**MANUFACTURER:**

**PRONAR Sp. z o.o.**
17-210 NAREW, ul. Mickiewicza 101 A; woj. podlaskie
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# WHEELED AGRICULTURAL TRACTORS TYPU P2

**PRONAR 82A II (58,7 kW)**
**PRONAR 82SA II (58,7 kW)**
**PRONAR 82TSA II (66,7 kW)**
**PRONAR 1025A II (77,0 kW)**


# OPERATION MANUAL

2nd edition
Narew 03/2006

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# TYPE P2

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## SELLER'S NOTICES:

Name and address of the point of sale:.....
.....
.....
.....

User name & address:.....
.....
.....

Tractor type:.....

Chassis serial:.....

Engine serial:.....

Cab serial:.....

Next authorised service station (ASS):.....
.....
.....

Purchase date:.....

Warranty expiry date:.....

**The operation manual is the principal equipment of the tractor.**

**Read the manual carefully before operation, observe safety rules.**

**In the case of loss or destruction purchase a new copy of the manual from the manufacturer.**

**In the case of sale or lending supply the next user with the manual.**

**The seller should place at the first page the serial of the tractor (according to the type plate) and data of the point of sale.**

## CONTENTS

# A. INTRODUCTION



The **PRONAR-82A II / 82SA II / 82TSA II i 1025A II** class 1.4 agricultural tractors, thanks to their parameters and hitches/catches can be aggregated with various suspended, semi-suspended or towed tools and agricultural machines. The unit **PRONAR** tractor - machine (tool) is capable to carry on all works in your farm. As a result of constant improvement of reliability and development of construction the **PRONAR** tractors are reliable working tools. They are also applicable for ground, transport and other works, depending on coupled machine or tool.

Constant improvement of the tractor and connected alterations of its structure may cause that the Operation Manual could slightly differ from the real condition of the tractor. In case of any doubt please contact us by letter or phone.

**PRONAR Sp. z o. o.**
**ul. Mickiewicza 101 A**
**17-210 Narew**
**woj. podlaskie**

**Phone/fax:** **0/85/ 681 63 29; 681 64 29; 681 63 81, 681 63 82; 681 63 84**
**Fax:** **0/85/ 6816383**
**www.** **pronar.pl**

***Dear user of the PRONAR tractor – we thank for good choice !***

Observation of safety rules as well as traffic regulations ensures safety for the operator, other users and the tractor.

**The text within frames and marked with this sign points at:**
**- possibility of a dangerous situation for the operator, if the reservation/hint is not observed;**
**- an information important for proper utilisation of the tractor.**

## GENERAL REQUIREMENTS

- Prior to operating the tractor read the manual carefully for insufficient acknowledgement with its content might cause dangerous situation for the operator and the tractor.
- The tractor should be operated by a driver having proper driving licence and acknowledged with principles of proper operation and utilisation of tractors and agricultural machines (tools).
- Tractors **PRONAR-82A II / 82SA II / 82TSA II** are fitted with a safe cab **type KS-07** having the **OECD** certificate **No. 4/0871** and not adapted for transportation of passengers on public roads. **Transportation of passengers on public roads is prohibited.**
- Tractors **PRONAR-1025A II** are fitted with a safe cab **type KS-08** having the **OECD** certificate **No. 4/0872** and not adapted for transportation of passengers on public roads. **Transportation of passengers on public roads is prohibited.**

## PRINCIPLES OF SAFE OPERATION OF THE TRACTOR

- Prior to operation perform visual inspection of the tractor, its catches/hitches, coupled machine (tool) and **do not start the work, if you are not sure if they are complete and properly coupled**.
- For towed machines always use reliable connectors (original bolts and their protections).
- Adjust the three-point hitch, so that coupled machines (tools) in their transport position always are stiff connected with the tractor.
- Carefully perform all maintenance actions for the tractor and its equipment, and especially brake and steering systems, so that they are always in perfect condition. This determines your safety!
- All operations connected to washing, cleaning, preparation to work and maintenance after work perform with the engine off and with activated parking brake.
- During engine's operation the pressure in the cooling system is very high (the cooler plug is fitted with a pressure valve). For that reason **do not unscrew the plug while the engine is running**, or – if necessary – do it very slowly and cautiously, so that to lower the system pressure.
- While removing hot coolant from the cooling system or oil from drive system components or steering system take precautions so as not to be scalded.
- Do not come close with open fire (even with a lit cigarette) to the tractor during refueling, fuel system maintenance or inspection of batteries.
- Do not fit the tractor with parts or components, which may introduce changes or modifications to its structure without prior consultation with the manufacturer.

## PRINCIPLES OF SAFE WORK

- Prior to starting the engine set **the gearbox lever** to **H** or **L** (PRONAR-82A II / 82SA II / 82TSA II) or **N** (PRONAR-1025A II).
- Do not start the engine and do not manipulate levers (pedals) if you do not sit at the operator's seat.
- Prior to moving forward release the parking brake and make sure that helpers are not endangered, and especially if they are not **between the tractor and the coupled machine**. Warn them with a horn about your intention to move forward.
- Do not get out from the tractor while moving.
- Before leaving the cab switch off the engine and activate the parking brake.
- Do not start-up the tractor in closed rooms with damaged or ineffective ventilation; exhaust gas is a deadly poison.
- If the engine or the steering system appears to be out of order in the course of driving, **stop immediately**, because in thi case steering requires higher power at the steering wheel.
- **Do not work** and do not allow helpers to work under machines (tools) in their upper position.
- Do not leave machines (tools) in upper position during longer stops of the tractor.
- If the front axle wheels loose contact with ground, hoist the coupled machine (tool) and mount the front axle ballast. If the front wheels still have no sufficient contact with ground (i.e. the tractor is not sufficiently

steerable) **do not work** with this machine/tool. It is possible to load the front axle in any other way but without exceeding the maximum load of tyres.

- While manoeuvring the coupled machine (tool) make sure that your manoeuvres will not cause a collision with co-operating people or objects, which results in dangerous situation.
- **Do not use** articulated / telescopic shafts **without guards** for driving of machines and tools from the PTS.
- Check connected machines (tools) only during stop and **with PTS off**.
- If using complementary or supporting devices (components) check if they are suitable for co-operation with the tractor. Acknowledge with their proper installation and co-operation with the tractor.

**In the case of application of a front loader do not exceed admissible pressure on the front axle (see p. 89). Use also a counter-ballast on the rear hitch.**

**Application of a front loader without ballast on the rear hitch is prohibited.**

**DO NOT FORGET – it's your tractor.**
**If used improperly, may be dangerous to you, to third persons and your environment. Operate only the equipment adapted for co-operation with your tractor.**

## DRIVING THE TRACTOR

To avoid dangerous situations (especially overturning of the tractor) be careful and judicious while driving the tractor. Match tractor's speed to terrain, especially while crossing bumps or ditches, on slopes and curves as well as in hills and while turning back. Do not turn sharply while the tractor is fully loaded or at high speed.

**CAUTION! While working on slopes of 8 ÷ 12° inclination always use wheel track not smaller than 1800 mm.**
**Admissible working angle at slopes amounts to 12°**

## SAFETY RULES DURING TRANSPORT OPERATIONS

While driving on public roads observe local traffic regulations.

- While driving on public roads the tractor should be equipped with **warning reflecting triangle** and marked with a **triangular plate for slowly moving vehicles**. If the tractor is coupled with a machine or a trailer, the plate should be mounted at the coupled machine or trailer (accordingly to regulations).
- Driving the tractor (coupled with a trailer, machine or tool) if the lighting or the brake system is inefficient or if the installations of the trailer (machine) are not connected to the tractor is prohibited. **This may cause an accident and is prohibited by regulations.**
- Do not leave the disconnected trailer (machine, tool) alone on public roads. In the case of a failure drive to the verge and place the warning triangle (the obligatory equipment of each tractor and trailer) according to traffic regulations and turn on the position lights.
- Do not leave the tractor on slopes; if the stop is absolutely necessary lower the coupled tool, switch on the first gear, switch on the front axle drive (position "on"), and activate the parking brake.
- Do not exceed 30 kph with coupled machine (tool); do not drive from a slope with engine off, with gearbox lever in neutral position or with pressed clutch pedal. **This may cause dangerous situation**.
- Do not transport people in the cab, on the trailer or on coupled machines. **This is strictly prohibited!**
- For transport works use wheel track not smaller than 1600 mm.
- Take care that independent brake pedals **are coupled** and their action simultaneous.
- Do not drive the set tractor + trailer if the **red lamp** signalling low trailer (trailers) brake pressure **is on**. This may cause the braking action ineffective.
- Connect trailers and machines (tools) only according to manufacturer's recommendations i.e. with original bolts and cotter pins. Other connection methods may cause dangerous situations
- Do not tow trailers **of total weight greater than 3500 kg** without brakes.
- During towing of the tractor observe traffic regulations. It is allowed to tow the tractor with the engine off only if its steering system is OK and the speed does not exceed 10 kph.

## TRACTOR'S OPERATION WITH THE PTS ON

- While operating machines (tools) driven via the PTS make sure that the PTS is off if it is necessary to maintain (disconnect) the machine.
- While operating machines (tools) driven via the PTS people close to rotating parts or elements should not wear loose clothing because it may lead to dangerous situations.
- While operating stationary machines driven with the PTS always activate the parking brake, lock rear wheels on both sides and set front wheels as for driving forward.
- Do not execute operations connected to washing, adjustment or maintenance of PTS-driven machines (tools) while **the engine is on**.
- Always use the umbrella guard; when the PTS is not in use put the protective cap on the PTS end.
- Do not use shafts for driving external machines without suitable, complete guards.
- Always use properly matched (depending on torque value of driven machine) articulated / telescopic shafts. The torque value (Nm) is usually written on the PTS guard.

## FIRE SAFETY RULES

- Under any circumstances do not add gasoline or other mixtures to diesel; this may increase risk of fire or explosion.
- Close the fuel filling plug tightly.
- Do not replenish fuel when the engine is on.
- Do not smoke while replenishing fuel or maintaining the fuel system.
- Do not fill the tank completely. Leave some empty space for thermal expansion.
- Always replenish fuel just after work to avoid forming of water condensate in the tank.
- Do not store fuel and lubricants closer than 3 m from the tractor's parking place. Equip the place with fire extinguishing equipment.
- Take precautions during repairs with use of welding. Clean the working place thoroughly to avoid fire.
- Keep the exhaust system tight and free of flammable substances, especially from outside.
- Keep fuel and hydraulic systems tight.
- Equip the tractor with a fire extinguisher type GP-1X, BC-DB, or similar and fasten it in a holder.

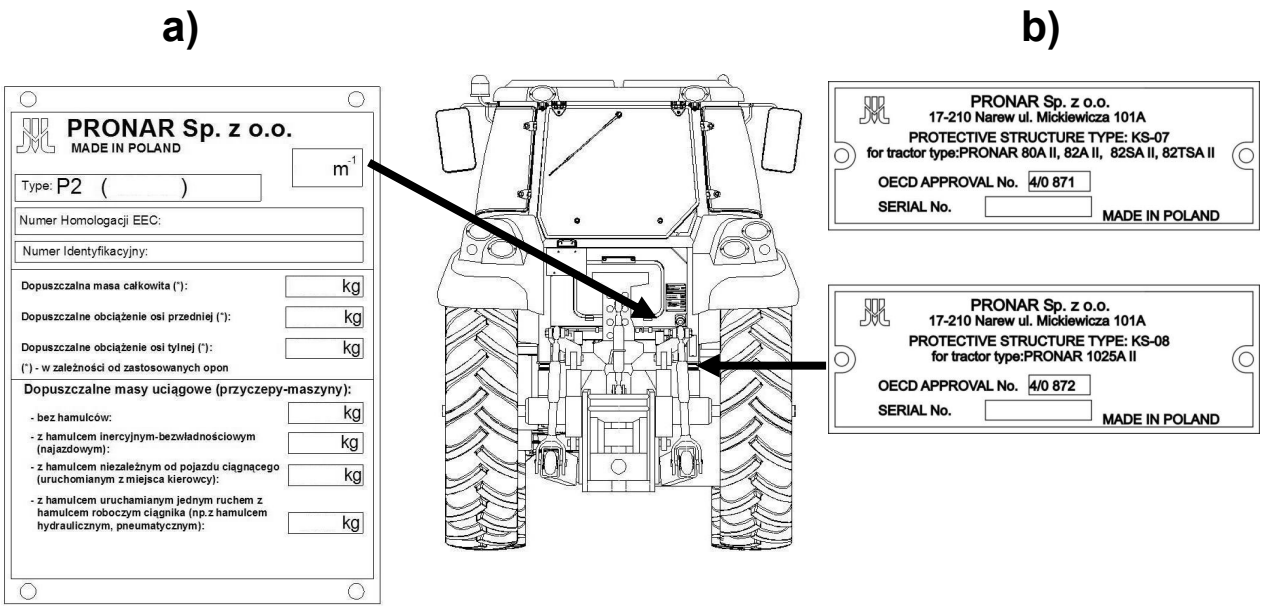



**Fig. C-1** Location of manufacturer's plates
**a** – tractor's type plate; **b** – cab's type plate;

The tractor (chassis) number is located at the plate situated at the rear cab wall on the right-hand side near the electric socket (see **Fig. C-1 pos. a**), and at the front axle console on the right-hand side.

The type & number of the cab is located at the plate situated at the rear cab wall on the right-hand side (**Fig. C-1 pos. b**)

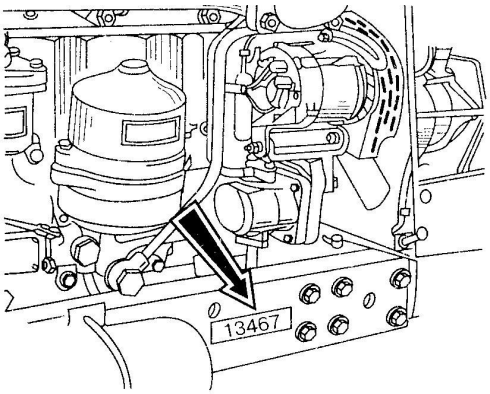



**Fig. C-2** Tractor number at the left longeron

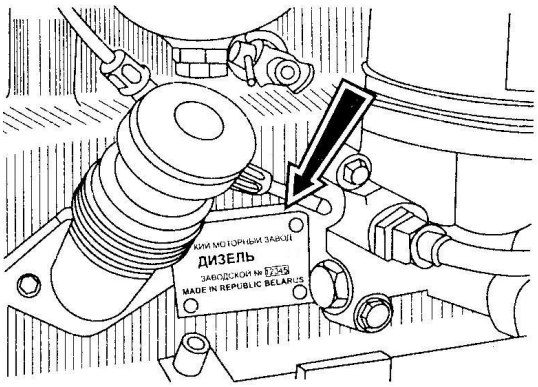
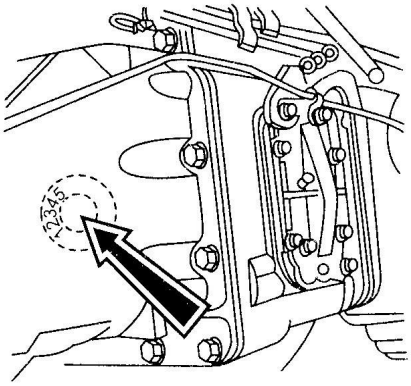



**Fig. C-3** Manufacturer plate with the engine number.

**PRONAR-82A II/82SA II/82TSA II**



**Clutch PRONAR-1025A II**

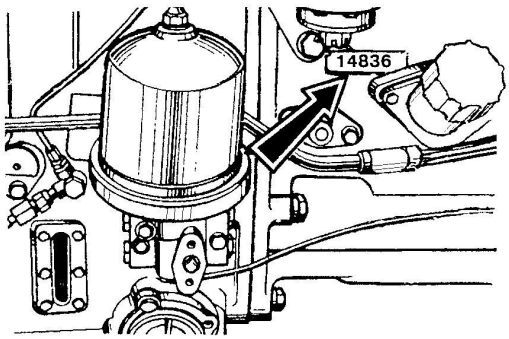
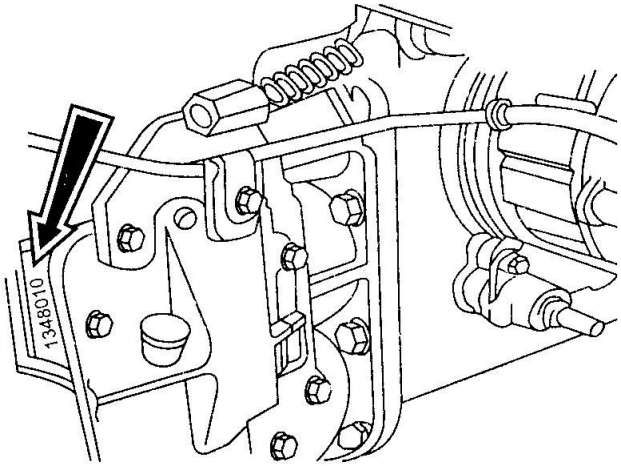



**Fig. C-4** Location of clutch serials

**PRONAR-82A II, 82SA II, 82TSA II**




**PRONAR-1025A II**

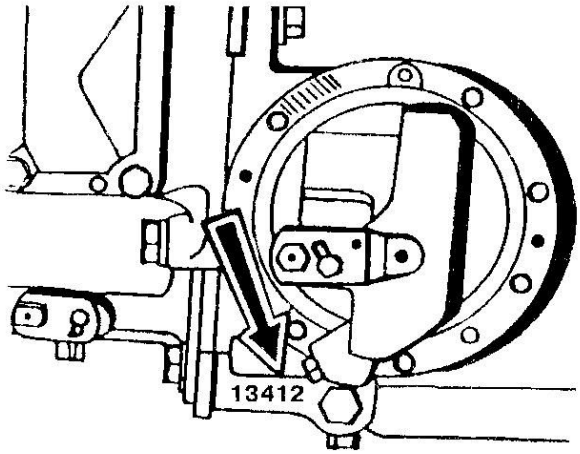
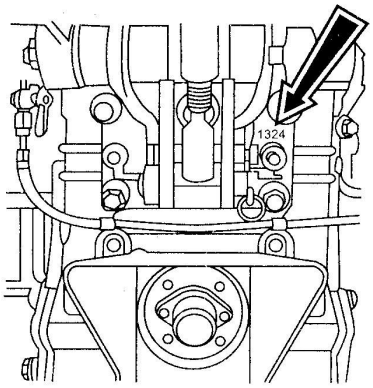



**Fig. C-5** Location of gearbox serials

**Rear axle**




**Front axle**

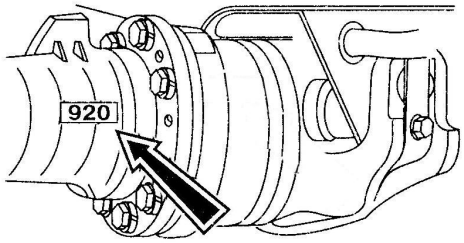



**Fig. C-6** Location of rear and front axle serials.

## CAB

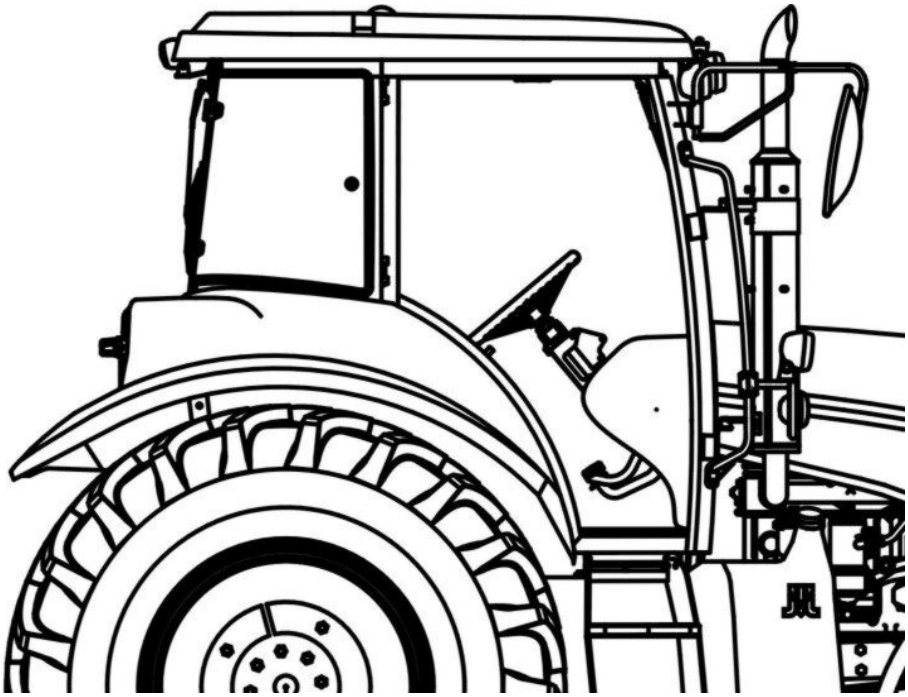


**Fig. D-1** The cab of tractors **PRONAR-82A II / 82SA II / 82TSA II / 1025A II**

**Prior to starting tractor's operation acknowledge with controlling elements, indicators and their indications. Information supplied with the present manual will help you to drive the tractor properly and safely and to perform intended works with possibly lowest effort.**

## ARRANGEMENT OF CONTROL GEAR

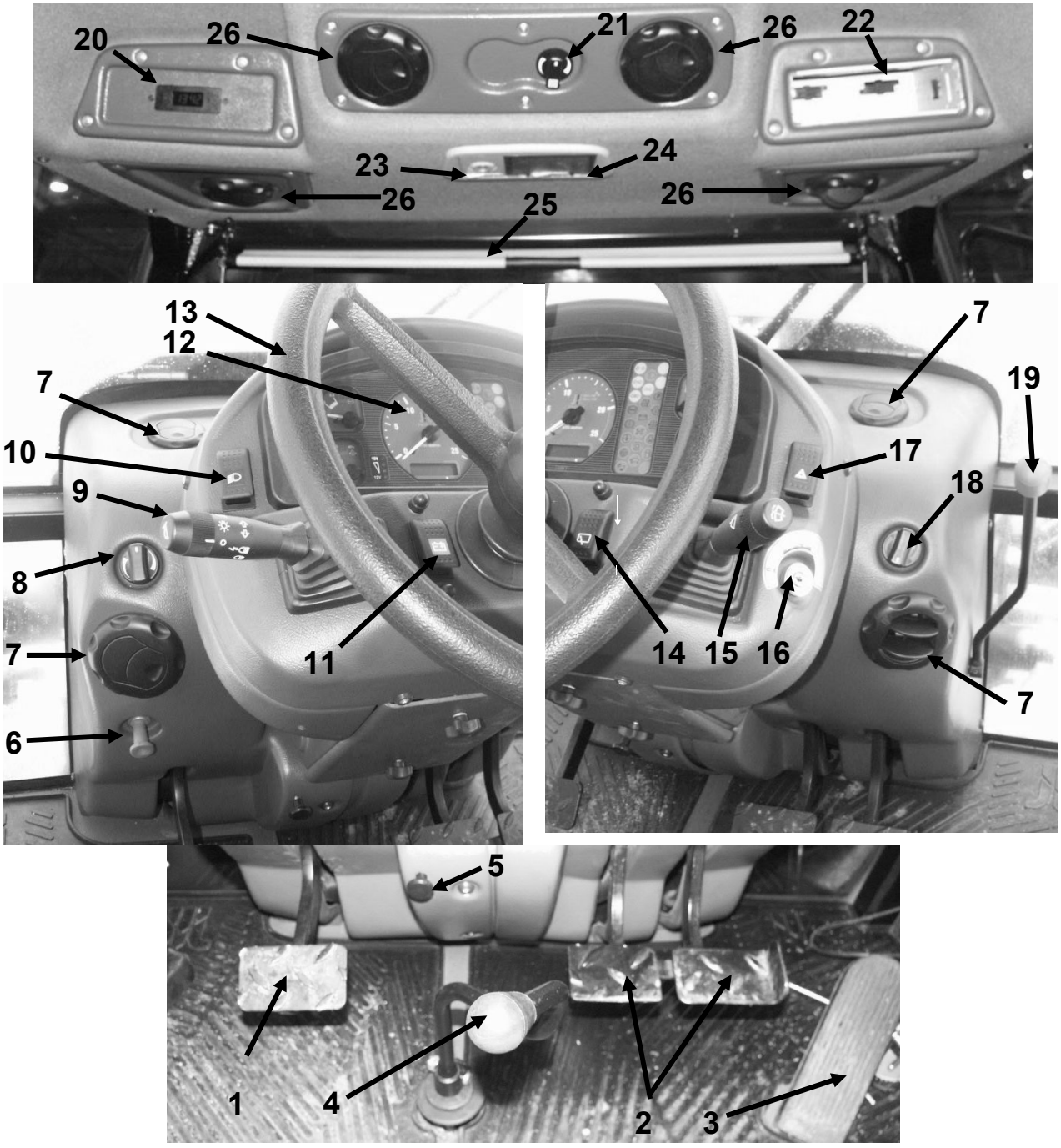



**Fig. D-2** Arrangement of control & steering gears of **PRONAR** tractors
**1** – clutch pedal; **2** – brake pedals (for left and right wheel, coupled with help of a latch); **3** – throttle pedal; **4** – reduction gera lever (except of PRONAR-1025A II); **5** – pull rod for lock of angular position of the steering wheel; **6** – engine stop cable; **7** – adjustable flaps for air outlets at the steering column; **8** - adjustment knob for air blow speed for outlets at the steering column; **9** – multi-function change-over switch for lights and horn; **10** – change-over switch - front lights to side lights; **11** – mass switch inside the cab; **12** – indicator panel; **13** – steering wheel; **14** – rear window wiper switch; **15** - multi-function change-over switch for wipers and front window washer; **16** – ignition switch; **17** – emergency lights switch; **18** – adjustment knob for air blow temperature for outlets at the steering column; **19** – throttle lever; **20** – electronic clock; **21** – adjustment knob for air blow speed for outlets at the upper cab panel; **22** – radio-cassette player; **23 –** cab spot-lighting switch; **24 –** cab lighting switch; **25** – sun visor; **26** - adjustable flaps for air outlets in upper cab panel;

