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S4565/S4575/S4585 SERIES

IGNITION CONTROLS FOR COMBINED VALVE AND IGNITION SYSTEM

INSTRUCTION SHEET



"Old"- style



"New"- style

APPLICATION

The Combined Valve and Ignition system (CVI) has specially been developed for application in gas fired appliances with either intermittent pilot or direct burner ignition.

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

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

DESCRIPTION

The S4565/S4575 ignition controls provide automatic ignition for direct gas burner applications and for intermittent pilot gas burner applications with safety timer.

The S4565/S4575 ignition controls are not intended for direct exposure to flame envelope.

The S4585 ignition controls provide automatic ignition for intermittent pilot gas burner applications without safety timer.

The S4565/S4575/S4585 ignition controls are designed to meet the european standards:

EN 298: Automatic gas burner control systems.
EN 60730-1: Automatic electrical controls for house hold and similar use.

The S4565/S4575/S4585 ignition controls can be used in appliances according European standard for household electrical requirements EN 60335 series.

The S4565/S4575 ignition controls are approved on the North American standard ANS Z21.20 Automatic Ignition Systems.

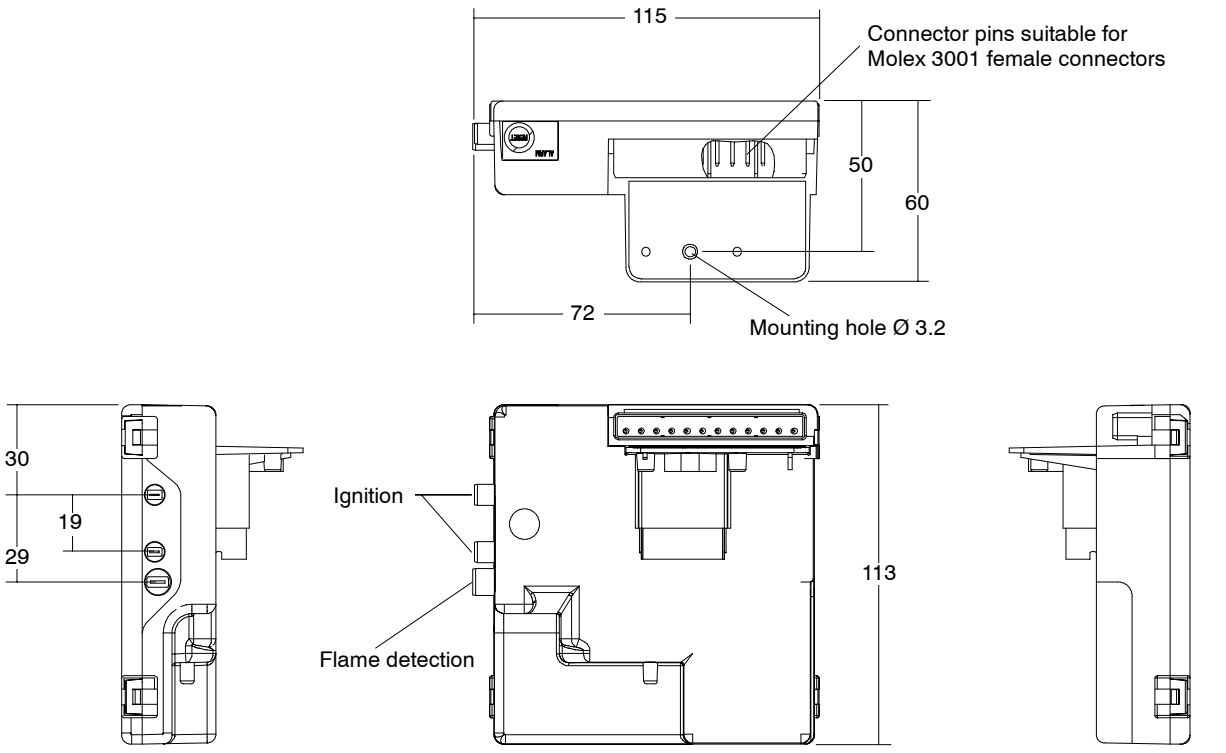
NOTE: S4565SD is not an ignition control but an ignition circuit and rectifier only

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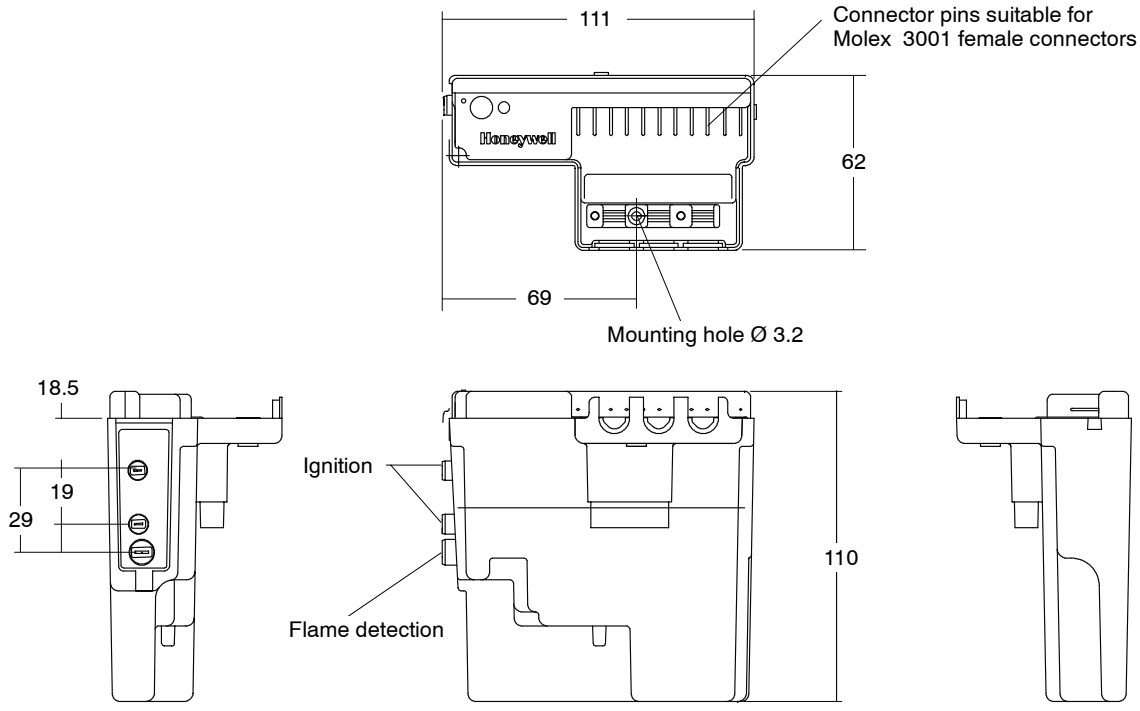
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Subject to change without notice. Printed in the Netherlands.



Note: specific housings may deviate from drawing

Fig. 1. Dimensional drawing “new style” housing in mm



Note: specific housings may deviate from drawing

Fig. 2. Dimensional drawing “old style” housing in mm

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FEATURES IGNITION CONTROLS

- Flame supervision.
- Built-in 2.5 ... 60 Hz ignition.
- Internal or external reset and alarm.
- Accurate safety timer.
- Supply voltages of 220 ... 240 V in a single product.
- Full operating sequence after flame loss.
- Extended spark time.
- Optional phase neutral independent operation, flame sensing independent of safety ground potential for S4565AD ... TD “2000” series and S4575.
- Safety time triggered by Air Pressure Switch (APS) for S4565AD ... TD “2000” series and S4575.
- Optional safe separation flame relay output or opto coupler.
- Optional main burner interrupt for S4565 BF, DF, QF, TF.
- Volatile or non volatile lock-out according EN 298.
- EMC filter optional
- Protective impedance flame rod
- Under voltage protection

SPECIFICATIONS DIRECT BURNER IGNITION CONTROL S4565A, B, P, Q

Model
Suffix A: atmospheric, direct burner ignition
Suffix B: atmospheric, direct burner ignition, flame relay output
Suffix P: as A except volatile lock-out
Suffix Q: as B except volatile lock-out

Supply voltage
220 ... 240 Vac, 50/60 Hz

Power consumption
4 VA

Humidity
90% RH max. at 40 °C

Ambient temperature
0 ... 60 °C
-15 ... 60 °C (optional)

Electrical rating (see also note 2.)
Alarm: 220 ... 240 Vac, 50/60 Hz, 1 A, cos φ > 0.6 or 1 mA max.
Flame relay contact: 220 ... 240 Vac, 50/60 Hz, 1 A, cos φ > 0.6
Flame opto coupler: +5 V, 10 kΩ

Electrical connection
High voltage spark: 2.8 mm spade terminal
Flame sensing: 4.8 mm spade terminal
PCB connectors: Molex 3003 series suitable for Molex 3001 female cable connector

Housing (degree of protection)
See page 29

Timing (depending on O.S. number)
Self check time (T_c): 1.5 s
Waiting time (T_w): 0 ... 30 s
Safety time (T_s): 3.5 ... 55 s
Extended spark ignition time: 0 ... T_s

Flame sensing
Min flame current: 0.9 μA
Response time on: > 0.2 s
Response time off (T_{FR}): < 1 s (optionally other values available)

Ignition
Spark voltage: > 12 kV at 40 pF load
Repetition rate: 2.5 ... 60 Hz (depending on O.S. number)
Max. spark gap: 3.5 mm

Length flame sensing cable
1 m max.

Length ignition cable
0.5 m max.

Length of wiring for external components
1 m max.

Remark
Optional integrated flame relay available with safe separation or opto coupler with safe separation.

N.C. contact of flame relay has no safe separation.

⚠ WARNING

Opto coupler interface needs a debounce time > 20 ms in order to prevent noise caused by transients on mains.

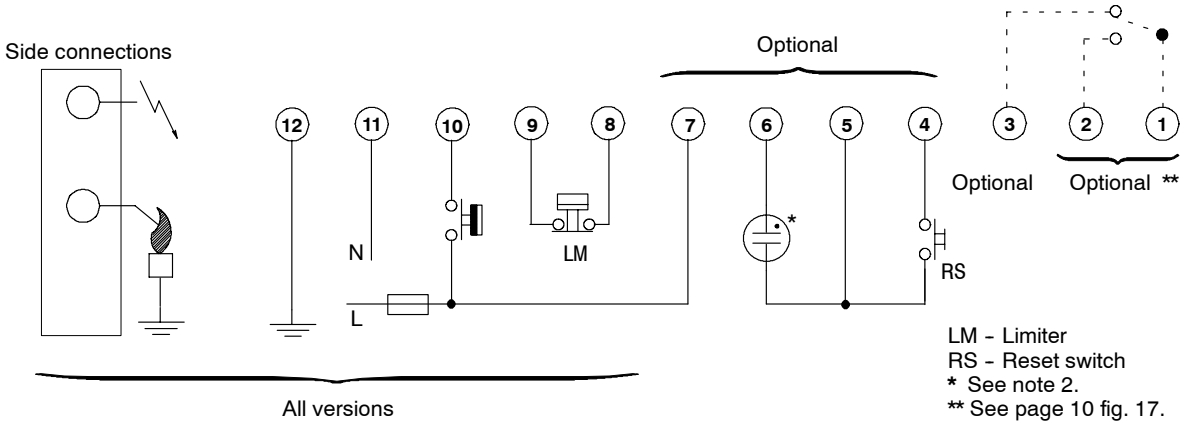


Fig. 3. Connection diagram S4565A, B, P, Q

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SYSTEM OPERATION

General

Lock-out reset

The S4565 ignition control can be reset by either depressing the internal/external reset button (suffix A and B) or by interrupting the permanent life (suffix P and Q).

NOTE 1.: If during normal use the reset button is pressed, the gas valves drop out and the S4565 ignition control starts a new sequence after releasing the reset button.

NOTE 2.: If permanent alarm output:
neon indicator with integral resistor >150 kΩ
(max 1 mA)

NOTE 3.: If an return high limit thermostat is used, the high limit switch in the application needs a longer return time than the trial for ignition time of the control. This in order to provide non volatile lock out.

Suffix A, B, P and Q (see fig. 4.)

When there is a call for heat a self check period (T_c) plus waiting period (T_w) elapse before built-in igniter and gas valve are switched on.
The ignition spark ignites gas and resulting flame is detected by the flame rod.
Ignition is switched off after extended ignition time and flame establishment.
If flame is not established within the safety time (T_s), the S4565 ignition control locks out.
If the flame is lost during normal run, the S4565 ignition control repeats start sequence.

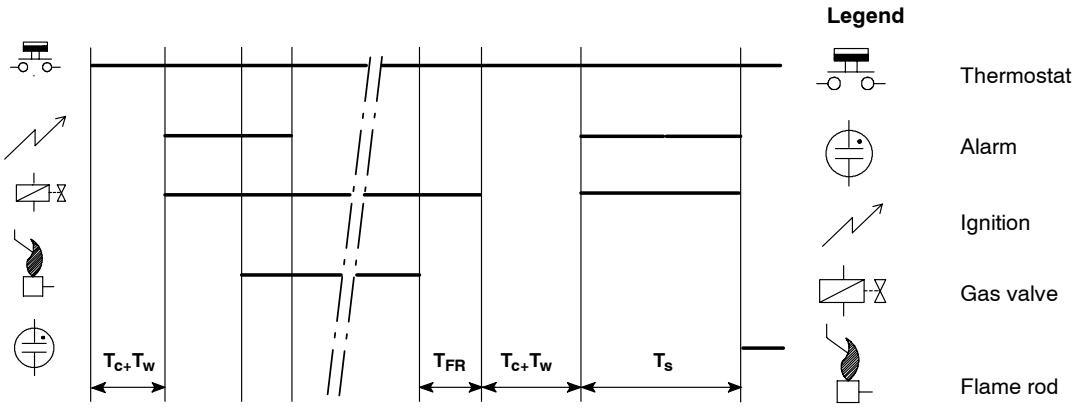


Fig. 4. Functional diagram S4565A, B, P, Q

SPECIFICATIONS IGNITION CONTROL S4565C, D, R, T

Model

Suffix C: fan assisted, direct burner ignition
Suffix D: fan assisted, intermittent pilot burner ignition including safety timer
Suffix R: as C except volatile lock-out
Suffix T: as D except volatile lock-out

Supply voltage

220 ... 240 Vac, 50/60 Hz

Power consumption

4 VA

Humidity

90% RH max. at 40 °C

Ambient temperature

0 ... 60 °C
-15 ... 60 °C (optional)

Electrical rating (see also note 5.)

