Tightness control TC

Product brochure · GB
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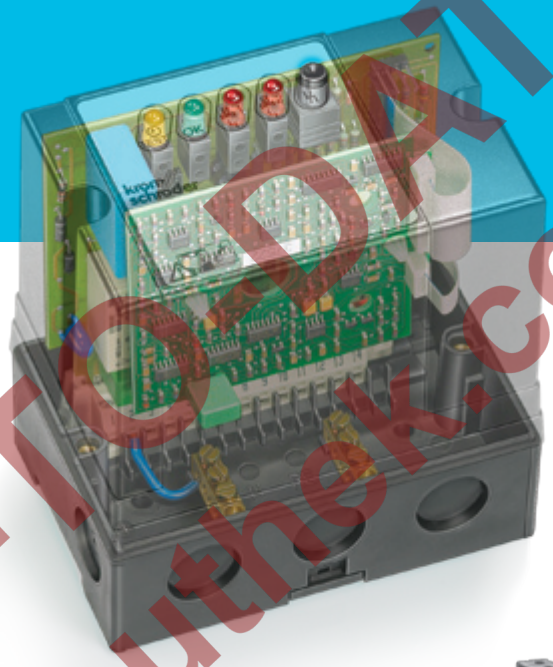


- Test of both safety valves
- Short test period thanks to logical decision-making in the program sequence
- Adjustable test period which can be adapted to different systems
- Adjustable test mode allows quick system start
- Maximum safety thanks to self-monitoring electronics
- Less space required thanks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

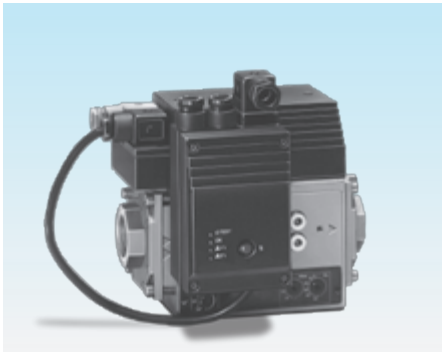
Slow opening motorised valves VK up to DN 65 which are directly flanged together can also be checked by TC 2 and TC 4 within a temperature range of 0 to 60°C (32 to 140°F).

TC 4

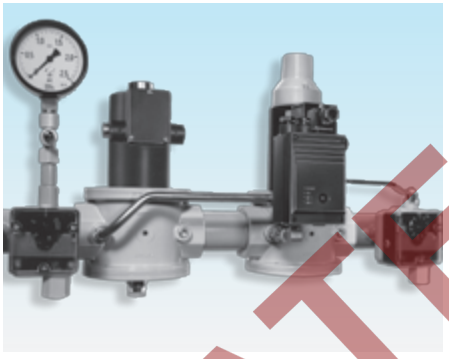
Tightness control TC 4 consists of detection circuitry and can be installed in the control cabinet, separately from the system. An external pressure switch takes over the mechanical pressure test between the valves. Tightness control TC 4 is independent of gas type and inlet pressure p_e and can be used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

TC 3

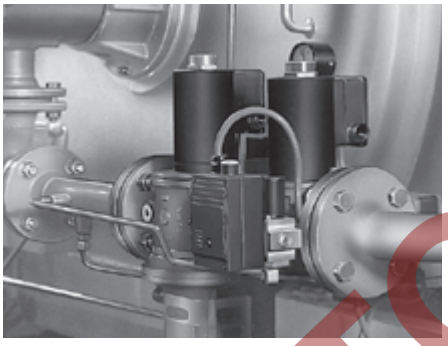
Tightness control TC 3 is a universal device for quick and slow opening gas solenoid valves of any nominal size as well as for motorised valves. The tightness test is carried out with the valves installed in TC 3.



TC 1 mounted to a combination control CG



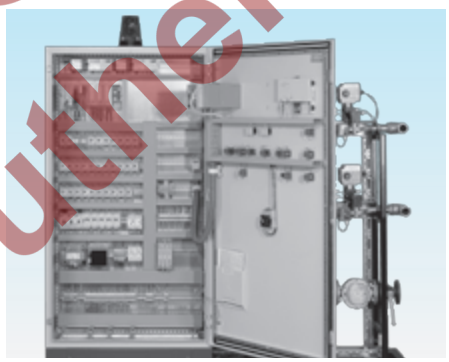
TC 2 in a gas inlet section between a quick opening and a slow opening gas solenoid valve VG



