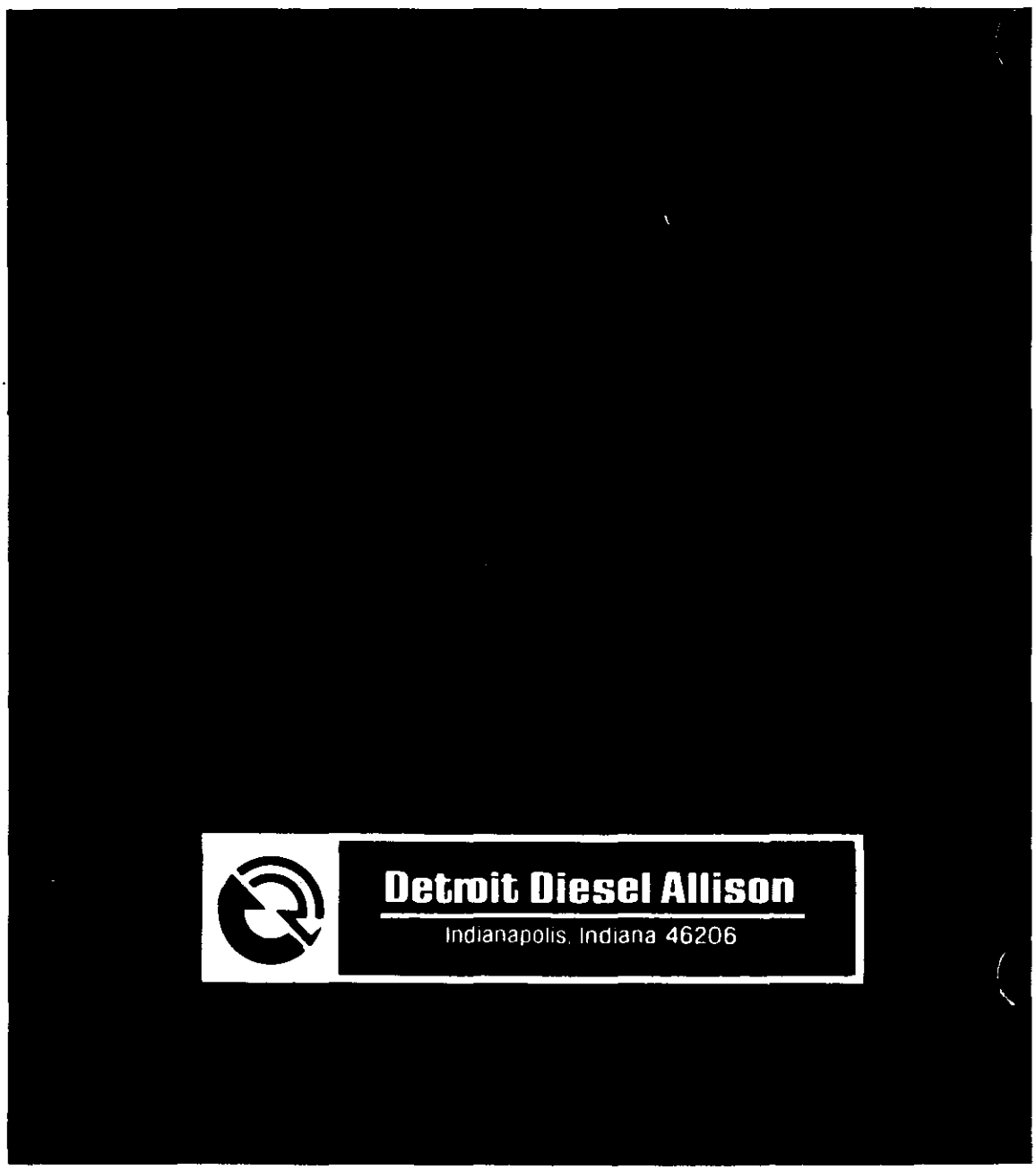
The Allison Powershifts



SA 1318 873 • 15M

Litho in U.S

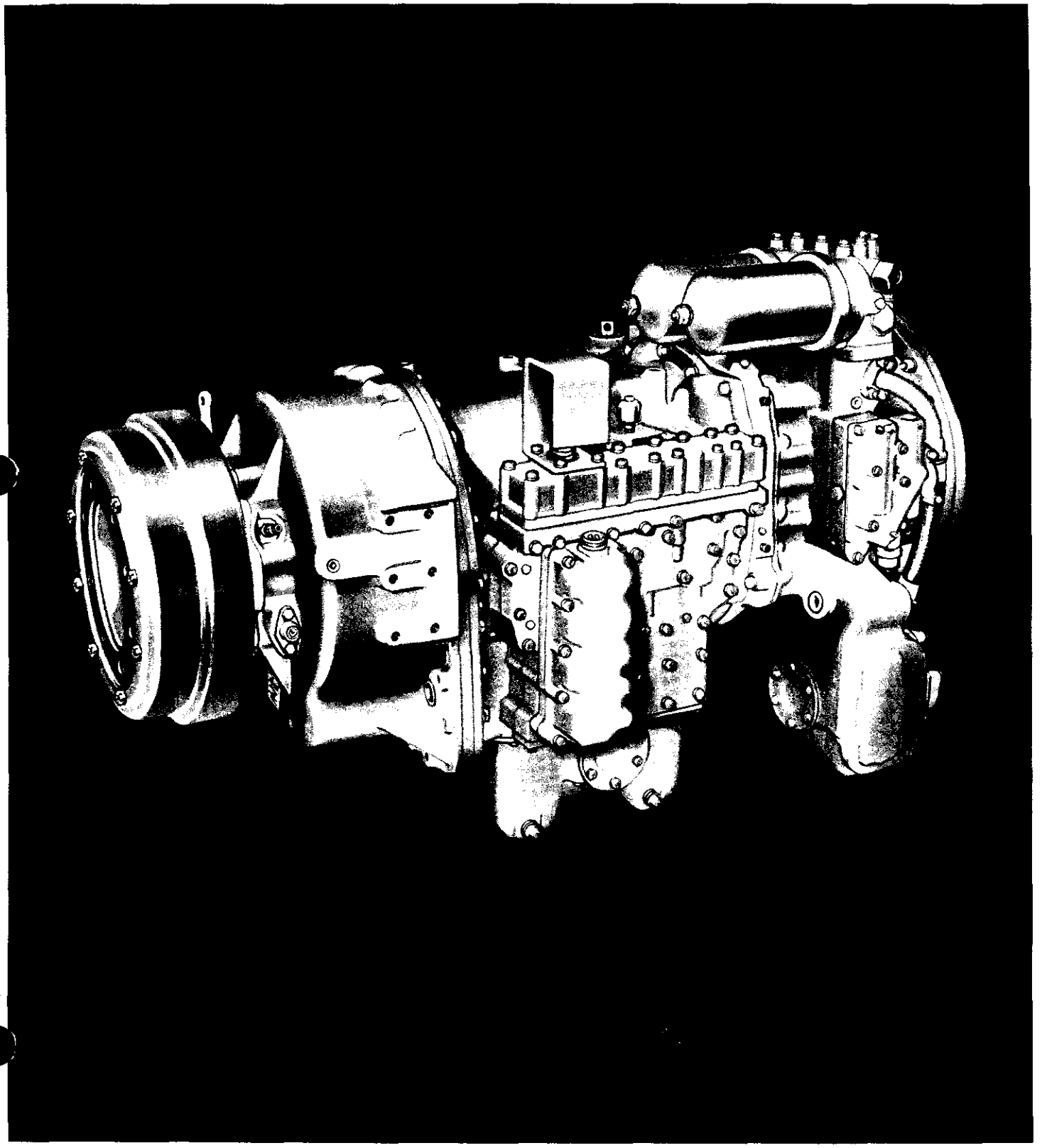
Allison Transmissions

hauling models

DP 8000

700 to 1050 hp*

(522 to 783 kW)*



*For engines up to 1050 hp (783 kW) gross

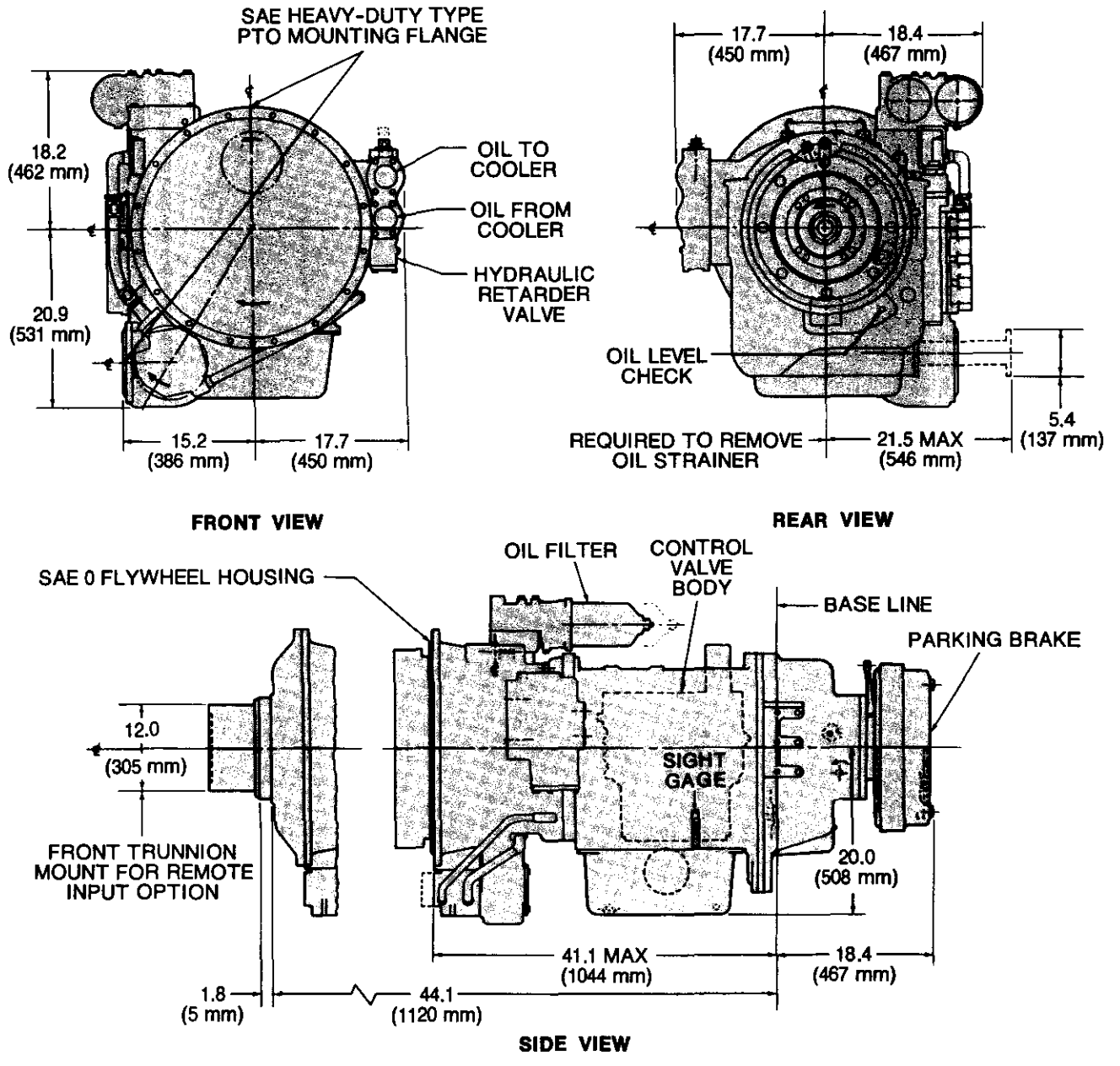
DP 8000 specifications

rotation	Input—right hand Output—right hand (forward ranges)	
rating	Input speed, max Input torque, max (net)	2300 rpm 2960 lb ft (4014 N·m)
applicable power	Input	For engines from 700 to 1050 hp (522 to 783 kW)—net input to transmission 975 hp (727 kW)
mounting	Front (direct mounted) Front (remote mounted) Rear (all models)	SAE 0 flange on converter housing, bolts to engine, flex disk drive Trunnion on front cover SAE 1 engine-type mounts—one each side
torque converter	Stall torque ratio: TC 840, 860, 880 TC 890 Type Lockup clutch, automatic	 2.27, 2.34, 2.24 1.95 Single-stage, 3-element, polyphase Effective all forward ranges
hydraulic retarder	Type Capacity (torque absorption)	Bladed rotor between fixed stators 3260 lb ft (4420 N·m) at 2300 rpm 1415 hp (1056 kW) at 2300 rpm
gearing	Type Gear ratios: First Second Third Fourth Fifth Sixth Reverse	Constant mesh, spur type planetary 4.240:1 2.318:1 1.691:1 1.306:1 1.000:1 0.727:1 5.750:1
