

Workshop Service Manual

MF 7600

GBA15
GBA25
GPA20
GPA40
HA130

HA160
ML130
ML160



MF 7600

- 1 Introduction
 - 1A10 MF 7600 - General
 - 1A16 MF 7600 - Adjustments, bleeding and calibrations
- 2 Separation of assemblies
 - 2A17 Front linkage - Removing and refitting
 - 2B17 Front axle - Removing and refitting
 - 2C17 Cooling unit - Removing and refitting
 - 2D17 Front frame - Removing and refitting
 - 2E17 Bonnet - Removing and refitting
 - 2F17 Engine - Removing and refitting
 - 2G17 Gearbox - Removing and refitting
 - 2H17 Cab - Removing and refitting
 - 2I17 Pedal assembly - Removing and refitting
 - 2J17 Rear axle - Removing and refitting
- 3 Engine
 - 3A13 Sisu Tier 4i engine - Layout of components
 - 3A14 Sisu Tier 4i engine - Tests and diagnostics
 - 3A17 Sisu Tier 4i engine - Disassembly and reassembly
 - 3B10 SCR Technology engine - General
 - 3B13 SCR Technology engine - Layout of components
 - 3B17 SCR Technology engine - Disassembly and reassembly
 - 3B18 SCR Technology engine - Service tools
- 4 Clutch

Chapter not used for this model
- 5 Gearbox
 - 5A10 ML130/ML160 - General
 - 5A14 ML130/ML160 - Tests and diagnostics
 - 5A17 ML130/ML160 - Disassembly and reassembly
 - 5A18 ML130/ML160 - Service tools
 - 5B10 GBA15 - General
 - 5B13 GBA15 - Layout of components
 - 5B17 GBA15 - Disassembly/reassembly
 - 5B20 GBA15/PowerShuttle - General
 - 5B23 GBA15/PowerShuttle - Layout of components
 - 5B27 GBA15/PowerShuttle - Disassembly/reassembly
 - 5B28 GBA15/PowerShuttle - Service tools
 - 5B30 GBA15/Powershift module - General
 - 5B33 GBA15/Powershift module - Layout of components
 - 5B37 GBA15/Powershift module - Disassembly/reassembly
 - 5B38 GBA15/Powershift module - Service tools
 - 5B40 GBA15/Robotic mechanical gearbox - General
 - 5B43 GBA15/Robotic mechanical gearbox - Layout of components
 - 5B47 GBA15/Robotic mechanical gearbox - Disassembly/reassembly

5B48	GBA15/Robotic mechanical gearbox - Service tools
5B50	GBA15/Creeper gears - General
5B53	GBA15/Creeper gears - Layout of components
5B57	GBA15/Creeper gears - Disassembly/reassembly
5C10	GBA25 - General
5C13	GBA25 - Layout of components
5C16	GBA25 - Adjustments, bleeding and calibrations
5C17	GBA25 - Disassembly and reassembly
5C20	GBA25/PowerShuttle - General
5C23	GBA25/PowerShuttle - Layout of components
5C27	GBA25/PowerShuttle - Disassembly and reassembly
5C28	GBA25/PowerShuttle - Service tools
5C30	GBA25/Powershift module - General
5C33	GBA25/Powershift module - Layout of components
5C37	GBA25/Powershift module - Disassembly and reassembly
5C38	GBA25/Powershift module - Service tools
5C40	GBA25/Robotic mechanical gearbox - General
5C43	GBA25/Robotic mechanical gearbox - Layout of components
5C47	GBA25/Robotic mechanical gearbox - Disassembly and reassembly
5C48	GBA25/Robotic mechanical gearbox - Service tools
5C50	GBA25/Creeper gears - General
5C53	GBA25/Creeper gears - Layout of components
5C57	GBA25/Creeper gears - Disassembly and reassembly
5C60	GBA25/Super creeper gears - General
5C63	GBA25/Super creeper gears - Layout of components
5C67	GBA25/Super creeper gears - Disassembly and reassembly

6 Rear axle

6A13	HA130/160/Final drives - Layout of components
6A17	HA130/160/Final drives - Disassembly and reassembly
6A23	HA130/160/Differential - Layout of components
6A26	HA130/160/Differential - Adjustments, bleeding and calibrations
6A27	HA130/160/Differential - Disassembly and reassembly
6A30	HA130/160/Tractor braking - General
6A33	HA130/160/Tractor braking - Layout of components
6A36	HA130/160/Tractor braking - Adjustments, bleeding and calibrations
6A37	HA130/160/Tractor braking - Disassembly and reassembly
6A40	HA130/160/ParkLock - General
6A43	HA130/160/ParkLock - Layout of components
6A46	HA130/160/ParkLock - Adjustments, bleeding and calibrations
6A50	HA130/160/Hydraulic trailer braking - General
6A53	HA130/160/Hydraulic trailer braking - Layout of components
6A60	HA130/160/Pneumatic trailer braking - General
6A63	HA130/160/Pneumatic trailer braking - Layout of components
6A64	HA130/160/Pneumatic trailer braking - Tests and diagnostics
6A66	HA130/160/Pneumatic trailer braking - Adjustments, bleeding and calibrations
6A67	HA130/160/Pneumatic trailer braking - Disassembly and reassembly
6B10	GPA40/Rear axle - General
6B13	GPA40/Rear axle - Location of components
6B17	GPA40/Rear axle - Disassembly and reassembly
6B20	GPA40/Trumpet housings - General
6B23	GPA40/Trumpet housings - Layout of components