Alarm: 220 ... 240 Vac, 50/60 Hz, 1 A, cos φ > 0.6 or max 1 mA
Fan: 220 ... 240 Vac, 50/60 Hz, 1 A, cos φ > 0.6
LPG outdoor valve: 220 ... 240 Vac, 50/60 Hz, 1 A, cos φ > 0.6
External ignition transformer: 220 ... 240 Vac, 50/60 Hz, 1 A, cos φ > 0.6

Electrical connection

High voltage spark: 2.8 mm spade terminal
Optional:
External mains voltage ignition transformer with 2.8 mm spade terminal

Flame sensing: 4.8 mm spade terminal or 2.8 mm spade terminal for combined high voltage spark/flame sensing

PCB connectors: Molex 3003 series suitable for Molex 3001 female cable connector

Housing (degree of protection)

See page 29

Timing (depending on O.S. number)

Self check time (T_c): 0, 1.5 or 2 s
Prepurge time (T_p): 0 ... 30 s
Safety time (T_s): 3.5 ... 55 s
Extended spark ignition time and stabilisation time: 0 ... T_s (dependent on elaps of safety time)

Flame sensing

Min flame current: 0.9 µA
Response time on: > 0.2 s
Response time off (T_{FR}): < 1 s
(optionally other values available)

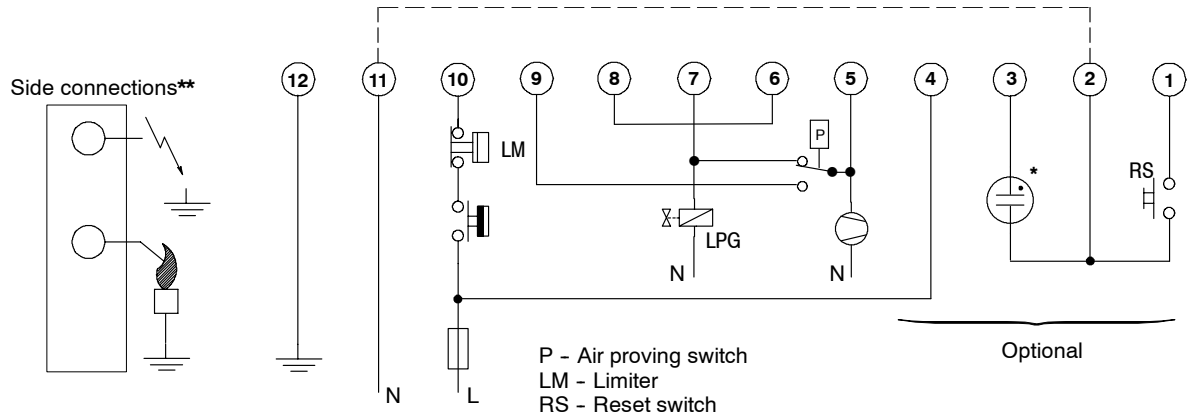
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Ignition
Spark voltage: > 12 kV at 40 pF load
Repetition rate: 2.5 ... 60 Hz (depending on O.S. number)
Max spark gap: 3.5 mm

Length flame sensing cable
1 m max.

Length ignition cable
0.5 m max.

Length of wiring for external components
1 m max.



P - Air proving switch
LM - Limiter
RS - Reset switch
* See note 5.
** Alternative side connection for models with combined flame detection/high voltage. See page 5 fig. 6.

Fig. 5. Connection diagram S4565C, D, R, T

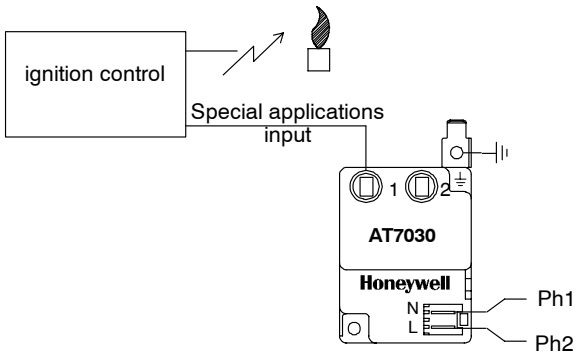


Fig. 6. Alternative side connection for models with combined flamedetection/high voltage.

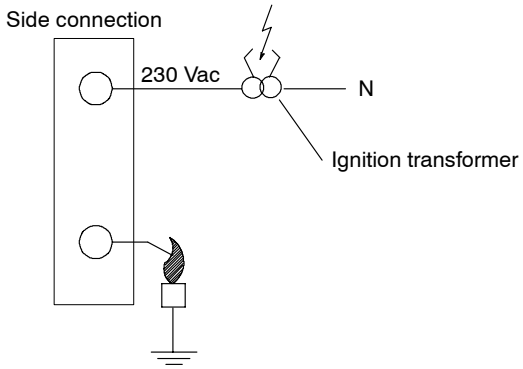


Fig. 7. Alternative side connection for models with flame sense input + 230 Vac output for external ignition transformer

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SYSTEM OPERATION

General

Lock-out reset

The S4565 can be reset by either depressing the internal/external reset button (suffix C and D) or by interrupting the permanent life (suffix R and T).

NOTE 4.: If during normal use the reset button is pressed, he gas valves close and the S4565 ignition control starts a new sequence after releasing the reset button.

NOTE 5.: If permanent alarm output:
neon indicator with integral resistor >150 kΩ
(max 1 mA)

Suffix C and R (see fig. 8.)

When there is a call for heat the fan starts running through the no air position of the air proving switch.
If an external LPG valve is connected, this will be energized.
When sufficient air flow is proven by the air proving switch, a self check period (T_c) and prepurge period ($T_{p)}$ elapse before the gas valve and built-in ignition or external ignition transformer (optional) are switched on.
The ignition spark ignites gas and resulting flame is detected by the flame rod.
Internal or external ignition is switched off.
After flame establishment a predetermined, extended ignition time can be included.
If flame is not established within the safety time (T_s), the S4565 ignition control locks out.
If the flame is lost during normal run, the S4565 ignition control repeats the start sequence with prepurge.
If no air is proven by the air proving switch within the prepurge time (T_p), the ignition control stays in waiting mode with fan running.

Suffix D and T (see fig. 9.)

When there is a call for heat the fan starts running through the no air position of the air proving switch.
If an external LPG valve is connected, this will be energized.
When sufficient air flow is proven by the air proving switch, a self check period (T_c) and prepurge period ($T_{p)}$ elapses before the pilot gas valve and built-in ignition or external ignition transformer (optional) are switched on.
The ignition spark ignites pilot gas and resulting flame is detected by the flame rod.
Internal or external ignition is switched off.
After flame establishment a predetermined, extended ignition time can be included and flame establishment and the main valve is switched on.
If flame is not established within the safety time (T_s), the S4565 ignition control locks out.
If the flame is lost during normal run, the S4565 ignition control repeats start sequence at prepurge.
If no air is proven by the air proving switch within the prepurge time (T_p), the ignition control stays in waiting mode with fan running.

⚠ WARNING

Do not interchange air proving switch wiring in order to prevent malfunctioning

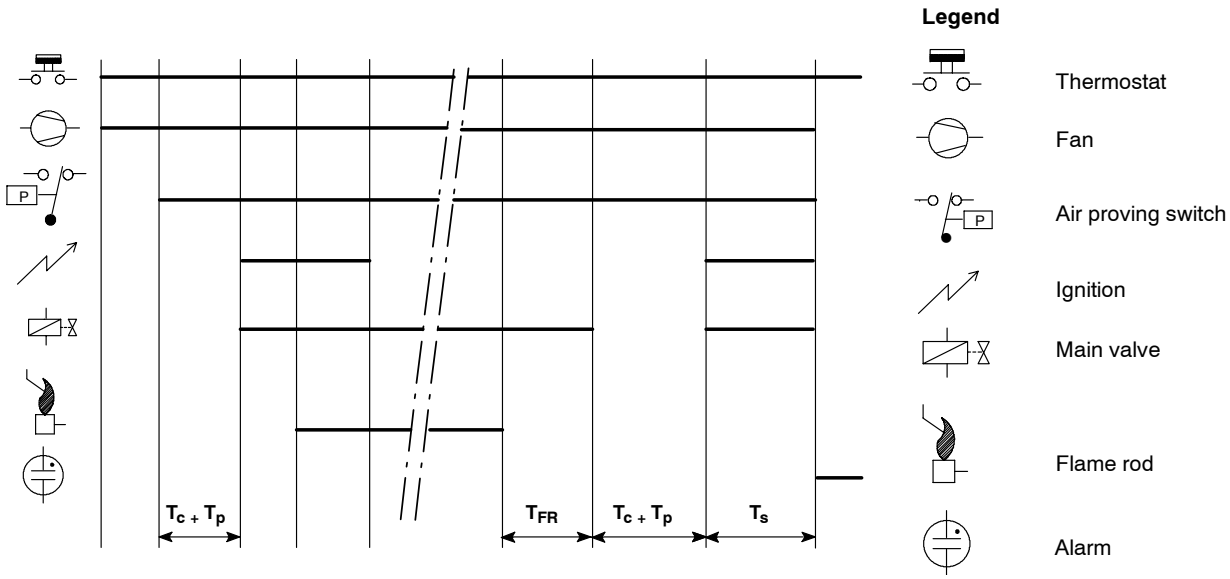


Fig. 8. Functional diagram S4565C, R

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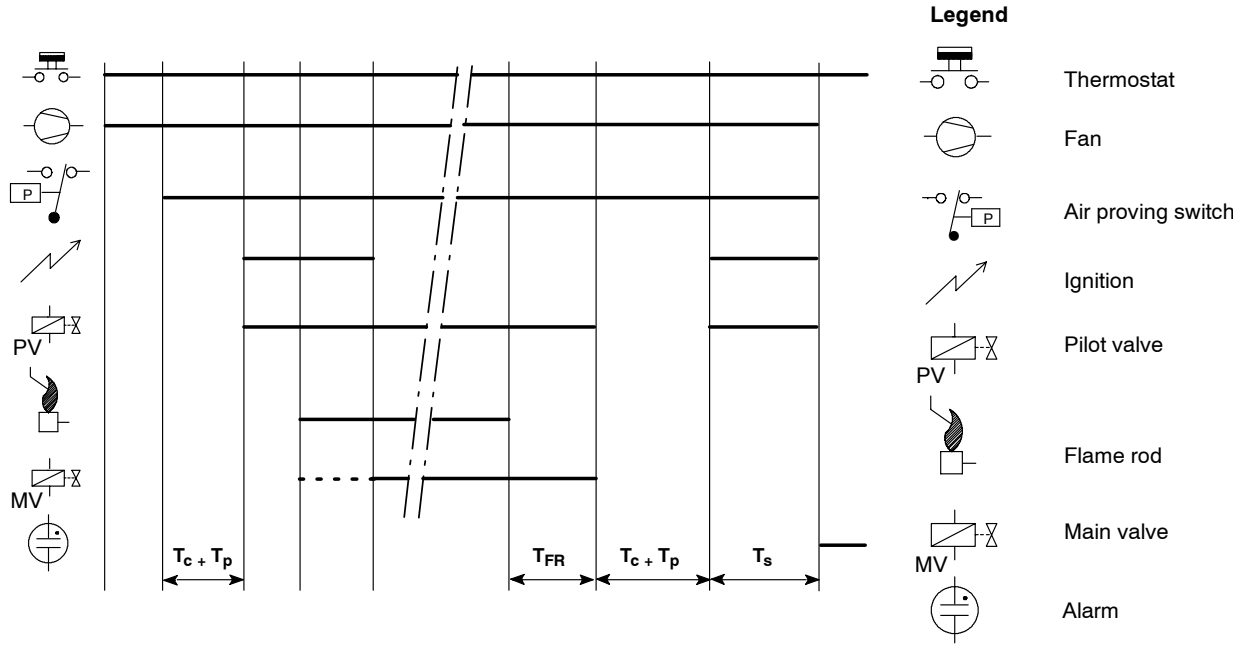


Fig. 9. Functional diagram S4565D, T

SPECIFICATIONS DIRECT BURNER IGNITION CONTROL S4565AD, BD, CD, DD, PD, QD, RD, TD "1000-SERIES"

Model
Suffix AD: atmospheric, direct burner ignition
Suffix BD: as AD but with flame relay output
Suffix CD: fan assisted, direct burner ignition
Suffix DD: as CD but with flame relay output
Suffix PD: as AD except volatile lock-out
Suffix QD: as BD except volatile lock-out
Suffix RD: as CD except volatile lock-out
Suffix TD: as DD except volatile lock-out

Supply voltage
220 ... 240 Vac, 50/60 Hz

Power consumption
4 VA

Humidity
90% RH max. at 40 °C non condensing

Ambient temperature
0 ... 60 °C
-15 ... 60 °C (optional)

Electrical rating (see also note 8.)
Alarm: 220 ... 240 Vac, 50/60 Hz, 1 A, cos φ > 0.6 or max 1mA
Fan: 220 ... 240 Vac, 50/60 Hz, 1 A, cos φ > 0.6
Flame relay contact: 220 ... 240 Vac, 50/60 Hz, 1 A, cos φ > 0.6
Flame opto coupler: +5 V, 10 kΩ
LPG valve: 220 ... 240 Vac, 50/60 Hz,1 A max, cos φ > 0.6

Electrical connection
High voltage spark: 2.8 x 0.5 mm spade terminal
Flame sensing: 4.8 x 0.8 mm spade terminal
PCB connectors: Molex 3003 series suitable for Molex 3001 female cable connector

Housing (degree of protection)
See page 29

Timing (depending on O.S. number)
Self check time (T_c): 1.5 s
Waiting time (T_w): 0 ... 30 s
Safety time (T_s): 3.5 ... 25 s
Extended spark ignition time: 0 ... T_s (dependent on elaps of safety time)

Flame sensing
Min flame current: 0.9 μA
Response time on: > 0.2 s
Response time off (T_{FR}): < 1 s

Ignition
Spark voltage: >12 kV at 40 pF load (depending on O.S. number)
Repetition rate: 2.5 ... 60 Hz (depending on O.S. number)
Max. spark gap: 3.5 mm
Optional external ignition circuit: 220 ... 240 V (at no load), single phase rectified, max 2 VA

Length flame sensing cable
1 m max.

Length ignition cable
0.5 m max.

Length of wiring for external components
1 m max.

Remark
Optional integrated flame relay available with safe separation or opto coupler with safe separation.
N.C. contact of flame relay has no safe separation.

⚠ WARNING

Opto coupler interface needs a debounce time > 20 ms in order to prevent noise caused by transients on mains.

