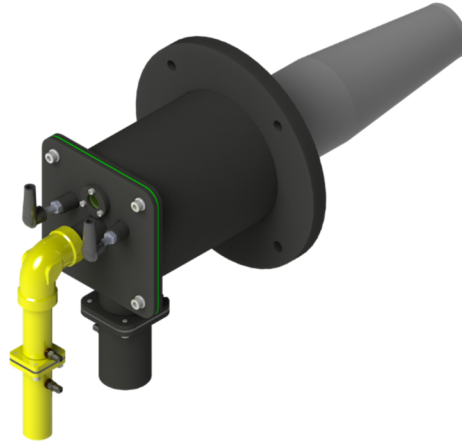


FUSE SERIES BURNERS INSTALLATION, OPERATING AND MAINTENANCE MANUAL

ONE STAGE, TWO-STAGE AND MODULATING OPERATION



FUSE-SS0012-UL
FUSE-SS0020-UL
FUSE-SS0030-UL
FUSE-SS0050-UL
FUSE-SS0100-UL
FUSE-SS0150-UL
FUSE-SS0200-UL
FUSE-SS0250-UL

FUSE -SC0012-UL
FUSE -SC0020-UL
FUSE -SC0030-UL
FUSE -SC0050-UL
FUSE -SC0100-UL
FUSE -SC0150-UL
FUSE -SC0200-UL
FUSE -SC0250-UL
FUSE -SC0400-UL
FUSE -SC0500-UL
FUSE -SC0600-UL
FUSE -SC1000-UL

FUSE -RR0150-UL
FUSE -RR0200-UL
FUSE -RR0250-UL
FUSE -RR0400-UL
FUSE -RR0500-UL
FUSE -RR0600-UL
FUSE -RR1000-UL
FUSE -RR1200-UL
FUSE -RR1600-UL
FUSE -RR2000-UL
FUSE -RR3500-UL
FUSE -RR4250-UL
FUSE -RR5000-UL
FUSE -RR6000-UL

FUSE -RS0150-UL
FUSE -RS0200-UL
FUSE -RS0250-UL
FUSE -RS0400-UL
FUSE -RS0500-UL
FUSE -RS0600-UL
FUSE -RS1000-UL
FUSE -RS1200-UL
FUSE -RS1600-UL
FUSE -RS2000-UL
FUSE -RS3500-UL
FUSE -RS4200-UL
FUSE -RS5000-UL
FUSE -RS6000-UL

FUSE -SS0012-HI
FUSE -SS0020-HI
FUSE -SS0030-HI
FUSE -SS0050-HI
FUSE -SS0150-HI
FUSE -SS0200-HI

FUSE -SC0012-HI
FUSE -SC0020-HI
FUSE -SC0030-HI
FUSE -SC0050-HI
FUSE -SC0150-HI
FUSE -SC0200-HI
FUSE -SC0400-HI
FUSE -SC0500-HI
FUSE -SC0600-HI

FUSE -RR0150-HI
FUSE -RR0200-HI
FUSE -RR0400-HI
FUSE -RR0500-HI
FUSE -RR0600-HI
FUSE -RR1200-HI
FUSE -RR1600-HI
FUSE -RR3500-HI
FUSE -RR4250-HI
FUSE -RR5000-HI

FUSE -RS0150-HI
FUSE -RS0200-HI
FUSE -RS0400-HI
FUSE -RS0500-HI
FUSE -RS0600-HI
FUSE -RS1200-HI
FUSE -RS1600-HI
FUSE -RS3500-HI
FUSE -RS4250-HI
FUSE -RS5000-HI



DEAR USER,

ECOSTAR FUSE-SS0012-SS0020-SS0030-SS0050-SS0100-SS0150-SS0200-SS0250 UL, FUSE-SC0012-SC0020-SC0030-SC0050-SC0100-SC0150-SC0200-SC0250-SC0400-SC0500-SC0600-SC1000 UL, FUSE-RR0150-RR0200-RR0250-RR0400-RR0500-RR0600-RR1000-RR1200-RR1600-RR2000-RR3500-RR4250-RR5000-RR6000 UL, FUSE-RS0150-RS0200-RS0250-RS0400-RS0500-RS0600-RS1000-RS1200-RS1600-RS2000-RS3500-RS4200-RS5000-RS6000 UL, FUSE-SS0012-SS0020-SS0030-SS0050-SS0100-SS0150-SS0200 HI, FUSE- SC0012-SC0020-SC0030-SC0050-SC0150-SC0200-SC0400-SC0500-SC0600 HI, FUSE-RR0150-RR0200-RR0400-RR0500-RR0600-RR1200-RR1600-RR3500-RR4250-RR5000 HI, FUSE-RS0150-RS0200-RS0400-RS0500-RS0600-RS1200-RS1600-RS3500-RS4200-RS5000 HI high speed and ultra-high speed industrial burners are prepared and manufactured according to the latest technical developments and safety rules. It is easy to use for our customers.

We recommend that you read this manual and safety warnings thoroughly before the use of the device in order to ensure safe, cost effective and environmental-friendly use.

If you encounter any issue that is not explained clearly in this manual or you could not understand, please contact with our service department.

We thank you for choosing ECOSTAR brand.

Ecostar Gas Process Burners are manufactured in accordance with TS EN 746-2 standards.

This Operating Manual is an integral part of the burner and must be maintained in a plastic dossier and hung at a clearly visible place in the burner room.

TERMO ISI SİSTEMLERİ SAN.VE TİC.A.Ş.

Esentepe Mah.Milangaz Cad. No:75 K:3

Kartal Monumento Plaza
Kartal/İSTANBUL/TÜRKİYE

Tel: +90 216 442 93 00

Fax: +90 216 370 45 03

www.ecostar.com.tr







e-mail:servis@ecostar.com.tr

CONTENTS

1.	WARNINGS	3
1.1.	Warning Symbols and Descriptions	3
1.2.	General Safety Rules	5
2.	TERMS OF WARRANTY	7
2.1.	Out of Warranty Conditions	8
3.	ECO-FUSE INDUSTRIAL BURNER'S GENERAL FEATURES	9
3.1.	Purpose of Use and Work Limits of Burners	9
4.	TECHNICAL DATA	10
4.1.	Product Family and Code Key	10
4.2.	Capacity and Code Key Charts	11
4.3.	Size Charts	12
5.	INSTALLATION	15
5.1.	ECO-FUSE Burner Assembly Drawing	15
6.	COMMISSIONING	16
6.1.	Ignition and Ionization System	16
6.2.	General Controls	17
6.3.	Combustion Adjustment	18
6.3.1.	Gas Adjustment	18
6.3.1.1.	VGD 20 4011 - 5011 Series Gas Valve	18
6.3.1.2.	MB DLE Series Multiblock Gas Valve	19
6.3.1.3.	MB ZRD(LE) 405 – 412 Series Gas Valve	21
6.4.	Air pressure switch adjustment	22
6.5.	Servomotor Adjustment	22
	22
6.6.	Pilot Ignition System	24
6.7.	Program Relay	24
6.8.	Photocell	25
6.9.	Function Controls and Adjustments	26
6.10.	Final Checks	26
6.11.	Gas Pass Equipment Required in Gas Line	27
7.	MAINTENANCE	29
7.1.	Monthly Maintenance	29
7.2.	Seasonal Maintenance	29
8.	TROUBLESHOOTING	30
9.	PERIODICAL FLUE GAS MEASUREMENT REPORT	31
10.	AFTER-SALES SERVICES	32
11.	NOTES	33

1. WARNINGS

1.1.Warning Symbols and Descriptions

Symbols	Symbol Descriptions
	Important information and useful hints.
	Warning of danger to life or property.
	Warning of electrical voltage.
	Product handling information.
P _F	Impulse connection detecting combustion chamber pressure
P _L	Impulse connection detecting combustion air pressure
P _{BR}	Impulse connection detecting burner gas head
 GAZ HATTINI TEMİZLEYİNİZ. CLEAN GAS LINE. ЧИСТАЯ ЛИНИЯ ГАЗ.	"Clean the gas line" warning on gas line.
	Carry in an upright position. Fragile Item. Protect against water.

Unit Replacement

From Metric Units to English Units System				
Unit	Symbol	Unit	Symbol	Coefficient
cubic meters	m ³	cubic foot	ft ³	35.31
cubic meters / hour	m ³ /h	cubic foot /hour	cfh	33.31
degrees Celsius	°C	degrees Fahrenheit	°F	(°C x 1.8) + 32
kilogram	kg	pound	lb	2.205
kilowatt	kW	British thermal unit/hour	Btu/hr	3414
meter	m	foot	ft	3.28
millibar	mbar	inches of water column	'wc	0.401
millibar	mbar	pound/square in	psi	14.5 x 10 ⁻³
millimeter	mm	inch	in	3.94 x 10 ⁻²

From Metric Units to Metric Units				
Unit	Symbol	Unit	Symbol	Coefficient
kilopascal	kPa	millibar	mbar	10
meter	m	millimeter	mm	1000
millibar	mbar	kilopascal	kPa	0.1
millimeter	mm	meter	m	0.001

From English Units System to Metric Units				
Unit	Symbol	Unit	Symbol	Coefficient
British thermal unit/hour	Btu/hr	kilowatt	kW	0.293 x 10 ⁻³
cubic foot	ft ³	cubic meters	m ³	2.832 x 10 ⁻²
cubic foot /hour	cfh	cubic meters / hour	m ³ /h	2.832 x 10 ⁻²
degrees Fahrenheit	°F	degrees Celsius	°C	(°F x 32) + 1.8
foot	ft	meter	m	0.3048
inch	in	millimetre	mm	25.4
inches of water column	'wc	millibar	mbar	2.49
pound	lb	kilogram	kg	0.454
pound/ square in	psi	millibar	mbar	68.95

1.2.General Safety Rules

- All personnel engaged in installation, disassembly, commissioning, operation, control, maintenance and repair should have received the necessary training and fully read and understood this manual.
- No changes that might damage the safety of the burner unit must be made by persons and/or organizations on the burner unit.
- All operation, commissioning and installation works (except for burning adjustment) should be carried out when the burner is not operating and after disconnecting the power supply. Noncompliance with these rules may lead to serious bodily injuries and even death by electrical shocks or uncontrolled flame formation.
- Repairs concerned with safety elements should be carried out only by the manufacturing company.
- The device should never be used by children, mentally handicapped and inexperienced persons.
- Children must not be allowed to play with the device.
- Keep the device away from explosive and flammable materials.
- Device must intake air, ventilation and air discharge holes must not be closed.