clutches	Hydraulic-actuated, spring-released, oil-cooled, multidisk, self-adjusting (automatic compensation for wear)	
flanges	Input (remote mounted) Output	Mechanics 9C; Spicer 1850, 1950 Spicer 1850, 1950; Twin Disc—J490
parking brake	Type Size	Internal-expanding shoe, lever controlled 17¼ x 4 in. (438 x 102 mm)
power takeoff (2)	Size Engine driven Rating (either or both) Ratio (x engine speed)	Heavy-duty SAE, 8 bolt Top, side, or both Intermittent—400 hp (298 kW) Continuous—300 hp (224 kW) Top—1.51 Side—1.13
speedometer drive	Size Ratio	SAE 5/32 (3.96 mm) heavy duty Output speed (1:1)
control valve body	Manual electric shift control (12 or 24 volt)—standard Automatic electric shift control (12 or 24 volt)—optional	
oil system*	Type Capacity (excluding external circuit) Sump Filter (remote or direct mounted) Cooler (customer furnished) Oil pre-heater opening	Hydraulic transmission fluid, type C-3 21 US gal (79.5 litres) Integral Full flow, replaceable elements Remote mounted 1 in. NPTF provided in oil pan
size	Length (engine mounted) Width (w/direct mounted oil filter) Height (w/direct mounted oil filter) Weight (dry)	59.50 in. (1511 mm) (approx) 36.1 in. (917 mm) 39.1 in. (993 mm) 3700 lb (1678 kg) (approx)

*Totally enclosed system. No external lines except to oil cooler and to optional remote oil filters.

