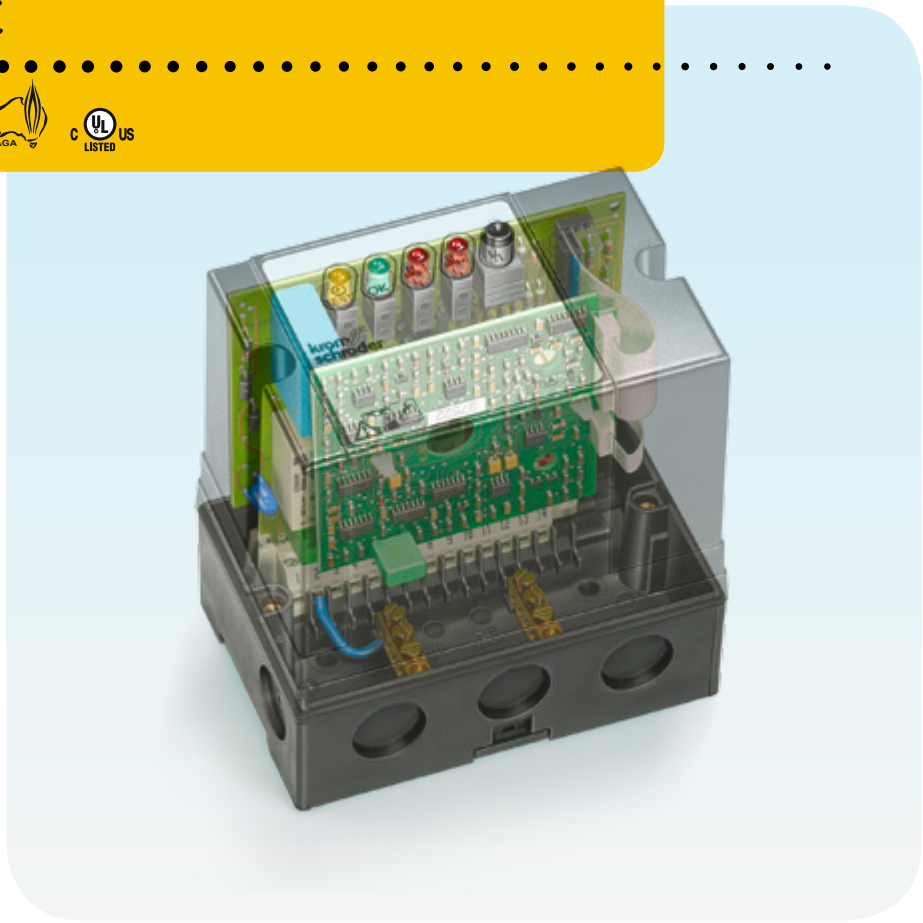
elster
Kromschröder

Tightness control TC

Product brochure · GB
3 Edition 07.14



- Test of two safety valves
- Short test period thanks to logical decision-making in the program sequence
- Adjustable test period which can be adapted to different systems
- Adjustable test instant allows quick system start
- Maximum safety thanks to self-monitoring electronics
- Less space required thanks to small dimensions
- EC type-tested and certified
- UL listed, FM and AGA approved

TC 1, TC 2 TC 3 TC 4

TC 1: for attachment to valVario controls and CG

TC 2: for quick opening individual valves

TC 3: for quick or slow opening or manually resettable individual valves

TC 4: for control cabinet installation

Application

The tightness control TC checks the fail-safe function of both valves before each start-up or after each shut-down of a system with two safety valves.

The aim is to identify an inadmissible leak on one of the gas valves and to prevent burner start. The other gas valve continues working properly and takes over the safe shut-off of the gas supply.

It is used in industrial thermoprocessing equipment, in boilers and forced draught burners.

European standards EN 746-2 and EN 676 stipulate tightness controls for capacities over 1200 kW (NFPA 86: from 117 kW or 400,000 Btu/h in conjunction with a visual indicator). Pre-purge of the combustion chamber can be dispensed with under certain conditions in accordance with EN 746-2, if a tightness control is used. In this case, the system must be vented into the open air.

TC 1

Tightness control TC 1 can be directly mounted to all CG combination controls. There is only one version for all sizes. The pre-set test period applies to all CG variants.

In addition, TC 1 can be used for valVario controls VAS, VAD and VAG (with separate adapter plate.

TC 2 and TC 4

Tightness controls TC 2 and TC 4 can be used with gas solenoid valves of any nominal size, which are quick opening or slow opening with start rate. It is possible to conduct a tightness test on pneumatically operated or slow opening valves without start rate by using additional auxiliary valves.

Slow opening motorized valves VK up to DN 65 which are directly flanged together can also be checked by TC 2 and TC 4 within a temperature range of 0 to 60°C (32 to 140°F).

TC 4

Tightness control TC 4 consists of detection circuitry and can be installed in the control cabinet, separately from the system. An external pressure switch takes over the mechanical pressure test between the valves. Tightness control TC 4 is independent of gas type and inlet pressure p_u and can be used for a test period of up to 10 minutes with a large test volume.

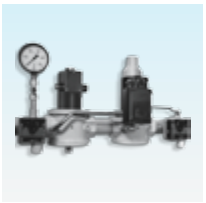
TC 3

Tightness control TC 3 is a universal device for quick and slow opening gas solenoid valves of any nominal size as well as for motorized valves. The tightness test is carried out with the valves installed in TC 3.

