Ford

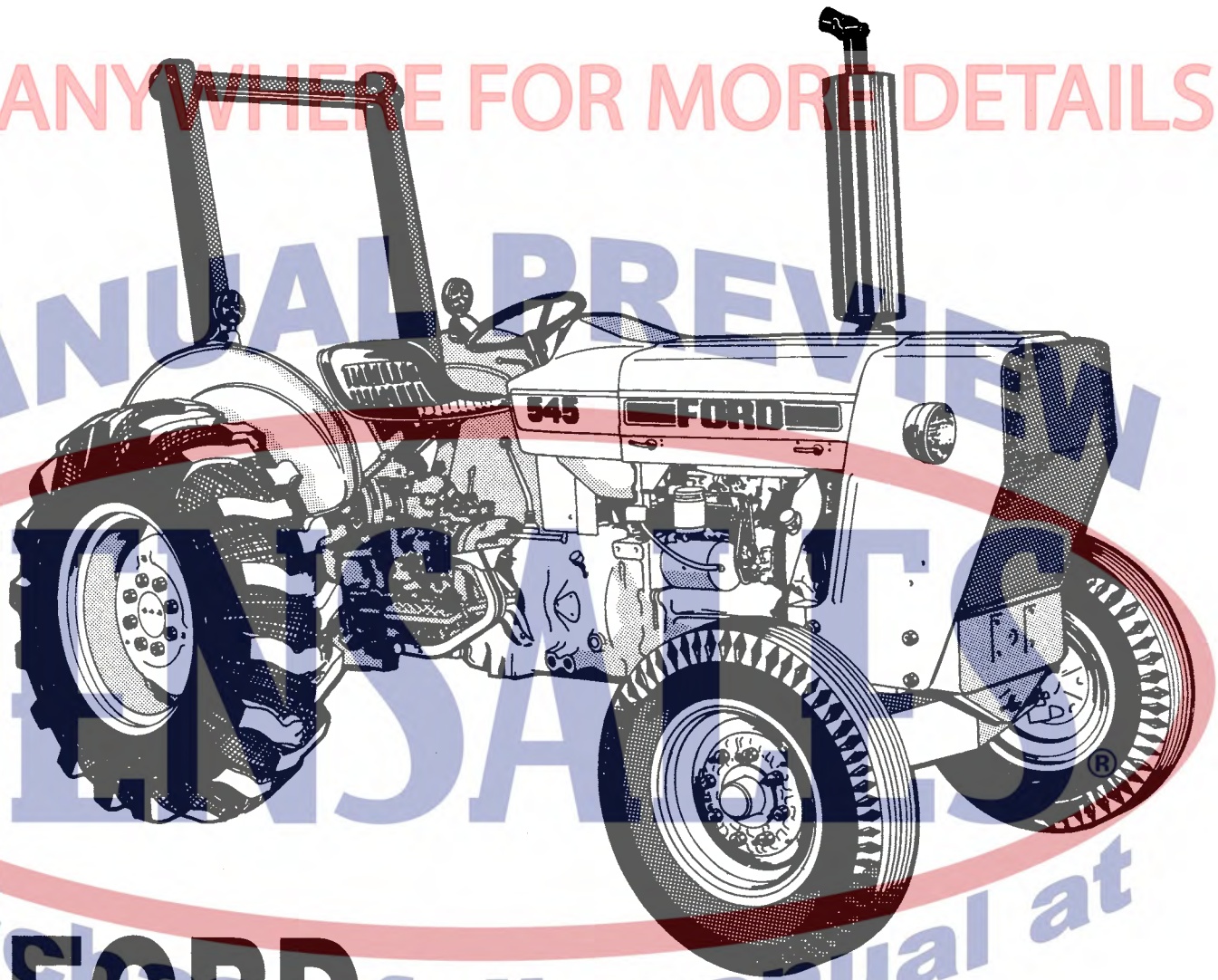
Service Manual

230A, 231, 335, 340, 340A, 340B, 420, 445, 445A, 515, 530A, 531, 532, 535, 540, 540A, 540B, 545 & 545A

Volume 1 of 2

Service® Manual

FO-S-230A,231+



FORD

INDUSTRIAL TRACTORS

Repair Manual

40023021 (SE4044)

Reprinted

FOREWORD

This repair manual provides information for the proper servicing and overhaul of Ford Industrial Tractor Models and is an essential publication for all service personnel carrying out repairs and maintenance procedures.

