STANDARD STARTING PROCEDURE

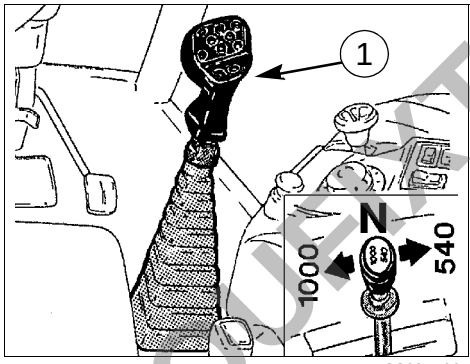
WARNING: *Operate the controls from the driver's seat only.*

IMPORTANT: *Let the engine idle for a few minutes to make sure that enough oil can get to the turbo charger bearings and other engine parts before operating the engine at nominal speed.*

STEP 1

Switch the battery master switch ON (if fitted).

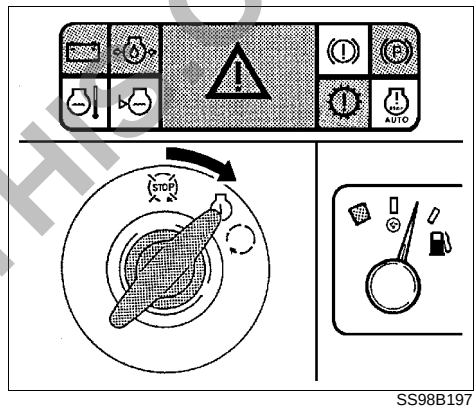
STEP 2



SS98B196

Shift the gear lever (1) and PTO shaft shift lever into their neutral positions.

STEP 3

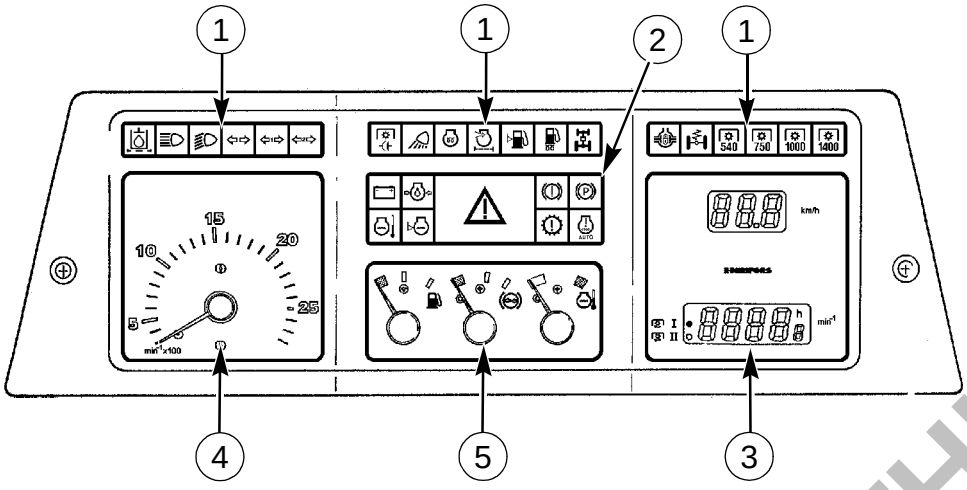


SS98B197

Turn the ignition start switch to the ON position.Charging, oil pressure indicator and transmission lubrication and the parking brake applied indicator lamps light up and the large WARNING symbol flashes simultaneously on the centralised warning system. On the power shift transmission display, a column lights up for the power shift group (slow) and the letter N for neutral. The fuel level can be read off the combination instrument at any time.

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Instrument panel



SS99B013

1. CONTROL LAMPS – These light up to show the driver that an operational condition requires his/her attention or that the pre-selected function is in operation. For details and complete instructions see under control lamps on page 28 of this manual.