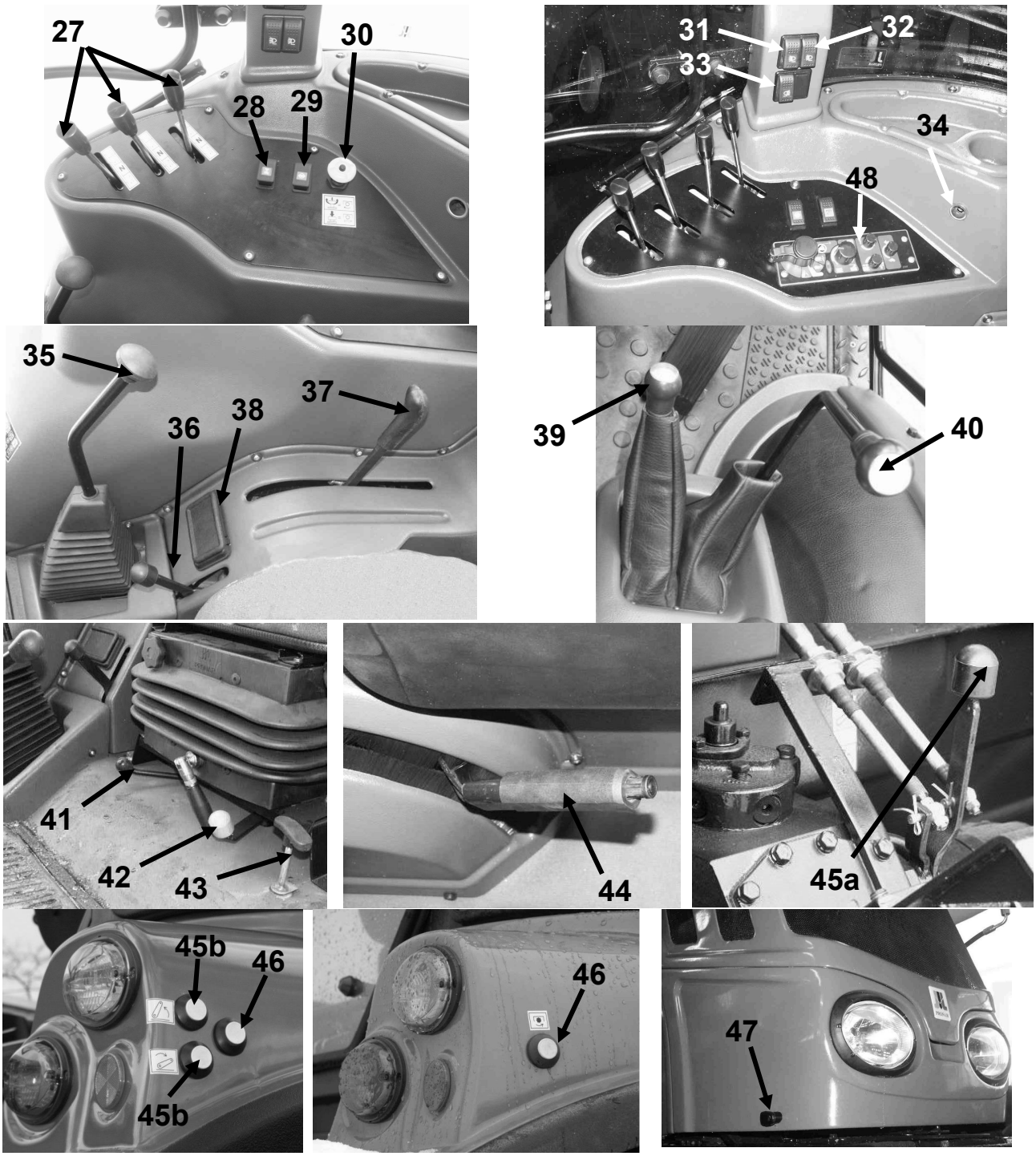
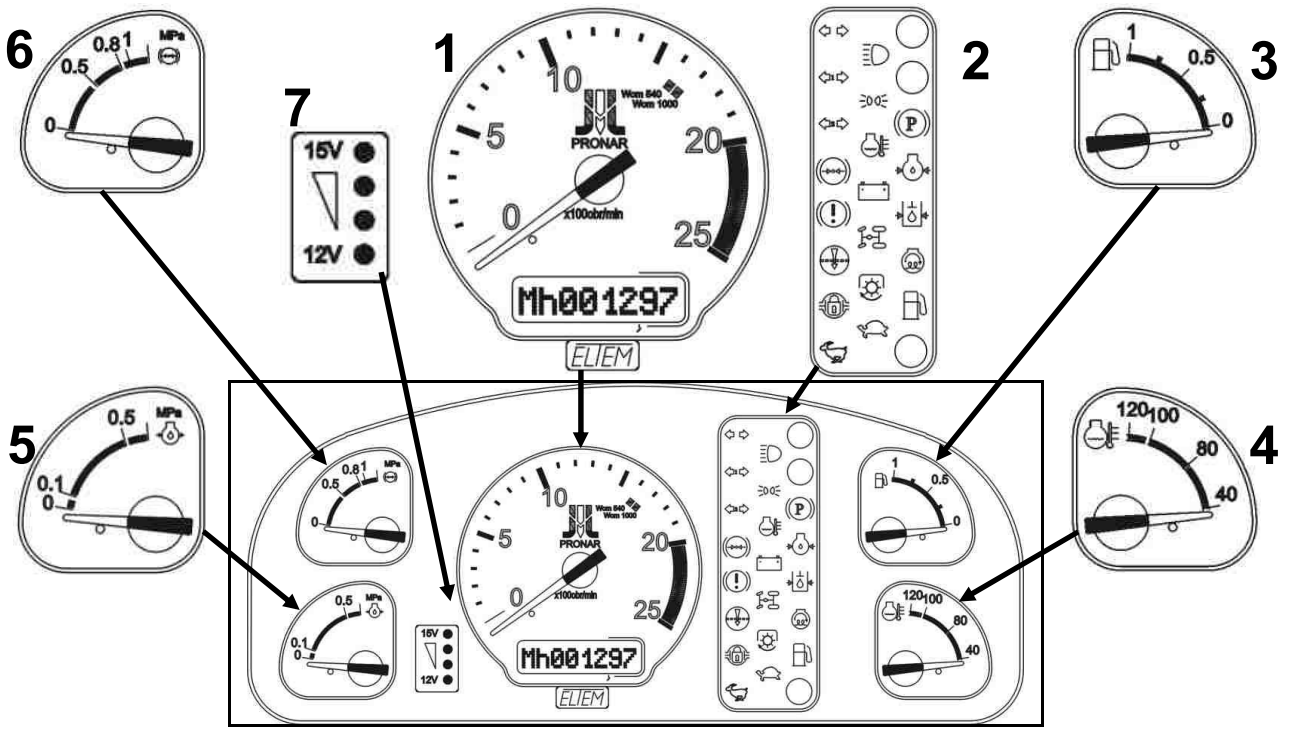



**Fig. D-2a** Arrangement of control & steering gears of **PRONAR** tractors
**27** – control levers for quick-release connectors on the left and right side of the tractor and in the rear; **28** – rear axle differential gear lock; **29** – front axle drive switch (PRONAR-1025A II); **30** – PTS switch; **31** – front upper lights (“field lights”) switch (inner pair); **32** - front upper lights switch (outer pair); **33** - rear upper lights switch; **34**- lighter socket (12 V); **35** – gearbox lever (PRONAR-82A II / 82SA II / 82TSA II); **36** – front axle drive lever; **37** – hoist control lever; **38** – ash tray; **39** – reduction gear & gear group lever (PRONAR-1025A II); **40** – gearbox lever (PRONAR-1025A II); **41** – lower transport catch lock lever (except of PRONAR-82SA II); **42** – PTS rotation change lever (dependent-independent); **43** – three-point linkage hoist lock lever; **44** – parking brake lever; **45a** – hoist control lever outside the tractor (PRONAR-82SA II); **45b** – push-buttons for hoist control outside the tractor (PRONAR-82SA II wersja z EHR); **46** – push-button for PTS activation outside the tractor; **47** - cable for opening of the bonnet; **48** – control panel for the electro-hydraulic system EHR (option for PRONAR-82SA II);

**INDICATOR PANEL OF TRACTORS PRONAR-82A II / 82SA II / 82TSA II**




**INDICATOR PANEL OF TRACTORS PRONAR-1025A II**

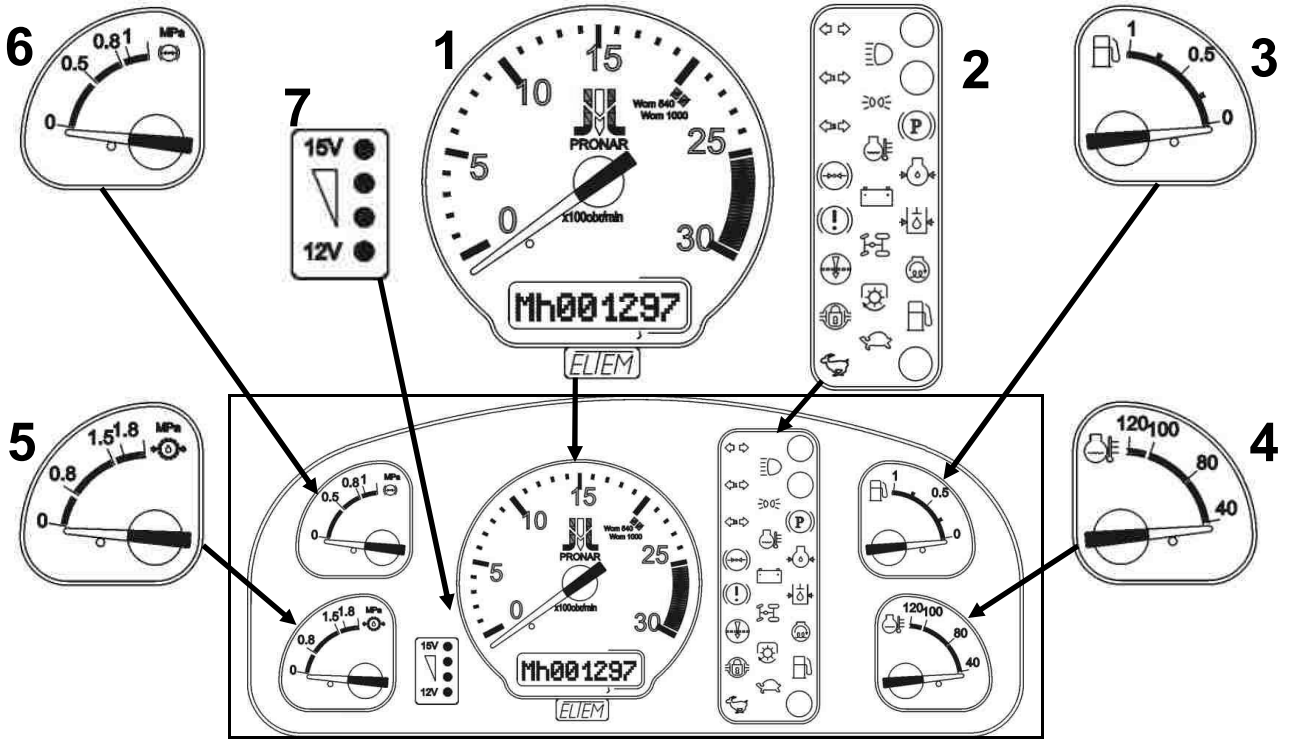



**Fig. D-3** Control indicators of PRONAR tractors
**1** – indicator of motohours + tachometer; **2** – control lamps panel; **3** – fuel level indicator; **4** – coolant temperature indicator; **5** – engine oil pressure indicator (**PRONAR-82A II / 82SA II / 82TSA II)** or oil pressure in gearbox control & lubrication system (**PRONAR-1025A II)**; **6** – indicator of air pressure in the pneumatic system; **7** – battery charge level indicator.

**Indicator of motohours + tachometer**

Displays engine's rpm, tractor's speed and number of working hours. (see **fig. D-4**)

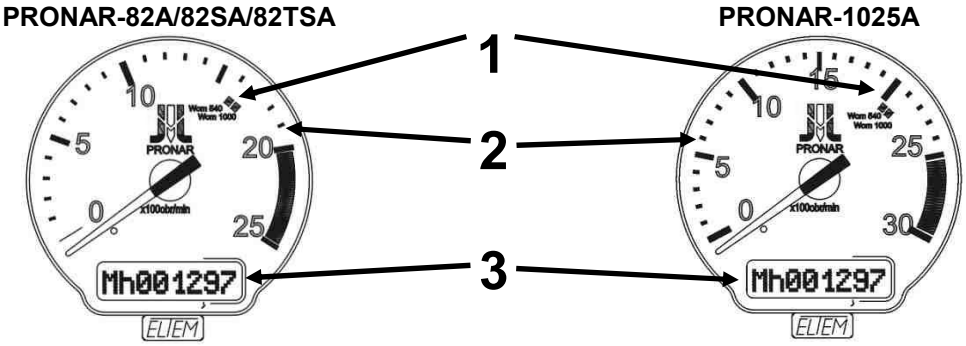
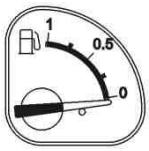


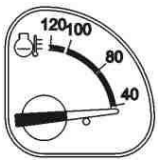

**Fig. D-4** Tachometer scale.

**1**- engine shaft rpm range where the PTS achieves 540 or 1000 rpm (green); **2**- engine shaft rpm range (white); **3**- motohours counter, indicates engine working time with accuracy of 0,01 mth.




**Fuel level indicator**

If the arrow points at zero, the tank contains 3÷5 $dm^3$ (l) fuel.

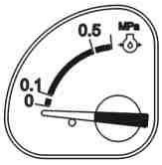



**Coolant temperature indicator**

Shows the coolant temperature in °C. The normal coolant temperature should range from 80 to 100°C. If the arrow is positioned over the red field, the engine is overheated and it is necessary to find the reason. Possible reasons are:

- to low coolant volume in the cooling system;
- improperly tensioned V-belt driving the fan;
- cooler contaminated internally or externally.

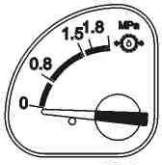
**If the reason of engine overheating will not be removed this may cause serious damage of the engine.**




**Engine oil pressure indicator (PRONAR-82A/82SA/82TSA)**

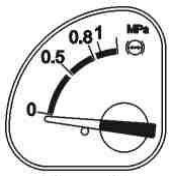
Shows the engine oil pressure. Working pressure amounts to: 0,1÷0,5 Mpa.

**The engine must not work at pressure above or below the admissible value. In such case stop the engine and find the reason of klack of pressure. Lack of pressure in the lubrication system may cause serious damage of the engine.**




**Gearbox oil pressure indicator (PRONAR-1025A)**

Shows the pressure in the gearbox control & lubrication system. Should range from 0,8 to 1,5 MPa (8÷15 $kG/cm^2$),




**Air pressure indicator**

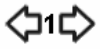
In the pneumatic system, for braking of trailers. The pressure should range from 0.5 to 0.8 MPa (4÷8 $kG/cm^2$) i.e. in the white sector of the scale.

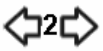

**Battery charge indicator**

**Control lamps panel.**

Description of control lamps at the panel:

 - tractor direction indicators

 - 1st trailer direction indicators

 - 2nd trailer direction indicators

 - air pressure in the pneumatic system for braking of trailers. Comes on, when the pressure drops below the admissible value.

 - braking fluid level indicator – comes on, when the level drops below the admissible value

 - air filter (engine) polluted – comes on, when the filter should be maintained (i.e. removal of impurities).

 - lock of the rear axle differential on

 - reduction gear set for „hare”

 - reduction gear set for „tortoise”

 - PTS on

 - front axle drive on (for PRONAR-1025A)

 - battery charging. If the lamp is on and the engine is also on, this means a failure, which must be removed.

 - coolant temperature indicator – comes on, when the temperature exceeds 105ºC

 - position lights on

 - road lights on

 - parking brake on

 - engine oil pressure. Comes on, when the pressure drops below the admissible value. Comes on also, when the starter key is set to **I** (see **Fig. D-6**).

**CAUTION! The engine must not work if the oil pressure lamp comes on. In such case stop the engine and remove the cause of low pressure. Low pressure in the lubrication system may cause serious engine damage.**

 - steering system oil pressure. Comes on, when the pressure drops below the admissible value; momentary blinking is admissible.

**CAUTION! The steering system defective. Prior to work remove the reason of low system pressure.**

 - glow plug on

 - fuel level indicator

## MULTI-FUNCTION SWITCHES

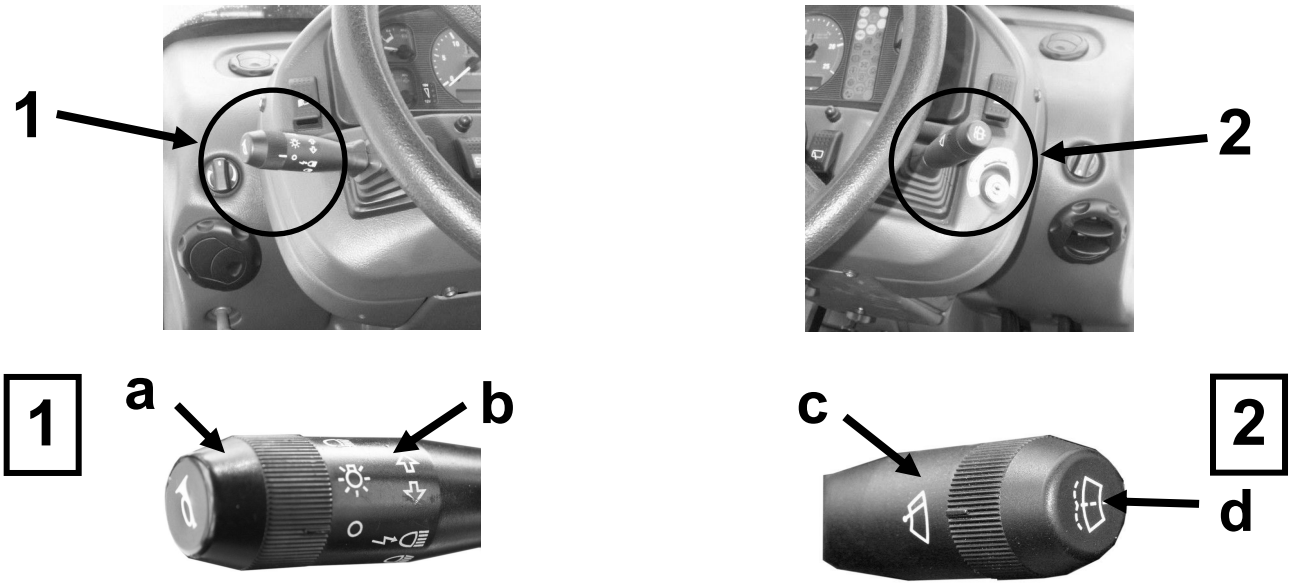



**Fig. D-5** Switches at the steering column:
**1** - change-over switch for lights and horn
**2** - change-over switch for wipers and front window washer

Switches shown on the **Fig. D-5** work as follows (see the drawing):
**The change-over switch for lights and horn (pos.1)** works as follows:

- turn the knob **(a)** to - position lights on;
- turn the knob **(a)** to - passing lights on;
- shift the lever **(b)** to and downwards – road lights on;
- shift the lever **(b)** upwards – road lights off for a moment;
- shift the lever **(b)** forward – right direction indicator on;
- shift the lever **(b)** rearward – left direction indicator on;
- press the lever **(b)** at the point marked - horn on

**The change-over switch for wipers and front window washer (pos. 2)**:
- shift the lever **(c)** forward or rearward – wipers on, 1st or 2nd speed respectively;
- press the lever **(d)** in the direction of the steering wheel axis – the front widow washer on. When the windows is sprayed, the wiper switches on (2 moves).

## IGNITION SWITCH

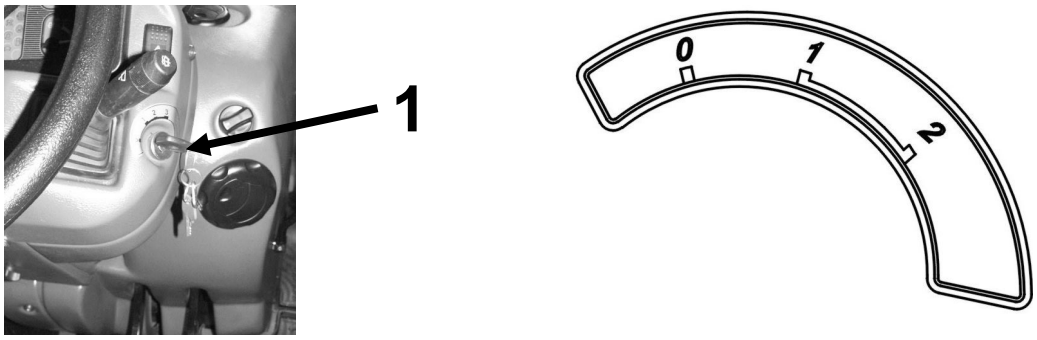



**Fig. D-6** Engine start-up. **1** – starter switch;

At the control panel (**Fig. D-6**), on the right, there is the three-position starter switch (ignition switch): **0** - off STOP (the key can be removed); **1** – control gears on; **2** – starter on

The starter is activated by turning the key from **1** to **2**. When the engine is on, the key returns from **2** to **1** automatically..

## OPERATOR SEAT

The **PRONAR- 82A II / 82SA II / 82TSA II / 1025A II** tractors can be equipped with four types of driver seats, which ensure comfortable working conditions, and can be adjusted and matched to driver's weight, dimensions and personal requirements.

Prior to operation adjust the seat position so that your position is most comfortable. All adjustments should be carried on **when sitting on the seat.**

**CAUTION ! All elements of seat adjustment systems (screws, nuts, rollers, guides) should be every 1000 mth (but at least once a year) cleaned and greased with solid grease.**

**a) seat PRONAR type MT50/M60**

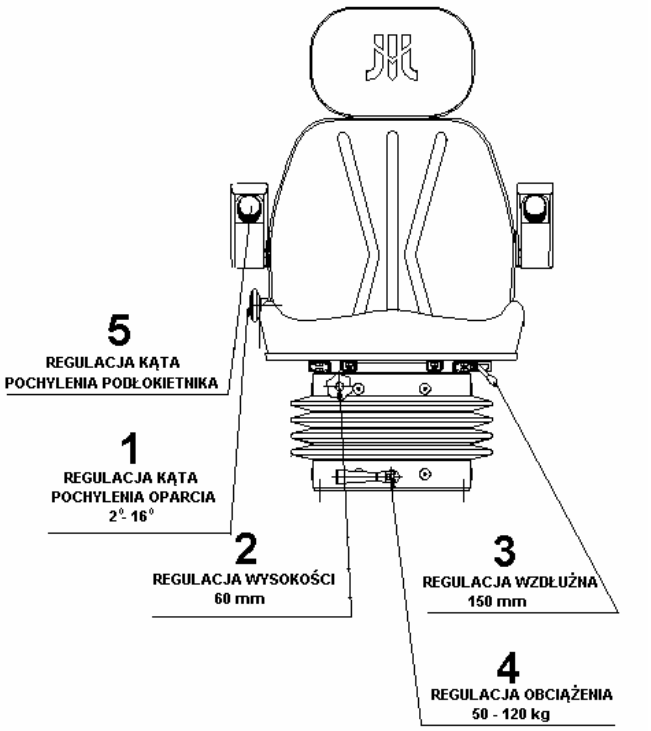



**Fig. D-7** Adjustment gears of the seat PRONAR type MT50/M60

The adjustment - depending on driver's / operator's weight (50÷120kg) - is performed through adjustment of tension of springs with the articulated knob **4** situated in the lower part of the shock-absorbing system. The longitudinal shift (within the range ±75 mm ) is obtained through loosening the rack with the lever **3** situated under the seat cushion. When adjusted, loosen the lock lever, what ensures firm seat position. The backrest inclination angle is adjusted smoothly (within the range 2°÷16°) with the knob **1**. The height of the seat is adjusted smoothly (within the range ±30mm) by turning the knob **2**. Armrest angle is adjusted with the knobs **5** situated in armrests.

