WORKSHOP MANUAL

Agrofarm 85

Agrofarm 100

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0 - INTRODUCTION

0.1 - INTRODUCTION

The purpose of this workshop manual is to provide instruction for repair technicians and a practical guide to improving the quality of repairs. This manual enables repair technicians to acquire a thorough knowledge of the machine, indicating the correct methods for fault diagnosis, for working in safety and for accurate dimensional checks and visual inspections. The instructions also indicate the products to use, the tightening torques and the adjustment data. The technical material contained in this manual is reserved to Authorised Dealers and Service Centres who will be duly informed of any technical changes to the machines in question through the issue of documents regarding modifications, updates and supplements for optional equipment. All technicians and their colleagues are expressly forbidden from reproducing any part of this manual in any form or from communicating the contents to third parties without the express written permission of the Manufacturer, who remains the sole owner of this document with all rights reserved in accordance with applicable laws.

0.1.1 - Safety notes

To ensure that machines entrusted to Authorised Service Centres for repair or overhaul continue to function correctly, it is very important that all repair work is carried out in the prescribed manner. The procedures for checks and repairs indicated in this manual are safe and effective. Some of the operations described require the use of special tools and equipment; these tools have been specifally designed for the intended purpose and may be ordered directly from the Manufacturers. DO NOT USE MAKESHIFT TOOLS; not only is there a risk of personal injury, but such tools are rarely suited to the purpose for which they are used. In potentially hazardous situations, always give priority to personal safety and take the necessary actions to eliminate the danger

0.1.2 - General safety rules

- Even if you have a thorough knowledge of the machine as regards its components, operation and controls, always take special care when carrying out the following operations; Remember that the machine you are working on is in need of repair or overhaul and consequently may not always behave as expected.
- Before starting work, clean the tractor thoroughly to remove all mud, dust and road dirt. Also clean the cab to remove all traces of oil, snow and ice from the access steps and grab rails.
- When climbing up to or down from the cab, always ensure you maintain three points of contact at a time (foot or handholds) in order to keep your balance and prevent accidental falls.
- Always take special care when carrying out fault diagnosis operations; these operations often require two persons, who must never stand in front of the wheels when the engine is running.
- When carrying out checks and repairs, wear close-fitting clothing, safety goggles and protective gloves that are suitable for the task (cleaning, draining fluids, repairs). When working near moving parts, long hair should be gathered up and tied back safely under a cap to prevent the risk of entanglement and severe injury.
- Do not allow anyone who is not directly involved in the work to come near the tractor; ensure that they remain at a safe distance.
- Keep well clear of moving parts; when the engine is running, some moving parts are not easily visible and therefore present a risk of entanglement, even if protected by safety guards.
- Ensure that the area is well ventilated before starting the engine in order to avoid the formation of dangerous concentrations of toxic gases; always connect suitable fume extraction equipment to the exhaust pipe.
- Do not start the engine with the safety guards removed under any circumstances; all repair and adjustment operations must be carried out with the engine stopped.
- Do not top up fuel, oil or coolant levels when the engine is running.
- Never smoke and ensure there are no naked flames nearby when topping up fuel or oil. Always remove the battery from the machine before recharging.
- Before checking or removing the battery, stop the engine and remove the key from the starter switch.
- Remove the battery and recharge in a well-ventilated area where the temperature exceeds 0°C.
- When checking or recharging the battery, do not smoke or allow naked flames in the vicinity as the hydrogen gas given off by the battery is highly explosive.
- The liquid (electrolyte) contained in the battery is very harmful if it comes into contact with the skin and the eyes; for this reason, always wear gloves and safety goggles with side shields when checking or topping up the battery. Should any electrolyte accidentally come into contact with your skin, wash the affected areas immediately with plenty of fresh water; if electrolyte comes into contact with your clothing, this should be removed as soon as possible. In case of accidental ingestion of electrolyte, drink copious amounts of water, milk or vegetable oil and take antacids such as magnesium, bicarbonate, etc. and seek medical attention immediately.
- Before working on the electrical systems, always disconnect the battery terminals.

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Always disconnect the negative lead (--) before the positive lead (+); when re-connecting the battery on completion of the work, first connect the positive terminal (+) and then the negative (--).

- Before carrying out any arc welding (permitted only on implements attached to the machine) always disconnect the battery terminals and unplug all the connectors of the electronic control units and the alternator.
- When topping up lubricants, always wear suitable protective gloves.
- Do not wear clothing contaminated by engine or hydraulic oil; prolonged contact with the skin can be harmful and may cause allergic reactions.