If you sense scent of gas;

- Shut down valves of all gas devices.
- Open all doors and windows.
- Do not turn on electric devices or do not turn them off if they are working.
- Do not use burner derived tools such as match and lighter.
- Inform the gas company.



Do not store any inflammable materials in boiler room.



Wear hearing protectors if there is noise in boiler room.



In case of fire or other emergency;

- Switch off the main switch
- Close the main fuel shut-off valve outside the plant.
- Take appropriate actions



Install burner firmly. Vibration may damage burner or its components.



Keep boiler doors closed while starting burner and during burner operation.



During the first commissioning of the burner or in case of any revision carried out in the electrical system or motor cables by any reason, direction of the fan rotation must certainly be checked by the authorized technical service.



For products that have not been commissioned or started more than 6 months, before activating the servomotor;

In gas and air dampers, servomotor and air damper connections must be checked to ensure that they are free running in spite of immobility and oil freezing.



In products used in high temperature oven applications; When the burners are not operated / are switched off, The air flaps must be set to remain in the half-open position, to prevent the burner components being damaged by hot air.



BURNER ROOM

Install the burner in a suitable room/floor with minimum external air openings and sufficient to ensure perfect combustion, in compliance with current regulations.

Never obstruct air openings of the burner room, burner fan intake vents or air ducts in order to prevent:

a. The build up of toxic / explosive gas mixtures in the burner room,

b. Combustion with insufficient air, resulting in hazardous, anti-economical and polluting operation.

The burner must be always protected from rain, snow and frost to prevent corrosion and paint deformations.

Keep the burner room clean and free of solid volatile substances, which could be sucked into the fan and clog the internal burner or combustion head air ducts.

2. TERMS OF WARRANTY

Main and auxiliary equipment and all components used in Ecostar gas process burners are guaranteed for 1 year by TERMO ISI SİST. A.Ş starting from the date of commissioning under the maintenance, adjustment, operating conditions and relevant mechanic, chemical and thermal effects explained herein.



Please note that this warranty is only valid if the device(s) is commissioned and maintained by our authorized services.



Our company reserves the right to make any modifications on the product and all instructions thereof for improvement purposes.

Refractory Head Warranty Terms

- When process operation temperature is 1400°C or below,
- When it isn't continuous stop and start situations with the pulse ignition principle,
- When the humidity rate in the process is 50% relative humidity and below,
- When it is specified the maximum operating temperature of the burner at the order stage,
- When it isn't used above the maximum operating temperature suitable for the head type,
- When there isn't high humidity, liquid contact, mechanical impact, etc. in the process.

Warranty period for processes is 12 months, under all other conditions and environmental conditions warranty period is 6 months.

2.1.Out of Warranty Conditions

- Any damage arising out of or in relation to customers' non-compliance to their responsibilities with regards to installation, commissioning, operation and maintenance,
- Any damage arising out of or in relation to commissioning, repairs and maintenance carried out by unauthorized services,
- Any damage that may occur during transportation or storage of the product,
- Not preserving the product in its original packaging until the installation stage,
- Incorrect and poor electrical connections, Failures due to incorrect voltage applications, frequent repetition of voltage fluctuations,
- Any damage that may occur as a result of incorrect fuel usage or, foreign substances in the fuel used or using of the product without any fuel,
- Any damage that may occur due to foreign particles entered into the product during installation and operation,
- Failures due to incorrect device selection,
- Any damage to unit due to natural disasters,
- Devices without any warranty certificates,
- Warranty Certificates without the stamp and signature of the authorized dealer or service,
- Devices with any falsification on the warranty certificate or without an original serial number.
- The risks during transportation of device under the responsibility of customer belong to the customer.
- Presence of misuse faults are indicated in the reports issued by authorized service stations or our authorized agent, dealer, representative or our factory in case of unavailability of authorized service stations.
- Customers may apply consumer protection arbitrator committee with regards to this report and request for an expert report.

Out-Of-Warranty Terms For Refractory

- Mechanical assembly and commissioning of the burner and refractory head are done by unauthorized personnel,
- Liquid contact,
- Mechanical destruction/forcing (material impact in the process, etc.),
- Not specifying the maximum process temperature at the order stage,
- Sufficient preheating times are not provided in the process commissioning and daily use processes,
- All factors that cause thermal shock,
- Condensation-liquid detection on fuel/air lines and hood,
- Detection of chemical substances that may disrupt the product head structure,
- Necessary weekly, monthly and annual periodic controls/maintenances are not implemented,
- Product combustion settings are not done and changed by authorized personnel,

If above mentioned condition is detected, the product and the concrete refractory head will be out of warranty.

3. ECO-FUSE INDUSTRIAL BURNER'S GENERAL FEATURES

ECOSTAR ECO-FUSE Industrial burners are manufactured such that they operate in gas pressure at -15%...+10% of nominal voltage, between the ambient temperature range of -15°C...+60°C and declared capacity and boiler pressure ranges with Natural Gas.

3.1.Purpose of Use and Work Limits of Burners

- This product works at any load value equivalent to its max. capacity or covered by its capacity range;
 - High temperature industrial appliances.
 - In direct and indirect hot air generators,
 - -15 °C...+60 °C ambient temperature range,
 - In accordance with the model, 1N 230 VAC / 3N 380VAC 50 Hz supply voltage (-%15 ... + 10%)
 - Max. 95% relative humidity,
 - In well-ventilated open and closed spaces compatible with protection class IP 40.
 - Operation with Natural gas.



This device must never be operated with open flame!

4. TECHNICAL DATA

4.1. Product Family and Code Key

ECO-FUSE Series products are specially designed to work at high temperatures and demanding processes. It produces a homogeneous flame thanks to its high flame rates and flame stabilization to heat the cell or product as soon as possible. These burners, which have high efficiency and performance, are divided into four different models in terms of flame tube (flame head). There are two different models with high flame velocity (+90m/s) and ultra high flame velocity (+150m/s) under the burner model of each flame head.

You can meet your needs with ECO-FUSE burners in your all process requirements thanks to the flame velocity and head diversity.

FUSE-SC Models

FUSE-SC models have silicon carbide flame tube. By means of this they can operate at 1350 °C temperatures.

FUSE-SS Models

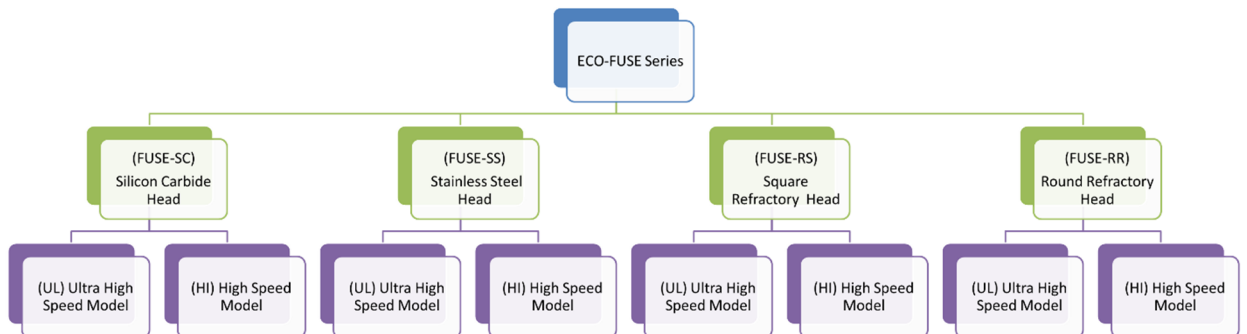
FUSE-SS models have stainless steel flame tube. By means of this they can operate at 1100 °C temperatures.

FUSE-RS Models

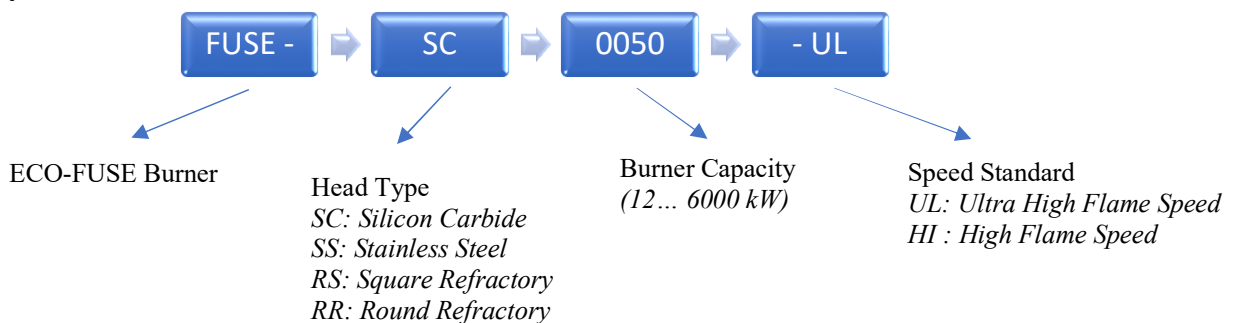
FUSE-RS models have square refractory alloy flame tube. By means of this they can operate at 1700 °C temperatures.

FUSE-RR Models

FUSE-RR models have circular refractory alloy flame tube. By means of this they can operate at 1700 °C temperatures.