2. CENTRALISED WARNING SYSTEM

3. DIGITAL TRACTOR METER

4. ANALOGUE – TACHOMETER

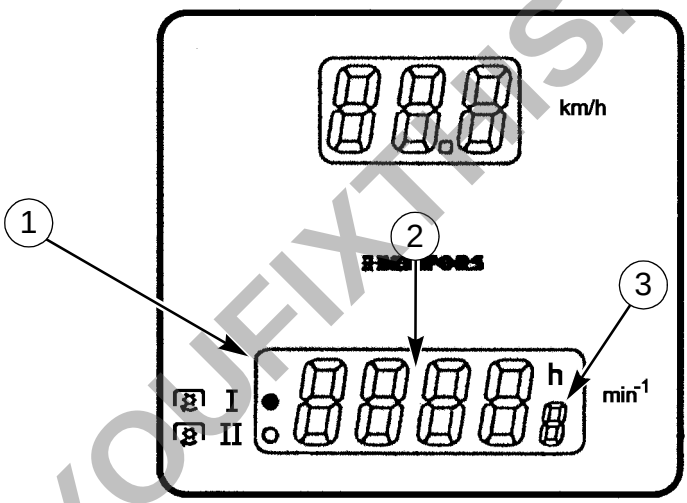
5. COMBINATION INSTRUMENT – Consists of fuel gauge, cooling water temperature gauge and if fitted, the air pressure gauge.

PREVIEW - YOUFIXTHIS

OPERATING HOURS COUNTER

Service the machines according to the maintenance intervals in the lubrication/ maintenance plans and to the instructions on the following pages. Only use quality lubricants for vehicle maintenance.

WARNING: *Read through the instructions in this section carefully before carrying out maintenance work. There is a risk of injury and death if maintenance work is not carried out correctly or if the following instructions are not observed. If you do not understand the instructions for any kind of maintenance, please consult your dealer.*



SS97G119

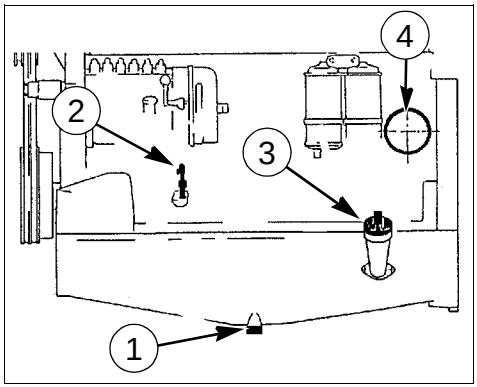
DIGITAL TRACTOR METER

When the ignition switch is switched to the ON position, the engine operating hours counter (1) displays the actual number of engine operating hours accrued. The digit on the right-hand side (3) shows the tenths of an hour and the left-hand digits (2) on the display show the hours. To carry out maintenance work at the correct time intervals, observe the engine operating hours counter in conjunction with the lubrication/maintenance plans.

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ENGINE MAINTENANCE

Maintenance points



SS98C014

1 = Drain plug

2 = Oil dip stick

3 = Oil filler aperture

4 = Engine oil filter

Engine oil and filter change

To check the engine oil level, park the tractor on level ground and switch the engine OFF.

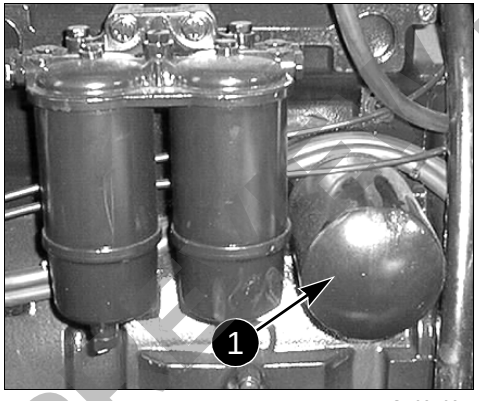
NOTE: *Drain the engine oil only when engine is warm.*

WARNING: *Avoid contact with hot oil. Do not change the filter while it is hot since you can burn the skin on your hands. Wait until the temperature drops below 50 °C.*

M528

IMPORTANT: *Dispose of old oil and filters in compliance with local regulations. Do not drain old oil onto the ground or into drains. Do not drain old oil into leaking containers. Be aware of environmental protection.*

Filter change



SD98E031

Screw the filter cartridge (1) off and replace.

Oil the sealing ring on a new filter before inserting.