- Used engine oil and hydraulic oil must be disposed of properly; recover used lubricants and dispose of them in accordance with the applicable regulations.
- Before carrying out any work on the hydraulic or pneumatic systems, discharge all residual pressure from the circuits.
- Before carrying out any work on the hydraulic system or engine, allow the oil and engine coolant to cool down.
- When removing and refitting certain assemblies, it will be necessary to support the tractor; use stands, jacks or blocks capable of supporting the weight and arrange them in a triangular pattern to prevent the machine from overturning.
- To lift heavy components, use a hoist or crane. Check that wire ropes, chains or fibre slings are not worn and that hooks are not damaged.
- Always use lifting equipment of suitable capacity for the weight of the components to be removed. Ensure lifting equipment is attached correctly.
- When lifting or supporting an assembly or component, manoeuvre the parts slowly and carefully to avoid swinging movements or collision with other components.
- Never work on components suspended from a hoist or crane.
- When removing the retaining bolts of a component that could fall, always leave two opposing bolts in place for safety; before removing these last two bolts, attach the component to suitable lifting equipment or position support blocks.
- Any oil or fuel spilled during removal or dismantling operations should be cleaned up as soon as possible to prevent the risk of slipping and fire.
- When refitting electrical wiring looms and wires, ensure that they are properly secured with their original retaining straps or brackets to prevent the possibility of damage caused by vibration.
- Never insert your fingers or hands to check the alignment between fixing holes in components; always use a suitable dowel of soft material.
- When refitting assemblies or components, always use the specified tightening torques; the tightening torques indicated in the paragraphs regarding assembly/refitting operations have been determined through experimentation and must be scrupulously adhered to.
- When refitting parts that are subject to vibration or that rotate at high speed, take particular care when carrying out final installation checks.

0.1.3 - Safety precautions for removal and refitting operations

When removing or refitting parts, always take the following safety precautions.

Precautions for removal operations

- Unless otherwise indicated, lower the lifting equipment until it the component or assembly rests on the ground.
- After disconnecting hydraulic and fuel system pipes, always fit plugs to the open ends of the pipes to prevent ingress of dirt.
- Before removing a cylinder, fully retract the piston and secure it in this position using a retaining strap.
- Use containers of sufficient capacity when draining oil, coolant or fuel.
- Before removing a part from the machine, check for alignment markings indicating the correct assembly position. If necessary, make new markings to ensure correct assembly.
- When unplugging electrical connectors, always grip the connectors firmly to avoid pulling on the wires.
- Where necessary, label wires and pipes before removal to avoid confusion when reconnecting.
- Check the number and thickness of any shims removed and keep them together in a safe place.
- To lift the tractor or any of its main components, use lifting equipment of suitable capacity.
- When using eyebolts for lifting components, first check that they are not deformed or damaged; screw them fully home and then turn the bolt so that the eye is aligned with the lifting hook.
- Before removing a part, clean the surrounding area and, after removing the part, cover it to protect it from dirt and dust.

Precautions for refitting operations

- Tighten nuts and screws to the specified tightening torques.
- When refitting flexible pipes and cables, take care not to twist or tangle them.
- Always fit new seals, O-rings, split pins and safety stop rings; make sure that the ends of the cotter pins are separated and bent back so that the pin cannot be withdrawn from the hole.
- Ensure that circlips are correctly installed in their seatings.
- When applying threadlocking compound, first clean the part to remove all oil and grease, then cover the thread evenly applying a few drops of the compound.
- When applying sealant, first clean the surface removing all traces of oil and grease and check for dirt or indentations, then apply the sealant evenly making sure that it forms a continuous film around any fixing holes.
- Clean all parts, removing dirt, oxidisation, carbon deposits, burrs and indentations.
- Coat all moving parts with a thin film of engine oil.
- When reconnecting electrical wiring connectors, first remove all traces of oil, dust and water from the inside of the connector and then push the two halves together firmly; connectors with locking tabs should be pushed together until the tab engages the keeper.
- Bolt down flanged fittings evenly, tightening the screws gradually in a crosswise pattern.

Precautions to be taken on completion of removal/refitting operations

- If coolant has been drained from the engine, refit the drain plug and pour in new coolant to the correct level. Start the engine to circulate the coolant and then check the level again and top up.
- After removing hydraulic components, top up the hydraulic oil to the specified level. Start the engine to circulate the oil in the hydraulic circuits and then recheck the level and top up as necessary.

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- After having removed a variable displacement pump, connect the drain pipe and fill the pump casing with oil through the filler hole provided.
- Grease stub axle housings, cylinder pivot mountings and drive shafts thoroughly after assembly.

