

SYSTEM TROUBLE SHOOTING

The following information lists possible problems, their cause and corrective action. The systems are listed as follows:

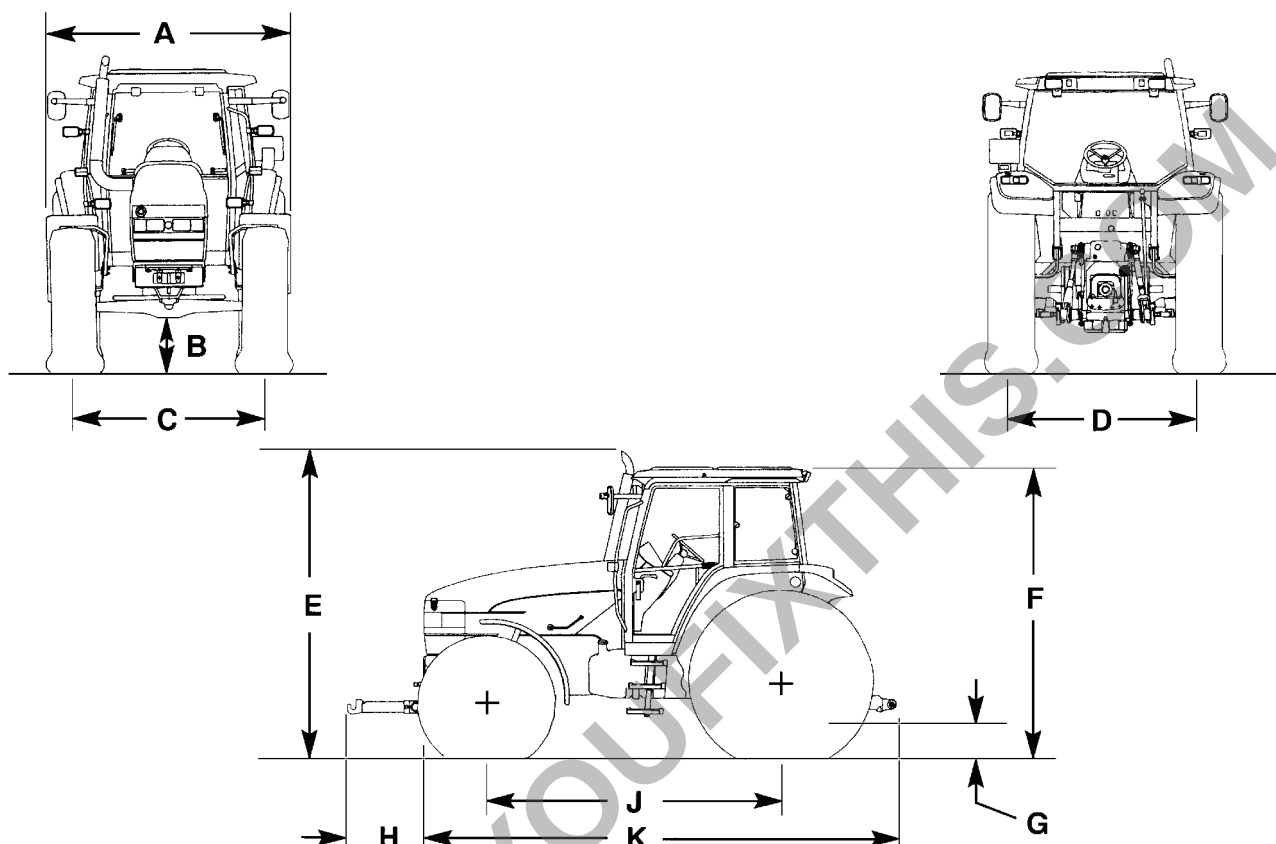
Subject	Page	Subject	Page
Engine	5-2	Hydraulics	5-8
Transmission		3-point linkage	5-9
- Range Command or Power Command	5-5	Brakes	5-10
- Dual Command	5-6	Cab	5-10
- Synchro Command	5-7	Electrical	5-11

ENGINE

PROBLEM	POSSIBLE CAUSE	CORRECTION
Engine will not start or is difficult to start	Incorrect starting procedure.	Review starting procedure.
	Low or no fuel.	Check fuel level.
	Air in fuel lines.	Bleed fuel system.
	Low ambient temperature.	Use cold starting aid.
	Contaminated fuel system.	Clean and bleed fuel system.
	Fuel pump inoperative.	Check fuse. If satisfactory, replace pump.
	Clogged fuel filter(s).	Replace fuel filter element(s).
	Malfunctioning fuel injectors.	See your authorised dealer.
	Malfunctioning fuel solenoid or solenoid relay.	See your authorised dealer.
	Incorrect engine oil viscosity.	Use correct viscosity oil.
Engine runs roughly and/or stalls	Incorrect fuel for operating temperature.	Use correct type fuel for temperature conditions.
	Slow starter speed.	See slow starter speed in Electrical.
	Clogged fuel filter(s).	Replace fuel filter element(s).
	Contaminated fuel system.	Clean and bleed fuel system.
	Fuel solenoid incorrectly adjusted.	See your authorised dealer.
	Fuel cap vent blocked.	Wash cap in clean fuel oil.

