

902/02 / FIVE-SPEED REFERENCE

## A · F · M · S · X

A reproducible gearing notebook: tooth counts first, ratios second, speed predictions only after the tyre and final-drive assumptions are stated.

5

Forward ratios in the selected reference

31 : 7

Selected crown-wheel / pinion teeth

1.950 m

Illustrative rolling circumference

| GEAR | CODE | INPUT : OUTPUT TEETH | REDUCTION $i = \text{OUTPUT} / \text{INPUT}$ |
|------|------|----------------------|----------------------------------------------|
| 1    | A    | 11 : 34              | 3.090909                                     |
| 2    | F    | 18 : 34              | 1.888889                                     |
| 3    | M    | 22 : 29              | 1.318182                                     |
| 4    | S    | 25 : 26              | 1.040000                                     |
| 5    | X    | 28 : 24              | 0.857143                                     |

## SCOPE

The car's record names 902/02. The A-F-M-S-X set is the Porsche PET 912 reference used for this notebook; no internal gears or final-drive teeth have been inspected.

REFERENCE: S03, illustration 303-00, PDF p.270; transmission summary p.5. ASSUMPTIONS: final drive 31/7 and circumference 1.950 m. Numbers here are not a road-test result or a safe engine-speed limit.

[S03 / Open the manufacturer gear-pair table](#)

# Two sources. Not the same fifth gear.

A technically serious archive preserves disagreements instead of choosing whichever number produces the most attractive speed figure.

| SOURCE             | FIFTH-GEAR ENTRY                                       | INTERPRETATION                                                                     |
|--------------------|--------------------------------------------------------|------------------------------------------------------------------------------------|
| Porsche PET, p.270 | 912 entry: X, teeth 28:24.<br>$i = 24/28 = 0.857143$ . | Selected reference for the 902/02 notebook.                                        |
| FIA form 580, p.11 | Main table: teeth 29:23.<br>$i = 23/29 = 0.793103$ .   | A homologation configuration is not an inventory of this particular car.           |
| FIA form 580, p.12 | Additional ratios include 28:24 / 0.857.               | The document itself permits several combinations; it cannot settle what is fitted. |

## What the difference changes

With the same tyre and final drive, the 23/29 fifth gives **8.07% more theoretical road speed at the same engine rpm** than 24/28. That is a calculated comparison, not evidence of a faster car: available power and drag remain separate constraints.

### ANOTHER USEFUL ARITHMETIC CHECK

The FIA p.11 final-drive line prints 4.448 beside 7:31. Tooth arithmetic gives  $31/7 = 4.428571$ . The calculator uses the teeth, not the apparently inconsistent decimal.

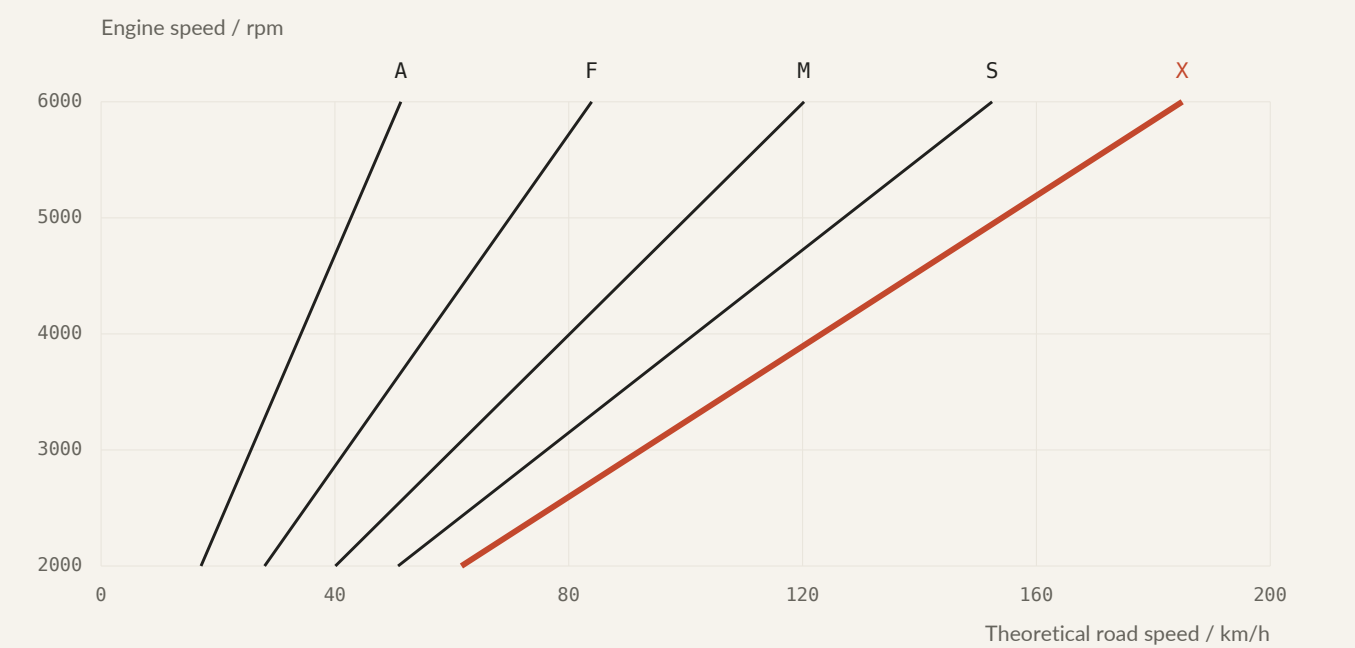
[S05 / FIA original - main transmission table, PDF page 11](#)

