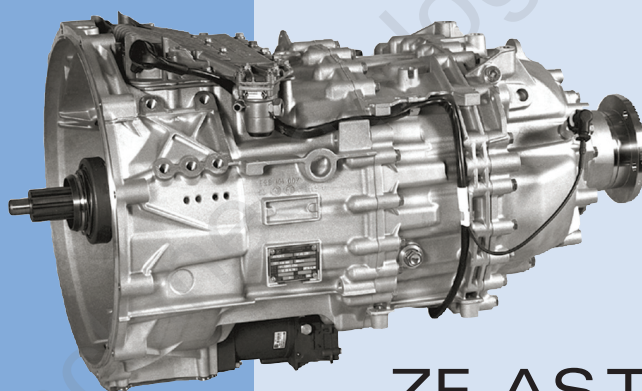
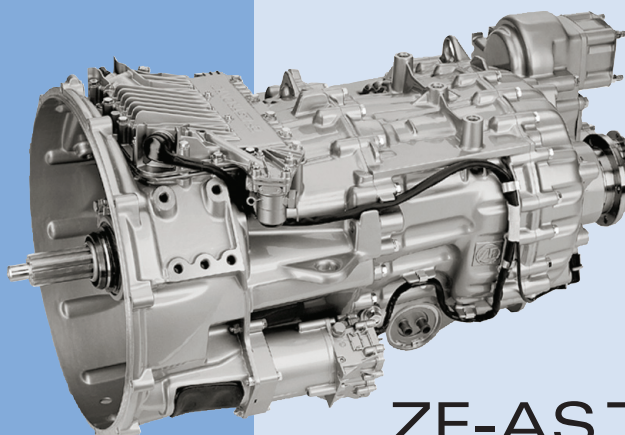


Technical Manual

for installation, function
and initial setup



ZF-AS Tronic



ZF-AS Tronic mid

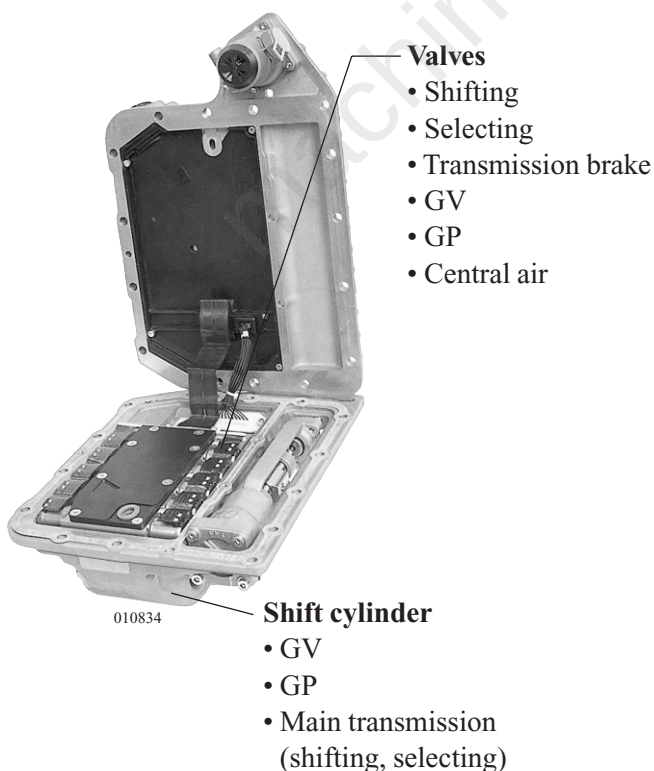
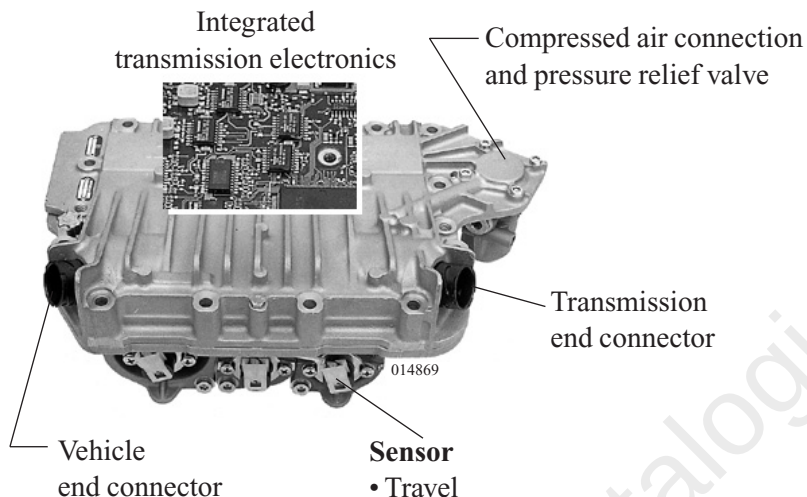
- 2.5.1.7 Communication interface
- 2.5.1.8 Speedo signal
- 2.5.2 PTOs
 - 2.5.2.1 Clutch-dependent PTOs
 - 2.5.2.2 Vehicle driven PTOs
 - 2.5.2.3 Engine-dependent PTOs
 - 2.5.2.4 Retrofitting

