

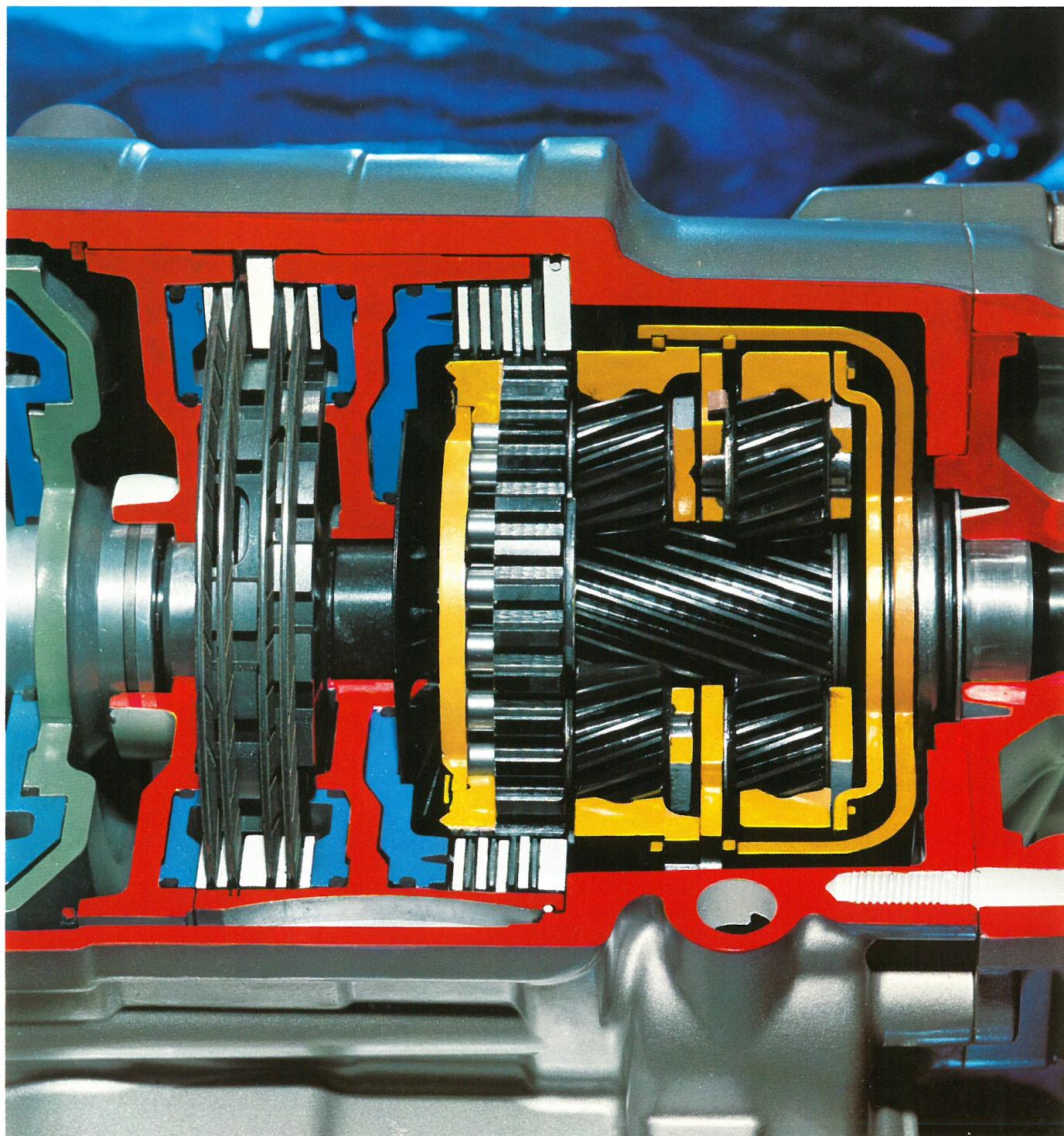
ZF 3 HP-22 Automatic Transmission for Passenger Cars