TRACTOR DIMENSIONS

All Models



NOTE: The following dimensions are based on standard tractors fitted with tyre sizes as shown. Allowance must be made for tyres of larger or smaller dimensions:

Front tyres (two wheel drive)
11.00 - 16

Front tyres (four wheel drive)
480/70R-28

Rear tyres
580/70R-38

A Standard fenders
Extended fenders

2012 mm
2300 mm

79.2 in
90.6 in

B Under standard 4WD front axle

413 mm

16.2 in

C 2WD
4WD - Manual adjust wheels

1543 - 2187 mm
1552 - 2269 mm

60.8 - 86.1 in
61.1 - 89.3 in

LUBRICATION AND MAINTENANCE CHART

Service Interval	Operation No.	Maintenance Requirement	Check	Clean	Lube	Change	Adjust	Drain	Page No.
When warning lamp lights	1	Engine air cleaner outer element	X	X					4-7
	2	Engine coolant level	X				X		4-10
	3	Brake fluid reservoir level	X				X		4-11
	4	Clutch fluid reservoir level (where fitted)	X				X		4-11
	5	Fuel filter/water separator	X					X	4-12
Every 10 hours or daily	6	Engine oil level	X				X		4-13
	7	Windscreen washer reservoir fluid level (where fitted)	X				X		4-13
	8	Air reservoir(s) (air operated trailer brakes)						X	4-14
Every 50 hours	9	Radiator, oil cooler and air conditioner condenser	X	X					4-15
	10	Cab air filters		X					4-16
	#11	All grease fittings			X				4-17
	12	Front and rear wheel nut torque	X				X		4-25
	13	Tyre pressures and condition	X				X		4-26
	14	Remote control valve drain bottle(s)	X						4-26
Every 300 hours	*15	Engine oil and filter				X			4-27
	16	Battery electrolyte level (tropical climates)	X	X			X		4-29
	17	Four wheel drive front axle and hubs oil level	X				X		4-29
	#18	Front wheel bearings (2 wheel drive only)			X				4-30
	#19	Rear axle shafts			X				4-31
	20	Transmission/rear axle/hydraulics oil level	X				X		4-31
	21	Poly V-belt	X						4-32
	22	Compressor drive belt (where fitted)	X				X		4-32
	23	Cab and safety frame mounting bolts torque	X				X		4-33
	24	Parking brake	X				X		4-34
Every 600 hours	25	Hydraulic and transmission oil filters				X			4-35
	26	Engine air cleaner outer element				X			4-36
	27	Engine air intake connections	X						4-36
	28	Engine valve clearance	X				X		4-37
	29	Fuel filter secondary element	X			X			4-38
Every 1200 hours or annually	30	Fuel filter primary element	X			X			4-39
	31	Cab air filters				X			4-40
	32	Transmission/rear axle/hydraulic oil and filter				X			4-41
	33	FWD axle differential oil				X			4-42
	34	FWD axle hub oil				X			4-43
	35	Battery electrolyte level (temperate climates)	X	X			X		4-44
Every 1200 hours or two years	36	Engine coolant				X			4-45
	37	Engine air cleaner inner element				X			4-49
Every 1800 hours	38	Fuel injectors	X	X			X		4-51
General maintenance	39	Bleeding the fuel system	X				X		4-53
	40	Transmission calibration (Dual Command transmission)	X				X		4-53
	41	Transmission calibration (Range Command transmission)	X				X		4-57
	42	Transmission calibration (Power Command transmission)	X				X		4-60
	43	Calibrating the EMU	X				X		4-63
	44	Footbrakes	X				X		4-65
	45	Engine idle speed	X				X		4-66
	46	Automatic pick-up hitch	X				X		4-66
	47	Air conditioner	X						4-66
	48	Headlight and worklamp adjustment	X				X		4-67
	49	Bulb replacement				X			4-67
	50	Fuse replacement				X			4-71

* Oil change interval will be reduced if fuel has a high sulphur content or if the tractor is operated in extremely cold temperatures.

Grease more frequently when operating in very wet, muddy or extremely dusty conditions.

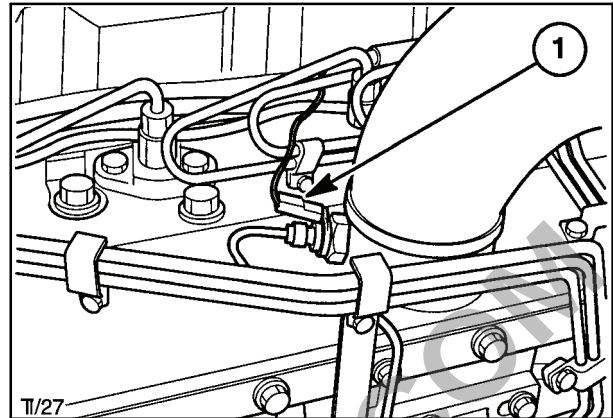
STARTING THE ENGINE

Figure 1



WARNING

Your tractor is equipped with the Thermostart cold weather starting aid. Do **not** use ether with Thermostart installed. It will explode in the intake manifold. If, in an emergency, it is necessary to use ether, disconnect the Thermostart wire (1) from the heater terminal on the intake manifold.



1

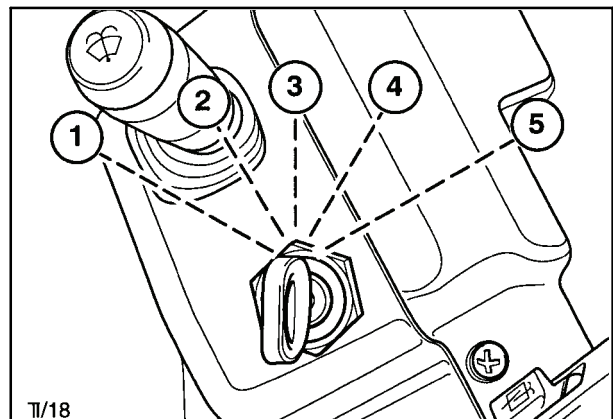
The Thermostart, which is effective in ambient temperatures down to -18°C (0°F), consists of a heating element installed in the intake manifold. When operated by the key-start switch, the Thermostart will ignite fuel in the manifold, heating inducted air prior to it being drawn into the combustion chamber.

If temperatures below -18°C (0°F) are encountered, a coolant immersion heater is available as an accessory. The coolant immersion heater is effective in ambient temperatures down to -29°C (-20°F) when used in conjunction with the Thermostart.

