Challenger®

MT265B / MT275B
Compact Tractor

SERVICE MANUAL
79028571 A Rev.

CONTENTS

Part Number 79028571 A Rev. (English)

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Challenger®

MT265B / MT275B
Compact Tractor

SERVICE MANUAL
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01 - General Information

Contents

NOTES

GENERAL

INTRODUCTION

This service manual has been prepared with the latest service information available at the time of publication. Read the service manual carefully before doing any service on the machine. This manual is one of the most important tools available to the service technician.

Right-hand and left-hand, as used in this manual, is determined by facing the direction the machine will travel when in use.

The photos, illustrations, and data used in this manual were current at the time of printing, but due to possible production changes, your machine can vary slightly. The Manufacturer reserves the right to redesign and change the machine as necessary without notification.

WARNING: Some pictures in this manual show the machine with shields or guards removed to allow for a better view of the subject of the picture. All shields and guards must be in position before operating the machine.

TO THE DEALERS

This manual was developed to provide the best possible information, technical support and service to the customer. Review the Table of Contents and basic layout to become familiar with locations of pertinent information such as maintenance table, specifications and etc.

REPLACEMENT PARTS

To receive efficient service, always remember to give the dealer the following information:

- Correct part description or part number.
- Model number of your machine.
- Serial number of your machine.

UNITS OF MEASUREMENT

Measurements are given in metric units followed by the equivalent in US units. Hardware sizes are given in millimeters for metric hardware and inches for U.S. hardware.

TABLE OF CONTENTS

A Table of Contents is in the front of this manual. The Table of Contents shows the divisions. The individual divisions also have a Table of Contents.

PAGE NUMBERS

All page numbers are made of two numbers separated by a dash, such as 01-25. The number before the dash is the division number. The number following the dash is the page number in that division. Page numbers will be at the lower right or left of each page.

TRACTOR IDENTIFICATION

Model/Serial Numbers

FIG. 1: Chassis number (1) is stamped in right side of front frame.

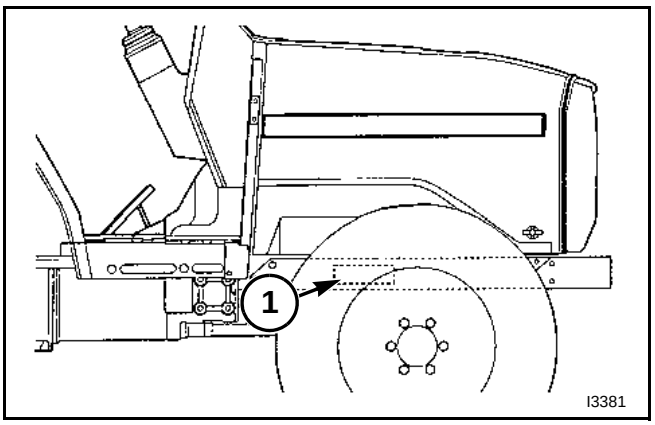


FIG. 1

FIG. 2: Engine model number (1) is cast on right side of engine block, below the injection pump.

Engine serial number (2) is stamped into cylinder block, below engine model number.

Engine Serial Number

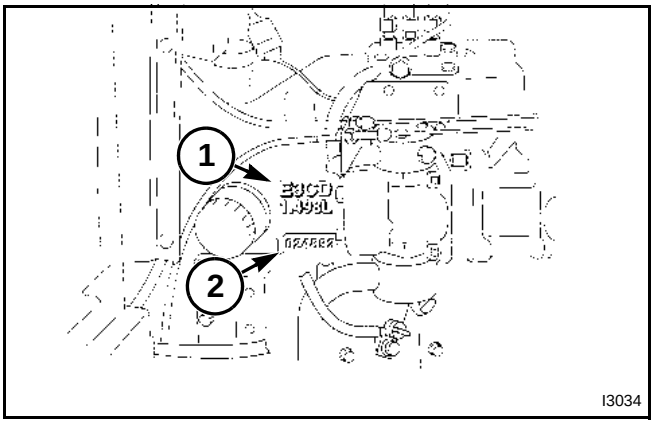


FIG. 2

FIG. 3: The tractor identification plate (1) is located below the operator's seat.

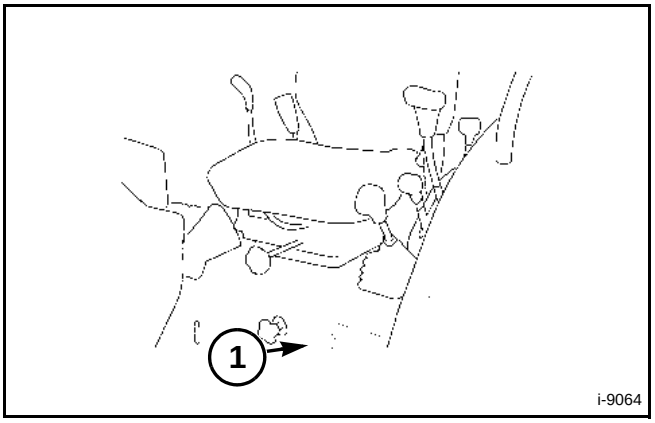


FIG. 3

FIGS. 4–6: The identification plate contains model number and tractor serial number.

FIG. 4

FIG. 5

FIG. 6

NOTES

SPECIFICATIONS AND CAPACITIES

GENERAL DIMENSIONS

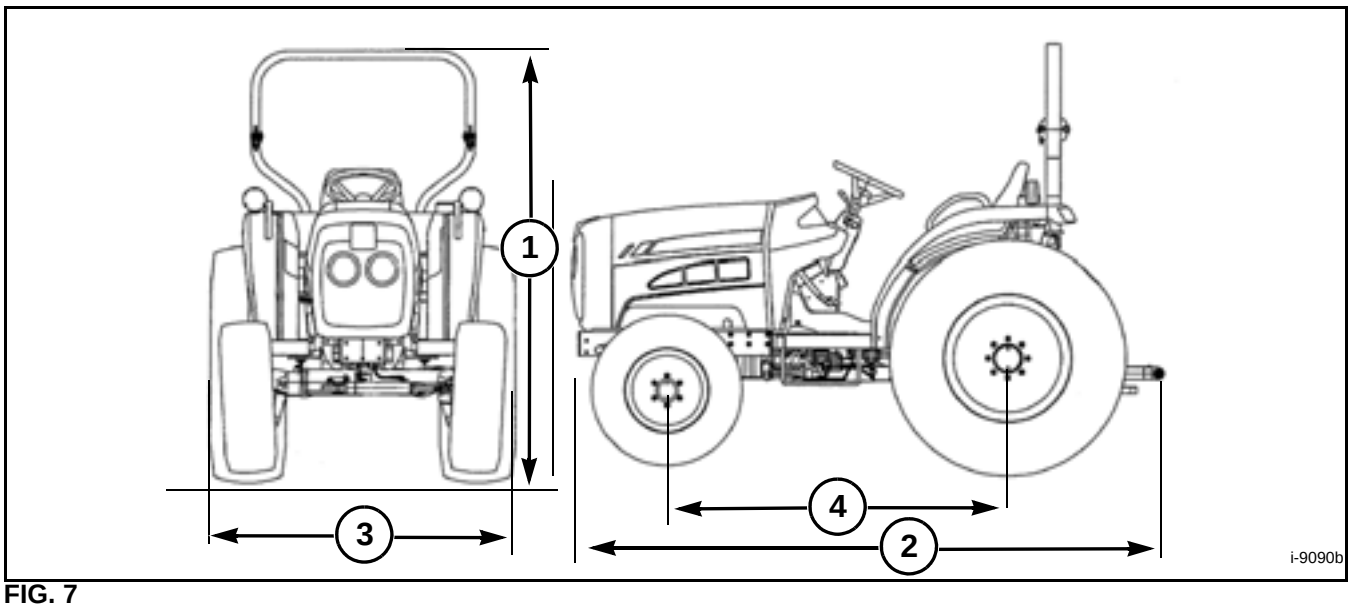


FIG. 7

FIG. 7: Non Cab Tractor Dimensions.