TC 1 mounted to a combination control CG

TC 1 on a double solenoid valve in an inlet section

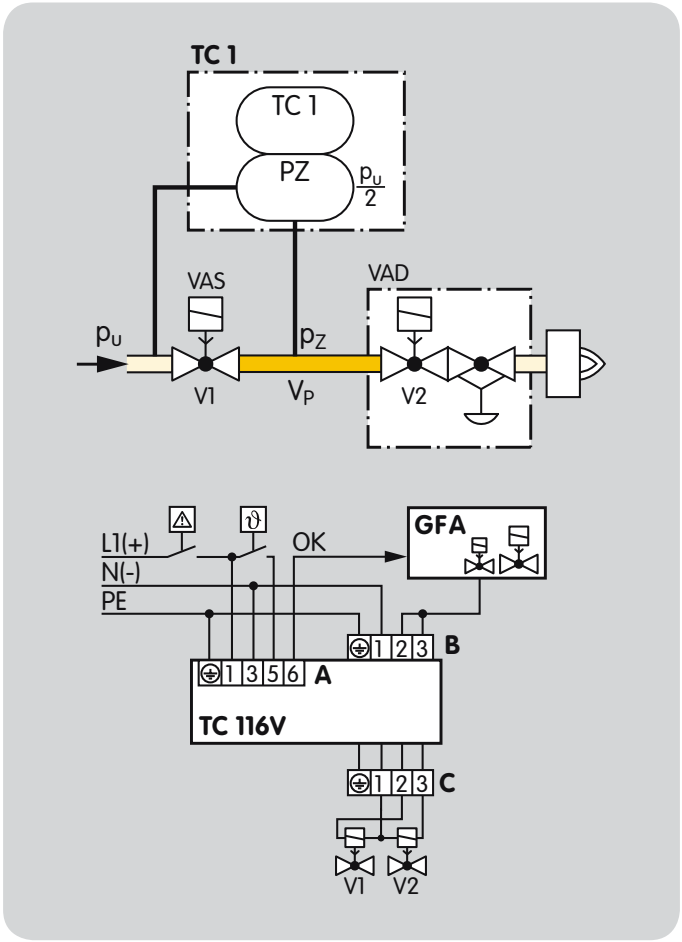
TC 4 installed separately from the system in a control cabinet



TC 2 in a gas inlet section between a quick opening and a slow opening gas solenoid valve VG

TC 3 for tightness control on gas motorized valves VK

TC 4 installed in control cabinet by securing the lower section with screws or snapping it on to a DIN rail



Examples of application

TC 116V with valVario controls

Tightness control TC 1 checks gas solenoid valves V1 and V2 for tightness.

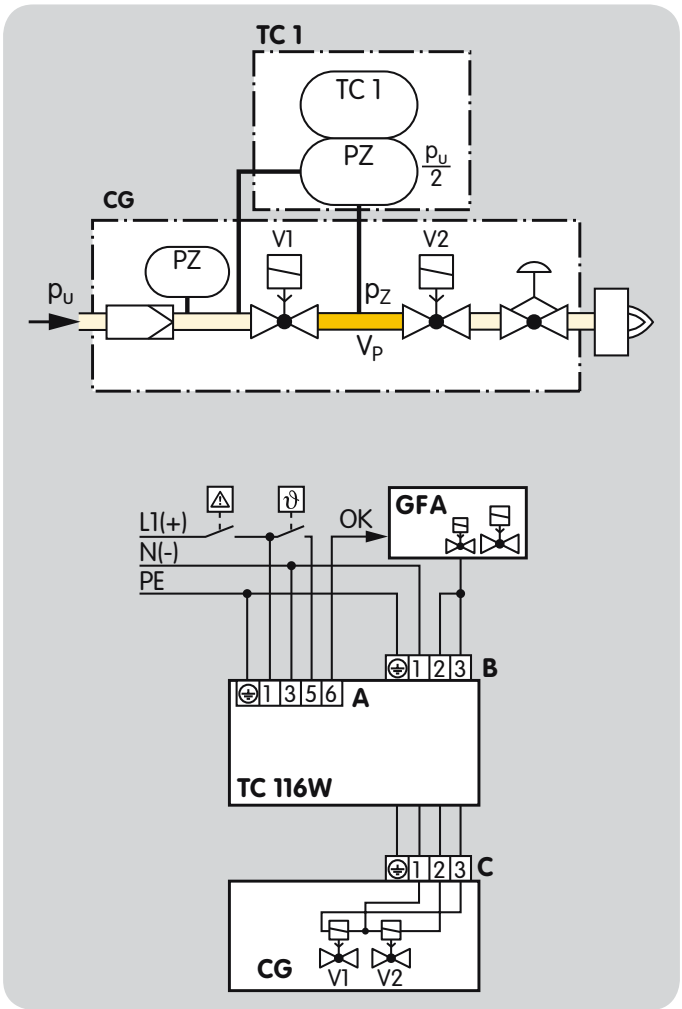
If both valves are tight, the tightness control forwards the OK enable signal to the automatic burner control unit GFA. This opens valves V1 and V2 simultaneously. The burner starts.

V1: quick or slow opening valve with start rate.

A = Supply and signal forwarding
B = Automatic burner control unit
C = Gas solenoid valves

PZ = Internal pressure sensor of the TC for the comparison of inlet pressure p_u and interspace pressure p_z

V_P = Test volume



TC 116W with combination control CG..D or CG..V

Tightness control TC 1 is directly mounted to combination control CG..D or CG..V and checks gas solenoid valves V1 and V2 in the combination control for tightness.

