

**DIRECTOR GENERAL BORDER ROADS**

**GENERAL MAINTENANCE INSTRUCTIONS NO : 210**  
**ON**

**SCHMIDT SNOW CLEARING MACHINE SUPRA –4001**

**INTRODUCTION**

The Schmidt Snow Clearing Machine Supra 4001 is a specially designed vehicle, developed specially for the clearance of snow in all types of terrain climatic condition.

The steering and driving properties should therefore not be compared with traditional vehicle. For this reasons it is necessary that the operator/Driver acquaints himself thoroughly with the vehicle to familiars himself with the vehicle and muster its function. It is powered with 6-cylinder V shape 4 stroke Mercedes Benz OM 501 LA water cooled diesel engine electrically controlled fitted with Telligent service system. It is an direct injection engine fitted with turbo charger. Eqpt is provided with computerized diagnosis system.

**AIM**

The aim of this instruction is to guide the user units to maintain/operate the equipment to achieve maximum life and to keep the equipment in good mechanical condition.

**ACTION BY**

- UNITS**
- (a) Carryout regular/periodical maintenance task on laid down in this instruction.
  - (b) Enter periodical task in logbook.

- FD WKSP**
- (a) To keep watch over the periodical maintenance task carried out by user units and maintained records in logbook.
  - (b) To advise user units in respect of any discrepancy/short coming noticed.

**DETAILS**

General maintenance instructions and safety Regulations are enclosed as per Appx 'A' Lubrication and periodicity of oil change as per Appx 'B' and Technical Data as per Appx 'C'.

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(US Misra)  
SE (E&M) SG  
Director (Tech)  
For Dir General Border Roads

Dated : 31 Jul 2000

**GENERAL MAINTENANCE INSTRUCTIONS AND SAFETY REGULATION**

**GENERAL**

In order to prevent the occurrence of accidents make sure that the machine is on flat and firm base, when carrying out maintenance work. All steps and standing surface must be kept free of dirt, grease, oil, snow and ice.

**NOTE**

(I) Before lubricating any parts of the machine, thoroughly clean the grease nipples and dispose of old grease.

(ii) No high pressure is to be applied during lubrication as this can damage the gaskets.

(iii) Fuel used for Schmidt Supra 4001 must be free from any water content to avoid damage to the engine specially to unit injectors.

(iv) The blending of fuel must be accurate for temperatures going below -25°C to -35°C.

**AFTER END PLOUGHING SEASON**

When the ploughing seasons is completed, give the machine a through cleaning, lubricate all lubrication areas and apply grease to all exposed components, repair damaged paint work, completely drain fuel tank and refill with fresh fuel.

**PERIODICAL MAINTENANCE INSTRUCTIONS**

**DAILY INSPECTION WORK**

(a) Check and inspect friction rail for its fastening and wear ness.

(b) Check and inspect skids for its fastenings and wear ness.

(c) Check fluid level with oil dip stick in Hydraulic fluid tank.

(d) Check oil level with dip stick in planetary gear.

(e) Check engine oil level

(f) Check and inspect for leakages.

(g) Check preliminary fuel filter every day and drain water from water separation when necessary.

**WEEKLY INSPECTION WORK (EVERY 50 HRS OF OPERATION)**

- (a) Check oil level in Drum gear (Cleaning head) with dip stick.
- (b) Check oil in planetary gear (Cleaning head) with dip stick.
- (c) Check oil level in Spur Gear with dip stick.
- (d) Check oil level in Spur Gear (axle) with oil control screw.
- (e) Check oil level in Axle with oil control screw.
- (f) Check oil level in planetary gear (axle) with oil control screw.
- (g) Check tightness of screw/bolts of slewing ring.
- (h) Check and re-tighten screws of snow divider bar.
- (j) Check brake fluid level in brake fluid reservoir.
- (k) Check and re-tighten wheel nuts (Tightening torque 350 NM)

NOTE :- Please observe when examining the oil level in gear boxes oil level  
Should only be checked when oil is warm.