Figure 2

A five-position key-start switch is installed. The key-start switch positions are as follows:

Position 1	Thermostart activated
Position 2	Off
Position 3	Accessories on
Position 4	Warning lights and instruments on
Position 5	Starter motor engaged

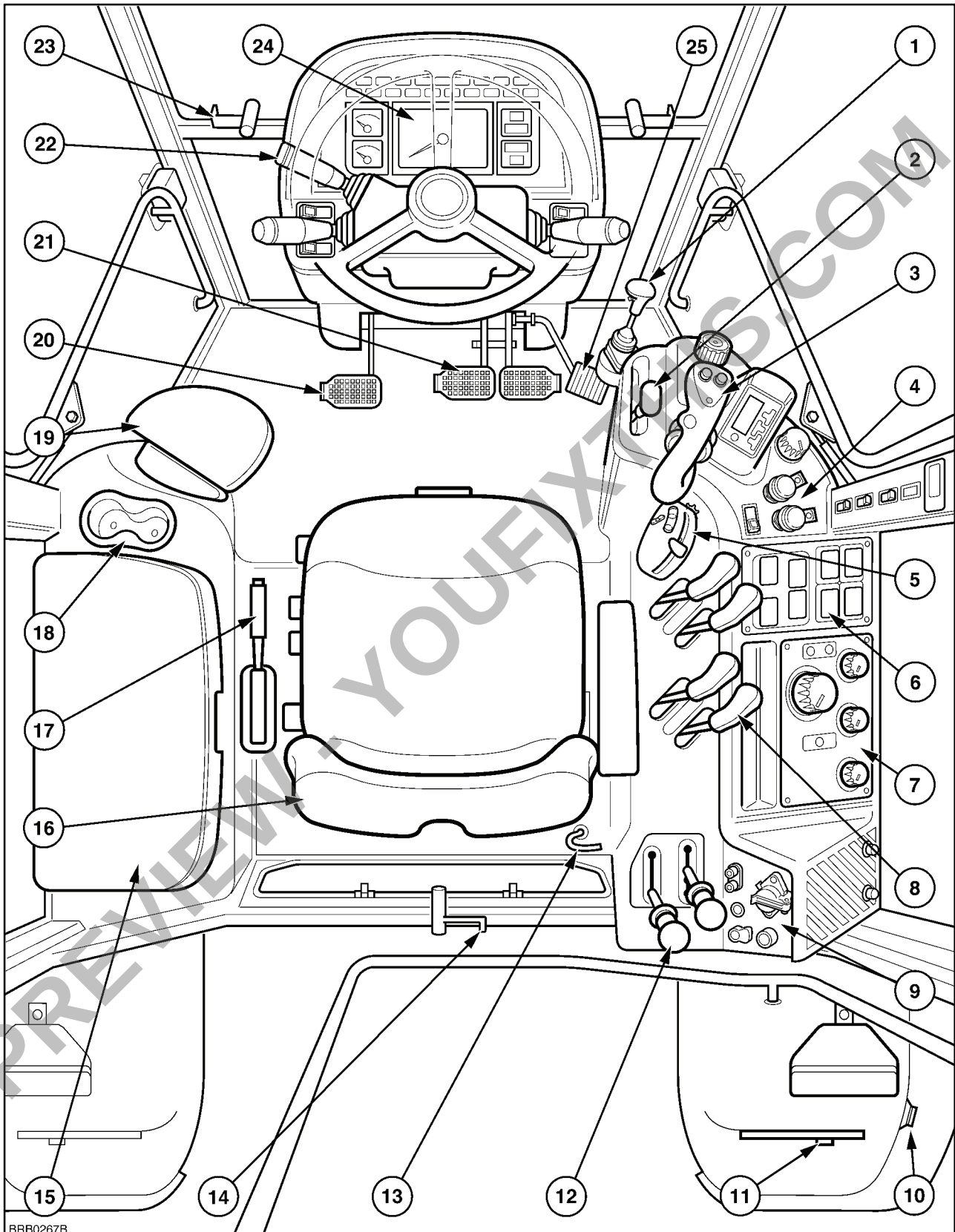


2

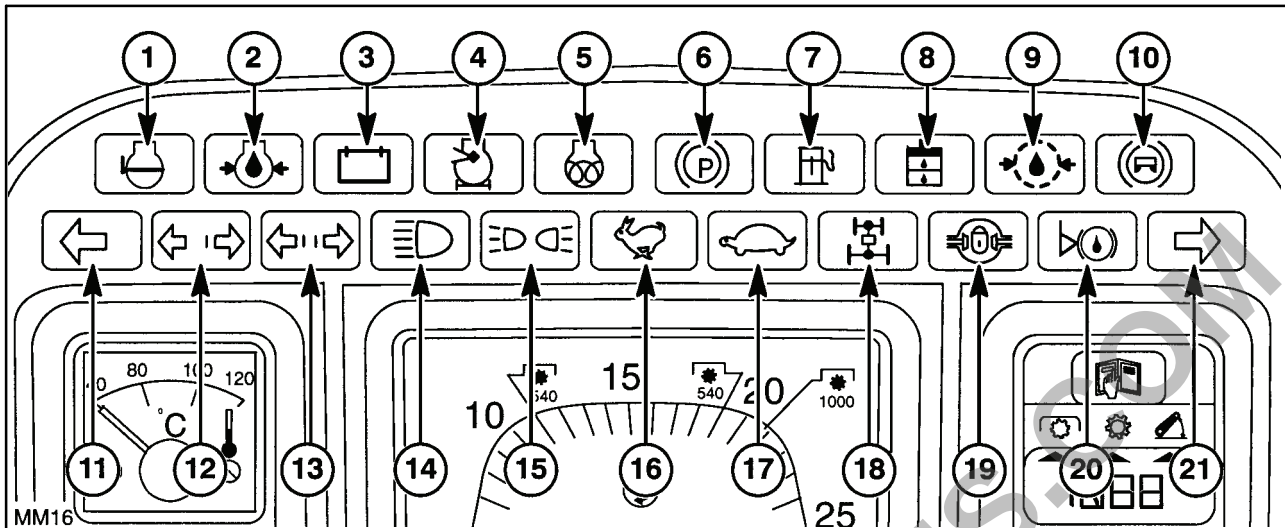
IMPORTANT: Never push or tow the tractor to start the engine. Doing so may overstress the drive train.