6B27	GPA40/Trumpet housings - Disassembly and reassembly
6B28	GPA40/Trumpet housings - Service tools
6B30	GPA40/Differential - General
6B33	GPA40/Differential - Layout of components
6B37	GPA40/Differential - Disassembly and reassembly
6B38	GPA40/Differential - Service tools
6B40	GPA40/Tractor braking - General
6B43	GPA40/Tractor braking - Layout of components
6B46	GPA40/Tractor braking - Adjustments, bleeding and calibrations
6B47	GPA40/Tractor braking - Disassembly and reassembly
6B48	GPA40/Tractor braking - Service tools
6B50	GPA40/ParkLock - General
6B53	GPA40/ParkLock - Layout of components
6B57	GPA40/ParkLock - Disassembly and reassembly
6B60	GPA40/Pneumatic trailer braking - General
6B63	GPA40/Pneumatic trailer braking - Layout of components
6B64	GPA40/Pneumatic trailer braking - Tests and diagnostics
6B66	GPA40/Pneumatic trailer braking - Adjustments, bleeding and calibrations
6B67	GPA40/Pneumatic trailer braking - Disassembly and reassembly
6B70	GPA40/Hitch/Linkage - General
6B73	GPA40/Hitch/Linkage - Layout of components
6767	GPA40/Hitch/Linkage - Disassembly and reassembly
6B80	GPA40/Auto-hitch - General
6B83	GPA40/Auto-hitch - Layout of components
6B86	GPA40/Auto-hitch - Adjustments, bleeding and calibrations
6B87	GPA40/Auto-hitch - Disassembly and reassembly
6B90	GPA40/Rear wheels/hubs - General
6B97	GPA40/Rear wheels/hubs - Disassembly and reassembly
6C10	GPA20 - General
6C13	GPA20 - Layout of components
6C20	GPA20/Trumpet housings - General
6C23	GPA20/Trumpet housings - Layout of components
6C27	GPA20/Trumpet housings - Disassembly and reassembly
6C28	GPA20/Trumpet housings - Service tools
6C30	GPA20/Differential - General
6C33	GPA20/Differential - Layout of components
6C37	GPA20/Differential - Disassembly and reassembly
6C38	GPA20/Differential - Service tools
6C40	GPA20/Tractor braking - General
6C43	GPA20/Tractor braking - Layout of components
6B46	GPA20/Tractor braking - Adjustments, bleeding and calibrations
6C47	GPA20/Tractor braking - Disassembly and reassembly
6C48	GPA20/Tractor braking - Service tools
6C60	GPA20/Hydraulic trailer braking - General
6C63	GPA20/Hydraulic trailer braking - Layout of components
6C67	GPA20/Hydraulic trailer braking - Disassembly and reassembly
6C70	GPA20/Pneumatic trailer braking - General
6C73	GPA20/Pneumatic trailer braking - Layout of components
6C74	GPA20/Pneumatic trailer braking - Tests and diagnostics
6C76	GPA20/Pneumatic trailer braking - Adjustments, bleeding and calibrations
6C77	GPA20/Pneumatic trailer braking - Disassembly and reassembly

6C78	GPA20/Pneumatic trailer braking - Service tools
6C80	GPA20/Hitch/Linkage - General
6C83	GPA20/Hitch/Linkage - Layout of components
6C86	GPA20/Hitch/Linkage - Adjustments, bleeding and calibrations
6C87	GPA20/Hitch/Linkage - Disassembly and reassembly
6C90	GPA20/Auto-hitch - General
6C96	GPA20/Auto-hitch - Adjustments, bleeding and calibrations
6C97	GPA20/Auto-hitch - Disassembly and reassembly
6D80	GPA20 +/Hitch/Increased capacity linkage - General
6D83	GPA20 +/Hitch/Increased capacity linkage - Layout of components
6D86	GPA20 +Hitch/Increased capacity linkage - Adjustments, bleeding and calibrations
6D87	GPA20 +Hitch/Increased capacity linkage - Disassembly and reassembly
6D88	GPA20 +Hitch/Increased capacity linkage - Service tools