**b) seat SEAT type TOP S-698 (MOL 698)**

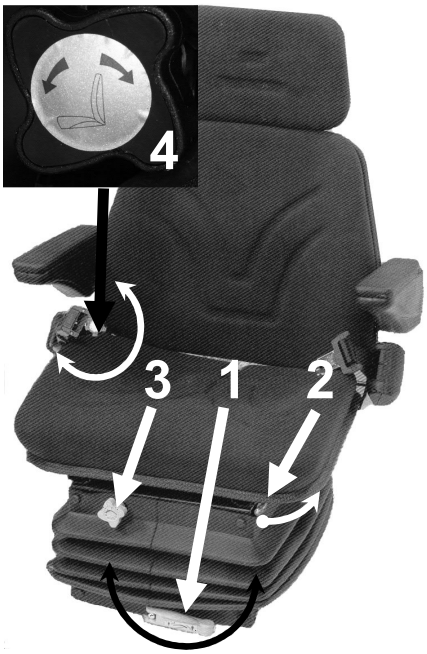



**Fig. D-8** Adjustment gears of the seat SEAT

The seat **SEAT** can be adjusted and matched to operator's weight & dimensions. The stiffness of shock-absorbers is adjusted with the knob **1** depending on operator's weight within the range of 50-120kg.

The lever **2** is used for shifting the seat in the horizontal plane. To adjust the seat pull the lever **2** sideward and lock in required position by loosening the lever.

The knob **3** is used for adjustment of the seat height within the range of 60mm.

With the help of the knob **4** the backrest inclination angle can be adjusted smoothly.

The headrest height can be also adjusted by pulling the headrest upwards.

**c) seat GRAMMER type MSG85/721 and DS 85H/90A**

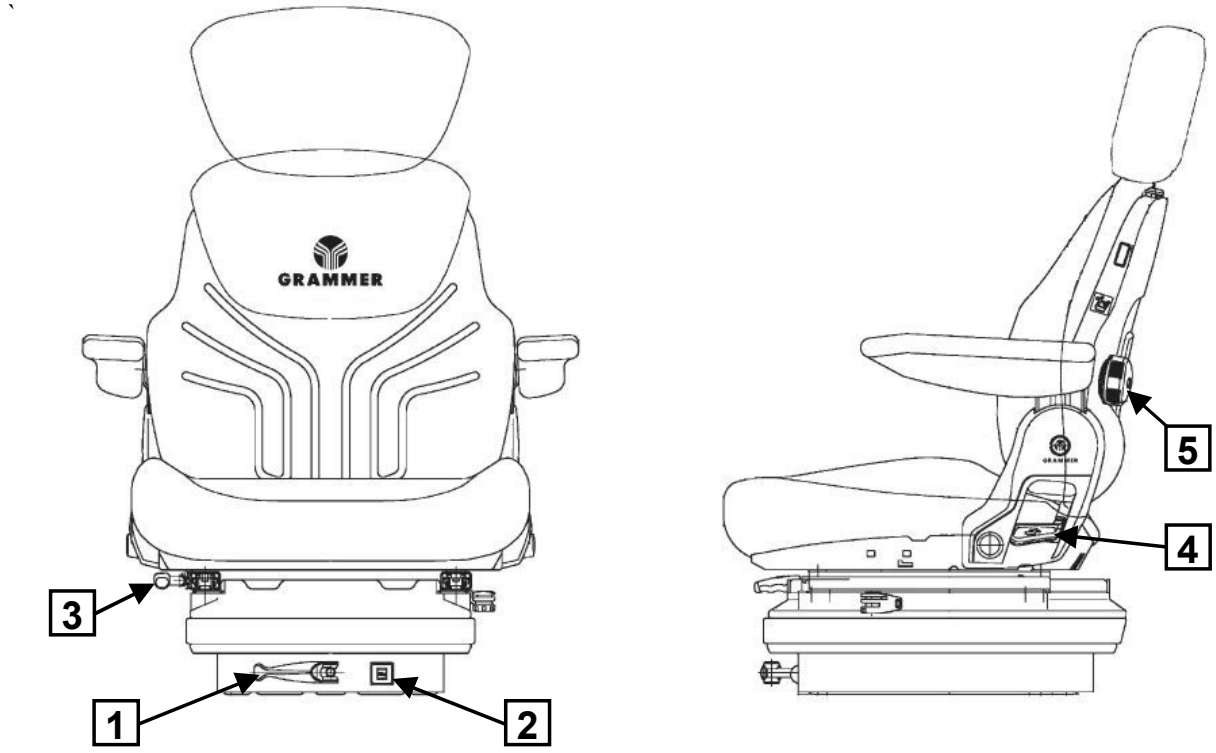
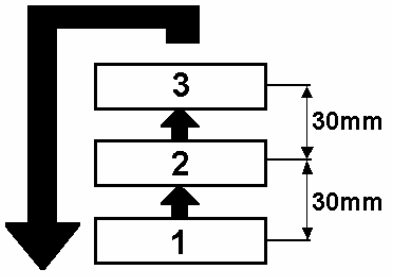



**Fig. D-9** Adjustment gears of the seat GRAMMER.

The stiffness of shock-absorbers is adjusted with the knob **1** depending on operator's weight. Nearby situated is the indicator **2** of set operator's weight.
The lever **3** is applied for shifting the seat in the horizontal plane every 10mm. The adjustment is possible, when the lever **3** is raised; when loosened, the set position becomes locked**.**

The lever **4** is used for adjustment of the backrest inclination angle every 2,5º. The adjustment should be carried on when sitting on the seat. Having raised the lever **4** set the required backrest angle and lock in the required position by loosing the lever.

The knob **5** is used for adjustment of position and convexity of the backrest. The adjustment is performed by turning the knob **5** right or left until the required position is obtained.




The seat **GRAMMER** has three height setting; low-1; medium-2; high-3 (see Fig. on the left)

The adjustment is carried on every 30 mm when sitting on the seat. The change of the height consists in manual raising of the seat when the latch meshes in required position. Raising of the seat above the position 3 causes return to the position 1.
The headrest height can be also adjusted by pulling the headrest upwards.

**Fig. D-10** Marking of fastening points for the safety belt.

**CAUTION ! In the tractor's cab there are pictograms (Fig. D-10) showing the fastening points for the safety belt.**

## VENTILATION & HEATING OF THE CAB

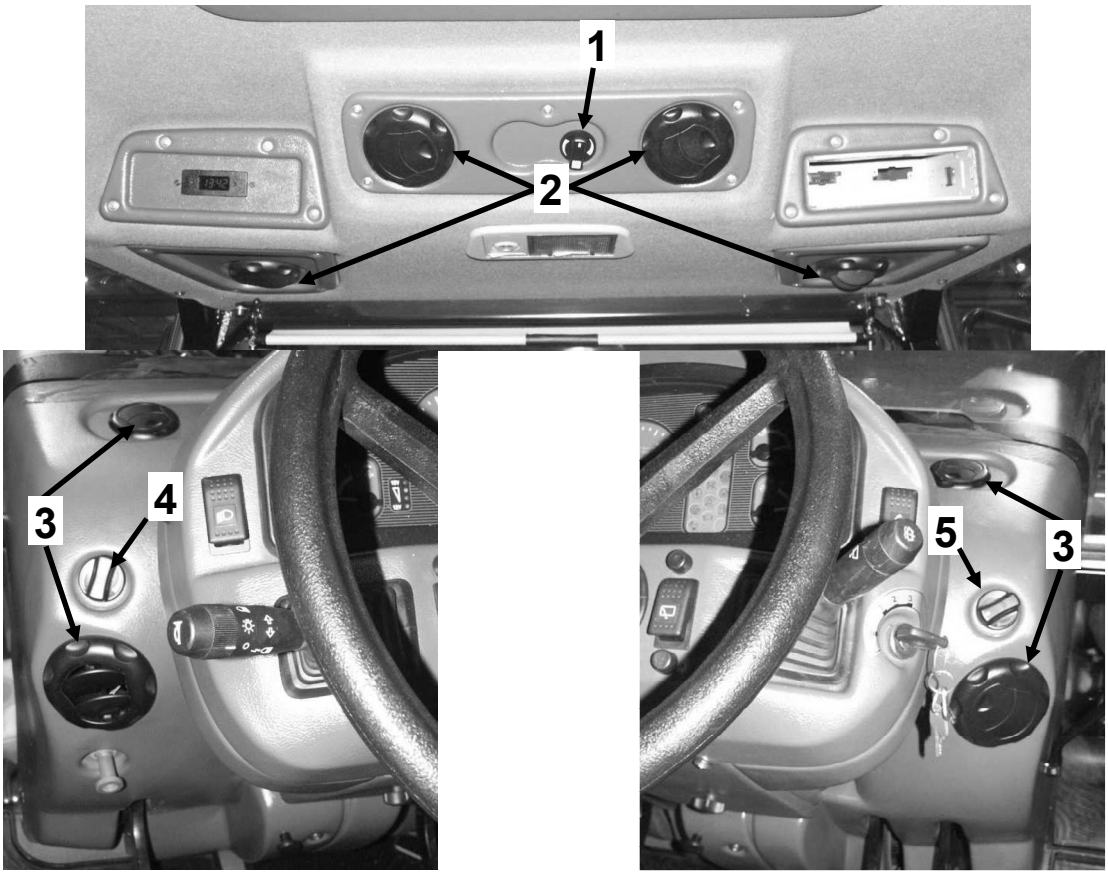



**Fig. D-11** Ventilation & heating of the cab.
**1** – adjustment knob for air blow speed for outlets at the upper cab panel; **2** – adjustable flaps of air outlets at the upper cab panel; **3** – adjustable flaps of air outlets at the steering column; **4** – adjustment knob for air blow speed for outlets at the steering column; **5** - adjustment knob for air blow temperature for outlets at the steering column;

The ventilation & heating system makes possible heating of the cab at low temperatures thanks to connection to the engine cooling system and for ventilation and cooling (option) of the cab at high temperatures.

At positive temperatures the control knob **5** (**fig. D-11**) for air blow temperature should be off, when the cab ventilation is on.

To switch on the cab heating system at negative temperatures:

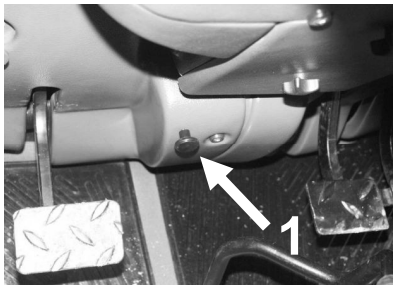
- when the heater knob **5** is off heat the engine to min. 60°C (indicated at the engine temperature indicator);
- turn the heater knob **5** to maximum and increase the engine rpm to maximum for 2 ÷ 3 minutes;
- to increase the heating effectiveness switch on the fan **4** (**fig. D-11**) and set the air inlet flaps **3 (fig. D-11)** for optimum value;
- set the knob **5 (fig. D-11)** to required position.

**CAUTION ! : Use of water for the ventilation & heating system is not recommended. We recommend to use an anti-freeze fluid. When leaving the factory the ventilation & heating system in PRONAR tractors is filled with the „BORYGO Nowy" fluid.**

**If the ventilation & heating system is filled with water, then at low temperatures remove water from the engine cylinder block and cooler and also from the cab heater.**

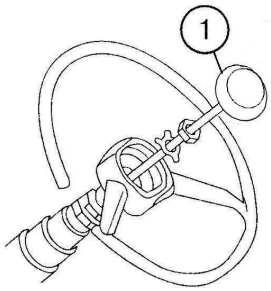
## STEERING SYSTEM

Tractors **PRONAR** are fitted with hydrostatic steering systems with a dosing pump made by Danfoss or Rexroth, which make possible steering of the tractor, when the engine is off. The system is fitted with a hydraulic pump (always working) driven from the tractor's engine. The inclination and the position along the column axle of the steering wheel can be adjusted to make operator's work comfortable.




Adjustment of inclination is realised with help the pull-rod **1** (**Fig. D-12**) – pull it and hold. Change the steering wheel's inclination for required, let go of the pull rod and with small movements make the steering wheel locked. The inclination adjustment system has 4 positions (within the range of its entire pitch), where the steering wheel is locked. You can select one of 4 positions in the range 25° to 40° every 5°.

**Fig. D-12** Cable for locking the inclination of the steering wheel (column).




Change of steering wheel's position along the axle is realised as follows (**Fig. D-13**):

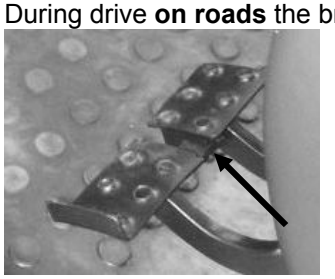
- unscrew the steering wheel axle cover together with the screw **1**;
- adjust the steering wheel in the selected (any) position within the range 100 mm;
- screw the cover home together with the screw **1** (manually).

**Fig. D-13** Change of steering wheel's position along the axle.

## BRAKES

### Working brake (main)

During drive **on roads** the brake pedals should be **coupled** with the latch (**fig. D-14**)



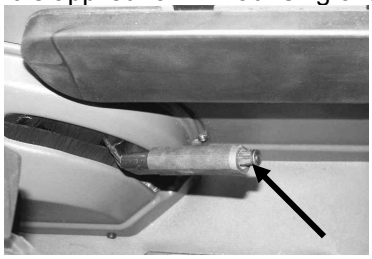
During field works, when it is necessary to perform turns of small radius, it is possible – when the latch is unlocked - to brake left or right wheel with respective pedals.
Brake smoothly, without jerks, pressing the pedal until the end and without stops in intermediate positions. Do not hold the leg on pedals if not necessary, for this may cause premature wear of brake discs linings.

**Fig. D-14** Latch locking pedals of the working brake..

**During drive on roads lock working brake pedals with the latch.**

### Parking brake (emergency brake)

It is applied for immobilising of the tractor during stops.



Use of the parking brake for braking during motion **is prohibited**. Only one exception is an emergency situation, when during drive, without previous symPTSms, main brake becomes defective.
The parking brake is activated through pulling the lever upwards. To release the brake first press the push button releasing the pawl. (**fig. D-15**)

**Fig. D-15** Parking brake.

## DIFFERENTIAL GEAR LOCK

**Do not activate the differential gear lock at speeds higher than 10 km/h and on turns – this may cause steering of the tractor difficult.**


**Fig. D-16** Controlling of the rear axle differential gear lock (at the switches panel on the right side of the seat)

**Switch for the differential gear lock (Fig. D-16)–** has three positions:
**1 (upper) -** the lock on (automatically) – use during field or transportation works, when the wheels go into skid and when there is the risk that the tractor gets bogged down. When the front wheels are turned by more than 13±2°, the lock is released automatically. When the wheels are set straight, the lock activates again.
**2 (central)** – the lock off – the tractor can drive on hardened roads and in field conditions, when the ground has good adherence.
**2 (lower)** – the lock on temporarily, when the push button is pressed; when the push button is released, the lock is off and the key returns to the central position.

**Control of the rear differential gear and the rear PTS works only when the hydraulic system pump is on.**

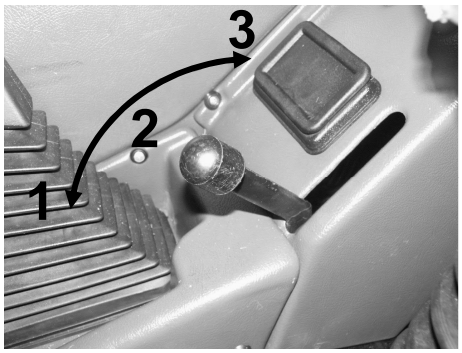
**CAUTION ! The differential gear lock can be activated during field and transportation works, when the risk of getting into skid is increased.**

**ACTIVATION OF THE DIFFERENTIAL GEAR LOCK DURING TRANSPORTATION WORKS ON HARDENED SURFACES IS PROHIBITED**

**Inobservance of above-mentioned principles can reduce the period of failure-free operation of the driving system and makes steering of the tractor difficult. Use the forced lock (lower position of the key 1, fig. D-16) just for short periods, for surmounting of road obstacles.**

## FRONT AXLE DRIVE

**PRONAR-82A II, 82SA II, 82TSA II**




Control cable for the front axle drive (**fig. D-17a**) can be set in three self-locking positions:
**1** – drive off (lower);
**2** – drive on, automatic control (intermediate);
**3** – drive on (upper).

**Fig. D-17a** Control lever for front axle drive.

Activate the drive:

- when there is a need of surmounting of momentary resistance on hardened roads and hard surfaces,
- during field works, when the adherence of the ground is low (high humidity, ground covered with plant leftovers, loose ground, etc.),
- during field works, when coupled machine (tool) requires high towing power,
- when the front axle is used for braking.

**PRONAR-1025A II**


**Fig. D-17b** Switch for the front axle drive control can be set in three positions:
**1** – drive off (lower);
**2** – drive on, automatic control (intermediate);
**3** – drive on (upper).

**CAUTION !**

**Activation of the drive on hardened roads is prohibited.**
**Activation of the front axle drive at speeds higher than 15 km/h is prohibited.**
**Do not activate the front axle drive in automatic mode (poz.2, fig.D-17a, D-17b) when driving with reverse gear.**
**If it is necessary to use the front axle drive during drive with reverse gear, activate the forced drive just for short period (pos. 3, Fig. D-17a; D-17b).**

The automatic mode causes that the front axle drive switches on when the skid of rear wheels exceeds 4÷6 %.

**If the tractor is fitted with a front loader, it is admissible to use the automatic activation of the front axle drive (poz. 2 fig. D-17a lub fig. D-17b).**
**Setting of the lever or the switch to the "on" position may cause damage of the front axle drive chain.**

## REAR POWER TRANSMISSION SHAFT (PTS)

The PTS of **PRONAR** tractors can drive co-operating machines with following speeds:

- independent (of drive speed), normalised: 540 or 1000 rpm
- dependent (of drive speed), with 3,5 revolutions for each metre of distance. Number of revolutions for each metre of distance is constant, regardless of which gear is on; however, the PTS rotation speed depends on selected gear (the higher gear, the higher speed)

**Prior to connection of a PTS-driven machine check if the rpm of tractor's PTS matches the speed of machine's shaft.**

### SELECTION OF PTS ROTATIONS – INDEPENDENT / DEPENDENT

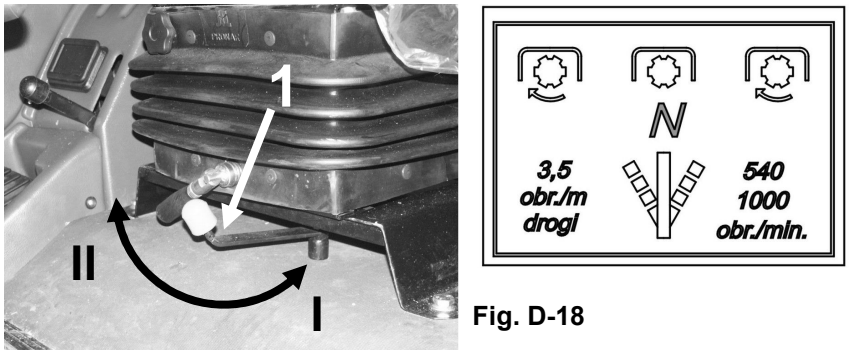



**Fig. D-18**

To switch on proper PTS speed follow the procedure below:

- **for dependent speeds:**
  - start the engine at minimum rpm;
  - press the clutch pedal;
  - set the lever **1** (**Fig. D-18**) to **I**;
  - release smoothly the clutch pedal;
  - turn the lever **1** counterclockwise until it would be locked;
- **for independent speeds:**
  - turn the lever **1** (**fig. D-18**) to **II** clockwise until it would be locked;

It is not necessary to stsrt the engine and activate the clutch pedal.

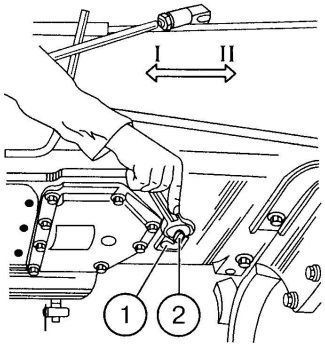
**CAUTION ! Central position of the lever 1 (Fig. D-18) is the neutral position. If the lever remains in this position, the PTS is off.**

**Use dependent PTS speeds only at tractor speeds below 8 km/h, otherwise the tractor drive system may be damaged.**

**To avoid accidental start of a PTS-driven machine turn off the PTS during each break in machine's operation. Turn off the PTS during each turn back and while hoisting the machine suspended at the hitch. (lever 1 Fig. D-18).**

**SPEED SELECTION FOR INDEPENDENT PTS**

**PRONAR-82A II / 82SA II / 82TSA II**




**PRONAR-1025A II**

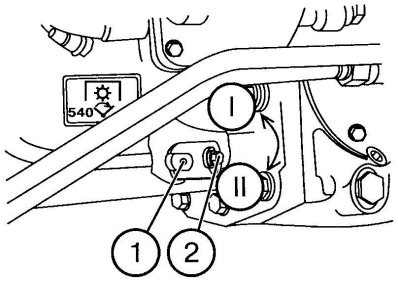



**Fig. D-19** Selection of PTS speed 540 or 1000 rpm (as seen from below)

To select one of PTS speeds: **540 or 1000 rpm**:

- unscrew the screw **1** by one turn (wrench No. 14) which releases the switch **2**,
- turn the switch (wrench No. 17) to:
  **I** – 540 rpm
  **II** – 1000 rpm
- tighten the switch protection screw **1**.

**CAUTION ! Depending on selected PTS rotation speed instal suitable PTS end (see table).**

| Engine rotation speed, rpm | Typ końcówki WOM | | PTS rpm | Transferred power (kW) |
|---|---|---|---|---|
| | Number of splines | Outer diameter mm | | |
| **82A II \ 82SA II:** | | | | |
| 1632 | 6 | | 540 | 52,8 |
| 1673 | 21 (for request) | | 1000 | 52,8 |
| **82TSA II:** | | | | |
| 1632 | 6 | 35 | 540 | 60,0 |
| 1673 | 21 (for request) | | 1000 | 60,0 |
| **1025A II:** | | | | |
| 2037 | 6 | | 540 | 60,0 |
| 2157 | 21 (for request) | | 1000 | 69,3 |

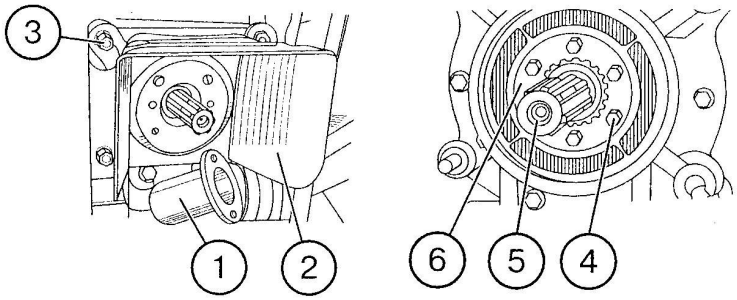
**The rotation speed of the PTS amounting to 540 rpm should be used only for machines, which power consumption does not exceed 52,8 kW. Above this value the PTS clutch starts to slide and the friction bands wear quicker.**

The end with 21 splines (for the rotation speed of 1000 rpm) should be used, when the power consumption of a PTS-driven machine (tool) exceeds 52,8 kW.

Maximum value of PTS-transferred power is limited by the friction band clutch, which is used simultaneously for activation of the PTS.

## REPLACEMENT OF THE PTS-SHAFT END

To replace the PTS end:




- stop the tractor and the engine;
- set the gearbox lever to N and activate the parking brake;
- unscrew two screws fastening the cap **1** of the PTS end;
- unscrew four nuts **3** and remove the cover **2**;
- unscrew six screws **4** and remove the cover **6**;

**Fig. D-20** Replacement of the PTS end.

- replace the **5**, **6**-splines end with a 21-splines one and reversely;
- install the cover **6** and fasten the shaft end with screws **4**
- install the PTS shield (umbrella) **2**.

## TURNING ON OF THE PTS

| | |
|---|---|
|  | **To eliminate dynamic loads in the PTS transmission system reduce engine speed to 900 rpm while turning the PTS on. When the PTS is on, increase the engine speed to the required value. Prior to turning the PTS off reduce the engine speed as well. This is especially important when co-operating machines have great moment of inertia. Such machines should be fitted with a single-direction clutch.** |

Inobservance of above-mentioned recommendations may cause premature wear of PTS elements, and as a consequence, increase frequency of adjustments or replacement of parts.

In PRONAR tractors the PTS drive is activated with a switch situated at the console on the right side of the seat **(rys D-21)** or from outside, with a push-button situated at the right rear mudguard **(Fig. D-22)**.