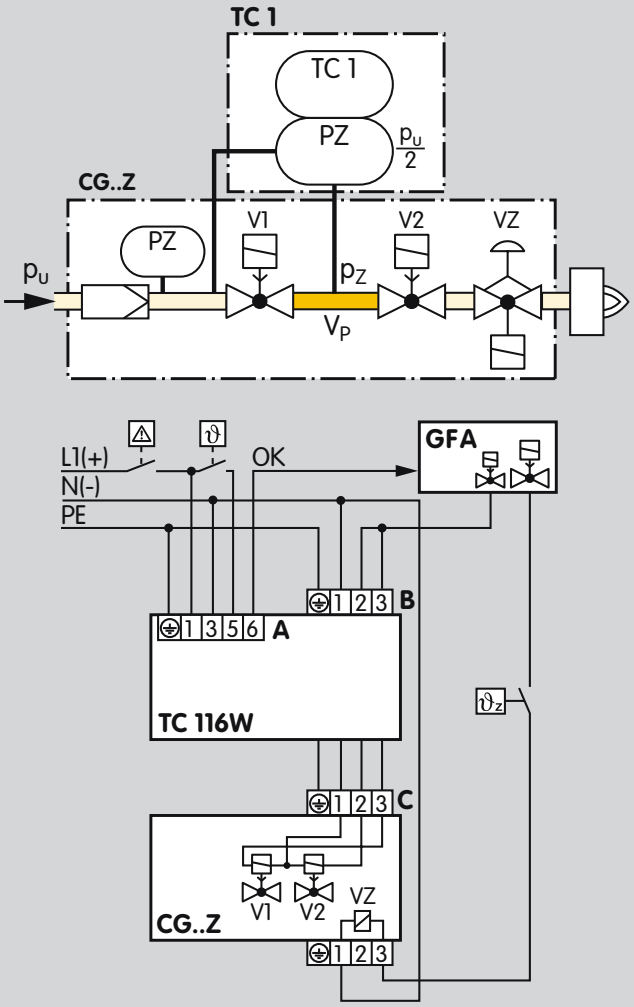
Once the tightness test has been carried out successfully, the tightness control forwards the OK enable signal to the automatic burner control unit GFA. This opens valves V1 and V2 in the combination control CG simultaneously. The burner starts.

V1 and V2: quick opening valves.

A = Supply and signal forwarding
B = Automatic burner control unit
C = Gas solenoid valves

PZ = Internal pressure sensor of the TC for the comparison of inlet pressure p_u and interspace pressure p_z

V_P = Test volume



TC 116W with two-stage combination control CG..Z

Tightness control TC 1 checks gas solenoid valves V1 and V2 in combination control CG..Z for tightness.

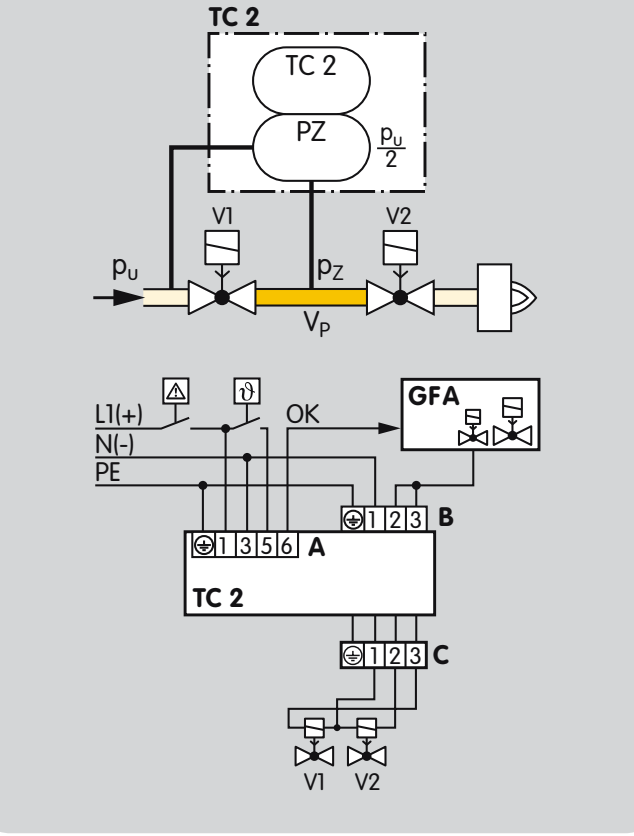
Once the tightness test has been carried out successfully, the tightness control forwards the OK enable signal to the automatic burner control unit GFA. The pilot valve output of the automatic burner control unit GFA opens valves V1 and V2 in the combination control simultaneously. The burner starts. The main valve output opens the two-stage valve VZ, independently of TC 116W.

V1 and V2: quick opening valves.

A = Supply and signal forwarding
B = Automatic burner control unit
C = Gas solenoid valves

PZ = Internal pressure sensor of the TC for the comparison of inlet pressure p_u and interspace pressure p_z

V_P = Test volume



TC 2 with two gas solenoid valves

Tightness control TC 2 checks gas solenoid valves V1 and V2 for tightness.

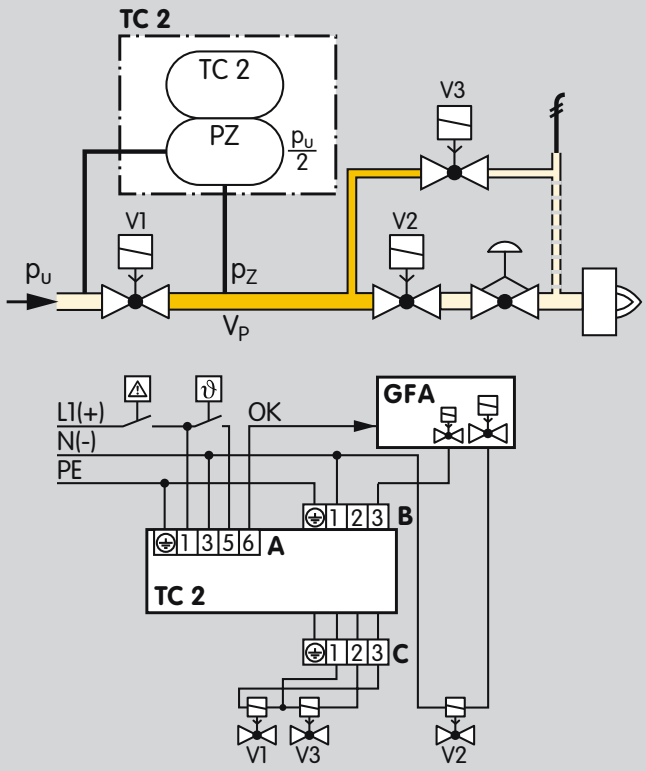
If both valves are tight, the tightness control forwards the OK enable signal to the automatic burner control unit GFA. This opens valves V1 and V2 simultaneously. The burner starts.

