



TA 1100-0120

Technical Instruction

J920 Compressed Air Requirements



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1 Scope

This Technical Instruction (TA) applies to the following Jenbacher Gas Engines:

- Type 9 engines

2 Purpose

This Technical Instruction (TA) describes the requirements for the compressed air for starting and control air.

3 Safety information

DANGER



Danger to persons from pressurized piping!

Hose whiplash can cause injuries!

- Only authorised personnel may operate or handle the hydraulic module (compressor), the hydraulic kit and the hydraulic cylinders.
- It is absolutely essential to observe the operating instructions for the hydraulic module (compressor) and the hydraulic kit.
- Check the hydraulic module, hydraulic cylinders, hoses etc. before starting the activity.
- Observe the annual maintenance requirement for the high-pressure hydraulics (test date)!
- Always maintain a safety distance of at least 3 m from the hydraulic cylinder.
- It is absolutely prohibited for anyone to stand facing the direction of the hydraulic tensile force.
- Watch the pressure gauge to check the increase in hydraulic pressure.
- Stop the pressure immediately if the pressure stops rising despite continued pressure generation. Check the bolted joints immediately for the correct shape and dimensions (plastic deformation, e.g. permanent elongation of the stud).
- Only undo the joints when depressurised.
- Make sure all activities are carried out as quickly as possible while the system is under pressure.
- Always release the pressure if the system is to be left unattended.

ATTENTION



Noise, unexpected ejection of particles

Slight or minor injuries, such as eye irritation, or eye injury due to ejected particles when cleaning with compressed air.

Slight or minor injuries, such as hearing damage caused by the intensity of sound levels that can occur when the filter is cleaned with compressed air.



- Ensure proper personal protective equipment (PPE) is available, is used and is in good order and condition.
- Wear eye protection.
- Wear hearing protection.

4 Additional information

The Type J920 engine from is fitted with a compressed air starting system and a control air system for the gas train. This Technical Instruction lays down all the requirements for the starting and control air supplies, and describes the various interfaces.

The control air is defined with reference to 1 bar and 20°C in accordance with DIN 1945-1.

Relevant documents:

TA 1100-0110 — Boundary conditions for Jenbacher gas engines

5 Interfaces

The position and flanges at the interfaces can be taken from the Technical Diagram and the module drawing. The interfaces are designated as follows:

- **K1:** Starting air system
- **K2:** Control air system

5.1 K1 Starting air system

5.1.1 Quality

The compressed air quality must comply with the following values as per ISO 8573-1:2010:

- Particles: Class 5 (size $1.0 \mu\text{m} < d \leq 5.0 \mu\text{m}$; max. number of particles = 100,000/m³ at reference conditions)
- Water: Class 9 ($5 \leq C_w \leq 10 \text{ g/m}^3$ at reference conditions)
- Oil: Class 4 ($\leq 5 \text{ mg/m}^3$ at reference conditions)

The permissible temperature range is laid down as +10 to +50 °C.



NOTE:

The compressed air supply pipes must be protected against internal corrosion to ensure that the compressed air quality is not compromised by debris or corrosion particles. After the piping has been fitted, the welds must be pickled and any residues or deposits removed.

The piping must be flushed in accordance with the INNIO standard procedure before commissioning.

The piping must be fitted with a valve at its lowest point to prevent the formation of rust and the ingress of water condensate into the starter motor.

5.1.2 Quantity

A minimum pressure of 8 bar(g) and a maximum permissible pressure of 10 bar(g) must be present at the K1 interface at a flow rate of:

- 8,000 m³/h (compressed air system with 3 starter motors, at reference conditions)
- 10,000 m³/h (compressed air system with 4 starter motors, at reference conditions)

The pressure needs to be regulated within the range of 8-10 bar(g).

The design pressure for the J920 compressed air starting system is 16 bar(g). Suitable measures must be taken to ensure that the design pressure is not exceeded under any circumstances.

5.2 K2 control air system

The control air system supplies the gas train and oil centrifuges in the engine lubrication system.

5.2.1 Quality

The compressed air quality has to comply with the following values according to ISO 8573-1:2010:

- Particles: Class 4 (size $1.0 \mu\text{m} < d \leq 5.0 \mu\text{m}$; max. number of particles $\leq 10,000/\text{m}^3$ at reference conditions)
- Water: Class 3 (dew point $\leq -20^\circ\text{C}$)

- Oil: Class 3 ($\leq 1 \text{ mg/m}^3$ at reference conditions)

The permissible temperature range is defined as +10 to +50 °C.

5.2.2 Quantity

A minimum pressure of 10 bar(g) and a maximum permissible pressure of 16 bar(g) at a flow rate of 3 m³/h (at reference conditions) must be present at the K2 interface.

6 Pressure reservoir

The compressed air reservoir design must be based on the consumption figures below and take into account the customer's requirement for the number of start attempts possible without topping up the reservoir:

	Compressed air starting system	Consumption [m ³ at reference conditions]
Successful start	System with 3 starter motors	25
	System with 4 starter motors	25
Start attempt until abort	System with 3 starter motors	38
	System with 4 starter motors	47

A "Start attempt until abort" involves the maximum consumption of compressed air until starting is automatically discontinued.

In the experience of , a "successful start" generally requires an average of 25 m³ of compressed air (under reference conditions).