General Dimensions

Overall Height (1) ..... 2209 mm (87 in)
Overall Length (2) ..... 3070 mm (121 in)
Minimum Width (3)
- (Ag Tires) ..... 1680 mm (66.1 in)
- (Turf Tires) ..... 1549 mm (61 in)

Wheelbase (4)
- 33 Horsepower ..... 1770 mm (70 in)
- 40 Horsepower ..... 1770 mm (70 in)

Ground Clearance (Ag Tires) ..... 360 mm (14 in)
Front Wheel Tread
- 2WD ..... 1120 mm (44.1 in)
- 33 Horsepower 4WD ..... 1130 to 1271 mm (44 to 50 in)
- 40 Horsepower 4WD ..... 1130 to 1271 mm (44 to 50 in)

Turning Radius
- With Brake ..... 2500 mm (98 in)
- Without Brake ..... 3100 mm (122 in)

Weight
- 33 Horsepower (4wd) ..... 1375 kg (3031 lb)
- 40 Horsepower (4wd) ..... 1390 kg (3058 lb)

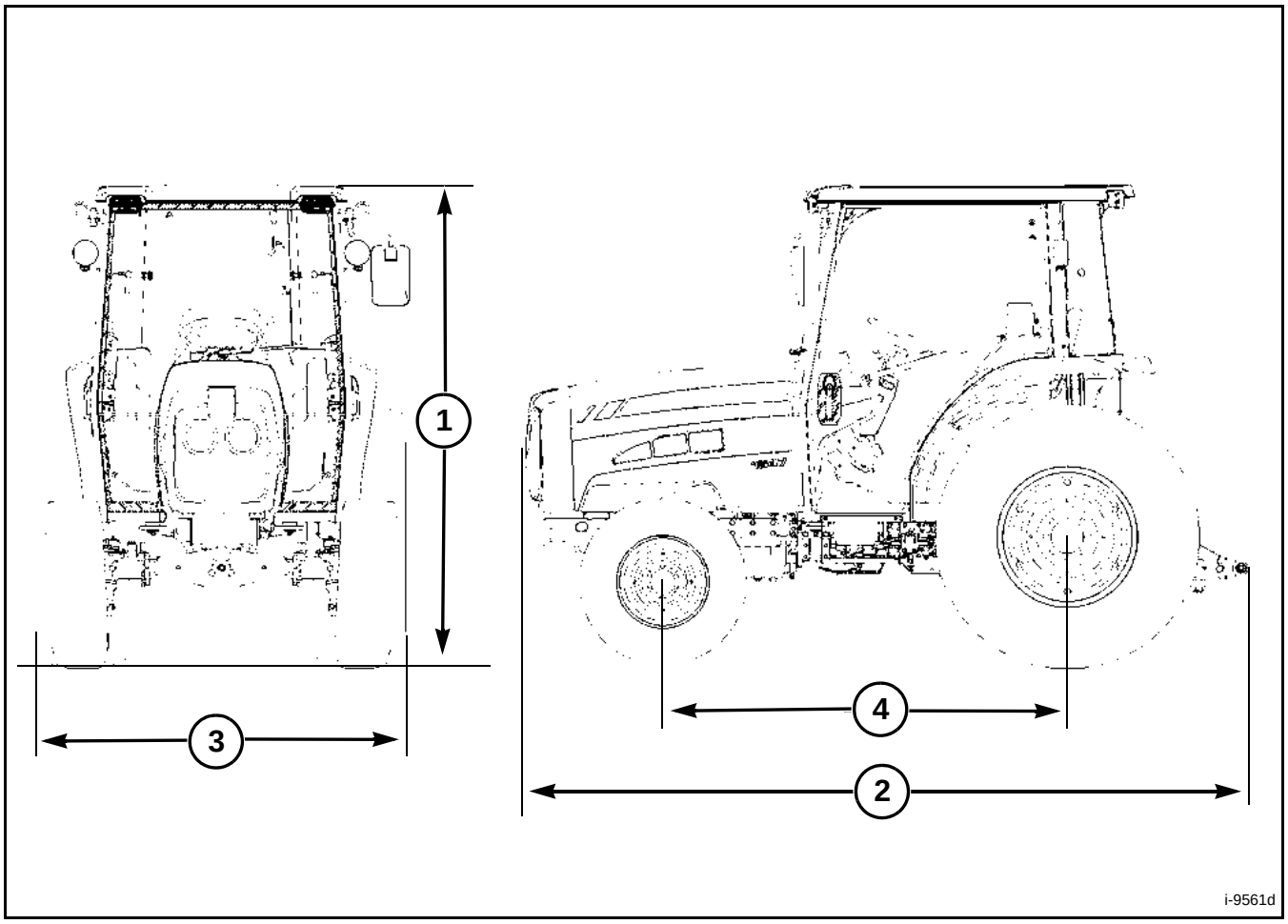


FIG. 8

FIG. 8: Cab Tractor General Dimensions.

Overall Height (1) (Ag Tires)	2220 mm (87.4 in)
Overall Length (2)	3070 mm (121 in)
Minimum Width (3)	
Ag Tires	1565 mm (62 in)
Turf Tires	1530 mm (60 in)
Wheelbase (4)	
33 Horsepower	1770 mm (70 in)
40 Horsepower	1930 mm (76 in)
Ground Clearance (Ag Tires)	360 mm (14 in)
Weight	
33 Horsepower	1535 kg (3384 lb)
40 Horsepower	1823 kg (4023 lb)
Front Wheel Tread	1130 to 1271 mm (44 to 50 in)
Rear Wheel Tread	1190 to 1495 mm (47 to 59 in)
Turning Radius With Brake	2500 mm (98 in)

Engine Oil

Use the appropriate SAE viscosity. Oil must meet or exceed MIL-L-46152 requirements, API Service CC.

Capacity (Crankcase and Filter)..... 4.7 liters (5.0 US qt)

25 degrees C (78 degrees F)..... SAE 30W, 1OW-30

Below 0 degrees C (32 degrees F)..... SAE 20W, 1OW-30

0 to 25 degrees C (32 to 78 degrees F)..... SAE 20W, 1OW-30

15W-40 may be used in ambient temperatures above -10 degrees C (14 degrees F).

