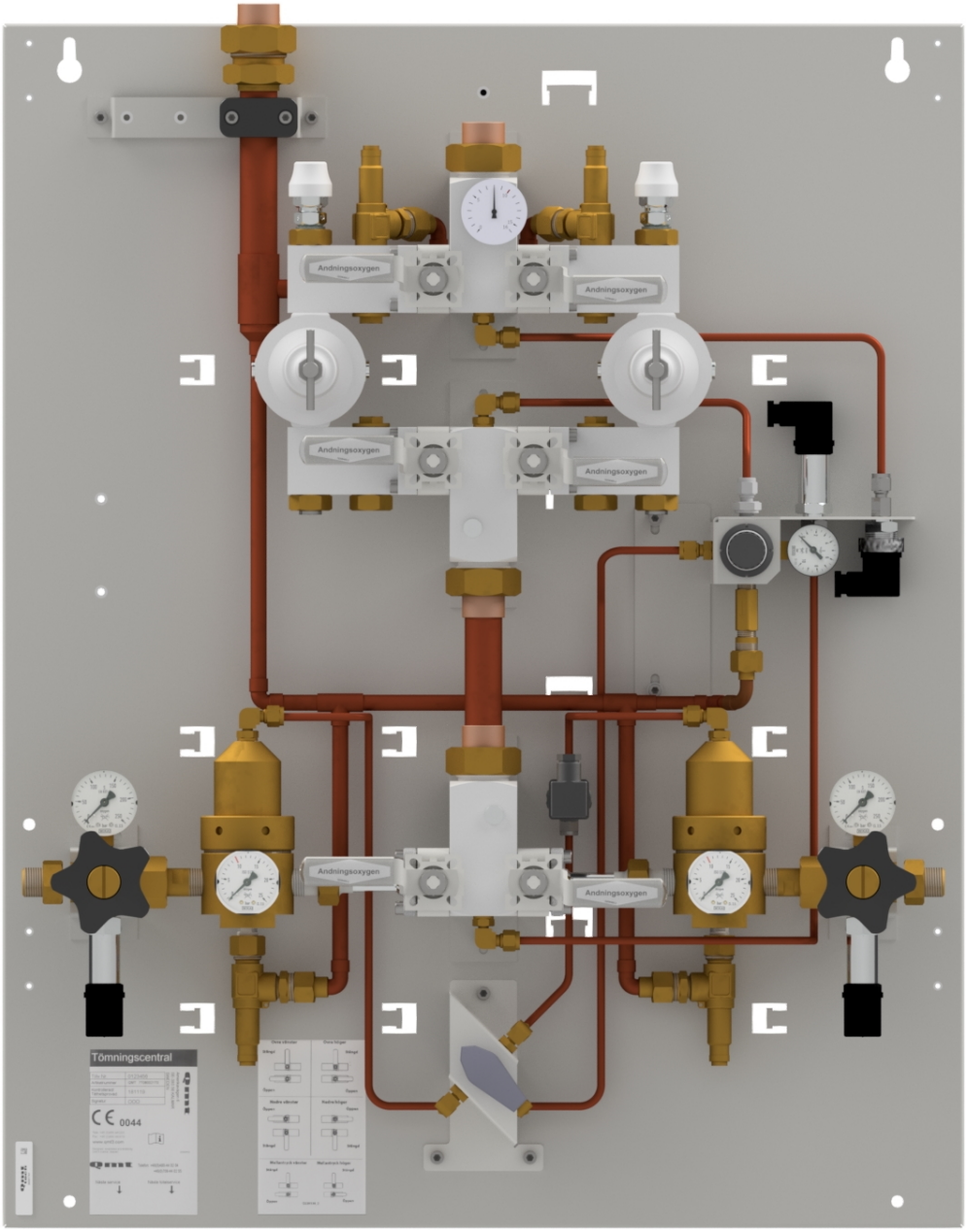
qmt tech care science

CE 0044

Operation & Maintenance
Switch-over station TC-80



Art. nr
QMT 7T08001-XX

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Table of Contents

General instructions

These instructions are to inform the user about this units function and construction.