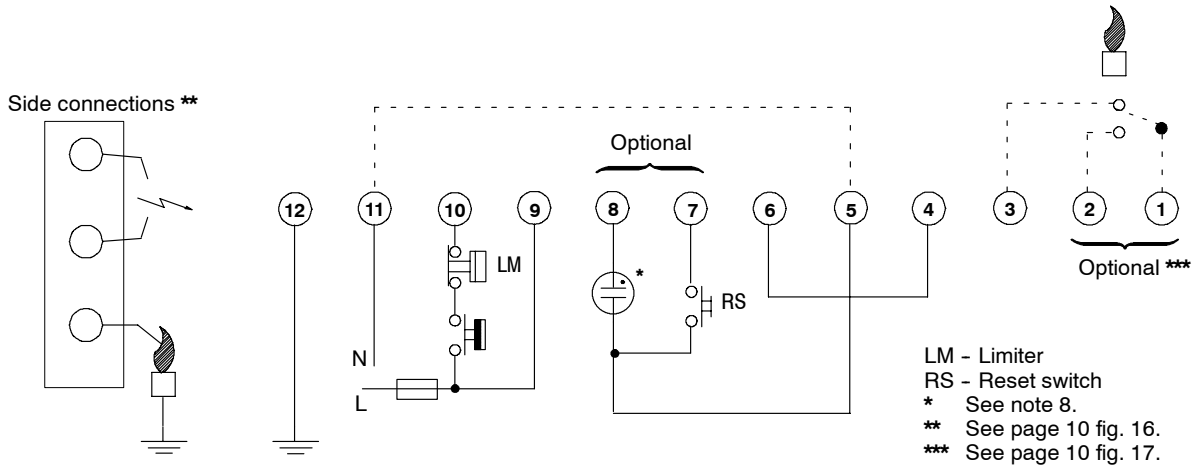


Fig. 10. Connection diagram S4565AD and BD

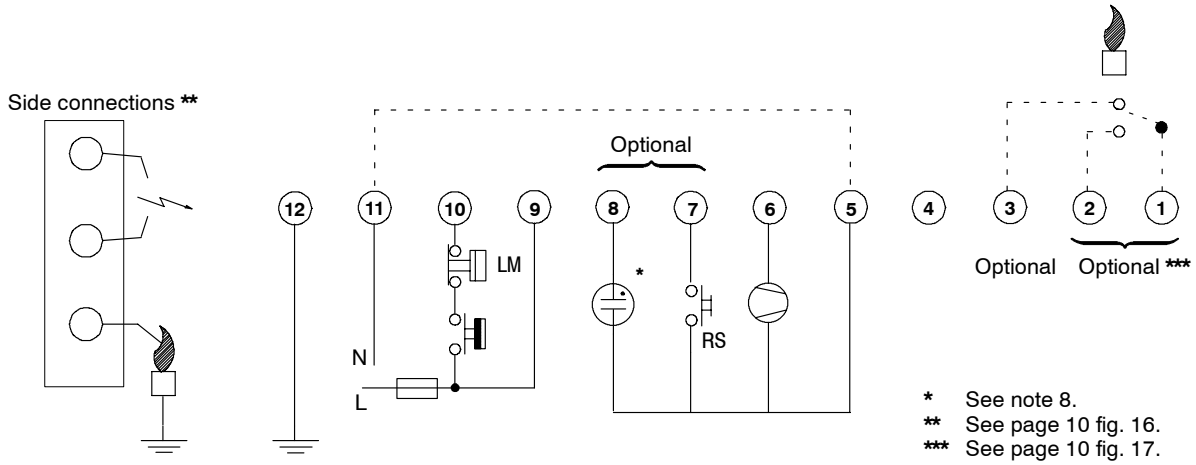


Fig. 11. Connection diagram S4565BD and QD “1000” series for gas/air application

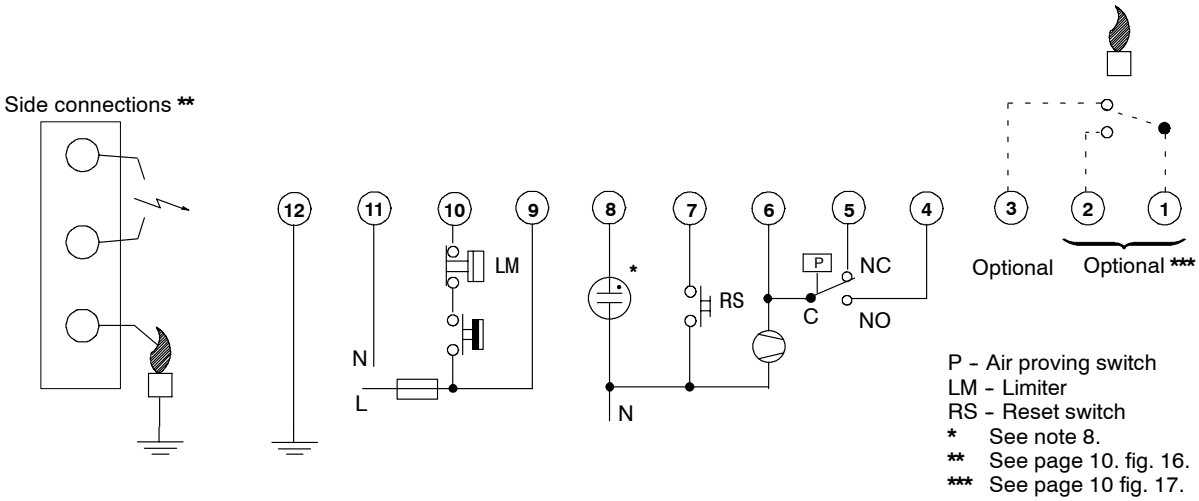


Fig. 12. Connection diagram S4565CD and DD

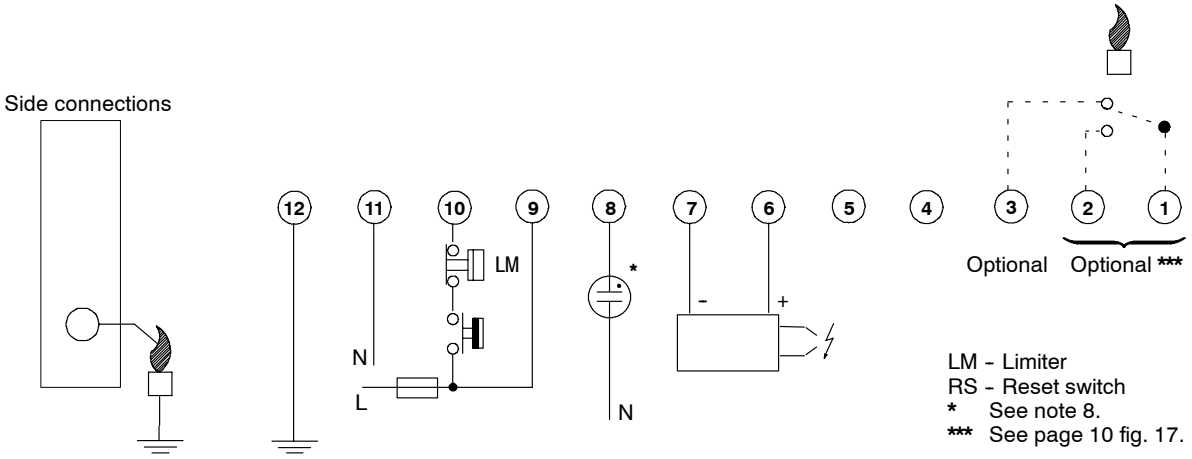


Fig. 13. Connection diagram S4565QD with external ignition circuit

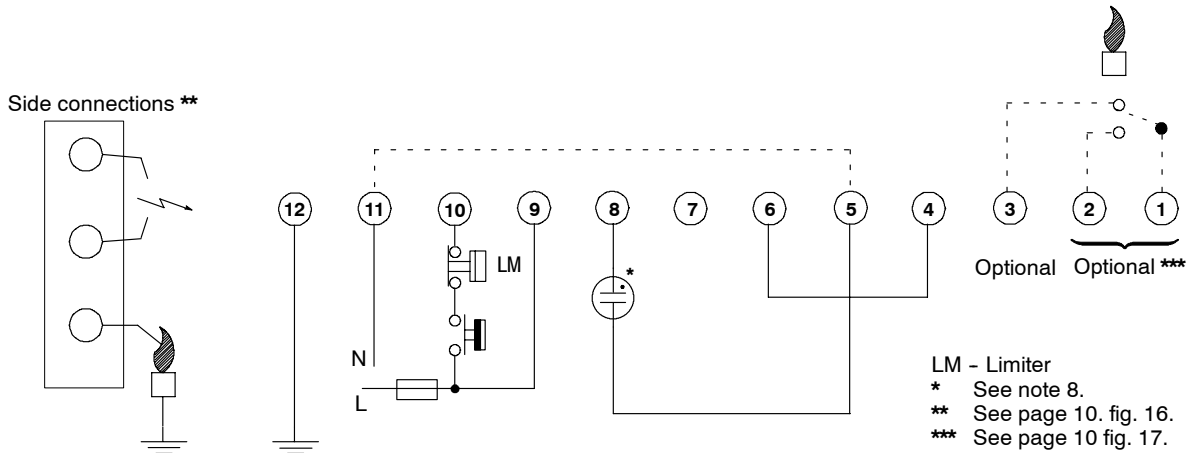


Fig. 14. Connection diagram S4565PD and QD

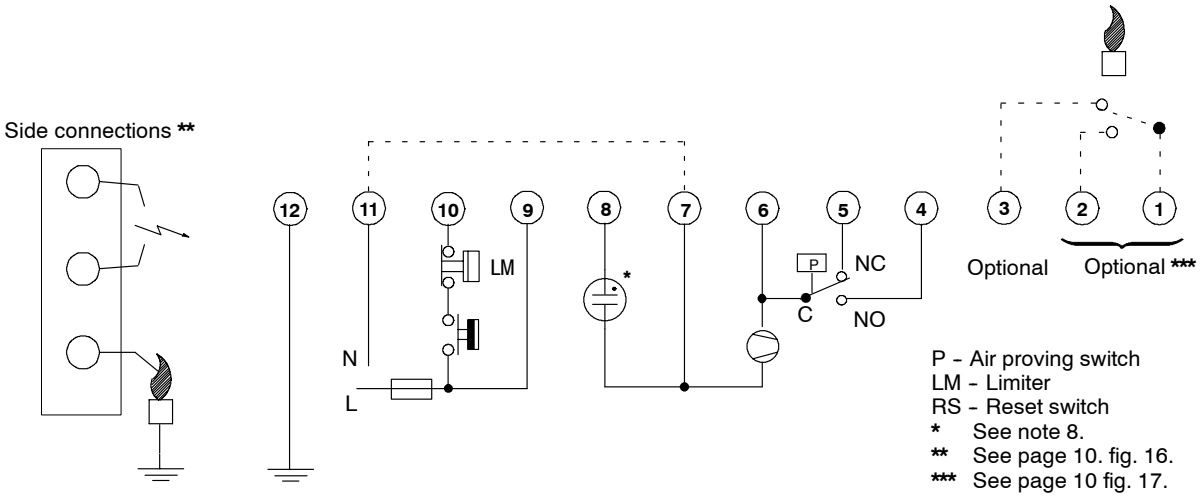


Fig. 15. Connection diagram S4565RD and TD

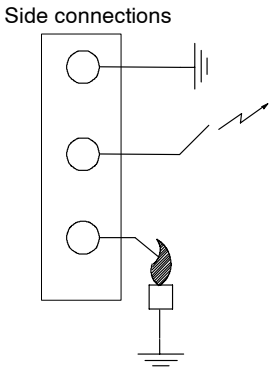


Fig. 16. Alternative side connection if sparking to ground

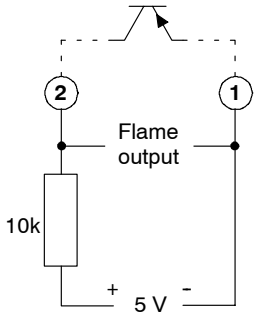


Fig. 17. Connection for opto coupler output

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SYSTEM OPERATION

General

The S4565AD, BD, CD, DD, PD, QD, RD, TD ignition control can provide both closed-loop sparking and sparking to ground.
If the S4565AD, BD, CD, DD, PD, QD, RD, TD will be used in sparking to ground applications, the upper spark tab has to be grounded.

Lock-out reset

The S4565 can be is reset by either depressing the internal/external reset button (suffix AD, BD, CD and DD) or by interrupting the permanent life (suffix PD, QD, RD and TD).

NOTE 6.: When first starting, the inition control can be in the lock-out condition; reset the ignition control. After a reset an extended waiting time will occur.

NOTE 7.: If during normal use the reset button is pressed, the gas valves close and the S4565 ignition control starts a new sequence after releasing the reset button.

NOTE 8.: If permanent alarm output:
neon indicator with integral resistor >150 kΩ (max 1 mA)

Suffix AD and PD (see fig. 18.)

When there is a call for heat a self check period (T_c) plus waiting period (T_w) elapses before the built-in igniter and gas valve are switched on.
The ignition spark ignites gas and resulting flame is detected by the flame rod.
After flame establishment a predetermined, extended ignition time can be included.
If flame is not established within the safety time (T_s), the S4565 ignition control locks out.
If the flame is lost during normal run, the S4565 ignition control repeats start sequence.

Suffix BD and QD (see fig. 19.)

As AD and PD except flame relay contact or opto is closed after flame detection.

Suffix CD and RD (see fig. 20.)

When there is a call for heat the fan starts running through the no air position of the air proving switch after a self check period (T_c) plus waiting period (T_w). When sufficient air flow is proven by the air proving switch, the built-in igniter and gas valve are switched on.
The ignition spark ignites gas and resulting flame is detected by the flame rod.
After flame establishment a predetermined, extended ignition time can be included.
If flame is not established within the safety time (T_s), the S4565 ignition control locks out.
If the flame is lost during normal run, the S4565 ignition control repeats start sequence.
If no air is proven by the air proving switch within the safety time (T_s), the ignition control locks out.

Suffix DD and TD (see fig. 21.)

As CD and RD except flame relay contact or opto is closed after flame detection.

Gas/air application

For gas/air application without dynamic aircheck, the S4565AD, BD, PD or QD can be used.
In this application the fan is connected between pin 4 and 5 and will start when a call for heat is present. The waiting period now acts as a prepurge time.
When the call for heat disappears or when the ignition control goes in lock-out, the fan will be switched off.