7 Power take-off

7A13	HA130/160/Power take-off - Layout of components
7A17	HA130/160/Power take-off - Disassembly and reassembly
7B10	GPA40 - General
7B13	GPA40 - Layout of components
7B17	GPA40 - Disassembly and reassembly
7B20	GPA40/Clutch - General
7B23	GPA40/Clutch - Layout of components
7B27	GPA40/Clutch - Disassembly and reassembly
7B28	GPA40/Clutch - Service tools
7B30	GPA40/Intermediate shaft and driving gears - General
7B33	GPA40/Intermediate shaft and driving gears - Layout of components
7B37	GPA40/Intermediate shaft and driving gears - Disassembly and reassembly
7B40	GPA40/Output shaft and brake - General
7B43	GPA40/Output shaft and brake - Layout of components
7B47	GPA40/Output shaft and brake - Disassembly and reassembly
7B48	GPA40/Output shaft and brake - Service tools
7C10	GPA20 - General
7C20	GPA20/Clutch - General
7C23	GPA20/Clutch - Layout of components
7C27	GPA20/Clutch - Disassembly and reassembly
7C28	GPA20/Clutch - Service tools
7C30	GPA20/Intermediate shaft/Driving gear/PTO brake - General
7C33	GPA20/Intermediate shaft/Driving gear/PTO brake - Layout of components
7C37	GPA20/Intermediate shaft/Driving gear/PTO brake - Disassembly and reassembly
7C40	GPA20/Removable PTO shaft - General
7C43	GPA20/Removable PTO shaft - Layout of components
7C47	GPA20/Removable PTO shaft - Disassembly and reassembly
7C50	GPA20/Shiftable PTO shaft - General
7C53	GPA20/Shiftable PTO shaft - Layout of components
7C57	GPA20/Shiftable PTO shaft - Disassembly and reassembly
7C60	GPA20/PTO electrohydraulic controls - General
7C63	GPA20/PTO electrohydraulic controls - Layout of components
7C67	GPA20/PTO electrohydraulic controls - Disassembly and reassembly

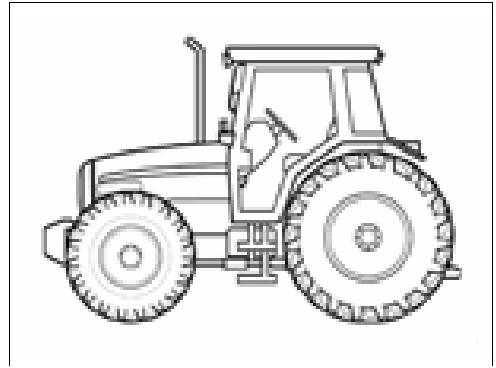
	7C70	GPA20/GSPTO - General
	7C73	GPA20/GSPTO - Layout of components
	7C77	GPA20/GSPTO - Disassembly and reassembly
	7E10	Zuidberg front power take-off - General
	7E13	Zuidberg front power take-off - Layout of components
	7E14	Zuidberg front power take-off - Tests and diagnostics
	7E16	Zuidberg front power take-off - Adjustments, bleeding and calibrations
	7E17	Zuidberg front power take-off - Disassembly and reassembly
8	Front axle	
	8A10	DANA - General
	8A17	DANA - Disassembly and reassembly
	8B10	HA130/160 4WD clutch - General
	8B17	HA130/160/4WD clutch - Disassembly and reassembly
	8B20	HA130/160/Universal joint shaft brake - General
	8B27	HA130/160/Universal joint shaft brake - Disassembly and reassembly
	8C10	GPA40/4WD clutch - General
	8C13	GPA40/4WD clutch - Layout of components
	8C17	GPA40/4WD clutch - Disassembly and reassembly
	8D10	Steering unit/Closed Center - General
	8D13	Steering unit/Closed Center - Layout of components
	8D17	Steering unit/Closed Center - Disassembly and reassembly
	8D20	Steering unit/Open Center - General
	8D23	Steering unit/Open Center - Layout of components
	8D27	Steering unit/Open Center - Disassembly and reassembly
	8E17	Steering rams - Disassembly and reassembly
9	Hydraulics	
	9A10	HA130/160/LS hydraulic system - General
	9A13	HA130/160/LS hydraulic system - Layout of components
	9A14	HA130/160/LS hydraulic system - Tests and diagnostics
	9A17	HA130/160/LS hydraulic system - Disassembly and reassembly
	9A18	HA130/160/LS hydraulic system - Service tools
	9A27	HA130/160/LS hydraulic system/Hydraulic pumps - Disassembly and reassembly
	9A28	HA130/160/LS hydraulic system/Hydraulic pumps - Service tools
	9A30	HA130/160/LS hydraulic system/Auxiliary spool valves - General
	9A33	HA130/160/LS hydraulic system/Auxiliary spool valves - Layout of components
	9A37	HA130/160/LS hydraulic system/Auxiliary spool valves - Disassembly and reassembly
	9A38	HA130/160/LS hydraulic system/Auxiliary spool valves - Service tools
	9A40	HA130/160/LS hydraulic system/Rear linkage - General
	9A43	HA130/160/LS hydraulic system/Rear linkage - Layout of components
	9A47	HA130/160/LS hydraulic system/Rear linkage - Disassembly and reassembly
	9A48	HA130/160/LS hydraulic system/Rear linkage - Service tools
	9A58	HA130/160/LS hydraulic system/Front linkage - Service tools
	9B10	GPA20/GPA40/Load Sensing - General
	9B13	GPA20/GPA40/Load Sensing - Layout of components
	9B14	GPA20/GPA40/Load Sensing - Tests and diagnostics
	9B17	GPA20/GPA40/Load Sensing - Disassembly and reassembly

