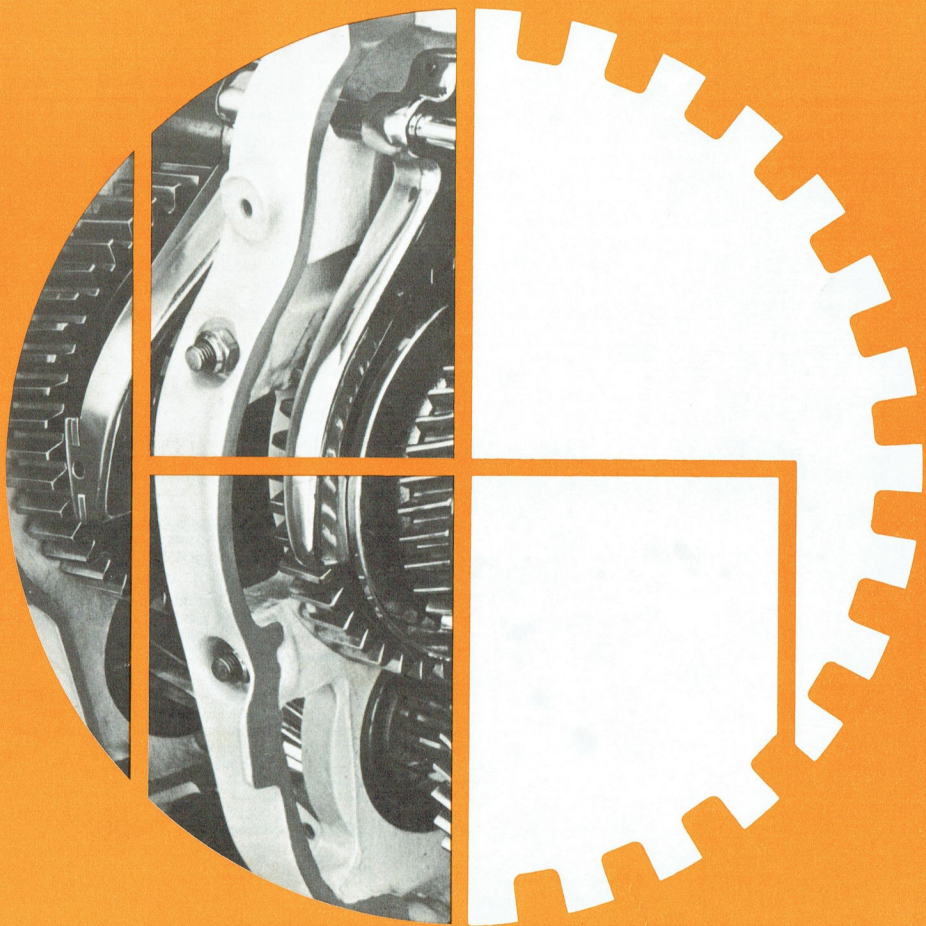


New Ford 4/6/8 Speed Transmissions



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Present day operators demand a lot from their trucks in an age when increasing emphasis is being placed upon higher carrying capacity, and greater durability levels. The introduction of higher revving diesel engines in particular has highlighted three design requirements critical for the trucks operating on the world's highways today:

- *Multispeed transmissions to take advantage of new and larger diesel engines and match vehicle performance to road conditions for improved economy.
- *All synchromesh transmissions with emphasis on ease of operation to improve driver productivity and vehicle safety.
- *Increased durability and reliability.

To meet these requirements Ford has designed and introduced its new range of 4, 6, 8 speed transmissions, designated:

- 4-410-S
- 6-600-S
- 8-570-S

Principal Features

All synchromesh simple design to allow maximum flexibility of operation.

Baulk ring synchronisers for easier gear engagement.

Substantial synchroniser dimensions for durability.

Constant mesh reverse gear with dog engagement.

Matched gears for quieter operation and durability.

Single rail gearshift for positive gear selection.

Smooth and direct change with small gate movement.

Positive lubrication to main shaft pilot bearing designed to alleviate a major source of transmission problems.

Needle roller bearings on all mainshaft gears for increased durability.

All forward gears constant mesh.

The 8 speed transmission range change is power operated.

All transmissions are suitable for vertical and horizontal left and right mounting.

Provision is made on all transmissions for an automatic reversing light switch.

The anti jump-out device built into the synchroniser hubs operates on all gears including reverse.

Engine mounted gearshift linkage to give a positive, direct change and avoid the possibility of gear jump-out.

Rear and right-hand mounted PTO points are incorporated on all transmissions (including left-hand PTO on 6 and 8 speed transmissions).

Construction

The new transmissions are of sandwich design, split along the line of the main and countershafts. Removal of the top cover reveals the total transmission with all gears clearly visible. Accessibility to each transmission component is considerably eased by this design feature, thus reducing problem diagnosis and service times. There is design commonality between the 4, 6 and 8 speed transmissions, thereby facilitating service requirements.