- The unit shall not be oiled or greased, as this could lead to fire and / or explosion.
- The units shall only be used by persons who have received appropriate instructions for use.
- Use only original spare parts.
- The planned maintenance measures must only be carried out by Qmt-tech or by technicians authorized by this company.
- Do not remove the labels from the unit.
- Wear safety goggles when working with the unit.
- Vibrations during long transports can loosen couplings and connections and cause small leaks. Locate these leaks exclusively with leak detection fluid or with equipment designed for this.
- Do not loosen any components in the unit.

Intended use:
Decompression of medical gases, compressed or in liquid form, in medical gas distribution systems in accordance with the European standard EN ISO 7396-1 and SIS HB 370.
Gas used: see process gas under specifications or information on the type plate.

Supplier

Qmt-tech ab

General description

TC-80 is a switch-over station with automatic switch-over for decompression of medical gases. The unit consists of a stainless steel mounting plate, two high-pressure valves with a metallic seal, two high-pressure regulators, a valve for manual selection of the primary distribution side and two secondary pressure regulators.
The switch-over station can handle two pressure sources, a primary pressure source and a secondary pressure source. When the primary pressure source is depleted the switch-over station switches to the secondary pressure source (which now becomes the new primary source). The pressure sensor also sends an alarm about which source is being depleted.
The unit has been designed to ensure gas supply during necessary maintenance. Each pressure regulator can be switched off (with ball valves) separately. This means that the unit functions partially and thus guarantees non-interrupted gas service.
The unit is intended for use with medical gases. Decompression of medical gases, compressed or in liquid form, in medical gas distribution systems in accordance with the European standard EN ISO 7396-1 and SIS HB 370. Supply pressure and distributions pressure are protected by safety valves according to the above standards.

Specifications

Table 1

Art nr	Processgas	Max inlet pressure	Min inlet pressure	High pressure coupling
QMT 7T08001-1X	O_2	220 bar	10 bar	SS 36 76 15
QMT 7T08001-2X	N_20	110 bar	10 bar	SS 36 76 15
QMT 7T08001-3X	Air	220 bar	10 bar	SS 36 76 15
QMT 7T08001-5X	CO_2	110 bar	10 bar	SS 36 76 15

X indicates equipment options

Standard	Pressure transmitter (T)
Optional	Contact gauge (S),
Accessories	Digital display PA 430

Table 2

General data for all units

Distribution pressure	4-10 bar
Capacity	80 m^3/h
Operating temperature	0 till +50 °C
Accuracy of manometers	1,6% of full scale
Outlet connection	Ø28 brazing connection
Connection of high pressure sensor	G1/4”
Safety valve connection	Ø28 brazing connection
External dimensions (mm)	See drawing under Installation instructions

The unit has been manufactured in accordance with the following standards:
EN ISO 10524-2
EN ISO 15001
EN 837-1
EN ISO 7396-1
SIS HB 370
SS 36 76 15
EN ISO 21969

Installation instructions

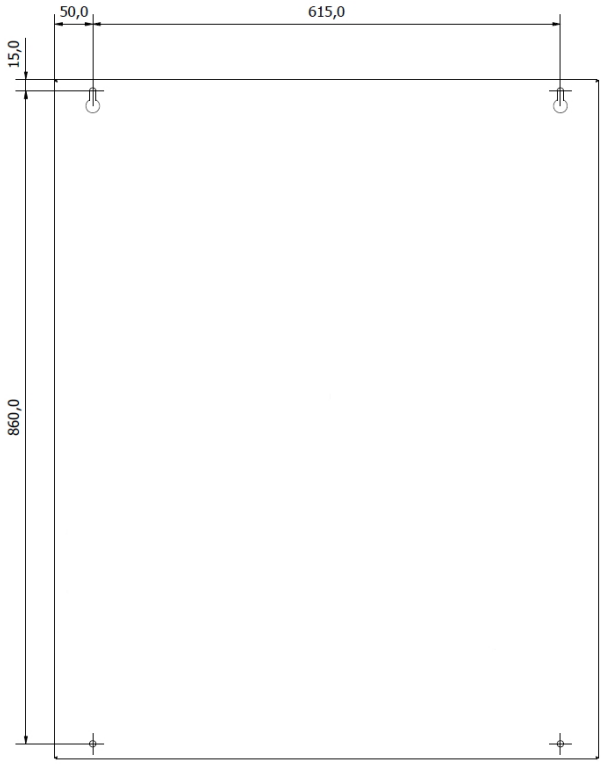
- The installation should be carried out by technicians with good knowledge of medical gas systems and brazing qualification according to SIS HB 370 or by qualified technicians from Qmt-tech ab.
- Do not use grease or oil.
- Wear safety goggles when working with the unit.
- The switch-over station shall be installed in accordance with EN ISO 7396-1, SIS HB 370 and current building standards.
- Do not remove protection plugs until installation.

