

SECTION 2

OPERATION

Section 2 details the location of all the instruments, switches and controls on your tractor and describes the correct method of operation. Read through this section of the Manual and ensure that you are familiar with the location and function of all the features of your new tractor. Do not start the engine or attempt to drive or operate the tractor until you are familiar with all the controls. It is too late to learn once the tractor is moving. If you have any questions regarding the operation of your tractor, contact your New Holland dealer.

This section is split into 18 parts, as listed below. The running heading at the top of each page indicates the subjects covered. A full index is provided at the back of this book.

Subject	Page Nos.
Operation – Safety frame and cab	2–13
Operation – Seats	14–18
Operation – Handbrake, foot pedals and instrument console	19–23
Operation – Analogue and analogue/digital instruments	24–29
Operation – Electronic instrument panel	30–45
Operation – Starting and stopping the engine	46–49
Operation – 12 x 12 transmission (Synchro Command)	50–57
Operation – 16 x 16 transmission (ElectroShift)	58–66
Operation – Differential lock and four wheel drive	67–68
Operation – Independent power take-off (P.T.O.)	69–74
Operation – Top link sensing hydraulics	75–76
Operation – Electronic Draft Control hydraulics	77–84
Operation – Remote control valves	85–90
Operation – Three-point linkage	91–99
Operation – Drawbars and towing attachments	100–108
Operation – Front wheel track adjustment	109–113
Operation – Rear wheel track adjustment	114–118
Operation – Ballasting and tyres	119–130

SECTION 3

LUBRICATION AND MAINTENANCE

GENERAL INFORMATION

Section 3 provides the step by step requirements necessary to maintain your new tractor in peak condition. A lubrication and maintenance chart provides a ready reference to these requirements. If in doubt about any aspect of lubrication and maintenance, consult your New Holland dealer.

This section is split into 10 parts, each part referring to a specific service interval. The running heading at the top of each page indicates the subject covered, as listed below. A full index is provided at the back of this book.

Subject	Page Nos.
General information	1-7
Lubrication and maintenance chart	8
Maintenance - when warning lamp lights	9-11
Maintenance - every 10 hours or daily	12-14
Maintenance - every 50 hours	15-23
Maintenance - every 150 hours	24
Maintenance - every 300 hours	25-31
Maintenance - every 600 hours	32-37
Maintenance - every 1200 hours/12 months	38-45
Maintenance - every 1200 hours/2 years ...	46-48
General maintenance - as required	49-56

SAFETY PRECAUTIONS

Read and observe all safety precautions listed in 'Servicing the Tractor' in the Introduction section at the front of this Manual.

NOTE: *Dispose of used filters and fluids properly.*



CAUTION



Do not check, lubricate, service or make adjustments to the tractor with the engine running.

DURING THE FIRST 50 HOURS OPERATION

In addition to the regular maintenance operations listed, check the following items every 10 hours or daily during the first 50 hours of operation of your new tractor:

- Check transmission/rear axle/hydraulics oil level
- Wheel nuts for tightness
- Front axle hub oil levels (four wheel drive)

IMPORTANT: *Park the tractor on level ground and, where applicable, extend all cylinders before checking oil levels.*

GENERAL DIMENSIONS		TS90, TS100, TS110 (2WD)		TS90, TS100, TS110 (4WD)		TS115 (4WD)
Height to top of cab (where fitted) with hatch closed	mm	2713		2713		2713
	in	106.8		106.8		106.8
Height to top of ROPS (where fitted)	mm	2889		2889		n/a
	in	113.7		113.7		n/a
Height to top of exhaust	mm	2832		2827		2827
	in	111.5		111.3		111.3
Ground clearance under front axle	mm	546		450		450
	in	21.5		17.7		17.7
Ground clearance under drawbar	mm	381		381		381
	in	15.0		15.0		15.0
Minimum width - across fenders (with cab)	mm	2012		2012		2012
	in	79.2		79.2		79.2
Minimum width - across tyres (less cab)	mm	1954		1954		n/a
	in	76.9		76.9		n/a
Maximum width - across tyres	mm	2454		2454		2454
	in	96.6		96.6		96.6
Overall length to end of lower links	mm	3815		4037		4368
	in	150.2		158.9		172.0
Wheelbase	mm	2340		2362		2623
	in	92.1		93.0		103.3
Minimum turning radius with brakes	mm	3277		3454		3785
	in	129		136		149
without brakes	mm	3660		4040		4420
	in	144		159		174
The above dimensions are based on tractors with tyre sizes shown:	Front	7.50 - 16		13.6 - 24		13.6 - 24
	Rear	16.9 - 34		16.9 - 34		16.9 - 34

NOTE: If your tractor has tyres of a different size then the above dimensions will vary due to the difference in the rolling radius and section width of the tyres fitted.

