

OPERATION MANUAL  
LOW NO<sub>x</sub> GAS BURNER  
BTN40-55-85-120-210-250-350-450-550-650-800-1000-  
1200-1500-1800GC BLU





## CONTENTS

---

1. BRIEFNESS .....	1
2. ANNOUNCEMENTS .....	2
3.SAFETY AND PROTECTION .....	5
4. BURNER TECHNICAL DATA .....	6
4.1. SUMMARY	
4.2. TECHNICAL DATA	
4.3. BTN40-1800GC BLU FITTING DRAWING	
4.4. BTN40-650 GC BLU DISTRIBUTION BOX DESCRIPTION	
4.5. BTN40-1800GC BLU OUTLOOK DRAWING	
4.6. BTN40-1800GC BLU WORKING CURVE DRAWING	
5. BURNER INSTALLATION .....	19
5.1. BURNER INSTALLATION	
5.2. AIR VALVE INSTALLATION POSITION	
5.3. CIRCUIT CONNECTION	
5.4. SUPPLY GAS PIPELINE INSTALLATION	
5.5. GAS PRESSURE ADJUSTMENT EQUIPMENTS	
6. BURNER OPERATION PRINCIPLE .....	22
6.1. CONTROL BOARD	
6.2. GAS GAS SYSTEM AND PROGRAM CONTROL PRINCIPLE	
6.3. FUNCTION DESCRIPTION OF EACH ADJUSTMENT	
6.4. START AND RUNNING	
6.5. GAS PRESSURE ADJUSTMENT EQUIPMENTS	
6.6. AIR PRESSURE SWITCH	
6.7. GAS VALVE SEAL CHECK	
7. VALVES SET .....	30
7.1. SOLENOID VALVE	
7.2. THE CHANGE OF DOUBLE SOLENOID VALVE DMV ELECTROMAGNET	
7.3. FRS PRESSURE STABILIZING VALVE(IF NECESSARY)	
7.4. GAS COMBINED VALVE WITH ADJUSTMENT VGD40....+SKP15...+SKP25	
7.5. GAS PIPELINE INSTALLATION	
8. BURNER HEAD ADJUSTMENT .....	35
8.1. THE AIR ADJUSTMENT IN BTN40-55GC BLU BURNER HEAD	
8.2. THE AIR ADJUSTMENT IN BTN85-250GC BLU BURNER HEAD	
8.3. REMOVE GAS NOZZLE	
8.4. BTN40-55GC BLU ELECTRODE,PROBE	
8.5. BTN85-250GC BLU ELECTRODE,PROBE	
8.6. ADJUSTABLE CAM	
9. SERVO MOTOR ADJUSTMENT .....	38
10. CONTROLLING SYSTEM .....	40
11. VALVE LEAKAGE CHECKER .....	54
12. MAINTENANCE .....	57
13. FAILURE AND MEASUREMENTS .....	58
14. WIRING DIAGRAMBTN40-1800GC BLU .....	60

## 1. BRIEFNESS

---

BTN40...1800GC BLU Burner is natural gas with full-automatic sliding or modulation . It is a spare part for most heating equipment, such as water oven ,steam boiler ,air heater ,etc.

- Fuel: natural gas - heating value:  $H_i = 35.8 \text{ MJ/m}^3 = 8550 \text{ kcal/m}^3$
- LPG: heating value:  $H_i = 92.1 \text{ MJ/m}^3 = 22000 \text{ kcal/m}^3$
- Fuel is natural gas , or LPG .
- When the fuel is not natural gas , you have to learn its composition , if you are not sure about it , ask the supplier.
- If necessary, decrease gas pressure through installing pressure regulator. Gas consumption is up to gas pressure regulator and gas conjoined valve.
- There has motor in burner , supplying enough air . make sure burner works fine by enough high and stable pressure.
- Sliding gas burner Max. controlling range is (GC series burner) 30%-100% .
- Needed gas consumption: each 10KWh needs  $13 \text{ m}^3$  air.
- Controller controls burner operation automatically , detect the flame.
- Boiler temperature regulator and pressure regulator controls burner load.
- IP40.
- control voltage : 230V (-15%...+10%) 50Hz 1-phase
- Supply voltage: BTN40...55GC: 220-240V 50Hz 2-phase  
BTN85...250GC: 380-400V 50Hz 3-phase
- The prerequisite of burner operation: ambient temperature is 0. . . . . +40°C when working .

Check below items before first start burner:

- Connection (motor turning direction)
- Adjustment and controlling system set
- Boiler and other equipments under working.
- Burner can get enough air
- Open gas supply pipeline valve
- There has enough air in pipeline
- Gas pipeline leakage check is finished

Gas pressure is enough

## 2. ANNOUNCEMENTS

---

### 2.1. Introduction

The instruction manual supplied with the burner :




- Is an integral and essential part of the product and must not be separated from it; it must therefore be kept carefully for any necessary consultation and must accompany the burner even if it is transferred to another owner or user, or to another system. If the manual is lost or damaged, another copy must be requested from the Technical Assistance Service of the area ;
- Is designed for use by qualified personnel ;
- Offers important indications and instructions relating to the installation safety, start-up, use and maintenance of the burner.

Symbols used in the manual :



In some parts of the manual you will see triangular DANGER signs. Pay great attention to these, as they indicate a situation of potential danger.









### 2.2. General dangers

The dangers can be of 3 levels, as indicated below.

 <b>DANGER</b>	<b>Maximum danger level!</b> This symbol indicates operations which, if not carried out correctly, cause serious injury, death or long-term health risks.
 <b>WARNING</b>	This symbol indicates operations which, if not carried out correctly, may cause serious injury, death or long-term health risks.
 <b>CAUTION</b>	This symbol indicates operations which, if not carried out correctly, may cause damage to the machine and/or injury to people.


### 2.3. Other symbols

 <b>DANGER</b>	<b>DANGER: LIVE COMPONENTS</b> This symbol indicates operations which, if not carried out correctly, lead to electric shocks with lethal consequences
	<b>DANGER: FLAMMABLE MATERIAL</b> This symbol indicates the presence of flammable materials.

	<p><b>DANGER: CRUSHING OF LIMBS</b></p> <p>This symbol indicates the presence of moving parts; danger of crushing of limbs.</p>
	<p><b>WARNING: MOVING PARTS</b></p> <p>This symbol indicates that you must keep limbs away from moving mechanical parts; danger of crushing.</p>
	<p><b>DANGER: EXPLOSION</b></p> <p>This symbol signals places where an explosive atmosphere may be present. An explosive atmosphere is defined as a mixture - under atmospheric conditions - of air and flammable substances in the form of gases, vapours, mist or dust in which, after ignition has occurred, combustion spreads to the entire unburned mixture.</p>
	<p><b>PERSONAL PROTECTION EQUIPMENT</b></p> <p>These symbols indicate the equipment that must be worn and kept by the operator for protection against threats against safety and/or health while at work.</p>
	<p><b>OBLIGATION TO ASSEMBLE THE COVER AND ALL THE SAFETY AND PROTECTION DEVICES</b></p> <p>This symbol signals the obligation to reassemble the cover and all the safety and protection devices of the burner after any maintenance, cleaning or checking operations.</p>
	<p><b>ENVIRONMENTAL PROTECTION</b></p> <p>This symbol gives indications for the use of the machine with respect for the environment.</p>
	<p><b>IMPORTANT INFORMATION</b></p> <p>This symbol indicates important information that you must bear in mind.</p>
	<p>This symbol indicates a list.</p>

## 2.4. Guarantee and responsibility

The manufacturer guarantees its new products from the date of installation, in accordance with the regulations in force and/or the sales contract. At the moment of the first start-up, check that the burner is integral and complete.

	Failure to observe the information given in this manual, operating negligence, incorrect installation and carrying out of non authorised modifications will result in the annulment by the manufacturer of the guarantee that it supplies with the burner.
---	--

In particular, the rights to the guarantee and the responsibility will no longer be valid, in the event of damage to things or injury to people, if such damage/injury was due to any of the following causes:

- Incorrect installation, start-up, use and maintenance of the burner;
- Improper, incorrect or unreasonable use of the burner;
- Intervention of unqualified personnel;
- Carrying out of unauthorised modifications on the equipment;
- Use of the burner with safety devices that are faulty, incorrectly applied and/or not working;
- Installation of untested supplementary components on the burner;
- Powering of the burner with unsuitable fuels;
- Faults in the fuel supply system.
- Continuation of use of the burner when a fault has occurred;
- Repairs and/or overhauls incorrectly carried out;
- Modification of the combustion chamber with inserts that prevent the regular development of the structurally established flame;
- Insufficient and inappropriate surveillance and care of those burner components most likely to be subject to wear and tear;
- Use of non-original components, including spare parts, kits, accessories and optional;
- Force majeure.

The manufacturer furthermore declines any and every responsibility for the failure to observe the contents of this manual.

### 3. SAFETY AND PROTECTION

#### 3.1. Introduction

The burners have been designed and built in compliance with current regulations and directives, applying the known technical rules of safety and envisaging all the potential danger situations. It is necessary, however, to bear in mind that the imprudent and clumsy use of the equipment may lead to situations of death risk for the user or third parties, as well as the damaging of the burner or other items. Inattention, thoughtlessness and excessive confidence often cause accidents; the same applies to tiredness and sleepiness.

It is a good idea to remember the following:


- The burner must only be used as expressly described. Any other use should be considered improper and therefore dangerous.

In particular:

it can be applied to boilers operating with water, steam, diathermic oil, and to other uses expressly foreseen by the manufacturer;

the type and pressure of the fuel, the voltage and frequency of the electrical power supply, the minimum and maximum deliveries for which the burner has been regulated, the pressurisation of the combustion chamber, the dimensions of the combustion chamber and the room temperature must all be within the values indicated in the instruction manual.

- Modification of the burner to alter its performance and destinations is not allowed.
- The burner must be used in exemplary technical safety conditions. Any disturbances that could compromise safety must be quickly eliminated.
- Opening or tampering with the burner components is not allowed, apart from the parts requiring maintenance.
- Only those parts envisaged by the manufacturer can be replaced.

 <b>WARNING</b>	<p>The manufacturer guarantees safety and proper functioning only if all burner components are intact and positioned correctly.</p>
---	---

#### 3.2. Personnel training

The user is the person, body or company that has acquired the machine and intends to use it for the specific purpose. He is responsible for the machine and for the training of the people working around it.

The user:

- undertakes to entrust the machine exclusively to suitably trained and qualified personnel;
- undertakes to inform his personnel in a suitable way about the application and observance of the safety instructions. With that aim, the user undertakes to ensure that everyone knows the use and safety instructions for his own duties.
- Personnel must follow all the danger and caution indications shown on the machine.
- Personnel must not carry out, on their own initiative, operations or interventions that are not within their province.
- Personnel are obliged to inform their superiors of every problem or dangerous situation that may arise.
- The assembly of parts of other makes, or any modifications, can alter the characteristics of the machine and hence compromise operating safety. The manufacturing company therefore accepts no responsibility whatsoever for any which may result from the use of non-original parts.

In addition:

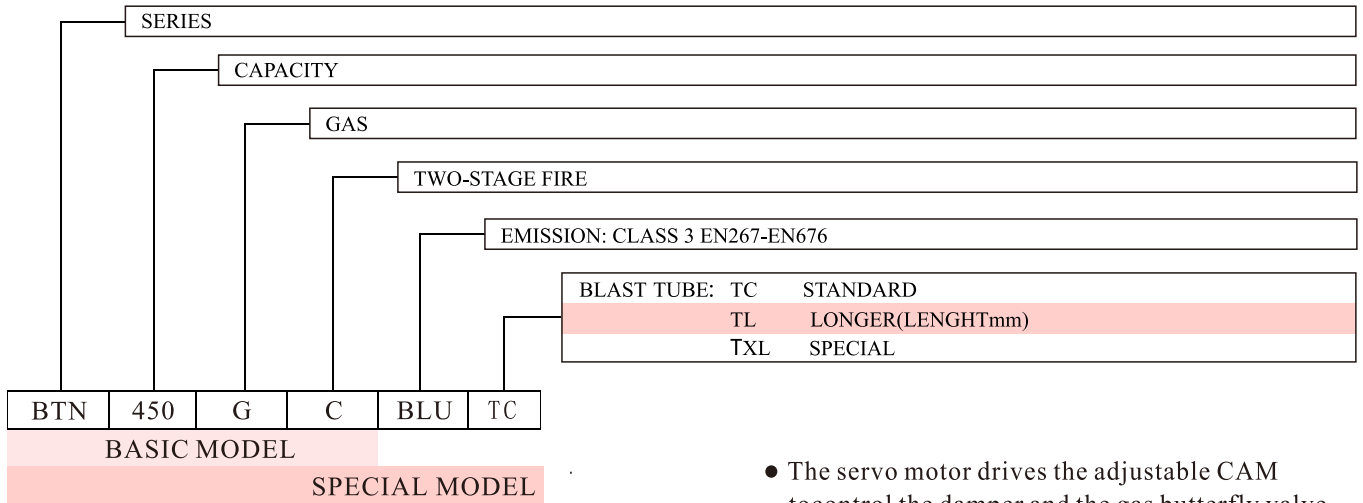


Must take all the measures necessary to prevent unauthorised people gaining access to the machine;

- The user must inform the manufacturer if faults or malfunctioning of the accident prevention systems are noticed, along with any presumed danger situation;
- Personnel must always use the personal protective equipment envisaged by legislation and follow the indications given in this manual.

## 4. BURNER TECHNICAL DATA

### 4.1. Summary



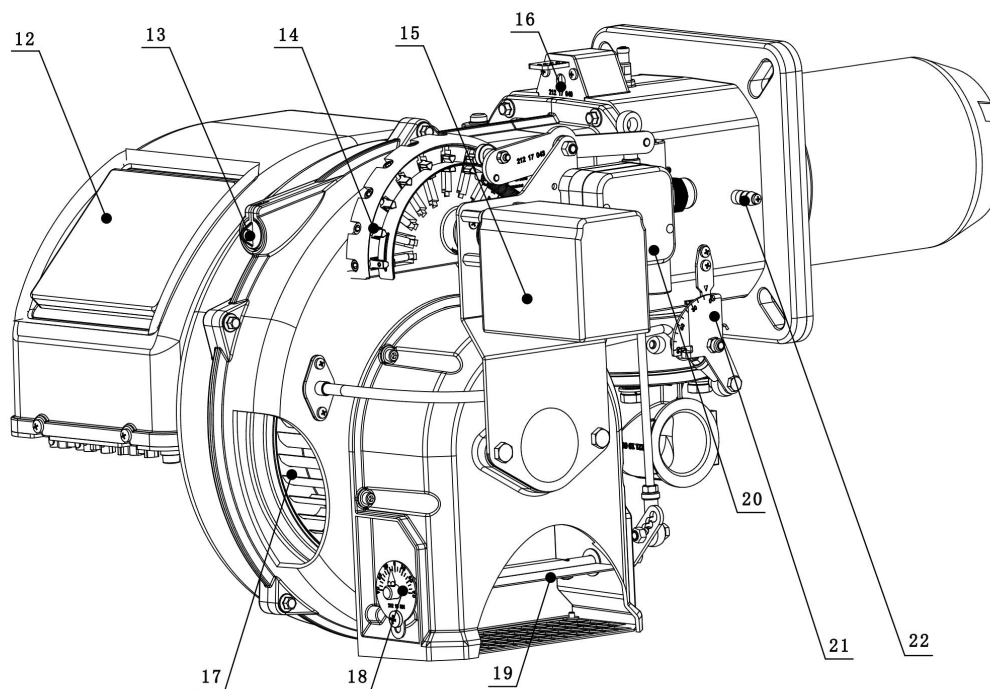
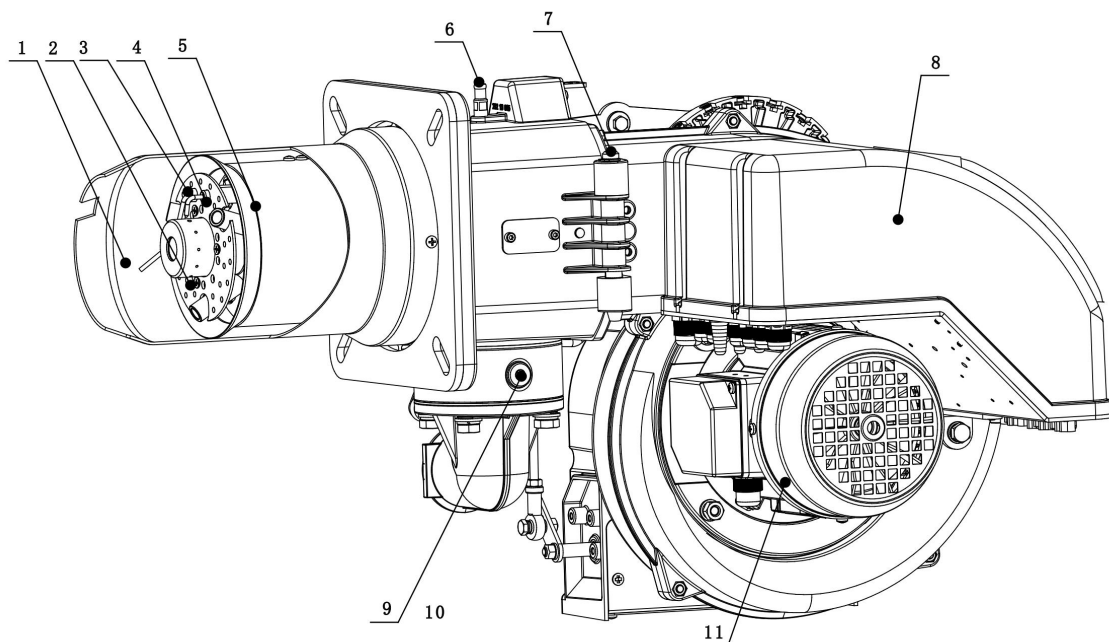
- Burner adopts automatic progressive regulation
- Control panel is simple and easy to operate
- Open the upper cover of the burner to inspect the gas nozzle assembly
- Air inlet has a muffler cover for quiet and smooth operation
- The servo motor drives the adjustable CAM to control the damper and the gas butterfly valve, and the adjustment precision is high
- Burner control system is integrated with the burner
- Electrical junction with plug type connector
- Proportional regulator (only when needed)

### 4.2. Technical Data

Burner	BTN40GC BLU	BTN55GC BLU	BTN85GC BLU	BTN120GC BLU	BTN210GC BLU	BTN250GC BLU	BTN350GC BLU	BTN450GC BLU
Power kW	45~370	72~480	150~860	300~1300	300~1860	570~2400	1200~3600	1500~4450
Gas flow m <sup>3</sup> /h	4.5~37	7.2~48	15~86	30~130	30~186	570~240	120~360	150~445
Motor Voltage	230V-50Hz	230V-50Hz	380V-50Hz	380V-50Hz	380V-50Hz	380V-50Hz	380V-50Hz	380V-50Hz
Motor kW	0.45	0.45	1.5	2.2	4.5	5.5	7.5	9.2
rpm	2850	2850	2850	2850	2850	2850	2850	2850
Controller	LME22	LME22	LME22	LME22	LME22	LME22	LFL1.322	LFL1.322
Flame detector	Ion-probe	Ion-probe	Ion-probe	Ion-probe	Ion-probe	Ion-probe	Ion-probe	Ion-probe
Servo motor	SQN70	SQN70	SQN70	SQN70	SQN70	SQN70	SQM40...	SQM40...
Air valve connection	G1 1/2"	G1 1/2"	G2"	G2"	G2"	G2"	DN65	DN65
K.Nkg	39	40	78	81	89	125	250	250

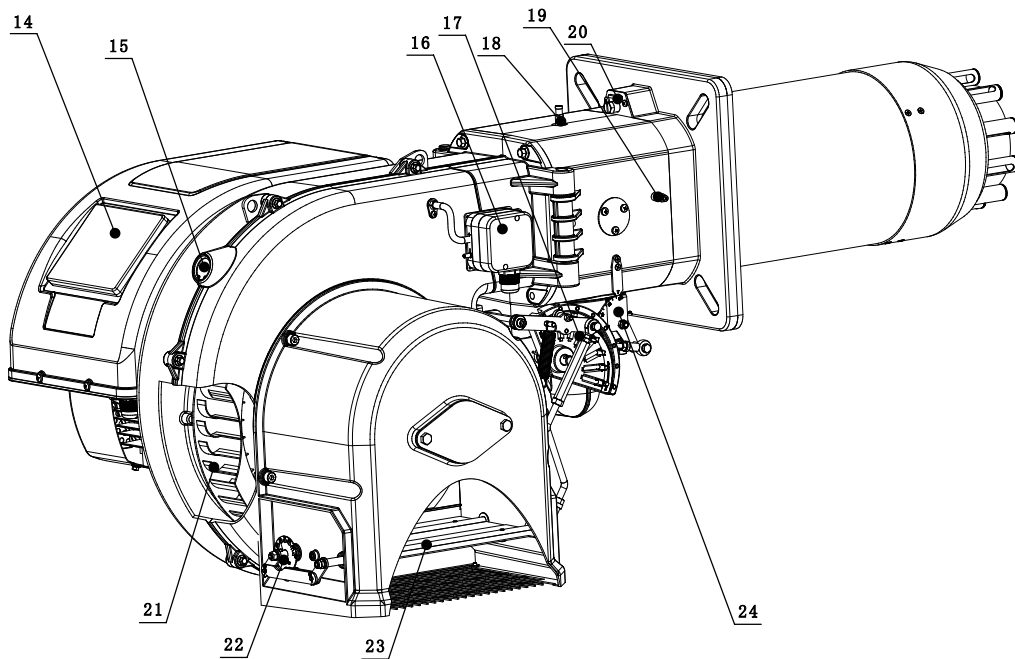
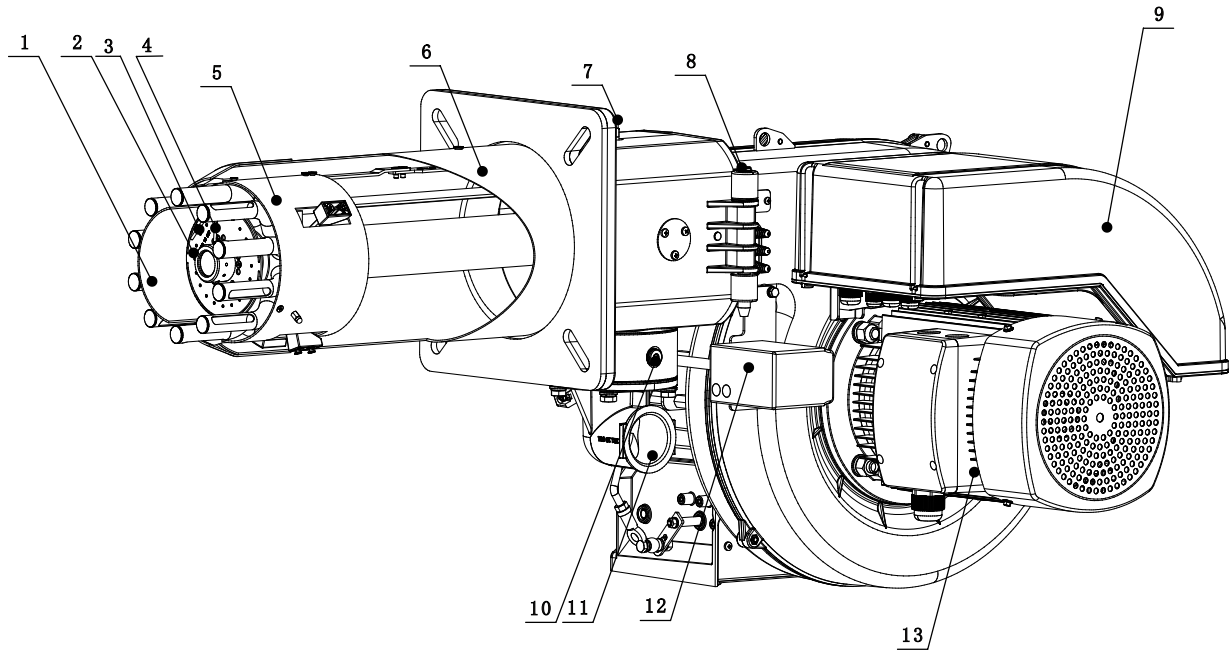
Burner	BTN550GC BLU	BTN650GC BLU	BTN800GC BLU	BTN1000GC BLU	BTN1200GC BLU	BTN1500GC BLU	BTN1800GC BLU
Power kW	1800~5250	2200~6250	3500~8100	2020~10100	2700~13000	2100~15500	2500~17500
Gas flow m <sup>3</sup> /h	180~525	220~625	350~810	202~1010	270~1300	210~1550	250~1750
Motor Voltage	380V-50Hz	380V-50Hz	380V-50Hz	380V-50Hz	380V-50Hz	380V-50Hz	380V-50Hz
Motor kW	12.5	15	18.5	22	37	45	55
rpm	2850	2850	2850	2850	2850	2850	2850
Controller	LFL1.322	LFL1.322	LFL1.322	LFL1.322	LFL1.322	LFL1.322	LFL1.322
Flame detector	Ion-probe	Ion-probe	QRA2	QRA2	QRA2	QRA2	QRA2
Servo motor	SQM40...	SQM40...	SQM40...	SQM40...	SQM56...	SQM56...	SQM56...
Air valve connection	DN65	DN65	DN80	DN80	DN125	DN125	DN125
K.Nkg	250	280	662	677			