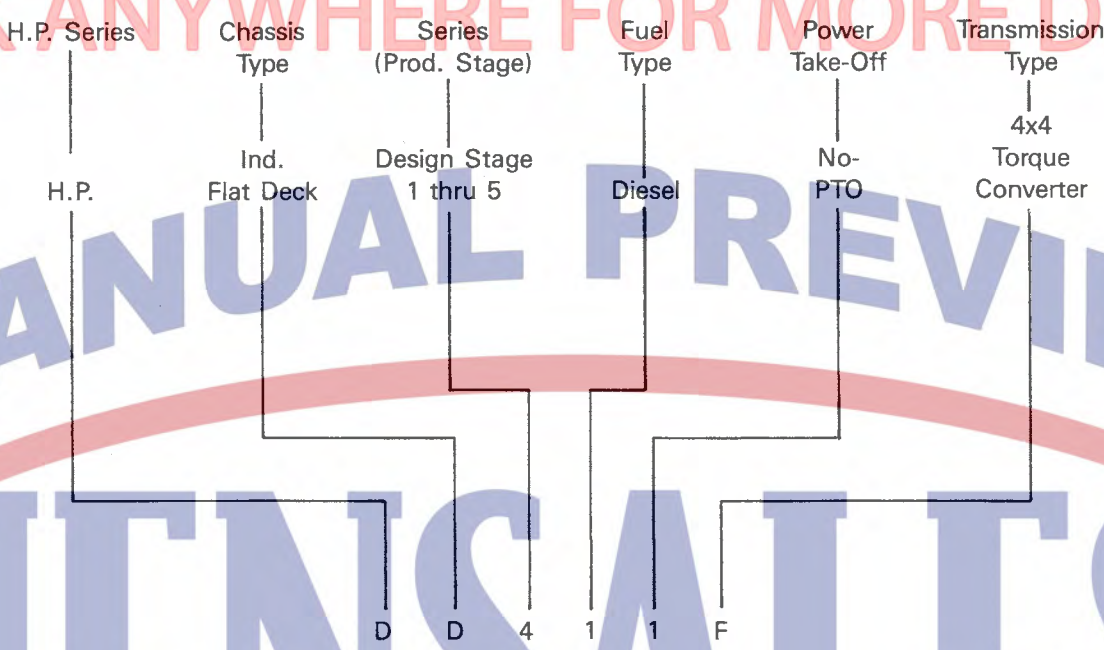
The Industrial Tractor Models covered were produced in 1975 through 6/83. Special service instructions are identified by tractor model number or applicable production dates throughout the text.

The Manual is divided into twelve PARTS each sub-divided into Chapters. Each Chapter contains information on general operating principles, detailed inspection and overhaul and, where applicable, trouble shooting, special tools and specifications.

The material contained in this Manual was correct at the time of going to print but Ford policy is one of continuous improvement and the right to change prices, specifications, equipment or design at anytime without notice is reserved. All data in this Manual is subject to production variations, so overall dimensions and weights should be considered as approximately only and the illustrations do not necessarily depict the unit to standard build specification.