9B20	GPA20/GPA40/Load Sensing/Right-hand cover plate - General
9B23	GPA20/GPA40/Load Sensing/Right-hand cover plate - Layout of components
9B27	GPA20/GPA40/Load Sensing/Right-hand cover plate - Disassembly and reassembly
6B28	GPA20/GPA40/Load Sensing/Right-hand cover plate - Service tools
9B30	GPA20/GPA40/Load Sensing/Left-hand cover plate - General
9B33	GPA20/GPA40/Load Sensing/Left-hand cover plate - Layout of components
9B37	GPA20/GPA40/Load Sensing/Left-hand cover plate - Disassembly and reassembly
9B40	GPA20/GPA40/Load Sensing/Linkage spool valve - General
9B43	GPA20/GPA40/Load Sensing/Linkage spool valve - Layout of components
9B47	GPA20/GPA40/Load Sensing/Linkage spool valve - Disassembly and reassembly
9B50	GPA20/GPA40/Load Sensing/Auxiliary spool valves - General
9B53	GPA20/GPA40/Load Sensing/Auxiliary spool valves - Layout of components
9B56	GPA20/GPA40/Load Sensing/Auxiliary spool valves - Adjustments, bleeding and calibrations
9B57	GPA20/GPA40/Load Sensing/Auxiliary spool valves - Disassembly and reassembly
9B58	GPA20/GPA40/Load Sensing/Auxiliary spool valves - Service tools
9C10	Open Center - General
9C14	Open Center - Tests and diagnostics
9C20	Open Center/Right-hand cover plate - General
9C23	Open Center/Right-hand cover plate - Layout of components
9C27	Open Center/Right-hand cover plate - Disassembly and reassembly
9C30	Open Center/Left-hand cover plate - General
9C33	Open Center/Left-hand cover plate - Layout of components
9C37	Open Center/Left-hand cover plate - Disassembly and reassembly
9D10	100 l/min Open Center - General
9D14	100 l/min Open Center - Tests and diagnostics
9D20	100 l/min Open Center/Right-hand cover plate - General
9D23	100 l/min Open Center/Right-hand cover plate - Layout of components
9D27	100 l/min Open Center/Right-hand cover plate - Disassembly and reassembly
9D30	100 l/min Open Center/Left-hand cover plate - General
9D33	100 l/min Open Center/Left-hand cover plate - Layout of components
9D37	100 l/min Open Center/Left-hand cover plate - Disassembly and reassembly
9E10	Open Center/Linkage spool valve - General
9E13	Open Center/Linkage spool valve - Layout of components
9E17	Open Center/Linkage spool valve - Disassembly and reassembly
9E20	Open Center/Auxiliary spool valves - General
9E23	Open Center/Auxiliary spool valves - Layout of components
9E26	Open Center/Auxiliary spool valves - Adjustments, bleeding and calibrations
9E27	Open Center/Auxiliary spool valves - Disassembly and reassembly
9E30	Open Center/Valve 21 bar - General
9E33	Open Center/Valve 21 bar - Layout of components

- 9E36 Open Center/Valve 21 bar - Adjustments, bleeding and calibrations
- 9E37 Open Center/Valve 21 bar - Disassembly and reassembly
- 10 Electricity**
 - 10A10 Fuse box - General
 - 10B14 Alternator - Tests and diagnostics
 - 10B17 Alternator - Disassembly and reassembly
 - 10B18 Alternator - Service tools
 - 10C10 Starter - General
 - 10C14 Starter - Tests and diagnostics
 - 10D17 Triflash triangle - Assembly
- 11 Electronics**
 - 11A10 Diagnostic tools - General
 - 11B10 Telemetry - General
 - 11B11 Telemetry - Error codes
 - 11B13 Telemetry - Layout of components
 - 11B15 Telemetry - Programming and setting parameters
 - 11B17 Telemetry - Disassembly and reassembly
- 12 Cab**
 - 12A10 Standard air conditioning - General
 - 12A12 Standard air conditioning - Electrical and hydraulics diagrams
 - 12A13 Standard air conditioning - Layout of components
 - 12A14 Standard air conditioning - Tests and diagnostics
 - 12A16 Standard air conditioning - Adjustments, bleeding and calibrations
 - 12A17 Standard air conditioning - Disassembly and reassembly
 - 12B10 Self-regulating air conditioning - General
 - 12B12 Self-regulating air conditioning - Electrical and hydraulics diagrams
 - 12B13 Self-regulating air conditioning - Layout of components
 - 12B14 Self-regulating air conditioning - Tests and diagnostics
 - 12B16 Self-regulating air conditioning - Adjustments, bleeding and calibrations
 - 12B17 Self-regulating air conditioning - Disassembly and reassembly
 - 12C10 Semi-active hydraulic suspension - General
 - 12C13 Semi-active hydraulic suspension - Layout of components
 - 12C16 Semi-active hydraulic suspension - Adjustments, bleeding and calibrations
 - 12C17 Semi-active hydraulic suspension - Disassembly and reassembly
- 13 Accessories**
 - accessories kits
- 14 Service tools**
 - 14A01 General
 - 14A02 Separation of assemblies
 - 14A03 Engine
 - 14A05 Gearbox
 - 14A06 Rear axle
 - 14A07 Power take-off
 - 14A08 Front axle
 - 14A09 Hydraulics
 - 14A10 Electricity
 - 14A11 Electronics