### 4.3. BTN40-55GC BLU BASIC FITTINGS DIAGRAM



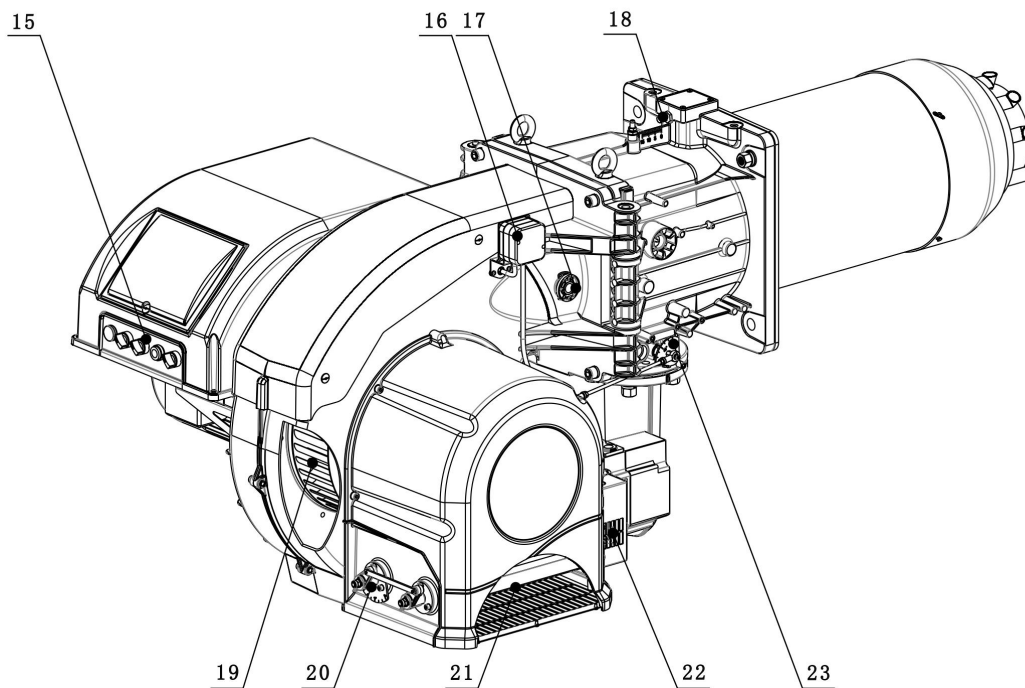
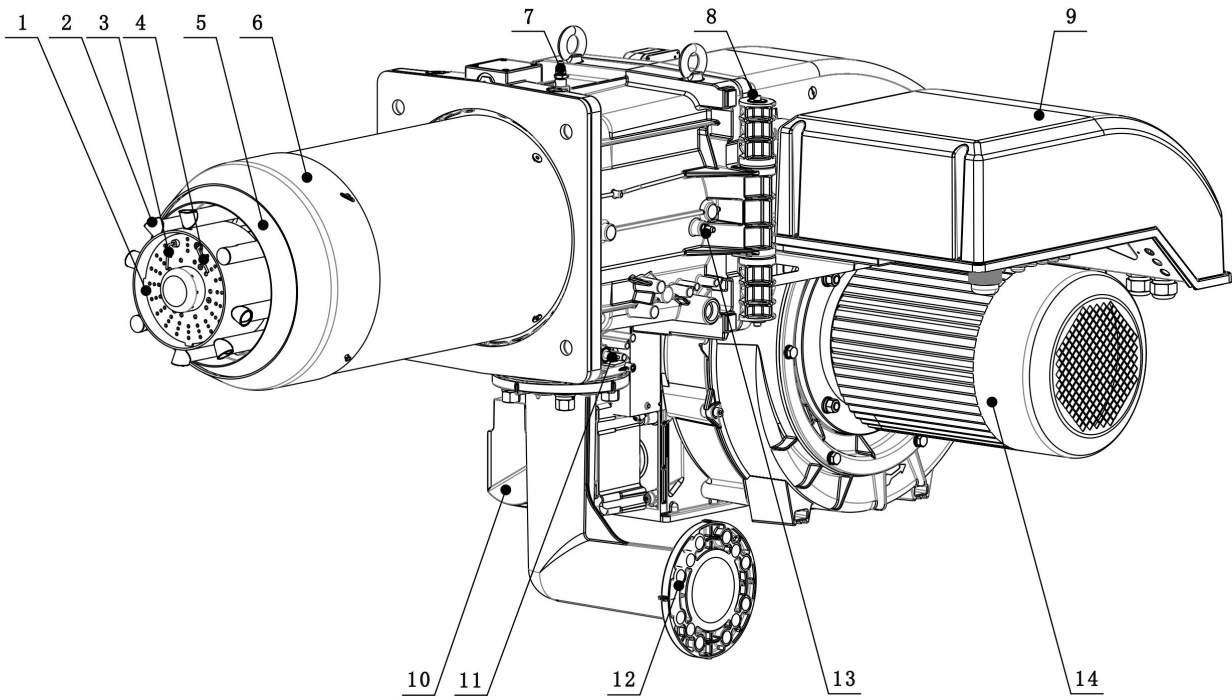
- |                          |                       |                          |                                  |
|--------------------------|-----------------------|--------------------------|----------------------------------|
| 1. Combustion cylinder   | 7. Hinge axis         | 13. Watch mirror         | 19. Air damper openness index    |
| 2. Air diffuser          | 8. Cabinet            | 14. Regulating CAM (air) | 20. Air damper block board       |
| 3. Ion-probe             | 9. Gas butterfly      | 15. Servo motor          | 21. Disc valve opening indicator |
| 4. Electrode             | 10. Gas inlet port    | 16. Adjustable nut       | 22. Air pressure check port      |
| 5. Adjustable block ring | 11. Motor             | 17. Impeller             |                                  |
| 6. Gas pressure nozzle   | 12. Controlling panel | 18. Air pressure switch  |                                  |

### 4.3. BTN85-250GC BLU BASIC FITTINGS DIAGRAM



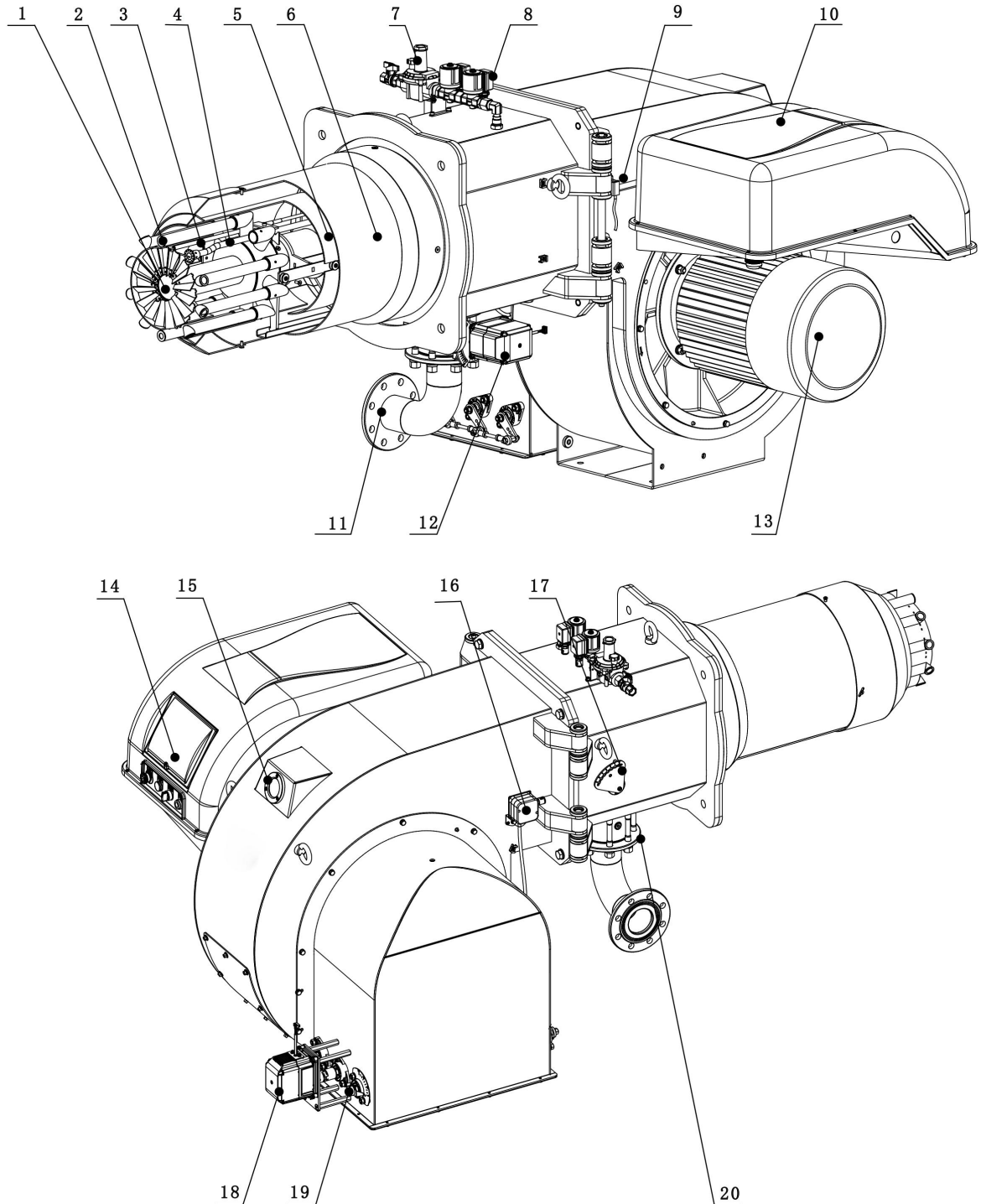
- |                          |                        |                          |                                  |
|--------------------------|------------------------|--------------------------|----------------------------------|
| 1. Air diffuser          | 7. Gas pressure nozzle | 13. Motor                | 19. Air pressure check port      |
| 2. Air nozzle            | 8. Hinge axis          | 14. Controlling panel    | 20. Adjustable nut               |
| 3. Ion-probe             | 9. Cabinet             | 15. Watch mirror         | 21. Impeller                     |
| 4. Electrode             | 10. Gas butterfly      | 16. Air pressure switch  | 22. Air damper openness index    |
| 5. Adjustable block ring | 11. Gas inlet port     | 17. Regulating CAM (air) | 23. Air damper block board       |
| 6. Combustion cylinde    | 12. Servo motor        | 18. Gas pressure nozzle  | 24. Disc valve opening indicator |

### 4.3. BTN350-650GC BLU BASIC FITTINGS DIAGRAM



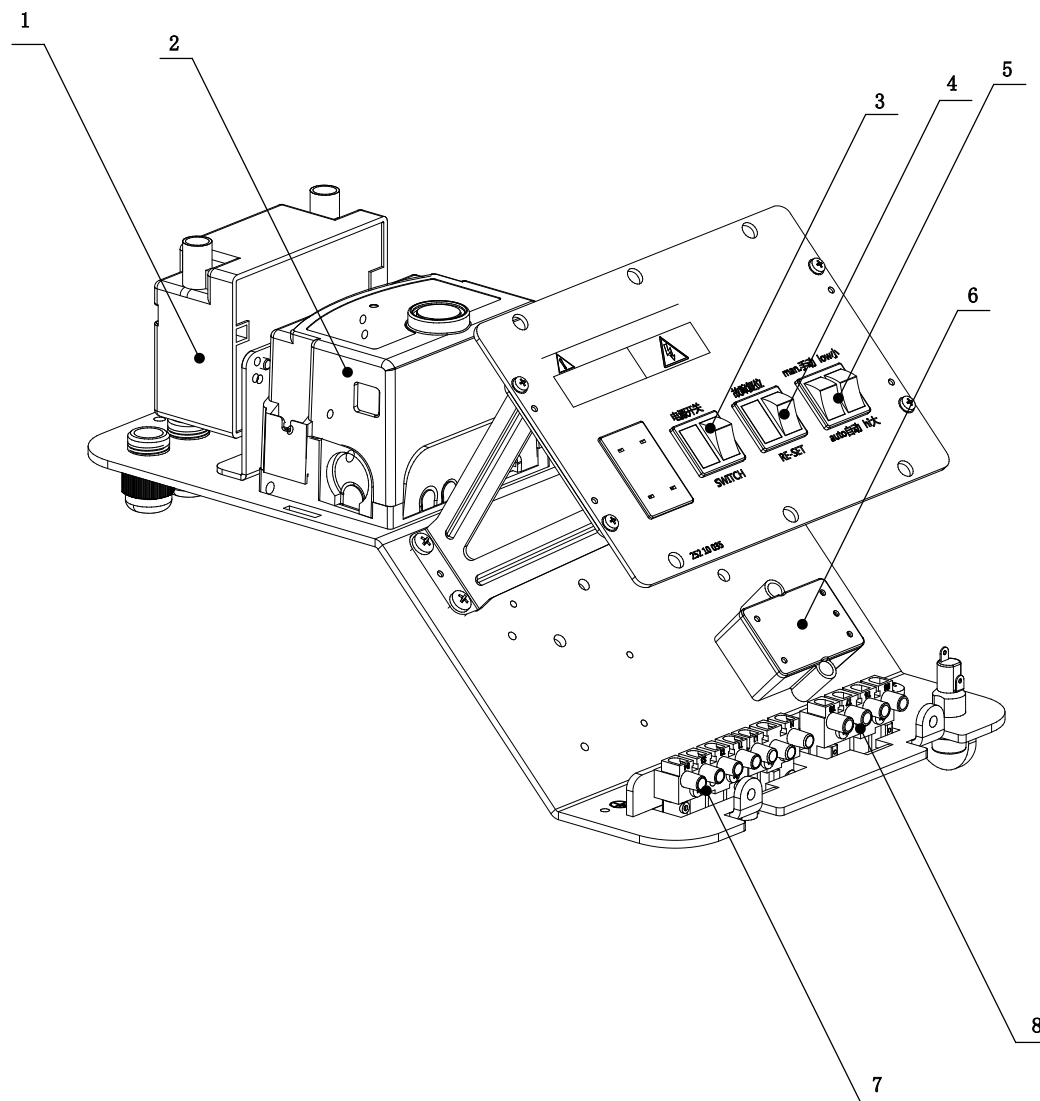
- |                          |                        |                             |                                  |
|--------------------------|------------------------|-----------------------------|----------------------------------|
| 1. Air diffuser          | 7. Gas pressure nozzle | 13. Air pressure check port | 19. Impeller                     |
| 2. Air nozzle            | 8. Hinge axis          | 14. Motor                   | 20. Air damper openess index     |
| 3. Ion-probe             | 9. Cabinet             | 14. Controlling panel       | 21. Air damper block board       |
| 4. Electrode             | 10. Servo motor        | 16. Air pressure switch     | 22. Regulating CAM (air)         |
| 5. Adjustable block ring | 11. Gas butterfly      | 17. Watch mirror            | 23. Disc valve opening indicator |
| 6. Combustion cylinde    | 12. Gas inlet port     | 18. Adjustable nut          |                                  |

### 4.3. BTN800-1800GC BLU BASIC FITTINGS DIAGRAM



- |                              |                       |                                      |
|------------------------------|-----------------------|--------------------------------------|
| 1. Diffuser                  | 9. Phototube          | 16. Air pressure switch              |
| 2. Gas sprayer               | 10. Distribution box  | 17. Secondary air conditioning board |
| 3. Electrode                 | 11. Gas connection    | 18. Servo motor(gas)                 |
| 4. Transformer               | 12. Gas servo motor   | 19. Damper scale plate               |
| 5. Adjuster block ring       | 13. Fan motor         | 20. Gas disc valve                   |
| 6. Burner head               | 14. Controlling panel |                                      |
| 7. Pressure regulating valve | 15. Watch mirror      |                                      |
| 8. Transformer               |                       |                                      |

#### 4.4.BTN40-55GC.BJU Distribution box Description

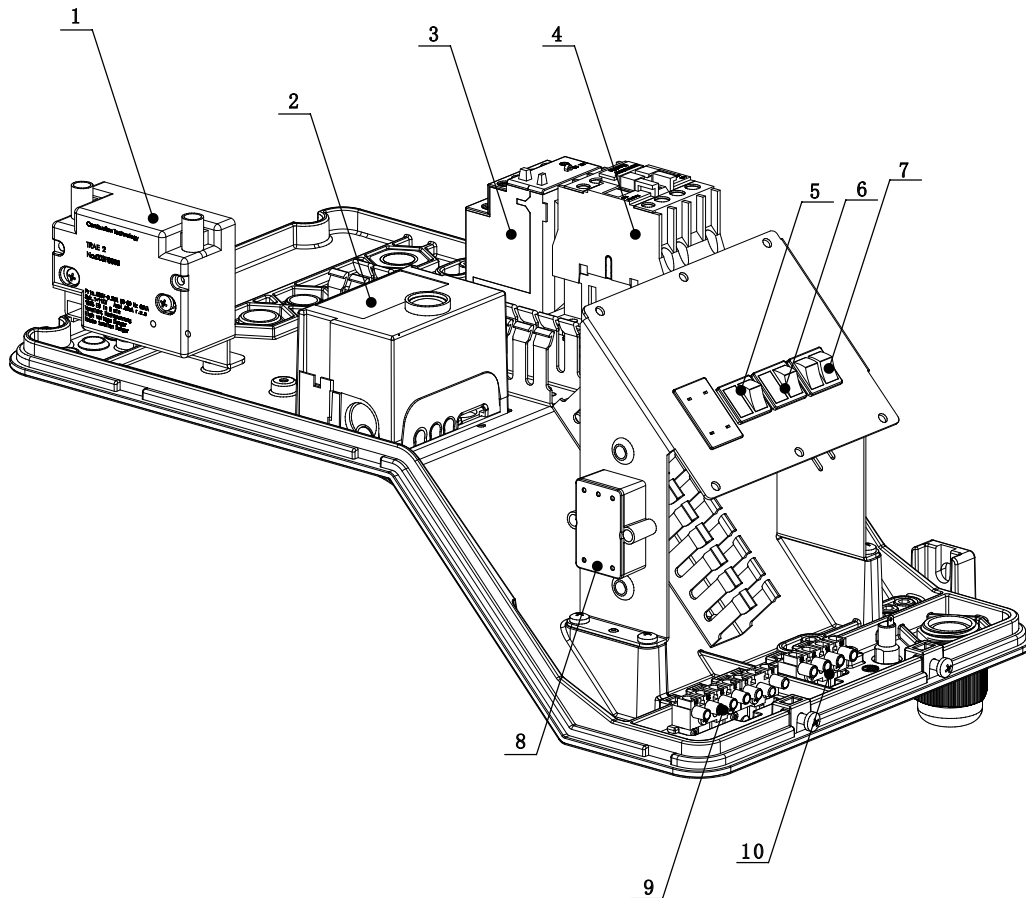


1. Ignition transformer  
 2. controller  
 3. Power switch

4. Fault reset switch  
 5. Manual automatic double switch  
 6. Filter

7. 7 pins plug (female)  
 8. 4 pins plug (female)

#### 4.4. Description of BTN85-250GC.BLU distribution box

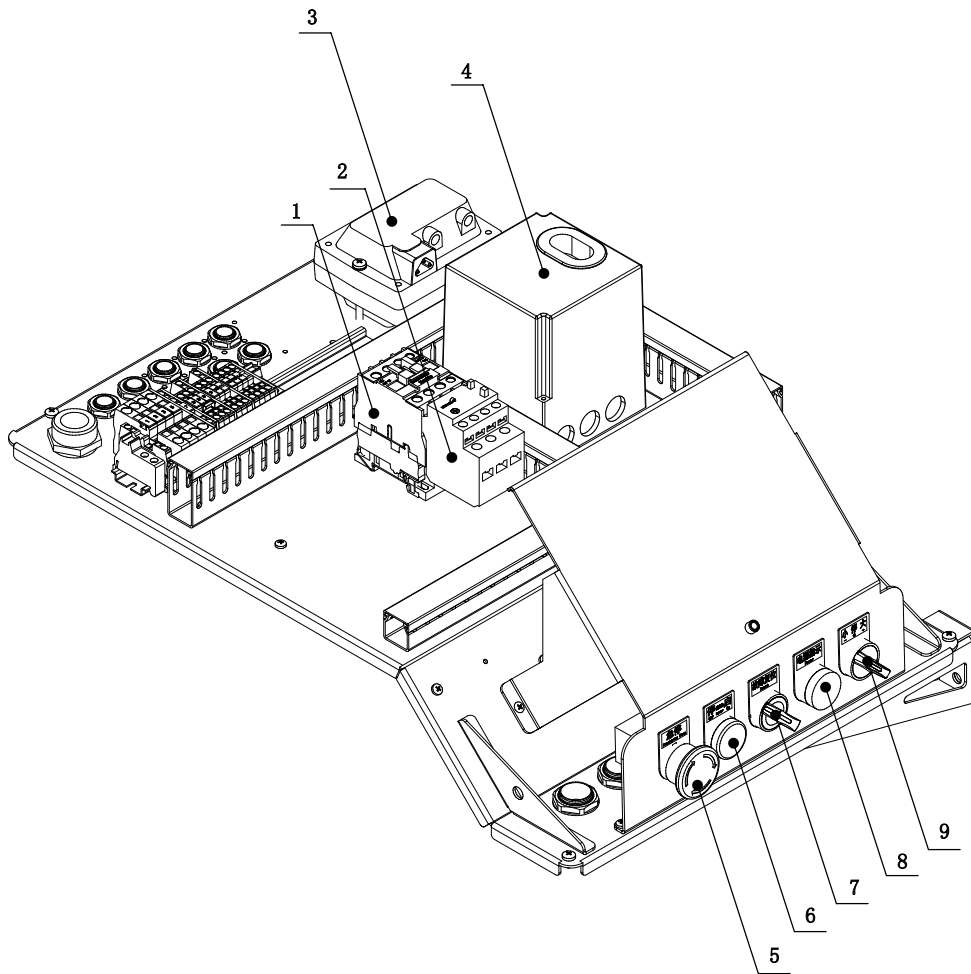


1. Igniter  
2. Program controller  
3. Relay  
4. Ac contactor

5. Power switch  
6. Fault reset switch  
7. Manual automatic dual switch  
8. Filter

9. 7 pins plug(female)  
10. 4 pins plug(female)

#### 4.4. Description of BTN350-650GCBLU distribution box

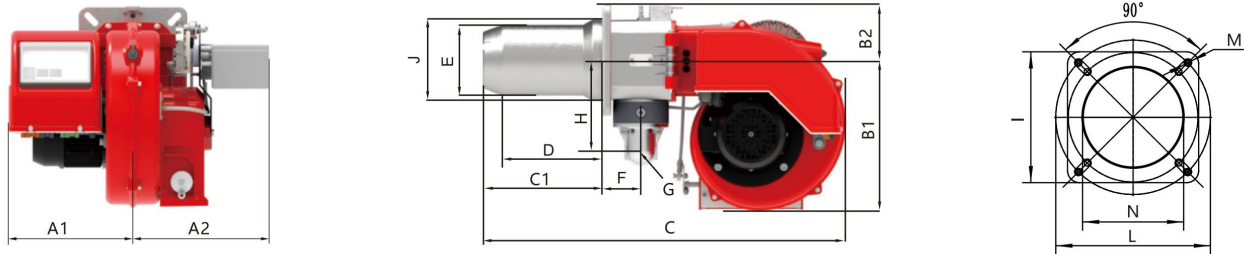


1. Ac contactor  
2. Relay  
3. Transformer

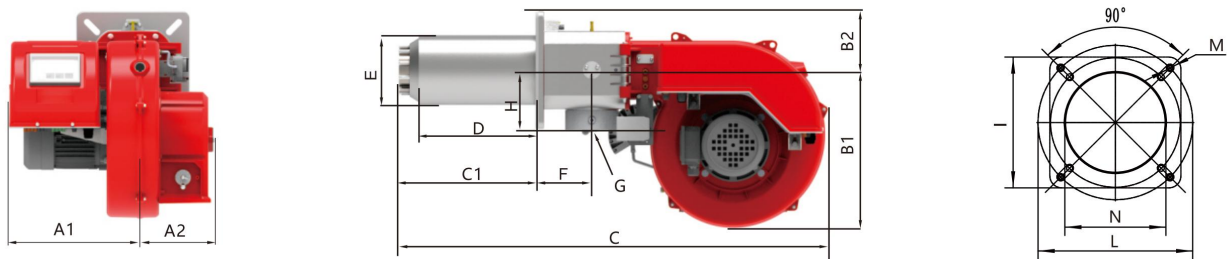
4. Controller  
5. Emergency stop knob switch  
6. Short-body signal lights

7. Fault reset knob  
8. The lamp has a reset button  
9. Three-speed knob switch

### 4.5. BTN40-120GC BLU BURNER BODY DIMENSION DIAGRAM

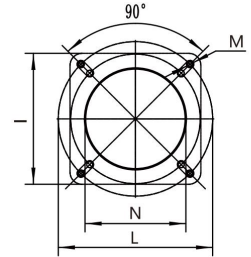
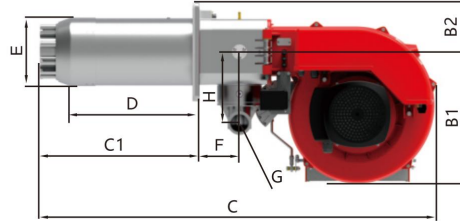
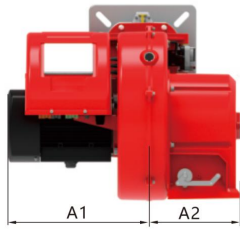


Model	A1	A2	B1	B2	C	C1	D	E	F	G	H	I	L	M	N	J
	mm	mm	mm	mm	mm	mm	mm	Φmm	mm	mm	mm	mm	Φmm	M	Φmm	Φmm
BTN40GC	253	276	300	110	713	230	197	140	77	G1½"	178	220	218-260	4-M10	170	161
BTN40GC-TL	253	276	300	110	837	354	316	140	77	G1½"	178	220	218-260	4-M10	170	161
BTN55GC	253	276	300	110	713	230	197	140	77	G1½"	178	220	218-260	4-M10	170	161
BTN55GC-TL	253	276	300	110	837	354	320	140	77	G1½"	178	220	218-260	4-M10	170	161