TRACTOR OPERATIONS
FORD MOTOR COMPANY

MODEL NUMBER — CODE



KEY TO PRODUCTION DATE CODES

First Number YEAR	First Letter MONTH	Second Number DAY OF MONTH	Second Letter PRODUCTION SHIFT
5 — 1975	A—Jan H—Aug.	01-32	A—Midnight
6 — 1976	B—Feb. J—Sept.		B—Day
7 — 1977	C—March K—Oct.		C—Afternoon
8 — 1978	D—April L—Nov.		
9 — 1979	E—May M—Dec.		
0 — 1980	F—June		
1 — 1981	G—July		

Example of Production Unit Date Code 7 L 0 3 B

- 7 — Year of Final Assembly (1977)
- L — Month of Year (November)
- 03 — Day of Month (Third)
- B — Shift Period (Day)

PART 1
ENGINE SYSTEMS

Chapter 1
ENGINES AND LUBRICATION SYSTEM

Chapter 2
COOLING SYSTEM

Chapter 3
TROUBLE SHOOTING, SPECIFICATIONS AND SPECIAL TOOLS

Figure 42
Checking Piston Ring Side Clearance
1. Feeler Gauge
2. New Piston Ring

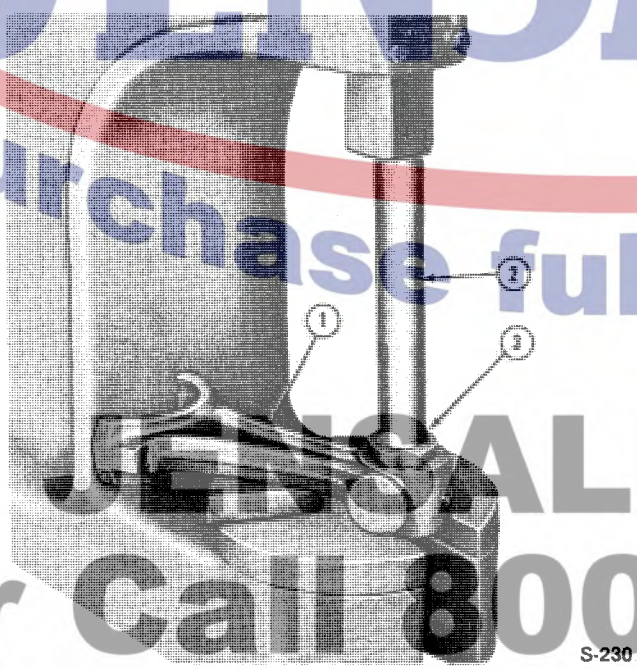


Figure 43
Connecting Rod Bushing Removal and Installation
1. Connecting Rod
2. Handle — Tool No. 9514
3. Adapter

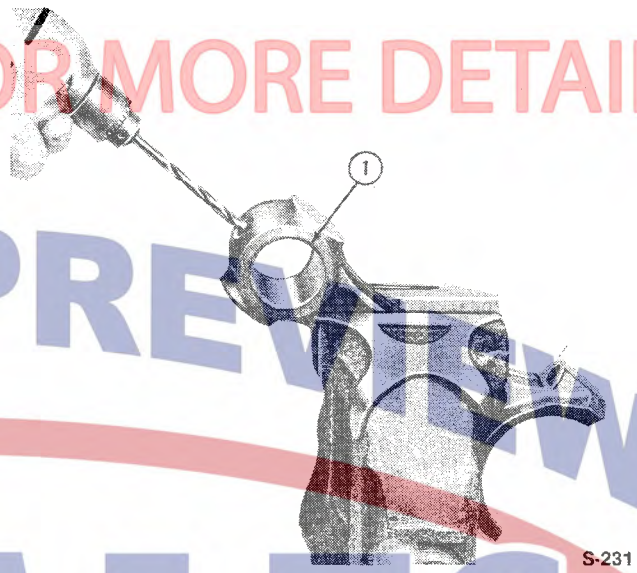


Figure 44
Connecting Rod Bushing Installed
1. Connecting Rod Bushing

7. Use an expansion reamer to ream the bushing to obtain the specified bushing-to-piston-pin clearance.

8. Check the connecting rod and main bearing clearances as described in this Chapter. If the bearing clearances exceed the specified limits, (see "Specifications" — Chapter 3), then install new bearings as described in the CRANKSHAFT section of this Chapter.

9. Clean and inspect the cylinder block. Rust around the core plugs indicates leakage and new plugs should be fitted with suitable sealant.