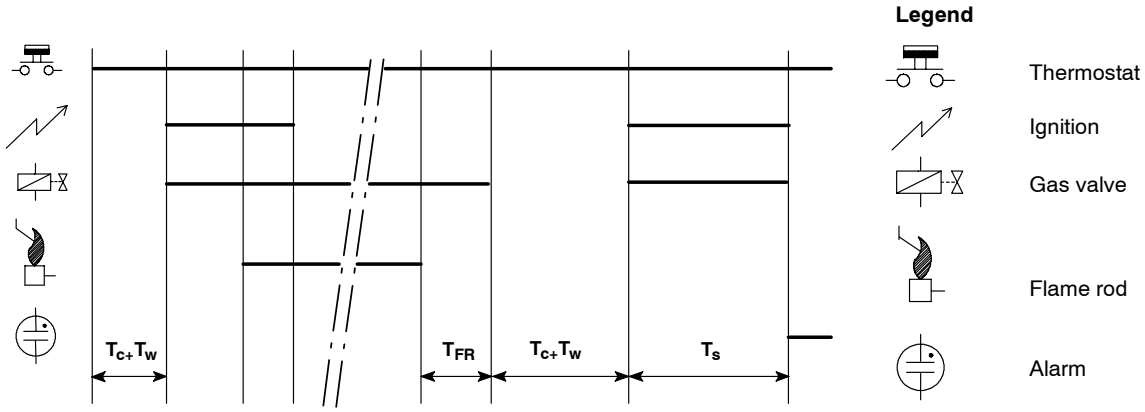


Fig. 18. Functional diagram S4565AD, PD

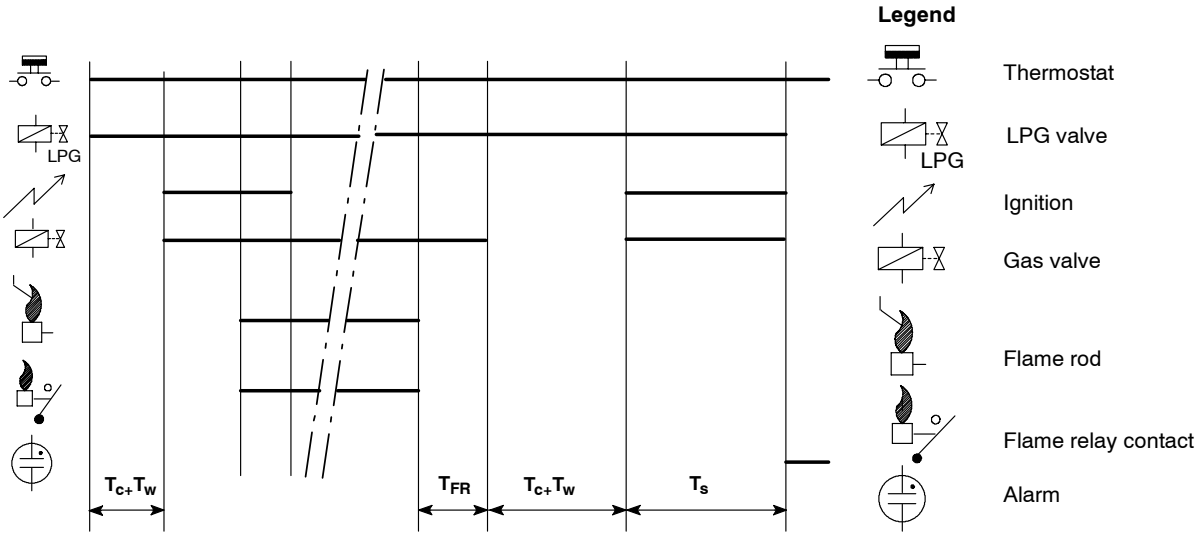


Fig. 19. Functional diagram S4565BD, QD

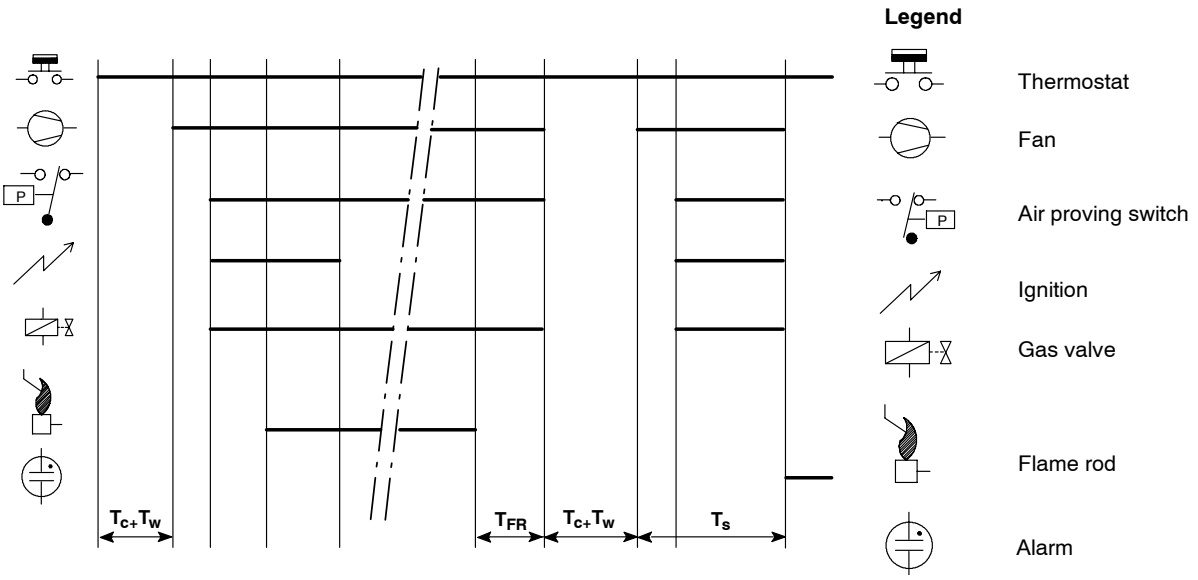


Fig. 20. Functional diagram S4565CD, RD

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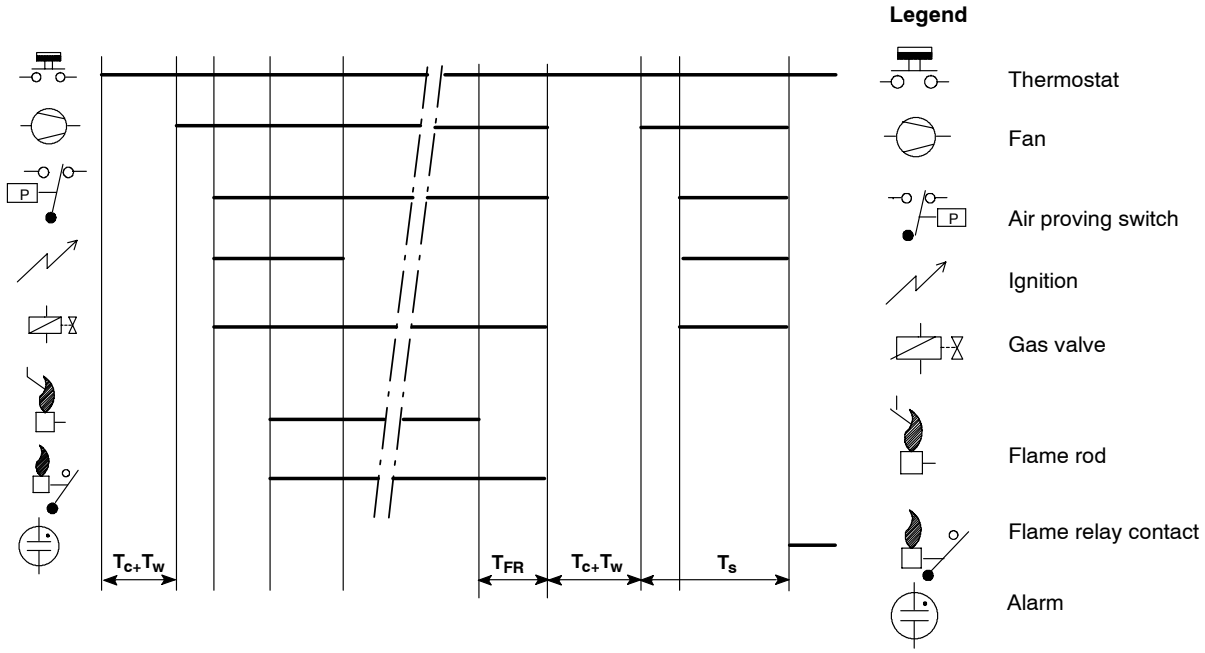


Fig. 21. Functional diagram S4565DD, TD

SPECIFICATIONS DIRECT BURNER IGNITION CONTROL S4565AD, BD, CD, DD, PD, QD, RD, SD, TD "2000" SERIES

Model
Suffix AD: atmospheric, direct burner ignition
Suffix BD: as AD but with flame relay output
Suffix CD: fan assisted, direct burner ignition
Suffix DD: as CD but with flame relay output
Suffix PD: as AD except volatile lock-out
Suffix QD: as BD except volatile lock-out
Suffix RD: as CD except volatile lock-out
Suffix SD: ignition circuit and rectifier only
Suffix TD: as DD except volatile lock-out

Supply voltage
230 ... 240 Vac, 50/60 Hz

Power consumption
4 VA

Humidity
90% RH max. at 40 °C

Ambient temperature
0 ... 60 °C
-15 ... 60 °C (optional)

Electrical rating (see also note 8.)
Alarm: 230 ... 240 Vac, 50/60 Hz, output max 1mA
(e.g. neon light with internal resistor > 150 kΩ)
Fan: 230 ... 240 Vac, 50/60 Hz, max 1 A, max cos φ > 0.6
Hour counter: 230 ... 240 Vac, 50/60 Hz, max 1 A, cos φ > 0.6
Flame relay contact: 230 ... 240 Vac, 50/60 Hz, max 1 A, cos φ > 0.6
Flame opto coupler: +5 V, 10 kΩ

Electrical connection
High voltage spark: 2.8 mm spade terminal
optional: 4 mm round terminal in spark to ground application
Flame sensing: 4.8 mm spade terminal
PCB connectors: Molex 3003 series suitable for Molex 3001 female cable connector

Housing (degree of protection)
See page 29

Timing (depending on O.S. number)
Self check time (T_c): 0 ... 2 s
Waiting time (T_w): 0 ... 30 s
Safety time (T_s): 3.5 ... 55 s
Extended spark ignition time: 0 ... T_s (dependent on elaps of safety time)

Flame sensing
Min flame current:
for optional phase independent systems: 0.5 µA
for phase dependent systems: 0.9 µA
Response time on: > 0.2 s
Response time off (T_{FR}): < 1 s
(optionally other values available)

Ignition
Spark voltage: > 12 kV at 40 pF load
Repetition rate: 2.5 ... 60 Hz (depending on O.S. number)
Max. spark gap: 3.5 mm

Length flame sensing cable
1 m max.

Length ignition cable
0.5 m max.

Length of wiring for external components
1 m max.

Remark
Optional integrated flame relay available with safe separation or opto coupler with safe separation.
N.C. contact of flame relay has no safe separation.

⚠ WARNING

Opto coupler interface needs a debounce time > 20 ms in order to prevent noise caused by transients on mains.

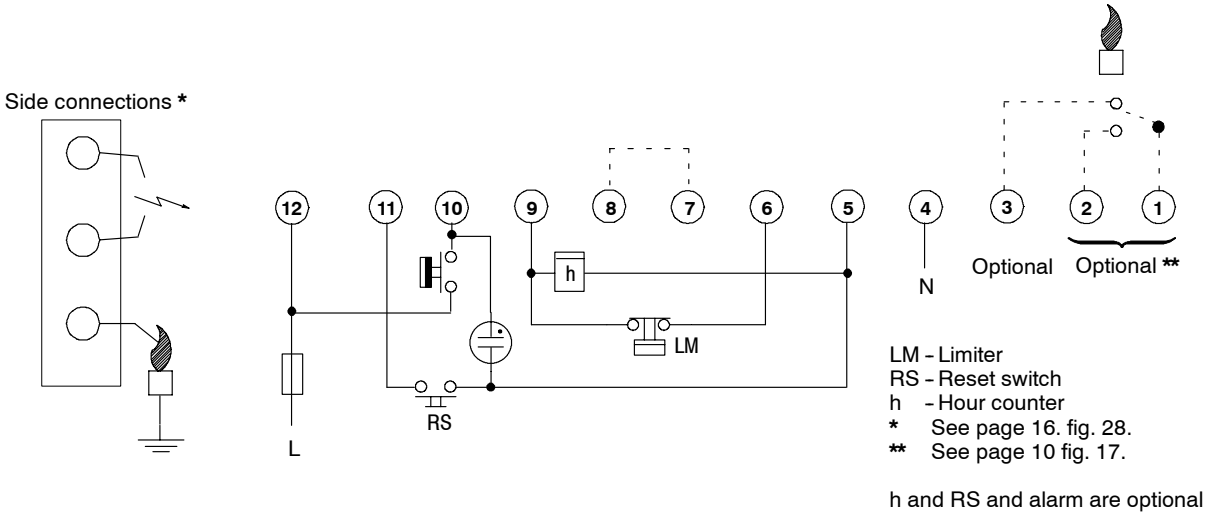


Fig. 22. Connection diagram S4565AD and BD “2000 “series

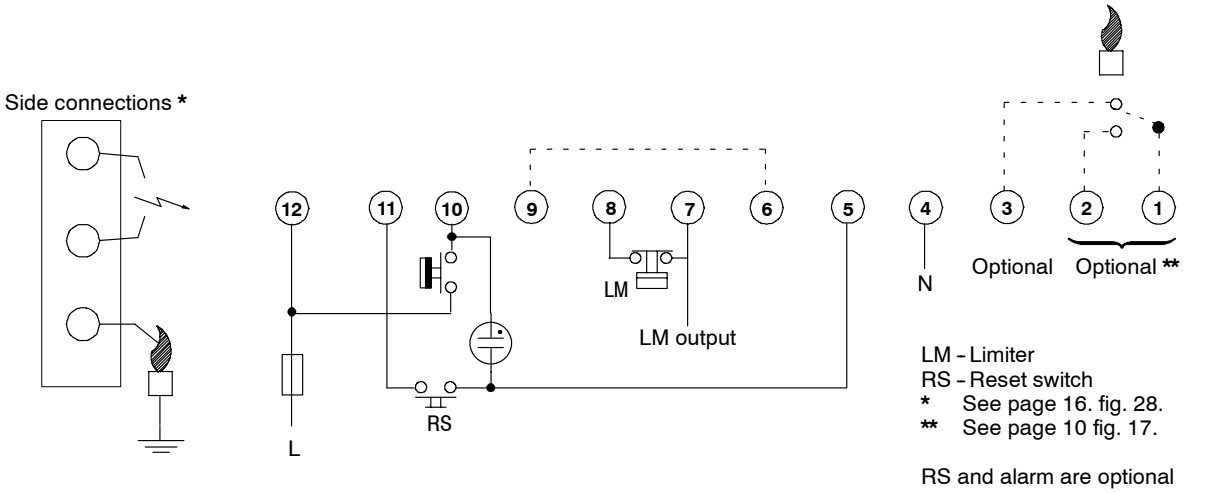


Fig. 23. Connection diagram S4565AD and BD “2000 “series (optional)