NOTE: Neutral start switches prevent operation of the starting motor unless the forward/reverse (shuttle) lever is in the neutral (N) position (except Synchro Command) and the clutch pedal depressed (all transmissions).

CAB AND PLATFORM CONTROLS



1 General View of Tractor Controls



60

Indicator and Warning Lights - Figure 60

The twenty one coloured lights, shown in Figure 60, provide operating information or give warning of system malfunction. The lights are common to both instrument panels and their illumination may be accompanied by a critical or non critical alarm sound. See 'Audible Alarm' on page 2-35.

The lights function as follows:

Upper Row - left to right

1. Engine coolant level - Flashing light indicates coolant is below a pre-set level. Stop the engine and investigate the cause. See Maintenance (Section 4).
2. Engine oil pressure - Steady light indicates low engine oil pressure. Stop the engine and investigate the cause.
3. Alternator - Steady light indicates that the alternator is not charging.
4. Air cleaner - Steady light indicates that the air cleaner is blocked or partially blocked. Stop the tractor and service the air cleaner to prevent damage to the engine.

5. Thermostart - Light will illuminate when the Thermostart is activated by the key-start switch. See 'Starting the Engine' on page 3-2.

6. Parking brake - With the key-start switch on, a flashing light indicates that the parking brake is applied.

If the key-start switch is turned off and the parking brake is not applied, an audible alarm will sound continuously for a minimum of two minutes or until the handbrake is applied.

⚠ WARNING ⚠

To avoid personal injury, always apply the parking brake before leaving the tractor seat.

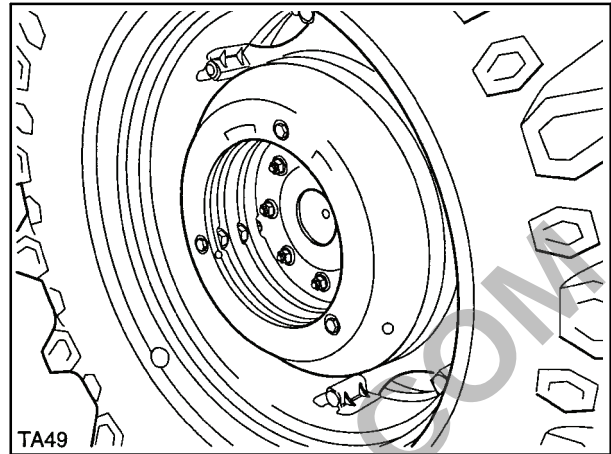
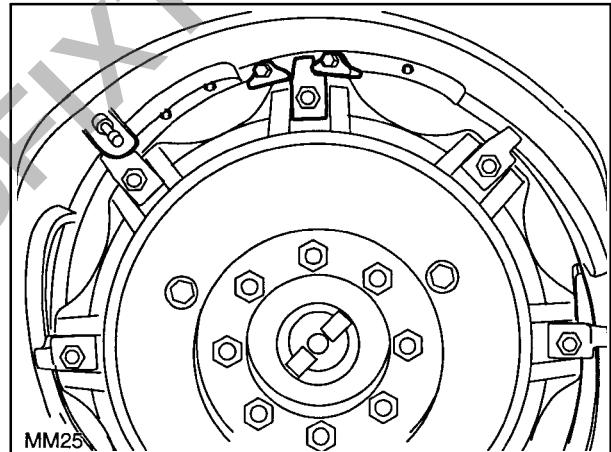
7. Water in fuel - Light will illuminate if water is detected in the fuel. Stop the tractor and service the fuel filters to prevent damage to the fuel injection system.
8. Transmission oil filter blocked - Steady light accompanied by **non-critical** alarm indicates that the transmission oil filter(s) is/are blocked or partially blocked. Stop the engine and service the oil filter(s) to avoid damage to the transmission.

OPERATION 12**CHECK FRONT AND REAR WHEEL NUTS****- Figures 47 and 48**

Check the front and rear wheel nuts for tightness using a torque wrench (with a torque multiplier, where necessary). A manual adjust wheel is shown in Figure 47 and a power adjust wheel in Figure 48.

The specified torque figures are shown in the following table:

Two wheel drive -	
Front disc to hub bolts	300 Nm (220 lbf. ft.)
Four wheel drive - Manual adjust front wheels	
Front disc to hub nuts	210 Nm (155 lbf. ft.)
Front disc to rim nuts	240 Nm (177 lbf. ft.)
Four wheel drive - Power adjust front wheels	
Front disc to hub bolts	210 Nm (155 lbf. ft.)
Disc to rim clamp nuts	245 Nm (180 lbf. ft.)
Manual adjust rear wheels	
Disc to hub nuts	250 Nm (184 lbf. ft.)
Disc to rim nuts (34 in. rims)	240 Nm (177 lbf. ft.)
Disc to rim nuts (38 in. rims)	280 Nm (207 lbf. ft.)
Power adjust rear wheels	
Disc to hub nuts	250 Nm (184 lbf. ft.)
Disc to rim clamp nuts	245 Nm (180 lbf. ft.)
Bar axle	
Split collet bolts	300 Nm (220 lbf. ft.)
Disc to hub nuts - steel discs	260 Nm (190 lbf. ft.)
Disc to rim nuts - cast discs	450 Nm (330 lbf. ft.)
Disc to rim nuts - steel discs:	
with M16 bolts	225 Nm (166 lbf. ft.)
with M18 x 125 mm bolts	360 Nm (266 lbf. ft.)
with M18 x 65 mm bolts	450 Nm (330 lbf. ft.)