Clutchless Shuttle Shifting - Figure 95

A transmission 'dump switch' (3) is provided on the shuttle lever. The switch enables gear engagement and drive off, without using the clutch pedal and is particularly useful for shuttle operations.

When the dump switch is depressed, drive is instantly disengaged. When the button is released, transmission output speed and clutch pack engagement are automatically monitored to take up the drive smoothly.

NOTE: To prevent inadvertent shuttle lever engagement, an electronic interlock is provided. If the tractor is stationary with the shuttle lever in neutral the following procedure must be used to drive away from a standstill:

Depress and release the dump switch then, within one second, depress and hold in the switch. Move the shuttle lever into gear. The drive will engage when the button is released. If this sequence is not followed, a warning 'bleeper' will sound and the fault code 'CP' will appear in the digital display.

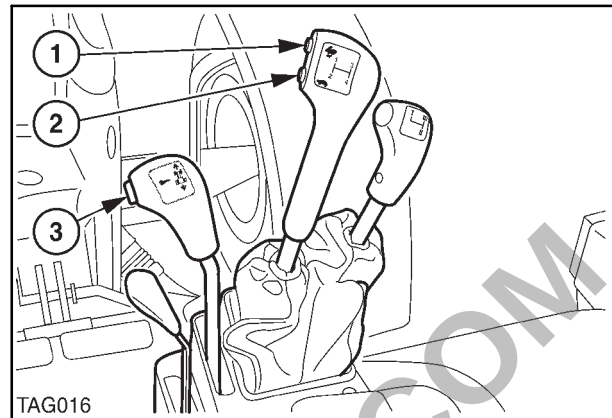
To change from forward to reverse motion, press the dump button, apply the brakes to slow the tractor, move the shuttle lever fully rearward, release the button and control tractor speed by means of the throttle.

IMPORTANT: To reduce clutch damage caused by shuttle shifting in too high a gear or at too high a speed, a warning bleeper will be heard and the symbol 'N' will flash in the instrument panel when tractor speed is greater than 5 MPH (9 km/h).

The shuttle shift will continue to operate under these conditions.

Error Codes

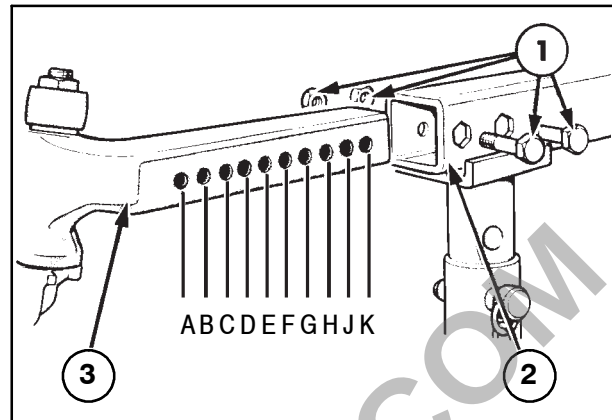
Should a fault occur in the transmission controls, causing the tractor to become disabled, an error code will be displayed in the instrument panel. If this should happen and you are unable to rectify the fault yourself, contact your New Holland dealer and report the error code displayed. Disabling error codes are as follows:

**95**

Code	Fault
E11	Clutch pedal potentiometer signal too low.
E12	Clutch pedal potentiometer signal too high.
E21	Drive line harness disconnected.
E34	Fuse No. 13 blown.
E35	Dump solenoid closed circuit.
E36	Dump solenoid open circuit.
E37	Clutch disconnect switch open circuit.
E38	C2 (high) clutch solenoid short circuit.
E39	C2 (high) clutch solenoid open circuit.
E40	C1 (low) clutch solenoid short circuit.
E41	C1 (low) clutch solenoid open circuit.
E48	Clutch disconnect switch short circuit.
E53	5 volt reference failed, shorted to 12 volts.
E54	5 volt reference failed, shorted to earth (ground).
CP	Depress clutch pedal to enable transmission (restore drive).