TC 3 on a heating boiler

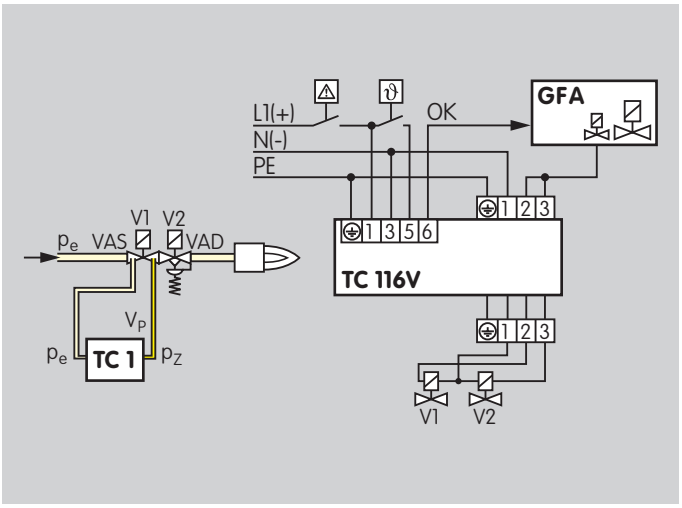
TC 3 for tightness control on gas motorised valve VK

TC 4 installed separately from the system in a control cabinet



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

Examples of application

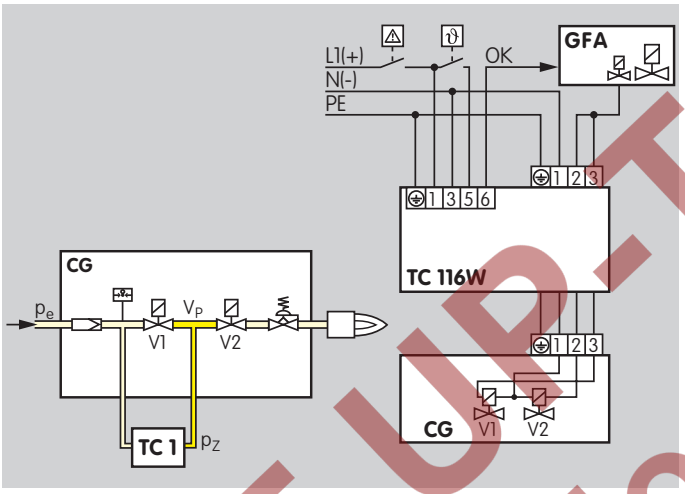


TC 116V with valVario controls

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

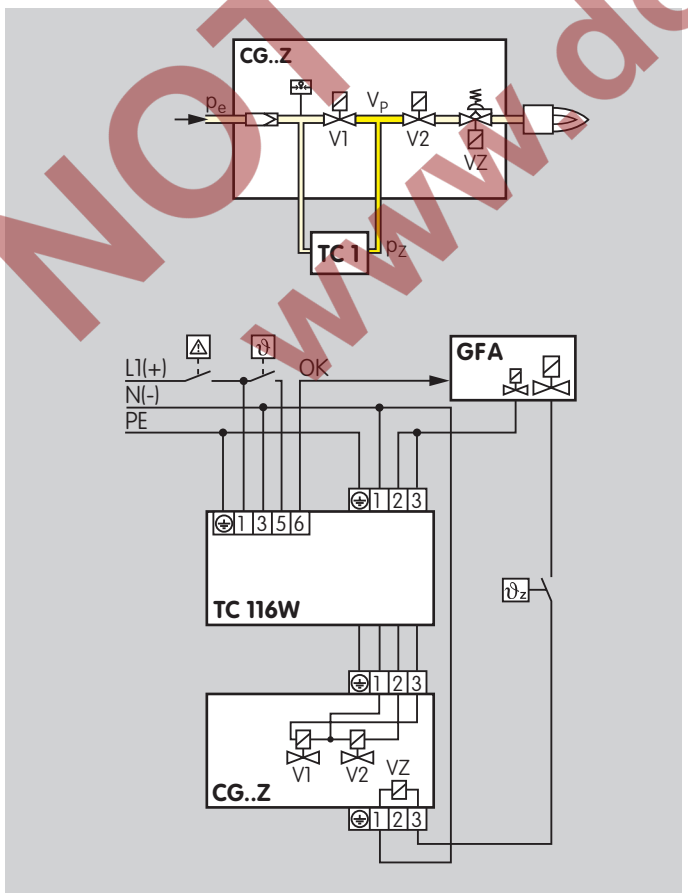


TC 116W with combination control CG..D or CG..V

The tightness control is directly mounted to combination control CG..D or CG..V.

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.