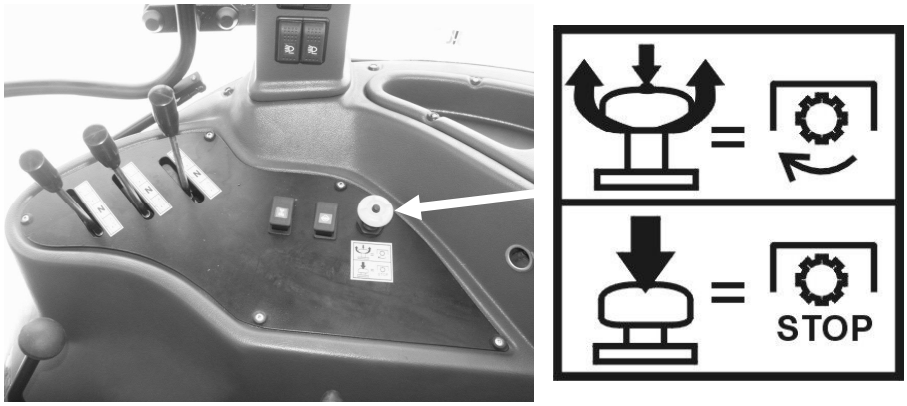



**Fig. D-21** PTS switch in **PRONAR** tractors

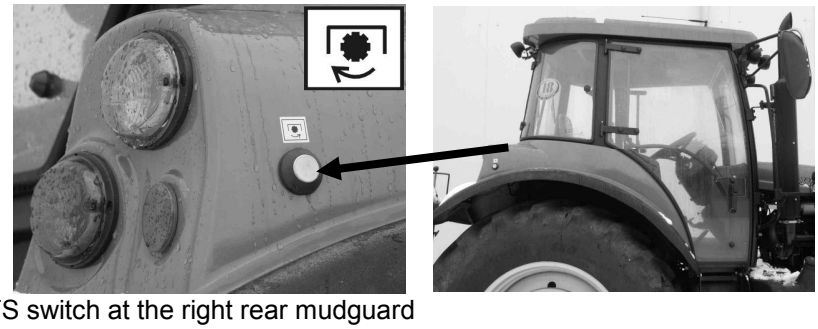


**Fig. D-22** PTS switch at the right rear mudguard

**The PTS can be turned on and off only when the engine is on.**

**CAUTION!**
**WHEN THE ENGINE BECOMES OFF, THE PTS TURNS OFF AUTOMATICALLY**

**When raising the PTS-driven machine (tool) suspended at tractor's hitch, turn off the PTS drive when turning back.**

## START-UP

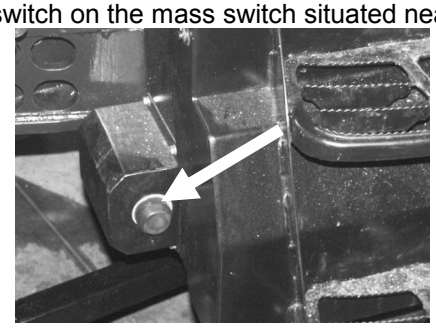
Prior to start-up of a new or a long-garaged tractor check the oil level in the engine and other assemblies and the fluid level in brake and cooling systems.

**CAUTION ! Start-up without cooling fluid in the cooling system is PROHIBITED.**

**Prior to starting the engine check if all guards are complete and check their fastening.**

Prior to operating the tractor perform following actions:

- switch on the mass switch situated nearby the battery box or inside the cab (**fig.E-1**).



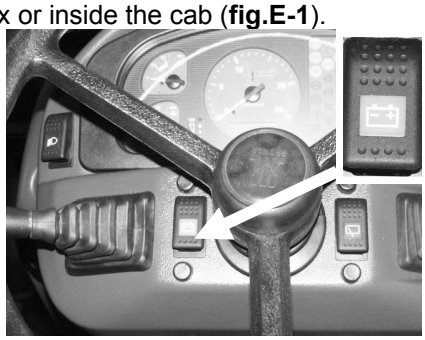
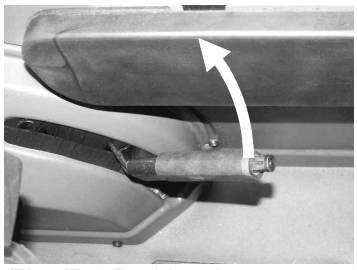


**Fig. E-1** Mass switch nearby the battery box and inside the cab.



- activate the parking brake **(fig. E-2)**;

**Fig. E-2** Parking (emergency) brake.

- set the throttle lever (**fig.E-3**) to the central position

**Fig. E-3** Throttle lever

**PRONAR-82A II \ 82SA II \ 82TSA II:**

• make sure that the gearbox lever (**fig. E-4a**) is set to **H** or **L** (pay attention to the gearbox control scheme at the console on the right side of the cab).

**CAUTION ! The tractor is fitted with the starter lock – if the gearbox is set to other position than H or L - activation of the starter is impossible.**

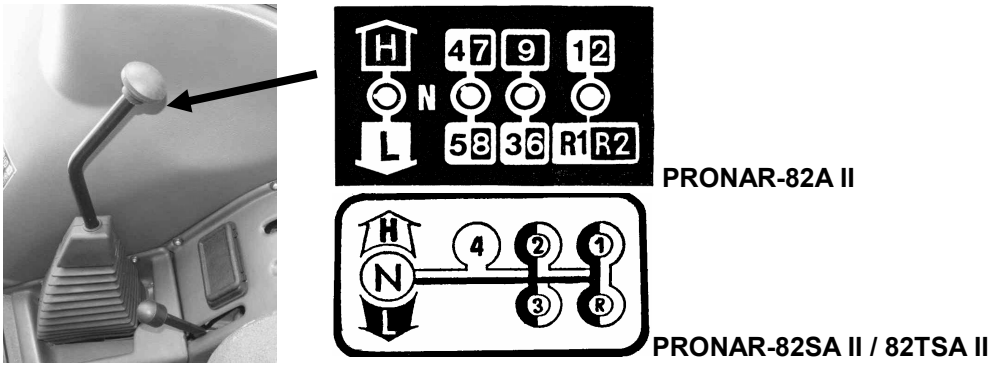



**Fig. E-4a** The gearbox lever of PRONAR-82A II / 82SA II / 82TSA II tractors.

**PRONAR-1025A II:**

- make sure thet the lever **1** (**fig. E-4b**) for reduction gear lever and gear group selection and the lever **2** for gearbox control are in the **N** position. (pay attention to the gearbox control scheme at the console on the right side of the cab).

**CAUTION ! The tractor is fitted with the starter lock – if the gearbox is set to other position than N - activation of the starter is impossible.**

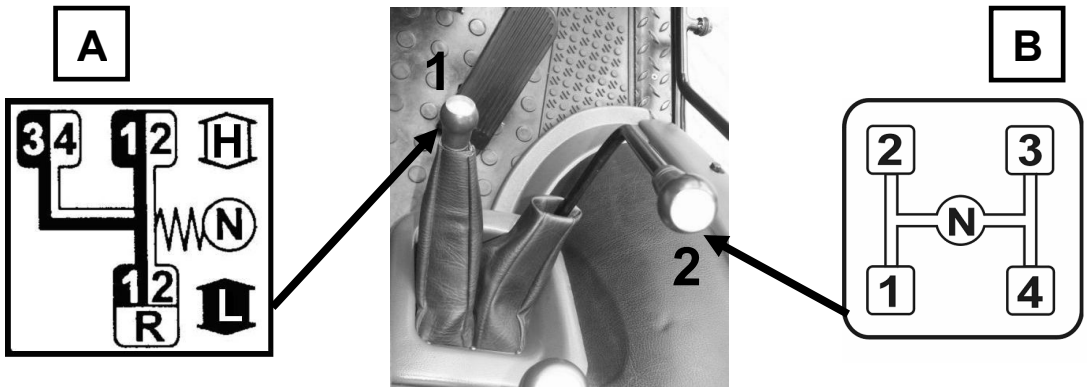



**Fig. E-4b**. Gear selection levers of PRONAR-1025A II tractors
**A** – reduction gear & gear group; **B** - gerabox.
**1** - reduction gear & gear group lever; **2** – gearbox lever

- uncouple the clutch pressing its pedal as far as it will go;
- turn the ignition key to „**1**” **(fig. D-6)**, and then to „**2**” according to following procedure:

**a) Engine start without glow plugs.**

Is realised through „quick” switch over of the key from „**1**” to „**2**” – (start). Quick i.e. shorter than 3 seconds (the key must not be in position „**1**” for longer than 3 seconds). Such method of start-up is recommended at positive ambient temperatures or in the case of repeated start-ups, when the engine is hot. The glow plugs are then not activated.

**b) Engine start with glow plugs.**

Is realised if the key remains in position „**1**” for longer than 3 seconds. After 3 seconds begins so-called „preliminary heating” – glow plugs are supplied with power, what is signalled with the orange indicator lamp at the indicator panel. The preliminary heating time is constant and amounts to 20 seconds. If during this period of 20 seconds the engine would be started the glow plugs would work also after start-up – this is so-called „additional heating”. The period of additional heating lasts for 180 seconds. Such method of start-up is recommended at low ambient temperatures. If the engine is hot, there is no need to activate the glow plugs i.e. it is recommended to use the method described in a).

After 20 seconds the indicator lamp at the indicator panel starts to blink for 10 seconds (blinking 0,5 s / 0,5 s). If we start the engine when the lamp is blinking, the additional heating time will last also 180 seconds. However, if we start the engine, when the lamp comes off, then the additional heating will not be realised. Operation of the relay for heating of glow plugs becomes locked. To resume the relay operation switch the power supply again.

If it is necessary to heat the glow plugs, we recommend to realise the so-called „preliminary heating” (the lamp at the indicator panel comes on for 20 seconds, and then starts to blink for next 10 seconds, and only when the lamp is off start the engine). Such method of start-up saves batteries significantly.

**CAUTION! Do not leave the tractor with the ignition kay in position „1”. Having switched off the tractor with the cable 6 (fig. D-2) turn the key to „0”.**

**Always start the engine from operator’s seat !**

**Having started a turbocompressor-fitted engine, set the engine to idle run and let work without work for ca. 3 minutes.**

- watch if all gauges display proper indications (oil temperature, coolant temperature, engine oil pressure etc.).

**CAUTION ! Starting the engine through towing of the tractor is prohibited.**

**It is prohibited:**
- **to switch off the “mass” switch, when the engine is on;**
- **to operate the tractor without batteries.**

- when the engine works, release the clutch pedal, activate the hydraulic pump drive (if not activated) **(Fig. E-5)**, and the compressor drive, if necessary **(Fig. E-6)** if the tractor would be coupled with a trailer;

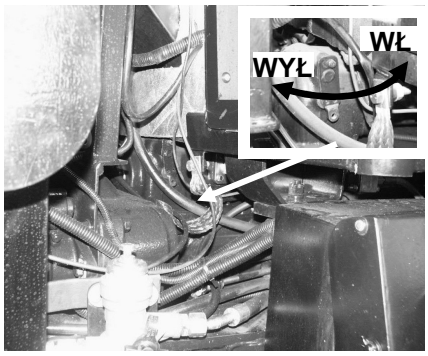



**Fig. E-5** Hydraulic pump activation lever.

The hydraulic pump activation lever is situated in the central front part under the cab (**fig. E-5**).
Prior to setting of the lever decrease the engine rpm to minimum. Then turn the lever in required direction until the pump comes on or off.

**Pump lever positions:**

**WŁ** – pump on;
**WYŁ** – pump off.

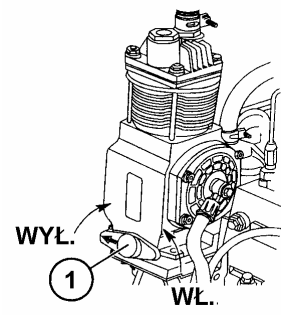



**Fig. E-6** Pneumatic system compressor.

The compressor is installed on the left engine side. Turning of the knob **1 (fig. E-6)** clockwise makes the compressor on, counterclockwise - off.

**CAUTION ! Switch on the compressor only if you intend to use it: when working with a trailer or with machines equipped with pneumatic brake system, and also when pumping wheels. When the operation is finished switch the compressor off.**

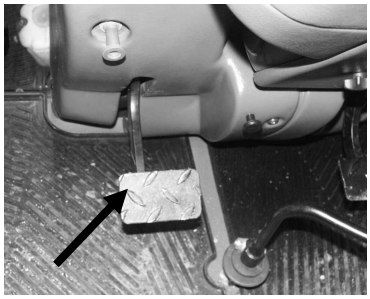
## MOVING FORWARD

**CAUTION ! Prior to work check operation of engine, steering system, brake system and other tractor's systems and assemblies.**

The engine should work stable within the entire rotation speed range. When the engine stops after longer operation, a murmur can be heard from the oil filter body; it is caused by rotation of the rotor.

Steering system elements, steering system, brakes, lighting & signalling system, wipers etc. should be reliable and in good technical condition.

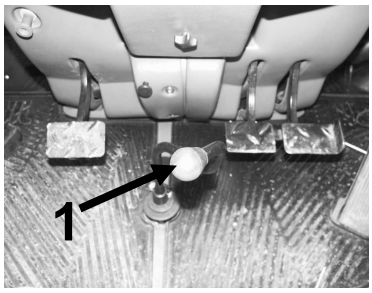
**MOVING FORWARD WITH TRACTORS PRONAR-82A II / 82SA II / 82TSA II:**

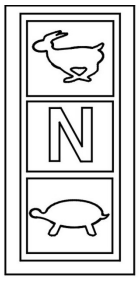


While start moving perform following actions:

- press the clutch pedal as far as it will go (**Fig. E-7**);
- set the throttle lever so that the engine works at 1200 rpm. During tractor's operation use the throttle pedal;
- release previously activated parking brake;

**Fig. E-7** Pedał sprzęgła.




- set the reduction gear lever **1** (**Fig. E-8**) depending on work type:
  **1** – low-speed gears „tortoise";
  **2** – high-speed gears „hare".

**Fig. E-8** Reduction gear lever - positions. **1** – low-speed gears; **N** - neutral; **2** – high-speed gears.

- with the gearbox lever (**Fig. E-4a**) activate the reduction gear of the gearbox:
  **L** – low-speed gears „field";
  **H** – high-speed gears „road".

• now with the same lever switch on the selected gear, according to the scheme situated in the cab (**fig. E-9; E-10**). Perform gear selection with smooth motion, do not pull at the lever. If the gear does not "catch", set the lever smoothly to neutral position, release slightly pressure on the clutch pedal, then press it as far as it will go and select the required gear once again.

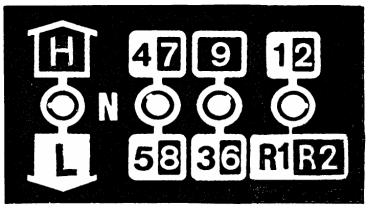



**Fig. E-9** Gearbox lever operation scheme **PRONAR-82A II**

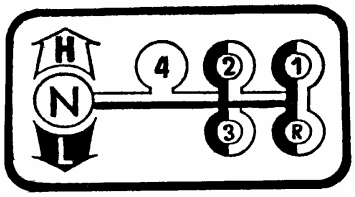



**Fig. E-10** Gearbox lever operation scheme **PRONAR-82SA II \ 82TSA II**

Each speed selected with the gearbox lever can be changed by 32 % (increased when the reduction gear lever (**fig. E-8**) is set from **1** „tortoise" to **2** „hare" or decreased when set from **2** to **1**). The reduction gear is synchronised, what causes that when the clutch pedal is pressed the reduction gear can be switched over during tractor's motion.

**CAUTION ! During transport works with heavy load (and weight) trailers we recommend to start drive at low gears with the reduction gear lever in position L, and after acceleration of the unit tractor + trailer set the reduction gear lever to H. Having changed gear to a higher one act in the same way until you reach the proper, safe drive speed.**

- press the throttle pedal smoothly (increasing engine's rotation speed) and slowly, smoothly release the clutch pedal;
- when the clutch is released take the foot off the clutch pedal;
- selection of next gears during drive is realised in the same way i.e. by pressing the clutch pedal as far as it will go except of reverse gears;

**MOVING FORWARD WITH TRACTORS PRONAR-1025A II:**

While start moving perform following actions:

- press the clutch pedal as far as it will go (**Fig. E-7**);
- set the throttle lever so that the engine works at 1200 rpm. During tractor's operation use the throttle pedal;
- release previously activated parking brake;

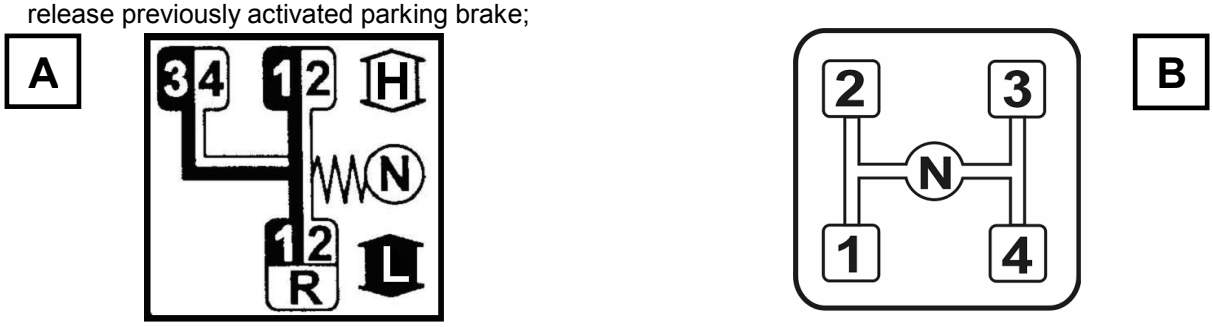



**Fig. E-11**. Control schemes for drive system:
**A** – reduction gear & gear group; **B** - gearbox.

- with the reduction gear & gear group lever according to the scheme **A** (**fig. E-11**) activate the reduction gear (**I** or **II**), and then set the lever to selected gear group (**1**, **2** or **3**, **4** or **R** - reverse);

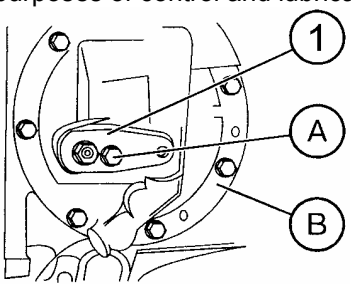
**CAUTION: Switching over of the reduction gear and gear groups should be carried on only when the tractor is completely stopped.**

- with the gerbox lever set the selected gear according to the scheme **B** (**fig. E-11**);
- perform gear selection with smooth motion, do not jerk at the lever. If the gear does not "catch", set the lever smoothly to neutral position, release slightly pressure on the clutch pedal, then press it as far as it will go and select the required gear once again. In the same way operate the reduction gear lever and the gear group lever;
- press the throttle pedal smoothly (increasing engine's rotation speed) and slowly, smoothly release the clutch pedal;
- when the clutch is released take the foot off the clutch pedal;
- selection of next gears during drive should be realised **during drive only in the course of transport works at hardened roads** (i.e. by pressing the clutch pedal as far as it will go) except of reverse gears (do not activate reverse gears when the tractor drives forward);

**During works on soft ground (ploughed or sandy field, peat-bog etc.) switching over of gears during drive IS PROHIBITED, for this may cause premature wear of gearbox toothed wheels and damage of synchronisers.**

**If it is necessary to tow the tractor, switch over the gearbox pump drive.**

If it is necessary to tow the tractor at longer distance and with engine off, switch over the pump for purposes of control and lubrication of the gearbox for driving from wheels. For this purpose: (**fig. E-12**):




- unlock the screw **A;**
- turn the lever **1** clockwise, switching on the gearbox pump for driving from wheels;
- secure the lever (in the bean-shaped opening) with the screw **A**;

Having removed the failure switch over the pump for driving from the engine, i.e. turn the lever counterclockwise.

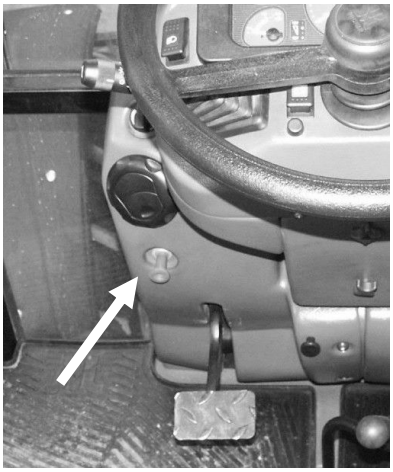
**Fig. E-12** Switching over of he gearbox pump drive.
**1** – switch over lever; **A** – lock screw; **B** - cover

If it is necessary to remove the cover **B**, the switch over lever **1** should be positioned as for driving the pump with engine on.

## STOP OF ENGINE & TRACTOR

To stop the tractor:
- reduce the engine rotation speed;
- press the clutch pedal as far as it will go;
- set the gear selection lever to neutral (**N**);
- press the working (main) brake pedal;
- when the tractor stops activate the parking brake with the hand lever (**Fig. E-2**).

**In the case of <u>emergency</u> braking press <u>brake and clutch</u> <u>simultaneously.</u>**



Do not stop the engine when the engine oil and coolant are hot. It is recommended to let the engine work at idle run until the temperatures fall. To stop the engine set the throttle lever (**Fig. E-3**) to „minimum", and pull the engine stop cable **(see Fig. E-13)** and, when the work is over, switch off the „mass" **(Fig. E-1)**. All lamps at the control panel should go off.

**Fig. E-13** Engine stop cable.

Engines fitted with a **turbocompressor** (PRONAR-82TSA II, PRONAR-1025A II) should be cooled down after work, if worked with full load.

Prior to stopping the engine reduce the rotation speed to 800-1000 rpm and let work without load for ca. 5 minutes.

## COUPLING DEVICES

Coupling devices of **PRONAR** tractors thanks to their structure enable coupling of wide range of machines and tools. To create optimum working conditions for the unit tractor + machine (tool) it is necessary to know adjustment ranges of these machines as well as their future working environment. Principles of proper work require also knowlege of re-installation of said mechines and thereby possibilities of utilisation of tractor's operational parameters.

## REAR THREE-POINT HITCH

### STRUCTURE

**PRONAR** tractors are fitted with a rear three-point hitch, which connection dimensions match the 2nd category hitches according to the ISO–730 standard.
**Fig. E-14a; E-14b** show the structure of the 3-point hitch and ajustment ranges of its individual elements.

