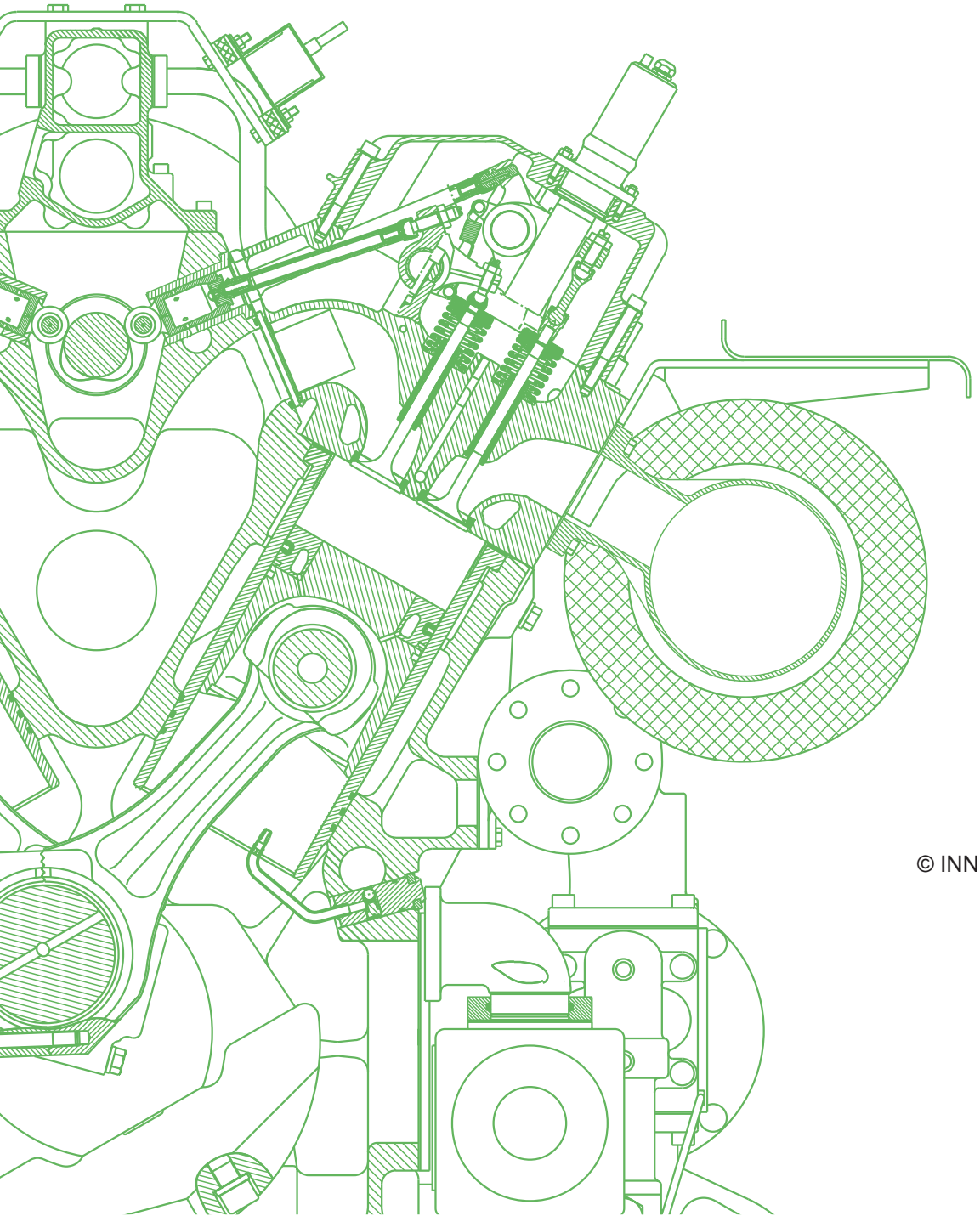
JENBACHER

TA 1530-0193

Technical Instruction

P7N1 spark plugs



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The target recipients of this document are:

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⚠ WARNING

Danger from unauthorised restarting

Serious injuries such as cutting, crushing, severing or shearing of body parts due to unintentional contact with rotating or moving machine parts.

- Shut down the engine as described in TA 1100-0105.
- Secure the engine against unauthorised restarting in accordance with TA 2300-0010.

Observe the Safety Instructions as per Technical Instruction TA 2300-0005 and wear the appropriate "Personal Protective Equipment".

1 Scope

This Technical Instruction applies to all INNIO Jenbacher engines using P7N1 spark plugs.

2 Purpose

This Technical Instruction describes the use of P7N1 spark plugs.

