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**Fiat Trattori**  
**FIAT**

**780 - 780 DT**  
**880 - 880 DT**

**WORKSHOP**  
**MANUAL**

06910052

**D I R E Z I O N E      C O M M E R C I A L E**

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# **Fiat Trattori**

## **FIAT**

# **780-780 DT**

# **880-880 DT**

## **WORKSHOP**

## **MANUAL**

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**D I R E Z I O N E      C O M M E R C I A L E**

# FOREWORD

- *The manual is divided into separately numbered sections.*
- **Two-digit sections contain**
  - *Tractor specification (00).*
  - *Tractor sub-assembly specification and data (10 Engine, 20 Power Train, etc.).*
- **Three-digit sections deal with the overhaul of the sub-assemblies whose data are listed in the two-digit sections. The first two digits are the same as those of the associated data sections (e.g. 20 Power Train, 201 Clutch, 202 Transmission, etc.).**
- *A contents list is provided to facilitate retrieval of desired information.*
- *Each sheet carries the print number of the manual and the date of issue in the bottom right-hand corner of the front page.*
- *Revised sheets will carry the same print number followed by a two digit number (e.g. first revision 603.54.201|01; second revision 603.54.201|02, etc.) and new issue date. Revised sheets will be accompanied by the updated contents sheet.*
- **Note:** *The modifications given in the revision sheets of this publication are the result of Fiat Trattori's constant endeavor to improve their product in order to meet market demands and are not intended to be implemented by means of recall campaigns. Fiat Trattori reserve the right to introduce further changes at any time and without notice.*

**The Imperial weights and measures are given for operators' convenience and, though the closest approximation is sought, they are normally rounded off for practical reasons. In case of discrepancies only the metric units should be considered.**

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# **GENERAL: General Instructions**

## **SHIMS**

When adjusting, measure each shim with a micrometer gauge and add the values obtained. Do not rely on overall shim thickness or the nominal value indicated for each shim.

## **ROTARY SHAFT SEALS**

To fit rotary shaft seals proceed as follows:

- Prior to fitting, soak the seals for at least half an hour in the fluid to be retained.
- Carefully clean the shaft and ensure that the contact surface is free from damage.
- Turn the end of the sealing lip towards the fluid. If of the thrower lip type, turn the grooves so that during shaft rotation the fluid tends to be thrown back.
- Smear the sealing lip with a very thin coat of lubricant (oil is better than grease) and pack the space between sealing lip and dust shield with grease (applicable to double-lip seals).
- Fit the seals into their housing using a flat-ended tool or ram. Under no circumstances fit with a drift or hammer.
- Avoid entry of the seal into the recess in a tilted position. Exert a firm and uniform pressure squarely on it and ensure that the seal is pressed fully home.
- To prevent sealing lip damage during fitting, use some sort of protection before sliding over the shaft.

## **O-RINGS**

Lubricate each ring prior to fitting and, on reassembly, slide over the part but do not twist, otherwise leakage will result.

## **SEALING COMPOUNDS**

On the mating surfaces indicated with X or Y apply one of the following sealing compounds: RTV SILMATE, RHODORSIL CAF 1 or LOCTITE PLASTIC GASKET.

Before applying the sealing compound, prepare the surfaces as follows:

- Using a wire brush, remove any deposits.
- Thoroughly degrease using one of the following detergents: Solvent, kerosene or hot water/soda solution.

## **BEARINGS**

To fit bearings:

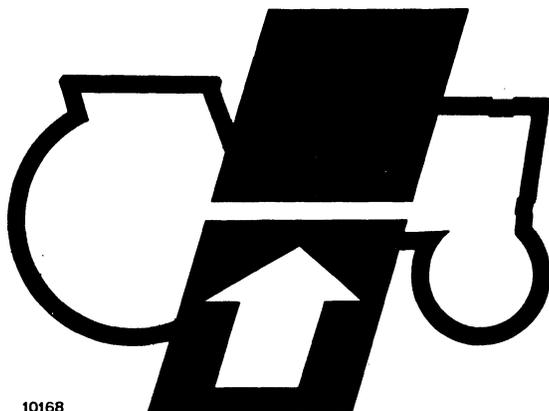
- Before installing on shafts, heat to 80 °C to 90 °C.
- Cool before pressing them into their seats.

## **ROLL PINS**

When fitting straight roll pins ensure that they face in direction of work to stress the pin. Coil roll pins can be installed in any position.

## SPARE PARTS

Use exclusively **FIAT spare parts**, having the trade mark below.



*ricambi  
originali*  
**Fiat Trattori**  
**FIAT**

These are the only parts that guarantee the quality, durability and safety of the original parts, being parts fitted in production. Only FIAT spare parts can offer this guarantee.

When ordering spare parts please state:

- Tractor model (marketing code) and frame number.
- Engine type and number.
- Part number (given on « Microfiches » or « Spare Parts Catalogue »).

## SERVICE TOOLS

The service tools indicated in this manual are:

- Designed specifically for tractors of the FIAT range.
- Essential for reliable repair work.
- Manufactured and tested in such a way as to offer efficient and durable working instruments.

The mechanic is also reminded that being equipped means:

- Operating in optimum working conditions.
- Obtaining the best results.
- Saving time and energy.
- Working in safety.

## NOTICE

Wear limits recommended for some parts are not binding, being given for guidance only.  
« Front », « rear », « right » and « left » references are with operator facing normal direction of travel of tractor.

# GENERAL: Revisions

## ATTENTION

Update your manual by introducing the additions, notes and corrections indicated below

### OLD TEXT

### REVISED TEXT

Section 10, page 10 - Injection Pump: Update table as follows:

C.A.V. {	AM (see page 13)	—	DPA3342-F020-770996
	AM (see page 14)	—	DPA3342-F390-771363
	AM (see page 11)	DPA3342-F150-771050	—
	PM (see pages 15 and 19)	DPA3342-F570-771541	DPA3342-F450-771383

Section 10, page 11 - Table title.

... C.A.V. Injection Pump TYPE DPA 3342 F 150 - 771050

... C.A.V. Injection Pump TYPE DPA 3342 F 150 - 771050 (up to Engine 758846)

Section 100, page 2 - Performance data table title.

780 - C.A.V. Injection Pump

780 - C.A.V. Injection Pump (up to Engine 758846)

Section 102, page 1 - First line on right and caption on left.

On Model 780, renew the bushes using suitable extractor and drivers.

On Model 780, replace worn bushings using driver **A. 360383 (292103)**.

Section through camshaft drive

a. Model 780 - b. Model 880 - 5. Retaining screw

Section through camshaft drive

a. Model 880 - b. Model 780 - 5. Retaining screw

Section 20, page 11 - Platform removal - Bevel drive.

Screw, front and rear cushion mountings  
22.5 kgm - 163 lb ft  
Nut, self-locking, crown wheel (C<sub>1</sub>, page 6)  
15 kgm - 108 lb ft

Screw, front and rear cushion mountings  
11 kgm - 79 lb ft  
Nut, self-locking, crown wheel (C<sub>1</sub>, page 6)  
12.5 kgm - 90 lb ft

Section 20, page 12 - Fourth torque figure.

Screw, support, differential lock lever (C<sub>6</sub>, page 12):  
— 780 Tractor M 12 x 1.25 - 6.2 kgm - 45 lb ft  
— 880 Tractor M 12 x 1.25 - 10 kgm - 72 lb ft

Screw, support, differential lock lever (C<sub>6</sub>, page 12):  
M 12 x 1.25 - 10 kgm - 72 lb ft

**OLD TEXT**

**REVISED TEXT**

**Section 20, page 12 - Final drives.**

Nut, wheel disc and rim (C<sub>3</sub>)  
M 18 x 1.5 - 32 kgm - 231 lb ft

Nuts, sheet metal driving wheel disc to hub  
M 18 x 1.5 - 25 kgm - 181 lb ft  
Nuts, cast wheel disc to driving wheel hub  
M 18 x 1.5 - 32 kgm - 231 lb ft  
Nuts, RAIL rim to driving wheel  
M 20 x 2.5 - 25 kgm - 181 lb ft  
Nuts, rim to sheet metal driving wheel disc  
M 18 x 1.5 - 32 kgm - 231 lb ft

**Section 201, page 1 - 17th and 37th line on left.**

Apply engine lift chain **296962**  
Press the double shielded bearing in position **without packing with grease;**

Apply engine lift chain **290962**  
Press the double shielded bearing in position **packing the associated recess with grease;**

**Section 201, page 3 - Last para. on left.**

Position adjustable locators (E) on a 240 mm (9.4 inch) circumference with the top surface 9 mm (.35 inch) (11"/11" clutch, 780 Tractor) or 9.1 mm (.36 inch) (11"/11" and 12"/12" clutches, 880 Tractor) from base plate and tighten using hand wheels (M).

Position adjustable locators (E) on a 240 mm (9.4 inch) circumference with the top surface 9 mm (.35 inch) (11"/11" clutch, Model 780) or a 9.1 mm (.36 inch) (11"/11" clutch, Model 880) or 9.6 mm (.38 inch) (12"/12" clutch, Model 880) from base plate and tighten using hand wheels (M).