ZF DANMARK Aps

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ZF GETRIEBE GMBH



The ZF 3 HP-22 Automatic transmission

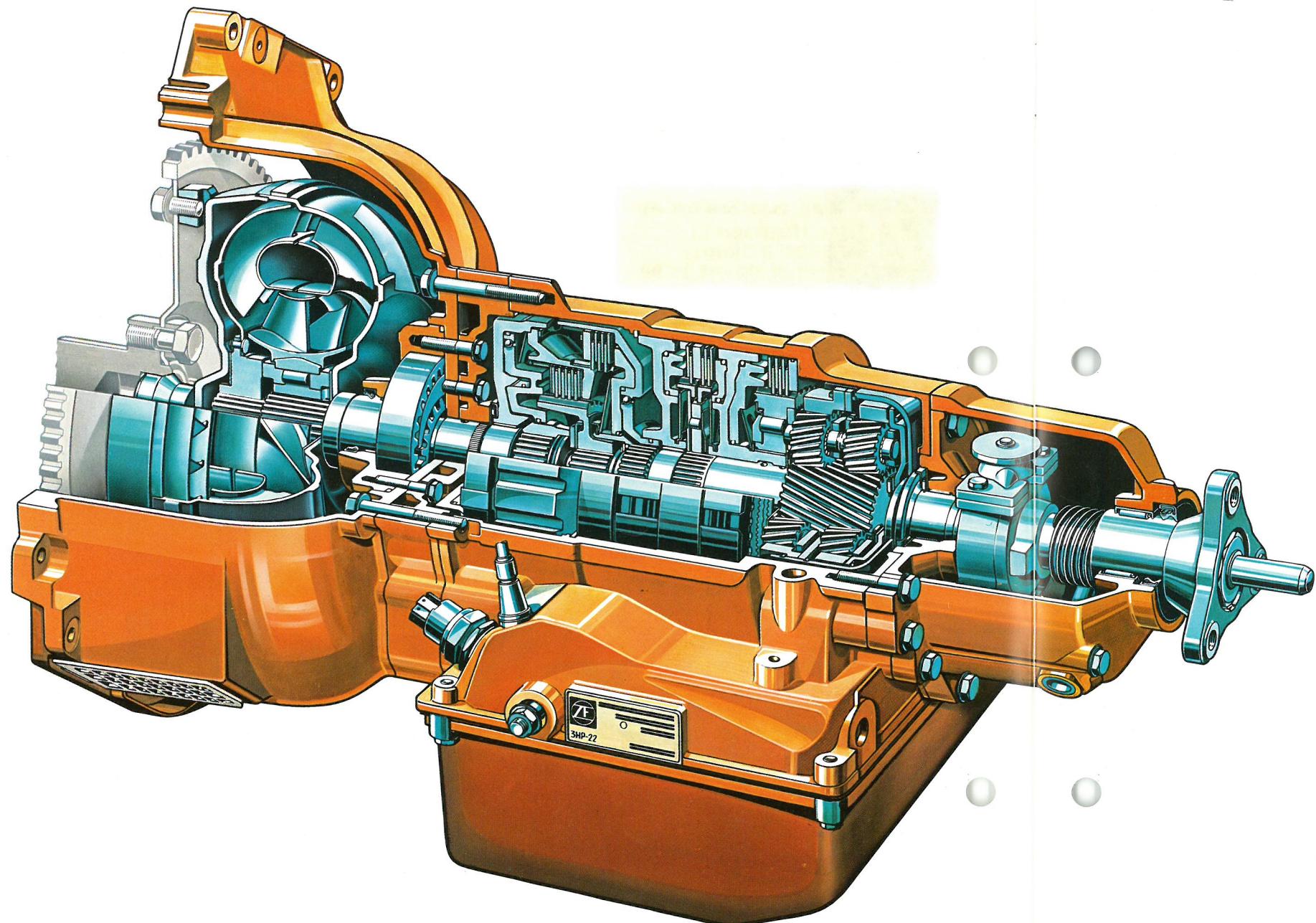


Fig. 1: General cutaway view of 3 HP-22

Times have changed. A lot of people who used to enjoy driving are beginning to think differently. This is particularly the case in town traffic, urban centers and on the motorways (expressways), especially during the holiday period. In spite of all the difficulties people still drive cars because there is often no other choice.

Industry has been trying for years to reduce the stress of driving and make the so-called "start-stop" traffic conditions more bearable. The automatic transmission - a major component of any car - makes a big contribution towards taking the effort out of driving. With a transmission that "thinks for itself" the driver can pay more attention to traffic situations. This contribution towards safety on the roads should not be underestimated.

The two-pedal layout makes driving easier and more comfortable.

Tests have shown that the stress connected with a manual gear shift is definitely higher - disregarding the considerably greater physical effort required. This means that those people who don't have to change gear stay healthier.

And it is not only the driver who benefits from automatic transmission, the car does as well. There is no clutch wear to worry about, no repairs or adjustments. The whole drive train from the engine, through the gearbox to the differential and right down to the tires is substantially preserved by the hydraulic system. Maintenance costs are reduced.

Automatic transmissions from Zahnradfabrik Friedrichshafen AG have been installed and demonstrated their worth in large numbers in the medium

to luxury range of cars. This was one of the reasons for opening a new ZF factory in Saarbrücken with modern production facilities. The 3 HP-22 is built there. The experience gained with its two predecessors 3 HP-12 and 3 HP-20 has been incorporated in the new model.

The 3 HP-22 is versatile. It is suitable for passenger cars as well as delivery trucks. Its range of power is such that it is ideal for use with low power engines and those in the heavyweight class - the favourable external dimensions remain the same. This adaptability is achieved by varying the layout of the converter, the number of friction discs in the hydraulic clutches and the number of planet gears - 3 to 4 - per planetary gear train.

When compared with a conventional gearbox the automatic transmission brings about only a slight increase in fuel consumption. Consumption can, in fact, be less in unfavourable conditions, e. g. in town traffic, where a car with a manual gearbox is often driven in a low gear with unnecessarily high engine speeds.



Fig. 2: The main components of the torque converter, from right to left: Impeller, stator, turbine.

Description

Hydrodynamic torque converter

The ZF automatic transmission has a converter which uses the well-known Trilok principle. This makes the clutch pedal superfluous and it is impossible to stall the engine. The converter can be adapted to a great extent to suit the engine being used. Its main components are impeller, turbine and stator with free-wheel unit. These components are arranged in a common housing in such a way that oil flows through them in a closed circuit.

Torque multiplication is at its greatest when the car is starting from a standstill. The stator, which deflects the oil to accelerate the impeller, is located on the housing by means of a free-wheel unit. As road speed increases, i.e. when impeller and turbine are rotating at approximately the same speed, the stator no longer produces any torque multiplication; it disengages from the housing and rotates

in the same direction as the impeller. The torque converter then acts as a fluid coupling.

Three-speed gearbox

A simple epicyclic gearbox with three forward and one reverse speed is mounted behind the torque converter. Considerable effort was made to produce a gearbox occupying a minimum of space and using as few components as possible. Hydraulically operated multi-disc clutches are used to effect the gear shifts. These do not wear and require no adjustment. Two free-wheel units are used to ensure that the gear shift takes place without loss of traction. A low-loss oil pump is fitted in the front casing of the gearbox.