Position both front wheels straight ahead and install the locating bolts (2) Figures 187 and 188, in the appropriate drilling (1) at each end of the track control rod.

Tighten the nuts on the axle extension securing bolts to 400 Nm (300 lbf.ft.). Tighten the locating bolts (2) Figures 187 and 188, to 150 Nm (110 lbf. ft.) and their locknuts to 75 Nm (55 lbf. ft.). Re-check all torque settings after 50 hours of operation.



186

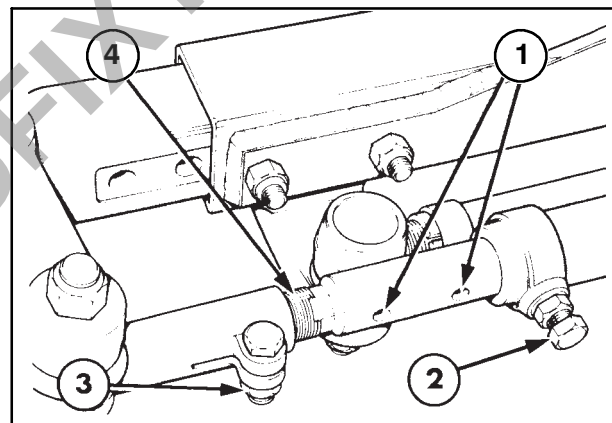
Front Wheel Toe-out - Figure 187

After resetting the track width, the front wheel toe-out may require adjustment. For correct operation, the front wheels should be parallel or toe **out** slightly.

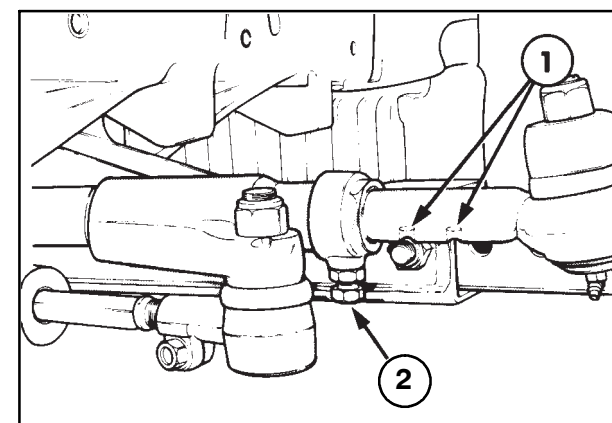
Measure the distance between the wheel rims at hub height at the **front** of the wheels. Rotate both front wheels 180° and check the measurements again, this time at the **rear** of the wheels. This will eliminate wheel rim run-out errors. The correct toe-out setting is 0 - 13 mm (0 - 0.5 in.), i.e. the measurement taken at the front of the rims should be the same as the rear or be **greater** by up to 13 mm (0.5 in.).

Should it be necessary to adjust the front wheel toe-out, proceed as follows:

Remove the locating bolt (2) from the left-hand end of the track rod, slacken the clamp bolt (3) and turn the threaded section of the track rod (4) in or out until the toe-out is correct when the locating bolt is re-inserted. Tighten the clamp bolt to 100 Nm (75 lbf.ft.), the locating bolts to 150 Nm (110 lbf. ft.) and their locknuts to 75 Nm (55 lbf. ft.).



187



188

⚠ WARNING ⚠

Owners should ensure that all steering components are maintained in a reliable and satisfactory condition to ensure safe operation and comply with legal requirements.

WHEN THE WARNING LAMP LIGHTS

OPERATION 1

SERVICE THE ENGINE AIR CLEANER OUTER ELEMENT - Figures 12 to 19

Service the outer element when the restriction indicator light on the instrument console illuminates or every 600 hours, whichever comes first. If the indicator lights up, perform the service within one hour of operation.

IMPORTANT: Service the outer element only when the restriction indicator light illuminates or at the recommended service intervals. Cleaning the filter too frequently will decrease the service life of the filter.