**MAINTENANCE WORK AT EVERY 150 OPERATING HOURS**

- (a) Grease the shearing pin/cotton pin.
- (b) Grease the skids/bolts.
- (c) Grease the housing adjustment for Catapult.
- (d) Grease the raise/lower Hydraulic cylinder.
- (e) Grease the slewing unit for front assembly/live rim.
- (f) Grease the angle of front assy/control points for hydraulic cylinder.
- (g) Grease the spring suspension/bolts.
- (h) Grease the front assembly fasteners/bolts\*\*.
- (j) Grease the Drivers cab/Tipping equipment.
- (k) Grease the universal joint/socket joints.
- (l) Grease the steering cylinder/pump.
- (m) Grease the energy spring mechanism linkage.
- (n) Grease the center pivot joint/bearing.
- (o) Grease the Hose fastener.
- (p) Grease the Door/hinges.
- (q) Grease the universal joint for cleaning unit drive.
- (r) Grease the Ejector Chimney flap/hydraulic cylinder.

- (s) Check bolt and grease the live rim/worm gear.
- (t) Grease the slewing rim for ejector housing, hydraulic cylinder steering pump.
- (u) Check radial packing ring and grease the bearing.
- (v) Grease the Cardan shaft for cutter drum drive unit.
- (w) Grease the Cardan shaft connection to middle piece.

NOTE: - \*\* Tighten all bolts/screw every 200 hrs of operation.

**MAINTENANCE WORK AT EVERY 300 OPERATION HOURS**

- (a) Clean and change oil in Drum gear box.
- (b) Clean and change oil in planetary gears. \*
- (c) Clean and change oil in spur gear.
- (d) Grease fill in the Generator/Stauffer grease cups.
- (e) Clean and replace filter element of Luft filter.
- (f) Clean filter of additional heater fuel filter (Special equipment).

**MAINTENANCE WORK AT EVERY 600 OPERATION HOURS**

- (a) Change oil in rear Axle.
- (b) Change oil in Rear Axle/Planetary gear.
- (c) Change oil in front Axle. \*\*
- (d) Change oil in front Axle/Planetary gear. \*
- (e) Change oil in spur gear.
- (f) Change oil and filter cartridges in filter assy.
- (g) Check radial packing ring in bearing.
- (h) Check and re-tighten Allen screw of center pivot bearing.

Note:- \* Re-tighten all Screws/bolts on the gear box fasteners and axle funnels at every oil change (torque 113NM).

**MAINTENANCE WORK AT EVERY 1200 OPERATING HOURS OR EVERY 2 YRS**

- (a) Change oil in vehicle hydraulic/oil Tank.

**MAINTENANCE INSTRUCTION FOR PRELIMINARY FUEL FILTER WITH WATER SEPARATOR**

- (a) Check filter every day and drain where necessary.
- (b) Change filter element every 600 or atleast once a year.

### **HOW TO DRAIN WATER**

- (a) Place vessel underneath.
- (b) Unscrew drain plug.
- (c) Pump out water using hand pump.

### **HOW TO CHANGE FILTER INSERT**

- (a) Unscrew drain plug and vent plug and allow filter insert to drain until empty
- (b) Remove filter insert with separation vessel from filter head.
- (c) Remove separation vessel from filter insert. Clean separation vessel and groove for sealing ring.
- (d) Rub clean diesel or engine oil into new plan compression ring and insert into groove in separation vessel.
- (e) Firmly screw separation vessel by hand onto new filter insert.
- (f) Rub clean diesel or engine oil into new sealing ring and place in groove at filter insert.
- (g) Firmly screw filter insert by hand onto filter head.
- (h) Retighten drain plug and vent screw.
- (j) Fill filter with hand pump.
- (k) Continue venting according to operation instructions.
- (l) Check for leakages.

**NOTE:** Only use with a fine filters.

### **SAFETY REGULATIONS**

#### **GENERAL**

- (a) It is advisable to exercise great caution when operating.
- (b) The machine may only be operated by fully trained and familiarized staff.
- (c) Snow Cutters are intended solely for cutting snow.
- (d) All safety devices (guards) must be complete and must be properly secured. They must not be complete and must be properly secured. They must not be able to rotate freely with the unit.