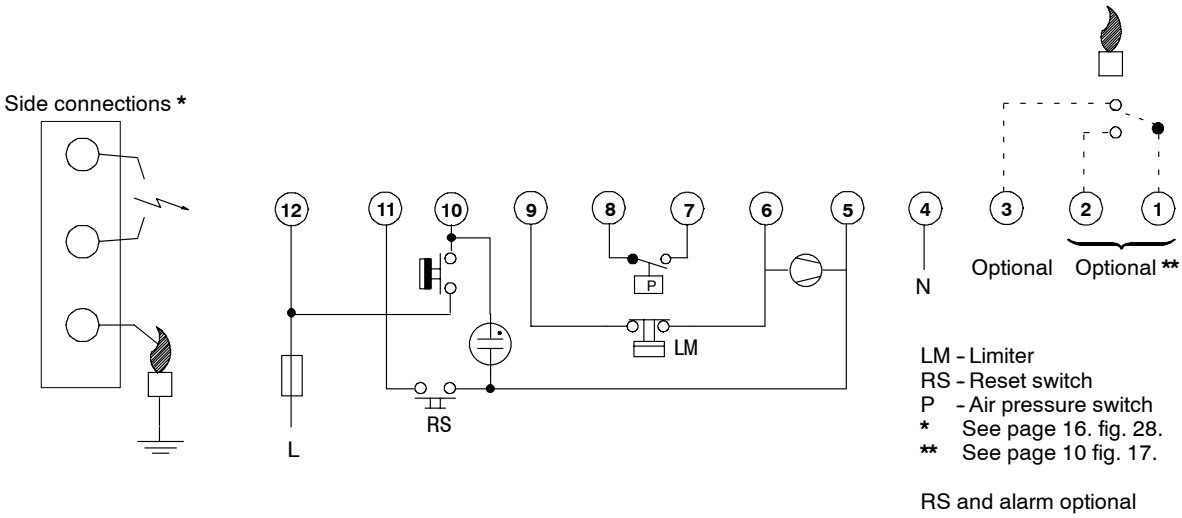


Fig. 24. Connection diagram S4565CD and DD “2000”series

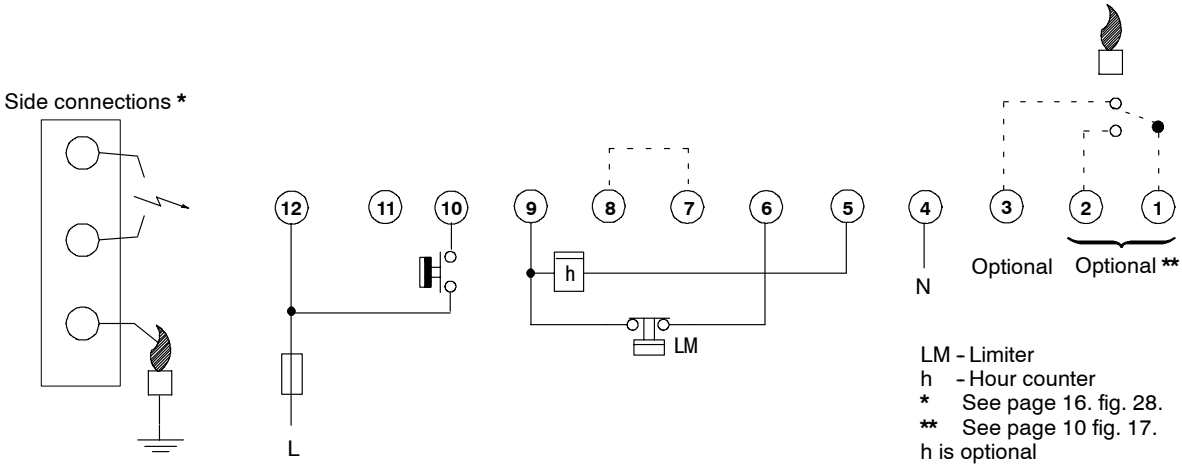


Fig. 25. Connection diagram S4565PD and QD “2000”series

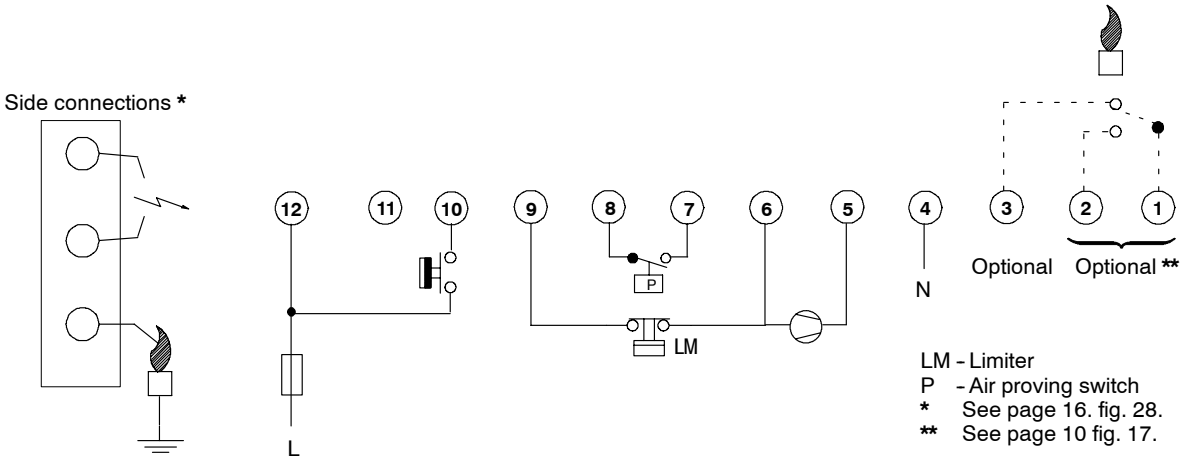


Fig. 26. Connection diagram S4565RD and TD “2000”series

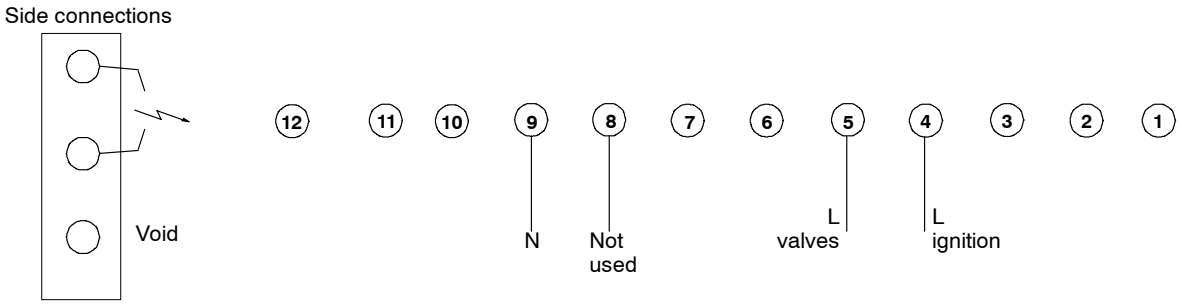


Fig. 27. Connection diagram S4565SD “2000” series

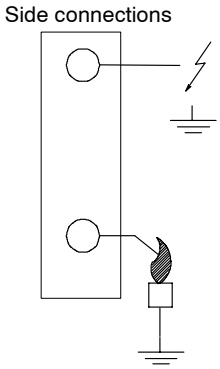


Fig. 28. Alternative side connection if sparking to ground

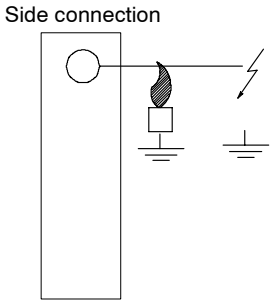


Fig. 29. Alternative side connection in case of single rod

SYSTEM OPERATION

General

The S4565AD, BD, CD, DD, PD, QD, RD, TD ignition control can provide both closed-loop sparking and sparking to ground.
The S4565SD ignition circuit and rectifier provides closed-loop sparking.

Lock-out reset

The S4565 can be is reset by either depressing the internal/external reset button (suffix AD, BD, CD and DD) or by interrupting the permanent life (suffix PD, QD, RD and TD).

NOTE 9.: If during normal use the reset button is pressed, the gas valves close and the S4565 starts a new sequence after releasing the reset button.

Suffix AD and PD (see fig. 30.)

When there is a call for heat a self check period (T_c) plus waiting period (T_w) elapse before the built-in igniter and gas valve are switched on.
The ignition spark ignites gas and resulting flame is detected by the flame rod.
After flame establishment a predetermined, extended ignition time can be included.
If flame is not established within the safety time (T_s), the S4565 ignition control locks out.
If the flame is lost during normal run, the S4565 ignition control repeats start sequence.

Suffix BD and QD (see fig. 31.)

As AD and PD except flame relay contact or opto is activated after flame detection.

NOTE 10.: The hour counter is energized when the valve is energized. It can be used as an output signal.

Suffix CD and RD (see fig. 32.)

When there is a call for heat, self check period (T_c) plus waiting period (T_w) elapse when the air proving switch is in the no air position.
After $T_c + T_w$ the fan starts running.
When sufficient air flow is proven by the air proving switch, the built-in igniter and gas valve are switched on.
The ignition spark ignites gas and resulting flame is detected by the flame rod.
After flame establishment a predetermined, extended ignition time can be included.
If flame is not established within the safety time (T_s), the S4565 ignition control locks out.
If the flame is lost during normal run, the S4565 ignition control repeats start sequence.

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If no air is proven by the air proving switch, the ignition control stays waiting (optional lock out on no air can be included).

Suffix DD and TD (see fig. 33.)

As CD and RD except flame relay contact or opto is activated after flame detection.

Suffix SD (see fig. 27.)

If line voltage is applied between pin 5 (line valves) and pin 9 (N), the gas valve is switched on.
If the line voltage is applied between pin 4 (line ignition) and pin 9 (N) the build in igniter is switched on.
The igniter circuit is fed during the negative half wave of the mains.

Pin 8 is present but not intended for use. It is connected with a resistor (100 Ω) to pin 5.
Ignition circuit must be on shorter than 10 s in an application with single ignition trial.

Gas/air application

For gas/air application without dynamic aircheck, the S4565AD, BD, PD or QD can be used.
In this application the fan is connected between pin 4 and 5 and will start when a call for heat is present. The waiting period now acts as a prepurge time.
When the call for heat disappears or when the ignition control goes in lock-out, the fan will be switched off.

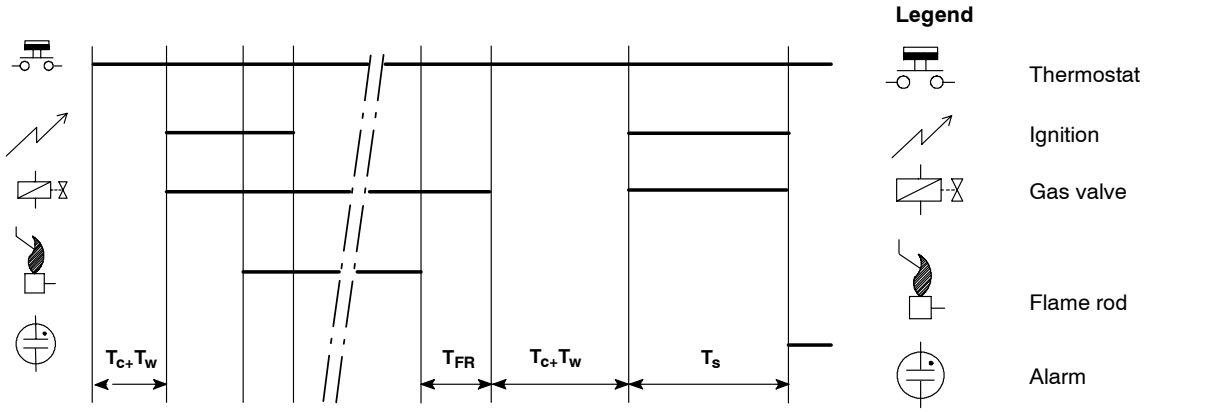


Fig. 30. Functional diagram S4565AD, PD “2000”series

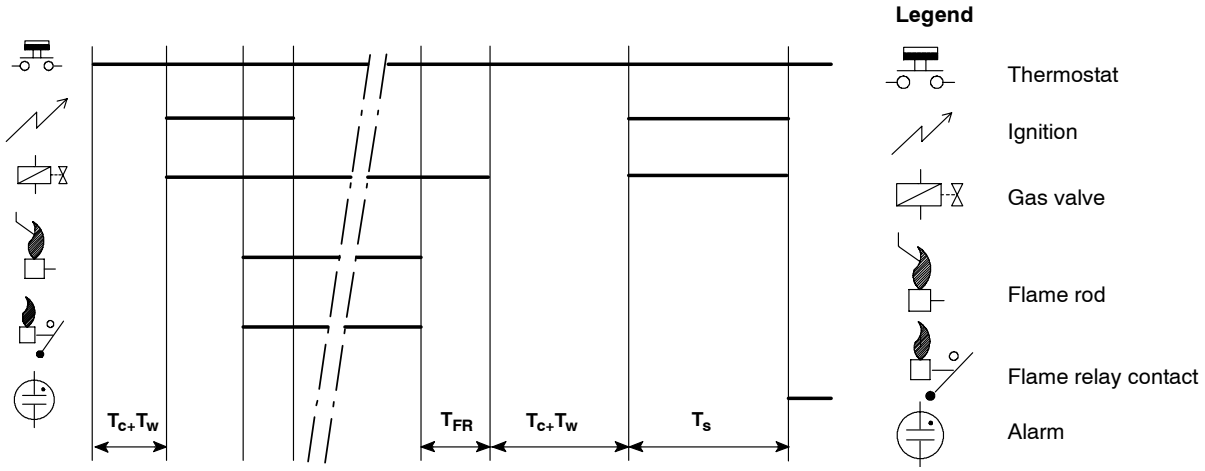


Fig. 31. Functional diagram S4565BD, QD “2000”series

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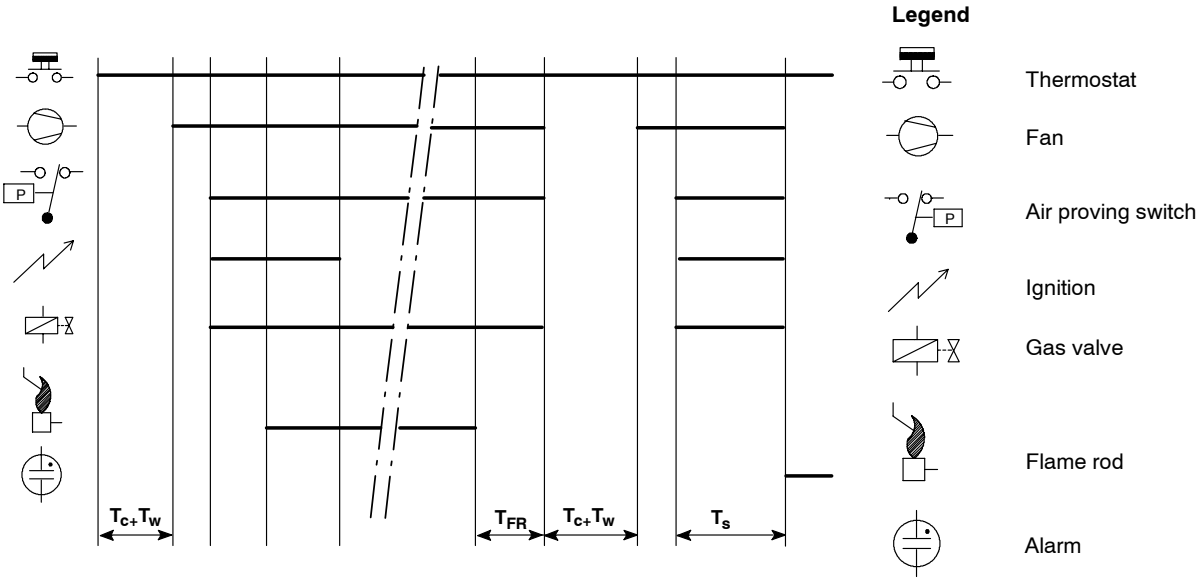


Fig. 32. Functional diagram S4565CD, RD “2000”series

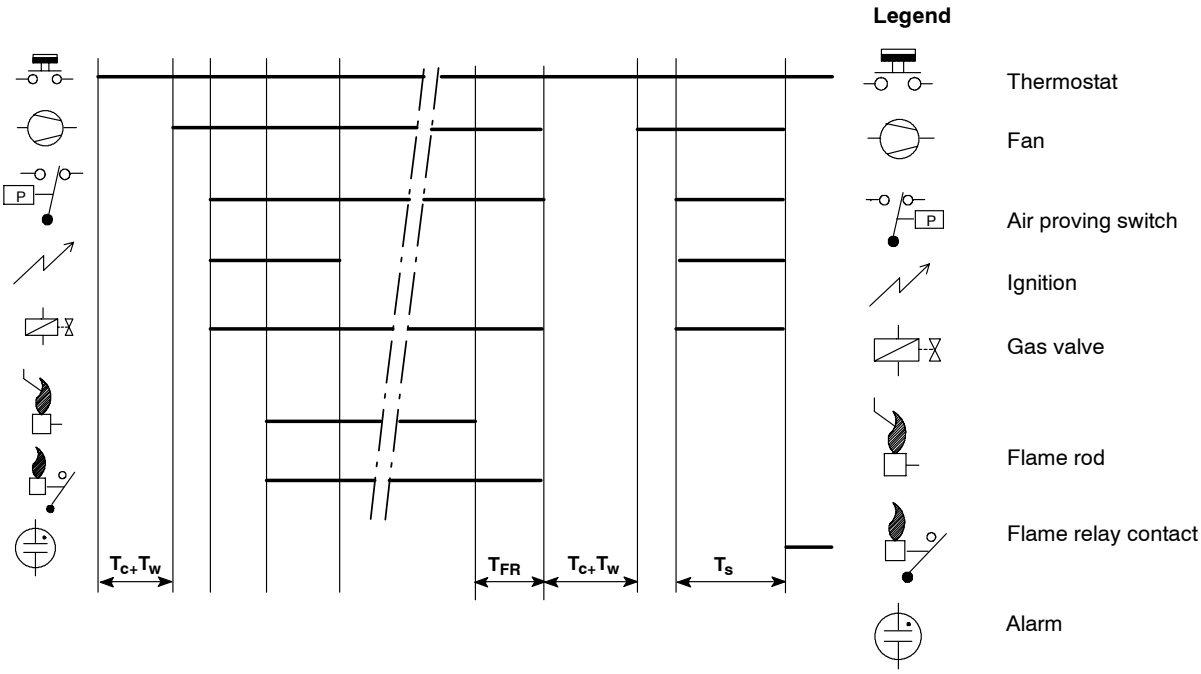


Fig. 33. Functional diagram S4565DD, TD “2000”series

SPECIFICATIONS IGNITION CONTROL S4565AF, BF, CF, DF, PF, QF, RF, TF

Model
Suffix AF: atmospheric, direct burner ignition
Suffix BF: atmospheric, intermittent pilot burner ignition including safety timer
Suffix CF: fan assisted, direct burner ignition
Suffix DF: fan assisted, intermittent pilot burner ignition including safety timer
Suffix PF: as AF except volatile lock-out
Suffix QF: as BF except volatile lock-out
Suffix RF: as CF except volatile lock-out
Suffix TF: as DF except volatile lock-out