14A12 Cab



1 - Introduction

1A10	MF 7600 - General	3
1A16	MF 7600 - Adjustments, bleeding and calibrations	177

1A10 - MF 7600 - General

1	Using the manual	5
2	General specifications.	6
2.1	Model MF 7614 Dyna-4	6
2.2	Model MF 7615 Dyna-4	13
2.3	Model MF 7615 Dyna-6	20
2.4	Model MF 7615 Dyna-VT	28
2.5	Model MF 7616 Dyna-6	35
2.6	Model MF 7616 Dyna-VT	43
2.7	Model MF 7618 Dyna-6	50
2.8	Model MF 7618 Dyna-VT	58
2.9	Model MF 7619 Dyna-6	65
2.10	Model MF 7619 Dyna-VT	72
2.11	Model MF 7620 Dyna-6	79
2.12	Model MF 7620 Dyna-VT	86
2.13	Model MF 7622 Dyna-6	93
2.14	Model MF 7622 Dyna-VT	100
2.15	Model MF 7624 Dyna-6	107
2.16	Model MF 7624 Dyna-VT	114
2.17	Model MF 7626 Dyna-6	121
3	Forward speeds for MF 7614, MF 7615, MF 7616, and MF 7618 models	128
3.1	Forward speed at maximum speed with Dyna-4 transmission, 40 kph and 20.8R38 tyres	128
3.2	Forward speed at maximum speed with Dyna-6 transmission, 40 kph and 20.8R38 tyres	129
3.3	Forward speed at maximum speed with Dyna-6 transmission, 50 kph and 20.8R38 tyres	131
3.4	Forward speed for all models with transmission in Dyna-VT mode	133
4	Forward speeds for MF 7619, MF 7620, MF 7622, MF 7624, and MF 7626 models	134
4.1	Forward speed at maximum speed with Dyna-6 transmission 40 km/h: and 20.8R42 tyres	134
4.2	Forward speed at maximum speed with Dyna-6 transmission 50 km/h : and 20.8R42 tyres	136
4.3	Forward speed with Dyna-6 transmission, 40 km/h and 50 km/h, creeper speed option, 20.8R42 tyres	138
4.4	Forward speed for all models with Dyna-VT transmission	139
4.5	Forward speed for all models with transmission in Stepshift mode	140
5	Dimensions and weights	144
5.1	Dimensions and weights	144
6	Attachment points for MF 7614, MF 7615, MF 7616, and MF 7618 models.	147
6.1	Attachment points: Dyna-4/Dyna-6 models without front linkage	147
6.2	Attachment points: Dyna-4/Dyna-6 models with front linkage	149
6.3	Attachment points: Dyna-VT models without front linkage	151
6.4	Attachment points: Dyna-VT models with front linkage	153
7	Attachment points for MF 7619, MF 7620, MF 7622, MF 7624, and MF 7626 models	155
7.1	Attachment points: Dyna-6 models with front linkage 5 T	155
7.2	Attachment points: Dyna-6 models without front linkage	157
7.3	Attachment points: Dyna-VT models with front linkage 5 T	159
7.4	Attachment points: Dyna-VT models without front linkage	161
8	Capacities for MF 7614, MF 7615, MF 7616, and MF 7618 models	163

8.1	Capacities	163
9	Capacities for MF 7619, MF 7620, MF 7622, MF 7624, and MF 7626 models	164
9.1	Capacities	164
10	Conversion table	165
11	Retaining compounds and sealing products	167
12	Tightening torques	169
12.1	Tightening torques for screws and nuts	169
12.2	Tightening torques for hydraulic unions	173

1 Using the manual

General

The purpose of this manual is to assist Dealers and Agents in the installation, servicing and repair of Massey Ferguson equipment. It is important to follow the methods shown and to use special tools in order to perform the operations within the times stated in the repair time schedule.