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2.3 Transmission components

2.3.1 Transmission actuator

All functions needed for open loop/closed loop transmission control can be found in the transmission actuator. It has a mechanical, electrical and pneumatic interface and is integrated in the transmission housing in a space saving manner.



- The integrated transmission electronics contain all functions needed for open loop / closed loop transmission and clutch control.
- The electro-pneumatic valves control the shift cylinder and transmission brake
- The pneumatic shift cylinders actuate the mechanical shift elements in the transmission.
- The sensors record
 - the present position of all shift cylinder
 - the transmission input speed
 - the transmission temperature
 - the amount of air pressure available
- The vehicle end connector is the electrical interface to the vehicle CAN system network, the interface to the display, to the range selector, to the voltage supply, to the diagnosis devices, etc.
- The transmission electronics are integrated in the housing cover. The figure (010834) shows the transmission actuator with open housing cover.
- Pneumatic connections are produced using corresponding connection ducts – electrical connections using short connection lines.

3

Description of function

3.1 Basic function

- 3.1.1 Shift engagement characteristics / ignition on
- 3.1.2 Gear selection when at a standstill
 - 3.1.2.1 Shifting from Neutral
 - 3.1.2.2 Shifting from one gear to another
 - 3.1.2.3 Shifting to Neutral
- 3.1.3 Setting off
- 3.1.4 Gear selection during travel
 - 3.1.4.1 Upshifts
 - 3.1.4.2 Downshifts
- 3.1.5 Manoeuvring
- 3.1.6 Protective functions
 - 3.1.6.1 Engine protection functions
 - 3.1.6.2 Clutch overload protection
- 3.1.7 Activating PTOs (PTO)
 - 3.1.7.1 Engaging PTO
 - 3.1.7.2 Disengaging PTO
- 3.1.8 Ignition off

3.2 Automatic drive program

- 3.2.1 Activating automatic drive program
- 3.2.2 Automatic selection of setting off gear
- 3.2.3 Automatic gear change
- 3.2.4 Deactivating automatic drive program

3.3 ZF-AS Tronic malfunction concept

- 3.3.1 Principles
- 3.3.2 System analyses undertaken
- 3.3.3 Clutch actuator concept
- 3.3.4 Transmission control unit concept
- 3.3.5 Interface concept
- 3.3.6 Driving modes investigated