- (e) Comply with all regulations.
- (f) Observe the operating instructions for industrial motors issued by Mercedes – Benz.
- (g) Never leave the engine running in enclosed areas with out suitable ventilation- it is danger of being poisoned.
- (h) In the case of an emergency, switch off the motor immediately by pressing the STOP BUTTON.
- (j) Always apply the parking brake, when parking the machine.
- (k) Always switch motor off when leaving the machine.
- (l) Adhere engage the mechanical transit locks on the cleaning head during transit.

**DURING TRANSIT TRAVEL**

- (a) Check all regulations have been observed prior to commencing with transit.
- (b) Ensure the exterior mirrors have been mounted.
- (c) Insert the mechanical transit lock on the clearing head prior to driving for transit purposes on public roads (only applicable out side of ploughing season). Hydraulically lower snow cutter and ejection shoot in order to have an adequate field of vision.
- (d) Observe max permissible speed limit.
- (e) When driving downhill, do not exceed the 40 Km/hrs speed limit.
- (f) When working lights are switch on, do not exceed the 30 Km/hrs speed limit.
- (g) Passengers may only sit on the seats provided for.

**DURING OPERATION/USE**

- (a) Check tightness of all bolts and fastening screw of vehicle, before every use.
- (b) Only switch off the differential lock when the vehicle is driving straight or the wheels are stationary.
- (c) When the snow cutter is in operation, accompanying persons must not be allowed to stand in front of the snow cutter and must maintain a safety clearance of min 2M around the sides.
- (d) No person may be allowed to stand inside the direction snow is ejected.
- (e) Only direct the stream of snow towards open country side or when unloading the loading area.

- (f) As flying snow can be safety hindrance, especially during unfavorable wind conditions, it may be necessary to use a co-driver for this.
- (g) Snow obstructions in the ejection chute may only be removed after the cutter drums have to a halt and the engine has been turned off and may only be carried out using the tools provided for that purpose. Suitable sign must be attached to the front assembly for this purposes.
- (h) Shear pins may only be replaced after the cutter drum has come to a halt and the engine has been turned off.

### **DURING MAINTENANCE AND REPAIRS**

- (a) Repairs may only be carried out by specialist staff. For this purpose, only original SCHIMIDT spare parts should be used. If in doubt, always consult the Schmidt customer service Department.
- (b) Repair, maintenance and cleaning work may only be carried out when the engine has been turned off and the parking brake has been applied shut down the engine on a firm surface or insert the transit locks.
- (c) Repair work on the steering and hydraulic drive unit may only be carried out by trained personnel by using original parts.
- (d) Before commencing work in hydraulic system, release the pressure carefully by loosening the threaded joints.
- (e) While doing any welding on Supra-4001, the battery must be disconnected and the two leads (+Ve and -Ve) must be connected directly (without battery) and the two electronic parts located in the operator's cabins in between the seats must also be disconnected. After the welding is over, these two electronic parts must be correctly reconnected.
- (f) In case of low battery charge, the engine can be started by putting parralled battery, but the connection must be made firm through fasteners and not hand held loose contract. Secondly while charging the mounted battery with as external charging system, no attempt should be made to start the engine as higher voltage from the charging system can damage the electronic parts.
- (g) After completing all maintenance work and repairs, all safety device must be refitted in accordance with requirements.
- (h) The hydraulic hoses must be renewed every 6 years. The date of manufacturer (Month/Year) is clearly marked on the fittings for all hydraulic hoses.

### **CAUTION : LED WARNING SIGNALS AND BUZZERS**

The following malfunctions are displaced as a warning signals if a circuit value is exceeds: -

.....P/7

**COOLANT**

- At Approx 100<sup>o</sup> C - LED Flashed (Flashing value is shown on Display.
- At Approx 103<sup>o</sup> C - In addition an intermittent beeping sound is also activated. The engine switches to idling speed.

**OIL PRESSURE**

- At Approx 0.25 bar - LED flashed, intermittent beeper is activated. Diesel engine is switched off.