It supplies oil to the converter, selector unit, gear shift and the lubrication system. The annulus of the epicyclic gearbox also has external teeth in which a pawl engages to prevent the vehicle rolling away while parked.

Selector unit

The selector unit with the selector valve, control pistons and pressure valves is situated on the underside of the transmission housing. The shift points are dependent on the throttle opening and the road speed of the vehicle. The centrifugal governor on the output shaft produces the pulses corresponding to the road speed.

Gears are changed automatically at predetermined points depending on the driving range selected.

When necessary the selector unit can be overridden by the driver by depressing the accelerator pedal fully (kick-down) to engage the next lowest gear for better acceleration. In this case the upward shift takes place at almost maximum permissible engine speed, i.e. only when the vehicle has reached a considerably higher speed. This, therefore, ensures that the engine power is fully utilized in each gear.

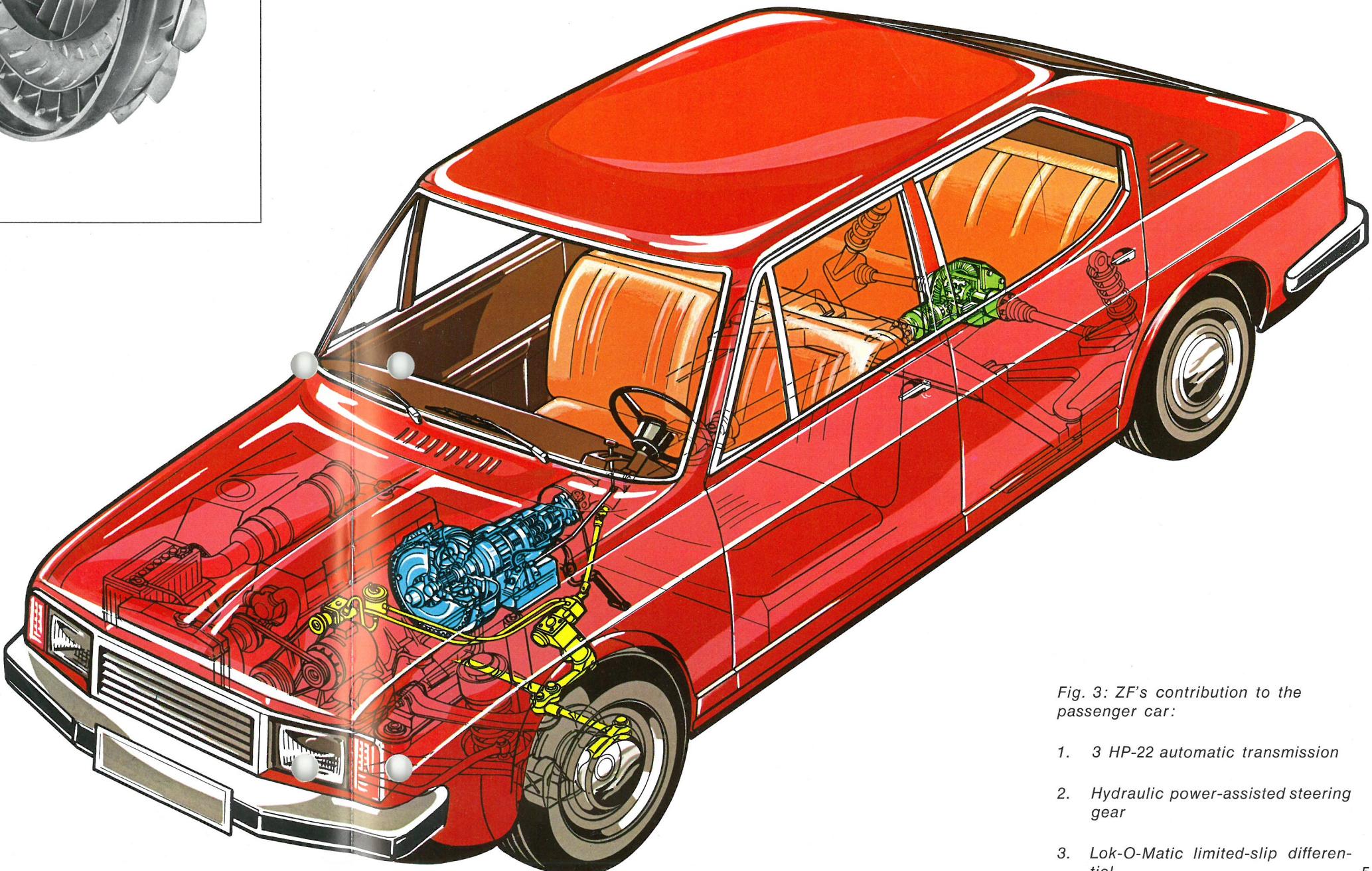


Fig. 3: ZF's contribution to the passenger car:

1. 3 HP-22 automatic transmission
2. Hydraulic power-assisted steering gear
3. Lok-O-Matic limited-slip differential

Operation

The transmission unit is operated by means of a selector lever which has an indicator with the following markings:

P = Park. To be selected only when vehicle is at a standstill. The drive wheels are locked by the lock pawl on the gearbox output shaft.

R = Reverse. Select only when vehicle is at a standstill.

N = Neutral. The transmission is in neutral. The engine and drive wheels are de-coupled.

A = Automatic. This is the normal drive position. The upward shifts to the 2nd and 3rd gear take place at the most economic points - fuel economy being the guiding principle. This position should be used in normal traffic conditions. A rapid downward shift for overtaking and, therefore, better acceleration in the gears is effected by using the kick-down. To obtain kick-down the accelerator pedal must be depressed fully to overcome the nominal resistance.

