



tz-air drier

– without brake control valve

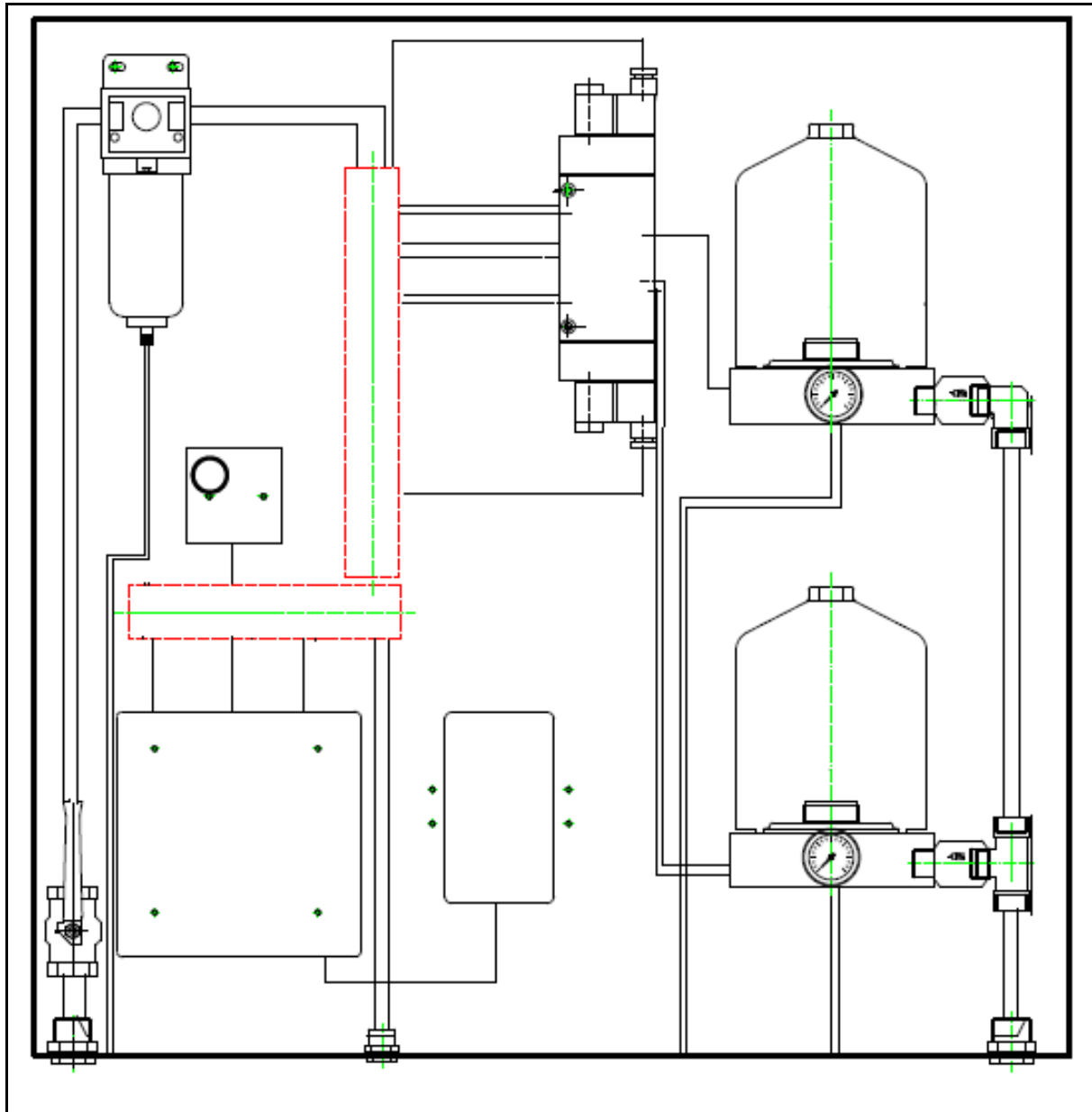


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Particular Safety Instructions and Symbols Used

In the following operating manual, concrete safety instructions are provided to advise against unavoidable residual hazards involved in the operation of the device. These residual hazards include danger posed to:

- persons
- product and machines
- environment

The symbols used in this operating manual are primarily intended to draw attention to the safety instructions!

The most important objective of the safety instructions is to avoid damage to persons. The respective symbol used cannot replace the text of the safety instructions. Therefore, the text must always be read completely!





<p>This symbol shows that dangers to persons are primarily to be expected. (Danger of death, risk of injury)</p>	
<p>This symbol shows that dangers regarding hand injuries are primarily to be expected.</p>	
<p>This symbol shows that dangers regarding hand injuries from hot surfaces are primarily to be expected.</p>	
<p>This symbol warns of dangers that can affect the explosion protection or cause a danger of explosion.</p>	

Table 1: Symbols Used

1 General Information

Copyright

Tüschen & Zimmermann holds the copyright for all documents bearing the signature of Tüschen & Zimmermann (tz) and which you received together with the product or otherwise from Tüschen & Zimmermann. Such documents may neither be made available to third parties nor otherwise improperly used without the prior written approval by Tüschen & Zimmermann.

In-house Use of the Documentation

Tüschen & Zimmermann allows you to use the documentation only for your own in-house use.

1.1 Foreword, General Notes

This installation and operating manual is intended to aid you in safely, correctly and economically using the tz-air drier. Observing the instructions given in this manual will help you:

- to increase the reliability and service life of the brake system,
- avoid dangers,
- avoid repairs and downtimes.