V1 and V2: quick or slow opening valves with start rate.

A = Supply and signal forwarding
B = Automatic burner control unit
C = Gas solenoid valves

PZ = Internal pressure sensor of the TC for the comparison of inlet pressure p_u and interspace pressure p_z

V_P = Test volume



TC 2 with two gas solenoid valves and one auxiliary valve for discharge

Tightness control TC 2 checks the gas solenoid valves V1 and V2 and the auxiliary valve V3 for tightness.

It must be ensured that the interspace is vented during the 2-second opening time. This is not guaranteed by the gas pressure regulator downstream of V2. The test volume V_P is thus discharged into the combustion chamber or into a safe area. Auxiliary valve V3 can also be used as a pilot gas valve. Since valve V2 remains closed during the test, it can also be a slow opening motorized valve VK.

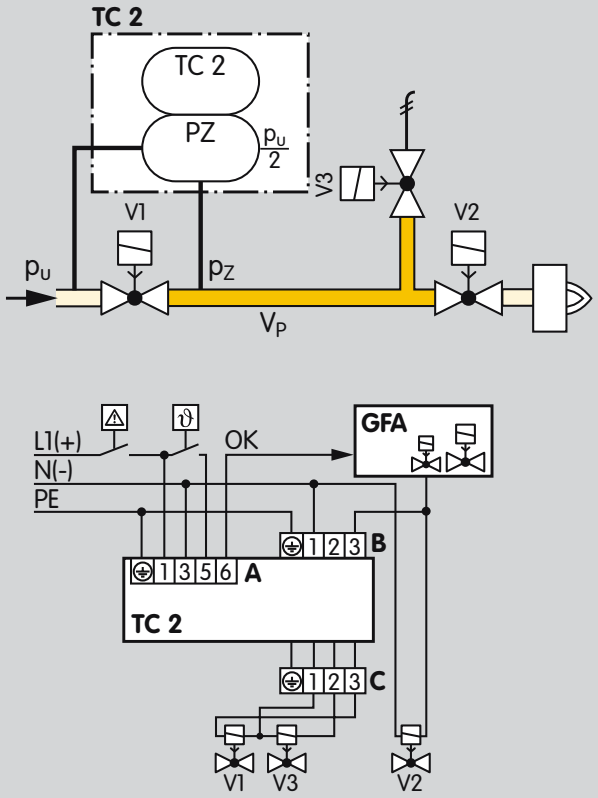
Once the tightness test has been carried out successfully, the tightness control forwards the OK enable signal to the automatic burner control unit GFA. The pilot valve output of the automatic burner control unit GFA opens the gas solenoid valves V1 and V3 simultaneously. The main valve output opens gas solenoid valve V2. The burner starts.

V1 and V2: quick or slow opening valves with start rate.

V3: quick or slow opening valve with start rate, nominal size is dependent on test volume V_P and inlet pressure p_u, but is at least DN 15.

A = Supply and signal forwarding
B = Automatic burner control unit
C = Gas solenoid valves

PZ = Internal pressure sensor of the TC for the comparison of inlet pressure p_u and interspace pressure p_z



TC 2 with two gas solenoid valves and one auxiliary valve for discharge

Tightness control TC 2 checks the gas solenoid valves V1 and V2 and the auxiliary valve V3 for tightness.

If all the gas solenoid valves are tight, the tightness control forwards the OK enable signal to the automatic burner control unit GFA. The pilot valve output of the automatic burner control unit GFA opens the gas solenoid valves V1 and V2 simultaneously. The burner starts.

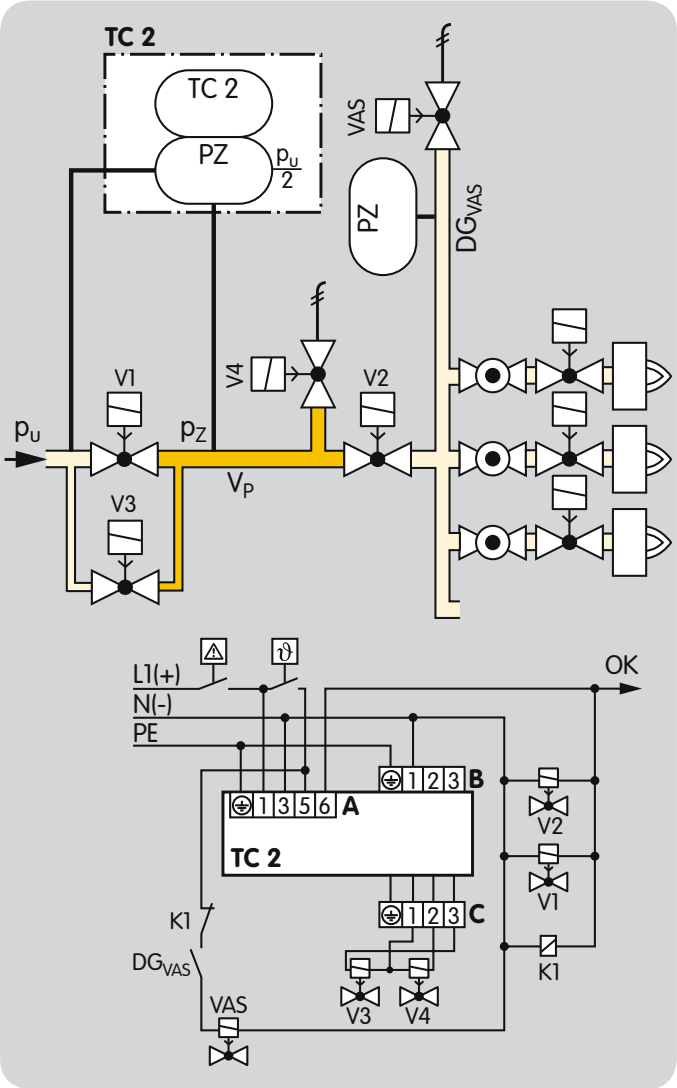
A relief line is used to discharge the test volume V_P into a safe area. Thanks to the installed auxiliary valve V3, valve V2 can also be a slow opening motorized valve VK.