The dry air cleaner, which is located under the rear, right-hand side of the hood, consists of an inner and outer paper element within a metal casing. See Figure 12.

1. Unscrew the retaining wing nut (1) Figure 12, from the central stud. Ease the outer element forward, as shown in Figure 13 and remove the outer element (1) from the air cleaner assembly.

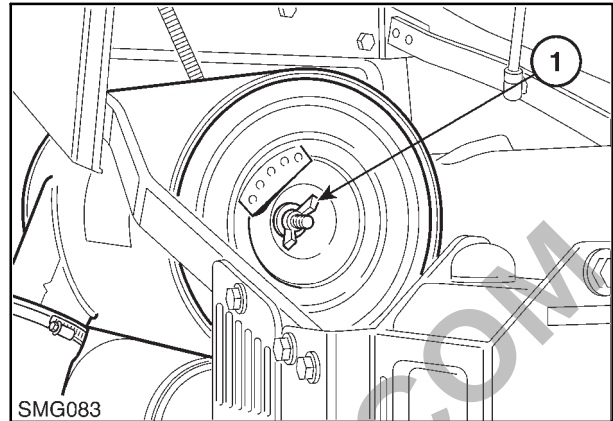
IMPORTANT: Do not remove or disturb the inner element (1) Figure 14.

2. Examine the inside of the outer element. If dust is present, the outer element is defective and must be replaced.

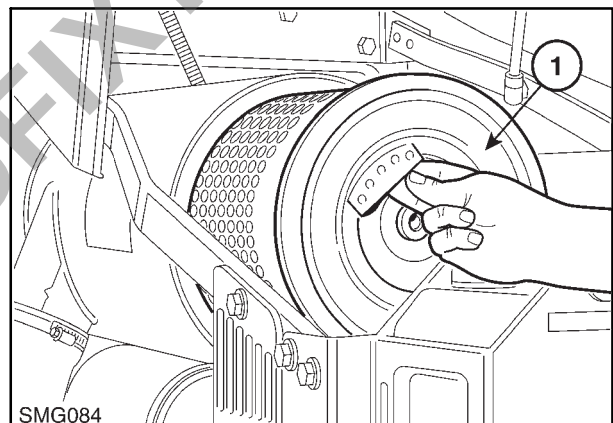
3. Clean the outer element using either method A, B, or C, depending on the element's condition

Methods A or B should be used for dry dust.

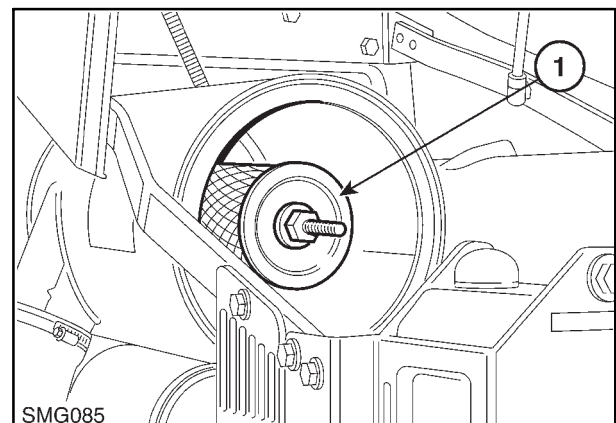
Method C should be used if the element is sooty, oily or heavily contaminated or after cleaning the element five times using methods A or B.



12



13



14

OPERATION 34 CLUTCH and SYNCHRONISER CALIBRATION (16 x 16 transmission only)

NOTE: The 16 x 16 transmission has four electronically controlled, wet, multi-plate clutch packs. To compensate for wear, the clutch packs must be calibrated manually. This service should be performed every 1200 hours or more frequently if a deterioration in the quality of speed changing is noted. It is recommended that this operation be carried out by a New Holland dealer.

IMPORTANT: During calibration, the electronic management system detects precisely the point at which the clutches start to engage. This is detected by a very small reduction in engine speed. During calibration, it is essential that no action is taken that may cause engine speed to vary. Ensure that the air conditioner, where fitted, and all electrical equipment is turned off. Do not operate the P.T.O. or any hydraulic lever or move the hand or foot throttle.