**Section 201, page 4 - First line on left.**

Slacken nuts (6a, page 2) and fully unscrew adjusting screws (6) using spanner **291187**.

Slacken nuts (6a, page 2) and completely back off adjusting screws (6) using wrench **293763**.

**Section 202, page 7 - 4th line of TO INSPECT.**

place a spring over a flat surface (see detail a), depress the spring in the centre all along the width applying a 1.4 to 1.55 kg (3 to 3 1/2 lb) load (P) and check that the camber is 1.5 mm (.06 inch)

position the spring on a surface plate (see inset a), apply a load (P) of 1.40 to 1.55 kg (13.7 to 15.2 N - 3 to 3 1/2 lb), AM spring, or 3.2 to 3.5 kg (31.4 to 34.3 N - 7 to 7 3/4 lb), PM spring to the centre of the spring and check that the associated deflection is 1.5 mm (.06 inch) or 1.4 mm (.055 inch) respectively

**Section 202, page 7 - Caption at bottom on right.**

P = 1.40 to 1.55 kg (3 to 3 1/2 lb) test load ...

P = 1.40 to 1.55 kg (3 to 3 1/2 lb), AM spring, or 3.2 to 3.5 kg (7 to 7 3/4 lb), PM spring. Test load ...

# GENERAL: Revisions

## OLD TEXT

## REVISED TEXT

### Section 204, page 1 - TO DISMANTLE AND REASSEMBLE CROWN WHEEL.

Peen pinion screw (15).

Peen AM retaining screw (15) for differential pinion shaft (14) and replace PM plastic coated screw as the latter cannot be reused

### Section 207, page 2 - Fourth line on left and first line on right of TO DISMANTLE and REASSEMBLE.

On 540 rpm PTO, 780 Tractor and 880 AM Tractor ...  
On 540 rpm PTO, 880 PM Tractor ...

On 540 rpm PTO 780 and 880 AM (up to frame 892607) ...  
On 880 PM (from frame 892608), ...

### Section 402, page 1 - 2nd and 6th line on left TO REFIT.

Align the two drive shafts (30 and 35, page 3) relative to drive sleeve (32) ...  
Bring front drive sleeve (27) in contact with circlip (28), assess the amount of clearance (L) using a suitable feeler gauge and install a shim (S<sub>s</sub>) of adequate thickness ...

On AM tractors, line up the two drive shafts (30 and 35, page 3) onto drive sleeve ...  
Bring front drive sleeve (27) right up against circlip (28), assess the amount of clearance (L) using a suitable feeler gauge and install a shim (S<sub>s</sub>) of adequate thickness in order to obtain a .5 to 1 mm (.02 to .04 inch) fitted clearance ...

### Section 50, page 6 - Lift - 3-point linkage and towing attachments.

Nut, lift body:

M 12 x 1.25 - 6 kgm - 43 lb ft  
M 14 x 1.25 - 15 kgm - 108 lb ft

Screw, levelling box cover (5, page 1)  
10 kgm - 72 lb ft

Nuts, lift body:

M 10 x 1.25 - 4.5 kgm - 32 lb ft  
M 14 x 1.25 - 12 kgm - 87 lb ft

Screws, levelling box cover (5, page 1)  
6 kgm - 43.5 lb ft

### Section 501, page 8 - Title on left.

3. AM Control Valve Response Adjustment

3. AM Control Valve Spool Response Adjustment  
(up to frame 673140, Model 780 and 892776, Model 880)

### Section 501, page 9 - Title at top on left.

4. PM Control Valve Response

4. PM Control Valve Response (from frame 673141, Model 780, and 892777, Model 880)

### Section 60, page 8 - Fuse No. 7.

Direction stop lights (tractor and trailer) and warning lights - Water temperature gauge - Fuel gauge - Air cleaner warning light

Direction stop lights (tractor and trailers) and warning lights - Water temperature gauge - Fuel gauge - Air cleaner warning light - Alternator charge indicator - Low engine oil pressure indicator

**IDENTIFICATION DATA**

Marketing Code

- Rear wheel drive (RWD)
- Live front axle (LFA)

Engineering code:

- 8-speed, rear wheel drive (780 and 880 AM)
- 12-speed, rear wheel drive (780 and 880 AM)
- 8-speed, four wheel drive (780 and 880 AM)
- 12-speed, four wheel drive (780 and 880 AM)
- 12-speed, rear wheel drive (780 and 880 PM)
- 16-speed, rear wheel drive (780 and 880 PM)
- 12-speed, four wheel drive (780 and 880 PM)
- 16-speed, four wheel drive

**780**  
**780 DT**

655.100.000
655.111.000
655.127.000
655.129.000
655.100.000 var. 720.286.040
655.100.000 var. 720.111.170
655.127.000 var. 720.286.050
655.127.000 var. 720.111.170
FIAT 8045.04.2. (with BOSCH pump)
FIAT 8045.04.3. (with C.A.V. pump)

**880**  
**880 DT**

656.100.000 (*)
656.111.000
656.127.000 (*)
656.129.000
656.100.000
656.100.000 var. 720.111.150
656.127.000
656.127.000 var. 720.111.150
FIAT OM C 03/75 (with C.A.V. pump)

Engine type (all versions)

**WEIGHTS (780 AM and 880)**

Operating weight (including lift implement attachment, swinging drawbar and ROP frame)

- Mod. 780
- Mod. 780 DT
- Mod. 880
- Mod. 880 DT

kg	lbs.	kg	lbs.
2440	5380	—	—
2740	6040	—	—
—	—	2780	6130
—	—	3080	6790

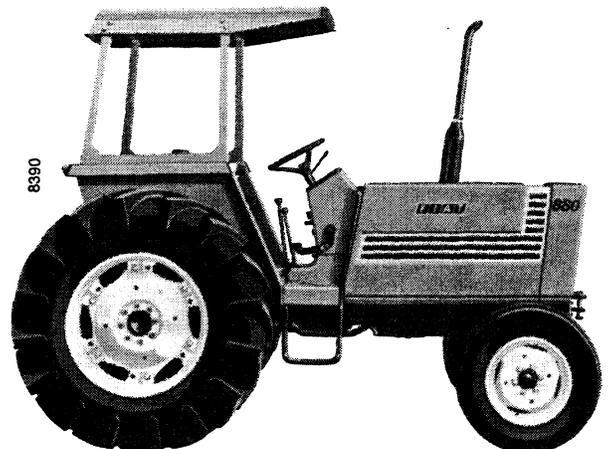
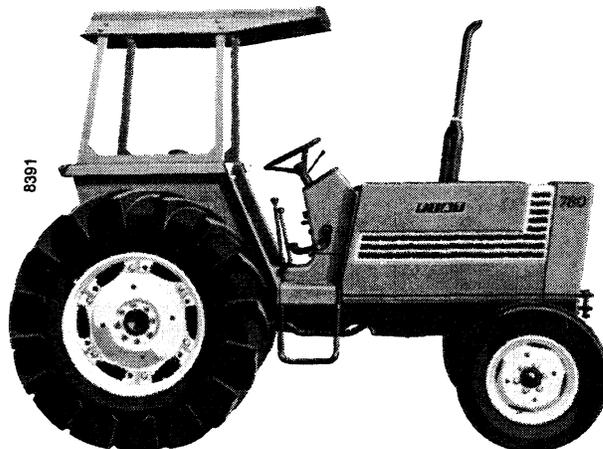
**WEIGHTS (780 PM)**