10. Inspect and measure the cylinder bores for waviness, scratches, scuffing, out of round, wear and taper. A wavy cylinder wall has a series of parallel lines or rings worn around the cylinder, within the ring travel area. These irregularities can be felt by running a finger over the surface. A scuffed cylinder can be identified by discolored areas. Out-of-roundness ,wear and taper can only be detected with a cylinder bore gauge. Measure lengthwise and crosswise to obtain dimensions 'A', 'B', 'C' and 'D', Figure 45. Dimension 'A' compared with 'B', and Dimension 'C' compared with 'D', indicates taper

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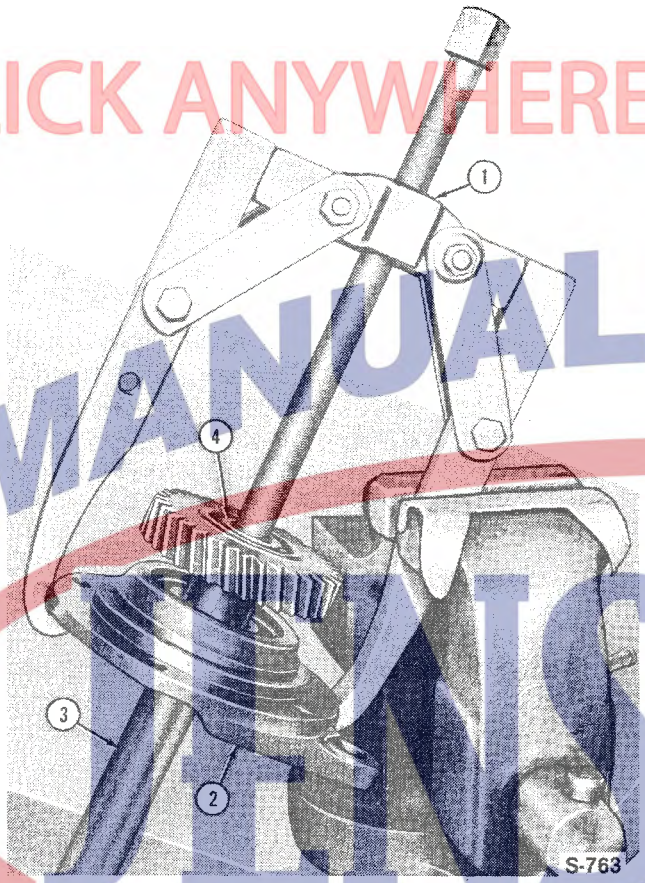

Figure 197
Installing Input Shaft in Retainer Plate (I.P.T.O. and No P.T.O.)

1. Tool No. 9516
2. Retainer Plate
3. Input Shaft
4. Tool No. 9212-4

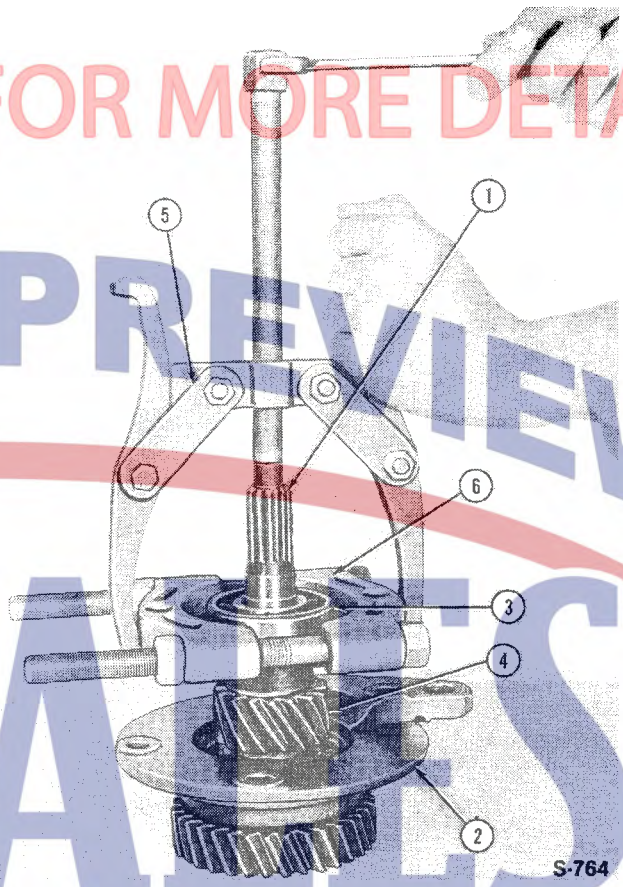

Figure 198
Input Shaft Front Bearing - Removal (Transmission P.T.O.)