WARNING

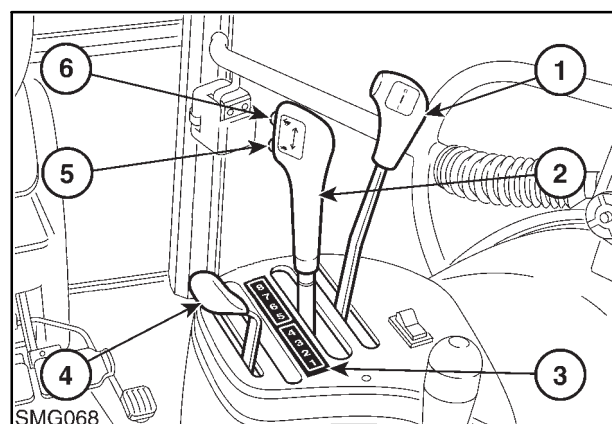
The calibration procedure is controlled by the electronic management system. To prevent inadvertent movement of the tractor. Park the tractor away from any obstacles, firmly apply the parking brake and block the wheels, front and rear.

Prior to calibrating the clutches, start the engine and operate the tractor to warm the transmission oil to at least 60° C (140° F).

Clutch Spring Pressure Calibration

1. Stop the engine, depress the clutch pedal and press and hold in **both** Powershift buttons (5 & 6) on the main shift lever (2). With the buttons (and the clutch pedal) still depressed, start the engine. The gearshift display in the instrument panel will display the letters 'CAL'. Release the buttons.

IMPORTANT: If 'CAL' is not displayed, do not proceed with calibration. Stop the engine and repeat step 1.



91

ROLL OVER PROTECTIVE STRUCTURE (ROPS) (where fitted)

- Figures 1 and 2

The roll bar (ROPS) is designed to be folded rearwards for use in low clearance operations. When in the normal, upright, operating position it is secured by two locking pins (1) Figure 1.

The ROPS is shown folded in the low clearance position in Figure 2.

The ROPS must always be maintained in a serviceable condition.

NOTE: Do not attempt to fold the ROPS if a canopy is fitted.

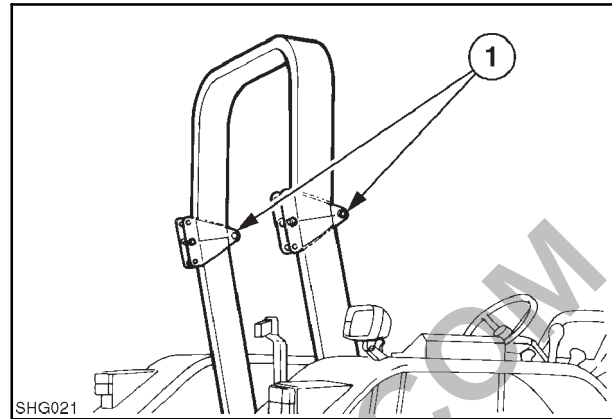
WARNING

When improperly operated, a tractor can roll over. For low clearance use only, the roll bar may be lowered. No protection is provided when the tractor is operated with the roll bar in the lowered position. Always raise the roll bar immediately after low clearance use. When the tractor is being driven from a low clearance job, the roll bar should be in the raised position. Always use the seat belt when the roll bar is raised. Seat belts save lives when they are used. Do not use the seat belt when the roll bar is lowered.

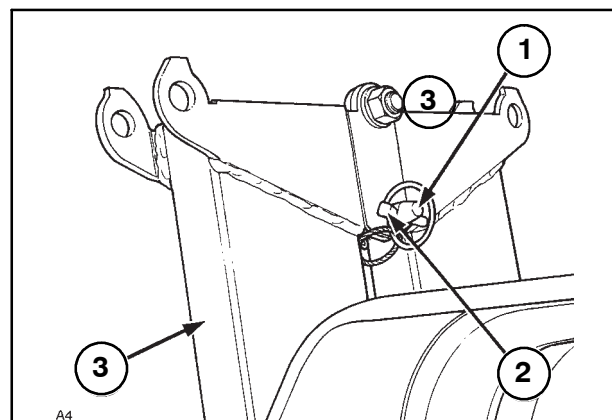
To fold the roll bar to the low clearance position, unclip the lynch pin (2) Figure 2 and remove the locking pin (1) from both sides of the roll bar. Lower the upper section of the roll bar (3) rearwards and insert the locking pin in the lower hole, as shown. Secure both locking pins with the lynch pins.

