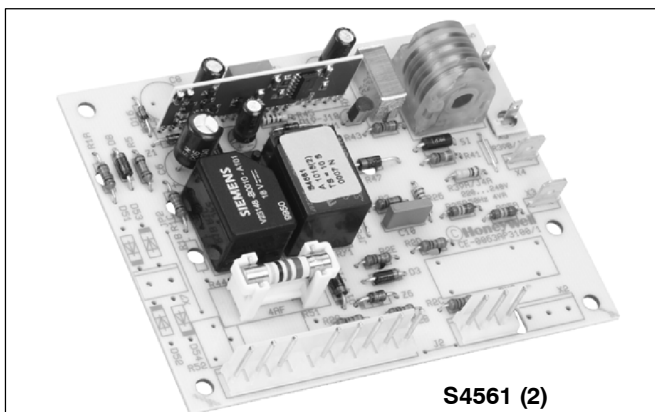


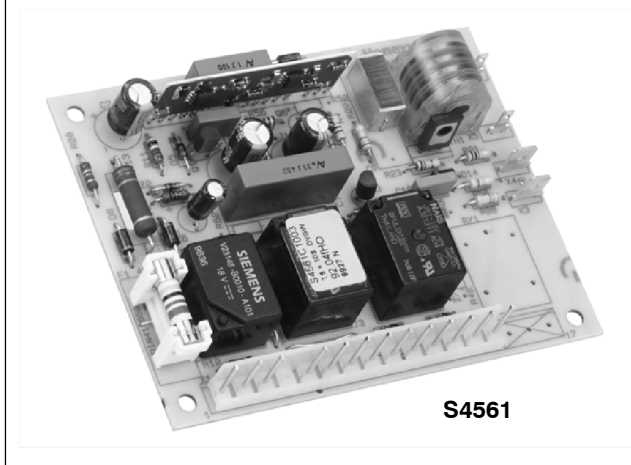
# S4561B, C, D and S4561A, B, P and Q (2)

## AUTOMATIC IGNITION CONTROL

### INSTRUCTION SHEET



S4561 (2)



S4561

- Full operating sequence after flame loss
- Volatile or non volatile lock out according EN 298
- Alarm signal without call for heat
- Protective impedance on flame rod

#### Optional

- Extended spark ignition
- Stabilisation time
- Potential free SPST or SPDT contact of flame indication relay for use in SELV circuits or in line voltage circuits
- External ignition circuit connector to the NC contact of the flame relay

## SPECIFICATIONS

#### Model

S4561: 220 ... 240 V, 4 VA, 50 Hz.

Suffix A: Ignition control module for atmospheric appliances. Non-volatile lock-out, manual reset in accordance with EN 298.

Suffix B: As suffix A except built in flame indication relay for modulating applications or external ignition circuit.

Suffix C: Ignition control module for fan assisted appliances. Non-volatile lock-out, manual reset in accordance with EN 298.

Suffix D: As suffix C except built in flame indication relay for modulating applications or external ignition circuit.

Suffix P: As suffix A except volatile lock-out. Reset possible by interrupting permanent phase connection

Suffix Q: As suffix B except volatile lock-out. Reset possible by interrupting permanent phase connection

#### Dimensions

See fig. 1., 3., 5., 7. and 9.

#### Ambient temperature

0 ... 60 °C

#### Relative humidity

90% max. at 40 °C (non condensing)

#### Supply voltage

Line voltage, 220 V (-15%) ... 240 V (+10%), 50 Hz ( $\pm 2$  Hz)

#### Power consumption

4 VA

#### Electrical rating

Valve output X<sub>1</sub>-pin 6: 1 A max.,  $\cos \varphi > 0.6$

Alarm output: 1 mA maximum

(e.g. neon light with internal resistor > 150 k $\Omega$ ) or 1 A,  
(depending on O.S. number)

Flame relay output: 1 A max.,  $\cos \varphi > 0.6$

## APPLICATION

The S4561C/D provides automatic ignition and control for fan assisted burners in accordance with EN 298.

The S4561A/B/P/Q provides automatic ignition and control for atmospheric burners in accordance with EN 298.

## FEATURES

- Flame supervision
- Built in 5 ... 50 Hz spark ignition
- External reset, alarm and high limit connection
- Factory set safety timer 0 ... 50 s
- Supply voltage of 220 ... 240 V

## Electrical Connection

High tension spark: 2.8 x 0.5 mm spade terminal.  
High tension ground: 2.8 x 0.5 mm spade terminal.  
Flame rod and ground: 6.3 mm spade terminal.  
Multiple connector: Molex 3001 series (see accessories)

## Timing

Waiting time ( $T_w$ ): 0 ... 30 s (depending on O.S. number)  
Self check time ( $T_c$ ): 2 s nominal  
Safety time ( $T_s$ ): 0 ... 50 s (depending on OS number)  
Extended spark ignition time ( $T_{ext}$ ):  
0 ...  $T_s$  seconds (depending on safety time)  
Stabilisation time ( $T_{stab}$ ):  
0 ...  $T_s$  seconds (depending on safety time)

## Flame sensing

Flame sensing is based on the rectification principle.  
Minimum flame current: 0.9  $\mu$ A  
Response time "ON" ( $T_{FR, on}$ ): < 200 ms  
Response time "OFF" at  $I_{Flame} = 2 \mu$ S ( $T_{FR, off}$ ): < 1 s

## Ignition

Integral electronic spark generator  
Spark voltage: > 15 kV at 40 pF load  
Repetition rate: 5 ... 50 Hz

## Cable length

Flame sensing: 1 m max.  
Ignition:  $1/2$  m max.  
Other peripherals: 1 m max.

## Fusing

Automatic ignition control should be externally fused to prevent damage to automatic ignition control, wiring or peripherals.  
External fuse max 16 A slow

## Recommended flame sensor

Q354 Flame sensor

## Recommended spark igniter

Q375 Spark igniter or flame sensor

## Recommended ignition circuit

S7030 Electronic ignition transformer

## Accessories (to be ordered separately)

High voltage ignition cable ( $1/2$  m) ..... 45.900.411-001  
Recommended multiple connectors **not** supplied by Honeywell.  
xx-pole connector ..... Molex ordernumber 10-01-1xx4  
Crimp terminal ..... Molex ordernumber 08-50-0106

# SYSTEM OPERATION

## S4561A (2), B (2), P (2) and Q (2) in atmospheric appliances.

### See fig. 1, 3, 5, 7 and 9.

When comfort control calls for heat, a self check time ( $T_c$ ) and a waiting period ( $T_w$ ) elapse before built in igniter and gas valve is switched on. Ignition spark ignites gas and resulting flame is detected by flame rod.