This manual must be kept at hand at all times while installation, maintenance and repair works are carried out and it must be read and observed by every person carrying out work on the tz-air drier. The tz-air drier has been built in accordance with state-of-the-art technology and in compliance with the generally accepted regulations on technical safety. Nevertheless, there still may be possible risks to the life and limb of the user or third persons and/or risks of damage to the machine or other property if the product is used or handled incorrectly. The manufacturer reserves the right to make changes to improve the product properties without providing any particular announcement.

In addition to this operating manual, the relevant country-specific statutory provisions and regulations on accident prevention must be observed. Comply with the safety and accident prevention regulations of

- the mine,
- the mining authority,
- the Bergbauberufsgenossenschaft (professional mining association) or other competent professional associations.

Furthermore, read attentively and carefully the operating manual on the components required for the operation, such as those belonging to the gearbox, the electric motor, the conveyor, etc. Clarify any questions that may arise before starting work.

1.1.1 Intended Use

Strictly observe the warnings according to 4.4 , as well as safety instructions according to 4.5 .

The tz-air drier is used for the treatment of compressed air for tz-brakes of the type series PL for maximum 4 brakes and is pre-connected to the tz-P-E distribution board.

Any different use or use in excess of this is not regarded as intended use.

Intended use also includes compliance with this operating manual and adherence to the inspection and maintenance instructions and intervals.

The measures are within the operator's area of responsibility and must be verified by the installation company of the plant.

Damage resulting from any use other than the intended use shall not be the responsibility of the manufacturer. The risk is solely borne by the user/operator. Spare parts must comply with the technical requirements stipulated by tz. This is always ensured when original spare parts are used as they are subject to continuous quality control.



1.2 General Safety Instructions

1.2.1 Work on the tz-air drier

DANGER!

Ensure with regard to all work at the tz-air drier that the plant has been shut down. Maintenance and repair work must only be performed at a depressurised system and with the pressure supply turned off.

Danger of death! Do not open any components while they are under pressure.



Interventions in the tz-air drier during an ongoing operation may close open brakes accidentally and trigger an unintended, uncontrolled deceleration (Fail-safe feature).

1.2.2 Handling of Oils and Greases

ATTENTION!

Follow the applicable safety regulations when handling oils, greases and other chemical substances.



Skin contact:	Avoid longer and repeated contact; after contact clean affected part of the body with soap and water. Use skin protection products during work. Possibly wear oil-resistant protective clothing (e.g. safety gloves, safety goggles). Do not wash hands with petroleum, solvents or emulsions.
Eye contact:	Rinse eyes with plenty of water. If eye irritation remains, seek medical advice.
Ingestion:	Do not induce vomiting. Seek medical aid immediately.
Environment:	The environment can be polluted by operating media. Therefore, they must not get into air, soil or water.
Safety data sheets:	They contain details on health, accident and environmental protection and can be obtained from the manufacturer.

Table 2: Handling of Oils and Greases

1.2.3 Transportation, Assembly and Disassembly

ATTENTION!

During transportation, installation and removal works, the transport units, sub-assemblies or individual parts must be carefully attached and secured to lifting appliances and load-lifting equipment with sufficient load-carrying capacity.



You can be severely injured or killed by falling objects. Only use appropriate load-lifting equipment.

If the fully installed tz-air drier has to be transported attached to other parts or systems, it must be protected against mechanical damage (e.g. impacts).

1.2.4 Personnel

The personnel working on the brake system must be familiar with the operating manual, and in particular, with Chapter 1. The generally accepted technical regulations must be observed when assembling and disassembling the product. The specific safety regulations must be complied with in particular while carrying out any work on the electrical and pneumatic equipment. In Germany, the current version of the "Sicherheitslehrbrief für Handwerker (Safety Requirements for Craftsmen)" must be complied with.

1.2.5 Operation, Maintenance and Servicing

Strictly observe the warnings according to 4.4, as well as safety instructions according to 4.5.

The safety and accident prevention regulations apply during operation.

This device coupling has been equipped with protective equipment. Modifications, attachments and / or conversions of the tz-air drier may impair safety, and must never be performed without the approval of tz.



ATTENTION!

The operating pressure must not exceed 10 bar!

The operator is responsible not to subject the device to unacceptable shocks or vibrations.



Regularly, but at least once per month, check the tz-air drier for external damage, cracks and fractures, dirt (particularly grease and oil) or other defects. If necessary, operation of the plant has to be stopped immediately and secured against unauthorised restart. Spare parts must comply with the technical requirements stipulated by tz. This is always ensured when original spare parts are used, as they are subject to continuous quality control.

Appropriate workshop equipment must be used when performing repair or work. The rules and regulations for electrical installations must be complied with. Failure to comply with the relevant safety regulations and instructions when using, operating, servicing or repairing the equipment may cause serious and/or fatal injuries.

Maintenance and repair work must only be performed at a depressurised system and with the pressure supply turned off. Danger of death! Do not open any components while they are under pressure. All additional installation locking devices must be removed before recommissioning.

1.2.6 Protection of the Environment

ATTENTION!

Operating resources, auxiliaries and replaced parts must always be disposed of in a safe and environmentally compatible manner. The relevant country-specific regulations must be observed. When handling oils, greases and other chemical substances, the safety instructions and regulations for this product must be complied with.



1.2.7 Residual Hazard

In order to avoid these residual hazards, the respective safety instructions contained in this operating manual must be strictly observed!

This section contains a summary of residual hazards which may occur during the transportation, storage, installation, operation, maintenance and repair works.

Mechanical hazards:

- Over-stretching and tearing off of cables and hoses.
- Insufficient stability

Electrical hazards:

- Damaged or defective lines and components

Thermal hazard:

- Burns due to contact with hot parts. Ignition due to sparks.