2 = Intermediate and engine braking. This position is used to advantage in mountainous regions and on long uphill or downhill gradients. In this position the transmission does not change above second gear. Engine power is fully utilized and engine braking is more effective.

1 = Low and engine braking. In this position the transmission is fixed in first gear. Select this range for difficult driving conditions on steep uphill or downhill gradients.

As can be seen from the above, the driver is not completely at the mercy of the automatic transmission. Even in position 'A' it is possible, in addition to kick-down, to achieve certain variations by appropriate regulation of the accelerator pedal. The gear shift points can, therefore, be varied within a limited range.

It is important to remember on down-hill routes to shift back to range 2

or even 1 in good time to preserve the service brakes. Subject to technical changes.

Installation

ZF automatic transmissions have about the same installed dimensions as conventional synchromesh gearboxes. There should, therefore, be no problems with installation. The converter bell housing and the transmission case with its mounting faces can be adapted to suit the vehicle layout.

Maintenance

This is confined to checking the oil level and carrying out oil changes at the prescribed intervals. Adjustments are not necessary even after prolonged periods of service.

ZF has a well equipped service network in Germany and abroad which is still being enlarged.

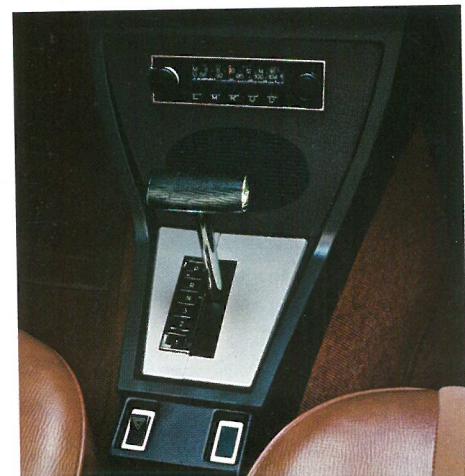
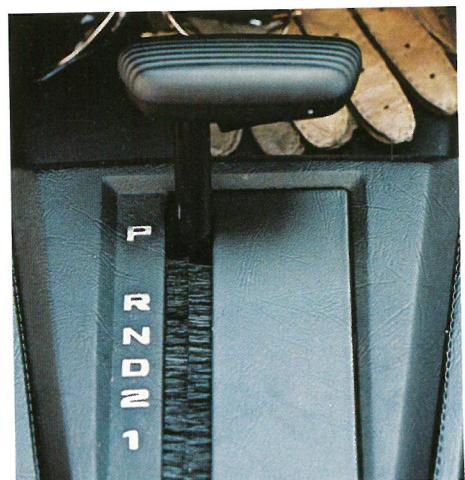
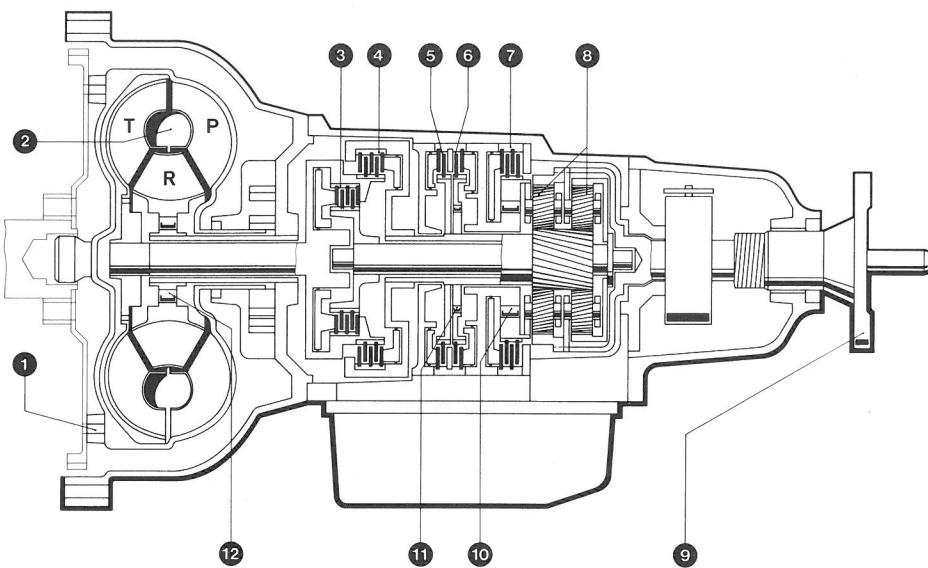
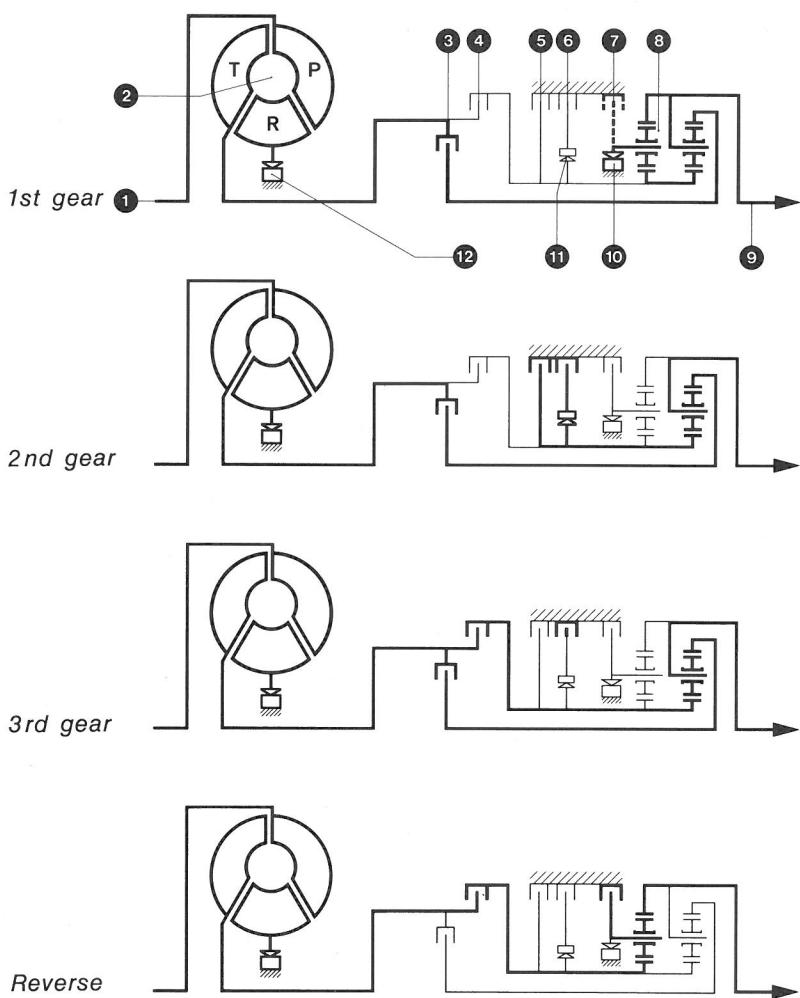