Operating weight with lift, implement attachment, swinging drawbar and ROP frame

- Mod. 780
- Mod. 780 DT

2530	5580	—	—
2770	6110	—	—

(\*) AM version 8 + 4 speeds



**ENGINE**

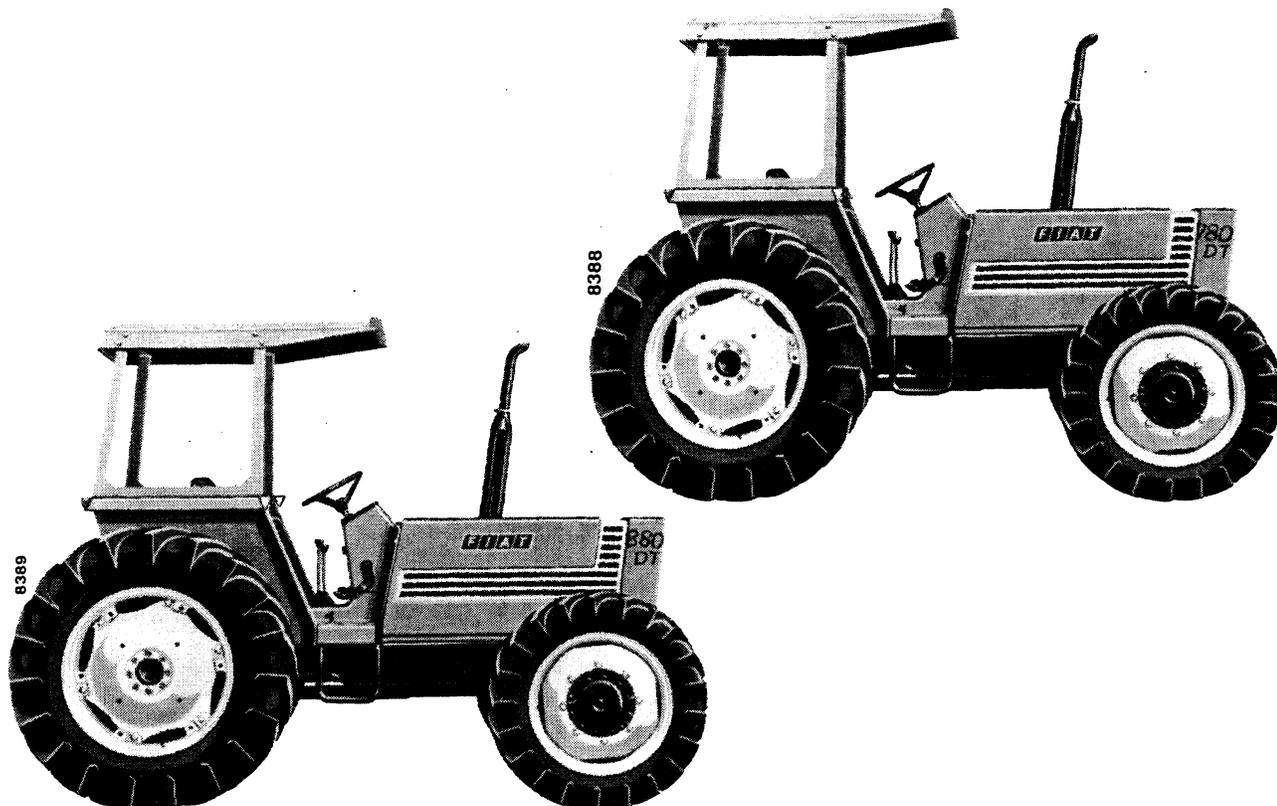
Type  
 Injection  
 Number of cylinders  
 Liners  
 Bore  
 Stroke  
 Displacement  
 Compression ratio  
 Max. horsepower, DGM/DIN, metric  
 Max. output speed  $\left\{ \begin{array}{l} \text{AM} \\ \text{PM} \end{array} \right.$   
 Max. torque speed  
 Main bearings  
 Balancer  
 Sump

**Valve Gear**

Inlet  $\left\{ \begin{array}{l} \text{Opens: BTDC} \\ \text{Closes: ABDC} \end{array} \right.$   
 Exhaust  $\left\{ \begin{array}{l} \text{Opens: BBDC} \\ \text{Closes: ATDC} \end{array} \right.$

Valve clearance  
 — For timing check  
 — Normal  
 - Inlet  
 - Exhaust

780-780 DT	880-880 DT
4-stroke diesel, naturally aspirated	
Direct	
Four	
Dry	Wet
103 mm (4.05 in)	110 mm (4.33 in)
110 mm (4.33 in)	120 mm (4.75 in)
3666	4562
17 to 1	
78 (57.4 kW)	88 (64.7 kW)
—	2300 rpm
2500 rpm	2400 rpm
1400 rpm	
Five	Five
Flyweight, engine sump	
Iron	
OH valves, push rod operated	
3°	10°
23°	54°
48° 30'	54°
6°	10°
.45 mm (.018 in)	.25 mm (.010 in)
.25 mm (.010 in)	.25 mm (.010 in)
.35 mm (.014 in)	.30 mm (.012 in)



**Fuel System**

Air cleaner

Fuel filters (between pumps)

Feed pump

— Operation

Injection pump

— Type	} BOSCH	or	} AM

— Integral all speed governor { BOSCH  
C.A.V.

— Integral advance device

— Pump timing, BTDC { BOSCH  
C.A.V.

Injectors

— Type

— Release pressure

Firing order

**Lubrication System**

Pump drive

Oil filters

Relief valve

— Oil pressure at governed speed

**Cooling System**

Radiator

Expansion tank

Fan, water pump pulley mounted

Temperature control

780-780 DT	880-880 DT
	Oil bath or dry, automatic drain centrifugal precleaner
	Two, in line, cartridge type, water separator integral with first filter
	Double diaphragm
	Cam
	Distributor
EP/VA 4/110 H 1250 CL136-6-771151	—
	DPA-3342 F020-770996 up to engine no. 002517
DPA-3342 F150- 771050 (from start of pro- duction and up to engine 758846)	DPA-3342 F390-771363 from engine no. 002518 and up to no. 002816
DPA-3342 F570- 771541 (from engine 758847)	DPA-3342 F450-771383 from engine no. 002817
Hydraulic Centrifugal	— Centrifugal
	Hydraulic
13° ± 1°	—
18° ± 1°	14° ± 1°
3-orifice	4-orifice
	See page 10, Section 10
230 ± 5 kg/cm <sup>2</sup> (3,270 ± 70 psi)	200 ± 5 kg/cm <sup>2</sup> (2,840 ± 70 psi)
	1 - 3 - 4 - 2
	Forced feed, gear pump
Camshaft	Crankshaft
Strainer on pump inlet and full flow cartridge on outlet	
In pump body	In filter
3 to 4 kg/cm <sup>2</sup> (48 to 57 psi)	4.8 to 5.2 kg/cm <sup>2</sup> (68 to 74 psi)
	Water, centrifugal pump
	3 or 4 deep core, vertical tube
	Semi-transparent plastics
	Suction, steel
	Wax thermostat

**Tractor Meter**

- Drive
- Hourmeter activation speed
- Meter drive ratio

**POWER TRAIN****Clutch**

Type	Luk or Ferodo, 11 in
Construction	Twin, dry single plate
Control	
— Transmission	Pedal
— PTO	Manual

**880 Option**

Type	Luk or Ferodo, 12 in
Construction	Twin, dry single plate
Control	Separate, as above
Plate material	
— Transmission	Cerametallic compound
— PTO	Organic compound

**Gearbox**

Type	Four-speed, constant mesh
— 780	Spur
— 880	Helical
Splitter	Planetary
— 780 and 880 AM	8 + 2
— 780 and 880 PM	12 + 3 (optional on 780)
Crawler gear	In line with splitter, optional
— 780 and 880 AM	12 + 3
— 780 and 880 PM	16 + 4
Control levers	Separate

Model 780 with 8 speed transmission may also be equipped (on request) with mechanical reverser for a total of 8 forward and 8 reverse ratios. Reverser control is through splitter-transmission lever.

**Bevel Drive** Straight

**Differential** Two pinion  
Differential lock Pedal controlled

**Final Drives** Epicyclic

780-780 DT	880-880 DT
On instrument panel	
Oil pump gear 1800 rpm 2 to 1	Injection pump shaft 1800 rpm 2 to 1

**BRAKES****Service**

Type	Disc, oil-bath, axle shaft mounted
Operation	Hydraulic
Circuits	Split
Control	Latched pedals

**Parking/Emergency**

Type	
— AM	Single disc, independent
— PM	Twin disc, independent
Position	Bevel pinion shaft mounted
Control	Manual lever

**STEERING**

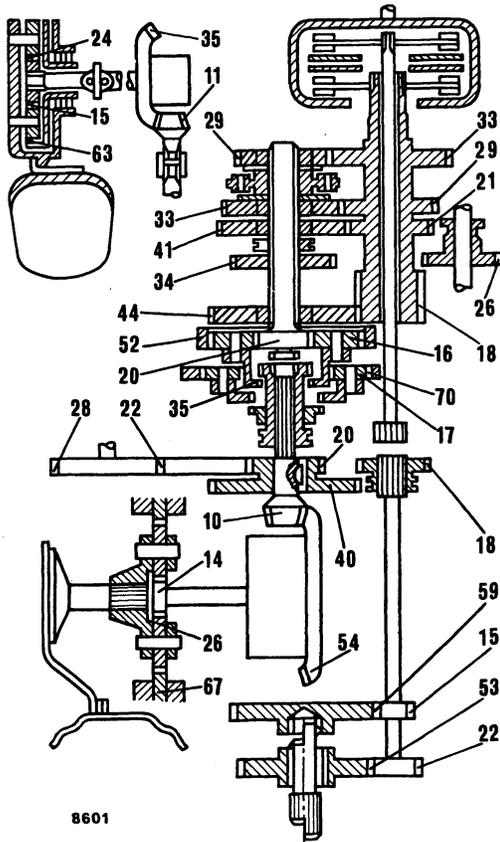
Steering unit	
— 780	Recirculating ball or fully hydraulic (optional)
— 780 DT, 880, 880 DT	Fully hydraulic
Linkage joints	Sealed for life
Turning radius	
— 780	4 m (13 ft 1 1/2 in)
— 780 DT, with front axle in	5.75 m (18 ft 10 1/2 in)
— 880	4.2 m (13 ft 9 1/2 in)
— 880 DT, with front axle in	6 m (19 ft 8 1/4 in)