Hazard due to the temporary failure of protective devices:

- Temporarily missing protective devices or bridging of control devices or similar items while carrying out repair or maintenance work may cause crushing or shearing of body parts.

Hazards caused by the entire machine and the failure of electrical or pneumatic energy have to be taken into consideration by the installer of the entire machine by taking appropriate measures and must be included in their risk analysis.

1.3 General Information

The tz-air drier was built for drying compressed air.

Manufacturer:	Tüschchen & Zimmermann GmbH & Co. KG (Address: see cover sheet)	
Definition:	tz-air drier	
Technical Data:	Weight:	approx. 50 kg
	Dimensions:	760x760x210
	Operating material:	Compressed air
	Ambient temperature:	-25°C to +50°C
	Supply pressure (network):	3,5 - 10 bar
	Mounting position:	vertical
	Additional information:	see Annexes
Scope of delivery:	1 pc. tz-air drier	
	1 pc. Installation and Operating Manual (The installation and operating manual includes all installation or conformity declarations required regarding the components included.)	
Copyright tz 2009		Protection mark according to DIN 34

Table 3: General Information

1.4 Device description

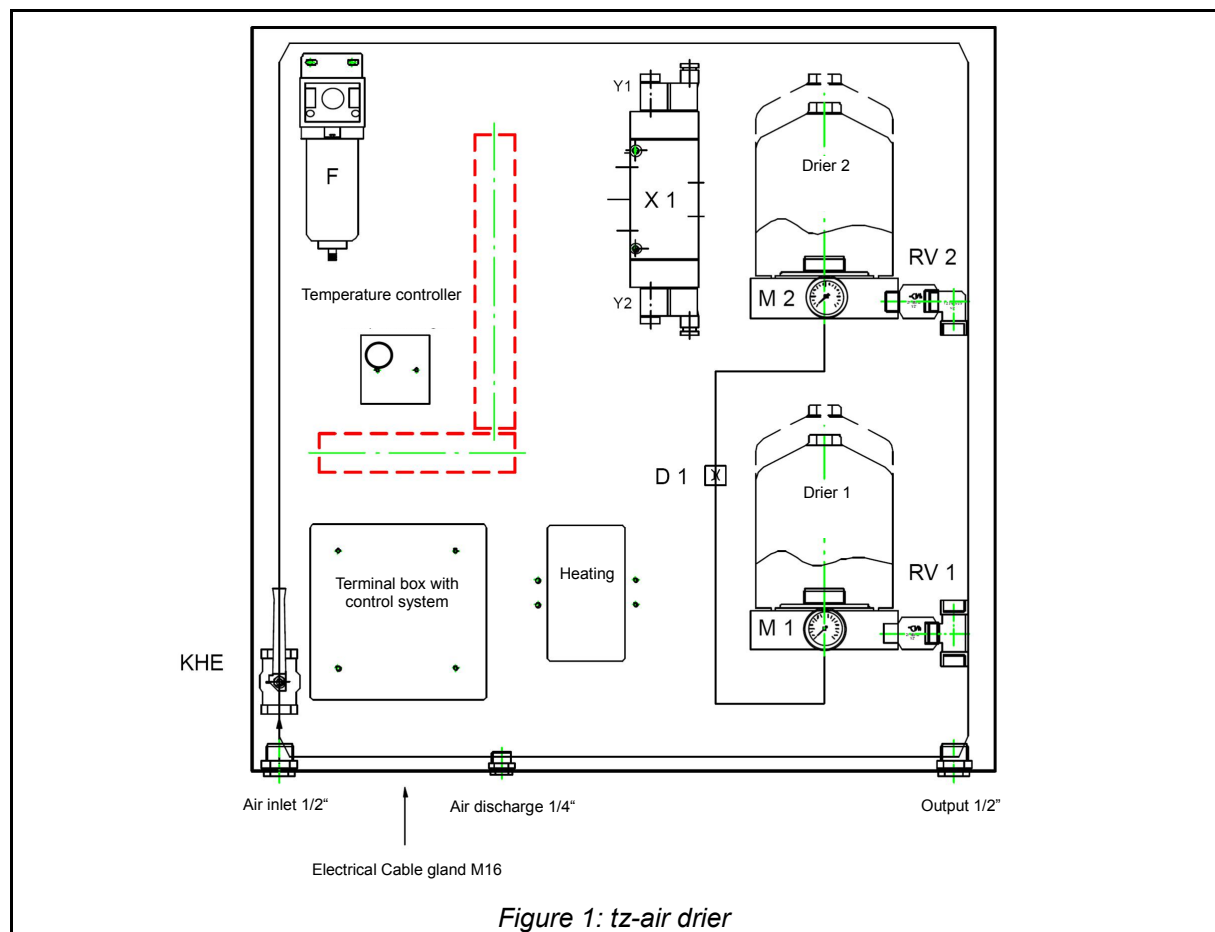
The tz-air drier was built for drying compressed air.