WARNING

Do not attach chains or ropes to the ROPS for pulling purposes as the tractor may tip backwards. Always pull from the tractor drawbar. Be careful when driving through door openings or under low overhead objects. Make sure that there is sufficient overhead clearance for the ROPS. Lower the ROPS, if necessary.



1



2

THE FIRST 50-HOUR SERVICE

At the first 50-hour service, ensure that the following **additional** service operations are carried out. The items are listed in the 'First 50-Hour Service' checklist at the rear of this manual.

- Change engine oil and filter
- Change fuel filter

NOTE: *The replacement fuel filter is larger than the original factory fitment.*

- Change hydraulics/transmission oil filters
- Check transmission/rear axle/hydraulics oil level
- Check FWD differential oil level
- Check FWD axle hub oil level
- Check and adjust brakes
- Check all air intake connections
- Inspect Poly V-belt
- Tighten all cooling system hose connections.
- Check torque of front end weight clamp bolts (where fitted)
- Check torque of safety cab or frame mounting bolts
- Check torque of exhaust manifold bolts

NOTE: *Items listed in the first 50-hour check are important. If not performed, early component failure and reduced tractor life may result.*

FLEXIBILITY OF MAINTENANCE INTERVALS

The intervals listed in the lubrication and maintenance chart are guidelines to be used when operating in normal working conditions.

Adjust the intervals for environmental and working conditions. Intervals should be shortened under adverse (wet, muddy, sandy, extremely dusty) working conditions.

PREVENTING SYSTEM CONTAMINATION

To prevent contamination when changing oils, filters, etc., always clean the area around filler caps, level and drain plugs, dipsticks and filters prior to removal. Before connecting remote cylinders, ensure that oil contained within them is clean, has not degenerated due to long storage and is of the correct grade.

To prevent dirt entry during greasing, wipe dirt from the grease fittings before greasing. Wipe excess grease from the fitting after greasing.

FUELLING THE TRACTOR



CAUTION



When handling diesel fuel, observe the following:

Do not smoke around diesel fuel. Under no circumstances should gasoline, alcohol, gasohol or dieselhol (a mixture of diesel fuel and alcohol) be added to diesel fuel because of increased fire or explosion risks. In a closed container such as a fuel tank they are more explosive than pure gasoline. Do not use these blends. Additionally, dieselhol is not approved due to possible inadequate lubrication of the fuel injection system.

Clean the filler cap area and keep it free of debris.

Fill the tank at the end of each day to reduce overnight condensation.

Never take the cap off or refuel with the engine running.

Keep control of the fuel nozzle while filling the fuel tank.

Don't fill the tank to capacity. Allow room for expansion. If the original fuel tank cap is lost, replace it with a genuine original equipment cap and tighten securely.

Wipe up spilled fuel immediately.

WEIGHT		TS90	TS100	TS110	TS115
(two wheel drive - with cab)					
On front axle	kg	1290	1290	1300	n/a
	lb	2844	2844	2866	n/a
On rear axle	kg	2640	2640	2650	n/a
	lb	5820	5820	5842	n/a
Total (with fuel, oil and coolant)	kg	3930	3930	3950	n/a
	lb	8664	8664	8708	n/a
(four wheel drive - with cab)					
On front axle	kg	1725	1735	1820	1850
	lb	3803	3825	4012	4078
On rear axle	kg	2685	2735	2770	2890
	lb	5919	6030	6017	6371
Total (with fuel, oil and coolant)	kg	4410	4470	4590	4740
	lb	9722	9855	10119	10449
(two wheel drive - less cab)					
On front axle	kg	1125	1125	1130	n/a
	lb	2480	2480	2491	n/a
On rear axle	kg	2175	2175	2185	n/a
	lb	4795	4795	4817	n/a
Total (with fuel, oil and coolant)	kg	3300	3300	3315	n/a
	lb	7275	7275	7308	n/a
(four wheel drive - less cab)					
On front axle	kg	1524	1524	1530	n/a
	lb	3360	3360	3373	n/a
On rear axle	kg	2226	2226	2245	n/a
	lb	4907	4907	4949	n/a
Total (with fuel, oil and coolant)	kg	3750	3750	3775	n/a
	lb	8267	8267	8322	n/a

The above weights are based on standard production tractors (12 x 12 transmission) with full fuel tank, but without driver, ballast or additional equipment. If your tractor has any of the following features, add the following weights:

Error Codes - Figure 112

In the unlikely event of a fault occurring in the electronic transmission circuitry, the malfunction symbol (1) or warning light and a two-digit error code (2), preceded by the letter 'E', will flash in place of the transmission display on the instrument panel.