**47****48**

ENGINE (continued)

PROBLEM	POSSIBLE CAUSE	CORRECTION
Engine lacks power	Engine overloaded.	Shift to lower gear, reduce draft load or ballast carried.
	Air cleaner restricted.	Service air cleaner.
	Low engine operating temperature.	Check thermostats.
	Engine overheats.	See Engine overheats.
	Clogged fuel filter(s).	Replace fuel filter element(s).
	Incorrect fuel.	Use correct type fuel.
	Incorrect engine valve clearance.	Check and adjust.
	Malfunctioning fuel injectors.	See your authorised dealer.
	Malfunctioning fuel injection pump.	See your authorised dealer.
	Maximum 'no-load' speed set too low.	See your authorised dealer.
	Leaking air intake or exhaust manifold.	Check and rectify or see your authorised dealer.
	Turbocharger malfunctioning (where fitted).	See your authorised dealer.
	Implement incorrectly adjusted.	See implement Operator's Manual.
Engine knocks	Fuel injection pump timing.	See your authorised dealer.
	Low engine oil level.	Add oil, as required.
	Low engine oil pressure.	See your authorised dealer.
	Low engine operating temperature.	Check thermostats.
	Engine overheats.	See Engine overheats.
Engine overheats	Low engine oil level.	Add oil, as required.
	Low engine coolant level.	Fill coolant recovery tank. Check cooling system for leaks.
	Defective thermostat(s).	Check thermostat(s).
	Dirty/blocked radiator core.	Clean.
	Excessive engine overload.	Shift to lower gear, reduce draft load or ballast carried.

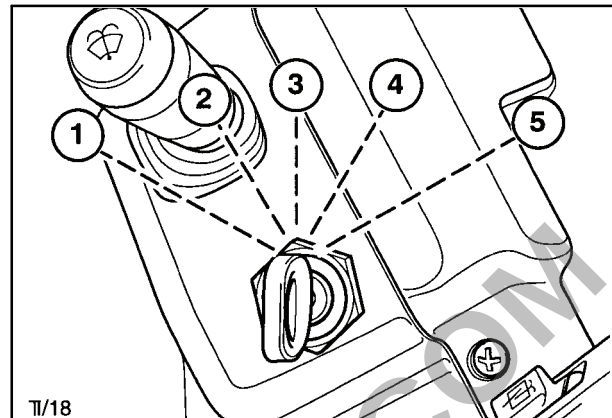
ENGINE		TM115	TM125	TM135	TM150	TM165
Advertised						
Engine power (at rated speed)	Kw	78	86	93	104	119
	Hp	105	115	125	140	160
Turbocharged		No	Yes	Yes	Yes	Yes
Rated speed	rev/min.	2200	2200	2200	2200	2300
Maximum no load speed	rev/min. $\pm$ 25	2375	2375	2375	2375	2485
Idle speed	rev/min. $\pm$ 25	800				
Number of cylinders		6				
Bore	mm.	111.8				
	in.	4.4				
Stroke	mm.	127				
	in.	5.0				
Displacement	cm ³	7472				
	in ³	456				
Compression ratio		17.5:1				
Firing order		1.5.3.6.2.4				
Valve tappet clearance (cold) Intake	mm.	0.36 - 0.46				
	in.	0.014 - 0.018				
Valve tappet clearance (cold) Exhaust	mm.	0.43 - 0.53				
	in.	0.017 - 0.020				
FUEL SYSTEM						
Injection pump type (Rotary)		Bosch VE				
Timing BTDC		3.5°				
Injector crack-off pressure	bar	270 - 278				
	lbf/in. ²	3915 - 4031				

STOPPING THE ENGINE - Figure 10

IMPORTANT: Turbo-charged engines only – Before stopping, idle the engine at 1000 rev/min for approximately one minute. This will allow the turbo-charger and manifold to cool and prevent possible distortion of components.

To stop the engine, carry out the following procedure:

- Sit in the driver's seat.
- Close the throttle.
- Ensure that the parking brake is firmly applied.
- Ensure that **all** gearshift levers are in neutral.
- Ensure the P.T.O. is disengaged.
- Place the remote control valve levers in the neutral position.
- Move the hydraulic lift control lever fully forward to lower all hydraulic equipment to the ground.
- Turn the key-start switch off – position (3).

**10****RUNNING-IN PROCEDURE**

Your new tractor will provide long and dependable service if given proper care during the 50 hour running-in period and if serviced at the recommended intervals.

Avoid overloading the engine. Operating in too high a gear under heavy load may cause excessive engine overloading. Overloading occurs when the engine will not respond to a throttle increase.

Do not operate without a load on the engine. This can be as harmful to the engine as overloading. Vary the type of operation undertaken so that the engine is subjected to heavy as well as light loads during the running-in period.

Use the lower gear ratios when pulling heavy loads and avoid continuous operation at constant engine speeds. Operating the tractor in too low a gear with a light load and high engine speed will waste fuel. You will save fuel and minimise engine wear by selecting the correct gear ratio for each particular operation.

Check the instruments and warning lights frequently and keep the radiator and various oil reservoirs filled to the recommended levels.

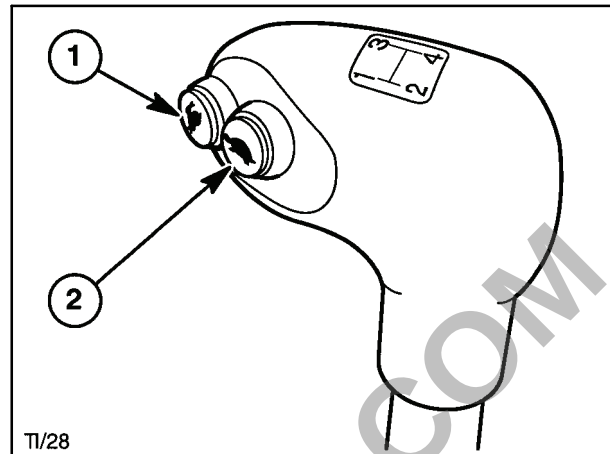
Key to Figure 1**Page Nos. for Reference**