NOTE! Read Manifold Operation and Maintenance before installing the high pressure connections.

- Install high pressure connections that are designed in accordance with the requirements of SS 36 76 15, EN ISO 7396-1 and EN ISO 21969.
- Check that the high-pressure connections and all parts upstream of the control panel are completely clean and degreased.

Installation (see also Component list)

1. Remove the unit from its packaging at the time of installation.
2. Attach the unit to a wall or other solid surface, see dimensional drawing.
3. Braze copper pipes to the brazing couplings that come with the unit. NOTE! Install a shut-off valve directly downstreams of the unit.
4. Connect the high pressure connections to the inlet connections (1V and 1H). Make sure that the threads comply with the reference standard specified in Table 1, the high pressure connection must comply with the standard EN ISO 21969 and SS 36 76 15.
5. Make the connection between the high-pressure connection and the inlet using two tools to avoid twisting the coupling.



Connection of the safety valve connection
The European standard EN ISO 7396-1 and SIS HB 370 states that outlets from safety valves must be vented outdoors. NOTE! venting outdoors is not required for AIR.
1. Braze a copper pipe to the brazing connector supplied with the unit.
2. Make sure that the copper pipe is vented outdoors (not a requirement for AIR).

Check during the installation phase
1. When all connections have been made, pressurize the unit by SLOWLY opening the high pressure valves of the manifolds and gas cylinder. All valves in the unit must be closed.
2. Check with leak detection spray if there is a leak in the high-pressure inlet connection (1V, 1H). If there are leaks, replace the inlet gasket and check that the connection is clean.
3. Slowly open the high pressure valves (2V and 2H) and check that the pressure gauges (6V and 6H) show the value of the inlet pressure.
4. Open the shut-off valves (17V, 17H).
5. Check the pressure on the pressure gauge (5). 13 bar standard.
6. Open the shut-off valves (10V, 10H, 13V, 13H).
7. Check that the pressure gauge (7) shows the distribution pressure set for the system (4-10 bar).
8. Check with a suitable leak detection spray or other suitable equipment if there are any leaks at the connection points.

Check of the switch-over function
1. Make the unit distribute gas.
2. Check that the valves (2V and 2H) are open and that the gas sources are connected.
3. Identify the primary depletion side, the valve handle points to the primary depletion side.
4. Close the valve (2) on the depletion side.
5. Check that the pressure drops on the high pressure gauge for the selected depletion side. When the pressure has dropped to about 10.5 bar, the unit switches operating side.
6. Open the closed valve (2) again and perform the switch-over on the opposite side by turning the valve handle to the oposite side and closing the valve (2) on the new drain side.

Preheater
If CO_2 and N_2O are used as medicated gas, it can be necessary to use suitably dimensioned preheaters located at the inlet to the unit. Qmt-tech ab can supply these devices.

Alarm
For connection and information, see separate manual for the alarm system.

Use

When the installation is done according to the Installation Instructions, the unit is ready to distribute gas to the medical gas pipeline system.