Fig. 4: Selector lever of ZF automatic transmission in two different makes of car



- ① Input shaft
- ② Hydrodynamic torque converter
P = impeller
R = stator
T = turbine
- ③ Rotating multi-disc clutches
- ④ Fixed multi-disc clutches
- ⑤ Epicyclic gear train
- ⑥ Output shaft
- ⑦ Free-wheel units
- ⑧ In the idle condition all clutches are disengaged.



The bold lines indicate the power flow in 1st, 2nd, 3rd and reverse gears.

Fig. 5: Schematic drawing of 3 HP-22 automatic transmission and the power flow in the individual gears



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Konto nr.: 11094-0
Aps. reg. nr. 26 599

Citroën Automobiles A/S
Bådehavnsgade 38
2450 København SV.-

1981-07-13 bl/ic

Att.: hr. servicechef Kurt Mejlgård

Vi har modtaget Deres brev af 09.06.81 omh. olietype
BP Autran GM-MP og har i den forbindelse forespurgt
på fabriken, om denne olietype må anvendes til ZF's
automatgear type 3 HP 22, som anvendes i Citroën CX 2400.

Vi har nu modtaget fabrikens svar, som er som følger:

Den af BP tilbudte olie må ikke anvendes.

Fabriken henviser til smøreskema TE-ML 11, som vedlægges.

Med venlig hilsen
ZF DANMARK ApS

Bjarne Linnet

A handwritten signature in blue ink, appearing to read "Bjarne Linnet".



für ZF-AUTOMATGETRIEBE	3 HP-12
	3 HP-20
	3 HP-22
	4 HP-22

Zugelassen sind nur die auf der Rückseite dieses Blattes benannten Produkte.

(Bitte D-Nummer beachten!)

Für Nachfüllungen und Ölwechsel können alle Sorten dieser Liste verwendet werden.

Diese Sorten sind auch für die Erstbefüllung von Reparatur- und Ersatzgetrieben zugelassen.

Die ATF-Sorten dieser Liste sind miteinander mischbar.

Hinweise für Schmierstofflieferanten: Änderungen der Markenbezeichnungen, der Zusammensetzung und der Herkunft der freigegebenen Dexron-Sorten sind uns unverzüglich zu melden.

Vorliegende Ausgabe wird am 31.12.1983 ungültig.

Bitte fordern Sie im Januar 1984 die neue Ausgabe bei der ZF Getriebe GmbH, Saarbrücken, Abt. MK, oder bei der nächsten ZF-Kundendienststelle an!