Ignition is switched off after the stabilisation time ( $T_{stab}$ ) (depending on elapsed safety time) and after flame is established.

When the flame is detected, the flame relay (if present) switches after the stabilisation time ( $T_{stab}$ ).

NOTE 1.: For S4561B (old version) stabilisation time ( $T_{stab}$ ) and extended ignition time ( $T_{ext}$ ) is not available.

If flame is not established within the safety time ( $T_s$ ), automatic ignition control locks-out.

If flame is lost during normal run, automatic ignition control repeats start sequence. See figure 2., 4., 6. and 10.

NOTE 2.: Power interruptions will cause program restart.

NOTE 3.: An external ignition circuit may be connected to connector  $X_2$  pin 1.

$X_2$  pin 2 must then be connected to  $X_{1a}$  pin 6.

## S4561C and D (old version) in fan assisted appliances.

### See fig. 13. and 14.

When there is a call for heat, fan is energized if air proven switch is in the "NO AIR" position.

When sufficient air flow is proven by the air proving switch, a prepurge period ( $T_p$ ) elapses before built in igniter or external igniter and gas valve is switched on.

Ignition spark ignites gas and resulting flame is detected by the flame rod.

Internal and if appropriate external ignition is switched off immediately.

If flame is not established within the safety time ( $T_s$ ) the automatic ignition control locks-out.

## Lock-out reset

The auto ignition control will be reset by depressing the reset button in the external wiring in case of suffix A, B (see fig. 1., 3., 5. and 7.) and in case of suffix P, Q reset can be performed by depressing the reset button or by interrupting the permanent phase (see fig. 9.)

If a first reset is not successful wait at least 15 seconds before making another reset attempt.

NOTE 4.: At first start the ignition control can be in lock-out; wait at least 15 seconds and depress reset button to free control.

NOTE 5.: After reset an extended waiting time will occur

# INSTALLATION

## IMPORTANT

*Installer must be a trained experienced service person.*

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

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

*Never use a type with a larger safety time for which the appliance is approved.*

*The appliance manufacturer's instructions should always be followed when provided.*

*Ensure combustion chamber is free of gas before start up.*

*At the first start the automatic ignition control can be in lock-out; reset to free control.*

*Conduct a thorough check out when installation is completed.*

## Mounting

The automatic ignition control should be mounted in an environment that provides a clean situation according EN 60730-1.

The board itself has protection class IP 00 and protection against electric shock must be provided by the appliance in which the control is installed.

### Mounting position

The automatic ignition control functions position independently.

### Spark gap

Refer to the appliance manufacturer's instructions for recommended ignition electrode position.  
Maximum allowable spark gap: 3.5 mm

### Wiring

- Use untinned female spade terminals for easier connection.
- Wiring must be in accordance with local regulations.
- Use leadwire which can withstand 105 °C ambient.
- Use leadwire which is proven against moisture.
- Wiring between automatic ignition control and spark sensing probe should have good quality insulation, suitable for the temperatures encountered.
- Maximum length of wiring for external components: 1 m
- Wiring between the automatic ignition control and the flame sensing probe must have a minimum isolation resistance to earth of 500 MΩ under all working conditions.
- Wiring between automatic ignition control and flame sensing probe must be one piece without means for interrupting.

### Supply voltage polarity



## WARNING

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

## CHECKOUT

### Checking flame current

- The minimum value should be 0.9 μA.
- To check flame current connect a DC micro-Ampèremeter between flame sensing wire and flame sensing rod.
- Meter connections polluted with e.g. alkaline substances lying close to earth can cause flame current simulation. Make sure no false flame current can flow from meter connections to earth.
- If flame current is insufficient, check that flame sensing rod is fully enclosed by the flame and that burner is reliable grounded to automatic ignition control.

### Flame indication relay

The flame indication relay SPST or SPDT can be used in SELV and in line voltage circuits.

The clearance and creepage distances are made in accordance with IEC 730 3<sup>rd</sup> edition.

The flame relay gives safe separation between coil and contacts.

NOTE 6.: If EN 60730 2<sup>nd</sup> edition is needed, SELV must be made with a SPST relay and a 2-pole connector for X<sub>2</sub>.

An SPDT relay is offered for line voltage circuits. In that case X<sub>2</sub> will be a 3-pole connector.

NOTE 7.: For an S4561 without internal ignition circuit, the flame relays is used to switch an external ignition circuit.

In such cases where the gasvalve X<sub>1a</sub> pin 6 is also connected to X<sub>2</sub> pin 1, the following applies. In case of external connection (other than a separate external load such as an ignition circuit) made to the NO and/or NC contacts of the flame relay, a hazardous situation can occur. In that a case, the application of the flame relay and the circuit diagram of the complete appliance in which this S4561 is used shall be approved separately by a Notified Body for the Gas Application Directive. The creepage and clearance distances on the PCB are suitable for safety related applications such as switching a second valve.

### Final checkout

After installation, set burner system in operation and observe through a complete cycle to ensure that burner system components function correctly.

## EMC GUIDELINES

- The ignition cable(s) has/have to be as short as possible.
- Do not lead ignition cable(s) close to other cabling
- Provide a thorough ground connection to a sufficient groundplane with a cable (as short as possible) to the ignition control pin X<sub>5</sub>.
- The provided ground connection(s) are intended as functional ground and not as protective ground.

## GENERAL CONSIDERATIONS

The automatic ignition control should be externally fused. If, due to a short circuit, the internal fuse is blown, the automatic ignition control must be repaired by Honeywell.

To ensure reliable long term operation, mount automatic ignition control at a position in the appliance with a low ambient temperature and a low thermal radiation.

High temperatures will affect product life negatively.

For safety a high limit thermostat must be connected in series with the comfort controls to de-energize the automatic ignition control in case of overtemperature.

An automatic return high limit thermostat can be connected in series with the gas control.

As soon as the high limit opens a restart attempt will be made, resulting in lock-out. The reset time of such a high limit thermostat should be sufficiently longer than the safety time.