V1: quick or slow opening valve with start rate.
V2: any.

V3: quick opening, nominal size is dependent on test volume V_P and inlet pressure p_u, but is at least DN 15.

A = Supply and signal forwarding
B = Automatic burner control unit
C = Gas solenoid valves

PZ = Internal pressure sensor of the TC for the comparison of inlet pressure p_u and interspace pressure p_z



TC 2 in a multiple burner system with 3 valves installed in series

When using slow opening main valves (V1 and V2), auxiliary valves (V3 and V4) must be used for the supply and discharge of the test volume V_P.

Tightness control TC 2 checks the central shut-off valve V1, the gas solenoid valve V2 and the auxiliary valves V3 and V4 for tightness.

Valve V2 can only be checked for tightness when the pressure downstream of V2 approximately corresponds to the atmospheric pressure and the volume downstream of valve V2 is 5 x V_P. The gas solenoid valve VAS and the pressure switch DG_{VAS} are used to relieve the pressure. The pressure switch must be adjusted in such a way so that enough pressure is relieved and no air can get into the pipework.

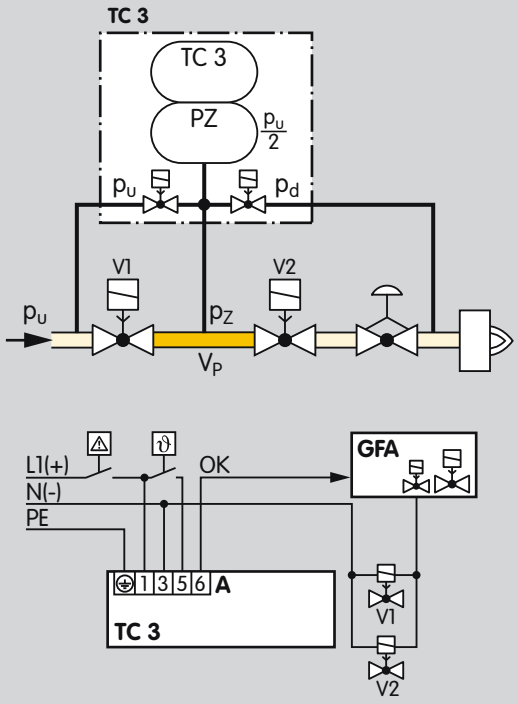
Once the tightness test has been carried out successfully, the tightness control TC 2 opens the main valves V1 and V2 with the OK enable signal and enables the downstream burner control units.

V3 and V4: quick opening, nominal size is dependent on test volume V_P and inlet pressure p_u, see page 34 (Project planning information), but is at least DN 15.

A = Supply and signal forwarding
B = Automatic burner control unit
C = Gas solenoid valves

PZ = Internal pressure sensor of the TC for the comparison of inlet pressure p_u and interspace pressure p_z

PZ = Pressure switch DG_{VAS} for monitoring the pressure downstream of V2



TC 3 with two gas solenoid valves

Tightness control TC 3 checks the slow opening gas solenoid valves or motorized valves VK for tightness using the auxiliary valves installed in TC 3.

Once the tightness test has been carried out successfully, the tightness control forwards the OK enable signal to the automatic burner control unit GFA. The pilot valve output of the automatic burner control unit GFA opens valves V1 and V2 simultaneously. The burner starts.

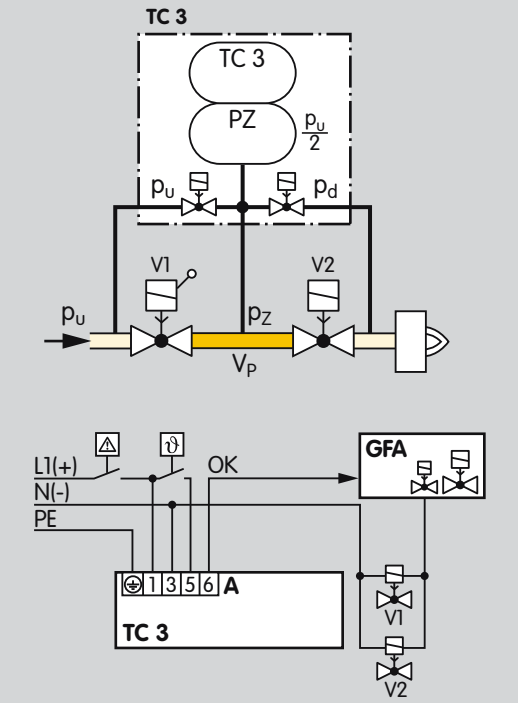
V1 and V2: any.