Housing

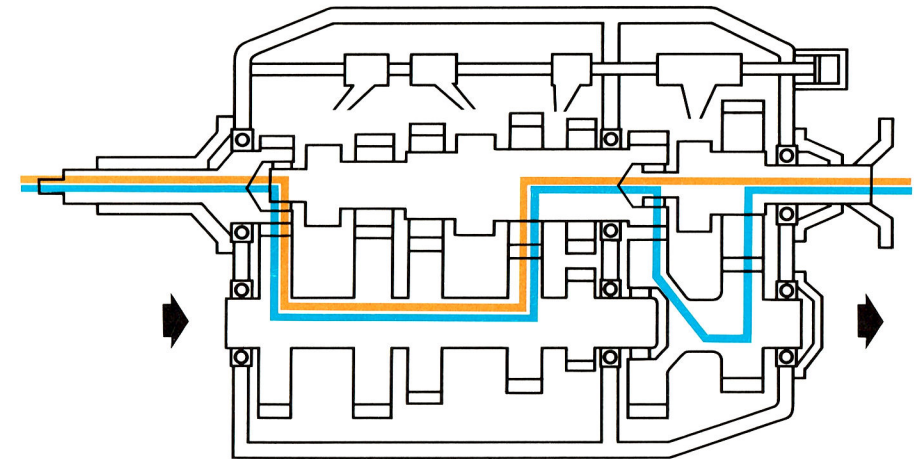
The 6 and 8 speed transmissions share the same basic housing. The 4 speed transmission has a similar but shorter housing.

Construction

The main features of this are that the 4 and 6 speed transmissions are of conventional single countershaft construction.

The 8 speed transmission consists of a 4 speed transmission plus a two speed range change (auxiliary) unit in a common case to give eight speeds.

The diagram below illustrates the operation of this unit.



Legend: — Low Range, Gears 1 to 4
— High Range, Gears 5 to 8

The New 4 Speed 4-410-S

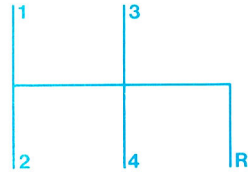
The new 4 speed, all synchromesh box has many features in common with the 6 and 8 speed systems. Baulk ring synchronisers for easier gear engagement, matched gears for quieter operation and durability, and anti jump-out device on all gears.

Ratios

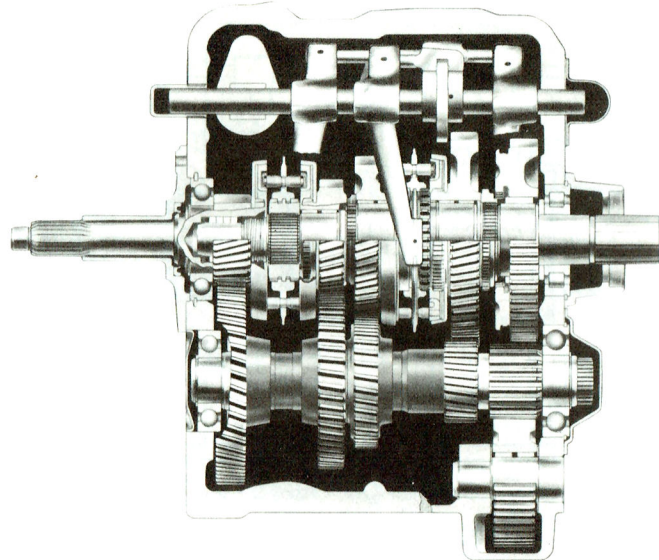
The gear ratios have been selected so that first gear gradeability and top gear speedability of vehicles fitted with the new transmissions do not differ significantly from current levels. The ratios of the box are:

1st gear	6.49
2nd gear	3.21
3rd gear	1.67
4th gear	1.00
Reverse	7.18

The input torque capacity is 41 mkg (300 lb/ft) and the undressed weight 137 kg (301 lb).



All the new transmissions have provision for shifting by either direct manual or remote manual methods and a single rail gearshift for positive selection and small gate movements. The 4-410-S standard gate procedure is from left to right with reverse gear to the right of and adjacent to top gear.



The New 6 Speed 6-600-S

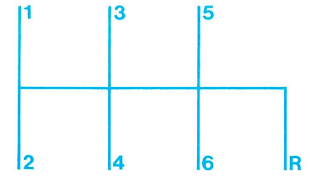
The new 6 speed gearboxes, are also synchromeshed on all gears and represent a significant and highly competitive improvement in this area. Like the 4-410-S the 6 speed version is of modern single countershaft construction.