Code Key



4.2.Capacity and Code Key Charts

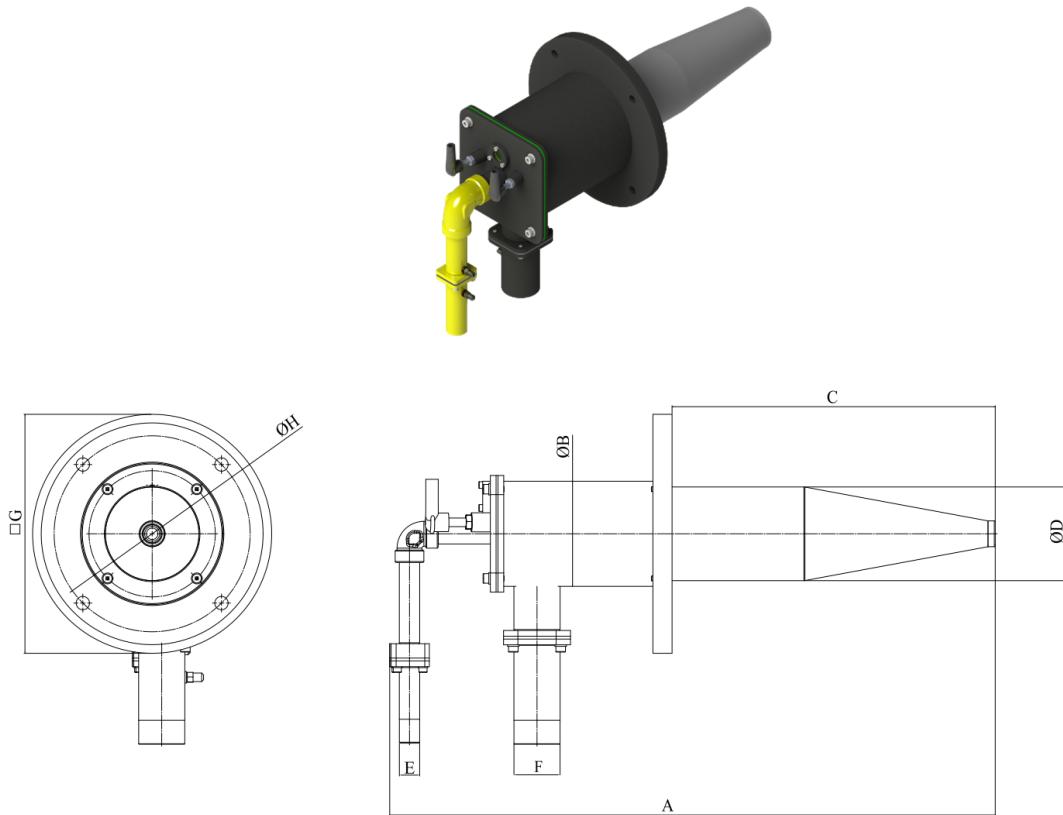
HIGH SPEED FUSE SERIES BURNER PRODUCT FAMILY											
BODY TYPE	BURNER CAPACITY		BURNER CAPACITY		NATURAL GAS CONSUMPTION		SS SERIES Stainless Steel Combustion Head	SC SERIES Silicon Carbide Combustion Head	RR SERIES Circular Refractory Combustion Head	RS SERIES Square Refractory Combustion Head	VOLTAGE VAC
	MINIMUM (kW)	MAKSIMUM (kW)	MINIMUM (kcal/h)	MAKSIMUM (kcal/h)	MINIMUM (Nm ³ /h)	MAKSIMUM (Nm ³ /h)					
FUSE-1	5	12	4300	10320	0.52	1.25	FUSE-SS0012-HI	FUSE-SC0012-HI			IN 230/3N 400
	8	20	6880	17200	0.83	2.08	FUSE-SS0020-HI	FUSE-SC0020-HI			IN 230/3N 400
	12	30	10320	25800	1.25	3.13	FUSE-SS0030-HI	FUSE-SC0030-HI			IN 230/3N 400
FUSE-2	20	50	17200	43000	2.08	5.21	FUSE-SS0050-HI	FUSE-SC0050-HI			IN 230/3N 400
	60	150	51600	129000	6.25	15.64	FUSE-SS0150-HI	FUSE-SC0150-HI	FUSE-RR0150-HI	FUSE-RS0150-HI	IN 230/3N 400
	80	200	68800	172000	8.34	20.85	FUSE-SS0200-HI	FUSE-SC0200-HI	FUSE-RR0200-HI	FUSE-RS0200-HI	IN 230/3N 400
FUSE-3	160	400	137600	344000	16.68	41.70		FUSE-SC0400-HI	FUSE-RR0400-HI	FUSE-RS0400-HI	IN 230/3N 400
	200	500	172000	430000	20.85	52.12		FUSE-SC0500-HI	FUSE-RR0500-HI	FUSE-RS0500-HI	IN 230/3N 400
	240	600	206400	516000	25.02	62.55		FUSE-SC0600-HI	FUSE-RR0600-HI	FUSE-RS0600-HI	IN 230/3N 400
FUSE-4	480	1200	412800	1032000	50.04	125.09			FUSE-RR1200-HI	FUSE-RS1200-HI	IN 230/3N 400
	640	1600	550400	1376000	66.72	166.79			FUSE-RR1600-HI	FUSE-RS1600-HI	IN 230/3N 400
	1500	3500	1290000	3010000	156.36	364.85			FUSE-RR3500-HI	FUSE-RS3500-HI	IN 230/3N 400
FUSE-5	1800	4250	1548000	3655000	187.64	443.03			FUSE-RR4250-HI	FUSE-RS4250-HI	IN 230/3N 400
	2100	5000	1806000	4300000	218.91	521.21			FUSE-RR5000-HI	FUSE-RS5000-HI	IN 230/3N 400

ULTRA HIGH SPEED FUSE SERIES BURNER PRODUCT FAMILY											
BODY TYPE	BURNER CAPACITY		BURNER CAPACITY		NATURAL GAS CONSUMPTION		SS SERIES Stainless Steel Combustion Head	SC SERIES Silicon Carbide Combustion Head	RR SERIES Circular Refractory Combustion Head	RS SERIES Square Refractory Combustion Head	VOLTAGE VAC
	MINIMUM (kW)	MAKSIMUM (kW)	MINIMUM (kcal/h)	MAKSIMUM (kcal/h)	MINIMUM (Nm ³ /h)	MAKSIMUM (Nm ³ /h)					
FUSE-1	5	12	4300	10320	0.52	1.25	FUSE-SS0012-UL	FUSE-SC0012-UL			IN 230/3N 400
	8	20	6880	17200	0.83	2.08	FUSE-SS0020-UL	FUSE-SC0020-UL			IN 230/3N 400
	12	30	10320	25800	1.25	3.13	FUSE-SS0030-UL	FUSE-SC0030-UL			IN 230/3N 400
FUSE-2	20	50	17200	43000	2.08	5.21	FUSE-SS0050-UL	FUSE-SC0050-UL			IN 230/3N 400
	40	100	34400	86000	4.17	10.42	FUSE-SS0100-UL	FUSE-SC0100-UL			IN 230/3N 400
	60	150	51600	129000	6.25	15.64	FUSE-SS0150-UL	FUSE-SC0150-UL	FUSE-RR0150-UL	FUSE-RS0150-UL	IN 230/3N 400
FUSE-3	80	200	68800	172000	8.34	20.85	FUSE-SS0200-UL	FUSE-SC0200-UL	FUSE-RR0200-UL	FUSE-RS0200-UL	IN 230/3N 400
	100	250	86000	215000	10.42	26.06	FUSE-SS0250-UL	FUSE-SC0250-UL	FUSE-RR0250-UL	FUSE-RS0250-UL	IN 230/3N 400
	160	400	137600	344000	16.68	41.70		FUSE-SC0400-UL	FUSE-RR0400-UL	FUSE-RS0400-UL	IN 230/3N 400
FUSE-4	200	500	172000	430000	20.85	52.12		FUSE-SC0500-UL	FUSE-RR0500-UL	FUSE-RS0500-UL	IN 230/3N 400
	240	600	206400	516000	25.02	62.55		FUSE-SC0600-UL	FUSE-RR0600-UL	FUSE-RS0600-UL	IN 230/3N 400
	400	1000	344000	860000	41.70	104.24		FUSE-SC1000-UL	FUSE-RR1000-UL	FUSE-RS1000-UL	IN 230/3N 400
FUSE-5	640	1600	550400	1376000	66.72	166.79			FUSE-RR1600-UL	FUSE-RS1600-UL	IN 230/3N 400
	900	2000	774000	1720000	93.82	208.48			FUSE-RR2000-UL	FUSE-RS2000-UL	IN 230/3N 400
	1500	3500	1290000	3010000	156.36	364.85			FUSE-RR3500-UL	FUSE-RS3500-UL	IN 230/3N 400
FUSE-5	1800	4250	1548000	3655000	187.64	443.03			FUSE-RR4250-UL	FUSE-RS4250-UL	IN 230/3N 400
	2100	5000	1806000	4300000	218.91	521.21			FUSE-RR5000-UL	FUSE-RS5000-UL	IN 230/3N 400
	2600	6000	2236000	5160000	271.03	625.45			FUSE-RR6000-UL	FUSE-RS6000-UL	IN 230/3N 400

*Fuel consumption values are given for $Hu = 8250 \text{ kcal/Nm}^3$

4.3. Size Charts

a) FUSE-SS Series ve FUSE-SC Series



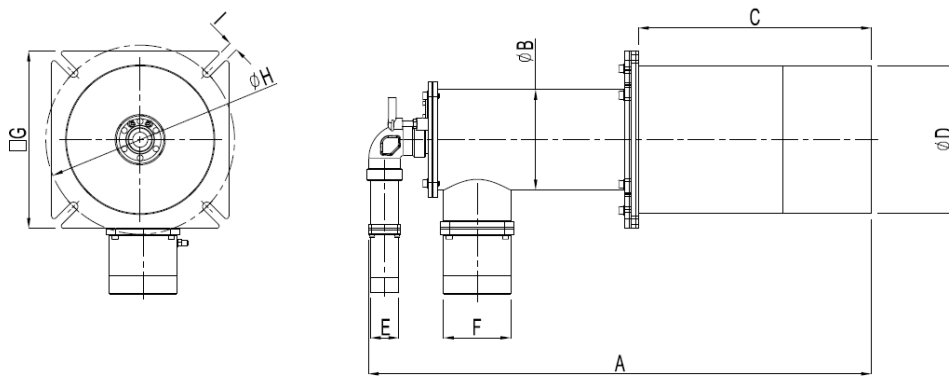
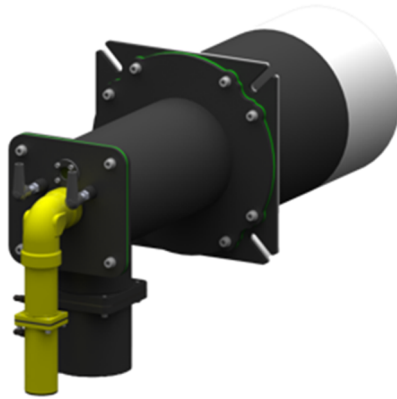
High Speed Flame Models