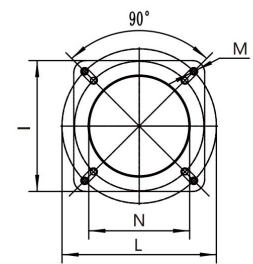
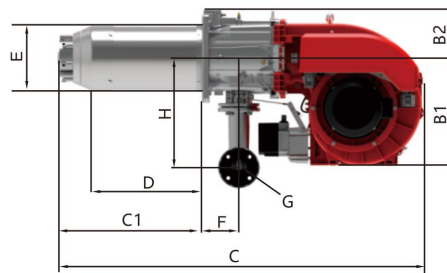
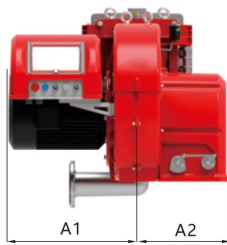


Model	A1	A2	B1	B2	C	C1	D	E	F	G	H	I	L	M	N
	mm	mm	mm	mm	mm	mm	mm	Φmm	mm	mm	mm	mm	Φmm	M	Φmm
BTN85GC BLU	355	235	430	160	1030	236	182	190	151	G2"	231	320	290-370	4-M16	200
BTN85GC BLU-TL	355	235	430	160	1165	371	317	190	151	G2"	231	320	290-370	4-M16	200
BTN120GC BLU	355	235	430	160	1033	238.5	182	190	151	G2"	231	320	290-370	4-M16	200
BTN120GC BLU-TL	355	235	430	160	1168	373.5	317	190	151	G2"	231	320	290-370	4-M16	200

#### 4.5. BTN210-650GC BLU BURNER BODY DIMENSION DIAGRAM

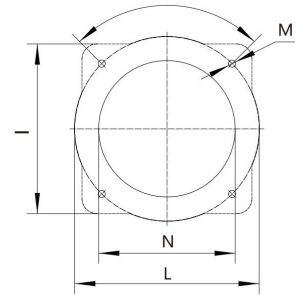
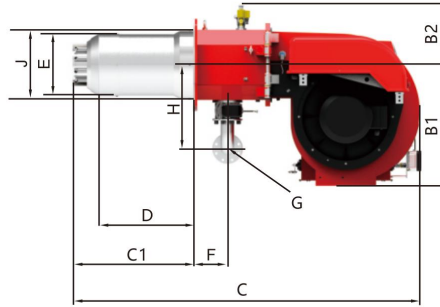
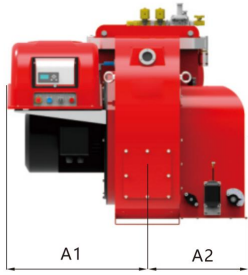


Model	A1	A2	B1	B2	C	C1	D	E	F	G	H	I	L	M	N
	mm	mm	mm	mm	mm	mm	mm	φmm	mm	mm	mm	mm	φmm	M	φmm
BTN210GC BLU	403	298	427.5	160	1155	361	262	222	151	G2"	231	320	290-370	4-M16	232
BTN210GC BLU-TL	403	298	427.5	160	1290	496	397	222	151	G2"	231	320	290-370	4-M16	232
BTN250GC BLU	403	298	427.5	160	1155	361	262	222	151	G2"	231	320	290-370	4-M16	232
BTN250GC BLU-TL	403	298	427.5	160	1290	496	397	222	151	G2"	231	320	290-370	4-M16	232

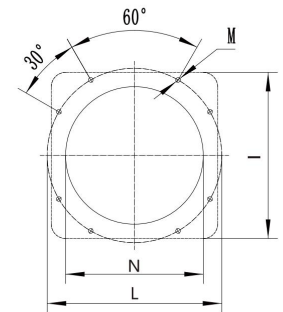
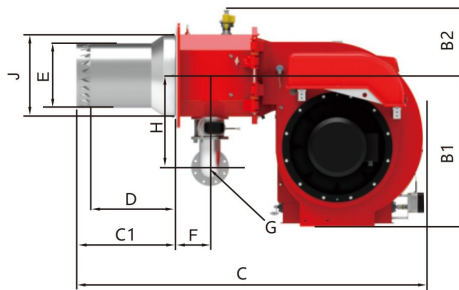
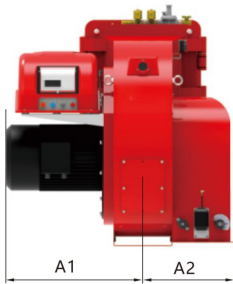


Model	A1	A2	B1	B2	C	C1	D	E	F	G	H	I	L	M	N
	mm	mm	mm	mm	mm	mm	mm	φmm	mm	mm	mm	mm	φmm	M	φmm
BTN350GC BLU	556	400	519	239	1775	698	534	313	178	DN65	528	400	452	4-M16	350
BTN450GC BLU	556	400	519	239	1775	698	534	313	178	DN65	528	400	452	4-M16	350
BTN550GC BLU	583	400	519	239	1775	698	534	336	178	DN65	528	400	452	4-M16	350
BTN650GC BLU	583	400	519	239	1775	698	534	336	178	DN65	528	400	452	4-M16	350

#### 4.5. BTN800-1800GC BLU BLU BURNER BODY DIMENSION DIAGRAM

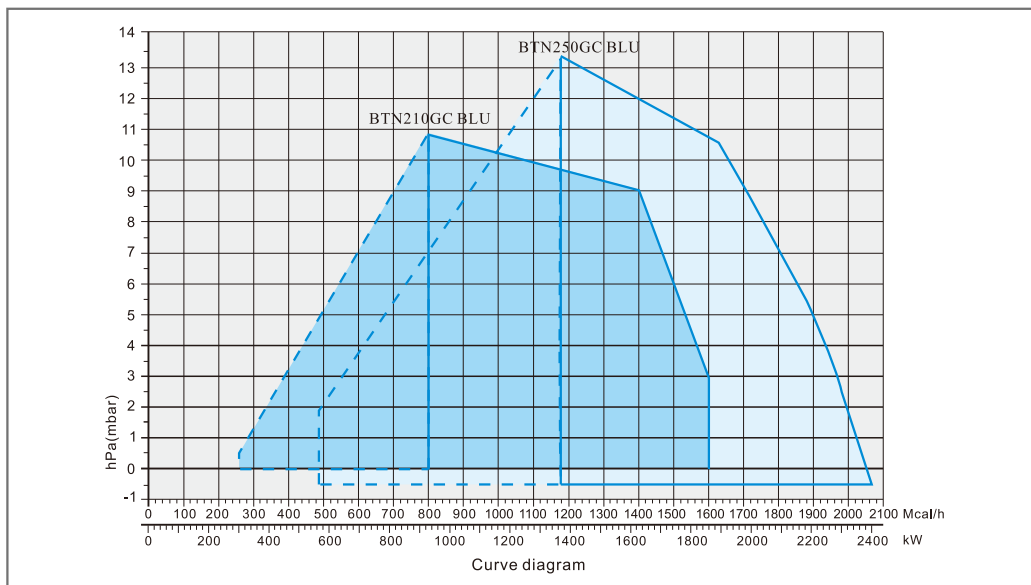
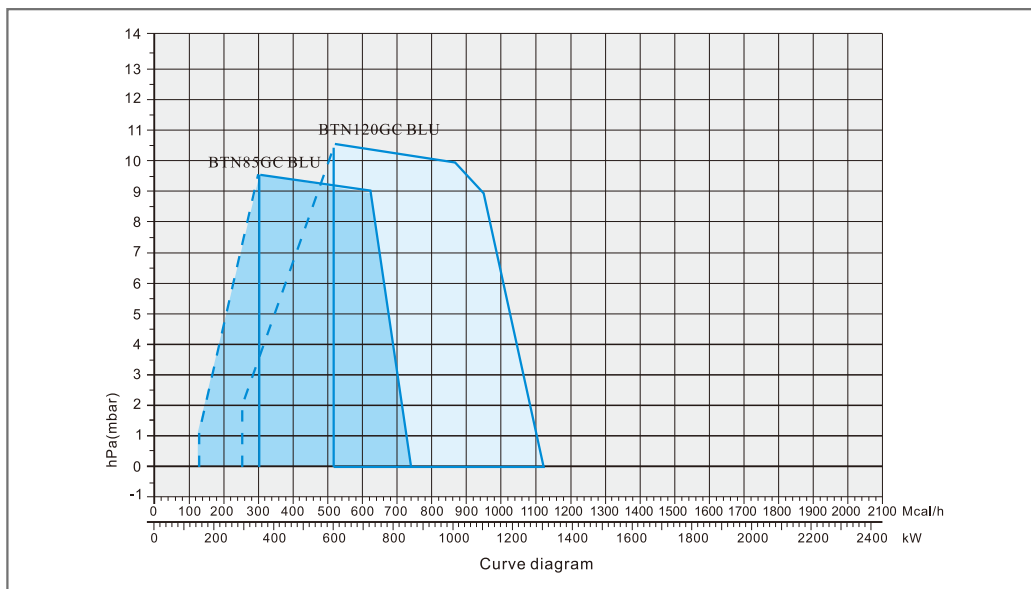
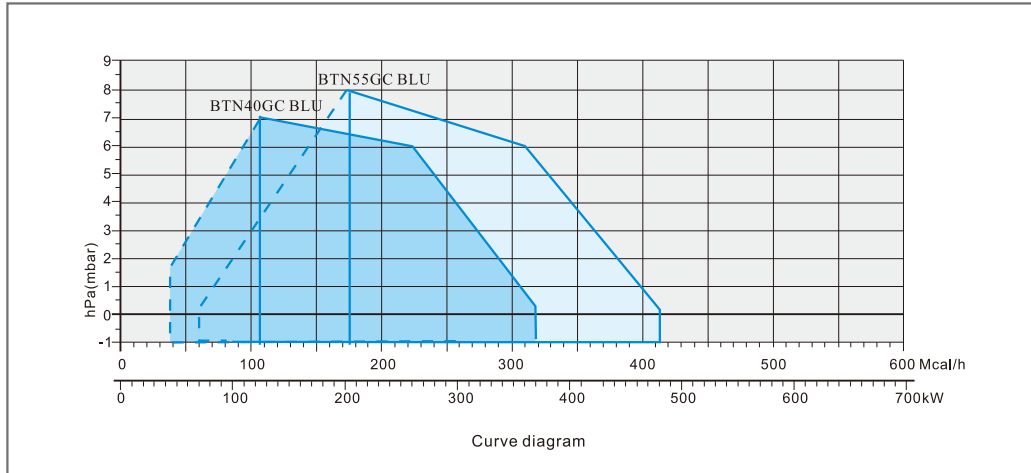


Model	A1	A2	B1	B2	C	C1	D	E	F	G	H	I	L	M	N	J
	mm	mm	mm	mm	mm	mm	mm	Φmm	mm	mm	mm	mm	Φmm	M	Φmm	Φmm
BTN800GC BLU	757	585	802	398	2340	797	624	413	226	DN80	556	560	608	4-M20	490	448
BTN1000GC BLU	757	585	802	398	2340	797	624	413	226	DN80	556	560	608	4-M20	490	448

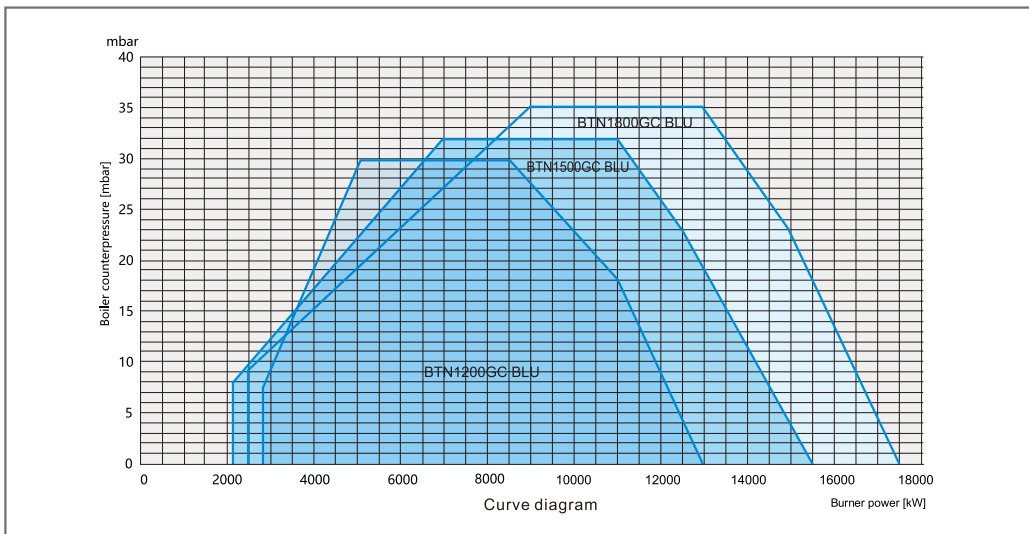
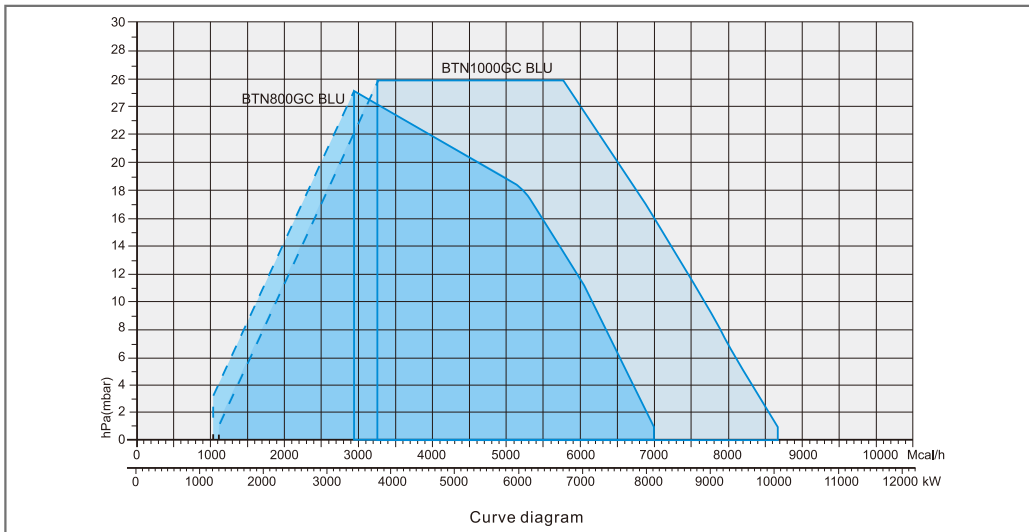
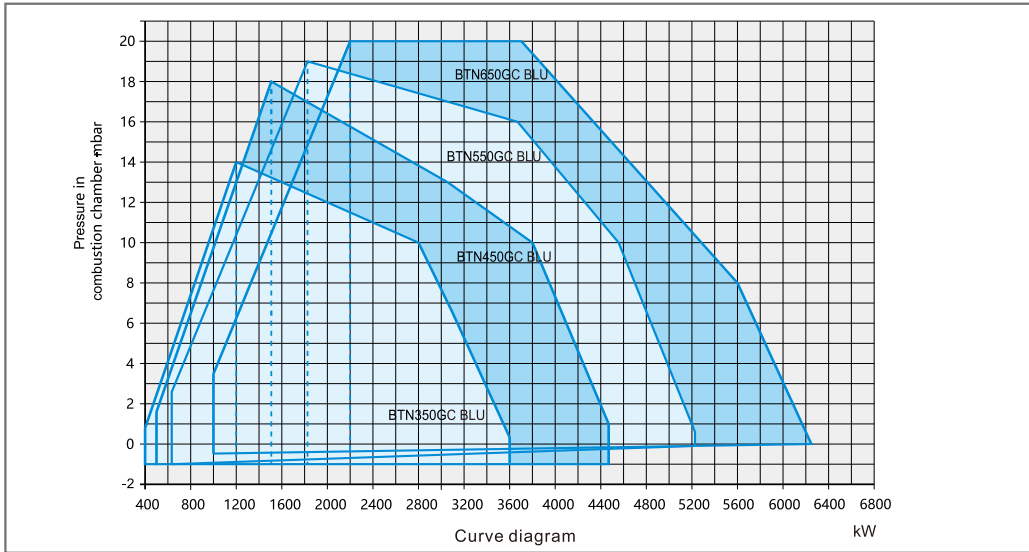


Model	A1	A2	B1	B2	C	C1	D	E	F	G	H	I	L	M	N	J
	mm	mm	mm	mm	mm	mm	mm	Φmm	mm	mm	mm	mm	Φmm	M	Φmm	Φmm
BTN1200GC BLU	825	585	1012	440	2350	663	569	430	230	DN125	614	700	735	8-M16	580	544
BTN1500GC BLU	835	585	1012	440	2305	620	484	490	230	DN125	614	700	735	8-M16	580	544
BTN1800GC BLU	905	585	1012	447	2305	620	484	490	230	DN125	614	700	735	8-M16	580	544

#### 4.6. OPERATION CURVE DIAGRAM (BTN40-250GC BLU)



#### 4.6. OPERATION CURVE DIAGRAM(BTN350-1800GC BLU)



Comparing with burning output of combustion chamber pressure that is the Max. value under ideal test. All data is based on 20°C air temperature and 500meters altitude .

## 5. BURNER INSTALLATION

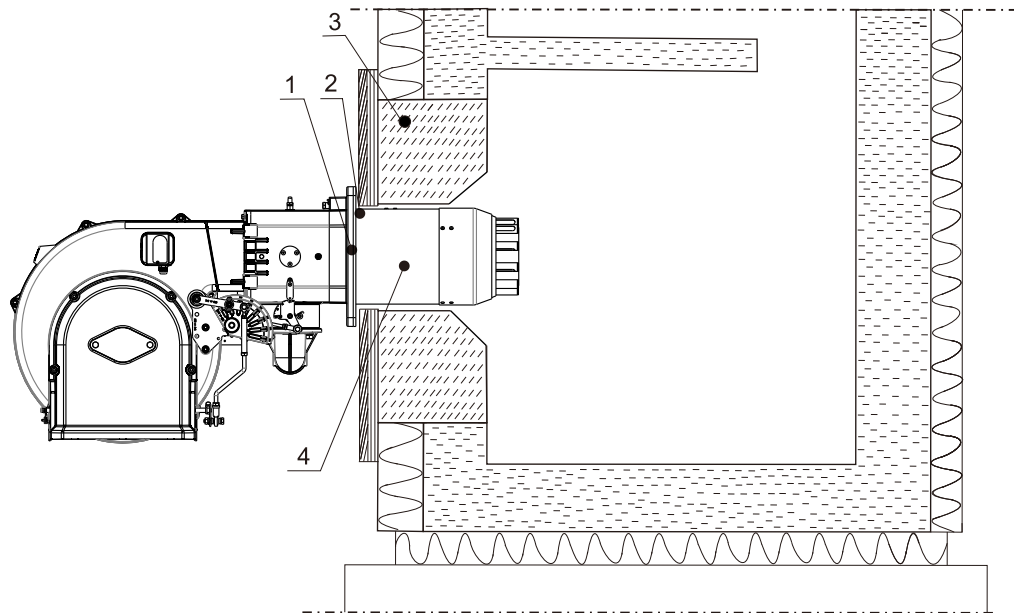
### 5.1. BURNER INSTALLATION

Preparation before installation

1. Check chimney (sectional area and height).
2. Voltage and frequency.
3. Gas system and dimension ,gas pipeline valve voltage stabilizer and accessory seal.
4. Check burner accessory.
5. Reduced pressure voltage stabilizer is behind filter
6. Rust clear inside pipe.

Installation

1. Put gasket inside boiler mounting board and flange,place the bolt.After taking burner head and tube into combustion chamber,fasten the bolt ,fix burner. There must be seal among boiler board,gasket and mounting flange.no air leak in case that the heating smoke will reduces heating reaction or damage spare parts during running.
2. Take oil supply and return system diagram for reference,connect oil to pump.
3. Connect circuit.



1. Mounting flange
2. Gasket
3. Heat-proof material
4. Burner head

Note: There must have standard screw hole in the installation plate.

## 5.2.GAS VALVE INSTALLATION POSITION

There could install the gas valve at left or right position.

Standard gas pipeline connection is at the right side.

## 5.3. CIRCUIT CONNECTION

Burner connection must follow what supplier` wiring diagram told.

## 5.4.SUPPLY GAS PIPELINE INSTALLATION

The dimension of supply gas pipe which locates behind the pressure regulator must bigger or equal to valve.

Gas pipeline must be at the burner right side .

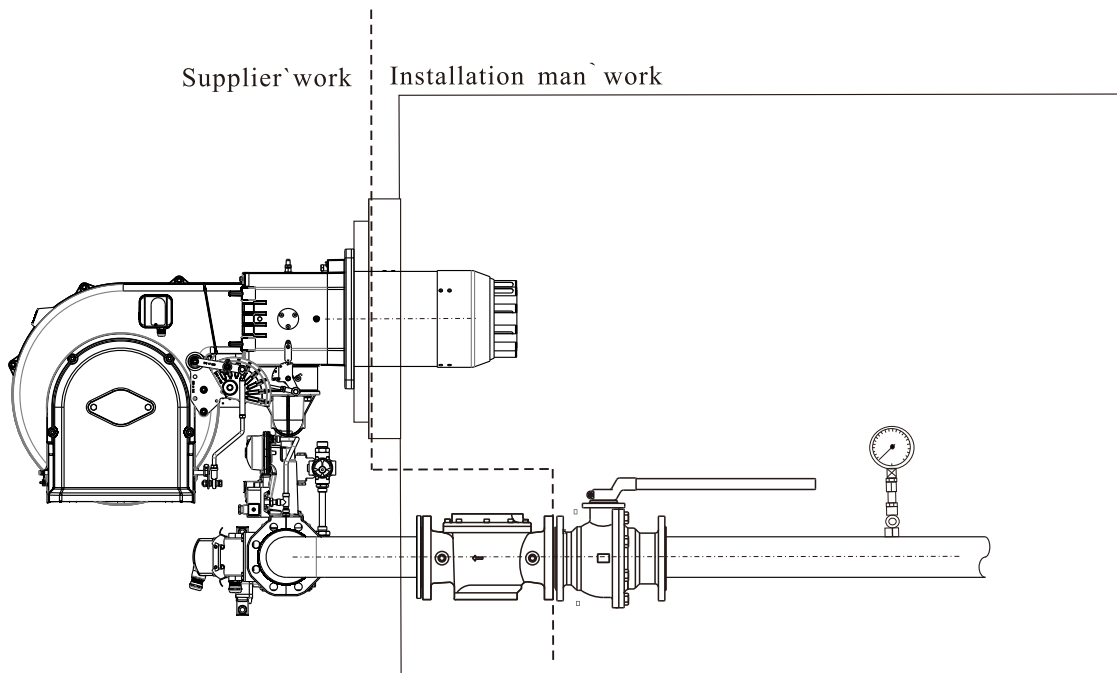
Note! There must have manual stop valve before burner adjustment equipments.



Note! There must have manual stop valve before burner adjustment equipments.

### Gas pipe ventilation

Connecting flexible hose, open gas valve pressure inlet for exhaust。 when ventilates, open gas pipeline ball valve, full pipeline gas , then close the inlet.

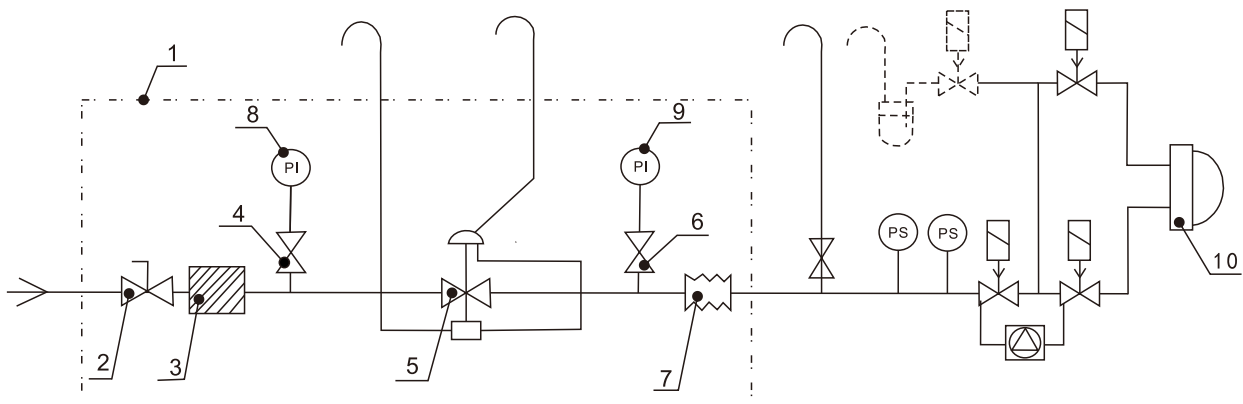


## 6.5.GAS PRESSURE ADJUSTMENT EQUIPMENTS

If input gas pressure is higher the original set  $P_{max}$ , it must be reduced .If the pressure is not stable, adjust it . If there has no safety blowoff valve and safety stop valve in pressure regulator, install them .

Safety blowoff valve must have correct installation to guarantee that safety valve will not release under the condition that burner will close as full load with main gas line interrupt.

Safety stop valve should be set to close when gas pressure about 60% more than second pressure(the pressure is adjusted by regulator).but not higher than  $P_{MAX}$ .Safety should be set to open as pressure is 30% higher than second pressure.The selection of pressure regulator is affected by inlet pressure,second pressure,gas flow and its kind .



- |  |                        |
|--|------------------------|
| 1. Gas pressure regulator                                | 6. Gauge valve         |
| 2. Gas filter  | 8. Gauge,high pressure |
| 4. Gauge valve   | 9. Gauge,low pressure  |
| 5. Regulator with safety stop valve<br>and blowoff valve | 10. Burner             |



## 6. BURNER OPERATION PRINCIPLE

---

### 6.1. Controlling Panel

Burner is controlled by external controlling board which includes power indicator, fault indicator, power button, manual/auto button, (big/stop/small fire button), reset button.

Control button (power button, manual/auto, big/stop/small fire button, reset button)

Power button

Power control

Manual/auto

When " manual", burner will not start by controlling signal, " Auto" controlling system detects burner operation and stop. if necessary, lock it.