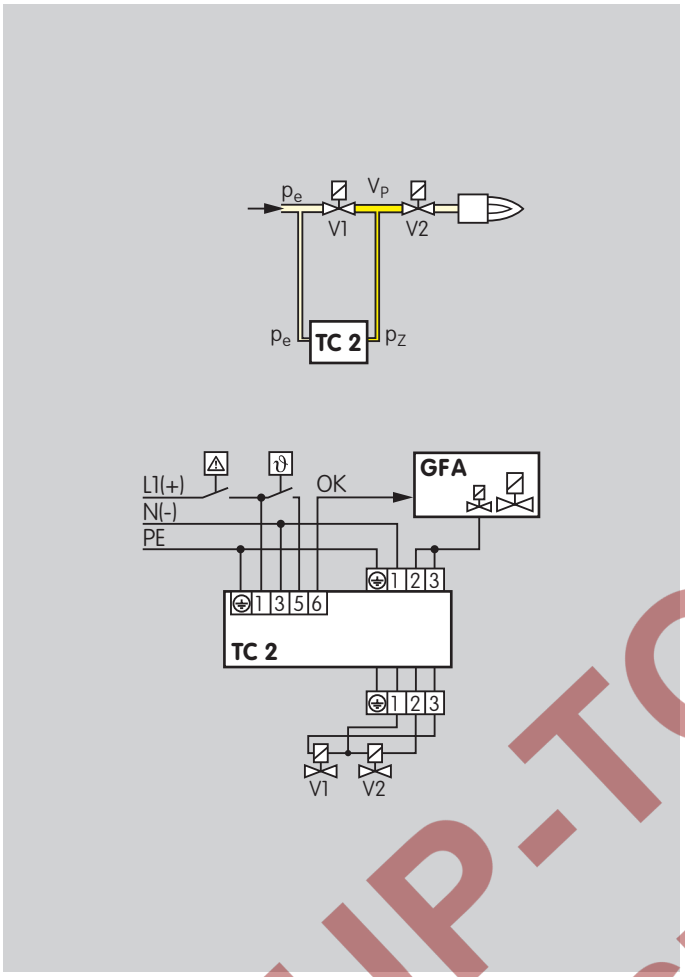
V1 and V2: quick opening valves.



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

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.

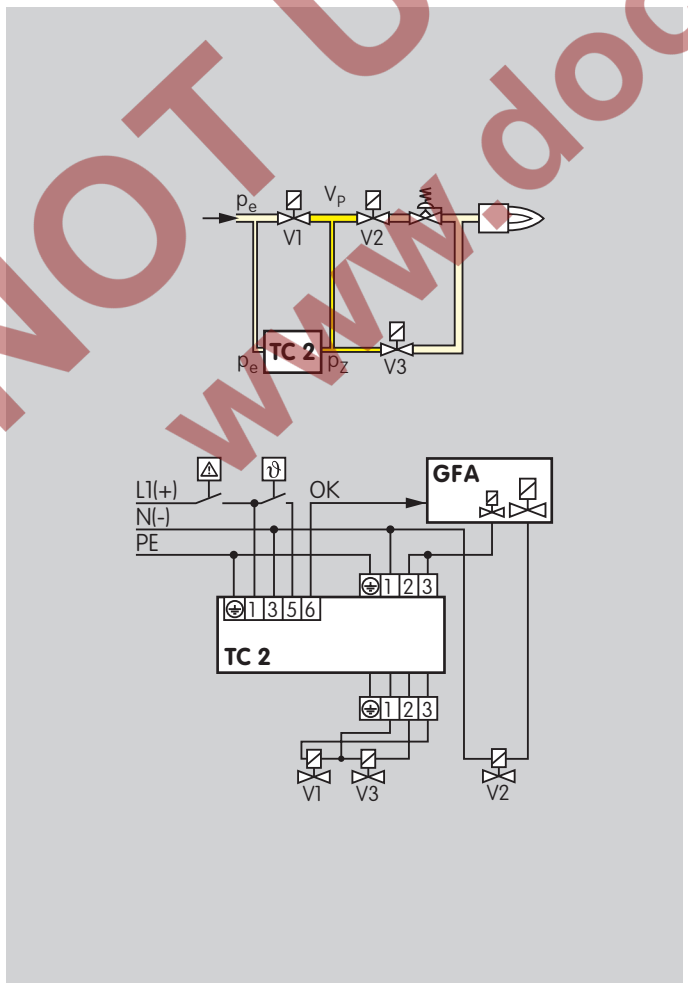


TC 2 with two gas solenoid valves

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.