3.4 Error responses

3.5 Diagnosis

- 3.5.1 Error memory
- 3.5.2 On-board diagnosis
- 3.5.3 Off-board diagnosis

3.2 Automatic drive program

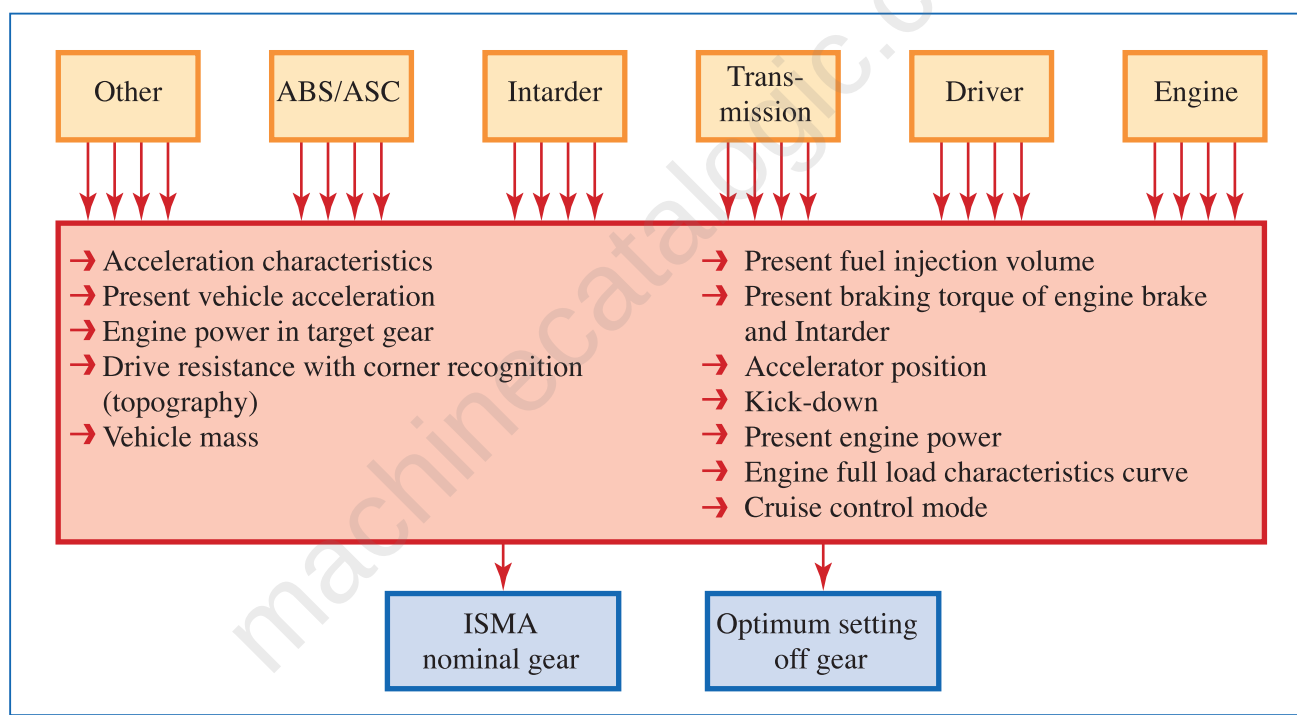
When the ZF-AS Tronic automatic drive program is installed, only accelerator and brake (service brake and 3rd brake) actuation is needed to move the vehicle. The transmission is fully automatically shifted by the transmission control unit.

With the automatic drive program, customer benefits come to the fore. A reduction in fuel consumption when compared with the average driver in long-haulage transport and frequency of shifting together with optimum gear selection are some of the key features of this function. The program can also be adapted to different vehicles and engines.

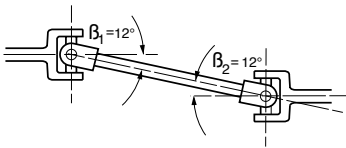
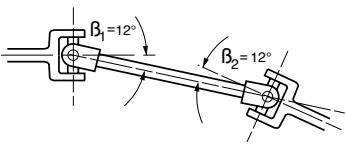
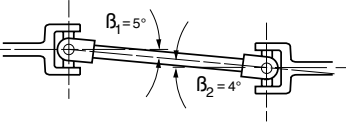
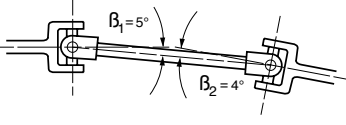
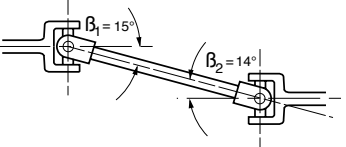
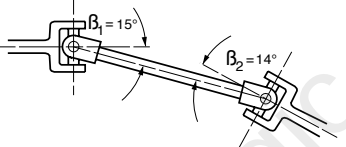
The existing vehicle CAN signals are used to network EDC (Electronic Diesel Control), ABS (Anti-lock-Braking-System), ASC (Anti-Slip Control), Intarder and transmission. It is therefore very easy to determine the necessary driving modes.

➤ Detailed descriptions of the signals can if necessary be found in signal specification ZF no. 1328 761 005.

Exchange of signals:



018979

	Z-arrangement	W-arrangement	Angle error $\Delta\beta = \beta_1 - \beta_2$	Resultant deflection angle $\beta_E = \sqrt{ \beta_1 ^2 + \beta_2^2}$
Example 1 (exact Z and/or W arrangement)			0°	0°
Example 2 (small deflection angle with angle error)			1°	3°
Example 3 (large deflection angle with angle error)			1°	5.4°

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Example 3 shows that with larger deflection angles, even an angle error of 1° results in excessively high joint deflection angles.