AGIP	AGIP DEXRON II D-21 103	LABO, Nanterre/F	DEXRON II D-20 923
AMPOL, Sydney/AUS	Ampol ATF Type DXR II D-20353	MARTIN, Nürnberg	GIROMATIC DEXRON C/D-20383
ANTAR, Paris/F	ANTAR DEXRON II D-20 600	Merk, Landshut	Deltinol-Getriebeöl ATF Dexron
Aral, Bochum	Aral Getriebeöl ATF 22 D-20 749	Mobil Oil	D-20383
ASEOL, Bern/CH	ASEOL DEXRON II D 16-712 D-20 137	Morris, Shrewsbury/GB	Mobil ATF 220 D-20 104
Autol, Hannover	Autol-Dexron-D-20 383	Motul, Aubervilliers/F	Golden Film Dexron II D-20 807
Avia	AVIA FLUID ATF 77 DEXRON D-20 760	Neuling, Berlin	MOTUL DEXRON II D-21 159
BayWa, München	BayWa ATF, DEXRON-D 20 739	OEL HANSA, Hamburg	PN-FLUID-Getriebeöl Dexron II
Beverol, Beverwijk/NL	Beverol Dexron II D-20 727	ÖMV, Wien/A	D-20 137
Bösche & Bödeker, Bremen	Turbo-Getriebeöl ATF Dexron D-20 383	OPAL, Nanterre/F	HANSA DEXRON D-20 739
BP	BP Autran DX II D-20 335	ORVEMA, Maarssen/NL	ÖMV-AUTROMATIC DEXRON II-
BUCHER, Langenthal/CH	MOTOREX ATF DEXRON II D-21 121	PENNASOL, Lehrte	D-20 768
Caltex	Texamatic Fluid Dexron II D-20 139	PENNZOIL, Houston/USA	OPALFLUID TA/D-20 728
CASTROL	D-20 329, D-20 576	Polaroil, Issoudun/F	Orvematic D-20 725
CHEVRON	CASTROL TQ DEXRON II D-20 180,	Prinz-Schulte, Frechen	Pennasol Fluid Getriebeöl Dexron
	D-21 130, D-20 366, D-20 354,	Raiffeisen, Hannover	D-20 112
	D-20 182, D-20 185, D-20 583	Sauerstoffwerk, Münster	Pennzoil Hydra-Flo D-20 122
	Chevron Automatic Transmission	Schindler, Hamburg	Polafluid Dexron D-20 356
	Fluid D-20 824	Shell	AERO-LINE Dexron D-20 101
DELUXOL, Rotterdam/NL	DEXRON II-D-20 726	Shell-Handel, Hamburg	HG RENOFLUID DEXRON D-20 739
Deutzer Öl KG, Köln	Dexron II D-21 158	SOFRA, Paris/F	WESTFALEN-Getriebeflüssigkeit ATF
DUCKHAM, West	DUCKHAMS FLEETMATIC CD-20 801	SUN OIL	Dexron D-20 383
Wickham/GB		TEXACO	FRONTOL GETRIEBEÖL DXS
ELAN, Wien/A	ELAN Austromatic Dexron II D-20 168	Total	DEXRON C/D-20 383
ELF	ELFMATIC G2 D-20 211	trek, Johannesburg/ZA	Shell Dexron II D-20 137
Eller-Montan, Duisburg	ELLMO-Fluid Dexron D-20 112	UNIL International	Mac Dexron II – D-20 137
ESA. Burgdorf/CH	ESA DEXRON ATF D-20 356	Valvoline	HAFA TRANSMATIC B/D II-20 781
Esso	ESSO AUTOMATIC TRANSMISSION	VEEDOL International	SUNMATIC 149 D-20 101
	FLUID DEXRON D-21 065	Voitländer, Kronach	
FANAL, Mühlheim	FANAL Dexron II D-20 383	WCG, Münster	Texaco Texamatic Fluid 9226
Fiat, Torino/I	Tutela G1/A D-20 782	Wenzel & Weidmann,	D-20 112
FINA	FINA DEXRON II D-20 668	Eschweiler	Lastona Fluid II D-20 112
FINKE, Bremen	Aviacaron ATF/DEXRON D-20 112	WEVAG, Bocholt	TOTAL DEXRON D-20 356
FUCHS, Mannheim	RENOFLUID DEXRON D-20 739	Wintershall, Düsseldorf	TREK DEXRON II D-20 530
Gulf	Gulf ATF Dexron II D-20111	YACCO, Caudebec/F	UNIL MATIC DEXRON II D-20 112
Haberland, Dollbergen	Automatic Transmission Fluid		VALVOLINE VALVOMATIC ATF
HESSOL, Bad Vilbel	Dexron D-20 112		Type Dexron II D-20 739
HGK, Düsseldorf	HESSOL Dexron D-20 112		VEEDOL ATF DEXRON II D-20 816,
Homberg, Wuppertal	SVG Getriebeöl ATF D-20 790		D-20 366, D-20 808
Hürlimann, Wädenswil/CH	HOMBERG-Getriebe-Fluid D-20383		ARGON-Flüssigkeitsgetriebeöl
HUILES RENAULT,	ROLLSYNOL ATF Dexron II D-20101		AFT Dexron D-20 383
Venissieux/F	RENAULT DIESEL DEXTRON		OK Getriebeöl ATF Dexron D 20 739
ICPA, Dordrecht/NL	D-20211		UK-Fluid II D-20 137
Käppler, Stuttgart	OK – ATF-Dexron D-20 790		WEVAG Automatic Getr. Oel ATF
Kompressol, Köln	Selectol Fluid Getriebeöl Dexron		Dexron D-20 383
	D-20 112		Violin ATF Dexron D-20 383
	KOMPRESSOL-Fluid-Matic D 52 –		YACCO ATF Type II D-20 806
	D 20 739		



Druckflüssigkeiten für hydrostatische Antriebe in geschlossenem Kreislauf

(Bei hydrostatischen Lenkungen bitte Schmierstoffliste TE-ML 09 beachten!)

Für Antriebe mit gemeinsamem Ölhaushalt des mechanischen Getriebes mit der Hydrostatik bitten wir um Rückfrage bei ZF, Abt. TE-WL.

Die nachstehend empfohlenen Druckflüssigkeiten sind für den Einsatz in hydrostatischen Antrieben bestimmt.

1. Hydrauliköle HLP nach DIN 51525 (diese Norm ist in Überarbeitung und wird DIN 51524 zugeordnet)
2. HD-Motorenöle nach MIL-L-2104 B, 2104 C, 46152 bzw. API-CC, CD, SC, SD, SE
3. Automatic Transmission Fluids (ATF)
4. Andere Medien wie Universal- oder Mehrzwecktraktorenöle, HL-Öle, Mehrbereichsöle, schwer entflammbare Flüssigkeiten und Syntheseöle nur auf Anfrage.