Ratios

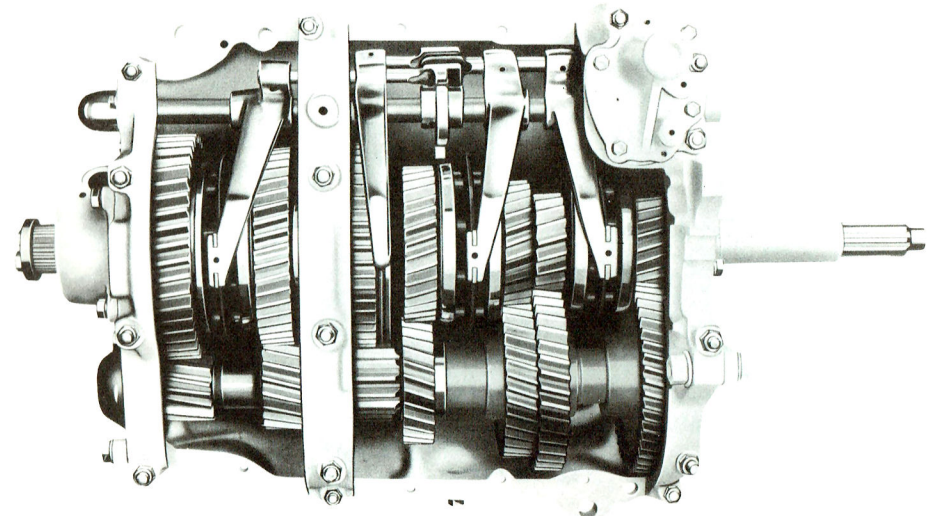
6-600-S

1st gear	7.51
2nd gear	4.58
3rd gear	2.85
4th gear	1.87
5th gear	1.31
6th gear	1.00
Reverse	7.18

This choice of even progression ratios provides the operator not only with greatly increased operational flexibility, but the opportunity to eliminate in many instances costly and complicated 2 speed rear axle assemblies. The input torque capacity is 61 mkg (440 lb/ft). The undressed weight is 188.7 kg (416 lb).



Standard gate procedure from left to right is employed with reverse gear to the right of and adjacent to top gear. The gate movement is small with selection smooth and positive.



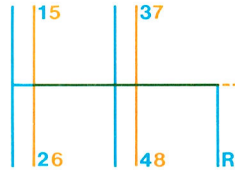
The New 8 Speed 8-570-S

The 8-570-S provides eight forward all synchromeshed gears. This is achieved by incorporating an integral pneumatically operated range change in the housing, thus providing the maximum possible gradeability and speedability with greatly reduced operator effort.

Ratios

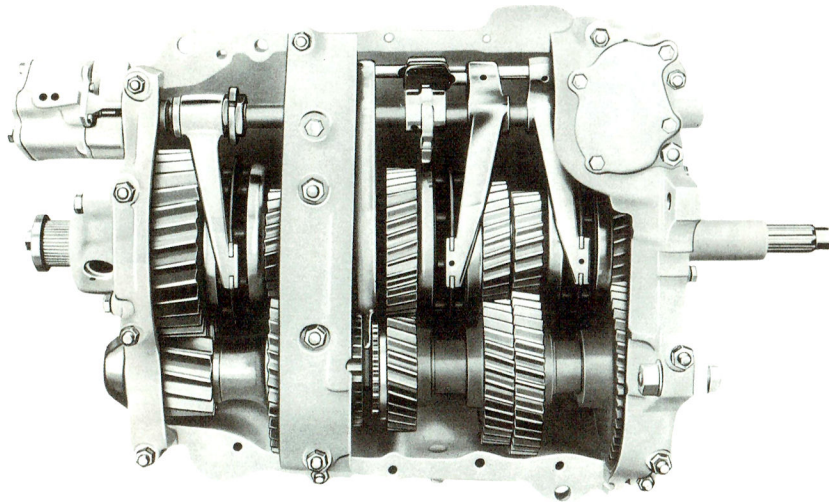
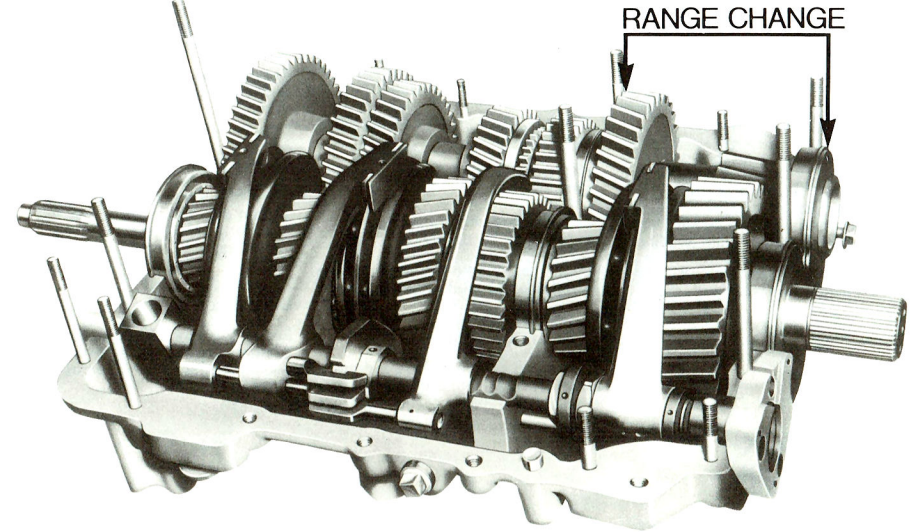
1st gear	10.71
2nd gear	7.04
3rd gear	4.93
4th gear	3.76
5th gear	2.85
6th gear	1.87
7th gear	1.31
8th gear	1.00
Reverse	10.66