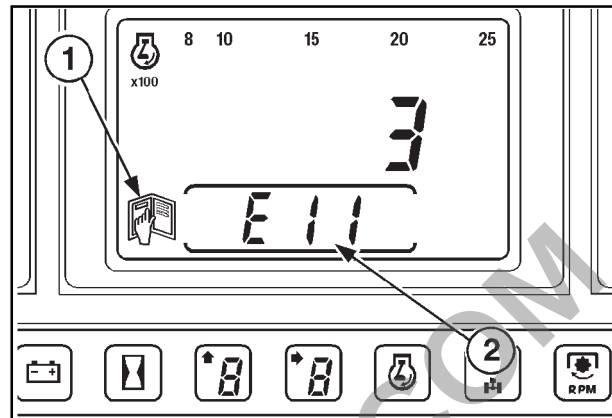
The code indicates the faulty circuit or sensor and the type of fault, e.g., open circuit, short circuit, etc. In this event, the tractor will require the attention of your New Holland dealer.

Should a fault occur in the transmission controls, causing the tractor to become disabled, an error code will be displayed in the instrument panel. If this should happen and you are unable to rectify the fault yourself, contact your New Holland dealer and report the error code displayed. Disabling error codes are as follows:

Error**code Fault**

- E11 Clutch pedal potentiometer signal too low.
- E12 Clutch pedal potentiometer signal too high.
- E21 Drive line harness disconnected.
- E24 Synchroniser calibration incorrect.
- E34 Fuse No. 13 blown.
- E35 Dump solenoid closed circuit.
- E36 Dump solenoid open circuit.
- E37 Clutch disconnect switch open circuit.
- E38 C4 clutch solenoid short circuit.
- E39 C4 clutch solenoid open circuit.
- E40 C3 clutch solenoid short circuit.
- E41 C3 clutch solenoid open circuit.
- E42 C2 clutch solenoid short circuit.
- E43 C2 clutch solenoid open circuit.
- E44 C1 clutch solenoid short circuit.
- E45 C1 clutch solenoid open circuit.
- E48 Clutch disconnect switch short circuit (maladjusted, always closed).
- E53 5 volt reference failed, shorted to 12 volts.
- E54 5 volt reference failed, shorted to earth (ground).
- E61 Shuttle potentiometer voltage too high
- E62 Shuttle potentiometer voltage too low
- E67 Forward solenoid short to 12 volts
- E68 Reverse solenoid short to 12 volts

- C Wheel speed too high for creeper gears.
- HC Road range selected with creeper gears engaged.
- CP Depress clutch pedal to enable transmission (restore drive).
- N Clutchless shuttle operation attempted at too high a speed and in too high a gear - see 'IMPORTANT' text on page 60.

**112****Stationary Operations**

NOTE: To avoid power losses due to internal friction, place all both gearshift levers and the shuttle lever in neutral when performing stationary operations.

Speed Matching

When travelling on the road in high range, gears 5 to 8, the transmission will automatically select a gear to match engine speed to road speed if the following method is adopted:

To upshift: Depress the clutch pedal then decrease engine speed with the foot throttle. When the clutch pedal is released, the transmission will automatically select a higher gear ratio (provided 8th. speed is not already selected) to approximately match engine speed to road speed.

To downshift: Decrease engine speed, depress the clutch pedal simultaneously increasing engine speed by pressing the foot throttle further down. When the clutch pedal is released, the transmission will automatically select a lower gear ratio (provided 5th. speed is not already selected) to approximately match engine speed to road speed.

When refitting or adjusting a wheel, tighten the bolts to the following torques then re-check after driving the tractor for 200 m (200 yards), after 1 hour and 8 hours operation and, thereafter, at the 50 hour service intervals:

Disc to hub nuts	210 Nm (156 lbf.ft.)
Disc to rim nuts	240 Nm (177 lbf.ft.)