BODY TYPE	PRODUCT	MINIMUM CAPACITY (kW)	MAKSİMİM CAPACITY (kW)	A	ØB	C	ØD	E	F	□G	ØH	I
FUSE-1HI	FUSE-(SS/SC)0012-HI	5	12	634	110	338	98	DN15	DN40	250	205	14
	FUSE-(SS/SC)0020-HI	8	20	634	110	338	98	DN15	DN40	250	205	14
	FUSE-(SS/SC)0030-HI	12	30	634	110	338	98	DN15	DN40	250	205	14
	FUSE-(SS/SC)0050-HI	20	50	634	110	338	98	DN15	DN40	250	205	14
FUSE-2HI	FUSE-(SS/SC)0150-HI	60	150	683	170	337	110	DN25	DN50	286	241	14
	FUSE-(SS/SC)0200-HI	80	200	683	170	337	110	DN25	DN50	286	241	14
FUSE-3HI	FUSE-SC0400-HI	160	400	864	219	389	170	DN40	DN100	355	300	14
	FUSE-SC0500-HI	200	500	864	219	389	170	DN40	DN100	355	300	14
	FUSE-SC0600-HI	240	600	864	219	389	170	DN40	DN100	355	300	14

Ultra High Speed Flame Models

BODY TYPE	PRODUCT	MINIMUM CAPACITY (kW)	MAKSİMİM CAPACITY (kW)	A	ØB	C	ØD	E	F	□G	ØH	I
FUSE-1UL	FUSE-(SS/SC)0012-UL	5	12	634	110	338	98	DN15	DN40	250	205	14
	FUSE-(SS/SC)0020-UL	8	20	634	110	338	98	DN15	DN40	250	205	14
	FUSE-(SS/SC)0030-UL	12	30	634	110	338	98	DN15	DN40	250	205	14
	FUSE-(SS/SC)0050-UL	20	50	634	110	338	98	DN15	DN40	250	205	14
	FUSE-(SS/SC)0100-UL	40	100	634	110	338	98	DN15	DN40	250	205	14
FUSE-2UL	FUSE-(SS/SC)0150-UL	60	150	683	170	337	110	DN25	DN50	286	241	14
	FUSE-(SS/SC)0200-UL	80	200	683	170	337	110	DN25	DN50	286	241	14
	FUSE-(SS/SC)0250-UL	100	250	683	170	337	110	DN25	DN50	286	241	14
FUSE-3UL	FUSE-SC0400-UL	160	400	864	219	388,5	170	DN40	DN100	355	300	14
	FUSE-SC0500-UL	200	500	864	219	388,5	170	DN40	DN100	355	300	14
	FUSE-SC0600-UL	240	600	864	219	388,5	170	DN40	DN100	355	300	14
	FUSE-SC1000-UL	400	1000	864	219	388,5	170	DN40	DN100	355	300	14

b) FUSE-RR Series



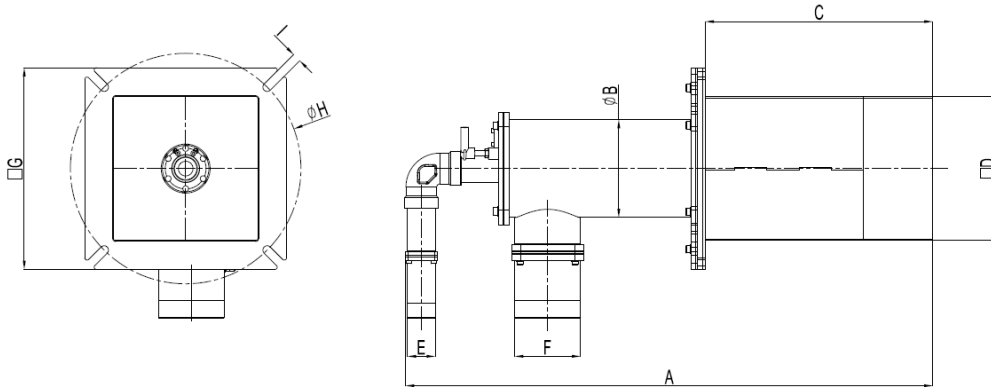
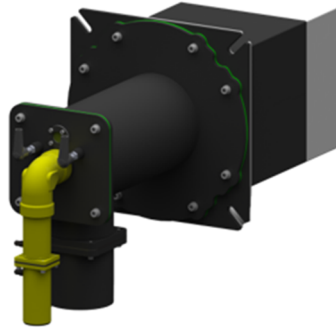
High Speed Flame Models

BODY TYPE	PRODUCT	MINIMUM CAPACITY (kW)	MAKSIMIM CAPACITY (kW)	A	ØB	C	ØD	E	F	□G	H	I
FUSE-2HI	FUSE-RR0150-HI	60	150	680	Ø110	345	Ø190	DN25	DN50	□230	Ø230	15
	FUSE-RR0200-HI	80	200	680	Ø110	345	Ø190	DN25	DN50	□230	Ø230	15
FUSE-3HI	FUSE-RR0400-HI	160	400	895	Ø170	395	Ø250	DN40	DN100	□300	Ø320	15
	FUSE-RR0500-HI	200	500	895	Ø170	395	Ø250	DN40	DN100	□300	Ø320	15
FUSE-4HI	FUSE-RR1200-HI	480	1200	855	Ø250	395	Ø330	DN50	DN150	□450	Ø450	15
	FUSE-RR1600-HI	640	1600	855	Ø250	395	Ø330	DN50	DN150	□450	Ø450	15
FUSE-5HI	FUSE-RR3500-HI	1500	3500	You can contact Ecostar sales department to get information about the dimensions of products with Fuse-5 series.								
	FUSE-RR4250-HI	1800	4250									
	FUSE-RR5000-HI	2100	5000									

Ultra High Speed Flame Models

BODY TYPE	PRODUCT	MINIMUM CAPACITY (kW)	MAKSIMIM CAPACITY (kW)	A	ØB	C	ØD	E	F	□G	H	I
FUSE-2UL	FUSE-RR0150-UL	60	150	680	Ø110	345	Ø190	DN25	DN50	□230	Ø230	15
	FUSE-RR0200-UL	80	200	680	Ø110	345	Ø190	DN25	DN50	□230	Ø230	15
	FUSE-RR0250-UL	100	250	680	Ø110	345	Ø190	DN25	DN50	□230	Ø230	15
FUSE-3UL	FUSE-RR0400-UL	160	400	895	Ø170	395	Ø250	DN40	DN100	□300	Ø320	15
	FUSE-RR0500-UL	200	500	895	Ø170	395	Ø250	DN40	DN100	□300	Ø320	15
	FUSE-RR0600-UL	240	600	895	Ø170	395	Ø250	DN40	DN100	□300	Ø320	15
FUSE-4UL	FUSE-RR1000-UL	400	1000	895	Ø170	395	Ø250	DN40	DN100	□300	Ø320	15
	FUSE-RR1200-UL	480	1200	855	Ø250	395	Ø330	DN50	DN150	□450	Ø450	15
	FUSE-RR1600-UL	640	1600	855	Ø250	395	Ø330	DN50	DN150	□450	Ø450	15
FUSE-5UL	FUSE-RR2000-UL	900	2000	855	Ø250	395	Ø330	DN50	DN150	□450	Ø450	15
	FUSE-RR3500-UL	1500	3500	You can contact Ecostar sales department to get information about the dimensions of products with Fuse-5 series.								
	FUSE-RR4250-UL	1800	4250									
	FUSE-RR5000-UL	2100	5000									
FUSE-RR6000-UL	2600	6000										

c) **FUSE-RS Series**



High Speed Flame Models

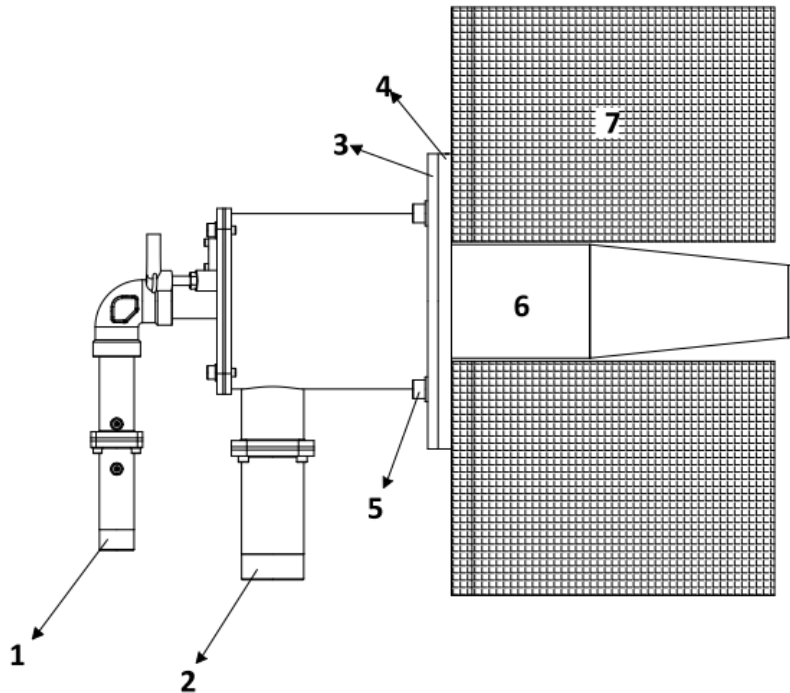
BODY TYPE	PRODUCT	MINIMUM CAPACITY (kW)	MAKSIMIM CAPACITY (kW)	A	ØB	C	□D	E	F	□G	H	I
FUSE-2HI	FUSE-RS0150-HI	60	150	680	Ø110	345	□190	DN25	DN50	□300	Ø300	15
	FUSE-RS0200-HI	80	200	680	Ø110	345	□190	DN25	DN50	□300	Ø300	15
FUSE-3HI	FUSE-RS0400-HI	160	400	915	Ø170	395	□250	DN40	DN100	□350	Ø400	15
	FUSE-RS0500-HI	200	500	915	Ø170	395	□250	DN40	DN100	□350	Ø400	15
	FUSE-RS0600-HI	240	600	915	Ø170	395	□250	DN40	DN100	□350	Ø400	15
FUSE-4HI	FUSE-RS1200-HI	480	1200	880	Ø250	395	□330	DN50	DN150	□450	Ø500	15
	FUSE-RS1600-HI	640	1600	880	Ø250	395	□330	DN50	DN150	□450	Ø500	15
FUSE-5HI	FUSE-RS3500-HI	1500	3500	You can contact Ecostar sales department to get information about the dimensions of products with Fuse-5 series.								
	FUSE-RS4250-HI	1800	4250									
	FUSE-RS5000-HI	2100	5000									