PREVIEW - YOUFIXTHIS

ENGINE

General information

Four stroke diesel engine with fuel injection and exhaust turbo-charger

Type	CS100	WD 420.85/1 – 4 cylinder
	CS110	WD 420.85 – 4 cylinder
	CS120	WD 620.94 – 6 cylinder
	CS130	WD 620.92 – 6 cylinder
	CS150	WD 620.93 – 6 cylinder
Ignition sequence	CS100, CS110	1-2-4-3
	CS120, CS130, CS150	1-5-3-6-2-4
Cylinder diameter		108 mm
Stroke		120 mm
Working volume	CS100, CS110	4400 cm^3
	CS120, CS130, CS150	6596 cm^3
Compression ratio	CS100, CS110, CS150	16.5 : 1
	CS120, CS130	18.5 : 1
Engine power rating	CS100	73,5 kW (100 PS)
	CS110	77 kW (105 PS)
	CS120	85 kW (115 HP)
	CS120	92 kW (125 HP)
	CS150	107 kW (145 HP)
	At nominal engine speed	2300 rpm
Maximum engine power	CS100	77,7 kW (106 HP)
	CS110	81 kW (110 HP)
	CS120	85 kW (120 HP)
	CS130	9 kW (130 HP)
	CS150	107 kW (150 HP)
	at engine speed	2100 rpm
Nominal engine speed		2300 rpm
Idling speed	CS100	850 ±50 rpm
	CS110, CS120, CS130, CS150	800 ±50 rpm
Maximum torque	CS100	412 Nm (42.0 kpm)
	CS110	421 Nm (42.9 kpm)
	CS120	456 Nm (44.7 kpm)
	CS130	497 Nm (50.7 kpm)
	at engine speed	1400 rpm
	CS150	577 Nm (58.8 kpm)
	at engine speed	1500 rpm

PREVIEW - YOUFIXTHIS

OPERATING THE TRANSMISSION

The tractor is fitted with a synchronised transmission and a power shift transmission.

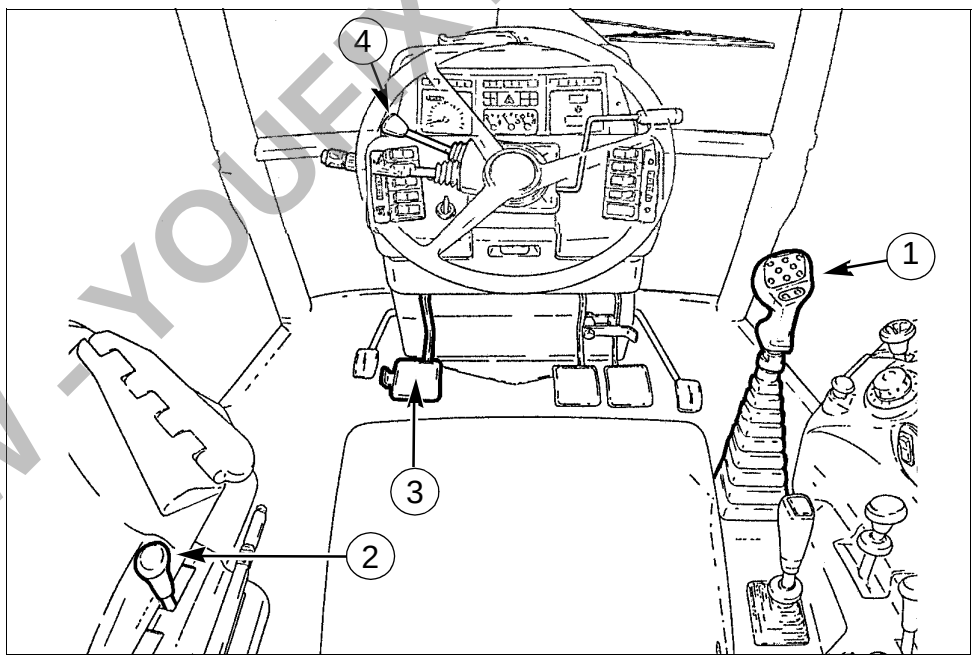
SYNCHRONIZED TRANSMISSION – gears must be changed by operating the clutch.

POWER SHIFT TRANSMISSION – is changed electro-hydraulically using the multi-controller with the tractor at a standstill or in motion.

REVERSING THE DRIVING DIRECTION – is carried out without operating the clutch.

CRAWLER GEAR GROUP – Only change when tractor is standing still.
Depress the clutch pedal fully.