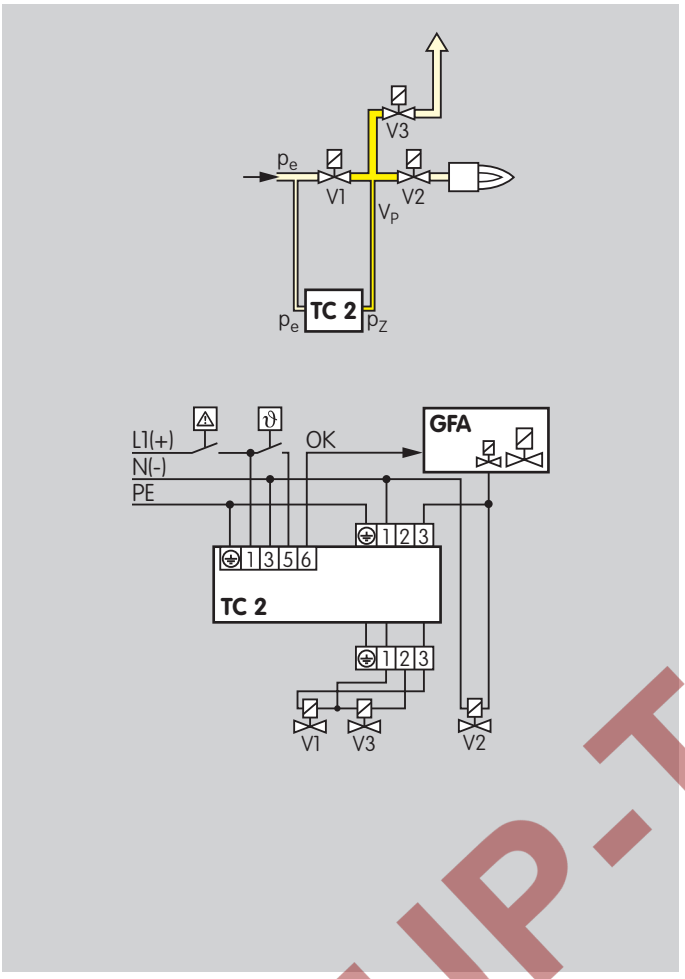


TC 2 with two gas solenoid valves and one pilot gas valve

Tightness control TC 2 checks the gas solenoid valves for tightness. The test volume is discharged into the combustion chamber. Auxiliary valve V3 can be used as a pilot gas valve.

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 opening, minimum nominal size = DN 15.



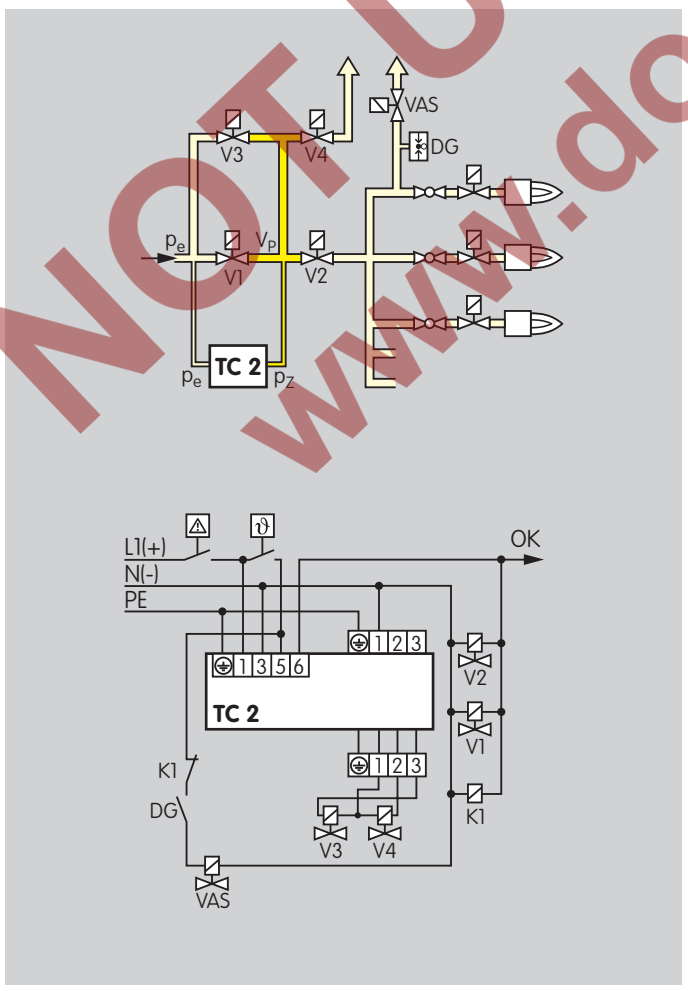
TC 2 with two gas solenoid valves and one auxiliary valve for discharge

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 into the open air via the roof. Thanks to the installed auxiliary valve V3, valve V2 can also be a slow opening motorised valve VK.

V1: quick or slow opening valves with start rate,
V2: any,
V3: quick opening, minimum nominal size = DN 15.