Supply voltage
220 ... 240 Vac, 50/60 Hz

Power consumption
4 VA

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Humidity
90% RH max. at 40 °C

Ambient temperature
0 ... 60 °C
-15 ... 60 °C (optional)

Electrical rating (see also note 12.)
Alarm: 220 ... 240 Vac, 50/60 Hz, 1 A, cos φ > 0.6 or max 1mA
Fan: 220 ... 240 Vac, 50/60 Hz, 1 A, cos φ > 0.6
LPG outdoor valve: 220 ... 240 Vac, 50/60 Hz, 1 A, cos φ > 0.6

Electrical connection
High voltage spark: 2.8 mm spade terminal
Optional: 4 mm round terminal
Flame sensing: 4.8 mm spade terminal or 2.8 mm spade terminal for combined high voltage spark/flame sensing
PCB connectors: Molex 3003 series suitable for Molex 3001 female cable connector

Housing (degree of protection)
See page 29

Timing (depending on O.S. number)
Self check time (T_c): 1.5 s
Waiting time (T_w): 0 ... 30 s
Safety time (T_s): 3.5 ... 55 s
Extended spark ignition time and stabilisation time: 0 ... T_s (dependent on elaps of safety time)

External main burner interrupt
Max open contact voltage 24 V, max current 15 mA
A low voltage relay is suitable.
An opto coupler e.g. CNY17-3 is also possible
A flame indicating series LED (see connection diagram) will conduct min 0.85 mA if the contact is open and minimal 3.5 mA if the contact is closed.

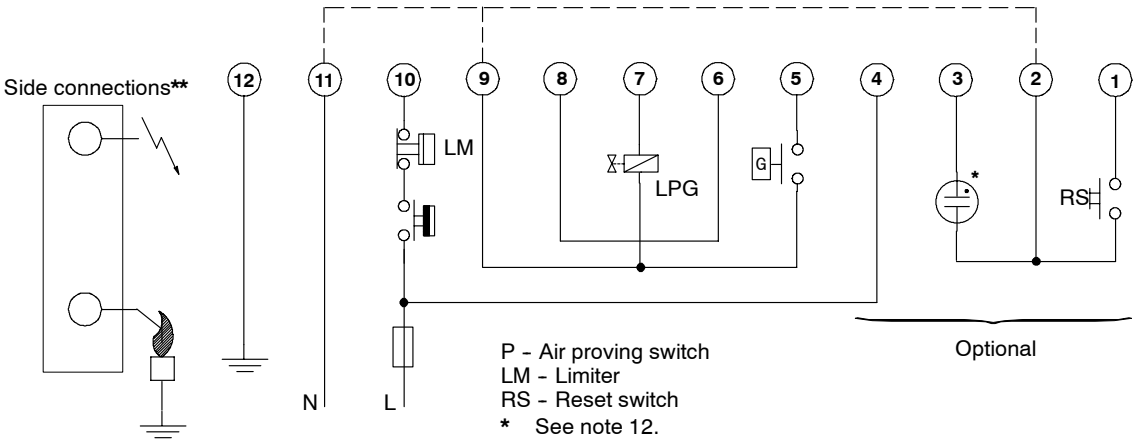
Flame sensing
Min flame current: 0.9 µA
Response time on: > 0.2 s
Response time off (T_{FR}) : < 1 s

Ignition
Spark voltage: > 12 kV at 40 pF load
Repetition rate: 2.5 ... 60 Hz (depending on O.S. number)
Max spark gap: 3.5 mm

Length flame sensing cable
1 m max.

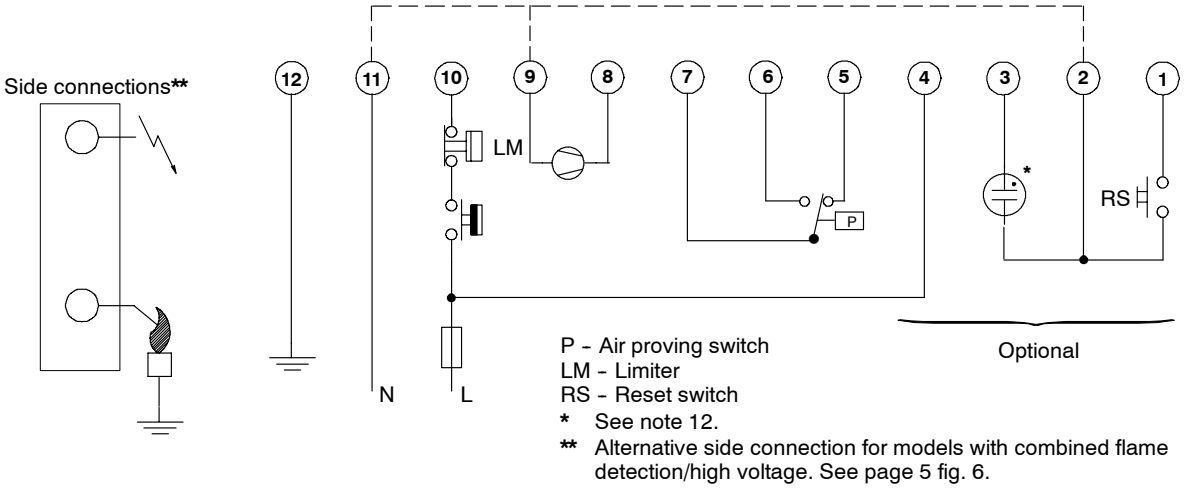
Length ignition cable
0.5 m max.

Length of wiring for external components
1 m max.



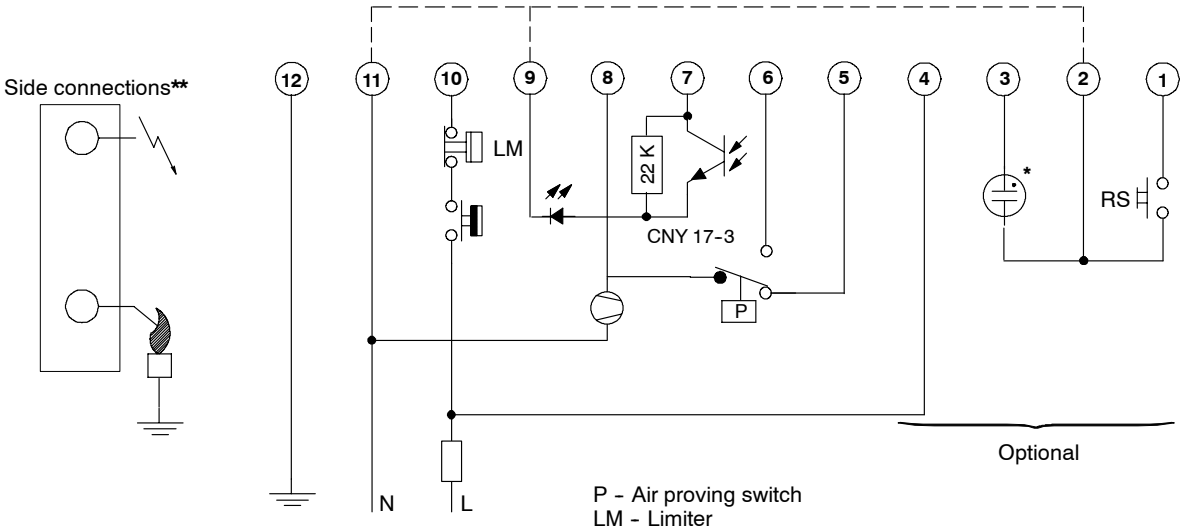
P - Air proving switch
LM - Limiter
RS - Reset switch
* See note 12.
** Alternative side connection for models with combined flame detection/high voltage. See page 5 fig. 6.

Fig. 34. Connection diagram S4565AF, BF, PF, QF



P - Air proving switch
LM - Limiter
RS - Reset switch
* See note 12.
** Alternative side connection for models with combined flame detection/high voltage. See page 5 fig. 6.

Fig. 35. Connection diagram S4565CF, DF, RF, TF



P - Air proving switch
LM - Limiter
RS - Reset switch
* See note 12.
** Alternative side connection for models with combined flame detection/high voltage. See page 5 fig. 6.

Fig. 36. Connection diagram S4565DF, TF with external main burner interrupt

SYSTEM OPERATION

General

Lock-out reset

The S4565 can be is reset by either depressing the internal/external reset button (suffix AF, BF, CF and DF) or by interrupting the permanent life (suffix PF, QF, RF, and TF).

NOTE 11.: If during normal use the reset button is pressed, the gas valves close and the S4565 ignition control starts a new sequence after releasing the reset button.

NOTE 12.: If permanent alarm output:
neon indicator with integral resistor >150 kΩ (max 1 mA)

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NOTE 13.: If an external LPG valve and gas pressure switch are connected, the LPG valve is energized after call for heat.
The ignition control stays in waiting mode, until the gas pressure switch is closed.
If during normal operation the gas pressure switch opens, the gas valves will not be closed.

Suffix AF and PF (see fig. 37.)
When there is a call for heat a self check period (T_c) plus waiting period (T_w) elapses before built-in igniter and gas valve are switched on.
The ignition spark ignites gas and resulting flame is detected by the flame rod.
After flame establishment a predetermined, extended ignition time can be included.
If flame is not established within the safety time (T_s), the S4565 ignition control locks out.
If the flame is lost during normal run, the S4565 ignition control repeats start sequence.

Suffix BF and QF (see fig. 38.)
When there is a call for heat a self check period (T_c) plus waiting period (T_w) elapses before built-in igniter and pilot gas valve are switched on.
The ignition spark ignites pilot gas and resulting flame is detected by the flame rod.
After flame establishment a predetermined, extended ignition time can be included then the main valve is switched on.
If flame is not established within the safety time (T_s), the S4565 ignition control locks out.
If the flame is lost during normal run, the S4565 ignition control repeats start sequence.

Suffix CF and RF (see fig. 39.)
When there is a call for heat the fan starts running through the no air position of the air proving switch after a self check period (T_c) plus waiting period (T_w).
When sufficient air flow is proven by the air proving switch, the built-in igniter and gas valve are switched on.
The ignition spark ignites gas and resulting flame is detected by the flame rod.
Ignition is switched off after a predetermined extended ignition time and flame establishment.
If flame is not established within the safety time (T_s), the S4565 ignition control locks out.
If the flame is lost during normal run, the S4565 ignition control repeats start sequence.
If no air is proven by the air proving switch within the safety time (T_s), the ignition control locks out.

Suffix DF and TF (see fig. 40.)
When there is a call for heat the fan starts running through the no air position of the air proving switch after a self check period (T_c) plus waiting period (T_w).
When sufficient air flow is proven by the air proving switch, the built-in igniter and pilot gas valve are switched on.
The ignition spark ignites pilot gas and resulting flame is detected by the flame rod.
Ignition is switched off after a predetermined extended ignition time (T_{ext})and flame establishment and then the main valve is switched on.
If flame is not established within the safety time (T_s), the S4565 ignition control locks out.
If the flame is lost during normal run, the S4565 ignition control repeats start sequence.
If no air is proven by the air proving switch within the safety time (T_s), the ignition control locks out.
If the internal main burner interrupt is activated (relay contact opened or opto transistor de-activated) the main valve drops off, but the pilot flame stays present.

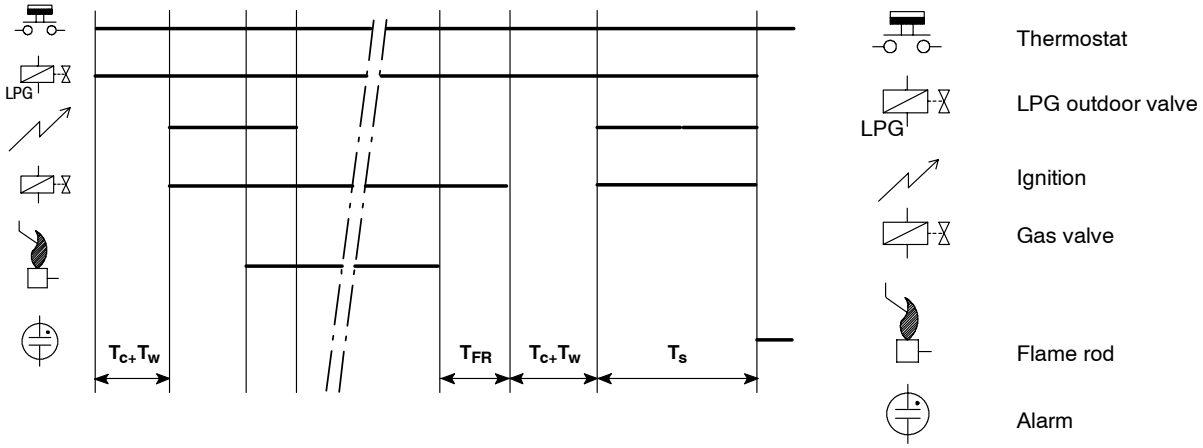


Fig. 37. Functional diagram S4565AF, PF

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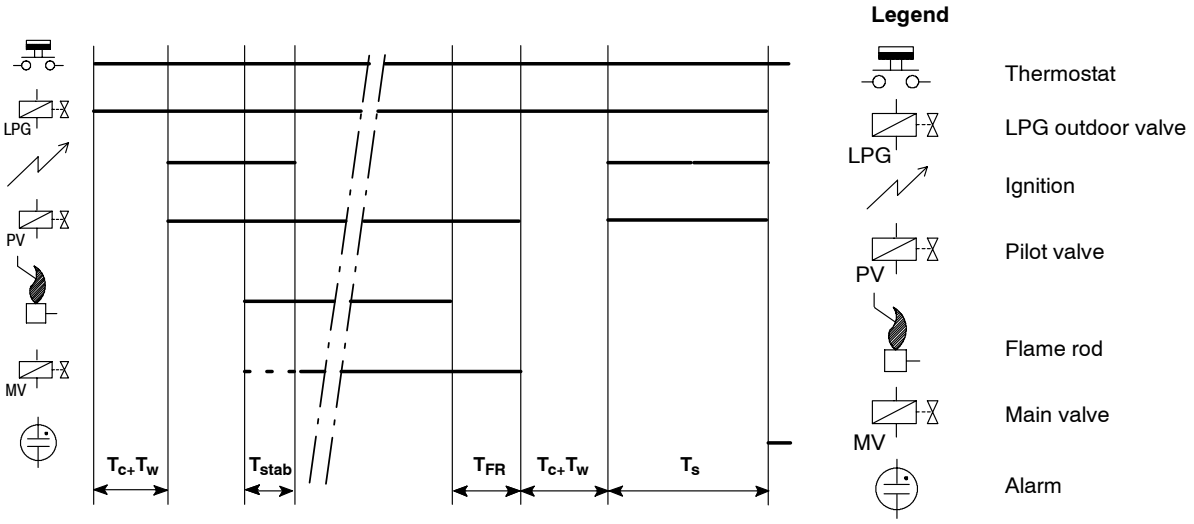