1. Joystick control	3-26/3-31, 3-59
2. Hand throttle	2-23
3. Transmission controls	
Synchro Command transmission	2-54/2-56
Dual Command transmission	2-61/2-65
Range Command transmission	2-70/2-78
Power Command transmission	2-85/2-99
4. P.T.O. controls and front hitch	3-9/3-31
5. Hydraulics controls	
Open centre system	3-32/3-37
Closed centre system	3-51/3-57
6. Electronic Management Unit (EMU)	2-100/2-106
7. E.D.C. control panel	3-51/3-57
8. Remote control valve levers	
Open centre system	3-38/3-44
Closed centre system	3-58/3-58
9. Electrical accessory sockets	2-14
10. External P.T.O. control switch	3-22
11. External hydraulic power lift control	3-55/3-57
12. P.T.O. range selectors	3-9/3-24
13. Release handle	
Automatic pick-up hitch	7-25
Tow hitch	7-24
14. Rear window locking handle	2-6
15. Storage box	2-12
16. Operator's seat	2-17/2-20
17. Parking brake	2-23
18. Drinks holder	2-12
19. Folding passenger seat	2-12
20. Clutch/inching pedal	
Synchro Command transmission	2-54/2-56
Dual Command transmission	2-61/2-65
Range Command transmission	2-70/2-78
Power Command transmission	2-85/2-99
21. Foot brakes	2-24
22. Shuttle lever	
Dual Command transmission	2-61/2-65
Range Command transmission	2-70/2-78
Power Command transmission	2-85/2-99
23. Opening windscreen locking handle	2-6
24. Instrument panel	
Console switches	2-25/2-27, 7-2
Analogue and analogue/digital instrument panel	2-28/2-33
Electronic instrument panel	2-34/2-53
25. Foot throttle	2-23

Synchro Calibration - Figure 112

1. Press and hold in both Dual Command shift buttons (1) and (2) on the main gearshift lever. If an error code ('U' followed by a two digit number) is displayed in the instrument panel, then the calibration conditions have not been met. See table below for explanation of error codes.

2. Under normal calibration conditions, 'Soc' will be displayed for a few seconds then the numbers 1 to 5 will be displayed sequentially, indicating progression through the synchroniser calibration. When calibration is completed, 'End' will be displayed.



TI/28

112

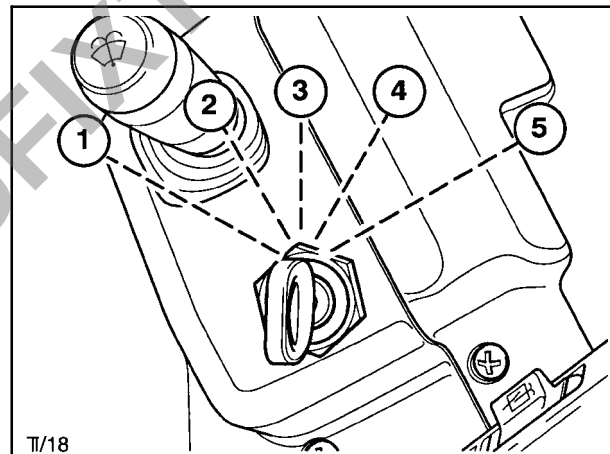
To Exit The Calibration Mode - Figure 113

1. Turn the key-start to the off position (2).

The tractor is now ready for normal operation.

Error Codes

Code	Meaning
U20	Correct start up sequence was not used. Depress and release the clutch pedal, then repeat the high range clutch calibration procedure.
U21	Engine speed too low (1200 ± 100 rev/min)
U22	Engine speed too high (1200 ± 100 rev/min)
U23	Shuttle lever not in forward position.
U24	Main gear lever not in 1st. gear.
U25	Range lever not in high range.
U26	Clutch pedal not fully released.
U27	High clutch calibration too low. Starting pressure sufficient to cause engine pull down.
U28	High clutch calibration too high. Max. test pressure reached without drop in engine speed.
U29	Low clutch calibration too low. Starting pressure sufficient to cause engine pull down.
U30	Low clutch calibration too high. Max. test pressure reached without drop in engine speed.
U31	Tractor wheel movement detected.
U37	Synchroniser shuttle mode calibration - Synchro potentiometer feedback outside limits.
U38	Synchroniser hi/lo mode calibration - Synchro potentiometer feedback outside limits.
U39	Synchroniser neutral mode calibration - Synchro potentiometer feedback outside limits.



TI/18

113

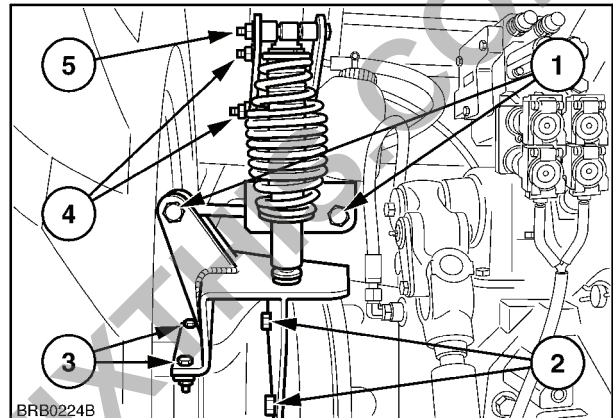
Cab Rear Mounting Bolts and Nuts (tractors with suspended cab) - Figure 67

The rear mounts are accessible from beneath the cab and are located on both sides, at the rear. Torque the nuts/bolts as follows:

- | | |
|---|--|
| (1) Stabiliser rod nuts:
(two nuts, left-hand side only) | 200 Nm
(147 lbf. ft.) |
| (2) Mounting bracket
to axle housing
bolts:
(three
each side) | 145 Nm (107 lbf. ft.)
(except TM165)

215 Nm (158 lbf. ft.)
(TM165 only) |
| (3) Mounting bracket
to axle bolts:
(two
each
side) | 310 Nm (228 lbf. ft.)
(except TM165)