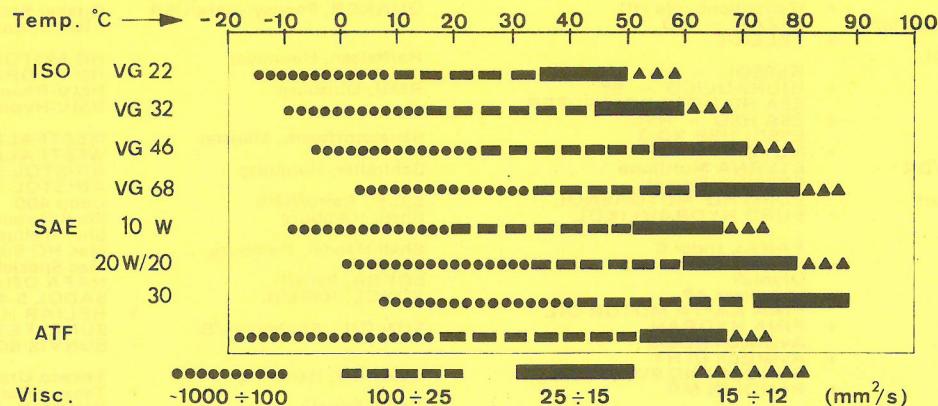
Zulässige Viskositätsgrenzen:

Die Betriebsviskosität darf $12 \text{ mm}^2/\text{s}$ nicht unterschreiten, sie soll im Bereich von 12 bis $100 \text{ mm}^2/\text{s}$ liegen (bester Wirkungsbereich 15 bis $25 \text{ mm}^2/\text{s}$).

Die Startviskosität darf $1\,000 \text{ mm}^2/\text{s}$ nicht überschreiten.

Die Betriebstemperatur soll nicht höher als ca. 80°C sein (gemessen am Leckölaustritt der Pumpe bzw. des Motors). Gegebenenfalls ist ein Wärmetauscher zwischenzuschalten!

Die nachstehende Skizze gibt den ungefähren Anwendungsbereich der nach 1. bis 3. zulässigen Druckflüssigkeiten an:



Auf der Rückseite dieses Blattes sind verwendbare HD-Motorenöle aufgeführt. Andere Motorenöle können eingesetzt werden, wenn die unter 2. genannten Bedingungen erfüllt sind.

Die mit dem Vorzeichen * gekennzeichneten Produkte sind HLP-Öle. Diese Markenöle können in der geeigneten Viskositätsgruppe zur Anwendung kommen.

Hinweis für Schmierstofflieferanten: Änderungen in der Zusammensetzung der freigegebenen Produkte oder der Markenbezeichnung sowie Qualitätsunterschiede im In- und Ausland sind uns unverzüglich zu melden.

Vorliegende Ausgabe wird am 31.12.1982 ungültig.

Bitte fordern Sie im Januar 1983 die neue Ausgabe bei der Zahnradfabrik Passau GmbH, Abt. TSID oder bei der nächsten Kundendienststelle an.