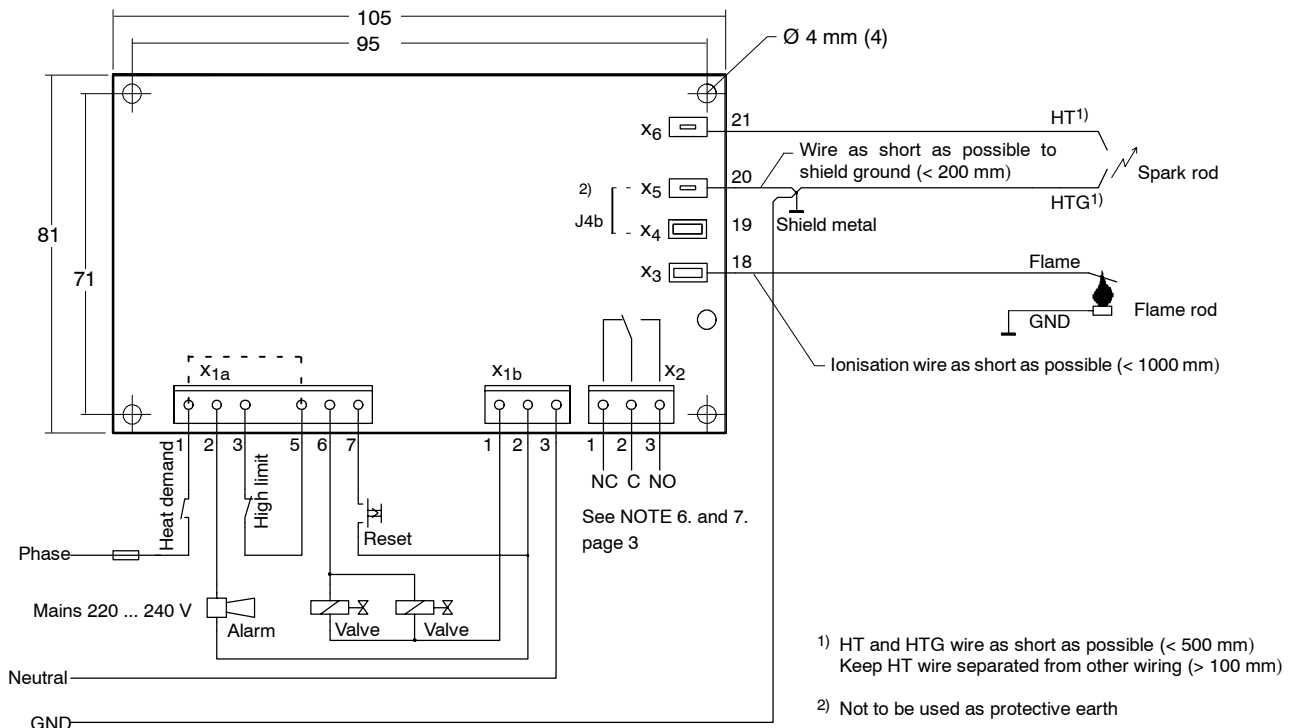
To suppress Radio Frequency Interference (RFI) the automatic ignition control including spark igniter cabling should be mounted in sufficient shielded environment.



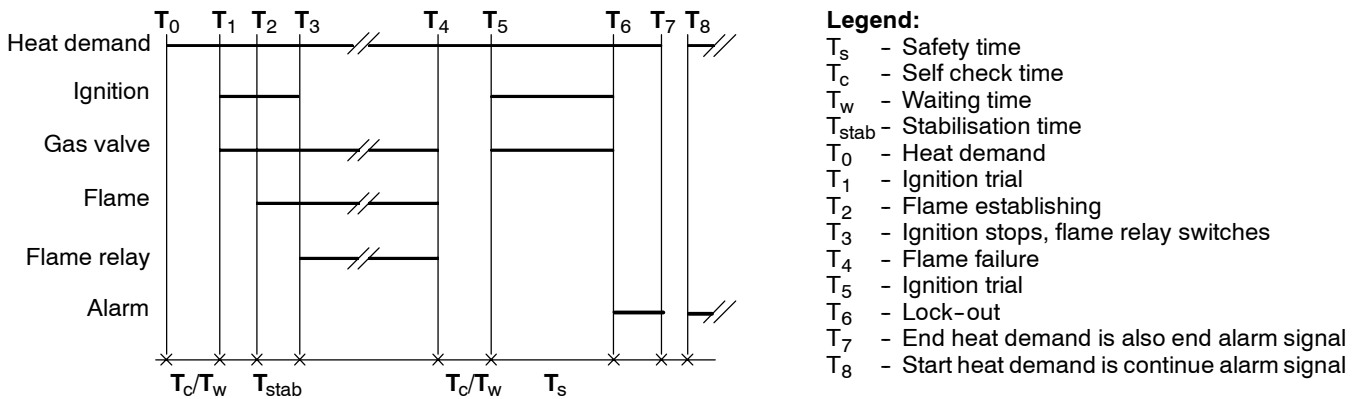
## WARNING

Electrical rating of connected controls should be appropriate for the loads that are switched by the automatic ignition control.

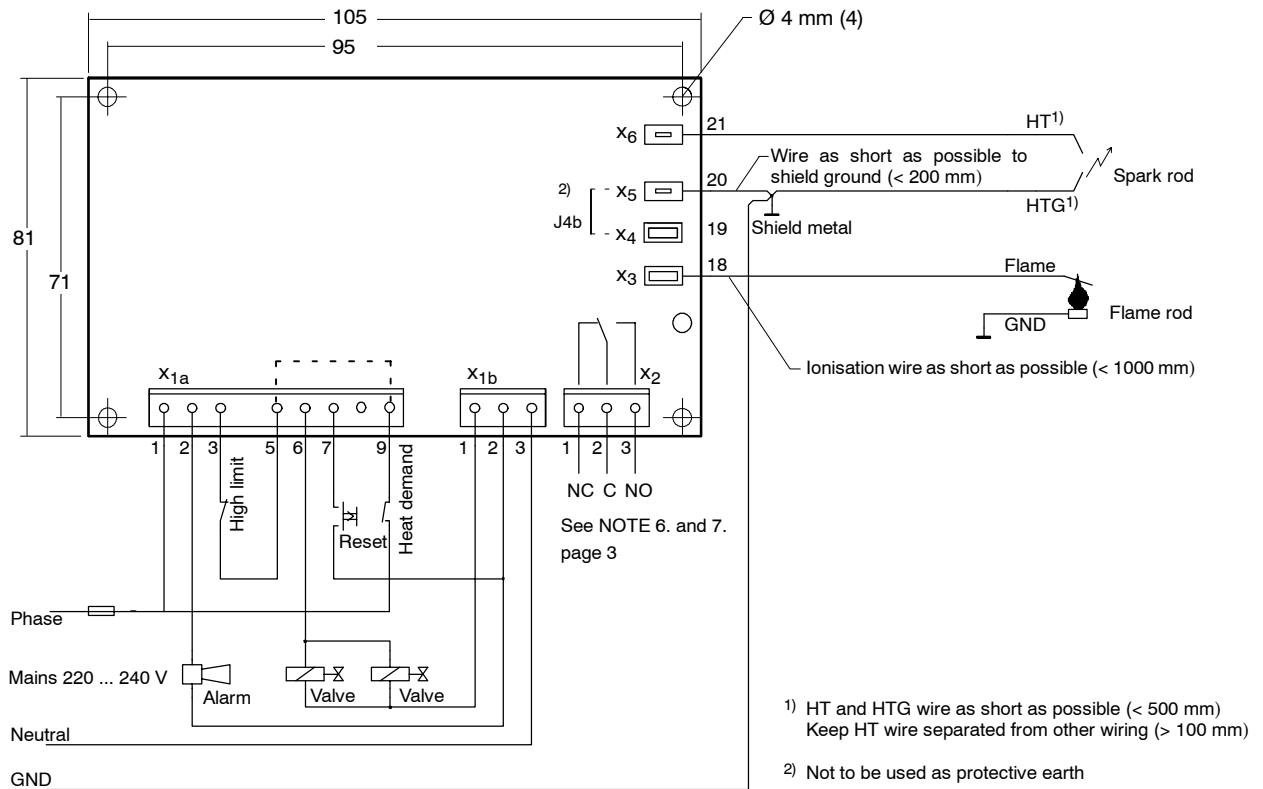
After moving S4561 automatic ignition control from outdoor to indoor conditions, condensation may occur. Do not connect a wet device to mains.