1.4.1 Design

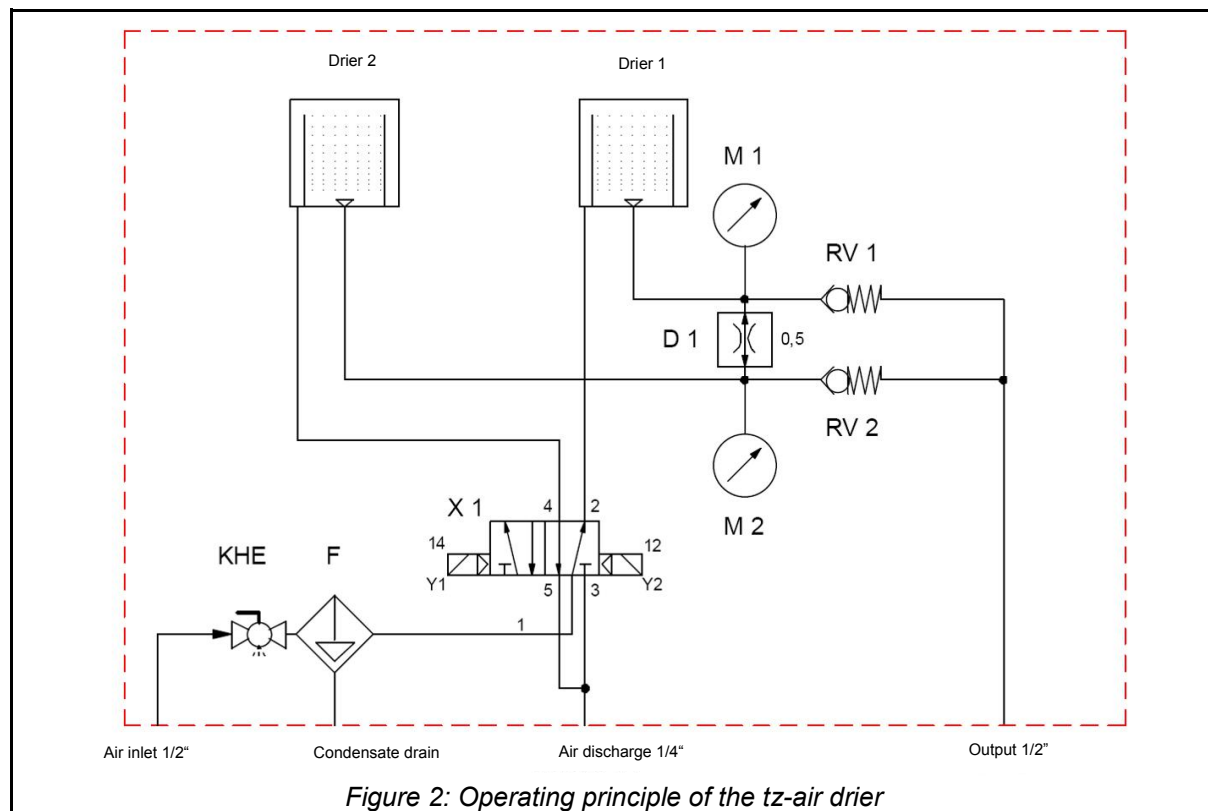
(see also Drawing 1177-03-01)

The tz-air drier (acc. to Fig. 1) basically consists of:

- Housing with wall-mounting brackets
- Filter water separator (Item F, Fig. 1)
- Temperature controller
- Ball cock 1/2" with venting (Item KHE, Fig. 1)
- Terminal box with control system
- Heating
- 5/2-way-valve (Item X1, Fig. 1) with magnetic coils (Items Y1 and Y2, Fig. 1)
- Drier 1 and Drier 2 with pressure gauges (Items M1 and M2, Fig. 1) and throttle check valves (Items RV1 and RV2, Fig. 1)
- Connections in the floor plate



1.4.2 Operating Principle



The compressed air (supply air) must be connected to the connection G1/2" provided. The compressed air applied should be free of oil and be filtered (degree of fineness 50 µm). The ball cock (Item KHE, Fig. 1) is equipped with a secondary venting system. If the ball cock (Item KHE, Fig. 1) is closed, the downstream system vents up to the one-way flow control valves (Items RV1 and RV2, Fig. 1) and the network pressure applied must no longer apply to the pressure gauges (Items M1 and M2, Fig. 1).

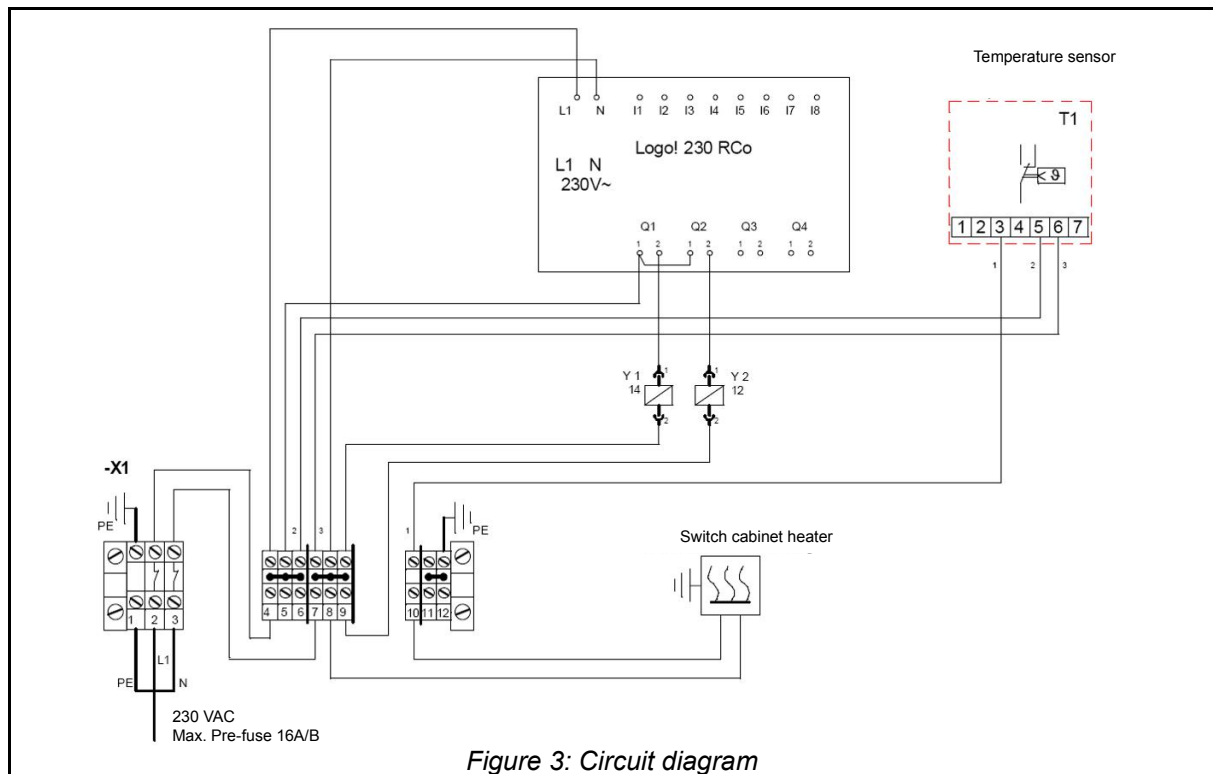
Note!