Ultra High Speed Flame Models

BODY TYPE	PRODUCT	MINIMUM CAPACITY (kW)	MAKSIMIM CAPACITY (kW)	A	ØB	C	□D	E	F	□G	H	I
FUSE-2UL	FUSE-RS0150-UL	60	150	680	Ø110	345	□190	DN25	DN50	□300	Ø300	15
	FUSE-RS0200-UL	80	200	680	Ø110	345	□190	DN25	DN50	□300	Ø300	15
	FUSE-RS0250-UL	100	250	680	Ø110	345	□190	DN25	DN50	□300	Ø300	15
FUSE-3UL	FUSE-RS0400-UL	160	400	915	Ø170	395	□250	DN40	DN100	□350	Ø400	15
	FUSE-RS0500-UL	200	500	915	Ø170	395	□250	DN40	DN100	□350	Ø400	15
	FUSE-RS0600-UL	240	600	915	Ø170	395	□250	DN40	DN100	□350	Ø400	15
	FUSE-RS1000-UL	400	1000	915	Ø170	395	□250	DN40	DN100	□350	Ø400	15
FUSE-4UL	FUSE-RS1200-UL	480	1200	880	Ø250	395	□330	DN50	DN150	□450	Ø500	15
	FUSE-RS1600-UL	640	1600	880	Ø250	395	□330	DN50	DN150	□450	Ø500	15
	FUSE-RS2000-UL	900	2000	880	Ø250	395	□330	DN50	DN150	□450	Ø500	15
FUSE-5UL	FUSE-RS3500-UL	1500	3500	You can contact Ecostar sales department to get information about the dimensions of products with Fuse-5 series.								
	FUSE-RS4250-UL	1800	4250									
	FUSE-RS5000-UL	2100	5000									
	FUSE-RS6000-UL	2600	6000									

5. INSTALLATION

5.1.ECO-FUSE Burner Assembly Drawing



- 1-Gas Intake
- 2-Air Inlet
- 3-Connecting Flange
- 4-Insulation Material(Gasket)
- 5-Assembly Bolt
- 6-Flame Tube
- 7-Combustion Chamber Refractory



Sealing between the combustion chamber and burner must be ensured



Device must be shipped in original packaging!



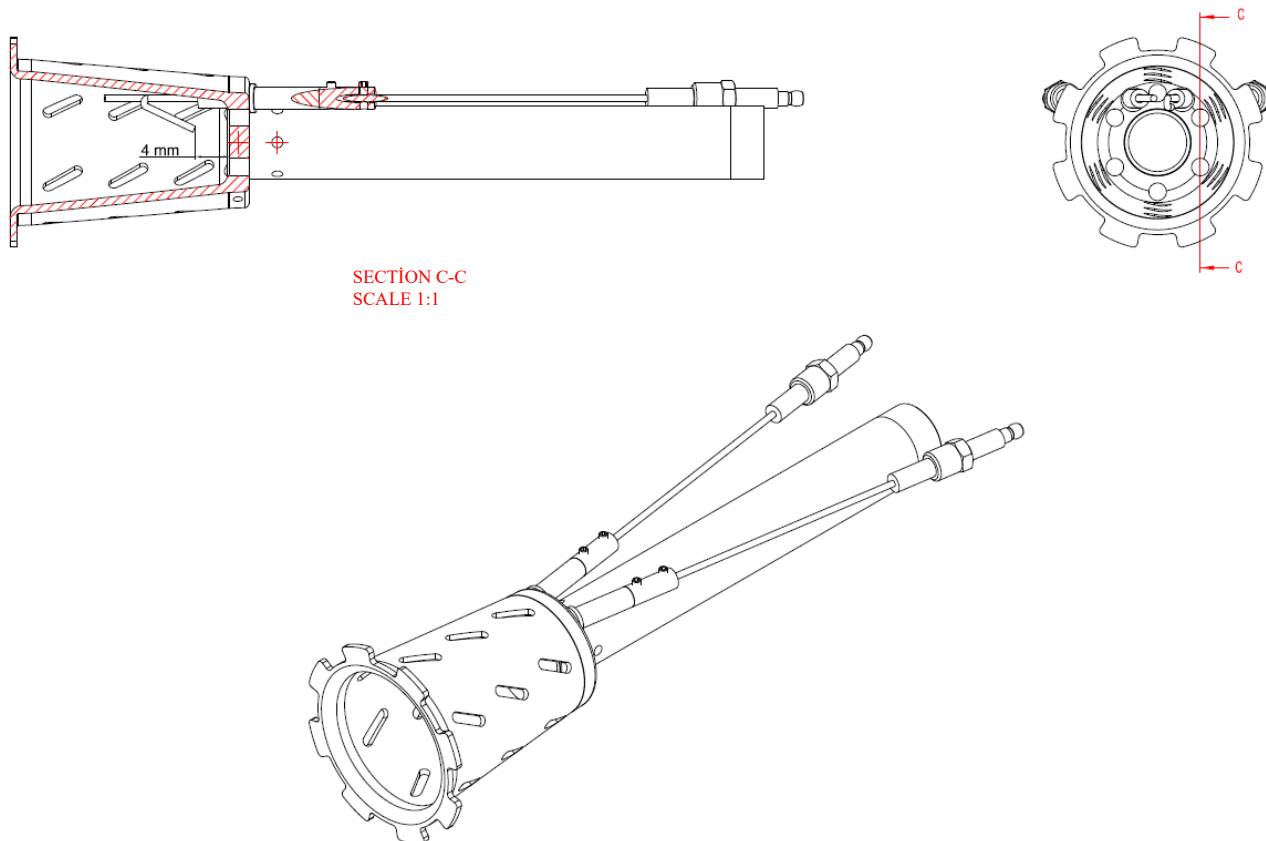
Do not lift the device holding from servomotor, gas valve, impulse pipes or pressure switch during installation!



Clean the inside of fuel line thoroughly before installing the burner to the fuel line. Any damage that may occur due to solid objects and metal particles from the fuel line shall not be covered by our company.

6. COMMISSIONING

6.1. Ignition and Ionization System



Electrical connection

Perform electrical connections according to the diagram provided with the burner. Follow general security rules during installation of electric wiring and making connections. Connect the earthing terminal in electric panel to the earthing installation.

6.2.General Controls



Make sure to perform the following controls before commissioning the burner.

- Has heat demand been formed?
- Are the thermostat and other thermo-elements for control purposes working properly?
- Are the electrical connections correct?
- Is there gas?
- Is there sufficient air in boiler room (ventilation section $\text{cm}^2 = \text{boiler capacity kW} \times 7$)
- Has the boiler been installed correctly?
- Has the air of the gas line been removed? Has a sealing test been made?

Operation of one-stage burner

- Open the main gas valve, check the gas pressure from the manometer at the valve. (max.300 mbar)
- Check the boiler thermostat or pressure switch settings.
- Bring the operating switch on the burner panel to position 1.
- Burner fan motor will be activated.
- Ignition will take place at the end of pre-purge process.
- 3 sec. later, the gas valve will be opened and combustion will occur.
- Flame control system (ionization) will start flame control.
- Burner is deactivated after the required capacity is formed.

Operation of two-stage burner

- Open the main gas valve, check the gas pressure from the manometer at the valve. (max.300 mbar)
- Check the boiler thermostat or pressure switch settings.
- Bring the operating switch on the burner panel to position 2.
- Burner fan motor will be activated.
- Ignition will take place at the end of pre-purge process.
- 3 sec. later, the gas valve will be opened and combustion will occur.
- Flame control system (ionization) will start flame control.
- Burner will switch to the second stage (max. capacity) according to the heat requirement.
- Burner is deactivated after the required capacity is formed.

Operation of a modulating burner

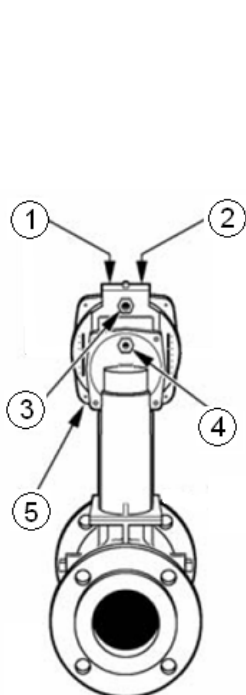
- Open the main gas valve; check max 300 mbar gas pressure from the manometer.
- Open operating switch on the burner panel.
- Switch on the modulating control switch.
- Switch automatic-hand switch to automatic.
- Check the temperature and pressure set values from the modulating control unit.
- Ignition will take place at the end of pre-purge process.
- 3 sec. later, the gas valve will be opened and combustion will occur.
- Flame control system (ionization) will start flame control.
- In modulating burner, the burner goes into max. capacity according to the signal from the modulating control unit.
- When the capacity increases, modulating control unit will switch the burner to min. capacity.
- If the boiler water temperature or steam pressure increases despite the operation of burner with min. capacity, the modulating control unit will stop the burner.