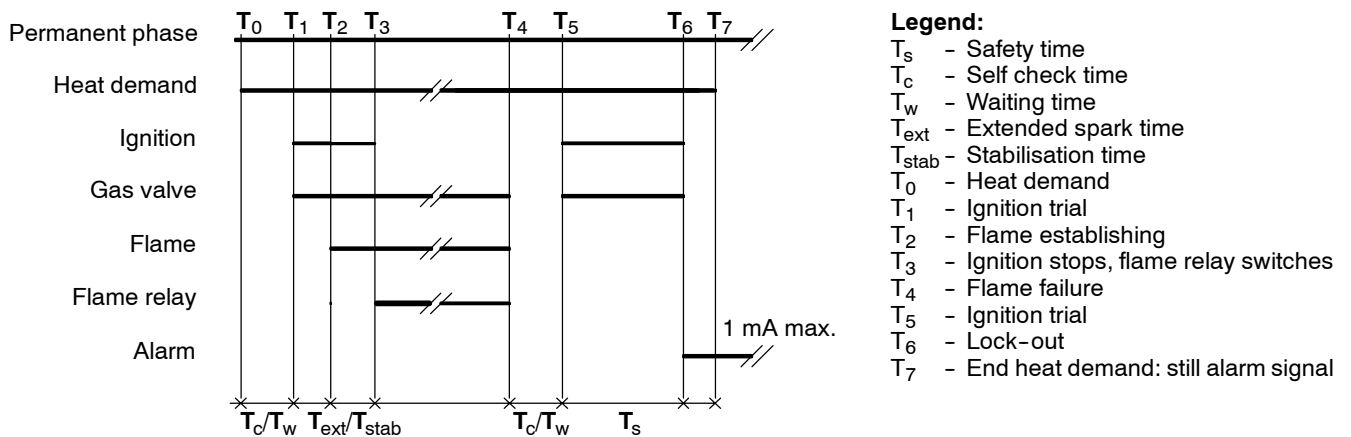
**Fig. 1. Dimensions in mm and connections S4561B (2) with combined heat demand & phase connection**



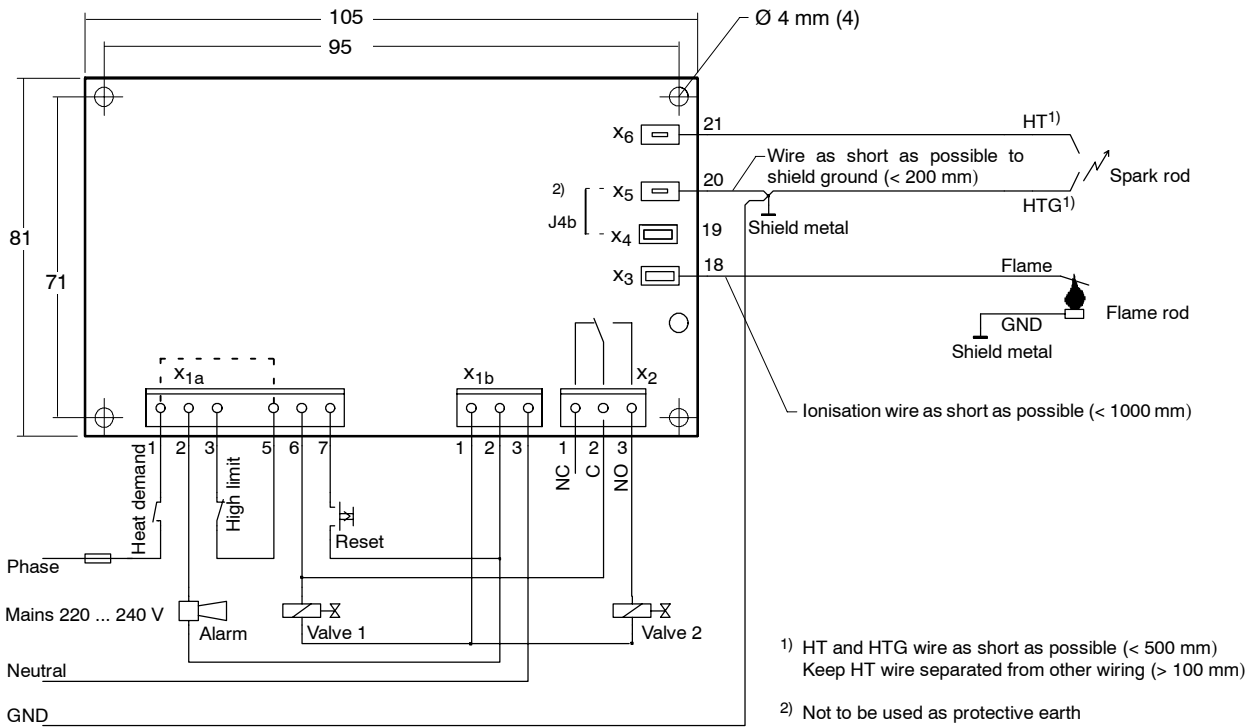
**Fig. 2. Timing diagram S4561B (2) with combined heat demand & phase connection**