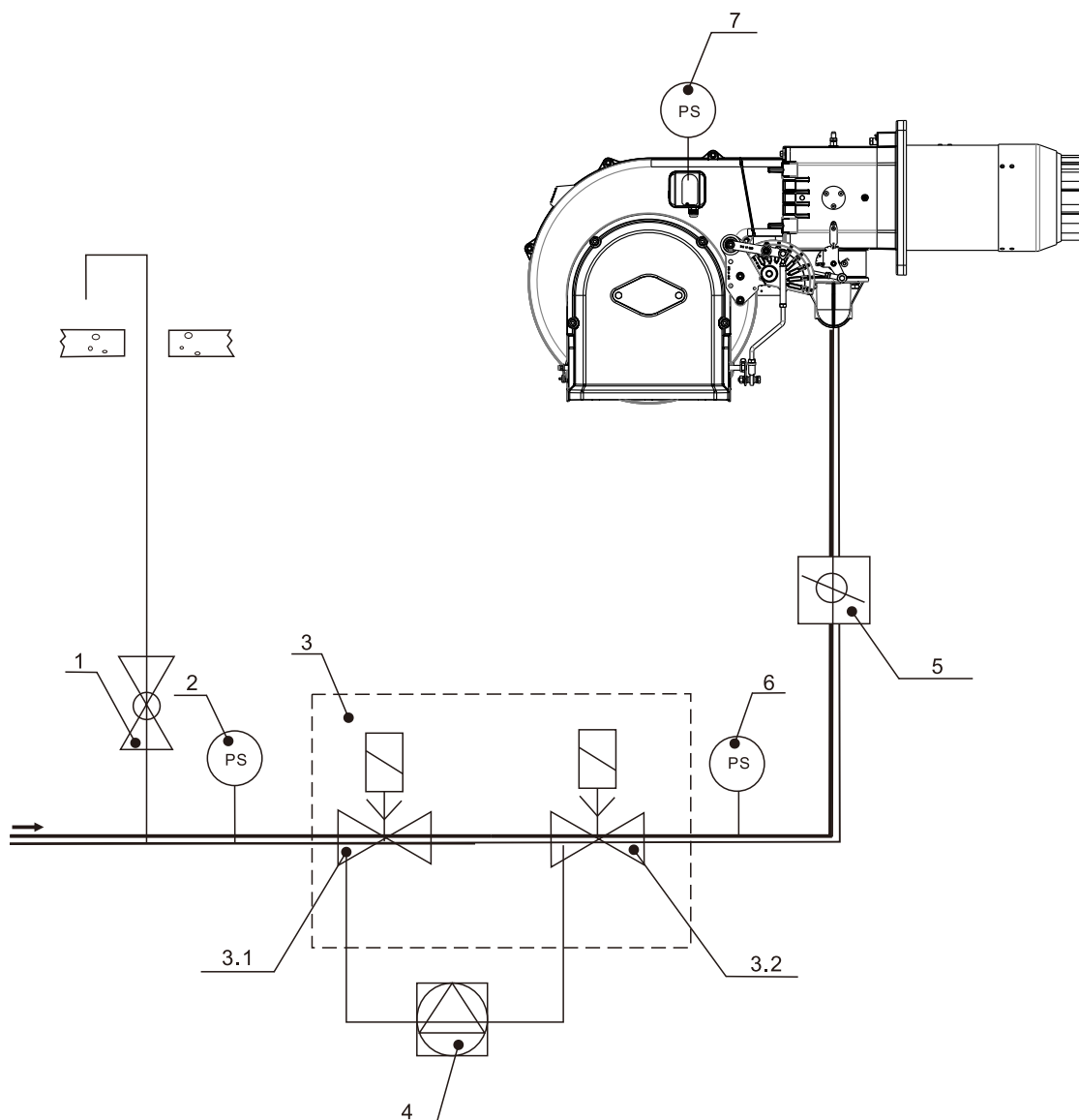
Big/stop/small fire button (Manual operation)

Control servo motor/combined adjustable scale from high to low load manually.

Reset button

If happen the fault, reset it manually.

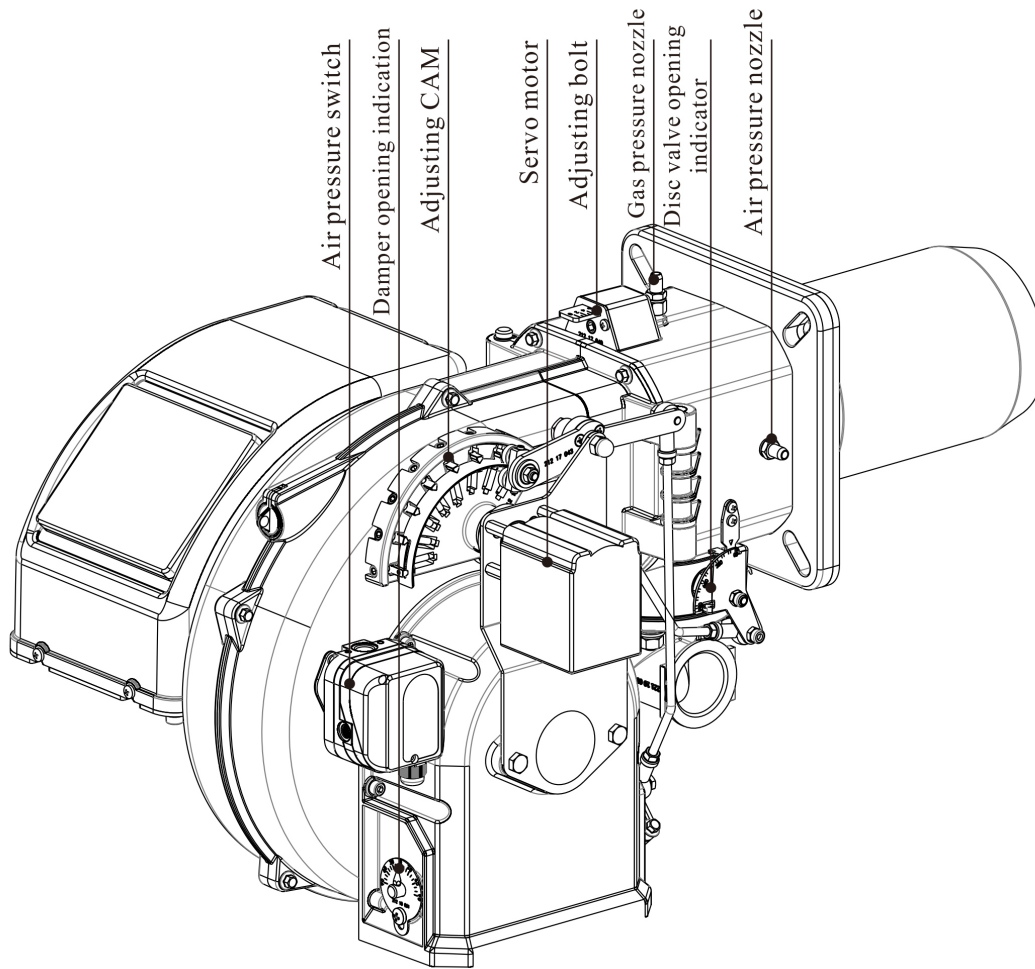
## 6.2.GAS



- |                         |                               |
|-------------------------|-------------------------------|
| 1. Ball valve           | 4. leakage test(if necessary) |
| 2. Pressure switch,Min. | 5. Gas butterfly valve        |
| 3. Gas valve            | 6. Pressure switch,MAX.       |
| 3.1 Gas valve1, NC      | 7. Ignition valve, NC         |
| 3.2 Gas valve2, NC      |                               |

Prepurge happens as full load air. Valve(3.1), (3.2)and(7)close. Ignition starts when prepurge ends, ignition valve(7)opens, Gas is sent to be ignited by spark. Controller controls the ignition time. Valves(3.1)and(3.2)open. After flame forms, valve(7)closes. flames burns under ignition load. Load controller adjusts servo motor, gas butterfly valve (5)and air damper between full and partial load under load request. If partial load exceeds request, burner closes, valve (3.1)and(3.2)closes. Valve leakage is controlled by (4)tester, check(3.1),(3.2)seal, Close leakage tester when burner return to start position.

### 6.3. Function description of each adjustment



#### 6.3.1. Air pressure switch

Its main function is to detect the wind pressure of the fan and lock the burner when the wind pressure is lower than the set value.

#### 6.3.2. Damper opening indication

Look at the position of the pointer to indicate the opening size of the damper damper, "0" position when the damper damper is completely closed, "90" position when the damper damper is fully open.

#### 6.3.3. Regulating CAM

Fine-adjust the opening of the damper damper to increase or decrease the inlet air volume of the damper, so as to achieve the best ratio with the gas volume, so that the gas can be fully burned.

#### 6.3.4. Servo motor

Drive the damper damper and the opening of the gas disc valve, so that the burner between the size of the load conversion, the gas disc valve is directly driven by the motor, so the opening of the gas disc valve is directly determined by the rotation Angle of the servo motor, the servo motor is provided with the rotation Angle of the micro switch, by 4 micro switches (different types of servo motor micro-switch number is different) Control off position, ignition (small fire) position, fire position.

#### 6.3.5. Adjusting bolt

Rotating the adjusting bolt can move the position before and after the adjusting ring, so as to change the size of the secondary air volume, so that the gas combustion is more adequate, and observe the scale when adjusting. The smaller the value, the smaller the secondary air volume, and the larger the secondary air volume.

#### 6.3.6. Gas pressure nozzle

It should be used when the burner is on fire and running normally. After loosening the blockage inside the gas pressure measuring nozzle, the current gas pressure value can be measured by connecting the pressure measuring tube. After the test, the blockage must be tightened.

#### 6.3.7. Gas disc valve opening indicator

Gas disc valve opening indicator

#### 6.3.8. Air pressure nozzle

It is necessary to test the air pressure when the burner fan is running and the damper is opened. After loosening the blockage inside the air pressure measuring nozzle, the pressure measuring tube can be connected to measure the current air pressure square value. After the test, it must be tightened and blocked.

## 6.4. START AND RUNNING

Note: Burner is with a manual/auto button, big/off/small fire button.

- a. Check boiler water and equipments valve open.
- b. Check burner outcome exhausts well.(boiler air brake and chimney is ok).
- c. Check the supply voltage matches the burner one, and the power, check all circuit connection. Connecting thermostat circuit. Manual/auto button should be on "manual", big/off/small fire button is "small fire"
- d. Adjusting small fire` supporting combustion air, the burner air valve indicate servo motor and cam adjustment.
- c. Adjust the gas valve properly, small fire flow regulator to need.
- d. Burner controlling board switch is on "close", and main switch connects power, close relay manually, check motor rotate direction, if necessary, change the two power wires to change rotate directions.
- e. Connecting board switch power, then controller has power, it will work. During pre-air time, it must check air pressure switch can change (from non-pressure position to be-pressure close point). If air pressure switch does not sensor enough pressure, then transformer and ignition valve will not have power, controller will be in "lock", fan motor does not work.

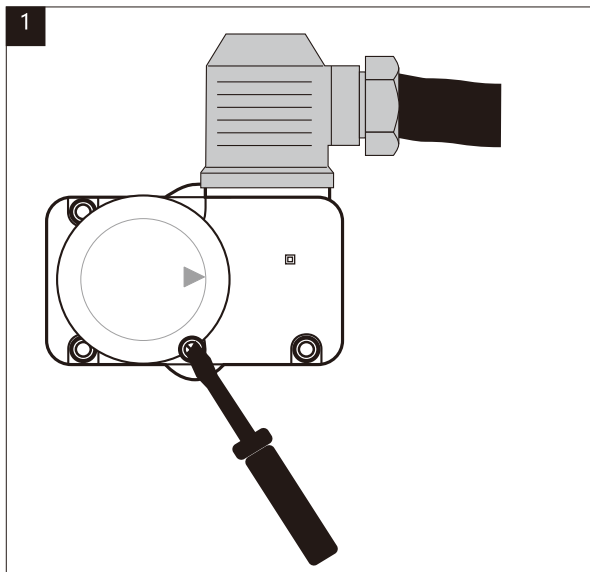
First ignition will come out "dead fire" result.

Here are the causes:

- a). Gas pipes do not exhaust enough air. then gas flow is too less to keep flame stable.
- b). "Dead fire" maybe the flame is not stable in ionization zone or UV photocell does not detect flame, air/gas proportion not correct. then change air or gas flow to correct. Rotate burner head adjustment equipments, close the air pipe between burner head and gas pipe, or open a little.
- c). Ionization current possibly is effected by transformer released discharging current blocks. (two kind of currents will go to same way through burner ground line), then burner will stop thanks to little ionization. Change the transformer two wires connection to solve this problem. Above problems sometimes are caused by bad connection of ground line.
- e. When burner is at lowest position, must watch flame and its outlook, it can adjust by air or gas flow (refer to d or c point), later, check the gas supply flow.  
Gas/air correct proportion is  $\text{CO}_2$  capacity in methane of natural gas is 8% or  $\text{O}_2$  at burner in lowest position, at the highest, it is 10% or  $\text{O}_2 = 3\%$ . must use professional tool to check the  $\text{CO}_2$  capacity in smoke does not higher than 0.1% (1000 p.p.m).
- f. Adjust to small fire operation, check the gas supply flow, close burner, cut off main switch and close the thermostat control (or short circuit thermostat). then turn to big fire position manually, watch servo motor rotate direction, turn to "stop" position, watch servo motor cam each function is good.
- g. Open gas flow manual regulator to supply gas flow for big fire.
- h. Close main and controller switch, reconnect burner power. Ignite burner. "big/off/small fire" to big fire, start the big fire process. watch flame and its outlook, it can adjust by air or gas flow (refer to d or c point). Connect thermostat which is with PID.
- I. Open flow regulator properly to supply big fire gas consumption. If the consumption exceeds the boiler Max. limit, avoid to run again for damage.

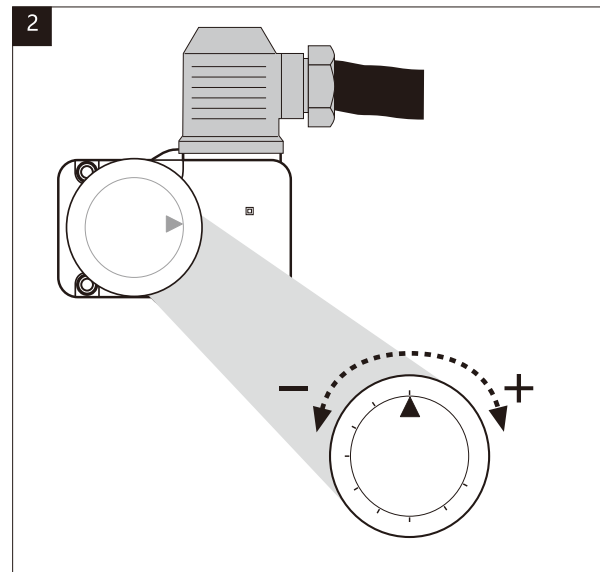
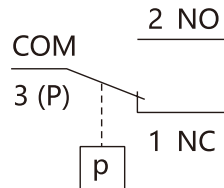
- k. Air pressure switch is that when air pressure is not correct, it will block gas valve open, so pressure switch must adjust to make the burner air pressure enough to close circuit. Pressure switch connection has self-control function which close as fan motor is off (there has no air pressure in burner). If air pressure switch does not detect the over limit pressure (no adjustment), controller does its recycle, but transformer does not connect the power and ignition valve is not open, the controller leave "stop". To guarantee pressure switch working, must raise adjustment value when burner is on small fire. when it comes to intervention points, burner goes to stop. Press button to release it, and adjust the pressure switch to detect enough air in pre-air process.
- L. Control gas pressure switch (highest or lowest) is to stop burner operation when gas pressure is not in the range. from the special function of pressure switch, the lowest pressure control switch uses contact when the pressure value exceeds preset one; the highest one uses it when lower, It is forbidden that controller connects power while adjusting gas pressure switch, Burner is on working, any gas pressure switch interruption lead to burner stop immediately. Check pressure switch when burner first starts.
- m. BY removed electrodes wires, burner starts, check photocell (probe detector). Controller must finish self recycle, and goes to "stop" status after 3s flame forms, this test does not be neglected when burner works. Remove wire of probe detector, controller must "stop" right away. If there has UV photocell, take it out after 1 mint fire. When UV photocell remove from its brace, can not "see" flame UV radiation. burner will come to "lock". If photocell is a bit dirty, it will effect its function. When photocell detecting head got dirty by oil, clean it completely, take care of finger movements also will influent the photocell performance. UV photocell can not "see" sun light or normal light. Check photocell sensitivity via lighter, candle or spark of transformer electrodes. To make excellect work, UV photocell current should be stable and can not reduce to the value which controller requests. maybe need to make photocell move in board finding the best position.
- n. Check boiler thermostat or pressure switch function (must stop burner firstly)

## 6.5. GAS PRESSURE SWICTH



Adjust gas pressure switch  
Remove cap with proper tool,  
screwdriver No.3 or PZ 2, Fig.1.  
remove cap.

GW...A... switch parameters  
when pressure increases  
1 NC open, 2 NO close  
when pressure decreases  
1 NC close, 2 NO open



Use scale cam to adjust pressure switch to requested value.  
Fig.2.

Pressure switch has on-off movements when pressure reduces  
:to ▲.  
reinstall cap.

Gas pressure switch , min .

Adjusting gas pressure switch(min) to lower supply pressure 20-40%(min)when burner runs under full load . During burner starts,gas pressure will close shortly,burner stops, now set to low.As adjusting ,open switch cover ,rotate scale button ,recover .

Pressure switch button, max.

If load increases to 1. 15 times standard value, or burner head pressure exceeds standards (nozzle pressure) 1. 3times, Max. pressure switch will occurs permanent lock.

Adjustment

Adjustment of pressure switch after finish burner adjustment and waste gas analysis

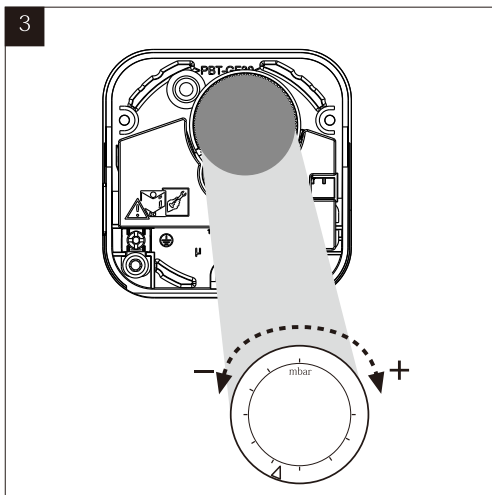
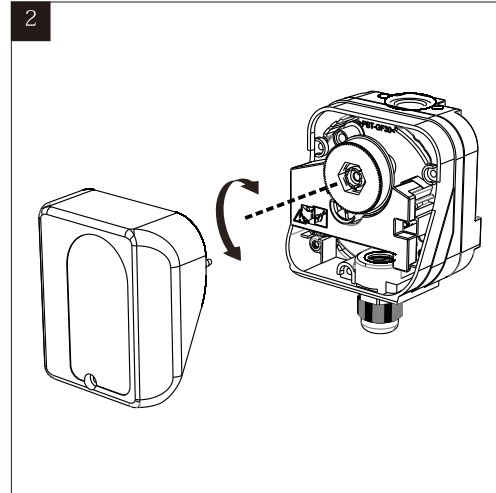
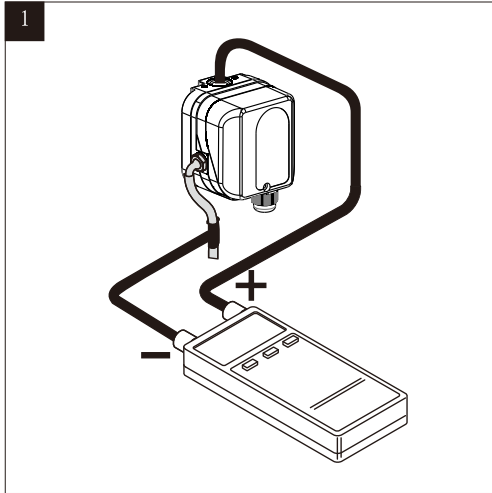
With gas meter

- Rotate pressure switch to Max. position.
- Burner runs to standard output.
- Increase burner load to 1. 15 times more than standard one by increasing gas pressure.
- Rotate the switch to Min. slowly, burner closes. Now adjustment is Ok .
- Reset gas pressure switch.
- Return to standard load by reducing gas pressure.

Without gas meter

- Rotate pressure switch to Max. position.
- Burner to standard load, such as O<sub>2</sub>:2. 5-3. 0%, CO consumption=50ppm
- Raise burner output to O<sub>2</sub>:0. 5-1. 0, CO =2000ppm by increasing pressure.
- Rotate the switch to burner closes. Now adjustment is Ok .
- Reset gas pressure switch.
- Return burner running to standard load by reducing gas pressure,make O<sub>2</sub> and CO return to original set value.

## 6.6. AIR PRESSURE SWITCH



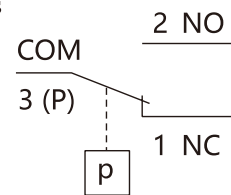
LGW... switch parameters

when pressure increase:

1 NC open, 2 NO close

when pressure reduce:

1 NC close, 2 NO open



### Adjustment

After testing each items of burner , air pressure switch sets starts. First of all, burner is on the small load , refer to Fig 1. connect air pressure gauge to negative pressure tube. Positive pressure terminal to burner body, value $\times 0.8$ =air pressure setting value. Fig 2 open cover, Fig 3 rotate scale to setting value slowly. If encounter burner lock, rotate to “-” direction anticlockwis to 20% setting value , then reopen burner, make sure it can work.

Without negative pressure gauge:

Make burner stat in small load status, Fig 2 open cover, Fig 3 turn to “+” directly clockwise slowly, , increase pressure to burner lock, then anticlockwise to reduce 20% than original setting, reopen the burner , make it work well.



**Warning!** There has voltage in gas pressure switch, it is better that professionals do the adjustment.

## 6. 7. GAS VALVE SEAL CHECK

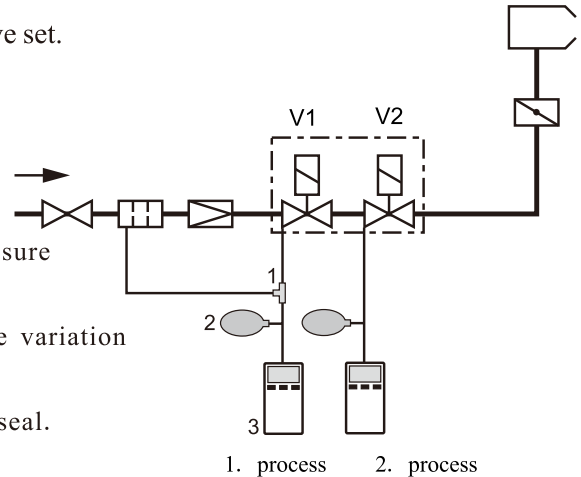
Ball valve and solenoid valve must close as seal checking of valve set.

1. Test between the ball valve and first solenoid valve.

Connect test tool between filter and DMV inlet  
 . The test terminal of V1 and V2 must be open.

2. Test between two solenoid valves

Connect test tool between the DMV two valves , the pressure should be 100mbar to 150mbar.  
 wait for 5mints of inner presssure balance, then watch the variation in 5mint testing time.  
 If the variation below 1mbar in 5mints, proves excellent seal.



3. Test between gas butterfly to valve set.

Smear test liquid in part to finish the test.

1. Rubber pipe connect triple way contacts
2. Hand pump

### Notice :

After maintenance of gas valve set , redo the seal test.

#### 5.7.1. Function process test

Check arrangement of wire

Check burner

Check motor rotate direction.

Remove servo motor, rotate it manually, then install it again.

Gas check(no supply)

During this test ,close the ball valve.Seal test ,connected hand pumps push the air to valve pipes,make the pressure to equal to working gas pressure.

Connect equipments,must finish below items

when it is with DMV and VPS.

- Leakage test process finish ,then motor starts.
- Sero motors opens the air damper in about 40(20)s.
- Purge time is 30S in full load position.
- Servo motor will drive air damper close to ignitionposition after 35 (17) s
- Start 4s pre-ignition time

- Open gas solenoid valve
  - Reduce gas set and pipeline pressure.
  - Gas pressure switches close the burner.
  - Gas solenoid valve simultaneously.
- If gas pressure switch does not close the burner in safety time 2s,controller will in fault .

Equip with two separate solenoid valves and DSLC:

- Burner motor starts
- Servo motor opens air damper after40s(20s)
- Purge time is 30S in full load position.
- Do seal test
- Servo motor will drive air damper close to ignition position after 35(17)s
- Start 4s pre-ignition time
- Open gas solenoid valve
- Reduce gas set and pipe pressure.
- Gas pressure switch closes burner.
- Gas solenoid valve simultaneously.

## 7. VALVES SET

### 7.1. Solenoid valve

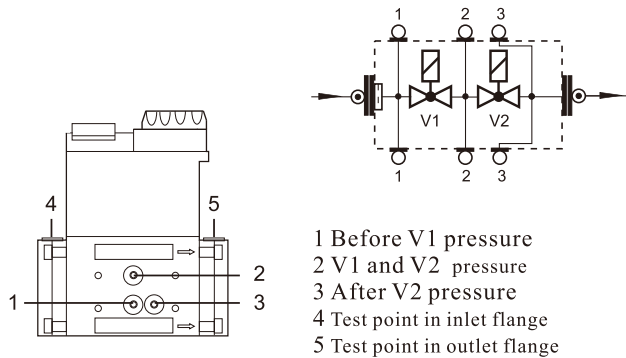
#### Function

DMV-D/11

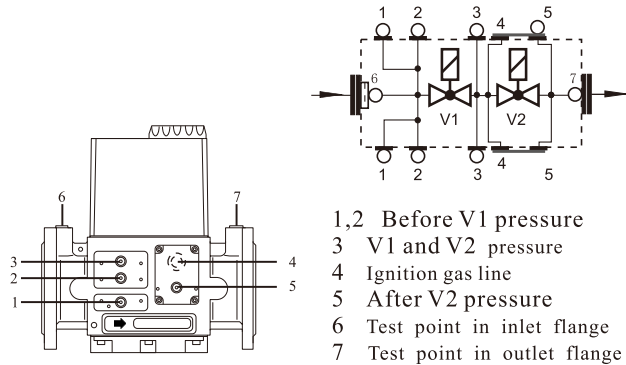
Two single NC solenoid valves, open fast, close fast, control gas flow by valve1(V1)adjustable screw.