IMPORTANT: *At outside temperatures below -10 °C it is possible, that when automatically moving off after a cold start, the transmission shifts to neutral. In this case, the first moving off procedures must be carried out using the clutch, until the engine has reached operating temperature.*



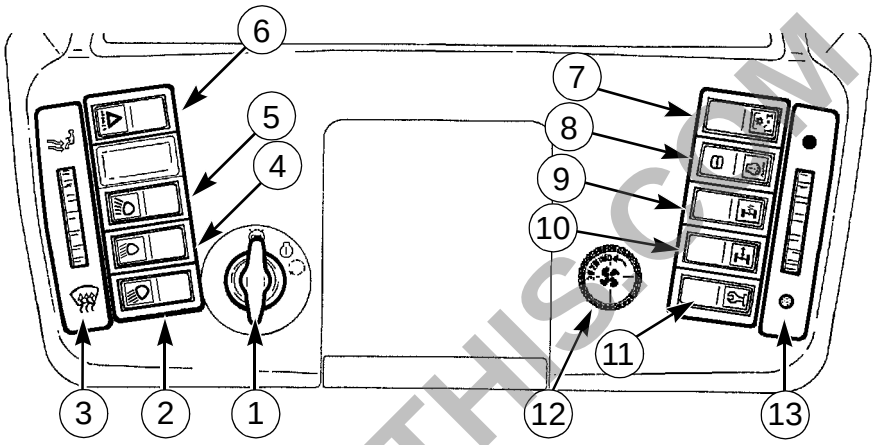
SS98F053

1. MULTI-FUNCTION LEVER
2. SUPER CRAWLER GEAR (If fitted)
3. CLUTCH PEDAL
4. REVERSE DIRECTION LEVER (shuttle lever)

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OPERATING CONTROLS

Instrument panel



SS98B192

1. IGNITION SWITCH – The ignition switch has the following positions:

   OFF position – The ignition key is vertical. Everything is switched OFF and the ignition key can be removed. The parking light and hazard warning lights can be switched ON without the key.

   ON position – Turn in a clockwise direction from the OFF position. The indicator lamps for low oil pressure, battery charging control and applied parking brake light up on the instrument panel. At the same time the large ATTENTION symbol in the centralised warning system blinks. In addition, the combination instrument indicates the correct value. The indicator lamp remains lit until the engine is started.

   START position – Turn further in a clockwise direction from the ON position. Turn the ignition key to the START position. As soon as the engine starts, release the key. It automatically returns to the ON position.
   Stop the engine by turning the ignition key from the ON position to the OFF position.

2. SWITCH FOR SEARCHLIGHTS ON THE REAR MUDGUARDS (if fitted) – Double action rocker switch for switching the searchlights ON and OFF.
   The rear searchlights must not be used on public highways.

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LUBRICATION / MAINTENANCE PLAN

Operating hours	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000
ENGINE																
Engine oil change (at least 1 x year)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Oil filter change (at least 1 x year)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Drain water from the fuel filter/pre-filter	weekly or every 50 operating hours															
Clean the fuel filter and pre-filter	■															
Fuel filter – replace cartridge(s)		■		■		■		■		■		■		■		■
Drain the water separator	weekly or every 50 operating hours															
Replace the water separator (at least once a year)		■		■		■		■		■		■		■		■
Check the hose connections and dirt level indicator of the dry air filter	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Check the valve play, adjust as necessary				■				■				■				■
Replace the dry filter cartridge (at least 1 x year)				■				■				■				■
Replace the safety cartridge in the dry air filter	after cleaning the main cartridge 5x or every 2 years															
Check and readjust injection nozzle pressure	every 2000 operating hours															
Check the oscillation absorber				■				■				■				■
Check coolant fill level (top-up)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Clean the radiator grill, radiator and oil cooler	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Check the condition and tension of all drive/fan belts	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Front PTO shaft – Oil change (after approx. 20 PTO shaft operating hours, every 100 hours of operation thereafter or at least once a year																
DRIVING GEAR																
Check transmission fluid level, refill if necessary (inspection glass)	■		■		■		■		■		■		■		■	
Transmission: Change filter cartridge				■				■				■				■
Transmission oil change (at least 1 x per year)		■		■				■				■				■
Change planetary gear oil	■			■				■				■				■
Check oil level in the planetary gear			■		■		■		■		■		■		■	
HYDRAULICS SYSTEM																
Change suction filter (CC system)		■				■				■				■		
Change pressure filter (CC system)	■		■		■		■		■		■		■		■	
Change suction filter (OC system)		■		■				■				■				■

PREVIEW - YOUFIXTHIS

Dry-air filter maintenance

STEP 1

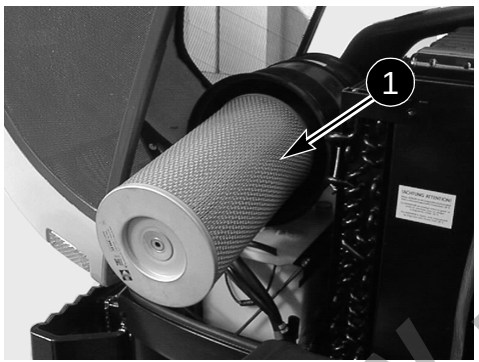


SD98E043

Remove air filter cap and screw off the nut for the cartridge holder. Pull out the air filter cartridge.