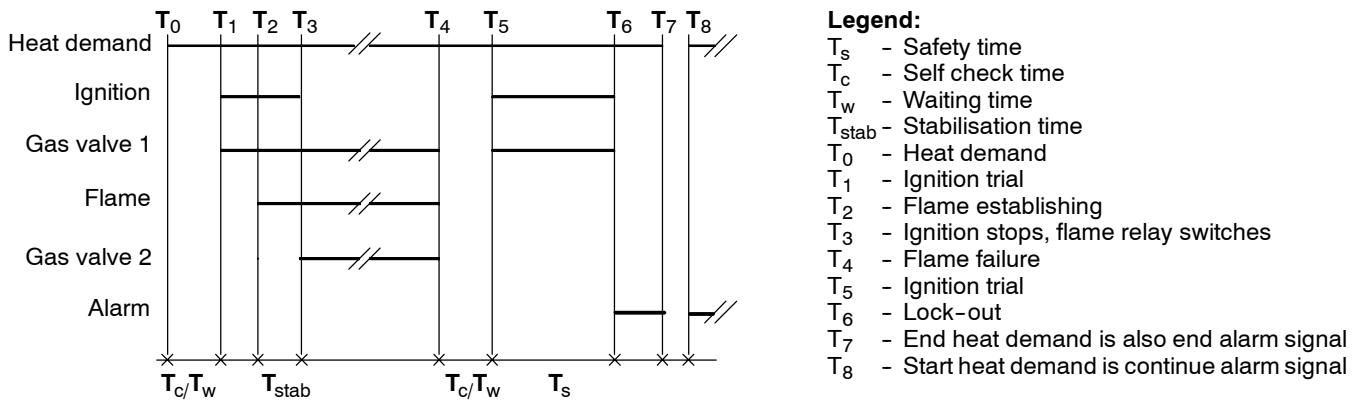
**Fig. 3. Dimensions in mm and connection S4561 with separate heat demand and phase connection**



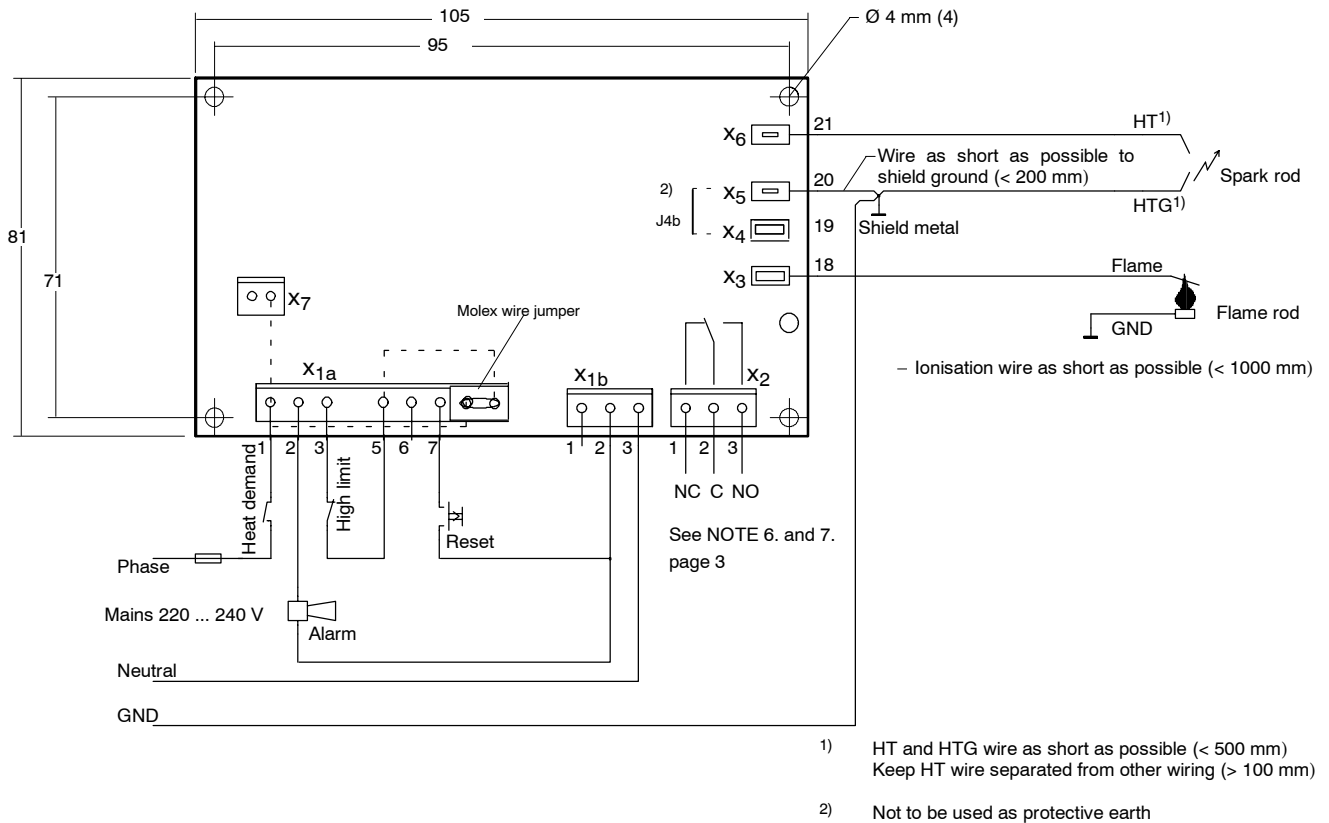
**Fig. 4. Timing diagram S4561 with separate heat demand and phase connection**