#### Pressure test position

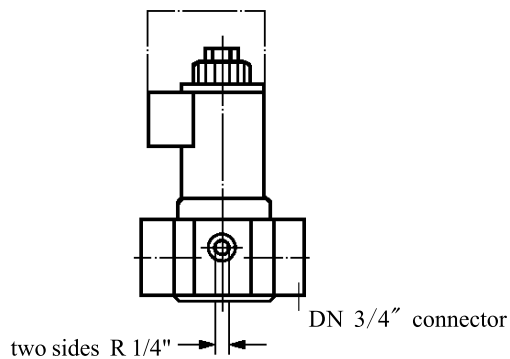
DMV-D 507/11 - 520/11



DMV-D 5040/11 - 5125/11



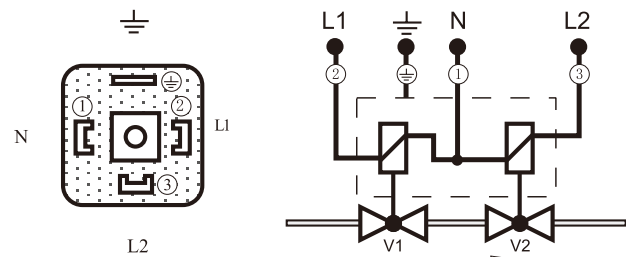
MVD 207/5



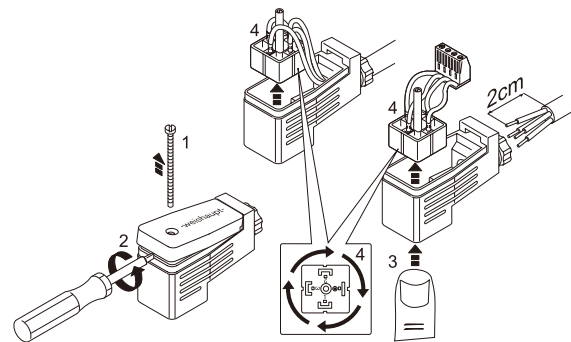
#### Technical data

Max .working pressure	500 mbar
Voltage/frequency	~(AC) 230 V - 15 % . . . to 240 V + 10 % 50/60 Hz or ~(AC) 110 V 50/60 Hz
Conbient temperature	-15 C ... +60 C
Mounting place	Solenoid valve coil vertical position.

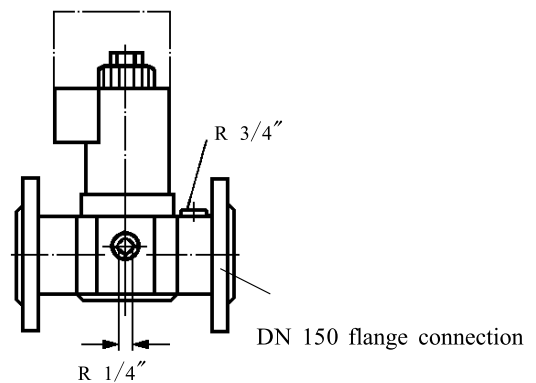
#### Circuit connection



#### DMV and GW plug



MV 5150/5-S



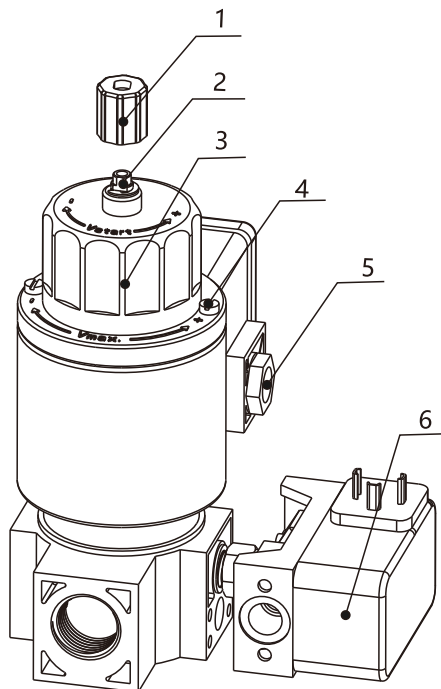
## MVDLE... Air valve

### 1. Load regulation

Loosen the locking screw (4 not painted), turn the flow adjustment knob (3) to adjust the gas amount, turn clockwise (- arrow direction) to reduce the gas flow, turn counterclockwise (+ arrow direction) to increase the gas flow, and tighten the locking screw (4) after adjustment.

### 2. Fast and slow open adjustment

Remove the protective cover (1), use the back of the protective cover as a tool, turn the fast or slow opening adjustment screw, turn clockwise (- arrow direction) the valve opening speed becomes slower, turn counterclockwise (+ arrow direction) the valve opening speed becomes faster, and screw on the protective cover (1) after adjustment.



#### Features: :

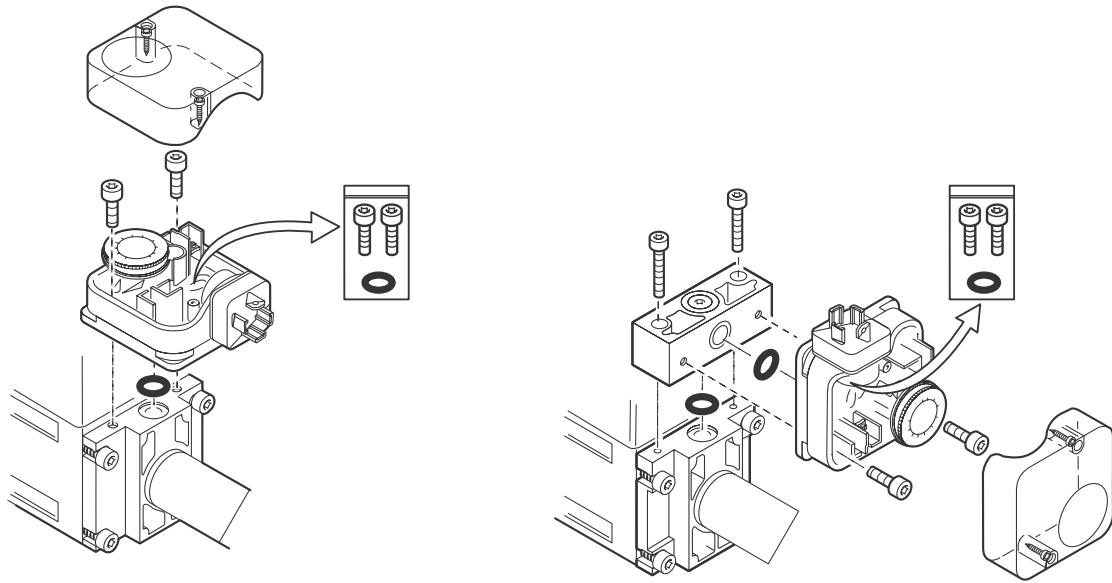
- The valve is usually closed
- Belt flow regulator
- Slow open fast close
- Valve opening stroke can be adjusted

1. Protective cover
2. Open the adjusting screws quickly or slowly
3. Flow adjustment knob
4. Locking screw (unpainted)
5. Power port
6. Air pressure switch

Explain!

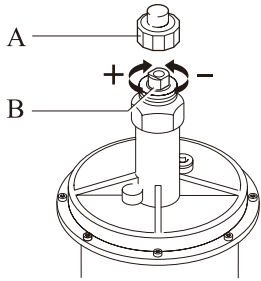
Do not open the seal lock screw with paint, after opening will lose the warranty!

Installing pressure switch in screw thread joint DMV



7.3. FRS Pressure Stabilizing Valve(If necessary)

Adjust outlet pressure(set value)

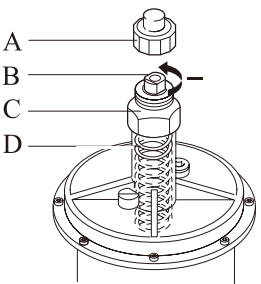


- 1.Open protective cap(A)
- 2.Raise outlet pressure value(setting value):Adjustable bolt(B) rotates in right side.

or

- 3.Reduce outlet pressure value(setting value): Adjustable bolt(B) rotates in left side.
- 4.Check setting value
- 5.Reclose the protective cap(A)

Change spring



- 1.Open protective cap(A), turn left rotate screw bolt (B) , loose spring to Max.
- 2.Remove complete adjustment equipment(C),take spring (D) out.
- 3.Put back new spring(D)
- 4.Reput complete adjustment equipment(C),and set the outlet pressure.
- 5.Recover protective cap(A),All spring package colors sticker should be in their relative position.

Spring color	outlet pressure range(mbar)
Orange	5... 20
Blue	10... 30
Red	25... 55
Yellow	30... 70
Black	60... 110
Pink	100... 150

## 7.5 GAS COMBINED VALVE WITH ADJUSTMENT VGD40....+SKP15...+SKP25

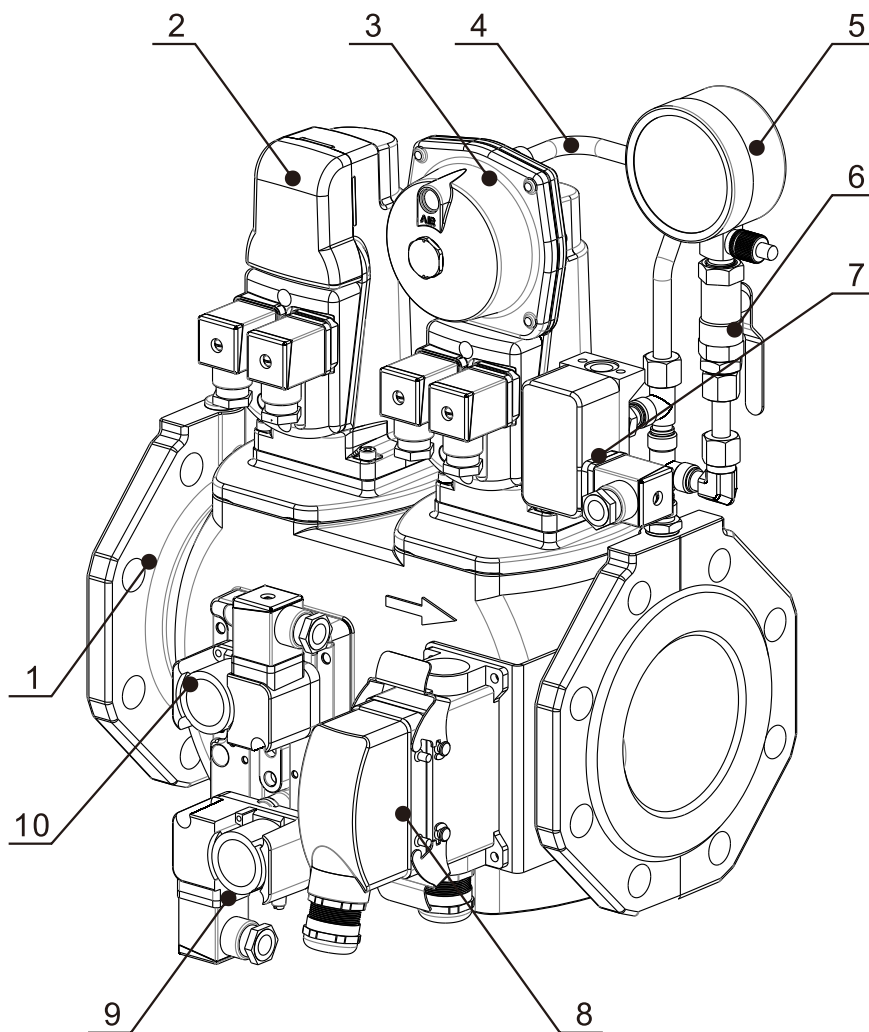
### Function

SKP15...Electrical Hydraulic actuator , close safely.

SKP25...Electrical Hydraulic actuator , close safely.it can use as constant voltage adjustment device with set spring

VGD40 gas combined valve.it is with two SKP... Electrical Hydraulic actuator connected gas combined valve slow open and fast open.

Combined gas valve diagram



- 1. VGD40...Gas combined valves
- 2. SKP15...Electrical Hydraulic actuatorV1
- 3. SKP25...Electrical Hydraulic actuatorV2
- 4. Pressure testing pipe
- 5. Gas pressure gauge

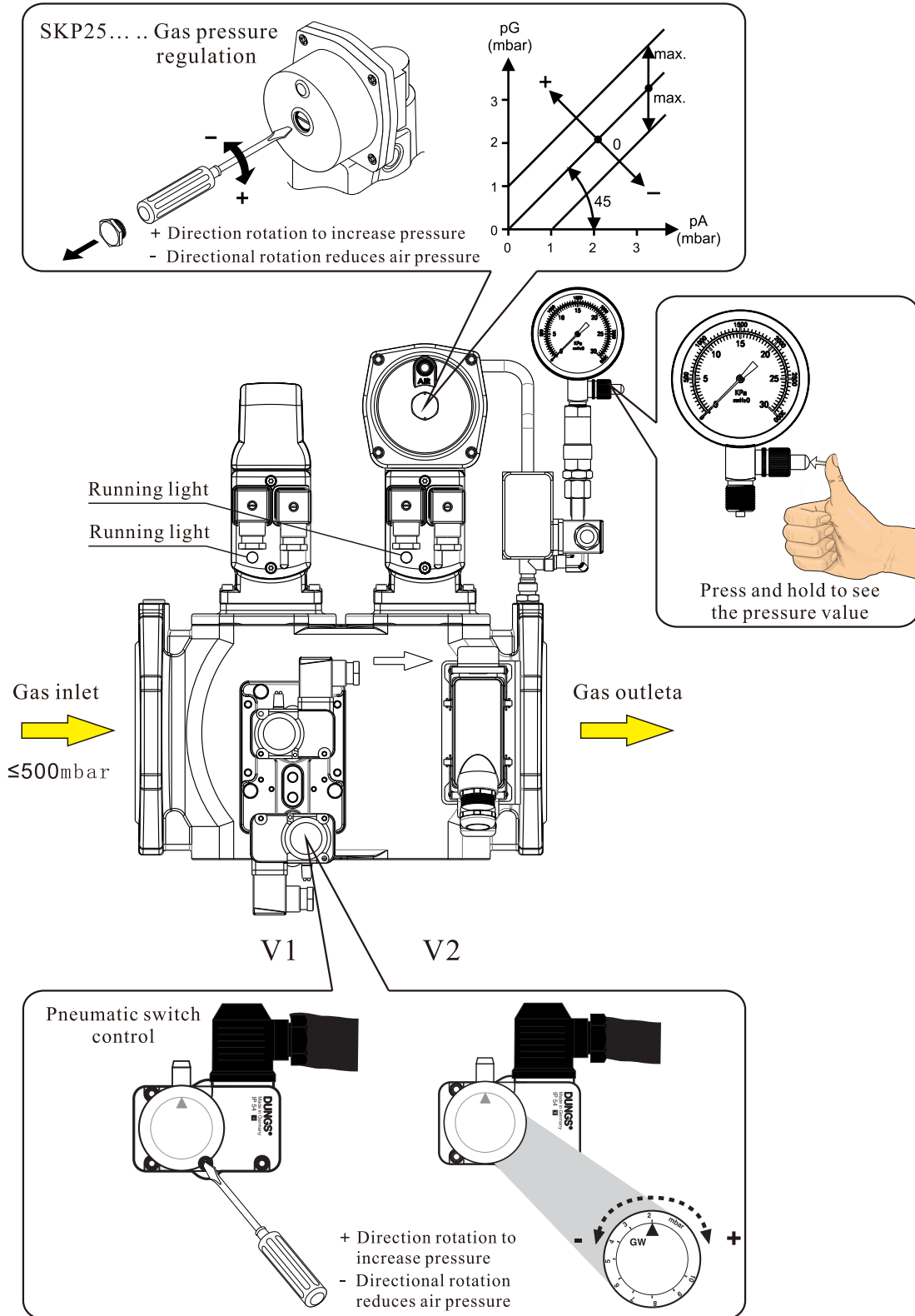
- 6. Filter
- 7. Gauge with button
- 8. Ball valve
- 9. Compensator
- 10. Gas pressure switch (low limit)

### 7.5. Gas valve group installation/regulation

During installation, it should be noted that the direction of gas flow should be consistent with the arrow on the gas valve group. The inlet pressure of the gas valve group is less than or equal to 600mbar. Do not install it upside down.

The gas valve group is provided with a gas pressure regulating device. It can be adjusted as shown in the figure below. After adjustment, press and hold the button on the pressure gauge to check the pressure value.

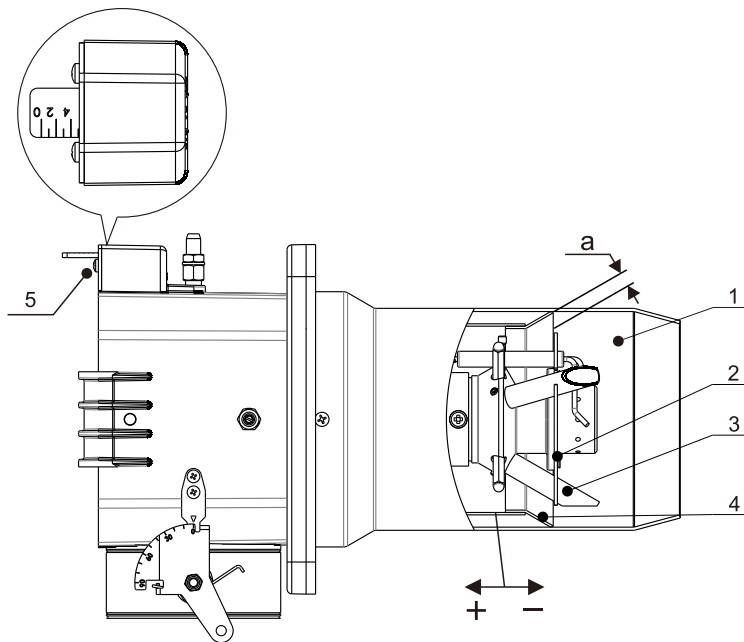
Gas valve group installation and adjustment diagram



## 8. The setting of the combustion cylinder

### 8.1. Air conditioning in the BTN40-55GC BLU/TL combustion cylinder

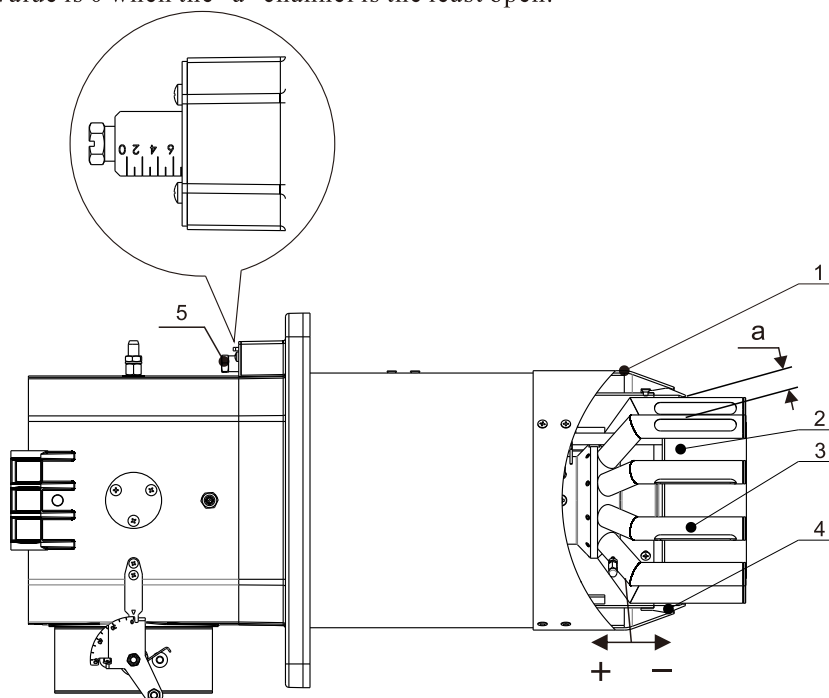
Turn the adjusting screw 5, adjust the stop ring along the "+" "-" direction to change the distance between the adjusting stop ring and the steady flame plate, you can adjust the air flow and speed of the air channel "a". The factory setting scale value is 5 when the "a" channel is the most open.



1. Combustion cylinder
2. Steady flame plate
3. Gas sprinkler
4. Adjust the stop ring
5. Adjust screws
- a. Gas pipeline

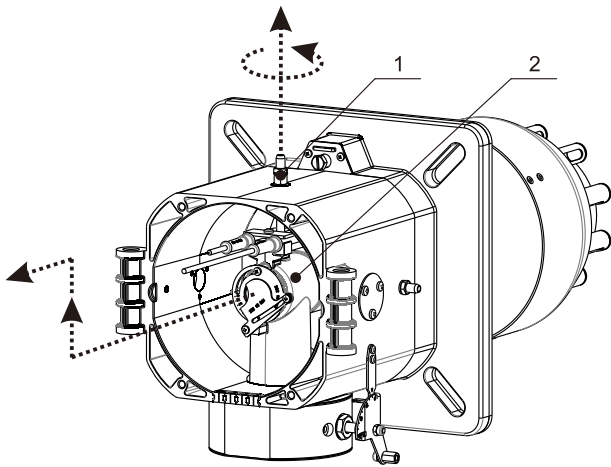
### 8.2. Air conditioning in the BTN85-250GC BLU/TL combustion cylinder

Turn the adjusting screw 5, adjust the stop ring along the "+" "-" direction to change the distance between the adjusting stop ring and the steady flame plate, you can adjust the air flow and speed of the air channel "a". The factory setting scale value is 0 when the "a" channel is the least open.



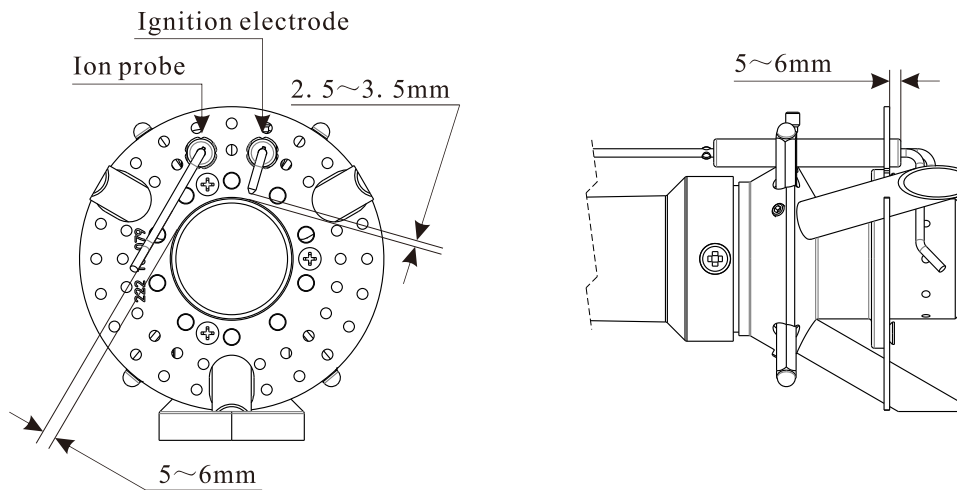
1. Combustion cylinder
2. Steady flame plate
3. Gas sprinkler
4. Adjust the stop ring
5. Adjust screws
- a. Gas pipeline

### 8.3. Remove gas nozzle

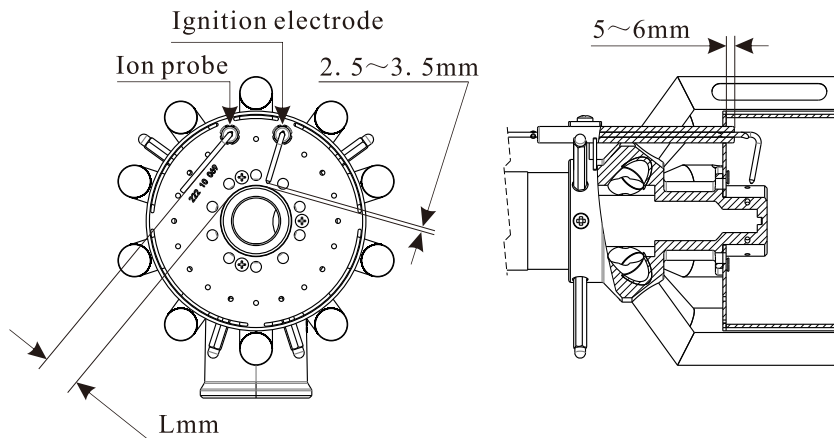


Press the ring to loosen the hexagon bolt (1) and lift the gas spray gun (2) upward before it can be removed. Install in reverse order.