Initial Oil and Filter Change..... 50 hours

Oil and Filter Change, Thereafter..... Every 100 hours

Engine Coolant

Freezing Protection (Original Factory Fill)..... -34 degrees C (-30 degrees F)

Recommended Coolant..... 50/50 mixture ethylene glycol and water

System Capacity..... 7.6 liters (8.0 US qt)

Fuel Tank

Capacity..... 50.0 liters (13.2 US gals)

Fuel Recommended, Above 4° C (39° F)..... No. 2 or No. 2-D

Fuel Recommended, Below 4° C (39° F)..... No. 1 or No. 1-D

Transmission & Differential Housing (Including Hydraulic System)

Capacity..... 31 liters (8.2 US gals)

Recommended Lubricant..... Permatran III or 821XL

Recommended Change Interval..... First 50 hours, every 300 hours thereafter

Front Axle (4 WD)

Capacity (Common Reservoir)..... 7.5 liters (1.9 US gals)

Recommended Lubricant..... Permatran III or 821XL

Recommended Change Interval..... First 50 hours, every 300 hours thereafter

Grease Fittings

Grease Interval (All Fittings)..... Every 50 hours

Recommended Grease..... Lithium multi-purpose grease EP2

NOTE: Change intervals stated above are for normal usage. Due to adverse operating conditions, that may be experienced (extremely dusty or muddy), change intervals may need to be more frequent.

Engine

Make ..... Iseki Diesel

Model

- 33 Horsepower E3CD
- 40 Horsepower E3CDT

Type ..... Indirect injection, overhead valve

Aspiration ..... Natural

Displacement

- 33 Horsepower ..... 2197 cu cm (134.05 cu in)
- 40 Horsepower ..... 2955 cu cm (180.29 cu in)

Number of Cylinders 3

Bore

- 33 Horsepower ..... 84 mm (3.30 in)
- 40 Horsepower ..... 84 mm (3.30 in)

Stroke

- 33 Horsepower ..... 92.4 mm (3.64 in)
- 40 Horsepower ..... 100 mm (3.94 in)

Engine Horsepower (Gross)

- 33 Horsepower @ 2600 rpm ..... 35.4 kw (47.5 hp)
- 40 Horsepower @ 2500 rpm ..... 38.9 kw (52.1 hp)

PTO Horsepower (Estimate)

- Power Shuttle / Electronic Transmissions
  - 33 Horsepower @ 568 PTO rpm ..... 19.4 kw (26.0 hp)
  - 40 Horsepower @ 568 PTO rpm ..... 23.1 kw (31.0 hp)

PTO Horsepower (Estimate)

- Hydrostatic Transmission
- 33 Horsepower @ 568 PTO rpm ..... 18.3 kw (24.5 hp)

Firing Order 1-3-2

Compression

- 33 Horsepower 21.7-1
- 40 Horsepower 21.7-1

Low Idle Speed

- 33 Horsepower ..... 980 to 1020 rpm
- 40 Horsepower ..... 980 to 1020 rpm

Valve Clearance (Cold) - Intake ..... 0.35 mm (.014 in)

Air Cleaner ..... Dual stage, dry element

Engine Cooling ..... Liquid, forced circulation

Cold Starting Aid ..... Glow plugs (4)

Transmission

Type

- Primary
  - Power Shuttle ..... 4-speed sycnhronized
  - Synchroshuttle ..... 4-speed constant mesh
- Range
  - Power Shuttle and Electronic ..... 3-speed sliding mesh
  - Synchroshuttle ..... 2-speed constant mesh
- Mechanical Shuttle ..... Elector-Hydraulic control with multi plates, wet disc, 95% reverse reduction

Gear Speeds

- All Synchroshuttle ..... 8 gears forward, 8 reverse
- All Powershuttle ..... 12 gears forward, 12 reverse

Clutch ..... 240 mm (9.4 in)

Front Wheel Drive Ratio 1.61184

Hydrostatic

Primary ..... Infinite

Range ..... 3-speed sliding mesh

Gear and Motor Speeds ..... 3 forward, 3 reverse

Clutch ..... None

Power Take Off (PTO)

Type ..... Independent, engine driven

Clutch ..... Hydraulically engaged, multi-plate wet disc

Rear PTO Shaft

- Output ..... Clockwise rotation
- Engine Speed @ 540 PTO rpm ..... 2430 rpm

Rear PTO; Six Spline Shaft Diameter ..... 35 mm (1.375 in)

Engine Speed @ 540 PTO rpm ..... 2430 rpm

Mid-PTO Shaft (Option)

- Shaft Size (15 Spline) ..... 25.4 mm (1.00 in)
- Output ..... Clockwise rotation
- Mid-PTO Speed @ 2600 Engine rpm ..... 1916 rpm

Specifications And Capacities

Hydraulics

Steering System

- Type ..... Hydrostatic
- Pump ..... Separate engine-mounted gear pump
- Maximum Output
  - 33 Horsepower Synchroshuttle and Hydrostatic ..... 18.5 lpm (4.9 US gpm)
  - 40 Horsepower Powershuttle ..... 22.7 lpm (6.0 US gpm)
- Pressure Relief Valve Setting ..... 7848 kPa (1138 psi)

Main Hydraulic System

- Pump ..... Engine-mounted
- Maximum Output
  - 33 Horsepower ..... 34.4 lpm (9.1 US gpm)
  - 40 Horsepower ..... 34.4 lpm (9.1 US gpm)
- Pressure Relief Valve Setting ..... 15,692 kPa (2276 psi)

Rear Linkage

- Type ..... Three-point hitch
- Size ..... Category I
- Lift Capacity Measured at Ball Ends ..... 1270 kg (2800 lb)
- Measured at 24 Inches ..... 1150 kg (2535 lb)

Electrical System

System Voltage ..... 12 volt, negative (-) ground

Battery cca @18° C (0° F) 630

Charging

- Non Cab ..... 40 amp alternator with internal regulator/rectifier
- Cab ..... 40 amp alternator with internal regulator/rectifier

Capacities

Engine Crankcase with Filter ..... 4.7 liters (5.0 US qts)

Transmission ..... 31.0 liters (8.2 US gals)

Fuel Tank ..... 40.0 liters (10.6 US gals)

Cooling System ..... 6.7 liters (7.1 US qt)

Front Drive Axle (4WD only) ..... 7.5 liters (7.9 US qt)

Maximum Axle Loading

Front Axle Capacity 1540 4WD ..... 1800 kg (3968 lb)

Rear Axle Capacity 1540 4WD ..... 1800 kg (3968 lb)

Total Capacity 1540 4WD ..... 3000 kg (6614 lb)