Note: All data and specifications subject to change without notice.

DP 8000 mounting dimensions

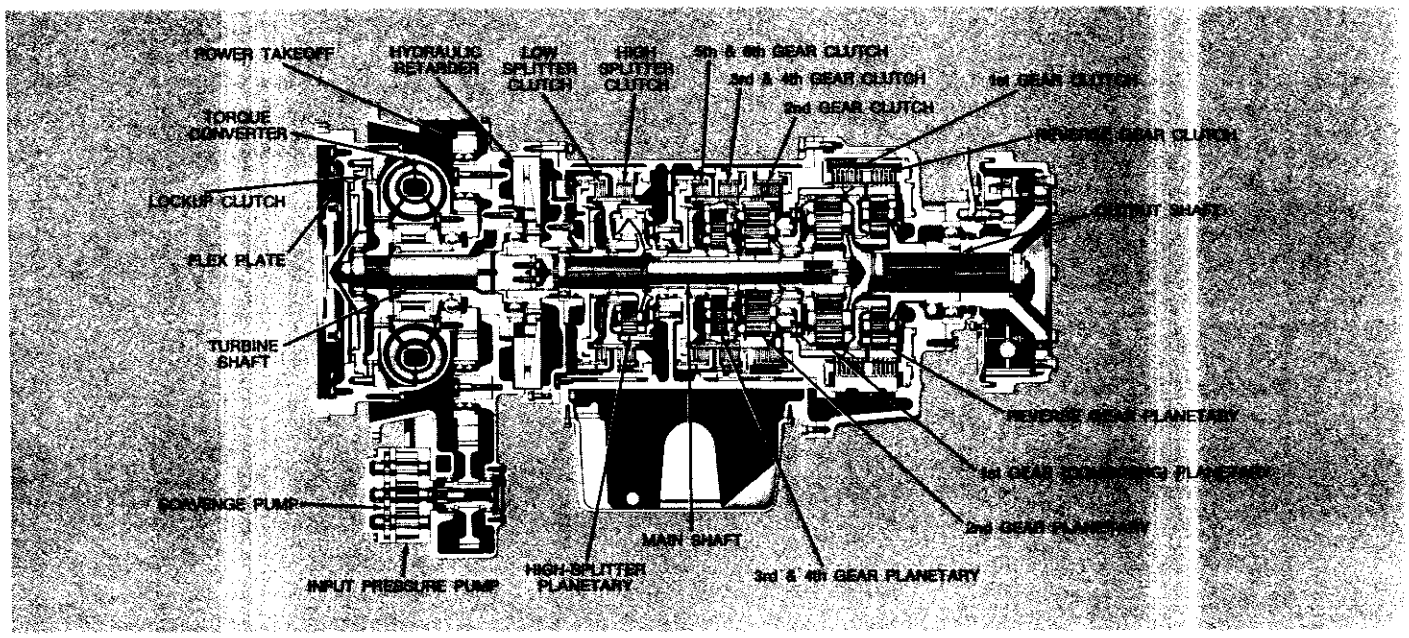


Note: Dimensions are given in inches with metric value in parentheses.

options

- Transmission remote mounted, or direct mounted on engine
- Automatic Electric Shift control for either 12-volt or 24-volt system
- Parking brake
- Oil filter remote mounted or on transmission
- Engine driven power takeoff at top, side or both
- Choice of popular drive flanges

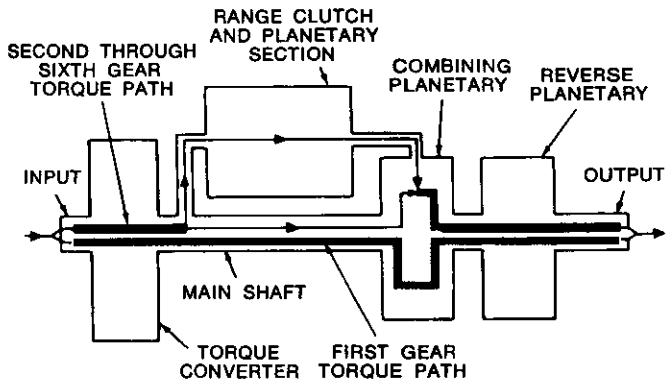
DP 8000 powershift transmission



dual path principle

To keep ahead of the growing demand for bigger haulers and carriers with higher horsepower engines, and to provide transmissions with less *bulk* and *weight* to handle this increased power, Allison engineers have broken the "transmission-horsepower-barrier" with the *dual path* Powershift. The *dual path* Powershift is the biggest capacity, single package transmission commercially available for haulers and carriers today.

With the dual path concept, the converter delivers up to 2.3 times engine torque to the transmission. Note the dual path power flow in the schematic and the components' functional arrangement—torque converter, range gearing and output. The planetary-type gearing is ideally suited for the ingenious method devised to transmit higher horsepower efficiently through components which, in many instances, are not as bulky as those used in other transmissions to carry less power. Only the primary torque members are bigger and heavier—the input and output members, the main shaft, and the combining gear set. Higher horsepower capacity is possible in this compact transmission because torque is divided between the main shaft and the range



clutches and gears. In low gear (first), all the torque is transmitted by the main shaft. In other gears (second through sixth), torque is divided between the main shaft, and the range clutch and planetary section. Before leaving the transmission, the divided torque is recombined in a sturdy combining planetary gear set.

The *dual path* design has these outstanding advantages: (a) high capacity transmission in a compact package; (b) reduced stress on gears and shafts; and (c) increased durability and reliability.

Detroit Diesel Allison
Division of General Motors Corporation
Indianapolis, Indiana 46206

SA1150D Rev. 5-77 Litho U.S.A.

Allison Transmissions

Sales Brief

Date March, 1977 No. 64-I

DP 8000 TORQMATIC TRANSMISSIONS

The DP 8961 is a completely integral transmission consisting of a single stage torque converter with a freewheeling stator, automatic direct drive lockup, a hydraulic retarder, and constant mesh planetary gearing with hydraulic clutches. The electrically actuated hydraulic control valve provides selection for six forward gear ranges and a high reduction reverse range.

Maximum input ratings are:

Maximum Net Input Torque	4014 Nm (2960 lb.ft.)
Maximum Input Speed (RPM)	2300 RPM
Maximum Net Input Horsepower	727 kW (975 HP)

I. PRODUCT DESCRIPTION

A single stage, three-element hydraulic torque converter is provided in the DP 8961 transmission. In order to provide suitable converter match characteristics with various engines, four different torque converter models are available. The converter models and their respective stall torque multiplication ratios are listed below:

Model	Stall Ratio
TC 840	2.27
TC 860	2.34
TC 880	2.24
TC 890	1.95

A hydraulically actuated direct drive lockup clutch is located in the converter flywheel. The lockup clutch engages automatically at higher vehicle speeds to provide a 1:1 direct drive ratio through the converter. The lockup clutch will engage in all forward ranges and reverse or can be selected to engage in only 3rd through 6th gear by the use of an optional lockup control valve body. The customer should specify which lockup shift pattern is preferred to meet the vehicle application.