Fig. 38. Functional diagram S4565BF, QF

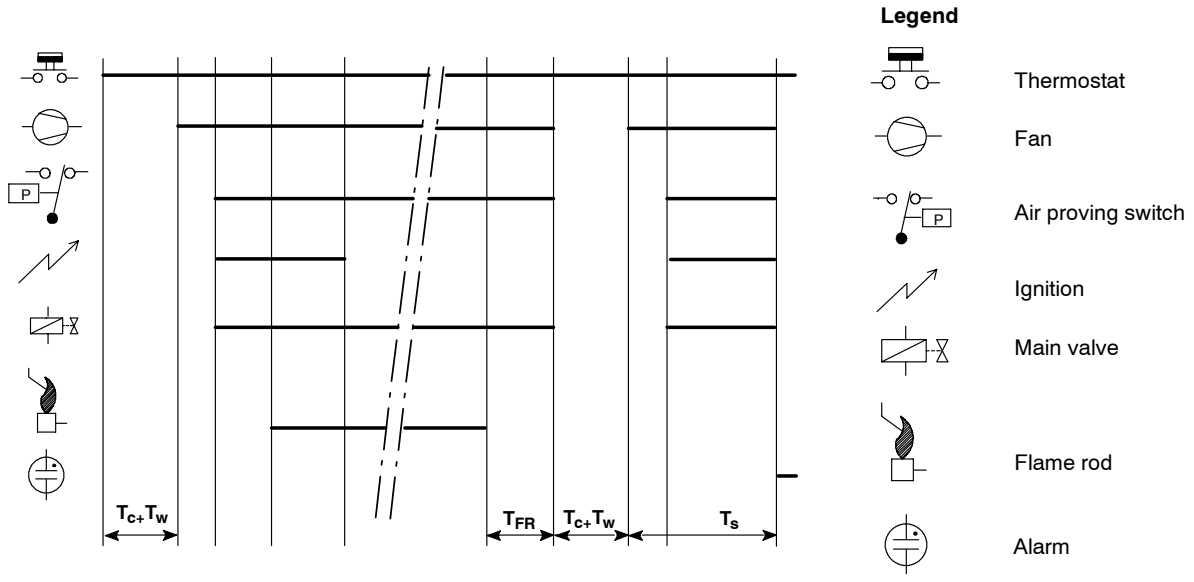


Fig. 39. Functional diagram S4565CF, RF

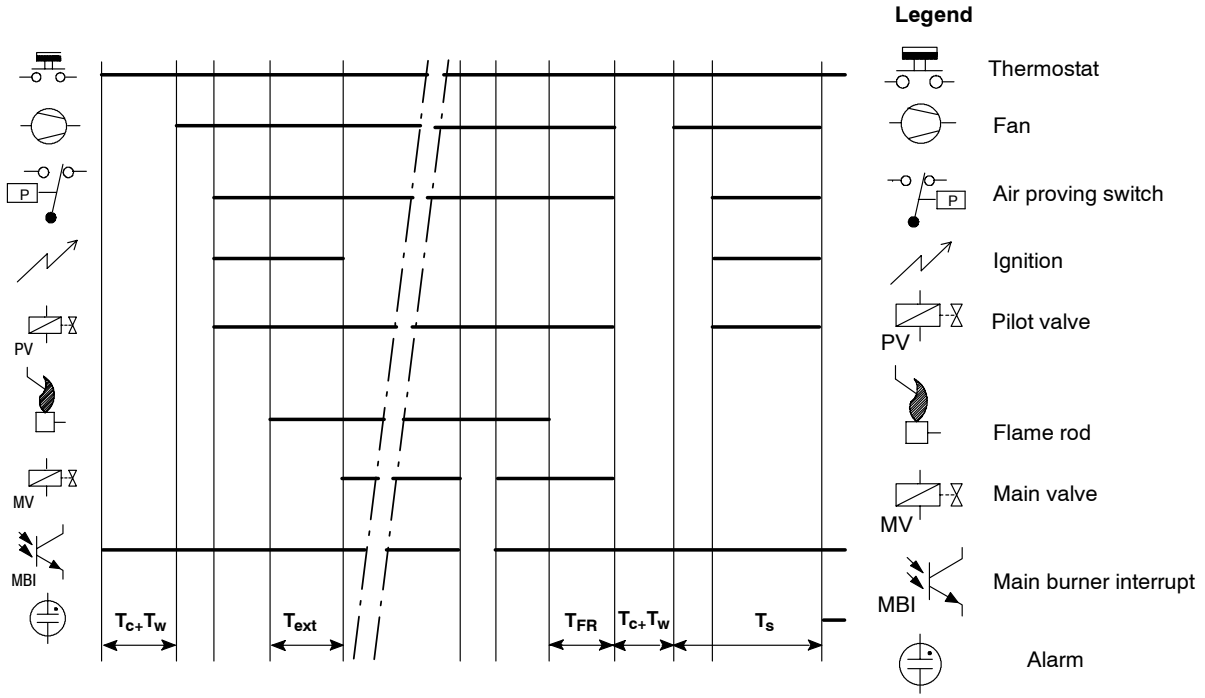


Fig. 40. Functional diagram S4565DF, TF

SPECIFICATIONS DIRECT BURNER IGNITION CONTROL S4575A, B, P, Q

Model
Suffix A: atmospheric, direct burner ignition
Suffix B: as A but with flame relay output
Suffix P: as A except volatile lock-out
Suffix Q: as B except volatile lock-out

Supply voltage
230 ... 240 Vac, 50/60 Hz (-15%, +10%)

Power consumption
4 VA

Humidity
90% RH max. at 40 °C

Ambient temperature
0 ... 60 °C
-15 ... 60 °C (optional)

Electrical rating
Alarm: 230 ... 240 Vac, 50/60 Hz, max 1 mA
Fan: 230 ... 240 Vac, 50/60 Hz, 1 A, cos φ > 0.6
Flame relay contact: 230 ... 240 Vac, 50/60 Hz, 1 A, cos φ > 0.6
Flame opto coupler: +5 V, 10 kΩ

Electrical connection
Hot surface ignition relay: 2.8 mm spade terminal
Flame sensing: 4.8 mm spade terminal
PCB connectors: Molex 3003 series suitable for Molex 3001 female cable connector

Housing (degree of protection)
See page 29

Timing (depending on O.S. number)
Self check time (T_c): 1.5 s
Glowing time (T_g): 0 ... 30 s
Safety time (T_s): 3.5 ... 25 s
Extended ignition time: 0 ... T_s (dependent on elaps of safety time)

Flame sensing
Min flame current:
for optional phase independent versions: 0.5 µA
for phase dependent versions: 0.9 µA
Response time on: > 0.2 s
Response time off (T_{FR}): < 1 s

Hot surface ignition relay
Free contact: 230 ... 240 Vac, 2 A, cos φ = 1
24 Vac, 2 A, cos φ = 1
120 Vac, 2 A, cos φ = 1

⚠ WARNING

Hot **S**urface **I**gniter (HSI) needs to be supplied from a floating winding of a transformer in order to quarantee reliable flame detection.

Length flame sensing cable
1 m max.

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Length of wiring for external components
1 m max.

Remark
Optional integrated flame relay available with safe separation or opto coupler with safe separation.
N.C. contact of flame relay has no safe separation.

⚠ WARNING

Opto coupler interface needs a debounce time > 20 ms in order to prevent noise caused by transients on mains.

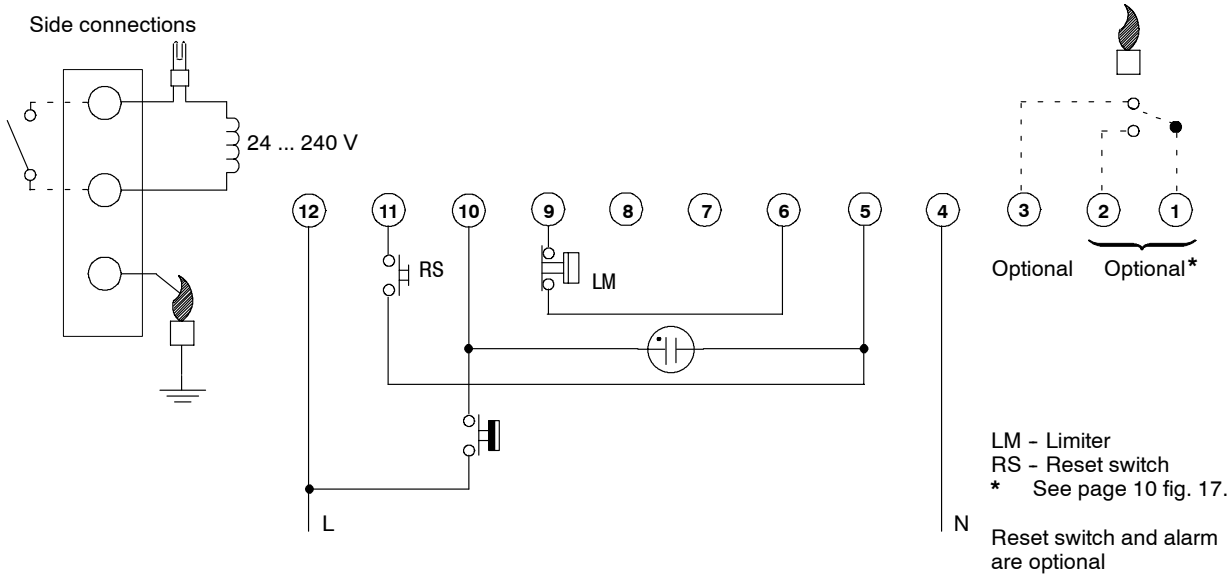


Fig. 41. Connection diagram S4575A, B, P and Q

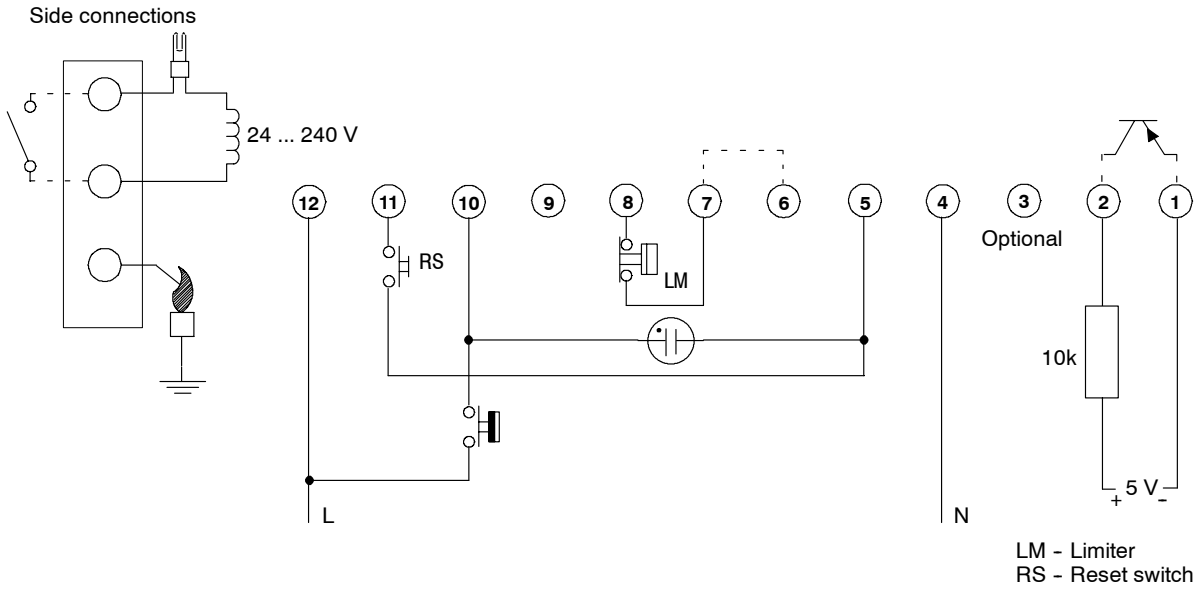


Fig. 42. Connection diagram S4575B 1009

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SYSTEM OPERATION

General

The S4575A, B, P, Q ignition controls can provide hot surface ignition.
The **H**ot **S**urface **I**gniter (HSI is connected to a floating winding of a transformer (see fig 41., 42.).

Lock-out reset

The S4575 can be is reset by either depressing the internal/external reset button (suffix A and B) or by interrupting the permanent life (suffix P and Q).

NOTE 14.: If during normal use the reset button is pressed, the gas valves close and the S4575 ignition control starts a new sequence after releasing the reset button.

NOTE 15.: If permanent alarm output: neon indicator with integral resistor >150 kΩ (max 1 mA)

Suffix A and P (see fig. 43.)

When there is a call for heat the HSI starts glowing during glowing time (T_g).
After the glowing time (T_g) the gas valve is switched on.
The igniter ignites gas and resulting flame is detected by the flame rod.
After flame establishment a predetermined, extended ignition time can be included.
If flame is not established within the safety time (T_s), the S4575 ignition control locks out.
If the flame is lost during normal run, the S4575 ignition control repeats start sequence.

Suffix B and Q (see fig. 44.)

As suffix A and suffix P except flame relay contact is closed after flame detection.