[S05 / FIA original - optional gearing, PDF page 12](#)

02 / ROAD-SPEED MODEL

# A gearbox is not a speed claim.

These lines describe mechanical relationships only. They do not include aerodynamic drag, power availability, tyre slip or the condition of a 58-year-old drivetrain.



| ENGINE RPM | 1 / A | 2 / F | 3 / M | 4 / S | 5 / X |
|------------|-------|-------|-------|-------|-------|
| 2,500      | 21.4  | 35.0  | 50.1  | 63.5  | 77.1  |
| 3,000      | 25.6  | 42.0  | 60.1  | 76.2  | 92.5  |
| 3,500      | 29.9  | 49.0  | 70.1  | 88.9  | 107.9 |
| 4,000      | 34.2  | 55.9  | 80.2  | 101.6 | 123.3 |
| 5,000      | 42.7  | 69.9  | 100.2 | 127.0 | 154.1 |
| 5,800      | 49.6  | 81.1  | 116.2 | 147.3 | 178.8 |

CALCULATED road speed in km/h. Preset: A-F-M-S-X; final drive 31/7; C = 1.950 m. The plot extends to 6,000 rpm solely to show the mathematical relationship. Neither plot nor table recommends operation at that speed.

At 100 km/h the preset gives approximately **3,244 rpm in fifth**. Use the interactive laboratory to replace the illustrative circumference and to compare the FIA fifth-gear entry.

## 03 / SHIFT CONTINUITY

# Where the engine lands after an upshift.

For an ideal shift at unchanged road speed, the next engine speed depends only on the ratio of the two selected gears. Tyre circumference and final drive cancel.

| SHIFT | RATIO RETAINED | RPM AFTER SHIFT | DROP      |
|-------|----------------|-----------------|-----------|
| 1 → 2 | 61.1%          | 3,544           | 2,256 rpm |
| 2 → 3 | 69.8%          | 4,048           | 1,752 rpm |
| 3 → 4 | 78.9%          | 4,576           | 1,224 rpm |
| 4 → 5 | 82.4%          | 4,780           | 1,020 rpm |

**CALCULATION CONDITION**

All rows begin at 5,800 rpm as a common arithmetic reference. This is not a recommended shift schedule and assumes no clutch slip or change in road speed.

## Tyres are an input, not a footnote

A sidewall size is not a measured rolling circumference. Load, pressure, tread and construction can change the distance travelled per wheel revolution. Leave 1.950 m labelled as an example until a specialist supplies a suitable effective value.

At fixed rpm, a 2% larger circumference gives exactly 2% more calculated speed. At a fixed speed, the corresponding engine rpm is divided by 1.02: approximately 1.96% lower. Do not confuse these two sensitivities.

## What a logged discrepancy can mean

A mismatch between measured and calculated rpm can come from tyre input, instrument error, internal ratios, final drive or slip. It is a question for investigation, not an automatic diagnosis of a non-original gearbox.

CALCULATED from the PET reference ratios. Vehicle operation, tyre measurement and inspection should be organised safely by a competent specialist; this notebook contains no road-test procedure.

## 04 / CALCULATION SPECIFICATION

# Every result can be rebuilt.

The downloadable CSV and interactive laboratory use the same equations and tooth counts as this document.

**FORWARD MODEL**

$$v = n \times C \times 60 / (i \times i_0 \times 1000)$$

| SYMBOL         | MEANING                                                 | UNIT          |
|----------------|---------------------------------------------------------|---------------|
| v              | Theoretical road speed                                  | km/h          |
| n              | Engine rotational speed                                 | rpm           |
| C              | Effective tyre rolling circumference                    | m             |
| i              | Selected gear reduction: driven teeth / driving teeth   | dimensionless |
| i <sub>0</sub> | Final-drive reduction: crown-wheel teeth / pinion teeth | dimensionless |

**Inverse model:**  $n = v \times i \times i_0 \times 1000 / (60 \times C)$ .

**Shift model:**  $n_{\text{after}} = n_{\text{before}} \times i_{\text{next}} / i_{\text{current}}$ .

**Displacement units:** circumference in metres, not millimetres; speed in km/h, not mph.

## Preset versus verified configuration

Use the PET X fifth or the FIA main-table fifth as clearly labelled alternatives. The final-drive selector offers 31/7 and 29/6 from the historical references. Enter a custom positive ratio only when supported by evidence. Record the source of every changed input.

[S03 / 1968 differential reference - PDF page 296](#)

[S03 / Gear-pair reference - PDF page 270](#)

The laboratory is self-contained: no tracking, account, server or external script is required. Source URLs need an internet connection. No component specification in this archive overrides a correct, vehicle-specific workshop reference.