**TRACTORS PRONAR-82A II / 82TSA II / 1025A II**

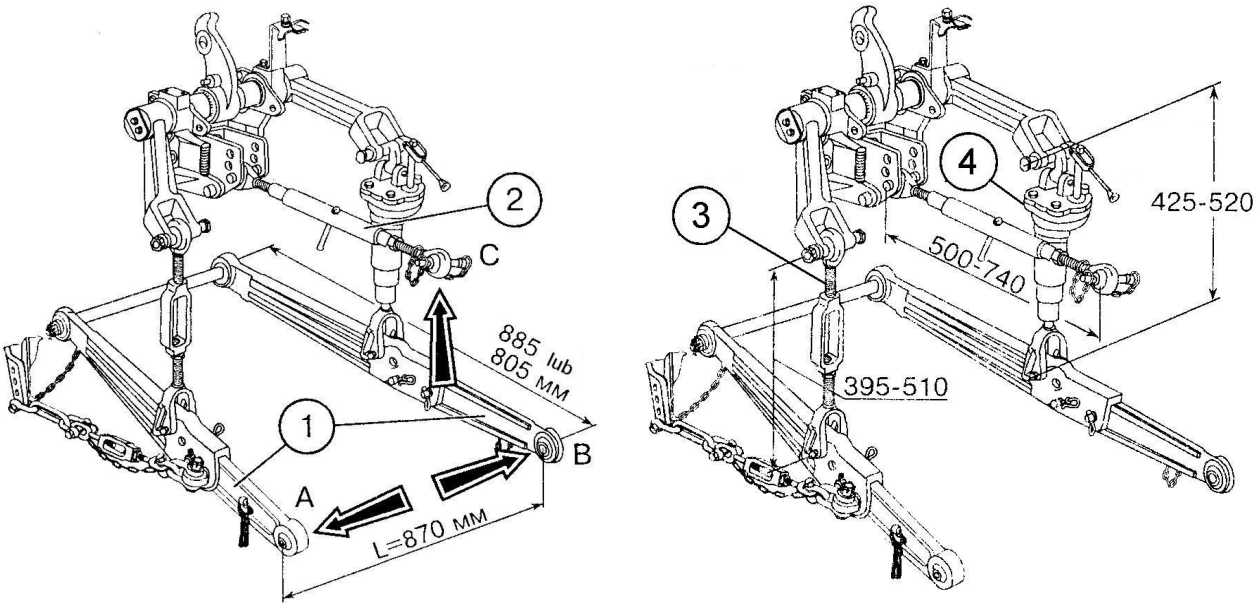



**Fig. E-14a** 3-point hitch – structure and basic dimensions.
**1** – lower pull rods; **2** – upper pull rod; **3** – left hanger; **4** – right hanger;

**TRACTORS PRONAR-82SA**

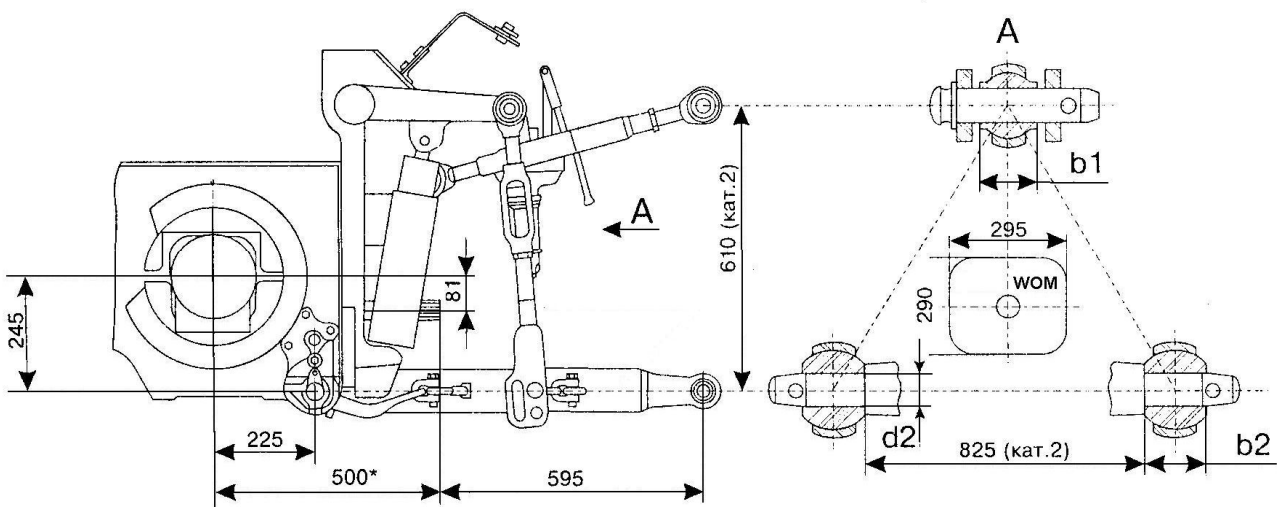



**Fig. E-14b** 3-point hitch of tractors PRONAR 82SA. (dimensions)

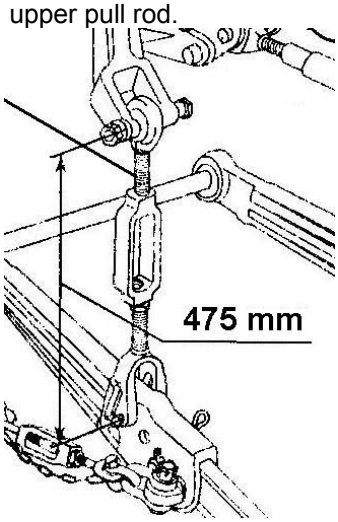
**Basic dimensions of the 3-point hitch rear hitch:**

| | |
|---|---|
| **Length of lower pull rods; mm** | |
| PRONAR-82A II / 82SA II/ 82TSA II | 805, 885 |
| PRONAR-1025 II | 885 |
| **Ball-and-socket joint width; mm** | |
| - upper (**b1**) | 51 |
| - lower (**b2**) | 38 lub 45 |
| **Nominal diameter; mm:** | |
| - upper pull rod bolt | 25 |
| - ball-and-socket joints of lower pull rods (**d2**) | 28 |
| **Lifting capacity, kN (kG)** | |
| PRONAR-82A II / 82TSA II: | |
| - at the axis of ball-and-socket joints of lower pull rods | 35 (3500) |
| - at the distance of 610 mm from the axis of pivots of lower pull rods | 21,83 (2183) |
| PRONAR-82SA II / 1025A II: | |
| - at the axis of ball-and-socket joints of lower pull rods | 45 (4500) |
| - at the distance of 610 mm from the axis of pivots of lower pull rods | 27,5 (2750) |

## ADJUSTMENT

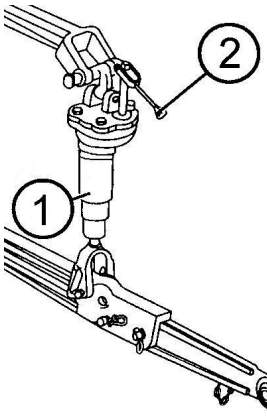
Suspended machines (tools) are connected (coupled) with the tractor in three points: two articulated joints of lower pull rods (**points A and B fig. E-14a**) and in the upper articulated joint via the upper pull rod (**point C fig. E-14a**).

The machine (tool) can be easily coupled with the tractor thanks to adjustable length of hangers and upper pull rod.



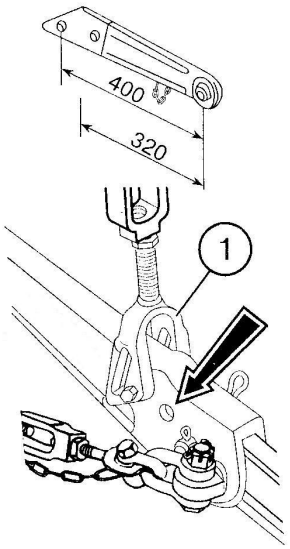

As a principle it is necessary to assume that the length of the left hanger remains unchanged and its value amounts to 475 mm (see **fig. E-15**). If it is necessary to change the hanger length during coupling of the machine, do it, but after installation set the length of the left hanger to recommended value

**Fig. E-15** Left hanger of the 3-point hitch.




Machines (tools) should be coupled with the tractor with help of adjustment of right hanger length **1 (fig. E-16)**, which is fitted with the crank **2** making adjustment easier. Turning the crank clockwise (looking from above) causes lengthening of the hanger, counterclockwise - shortening.

**Fig. E-16** Right hanger of the 3-point hitch.




Hangers of the 3-point hitch can be connected with lower pull rods in two points (openings in lower pull rods **fig. E-17**). This givest the possibility of change of lift stroke range. Installation of hangers inopenings closer to the tractor enables lowering of articulated joints of lower pull rods when the lift goes down.

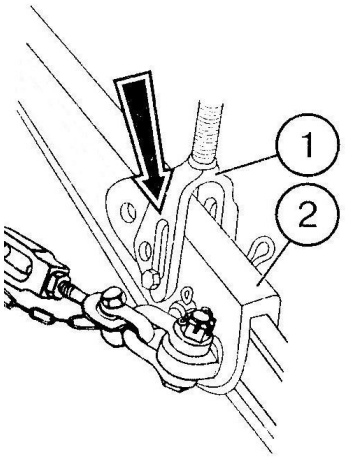
Installation of hangers in opening marked with an arrow on the **fig. E-17** causes that articulated joints of lower pull rods cannot be lowered to extreme lower position but can be raised much higher above the ground. Simultaneously the lifting capacity of the hoist is decreased by ca. 10 %.

Change of fastening points of hangers can be used during coupling of machines (tools) depending on location of pivots for installation of lower pull rods of the 3-point hitch or if it necessary to raise maximally the machine to obtain sufficient clearance under the machine (tool) suspended on the 3-point hitch.

In tractors PRONAR-82A II / 82SA II/ 82TSA II lower pull rods can be also adjusted through pullin in or out the pull rod end.

**Fig. E-17** Change of length of lower pull rods and points for fastening the hanger **1** to the lower pull rod.

Hangers **1** of the 3-point hitch can be also mounted on lower pull rods **2** in two ways (**fig. E-18)**:




- in round openings when the lower pull rods (and their articulated joints) cannot change their position in relation to the hanger,
- and in the bean-shaped opening (marked with an arrow on the figure on the left). This allows re-location of lower pull rods in relation to the hanger.

The first method should be used when we force with the hoist sinking of the coupled machine (tool) into the soil and when working with automatically adjusted machines.

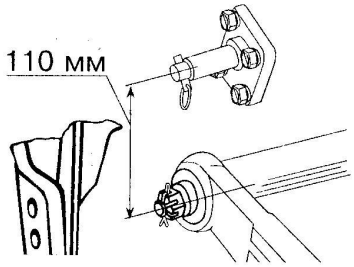
The second method allows compensation of mutual motions of the tractor and and the machine (tool), especially of great working width in the plane transverse to tractor's drive direction. It can be also used when working with machines (tools) fitted with jockey wheels.

**Fig. E-18** 3-point hitch hanger installed in the bean-shaped opening.

**After change of hanger's fastening place, lower pull rod pins fastening the hangers should be secured with original cotter pins.**

Method of connection of hangers with lower pull rods is influenced by many factors e.g. type of work, type of machine (tool), microprofile of the field, agricultural requirements etc. Thus the present paragraph is just a kind of information about adjustment possibilities of the 3-point hitch of **PRONAR** tractor useful for carrying on of a concrete work.

Additionally, in tractors PRONAR-82A II / 82TSA II / 1025A II the lower pull rods can be re-positioned in relation to the tractor (**fig. E-19)**.




Change of rotation axis of the lower pull rod (**fig. E-19**) by 110 mm within vertical plane enables increase of clearance of a machine (tool) suspended on the 3-point hitch.

**Fig. E-19** Additional axles for installation of lower pull rods.

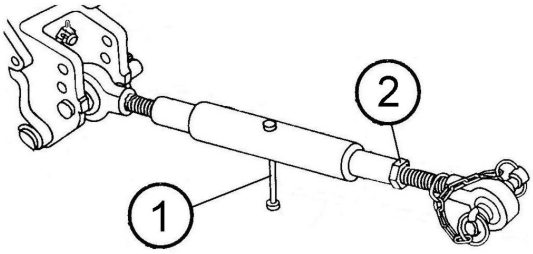



**Fig. E-20** Adjustment of the upper pull rod.

Structure of the upper pull rod (adjustment screw) enables its shortening or lengthening (through turning the central part **1 (Fig. E-20)**, as required. When the pull rod is adjusted, screw home a counter-nut to avoid accidental length change **2**.

**While adjusting the upper pull rod take care so that its ends are screwed out from the tube for the same length and locked with protective nut on either sides.**

As an example, if the tractor works with a plough, it is necessary to perform following hitch adjustments:

- while ploughing the tractor has its right wheels (usually) in the furrow, thus it is necessary to level the plough frame (shortening or lengthening the right hanger), because – in relation to the field surface – the tractor is tilted to right;
- to obtain the same working depth of the first and the last body it is necessary (after levelling) change the length of the upper pull rod with the knob **1** (**Fig. E-20**) after loosening of the protective nut **2**. Having adjusted the depth screw the nut home.

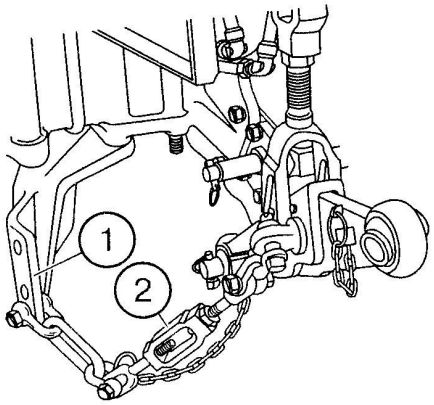
During drive of the tractor with a suspended machine (tool) shorten the upper pull rod to increase the clearance of the unit (under the machine).

**PRONAR** tractors can be fitted with limiters of lower pull rods:
- external chain limiters;
- external telescopic limiters.

**Check, which type of limiters of lower pull rods is installed in your tractor.**

**External chain limiters**

Locking of lower pull rods outside the 3-point hitch should be carried out as follows (**fig. E-21**):




- connect limiting chains with the console **1** in its lower opening;
- connect the machine (tool) with the 3-point hitch;
- unscrew protection nuts and lengthen the limiting chains maximally through turning the knob **2**;
- adjust the right hanger length so as the machine (tool) is levelled during operation;
- lift the machine (tool) to transport position (to maximum height);
- turn the knob **2** so that limiting chains enable side motions of joints of lower pull rods within the range of 20 mm from their central position;
- secure the knobs with protection nuts.

**Fig. E-21** External chain limiters.

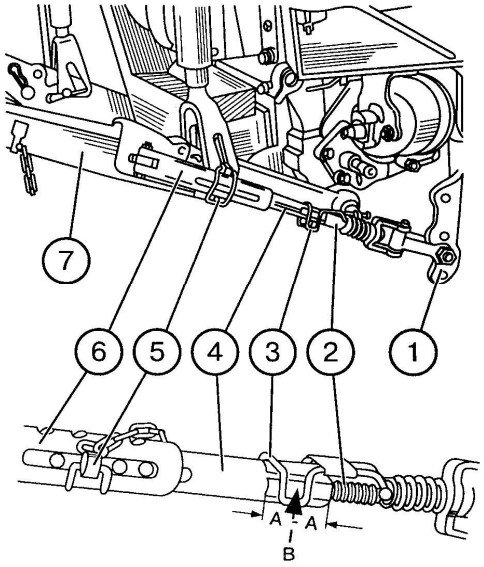
To lock completely (if necessary) lower pull rods in their working position install the limiting chains in the second opening (from below) of the console **1** and shorten the chain maximally. It is possible to use remaining openings in the console for fastening of limiting chains, if necessary.

**External telescopic limiters**

Telescopic limiters of lower pull rods **(fig. E-30)** are installed in tractors equipped with 3-point hitches fitted with external locking system.

**CAUTION! Telescopic limiters should be installed only in the second opening (from below) in the console 1 (fig. E-22), otherwise th limiters may be damaged.**

While coupling the tractor with machines (tools) which require free motion (within the horizontal plane) during operation, adjust the limiters as follows (**fig. E-22**):




- remove the cotter pin **5**;
- connect lower pull rods **7** and upper pull rod with machine (tool) being coupled and lift with the hoist for small height (2 ÷ 3 cm);
- align position of the opening of internal tube of the telescope with the recess (groove) in outer tube of the telescope and insert the cotter pin **5**;
- unlock the screw **2** and with its knob **3** adjust position of the internal tube so that the cotter pin **5** divides the recess (groove) for two equal parts or is situated closer to the console, and the lower pull rods should be positioned symmetrically to the PTS axis.

**Fig. E-22** Telescopic limiters of lower pull rods.

To verify the adjustment lift the machine (tool) to transport position (to maximal height) and check if side motions of joints of lower pull rods within the horizontal plane lie within the range of 10÷20 mm from their central position.

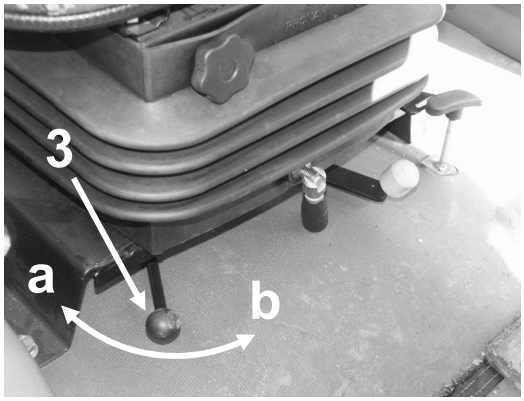
If just after operation of the machine (tool) which requires locking of the 3-point hitch in workin position it is necessary to transport it to other place:

- lift the machine (tool) to transport position and lock the hoist with the lock lever **3** (**fig. E-23**) (except of PRONAR-82SA);
- unlock the knob **3** and by screwing in the screw **2** lock both limiters (left and right) of the the rear 3-point hitch in transport position.

The **Fig. E-23** (**except of PRONAR 82SA**) shows the lever **3** for control of shaft lock gear **2** of the rear 3-point hitch, which prtects the machine (tool) suspended on the hitch and raised to transport position (to maximal height from the ground) against rapid (unintended) fall down during transport drive.

The machine (tool) suspended on the rear hitch is locked in transport position as follows:

- set the hoist control lever to „lift" and lift the machine to transport position;
- set the lock lever **3** to left extereme position („**a**");
- set the hoist control lever to „**N**";
- the weight of suspended machine causes automatic lock of the gear.



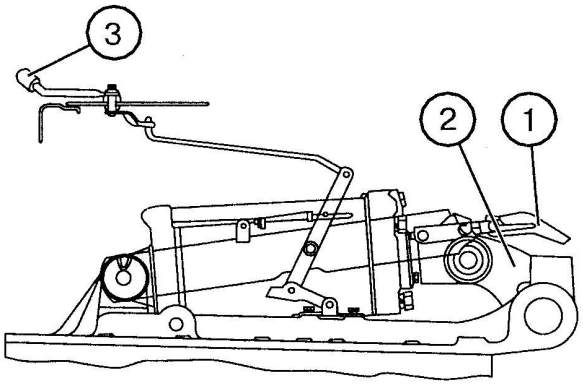



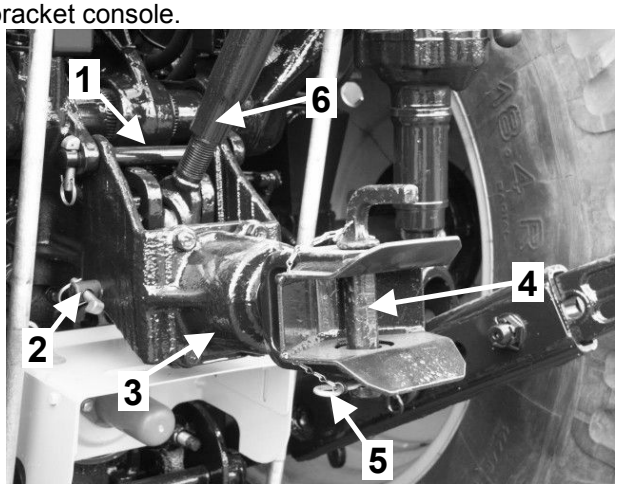

**Fig. E-23** Control lever for lock gear for 3-point hitch – except of PRONAR 82SA. **1**- console; **2**- shaft of rear hitch arms; **3**- control lever for rear hitch lock

To unlock the rear hitch set the hoist control lever to „lift" (lift the machine) and set the control lever of the lock gear to right extreme position („**b**").

## UPPER TRANSPORT BRACKET

The upper transport bracket of fork type is applied for connection of the tractor with two-axle trailers or agricultural machines built on chassis of such trailer.

The upper transport bracket (**fig. E-24a**) should be installed on the tractor with two bolts.
The manufacturer supplies tractors with upper transport brackets fastened **with only one** upper bolt **1 of the** bracket console.




To make the bracket ready for operation:

- lift the bracket slightly and re-install the upper pull rod **6** together with the bolt from the lower opening of the console to the upper one;
- remove the lower bolt **2** from the upper pull rod console;
- remove the lower bolt **2** of the bracket console, lower the bracket and insert the bolt into lower opening of the console of upper pull rod.

**Fig. E-24a** Upper transport bracket of tractors **PRONAR-82A II / 82TSA II / 1025A II**.
**1** – upper bolt of the bracket console; **2** – lower bolt of the bracket console; **3** – upper bracket console; **4** – bracket bolt; **5** – cotter pin of the bracket bolt; **6** – upper pull rod of the rear hitch;

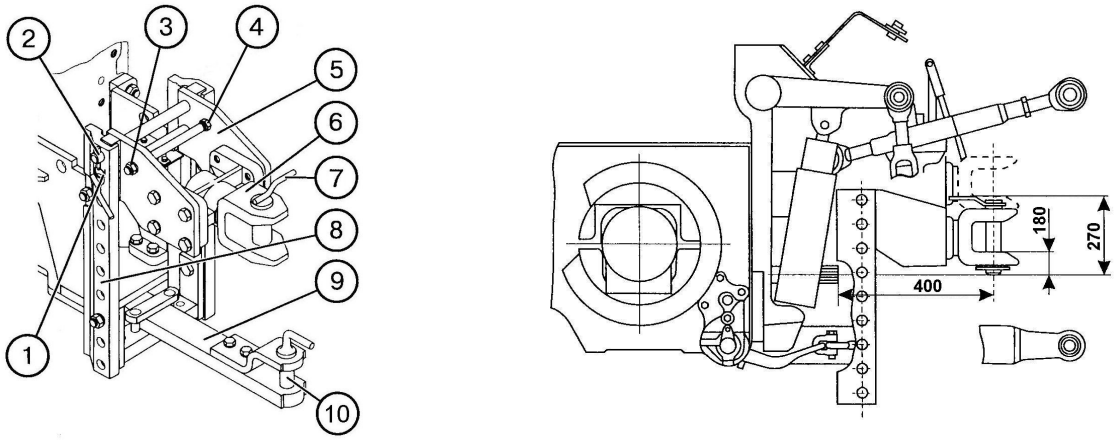



**Fig. E-24b** Upper transport bracket of tractors **PRONAR-82SA II** – structure and basic dimensions.
**1** – cotter pin; **2** – bracket console bolt; **3** – connection bolt nut; **4** – connection bolt counter-nut; **5** – transport bracket console; **6** – transport bracket fork; **7** – transport bracket bolt; **8** – height adjustment guides for transport bracket; **9** – agricultural bracket; **10** – agricultural bracket bolt.

The catch can be repositioned within the vertical plane every 65 mm. When coupling PTS-driven machines, the upper transport bracket should be installed in upper extreme position or removed.

The distance between the transport bracket and the PTS end within the vertical plane can be also increased through turning of the fork console in upper position of the bracket (**fig. E-24b)**. Then the distance amounts to 270 mm

To change the position of the transport bracket within the vertical plane, remove two bolts **2**, loosen two counter-nuts **4** and tighten slightly two nuts **3** i.e. clamp bracket consoles. Having performed this action you can easily shift the upper transport bracket to required position. To lock the bracket in required position carry on above-mentioned actions in reverse order. Do not forget to secure the bolts **2** with cotter pins **1**.

To connect the tractor with a trailer, remove the cotter pin from the bolt **7 (Fig. E-24b)**, remove the bolt from the bracket fork openings, and then, matching the trailer's towing lug in the direction of the bracket fork connect it using the pin **7** with tractor's bracket and protect with a lock.

To disconnect the tractor and the trailer, remove the cotter pin from the bolt **7**, remove the bolt and drive forward with the tractor.

**IT IS CATEGORICALLY PROHIBITED:**

- **to connect with the upper transport bracket single-axle trailers or agricultural machines built on the chassis of such trailer;**

**to use the rear 3-point hitch when the tractor is fitted with an upper transport bracket.**

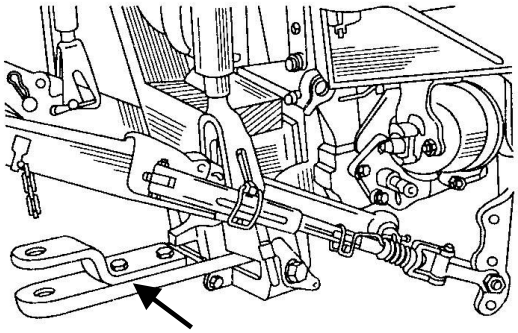
**Caution!**

**Connection of trailers and machines fitted with a rotary draught bar to the transport bracket is prohibited.**

## AGRICULTURAL BRACKET

Tractors **PRONAR** are purchased with installed agricultural bracket (**Fig. E-16**) applied for coupling of towed agricultural machines. The bracket can be repositioned within the vertical plane (if the coupled machine requires) and locked (what is necessary) in set position.

**PRONAR-82A II / 82TSA II / 1025A II**



**PRONAR-82SA II**

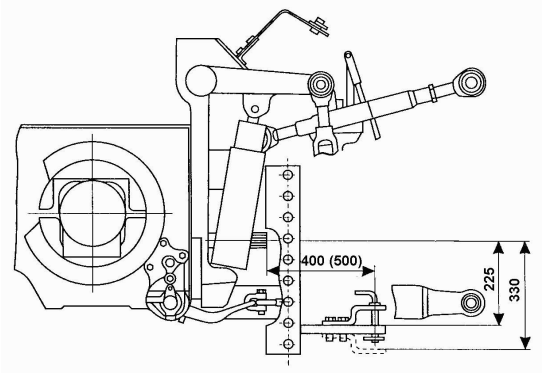



**Fig. E-25** Agricultural bracket of tractors PRONAR.

The structure of the agricultural bracket (deflectable) enables replacement of the bracket with hydraulically-controlled lower transport bracket (**fig. E-26**). The hook of the lower transport bracket is inserted nearby the agricultural bracked and should be remowved before installation.

To carry out the replacement:

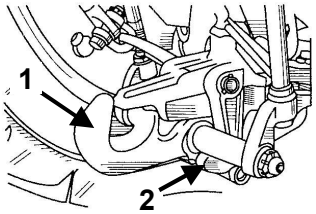
- set the hoist in upper (transport) position;
- unscrew the M10 screw securing the agricultural bracket (lock);
- set the hoist to upper (max.) position, release the contrl cable for hook lock (**fig. E-26**) and lower the hoist (the agricultural bracket also changes its position);
- remove (unscrew the screw) the transport bracket hook;
- remove the bolt fastening the agricultural bracket, remove the bracket, install the hook and secure the bolt;
- check operation of the lower transport bracket by lifting and lowering it with the hoist, check also laock of the bracket in transport position (closed).