6.3. Combustion Adjustment

6.3.1. Gas Adjustment

Follow the instructions of the valve manufacturer during installation, dismantling and adjustment of the gas valve

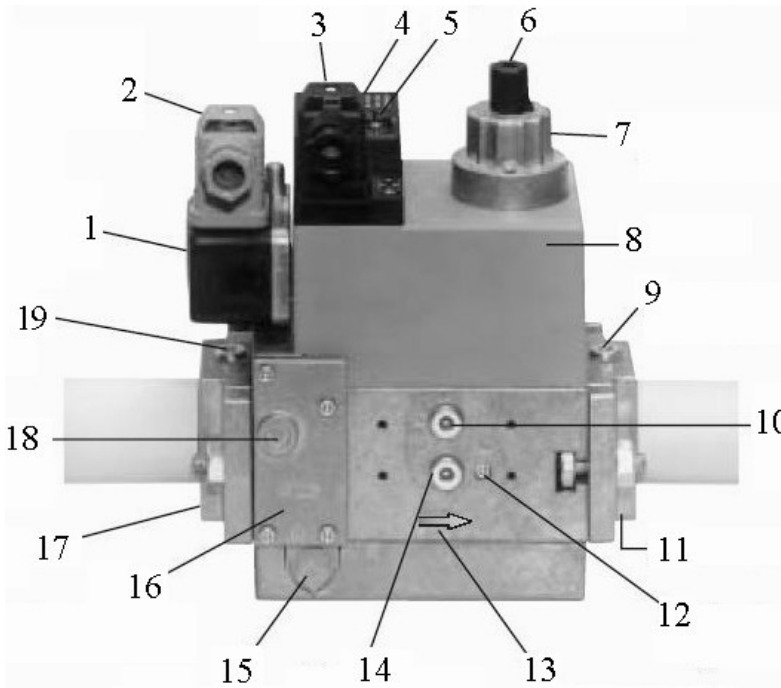
6.3.1.1. VGD 20 4011 - 5011 Series Gas Valve



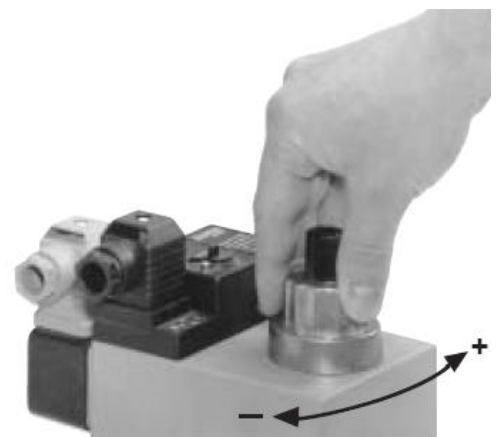
SKP 75 connection diagram

- 1 – Air-gas adjustment ratio
- 2 – Zero "0" point (start) adjustment
- 3 – Boiler counter pressure impulse connection
- 4 – Gas pressure impulse connection
- 5 – Air pressure impulse connection

6.3.1.2.MB DLE Series Multiblock Gas Valve



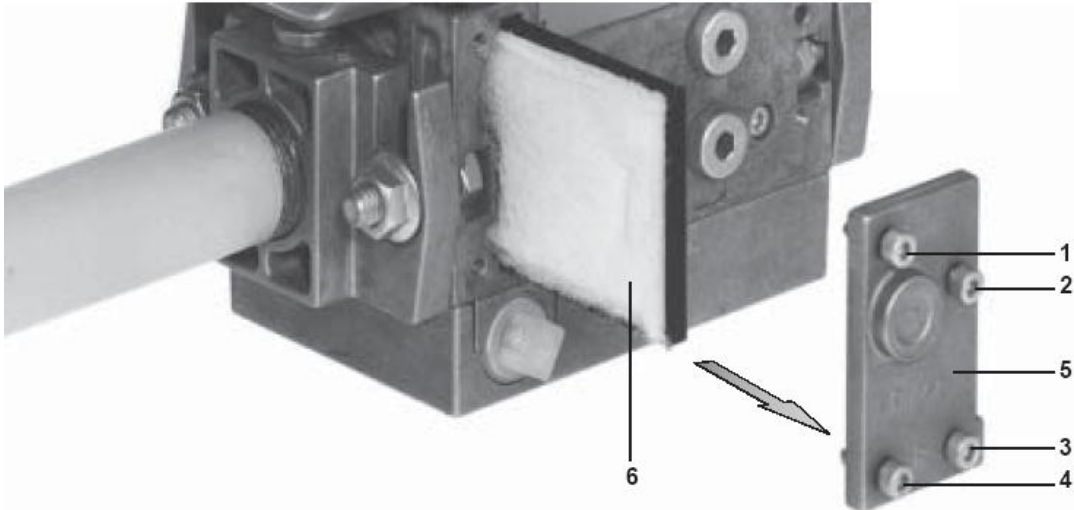
- 1- Pressure switch
- 2- Pressure switch electrical connection
- 3- Electrical connection of the valve
- 4- Operation gauge
- 5- The sealing ring
- 6- Set cover
- 7- Hydraulic disk brakes or settings
- 8- Coil
- 9- Measuring element connection (1/8)
- 10- Measuring element connection (1/8)
- 11- Output flange
- 12- Measuring element connection (1/8)
- 13- Gas flow way
- 14- Measuring element connection (1/8)
- 15- The vent plug
- 16- Filter chamber cover
- 17- Inlet flange
- 18- Measuring element connection (1/8)
- 19- Measuring element connection (1/8)



- Consider the below torque values for bolts tightened on the valve.
- Tighten flange bolts according to cross ordering and use proper tools.
- Sealing and function check must be performed if the valve is dismantled and re-installed over the line due to any reason.
- Before dismantling the valve from the line, you can perform filter replacement according to the below order.
 - o Cut off the gas flow (turn off the ball valve)
 - o Remove the 4 bolts (1,2,3,4) on the cover seen in the picture and take out the cover (5).
 - o Take the filter cartridge (6) out of its socket and replace with a new one
 - o Close the cover and tighten the bolts. In frequently performed filter replacement operations, use M4x14 bolt instead of self-tapping bolts used for fixing the cover.
 - o Perform sealing and function control

Max. torque values;

M 4	M 5	M 6	M 8	G 1/8	G 1/4	G 1/2	G 3/4
2,5 Nm	5 Nm	7 Nm	15 Nm	5 Nm	7 Nm	10 Nm	15 Nm

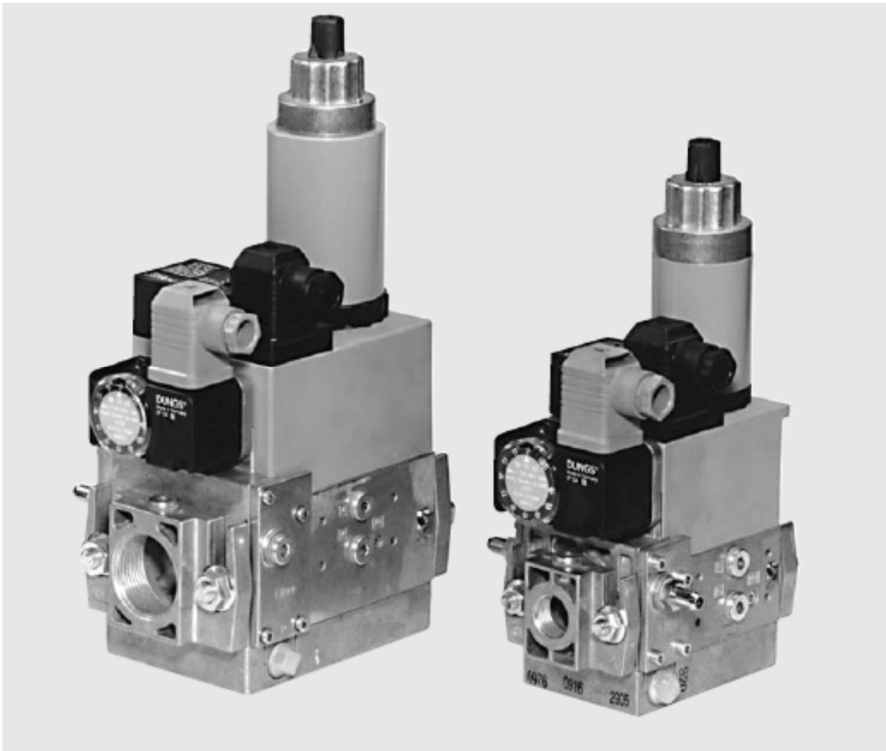


6.3.1.3.MB ZRD(LE) 405 – 412 Series Gas Valve

GasMultiBloc[®]
Combined regulator and
safety shut-off valves
Two-stage function

MB-ZRD(LE) 405 - 412 B01

DUNGS[®]
Combustion Controls



Technical description

The DUNGS GasMultiBloc[®] integrates filter, regulator, valves and pressure switches in one compact fitting.

- Dirt trap: microfilter
- One regulator and two main valves: B01
- One one-stage valve and one two-stage valve
- One valve is fast opening, one valve is slow or fast opening
- Solenoid valves up to 360 mbar (36 kPa) as per DIN EN 161 Class A Group 2
- Sensitive setting of output pressure by proportional regulator as per DIN EN 88 Class A Group 2
- High flow rates with low pressure drop
- DC solenoid drive interference degree N
- Main volume restrictor and partial volume restrictor at valve V2
- Hydraulic opening delay
- Flange connections with pipe threads as per ISO 7/1
- Simple mounting, compact, light-weight

The modular system permits individual solutions by using external ignition gas tap in connection with separately controlled valves, by adding a valve proving system, mini/maxi pressure switches, pressure limiters, limit switch and closing stroke limiter at valve V2, regulator blocking for liquid gas applications.

Application

The modular system permits individual solutions in gas safety and regulator engineering. Suitable for gases of families 1, 2, 3 and other neutral gaseous media.

Approvals

EC type test approval as per EC Gas Appliance Directive:
MB-ZR...405-412 B01 CE-0085 AP 3156
EC type test approval as per EC Pressure Equipment Directive:
MB-ZR...405-412 B01 CE0036
Approvals in other important gas consuming countries.

6.4. Air pressure switch adjustment

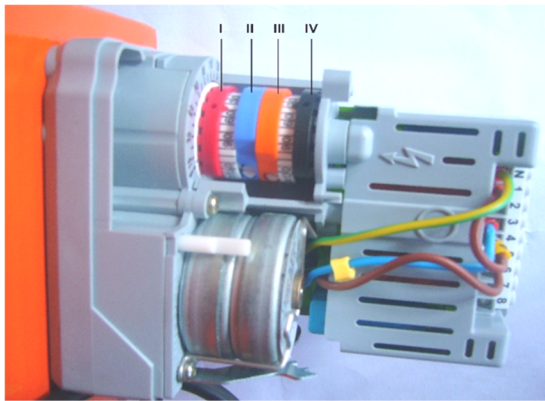
While the burner is working without any problem, the air pressure switch is adjusted to desired minimum pressure as follows.