TC 2 with 3 valves installed in series

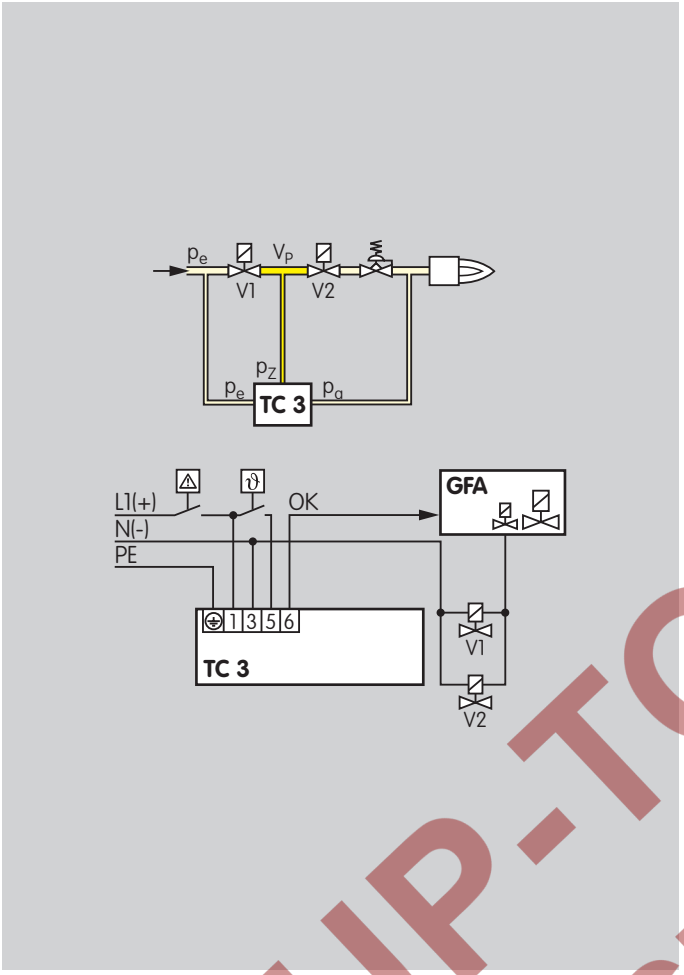
Tightness control TC 2 checks the central shut-off valve V1, the gas solenoid valve V2 and the auxiliary valves V3 and V4 for tightness.

The test volume is supplied via the auxiliary valve V3. The central shut-off valve V1 can thus also be a slow opening motorised valve VK. The test volume is discharged via auxiliary valve V4 and the relief line.

It must be ensured that the test volume can be supplied and discharged during the opening time of the gas solenoid valves. Therefore, the pressure switch DG monitors the pressure downstream of the gas solenoid valve V2 and switches when the set pressure is exceeded. Then the gas solenoid valve VAS opens and the pipe downstream of V2 is vented.

Once the tightness test has been carried out successfully, the tightness control TC 2 opens the shut-off valve V1 and gas solenoid valve V2. The tightness control forwards the OK enable signal simultaneously to the automatic burner control units. These open the burner valves and the burners start.

V3 and V4: quick opening, minimum nominal size = DN 15.

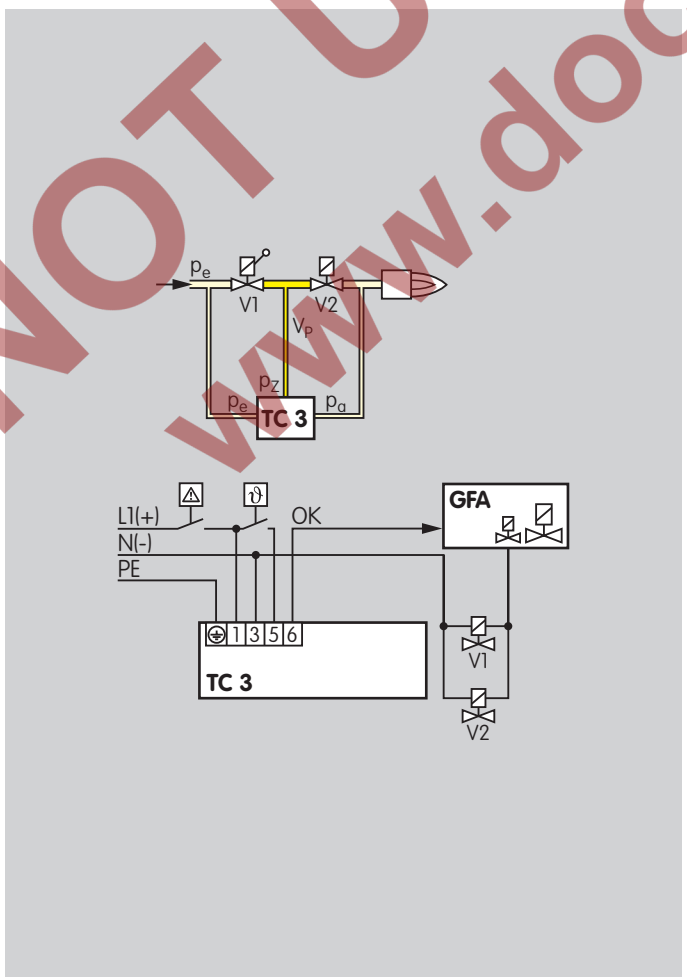


TC 3 with two gas solenoid valves

Tightness control TC 3 checks the slow opening gas solenoid valves or motorised 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 the gas solenoid valves V1 and V2 simultaneously. The burner starts.

V1 and V2: any.