A = Supply and signal forwarding

PZ = Internal pressure sensor of the TC for the comparison of inlet pressure p_u and interspace pressure p_z

p_d = Outlet pressure

V_P = Test volume



TC 3 with a manually resettable valve

Valves, which are manually reset, cannot be opened by the tightness control. The tightness test is then carried out using an additional auxiliary valve.

Tightness control TC 3 checks the tightness between the manually resettable valve V1 and gas solenoid valve V2 using the auxiliary valves installed in TC 3.

Once the tightness test has been carried out successfully, TC 3 forwards the OK enable signal.

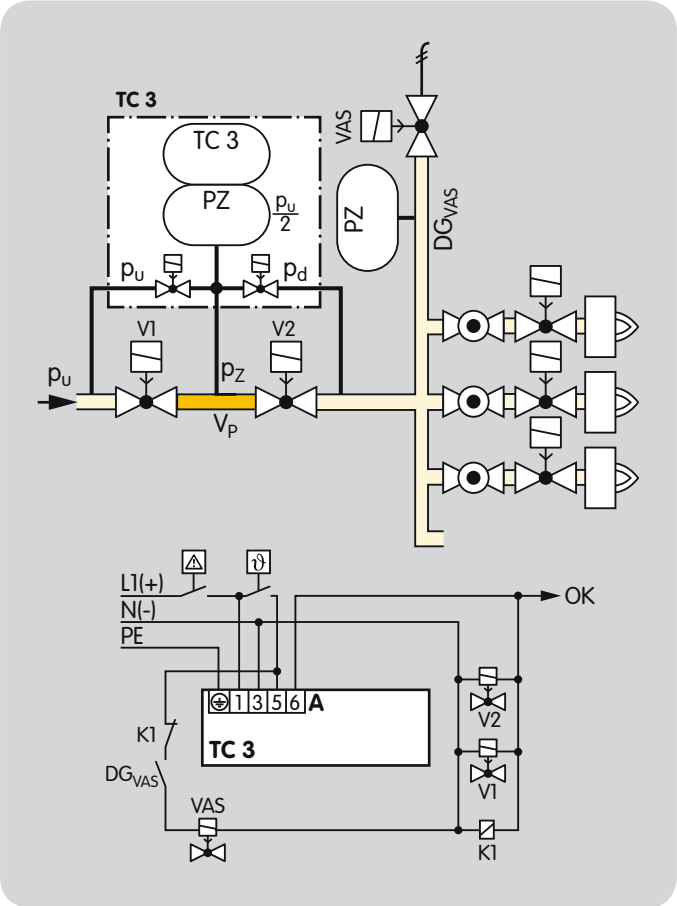
V1 and V2: any.

A = Supply and signal forwarding

PZ = Internal pressure sensor of the TC for the comparison of inlet pressure p_u and interspace pressure p_z

p_d = Outlet pressure

V_P = Test volume



TC 3 in a multiple burner system with 3 valves installed in series

Tightness control TC 3 checks the slow opening main valves V1 and V2 for tightness. The test volume V_P is supplied and discharged via the TC 3 auxiliary valves.

Valve V2 can only be checked for tightness when the pressure downstream of V2 approximately corresponds to the atmospheric pressure and the volume downstream of valve V2 is 5 x V_P. The gas solenoid valve VAS and the pressure switch DG_{VAS} are used to relieve the pressure. The pressure switch must be adjusted in such a way so that enough pressure is relieved and no air can get into the pipework.

Once the tightness test has been carried out successfully, the tightness control TC 3 opens the main valves V1 and V2 with the OK enable signal and enables the downstream burner control units.

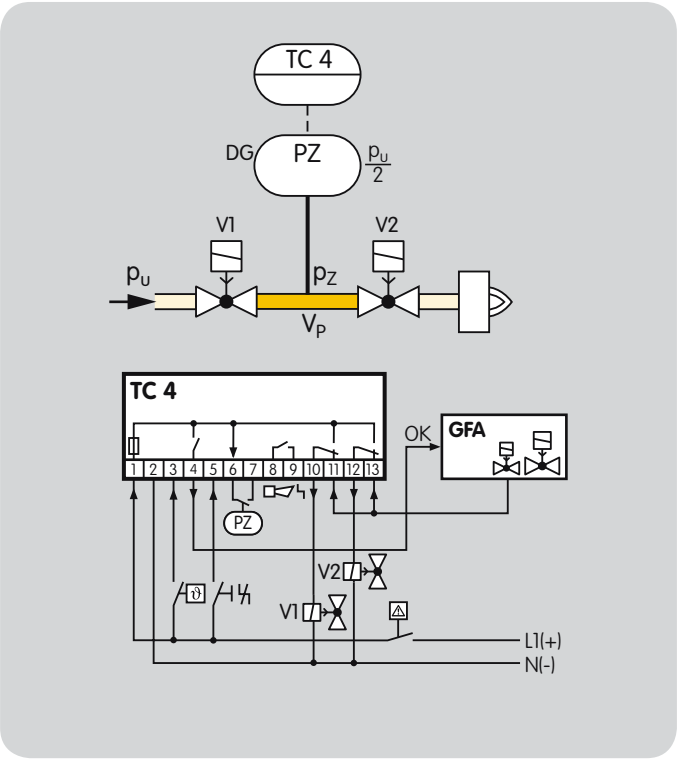
V1 and V2: any.

A = Supply and signal forwarding

PZ = Internal pressure sensor of the TC for the comparison of inlet pressure p_u and interspace pressure p_z

PZ = Pressure switch DG_{VAS} for monitoring the pressure downstream of V2

p_d = Outlet pressure



TC 4 with two gas solenoid valves

Tightness control TC 4 checks gas solenoid valves V1 and V2 for tightness.