### 8.4. Location of BTN40-55GC BLU/TL ignition electrode and ion probe



### 8.5. Location of BTN85-250GC BLU/TL ignition electrode and ion probe

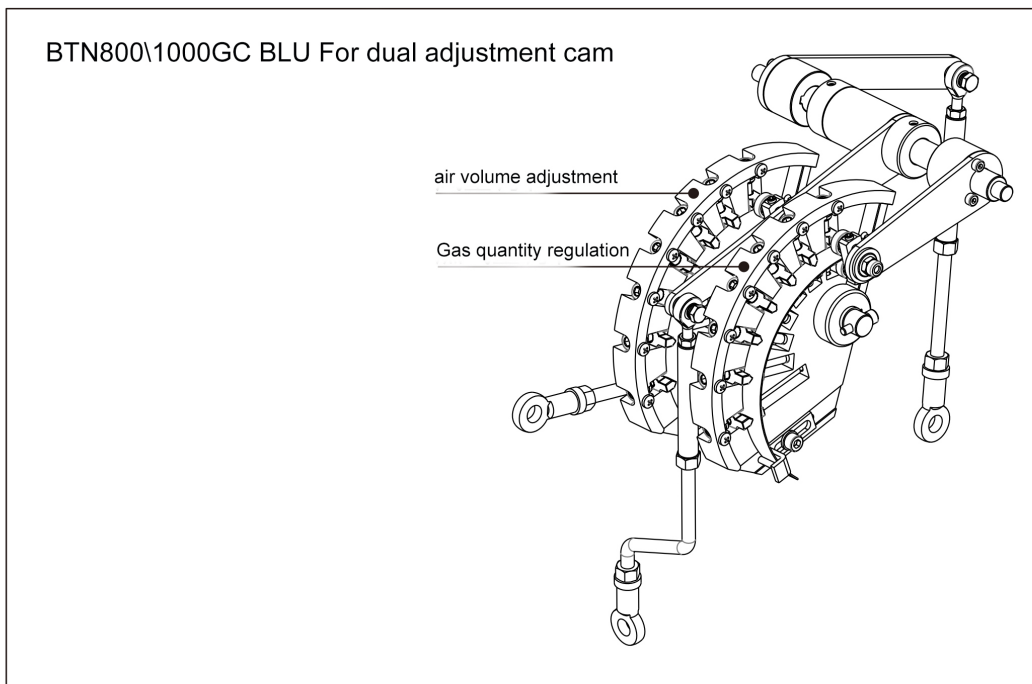
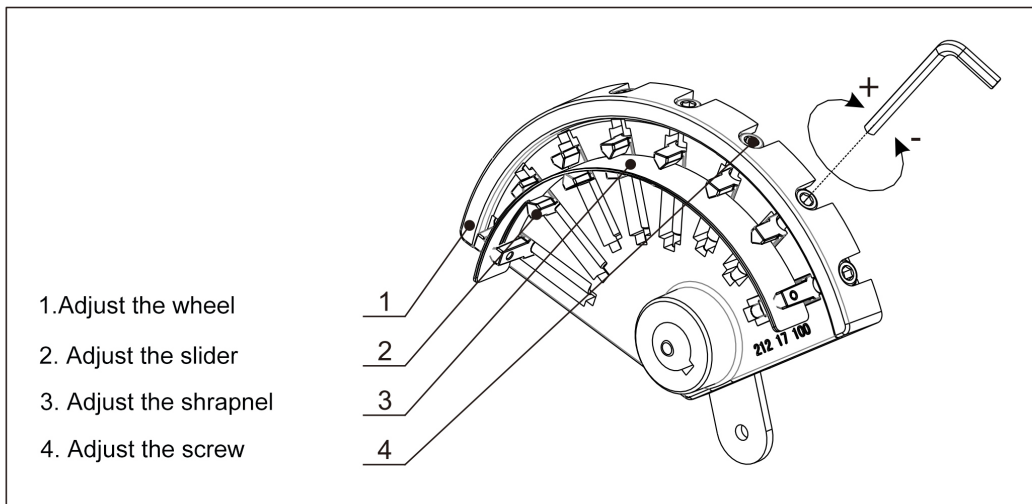


Model number	Lmm
BTN85GC BLU	15
BTN120GC BLU	15
BTN210GC BLU	23
BTN250GC BLU	23

## 8.6. Adjustable cam adjusts air volume

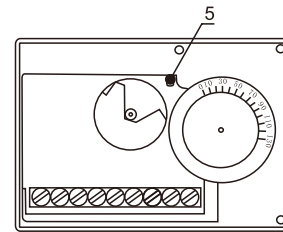
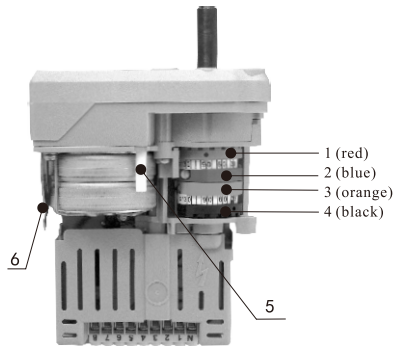
The opening of the air damper is controlled by the deformation of the adjusting spring (3) installed on the adjusting disc (1). Rotate the adjusting screw (4) with a wrench to move the adjusting slider (2) up and down, thereby changing the deformation of the adjusting spring to increase or decrease the air volume, so that the air volume matches the gas volume. As shown in the figure, when the adjusting screw is rotated in the "+" direction, the air volume increases, and vice versa.

When adjusting the air volume, it is necessary to first confirm whether the gas volume of the burner reaches the rated standard flow rate of the burner at the maximum load, then adjust the burner to the minimum load, use a flue gas analyzer to detect whether the flue gas emissions are normal, and determine whether to increase or decrease the air volume according to the value measured by the flue gas analyzer. After adjusting the minimum load, manually adjust the burner to the maximum load to detect whether the flue gas meets the standard. After adjusting the maximum load, gradually adjust the air volume of the intermediate load



## 9. Servo motor adjustment

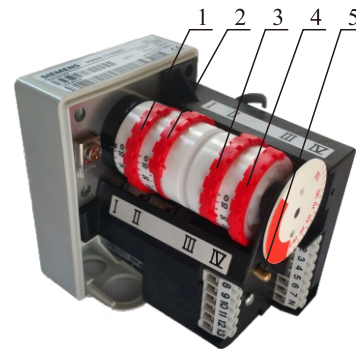
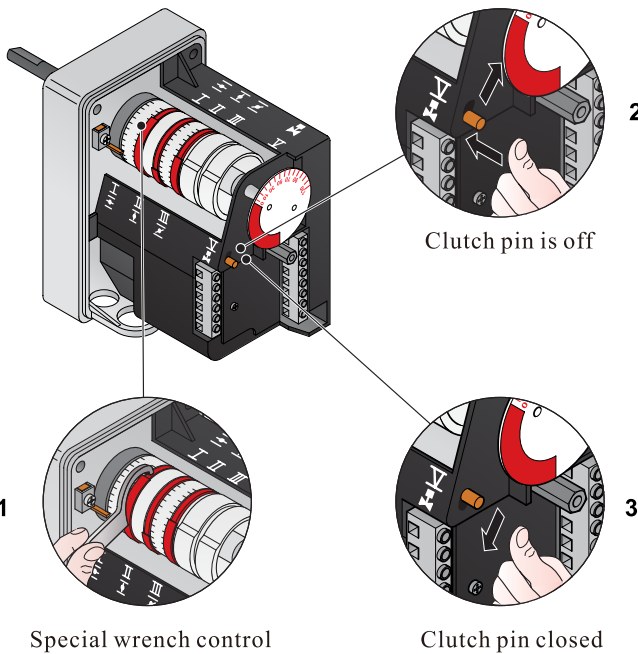
### 9.1. SQN70 servo motor



- 1. Air flow regulation, big fire
- 2. Airflow baffle, close
- 3. Air flow regulation, small fire

- 4. Solenoid valve control, big fire  
Must be between 3 (orange) and 1 (red)
- 5. Clutch pin
- 6. Adjusting wrench

### 9.2. SQN30 servo motor



- 1. Big fire air inlet
- 2. Close the air supply inlet position
- 3. Small fire air inlet
- 4. Big fire Solenoid valve open position
- 5. Clutch pin

#### Servo motor SQN CAM switch point function

CAM switch points are set manually or with adjusting pins

II(2): Air transmission port baffle to the closed position, set the value  $\geq 0^\circ$

III(3) : small fire position of the air transmission port baffle, set value  $20^\circ$

IV(4) :Big fire Solenoid valve switch point, set value  $60^\circ$

I (1): Fire position of damper damper, set value  $\leq 90^\circ$

The CAM switch point IV(4) should be set to facilitate the rotation size, but not higher than 2 stages of fire, whether the flame does not work when the fire changes to 1 stage the CAM switch point is between III(3)-I (1).

The servo motor is equipped with a release lever (5), and the damper damper can be moved by hand when the lever is depressed.

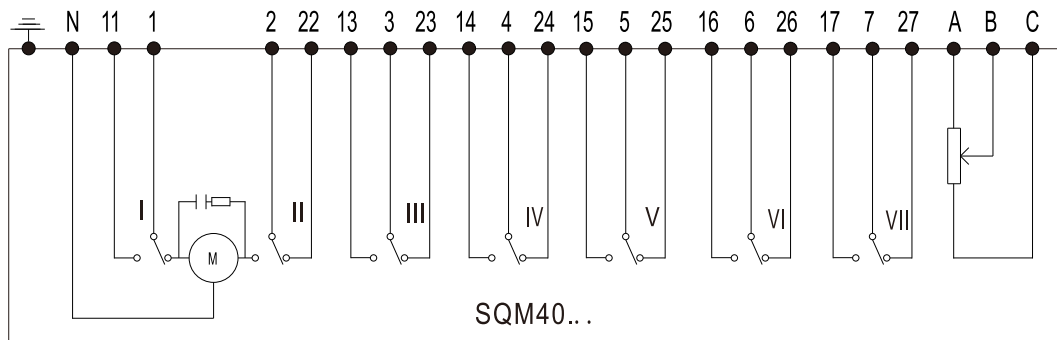
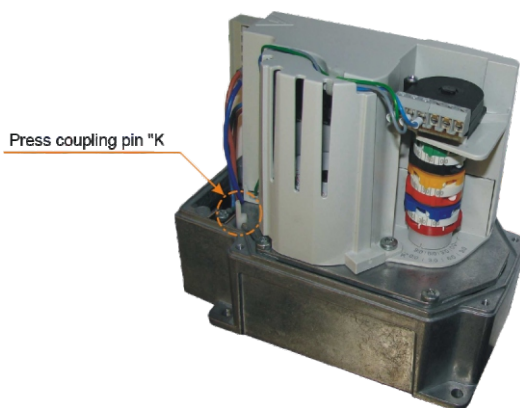
### 9.3 SQM40 Adjustment Description

Limit and auxiliary switches are manually set on the CAM switch. The CAM is adjustable and has a small pointer on it to indicate the location of each point on the dial.

Servo motor is usually set as follows:

- I -110°      IV-30°
- II -0°
- III-20°

According to the actual requirements of different devices, these Settings should be adjusted during debugging. Outermost dial on the CAM plate is used to indicate the position. There is also a flip bar in the servomechanism, through which the drive and the driven mechanism can be detached. In this way, you can manually rotate the CAM disc to any position during debugging. When the lever is in the vertical position, the transmission and the follower are closed.

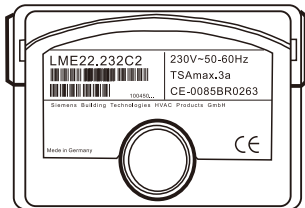


- I -Limit switch, full load position
- II -Limit switch, off position
- III -Auxiliary switch, ignition load during gas operation
- IV -Auxiliary switch, low load during gas operation

## 10. Control system

### 10.1. Siemens LME Controller

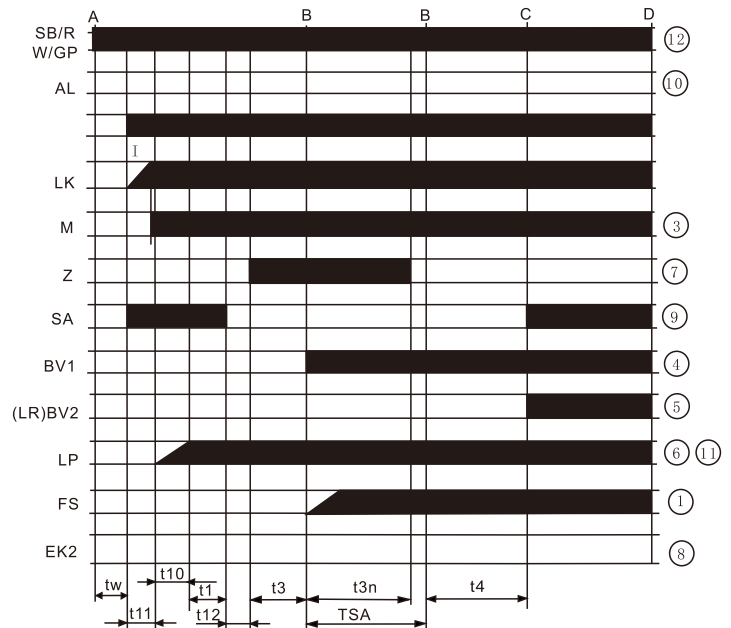
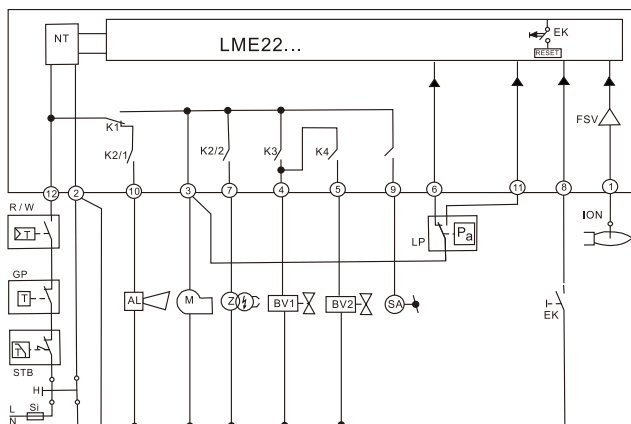
#### 10.1.1 Technical Specifications



Rated voltage	AC120V=10%-15% AC230V=10%-15%
Rated frequency	50...60Hz%
Power dissipation	12VA
External fuse (Si)	Max. 10A(slow)
Installation position	Can be Selected
Input current of terminal 12	Max 5A
weight	About 160g
Safety level	I
Protection class	IP40(need to confirm during installation)
Terminal 1 Allows cable length	longest 1m , 100pF/m (longest 3m , 15pF/m)
ORA Configuration AGQ3 A27 Cable length (laying separate cables)	longest 20m in 100pF/m
Remote reset	longest 20m in 100pF/m
Allowable cable length of terminals 8 and 10	longest 20m in 100pF/m
Length of cable allowed by other terminals	longest 3m in 100pF/m

Allowable amperage	At $\cos \phi \geq 0.6$	At $\cos \phi = 1$
-terminal 3	Max 2.7A (15A at maximum 0.5s only LME2...)	longest 3A
-terminal 4,5 and 7	longest 1.7A	longest 2A
-terminal 10	longest 1A	longest 1A

#### Function chart



## Switching frequency

Flame detector model	Reference model	voltage	tw approx. s	t1 min. s	TSA max. s	t3n approx. s	t3 approx. s	t4 approx. s	t22 approx. s <sup>2)</sup>	t10 min s <sup>3)</sup>	t11 min s <sup>1)</sup>	t12 min s <sup>1)</sup>	t20 min s
Ion probe(ION) or Flame detector QRA... 4) And auxiliary equipment ARQ3...	LME22.232A2	AC230V	2.5	20	3	2	3	8	—	3	16.5	16.5	—
	LGB22.230A27	AC230V	9	20	3	2.4	3	8	—	4	16.5	16.5	2

tw	Waiting time
TSA	Safe time
t1	Prepurge time
t3	Preignition time
t3n	Afterfiring time
t4	Time interval between «off» and «BV2»
t10	Wind pressure signal detection time
t11	Actuator SA sets the start time
t12	Actuator SA sets the shutdown time
t22	Safe time

- 1) Maximum running time of the actuator  
The actuator running time must be shortened
- 2) Corresponding time of flame control
- 3) Up to 65 seconds
- 4) Only 230V AC can be used

## Feature

- |   |  |
|---|--|
| Prerequisites for startup                                 | <ul style="list-style-type: none"> <li>· Combustion controller resets</li> <li>· All contacts in the line are closed according to heat requirements</li> <li>· No low voltage</li> <li>· Air pressure switch LP must be in a position where there is no load or CPI or connection port 2</li> <li>· Fan or AGK25 is turned off</li> <li>· Flame detector area is darkened and there is no external light source</li> </ul> |
| Undervoltage<br>(at UN=AC230V)                            | <ul style="list-style-type: none"> <li>· AC175V can be safely cut off from the operating position when the rated voltage is below</li> <li>· Restart is required when the rated voltage exceeds AC185V(at UN=AC230V)</li> </ul>  |
| Control intermittent operation                            | <ul style="list-style-type: none"> <li>· After no more than 24 hours of uninterrupted operation, the combustion controller should be safely turned off and then restarted</li> </ul>   |
| Reverse polarity protection                               | <ul style="list-style-type: none"> <li>· If the phase line (terminal 12) and the center line (terminal 2) are confused, the combustion controller is at TSA time</li> <li>· At the end, the lock procedure is initiated</li> </ul>   |
| Control procedure under failure state and lock indication | <ul style="list-style-type: none"> <li>· In the event of a shutdown, the burner fan and ignition equipment are immediately disengaged (&lt;math&gt;t=1s&lt;/math&gt;)</li> </ul>   |

Reason	Reactivity
Major partial failure	Restart
Voltage is below the low voltage limit	Safe shutdown
Voltage is above the low voltage limit range	Restart
There are external sources of light during《t1》	Lock
There are external light sources during《tw》	Prevents activation. Locks in 30 seconds
《TSA》found no flames	LME11...Up to 3 repetitions, then lock LME2... after《TSA》Immediately after《TSA》
Flame disappears during operation	LME11... • Create Flame《TSA》up to 3 repetitions • No flame《TSA》lock established LME2... Lock
《LP》is closed in the working position	Prevents activation. Locks in 65 seconds
《Lp》closed in its normal position	Stop when《t10》is finished
No wind pressure signal after completion of《t10》	Lock
《CPI》is on during《tw》	Prevent activation. Lock in 60 seconds

If not working occurs, LME. Still locked red signal light on. The combustion controller will reset immediately. This case is also used in the case of a major partial failure.

#### Reset the combustion controller

When a stop occurs, the combustion controller is reset immediately. Press the lock reset button for 1 second (< 3 seconds). LME is reset only when all contacts in the line are closed and no low voltage is present.

#### Repetition limit (LME11 only)

If the flame is not established after 《TSA》 or if the flame is extinguished during operation, each control start is repeated up to 3 times by《R》or other stops work will be restarted. Double counting is restarted each time via《R》.

### Operational status indication

Status that occurs during startup is indicated in the following table.

Multi-color signal light (LED) color code table		
Status	Color code	Color
Waiting time《tw》, other waiting states	○.....	Off
Oil preheater on	●.....	Yellow
Ignition stage ignition control	● ○ ● ○ ● ○ ● ○ ● ○ ●	Shimmering yellow
Operating flame normal	□.....	Green
Operating flame is not normal	□ ○ □ ○ □ ○ □ ○ □ ○	Shimmering green
Excess light when the burner is started	□ ▲ □ ▲ □ ▲ □ ▲ □ ▲	Greenish red
Undervoltage	● ▲ ● ▲ ● ▲ ● ▲ ● ▲	Yellowish red
Error, alarm	▲.....	Red
Error code output(see Error Code Table)	▲ ○ ▲ ○ ▲ ○ ▲ ○ ▲ ○	Shimmering red
Interface diagnosis	▲ ▲ ▲ ▲ ▲ ▲ ▲ ▲	Red flashing light

Give an example

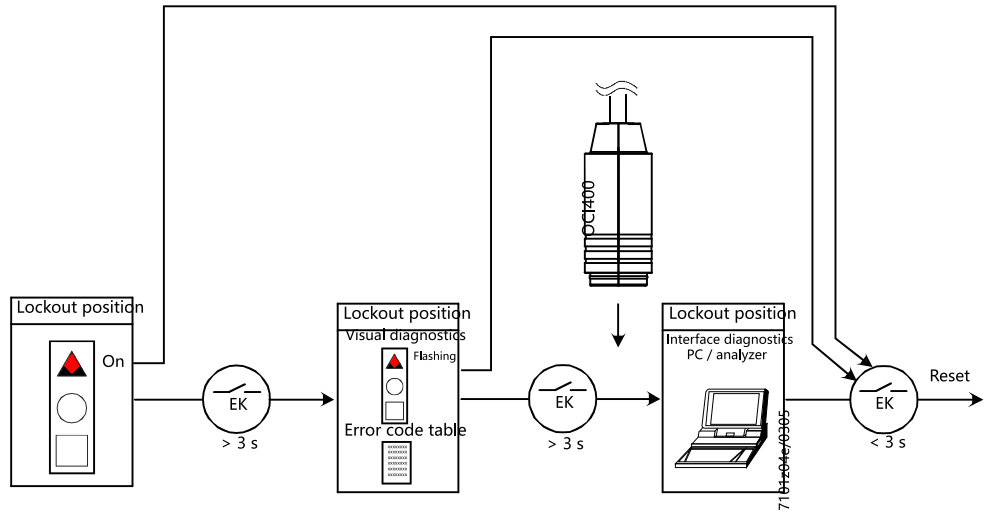
..... Steady on  
○ Off

▲ Red  
● Yello  
□ Green

### Fault cause diagnosis

After stopping work, the red fault signal light remains stable. In that case, the visual diagnosis of the cause of the failure follows the error code table by pressing the lock reset button for too little as 3 seconds to make it work. Press the reset button for at least 3 seconds and interface diagnostics will make it work (see data N7614 for more specific information).

Following sequence of activities are used to diagnose the cause of the failure:



Error code table		
Red Flashing Light Code (LED)	《AL》 port 10	Possible cause
2 times flicker ..	On	No flame was established after《TSA》 Error or fuel valve contamination Error or flame detector contamination Wrong burner adjustment. No fuel Ignition equipment error
3 times flicker ...	On	《LP》 faulty 《t10》 after the wind pressure switch signal disappeared 《t10》 closes in the usual position
4 times flicker ....	On	External light source when the burner is started
5 times flicker .....	On	Termination of connection 《LP》 《LP》 Close in working position
6 times flicker .....	On	Leisure
7 times flicker .....	On	Loss of flame during operation (repeat restriction) Error or fuel valve contamination Error or flame detector contamination Burner wrong adjustment
8 times flicker .....	On	Leisure
9 times flicker .....	On	Leisure
10 times flicker .....	Off	Internal wiring error, output connection, other errors
14 times flicker .....	Off	CPI link is not closed

While the cause of the fault is being diagnosed, the controller outputs a signal to enable it to operate

It remains closed while burning

Operate when external failure indicates

Operate when external failure indicates: Fault status signal 《AL》 on port 10, according to the error code table

Fault cause diagnosis Exit and turn on the burner again by resetting the combustion controller. Press the lock reset button for about 1 second (< 3 seconds).

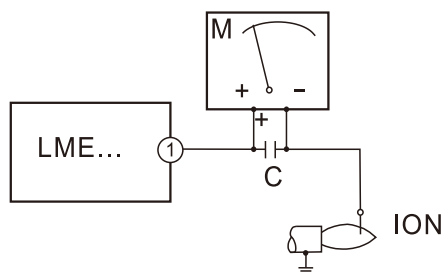
### Using probe detector to check flame

	Rated voltage UN=AC 230V 1)
Detector voltage passes probe detect and ground, (AC voltage, $R_i \geq 10M\Omega$ )	AC 115...240V
Change start (setting value) : Open (flame is on) (DC, $R_i \leq k\Omega$ ) Close (flame is off) (DC, $R_i \leq k\Omega$ )	$\geq DC 1.5 \mu A$ $\leq DC 0.5 \mu A$
The current of detector	$\geq DC 3 \mu A$
Flame is weak when starts (green LED flashes)	Approx. DC $5 \mu A$
Short circuit of current between probe detector and ground (AC ammeter $R_i \leq 5k\Omega$ )	Max. AC 100. . . 300 $\mu A$

1) In order to apply for use in outside Europe, rated voltage is AC 230V $\pm$ 10%

Notice: At same flame, LME...controller current maybe is lower than LMG...and LGB...  
Flame detection is worked by transmission and revision. Flame signal amplifier only reacts for component part DC current of flame signal, probe detector and ground short circuit will lock the burner.

Measured current



Pic.

C Electrolysis capacitor 100. . . 470  $\mu A$ ; DC 10...25V  
ION probe detector

M Microammeter,  $R_i$  Max. 5000 $\Omega$

Check below items when burner is in maintenance

matters need attention

	Safety equipment	Anticipation reaction
a)	Probe detector line returns open before burner starts	LME11.... At most repeat 3times  LME2.... [TSA] finishes ,lock
b)	Burner flame is off simulatesly, then close gas supply	LME11.... [TSA] finishes flame at most 3times. [TSA] no finishes flame --lock LME2.... lock
c)	Simulate that air pressure fault when burner is running	Lock immediately



Warning! This controlling system is complete one! Not allow to change it.