0.1.4 - Lifting instructions

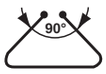
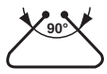
DANGER

Components weighing over 25 kg or of significant size must be supported and removed using suitable lifting equipment with wire rope or polyester slings.

Wire ropes - slings

- Use wire ropes or polyester slings of suitable capacity for the parts to be lifted, referring to the following tables:

Tab.1

WIRE ROPES (standard twisted "S" or "Z" type)				POLYESTER SLINGS (eye-and-eye - simple loop)				
Ø rope mm	Capacity (kg)			Width (mm)	Capacity (kg)			
								
8	650	620	500	25	500	400	860	700
10	1000	1740	1420	50	1000	800	1730	1410
12	1450	2500	2050	62	1250	1000	2160	1760
14	2000	3460	2820	75	1400	1120	2420	1980
16	2600	4500	3670	100	2000	1600	3460	2820
18	3300	5710	4660	150	2500	2000	4330	3530

Lifting capacities are calculated with a safety coefficient.

- The lifting hook should be attached to the central part of the rope or sling; if the hook is attached near the ends of the rope/ sling, this could cause the load to slip during lifting.
- Never lift a heavy load using a single rope; always use two or more symmetrically arranged ropes.

DANGER

Suspension of a load from a single rope could cause the load to start rotating and consequently cause the rope strands to untwist or the load to slip; this could lead to serious injury.

- Never lift a heavy load when the two legs of the ropes form a wide angle. the permitted load (kg) decreases in inverse proportion to the angle of suspension; the table below indicates how the permitted load varies according to the angle of suspension for two Ø 10 mm ropes each with a load capacity of 1000 kg.

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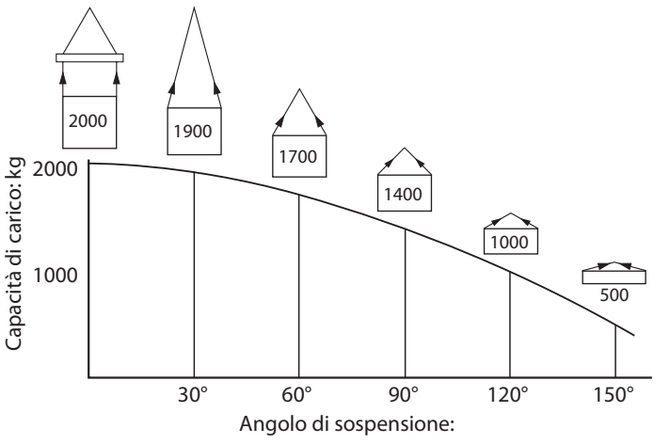


Fig.1

0.1.5 - Tightening torques

Bolts and nuts

DANGER

The tightening torques for certain specific components and special tightening methods are indicated in the relative assembly paragraphs.

The tightening torques indicated below refer to screws and nuts assembled without lubrication and, where applicable, with anaerobic threadlocking compound. the values apply to tightening on steel or cast iron components; for soft materials such as aluminium, copper, plastic, sheet metal or panels, the indicated tightening torques must be reduced by 50%.

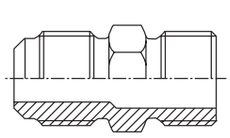
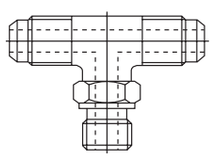
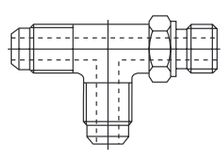
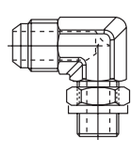
Tab.2