A hydraulic retarder is provided in the DP 8961 transmission for controlled braking on downhill operations. The retarder rotor turns at engine speed during lockup operation providing absorption ability up to 1415 HP (1056 kW) at 2300 RPM at full retarder valve apply. Horsepower absorbed by the retarder is converted to heat in the transmission oil system. The oil is cooled as it flows through the vehicle heat exchanger. This condition was, and still is, true under "full-on" conditions; however, it will become more important that the vehicle controls be designed to provide a means of a controlled partial apply as well as full apply. As in the past, the applying force may be accomplished by hand or foot control. In all installations, a return spring is required to insure positive release to the full off valve position. The modulated retarder operation can result in a smoother and improved control of the vehicle on downhill grades, which results in a reduction in power surges through the drive train.

The amount of horsepower that can be safely absorbed by the hydraulic retarder in the DP 8961 depends both upon the capacity of the heat exchanger and cooling system and upon the strength of the driveline components - the universal joints, drive shafts, axles, etc.

The constant mesh planetary gear train in the DP 8961 offers a new "Dual Path" powerflow system. This system provides a heavy duty deep reduction planetary gear set and main combining shaft that handles full converter output power in first and reverse gears only. This deep reduction planetary gear set is called the combining planetary. In second through sixth gear, output power from the torque converter is divided between the combining planetary and the main planetary gear section of the transmission.

1976 CONFIGURATION CHANGES

Effective September 1, 1975, changes were made in the DP 8000 transmission to allow more flexibility for use with either manual or automatic electric shift controls. These changes are defined as follows:

1. All units will have the magnetic pickup gear, 6837424, installed. (This is presently installed only in automatic electric units.)

2. All units will have the pressure switch, 6835635, installed. (This is presently installed only in manual electric units.)

3. Magnetic pickup, 6835104, and pick up guard, 6837322, will be deleted from all units. (These are presently installed only in automatic electric units.)

The above changes will not affect the vehicle manufacturer using manual electric controls. The manufacturer using automatic electric controls, will have to purchase the magnetic pickup, 6835104; guard, 6837322; and two bolts, 271562, from the Detroit Diesel Allison Parts Department, and install them in the transmission.

Any 24 volt DP 8000 can be used with the automatic controls as stated above. Twelve volt assemblies will additionally require the control solenoids to be changed to 24 volt use.

A manual electric control system is standard on the DP 8961 transmission. This system requires an actuating shift controller and appropriate wiring harness to complete the system. The manual electric control system has simplified installation requirements and reduces service problems created by worn or misadjusted linkage.

The hydraulic retarder requires a separate customer supplied control system. Usually rod or cable linkage operated by pedal or lever from the cab of the vehicle prove suitable for controlling the retarder.

Additional features provided as a part of the DP 8961 transmission include integral oil filters for the hydraulic circuit and provision for speedometer drive.

**During Derrick Operations when the hook or boom is required to free fall the transmission should be placed in neutral range with engine RPM 650-700 minimum. Additionally, the output shaft reverse rotation should not exceed 960 RPM maximum.

II. OPTIONAL FEATURES

A. Mounting

The DP 8961 transmission may be either remote or engine mounted, depending upon application requirements. Engine mounted units are designed for flex disc drive.

B. Engine Driven PTO

An 8-bolt engine driven PTO opening is optional at the top and standard at the side of the converter housing.

C. Automatic Electric Controls

The automatic electric control system is an electrically operated control system by which the driver may select any one of six forward or one reverse position on a shift tower which provides fully automatic transmission operation.

The automatic electric control system requires the utilization of the following major components: 1) actuating shift control, 2) wiring harness, 3) throttle potentiometer, 4) magnetic output speed pickup, 5) shift pattern generator (SPG), and a valve body appropriate for this system.

A converter (power source) is needed for vehicles with a 12-volt system, due to the automatic electric control system operating on a 24-volt system.

Part numbers and dimentional information for the automatic/manual systems are listed in Section V.

D. Oil level sight gauge - Reference AS 80-024

E. Parking Brake

A Bendix 17.25 X 4 integral - expanding shoe type parking brake is available for mounting to the output flange of the transmission.

Rating - 200,000 lb. in.* (22,597 Nm) at 800 lbs. (3.559N) lever force.

*This rating represents brake capacity in run and burnished state. The brake assembly on a new transmission is supplied in unburnished condition.

F. Flanges

There are several types of flanges offered to accommodate various drivelines. These flanges are available for all three positions (A, B and C). Drive flange option chart AS 80-007 list the type, location, dimensions and part number of the flanges offered. Some of the various flanges offered are listed below.

Input Flanges	Output Flanges
Mech. 9-C	Twin Disc. J490
Spicer 1950	Spicer 1850
Spicer 1850	Spicer 1950
	*Spicer 1950

*NOTE: Provision for Parking Brake

III. SPECIFICATIONS AND DATA

A. Input Inertia

Engine Mounted - 4.930 lb.ft. sec.^{2} (6.685 Kgm^2)
Remote Mounted - 3.670 lb.ft. sec.^{2} (4.98 Kgm^2)

B. Mounting

Engine - SAE #0 bell housing wet, two modified SAE #1 pads on rear housing.

Remote - Trunnion mount at front, two modified SAE #1 pads on rear housing.

Top Mounted Gear Data - 6 pitch - 25° pressure angle, 6.500 PD - 39 teeth, backlash required .005 to .025.

Side Mounted Gear Data - 6 pitch - 25° pressure angle, 8.6667 PD - 52 teeth, backlash required .005 to .025.

NOTE: Lubrication to the PTO can be furnished from the transmission hydraulic system through an external line. Refer to AS 80-017 for details.

C. Gearing

Type: Constant mesh, spur type planetary.

Ratios:

First	4.240:1
Second	2.318:1
Third	1.691:1
Fourth	1.306:1
Fifth	1.000:1
Sixth	.727:1
Reverse	5.750:1

D. Speedometer Drive

Type - SAE 5/32 heavy duty

Ratio - 1.00:1 to transmission output speed.

E. Oil System

Oil Type - Hydraulic transmission fluid, Type C-3.

Capacity - 21 U.S. gallons (79.5 liters) excluding cooling circuit.

Temperature - 250 degrees F. (139 degrees C) maximum.

Filters - 2 PF151 full flow filters may be integral or remote mounted. Strainer supplied in transmission sump.

Oil Check - Check plug in transmission rear cover. (Sight gage optional).

Cooler Lines - 2.375" (2 3/8") ID - 60.3 mm.

F. Instrumentation

Pressure gauge - Required (Refer to Sales Brief No. 9 or AS 00-045).

Temperature gauge - Required (Refer to Sales Brief No. 9 or AS 00-045).

G. Dry Weight

3700 lbs. (1678 kG) approximate - depending on input and output configuration.

H. Transmission Breather

Integral cap type breather standard. Remote mounted breather optional; refer to AS 00-019.