Pressurization of the pipeline system:

- Close all valves in the unit and also the shut-off valve directly downstream of the unit
- Carefully open the right gas cylinder valve, check the high pressure on the pressure gauge (6H)
- Carefully open the left gas cylinder valve, check the high pressure on the pressure gauge (6V)
- Carefully open the right high pressure valve (2H), check the pressure on the pressure gauge (5H)
- Carefully open the left high pressure valve (2V), check the pressure on the pressure gauge (5V)
- Carefully open the right shut-off valve (17H) and then the left shut-off valve (17V)
- Carefully open the right shut-off valve (10H)
- Carefully open the right shut-offvalve (13H), check the distribution pressure on the pressure gauge (7)
- Carefully open Left shut-off valve (10V)
- Carefully open the left shut-off valve (13V), check the distribution pressure on the pressure gauge (7)
- Finish by very slowly opening the shut-off valve directly downstream of the switch-over station until the entire piping system is pressurized.

The switch-over station is now ready for use

Replacement of depleted gas source:

The example indicates the right operating side.

- The pressure on the right-hand operating side drops below 20 bar
- The right pressure sensor (3H) and connected alarm unit indicates right source depleted.
- Turn the primary side selection valve handle (8)
- Close the high pressure valve (2H) and check that the left gas source is connected and that the left high pressure valve (2V) is open
- Check that the switch-over has been performed by acknowledging the switch-over alarm
- Replace the depleted gas sources
- Open the high pressure valve (2H) very carefully

Adjustment

The unit is delivered pre-set with an outlet pressure according to Table 2 or customer-specific distribution pressure with an inlet pressure of 200 or 50 bar depending on gas type. Changes to the outlet pressure may only be made by qualified technicians from Qmt-tech ab.

QMT 7T08001-1X	O_2	4,5 bar
QMT 7T08001-2X	N_20	4,0 bar
QMT 7T08001-3X	Air	5,0 bar
QMT 7T08001-5X	CO_2	4,0 bar

Maintenance

Instructions for maintenance

- Perform maintenance with the correct instrument and combination wrenches
- All instruments used for maintenance must be clean and degreased
- Wear safety goggles during maintenance
- Maintenance should only be performed by Qmt-tech ab or by technicians authorized by Qmt-tech ab.
- The spare parts must be original parts from Qmt-tech ab.
- Qmt-tech ab disclaims all responsibility for maintenance and installations performed by personnel who are not expressly authorized and qualified for the assignment.
- Qmt-tech ab disclaims all responsibility if spare parts other than original spare parts are used.

We recommend that you record in a maintenance sheet all the measures that has been performed to the unit by the technician. On the last page of this manual there is an example: The first part must be compiled during installation, the second part can be copied and filled out for each maintenance operation. The maintenance sheet must be made available to the technician who makes maintenance measures to the unit.

Planned maintenance

- Every three years, the pressure regulators (9V and 9H) must be replaced at service.
- Every three years, change what is included in the replacement kit for the second-stage regulators (11V and 11H).
- Every year, make a general check of the settings, check for leaks and also check that the unit performs the switch-over correctly.

Replacement of the pressure regulators may only be done by qualified technicians from Qmt-tech ab.

Check every quarter

Perform the following checks at least every three months.

- Check that the pressure shown on the pressure gauge (7) is at the distribution pressure set for the system.
- Check for leaks at various connection points with leak detection spray or other suitable equipment.
- Check that the valves (2V and 2H) are fully open.
- Check that the unit performs the switch-over correctly (see "Check of the switch-over function").
- If the swicth-over does not work properly check that the pressure gauges (5V and 5H) show the same pressure when the valve for selecting primary side (8) is set to both left and right side.

Check that the switch-over works correctly

The test must be carried out when the unit distributes gas.

Operating side right (valve handle turned to the right):
(For operating side left, the operations are performed mirror-inverted to the symmetrical components.)

1. Close the valve (2H)
2. Check that the alarm signals right source depleted when the pressure indicated by the pressure gauge (6H) drops below 20 bar.
3. Check that the switch-over is performed. If the switch-over is not performed, carefully open the valve (2H) immediately. Turn the valve very slowly to prevent adiabatic compression.