- Unscrew the screw of the transparent cover and remove the cover.
- Turn the adjustment wheel in the direction to increase the pressure, note the pressure value at which the burner is failed.
- Set the pressure switch to a value 1 mbar lower than the pressure value at which the burner failed and close the pressure switch lid.
- It is recommended that this adjustment is carried out when the burner is at minimum load.



6.5. Servomotor Adjustment

- SQN70



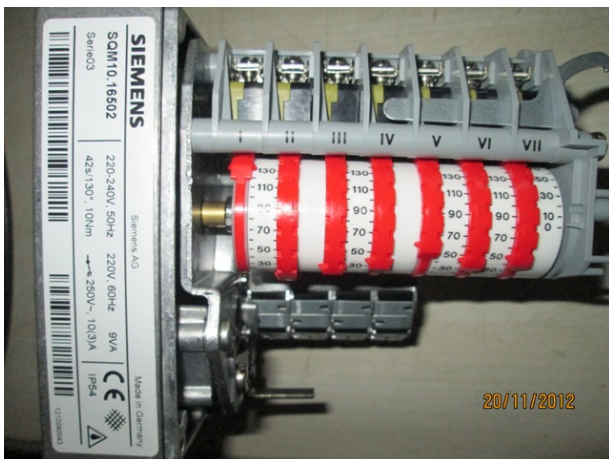
At Two-stage Burners;

- I. Red Cam: Adjusts 2nd level max. air.
- II. Blue Cam: Resets the clamp.
- III. Orange Cam: Adjusts 1st level min. air.
- IV. Black Cam: Adjusts 2nd level valve opening degree.

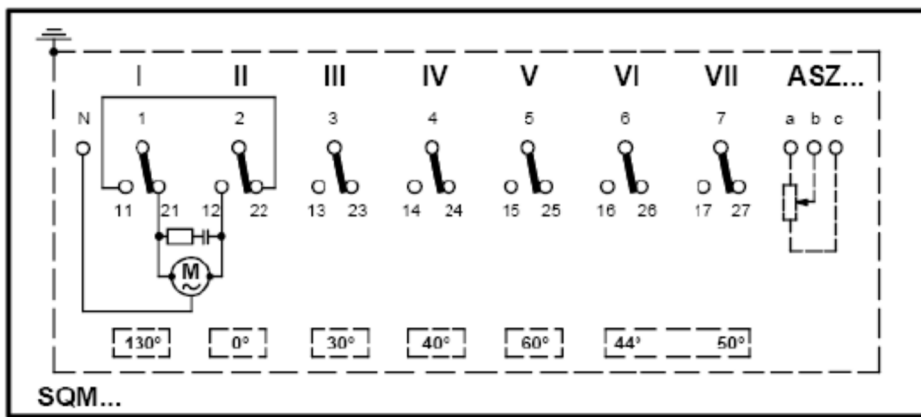
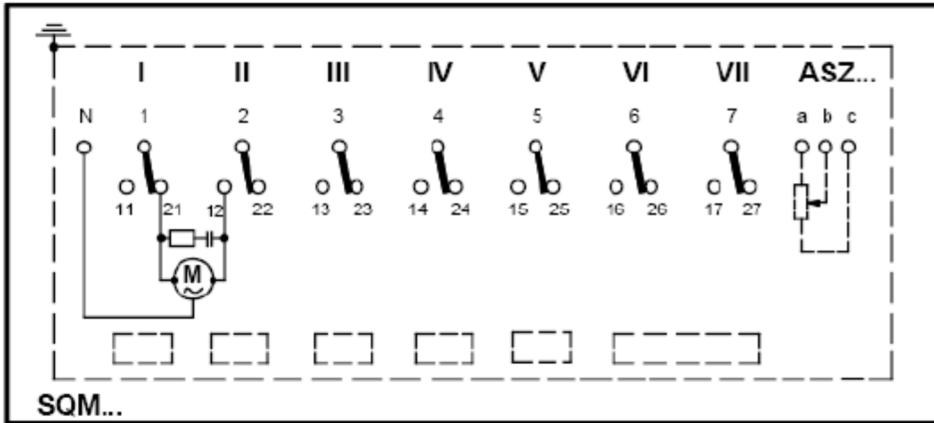
At Modulating Burners;

- I. Red Cam: Performance max. air adjustment.
- II. Blue Cam: Resets the clamp.
- III. Orange Cam: Performs min. air adjustment.
- IV. Black Cam: Not used.

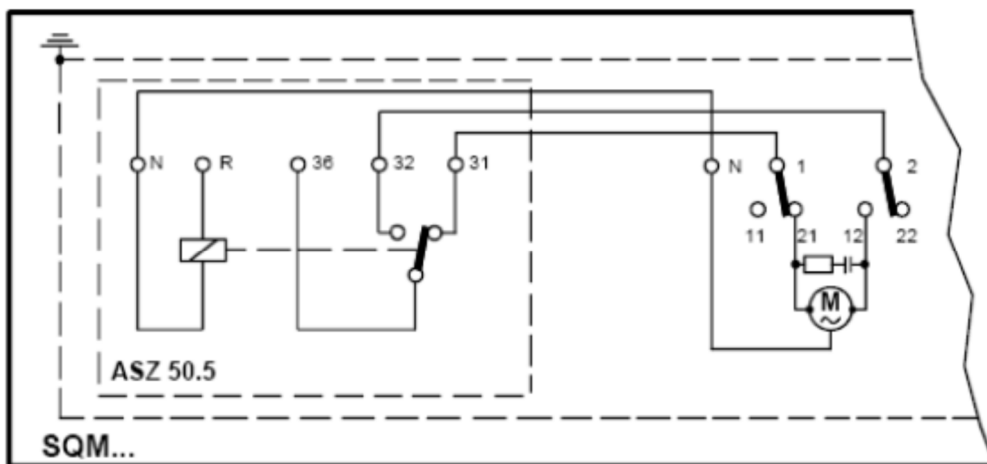
- SQM10



- I. Cam: Opening
- II. Cam: Resets the clamp
- III. Cam: Commissioning air
- IV. V.VI. and VII. Cam not used



7812a02/1097



7812a03/1097

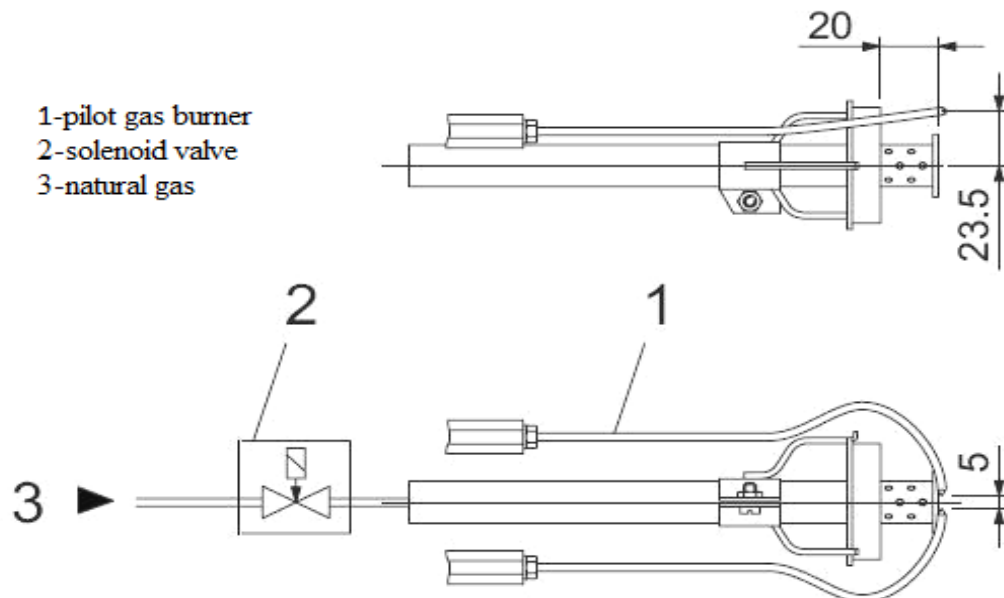


Do not open servomotor. Do not interfere with. It may damage servomotor or change burner settings.



Burner's actuators should not be installed closer to high temperature zones, max allowed ambient temperature should be 60 °C for actuator's operation safety

6.6.Pilot Ignition System



Pilot gas burner inlet pressure $P_{max} = 200$ mbar

6.7.Program Relay

LFL 1.32



LME 22



- Yellow led on: Indicates that the burner is making pre-purge.
- Yellow led flashing: Indicates that the burner is igniting.
- Green led flashing: Indicates poor combustion.
- Red led on: Indicates burner malfunction.

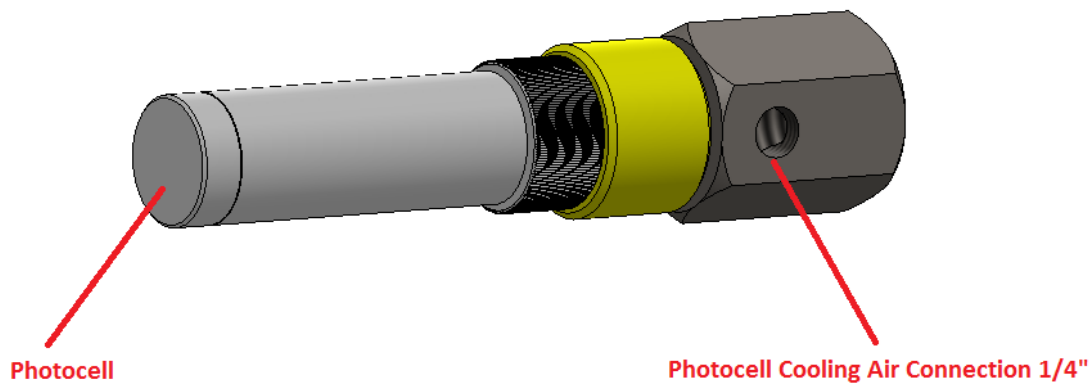
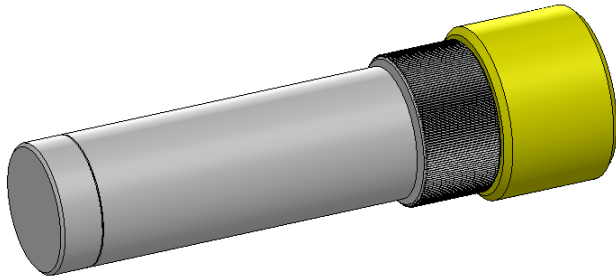


Press and hold the light button for 2 sec. to reset the program relay.