LUBRICATION / FILL POINTS

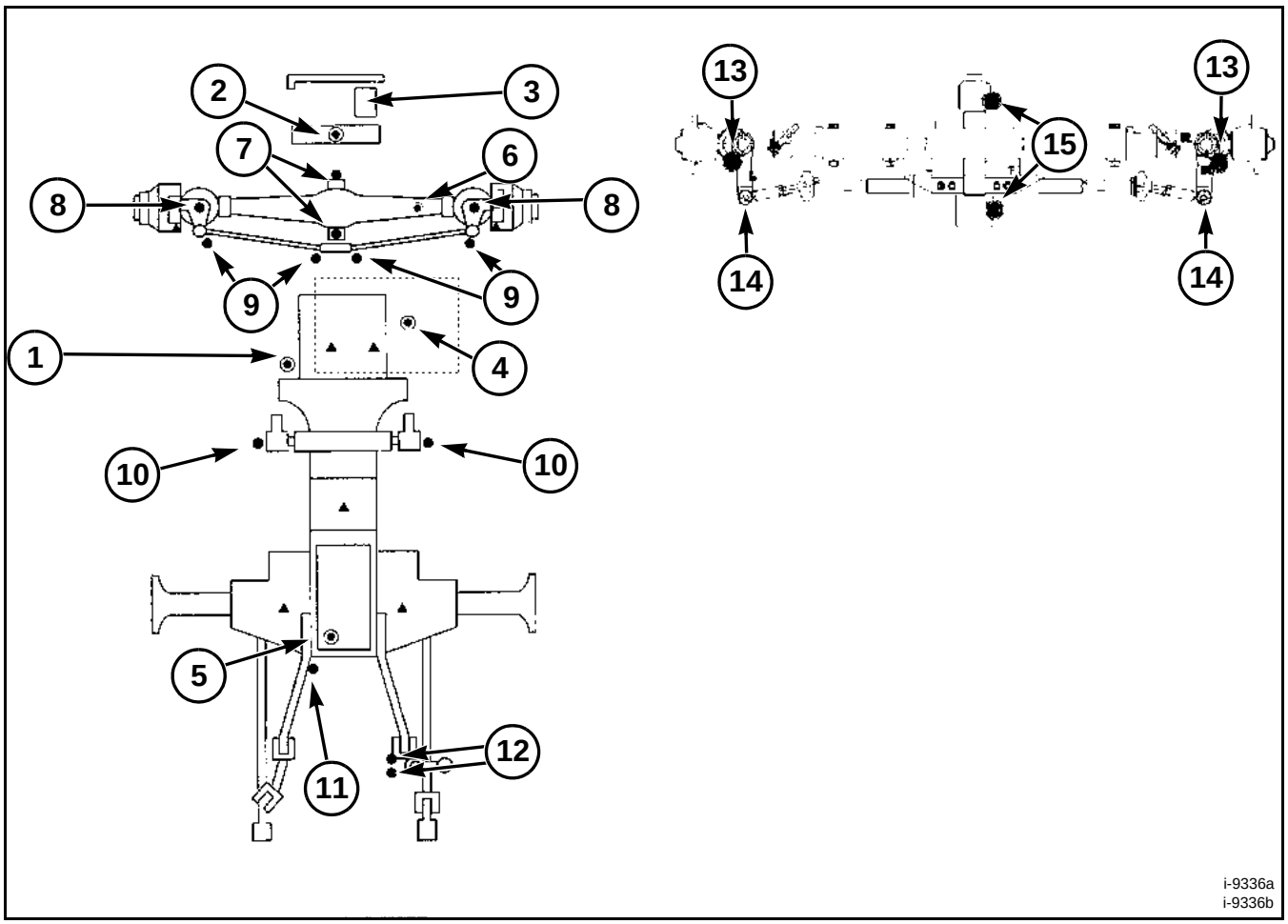


FIG. 9

FIG. 9: General layout of lubrication, fill and drain locations on Tractor:

Ref	Description	Type
1	Crankcase	Engine Oil
2	Engine Radiator	Coolant
3	Radiator Overflow Reservoir	Coolant
4	Fuel Tank	Diesel Fuel
5	Rear Housing	Hydraulic Oil
6	4WD Axle	Hydraulic Oil
7	Axle Pivots (4WD)	Grease
8	Front Spindles (4WD)	Grease
9	Tie Rod Ends (4WD)	Grease
10	Brake Pivots	Grease
11	Assist Cylinder	Grease
12	Leveling Crank	Grease
13	Front Spindles (4WD)	Grease
14	Tie Rod Ends (2WD)	Grease
15	Axle Pivots (2WD)	Grease

PERIODIC INSPECTION AND MAINTENANCE CHART

Daily	50 hr	150 hr	300 hr	Yearly	Maintenance Point(s)	Maintenance Required
•					All controls and switches	Inspect and repair
•					All fasteners and hardware	Check and tighten
•					Hoses, fan belt, and wiring	Inspect and repair
	•				Grease fittings	Lubricate
•					Engine oil level	Check and replenish
	(*)	•			Engine oil and filter	Replace
•					Transmission oil level	Check and replenish
	(*)		•		Transmission oil and filter	Replace and clean
		•			Front axle oil level (4WD)	Check and replenish
	(*)		•		Front axle oil (4WD)	Replace
•					Air screens	Clean of debris
•					Radiator screens	Clean of debris
•					Radiator coolant level	Check and replenish
				•	Radiator coolant	Drain, flush and replace
•					Fan belt tension	Check and adjust
•					Air cleaner	Clean
	•				Air cleaner elements	Inspect, clean or replace
•					Fuel tank level	Fill
•					Fuel filter sediment bowl	Inspect and clean
			•		Fuel filter element	Replace and bleed

Items marked (*) indicate initial service interval only. Subsequent (later) intervals marked "•". Intervals above are for normal usage. Severe operating conditions (wet, dusty, etc.), or when previous servicing has indicated need for more frequent action, intervals may need to be more often.

Daily	50 hr	150 hr	300 hr	Yearly	Maintenance Point(s)	Maintenance Required
	•				Battery and cables	Check, clean and tighten
	•				Battery charge indicator	Check
•					Lights and flashers	Check and repair
•					Clutch pedal free-play	Check and adjust
•					Brake adjustment and balance	Check and adjust
•					Tire pressure and condition	Check and adjust
•					Wheel bolt torque	Check and tighten
			•		Front wheel alignment	Check and adjust
•					Steering free-play	Check and repair
			•		Front axle end-float (4WD)	Check and adjust
		•		•	Clutch housing plug	Inspect

Items marked (*) indicate initial service interval only. Subsequent (later) intervals marked "•". Intervals above are for normal usage. Severe operating conditions (wet, dusty, etc.), or when previous servicing has indicated need for more frequent action, intervals may need to be more often.

NOTES

PRECAUTIONS FOR DISASSEMBLY

GENERAL PRECAUTIONS FOR DISASSEMBLY AND INSTALLATION

Before Operation

Always be safety conscious in selecting clothes to wear and suitable tools to use.

Before disassembly, be sure that you familiarize yourself with the assembled condition for subsequent reference in assembly.

Keep parts, and tools in proper order during operations.

When servicing electrically charged parts, be sure to disconnect the negative battery terminal.

To prevent oil or water leaks, use the liquid gasket as required.

When assembling disassembled parts, discard used gaskets, O-rings, or oil seals and install new ones.

When lifting tip only the front or rear part of the tractor, be sure to wedge the grounded wheels.

When the tractor is jacked up, be sure to support the entire tractor with a stand. Lifting it up with jack only is a dangerously unstable procedure.

When replacing parts, use authorized genuine Massey Ferguson, AGCO and Challenger parts only. Massey Ferguson, AGCO and Challenger assumes no responsibility for accidents, operating problems or damage caused by the use of imitation parts. Also, the use of unauthorized parts will result in relatively poor machine performance.

Precautions To Be Followed When Installing Standardized Parts

Roller or ball bearings

When a bearing is installed in a housing by the outer race, use an installer, which is specially designed to push only the outer race and vice versa.