IV. Additional Reference Material

A. Sales Briefs

No.	Subject
9	Temperature and Pressure Gauges
42	Oil Recommendations
56	Paint Specifications
65	Driveline Angularity

B. Manuals and Catalogs

SA No.	Publication
SA 1304	DP-8000 Installation Manual
SA 1228	DP-8000 Service Manual
SA 1249	DP-8000 Parts Catalog
SA 1318	DP-8000 Operators Manual

C. Match Charts

Converters
TC-840
TC-860
TC-880
TC-890

SA 1240A
SA 1343
SA 1261
SA 1262

D. Installation Drawings

Subject	Drawing No.
Transmission Trunnion Support	AS 00-003
Shift Tower Recommendation	AS 00-014
Remote Mounted Breather	AS 00-019
Physical Adaptation (Also see AS-04 Section)	AS 00-021
Wire Harness, Manual Electric	AS 00-033
Installation Requirements for Inhibitor Switch	AS 00-034
Installation Requirements for SPG	AS 00-038
Installation Requirements - Auto Shift Tower	AS 00-039
Installation Requirements - Throttle Potentiometer	AS 00-040
Installation Requirements - Cab Harness	AS 00-041

Subject	Drawing No.
Installation Requirements - Vehicle Harness	AS 00-042
Installation Requirements - 12-24 Volt Converter	AS 00-043
Range Restricter Harness	AS 00-044
Installation Requirements - Auto Shift Control	AS 00-048
Installation Requirements - 24 Volt Overload Protector	AS 00-049
Remote Filter Installation	AS 58-004
Flange Chart	AS 80-007
External Hydraulic Circuit	AS 80-008
Installation Diagram	AS 80-015
Side PTO	AS 80-016
Top PTO Option	AS 80-017
Retarder Capacity	AS 80-020
Installation Requirements - Magnetic Pickup	AS 80-023
Oil Fill and Level Check Requirements	AS 80-024
Retarder Oil Flow	AS 80-025
Cooler Oil Flow	AS 80-019
Cooler Oil Flow	AS 80-021

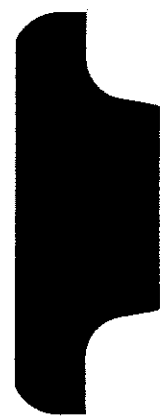
V. Automatic/Manual Electric Controls

All wiring harnesses and automatic/manual controls must be procured directly from Detroit Diesel Allison, GMC, Indianapolis, Indiana. The items listed below are currently available upon request through the Parts Department. For applications that cannot be satisfied with the available harness, contact the Sales Department, Indianapolis.

Feature	DP-8000
SPG 2100	6882672
2000	6882671
2300	---
1900	6882670
Cab Harness	6834896
Vehicle Harness 20'	6835134
27'	6834897
Shift Tower 12V	6837301
24V	6836517
Voltage Converter 12V	6835105
Voltage Regulator 24V	6838380
Throttle Potentiometer	6837296
Magnetic Pickup #	6834882

Type	Cable Length	Automatic/Manual	Part No.
Tower - Body	27'	Manual	6834071
Tower - Body	20'	Manual	6836695
Tower - Body	15'	Manual	6837956
Ext. - Body	55'	Manual	6837134
SPG - Body	20'	Automatic	6835134
SPG - Body	27'	Automatic	6834897
Restrictor - 1-4		Automatic	6837318
Restrictor - 1-5		Automatic	6837319
Tower - SPG	CAB	Automatic	6834896

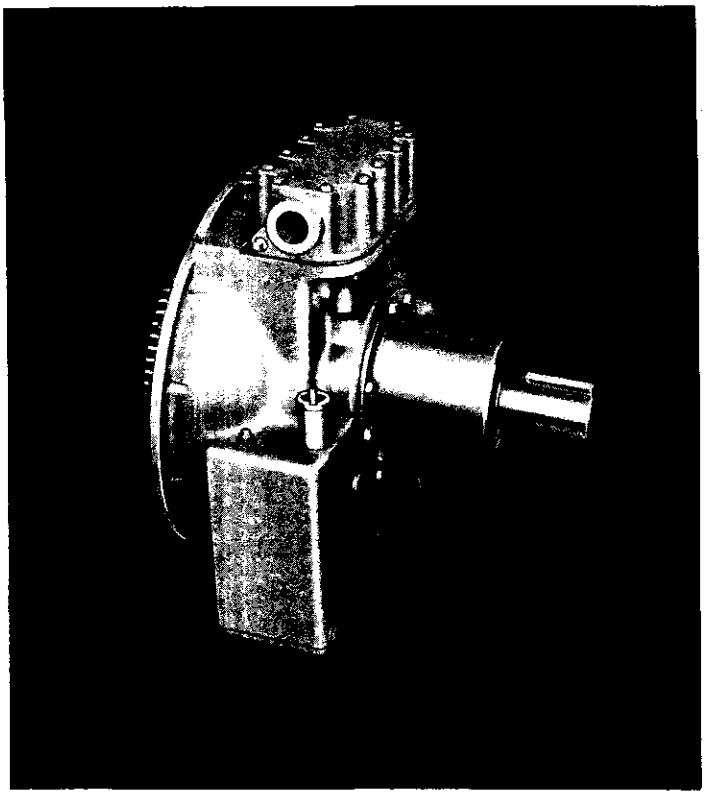
For further information, contact the Transmission Sales Department, J-5, Detroit Diesel Allison Division, General Motors Corporation, P. O. Box 894, Indianapolis, Indiana 46206.