**FRONT AXLE  
(780 and 880)**

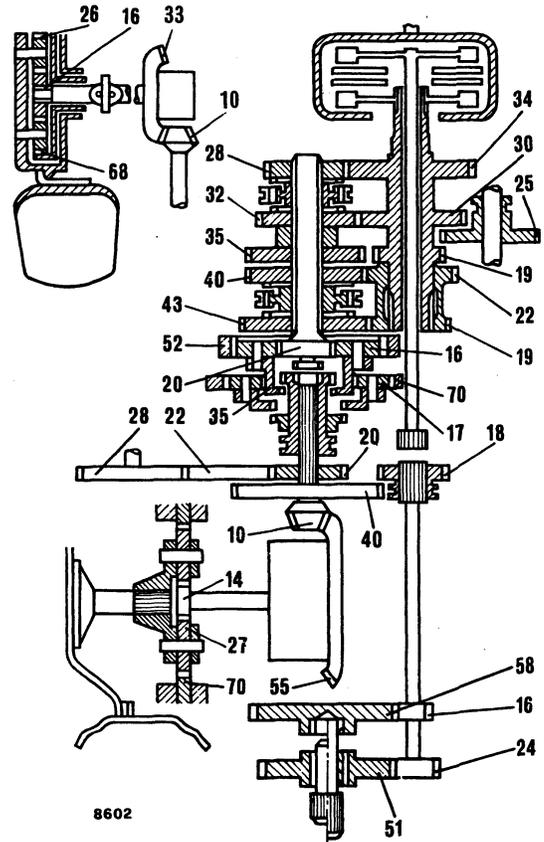
Type	Inverted U, telescoping, centre pivoting
Track widths	6

**POWER TRAINS SCHEMATICS**

**780-780 DT (AM)**



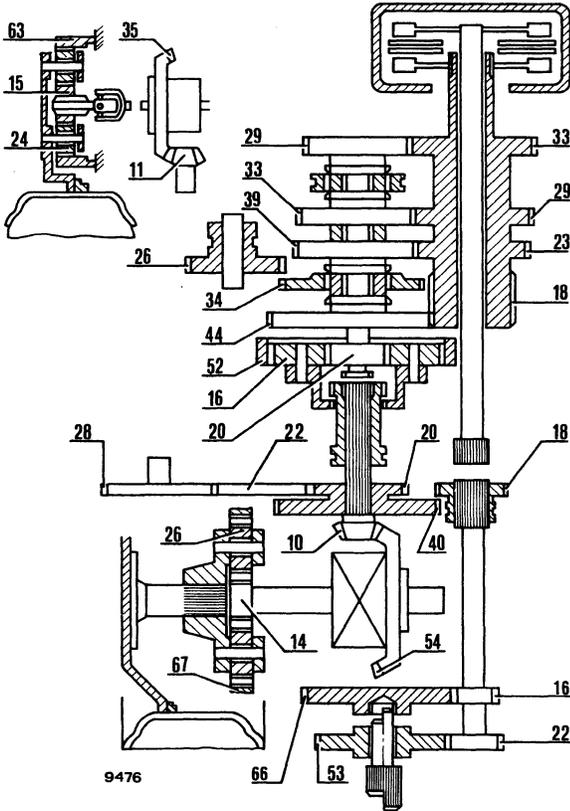
**880-880 DT (AM)**



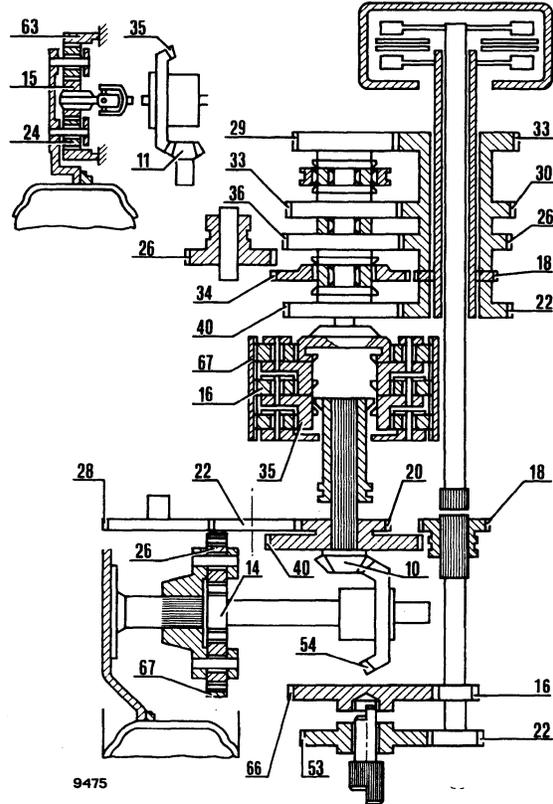
Tractor speeds at maximum engine speed, full load											
GEARS	780 and 780 DT (AM) Rear tyres					880 and 880 DT (AM) Rear tyres					
	13.6/12-38 and 16.9/14-34		18.4/15-30			13.6/12-38 and 16.9/14-34		18.4/15-34		16.9/14-38	
	kph	mph	kph	mph	kph	mph	kph	mph	kph	mph	
Crawler	1st	.8	.5	.8	.5	.8	.5	.8	.5	.9	.6
	2nd	1.0	.6	1.0	.6	1.0	.6	1.0	.6	1.1	.7
	3rd	1.8	1.1	1.7	1.0	1.7	1	1.8	1.1	1.8	1.1
	4th	2.3	1.4	2.2	1.4	2.2	1.3	2.3	1.4	2.4	1.5
	Reverse	1.1	.7	1	.6	1	.6	1	.6	1.1	.7
Low	1st	2.5	1.5	2.4	1.5	2.4	1.5	2.5	1.5	2.6	1.6
	2nd	3.1	1.9	3	1.8	3	1.8	3.1	1.9	3.2	2
	3rd	5.4	3.3	5.2	3.2	5.1	3.2	5.3	3.3	5.5	3.4
	4th	6.9	4.3	6.7	4.1	6.6	4.1	6.9	4.3	7.1	4.4
	Reverse	3.2	1.9	3.1	1.9	2.9	1.8	3.1	1.9	3.2	2
High	1st	9	5.6	8.7	5.5	8.5	5.3	9	5.6	9.3	5.8
	2nd	11.2	6.9	10.9	6.8	10.8	6.7	11.2	6.9	11.6	7.2
	3rd	19.3	12	18.7	11.6	18.3	11.4	19.1	11.9	19.7	12.2
	4th	25	15.5	24.3	15.1	23.8	14.3	24.7	15.3	25.5	15.8
	Reverse	11.6	7.2	11.3	7.1	10.6	6.6	11.1	6.9	11.4	7.1