BOLT SIZE		BOLT CLASS					
		8.8		10.9		12.9	
		Nm	lb.ft.	Nm	lb.ft.	Nm	lb.ft.
COAR-SE	M6x1	8.0 – 8.8	5.9 – 6.5	11.8 – 13.0	8.7 – 9.6	13.8 – 15.2	10.2 – 11.2
	M8x1.25	19.4 – 21.4	14.3 – 15.8	28.5 – 31.5	21.0 – 23.2	33.3 – 36.9	24.5 – 27.2
	M10x1.5	38.4 – 42.4	28.3 – 31.2	56.4 – 62.4	41.6 – 46.0	67.4 – 74.4	49.7 – 54.8
	M12x1.75	66.5 – 73.5	49.0 – 54.2	96.9 – 107	71.4 – 78.9	115 – 128	84.8 – 94.3
	M14x2	106 – 117	78.1 – 86.2	156 – 172	115.0 – 126.8	184 – 204	135.6 – 150.3
	M16x2	164 – 182	120.9 – 134.1	241 – 267	117.6 – 196.8	282 – 312	207.8 – 229.9
	M18x2.5	228 – 252	168.0 – 185.7	334 – 370	246.2 – 272.7	391 – 432	288.2 – 318.4
	M20x2.5	321 – 355	236.6 – 261.6	472 – 522	347.9 – 384.7	553 – 611	407.6 – 450.3
	M22x2.5	441 – 487	325.0 – 358.9	647 – 715	476.8 – 527.0	751 – 830	553.5 – 611.7
	M24x3	553 – 611	407.6 – 450.3	812 – 898	598.4 – 661.8	950 – 1050	700.2 – 773.9
	M27x3	816 – 902	601.4 – 664.8	1198 – 1324	882.9 – 975.8	1419 – 1569	1045.8 – 1156.4
FINE	M8x1	20.8 – 23.0	15.3 – 17.0	30.6 – 33.8	22.6 – 24.9	35.8 – 39.6	26.4 – 29.2
	M10x1.25	40.6 – 44.8	29.9 – 33.0	59.7 – 65.9	44.0 – 48.6	71.2 – 78.6	52.5 – 57.9
	M12x1.25	72.2 – 79.8	53.2 – 58.8	106 – 118	78.1 – 87.0	126 – 140	92.9 – 103.2
	M12x1.5	69.4 – 76.7	51.1 – 56.5	102 – 112	75.2 – 82.5	121 – 134	89.2 – 98.8
	M14x1.5	114 – 126	84.0 – 92.9	168 – 186	123.8 – 137.1	199 – 220	146.7 – 162.1
	M16x1.5	175 – 194	129 – 143	257 – 285	189.4 – 210.0	301 – 333	221.8 – 245.4
	M18x1.5	256 – 282	188.7 – 207.8	375 – 415	276.4 – 305.9	439 – 485	323.5 – 357.4
	M20x1.5	355 – 393	261.6 – 289.6	523 – 578	385.5 – 426.0	611 – 676	450.3 – 498.2
	M22x1.5	482 – 532	355.2 – 392.1	708 – 782	521.8 – 576.3	821 – 908	605.1 – 669.2
	M24x2	602 – 666	443.7 – 490.8	884 – 978	651.5 – 720.8	1035 – 1143	762.8 – 842.4

Fittings

The tightening torques indicated below refer to fittings assembled on any material.

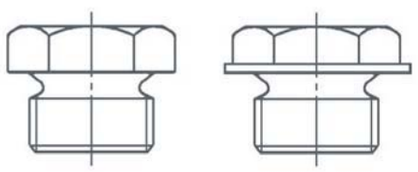
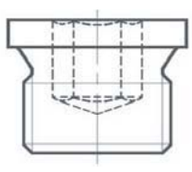
Tab.3

METRIC		Straight end fittings	T" end fittings	L" end fittings	90° end fittings
					

	Thread size	Wrench	Torque Nm ±10%	Wrench	Torque Nm ±10%	Wrench	Torque Nm ±10%	Wrench	Torque Nm ±10%
	M10x1.25	17	14	14	14	14	14	14	14
		19	14	17	14	17	14		
	M12x1.25	19	30	17	30	17	30	17	30
	M14x1.5	19	40	19	40	19	40	19	40
	M16x1.5	22	48	22	48	22	48	22	48
	M18x1.5	24	58	24	58	24	58	24	58
	M20x1.5	27	65	27	65	27	65	27	65
	M22x1.5	30	73	30	73	30	73	30	73
	M26x1.5	36	95	36	95	36	95	36	95
	M27x2	36	100	36	100	36	100	36	100
	M33x2	41	160	41	160	41	160	41	160
	M42x2	50	250	50	250	50	250	50	250
	M48x2	60	305	60	305	60	305	60	305
	G 1/8”	17	13	14	13	14	13	14	13
		19	13						
	G 1/4”	19	37	19	37	19	37	19	37
		22	37						
	G 3/8”	24	53	24	53	24	53	24	53
	G 1/2”	27	73	27	73	27	73	27	73
		30	73						
	G 3/4”	36	100	36	100	36	100	36	100
	G 1”	41	160	41	160	41	160	41	160
		46	160						
	G 1 1/4”	50	250	50	250	50	250	50	250
	G 1 1/2”	60	305	60	305	60	305	60	305

Plugs

Tab.4

		Hex plugs		Threaded plugs with hex socket head	
					
	Thread size	Wrench	Torque Nm ±10%	Wrench	Torque Nm ±10%