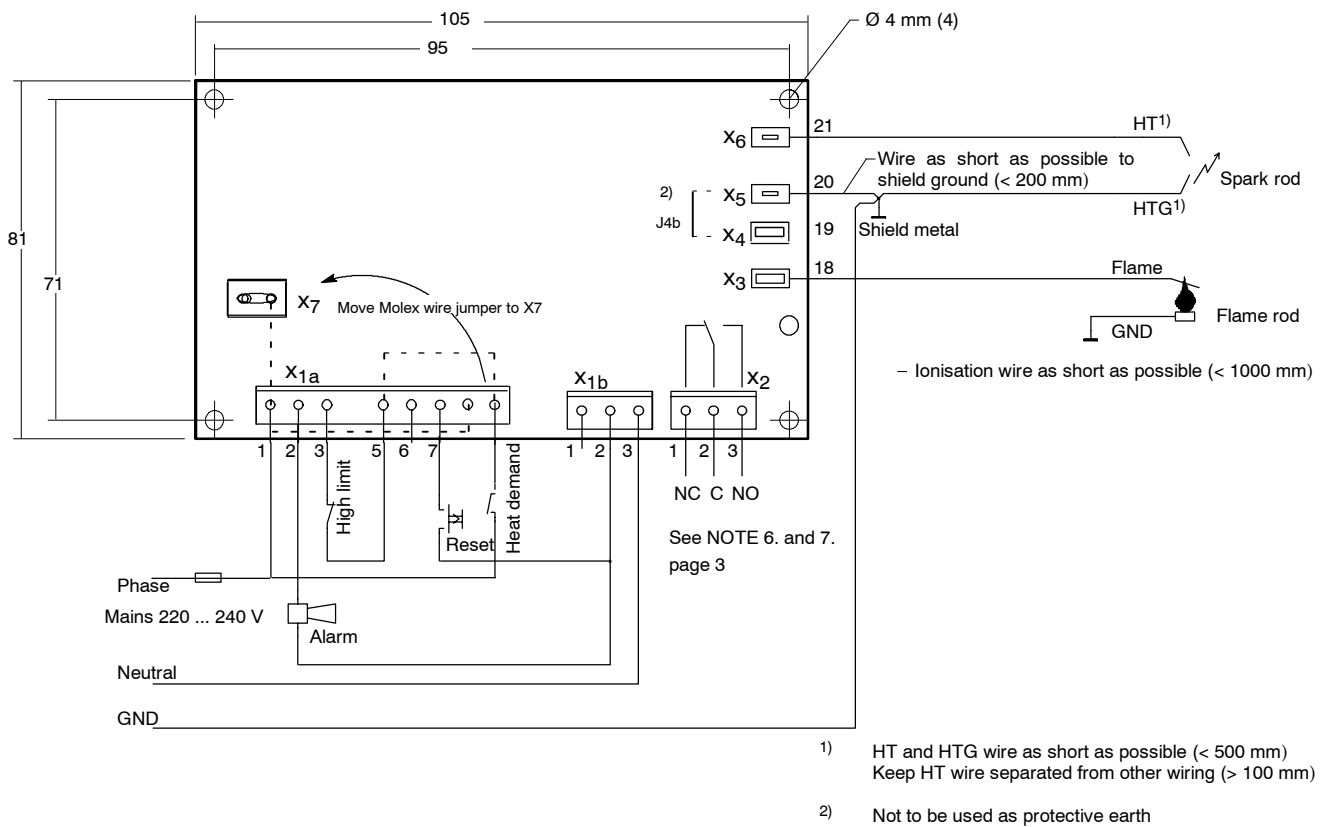
**Fig. 5. Dimensions in mm and connection S4561 for IP appliances**



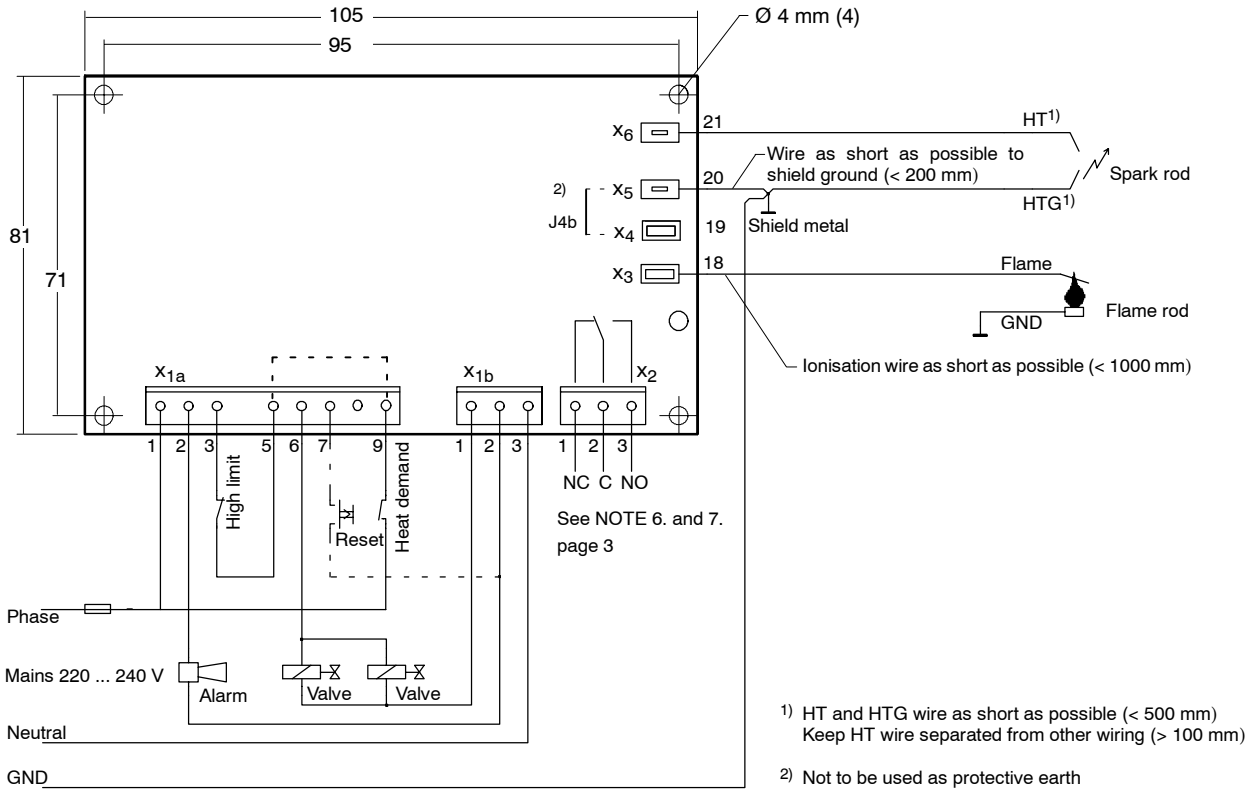
**Fig. 6. Timing diagram S4561 for IP appliances**