**POWER TRAIN SCHEMATICS**

**780-780 DT, 8-speed  
(Old live front axle)**



**780-780 DT, 12-16-speed  
(Old live front axle-optional)**

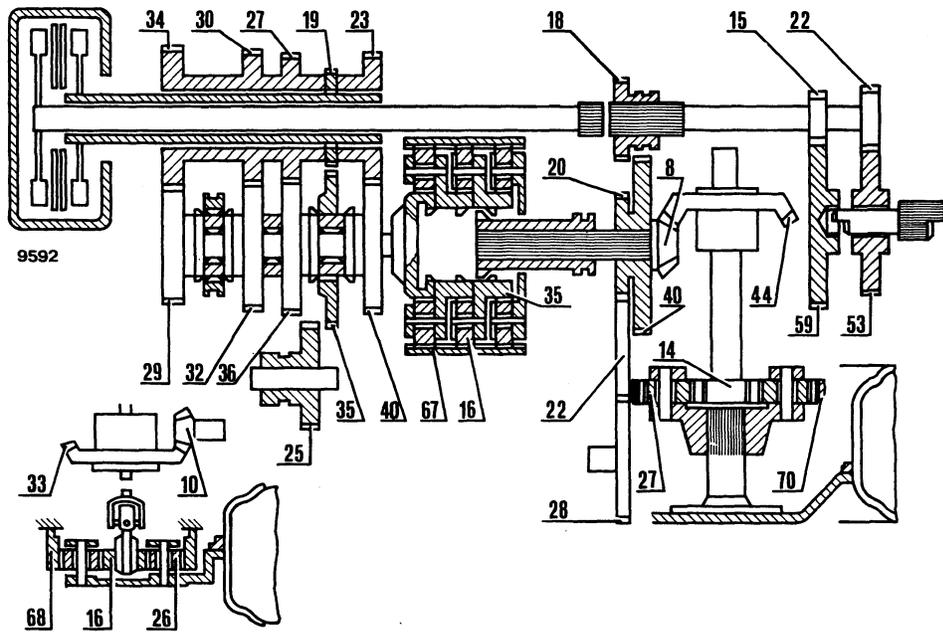


**Tractor speeds at maximum engine speed, full load**

GEARS	780 and 780 DT, 8-speed, Rear tyres				780 and 780 DT, 12-16-speed, Rear tyres				
	16.9/14-34 and 13.6/12-38		18.4/15-30		16.9/14-34 and 13.6/12-38		18.4/15-30		
	kph	mph	kph	mph	kph	mph	kph	mph	
Crawler	1st	—	—	—	.5	.3	.5	.3	
	2nd	—	—	—	.6	.4	.6	.4	
	3rd	—	—	—	.8	.5	.8	.5	
	4th	—	—	—	1.0	.6	1.0	.6	
	Reverse	—	—	—	.5	.3	.4	.2	
Low	1st	2.5	1.5	2.4	1.5	1.4	.9	1.4	.9
	2nd	3.6	2.2	3.5	2.2	1.9	1.2	1.8	1.1
	3rd	5.3	3.3	5.2	3.2	2.3	1.4	2.3	1.4
	4th	6.9	4.3	6.7	4.2	2.9	1.8	2.8	1.7
	Reverse	3.2	2.0	3.1	1.9	1.4	.9	1.3	.8
Normal	1st	—	—	—	—	4.1	2.5	4.0	2.5
	2nd	—	—	—	—	5.4	3.4	5.3	3.3
	3rd	—	—	—	—	6.8	4.2	6.6	4.1
	4th	—	—	—	—	8.5	5.3	8.3	5.2
	Reverse	—	—	—	—	4.0	2.5	3.9	2.4
High	1st	8.9	5.5	8.7	5.4	12.1	7.5	11.7	7.3
	2nd	12.9	8.0	12.6	7.8	15.8	9.8	15.4	9.6
	3rd	19.3	12.0	18.7	11.6	19.9	12.4	19.4	12.1
	4th	24.9	15.5	24.3	15.1	24.9	15.5	24.3	15.1
	Reverse	11.6	7.2	11.3	7.0	11.6	7.2	11.3	7.0

**POWER TRAIN SCHEMATICS**

880-880 DT, 12-16-speed (PM)



Tractor speeds at maximum engine speed, full load							
GEARS		880 and 880 DT, 12-16-speed (PM), Rear tyres					
		13.6/12-38 and 16.9/14-34		18.4/15-34		16.9/14-38	
		kph	mph	kph	mph	kph	mph
Crawler	1st	.5	.3	.5	.3	.5	.3
	2nd	.6	.4	.6	.4	.7	.4
	3rd	.8	.5	.8	.5	.8	.5
	4th	1.0	.6	1.0	.6	1.0	.6
	Reverse	.4	.2	.5	.3	.5	.3
Low	1st	1.4	.9	1.4	.9	1.5	.9
	2nd	1.8	1.1	1.9	1.2	1.9	1.2
	3rd	2.3	1.4	2.3	1.4	2.4	1.5
	4th	2.8	1.7	2.9	1.8	3.0	1.9
	Reverse	1.3	.8	1.4	.9	1.4	.9
Normal	1st	4.0	2.5	4.2	2.6	4.3	2.7
	2nd	5.3	3.3	5.5	3.4	5.6	3.5
	3rd	6.6	4.1	6.8	4.2	7.1	4.4
	4th	8.2	5.1	8.5	5.3	8.8	5.5
	Reverse	3.8	2.4	4.0	2.5	4.1	2.5
High	1st	11.7	7.3	12.2	7.6	12.6	7.8
	2nd	15.3	9.5	15.9	9.9	16.5	10.3
	3rd	19.1	11.9	19.9	12.4	20.6	12.8
	4th	23.9	14.9	24.9	15.5	25.7	16.0
	Reverse	11.1	6.9	11.5	7.1	11.9	7.4

## LIVE FRONT AXLE (780 DT and 880 DT)

Type	Full floating, centre pivoting, unjointed drive shaft and articulations on tractor centreline
Differential	Two pinion
Final drives	Epicyclic
Track widths	
— AM, wheel interchange	2 off
— PM, change of relative position between rim, disc and wheel hub	
- 780	4 off
- 880	8 off

## REAR WHEELS

Track width adjustable through change of position between rim and disc and wheel hub.

— Pressed steel or cast disc wheels (AM)	8 off
— Cast disc wheels, PM, tyre size 18.4/15-30	9 off
— Cast disc wheels, PM, tyre size 13.6/12-38 or 16.9/14-34	8 off

## POWER TAKE-OFF Transmission Driven PTO

Type	Fully independent
Speed	540 rpm, $1\frac{3}{8}$ in six-spline or $1\frac{3}{4}$ in six-spline extension 1000 rpm, $1\frac{3}{4}$ in 21-spline extension
Control	Manual lever
Standard speed selection	Automatic
Engine speed with PTO at standard speeds	
— 780	
- 540 rpm	
- AM	2125 rpm
- PM	2225 rpm
- 1000 rpm	2410 rpm
— 880	
- 540 rpm	
- AM	1960 rpm
- PM	2125 rpm
- 1000 rpm	
- AM	2125 rpm
- PM	2400 rpm
Direction of rotation (tractor viewed from rear)	Clockwise

## Ground Speed PTO

Speed	See transmission PTO
Control	See transmission PTO
Rotation	See transmission PTO
Shaft drive ratio	
— 780 (rear tyre size 16.9/14-34)	
- AM	3.77 rev/m of tractor travel
- PM	3.58 rev/m of tractor travel
— 880 (rear tyre size 18.4/15-34)	
- AM	4.15 rev/m of tractor travel
- PM	3.83 rev/m of tractor travel

## LIFT

Type	Hydraulic, draught and position control
Response	Adjustable
Draught control	Lower links through deflection bar
Pump	Gear, engine driven
Hydraulic fluid	Rear axle oil
Design lift capacity	See Section 50, pages 2 and 4
Max. lift stroke	See Section 50, pages 2 and 4
Max. lift capacity	See Section 50, pages 2 and 4
Linkage	Three-point
Attachment	Category two
Lower links	Conventional or telescoping
Check blocks	AM
Check links	PM, adjustable

## Remote Control Valves

Number	Up to three
Type	Single or double acting, for trailer power braking

## TOWING ATTACHMENTS

### Rear

Drawbar	Swinging, suitable for use with or without tow hook
Tow hook	Conventional, adjustable for height

Rockinger hook      Pivotting, with safety type automatic hitch and lock-up device

**Front**

Pull hook      Rigid, not usable with front ballast

**BALLASTING**

**Front Axle**

Support      130 kg (287 lb)  
— Cast iron plates  
  - Six, 40 kg (88 lb)      370 kg (816 lb)  
  - Ten, 40 kg (88 lb)      530 kg (1168 lb)

**Rear Axle**

Cast iron rings  
— Four, 58 kg (128 lb)      230 kg (507 lb)  
— Six, 58 kg (128 lb)      350 kg (772 lb)  
Cast iron wheel discs  
— AM  
  - 780 tractor, 225 kg (496 lb) each for a total of 450 kg (992 lb), or 300 kg (661 lb) for a total of 600 kg (1322 lb), tyre size 16.9/14-34 and 13.6/12-38 only  
  - 880 tractor, 300 kg (661 lb) each (for a total of 600 kg - 1322 lb), any tyre size  
— PM  
  - 780 and 880 tractors, 150 kg (330 lb) each for a total of 300 kg (660 lb), any tyre size

**BODY**

**Floor**

Compact, rigid, vibration free, integral, complete with footboards, mudguards, dash and provision for safety frame or cab installation

**Fuel Tank**

Behind seat, boxed between mudguards

**Driver's Seat**

Suspension      Parallelogram, hydraulic damper  
Adjustment  
— Reach (Std. and De-Luxe)      11 positions  
— Height (De-Luxe only)      6 positions

**Dashboard**

13-function instrument panel plus control board

**Bonnet**

L.H. side section

Full enclosing, in four parts  
Access to air cleaner, oil filter and dipstick, brake fluid and battery

R.H. side section

Access to fuel filters, fuel pump, injection pump and steering fluid

**Cab**

Visibility  
Accessibility  
Rear window  
Protection

All-round  
On either side  
Adjustable  
Insulated, with provisions for roof-mounted heating and ventilating or air conditioning system

**ELECTRICAL SYSTEM (12 Volt)**

**Generating and Starting**

**Alternator**

— Type  
  - Bosch      G1 (R) 14V - 33A27 or  
  - Marelli      AA108 - 14V-33A-1  
— Rated output      33 A  
— Voltage regulator      Electronic, integral

**Starter**

— 780 Type  
  - Marelli      MT 68 AA  
  - AM      MT 68 AB  
  - PM  
  - Bosch      JD 12 V  
— 880 Type  
  - Marelli      MT 68 B  
  - Bosch      JD 4 PS/12V

**Battery**

— Location      Ahead of radiator  
— Capacity  
  - 780      110/120 Ah  
                 or 132/140 Ah  
  - 880      132/140 Ah  
                 or 176 Ah (\*)

(\*) AM

**Lighting**

Headlamps	Twin, main and asymmetric dipped beams, 45/50 W
Front lights	
— Side	5 W
— Direction	21 W
Tail lights	
— Rear	5 W
— Direction	21 W
— Stop	21 W
— Number plate	L.H. rear light