Troubleshooting

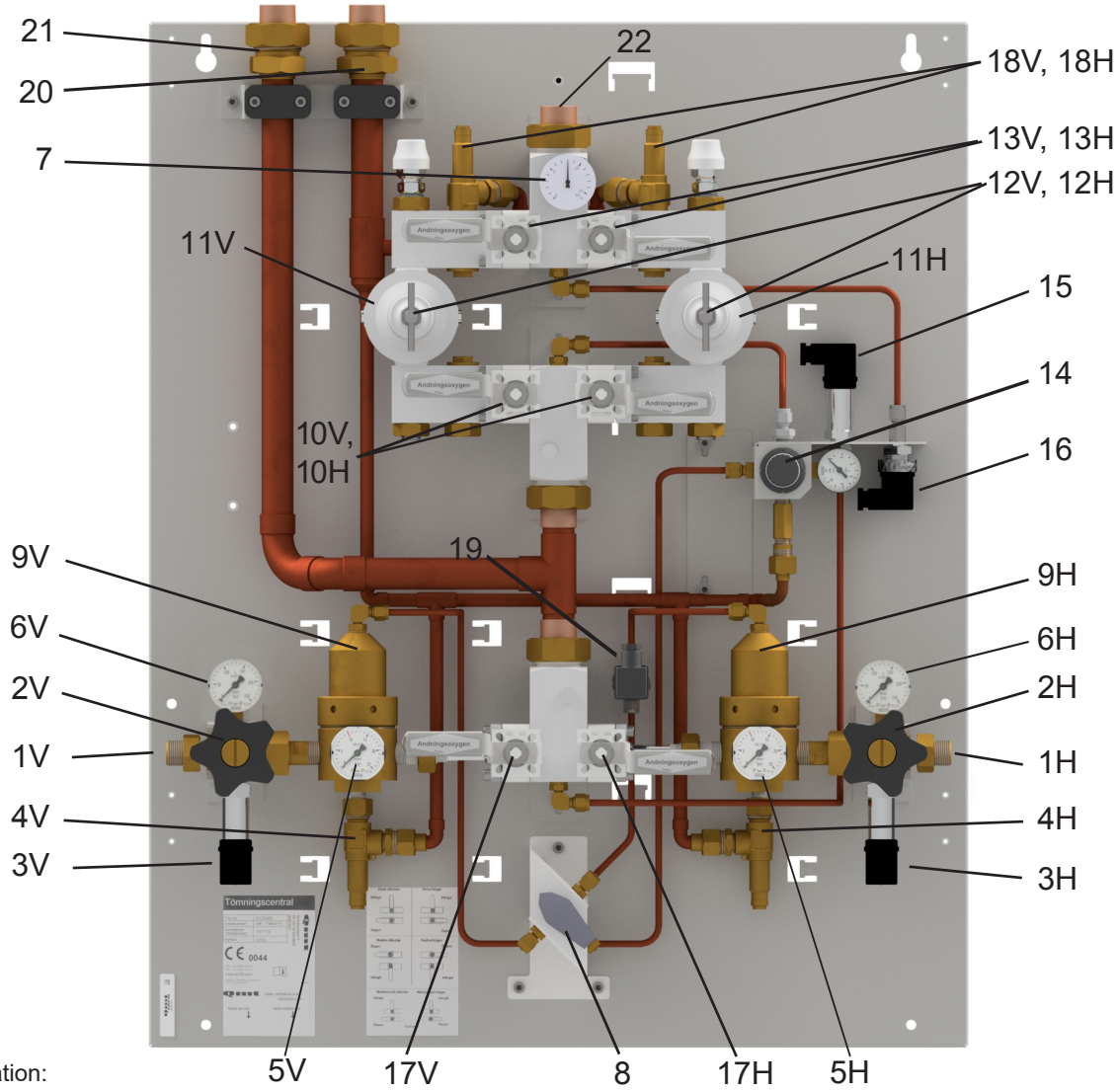
The switch-over station does not switch operating side

- Check that the left side is pressurized by reading the pressure on the pressure gauge (6V); if the side is empty, check that the valve (2V) is open. If so, replace the empty gas source and check why the fault has not been signaled and why the spare side is empty.
- If the side is pressurized, one reason may be that the pressure regulators (5V and 5H) are not set to the same outlet pressure.