3 Setting values for spark plugs

⚠ ATTENTION

Maximum ignition voltage requirement

The ignition voltage requirement stated below must (at full load) not be exceeded under any circumstances.

Spark-plug type	Engine type	NOx [mg/ Nm³]	Gas type	Ignition voltage requirement [< kV]	Spark plug setting guideline value: Electrode gap [mm]	Spark plug tightening torque in cylinder head [Nm]
P7N1	2, 3, 4	**500**	All	32	0.35	40

4 Wear signs, and adjusting the spark plugs

⚠ ATTENTION

Insulator nose breakage

Only use the feeler gauge for checking the electrode gap and not for anything else.

When adjusting the electrodes, always use the adjusting tool from the INNIO Jenbacher scope of supply and nothing else.

4.1 Analysing used spark plugs

4.1.1 Premature sparking / overheating

Electrode condition (spark plug photo):

Melting beads and metallic deposits near electrode.

Possible causes	Results / effects	Remedial measure
Too much gas when starting the engine	Spark plug electrodes melt.	Check the gas mixer/TecJet setting (reduce/adjust the gas quantity).
The spark plug is insufficiently tightened.		Visual inspection of the spark plug sleeve (thread).
Early sparking due to defective ignition box.		Inspect ignition box and replace if necessary.
Combustion knocking causing electrode to overheat.	Power reduction followed by engine damage. Possible spark plug insulator cracking due to overheated central electrode.	Installing a new spark plug. Clean piston and cylinder head local to combustion room.
Defective valves.		Fit new valves.
Auto-ignition due to deposits.		Clean and adjust the spark plug, replace if necessary.
Incorrectly set LEANOX.		Re-adjust LEANOX and re-establish control for entire load range.

4.1.2 Faulty noble metal electrode

Electrode condition (spark plug photo):

At one or more earth electrodes – loss of the precious metal.

Possible causes	Results / effects	Remedial measure
Too much sulphur or ammonia in the fuel gas (see TA No. 1000-0300).	Ignition voltage increases sharply when several electrodes fail. Noble metal residues can get stuck between valve and valve seat, causing damage (valve burn-through). This can cause auto-ignition.	Use the right spark plug type.

4.1.3 Silicon and combustion deposits

Electrode condition (spark plug photo):

Massive silicon and combustion deposits near the electrodes and the whirl chamber.

Possible causes	Results / effects	Remedial measure
Silicon values (see TA No. 1000-0300). Increased oil consumption. Poor blow-by oil separation. Defective piston rings.	Ignition voltages decrease until the cylinder fails. Deposits can flake off, resulting in auto-ignition.	Installing a new spark plug. Carefully clean the spark plug electrodes.

4.1.4 Electrode short-circuit

Electrode condition (spark plug photo):

Thread formation (molten conductive noble metal) between central and earth electrode.

Possible causes	Results / effects	Remedial measure
Insufficient distance between electrodes. Incorrect spark-plug type. Wrong ignition timing (plug overheats). Combustion knocking (spark-plug overheating).	Continuously decreasing ignition voltages until the cylinder in question fails completely (no more combustion): Exhaust gas temperature drops far below average value.	The cleaning can often be confined to a simple removal of the pearls/threads with the feeler gauge. Adjust electrodes correctly (see following instruction). Adjust electrode distance using feeler gauge. Check the engine settings.

4.2 Adjusting the spark plugs

4.2.1 P7N1 spark plug

Signs of wear/adjustment:

Check the electrode gap measurement with the feeler gauge provided and adjust it with the adjustment tool intended for the purpose. Select the gauge marked 0.35 mm. This gauge should just fit between the two electrodes when a spark plug is ideally adjusted.

If the gap between the earth electrode and the central electrode is greater than 0.35 mm, it must be corrected using the adjustment tool. Fit the adjustment tool so that the small spacer plate is positioned exactly between the central electrode and the earth electrode. Fitting it correctly in this way allows two

electrode pairs to be adjusted at the same time. The adjustment tool must be pushed on to the spark plug as far as it will go so that any change in the gap is effected at precisely the height of the ignition spark flash-over. When the tool is pressed together, the earth electrode is bent towards the central electrode. Measure the gap again with a feeler gauge after adjusting it. If the gap is still too large, repeat the procedure.

①	Feeler gauge	③	Central electrode
②	Earth electrode		

5 Revision code

Revision history

Index	Date	Description / Revision summary	Expert *Auditor*
3	15.04.2019	GE durch INNIO ersetzt / GE replaced by INNIO	**Opoku** *Pichler R.*
1	30.10.2015	Update auf P7N1 / Update to P7N1	**Provin** *Mai*
1	12.06.2015	Erstausgabe / First issue	**Provin** *Mai, Perger*