**Instruments and Accessories**

Instrument panel	13-function (see Section 60, page 11)
Control board	See Section 60, page 11
Flood light	35 W
Rear power point	DIN, 7-pole
Dash power point	Single-pole
Horn	Control board mounted
Cold starting	Thermostarter
Lighter	Dash-mounted
Fuses	See Section 60, page 11
Hazard warning	Tractor and trailers

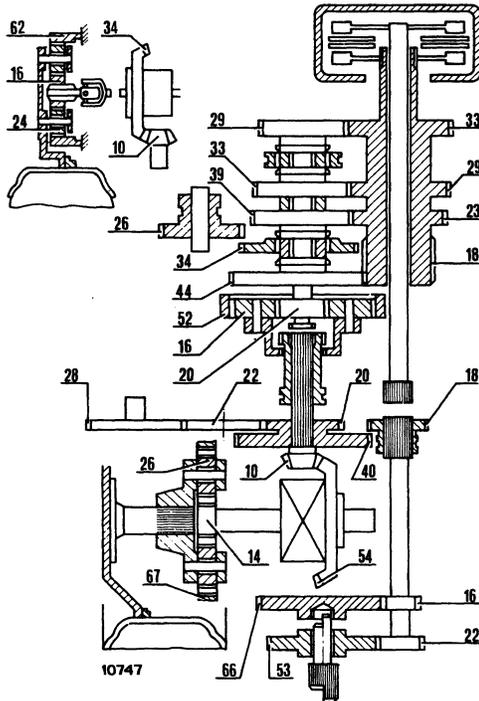
**TYRE SIZES**

	780	780 DT	880	880 DT
Front	6.50-20	12.4/11-24 (*)	7.50-18	11.2/10-28 (+)
	7.50-16	11.2/10-28 (°)	7.50-20	12.4/11-28 (●)
	7.50-18	—	—	—
Rear	13.6/12-38	18.4/15-30 (*)	13.6/12-38	16.9/14-38 (●)
	16.9/14-34	13.6/12-38 (°)	16.9/14-34	13.6/12-38 (+)
	18.4/15-30	16.9/14-34 (°)	16.9/14-38	16.9/14-34 (+)
	—	—	18.4/15-34	18.4/15-34 (●)

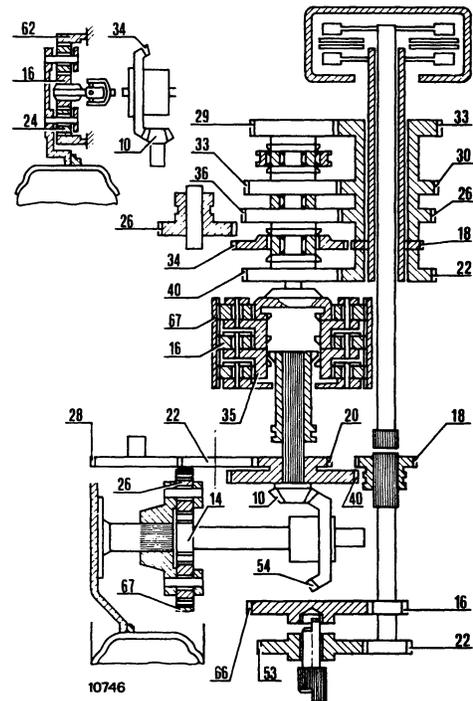
(\*) (°) (+) (●) Tyre matching references

**POWER TRAIN SCHEMATICS**

**Models 780-780 DT, 8-speed  
(new axle)**



**Models 780-780 DT, 12-16-speed  
(new axle, optional)**

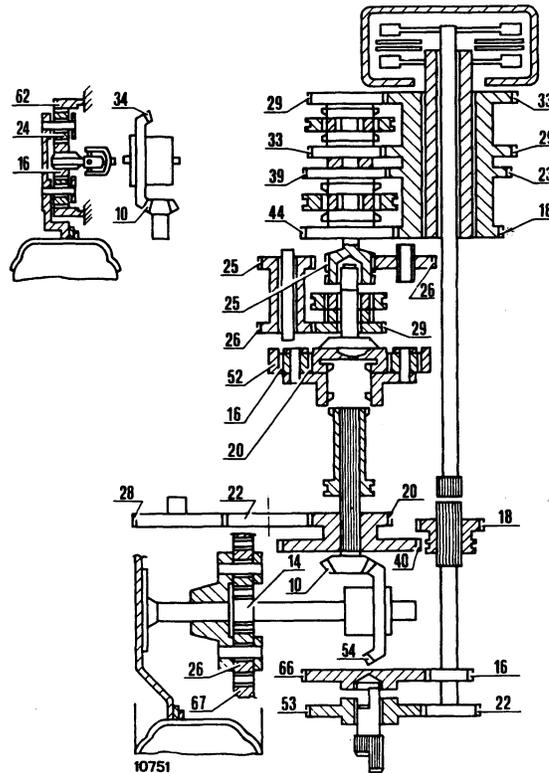


**Tractors speeds at maximum engine speed, full load**

GEARS	Models 780 and 780 DT, 8 speed, rear tyres				Models 780 and 780 DT, 12-16 speed, rear tyres				
	16.9/14-34 and 13.6/12-38		18.4/15-30		16.9/14-34 and 13.6/12-38		18.4/15-30		
	kph	mph	kph	mph	kph	mph	kph	mph	
Crawler	1st	—	—	—	.5	.3	.5	.3	
	2nd	—	—	—	.6	.3	.6	.3	
	3rd	—	—	—	.8	.4	.8	.4	
	4th	—	—	—	1.0	.6	1.0	.6	
	Reverse	—	—	—	.5	.3	.4	.2	
Low	1st	2.5	1.5	2.4	1.4	.8	1.4	.8	
	2nd	3.7	2.2	3.5	2.1	1.9	1.8	1.1	
	3rd	5.5	3.4	5.2	3.2	2.3	2.3	1.4	
	4th	7.1	4.4	6.7	4.1	2.9	2.8	1.7	
	Reverse	3.3	2.0	3.1	1.9	1.4	.8	1.3	.8
Normal	1st	—	—	—	4.1	2.5	4.0	2.4	
	2nd	—	—	—	5.4	3.3	5.3	3.2	
	3rd	—	—	—	6.8	4.2	6.6	4.1	
	4th	—	—	—	8.5	5.2	8.3	5.1	
	Reverse	—	—	—	4.0	2.4	3.9	2.4	
High	1st	9.2	5.7	8.7	5.4	12.1	7.5	11.7	7.2
	2nd	13.2	8.2	12.6	7.8	15.8	9.8	15.4	9.5
	3rd	19.7	12.2	18.7	11.6	19.9	12.3	19.4	12.0
	4th	25.6	15.9	24.3	15.1	24.9	15.4	24.3	15.1
	Reverse	11.9	7.3	11.3	7.0	11.6	7.2	11.3	7.0

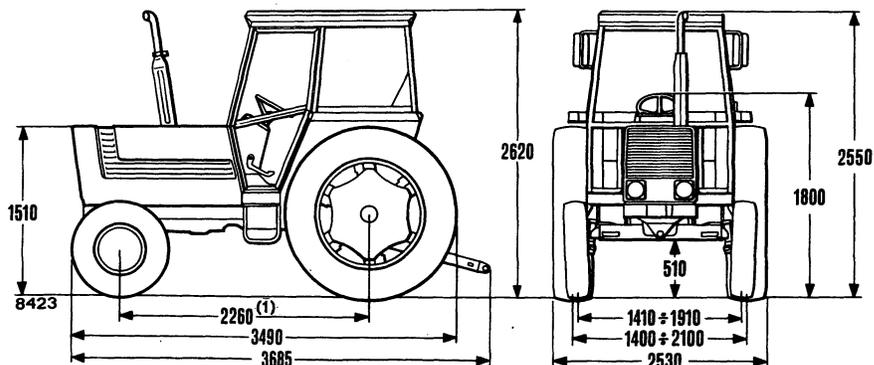
**POWER TRAIN SCHEMATICS**

Models 780-780 DT, 8-speed with reverser

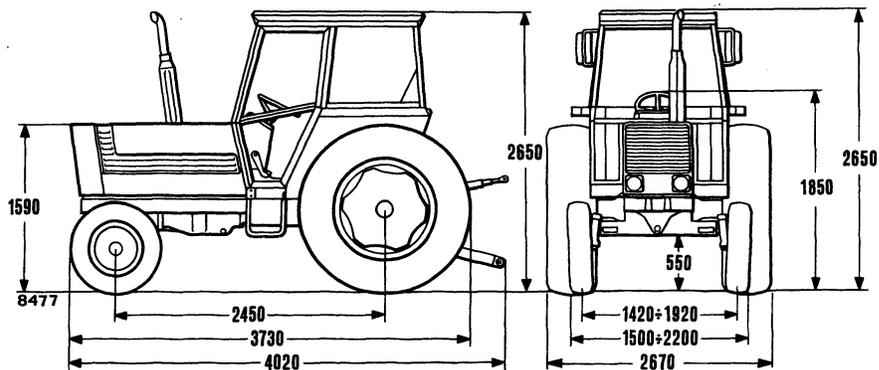


Tractor speeds at maximum engine speeds, full load						
GEARS		Models 780 and 780 DT, 8 speed with reverser and rear tyres				
		16.9/14-34 and 13.6/12-38		18.4/15-30		
		kph	mph	kph	mph	
Low	Forward	1st	2.5	1.5	2.5	1.5
		2nd	3.7	2.2	3.6	2.2
		3rd	5.5	3.4	5.3	3.2
		4th	7.1	4.4	6.9	4.2
	Reverse	1st	2.3	1.4	2.2	1.3
		2nd	3.3	2.0	3.2	1.9
		3rd	4.9	3.0	4.8	2.9
		4th	6.4	3.9	6.2	3.8
High	Forward	1st	9.2	5.1	8.9	5.5
		2nd	13.2	8.2	12.9	8.0
		3rd	19.7	12.2	19.2	11.9
		4th	25.6	15.9	24.9	15.4
	Reverse	1st	8.2	5.0	8.0	4.9
		2nd	11.9	7.3	11.5	7.1
		3rd	17.7	10.9	17.2	10.8
		4th	22.9	14.2	22.3	13.8