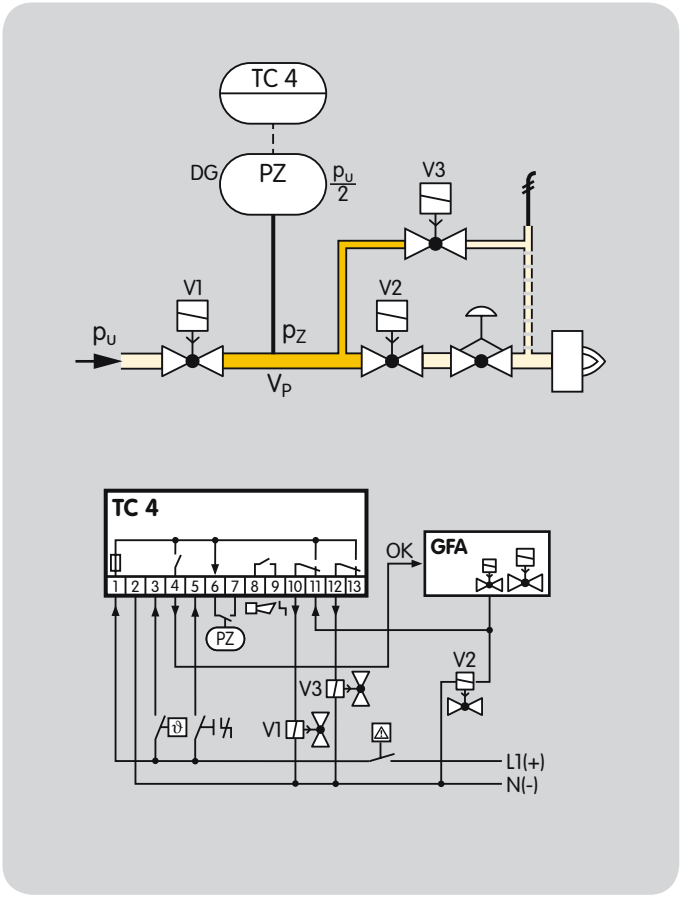
The external pressure switch DG monitors the pressure between the two valves.

Once the tightness test has been carried out successfully, the tightness control forwards the OK enable signal to the automatic burner control unit GFA. The pilot valve output of the automatic burner control unit GFA opens the gas solenoid valves V1 and V2 simultaneously. The burner starts.

V1 and V2: quick or slow opening valves with start rate.

p_u = Inlet pressure

V_P = Test volume



TC 4 with two gas solenoid valves and one auxiliary valve for discharge

Tightness control TC 4 checks the gas solenoid valves V1 and V2 and the auxiliary valve V3 for tightness.

It must be ensured that the interspace is vented during the 2-second opening time. This is not guaranteed by the gas pressure regulator upstream of V2. A relief line is thus used to discharge the test volume V_P safely into the combustion chamber or into a safe area. Since valve V2 remains closed during the test, it can also be a slow opening motorized valve VK.

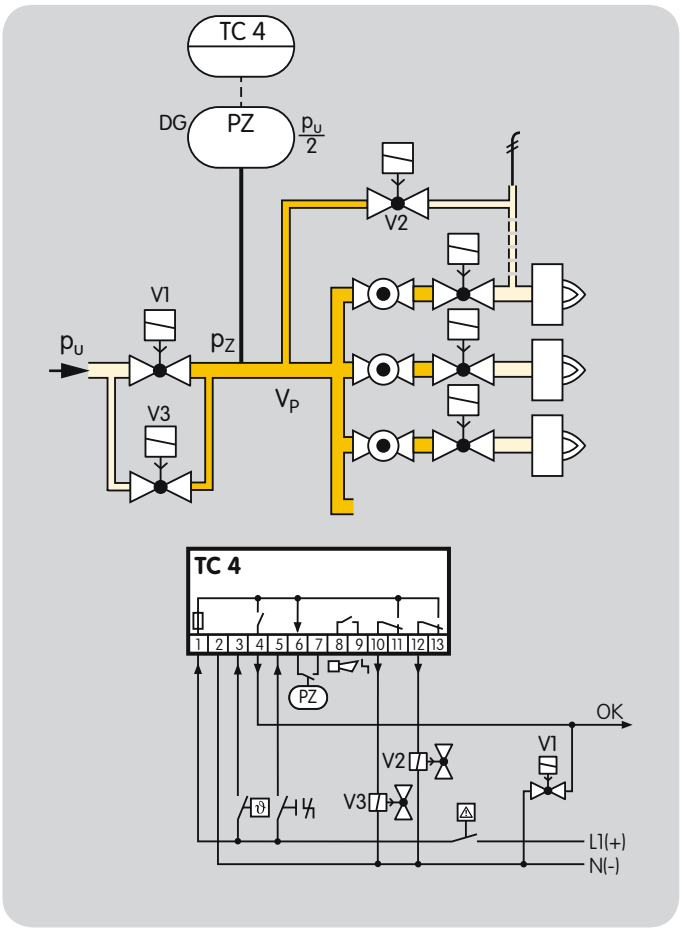
If all the gas solenoid valves are tight, the tightness control forwards the OK enable signal to the automatic burner control unit GFA. The pilot valve output of the automatic burner control unit GFA opens the gas solenoid valves V1 and V2 simultaneously. The burner starts.

V1: quick or slow opening valve with start rate.

V2: any.

V3: quick opening, nominal size is dependent on test volume V_P and inlet pressure p_u, but is at least DN 15.

PZ = External pressure switch DG for the comparison of inlet pressure p_u and interspace pressure p_z



TC 4 in a multiple burner system with two auxiliary valves for supply and discharge

Tightness control TC 4 checks the central shut-off valve V1, auxiliary valves V1 and V2 and several burner valves for tightness.