**TEMPERATURE OF HYDRAULIC FLUID IN TANK**

- At Approx 78<sup>o</sup> C - LED Flashes (Flashing value is shown on Display.
- At Approx 83<sup>o</sup> C - In addition, an intermittent beeping sound is also activated.

**TEMPERATURE OF HYDRAULIC FLUID IN CIRCUIT**

- At Approx 95<sup>o</sup> C - Led Flashes (Flashing value is shown on Display.
- At Approx 100<sup>o</sup> C - In addition, an intermittent beeping sound is also activated.





**SNOW CUTTER SCHIMIDT SUPRA-4001**

**MAINTENANCE, LUBRICATION AND PERIODICITY OF OIL CHANGES**

Ser No	Maintenance Jobs	Capacity in Ltrs	Operating Hours	Ambient Temperature	Standard Grade of oil	Ambient temperature	IOC grade Of oil	Remarks
1.	Engine Mercedes Benz Diesel eng OM501LA, 6Cyl, 4 Stroke V eng water cooled direct injection turbo charger, with inter cooled 315KW at 2000 rpm.	-	Change oil filter at every 300 hrs	° -10 C to + 30 C ° Below -10 C	SAE 15W40	° -10 C to + 30 C ° Below -10 C	CF4 15W40 5W30	*Note
2.	Drum Gear Box	14 Ltrs	300 hrs	° Up to max -25 C	SAE 80 STOU-Oil	° Up to -25 C ° to 0 C	Servo Gear HP-80 85W90	
3.	Planetary Gear	0-75 Ltrs	-do-	-do-	-do-			
4.	Spur Gear	3.5 Ltrs	-do-	-do-	-do-			
5.	Front Axle	5 Ltrs	600 Hrs	-do-	-do-			
6.	Front axle/Planetary gear	0.743 Ltrs	-do-	-do-	-do-			
7.	Spur Gear	2.5 Ltrs	-do-	-do-	-do-			
8.	Rear Axle	5 Ltrs	-do-	-do-	-do-			
9.	Rear Axle/Planetary Gear	0.7 Ltrs	-do-	-do-	-do-			
10.	Veh/ hyd/oil tank	110 Ltrs	-do-	-do-	OI- ATFSUFFIXA		Servo transfluid 'A'	

\*Note – Oil should be changed when warm to avoid dirt from collecting in oil pan.

Ser No	Maintenance Jobs	Capacity in Ltrs	Operating Hours	Ambient Temperature	Standard Grade of oil	Ambient temperature	IOC grade Of oil	Remarks
11.	Grease	-	-	Up to Maximum ° -25 C	Multi purpose grease  Autol universalfett K2K-30	° ° -25 C to 0 C	Servogem EP2	**Note

\*\* Note:- Before lubricating clean the grease nipples. The needle brg must be lubricated thoroughly until it reaches the old grease starts to merge out of the gasket. No high pressure is to be applied during lubrication as this can damage the gaskets.

## 12. Diesel Fuels

Only use correct grade diesel fuel.

No Fuel additives are needed. The use of fuel additives could affect warranty rights.

### Note: -

If the Telligent maintenance system is used, the sulphar content of the diesel must be entered in the system or adapted to the current value.

Fuel added from drums or canes could be contaminated. This could lead to malfunctions in the fuel system.

Always filter fuel before adding it to the tank.

Always filter fuel before adding it to the tank.

On no account may the fuel be mixed with water.

### **DIESEL FUEL IN EXTREAM COLD**

At low ambient temperatures, paraffin may separate from the diesel and affect its ability to flow freely. To avoid breakdown caused by this problems (e.g clogged filters). Diesel fuel with improved low temperature flow characteristics is sold in the winter months.

Refer GMI No.59 for correct grade of diesel fuel.

If summer grade diesel, or a less cold-resistant winter-grade diesel is in use, a flow improver or kerosene can be addes to it, the actual quantity being dependent on the ambient temperatures.

#### **Do not add petrol (gasoline) to the diesel**

Mix the flow improver or kerosene with diesel in good time, before the fuel's flow characteristics have been adversely affected by paraffin separation. If faults already been caused by paraffin separation, they can only be rectified by heating the entire fuel system.