Downstream of the one-way flow control valves (in the output line) there still is pressure toward the load, this line must be vented separately. The compressed air filter (Item F, Fig. 1) captures solid particles > 30 µm, and condensate borne by the compressed air is collected. Via the 5/2-way-valve (Item X1, Fig. 1) the applied compressed air is passed either via the drier 1 with one-way flow control valve (Item RV1, Fig. 1) or drier 2 with one-way flow control valve (Item RV2, Fig. 1) to the load via output G1/2". The pressure gauges (Items M1 and M2, Fig. 1) indicate which drier happens to be in operation. This drier regenerates the drier in waiting position, via the throttle (Item D1, Fig. 1).

The supply voltage for the control system is 230 V, 50 Hz. As soon as the supply voltage is applied, the drier control system starts up via LOGO 230:

- Magnetic coil (Item Y1, Fig. 1) is driven to in 3 seconds
- The 5(2-way-valve (Item X1, Fig. 1) switches via output 4 to drier 2, simultaneously the working time of 6 hours starts for drier 2
- On expiry of the working time of 6 hours, the magnetic coil (Item Y2, Fig. 1) is driven for 3 seconds.
- The 5(2-way-valve (Item X1, Fig. 1) switches via output 2 to drier 1, simultaneously the working time of 6 hours starts for drier 1
- On expiry of the working time of 6 hours, the sequence is repeated





The switch cabinet is equipped with a heater. A nominal temperature value of 5°C is to be set on the temperature sensor (controller).

ATTENTION!

The surface temperature of the heater may be 120°C (risk of burns).

Before carrying out any service / maintenance work the supply voltage must be switched off and the heater must have cooled down.



2 Installation

2.1 General Safety Instructions

Strictly observe the warnings according to 4.4 , as well as safety instructions according to 4.5 .



2.1.1 Electrical installation

ATTENTION!

- a) The installation of the intrinsically safe power circuits must be performed in accordance with the applicable installation regulations (e.g. DIN VDE 0118) by qualified experts (proof of professional qualification of the assembly personnel, protected installation of intrinsically safe circuits, etc., is to be furnished).
- b) The devices comply with the protection class IP54 and therefore, have to be suitably protected in the case of adverse ambient temperatures and conditions.
- c) The EC type examination certificates must be observed. Any “special regulations” that may be contained therein must be complied with.
- d) The device must only be used in compliance with its designated purpose.
- e) The interconnection with the power supplies must be checked separately with special care. All the cables and wires must be connected according to the terminal diagram.
- f) Equipotential bonding must be provided at the marked connection point.



2.1.2 Delivery State

The tz-air drier is supplied in a fully assembled condition.

2.1.3 Inspection before installing the unit

ATTENTION!

Prior to the installation, the tz-air drier must be checked for leaks, mechanical damage and other defects.



3 Commissioning

Strictly observe the warnings according to 4.4 , as well as safety instructions according to 4.5 .



Firmly mount the tz-air drier, e.g. to a stable rack or similar device, by using appropriate tools. Use a clean hose line to connect the inlet side of the compressed air treatment with the compressed air supply network.

The compressed air outlet side must be connected by hose lines equipped with G1/2" connectors, via the tz-P-E distribution board, to the tz-brakes of the type series PL.

Supply pressure (network): 3.5 to 10 bar

Ensure that the pipes and hoses are tightly connected to the cabinet unit.

An equipotential bonding must be provided at the marked connection point.

Ensure that all connections are firmly tightened.

Slowly open the operating medium inlet and ensure tightness of the system.

4 Service

Strictly observe the warnings according to 4.4 , as well as safety instructions according to 4.5 .



4.1 Maintenance

4.1.1 Definition of maintenance and servicing

(definitions under IEC 60079-17)

Maintenance and repair: A combination of all activities that are performed in order to maintain an object in or restore it to a condition that fits the requirements of the specification and ensures the execution of its required functions.

Inspection: An activity that includes a careful analysis of the object with the intention of providing a reliable statement about the condition of the object. The analysis has to take place without disassembly or, if necessary, with partial disassembly, completed with arrangements like e.g. taking measurements.

Visual inspection: A visual inspection is an inspection for visible faults without using keys or tools, e.g. looking for missing screws.

Close inspection: An inspection where, in addition to the visual inspection, also the use of means of access, e.g. stairs (if needed) or tools is permitted to detect faults, e.g. loose screws, which would otherwise remain undetected. For close inspection, usually a housing does not need to be opened and the equipment has not to be set de-energised.

Detailed checking: An inspection where, in addition to the aspects of a close inspection, faults like loose connections can be detected, which can only be recognised by opening housings and/or, if necessary, using tools and testing equipment.