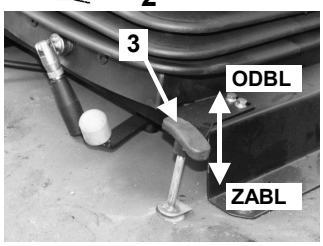
## HOIST-CONTROLLED LOWER TRANSPORT BRACKET

The hoist-controlled lower transport bracket is used for coupling (towing) of single-axle trailers of max. draught bar pressure on the hook amounting to 14 kN (1400 kg).

While coupling a single-axle trailer follow the procedure below:

- set the lever **1** for hoist control (**fig. E-27**) to „lift" to release catches **2** (**fig. E-26**) of the hook lock from load;




- the cable **3** (**fig. E-26**) for hook lock control set in unlocked position;
- set the hoist control lever **1** (**fig. E-27**) to (**N**);
- with reverse gear drive close to the trailer draught bar so that the lowered hook is below the trailer lug, stop the tractor with the parking brake and switch off the reverse gear;
- set the hoist control lever **1** (**fig. E-27**) to „lift" and raise the hook so that it goes into the trailer lug;
- set the lock control cable **3** (**fig. E-26**) to lower position (locked);
- set the hoist control lever **1** (**fig. E-27**) to **N** - neutral;
- connect the pneumatic, electric and hydraulic systems of the trailer with the tractor.

**Fig. E-26** Hoist-controlled lower transport bracket.
**1-** transport bracket; **2**- catches; **3-** lock control cable for lower bracket hook.

To disconnect the sjingle-axle trailer:

- disconnect the pneumatic, electric and hydraulic systems of the trailer from the tractor;
- set the lever **1** (**fig. E-27**) to „lift" so as to unlock the hook (pull the cable **3** (**fig. E-26)** upwards and lock in this position);
- lower the hook setting the control lever **1** to (**N**) (**fig. E-27**);
- switch on the gear, move the tractor forward and lift the hook with the lever **1** in position „lift";
- set the cable **3** (**fig. E-26**) to lower position, and the hoist control lever **1** to (**N**).

## HOIST CONTROL DURING OPERATION TRACTORS PRONAR-82A II / 82TSA II / 1025A II

Tractors **PRONAR** are fitted with hoist control in dependence from agricultural requirements, soil (crop) condition, and features and parameters of coupled machine (tool).

The hoist of tractors **PRONAR** can co-operate with machines (tools), which require following adjustment:

- contour tracking – the machine (tool) is fitted with a jockey wheel tracking the surface of the field, which it is rolling on. The adjustment consists in change of position of the jockey wheel in relation to working elements of the machine (tool);
- automatic: forced, position and mixed (**PRONAR-1025A II**), which are used for machines (tools) not fitted with jockey wheels (or other tracking elements). The automatic adjustment is used also when the manufacturer of the machine (tool) has fitted the machine with a jockey wheel (there are also tractors without automatic hoist control), but in an operation manual recommends to use the automatic regulation.

Application of automatic adjustment (examples):

- force: ploughing, cultivation, harrowing – in general for machines (tools), which working elements are sinked into the ground;
- position: sowing, fertilisation (spreaders), mowing - in general for machines (tools), which working elements work above the soil surface.
- mixed (**PRONAR-1025A II**): ploughing, cultivation, harrowing - in general for machines (tools), which working elements are sinked into the ground, and the cultivated field is characterised with high heterogeneity – variable soil resistance;

Mentioned examples of application are not obligatory recommendations. The position adjustment can be applied for ploughing, but under condition that the field surface is even, for the tractor is tracking the surface and logitudinal motions of the tractor cause change of working depth. Working elements of seeders work sinked into the soil, however, recommended is the position adjustment.

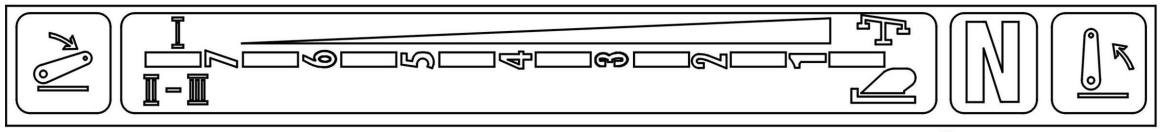
In practice there are many possibilities of utilisation of hoist adjustment, however, this requires good knowledge of technical features of used equipment (tractor, machines and tools), and also consciousnes of purpose and effect, which should be achieved on cultivated field during nurturing or crop works.

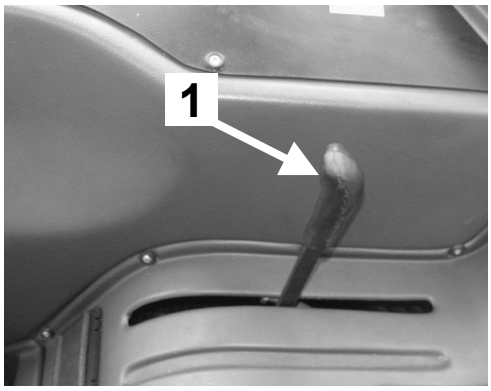
Tractors **PRONAR** as a standard are fitted with hoists:
**PRONAR-82A II / 82TSA II** - hoist with cylindre C-110 of lifting capacity **35.0 kN**
**PRONAR-82SA II / 1025A II** - hoist with cylindre C-125 of lifting capacity **45.0 kN**

**CAUTION! While utilising full range of hoist lifting capacity (above 28.0 kN) use front axle ballast, of weight 6x45kg+2x40kg, and, if the ballast is insufficient for keeping the longitudinal stability of the tractor, fill front wheels with water.**

**Coupling of tractors PRONAR-82A II / 82TSA II / 1025A II with a machine (tool).**

While coupling the tractor with the machine use the hoist control lever **1** inside operator's cab **(fig. E-27).** When moving the lever **1** rearwards the arms of the rear hitch raise, when moving the lever **1** forward – arms lower as a result of their own weight. When the arms lower too slowly put greater force for their lowering.



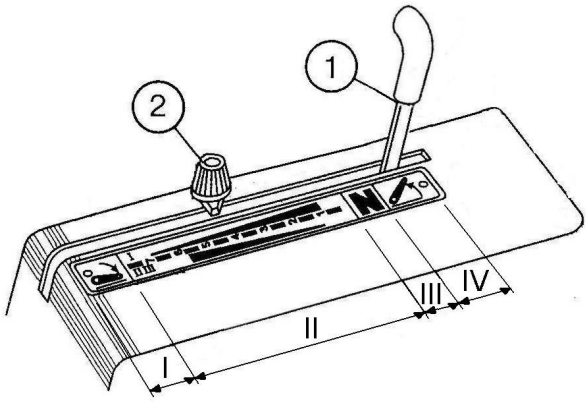
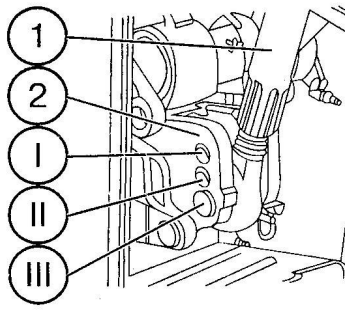




**Fig. E-27** Hoist and control range.
**1**- rear hitch control lever inside the cab; **2**- limiter.

While coupling the machine (tool) with the rear hitch of the tractor, and when **the automatic force adjustment** will be used, it is essential to select the console opening, where the upper pull rod will be fastened. The rotary installe console transfers pulses from forces (tensile and compression) in the upper pull rod to the automatic control system. Value of these pulses depends on fastening point of the upper pull rod to the console. Thus, select the opening when during work we expect:




**I** – **small forces at the rear hitch** i.e. while working with machines (tools) which working elements are not deep sinked into the soil or when the soil is of low resistance, with force adjustment;

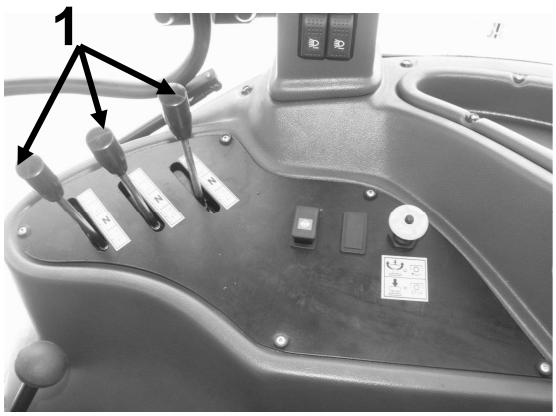
**II** – **medium forces at the rear hitch** i.e. while working with machines (tools) which working elements are medium deep sinked into the ground or when the soil is of medium resistance, with force adjustment;

**III** – **large forces at the rear hitch** e.g. during deep ploughing on high-resistance soil, deep cultivation etc, with force and position adjustment and without automatic adjustment.

**Fig. E-28** Fastening of the upper pull rod to the tractor console.
**1**- upper pull rod; **2**- pull rod console; **I**- upper opening for pull rod fastening; **II**- central opening for pull rod fastening; **III**- lower opening for pull rod fastening

**CAUTION ! Automatic position adjustment of the hoist does not require change of fastening point of the upper pull rod in dependence from work type & conditions.**

**Operation of tractors PRONAR-82A II, 82TSA II, 1025A II with machines (tools) with tracking adjustment.**
This type of operation requires as follows:

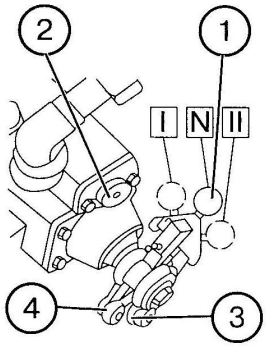



- set the hydraulics control levers **1 (fig. E-29)** to „neutral" if machines (tools) co-operating with tractor's external hydraulics are not used;
- set the hoist control lever **1** (**fig. E-27**) to the range - **II (1 ÷ 7)**;
- check if the lever **1 (fig. E-30)** for selection of automatic adjustment mode is in the position (**N**);
- adjust position of the jockey wheel of the machine (tool).

**Fig. E-29** Control levers for external hydraulics.

**Operation of tractors PRONAR-82A II, 82TSA II with machines (tools) with automatic adjustment.**

Activation of automatic adjustment is realised with the lever **1** situated nearby the force adjustment gear (**fig. E-30**).




The lever **1** has three positions:
**N-** neutral (tracking adjustment)
**I-** automatic, position
**II-** automatic, force

**Fig. E-30** Lever for selection of automatic adjustment mode.
**1**- lever for selection of adjustment mode; **2**- knob for adjustment of response quickness when the position or force automatic adjustment is on; **3**- force adjustment lever; **4**- position adjustmant lever.

**To activate the force adjustment**:

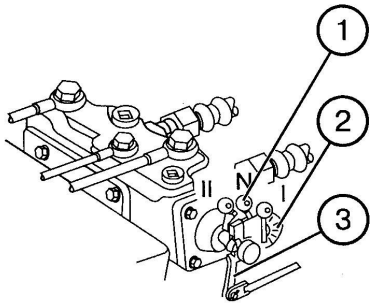
- couple the machine with the tractor and with upper pull rod properly fastened to tractor's console **(fig. E-28)**
- lift the machine (tool) to transport position with the hoist;
- set the lever for selection of adjustment mode **1 (fig. E-30)** to **II** and align with recess in the lever **3**;
- with the knob **2** set proper response quickness during automatic correction of position (clokwise turn – decrease of response quickness, counterclockwise – increase of response quickness during automatic correction of position);

**To activate the position adjustment**:

- couple the machine with the tractor;
- lift the machine (tool) to transport position with the hoist;
- lever for selection of adjustment mode **1 (fig. E-30 )** set to **I** and align with recess in the lever **4**;
- turn the knob **2** counterclockwise as far as it will go to set maximum response quickness during automatic correction of position;

**CAUTION ! If the automatic hoist adjustment is not used, set the lever 1 (fig. E-30) to „N".**

**Operation of tractors PRONAR-1025A II with machines (tools) with automatic adjustment.**




Activation of automatic adjustment is realised with the lever **1** (**fig. E-31**) situated nearby the force adjustment gear and the lever for selection of adjustment mode **4** (**fig. E-32**) in tractor's cab.

**Fig. E-31** Change-over switch at the controller.
**1**- change-over switch; **2** knob for adjustment of response quickness when the position or force automatic adjustment is on; **3**- lever connecting change-over switch of the with the lever for selection of adjustment mode.

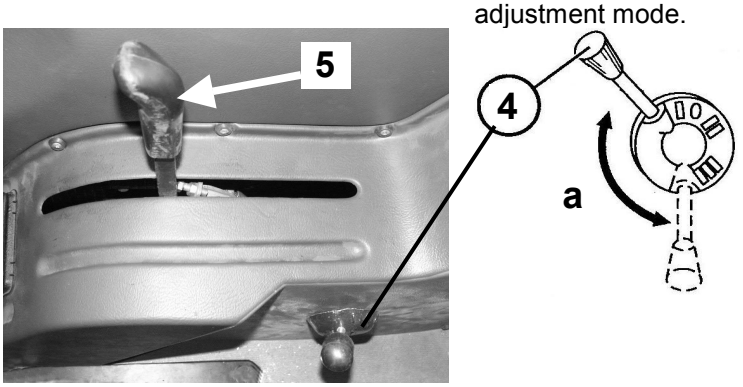



**Fig. E-32** Lever for selection of adjustment mode **4** (arrow „**a**" points the adjustment range):
**I** - position;
**I ÷ III** – mixed adjustmant range;
**III** - siłowa
**4-** lever for selection of adjustment mode
**5-** rear hitch control lever

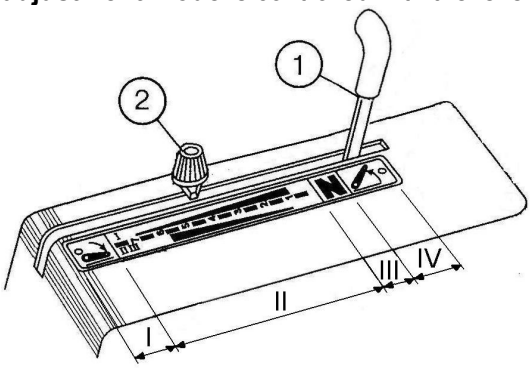
To activate force, position or mixed automatic adjustment:

- switch on the hydraulic pump drive (see **fig. E-5**);
- turn the knob **2** (**fig. E-31**) counterclockwise as far as it will go to set maximum response quickness during automatic correction of position;

- lift the machine (tool) to transport position with the hoist control lever **5** (**fig. E-32**);
- disconnect the change-over switch **1** (**fig. E-31**) at the controller (set it vertically) from the lever **3**, which connects the controller with the lever for selection of adjustment mode **4** in the cab;
- with the lever **4** (**fig. E-32**) select required adjustmant type (force, position or mixed);
- connect the change-over switch **1** (**fig. E-31**) with the lever **3**.

**Operation of rear hitch control lever in tractors PRONAR-82A II, 82TSA II, 1025A**

During operation with a machine (tool) suspended on the rear hitch the hoist working in **automatic adjustment mode** is controlled with the lever **1 (fig. E-33**) as shown on the **fig. E-34; E-35; E-36**



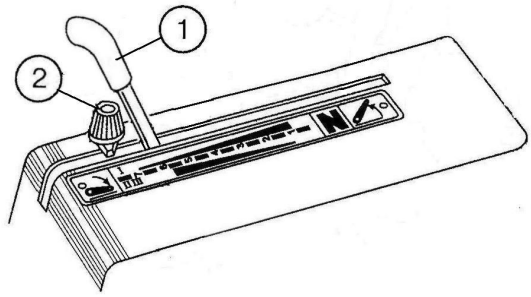

The lever **1** for automatic hoist adjustment can be set to following positions:

- **I** - lowering
- **II** (**1** ÷ **7**) – force or position adjustment range (depending on mode);
- **III** - (**N**) – neutral;
- **IV** - lifting;

**Fig. E-33** Hoist control lever + pictogram of positions, where the lever can be set. **1**- lever; **2**- limiter.

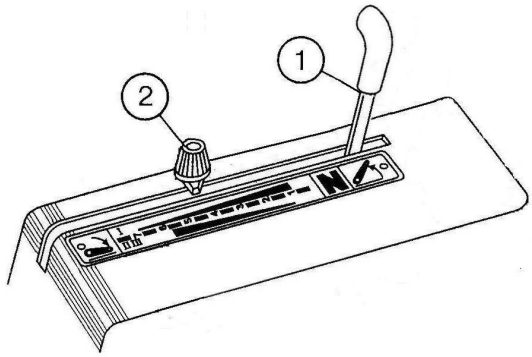
Setting of the lever **1** to **I** forward (acording to tractor's drive direction) and holding in this position causes forced lowering of the hoist – a working element of the tool suspended on the rear hitch sinks into the ground.

**Automatic force adjustment.**



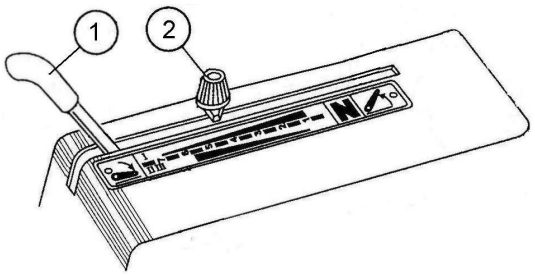

Initially set the limiter **2** to fron extreme position. Then, smoothly move the lever **1** forward, what causes lowering of the tool. Further movement of the level causes sinking of the working element of the machine (tool) into the ground. When the working element reaches required depth stop shifting of the lever, move the limiter to the set lever position and lock it there.

**Fig. E-34** Hoist control lever **1**– lowering,




Whle selecting the working depth we set simultaneously the force, which – through the rear hitch – loads the tractor. This improves tractor's working conditions, and especially working conditions of the engine, reducing fuel quantity required for execution of given work.
In the end of a patch, before turning back, set the lever **1** to rear extreme position „lifting" and hold until the machine (tool) is in upper position. In this moment release the lever – it will automatically set to „**N**"

**Fig. E-35** Hoist control lever- lifting.




In the beginning of each patch move the lever **1** fluently to the previously set limiter **2**. If it is necessary to sink the working element of the machine (tool) quickly, then, using flexibility of the lever **1** bend it to operator's side and shift forward avoiding the set limiter **2**. If such setting is no more necessary return to previously set position or move the limiter towards greater working depth.

**Fig. E-36** Hoist control lever- quick sinking.

**Automatic position adjustment**

When the automatic adjustment is on, operation of the lever **1** and the limiter **2** (**fig. E-34; E-35; E-36**) is the same as for the automatic force adjustment. However, do not forget that each position of the lever **1** corresponds with certain (always the same) position of the machine (tool), and exactly, its working elements in relation to the tractor.

**Automatic mixed adjustment (PRONAR-1025 A II)**

When the automatic mixed adjustment is on, operation of the lever **1** and the limiter **2** (**fig. E-34; E-35; E-36**) is the same as for the automatic force adjustment.

The mixed adjustment uses advantages of force adjustment (stable operation of the engine through load of the tractor with towing force) and simultaneously, thanks to influence of position adjustment, limits changes of tool's working depth, especialy on heterogenous soils of variable resistance.

When closing the lever **4 (fig. E-32)** to **I** the influence of force adjustment drops for the favour of position adjustment, when closing to **III** - reversely.

**CAUTION ! When during work with with automatic adjustment appear vibrations (shocks) of the tool suspended on the rear hitch, reduce senitivity of the controler by turning the knob 2 (fig. E-31) clockwise.**

## HOIST CONTROL DURING OPERATION TRACTORS PRONAR-82SA II

Tractors **PRONAR-82SA II** are fitted with hoist control in dependence from agricultural requirements, soil (crop) condition, and features and parameters of coupled machine (tool).

The hoist of tractors **PRONAR-82SA II** can co-operate with machines (tools), which require following adjustment:

- contour tracking – the machine (tool) is fitted with a jockey wheel tracking the surface of the field, which it is rolling on. The adjustment consists in change of position of the jockey wheel in relation to working elements of the machine (tool);
- automatic: forced, position and mixed (**PRONAR-1025A II**), which are used for machines (tools) not fitted with jockey wheels (or other tracking elements). The automatic adjustment is used also when the manufacturer of the machine (tool) has fitted the machine with a jockey wheel (there are also tractors without automatic hoist control), but in an operation manual recommends to use the automatic regulation.

Application of automatic adjustment (examples):

- force: ploughing, cultivation, harrowing – in general for machines (tools), which working elements are sinked into the ground;
- position: sowing, fertilisation (spreaders), mowing - in general for machines (tools), which working elements work above the soil surface.
- mixed (**PRONAR-1025A II**): ploughing, cultivation, harrowing - in general for machines (tools), which working elements are sinked into the ground, and the cultivated field is characterised with high heterogeneity – variable soil resistance. The mixed adjustment uses advantages of force adjustment ensuring smooth limitation of working depth of sunk tool.

Mentioned examples of application are not obligatory recommendations. The position adjustment can be applied for ploughing, but under condition that the field surface is even, for the tractor is tracking the surface and logitudinal motions of the tractor cause change of working depth. Working elements of seeders work sinked into the soil, however, recommended is the position adjustment.

In practice there are many possibilities of utilisation of hoist adjustment, however, this requires good knowledge of technical features of used equipment (tractor, machines and tools), and also consciousnes of purpose and effect, which should be achieved on cultivated field during nurturing or crop works.

Tractors **PRONAR-82 SA** as a standard are fitted with two cylinders (diameter 80 mm) of lifting capacity **45.0 kN**

**CAUTION! While utilising full range of hoist lifting capacity (above 45.0 kN) use front axle ballast, of weight not lesser than 360 kg (8x45kg) and, if the ballast is insufficient for keeping the longitudinal stability of the tractor, fill front wheels with water.**

**Coupling of tractors PRONAR-82A II / 82TSA II / 1025A II with a machine (tool).**

While coupling the tractor with the machine use the position adjustment lever **2** inside operator's cab **(fig. E-27)** or the external lever situated in the rear of the tractor **4 (fig. E-38)**. When moving the lever **4** downward the machine suspended on the rear hitch is raised, when moving the lever **1** uprwards – the machine is lowered as a result of its own weight. When the lower pull rods lower too slowly put greater force for their lowering.

During coupling of the machine with the tractor the force adjustment lever **3** should be shifted to extreme forward position (position „9" on the pictogram).

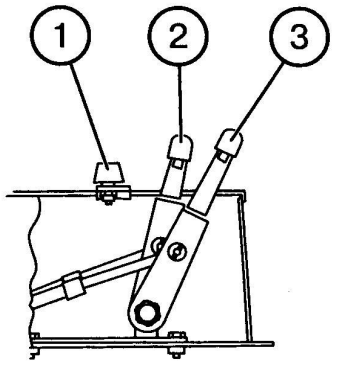




**Fig. E-37** Rear hitch control levers + pictogram.
**1-** limiter; **2-** position adjustment lever inside the cab; **3-** force adjustmant lever;

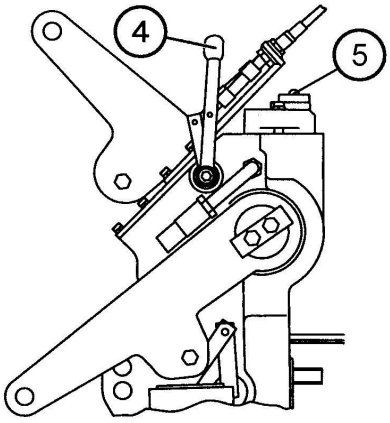



**Fig. E-38** Rear hitch control lever outside the tractor
**4-** position adjustment lever outside the cab
**5-** distributor push rod

**CAUTION! Automatic position adjustment of the hoist does not require change of fastening point of the upper pull rod in dependence from work type & conditions.**

If, after repositioning of the position adjustment lever the rear hitch arms do not lower, unlock the distributor slider by pressing the push rod **5 (fig.E-38)**. For safety reasons carry out this action from operator's seat through opened rear cab flab. Probably reason of distributor slider jam in position „lowering" or „lifting" is polluted oil in hydraulic system.

**Operation of tractors PRONAR-82SA II with machines (tools) with tracking adjustment.**
This type of operation requires as follows:

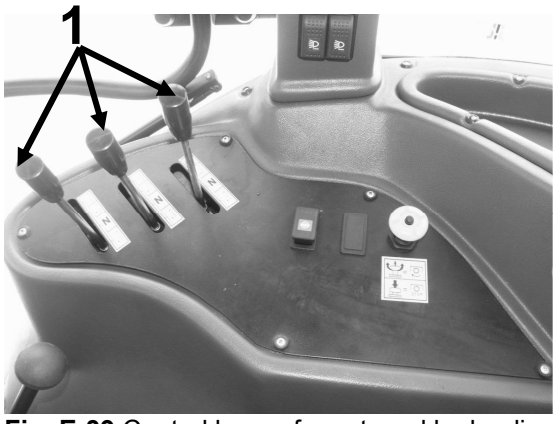


**Fig. E-39** Control levers for external hydraulics.

- set the hydraulics control levers **1 (fig. E-39)** to „neutral" if machines (tools) co-operating with tractor's external hydraulics are not used;
- set the hoist control lever **1** (**fig. E-37**) for position adjustment to the range **(1 ÷ 9)**;
- adjust position of the jockey wheel of the machine (tool).