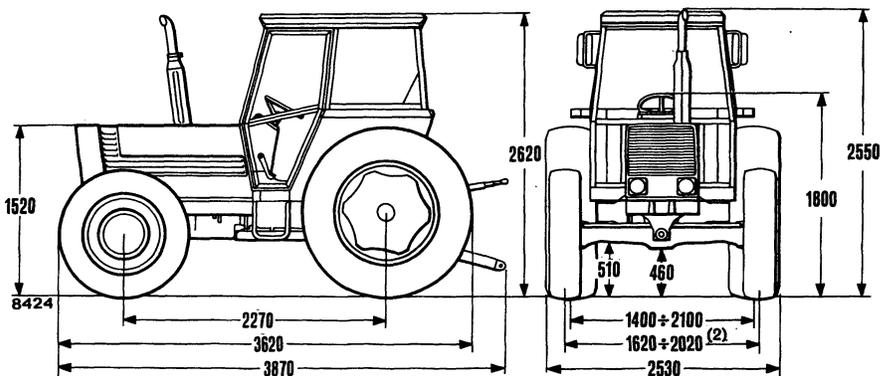
**MAIN DIMENSIONS (in mm)**



**Model 780**  
(7.50-18 front  
and 16.9/14-34  
rear tyres)  
(1) 2265 PM

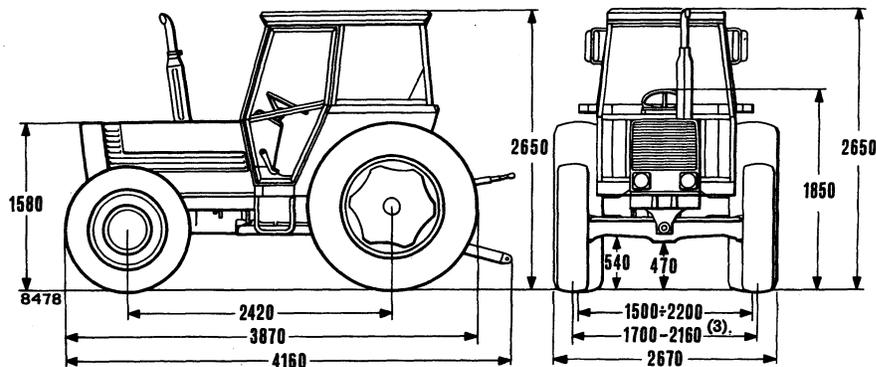


**Model 880**  
(7.50-20 front  
and 18.4/15-34  
rear tyres)



**Model 780 DT**  
(11.2/10-28 front  
and 16.9/14-34  
rear tyres)  
(2) 1500 to 1935 PM

**Model 880 DT**  
(12.4/11-28 front  
and 18.4/15-34  
rear tyres)  
(3) 1710 to 2145 PM



## CAPACITIES

DESCRIPTION	CAPACITY							International Designation	
	FIAT Recommended Lubricants	780-780 DT			880-880 DT				
		Litres	kg	Pints	Litres	kg	Pints		
Engine oil (with filter and lines)	oliofiat <b>AMBRA 20 W/40</b> above 0 °C	11.7	10.5	20 <sup>1</sup> / <sub>2</sub>	15.6 <sup>(4)</sup>	14 <sup>(4)</sup>	27 <sup>1</sup> / <sub>2</sub>	Multigrade detergent mineral oil, MIL-L-2104B EP characteristics	
Sump and filter oil		11.2	10.1	19 <sup>3</sup> / <sub>4</sub>	13.4 <sup>(4)</sup>	12.1 <sup>(4)</sup>	23 <sup>1</sup> / <sub>2</sub>		
Sump oil	oliofiat <b>AMBRA 10 W/30</b> below 0 °C	10.6	9.5	18 <sup>1</sup> / <sub>2</sub>	12.8 <sup>(4)</sup>	11.5 <sup>(4)</sup>	22 <sup>1</sup> / <sub>2</sub>		
Air cleaner <sup>(1)</sup>		.78	.70	1 <sup>1</sup> / <sub>2</sub>	1.9	1.7	3 <sup>1</sup> / <sub>2</sub>		
Power steering fluid		1.7	1.5	3	1.7	1.5	3		
Transmission oil		11.4	10.3	19 <sup>3</sup> / <sub>4</sub>	12.5	11.3	22		
Steering oil		.39	.35	<sup>3</sup> / <sub>4</sub>	—	—	—		
Live front axle oil	oliofiat <b>AMBRA 20 W/40</b>								
— Axle casing		4.7	4.2	8 <sup>1</sup> / <sub>4</sub>	6	5.4	10 <sup>1</sup> / <sub>2</sub>		
— Final drives (each)		1.5	1.35	2 <sup>1</sup> / <sub>2</sub>	1.7	1.5	3		
Rear transmission (bevel drive, final drives, brakes) and lift oil	oliofiat <b>AF 87 S</b>	32.2	29 <sup>(2)</sup>	Gall 7	36.1	32.5 <sup>(2)</sup>	Gall 8		Mineral gear oil with stick-slip inhibiting properties to MF1135 and FORD M2C86A
Brake fluid	oliofiat <b>AGERTER 10 W</b>	.7	.65	1 <sup>1</sup> / <sub>4</sub>	.7	.65	1 <sup>1</sup> / <sub>4</sub>		Single grade oil, MIL-L-2104C, API CD Serie 3
Front hub grease	grassofiat <b>MR 3</b>	—	—	—	—	—	—		Lithium based grease NLGI No. 3
Clutch withdrawal support and flywheel bearing grease	grassofiat <b>G 9</b>	—	—	—	—	—	—	Lithium-calcium based grease, NLGI No. 2	
Lubricator grease		—	—	—	—	—	—		
Coolant <sup>(3)</sup> (water and FIAT <b>PARAFLU 11</b> , see page 2, Section 106)								{ 780 13 Litres ( 2 <sup>3</sup> / <sub>4</sub> Gall) 880 18 Litres ( 4 Gall)	
Fuel (diesel oil)								{ 780 80 Litres (17 <sup>1</sup> / <sub>2</sub> Gall) 880 116 Litres (25 <sup>1</sup> / <sub>2</sub> Gall)	

(1) Change cleaner oil when sediment is 10 mm or <sup>1</sup>/<sub>2</sub> in deep(2) On 780 DT oil capacity is 32.8 litres or 29.5 kg (7<sup>1</sup>/<sub>4</sub> Gall.) and on 880 DT oil capacity is 36.7 litres or 33 kg (8 Gall.).