The installer must be designed to install the bearing on the shaft in a parallel position

When installing a bearing which appears the same on both sides, install it so that the face which has the identification number faces in a direction for easy visual identification. All bearings which are to be installed in the transmission case should be placed so that their identification number faces outward.

If a shaft or a hole where a bearing is to be installed has an inner seat the bearing should be pushed in completely until it is seated.

Bearings should turn smoothly.

Oil seals

Oil seal installer should not deform the oil seals.

During installation, be careful not to damage the lips, and assure that it is pushed in parallel to the shaft or hole.

When oil seals are installed, there should be no turnover of the lips nor dislocation of the springs.

When a multi-lip seal is installed, the grooves between lips should be filled with grease.

Use a lithium-based grease.

There should not be oil or water leaks past the new seals.

O-rings

O-rings should be coated with grease before installing.

Installed O-rings should have no slack or twist.

Installed O-rings should maintain proper tightness.

Snap rings

FIG. 10: Snap ring installers should be designed so as not to permanently deform the snap rings (1).

Installed snap rings should be seated securely in the groove.

Be careful not to overload the snap ring to the extent that it is permanently deformed.

How to install the snap ring:

When installing a snap ring, install it as shown in the figure with its round edge turned toward the part to be retained. This round edge is formed when the snap ring is pressed out.

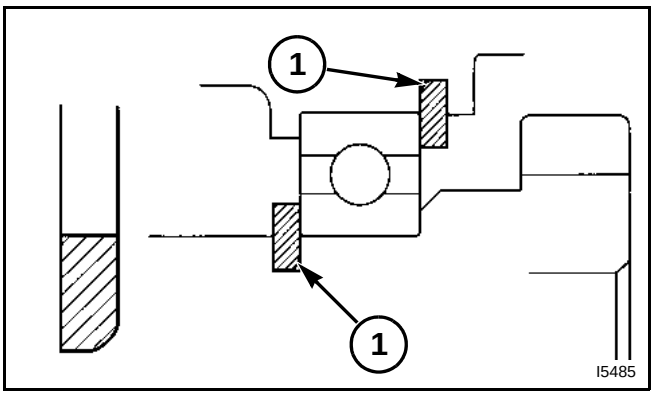


FIG. 10

Spring (roll) pin

FIG. 11: Spring pins should fit tightly.

Spring pins should be installed so that their seams face the direction from which the load is applied.

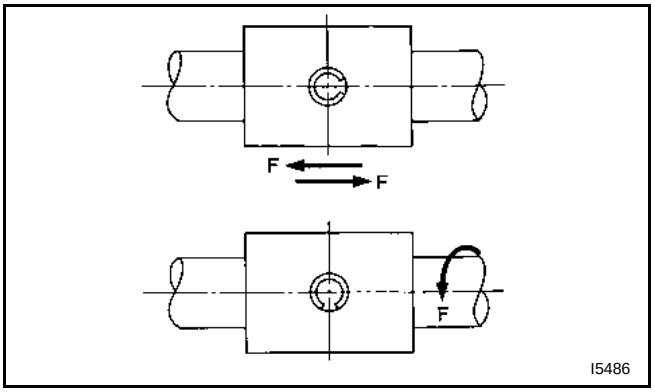


FIG. 11

Cotter pins

FIG. 12: When installed, cotter pins should be bent securely at the ends as shown in the figure.

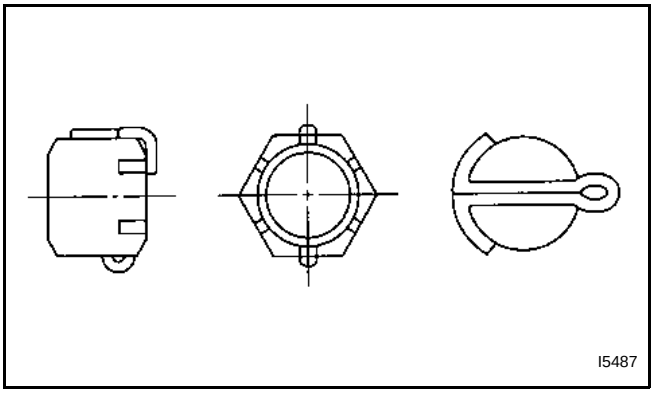


FIG. 12

Bolts and Nuts

Special bolts are installed at several locations, so be sure not to interchange them with other bolts.

Bolts and nuts should be tightened to their specified torque using a torque wrench.

When locking the bolts or nuts with wire pay particular attention to winding direction. To hold the bolt tight.

When locking the bolts or nuts with a tab lock washer. Bend the tab against the hex, to provide secure locking.

When locking bolts and nuts with an adhesive apply the adhesive on the thread and tighten securely.

Apply a sealant to parts which have any possibility of oil leaks, such as stud bolts and threaded holes.

Each lock nut must be tightened securely.

When tightening bolts and nuts, refer to the tightening torque table in introduction section.

Grease Fittings

After installation, each grease fitting should be filled with grease.

When installing 45 degree or 90 degree grease fittings be sure to turn the fitting in a direction that will provide easy access for a grease gun.

Other Precautions

Be sure not to damage any finished surfaces or parts.

Always refrain from forcing installation.

Each lever knob should be installed coated with an adhesive.

Each contact surface should be coated with an adhesive and tightened evenly with bolts. Adhesive coated surfaces should be installed within 30 minutes after application of the adhesive.

The contact surfaces should be flawless and free from foreign matter. Ensure all grease is removed prior to application of the adhesive.

Precautions for applying adhesives:

- The surface or the thread where an adhesive is to be applied should be completely free of chips.
- The surface of the thread where an adhesive is to be applied should be completely free of oils.

NOTES

STANDARD TORQUE CHART

STANDARD TORQUE CHART

TORQUE CHART FOR METRIC FASTENERS (ZINC COATED)						
Nominal Size in mm	Strength Class- ISO 4.6 (4T)		Strength Class- ISO 8.8 (7T)		Strength Class- ISO 10.9 (9T)	
	Torque Nm (lbf ft)		Torque Nm (lbf ft)		Torque Nm (lbf ft)	
	Min.	Max.	Min.	Max.	Min.	Max.
M3	0.5 (0.3)	0.7 (0.5)	1.3 (0.9)	1.7 (1.3)	1.8 (1.3)	2.4 (1.8)
M4	1.2 (0.9)	1.6 (1.2)	3.1 (2.3)	4.1 (3.0)	4.3 (3.2)	5.7 (4.2)
M5	2.2 (1.6)	3.0 (2.2)	6.0 (4.4)	8.0 (5.9)	8.5 (6.3)	1.5 (8.5)
M6	4.0 (2.9)	5.0 (3.7)	10 (7.4)	14 (10.3)	14 (10.3)	20 (14.8)
M8	9.5 (7.0)	12.5 (9.2)	25 (18.4)	35 (26)	36 (26)	46 (34)
M10	19 (14)	25 (18)	50 (37)	70 (52)	72 (53)	96 (71)
M12	33 (24)	43 (32)	90 (66)	120 (89)	120 (89)	160 (118)
M16	84 (62)	110 (81)	200 (148)	260 (192)	300 (221)	40 (295)
M20	160 (118)	210 (155)	420 (310)	560 (413)	600 (443)	800 (590)
M24	280 (207)	360 (266)	720 (531)	860 (634)	1000 (738)	1300 (959)
M30	540 (398)	720 (531)	1400 (1033)	1800 (1328)	2100 (1549)	2800 (2065)
M36	950 (700)	1250 (922)	2500 (1844)	3300 (2434)	3600 (2655)	4800 (3540)