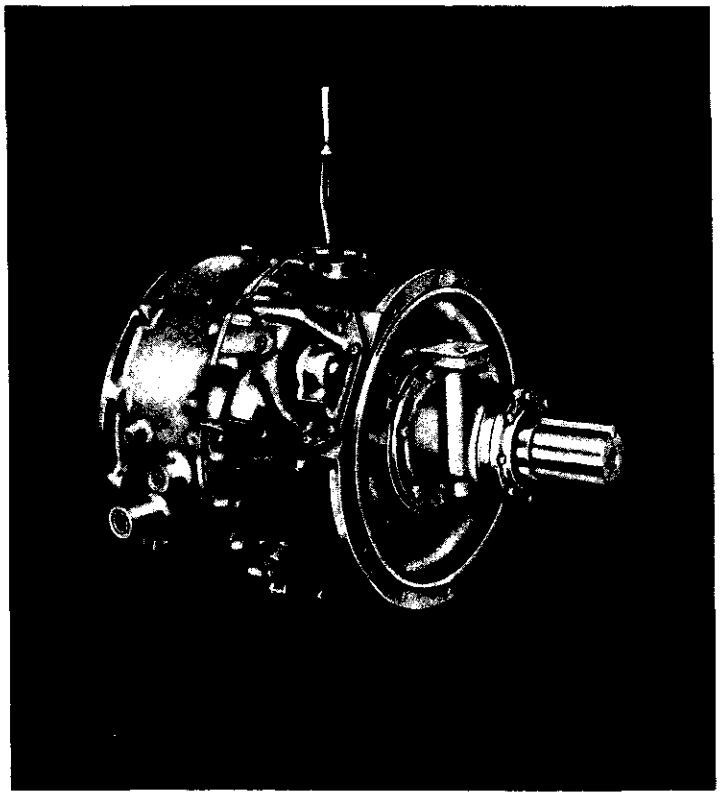


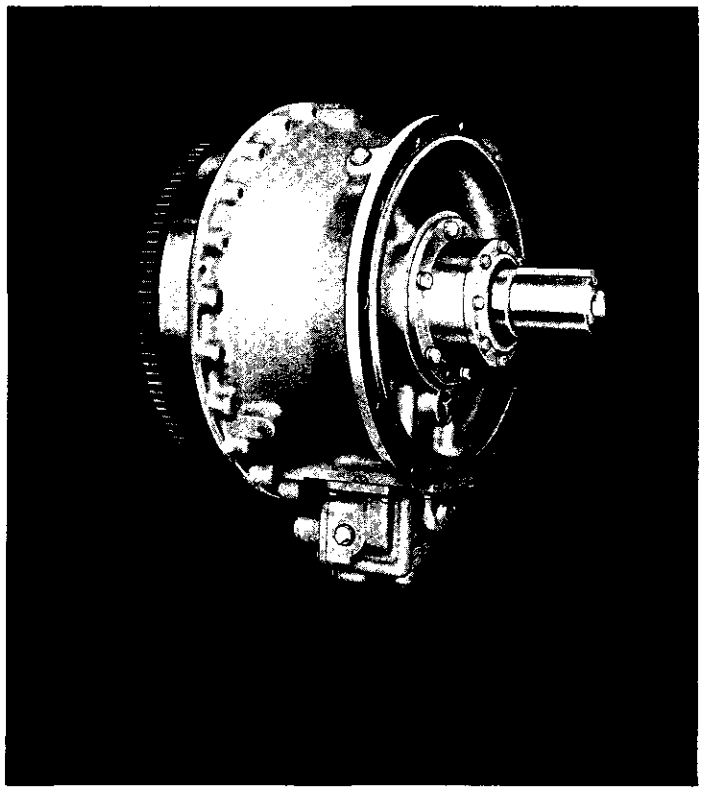
Allison Torque Converters

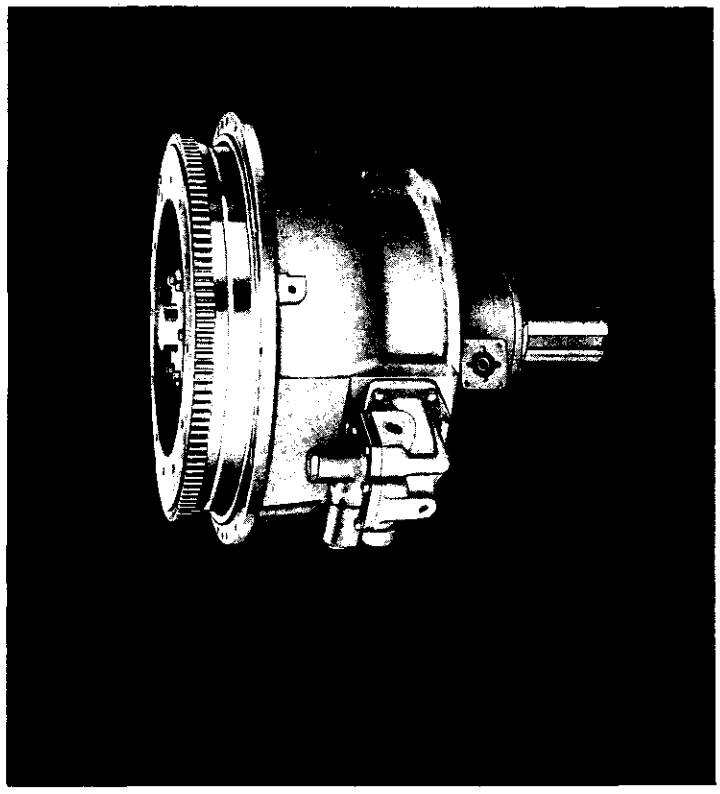
TC 300, 400, 500
800-900

40 to 600 hp*
(30 to 447 kW)





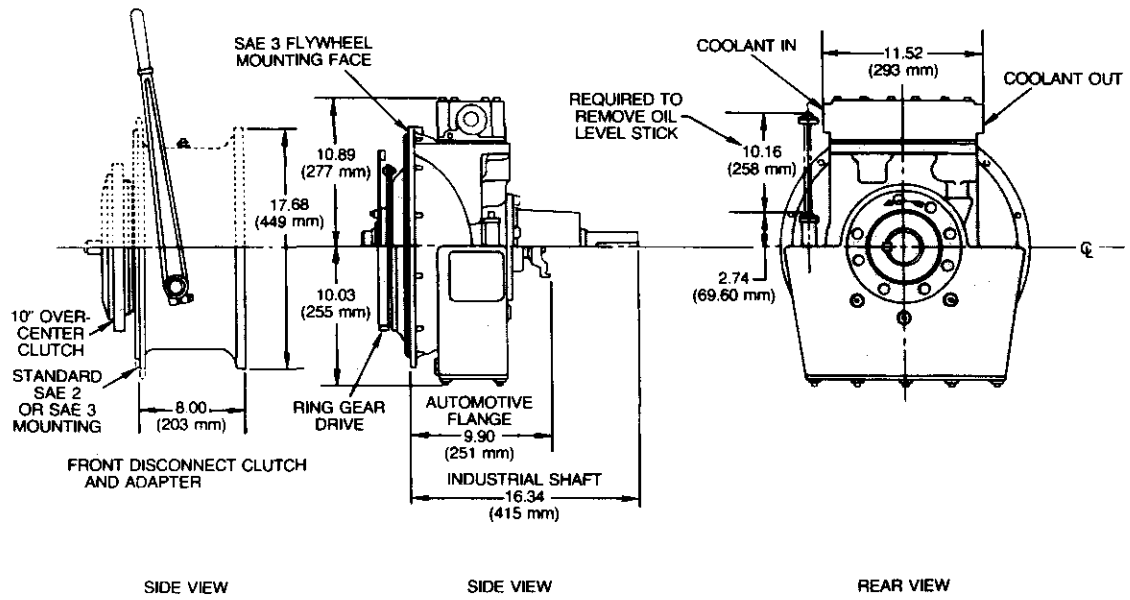




*For engines up to 600 hp (447 kW) gross

TC 300

MOUNTING DIMENSIONS



Note: Dimensions are given in inches with metric values in parentheses.