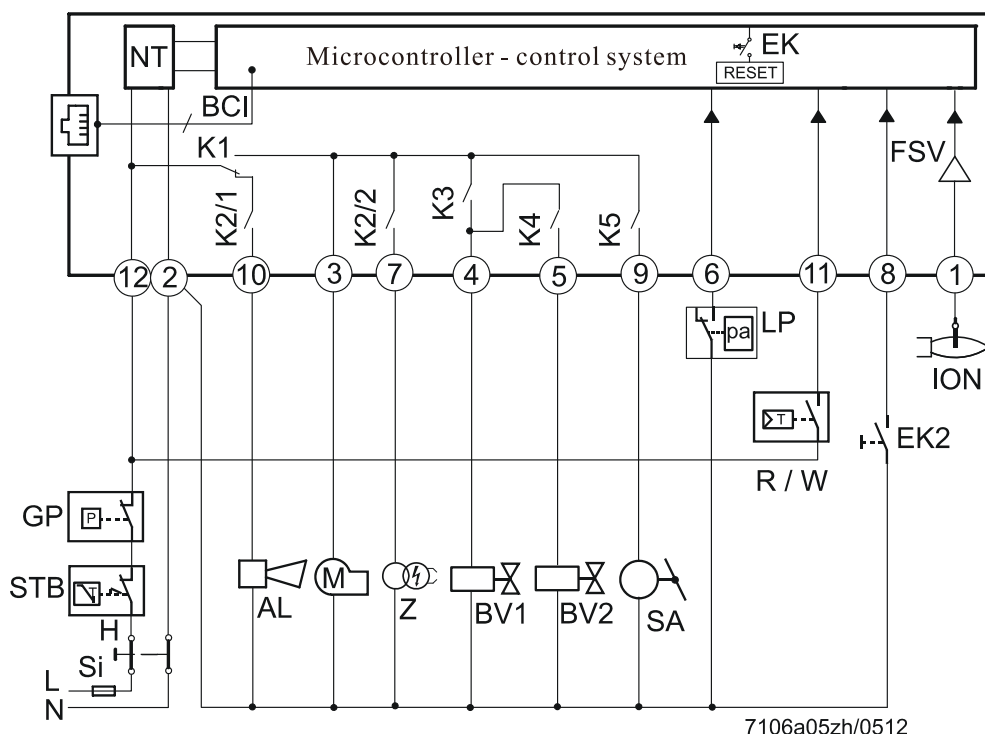
## 10:2 SIEMENS West Ask sub LME39 program controller

### Technical parameter

Supply voltage	
-LME39.xxxx1	AC 120V
-LME39.xxxx2	AC 230V
Power frequency	50...60Hz
Expend	12 VA
External Safety Device (Si)	Maximum T10H250V complies with IEC 60127-2 Suggestion T6,3H250V complies with IEC 60127-2
Allowed installation position	At will
Input current of terminal 12	Max 5A
Weight	About 160 g
Protection Class I (Burner controller with socket)	In accordance with DIN EN 60730-1 for connection in the socket AGK11 without a safety isolation device to prevent the risk of electric shock by doubling or strengthening the isolation
Class of protection	IP40, installation ensures this rating (P10 only if RJ11 socket is not closed)
Rated pulse voltage Class III (DIN EN 60664)	
• LME overall equipment	4 KV
• Creepage distance and electrical clearance	2.5kV due to voltage restriction measures
Pollution degree	2 In accordance with DIN EN 60730-1
Software level	Class C conforms to DIN EN 60730-2-5:20112 channel structure
Reaction time at flameout	Max. 1S
Terminal 1 Allowed wire length	Max. 1 m, 100 pF/m line capacitance, unshielded (Max. 3 m, 15 pF/m)
Allowable length of wire from QRA to AGQ3.xA27 (laid separately)	Max. 20 m at 100 pF/m, unshielded
Allowable wire lengths for terminals 8, 10, and 11	Maximum 20 m when capacitance is 100 pF/m. Unshielded (Separate cable laying)
Length of wire allowed for other terminals	Max. 3 m at 100 pF/m, unshielded
Allowed input voltage of terminals 6 and 11	AC 120V AC 230V
Possible input current of terminal 6	0.5mA 1mA

Allowable terminal load	$\text{Cos}\varphi \geq 0.6$	$\text{Cos}\varphi = 1$
- Terminals 3	Max 2.7A (15A Max 0.5S)	Max 3A
- Terminals 4,5 and 7	Max 1.7A	Max 2A
- Terminals 9		
- LME39.100	Max 1A	Max 1A
- LME39.400	Max 1.7A	Max 2A
- Terminals 10	Max 1A	Max 1A

Function chart (control program).



Reason	Coping measures
Supply voltage interruption	Restart after the power supply voltage is restored, and then safely cut off
Lower than the undervoltage threshold	Safety cut-off
Undervoltage threshold exceeded	Restart
External light during pre-sweep time	Fault power off, flashing code 4
Wait time for external light	Activate block, failure to power off approximately 30 seconds after flashing code 4
Flame is extinguished at the end of the safe time	<u>Factory setting</u> Failure power off at end of safe time, flashing code 2  <u>Configurable parameter</u> Repeat up to 3 times, after which failure power off at the end of the safe time, flashing code 2
Flameout during operation	<u>Factory setting</u> Fault power off. Flicker code 7  <u>Configurable parameter</u> Repeat up to 3 times, after which failure power off at the end of the safe time, flashing code 7
Weld the air pressure switch in the working position	About 65 seconds after the failure Scintillation code 5
Air pressure switch closes when there is no load - Valve leak detection error is only used with LDU11	About 180 seconds after the failure Scintillation code 3  <b>Tips</b> Running time of the actuator (t11) can be extended depending on the application
Pressure drops after the preset time	Fault power off, flashing code 3
Wait for the CPI contact to open	About 60 seconds after the failure Scintillation code 14

After the fault power failure, LME39 remains locked, and the red light can be reset immediately, even if the power supply voltage is interrupted, the burner controller remains in this state



Error code table		
Red Flashing Light Code (LED)	《AL》 port 10	Possible cause
2 times flicker ..	On	No flame was established after《TSA》 Error or fuel valve contamination Error or flame detector contamination Wrong burner adjustment. No fuel Ignition equipment error
3 times flicker ...	On	《LP》 faulty 《t10》 after the wind pressure switch signal disappeared 《t10》 closes in the usual position
4 times flicker ....	On	External light source when the burner is started
5 times flicker .....	On	Termination of connection 《LP》 《LP》 Close in working position
6 times flicker .....	On	Leisure
7 times flicker .....	On	Loss of flame during operation (repeat restriction) Error or fuel valve contamination Error or flame detector contamination Burner wrong adjustment
8 times flicker .....	On	Leisure
9 times flicker .....	On	Leisure
10 times flicker .....	Off	Internal wiring error, output connection, other errors
14 times flicker .....	Off	CPI link is not closed

While the cause of the fault is being diagnosed, the controller outputs a signal to enable it to operate

It remains closed while burning

Operate when external failure indicates

Operate when external failure indicates: Fault status signal 《AL》 on port 10, according to the error code table

Fault cause diagnosis Exit and turn on the burner again by resetting the combustion controller. Press the lock reset button for about 1 second (< 3 seconds).

### Diagram

a	The limit switch of air damper start position
AL	Remote alarm device (alarm)
AR	Main relay with electric shock «ar...» (load relay)
AS	Fuse protector unit
BR	Lock relay with electric shock «ar...»
Bv...	Gas valve limit connector for shut position
d...	Connector or relay
EK...	Lock reset button
FR...	Flame relay with electric shock «Fr»
GP	Gas pressure switch
H	Main insulation
ION	Probe detector
L1	Mistake signal light
L3	Operation ready indicator
LK	Air damper
LP	Air pressure switch
LR	Load controller

■ LFL1...controlling signal

▨ Allowed input signal

▤ Needed input signal:

If during  $\diamond$  or  $\square$ , there has no signal, controller will stop or lock process.

TSA	Ignition safety time
TSA'	Ignition safety time or first safety time (Main burner is started by ignition burner)
t1	Pre-purge time
t3	Pre-ignition time
t4	Charging interval between 18 and 19
t4'	Valve released time interval in TSA' start and 19
t5	Charging interval between 19 and 20
t6	Postpurge time (with «M2» )
t7	The time interval between start order and 7 charge (thanks to «M2» start delay)

- It is valid for expanding flame burner
- It is valid for cover ignition burner

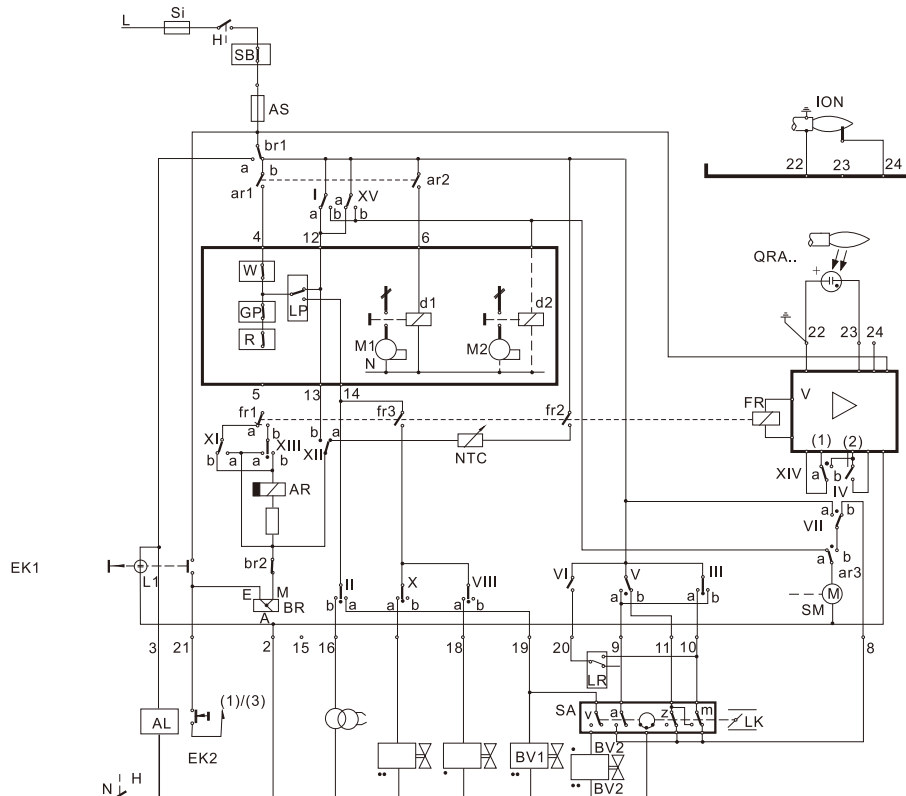
- (1) Increase running voltage input, it is needed by UV photocell QRA..
- (2) During flame detection line return (connector XIV) function testing and safety time «TSA» (connector IV) are for input of flame relay mandatory charge.

m	The auxiliary switch of air damper smallest position
M...	Fan motor or burner motor
NTC	NTC resistor
QRA...	Uv photocell
R	Controlling thermostat or pressostat
RV	Adjustment fuel valve
Si	External fuse
SA	Air damper motor
SB	Safety limit
SM	Process controlling switch motor
v	locates in damper motor: Auxiliary switch release fuel according to damper position
V	Flame signal amplifier
W	Limit thermostat or pressure switch
z	Locates in air damper motor, limit switch in close position
Z	Transformer
ZBV	Ignition fuel valve

T8	Start process duration time (not include «t11» and «t12» )
t9	In second safety time , Main burner is started by ignition burner
t10	To time interval of air pressure checking start not include fan motor start time
t11	The time from motor to start position
t12	The running time from motor to Min. position
t13	Allowed post burning time
t16	The time interval of giving fan motor start order
t20	The time interval of process switch self stop after start

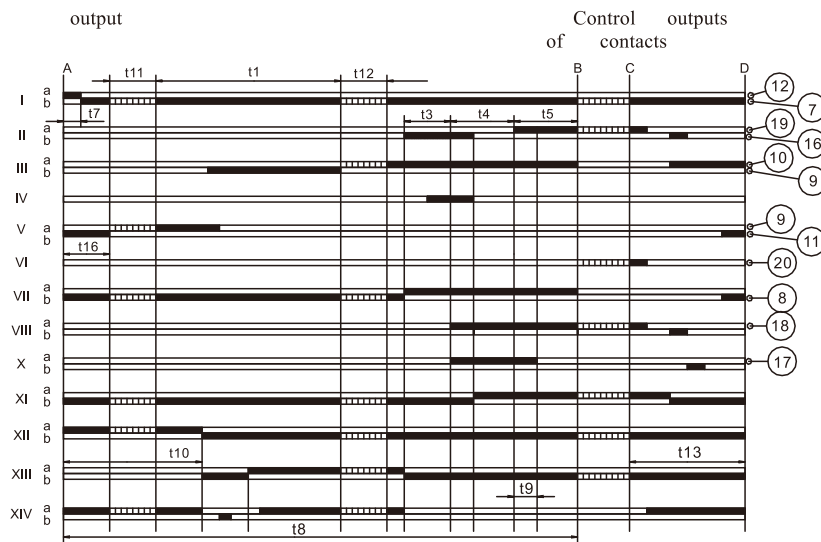
## 10.2 SIEMENS Siemens LFL1.3... D program controller

### 10.2.1 Wiring Diagram



Do not press lock reset button «EK...» more than 10s!  
About safety cover valve connection, refer to supplier` diagram

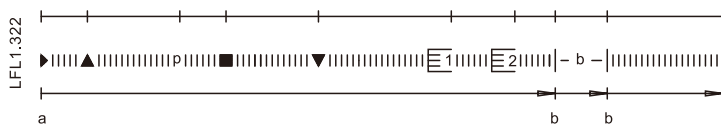
### Process consequence diagram



□ TSA'□ , □ t3'□ and □ t4'□ :

These time only use for 01 series burner controller(LFL1.335 ,LFL1.635 and LFL1.638).not use for 02series controller, because LFL1...cams X and VIII finish the movements at the same time

锁定指示



Use probe detector  
to check flame

probe detector voltage	
-Running	AC 330 V $\pm$ 10%
-Test	AC 380 V $\pm$ 10%
Short circuit current	Max. 0.5 mA
Testing tool rang	0. . . 50 $\mu$ A
Detector cable allowed length	
-Normal cable, alone lay <sup>2)</sup>	Max. 80 m
-Block cable	Max. 140 m (Such as high frequency cable; block to connecton 22)
Detecting current in running	Min. 6 $\mu$ A
Maybe detecting current in running	Max. 200 $\mu$ A

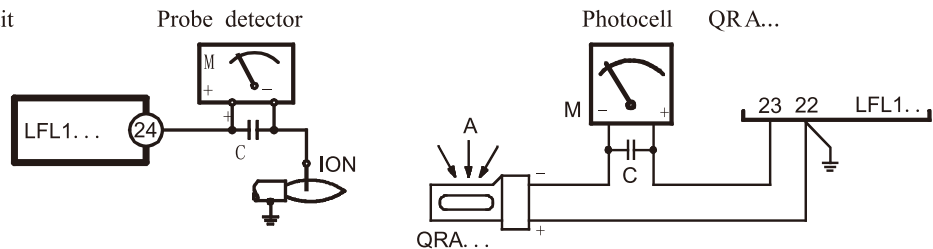
use photocell QRA  
to flame detects

Rated voltage	
-Running	AC 330 V $\pm$ 10%
-Test	AC 380 V $\pm$ 10%
Needed detecting current	Min. 70 $\mu$ A
Possible detecting current	
-Running	Max. 700 $\mu$ A
-Test	Max. 1000 $\mu$ A <sup>1)</sup>
Detector allowed cable length	
-Normal cable, alone lay <sup>2)</sup>	Max. 100 m
-block cable	Max. 200 m (Such as high frequency cable; block to connecton 22)

<sup>1)</sup> Prepurge stage process with high testing voltage: ignition automatically and external light test

<sup>2)</sup> Not allow to use one cable serval core

Measure detector current circuit



About detector current, please refer to <<technical data>>

C Electrolyte capacitor 100. . . 470 $\mu$ F; DC 10. . . 25 V

ION Probe detection

M microampere gauge Ri max. 5, 000 $\Omega$



Notice!

- LFL.. is safety equipment  not allow to open, revise system
- LFL.. must be insulated before any movements
- Check all safe function during system operation or change fuse
- No any water drop in controller during running or maintenance.

Note! Don` t press lock reset button over 10s

## 10.2.2 Control procedure and fault location display in case of failure

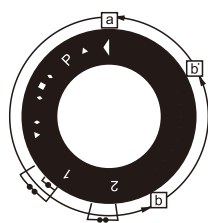
If happens kind of fault, process switch will stop, indicator locks.

The indicator signals show kind of fault:

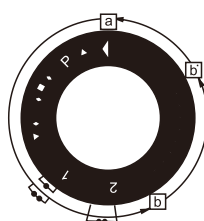
- |   |                                |  |
|---|--------------------------------|--|
| ◀ | No start                       | <ul style="list-style-type: none"> <li>• One connector does not close</li> <li>• Outer flame lock during controllinh process or finish,such as               <ul style="list-style-type: none"> <li>-No extinguished flame</li> <li>-Fuel leaks</li> <li>-Flame detection return line is faulty</li> </ul> </li> </ul> |
| ▲ | Start process cut off suddenly | <ul style="list-style-type: none"> <li>• Connection(8)does not receive the terminal «a» start signal</li> <li>• Connection 6,76,7 and 14 keep electricity until fault is solved.</li> </ul>  |
| P | Lock                           | <ul style="list-style-type: none"> <li>• No receive signal at first air pressure test.</li> <li>• There has air pressure leaks after test.</li> </ul>  |
| ■ | Lock                           | <ul style="list-style-type: none"> <li>• Flame detection return line is faulty</li> </ul>  |
| ▼ | Start process cut off suddenly | <ul style="list-style-type: none"> <li>• Connection 6, 76, 7 and 14 keep electricity until fault is solved.</li> </ul>   |
| 1 | Lock                           | <ul style="list-style-type: none"> <li>• After safety time «TSA» ,no flame signal</li> </ul>   |
| 2 | Lock                           | <ul style="list-style-type: none"> <li>• After second safety time «TSA» no flame signal (cover burner main flame signal)</li> </ul>  |
| I | Lock                           | <ul style="list-style-type: none"> <li>• Flame signal disappears during operation</li> </ul>   |

If happen fault in start and prepurge time ,no use signal. Normally it shows early flame signal it is caused by self-ignited UV photocell

Lock indicator



LFL1... 01series



LFL1... 02 series

- a-b Start process
- b-b' Free step  
(no connection check)
- b (b')-a postpurge process

- If no lock,contriller will reset immediately
  - No press reset button more than 10S
- Process switch always return to original setting position
  - After reset
  - After amending fault
  - After all power fault, only 7. 9. 11 has electricity
- Then, □ LFL1... starts a new process

## 11. Valve leak detector

---

### LDU11 gas leak detection

Leak detector LDU11 is suitable for automatic sealing tests between two solenoid valves in gas-fired installations. When used in connection with 1 or 2 pressure switches, valve validation automatically starts with each combustor start-up. Priority is given to the start of the burner in the pre-purge time lasting 1 minute immediately when the shutdown control command is issued, or - when the burner control is completed, for example, in the post-purge phase.

Valve validation test based on 2 level pressure validation test principle:

1. First stage of test: first the test area of the main pipeline valve is discharged clean, and then the atmospheric pressure inside is detected.
2. The second stage test: pressurize the test area of the burner valve to detect the gas pressure.

If the pressure on Test1 in the first stage increases, and the pressure on Test2 in the second stage decreases. The valve validation device will disable the burner from starting and shut it off (lockout). In this case, the lock reset button lights up to indicate an error. Remote indication errors can also be used. When a problem occurs, the program stops and indicates which valve is leaking.

### Feature

In the first stage of the valve validation test «Test1» atmospheric pressure must be present in the long pipe between the two valves for testing. In a unit with a blowoff tube, atmospheric pressure can be utilized if valve validation tests are performed first or during the cleaning phase. In devices without a release tube, atmospheric pressure can be used when the valve validation device opens the burner side valve at time: «t4» If the valve validation device is activated after the burner has finished running, the burner side valve will remain open after the close command is issued until the «t4» time runs out. This reduces the air pressure in the test area and ensures that the gas is fully burned in the combustion chamber during the post-purge phase. The prerequisite for performing this step is a suitable set of combustion controllers, and the following types of combustion controllers are available: LFE... , LFL.. LGK... Or LEC... When the gas is drained, the test area is closed. In the first stage of testing «Test1», LDU11... The pressure switch is checked to see if the gas pressure in the test area is maintained. If the valve on the main side leaks, causing the pressure to rise beyond the set pressure of the pressure switch, the LDU11 will alarm and trigger the cut-off procedure. The program indicator then stops and indicates «Test1». If the pressure does not increase because the valve is normally closed. LDU11 will continue to perform Phase 2 testing For this purpose, the valve on the main side of the road will remain open during the «t3» phase, so that the test area is always under pressure. Under normal circumstances, the pressure will not fall below the set point of the pressure switch. If the burner side valve leaks, the LDU11 activates the cutoff function, which prevents the burner from starting. When the second stage of the test is successfully completed, LDU11. Close the internal loop between terminals 3 and 6 (circuit: Terminal 3- connect to ar2 terminals 4 and 5- contact terminal 111- terminal 6). The control loop is usually contained within the control loop of the combustion controller. After the control loop is closed, the LDU11. Logic control program automatically returns it to the starting position and shuts it down. During some of the so-called idling phases, the logic control program will control its position to remain unchanged.

## PRESS AND CUT OFF INDICATION

The "stop" signal indicates the existing position when cutoff happens, and finished steps(one step=2.5S)

Signal meaning

▶ Start position = Running position

No blow off valve: equipment  
Open burner side valve to exhaust testing area gas

Test1 «Test1» in air pressure(main pipeline valve testing)

Open main pipeline valve to input gas for testing area

Test2 «Test2» in air pressure(burner valve testing)

I I I Idle turning stage until logic process to close it

▶ Running position = Next valve proof testing start position

In lock stage , except terminal 13 LDU11,all power terminal is in cut off status,terminal 13 indicates lock.

After reset, logic controlling process will return to start position automatically, and start new test

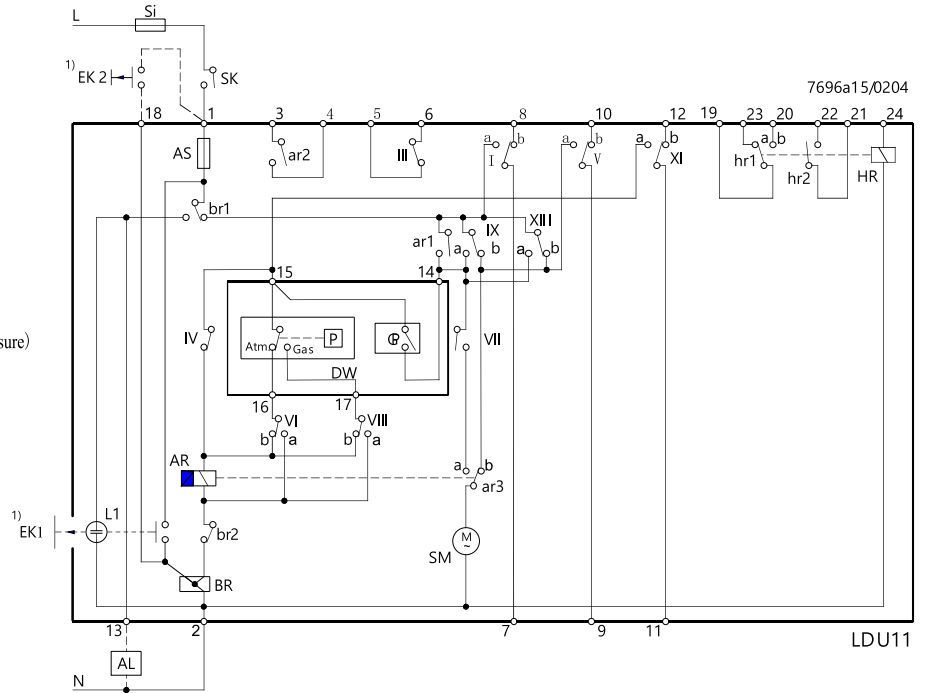
Notice Don` t press reset button over 10s

Controlling process in power-lossing There will not cause controlling process changing in power-lossing after exhausting in testing area

When power-lossing happens in the beginning of exhaust,the valve proof test will not move on as power recover.logic controlling process will return it to start position and start completed valve proof test.

**Legend**

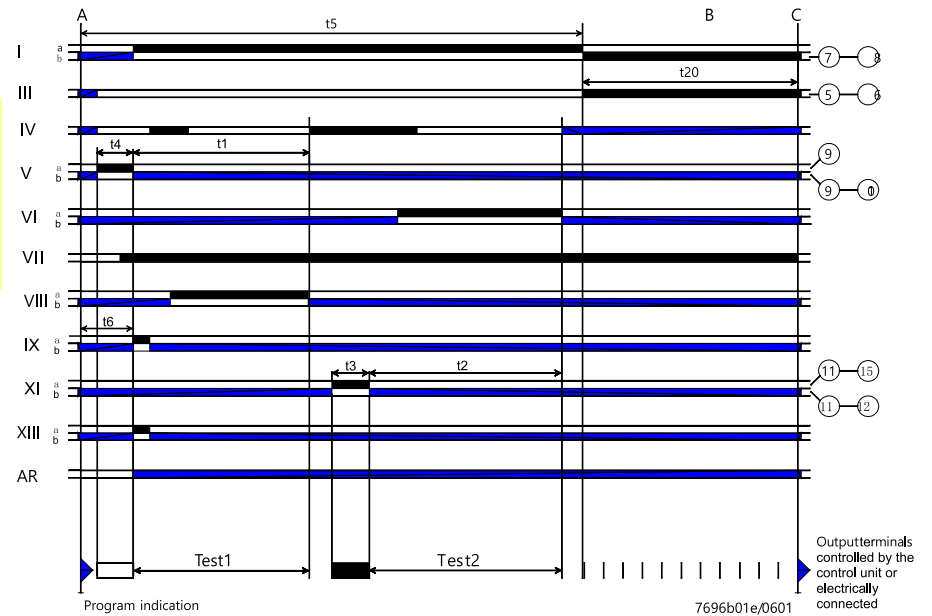
- AL Leaking valve alarm signal
- AR Main relay, connector r... ?
- AS Equipments fuse (inner)
- BR Lock relay, connector r... ?
- DW Pressure switch, for valve test  
(Not use for changing gas pressure switch  
the latter indicates lacking gas pressure)
- EK1 Lock reset button
- EK2 Remote reset button
- GP Gas pressure switch (check if it lacks gas pressure)
- HR Auxiliary relay, connector r... ?
- L1 Lock alarm indicate light (controller inner)
- Si External power fuse
- SK Control switch  
(use for starting valve test)
- SM synchronous motors controlled logically
- 1) Do not press K... ? over 10 S



**Timing Sequence Diagram**

**Legend**

- t1 22.1 s First stage test, air pressure
  - t2 27 s Second stage test, gas pressure
  - For LDU11.323...
    - t3 2.5 s Full air in testing area
    - t4 2.5 s Exhaust in testing area
  - For LDU11.523...
    - t3 5 s Full air in testing area
    - t4 5 s Exhaust in testing area
  - t5 66.3 s Valve total testing time
  - t6 7.4 s The time from start to main relay movement
  - t20 22.1 s The time of logic controlling system close = start position (empty rotation stage)
- A Controlling valve exhausts in testing area  
 B Controlling valve full air in testing area  
 C Exhaust valve starts well; begins to close in the first stage of valve testing



## 12. MAINTENANCE

---



Warning! Cut off power before burner maintenance, also close gas supply pipe manual stop valve. When checking , close burner power, but open gas supply pipe manual stop valve.