**If any control lever for external hydraulics is set to other than "neutral" position (fig. E-39), operation of rear hitch levers (fig. E-37) is impossible.**

**Operation of tractors PRONAR-82SA II with machines (tools) with automatic position adjustment**

The position adjustment is realised with the lever **2 (fig. E-37)**. When the position adjustment is on, the force adjustment lever **3** hould be in position „9" on the pictogram and is not used then.

With the position adjustment lever **2** we can set required height of the machine (tool) above the ground, or depth of sinking into the ground.

**Operation of tractors PRONAR-82SA II with machines (tools) with automatic force adjustment**

Automatic force adjustment is suitable for machines, whcih require sinking into the ground (e.g. plough, cultivator).

While working with a machine, which requires sinking into the ground first lower the tool with the position adjustmant lever **2** to the position 9 on the pictogram **(fig.E-37)**, and then, when the tractor moves, with the force adjustment lever **3** select required working depth. While driving out from a furrow and to lift or lower the rear hitch use only the position adjustment lever **2**, leaving the force adjustment lever **3** in previously set position. Then during next sinking of the tool we shift the position adjustment lever **2** extremely forward (to the position „9") and the settings of force adjustment remain unchanged.

**Operation of tractors PRONAR-82SA II with machines (tools) with automatic mixed adjustment**

The mixed adjustment uses advantages of force adjustment (stable operation of the engine through load of the tractor with towing force) and simultaneously, thanks to influence of position adjustment, limits changes of tool's working depth, especialy on heterogenous soils of variable resistance.

If on heterogenous soils of variable resistance it is impossible to obtain uniform working depth, reduce the working depth with the position adjustmant lever **2 (fig. E-37)**. The digit „1" on the pictogram means maximum tool height above the ground by which the machine can be raised, the digit „9" – minimum height.

## HOIST CONTROLLING WITH HELP OF THE ELECTRO-HYDRAULIC SYSTEM EHR IN TRACTORS PRONAR-82SA II (OPTION)

In tractors **PRONAR-82SA II** the hoist can be controlled with the electro-hydraulic system type EHR depending on agrotechnical requirements, soil (crop) condition, features and technical parameters of coupled machine (tool). The EHR system enables the tractor's operator to increase the drive speed and concentration on proper getting around on the arable field and releasing him simultaneously from necessity of watching the working equipment. This allows to speed up field works and simultaneously increases the grade of work accuracy, or utilisation of e.g. seeds or fertiliser.

The electronic controller manufactured in various versions enables realisation of following adjustment programs:

- **force, position and mixed adjustment** of the rear and/or front hitch. The electronic controller analyses then signals from force and position sensors;

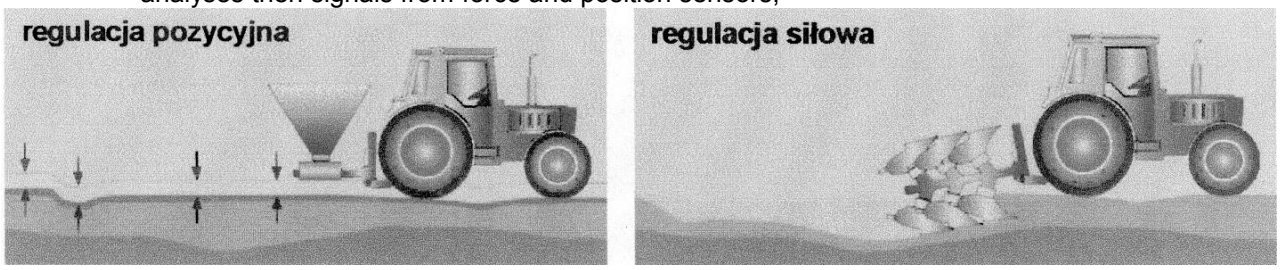
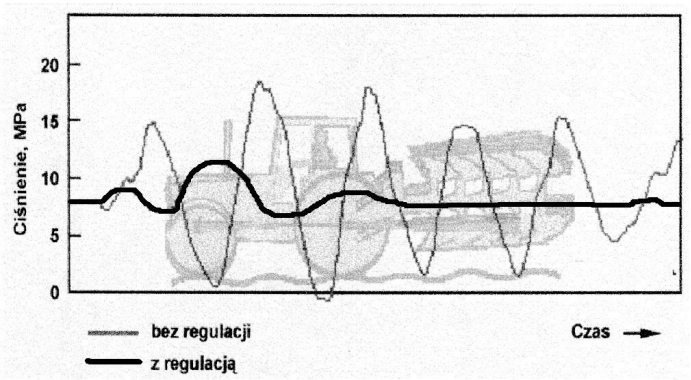



**Fig. E-40** Methods of adjustment used in hoists of agricultural tractors.




- **damping of longitudinal oscillations (rolling) of the tractor**. The tractor with hanged heavy plough has during transportation drive very unfavourable mass distribution, thus very easily goes into oscillations. Properly programmed electronic controller controlling the hoist cylinder can realise very good damping of oscillations.

**Fig. E-41** Oscillations damping graph.

Controlling of the electro-hydraulic system of the rear hitch is realised from the control panel **(Fig. E-42)** situated on the right side of the seat and additional push buttons for raising and lowering of lower pull rods situated in the rear at mudguards on both sides of the tractor **(Fig. E-19, pos. 10)** (they are used during coupling of agricultural machines and tools).

Method of controlling the rear hitch is as follows:

- with the knob **4 (Fig. E-42)** set the method of tool adjustment (position, force or mixed), depending on work type;
- with the knob **2** set the tool working depth, and with the knob **3** –height of raising to transport position;
- lowering of the tool is realised by moving the lever **1** to the lower position (the lamp **8** goes on).

Having lowered the tool and sank it into ground perform additional adjustment of optimum tool working conditions:

- knob **4** – method of adjustment;
- knob **5** – depth correction speed or working height;
- knob **2** – set the tool working depth.

**CAUTION: If the adjustment system warms up excessively turn the knob 4 towards the position adjustment and the knob 5 towards the position „tortoise".**

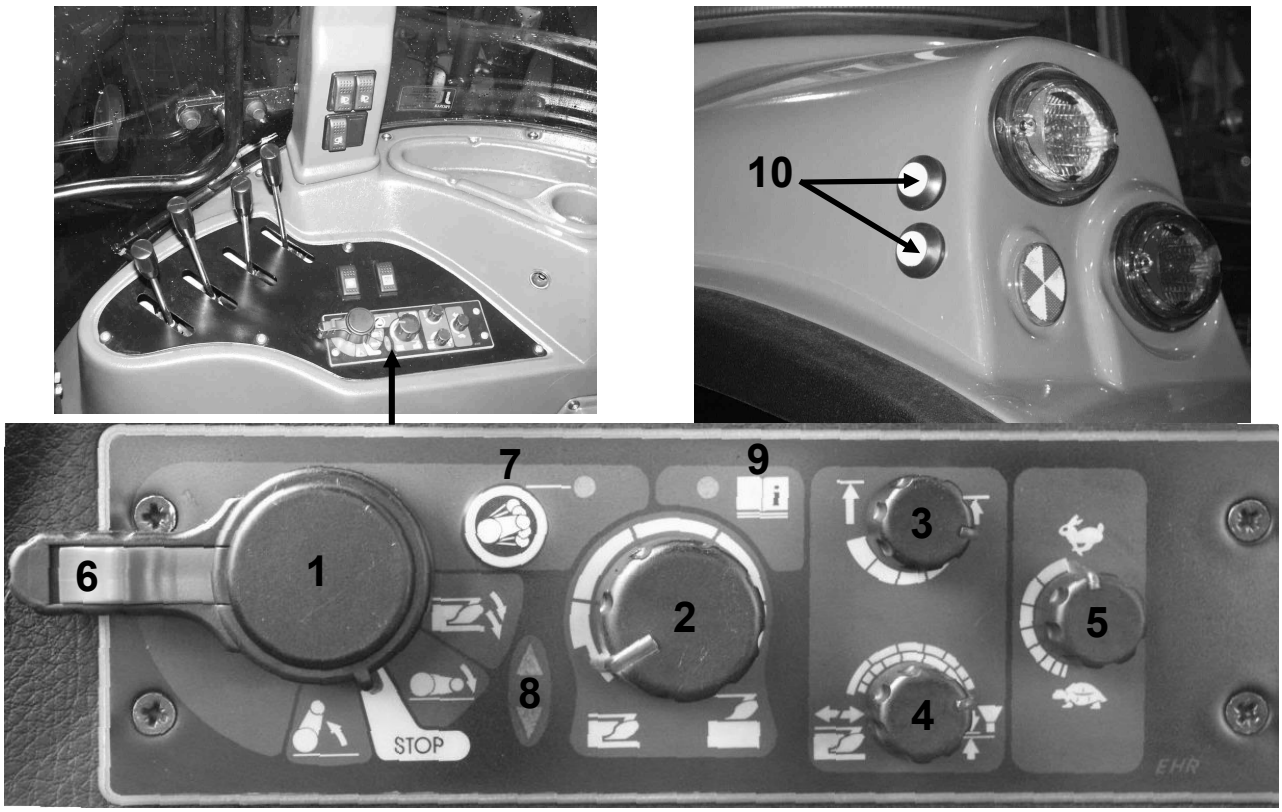



**Fig. E-42** Control panel of the EHR electro-hydraulic system.
**1** – hitch control lever (upwards - raising; downwards - lowering; pressing in lower position – sinking of the plough; central - off); **2** – adjustment knob for working depth of the tool hanged on the hitch (clockwise turn – depth decrease; anti-clockwise – depth increase); **3** – adjustment knob for hitch raising limit (clockwise turn – minimal limit; anti-clockwise – maximal limit); **4** – knob for adjustment method selection (clockwise turn to the extreme position – position adjustment, anti-clockwise to the extreme position – force adjustment; position between extreme positions – mixed adjustment); **5** – adjustment knob for lowering speed (upward - faster; downward – slower); **6 –** change-over switch for tool lock in transport position (locks the lever **1** in upper position); **7** – oscillation damping switch; **8** – indicator lamps for hoisting / lowering of the tool hanged on the hitch; **9** – diagnostics indicator lamp; **10** – external push buttons for hoist control

If the plough temporarily emerges during work on heavy soil, sink the plough by pressing the lever **1** to the very low position. When released, the lever **1** comes back to previously set position “lowering”, and the plough – to working depth set with the knob **4**.

**It is prohibited to operate the tractor if the hydraulic pump is defective, i.e. if the lamp 8 (Fig. E-42) does not go off after hoisting of the tool.**

Besides of above described functions, the EHR system has the oscillation damping function during transport drive. To activate the oscillation damping system:

- set the lever **1 (Fig. E-42)** to the position „hoisting” (in this moment the tool goes to the upper extreme position) and lock the tool in transport position with the push button **6**;
- turn on the push button **7** for oscillation damping (in this moment the tool lowers by 3% from the upper extreme position).

1. **The oscillation damping function works only when the lever 1 (Fig. E-42) is in the „hoisting” position and when the tool is locked in transport position with the push button 6.**
2. **During field works (ploughing, cultivation, etc.) the oscillation damping function should be off.**

## EXTERNAL HYDRAULIC SYSTEM

Tractors **PRONAR** are fitted with the external hydraulic system enabling work with hydraulic cylinders of single- and double-action and with hydraulic equipment of constant flow. The system has three pairs of external hydraulic outputs fitted with quick-release connectors.

Prior to beginning the work with machines (tools) fitted with hydraulic cylinders switch on the hydraulic pump situated under tractor's cab. (**fig. E-43**).

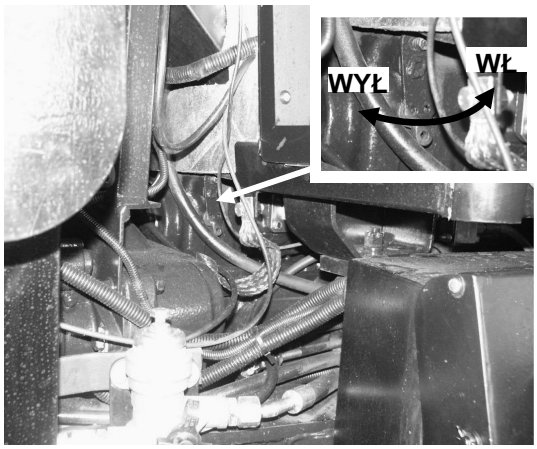
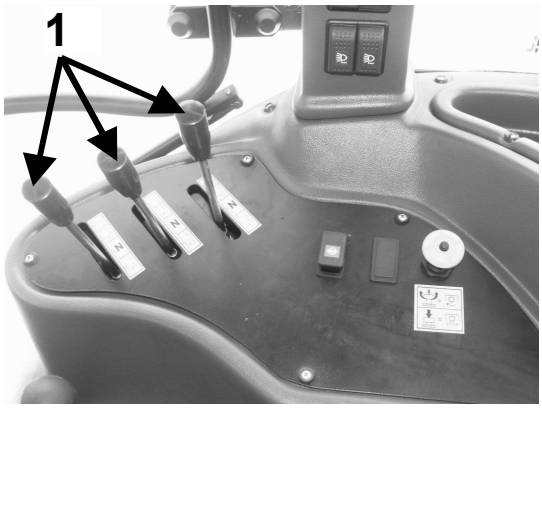


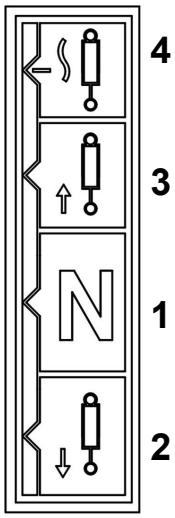

**Fig. E-43** Hydraulic pump lever.

The hydraulic pump lever is situated in the central part of the tractor under the cab (**fig. E-43**).
Prior to setting the lever reduce the engine rpm to minimum. Then turn the lever to required direction until the pump comes on or off.

**Pump lever positions:**

**WŁ** – pump on;
**WYŁ** – pump off.




**1** - neutral (stop);
**2** - lifting;
**3** - lowering;
**4** - floating.

**Fig. E-44** Levers **1** for control of external single- or double-action cylinders and the pictogram of external hydraulics control.

The scheme of positions of external hydraulics control levers depends on method of connection of hydraulic conduits of coupled machine (tool) with the pair of quick-release connectors.

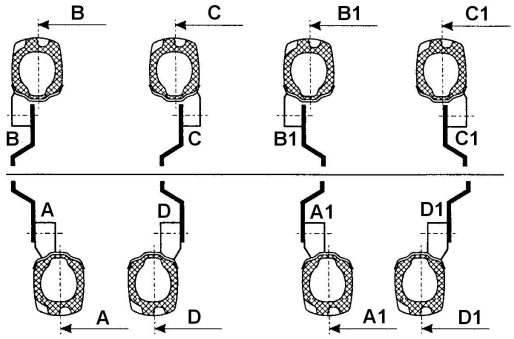
While connecting hydraulic conduits check if they are clean. When connecting dirty conduits, you can cause that impurities might penetrate to the hydraulic tank of your tractor, what (despite of filters installed in the system) may cause dysfunction of tractor's hydraulic system (pump, distributor etc.)

**Prior to starting the work check if motions of the machine powered by the external hydraulics match the lever motions. If not, change conduit fastening points in the pair of quick-release connectors.**

When the work is over secure disconnected ends of quick-release connectors, both in the tractor and in the machine, against pollution (put hole plugs).

## WHEEL TRACK CHANGE FOR FRONT AXLE

The front fheel track can be changed within the range of 1420 –1970 mm through rearrangement of wheels in relation to wheel bands. For wheels 11.2 R24 the minimum wheel track amounts to 1350 mm. Position of wheel disc in relation to the wheel band shows the **fig. E-45**.




| Wheel fastening method 360/70R24 | Wheel track [mm] |
|---|---|
| A | 1420 |
| B | 1530 |
| C | 1680 |
| D | 1790 |
| A1 | 1600 |
| B1 | 1710 |
| C1 | 1860 |
| D1 | 1970 |

**Fig. E-45** Scheme of wheel track in front axle.

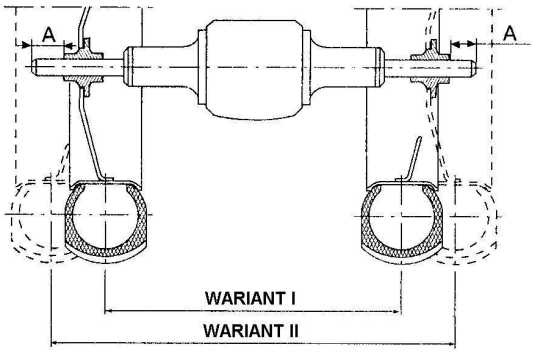
**CAUTION! Change of front wheels track through rotation of wheel discs in relation to wheel hubs ( i.e. poz. A1, B1, C1, D1) should be carried out only in special cases. As a standard use options A,B,C,D.**

To change the wheel track of front axle:

1. Stop the tractor with the parking brake and put wedge on both sides of rear wheels;
2. Lift the tractor with a jack so that one of front wheels is above the ground;
3. Remove front wheels and rearrange them for required wheel track according to the scheme above;
4. Pay attention to sense of the arrow on the tyre side wall – it should be consistent with the direction of tractor's drive forward. Tyre threads are then properly set and the tyre (of wheel and tractor) guarantee maximum towing force in given conditions.
5. Install the wheels and tighten screws fastening wheels to hubs with the torque of 210-260 Nm, an the screws fastening discs to wheel bands with the torque of 180-240 Nm.

**CAUTION ! If the wheel track was changed, it is necessary to adjust the wheel toe-in, which should amount for front axle wheels 0 ÷ 8 mm.**

## WHEEL TRACK CHANGE FOR REAR AXLE




In **PRONAR** tractors the rear wheel track can be adjusted smoothly within two ranges, if the wheels are fitted with welded rims.

Depending on tyre size the ranges of smooth adjustment amount to (acc. to the **fig. E-46**):

Wor wheels with tyres 15.5 R38: **I** - 1400 ÷ 1600 mm,
**II** - 1800 ÷ 2100 mm;

**Fig. E-46**.
**VARIANT I** – without turning and rearrangement of wheels (factory setting);
**VARIANT II** – with rearrangement of wheels (left to right, right to left).

| Wheel track [mm] | 1400 | 1500 | 1600 | 1800 | 1900 | 2000 | 2100 |
|---|---|---|---|---|---|---|---|
| Dimension „A" from the front of drive axle shaft to the front of wheel hub [mm] | VARIANT I | | | VARIANT II | | | |
| | 100 | 50 | 0 | 164 | 114 | 64 | 14 |

While changing the wheel track, when it is necessary to rearrange them, remove the wheel from the tractor, turn by 180 ° and install on opposite side of the tractor. The sense of the arrow on the tyre side wall – it should be consistent with the direction of tractor's drive forward. Tyre threads are then properly set and the tyre (of wheel and tractor) guarantee maximum towing force in given conditions.

To change the wheel track:

- loosen wheel fastening nuts;
- secure the tractor against accidental move through placing of wedges under wheels;
- lift the rear opart of the tractor with a jack so that one or two wheels (if it is necessary to change wheel track by rotation of wheels) is (are) above the ground;
- unscrew the nuts **1 (fig. E-47**) and remove the wheel;
- unscrew screws **2** by three to six turns to loosen hub clamp on the wheel axle shaft and clean the axle shaft;
- shift the hub until required wheel track is obtained;
- tighten screws **2** of the hub clamp with the torque 250 ÷ 300 Nm;
- install the wheel and tighten the nuts **1**;
- lower the tractor on the jack and tighten the nuts **1**;
- carry on the same actions for the another wheel.

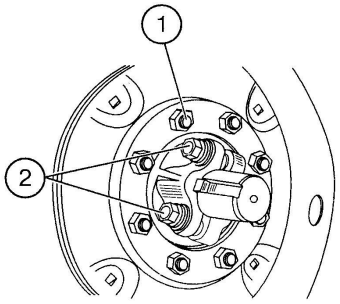



**Fig. E-47** Fastening of rear wheel
**1** – nuts fastening the wheel to the hub; **2** – hub clamp screws.

**Due to safety purposes, removal of tractor's rear wheel should be carried on by two workers, provided the operator has no effort-reducing appliances (hoist, overhead crane, fork lift etc.).**

## PRINCIPLES OF WHEEL SIZE SELECTION

Tractors **PRONAR** fitted with two-axle drive should have properly matched tyres (wheels) for front and rear axles.

The table shows dimensions of front and rear wheels, which can be installed in tractors **PRONAR-82A II / 82SA II / 82TSA II / 1025A II.** Rows (horizontal) contain dimensions of front wheel tyres, and columns (vertical) - dimensions of raer wheel tyres. Recommended Admissible tyre combinations for tractors are marked with „**X**" in relevant row and column.

| **Rear wheels** | **Front wheels** | | | |
|---|---|---|---|---|
| | 360/70 R24 Stomil $r_k$=538 mm | 360/70 R24 Taurus $r_k$=546 mm | 380/70 R24 Stomil $r_k$=569 mm | 380/70 R24 Taurus $r_k$=553 mm |
| 480/70 R34 Stomil $R_k$=746 mm | **X** | **X** | - | - |
| 480/70 R34 Taurus $R_k$=749 mm | **X** | **X** | - | - |
| 18.4 R34 Stomil $R_k$=771 mm | - | **X** | - | **X** |
| 18.4 R34 Taurus $R_k$=782 mm | - | - | - | - |
| 18.4 R34 Voltyre $R_k$=770 mm | - | **X** | - | **X** |
| 16.9 R38 Stomil $R_k$=784 mm | - | - | **X** | **X** |
| 16.9 R38 Taurus $R_k$=801 mm | - | - | **X** | - |
| 16.9 R38 Voltyre $R_k$=800 mm | - | - | **X** | - |
| 18.4 R34 Taurus $R_k$=781 mm | - | - | **X** | **X** |
| 480/70 R38 Stomil $R_k$=796 mm | - | - | **X** | - |
| 480/70 R38 Taurus $R_k$=796 mm | - | - | **X** | - |
| *520/70 R34 Stomil $R_k$=775 mm | - | - | - | **X** |
| *520/70 R34 Taurus $R_k$=781 mm | - | - | **X** | **X** |

* - only Pronar 1025A II

If in the course of operation it is necessary (for various reasons) change of wheel track for one axle, check if the wheels of the other axle should not be changed.

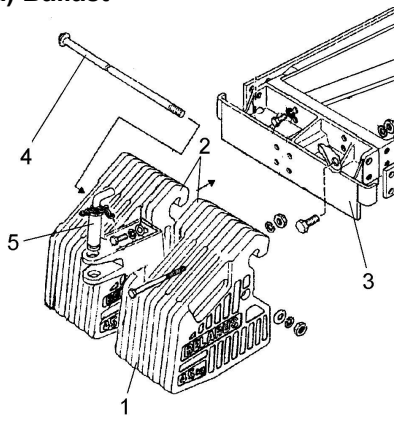
**CAUTION! Use of front and rear wheel combinations other than given in the table above leads to premature wear of tyres and damage of the drive system.**

## IMPROVEMENT OF TRACTION FEATURES OF PRONAR TRACTORS

Tractors **PRONAR** are fitted with a number of appliances, which enable improvement of traction features, i.e. increase of towing power, decrease of skid, thus increase of speed what is equal to reduction of fuel consumption for the unit of working area.
These appliances (and methods) are:

- 4-wheel drive;
- hydraulic hoist with a three-point hitch – the fact, that tools are hanged on the tractor results in increase of rear axle load and reduction of skid;
- use of automatic adjustment (especially force adjustment for machines, which working parts are sunk in the ground) also influences the increase of rear axle load;
- hydraulically-controlled lower transport bracket, which enables transfer of great loads from draft bars of single-axle trailers also influences the increase of rear axle load;
- rear axle ballast of 80 kg weight;
- front axle ballast – influence mainly improvement of stability, when the hanged machine is relatively heavy;
- option of filling front and rear wheels with fluid (water);
- rear axle lock (controlled by operator), and also automatic front axle lock;
- automatic activation of front axle drive.

**a) Ballast**

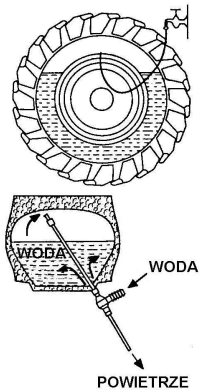



To add load to the front axle, tractors **PRONAR** coupled with a suspended machine can be fitted with ballast consisting of 6 weights 45 kg each + 2 weights 40kg each (**Fig.E-48**).
Front weights should be used for improvement of tractor's stability, when at the rear hitch there is a heavy machine (tool) (or a machine with the gravity centre shifted far rearwards). During light works, which do not require maximum towing force, front weights should be removed.