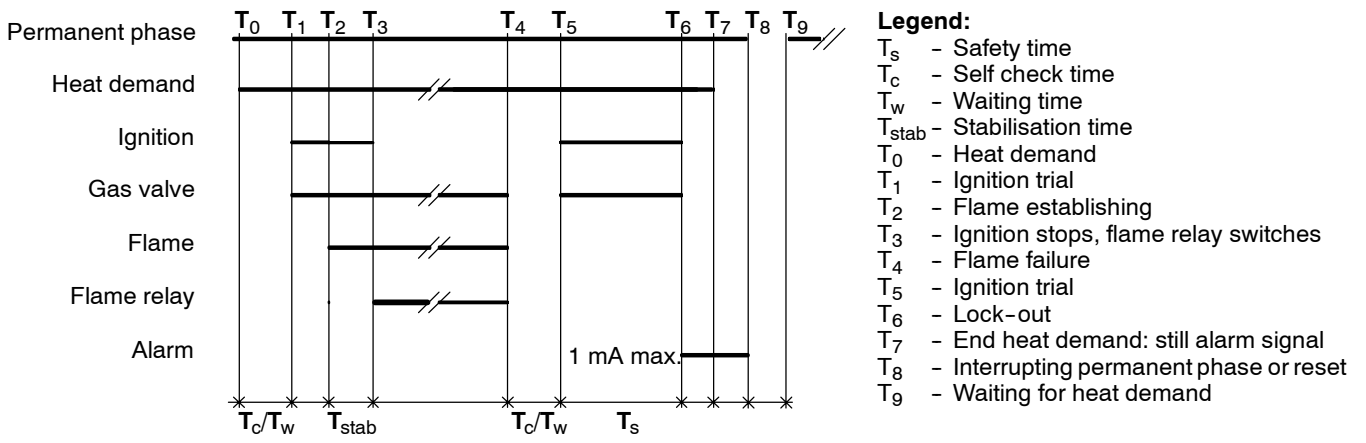
**Fig. 7. Spares product with combined heat demand & phase connection. Leave Molex wire jumper on X<sub>1a</sub>**



**Fig. 8. Spares product with separate heat demand & phase connection and permanent alarm indication. Move Molex wire jumper to X<sub>7</sub>**

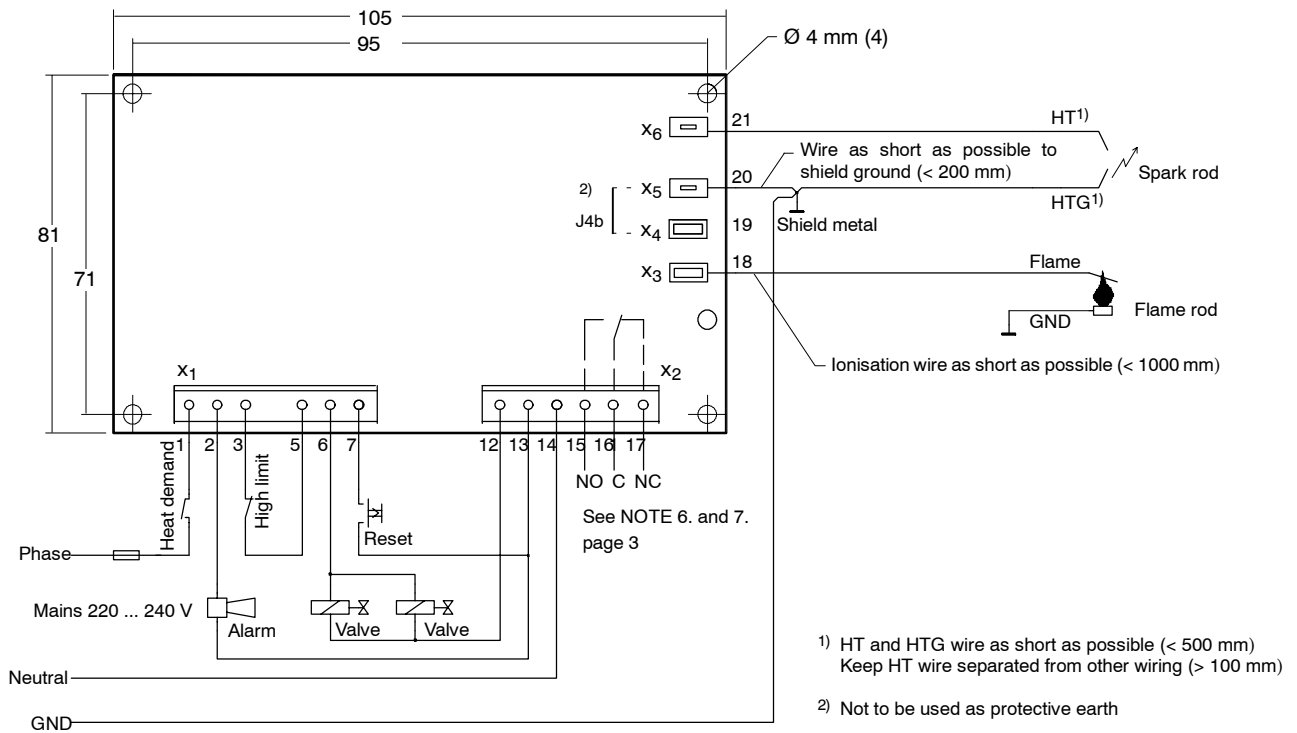


**Fig. 9. Dimensions in mm and connection S4561Q (2) (volatile lock-out) reset by either interrupting permanent phase or by reset switch**

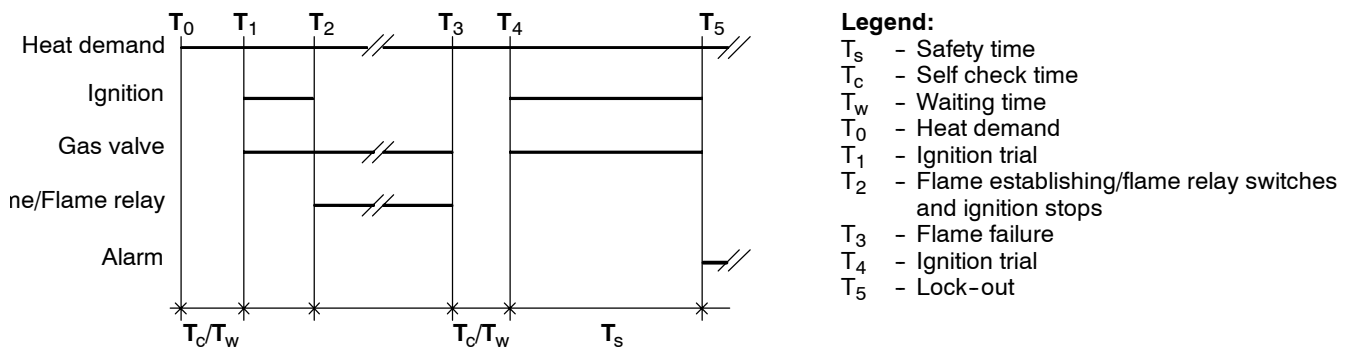


**Fig. 10. Timing diagram S4561Q (2) (volatile lock-out) reset by either interrupting permanent phase or by reset switch**