Do not add anything to cold-resistant winter-grade diesel fuels. The fuels low-temperatures flow characteristics could actually deteriorate with such an additive.

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**TECHNICAL DATA**

**ENGINE**

Manufacturer	:	Mercedes Benz OM501LA
Type	:	6 Cylinder 90 V Engine Direct Injection, Turbo-Charger and Inter cooler.
Bore	:	130 MM
Displacement	:	1190Cm3
Performance	:	(315KW/428HP)
Torque	:	1730NM at 1080 rpm
Rated speed	:	2000 rpm
Cooling system	:	Forced circulation cooling with refrigerant
Lubrication system	:	Pressure Lubrication System

**CHASSIS**

Ground Clearance	:	Approx 300mm
Truck Width	:	1500mm
Wheel Base	:	2300mm
Min. turning track diameter	:	Approx 9.00m
Axle Type	:	Rigid axles with Planetary hub reduction axles.
Permissible total weight	:	10,000 Kg
Permissible Axle Load	:	Front - 6900 Kg Rear - 5000 Kg
Tyre Pressure	:	Front - 5.5 bar Rear - 4.0 bar
Drivers Compartment heating	:	Water/Air
Fuel Tank	:	Content Approx 530 Liters

**DRIVE UNIT**

Tyre	:	Hydraulic or like an automatic with a displacement pump and Displacement pump and displacement motor, mechanical 2 gear box.
Displacement :		Hydraulic A4V125 Capacity : 125 Cm3/rpm max Max Pressure : 450 bar

Hydromatrik A6VM 140  
Displacement motor : Absorption Capacity 140Cm3/rpm  
: Max pressure 450 bar

**CUTTER DRIVE**

Displacement pump : Hydromatik A40VG250  
Capacity –250Cm3/rpm  
Max pressure 450 bar  
Displacement : Hydromatik A6VM200  
Absorption Capacity 200Cm3/rpm  
Max Pressure 450 rpm

**ELECTRICAL SYSTEM**

Generator : 28V100A  
Starter : 24V6, 2KW  
Batteries : 2X12V,143 Ah each  
Main head light : 24V 75/70W  
Side light : 24V 5W  
Front Directional Indicator : 24V21/5W  
Rear Directional indicator : 24V21W  
Tail Light/Brake Light : 24V5W/21W  
Speed meter Light : 24V2W  
Warning Light : 24V1, 2W  
Interior Light : 24V, 10W  
Hazard Warning Light : 24V1, 2W  
Rotary Beacon : 24V70W  
Reversing Light : 24V21W

**HEATED WINDOWS**

Front Wind Screen : 2x240 Watt  
Door Window : 2x120 Watt  
Heated Mirror : 2x30 Watt

**HYDRULIC SYSTEM**

Main fuel Tank capacity	:	110 Ltrs
Triple Circuit pump	:	Circuit 1 : Brake system, Control for front Assy.
		Circuit 2 : Radiator fan drive.
		Circuit 3 : Scavenging pump, Gear driven pump
Mode	:	Gear Drive Pump
Permissible operating Pressure	:	Circuit 1 : 150 bar
		Circuit 2 : 50 bar
		Circuit 3 : 4 bar
Control Pump	:	Steering
Permissible Operating Pressure	:	175 bar

**BRAKE**

Operating Brake	:	Hydraulic, dual circuit, non-muscular Energy braking system, braking pressure 58 bar.
Parking Brake	:	Mechanical accumulator, Opens Hydraulically.
Warning Light (C1)	:	Light up when reservoir Pressure drops to below 100bar

**STEERING**

Steering	:	Centre Pivot Steering
Steering Angle	:	Centre Pivot angle 35
Type of Steering	:	Danfoss OSPD 80/280 LS
Steering Power Transmission	:	Hydrostatic

**CLEANING HEAD**

**CUTTER EJECTOR ATTACHMENT**

Cleaning width	:	2600mm
Cutter Helix diameter	:	1100mm
High of front attachment	:	Approx 1150 mm
Excavation height	:	Approx 350mm
Throwing distance	:	Infinitely variable between 5-40m