1. Input Shaft
2. Retainer Plate
3. Front Bearing
4. P.T.O. Input Gear
5. Tool No. 9198
6. Tool No. 9190

Transmission P.T.O.:

1. Inspect the front bearing on the input shaft for wear or damage. If necessary, remove the bearing, as shown in Figure 198. Remove the P.T.O. input gear after removing the bearing.

2. Remove the inner snap ring from the input shaft and press the shaft from the retainer plate, as shown in Figure 199.

3. Inspect the bearing in the retainer plate for wear or damage. If necessary, remove the outer snap ring and drive the bearing from the retainer using Tool No. 9211-15 and a soft-faced mallet. Install a new bearing using Tool No. 9211-17. Secure the bearing in place by installing the outer snap ring.

4. Inspect the pilot bearing in the rear of the input shaft for wear or damage. If necessary, drive the bearing from the shaft in the same manner as illustrated for Independent P.T.O., see Figure 196. Install a new bearing using Tool No. 9211-15 and a soft-faced mallet.

5. Insert the input shaft through the retainer plate, as shown in Figure 197.

6. Place the P.T.O. input gear on the input shaft, being sure the gear teeth are toward the retainer. Place the front bearing on the shaft and drive it into place with a sleeve of the appropriate diameters, 1-3/16 in. I.D. (30.2 mm) and 1-3/4 in. O.D. (44 mm).

PART 5
TRANSMISSION SYSTEMS

Chapter 6
4 X 4 TORQUE CONVERTER DRIVE SYNCHROMESH TRANSMISSION

A. 4 x 4 TORQUE CONVERTER DRIVE SYNCHROMESH TRANSMISSION — DESCRIPTION AND OPERATION

GENERAL

Reference — Figure 283

The transmission consists of a 2.78:1 ratio torque converter, an internal gear type hydraulic pump, an oil distributor, modulator valve, dump valve, two hydraulically operated clutch assemblies, a 4 x 4 partially synchronized constant mesh gearbox, transmission case and cooler tubes.

The transmission incorporates two shift levers; a gearshift lever (3), Figure 284, and a column mounted power reversing lever (1). The gearshift lever is used to select any of four gear ratios. The power reversing lever is used to select either forward or reverse travel.

The transmission is synchronized in 3rd and 4th (transport) gear ratios. This allows upshifting from 2nd to 3rd, and 4th gears plus downshifting from 4th to 3rd gears without stopping the tractor. The tractor must be stopped to upshift from 1st to 2nd gears and when downshifting from 3rd to 2nd or 1st gears.

The power reversing lever (1), Figure 284, can be shifted at any engine RPM, however for safe, smooth direction change, the engine RPM should be allowed to slow down. This can be easily controlled by using the foot throttle to control engine speed.

The transmission receives power from the engine by means of oil reaction in the torque converter and hydraulic clutch assemblies.

The front clutch provides power for forward travel and the rear clutch power for reverse travel. Engagement of the front or rear clutch is controlled by the operator through the movement of the power reversing lever (1), Figure 284.

The gearshift lever (3), shown in Figure 284, is used to select any of the four gear ratios as shown in the gearshift pattern, Figure 285.

As a safety feature, the transmission incorporates a neutral start switch (5), Figure 284, wired in series with the starting circuit. The switch allows the engine to start only when the gearshift lever is in the neutral position. It is recommended the power reversing lever also be in neutral before starting the engine.