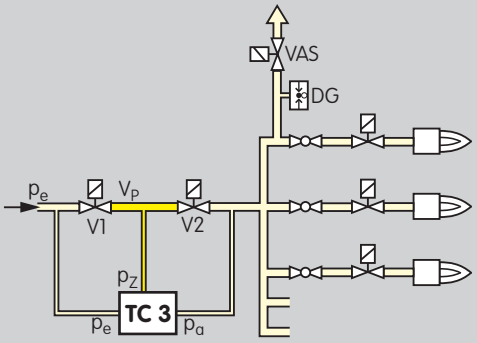


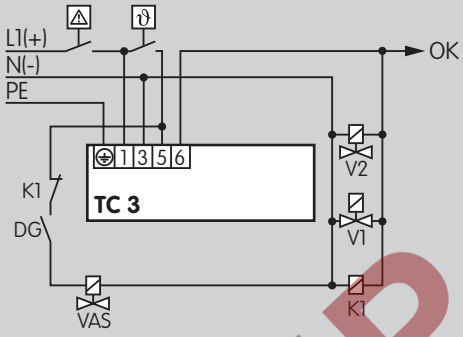
TC 3 with a manually resettable valve

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.



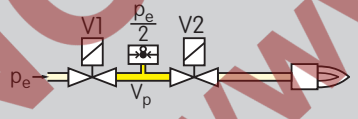


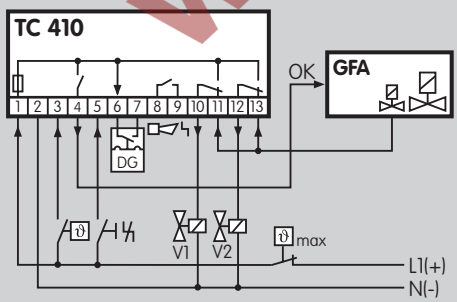
TC 3 in a multiple burner system

Tightness control TC 3 checks the central shut-off valve V1 and gas solenoid valve V2 for tightness. Both valves can also be motorised valves VK.

It must be ensured that the test volume can be supplied and discharged during the opening time of the gas solenoid valves. Therefore, the pressure switch DG monitors the pressure downstream of the gas solenoid valve V2 and switches when the set pressure is exceeded. Then the gas solenoid valve VAS opens and the pipe downstream of V2 is vented.

Once the tightness test has been carried out successfully, TC 3 opens the shut-off valve V1 and gas solenoid valve V2 and forwards the OK enable signal to the automatic burner control units. These open the burner valves and the burners start.





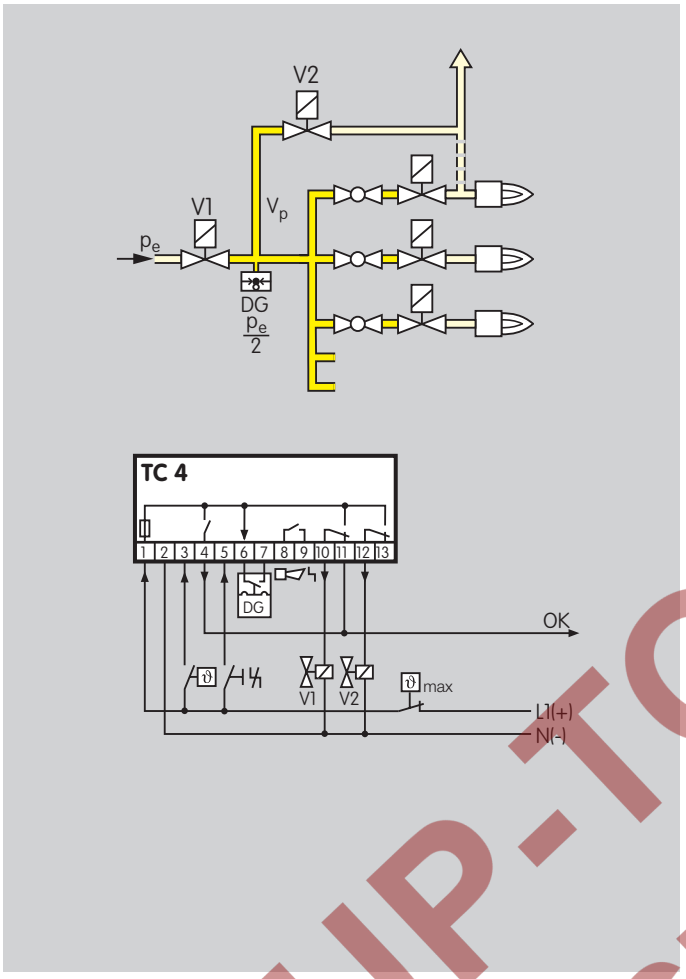
TC 4 with two gas solenoid valves

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

The external pressure switch 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.