1. Servicing measures must always be carried out by qualified persons (or persons with comparable qualifications, see TRBS 1203).
2. Components must be replaced with original spare parts, which are also released for use in hazardous areas; this also applies to the lubricants and additives used.
3. The equipment used in the hazardous area must be serviced and cleaned regularly. The intervals are defined by the operator depending on local levels of environmental pollution.
4. After the maintenance and/or servicing, all removed barriers and instructions must be attached again in the original position.

4.1.2 Maintenance of the tz-air drier

Weekly checks:

- Visual inspection of the tz-air drier for leaks and mechanical damage

In order to maintain system reliability, the tz-air drier must be sent to the manufacturer for a general overhaul after no more than 5 years.

Check the filter element of the operating medium filter for contamination once a month. Depending on the extent of contamination, clean or replace. Leaks determined at screwed connections and hoses must be eliminated.

- Before opening the operating medium filter/oil-mist lubricator, close and lock the hand slide valve for the supply air. Make sure that the downstream system is depressurised.

Danger of death! Do not open any components while they are under pressure.

If damage or deficiencies cannot be removed, the tz-air drier unit must be replaced.

4.2 Troubleshooting

Fault	Cause	Correction
Leaks at the tz-air drier	Loose hoseline connections / screwed connections	Check hoseline connections / screwed connections
No performance of the heater	Electrical connection defective	Check electrical connection

Table 4: General faults

4.3 Repair and inspection

ATTENTION!

Repairs and adjustments to the tz-air drier that exceed the scope of a normal inspection may only be carried out at the manufacturer's factory.

Professional repair or reconditioning can only be guaranteed by the manufacturer.

Interventions carried out on the plant by a third party may alter specified characteristics and may lead to faults and malfunctions for which tz does not assume any liability.



4.4 Warnings

ATTENTION!

Only use clean and oiled compressed air (e.g. from compressed gas cylinders) as an operating medium. Supply pressure (network) maximum 10 bar.

The system must be empty and de-pressurised when changing any connections.

Do not use hemp or similar products to pack connections.

Use new seals only.

All screwed connections released must be properly tightened before operating the equipment again.



4.5 Safety Instructions

4.5.1 General Information

ATTENTION!

Maintenance and repair work must only be performed at a depressurised system and with the pressure supply turned off. Danger of death! Do not open any components while they are under pressure. All additional installation locking devices must be removed before recommissioning.



4.5.2 Handling of pneumatic equipment

Only qualified and specially trained personnel are permitted to perform maintenance and repair work on the pneumatic equipment. Release the pressure in the pneumatic equipment before starting any maintenance or repair work. On principle, all service interventions on pneumatic systems must be carried out while the machine is at a standstill. Prior to starting any work on the equipment, make sure that all the drives are secured against unintentional re-start. Replace hoses as a preventive maintenance measure (Observe manufacturer's instructions).

4.5.3 Operating medium / treatment

Introduction

The operating medium in the piping system may contain moisture and other contaminants such as dirt and rust particles. These contaminations may affect the service life and the correct operation of the pneumatic devices connected.