Structure of the manual

Page numbering

This manual is divided into chapters and sections, each page containing the following information:

Example: 10A12.1

10	Chapter
A	Subset letter
1	Subset order number
2	Subset number
1	Page number within the section

The issue number is indicated at the bottom of the page.

Contents

For quick reference, each chapter starts with a table of contents, listing the various sections included in that chapter.

Meaning of reference numbers

(..)	Reference number for parts
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Service tools

Where the use of a service tool is necessary to carry out an operation, the tool reference is mentioned with the relevant instruction.

Tool drawings for makeshift tools are given at the end of the relevant sections.

Repairs and parts replacement

During replacement operations, it is essential that only genuine Massey Ferguson parts are used.

If non-genuine Massey Ferguson parts are fitted, the tractor warranty may be invalidated and tractor safety may be compromised. All Massey Ferguson parts are guaranteed by the manufacturer. Massey Ferguson Dealers and Agents are required to supply only genuine service parts.

When carrying out repairs and fitting replacement parts and accessories, the following points are of particular importance:

- Legislation in certain countries prohibits the fitting of parts that do not comply with the tractor manufacturer's specifications
- Torque wrench setting figures given in the workshop manual must be strictly respected
- Locking devices must be fitted where specified. If the efficiency of a locking device is impaired during dis-assembly, it must be replaced.

2 General specifications

2.1 Model MF 7614 Dyna-4

Engine	
Brand	AGCO Power
Type	66 AWI - 4V
Nominal power (ISO TR14396) at 2100 rpm	130 hp (96 kW)
Maximum power (ISO TR14396) at 1950 rpm	140 hp (103 kW)
EPM (Engine Power Management): Maximum power (ISO TR14396) at 2100 rpm	155 hp (114 kW)
EPM: Maximum torque (ISO TR14396)	660 Nm
Idle speed, Power Control lever in neutral or main brakes engaged	700 rpm
Normal idle speed	1000 rpm
Nominal speed	2100 rpm
Maximum speed	2160 rpm
Engine weight	960 kg
Number of cylinders	6
Engine displacement in litres	6.6
Piston travel	120 mm
Piston diameter	108 mm
Compression ratio	17.4
Compression pressure	-
Injection pump brand	Bosch
Injection pump type	Common rail CP4.2
Firing order	1-5-3-6-2-4
Maximum pressure in the high-pressure system	1800 bar
Injector brand	Bosch
Injector type	CRIN3 / 8 holes
Charge pump type	Manual
Fuel prefilter filtration capacity	10 μ
Main fuel filter filtration capacity	5 μ
Low-pressure system pressure at minimum speed	0.5 bar - 8.5 bar
Low-pressure system pressure at maximum speed	0.5 bar - 8.5 bar
Recommended oil:	API CJ4 / ACEA E9
Maximum operating tilt (precautions)	20° roll 25° pitch
Oil/fuel consumption	Maximum 0.1%
Lubrication system	Gear pump at the bottom of the timing
Oil cooling system	Cooler integrated into the engine (left side)
Oil pressure at minimum speed	1.5 bar
Oil pressure at maximum speed	2.5 bar at 5 bar depending on the temperature
Relief valve adjustment pressure	5 bar (spring pressure)
Air suction type	Turbocharged with air/air intercooler
Air preheating type	Grid heater with relay controlled by the ECU
Number of valves	24 (4 per cylinder)

Engine	
Valve clearance value	0.35 mm (inlet and exhaust)
Engine cooling system	Coolant
Fan type	Viscostatic
Thermostat begins to open at	83°C
Liquid temperature from - to	-35°C to 106°C
Air compressor brand for the brake system	Knorr Bremse
Type of compressor	Pistons
Pressure range:	6.5 bar to 8 bar
Type and brand of air conditioning compressor	SD7H15 - Sanden
Air conditioning compressor displacement (cm ³)	150
Refrigerant	R134a
Block preheater	110 or 220 volts
Fuel preheater	Options
Urea preheater	Coolant (tank) Electric (supply module and urea lines)
Exhaust fumes recirculation system	DOC (diesel oxidation catalyst) + SCR (selective catalytic reduction) systems
DOC (diesel oxidation catalyst) system	DOC (diesel oxidation catalyst) with metal substrate (exhaust fumes oxidation catalyst)
SCR system (AdBlue™ or DEF injection)	SCR with 2 ceramic substrates in silencer (exhaust fume treatment)
Safety system	NOx sensors at exhaust inlet and outlet
Device brand	Bosch Denox 2.2
Type of control	Engine controller EEM4
Tank strainer filtration capacity	70 µm
Main filter filtration capacity	20 µm
Filtration capacity of pump module inlet connector	100 µm
Urea solidification temperature	-11°C
Oil vapour recirculation system	Closed system breather (CCV)
Belt: air conditioning compressor/left-hand alternator/air compressor (2 dimensions: with or without air compressor)	Poly V 6 rib belt
Belt: fan/right-hand alternator/air compressor (2 dimensions: a different fan pulley is used depending on the power)	Poly V 10 rib belt