SPECIFICATIONS

Model	TC 350	TC 370
Stall torque ratio (max)	3.09	2.47
Input speed (max)	3000 rpm	3000 rpm
Input torque (max)		
lb ft	280	360
N·m	380	488

Oil type.....Hydraulic transmission fluid type C-3

Converter oil capacity.....10 qt (9.46 litres)

Charging oil pump capacity.....12 gpm (0.76 litre/s) at 1800 rpm converter input speed

Converter oil outlet temp (max).....250°F (121°C)

Type.....1-stage; 2-phase; 3-element

Output shaft.....Automotive or industrial

Flywheel housing.....SAE 3

Weight.....202 to 302 lb (92 to 137 kg)

BUILT IN

- Oil system
- Charging oil pump
- Oil cooler
- Oil sump
- Easy mounting drive

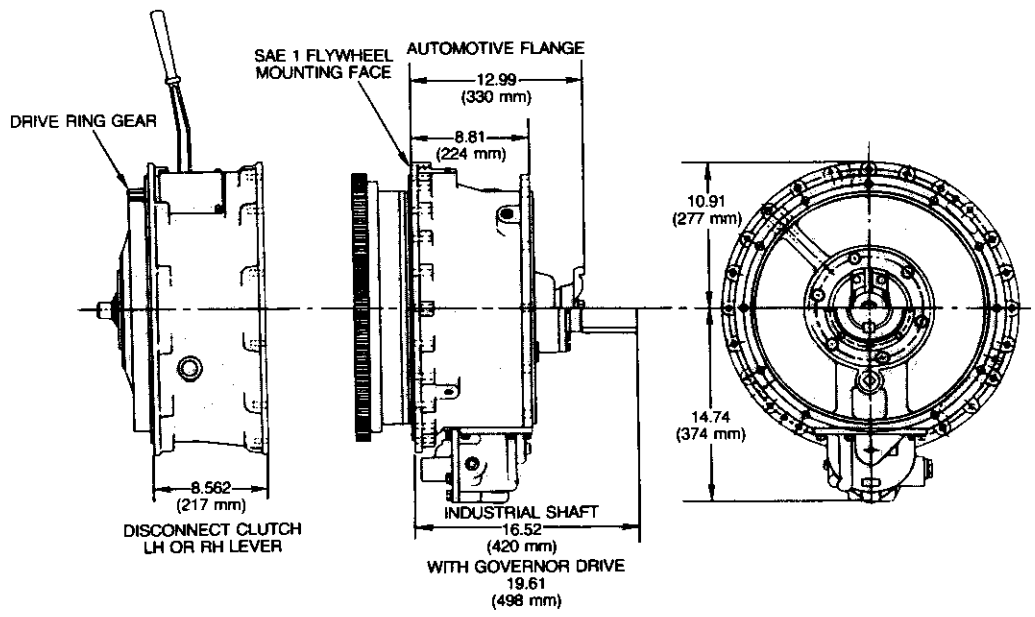
Plus a multiplicity of options for standard or special installations

OPTIONS

- Over-running lockup clutch
- Rear disconnect clutch housing
- Oil cooler
- Automotive flange
- Industrial shaft
- Governor drive
- Front disconnect clutch housing

TC 400

MOUNTING DIMENSIONS



Note: Dimensions are given in inches with metric values in parentheses.

Meets today's needs . . .

Aimed at a specific field in wide range of drive requirements. Smooth, efficient transmission of engine power to the job means lower maintenance cost, faster job cycles, lower fuel costs and less downtime.

matched to ECONOMY STANDARDS

and with all these options

- Manual overcenter input disconnect clutch
- Over-running clutch to provide engine braking
- Three converter torque ratios
- Industrial shaft output or automotive flanges
- Integral charging pump for transmission
- Governor drive

SPECIFICATIONS

Model	TC 430	TC 450	TC 470
Stall torque ratio (max)	3.55	3.20	3.04
Input speed (max)	3000 rpm	3000 rpm	3000 rpm
Input torque (max)			
lb ft	615	615	615
N·m	834	834	834

Oil type.....Hydraulic transmission fluid type C-3

Converter oil capacity.....5.5 gal (20.82 litres)

Charging oil pump capacity..21 gpm (1.32 litre/s) at 1800 rpm converter input speed

Converter oil outlet temp (max).....250°F (121°C)

Type.....1-stage; 2-phase; 3-element

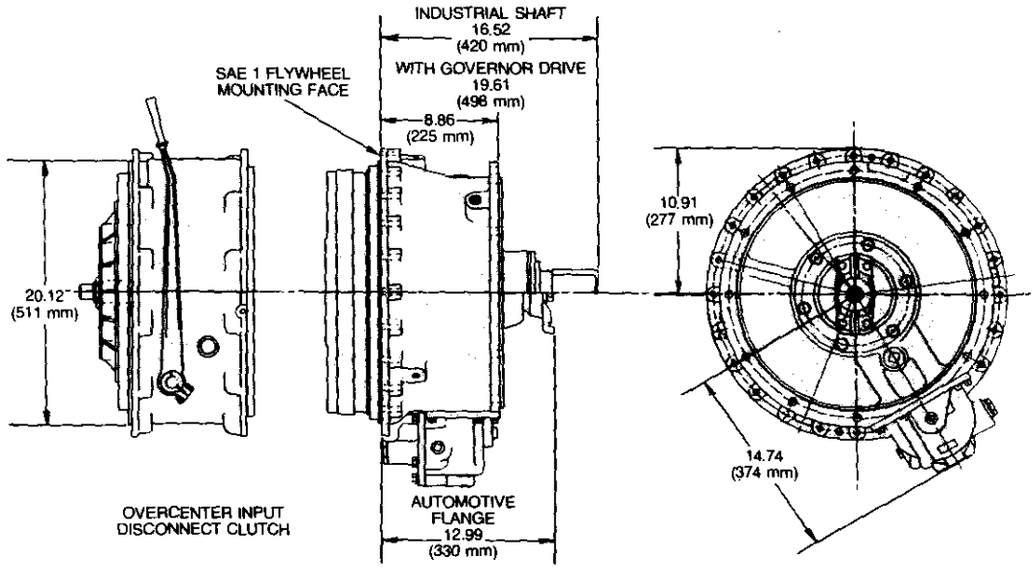
Output shaft.....Automotive or industrial

Flywheel housing.....SAE 1

Weight.....400 to 583 lb (181 to 264 kg)

TC 500

MOUNTING DIMENSIONS



Note: Dimensions are given in inches with metric values in parentheses.

WITH

4 DESIGN FEATURES IN 1

- One standard housing for all engines in the horsepower range
- Wider engine horsepower coverage
- Greater parts interchangeability for a variety of installations
- Greater versatility of installation for any given engine

OPTIONS

- Automotive output shaft
- Industrial output shaft
- Overcenter input disconnect clutch
- Over-running clutch
- Governor drive

SPECIFICATIONS

Model	TC 530	TC 540	TC 550	TC 560	TC 570	TC 580
Stall torque ratio (max)	3.58	2.95	3.43	2.74	3.26	2.67
Input speed (max)	2500 rpm	2500 rpm	2500 rpm	2500 rpm	2500 rpm	2500 rpm
Input torque (max)						
lb ft	865	865	865	865	865	865
N·m	1173	1173	1173	1173	1173	1173

Oil type.....Hydraulic transmission fluid type C-3

Converter oil capacity.....5.5 gal (20.82 litres)

Charging oil pump capacity.....21 gpm (1.32 litre/s) at 1800 rpm converter input speed

Converter oil outlet temp (max).....250°F (121°C)