IMPORTANT: *Never let the engine run without the main cartridge.*

STEP 2



SD98E044

Clean the dirty air cartridge by knocking and blowing it out. Pull out the guide device (1), clean the housing, re-install the guide device and filter cartridge.

IMPORTANT: *Avoid damaging the cartridge! Change the cartridge immediately when cracks or holes are detected!*

STEP 3

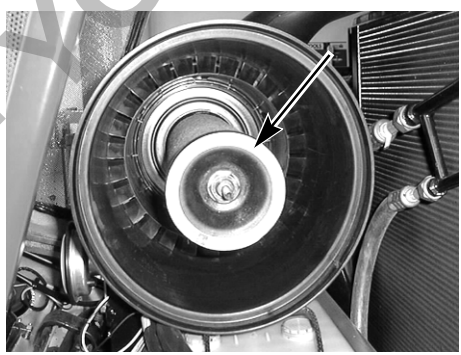


SD98E045

Renewing the safety cartridge:

a – after performing maintenance on the Main cartridge
b – at least after 2 years
c – if after completing maintenance on the main cartridge the maintenance indicator lights up again
d – if the main cartridge is defective.

IMPORTANT: *Do not clean the safety cartridge! Do not take out the safety cartridge to clean the filter housing and the main cartridge!*



SD98E033

IMPORTANT: *Always make a note, on the label, of when the safety cartridge was last cleaned (see arrow)!*

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DRIVING SPEEDS

Tractor with 40 km/h transmission

Regular speed in kilometres per hour (24 forward and 24 reverse) (40 forward and 40 reverse, with crawler gear)

The following speeds are calculated values with the index radius in accordance with ETRTO, at an engine speed of 2,300 rpm. Wheel slip has not been taken into account.

TYPE	CS100, CS110, CS120, CS130											
	REAR WHEEL TYRE SIZE											
	16.9R38 540/65R38				18.4R38 600/65R38				20.8R38 650/65R38			
LS	I	II	III	IV	I	II	III	IV	I	II	III	IV
FORWARD GEAR / CRAWLER GEAR												
GEAR												
1	0.34	0.40	0.48	0.58	0.35	0.41	0.50	0.60	0.37	0.43	0.52	0.62
2	0.60	0.72	0.87	1.04	0.62	0.74	0.90	1.07	0.65	0.77	0.94	1.12
3	0.97	1.16	1.39	1.67	1.00	1.20	1.42	1.72	1.04	1.25	1.49	1.80
4	1.46	1.75	2.10	2.51	1.51	1.81	2.17	2.59	1.57	1.88	2.26	2.70
FORWARDS GEAR / NORMAL												
1	2.74	3.28	3.94	4.72	2.83	3.38	4.06	4.87	2.95	3.53	4.24	5.08
2	4.93	5.91	7.10	8.50	5.09	6.10	7.32	8.77	5.30	6.36	7.64	9.14
3	7.91	9.47	11.38	13.63	8.16	9.77	11.74	14.06	8.51	10.18	12.24	14.66
4	11.92	14.28	17.15	20.55	12.29	14.73	17.69	21.20	12.82	15.36	18.44	22.10
5	16.41	19.65	23.61	28.28	16.93	20.27	24.35	29.17	17.65	21.13	25.39	30.41
6	22.43	26.87	32.28	38.66	23.14	27.71	33.30	39.87	24.12	28.90	34.72	41.58
REVERSE GEARS / CRAWLER GEAR												
1	0.33	0.39	0.47	0.57	0.34	0.40	0.48	0.59	0.35	0.42	0.51	0.61
2	0.59	0.71	0.85	1.02	0.61	0.73	0.88	1.05	0.63	0.76	0.91	1.10
3	0.95	1.13	1.36	1.63	0.98	1.17	1.40	1.68	1.02	1.22	1.46	1.75
4	1.43	1.71	2.05	2.46	1.47	1.76	2.11	2.54	1.54	1.84	2.20	2.65
REVERSE GEARS / NORMAL												
1	2.68	3.21	3.85	4.62	2.76	3.31	3.97	4.77	2.88	3.45	4.14	4.97
2	4.82	5.78	6.94	8.32	4.97	5.96	7.16	8.58	5.18	6.22	7.46	8.95