PART 6
POWER TAKE-OFF

Chapter 1
TRANSMISSION P.T.O. AND LIVE P.T.O.— FORD 230A-530A-340A-540A-445 AND 545

Chapter 2
INDEPENDENT P.T.O.— FORD 340A-540A-445 AND 545

Chapter 3
TROUBLE SHOOTING, SPECIFICATIONS AND SPECIAL TOOLS

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PART 7
REAR AXLE AND BRAKES

Chapter 1
REAR AXLE AND BRAKES — FORD 230A AND 530A

Chapter 2
REAR AXLE AND BRAKES—FORD 340A, 540A, 445, and 545

Chapter 3
SPECIFICATIONS AND SPECIAL TOOLS

PART 8
STEERING SYSTEMS

Chapter 1
MANUAL STEERING GEAR
FORD 230A

Chapter 2
POWER ASSISTED STEERING—
FORD 230A and 530A

Chapter 3
HYDROSTATIC STEERING SYSTEM—
FORD 340A-540A-445 and 545

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PART 9
FRONT AXLE

Chapter 3
FORD 445A AND 545A
FRONT WHEEL DRIVE ASSEMBLIES

A. FRONT AXLE ASSEMBLY — DESCRIPTION AND OPERATION

The front wheel drive axle (1), Figure 23, is of cast steel construction and pivots about its center to permit articulation when the tractor is traveling over rough terrain.

The front axle consists of a centrally located differential (2), Figure 23, mounted in the cast steel axle and two wheel hub assemblies. Each wheel hub assembly (3) contains a final planetary reduction gear set consisting of three planetary gears, ring gear and a sun gear. The wheel hub is mounted on a swivel casing (4) which connects to the axle by two swivel pins (5 and 6).

The drive to the front axle is transmitted from the rear axle pinion, through a transfer gearbox assembly (1), Figure 24, mounted to the bottom of the rear axle housing center case. A drive shaft assembly (2), Figure 24, connects the transfer gear case to the front gearbox (3) mounted to the front axle and drives the front axle differential. The drive to the wheel hubs is transferred from the differential by axle shafts located one on each side of the differential which engage with the planetary reduction gear set in each wheel hub assembly.

The front wheel drive is engaged and disengaged by a control lever (1), Figure 25, connected to a coupling in the transfer gearbox assembly (1), Figure 26.

Overhaul of the final planetary drive, wheel hub bearings, swivel casing pin bearings and axle shafts can be performed with the axle installed on the unit. Overhaul of the differential assembly requires removing the axle assembly from the tractor.

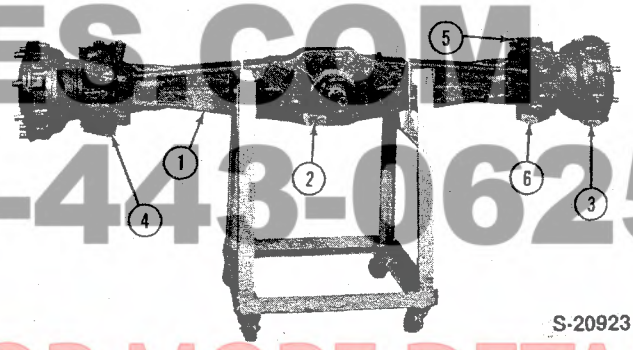

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Figure 23
Front Wheel Drive Axle — Model 445 and 545 Tractors

1. Axle
2. Differential Assy.
3. Wheel Hub Assy.
4. Swivel Casting
5. Pivot Pin (Upper)
6. Pivot Pin (Lower)

PART 10
HYDRAULIC SYSTEM

Chapter 1
HYDRAULIC SYSTEM CIRCUITS

Chapter 2
HYDRAULIC PUMPS

Chapter 3
ADJUSTMENTS

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PART 11
SEPARATING THE TRACTOR

Chapter 1
SEPARATING THE TRACTOR— FORD 230A and 530A

Chapter 2
SEPARATING THE TRACTOR— FORD 340A, 540A, 445 and 545

Chapter 3
SPECIFICATIONS AND SPECIAL TOOLS

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PART 12
WHEELS AND TIRES

Chapter 1
DESCRIPTION AND SPECIFICATIONS