85 Nm (62 lbf. ft.)
(TM165 only) |
| (4) Upper mounting bracket
nuts (two each side) | 50 Nm
(37 lbf. ft.) |
| (5) Suspension strut
upper mounting nut
(one each side) | 215 Nm
(158 lbf. ft.) |



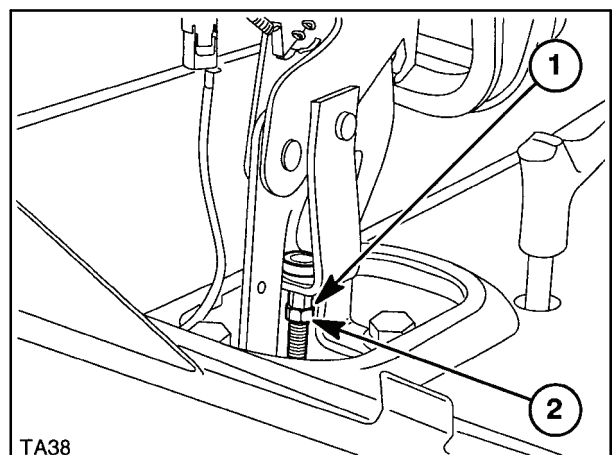
67

OPERATION 24 ADJUST PARKING BRAKE - Figure 68

Block the front wheels, jack up the rear of the tractor and support the rear wheels just clear of the ground.

Apply the handbrake so that the 4th. notch of the sector is engaged. Loosen the locknut (2) and turn the adjuster nut (1) on the operating cable until the wheels start to lock. Release the handbrake and ensure that both wheels are free to rotate. Apply the handbrake to ensure that the system operates freely. Tighten the locknut.

Road test, using the handbrake to stop the tractor.



68

CONTENTS

Title	Page
Section 1 - General Information and Safety	
To the owner	1-1
Product identification	1-2
Ecology and the environment	1-4
Safety precautions	1-5
Safety decals	1-11
International symbols	1-14
Airborne noise emission	1-15
Section 2 - Controls, Instruments and Operation	
Cab	2-2
Seats	2-17
Handbrake, Throttle and Foot Controls	2-23
Instrument Console	2-25
Analogue and Analogue/Digital Instruments	2-28
Electronic Instrument Panel	2-34
Synchro Command Transmission (16 x 16 and 20 x 16)	2-54
Dual Command Transmission (24 x 12 and 23 x 12)	2-61
Range Command Transmission (18 x 6 and 17 x 6)	2-70
Power Command Transmission (18 x 6 and 17 x 6)	2-85
Electronic Management Unit	2-100
Section 3 - Field Operation	
Starting and Stopping the Engine	3-2
Rear Power Take-Off	3-9
Front Power Take-Off and Hydraulic Lift	3-25
Mechanical Lower Link Sensing Hydraulics	3-32
Remote Control Valves - open centre	3-38
Electronic Draft Control	3-51
Remote Control Valves - closed centre	3-58
Three-point Linkage	3-65
Front Wheel Track Adjustment	3-73
Rear Wheel Track Adjustment	3-83
Ballasting and Tyres	3-97
Section 4 - Lubrication and Maintenance	
General information	4-1
Lubrication and maintenance chart	4-6
Servicing when warning lights illuminate	4-7
10-hour/daily service	4-13
50-hour service	4-15
300-hour service	4-27
600-hour service	4-35
1200-hour/12 month service	4-39
1200-hour/24 month service	4-45
1800-hour service	4-51
General maintenance - as required	4-53

SAFETY PRECAUTIONS

A careful operator is the best operator. Most accidents can be avoided by observing certain precautions. To help prevent accidents, read and take the following precautions **before** driving, operating or servicing the tractor. Equipment should be operated only by those who are responsible and instructed to do so.

PRECAUTIONARY STATEMENTS

Throughout this Manual you will see text in *italics*, preceded by the words **NOTE**, **ATTENTION**, **IMPORTANT**, **CAUTION**, **WARNING** or **DANGER**. Such text has the following significance:

Machine Safety

NOTE: *This text stresses a correct operating technique or procedure.*

ATTENTION: *This text warns the operator of potential machine damage if a certain procedure is not followed.*

IMPORTANT: *This text informs the reader of something that he needs to know to prevent minor machine damage if a certain procedure is not followed.*

Personal Safety

 **CAUTION:** *The word CAUTION is used where a safe behavioural practice, according to operating and maintenance instructions and common safety practices will protect the operator and others from accident involvement.*

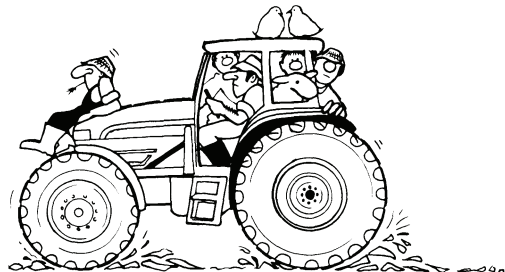
 **WARNING:** *The word WARNING denotes a potential or hidden hazard which could possibly cause serious injury. It is used to warn operators and others to exercise due care and attention to avoid a surprise accident with machinery.*

 **DANGER:** *The word DANGER denotes a forbidden practice in connection with a serious hazard.*

Failure to follow the CAUTION, WARNING and DANGER instructions may result in serious bodily injury or even death.

THE TRACTOR

1. Read the Operator's Manual carefully before using the tractor. Lack of operating knowledge can lead to accidents.
2. Only allow properly trained and qualified persons to operate the tractor.
3. To prevent falls, use the handrails and step plates when getting on and off the tractor. Keep steps and platform clear of mud and debris.
4. Replace all missing, illegible or damaged safety decals.
5. Keep safety decals free of dirt or grime.



6. Do not permit anyone but the operator to ride on the tractor unless a passenger seat is fitted. There is no safe place for extra passengers otherwise.
7. Keep children away from the tractor and farm machinery at all times.
8. Do not modify or alter or permit anyone else to modify or alter the tractor or any of its components or any tractor function without first consulting your dealer.
9. Install all guards before starting the engine or operating the tractor.