**Fig. 11. Dimensions in mm and connections S4561B atmospheric with flame relay output**



**Fig. 12. Timing diagram S4561B atmospheric with flame relay output**

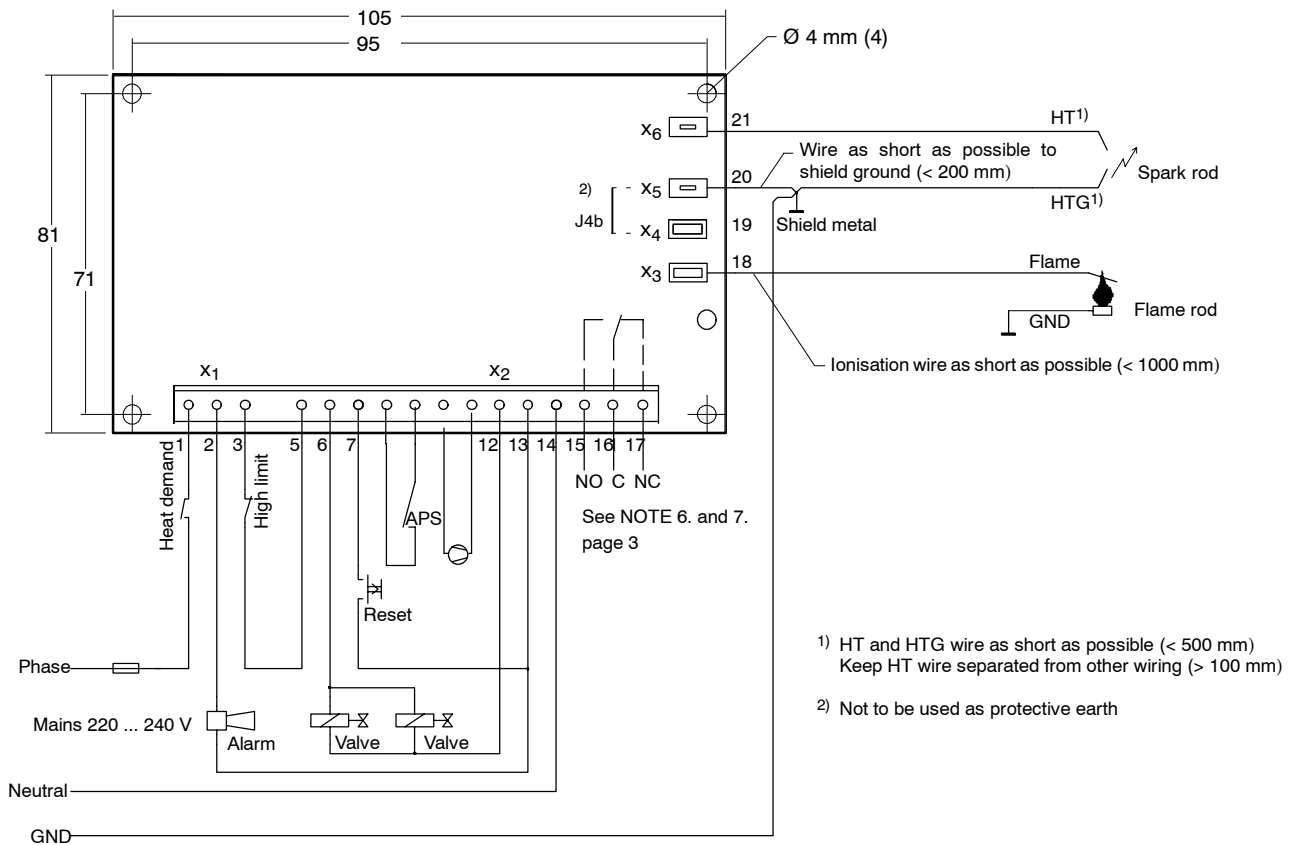


Fig. 13. Dimensions in mm and connections S4561D fan assisted with flame relay output

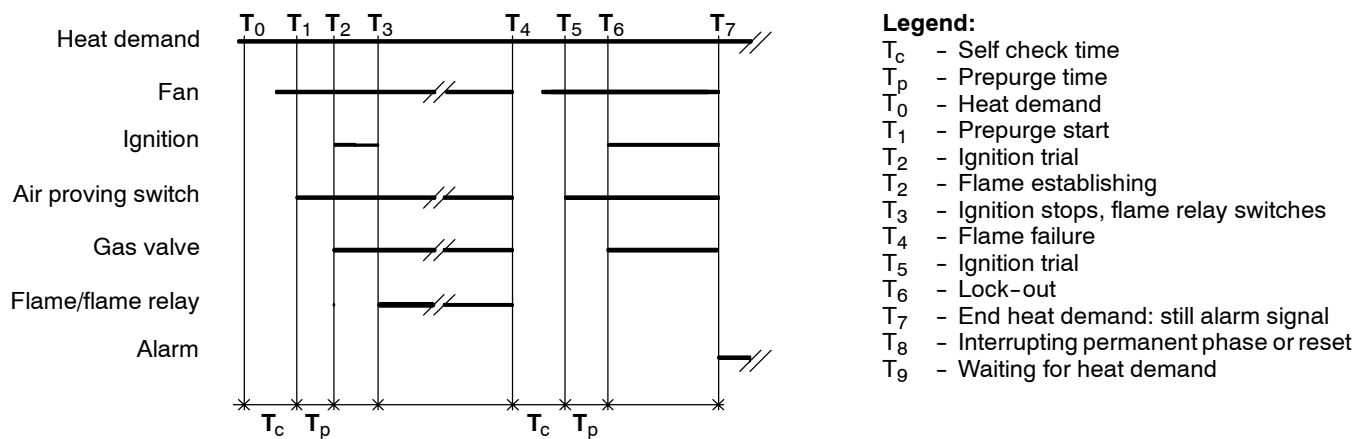


Fig. 14. Timing diagram S4561D fan assisted with flame relay output

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