Input torque capacity is 58 mkg (420 lb/ft) and the undressed weight 196.4 kg (433 lb).



The operation of the 8 speed gearbox is simple, since it is based on a standard 4 speed gate and only requires the range change to be operated to repeat the positions. Thus gears 1 and 5, 2 and 6, 3 and 7 and 4 and 8 are selected in the same position in the gate, thus avoiding the complication of switching in each gear needed with a two speed axle.

The range change is pneumatic and can only be operated when the main gearbox is in neutral. Preselection is possible in fourth gear and the range change operates as the gear lever passes through the neutral position back across the gate to position 1.



Power Take Off

There is provision for power take off on all the new transmissions. SAE 6 bolt normal duty mounting faces are provided on the right-hand of all units and also on the left-hand of all six and eight speed units, giving access for a geared drive from the countershaft. A rear mounting face is provided on all units to give a direct drive from the rear end of the countershaft. The maximum torque capacity rating from the transmission countershaft for each type of power take off is detailed below together with the conditions to which each is subject.

Power Take-off Type	Torque		BHP	RPM
	mkg	lb/ft		
Side Mounted 4, 6 and 8 speed	36.6	265	35	1700
Rear end mounted 4 speed 6 and 8 speed	41.5 55.0	300 400	60 80	1700 1700

The individual limits apply irrespective of the number of PTO's in use.

With more than one PTO in use the total torque or power transmitted must not exceed the limit specified for the rear PTO.

The sum of the torques or powers transmitted by two side mounted PTO's used together must not exceed the limit specified for one side mounted PTO.

Summary

The introduction of the new 4, 6, 8 speed transmissions makes Ford fully competitive throughout the world. Ford is the only British manufacturer to offer fully synchronised transmissions on all heavy commercial vehicles, others relying exclusively on 2 speed axle combinations. Ford now offers easy to operate all synchromesh transmissions with single speed axles, thereby removing the necessity for mandatory two speed axle combinations on certain models. The advantages of the new transmissions can be categorised under the following main headings: Reliability, Ease of Operation, Performance, Servicing and Advantages over Competition.

Reliability

Improved vehicle reliability and durability.

Heavy duty first and reverse gear giving extended life for off highway and rough terrain operation.

Matched gears for quieter operation and durability.

Higher torque capacity for 4 speed transmission.

Substantial synchroniser dimensions for durability.

Engine mounted gearshift linkage to avoid possibility of gear jump out.

Ease of Operation

Simplified driving technique from fully synchronised transmissions.

Substantial baulk ring synchronisers for ease of gear engagement.

Lighter gear shifting with short positive and direct change.

Removes the necessity for two speed axle combinations on virtually all models.

Performance

Wide ratio spread eliminating uneven gear progression and the need for 2 speed axles in many instances.

Servicing

Easier servicing due to sandwich design with removable cover giving complete access to all gearbox components.

Gearbox Availability

Model	Standard Gearbox	Rear Axle	Ratio/Opt.	Gearbox (Optional)	Rear Axle	Ratio
Petrol						
D0610	4-310	13A	5.29	—		
D0710	4-310	13A	5.29	—		
D0810	4-310	13A	5.29	—		
D0910	4-410S	14B	6.80	—		
D1011	6-600S	15C	6.14	4.410S	14B	6.17
D1211	8-570S	16C	6.50	6.600S	15C	6.50
Diesel						
D0810	4-410S	14B	4.62/5.29	—		
D0910	6-600S	14B	6.17/5.29	—		
D1010	6-600S	15C	6.14/5.57	—		
D1210	8-570S	16C	6.50	6.600S	15C	6.50
D1211	8-570S	16C	6.50/5.57	—		
D1314	8-570S	17300	5.05	—		
D1618	8-570S	19320	6.64/5.91	—		
DA2920	RT-610	19320	7.39/6.64	—		

- Note:** 1. The 4-310 is new designation for the continuing T98A transmission.
2. The RT610 is included to show total D Series transmission range.

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