NOTE: If your tractor is equipped with front fenders, ensure there is adequate clearance under all operating conditions. Adjust the steering stops and or fender position, as necessary.

IMPORTANT: At the smaller track settings a foul condition may occur between the tyre or fender and the tractor when the wheels are turned to the full lock position particularly when the axle is fully articulated. To avoid this condition, adjust the fenders and/or steering stops.

Steering Stops - Figure 190

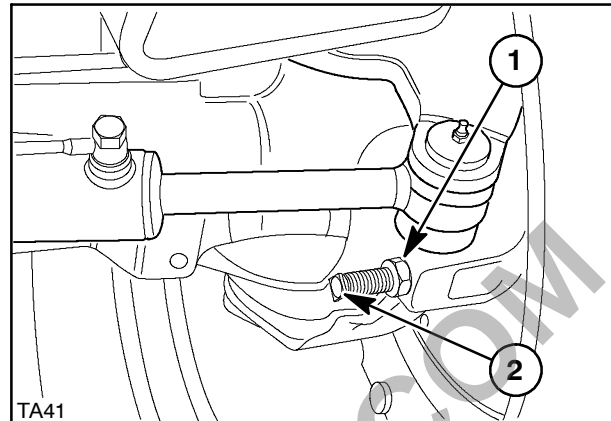
Two steering stops are incorporated in the axle, one at each end. The stops are adjustable and should be set to provide a minimum clearance of 20 mm (0.75 in.) between the tyres and any part of the tractor on full left and right lock with the axle fully articulated.

To adjust, slacken the locknut and turn the stop bolt anti-clockwise to reduce the steering angle of the wheels or clockwise to increase the steering angle. Tighten the locknut to 150 Nm (110 lbf. ft.).

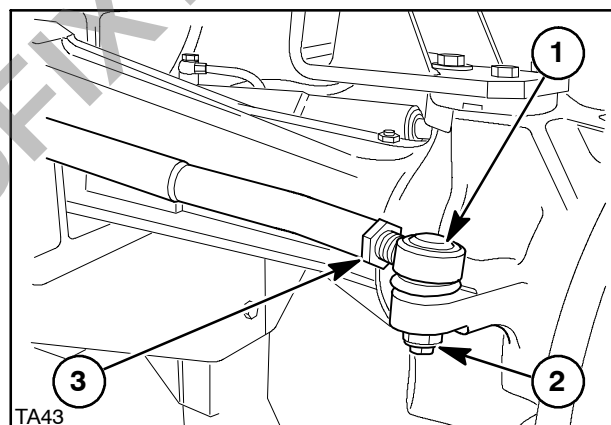
Front Wheel Toe-in - Figure 191

After resetting the track width, the front wheel toe-in may require adjustment. For correct operation, the front wheels should be parallel or toe in slightly.

Measure the distance between the wheel rims at hub height at the **front** of the wheels. Rotate both front wheels 180° and check the measurements again, this time at the **rear** of the wheels. This will eliminate wheel rim run-out errors. The correct toe-in setting is 0 – 6 mm (0 – 0.25 in.), i.e. the measurement taken at the front of the rims should be the same as the rear or be **smaller** by up to 6 mm (0.25 in.).



190



191

Should it be necessary to adjust the front wheel toe-in, proceed as follows:

Remove and discard the self-locking nut (2), on the left-hand end of the track control rod (1) and extract the track rod end. Loosen the lock nut (3) and screw the track rod end into or out of the track rod to shorten or lengthen the assembly, as required. Re-insert the track rod end and, when the toe-in setting is correct, secure with a new self-locking nut. Tighten the self-locking nut to 100 Nm (74 lbf. ft.) and the lock nut to 180 Nm (133 lbf. ft.).

PREVIEW ONLY

You're viewing 12 of 246 pages

The full manual includes:

- All 246 pages, complete
 - Searchable PDF (find any keyword)
 - No watermarks
 - Instant download
 - Print-ready quality
-

GET FULL MANUAL NOW

New Holland TS90, TS100, TS110, TS115 Operator Manual



Scan or click anywhere
youfixthis.com

Click anywhere on this page to get the full manual