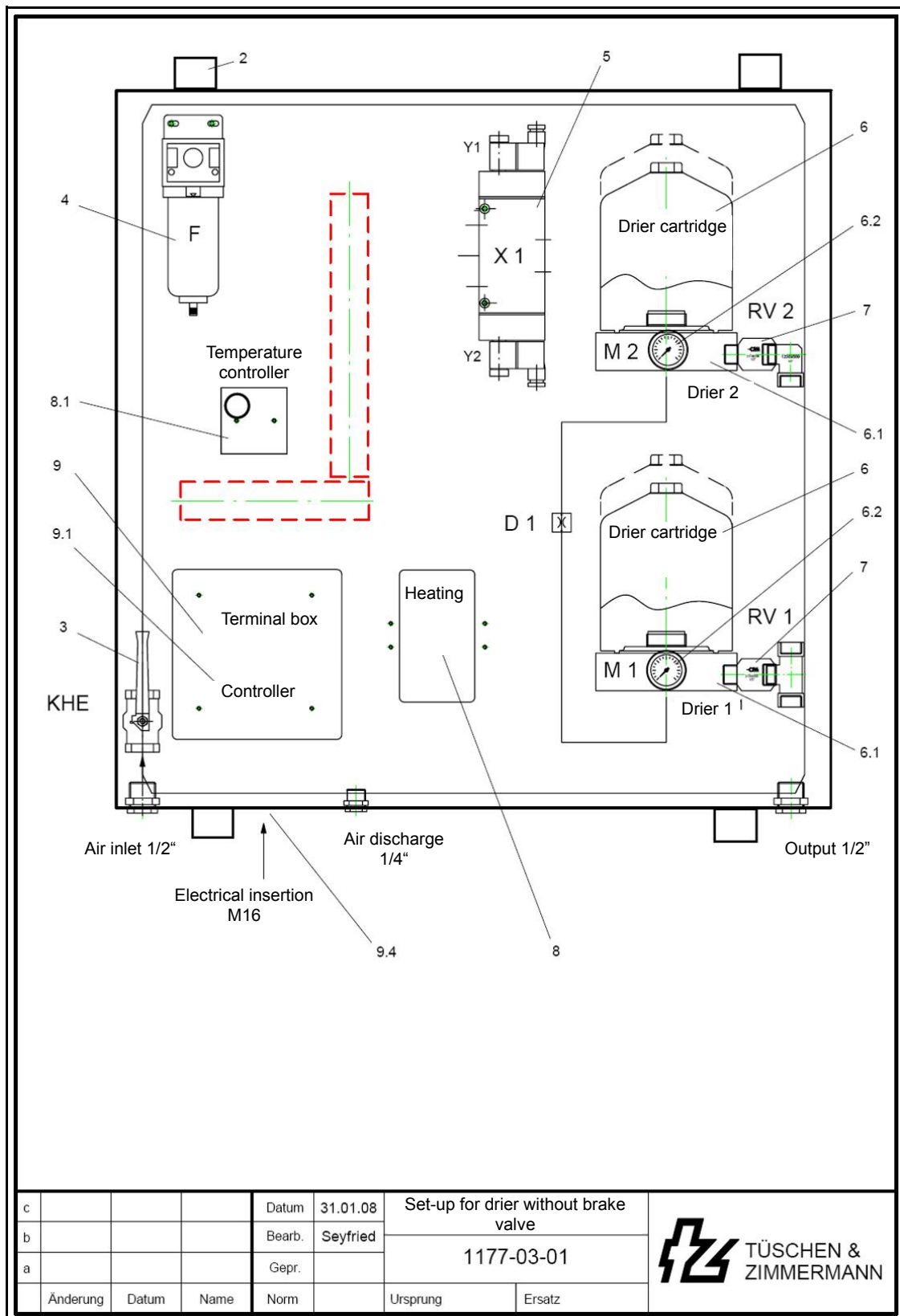
Pressure fluctuations

Pressure fluctuations may cause problems with respect to the proper operation of the pneumatic devices. Unacceptably high pressures can damage the pneumatic devices.

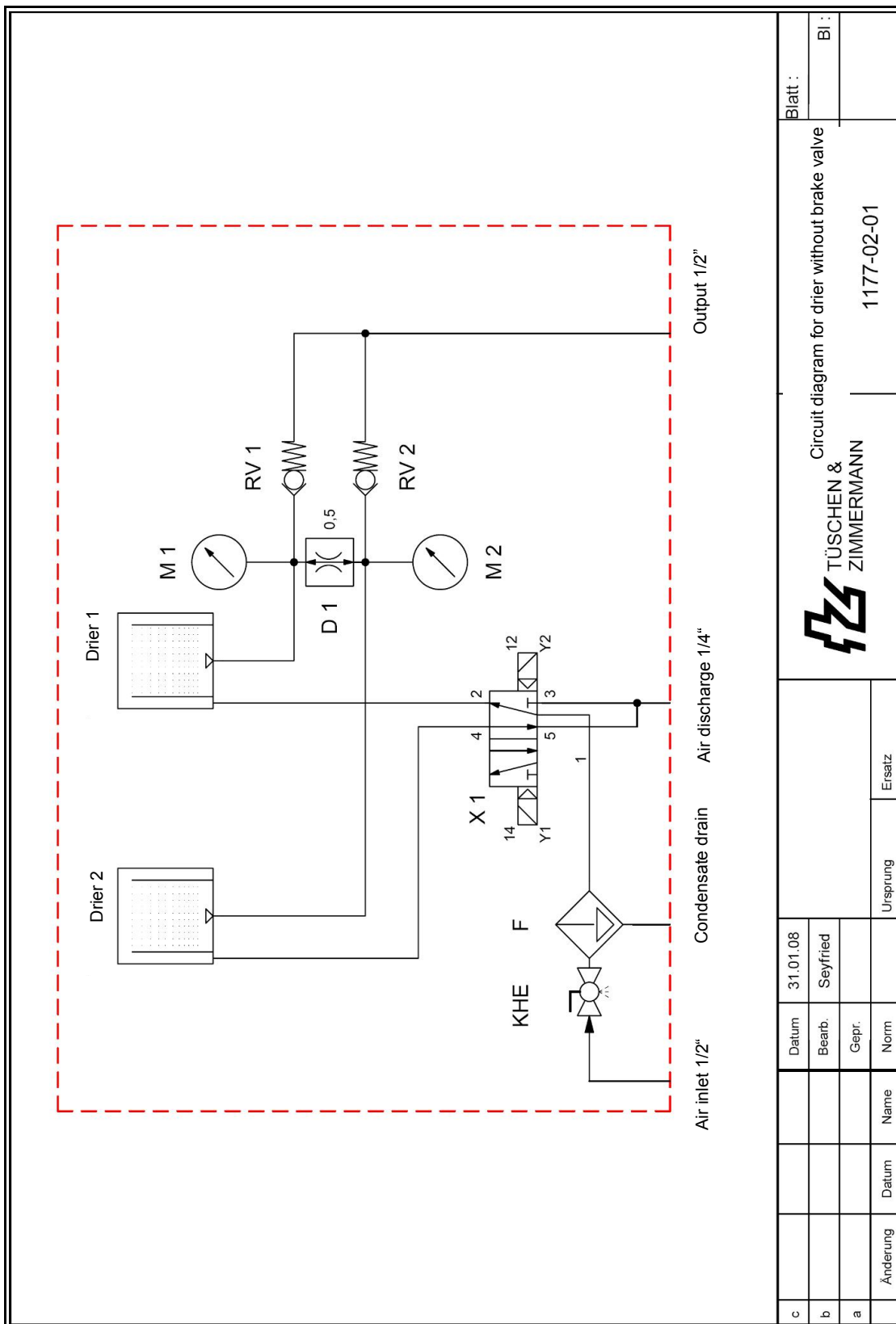
Oil lubrication

The lubricant reduces wear, protects against corrosion, and consequently prolongs the service life of the pneumatic devices.