Standard Torque Chart

TORQUE CHART FOR INCH FASTENERS (ZINC COATED)						
Nominal Size	Strength Class- SAE 2 (plain head)		Strength Class- (SAE 5)		Strength Class- (SAE 8)	
	Torque Nm (lbf ft)		Torque Nm (lbf ft)		Torque Nm (lbf ft)	
	Min.	Max.	Min.	Max.	Min.	Max.
1/4	6.8 (5)	8.1 (6)	10.8 (8)	15 (11)	16.2 (12)	21.7 (16)
5/16	13.5 (10)	16.2 (12)	22 (16)	30 (22)	31 (23)	42 (31)
3/8	24 (18)	28 (21)	39 (29)	53 (39)	56 (41)	75 (55)
7/16	41 (30)	46 (34)	64 (47)	85 (63)	91 (67)	121 (89)
1/2	61 (45)	70 (52)	99 (73)	131(97)	140 (103)	185 (137)
5/8	122 (90)	142 (105)	198 (146)	263 (194)	279 (206)	371 (274)
3/4	217 (160)	250 (185)	350 (258)	464 (342)	495 (365)	658 (485)
7/8	-	-	569 (420)	759 (560)	800 (590)	1071 (790)
1	-	-	847 (625)	1119 (825)	1200 (885)	1580 (1165)
1-1/8	-	-	1051 (775)	1390 (1025)	1681 (1240)	2224 (1640)
1-1/4	-	-	1491 (1100)	1966 (1450)	2386 (1760)	3159 (2330)
1-1/2	-	-	2576 (1900)	3390 (2500)	4121 (3040)	5437 (4010)

NOTE: Torques are for rigid joints, or joints meeting the following conditions:

Damage will not occur to joined members of an assembly.

It is desirable to use a higher clamping force.

Fastener threads are NOT lubricated prior to assembly.

The following conditions will require a torque value different than stated above:

Reduced torque required; non-parallel clamping surfaces, thick or highly compressible gaskets are used, or when a higher torque may damage joined assemblies.

Clip nuts, weld nuts, self-tapping hardware, or any condition that causes reduced thread engagement will warrant a torque less than stated above.

Special torque values, stated in this manual, must be strictly adhered to as stated in the specific operation.

NOTE: A number of special torques are used in assembly of tractors. See list.

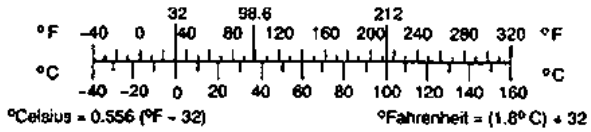
CONVERSION TABLE

CONVERSION TABLES

	MULTIPLY:	BY:	TO GET: MULTIPLY	BY:	TO GET:
LINEAR	inches	x 25.4	= millimeters (mm)	x 0.03937	= inches
	feet	x 0.3048	= meters (m)	x 3.281	= feet
	yards	x 0.9144	= meters (m)	x 1.0936	= yards
	miles	x 1.6093	= kilometers (km)	x 0.6214	= miles
	inches	x 2.54	= centimeters (cm)	x 0.3937	= inches
	microinches	x 0.0254	= intimaters (um)	x 39.37	= micrometers
AREA	$inches^2$	x 645.16	= $millimeters^2$ (mm^2)	x 0.00155	= $inches^2$
	$inches^2$	x 6.4516	= $centimeters^2$ (cm^2)	x 0.155	= $inches^2$
	$feet^2$	x 0.0929	= $meters^2$ (m^2)	x 10.764	= $feet^2$
	$yards^2$	x 0.8361	= $meters^2$ (m^2)	x 1.196	= $yards^2$
	acres	x 0.4047	= $hectometers^2$ (hm^2) = hectares (ha)	x 2.471	= acres
VOLUME	$inches^3$	x 16387	= $millimeters^3$ (mm^3)	x 0.000061	= $inches^3$
	$inches^3$	x 16.387	= $centimeters^3$ (cm^3)	x 0.06102	= $inches^3$
	$inches^3$	x 0.01639	= liters	x 61.024	= $inches^3$
	quarts	x 0.94635	= liters	x 1.0567	= quarts
	gallons	x 3.7854	= liters	x 0.2642	= gallons
	$feet^3$	x 28.317	= liters	x 0.03531	= $feet^3$
	$feet^3$	x 0.02832	= $meters^3$ (m^3)	x 35.315	= $feet^3$
	fluid oz.	x 29.57	= milliliters (ml)	x 0.03381	= fluid oz.
	$yards^3$	x 0.7646	= $meters^3$ (m^3)	x 1.3080	= $yards^3$
	teaspoons	x 4.929	= milliliters (ml)	x 0.2029	= teaspoons
	cups	x 0.2366	= liters	x 4.227	= cups
	bushel	x 35.239	= liters	x 0.02838	= bushels
	bushel	x 0.03524	= $meters^3$ (m^3)	x 28.378	= bushels
MASS	ounces (av)	x 28.35	= grams (g)	x 0.03527	= ounces (av)
	pounds (av)	x 0.4536	= kilograms (kg)	x 2.2046	= pounds (av)
	tons (2000 lbs)	x 907.18	= kilograms (kg)	x 0.001102	= tons (2000 lbs)
	tons (2000 lbs)	x 907.18	= metric tons (t)	x 1.1023	= tons (2000 lbs)
	tons (long) (2240 lbs)	x 1016.05	= kilograms (kg)	x .000984	= tons (long) (2240 lbs)
FORCE	ounces - f (av)	x 0.278	= newtons (N)	x 3.597	= ounces - f (av)
	pounds - f (av)	x 4.488	= newtons (N)	x 0.2248	= pounds - f (av)
	kilograms - f	x 9.807	= newtons (N)	x 0.10197	= kilograms - f

Conversion Table

	MULTIPLY:	BY:	TO GET: MULTIPLY	BY:	TO GET:
PRESSURE OR STRESS	pounds/sq. in.	x 6.895	= kilopascals (kPa)	x 0.145	= pounds/sq. in.
	pounds/sq. in.	x 0.0689	= bar	x 14.503	= pounds/sq. in.
POWER	horsepower	x 0.746	= kilowatts (kW)	x 1.34	= horsepower
	ft - lbf/min.	x 0.0226	= watts (W)	x 44.25	= ft - lbf/min.
TORQUE	pound - inches	x 0.11298	= newton-meters (N.m)	x 8.851	= pound-inches
	pound - feet	x 1.3558	= newton-meters (N.m)	x 0.7376	= pound-feet
VELOCITY	miles/hour	x 1.6093	= kilometers/hour (km/h)	x 0.6214	= miles/hour
	feet/sec.	x 0.3048	= meters/sec. (m/s)	x 3.281	= feet/sec.
	kilometers/hr.	x 0.27778	= meters/sec. (m/s)	x 3.600	= kilometers/hr.
	miles/hours	x 0.4470	= meters/sec. (m/s)	x 2.237	= miles/hour
TEMPERATURE					



D-10000A

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NOTES

Challenger®

MT265B / MT275B
Compact Tractor

SERVICE MANUAL
79028571 A Rev.