Fig. 11 Application examples for the influence of the deflection angle parameters β_1 and β_2 on the resultant deflection angle β_E

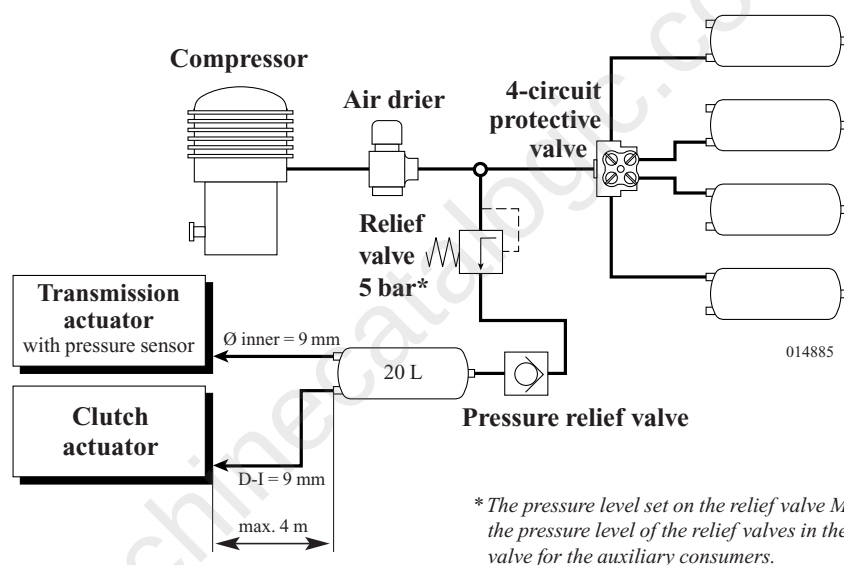
4.5 Pneumatics

The quality of the air supplied to the ZF-AS Tronic system is very important for vehicle availability. The same requirements as those placed on the braking systems therefore apply to air quality and air line versions.

The air for the ZF-AS Tronic system supplied to the vehicle's air system may either be connected up upstream of the 4-circuit protection valve (example 1), or downstream of the 4-circuit protection valve on the auxiliary consumer circuit. The following should be noted here:

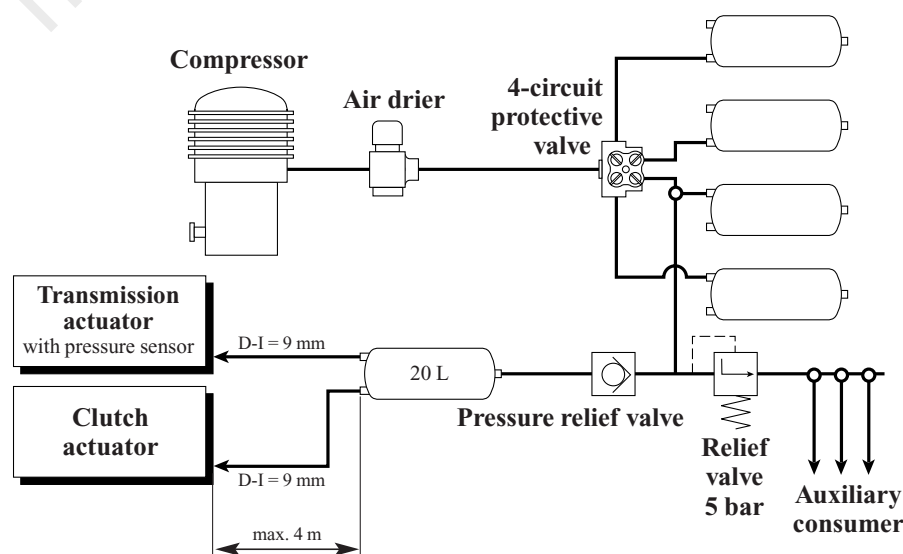
- In example 1, the air supply for the braking system takes priority over the shift system, since an relief valve (> 5 bar) is mounted in front of the ZF-AS Tronic air circuit.
- In example 2, the air supply for the ZF-AS Tronic takes priority over the other auxiliary consumers since this is mounted upstream of a relief valve (> 5 bar).

Example 1



* The pressure level set on the relief valve MUST be less than the pressure level of the relief valves in the 4-circuit protective valve for the auxiliary consumers.

Example 2



5

Annex

5.1 Designations for AS transmission

5.2 AS transmission program

5.2.1 AS transmission program for trucks

5.2.2 AS transmission program for buses

Annex: Attached documents

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Full Version Available

ZF AS Tronic mid Transmission Service Manual

ZF AS Tronic mid transmission service manual with repair procedures, adjustments and troubleshooting. 149-page searchable PDF. Instant PDF download.

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