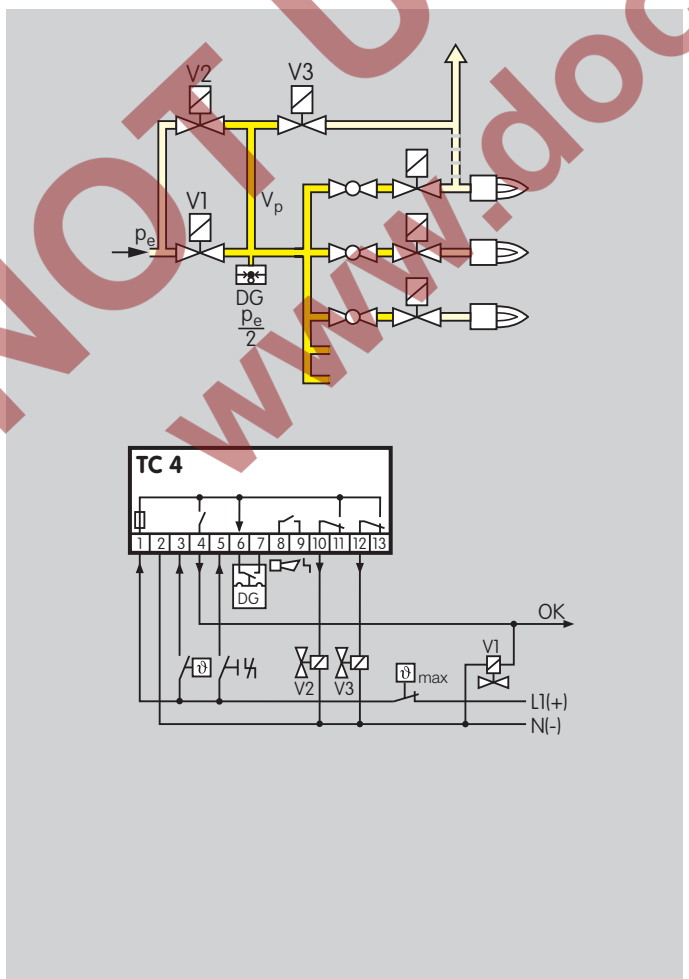
TC 4 in a multiple burner system with one auxiliary valve for discharge

Tightness control TC 4 checks the central shut-off valve V1, the auxiliary valve V2 and several burner valves for tightness. The external pressure switch 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 is discharged into the open air via the roof or into the combustion chamber.

V1: quick opening valve.
V2: quick opening, minimum nominal size = DN 15.



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 V2 and V3, and several burner valves for tightness.

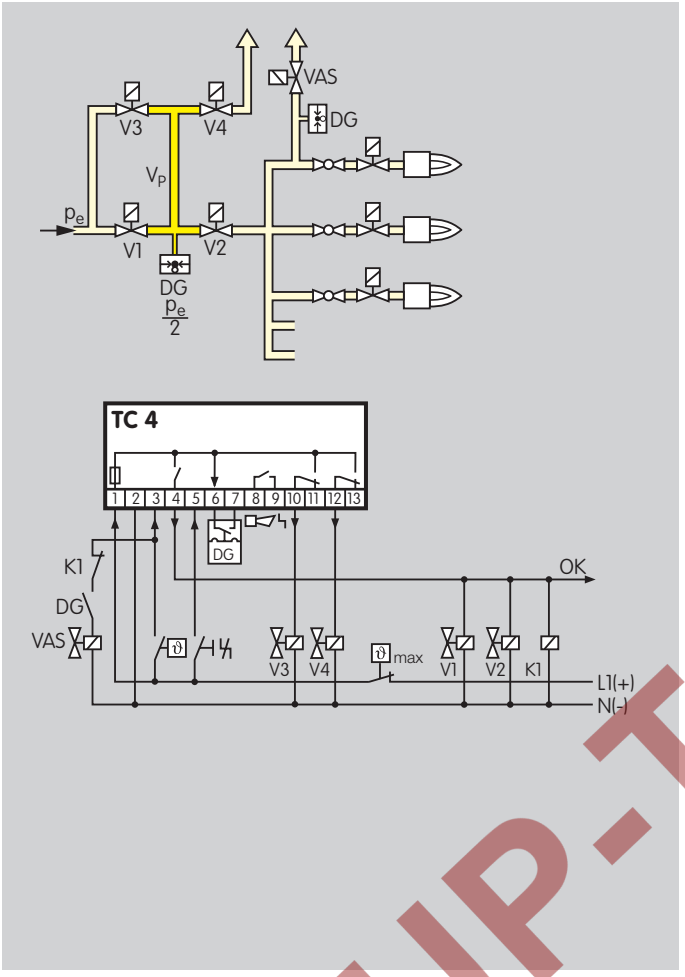
The test volume is supplied via the auxiliary valve V2.

The external pressure switch monitors the pressure between the gas solenoid valves and the burner valves.