6.8. Photocell

Check the photocell weekly. Clean the dust or fume stains on the glass of photocell by a dry cloth.

QRA4



6.9. Function Controls and Adjustments

- **Operation testing:** If the burner switch is turned on and safety circuit is complete (gas pressure switch, thermostat, water level gauge, lower pressure gas pressure switch, upper pressure gas pressure switch, gas leakage control device), turn on the ball valve, burner will start working and turn off the gas valve. Program operation of the relay must be normal until ignition time. During opening of the magnetic valve, gas pressure will drop down and the lower pressure switch will stop the burner for safety.
- When the ball valve is opened again, gas pressure will increase and lower pressure switch will trip in from safety position and the burner will automatically start operating.
- Disconnect the ionization circuit or remove the photocell when the burner is operating: Burner will give a fault after burning up.
- Increase the value of the air pressure thermostat: Burner starts operating, however it should give a fault due to the insufficiency of air pressure.

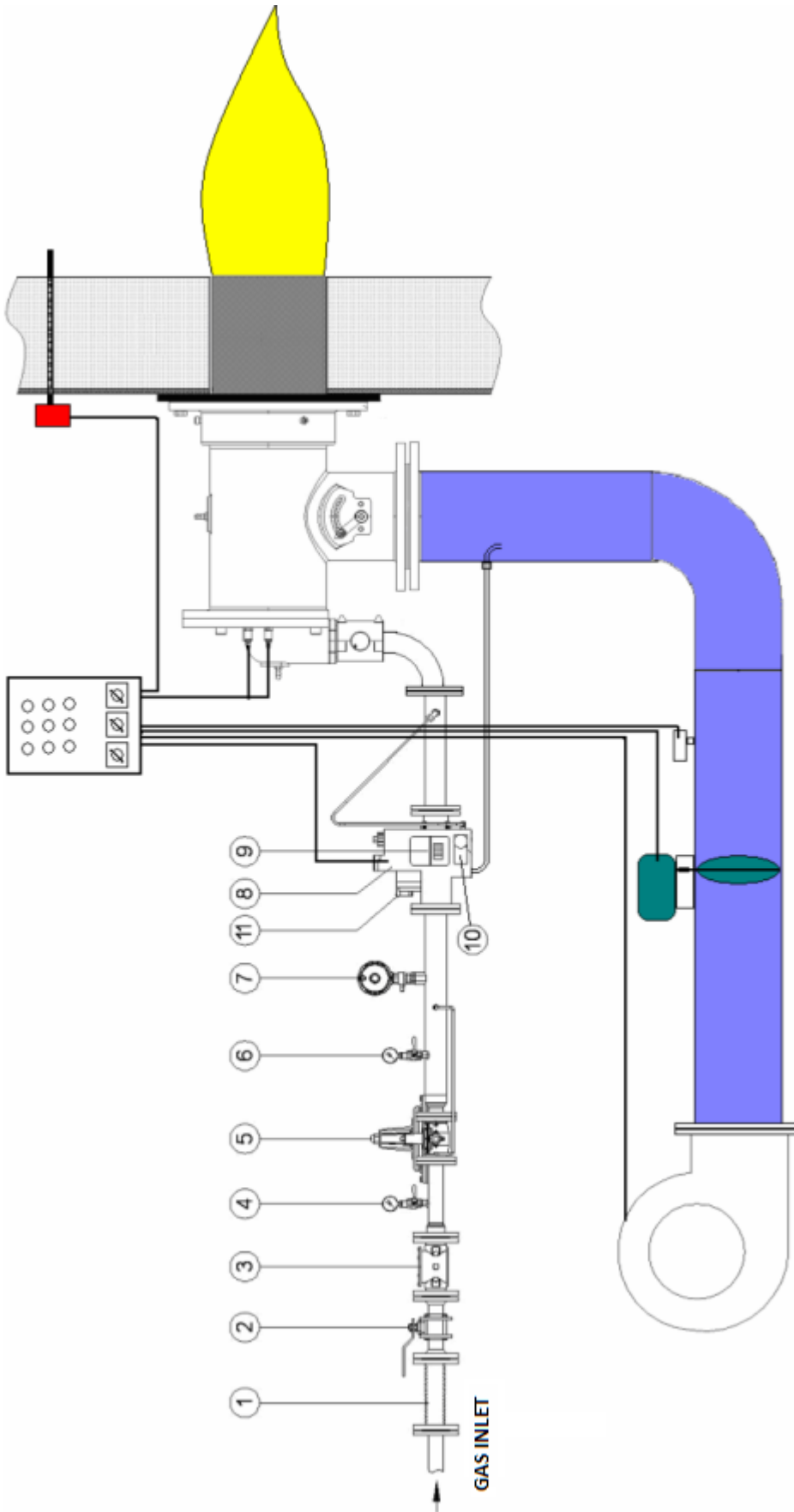


Magnetic valves must not be energized during pre-purge. Check if valves are in closed position!

6.10. Final Checks

- Switch of all purges after completion of all necessary measurements.
- Start and stop the burner at least 3 times to check the operation of the program.
- Make sure that all safety circuits on the burner and boiler operate properly before leaving the installation site.

6.11. Gas Pass Equipment Required in Gas Line



Pe < 300 mbar Q<1200kW	Pe > 300 mbar Q<1200kW	Pe < 300 mbar Q>1200kW	Pe > 300 mbar Q>1200kW
1- Compensator	1- Compensator	1- Compensator	1- Compensator
2- Ball valve	2- Ball valve	2- Ball valve	2- Ball valve
3- Gas filter	3- Gas filter	3- Gas filter	3- Gas filter
4- Inlet manometer + valve	4- Inlet manometer + valve	4- Inlet manometer + valve	4- Inlet manometer + valve
8 – Multi-block (safety and operation solenoids)	5- Regulator	8 – Multi-block (safety and operation solenoids))	5- Regulator
10- max. gas pressure switch	6- Outlet manometer + valve	9- Sealing Control Set	6- Outlet manometer + valve
11- min. gas pressure switch	7- Safety discharge valve	10- max. gas pressure switch	7- Safety discharge valve
	8 – Multi-block (safety and operation solenoids)	11- min. gas pressure switch	8 – Multi-block (safety and operation solenoids)
	10- max. gas pressure switch		9- Sealing Control Set
	11- min. gas pressure switch		10- max. gas pressure switch
			11- min. gas pressure switch

7. MAINTENANCE

7.1. Monthly Maintenance

Monthly maintenance is a comprehensive process where general checks of burner and peripheral components are performed to prevent possible faults.

- Clean the filters on the main line and multiblock.
- Check the burner gas tip.
- Perform insulation measurements of ignition and ionization electrodes, replace electrodes should there be leakage to the body.
- Check ignition cables and sockets.
- Check all wiring points. Tighten loose connections.
- Clean the dust and layers accumulated on the fan and air klappes.
- Check gas line pressure, it must be the same with the first adjusted pressure, otherwise burner load and emission values will also have changed.
- Check all bolts of the burner. Tighten loose bolts.

7.2. Seasonal Maintenance

Comprehensive maintenance work when the burner is re-started after long periods of shut-down or interruptions. After completion of maintenance and adjustment processes, make sure to perform a combustion analysis.

- Check insulation resistance of electric motor.
- Replace ignition and ionization electrodes with new ones.
- Clean air fan and clamps.
- Check the operating function.
- Check boiler thermostats.



Follow installation directions during maintenance.

8. TROUBLESHOOTING

Problem	Cause	Explanation-Suggestion
Burner cannot be commissioned	Gas is cut or does not come	Gas valve might be closed. Open the valve.
	Fuse failure	Check burner power supply. The fuse on the main panel or the fuse on the burner might be tripped.
	Relay failure	Reset the thermal relay. Check adjustment of the thermal relay according to the current in motor label. If the failure is not removed, replace the thermal relay.
	Boiler thermostat, pressure switch failure	If there is a problem with the burner thermostats, pressure switches and steam tank this may be due to an unadjusted or faulty water level device; adjust it and if broken, replace it.
Flame appears and goes into failure mode.	Gas pressure error	Supply gas pressure might be low.
	Ionization electrode failure	Ionization electrode may be faulty or contaminated. Remove and clean.
	Program relay failure	Replace it with a new one.
Burner starts up, but fails after 10 seconds.	Air pressure switch adjustment	Air pressure switch might be adjusted to a high value. There may be dirt in the air pressure switch. Air pressure switch might be broken.
	Program relay failure	Replace it with a new one.
	Fan motor failure	Check fan motor coils, motor contactor and outlet from program relay.
Burner starts up, but fails after 30 seconds.	Gas valve, gas pressure drop	Gas valve might be closed. Supply gas pressure might be low. Check gas inlet manometer.
	Ignition electrode failure	Ignition electrodes might be misadjusted or ignition cables might have come out of their terminals. Adjust ignition electrodes with a distance of 3-5 mm. between them.
	Gas valve adjustment	Check the starting setting of the gas valve. Burner must be adjusted to sufficient start gas flow for its activation.

10. AFTER-SALES SERVICES

Dear Customer,

We believe that providing a good service is as important as providing a good product. Therefore, we continue offering wide range of comprehensive services to our conscious customers.

For your suggestions, complaints and service requests

Esentepe Mah.Milangaz Cad. No:75 K:3

Kartal Monumento Plaza

KARTAL/İSTANBUL/TÜRKİYE

Tel: 444 8 326

Fax: +90 216 370 45 03

Factory Contact Details

Türkgücü OSB

Bülent Ecevit Bulvarı No:11

ÇORLU/TEKİRDAĞ/TÜRKİYE

Tel: +90 282 685 44 80-81

Fax: +90 282 685 42 09

Also you can contact with us:

Web site : www.ecostar.com.tr

E - mail : servis@ecostar.com.tr



Please observe the following recommendations.

- Use the product in accordance with the principles of this manual.
- For any service demands regarding the product, please contact our Service Center from the abovementioned phone numbers.
- Upon your purchase, register your warranty certificate during installation.