The alarm does not sound an alarm after closing the valve (2V). Note that the troubleshooting must apply to the current equipment option.

- Check that the unit distributes gas and that the pressure on the pressure gauge (6H) drops below 20 bar.
- If this happens, the problem can be located to the pressure sensor or the alarm. The fault is dependent on the current equipment option.
- Check that the connection between alarm and pressure sensor is correct. (See manuals for alarms and pressure sensors)
- Check with measuring equipment intended for this, that the pressure sensor emits correct signal. If this is not the case, the pressure sensor must be replaced.

List of components



Explanation:
Observe equipment options

1	Inlet connection, gas-specific
2	High-pressure shut-off valve with seat and metal seal which has passed the adiabatic pressure test in accordance with EN ISO 7396-1
3	Pressure sensor 0-300 bar, 4-20 mA signal / Pressure switches high pressure preset at 20 bar that have undergone adiabatic pressure test in accordance with EN ISO 7396-1
4	Safety relief valve, opening pressure 16 bar
5	Pressure gauge for first-stage pressure level in accordance with EN 837-1
6	Pressure gauge for high pressure in accordance with EN 837-1.
7	Distribution pressure gauge in accordance with EN 837-1
8	Valve for selection of primary operating side
9	High pressure regulator (first-stage pressure regulator)
10	Shut-off valve
11	Distribution pressure regulator (second-stage pressure regulator)
12	Screw for adjusting the distribution pressure
13	Shut-off valve
14	Pilot regulator for adjusting the pilot-pressure (switch-over function)
15	Pressure sensor for first-stage pressure 0-25 bar, 4-20 mA signal
16	Pressure sensor for outlet pressure 0-16 bar, 4-20 mA signal
17	Shut-off valve
18	Satfety relief valve, opening pressure 6,5 bar (or 10,0 bar depending on configuration)
19	Pressure switch indication operating side
20	Outlet from safety relief valve
21	LOX tank connection (Option)
22	Distribution pressure connection

Pressure sensors and pressure switch

Order number for pressure sensor: QMT 7217893
Degreased for oxygen use
Maximum pressure: 300 bar
Alarm range: 0-300 bar
Signal: 4-20 mA
Protection: IP65
Media-affected parts in stainless steel and FKM. The house is made of stainless steel.

Order number for pressure sensor: QMT 7217374
Degreased for oxygen use
Maximum pressure: 50 bar
Alarm range: 0-25 bar
Signal: 4-20 mA
Protection: IP65
Media-affected parts in stainless steel, FKM and aluminum oxide 96%, ceramic base. The house is made of stainless steel.

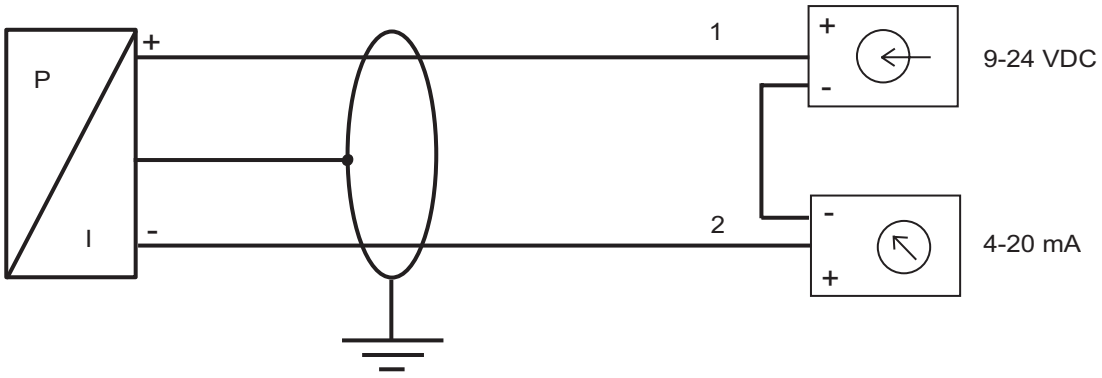
Order number for pressure sensor: QMT 7-TRANS-16
Degreased for oxygen use
Maximum pressure: 50 bar
Alarm range: 0-16 bar
Signal: 4-20 mA
Protection: IP65
Media-affected parts in stainless steel, FKM and aluminum oxide 96%, ceramic base. The house is made of stainless steel.