The test volume V_P is supplied via the auxiliary valve V3.

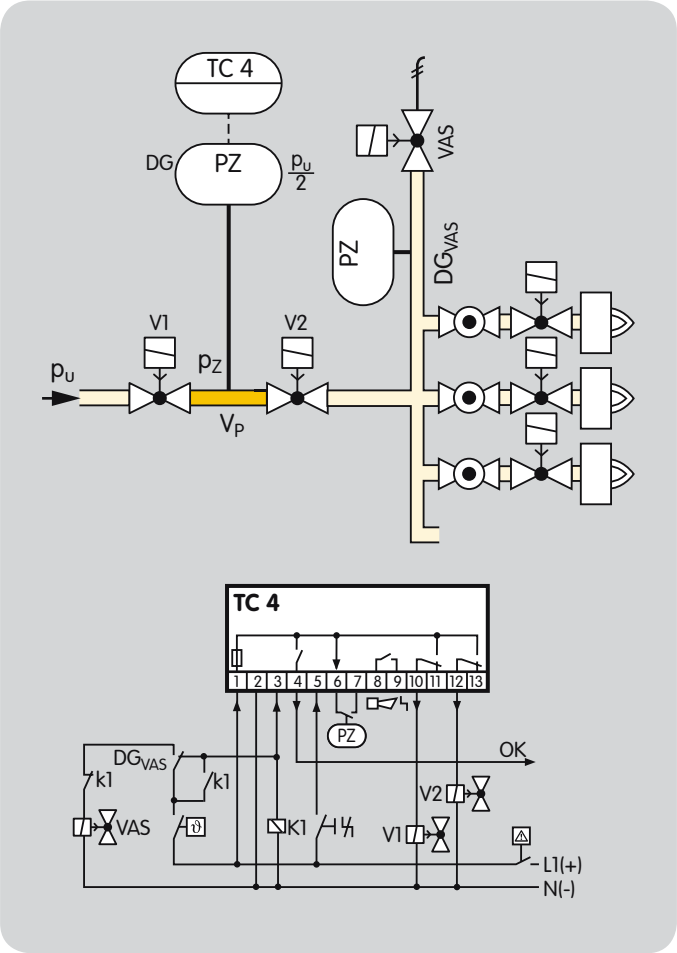
The external pressure switch DG monitors the pressure between the gas solenoid valves V1, V2 and the burner valves.

Once the tightness test has been carried out successfully, TC 4 opens gas solenoid valve V1. The tightness control forwards the OK enable signal simultaneously to the automatic burner control units for the burner valves. The burner valves open and the burners start.

Thanks to the relief line and auxiliary valve V2, the test volume V_P is discharged into the combustion chamber or into a safe area.

V1: any.

V2 and V3: quick opening, nominal size is dependent on test volume V_P and inlet pressure p_u, but is at least DN 15.



TC 4 in a multiple burner system with 3 valves installed in series

Tightness control TC 4 checks the central shut-off valve V1 and the gas solenoid valve V2 for tightness.

Valve V2 can only be checked for tightness when the pressure downstream of V2 approximately corresponds to the atmospheric pressure. The gas solenoid valve VAS and the pressure switch DG_{VAS} are used to relieve the pressure. The pressure switch must be adjusted in such a way so that enough pressure is relieved and no air can get into the pipework.

Once the start-up signal ϑ has been applied, first DG_{VAS} is scanned. If the pressure downstream of V2 is correct, the VAS closes and the tightness test is started.

Once the tightness test has been carried out successfully, the tightness control TC 4 opens the main valves V1 and V2 with the OK enable signal and enables the downstream burner control units.

V1 and V2: quick or slow opening valves with start rate.

p_u = Inlet pressure

V_P = Test volume

Technical data

Mains voltage:
110/120 V AC, -15/+10%, 50/60 Hz,
220/240 V AC, -15/+10%, 50/60 Hz,
24 V DC, ±20%.

Ambient temperature:
-15 to +60°C (+5 to +140°F),
no condensation permitted.

Housing made of impact-resistant plastic.

TC 1–3

For natural gas, town gas and LPG (gaseous), also for biologically produced methane.

Inlet pressure p_u: 10 to 500 mbar
(3.9 to 195 "WC).

Test period t_P: 10 to 60 s, adjustable.
Set at the factory to 10 s.

Enclosure: IP 54.

Standard coupler plug to
DIN 43650/ISO 4400.

TC 4

Gas type and inlet pressure p_u:
dependent on external pressure switch.

Test period t_P:
TC 410-1: 10 to 60 s, adjustable.
Set at the factory to 10 s.
TC 410-10: 100 to 600 s, adjustable.
Set at the factory to 100 s.

Enclosure: IP 40.

Maintenance cycles

The tightness control requires little servicing.
We recommend a function check once a year.

Type code

Code	Description
TC	Tightness control
1	For attachment to valVario controls and CG
2	For quick opening individual valves
3	For quick or slow opening or manually resettable individual valves
4	For control cabinet installation
1	Testing before or after burner run
0	External pressure switch required
6	6 mm (0.24") connection
8	8 mm, ¼" (0.31") connection
T	T-product
-1	Test period 10 to 60 s
-10	Test period 100 to 600 s
R	Rp internal thread
N	NPT internal thread
V	Mounted to valVario controls using adapter plate
W	Mounted to combination control CG
05	$p_{u\ max.}$ 500 mbar (7.25 psig)
K	Mains voltage: 24 V DC
N	110/120 V AC, 50/60 Hz
T	220/240 V AC, 50/60 Hz

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Detailed information on this product

http://docuthek.kromschroeder.com/doclib/main.php?language=1&folderid=203080&by_class=6

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