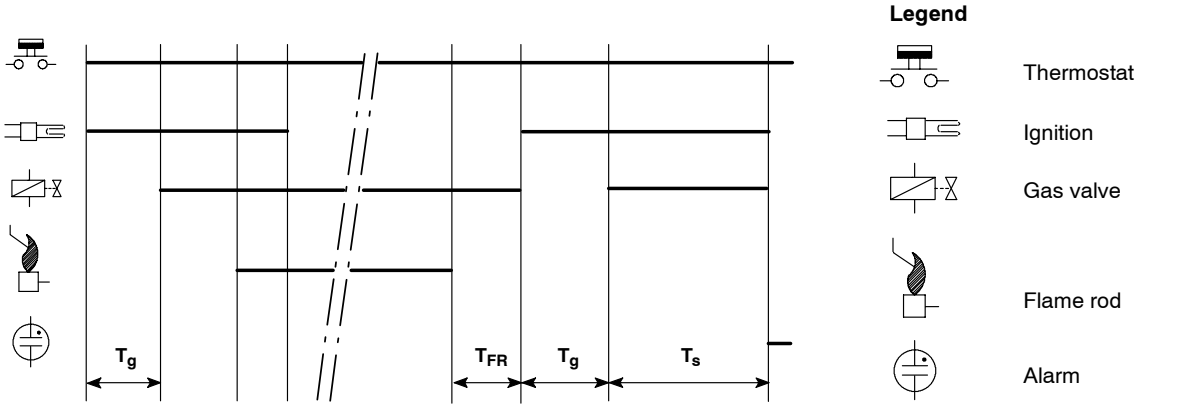


Fig. 43. Functional diagram S4575A, P

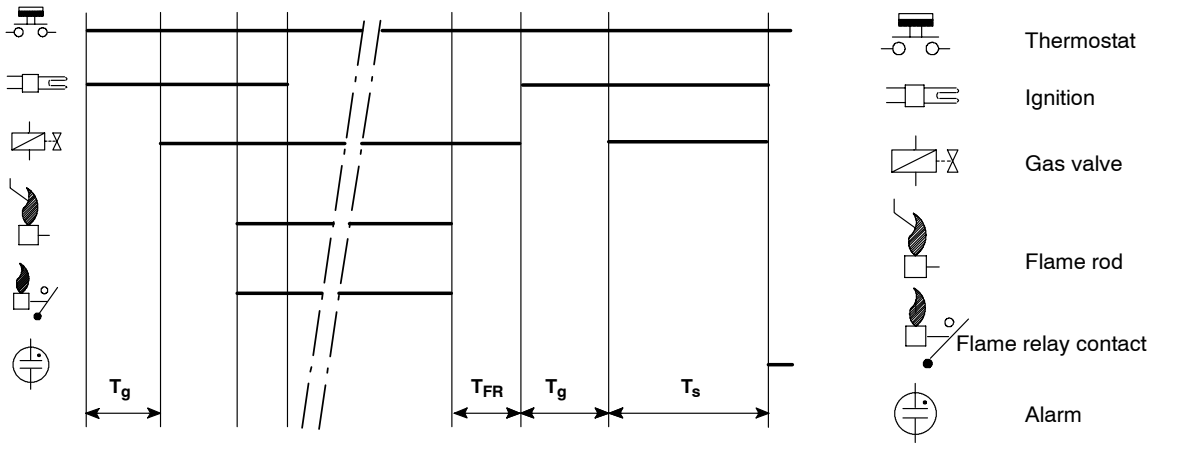


Fig. 44. Functional diagram S4575B, Q

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SPECIFICATIONS INTERMITTENT PILOT IGNITION CONTROL S4585D

Model
Suffix D: fan assisted, intermittent pilot burner ignition

Supply voltage
220 ... 240 Vac, 50/60 Hz

Power consumption
4 VA

Humidity
90% RH max. at 40 °C non condensing

Ambient temperature
0 ... 60 °C

Electrical rating
Fan: 220 ... 240 Vac, 50/60 Hz, 1 A, cos φ > 0.6
No flame indicator: 220 ... 240 V, 1 mA max

Electrical connection
High voltage spark/flame sensing single rod:
2.8 x 0.5 mm spade terminal
PCB connectors:
Molex 3003 series suitable for Molex 3001 female cable connector

Housing (degree of protection)
See page 29

Timing (depending of O.S. number)
Self check time (T_c): 1.5 s
Safety time (T_s): infinite

Flame sensing
Min flame current: 1.0 μA
Response time on: > 0.2 s
Response time off (T_{FR}): < 1.0 s
Phase-Phase mains trafo input: 220 ... 240 > 0.1 VA

Ignition
Spark voltage: > 12 kV at 40 pF load
Repetition rate: 1 ... 4 Hz
Max spark gap: 3.5 mm

Length ignition and flame sensing cable
0.5 m max.

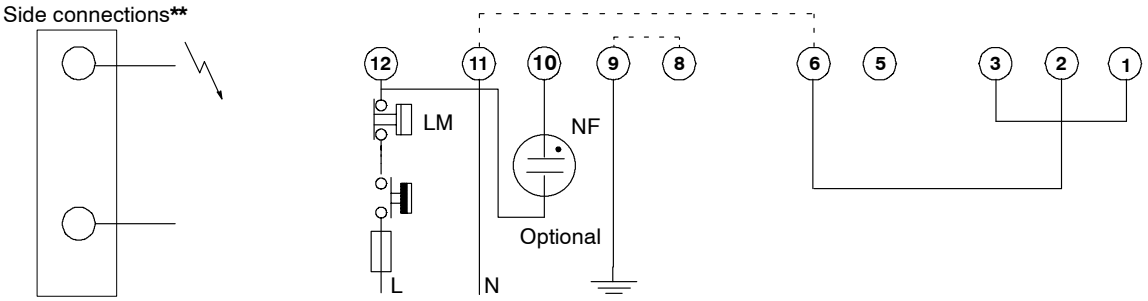
Length of wiring for external components
1 m max.

Recommended flame sensor
Q371/Q385 "2000 series"/Q389/Q395 intermittent ignition pilot burner

Maximum pilot burner output
250 Watt

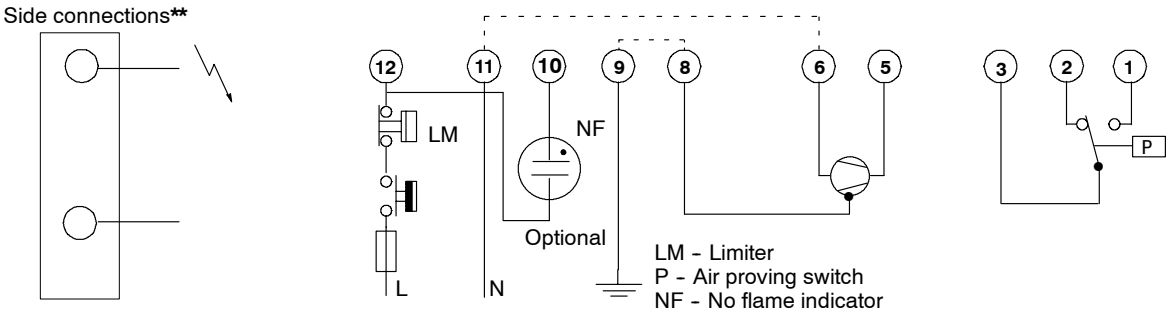
No flame indicator
Required impedance: > 100 kΩ

No flame indication time
T_{NF}: > 10 s



LM - Limiter
NF - No flame indicator
** Alternative side connection for models with combined flame detection/high voltage. See page 5 fig. 6.

Fig. 45. Connection diagram S4585D wired up in atmospheric application



LM - Limiter
P - Air proving switch
NF - No flame indicator
** Alternative side connection for models with combined flame detection/high voltage. See page 5 fig. 6.

Fig. 46. Connection diagram S4585D wired up in fan assisted application

SYSTEM OPERATION

Atmospheric ignition control S4585D (see fig. 47.)
After false flame check during self check time (T_c) a built-in igniter and pilot gas valve are switched on.
The ignition spark ignites gas and resulting flame is detected by the combined flame/ignition rod.
Ignition is switched off immediately after flame is established and main gas valve is switched on.
If the flame is lost during normal run, the main gas valve is closed and re-ignition of pilot occurs.

Fan assisted ignition control S4585D (see fig. 47.)
When there is a call for heat, fan is energized through no air position of air proving switch after self check time (T_c).
When sufficient air flow is proven by air proving switch, a built-in igniter and pilot gas valve are switched on.
The ignition spark ignites gas and resulting flame is detected by the combined flame/ignition rod.
Ignition is switched off immediately after flame is established and main gas valve is switched on.
If air flow is not proven by air proving switch ignition control will remain in a waiting mode with fan energized.
If the flame is lost during normal run, the main gas valve is closed and re-ignition of pilot occurs.

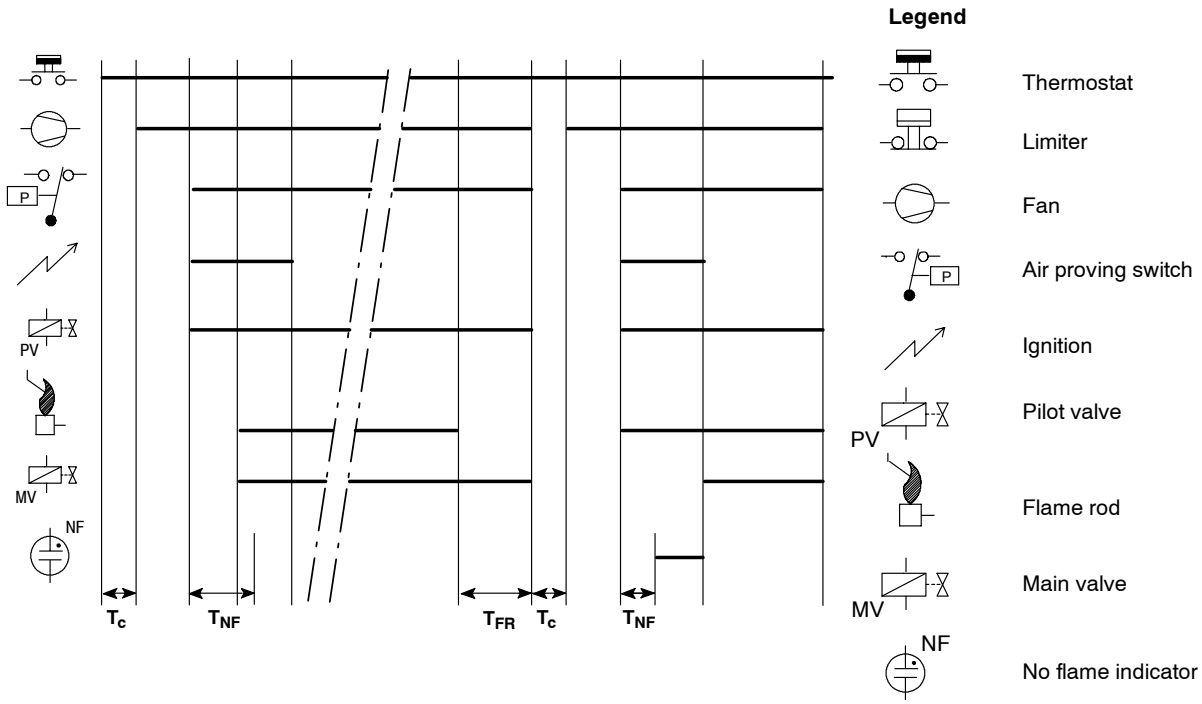


Fig. 47. Functional diagram S4585D

GENERAL CONSIDERATIONS

To ensure reliable long term operation, mount ignition control at a position in the appliance with a low ambient temperature and a low radiation.
High temperatures will affect product life.

To suppress Radio Interferency Interference (RFI) the ignition control including spark igniter cabling should be mounted in sufficient shielded environment.

NOTE 16.: When first starting, the control can be in the lock-out condition; reset the ignition control. If a first reset is not succesful, wait at least 15 seconds before attempting another one. After a reset an extended waiting time will occur.

NOTE 17.: Electrical rating of connected controls and air proving switch should be appropriate for the load that is switched by the ignition control.

NOTE 18.: Power interruptions will cause program restart.

NOTE 19.: The flame connection pin of all types is protected against electrical schock gas pressure switch as mentioned in this instruction sheet is a functional device.

NOTE 20.: If the S4565 ignition control incorporates an EMC filter, disconnect the ignition control from mains before performing a dielectric strength test.

No flame indication
If no flame indication is built in, the indicator ligths up if there is no flame detection within the no flame indication (T_{NF}) period.

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ELECTRICAL CONNECTIONS AND WIRING

⚠ WARNING

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

IMPORTANT

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

Wiring must be in accordance with local regulations.

The appliance manufacturer's instructions should always be followed when provided. If such instructions are not provided see the connection diagrams for typical systems.

Before installing or replacing any control check that type number is correct for the application.

Ensure combustion chamber is free of gas before start up.

Conduct a thorough check out when installation is completed.

At the first start the ignition control can be in lock out; depress reset button to free control.

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

⚠ CAUTION

Do not connect the ignition control to power supply when it is not connected to the gas control.

Wiring

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

⚠ CAUTION

If ignition frequency ⩾ 25 Hz or pulse energy > 45 µAs the ignition cable and its connections shall have a protection against electrical shock hazard.
For single rod applications, the ignition/sensing cable and its connections shall have protection against electrical shock hazard.
Label all wires prior to disconnection when servicing ignition controls. Wiring errors can cause improper and dangerous operation.
If electronics components are installed in an area subject to water (dripping, spraying, rain etc.), means shall be provided to protect these components.
Flame relay output is not accessible when the normally closed output is present.

Assembling of the cable connector(s) and cover (see fig. 48.)

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

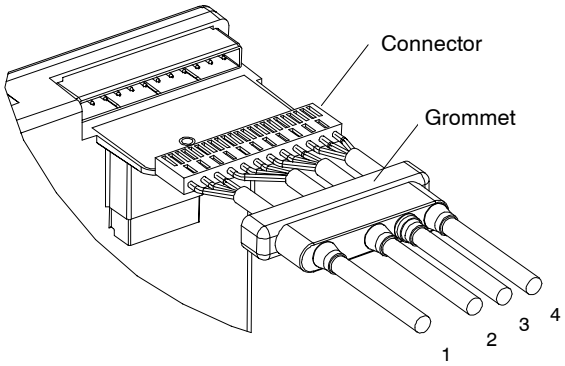


Fig. 48.

Assembly of strain relief for IP 44 protection (see fig. 49.)

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

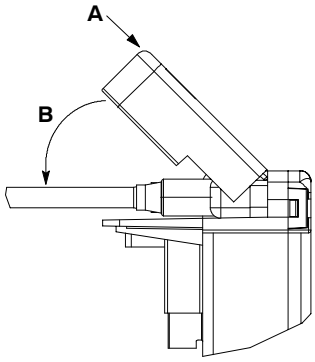


Fig. 49.

Fusing

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

Spark gap

Max. allowable spark gap 3.5 mm

Supply voltage polarity

⚠ WARNING

If ignition control (without the phase neutral independent operation feature) seems to operate normally but does not detect flame, check for right polarity of power supply (line, neutral).

Checking flame current

- The minimum value should be in accordance with specified value.
- To check flame current connect a DC micro-Ampèremeter between flame sensing wire and flame sensing rod.
- If flame current is insufficient check that flame sensing rod is fully enveloped by the flame and that burner is reliable grounded to the ignition control.
- If there is no sufficient flame current due to phase-phase mains it is recommended to use an ignition control with the phase neutral independent operation feature. If this is not available, it is recommended to use a AT7030A or AT7030B flame detection transformer. See also instruction sheet EN1R-9136 for the AT7030 transformer.

⚠ WARNING

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

FINAL CHECKOUT

Final checkout of the installation

Set appliance in operation after any adjustment and observe several complete cycles to ensure that all burner components function correctly.

- To check flame current connect a DC micro-Ampèremeter between flame sensing wire and flame sensing rod.
- If flame current is insufficient check that flame sensing rod is fully enveloped by the flame and that burner is reliable grounded to ignition control.
- If there is no sufficient flame current due to phase-phase mains it is recommended to use an ignition control with the phase-neutral independent operation feature. If this is not available, it is recommended to use an AT7030A or AT7030B flame detection transformer. See also instruction sheet EN1R-9136 for AT7030 transformer.

Housing (degree of protection)

New style housing (see fig. 1.)

Enclosure IP 20 (standard housing)

Use: strain relief set 45.900.440-001

Enclosure IP40

Use: cover set 45.900.431-004
cover set 45.900.431 -005
(flame retardant according to UL94-VO)
cable grommet ..... 45.900.442 -008

Enclosure IP 44 (only applicable for specific O.S. numbers)

Use: cover set 45.900.431-004
cover set 45.900.431 -005
(flame retardant according to UL94-VO)
cable grommet ..... 45.900.442 -008/009
sleeve 45.900.442-003
gasket 45.900.442-011

Old style housing (see fig. 2.)

Enclosure IP 20 (standard housing)

Enclosure IP30

Use: strain relief set 45.900.440-001
cover set (external reset) 45.900.401-044
cover set (internal reset) 45.900.401-045

Enclosure IP40

Use: strain relief set 45.900.440-001
cover set (external reset) 45.900.401-044
cover set (internal reset) 45.900.401-045
grommet ..... 45.900.442 -001 and -002
(depending on application and number of cables)

Enclosure IP 44 (on request)

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