02a - Engine

Engine Service Manual
Iseki Three-Cylinder Diesel Engine
(Effective 2005 Production)

Component Service Manual
to be inserted here

(Epsilon users go to AGCO Parts / Service Manuals / Miscellaneous / Engines)

NOTE TO THE USER - The above Component Service Manual was automatically shipped under separate part number when your Service Manual was ordered. This is to ensure you are provided with the latest information on a major component in your equipment.

Please insert the above Component Service Manual, in its entirety, into this position of your manual.

ENGINE

SERVICE MANUAL

Iseki Three-Cylinder Diesel Engine
(Effective 2005 Production)

TO OUR CUSTOMER:

Congratulations on your selection of an AGCO® Product. We believe you have exercised excellent judgment in the purchase of your AGCO® machine. We are most appreciative of your patronage.

Your Dealer has performed the pre-delivery service on your new machine.

He will discuss with you the operating and maintenance instructions given in this manual, and instruct you in the proper and varied applications of this machine. Call on him at any time when you have a question or need equipment related to the use of your machine.

We recommend that you carefully read this entire manual before operating the unit. Also, time spent in becoming fully acquainted with it's performance features, adjustments, and maintenance schedules will be repaid in a long and satisfactory life of the product.

This equipment is covered by a written warranty which will be provided to you by your AGCO® Dealer at time of purchase.

CALIFORNIA
Proposition 65 Warning

WARNING: Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

WARNING: Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer, birth defects, and other reproductive harm. Wash hands after handling.

AGCO®
Iseki Three-Cylinder Diesel Engine
4283035M2
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CONTENTS

ISEKI THREE-CYLINDER DIESEL ENGINE

INTRODUCTION

General Information

This manual has been prepared to provide information concerning the servicing and overhaul of the following ISEKI engines, assuming that trained mechanics perform this work at workshops outfitted with the required equipment.

Tractor / Engine Cross Reference	
GC2300 / GC2310 / GC2400 / ST22A *	E3112-VB19 (282)
1523 / ST24A / MT225B	E3112-VB21 (306)
1423 / ST25 / MT225 **	E3112-B11 (244)
1528 / ST28A / MT255B	E3CF-WB01 (294)
1531 / ST33A	E3CD-WB20 (293)
1533 / ST34A / MT265B	E3CD-WB13 (313)
1540 / ST41A / MT275B	E3CD-WTB01 (314)
ZT29	E3CF-VG (326)
ZT33	E3CD-VG02 (325)
GC2600	E3112-XB (371)
GC1715	E3112-XB (440)
GC1705	E3112-XB01 (441)

E3CD and E3CF engines are basically the same from one another except for the piston sizes. But tractor versions have different exterior views from each other. The E3112 engine is also basically the same except for the piston sizes and components of the fuel injection systems.

This manual does not apply to field work where adequate service tools and equipment are not available. The contents of this manual cover all of the necessary information which would be required for operations in a workshop. These include construction, the functions of major components, specifications, disassembly and reassemble instructions, inspection and adjustment instructions, troubleshooting, etc. Figures mentioned in this manual are standard values established by ISEKI for the E3C and E3100 series. Consequently, when a non-ISEKI part has been installed on the engine or

adjustments and repairs have been made in a manner other than as specified in this manual, the values mentioned herein are inapplicable and useless. Consequently, ISEKI does not assume responsibility for any problems or damage caused by a value deviation due to maladjustment or by the use of unauthorized parts.

Be sure to follow the instructions mentioned in this manual when servicing the engines in a workshop. Values necessary for servicing the engines are mentioned in each instruction section, besides which all of the service reference values are summarized in the SERVICE STANDARDS TABLE. Please refer to this table before commencing service work to assure efficient maintenance and operation. Prompt and reliable servicing is a critical factor in following the operating Procedures and precautions included in this manual, while keeping safety in mind at all times. The ultimate objective of this manual is to provide you with adequate information to service the engines most effectively and economically, and in the end to gain a favorable reputation for ISEKI products among its users.

NOTE: All information, illustrations, and specifications contained in this technical manual are based on the latest information available at the time of publication. The right is reserved to make changes at any time without notice.

*NOTE: *For engine service information on models prior to tractor serial number JNA25201, please use engine manual 1449395M3.*

*NOTE: **For engine service information on models prior to tractor serial number NM3601, please use engine manual 1449395M3.*

GENERAL INFORMATION AND SPECIFICATIONS

Specifications

TRACTORS	GC2300 / GC2310 / ST22A / GC2400 / GC2410 1523 / ST24A / MT225B	GC2600 / GC2610	GC1705 / GC1710	GC1715 / GC1720
Engine Models	E3112			
Type	4-cycle, over-head valve, diesel with swirl type combustion chambers			
Cylinder - Bore x Stroke mm (in)	3 - 78.2 x 78 (3 - 3.08 x 3.07)			
Total Displacement cc (cu in)	1123 (68.5)			
Compression ratio	22.5:1			
Rated output ps (kW) / engine rpm	21.5 (16.0) / 2500	24.0 (17.9) / 3000	21.5 (16.0) / 2500	24.0 (17.9) / 3000
Fuel consumption g/ps-h	205	216	205	216
Maximum power rpm (Gross HP)	16.5 (22.5) / 2600	24.5 (18.3) / 3000	16.5 (22.5) / 2600	24.5 (18.3) / 3000
Unloaded maximum speed rpm	2810 +/- 50	3220 +/- 50	2810 +/- 50	3220 +/- 50
Unloaded minimum speed rpm	1275 +/- 25			
Fuel	Diesel			
Dry Weight kg (lb)	88 (193)		94 (267)	
Dimensions (HxWxH) mm (in)	491 x 431 x 561 (19.4 x 17.0 x 22.2)		537 x 432 x 561 (21.2 x 17.1 x 22.2)	
Fuel Injection order	1-3-2			
Direction of rotation	Clockwise viewed from fan			
Fuel injection system: Fuel injection pump	Bosch, PFR type pump			
Model	ND-PFR3M			
Plunger (dia. x stroke) mm (in)	5.75 x 7.0 (0.23 x 0.28)			
Injection nozzle	Throttle type			
Governor	Centrifugal, all speed governor			

ISEKI THREE-CYLINDER DIESEL ENGINE

TRACTORS	GC2300 / GC2310 / ST22A / GC2400 / GC2410 / 1523 / ST24A / MT225B	GC2600 / GC2610	GC1705 / GC1710	GC1715 / GC1720
Engine Models	E3112			
Supercharger system	None			
Lubrication system	Forced Lubrication			
Oil Pump	Trochoid type			
Filtering method	Full-flow type			
Cooling System: Cooling method	Water Cooling			
Cooling fan mm (in)	Ø320 (12.6)			
Driving method	Belt-drive			
Pulley ration Crank p.: fan p.	1.29			
Starter Motor:	Engaging magnet type			
Voltage V	12			
Output kW	1.1			
Engine Stopping System	Fuel cut-off type			
Preheating System	Sheathed glow plugs			
Generator: Voltage V	12			
Output amp	40			
Regulator	Transistorized (installed in generator)			
Reference Data: Oil pan capacity liter (U.S. gallon)	2.6 (0.68)			
Valve timing:				
Intake Opening	10 degrees BTDC			
Intake Closing	46 degrees ABDC			
Exhaust Opening	46 degrees BBDC			
Exhaust Closing	10 degrees ATDC			
Valve clearance mm (in)	0.25 (0.0098)			
Fuel injection timing	19 degree BTDC			
Compression pressure kg/cm2 (psi) / 300 rpm	30 (427)			