NOTE



INNION recommendation

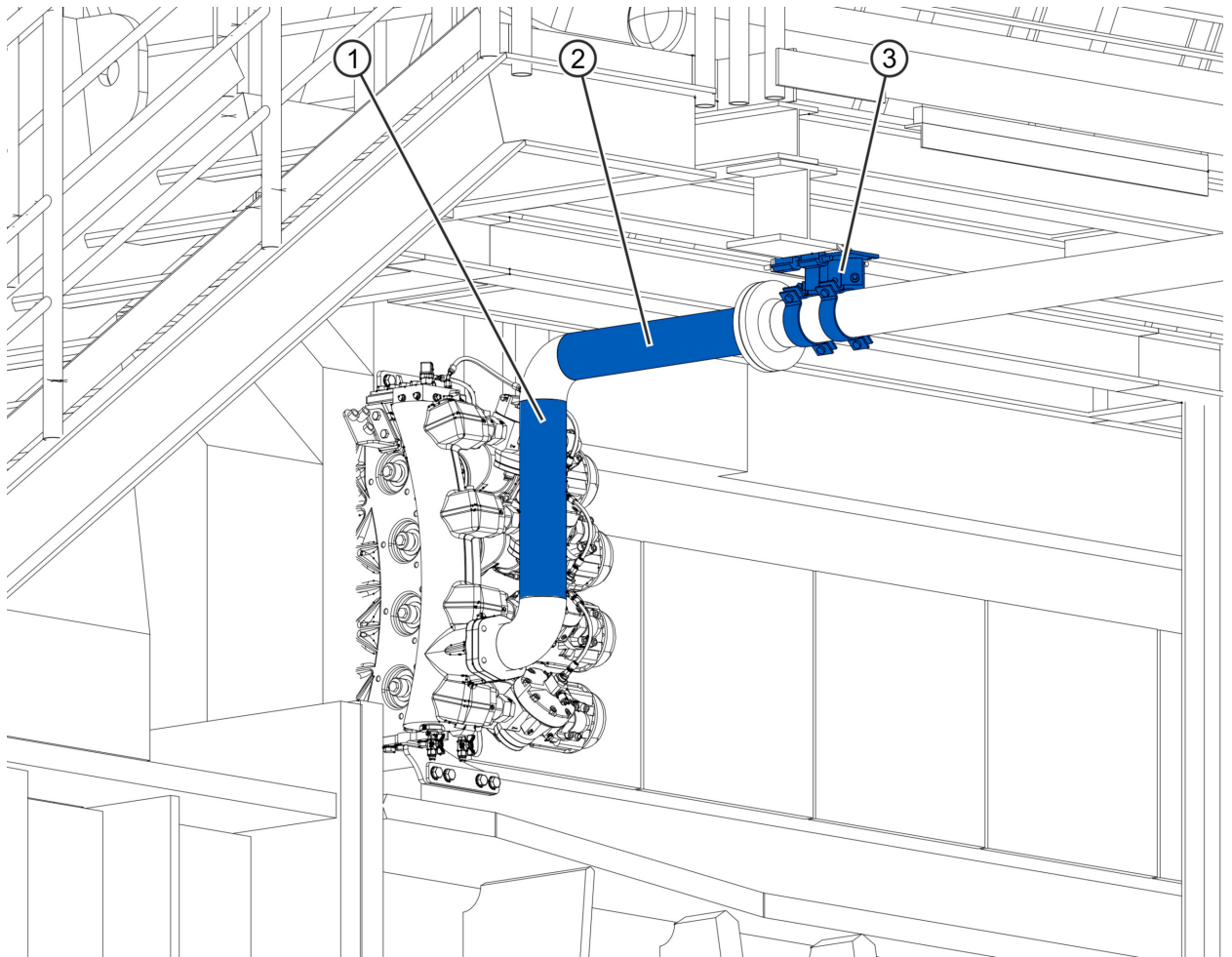
In the experience of , a compressed air reservoir of 5.0 m³ at 30 bar(g) is sufficient to ensure reliable operation of a single engine.

One compressed air tank per engine and a central back-up tank with a compressor unit are advised for multi-engine plants. Note that multiple components may need to be installed depending on the redundancy requirements.

7 Pipe connections

Flexible hoses should be used at the interfaces to the starter motor to avoid the introduction of any external forces and torques/moments.

The following figure is one of the example how to avoid external loads on the K1 interface.



A system comprising two flexible hoses arranged vertically ① and horizontally ② will compensate for most forces and moments arising from the internal pressure and external loads

A fixed point to stabilise the piping is absolutely essential.



See also: Boundary conditions for Jenbacher gas engines

8 Intake air

The environmental conditions are specified according to class IE35 as laid down in DIN EN 60721-3-3.

9 Electrical connection

This Technical Instruction is only applicable if the starting air system is not part of the INNIO Jenbacher GmbH & Co OG scope of supply, for which reason no information is given here about electrical equipment.

Control system interface:

Sufficient pressure in the compressed air tank is required by the DIA.NE control system to enable starting.

The pressure sensor must provide an analogue signal (0-40 bar(g) = 4-20 mA) for the Diane control system.

10 Reference Conditions

According to ISO 8573-1 reference conditions for gas volumes are as follows:

Air temperature	20 °C
Absolute air pressure	100 kPa = [1 bar] (a)
Relative water vapour pressure	0

11 Revision code

Revision history

Index	Date	Description / Revision summary	Expert Auditor
5	10.05.2019	GE durch INNIO ersetzt / GE replaced by INNIO	Stojiljkovic T. <i>Pichler R.</i>
4	28.01.2019	Strukturelle Anpassungen / structural adaption	Dris M. <i>Madl W.</i>
3	30.04.2015	Änderung Punkt 2.1.2 und 2.2.2 / Change of point 2.1.2 and 2.2.2	Dris <i>Madl</i>
2	19.08.2014	Referenzparameter angepasst / reference parameter adapted	Dris <i>Madl</i>
1	04.04.2014	Erstausgabe / First issue	Dris <i>Madl</i>