### BURNER MAINTENANCE

Make sure the good working , check electrodes position and clean.

Check flame detector position and status.

If necessary, clean the filter.

Check gas pipe

Clean dirty and float waste, keep burner clean

Do smoke test to check burning value regularly

### HEATING EQUIPMENTS CONTROL

Keep boiler clean and door closed

Guarantee heating system has enough water pressure

Clean fire oven and chimney regularly

Check smoke board adjustment regularly

Avoid water spray into burner

Boiler must open vent fan

Check gas pipe and burner safety equipments regularly

Check boiler work

Notice: check electrodes

## 13.FAILURE AND MEASUREMENTS

Failure, firstly check below items :

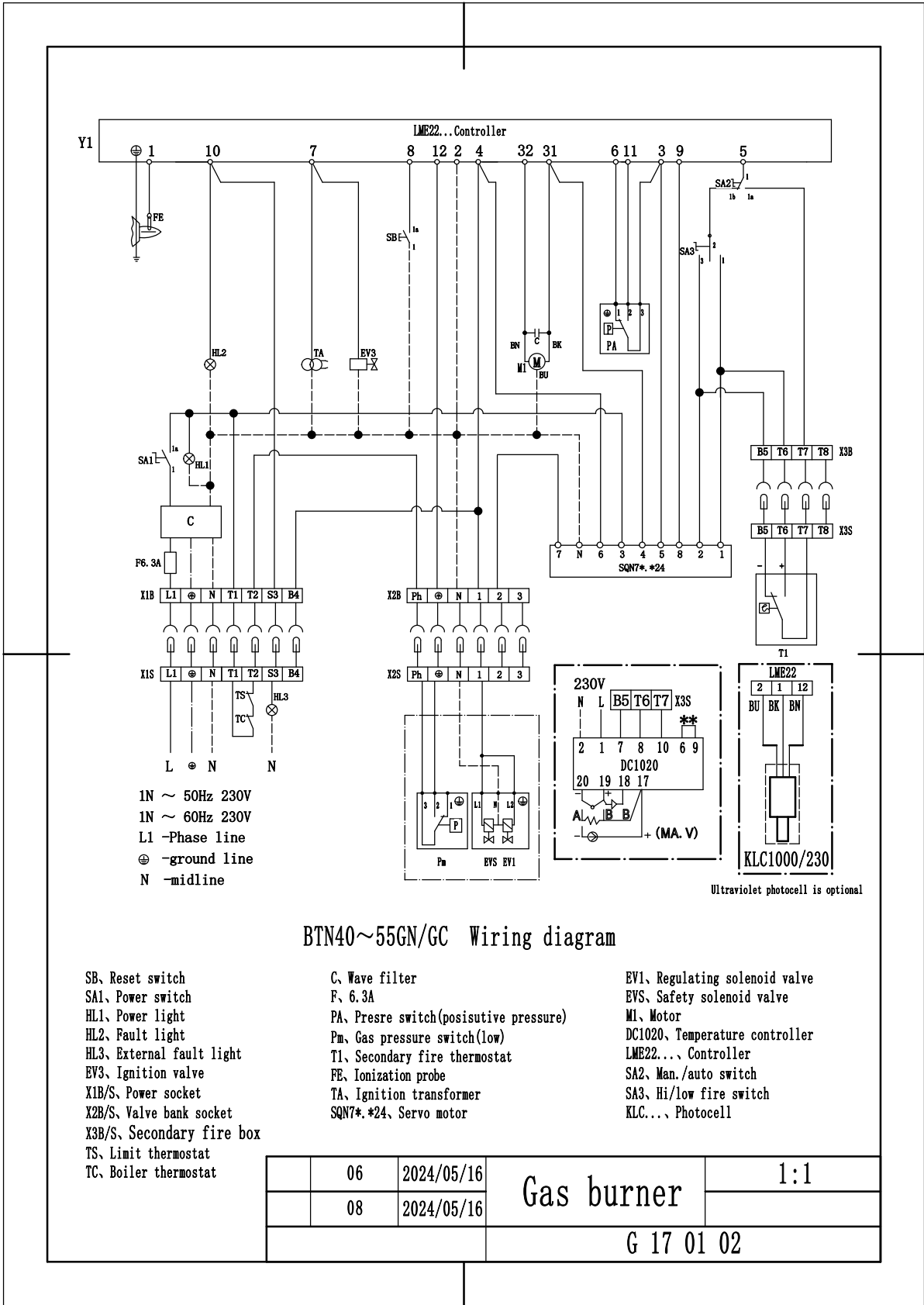
1. Check circuit(control and supply voltage)
2. Check valve leakage detector (Yellow light is ok)?
3. Check all adjustment device and controller installation.
4. The working of safe devices.
5. Gas pressure switch(max) working status (Gas pressure failure signal light maybe is not on) ?

If failure isn't caused by above items, have to check each part function. If controller is on "Lock" (signal light is on), need to reset.

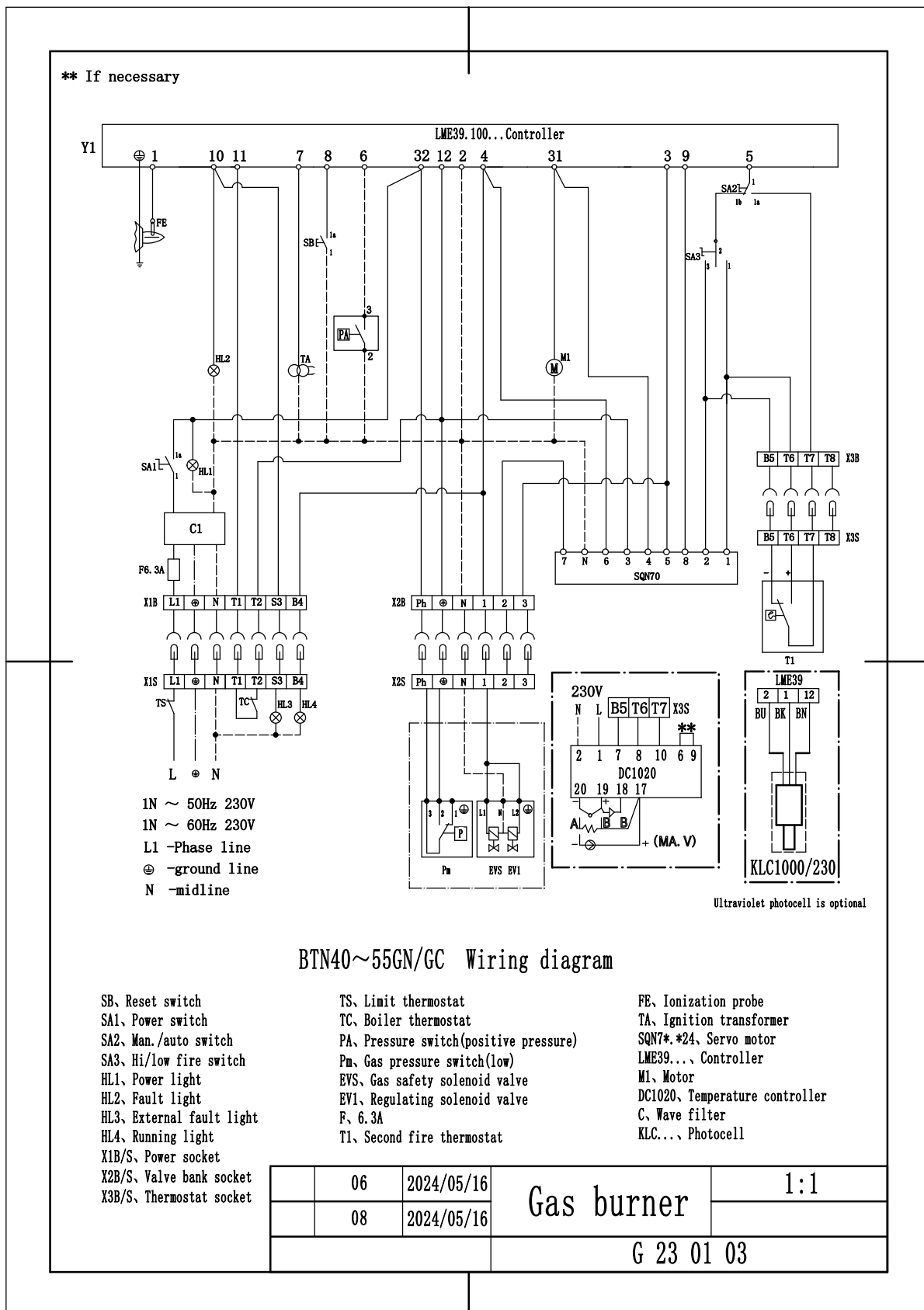
Notice	Causes	Measurements
1. motor		
Motor can not start	Controlling system cut off Controller failure	Find out the cause and revise it. Change controller
	Motor failure	Change
2. Air pressure is not enough		
Burner motor begins to work, but lock after finishing prepurge.	Air pressure switch installation is wrong. Hose is dirty Air pressure switch fault	Check installation, if necessary, change it. Clean Change
	Fan motor is dirty	Clean
3. Ignition failure		
Burner motor start, controlling voltage from controller to transformer is open flame, lock.	Servo motor failure or wrong setting.	Change or adjustment
Burner motor start, controlling voltage from controller to transformer is closed, no flame, lock.	Electrodes are dirty or damaged, no insulation. Electrodes far from diffuser. Ignition cable damage Ignition transfer failure.	Clean or change Adjustment Change Change

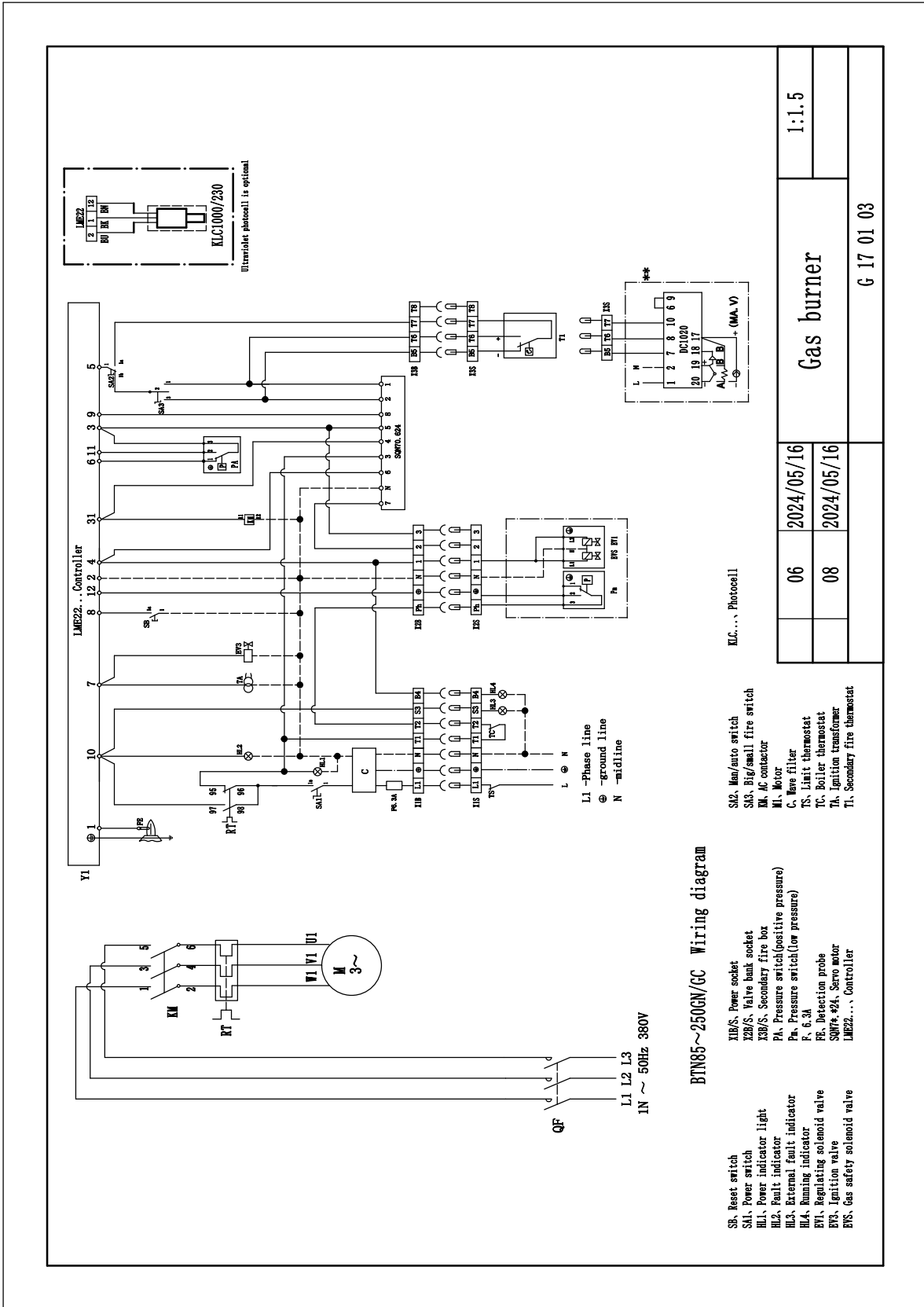
Notice	Causes	Measurements
4.No flame		
Burner motor statrm,spark comes out,after a short while, lock.	Gasvalveisnotopen .Servomotorfails .Wirecabledamages .Controlreturnlineisfaulty .Airdamperboardservomotor cam switchsetiswrong .Airdamperservomotorfails  Gasflowiswrong	Changedamagedparts  Adjustment  Adjustment
5.Lock after flame forms		
Flame comes out,then stop running (air pressure switch, low limit)restart.	Air pressure is too low -Pressure regulator fails  Filter blocks Air pressure switch set is wrong(low limit)	Repair or change regulator  Clean filter Adjustment
6.Flame detector failure(=lock)		
Prepurge lock  Fanmotorstarts comesout theflame.lock.  Burner stop work and lock	Flame detector failure Controller failure Flame detector position is wrong Flame detector is dirty Flame is weak Flame detector failure Controller failure Controller failure	Change Change Adjustment Clean Checkburneradjustment device Change Change Change
7.BURNER HEAD		
Diffuser damage	small fire loads low  wrong burning air setting  wrong distance from diffuser to nozzle  boiler vent is not enough  burning air ratio is too low -wrong adjustable ring position	adjustment adjustment adjustment raise air supply adjustment change
8.seal device does not work		
burner could not work ,red light is on	see "seal check " seal device not work	Change

# 14. Circuit diagram BTN40-55GC BLU

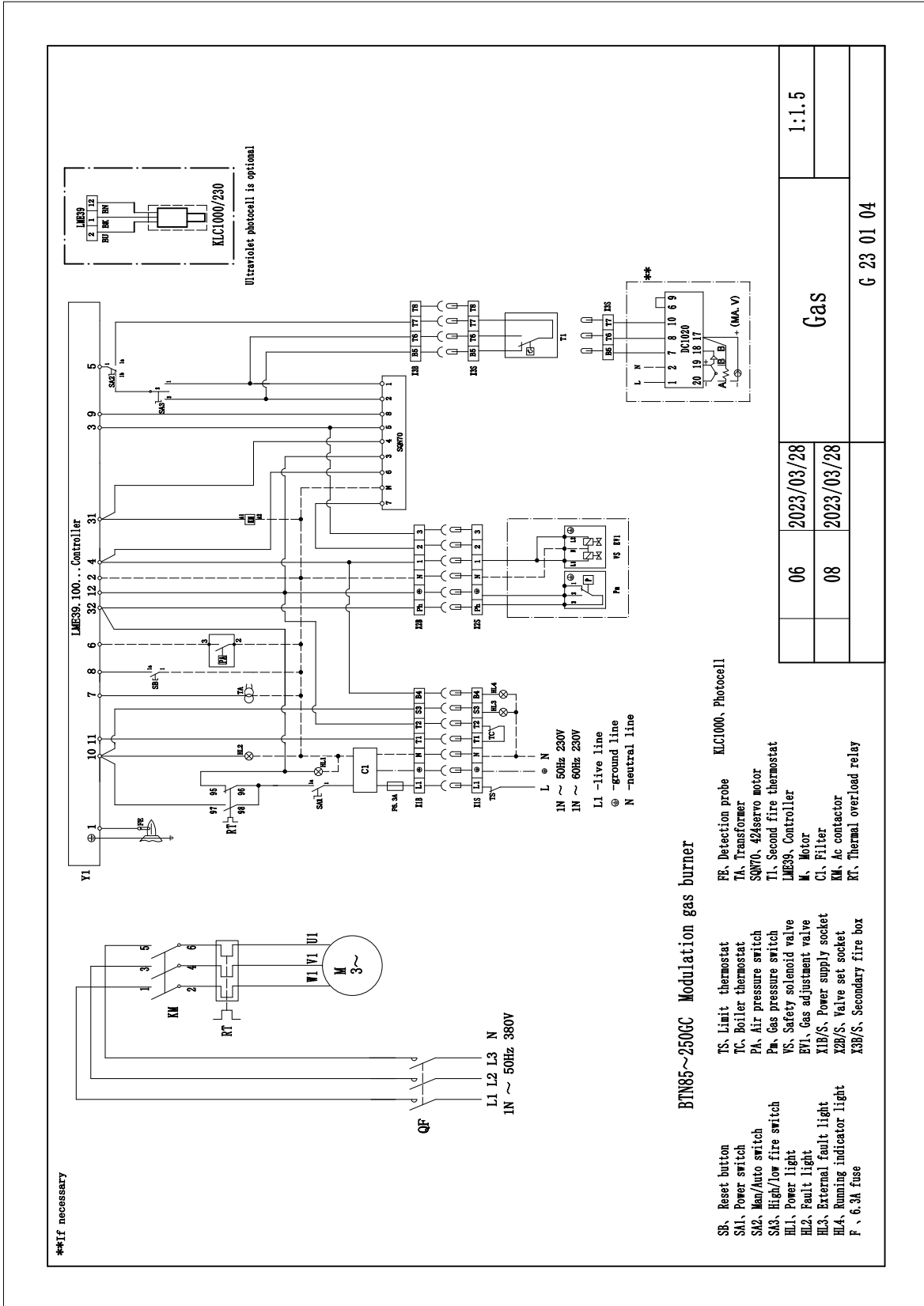


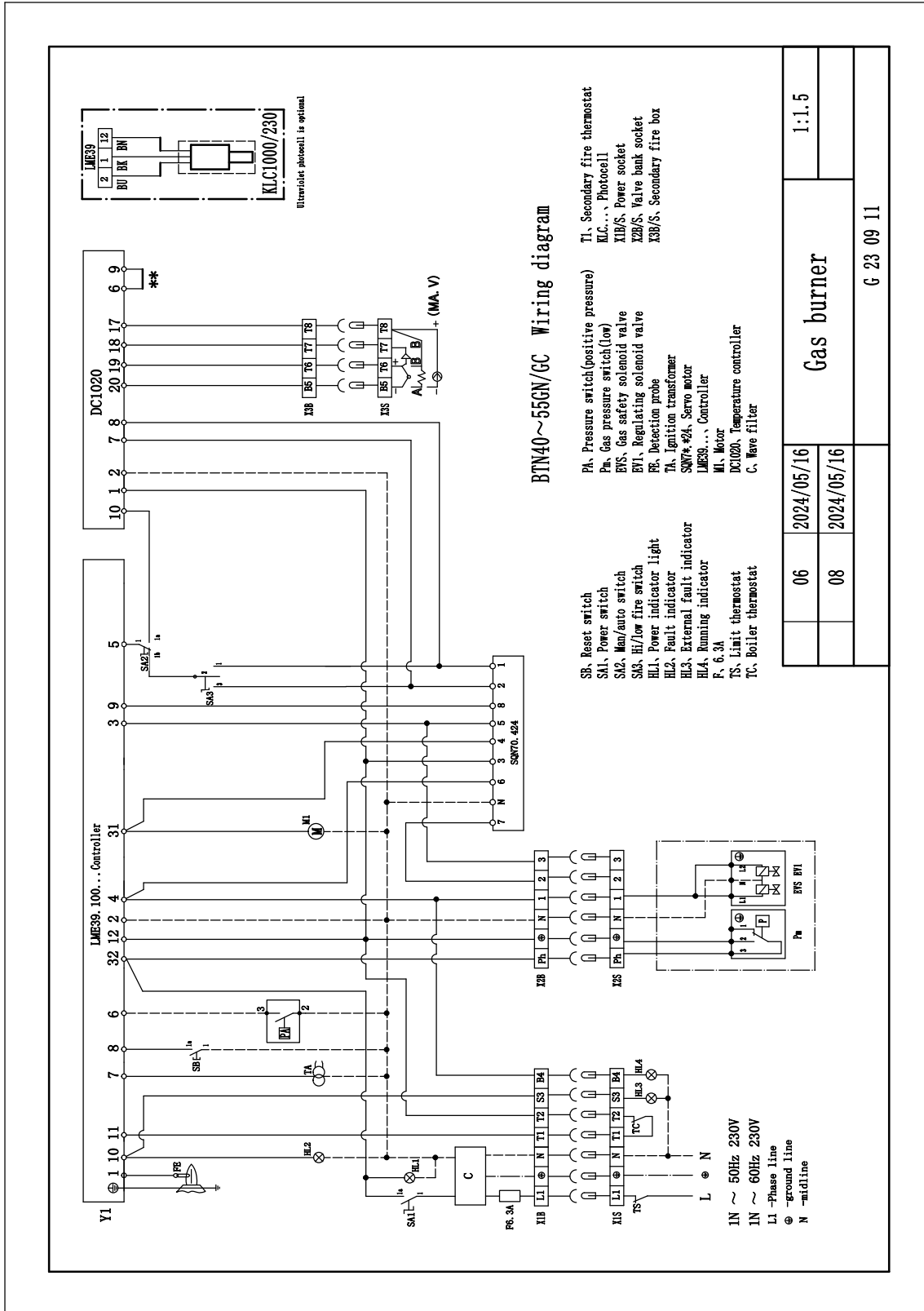
Model :BTN40-55GN (LME39 controller)



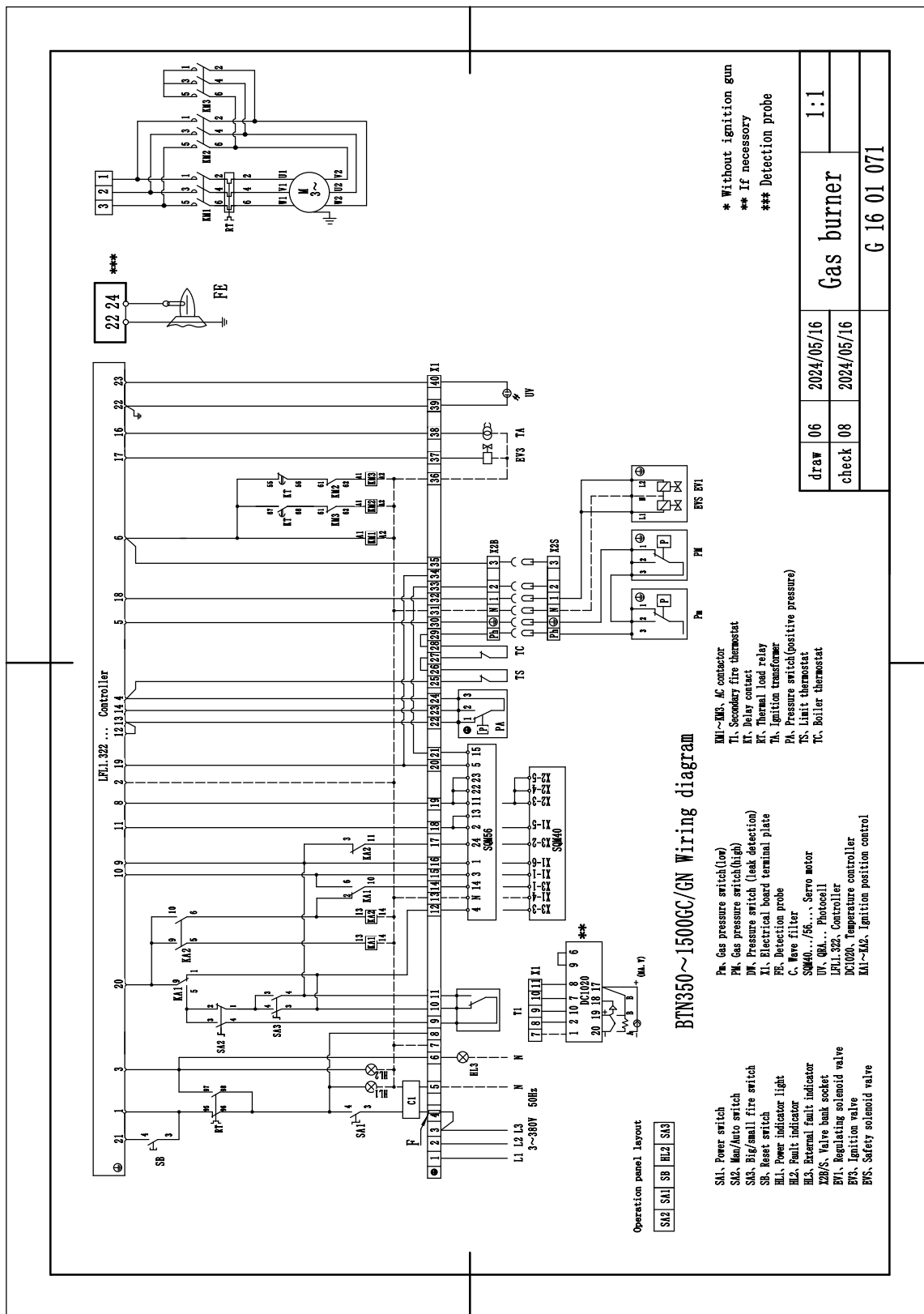


Model :BTN85-250GN (LME39 controller)





Model :BTN350-1800GN



SERVING GLOBAL HEAT TECHNOLOGY

# BEJO