Order number for pressure switch: QMT 7217450
Degreased for oxygen use
Burst pressure: 80 bar
Maximum working pressure: 25 bar
Media-affected parts in stainless steel.

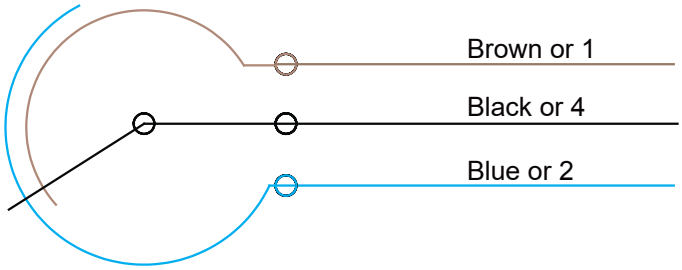
Equipment options

Each pressure sensor, microswitch and contact gauge are equipped with a 3 m long cable. The cables are marked with the gas that the pressure sensor, microswitch or contact gauge monitors.

Pressure sensor



Contact gauge



Connect to low alarm Connect

to common conductor Connect

to high alarm

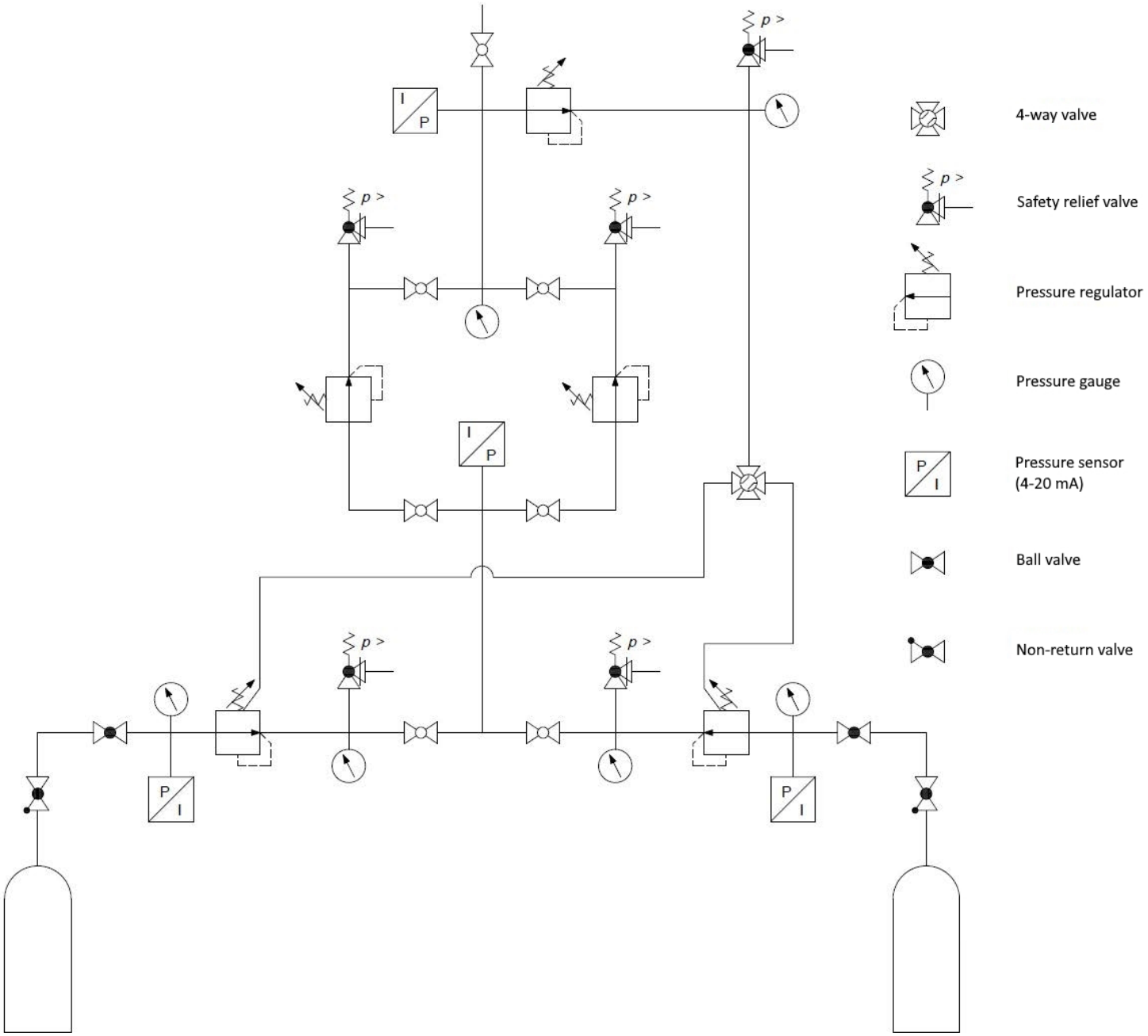
Pressure switch

Side indication

(Max 24 V)

1 = Left
0 = Right

FLOW CHART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4-way valve
Safety relief valve
Pressure regulator
Pressure gauge
Pressure sensor
(4-20 mA)
Ball valve
Non-return valve

SPARE PARTS

Equipment options pressure sensor, contact gauge

Spare parts codes

Marking	Art. nr	Description
6V - 6H	QMT 7219131	Pressure gauge high pressure 0-315 bar for switch-over station QMT 7T08001-1X and QMT 7T08001-3X (gas O2 and Air)
6V - 6H	QMT 7217945	Pressure gauge high pressure 0-100 bar for switch-over station QMT 7T08001-2X and QMT 7T08001-4X (gas N2O and CO2)
6V - 6H	QMT 7200300	Contact gauge (Optional)
7	QMT 7219130	Pressure gauge for low pressure
4V - 4H	QMT 76SÄK22XX	Safety relief valve
2V - 2H	QMT 787091073	Valve for high pressure
3V - 3H	QMT 7217893	Pressure sensor 0-300 bar for bottle pressure
18V - 18H	QMT 76SÄK22XX	Safety relief valve (XX = 6.5 or 16 bar release pressure)
18	QMT 7217374	Pressure sensor 0-25 bar for first-stage pressure
19	QMT 7TRANS16	Pressure sensor 0-16 bar for distribution pressure