Rear axle transmission	
Gearbox type	GBA25
Transmission type	Dyna-4
Number of ratios	4
Number of ranges	4
Number of gears	16/16
Creeper gears	4/1
Number of gears with creeper gears	24/24
Super creeper gears	14/1
Number of gears with super creeper gears	32/32
Maximum speed	40 kph

Rear axle transmission	
Rear axle type	GPA23
Number of pinion/ring gear teeth	8/39
Rear axle ratio (crownwheel and pinion)	27.161
4WD ratio	0.830
Final drive type	Super Heavy Duty
Final drive reduction ratio	(64+14)/14
Maximum 4WD clutch torque	206 daNm
Number of 4WD discs	6
Main brake type	Disc
Number of discs	1 per side
Braking pressure	-
Parking brake type	Hand brake
Trailer brake type	Hydraulic and/or pneumatic with built-in antifreeze pump
Pneumatic trailer braking pressure	6.5 bar to 8 bar
Hydraulic trailer braking pressure	0 to 150 bar
Maximum operating tilt - pitch (front/rear)	15° (> 15 kph) 22° (< or = 15 kph)
Maximum operating tilt - roll (right/left)	15° (> 15 kph) 22° (< or = 15 kph)
Maximum operating tilt - combined	15° (> 15 kph) 22° (< or = 15 kph)
Transmission preheater	110 V and 240 V accessory kits
Total loaded weight supported by rear axle - 40 kph	6900 kg

Front axle	
Front axle brand	DANA
Axle type	Fixed or suspended
Supplier reference - fixed front axle	735/530
Supplier reference - suspended front axle	735/613
Rotational direction	Anti-clockwise
Fixed front axle weight	347 kg
Suspended front axle weight	587 kg
Total loaded weight supported by front axle (maximum load on road)	5400 kg
Recommended oil type (beam and final drive)	SAE85W90 (API GL4-MIL L-2105)
Total ratio for fixed front axle	17.000
Total ratio for suspended front axle	17.000
Number of teeth on final drive	-
Ratio for fixed axle final drive	6
Ratio for suspended axle final drive	6
Number of fixed axle pinion/ring gear teeth	12/34
Number of suspended axle pinion/ring gear teeth	12/34
Differential type	Multidisc
Number of differential discs	12
Maximum steering angle	55°

Front axle	
Oscillation angle	± 9°
Type of oscillation stop	Mechanical
Steering ram diameter	68 mm x 32 mm
Steering ram stroke	2 x 129 mm
Suspension type	Hydraulics
Suspension ram diameter	65 mm x 60 mm
Suspension ram stroke	100 mm
Hydraulic control unit brand	Husco
Hydraulic control unit nominal pressure	200 bar
Number of accumulators	2
Accumulator pressure	Left-hand 0.5 l = 10 bar Right-hand 0.75 l = 50 bar
Suspension sensor type	Angular potentiometer.
Steering sensor type	Angular potentiometer.
Brake type	Combined with the rear brake
Factor K	1.326

Electrohydraulic	
System type	Open centre (OC) 57 l/min or 100 l/min Closed Centre Load Sensing (CCLS) 110 l/min
Flow rate	57 l/min or 100 l/min (OC) 110 l/min (CCLS)
High-pressure pump type	Bosch Rexroth gear pump(s) (OC) Bosch Rexroth piston pump (CCLS)
High-pressure pump displacement	19 cm ³ (OC 57 l/min) 19 cm ³ + 14 cm ³ (OC 100 l/min) 45 cm ³ (CCLS)
High-pressure pump rotational speed	2200 rpm
High-pressure pump maximum flow rate	57 l/min or 98 l/min (OC) 117 l/min (CCLS)
High-pressure pump maximum pressure	200 bar
Maximum quantity of oil to add for heavy implements	10 l
Maximum exportable oil quantity (without adding oil)	32 l
Maximum exportable oil quantity (adding oil)	42 l
Charge pump type	Suction (OC) Gear pump 71 cm ³ (CCLS 110 l/min)
Main relief valve adjustment pressure	195 bar ± 5 bar (OC) 230 bar ± 5 bar (CCLS)
Number of spool valves (maximum)	4
Number of front "push-pull" connectors (maximum)	4
Number of rear "push-pull" connectors (maximum)	8
Maximum flow rate per spool valve	57 l/min or 98 l/min (OC) 100 l/min (CCLS)
Spool valve control type	Mechanical (OC) Electrohydraulic (CCLS)
Recommended oil:	According to MF CMS M 1145 specification

Steering	
Steering type	Hydrostatic
Type of control	Steering wheel
Steering unit displacement	160 cm ³
Steering ram diameter	68 mm x 32 mm
Steering ram stroke	2 x 129 mm
Working pressure	175 bar ± 5 bar
Pressure relief valve adjustment pressure	175 bar ± 5 bar
Shock valve adjustment pressure	240 bar
Oil recommended for steering	According to MF CMS M1145 specification