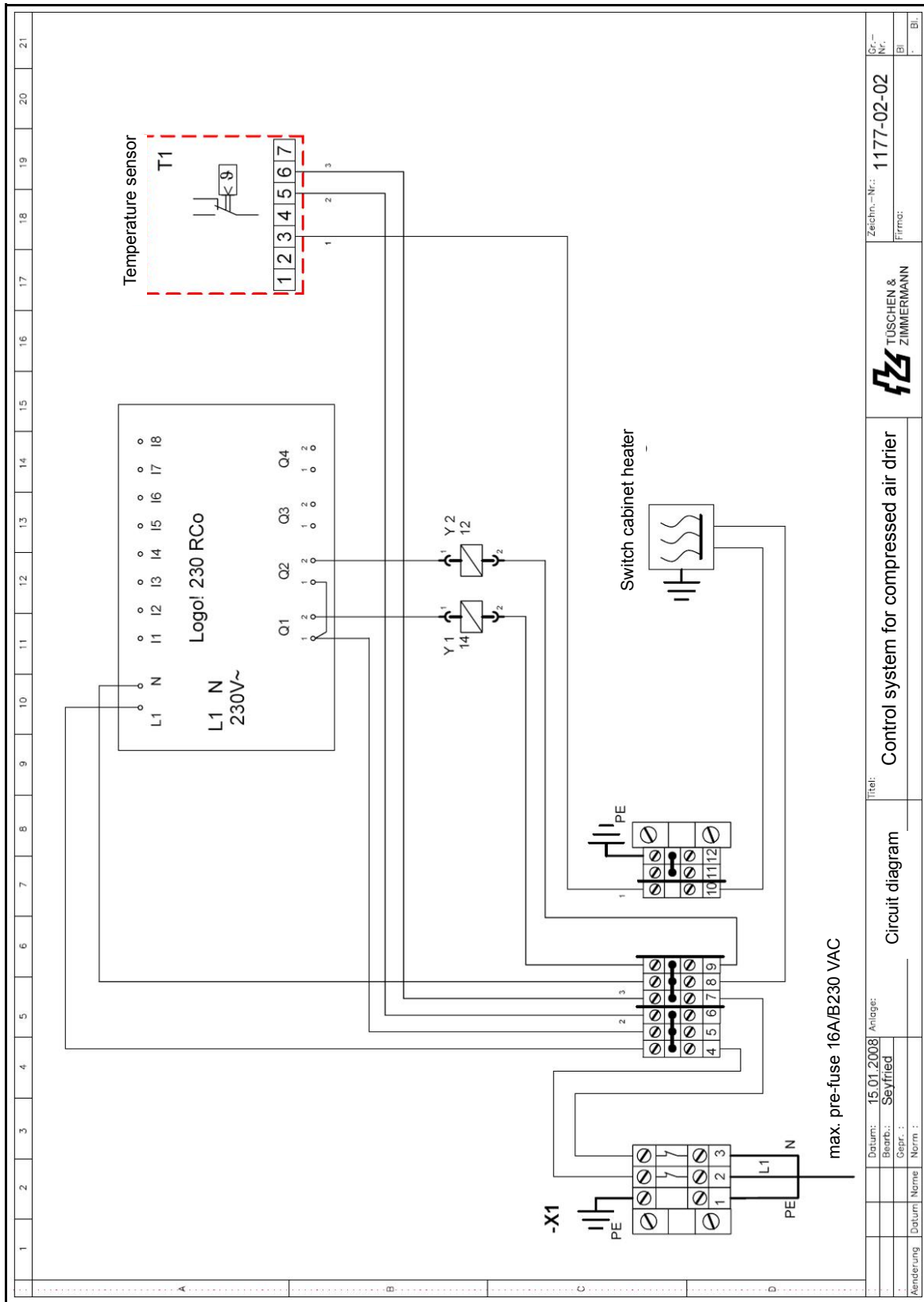
Use only air hammer oil type DA 50 ML or similar.



Cabinet unit tz-drier without brake valve 1177 04 01			
Position	Item	Description	Remark
1	1	Switch cabinet 760 x 760 x210	
2	4	Wall-mounting bracket	
3	1	Ball cock 1/2" with venting	KHE
4	1	Filter water separator 1/2" CF – 1/2A with mounting bracket	F
5	1	5/2-way-valve 1/2", 230 V S9 581 – 1/2	X1
6	2	Drier cartridge 1 1/4"	Drier 1, Drier 2
6.1	2	Cartridge holder	
6.2	2	Pressure gauge 0 – 6 bar	M1, M2
7	2	One-way flow control valve 1/2" i/a	RV1, RV2
8	1	Heater 130 Watt, 230 V	
8.1	1	Temperature controller	
9	1	Housing with grey cover 182 x 180 x11	
9.1	1	LOGO 230 Roo 6ED1052-2FB00-0BA5	
9.2	3	Disconnect terminal UK5 MTK-P/P	
9.3	9	Terminal UK5	
9.4	6	Plastic insertion M16	




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TÜSCHCHEN & ZIMMERMANN		1177-02-01	
Circuit diagram for drier without brake valve			
Datum		31.01.08	
Bearb.		Seyfried	
Gepr.			
Norm			
Ursprung		Ersatz	
Anderung	Datum	Name	
c			
b			
a			



Gr.-Nr.		1177-02-02	
Zeichn.-Nr.:		1177-02-02	
Firma:		TÜSCHEN & ZIMMERMANN	
Titel:		Control system for compressed air drier	
Datum:		15.01.2008	
Anlage:		Seyfried	
Bearb.:		Seyfried	
Gepr.:			
Datum		Name	
Norm			
Änderung			

Annex

Type plate

 Tüschchen & Zimmermann



Tüschchen & Zimmermann
D-57368 Lennestadt

Type: TZ-xx

xx

TZ-art.-no.: xxxxxxxxxxxx

Operating pressure: 3,5-10 bar

Operating voltage: 230V/50Hz

Temperature range: -25°C to 50°C

Weight: xxx kg

Serial number.: xxxx Construction year: xx.xx.xxxx