Type.....1-stage; 2-phase; 3-element

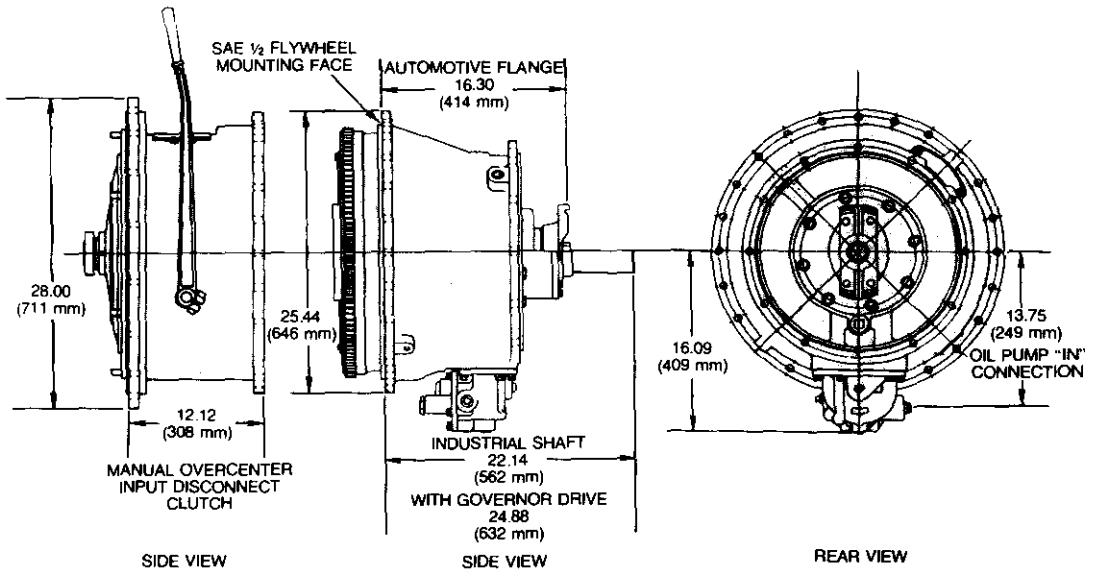
Output shaft.....Automotive or Industrial

Flywheel housing.....SAE 1

Weight.....420 to 650 lb (191 to 295 kg)

TC 800-900

MOUNTING DIMENSIONS



Note: Dimensions are given in inches with metric values in parentheses.

FEATURES

multiplies torque hydraulically

applies power to the load smoothly and finally

permits use of lower horsepower engines

protects against shock load damage to engine and equipment

prevents harmful engine lugging and stalling

increases life of engine and equipment

adjusts variation between engines in multiple installation

OPTIONS

- Output shafts (industrial or automotive)
- Governor drive
- 40 gpm charging pump

SPECIFICATIONS

Model	TC 840	TC 850	TC 940	TC 950
Stall torque ratio (max)	2.92	3.98	2.71	3.67
Input speed (max)	2100 rpm	2100 rpm	2100 rpm	2100 rpm
Input torque (max)				
lb ft	1065	1065	1065 (1470*)	1065 (1470*)
N·m	1444	1444	1444 (1993*)	1444 (1993*)
Charging oil pump capacity				
Standard pump (1600 rpm)	24.5 gpm (1.55 litre/s)		24.5 gpm (1.55 litre/s)	
Optional pump (1750 rpm)	—		40 gpm (2.52 litre/s)	

Oil type.....Hydraulic transmission fluid type C-3

Converter oil capacity.....8 gal (30.28 litres)

Converter oil outlet temp (max).....250°F (121°C)

Type.....1-stage; 3-phase; 4-element

Output shaft.....Automotive or heavy-duty industrial

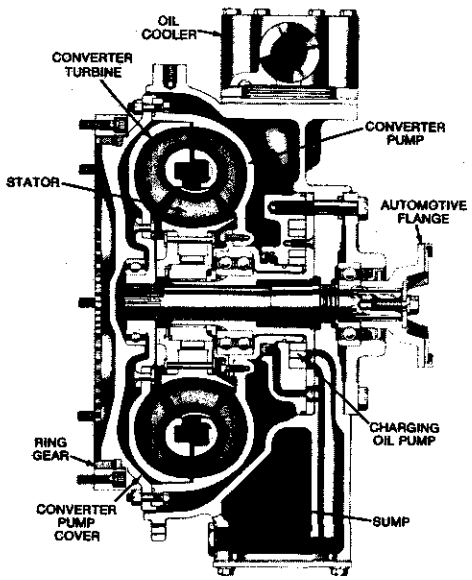
Flywheel housing.....SAE ½ (SAE 0 to ½ adapter available)

Weight.....698 to 815 lb (317 to 370 kg)

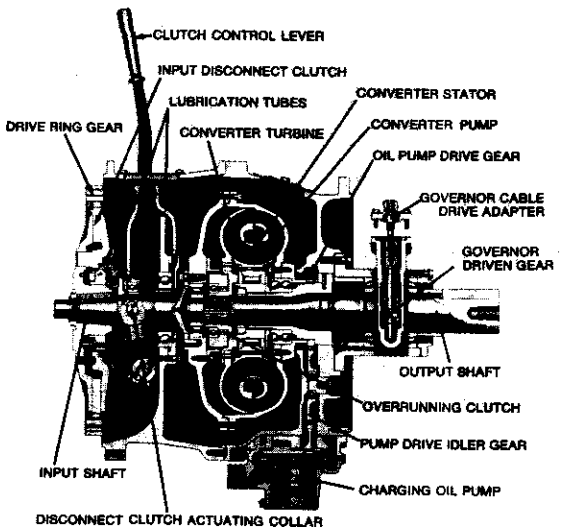
*with optional charging oil pump

Allison
Torque Converters

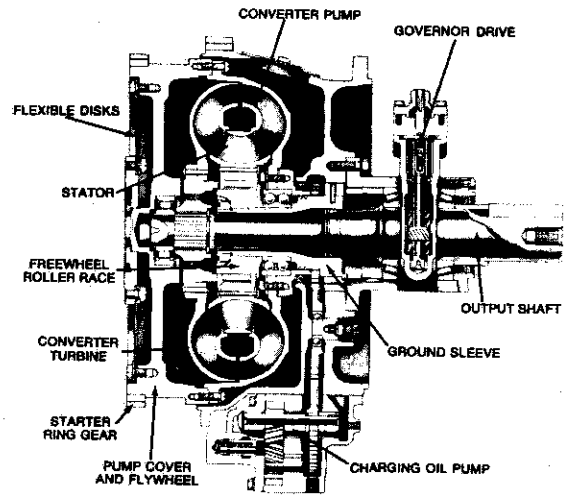
TC 300



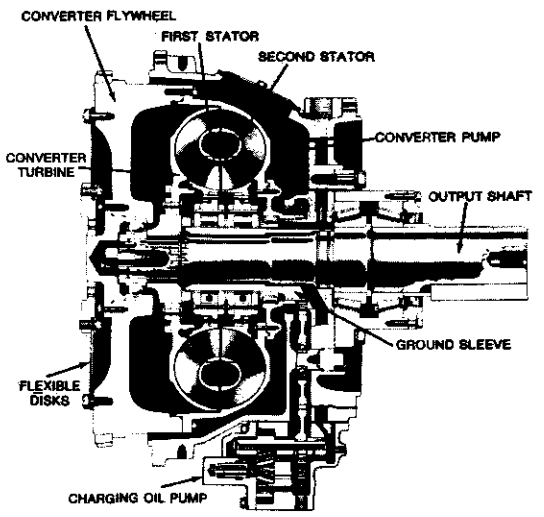
TC 400



TC 500



TC 800-900



Detroit Diesel Allison
Division of General Motors Corporation
Indianapolis, Indiana 46206

SA 1352 5-77

Litho USA