AGIP, München	AGIP DIESEL GAMMA	Käppler, Stuttgart	Drivolin Superior HD
AMERICOL, Zaandam/NL	+ AGIP OSO Selectovite C	Kompressol, Köln	+ KKS Hydrauliköl HLP KOMPRESSOL-HD-S3-C-ÖL
Ampol, Sydney/AUS	+ Hytanco	LABO, Nanterre/F	+ KOMPRESSOL-CH
ANTAR, Paris/F	+ DEULUBE S3	Leprince u. Siveke, Herford	MEGALUB AC3
Aral, Bochum	+ TECOMA OIL	Lubrication E., Fort Worth/USA	Leprinxol-SUPER
ASEOL, Bern/CH	+ MILANTAR 3C	MARTIN, Nürnberg	+ LEPRINXOL - SH 3550 LE
Autol, Hannover	+ VISGA	Merk, Landshut	+ Monolec GFS
Avia, München	+ Aral Turboral Motor Öl	MIHAG, Düsseldorf	+ Monolec Hydraulic Oil
	+ Aral Vitam GF	MIHAG WIESÖL, Düsseldorf	MAROL HD SUPERPLUS
	+ ASEOL 15-9.	Mineralölwerk, Osnabrück	+ LIGOMAR EP
	+ ASEOL PLUS	Mobil, Hamburg	+ Deltinol-Motorenöl HD Series 3
	+ Autol-CPM-HD	Montan-Union, Hamburg	+ Deltinol-Hydrauliköl ISO VG
	+ Autol-HYS	Motul, Aubervilliers/F	+ WIOLIN Rekord HD
	+ AVIA SPECIAL_HDC	NAFTAGAS, Belgrad/YU	+ MIHAG HS
	+ AVILUB Hydr.-Öl RSL	Neuling, Berlin	+ WIESOLUB Rekord HD
BayWa, München	BayWa HD Superior	Norsk Olje, Oslo/N	+ WIESOLUB HS
Bechem, Hagen	+ BayWa Hydrauliköl MR	Noviol, Nijmegen/NL	+ Irokal HD
Beverol, Beverwijk/NL	+ BECHEM MOTOR STAROIL S 3 HD	Nynäs, Stockholm/S	+ Chemfrol GP
Blaser, Hasle-Rüegsau/CH	+ BECHEM STAROIL	OEL HANSA, Hamburg	Mobil Delvac 1300
Bösche & Bödeker, Bremen	Beverol Gold Magna RX	OMV, Wien/A	+ Mobil D.T.E. 20
BP, Hamburg	+ Beverol Hydraulic Oils T	Oest, Freudenstadt	+ MU-Hyperol Motorenöl MIL-C
Brugarolas, Rubi/E	BLASOL 281	OPAL, Nanterre/F	+ MU-HYPEROL Hydrauliköl
BUCHER, Langenthal/CH	+ BLASOL 156 – 159	Optimol, München	SUPERIOR HP 3C
	Turbo-HD-Motorenöl C III	ORLY, Vieux-Thann/F	+ RUBRIC S HM
	+ Turbo-Hydrauliköl Spezial	ORVEMA, Maarssen/NL	GALAX GLX
	BF Vanellus C 3	PAM, Aschaffenburg	+ HIDRAULIK DHV
	+ BF Energol HLP	PANOLIN, St. Gallen/CH	Neuling HDB Motorenöl
	+ Fluid Drive B	PAZ, Haifa/IL	+ Hydrazol EP
	MOTOREX HD SERIES 3 SUPER	PENNOSOL, Lehrte	NOROL MOTOROLJE HD
	+ MOTOREX COREX EP	PENNZOIL, Houston/USA	+ NOROL Hydraulikolje HM
Caltex, London/GB	Caltex RPM DELO 300 Oil	PETROL, Maribor/YU	Kendall F-L Select Oil
CASTROL, Swindon/GB	+ RANDO OIL HD	Pintsch, Hanau	+ Kendall R & O Oil EP
CEPSA, Madrid/E	CASTROL/DEUSOL CRD	Polaroil, Issoudun/F	Nynäs Ajcol DM
CHEVRON, Frankfurt	+ CASTROL HYSPIN AWS	Prinz-Schulte, Frechen	+ Nynäs Hydraulolja
Cofran, Paris/F	Super Serie 3	QUAKER, Pennsylvania/USA	ROBUROL UNIVERSAL HD
Condat, Chasse/F	+ Delfin H	Raiffeisen, Hannover	OMV-MOTORÖL SHD 4-C
Coop, Cairo/ARE	Chevron Delo 300 Motor Oil	RMV, Duisburg	+ OMV-OL HLP
CORDIOL, Waldkraiburg	+ Chevron EP Hydraulic Oil	Sauerstoffwerk, Münster	OEST DIMO HDC
DANCO, Dortmund	SUTRILUX S3	Schindler, Hamburg	+ OEST Hydrauliköl H-LP
DELUXOL, Rotterdam/NL	+ COFRALINE EXTRA	S.C.P., Cairo/ARE	DIESOPAL MC 3
Deutzer ÖI KG, Köln	VICAM DUAL	Shell, Hamburg	+ HYDROPAL PEL
Diederichs, Wuppertal	+ HYDROLUB H	Shell-Handel, Hamburg	Optimol Motoröl SUPER LD
DUCKHAM, West Wickham/GB	Coop Superox Oil	SOFRA, Paris/F	+ Optimol HYDO
	+ Coop Hydraulic Oil Series	SUN OIL, Antwerpen/B	+ ORLY DRACO 2000
	Cordiol-HD Extra C	TEXACO, Hamburg	+ ORLY DORA EP
		Total, Paris/F	+ Purex DD
		trek, Johannesburg/ZA	+ Stipa
		UNIL, Berlin	PAM Ultra HD Motor Oil
		USOCO, Rotterdam/NL	+ PAM Cordanol Oil
		Valvoline, Hamburg	+ PANOLIN HD EXTRA DIESEL S-3
		VEEDOL Internat./England	+ PANOLIN HYDRAULIKÖL HLP
		WCG, Münster	PAZMULAR X
		Wenzel & Weidmann, Eschweiler	+ PAZALUS SEP
		WEVAG, Bocholt	Pennasol Motorenoel Extra C
		WISURA, Bremen	+ Pennasol Hydrauliköl HLP
		YACCO, Caudebec Les Elbeuf/F	Pennzoil Multi-Duty
		Zeller + Gmelin, Eislingen	+ Pennzoil AW Hydraulic
			PETROL MOTORÖL HD-D
			+ PETROL HYDROLUB
			Real Oil Super HD CS3
			+ Hydrauliköl HLP
			PÖLADIESEL S 3
			+ ELEVATOL B
			AERO-LINE Super HD M-C
			+ AERO-LINE Torqmatic Fluid
			Quaker State HDX Universal Fleet Motor Oil
			HG MOTORENÖL CS 3 HD
			HG HYDRAULIKÖL MR-Serie
			+ RMV-Rhemotol HD C
			+ RMV-Hydrauliköl HLP
			WESTFALEN-Motoröl C3 HD
			+ WESTFALEN-Hydrauliköl HLP
			ARISTOL HDC 3
			+ ARISTOL-HYDRAULIKÖL HLP
			Coop 400
			Shell Rotella Z
			+ Shell Tellus
			Mac HD Superior Motorenöl
			+ Mac Spezial-Hydrauliköl
			HAFA Detergente S 3 C
			SADOL S-400
			+ HELIAR H
			SUNFLEET S-3
			+ SUNVIS 800 WR-LP
			Texaco Ursa Super LA
			+ Texaco Rando Öl HD
			RUBIA H
			+ TOTAL AZOLLA
			+ TREK ENGINE OIL SE/CD
			+ TREK HYDRAULIC OIL
			UNILUBE Motor HP 3 C
			+ UNILUBE HYD HLP
			Usoco-Excello HD EXTRA Motoroil
			+ Usoco ANTLIA SUPER Oil
			VALVOLINE RITZOL Universal HD
			+ VALVOLINE RITZOL MR
			VEEDOL DIESEL HDC
			+ VEEDOL AUBURN AW
			OK Motor Öl Super Universal HD CT
			+ OK Hydrauliköl MR
			ECUBSOL Suprema C/S 3 HD
			+ ECUBSOL Öl HY
			WEVAGOL EXTRA "C3"
			+ WEVAG Hydr. Öl, Spez. HLP
			WISURA MULTI HD-C
			+ WISURA Tempo
			YACCO AS 3
			+ YACCO TRANSHYD
			DIVINOL Spezial HD S3
			+ ZET-GE HLP/ISO