SECTION 10

INDEX

A

Airborne noise 1-15
Air cleaner 4-7, 4-36, 4-49
Air conditioner 2-10, 4-15, 4-66
Air intake connections 4-36
Air operated trailer brakes 4-14, 4-32, 7-4
Air suspension seat 2-17, 2-19
Analogue & analogue/digital
instrument panel 2-28
Antifreeze 4-47
Attaching equipment 3-65, 7-15
Automatic engine shut down 7-2
Automatic pick-up hitch 4-66, 7-25

B

Ballast limitations 3-98
Ballasting and tyres 3-97
Bar axle 3-90
Bargraph display 2-37
Batteries 4-29, 4-44
Battery voltage display 2-42
Battery charging 4-73
Bleeding remote cylinders 3-44
Bleeding the fuel injection system 4-53
Booster cables 3-6
Brakes 2-24, 4-11, 4-34, 4-65, 5-10, 8-8
Bulb replacement 4-67

C

Cab 1-10, 2-4, 5-10
Cab air filters 4-16, 4-40
Cab and platform controls 2-2
Cab or platform mounting bolts 4-33
Calibrating ground speed 2-44
Calibrating the clutch
- Dual Command transmission 4-53
- Range Command transmission 4-57
- Power Command transmission 4-60
Calibrating the electronic management unit .. 4-63
Cast iron weights 3-100
Changing the P.T.O. shaft 3-24

Cigarette lighter 2-14
Cleaning the cab interior 2-16
Cleaning the tractor 1-1
Clock 2-12
Closed centre hydraulics system 3-51
Clutch 2-24, 4-11
Clutch calibration
- Dual Command transmission 4-53
- Range/Power Command transmission .. 4-57
Connecting remote cylinders 3-40, 3-61
Console light 2-8
Continuous flow hydraulic equipment .. 3-43, 3-63
Coolant 4-10, 4-47
Coolant immersion heater 3-5
Coolant temperature gauge 2-28, 2-38
Cooling system 4-45, 8-6
Creeper gears 2-55, 2-64, 2-77

D

Diesel fuel 1-10, 4-2
Differential lock 2-100
Dimensional specification 8-2
Door handles 2-4
Double-acting cylinders 3-42, 3-62
Draft Control 3-32, 3-45, 3-35, 3-51
Drain fuel/water separator 4-12
Drawbars and towing attachments 7-15
Drive belts 4-32
Driving the tractor 1-6, 2-72
Dual Command transmission 2-61, 5-6, 8-6
Dual rear wheels 3-95
Duoshift function 2-62
Dynamic front fenders 3-79
Dynamic Ride Control 3-55

E

Ecology and the environment 1-4
Electrical power panel 2-14
Electrical equipment - specification 8-8
Electronic Draft Control (EDC) 3-51
Electronic instrument panel 2-34
Electronic management unit 2-100, 4-63

SECTION

1 - General Information and Safety

2 - Controls, Instruments and Operation

3 - Field Operation

4 - Lubrication and Maintenance

5 - Fault Finding

6 - Vehicle Storage

7 - Accessories

8 - Specification

9 - First 50-hour Service Forms

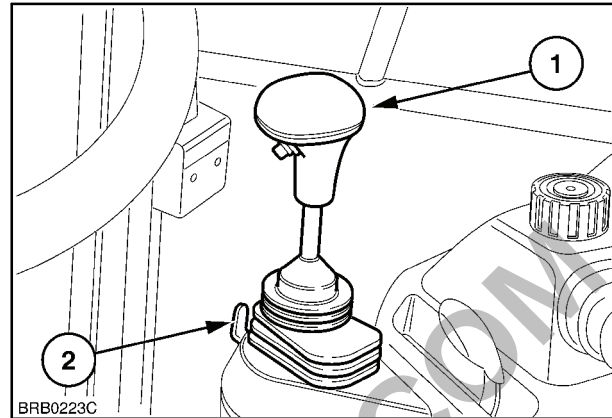
10 - Index



Figure 109

When four remote control valves are specified, an alternative joystick control (1) may be fitted to operate remote control valves III and IIII. The joystick, located at the front of the right-hand console, operates in a cross pattern.

The push/pull lever (2) is used to lock the joystick in the neutral position and avoid accidental actuation of a cylinder. Push the lever in to lock the joystick in neutral. Pull the lever out when it is required to operate equipment connected to the remote control valves.

**109****Figure 110**

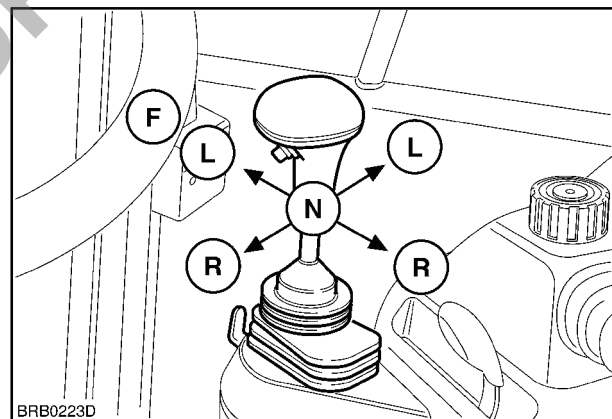
As with the conventional levers, the joystick provides four positions: Raise (R), Neutral (N), Lower (L) and, on No. III valve only, Float (F).

Forward and reverse movements of the joystick will operate valve No. III in the same way as a conventional remote valve lever.

When the joystick is moved to the left or right it will activate valve No. IIII. There is no float position on remote valve No. IIII.

The joystick has the added advantage of being able to operate two remote control valves simultaneously by moving the lever diagonally.

NOTE: The float position is also used for retracting a single-acting hydraulic ram. (see 'Operating Single-Acting Cylinders' on page 3-43).

**110**

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