjustment or correction in the case of preheated combustion air.



1 AKT manual valve
2 FL inlet flange
3 SB strainer module or FB filter module
4 DG pressure switch
5 GVS governor with solenoid valve
6 PB intermediate element with manual cock and pressure gauge
7 VS..N solenoid valve
8 LFC linear flow control or RV control valve
9 FL outlet flange
10 DG pressure switch
11 DK ring butterfly valve with GT 31 gear motor

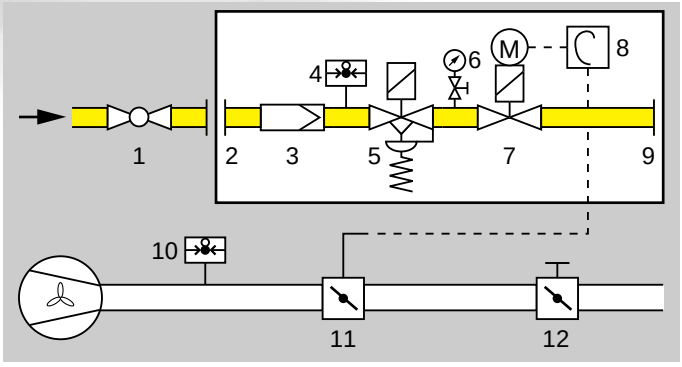
Example of application 10

For safeguarding and controlling steplessly controlled burners with mechanical link between gas and air, with broad control range.

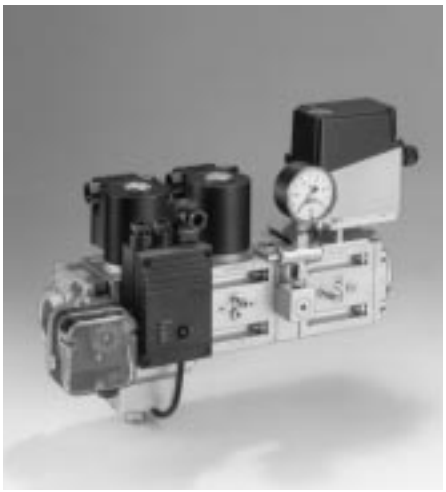


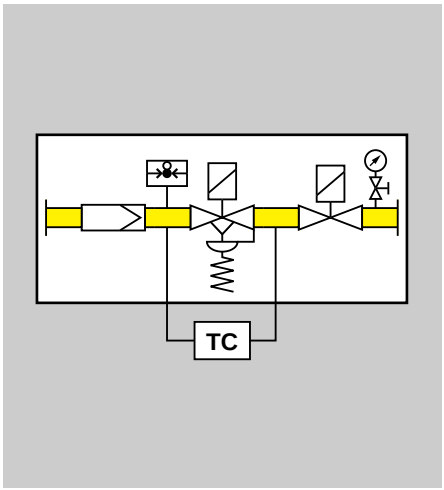
Continuous control of process burners with mechanical link

Mode of operation: After checking the gas and air pressure and after completion of the purging process, the gas control valve moves to ignition position. The mechanical link means that the butterfly valve is also in ignition position. The automatic burner control unit opens the two solenoid valves for gas so that the quantity of pilot gas reaches the burner.
When heat demand occurs, the gas control valve opens steplessly. The butterfly valve for air is opened via a cam disk. The ratio between gas flow rate and air flow rate can be set by means of the cam disk.



1 AKT manual valve
2 FL inlet flange
3 SB strainer module or FB filter module
4 DG pressure switch
5 GVS governor with solenoid valve
6 PB intermediate element with manual cock and pressure gauge
7 RVS control valve with solenoid valve
8 LKS 3 cam disk
9 FL outlet flange
10 DG pressure switch
11 DK ring butterfly valve
12 DK adjustment valve





Tightness control TC

The tightness control TC can be used in installations with two solenoid valves. It checks the safe function of both solenoid valves when the burner is started or after it is switched off.

Please send away for a quotation

Please fax us all relevant data on your heating system and place a cross on the next page against the devices which could be suitable for your application.

Subject to technical modification in the interests of progress.