TRACTORS	1528 / ST28A / MT255B	1531 / 1533 / ST33A / ST34A / MT265B	1540 / ST41A / MT275B
Engine Models	E3CF	E3CD	E3CD-T
Type	4-cycle, over-head valve, diesel with swirl type combustion chambers		
Cylinder - Bore x Stroke mm (in)	3 - 86 x 84 (3 - 3.37 x 3.3)	3-87 x 84 (3 - 3.4 x 3.3)	
Total Displacement cc (cu.in)	1463 (89.27)	1498 (91.41)	
Compression ratio	21.7:1	21.7:1	
Rated output ps (kW) / engine rpm	28 (20.6)/2500	32 (23.5) / 2500	38 (27.9) / 2500
Fuel consumption g/ps-h	203	205	200
Maximum power rpm (Gross HP)	28 (20.2) / 2500	24.6 (33) / 2600	29.9 (40.1 / 2600
Unloaded maximum speed rpm	2700 +/- 50	2810 +/- 50	2810 +/- 50
Unloaded minimum speed rpm	950 +/- 20	1000 +/- 20	1000 +/- 20
Fuel	Diesel		
Dry Weight kg (lb)	128 (197) - FH 125 (185) - F	144 (318)	147 (324)
Dimensions (HxWxH) mm (in)	584 x 475 x 650 (22.9 x 21.2 x 25.6) - FH 568 x 475 x 650 (22.4 x 21.2 x 25.6) - F	618 x 470 x 683 (24.3 x 18.5 x 26.9)	612 x 506 x 683 (24.1 x 19.9 x 26.9)
Fuel Injection order	1-3-2		
Direction of rotation	Clockwise viewed from fan		
Fuel injection system: Fuel injection pump	Bosch, PFR type pump		
Model	ND-PFR3KX	ND-PFR3KX	
Plunger (dia. x stroke) mm (in)	6.5 x 7.0 (0.26 x 0.28)	6.5 x 7.0 (0.26 x 0.28)	6.0 x 7.0 (0.24 x 0.28)
Injection nozzle	Throttle type		
Governor	Centrifugal, all-speed governor		

ISEKI THREE-CYLINDER DIESEL ENGINE

TRACTORS	1528 / ST28A / MT255B	1531 / 1533 / ST33A / ST34A / MT265B	1540 / ST41A / MT275B
Engine Models	E3CF	E3CD	E3CD-T
Supercharger system	None	None	Exhaust Turbo Charger
Lubrication System:	Forced lubrication		
Oil Pump	Trochoid type		
Filtering method	Full-flow type		
Cooling System: Cooling method	Water Cooling		
Cooling fan mm (in)	360 (14.3)	380 (15.0)	
Driving method	Belt-drive		
Pulley ration Crank p.: fan p.	1.2	1.10	1.23
Starter Motor:	Engaging magnet type		
Voltage V	12		
Output kW	1.4		
Engine Stopping System	Fuel cut-off type		
Preheating System	Sheathed glow plugs		
Generator: Voltage V	12		
Output	40		
Regulator	Transistorized (installed in the generator)		
Reference Data: Oil pan capacity liter (U.S. gallon)	3.6 (0.95)	4.7 (1.25)	
Valve timing:			
Intake Opening	8 degrees BTDC		
Intake Closing	40 degrees ABDC		
Exhaust Opening	48 degrees BBDC		
Exhaust Closing	12 degrees ATDC		
Valve clearance mm (in)	0.35 (0.013)		
Fuel injection timing	17 degrees BTDC	20 degress BTDC	17 degrees BTDC
Compression pressure kg/cm2 (psi)/300 rpm	31 (441)		

TRACTORS	ZT29	ZT33	1529
Engine Models	E3CF	E3CD	E3CD-T
Type	4-cycle, over-head valve, diesel with swirl type combustion chambers		
Cylinder - Bore x Stroke mm (in)	3 - 86 x 84 (3 - 3.37 x 3.3)	3-87 x 84 (3 - 3.4 x 3.3)	
Total Displacement cc (cu.in)	1463 (89.27)	1498 (91.41)	
Compression ratio	21.7:1	21.7:1	
Rated output ps (kW) / engine rpm	28 (20.2)/2500	33 (24.2) / 2600	28 (20.6) / 2500
Fuel consumption g/ps-h	205	205	186
Maximum power rpm (Gross HP)	28 (20.2) / 2500	33 (24.2) / 2600	28 (20.6) / 2500
Unloaded maximum speed rpm	2700 +/- 50	2810 +/- 50	2810 +/- 50
Unloaded minimum speed rpm	1400 +/- 25	1400 +/- 25	1400 +/- 25
Fuel	Diesel		
Dry Weight kg (lb)	125 (275)	125 (275)	137 (301)
Dimensions (HxWxH) mm (in)	598 x 490 x 619 (22.8 x 19.3 x 24.3)	598 x 490 x 619 (22.8 x 19.3 x 24.3)	618 x 470 x 660 (24.3 x 18.5 x 26.0)
Fuel Injection order	1-3-2		
Direction of rotation	Clockwise viewed from fan		
Fuel injection system: Fuel injection pump	Bosch, PFR type pump		
Model	ND-PFR3KX	ND-PFR3KX	
Plunger (dia. x stroke) mm (in)	6.5 x 7.0 (0.26 x 0.28)	6.5 x 7.0 (0.26 x 0.28)	6.5 x 7.0 (0.26 x 0.28)
Injection nozzle	Throttle type		
Governor	Centrifugal, all-speed governor		

ISEKI THREE-CYLINDER DIESEL ENGINE

TRACTORS	ZT29	ZT33	1529
Engine Models	E3CF	E3CD	E3CD-T
Supercharger system	None	None	Exhaust Turbo Charger
Lubrication System:	Forced lubrication		
Oil Pump	Trochoid type		
Filtering method	Full-flow type		
Cooling System: Cooling method	Water Cooling		
Cooling fan mm (in)	360 (14.3)		380 (15.0)
Driving method	Belt-drive		
Pulley ration Crank p.: fan p.	1.23	1.10	1.1
Starter Motor:	Engaging magnet type		
Voltage V	12		
Output kW	1.4		
Engine Stopping System	Fuel cut-off type		
Preheating System	Sheathed glow plugs		
Generator: Voltage V	12		
Output	40		
Regulator	Transistorized (installed in the generator)		
Reference Data: Oil pan capacity liter (U.S. gallon)	3.0 (0.79)		
Valve timing:			
Intake Opening	8 degrees BTDC		
Intake Closing	40 degrees ABDC		
Exhaust Opening	48 degrees BBDC		
Exhaust Closing	12 degrees ATDC		
Valve clearance mm (in)	0.35 (0.013)		
Fuel injection timing	20 degress BTDC		
Compression pressure kg/cm2 (psi)/300 rpm	31 (441)		