Linkage	
Rear lift ram diameter	75 mm
Rear linkage travel	728 mm (CAT 2) 718 mm (CAT 3)
Maximum lifting capacity at ball joints (rear)	7100 kg
Operating pressure (rear)	180 bar
3-point linkage category (rear)	CAT 2 or CAT 3
Front lift ram diameter	80 mm (3.2 t) 90 mm (4 t)
Front linkage travel	684 mm (3.2 t) 750 mm (4 t)
Maximum lifting capacity at ball joints (front)	3200 kg or 4000 kg
Operating pressure (front)	180 bar
3-point linkage category (front)	CAT 2

Rear power take-off (PTO)	
Number of selections possible for rear PTO	540/1000 540/540E/1000/1000E with GSPTO option
Maximum permissible power 540/540E in 1"3/8 (6 and 21 splines)	540 = 74 kW 540E = 40 kW
Maximum permissible power 540/540E in 1"3/4 (20 splines)	540 = 74 kW 540E = 40 kW
Maximum permissible power 1000/1000E in 1"3/8 (6 and 21 splines)	1000 = 93 kW 1000E = 40 kW
Maximum permissible power 1000/1000E in 1"3/4 (20 splines)	1000 = 93 kW 1000E = 40 kW
Engine speed if PTO 540	1980 rpm
Engine speed if PTO 540E	1533 rpm
Engine speed if PTO 1000	2030 rpm
Engine speed if PTO 1000E	1572 rpm
Rotational direction	Clockwise
Clutch type	Multidisc hydraulic
Number of clutch discs	5
Control pressure	21 bar
Splined shaft type	6 or 21 in 1"3/8 or 20 in 1"3/4

Front power take-off	
Number of selections possible for front PTO	1000 rpm
Maximum permissible power - clockwise	100 kW
Maximum permissible power - anti-clockwise	110 kW
Maximum permissible torque - clockwise	497 Nm
Maximum permissible torque - anti-clockwise	549 Nm
Rotational direction	2 directions of rotation: Clockwise or anti-clockwise
Engine speed if PTO 1000	1920 rpm
Ratio	1.92
Clutch type	Multidisc hydraulic
Splined shaft type	6 or 21 in 1"3/8

Electric	
Battery brand	TAB
Battery specifications (2 batteries)	12V 66 A/H
Maximum current at start-up (IEC standard)	840 A
Starter type	12 V
Starter power	3,2 KW
Alternator type	1 x 175 A or 2 x 120 A
Current available on ISOBUS connector	50 A
Hazard warning light unit	HELLA
Interior light, left-hand door	2 x 5 W
Roof light	-
Type of bulb for side light indicators on hand rail	12 V 21 W / 12 V 10 W
Type of bulb for brake lights, side lights on fenders	12 V 21 W / 12 V 5 W
Type of bulb for main beams on lighting bar at front of bonnet	H4 - 12 V 60/55 W
Type of bulb for dipped lights and side lights on lighting bar at front of bonnet	H7 - 12 V 55 W + T4 - 12 V 4 W
Type of bulb for main beams on hand rail	H4 - 12 V 60/55 W
Type of bulb for main beams on hand rail, low position	H3 - 12 V 55 W
Type of bulb for work lights on hand rail	H3 - 12 V 55 W
Type of bulb for work lights on roof	H3 - 12 V 55 W
Type of bulb for work lights on step	-
Type of bulb for number plate lights on roof	H3 - 12 V 55 W
Type of bulb for reversing lights	12 V 21 W
Type of bulb for rotary beacon	H1 - 12 V 55 W

Electronics	
Function of each controller	
DCC3	Instrument panel
EXT Lite	-
CAN levers and armrest	-

Electronics	
AUTOTRONIC 5 DC	3 Autotronic 5 DC: – 1 for linkage – 1 for transmission – 1 TECU (without VIN code) suspended front axle
SB23 valves	-
Lights module	Linkage/rear electrohydraulic power take-off/user lights interface
Lighting controller	-
EEM4 (ECM Tier 4 AGCO Power)	Engine/Denoxtronic module
NOx ECU	2 NOx ECU: converters of NOx sensor signals to EEM4 via CAN
Danfoss Orbitrol valve	-
TopDock aerial	-
Datatronic CCD	-
Automatic air conditioning module	-
CAN switches key pad	-
LIN switches key pad	Controls for: – main lighting – 4WD front axle, manual and automatic – manual and automatic differential lock – front axle suspension
AM50 unit	AgCommand™

Cab and fittings	
Type of cab suspension available	Mechanical, 2 points at rear
Type of rear-view mirror control available	Manual
Type of air conditioning control available	Manual
Type and brand of air conditioning compressor	SANDEN with axial pistons
Compressor displacement	154.9 cm ³ /rev.
Refrigerant	R134a
Noise level in cab with doors closed	70 dBA
Roof type	Standard or with hatch or high visibility

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