

TECHNICAL DELIVERY SPECIFICATION

II Technical Equipment Instructions

TA04 Pneumatics

Status 07/2015



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1 Scope of Application

The technical instructions described here apply specifically to the pneumatic system of the machine/machine system. They supplement the instructions listed in document I General Information of the Technical Delivery Specification of ZF Friedrichshafen AG and alongside these, are valid for all ZF plants.

2 General Requirements

2.1 Approved list

Only assembly groups, assemblies and devices appearing in the approved list may be used.

2.2 Standardized components

The unlimited exchange of different brands of standardized components and assemblies must be possible in terms of function and installation. This only applies to components which do not have a safety function (see TA07 Safety of Machinery, Environmental Protection and Fire Protection, Chapter 2.1.2 Risk assessment).

2.3 Design

The pneumatic system must be monitored during operation. Its design must ensure that it will perform without defects at 90% network supply line pressure at the machine/machine system location.

2.4 Accessibility

All components and assemblies must be accessible for maintenance and repair work and may not be concealed by pipes or hoses or any other components/assemblies.

2.5 Exhaust air

Oil mist residues are not permitted in the exhaust air.

Cooling lubricants and chips may not be taken up by the exhaust air.

3 Normative References

3.1 General requirements

As a basic principle, the agreements listed in document I General Information regarding normative references apply.

ISO 4414 will serve as the basis for these Technical Equipment Instructions for the machine/machine system's pneumatic system. It is binding along with any recommendations and added requirements contained within it.

An informative overview on the country-specific laws, guidelines and standards can be found in the Appendix (Chapter 8) of this document.

3.2 Requirements for pressure reservoirs, pipelines and equipment accessories

For requirements, see Technical Equipment Instructions, TA03 Hydraulics.

Important: Casing with press fittings is not allowed.

4 Cylinders

In accordance with DIN ISO 6432/DIN ISO 15552, cylinders with standard strokes must be used for the pneumatic system in the machine/machine system.

The counterforce in every cylinder must be a max. 70% of the effective cylinder-piston force.

The number of variants (model variety) of the cylinders used in the machine/machine system must be as low as possible.

5 Valves

5.1 General requirements

Valves must be concentrated on connection plates whenever possible. The bus system must be determined with the Customer.

When the main switch is turned off, the pneumatic supply line must be interrupted by an automatically closing valve. Pressure-accumulating components must be force-ventilated.

5.2 Electromagnetic valves

Use of electrical line outlets in accordance with DIN EN 175301-803, magnetic clamping 24 V DC with LED display and protective elements.

It must be possible to manually operate an electromagnetic valve (manual auxiliary operation in case of emergency); however, it must not be possible to operate the valve by accident.

5.3 Pressure control valves

The pressure control valves must have secondary ventilation and a pressure gage to display secondary pressure.

5.4 Flow control and check valves

Flow control and check valves must be used whenever a defined speed set by pneumatic drives is desired.

6 Piping

6.1 Maintenance unit

The pneumatic system must have a maintenance unit that is installed at an accessible place on the machine/machine system.

The maintenance unit must have the following components/assemblies:

- Shut-off valve (stop cock) with ventilation,
- Filters,
- Pressure regulator with pressure gage,
- [Pressure build-up valve](#) to prevent uncontrolled movements (for protecting persons and the machine/machine system),
- Lubricator (as needed),
- Water separator (as needed).

6.2 Line connections

No line connections are permitted in hard-to-reach areas of the pneumatic pipework.

6.3 Mufflers

All exhaust air outlets in the pneumatic system must have mufflers. Only low-noise nozzles and orifice plates may be used. They may not be mounted at head level.

6.4 Pressure gage

Every adjustable pressure must be easy to read from a pressure gage or a Minimes measuring point.

The pressure gage must display the minimum pressures in green markings and the maximum ones in red.

7 Marking

7.1 General requirements

All devices within a system including the hose lines must be distinctively and permanently marked.

Identification signs must always be

- engraved, etched or lasered in aluminum or double-layered plastic
- legible
- permanently attached at a clearly visible location
- located next to components, assemblies and devices
- when the devices are concealed, located next to the installation

space.

The identification signs may not be located on replaceable components, assemblies and devices.

Marking components which have safety functions: see TA07 Safety of Machinery, Environmental Protection and Fire Protection, Chapter 2.1.2 Risk assessment.

7.2 Additional information

For the identification of the pneumatics installed in the machine/machine system, the following information is important:

- The function identification in the form of a component identification must be affixed directly to the component or assembly in compliance with the electrical circuit diagram and in easy-to-understand language.
- The pressure measurement points must be clearly identified (e. g. MM1, MM2, etc.) on the machine/machine system in compliance with the circuit diagram and with the target pressure value indicated (in bar).

8 Appendix: Other Applicable Documents

8.1 International requirements

Re 3.1 Normative References, General requirements

- ISO 4414 Pneumatic fluid power - General rules and safety requirements for systems and their components

Re 4 Cylinders

- DIN ISO 6432 Fluid technology - Single rod pneumatic cylinders; 10 bar (1,000 kPa) series; bores from 8 to 25 mm; mounting dimensions
- DIN ISO 15552 Fluid power - Pneumatic cylinders with detachable mountings, 1,000 kPa (10 bar) series, bores from 32 mm to 320 mm - Basic, mounting and accessories dimensions

8.2 European requirements

Checked safety valves with CE marking - issued by a correspondingly authorized body - are to be used.

Re 5.2 Electromagnetic valves

- DIN EN 175301-803 Detail Specification: Rectangular connectors - Flat contacts, 0.8 mm thickness, locking screw not detachable

ZF Friedrichshafen AG

88038 Friedrichshafen

Deutschland Germany

Telefon/Phone +49 7541 77-0

Telefax/Fax +49 7541 77-90800

www.zf.com



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