Once the tightness test has been carried out successfully, TC 4 opens the central shut-off 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 is discharged into the open air via the roof or into the combustion chamber.

V1: any.
V2 and V3: quick opening, minimum nominal size = DN 15.



TC 4 with 3 valves installed in series

Tightness control TC 4 checks the central shut-off valve V1, the gas solenoid valve V2 and the auxiliary valves V3 and V4 for tightness.

The test volume is supplied via the auxiliary valve V3. The central shut-off valve V1 can thus also be a slow opening motorised valve VK. The test volume is discharged via auxiliary valve V4 and the relief line.

It must be ensured that the test volume can be supplied and discharged during the opening time of the gas solenoid valves. Therefore, the pressure switch DG monitors the pressure downstream of the gas solenoid valve V2 and switches when the set pressure is exceeded. Then the gas solenoid valve VAS opens and the pipe downstream of V2 is vented.

Once the tightness test has been carried out successfully, the tightness control TC 4 opens the shut-off valve V1 and gas solenoid valve V2. The tightness control forwards the OK enable signal simultaneously to the automatic burner control units. These open the burner valves and the burners start.

V3 and V4: quick opening, minimum nominal size = DN 15.

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%.

Power consumption:
10 VA for 110/120 V AC and 220/240 V AC,
1.2 W for 24 V DC.

Ambient temperature:
-15 to +60°C (+5 to +140°F), no condensation permitted.
2.5 mm² screw terminals.

Fusing:
fine-wire fuse 5 A, slow-acting, H pursuant to IEC 127, also protects the valve outputs and external operating signal.

External operating signal:
with mains voltage, max. 5 A resistive load (UL approved: 5 A for 120 V),
max. 2 A for cos φ = 0.35 (pilot duty).

External fault signal:
fault signalling contact, max. 5 A for 264 V.

Reset: using a button on the device.

Remote reset: by applying mains voltage.

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_e: 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.

TC 3: Power consumption of the installed valves during the opening time t_L: max. 9,5 VA (W).

Enclosure: IP 54.

Standard coupler plug to DIN 43650/ ISO 4400.

Weight:
TC 1: 550 g (1.21 lbs),
TC 2: 900 g (1.98 lbs),
TC 3: 1,500 g (3.31 lbs).

TC 4

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

The pressure switch is set to half the inlet pressure $p_e/2$. The switching differential may not exceed ±10% of the set switching pressure.

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.

External fault signal:
dry contact (not internally fused),
max. 1 A for 264 V, max. 2 A for 120 V.

Lower section with connection terminals.

5 knock-out holes for PG 11 cable gland or M16 plastic cable glands are pre-prepared.

Weight: approx. 400 g (0.88 lbs).

Maintenance cycles

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

Certification

EC type-tested and certified
pursuant to

- Gas Appliances Directive (90/396/EEC) of the standard "Valve proving systems for automatic shut-off valves for gas burners and gas appliances"

Meets the requirements of the

- Machinery Directive 98/37/EC in conjunction with the relevant sections of EN 746.
- Low Voltage Directive (2006/95/EC) in conjunction with the relevant standards.
- Electromagnetic Compatibility Directive (2004/108/EC) in conjunction with the relevant sections of IEC 801 relating to radiation, as well as EN 50093.

FM approved

TC 1, TC 2 and TC 3 for 120 V and 230 V,
TC 4 for 24 V, 120 V and 230 V
Factory Mutual Research Class: 7400 and 7411 Safety overpressure slam shut valves.

Designed for applications pursuant to NFPA 85 and NFPA 86.

UL approved

TC 1, TC 2 and TC 4 for 120 V
Underwriters Laboratories: UL 353 Limit control.

Canadian Standards Association:
CSA – C22.2 No. 24

Selection

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

Order example
TC 318R05T

	1	0	6	8	T	-1*	-10	R	N	V**	W	05	K	N	T
TC 1	●		●		○	●				●	●	●	●	●	●
TC 2	●			●	○	●		●	●			●	●	●	●
TC 3***	●			●	○	●		●	●			●	●	●	●
TC 4	●	●			○	●	●						●	●	●

Type = TC
Testing before or after burner run = 1
External pressure switch required = 0
6 mm (0,24") connection = 6
8 mm, ¼" (0,31") connection = 8
T-product = T
Test period 10 to 60 s = -1*
Test period 100 to 600 s = -10
Rp internal thread = R
NPT internal thread = N
Mounted to valVario controls using adapter plate = V**
Mounted to combination control CG = W
p_e max. 500 mbar (7.25 psig) = 05
Mains voltage
24 V DC = K
110/120 V AC, 50/60 Hz = N
220/240 V AC, 50/60 Hz = T

l = standard, v = available
* Designation "-1" only in type code for TC 4.
** An additional adapter plate is required for the TC 116V for attachment on the right- or left-hand side of valVario controls.
***Max. test volume V_p on TC 3.

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