(3) Including expansion tank

(4) Applicable to 880. For 880 DT reduce by 1.67 litres or 1.5 kg (3 pints)

**ENGINE BLOCK - CYLINDER HEAD**

	780-780 DT		880-880 DT	
	mm	in	mm	in
<b>Engine Block</b>				
Cylinder bore diameter in engine block	106.890 to 106.940	4.2083 to 4.2102	118.000 to 118.035	4.6457 to 4.6470
Liner O.D.	107.020 to 107.050	4.2127 to 4.2145	117.920 to 117.970	4.6425 to 4.6445
Liner fit in block				
— 780 (interference)	.080 to .160	.0031 to .0062	—	—
— 880 (clearance)	—	—	.030 to .115	.0012 to .0045
Liner diameter oversize	.2	.008	—	—
Liner bore diameter	103.000 to 103.018 <sup>(1)</sup>	4.0551 to 4.0558 <sup>(1)</sup>	110.000 to 110.022	4.3307 to 4.3316
Maximum ovality and taper due to wear <sup>(2)</sup>	.12	.0047	.15	.006
Liner bore undersize	.2-.4-.6-.8	.008-.016-.024-.032	.6	.024
Liner protrusion	—	—	.15 to .18	.006 to .007
Maximum liner misalignment	—	—	.03	.0012
Liner protrusion shim thickness	—	—	.05-.075-.10	.002-.003-.004
Housing bore diameter				
— Camshaft bushes, 780				
- Front	54.780 to 54.805	2.1567 to 2.1577	—	—
- Intermediate	54.280 to 54.305	2.1370 to 2.1380	—	—
- Rear	53.780 to 53.805	2.1173 to 2.1183	—	—
— Camshaft journals, 880	—	—	49.555 to 49.590	1.9510 to 1.9524
Tappet housing bore diameter	15.000 to 15.018	.5905 to .5912	27.000 to 27.033	1.0630 to 1.0643
Tappet oversize	.1-.2-.3	.004-.008-.012	.2-.4	.008-.016
Main bearing housing bore diameter	80.587 to 80.607	3.1727 to 3.1735	80.626 to 80.646	3.1742 to 3.1750
<b>Cylinder Head</b>				
Valve guide housing bore diameter in head	13.966 to 13.983	.5498 to .5505	14.000 to 14.018	.5512 to .5519
Valve guide oversize	.2	.008	.08	.003
Valve seat dimensions		See page 3, Section 101		
Valve depth below head face	.7 to 1.1	.0275 to .0433	.1 to .5	.004 to .020
— Maximum depth allowed	1.4	.055	.7	.028
Injector protrusion from head face	1 to 1.5	.040 to .059	3.3 to 3.9	.130 to .153
— Maximum protrusion allowed	2.8	.110	4.2	.165
Cylinder head height	92	3.622	99.80 to 100.20	3.929 to 3.945
Maximum head skimming depth	.5	.020	.5	.020

<sup>(1)</sup> After reaming in position. Liners may be finished to .1 mm or .004 in oversize in production, in which case they are matched to corresponding oversize pistons

<sup>(2)</sup> Measurement to be carried out over the swept area both parallel and at right angles to engine centreline

# ENGINE:

## Specification and Data

### CRANK GEAR

	780-780 DT		880-880 DT	
	mm	in	mm	in
<b>Crankshaft - Bearings</b>				
Main journal diameter	76.187 to 76.200 <sup>(1)</sup>	2.9995 to 3.0000 <sup>(1)</sup>	76.202 to 76.220 <sup>(1)</sup>	3.0001 to 3.0008 <sup>(1)</sup>
Main journal undersize	.254-.508-.762-1.016 mm (.010-.020-.030-.040 in)			
Main bearing wall thickness	2.162 to 2.172	.0851 to .0855	2.172 to 2.178	.0855 to .0857
Main bearing undersize	.254-.508-.762-1.016 mm (.010-.020-.030-.040 in)			
Main journal clearance in bearings	.043 to .096	.0017 to .0038	.050 to .100	.002 to .004
— Maximum wear clearance	.180 mm (.0071 in)			
Crankpin diameter	58.730 to 58.743 <sup>(1)</sup>	2.3122 to 2.3127 <sup>(1)</sup>	69.860 to 69.878	2.7504 to 2.7511
Crankpin undersize	.254-.508-.762-1.016 mm (.010-.020-.030-.040 in)			
Big end bearing wall thickness	1.805 to 1.815	.0710 to .0714	1.886 to 1.892	.0742 to .0745
Big end bearing undersize	.254-.508-.762-1.016 mm (.010-.020-.030-.040 in)			
Crankpin clearance in big end bearing	.035 to .080	.0014 to .0031	.058 to .103	.0023 to .0040
— Maximum wear clearance	.180 mm (.0071 in)			
Crankshaft thrust washer thickness	3.378 to 3.429	.1330 to .1350	2.310 to 2.360	.0909 to .0929
Thrust washer oversize	.127	.005	.254-.508	.010-.020
Width of main bearing housing over thrust washers	31.766 to 31.918	1.2506 to 1.2566	49.780 to 49.930	1.9598 to 1.9657
Length of corresponding main journal	32.000 to 32.100	1.2598 to 1.2638	50.000 to 50.050	1.9685 to 1.9704
Crankshaft end float	.082 to .334	.0032 to .0131	.070 to .270	.0027 to .0106
— Maximum wear over float	.40 mm (.016 in)			
Maximum main journal and crankpin ovality or taper after grinding	.01	.0004	.005	.0002
Maximum main journal and crankpin ovality or taper due to wear	.05	.0020	.05	.0020
Maximum main journal misalignment with crankshaft resting on end journals	.10	.0040	.10	.0040
Maximum crankpin misalignment relative to main journals (in either direction)	.25	.0100	.25	.0100
Maximum tolerance on distance from outer crankpin edge to crankshaft centreline	± .10	± .0040	± .10	± .0040

<sup>(1)</sup> .1 mm undersize crankpin and main journal crankshafts may be fitted in production coupled to corresponding undersize bearings.

**CRANK GEAR**

Continued

	780-780 DT		880-880 DT	
	mm	in	mm	in
Maximum crankshaft flange run-out with stylus in A, page 2, section 103, over:				
— 780 - 108 mm (4.25 in) diameter, T.I.R.	.02	.0008	—	—
— 880 - 149 mm (5.87 in) diameter, T.I.R.	—	—	.025	.0010
Maximum flywheel seat eccentricity relative to main journals (see B, page 2, section 103), T.I.R.	.04	.0016	.03	.0012
<b>Connecting Rods</b>				
Small end bore diameter				
— AM	—	—	44.000 to 44.025 (°)	1.7323 to 1.7333
— PM	37.877 to 37.916	1.4912 to 1.4928	43.946 to 43.971 (*)	1.7302 to 1.7311
Small end bushing ID				
— AM	—	—	44.078 to 44.117 (°)	1.7354 to 1.7369
— PM	37.979 to 38.017	1.4952 to 1.4967	44.069 to 44.120 (*)	1.7350 to 1.7370
Bushing interference fit in small end				
— AM	—	—	.053 to .177 (°)	.0021 to .0070
— PM	.063 to .140	.0025 to .0055	.098 to .174 (*)	.0039 to .0069
Small end bushing fitted ID	34.005 to 34.012	1.3388 to 1.3391	40.025 to 40.035	1.5758 to 1.5762
Big end bore diameter	62.408 to 62.420	2.4570 to 2.4575	73.720 to 73.735	2.9024 to 2.9029
Maximum connecting rod axis misalignment at 125 mm (5 in)	± .07	± .0027	± .07	± .0027
Maximum connecting rod weight difference over a complete set of the same engine	25 grams ( <sup>5</sup> / <sub>16</sub> oz)		15 grams ( <sup>1</sup> / <sub>2</sub> oz)	
<b>Pistons</b>				
Piston diameter				
— 780 - 50 mm (2 in) from base of skirt, at right angles to pin	102.813 to 102.825	4.0477 to 4.0482	—	—
— 880 - 30 mm (1.18 in) from base of skirt, at right angles to pin	—	—	109.855 to 109.875	4.3250 to 4.3258
Piston clearance in liner	.175 to .205	.0069 to .0081	.125 to .167	.0049 to .0066
— Maximum wear clearance	.30	.012	.30	.012
Piston oversize range	.2-.4-.6-.8	.008-.016-.024-.032	.6	.024

(°) Mod. 880, up to engine No. 003108  
(\*) Mod. 880, from engine No. 003109

# ENGINE:

## Specification and Data

### CRANK GEAR

*Continued*

	780-780 DT		880-880 DT	
	mm	in	mm	in
Piston pin diameter	33.983 to 33.990	1.3379 to 1.3382	40.000 to 40.006	1.5748 to 1.5750
Piston pin housing bore in piston	33.993 to 34.000	1.3383 to 1.3386	40.006 to 40.012	1.5750 to 1.5753
Piston pin clearance in piston	.003 to .017	.0061 to .0007	.000 to .012	.0000 to .0005
Piston pin oversize	.2-5	.008-.020	.2	.008
Piston pin clearance in small end bush	.015 to .029	.0006 to .0011	.019 to .035	.0007 to .0014
— Maximum wear clearance	.06	.0024	.10	.004
Maximum weight difference over a complete set of pistons	20 grams (2/3 oz)		15 grams (1/2 oz)	
Piston ring clearance in groove				
— Top	.090 to .122	.0035 to .0048	.055 to .082	.0022 to .0032
— 2nd	.050 to .082	.0020 to .0032	.055 to .082	.0022 to .0032
— 3rd	.040 to .072	.0016 to .0028	.045 to .072	.0018 to .0028
— Bottom	—	—	.045 to .072	.0018 to .0028
Maximum wear clearance				
— Top (780), top and 2nd (880)	.50	.020	.30	.012
— 2nd and 3rd (780), 3rd and bottom (880)	.20	.008	.20	.008
Piston ring gap				
— Top	.35 to .55	.0138 to .0216	.40 to .60	.0160 to .0240
— 2nd	.30 to .50	.0120 to .0200	.40 to .60	.0160 to .0240
— 3rd	.30 to .45	.0120 to .0180	.40 to .60	.0160 to .0240
— Bottom	—	—	.30 to .45	.0120 to .0180
Maximum wear gap	1.20	.0472	1.20	.0472

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