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REAR POWER TAKE OFF (PTO) SHAFT

General information concerning the PTO on your tractor can be found in the Technical Data section of this manual-
When using PTO driven implements in conjunction with the three-point hook up, the lifting bars must be adjusted in accordance with the specifications in the Implement Manufacturer's Operating Instructions.

> **WARNING:** *This tractor is fitted with a 4-speed PTO shaft, 540, 540E, 1000 or 1000E RPM. Pay attention to the fact that the implement to be used is capable of running at the tractor's PTO speeds. When using the PTO shaft, fix the adjustable tow-bar (if fitted) in the mid position. Do not use the 540 and 540E PTO shaft for implements which require more than 80 HP (59 kW) from the PTO.*
> *Never fit, maintain or repair PTO driven implements when the motor is running. Wait until the PTO has finally stopped turning.*

Operating the rear PTO shaft

The PTO is switched ON and OFF by means of a spring loaded switch on the right-hand operating console or using the external pushbuttons on the mudguard (if fitted). There are 4 speeds available. These can be selected using the selector levers 1000/540 and ECO/N.

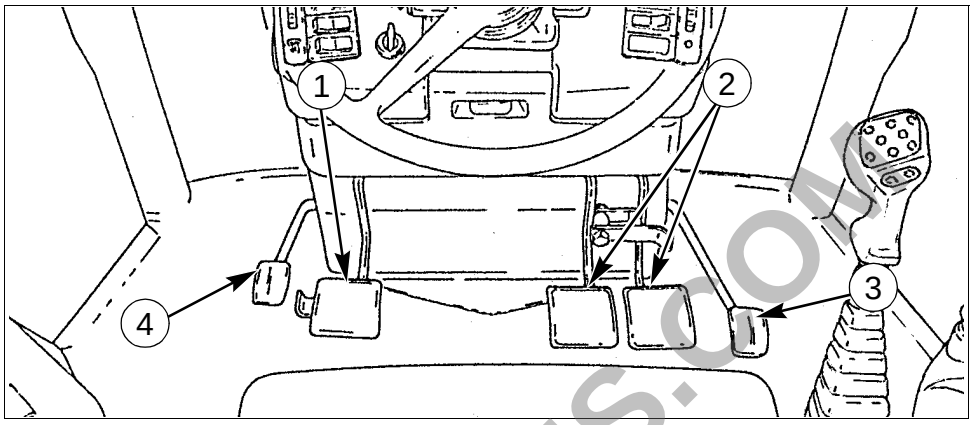
NOTE: *The lift limiter must always be used, when operating the PTO, see page 129.*

IMPORTANT: *The build up of pressure is slower at low oil temperatures, which will lead to a delayed implement run-up. Implements with a high run-up torque must only be switched ON when the gearbox oil is at operating temperature.*

Start the PTO shaft as follows:

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Pedals



SS98B193

1. CLUTCH PEDAL – For detailed information see the Clutch Pedal Function section on page 70 of this manual.

2. BRAKE PEDALS – Both brake pedals are linked using the brake pedal interlock. The left brake pedal is used to brake the left-hand rear wheel and the right brake pedal is used to brake the right-hand rear wheel. When driving off-road the pedals can be used separately to aid steering.

> ⚠ **WARNING:** *When driving on-road the brakes must be linked. This guarantees even brake function and maximum deceleration.* M112A

3. ACCELERATOR PEDAL – Foot operated and manually operated accelerators are linked. If the accelerator pedal is pushed down, the engine speed is increased above the speed that was set by the manually operated accelerator.

> ⚠ **WARNING:** *Additional weight and unfavourable contact between the tyres and the road, for example mud or ice, increases braking distance. One must consider that liquid-filled tyres, weight on the vehicle or the wheels and tanks filled with fertiliser or weed-killers increase the weight and thus the braking distance.* M113B

4. FOOT PEDAL FOR BACK PRESSURE BRAKE (if fitted) – The back pressure brake is most efficient at high engine speed. For long periods of downhill driving select suitable gear.

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