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Phone 11/4 52-5 06 01/2/3/4, Fax 11/6 09 24 05

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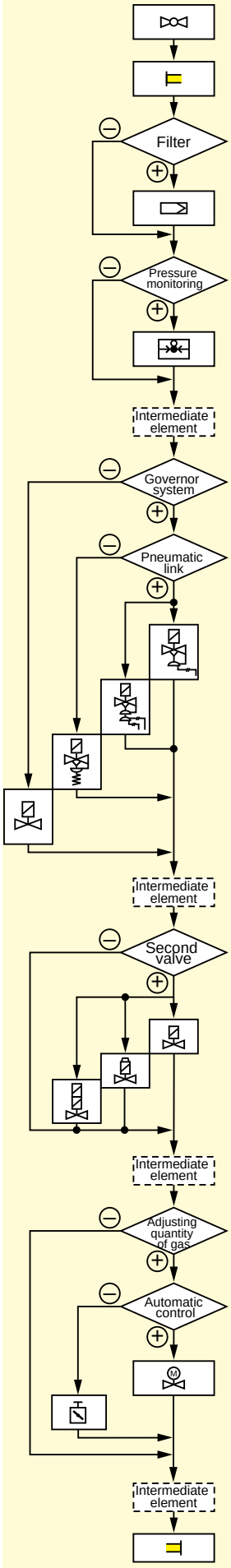
kromschroeder@t-online.de



It must be possible to shut each burner off individually Please provide manual valve.	AKT..	
Provide one FL inlet flange for each line: Size 1: Rp 3/8 - 1 Size 2: Rp 1 - 1 1/2 Size 3: Rp 1 1/2 - 2	FL..	X
FB filter module or SB strainer module fitted in-between, protection of downstream devices against dirt.	SB..	
	FB..	
DG pressure switch for monitoring the min/max gas pressure. Not necessary if the pressure in the gas inlet line is monitored. Mounted on intermediate element, inlet flange for the flow element.	DG..	
Intermediate element between individual modules for mounting pressure gauges, pilot gas valves or pressure switches.	PB..	
For controlling the gas outlet pressure.		
Controlling the gas outlet pressure as a function of the combustion air pressure.		
GVI/GVR/GVIB air/gas ratio control with solenoid valve for continuous control or impulse firing, for maintaining gas/air mixtures constant.	GVI..	
	GVR..	
	GVIB..	
GVRH variable air/gas ratio control with solenoid valve for continuous or stage control, for maintaining gas/air mixtures constant in the case of air-preheating.	GVRH..	
GVS/GVD governor with solenoid valve for maintaining the gas outlet pressure constant, GVD with adjustable start gas stage.	GVS..	
	GVD..	
VS solenoid valve, quick-opening or slow-opening, quick-closing.	VS..N	
	VS..L	
Intermediate element between individual modules for mounting pressure gauges or pressure switches.	PB..	
Burner safeguards in accordance with EN 746-2 must be equipped with two safety valves.		
VS..N solenoid valve, quick-opening, quick-closing.	VS..N	
VS..L solenoid valve, slow-opening, quick-closing.	VS..L	
VS..Z solenoid valve, two-stage-opening, quick-closing.	VS..Z	
Intermediate element between individual modules for mounting pressure gauges or pressure switches.	PB..	
Modules for control/adjustment of the gas flow rate.		
Automatic adjustment of the air flow rate, e.g. for capacity adjustment, lambda control or O_2 control.	LFC..	
LFC linear flow control, control range 1:25 or RV control valve, control range 1:100 for linear adjustment of the gas flow rate. Control valve with solenoid valve possible: RVS. In this case, no second valve necessary.	RV..	
	RVS..	
BV orifice module for adjusting/limiting the gas flow rate manually. necessary.	BV..	
Intermediate element between individual modules for mounting pressure gauges or pressure switches.	PB..	
Please provide an FL outlet flange for each line: Size 1: Rp 3/8 - 1, size 2: Rp 1 - 1 1/2 Size 3: Rp 1 1/2 - 2	FL..	

Fax

to

Name

Fax

From company

Department

Name

Telephone

Date Number of pages

Type of installation _____

Type of burner _____

Furnace/kiln temperature _____ ° C

Number of burner lines _____

Capacity per burner _____ kW

Gas supply

Type of gas _____

Calorific value _____ kW/h

Density _____ kg/m^3_N

Gas flow rate _____ m^3_N/h

Inlet pressure _____ mbar

Outlet pressure _____ mbar

Power supply

Valve voltage _____ V

Frequency _____ Hz

Signal voltage _____ V
(Pressure switches, limit switches)

Air/gas ratio control ☐ yes ☐ no

Air flow rate _____ m^3_N/h

Inlet pressure _____ mbar

Outlet pressure _____ mbar

Air temperature _____ ° C

Control

☐ One-stage

☐ Two-stage

☐ Continuous, control ratio 1: _____

Control: ☐ 3-point step

☐ continuous, signal ___

Equipment

Separate pilot burner ☐ yes ☐ no

TC tightness control ☐ yes ☐ no

Accessories

☐ Filter module ☐ Pressure switch

☐ Strainer module ☐ Pressure gauge

☐ Device line ☐ Position indicator

Flow direction

left → right ☐ right → left ☐

Connection

Inlet Rp _____

Outlet Rp _____

Quotation in accordance with example of application No. ____

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