Warning

Qmt ab products must not be exposed to temperatures exceeding 100 ° C during installation, service or operation. Should this happen, or suspect that this has happened, the product must be replaced and the system decontaminated. In the event of fire, the affected section must be separated and decontaminated immediately before operation.
Do not install any product from Qmt ab if the sealing plugs have been removed. The product may be contaminated and unsafe to install in medical gas systems.

Scope of the manual

Semi-automatic; automatic switch-over from primary to secondary gas source with manual selection of primary operating side.

The manual applies to the following products:

Art.nr	Description
QMT 7T08001-1X	Switch-over station TC-80 Oxygen
QMT 7T08001-2X	Switch-over station TC-80 Nitrous oxide
QMT 7T08001-3X	Switch-over station TC-80 Air
QMT 7T08001-5X	Switch-over station TC-80 Carbon dioxide

X indicates equipment options

Standard	Pressure sensor (T)
Optional	Contact gauge (S), Microswitch (M)
Accessories	Digital display PA 430 (QMT 7217908)
	Manifold, 3 connections (QMT788XX-2008M, XX indicates gas type)

Switch-over station for decompression of medical gas,
compressed or in liquid form. Supplier: Qmt-tech ab

Art. nr:	
Set:	
Installation data:	
Process gas:	
Distribution pressure:	

Maintenance sheet

Maintenance data:	
Suitable company for maintenance:	
Search for leaks:	
Check of distribution pressure:	
Check of switch-over:	
Check of alarm system:	

Repaired or replaced components

Remarks:

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