**Fig.E-48** Front ballast. 1- weights 45kg (6 pcs); 2- weights 40kg (2 pcs); 3-frame; 4-pin; 5-hitch bolt.

**b) Filling wheels with water or anti-freeze fluid.**
To increase tractor's towing force wheels can be filled with water or anti-freeze fluid **(fig. E-49)**.

**We do not recommend filling front wheels with water or anti-freeze fluid if this may decrease tractor's manoeuvrability.**




While filling wheel with water, raise the wheel and let the air out from the inner tube, by removing the inflation valve insert and then set the deflation valve in upper position. If you have a special valve for filling the wheel with water, screw it onto the deflation valve. If not, put a rubber hose supplying water under pressure (e.g. from a tap) onto the valve. Water fills the tube until pressures of water and air become equal, then remove the hose and release compressed air from the tube. Repeat this action a few times, until water starts to flow from the deflation valve, set in extreme upper position. Then screw in the valve insert and replenish air up to required pressure.
Quantity of solution (water) in the tube should amount to 75% its volume.

**Fig.E-49** Method of filling wheels with water.

**Before the winter season (= temperatures below 0°C) remove water from wheels.**

If great towing force of the tractor is required also in winter, wheels should be filled with the calcium chloride solution with concentration depending on ambient temperature and quantity depending on wheel size::

| Quantity of calcium chloride (g) for 1 litre of water | Ambient temperature |
|---|---|
| 200 | to -15°C |
| 300 | to -25°C |
| 435 | to -35°C |

| Rear wheels | Water volume 75% [l] |
|---|---|
| 18.4 R34 | 380 |
| 15.5 R38 | 235 |
| 16.9 R38 | 356 |
| **Front wheels** | |
| 360/70 R24 | 119 |

**All works connected with preparation of solution perform dressed in rubber gloves and with special precautions. For safety reasons while preparing the solution pour the calcium chloride to water and not inversely.**

To pour out (remove) the fluid from tubes:

- raise the wheel and turn the tyre so that the deflation valve is in upper position and screw out the deflation valve, **CAUTION:** THE FLUID WILL GUSH!.
- during removal of the fluid turn the wheel a few times so that the valve is once in upper position and once – in lower position,
- when the tube is empty empty screw in the deflation valve and pump up to the required pressure, and then screw a protection cap onto the deflation valve

## ELECTRICAL SYSTEM

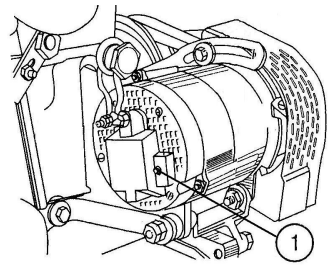
**Tractor's mass is connected to the negative pole (-). Prior to connection of any receiver to the electrical system check its polarity and connect properly.**

### Alternator

To ensure failure-free operation of alternator, during maintenance of tractor's electric system apply following principles:

- do not carry on any work while the engine is on and the battery is not disconnected.
- do not check connection between elements of the electric system with shorting;
- disconnect the battery from the "mass" while installing or dismounting the alternator.
- always check polarity while connecting the battery to the electrical system; the same concerns start-up batteries (portable) applied by some users for start-up at low temperatures.

**Do not carry out repairs of the tractor or connected machine with use of an electrical welder without prior disconnection of alternator's electrical system (both conductors).**

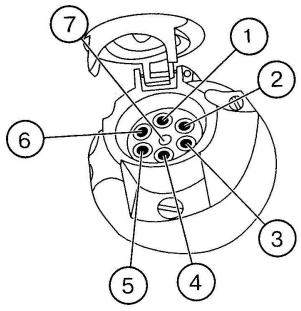



Alternator voltage should be adjusted with the screw **1** (**fig. E-50**) depending on season. Set the screw to I in summer (by unscrewing it as far as it will go) and to 3 in winter (by screwing it in as far as it will go).

**Fig. E-50** Alternator.
**1** – season adjustment screw „summer – winter"

### Electrical connector for trailers and additional power supply socket +12V

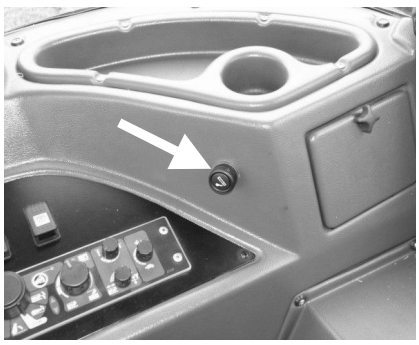
Tractors **PRONAR** are fitted with standardised (acc. to Polish Standards) electrical connector for trailers situated at the rear cab wall (outside).




To sockets shown on the **Fig. E-51** connected are (designations acc. to the Polish Standard are given in brackets):
**1** - (**L**) – direction indicators - left;
**2** - (**+**) – horn;
**3** - (**31**) – „mass";
**4** - (**R**) - direction indicators - right;
**5** - (**58R**) – position lights – right;
**6** - (**54**) – braking lights („stop");
**7** - (**58L**) – position lights - left;

**Fig. E-51** Electrical connector for trailers.

### Lighter socket



The lighter socket with 12 V voltage is situated in tractor's cab on the right mudguard (see **Fig. E-52**). If the lighter is removed, the socket is used for connection of portable lamp or other electrical devices supplied with 12 V voltage.

**Fig. E-52** Portable lamp (lighter) socket

**Fuses**

The sets of fuses are situated on the column under the steering wheel (**Fig. E-29)** and on the right wheelarch (**Fig. E-54)**. To obtain access to fuses screw out the screws **A (fig.E-53)** and remove the cover **B**.

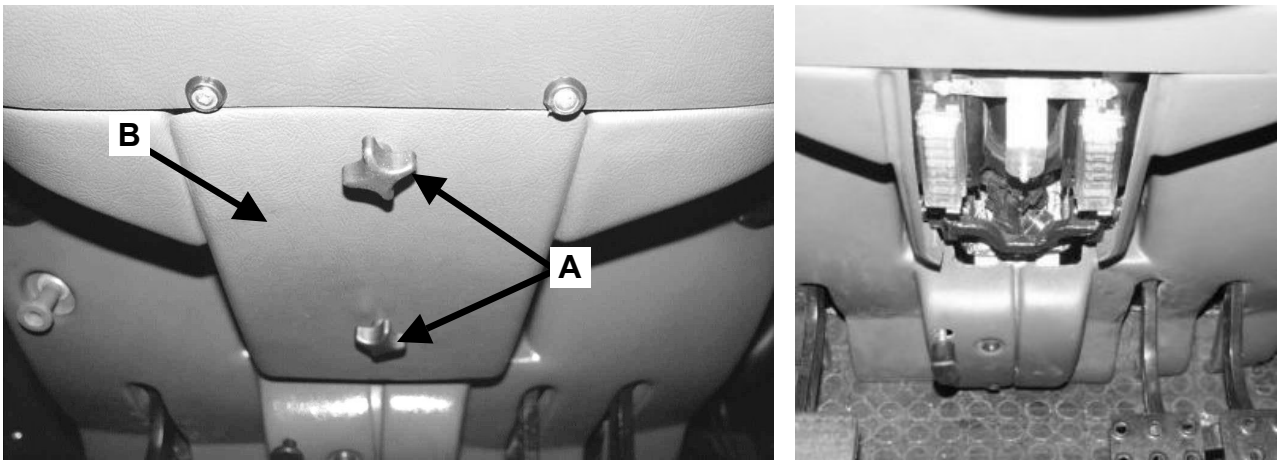



**Fig. E-53** Location of fuse sets **FB1** and **FB2** at the steering column. **A**- screws; **B**- cover


**Fig. E-54** Location of fuse set **FB3** on the right wheelarch. **A**- screw; **B**- cover

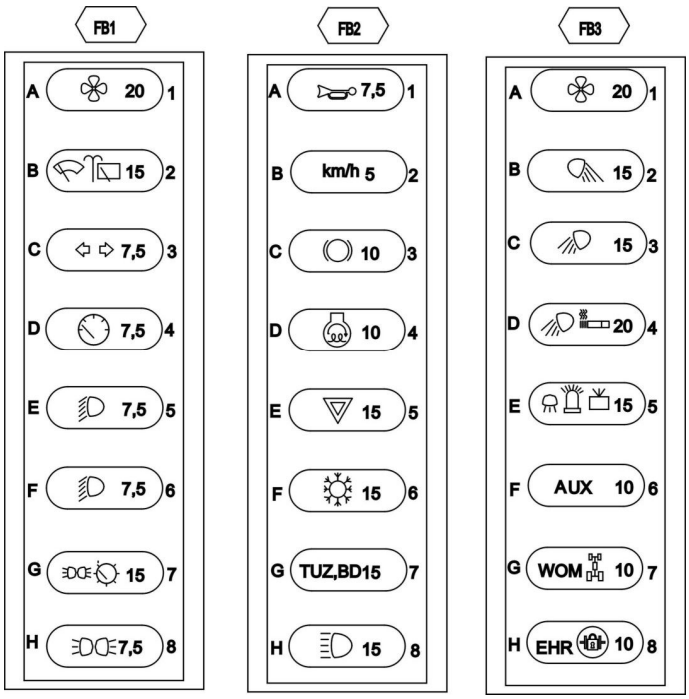



**Fig. E-55**. Description of fuses situated in the box at the steering column on the wheelarch on the right side of the seat

| Fuse group | Fuse No. on the Fig. E-55 | Protected circuit | Current [A] |
|---|---|---|---|
| FB1 | A1 | Heater fan | 20 |
| | B2 | Rear window wiper, washer and front window wiper | 15 |
| | C3 | Direction indicators (left and right) | 7,5 |
| | D4 | Power supply for indicator lamps, sensors and indicators | 7,5 |
| | E5 | Passing light, right lamp | 7,5 |
| | F6 | Passing light, left lamp | 7,5 |
| | G7 | Right hand position lights. Lighting of indicators (at the control panel) | 15 |
| | H8 | Left hand position lights | 7,5 |
| FB2 | A1 | Horn | 7,5 |
| | B2 | Tractor speed sensor | 5 |
| | C3 | Stop lights | 10 |
| | D4 | Emergency lights | 10 |
| | E5 | Memory of radio, clock | 15 |
| | F6 | Air condition | 15 |
| | G7 | Rear hitch control, differential gear lock | 15 |
| | H8 | Road lights (both lamps) | 15 |
| FB3 | A1 | Cab ventilation | 20 |
| | B2 | Rear work lights | 15 |
| | C3 | Front work lights | 15 |
| | D4 | Lighter socket, front work lights | 20 |
| | E5 | Cab lighting, warning flashlight, radio | 15 |
| | F6 | Additional electrical socket (unused) | 10 |
| | G7 | PTS-shaft activation, front axle drive activation (1025A II) | 10 |
| | H8 | EHR system control (hydraulics made by Bosch), differential gear lock | 10 |

## BONNET AND SIDE COWLING

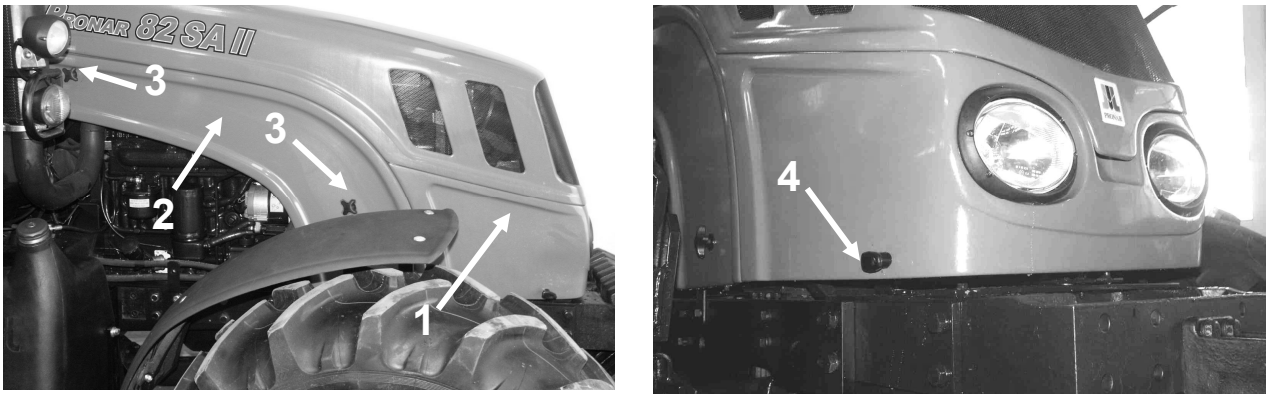



**Fig. E-56** Bonnet and side cowling.

To open the bonnet **1** (**Fig. E-56**):
- open the bonnet lock by pulling the actuator **4**;
- raise the bonnet **1** so that the gas springs oir a support hold it in this position;
- if necessary, remove side cowlings **2** by unscrewing the screws **3** fastening side cowls on the left and on the right (if present);

To close the bonnet, just lower it energetically. The bonnet lock should slam.

**At high ambient temperatures remove the side cowlings.**

## RUNNING-IN

**First 30 mth of operation has significant influence on tractor's durability, and especially the engine.**

In the initial period of operation the brand new tractor should be run-in for at least 30 mth.
During first 15 mth the tractor should perform only light transport works, and during next 15 mth – light field works with use of the hoist.
In the course of running-in:

- do not overheat the engine;
- do not cause engine smoking and drop of rotation speed due to excessive load.
- watch carefully indication of gauges and indicators;
- in the case of any improper engine's or tractor's work stop tractor's operation and call the service.

## MAINTENANCE AFTER RUNING-IN P-1 (30 MTH)

After running-in perform the maintenance P-1 after 30 mth (in an authorised service station) within the scope recommended in the warranty book (inspection **P-1** after running-in). User bears the cost of inspection.

During the **P-1** inspection perform following actions:

- wash the tractor and carry out visual;
- tighten the engine head (**Operation No. 41**);
- adjust engine valves (**Operation No. 27**);
- clean centrifugal gearbox oil filter (PRONAR-1025A II) (**Operation No. 23**);
- clean coarse gearbox oil filter (PRONAR-1025A II) (**Operation No. 24**);
- check tension of V-belts for vantilator and alternator drive (**Operation No. 10**);
- remove deposit from filters for coarse and fine fuel cleaning and from the fuel tank (**Operation No. 9**);
- adjust clutch pedal and brake pedal lost motion (**Operation No. 25, 31**);
- check battery condition, clean terminals, clean plug openings (**Operation No. 29**);
- replace oil in:
  - engine (**Operation No. 21**);
  - hydraulic tank, steering system tank, gearbox, rear axle (**Operations No. 42, 43, 44**);
  - in spur gears, front axle main gear and in support of front axle drive shaft (**Operation No. 45**);
- replace inserts of engine oil filter, and hydraulic & steering system filters (**Operations No. 22, 30, 31**);
- lubricate the clutch bearing (**Operation No. 16**);
- remove condensate from the pneumatic system tank (**Operation No. 3**);
- check tightness of connections of engine air filter and condition of filter inserts (**Operation No. 13**);
- check and tighten screwed connections of all tractor's assemblies (**Operation No. 53**);
- check operation of engine, steering system, brake system, and remaining systems and components of the tractor (**Operation No. 8**);
- lubricate pivot bearings of front axle steering knuckles (**Operation No. 15**);
- check (adjust) toe-in of front wheels (**Operation No. 15**);
- remove all fuel and oil leakage;

Method of execution of all above-mentioned actions is described in the section **„F. MAINTENANCE"**.

## TABLE OF OPERATIONS DURING TECHNICAL INSPECTION

| Operation No. | Maintenance actions | Technical inspection after every (mth): | | | | |
|---|---|---|---|---|---|---|
| | | 10* | 125 | 250 | 500 | 1000 |
| | | PC | P-2 | P-3 | P-4 | P-5 |
| **Technical inspection after every 10 mth (or daily)** | | | | | | |
| 1 | Check engine oil level | x | x | x | x | x |
| 2 | Check fluid level in the engine cooling system | x | x | x | x | x |
| 3 | Remove condensate from the pneumatic system tank | | | | | |
| 4 | Check hydraulic system oil level | x | x | x | x | x |
| 5 | Check steering system oil level | x | x | x | x | x |
| 6 | Check gerabox and rear axle oil level | x | x | x | x | x |
| 7 | Check fluid level in the hydraulic system for control of brakes and clutch | x | x | x | x | x |
| 8 | Check engine, steering system, brake system, and other systems and components | x | x | x | x | x |
| **Technical inspection after every 125 mth** | | | | | | |
| 9 | Remove deposit (impurities) from filters for coarse and fine fuel cleaning and from the fuel tank | | x | x | x | x |
| 10 | Check tension of V-belts for vantilator and alternator drive | | x | x | x | x |
| 11 | Check tightening of rear wheel hubs | | x | x | x | x |
| 12 | Check technical conition of tyres and tyre pressure | | x | x | x | x |
| 13 | Maintain engine air filter | | x | x | x | x |
| 14 | Maintain cab air filter | | x | x | x | x |
| 15 | Lubricate pivot bearings of front axle steering knuckles | | x | x | x | x |
| 16 | Lubricate clutch bearing | | x | x | x | x |
| 17 | Check oil level in the intermediate bearing of front axle driving shaft (except of 1025A II) | | x | x | x | x |
| 18 | Lubricate joints of steering system cylinder | | x | x | x | x |
| 19 | Check and adjust toe-in of front wheels | | x | x | x | x |
| 20 | Check and adjust play in joints of steering rods (next every 250 mth) | | x | x | x | x |
| **Technical inspection after every 250 mth** | | | | | | |
| 21 | Replace engine oil | | | x | x | x |
| 22 | Replace engine oil filter | | | x | x | x |
| 23 | Clean rotor of gearbox centrifugal oil filter (Pronar-1025A II) | | | x | x | x |
| 24 | Clean gearbox coarse oil filter (Pronar-1025A) | | | x | x | x |
| 25 | Check and adjust clutch pedal lost motion | | | x | x | x |
| 26 | Check fastening of turbocompressor (Pronar 82TSA II / 1025A II) | | | x | x | x |
| **Technical inspection after every 500 mth** | | | | | | |
| 27 | Check and adjust engine valve play | | | | x | x |
| 28 | Adjust lost motion of steering wheel | | | | x | x |
| 29 | Check batteries | | | | x | x |
| 30 | Replace hydraulic system oil filter (next every 1000 mth) | | | | x | x |
| 31 | Replace stering system oil filter (next every 1000 mth) | | | | x | x |
| 32 | Check and adjust brake system (main and parking) | | | | x | x |
| 33 | Check tightness of pneumatic system | | | | x | x |
| 34 | Check and adjust PTS control gear | | | | x | x |
| 35 | Check and adjust mixed adjustment control (Pronar-1025A) | | | | x | x |
| 36 | Check and adjust play in steering knuckle bearings of the front axle spur gear | | | | x | x |
| 37 | Clean alternator | | | | x | x |
| 38 | Check oil level in housing and spur gears of front axle | | | | x | x |
| 39 | Clean coarse fuel filter | | | | x | x |

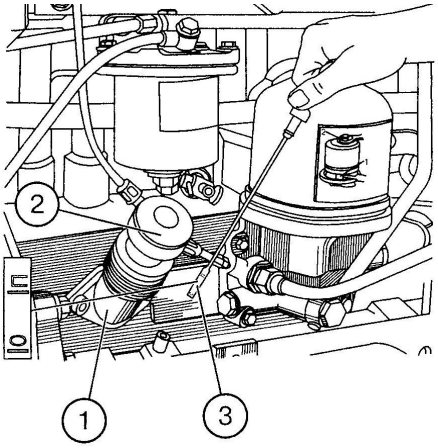
| Opera-tion No. | Maintenance actions | Technical inspection after every (mth): | | | | |
|---|---|---|---|---|---|---|
| | | 10* | 125 | 250 | 500 | 1000 |
| | | PC | P-2 | P-3 | P-4 | P-5 |
| 40 | Replace insert of coarse fuel filter | | | | x | x |
| **Technical inspection after every 1000 mth** | | | | | | |
| 41 | Check and tighten screws fastening engine head | | | | | x |
| 42 | Replace hydraulic system oil & filter | | | | | x |
| 43 | Replace steering system oil & filter | | | | | x |
| 44 | Replace gearbox and rear axle oil | | | | | x |
| 45 | Replace oil in housing and spur gears of front axle and in intermediate bearing of front axle drive shaft | | | | | x |
| 46 | Lubricate right hanger of 3-point rear hitch | | | | | x |
| 47 | Lubricate rotation axle of 3-point rear hitch | | | | | x |
| 48 | Check and adjust bearing of front wheel hubs | | | | | x |
| 49 | Clean engine vent | | | | | x |
| 50 | Check drive shaft and intermediate bearing | | | | | x |
| 51 | Check and adjust fuel system injectors | | | | | x |
| 52 | Check and adjust injection pump | | | | | x |
| 53 | Check screwed connections (external) | | | | | x |
| 54 | Clean turbocompressor (Pronar 82TSA II / 1025A II) | | | | | x |
| 55 | Check operation of starter | | | | | x |
| 56 | Check operation of alternator | | | | | x |
| **Other maintenance actions** | | | | | | |
| 57 | Adjust safety valve of centrifugal gearbox oil filter | | | | | |

**CAUTION ! CAUTION! Prior to inspection wash the tractor.**

The tractor can be washed with water with addition of car washing agents available on the market. Prior to washing protect the battery, starter, alternator, exhaust pipe and air filter. During washing remove all impurities from tractor's surface. Take care that the water stream has no contact with electrical components (wires, switches, indicators etc.).

## TECHNICAL INSPECTION (PC) AFTER 10 MTH OR DAILY

**OPERATION Nr 1. Engine oil level.**

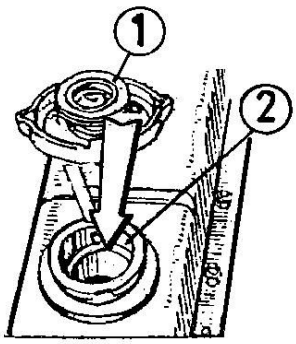



Check oil level before work or after 15 minutes after the hot engine stops. The level should stand between marks on the indicator rod **3**. If the oil level lies below the lower mark, replenish the oil. Remove the oil filling plug **2** from the filling hole **1**, pour oil, and then check, if the oil level lies between marks.

**CAUTION! Operation of the tractor when the oil level is below the lower mark is prohibited.**

**OPERATION Nr 2. Coolant level in the engine cooling system.**

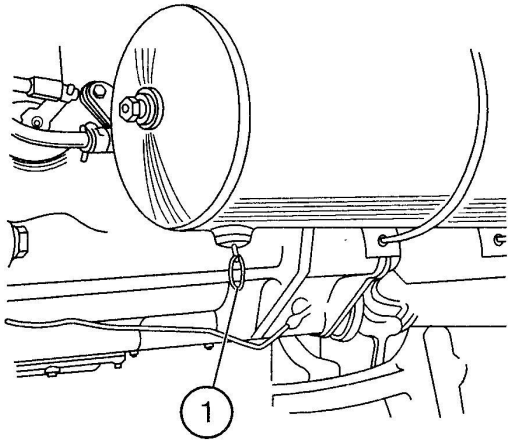
**The cooler filling plug should be unscrewed only, when the engine is cold. Negligence in making this may cause scalds!**




Raise the bonnet and check the coolant level; the level should be at 50÷60 mm from the upper cooler filling hole surface **2**. If necessary, replenish the coolant up to required level, and with the same coolant.

**CAUTION! It is recommended to replace the coolant every 2 years at least.**

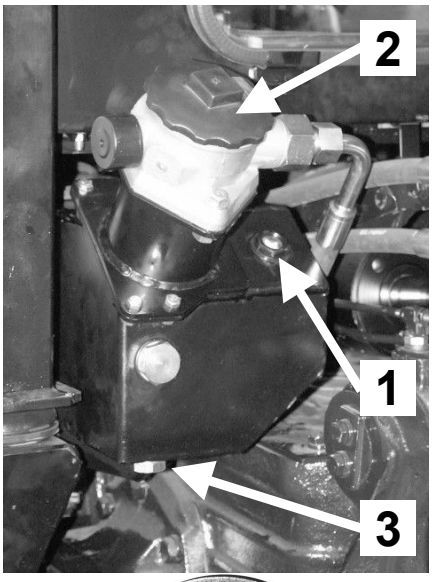
**OPERATION Nr 3. Condensate in the pneumatic system tank.**




To remove the condensate from the pneumatic system, press the ring **1** and open the drain valve. Hold the valve open until entire water (and possible impurities) flows out.

**OPERATION Nr 4. Oil level in the hydraulic system tank.**

**CAUTION ! Prior to checking the oil level in the hydraulic system place the tractor on the horizontal surface, stop the engine and activate the parking brake.**




The hydraulic oil level in tractors **PRONAR** is checked visually in the sight glass **1**, situated at the hydraulic system tank.

The oil level should reach central or upper part of the indicator situated at the tank housing.

If the oil level is below the central part of the sight glass, replenish it. For this purpose unscrew the plug **2** from the filling hole and add oil up to required level.

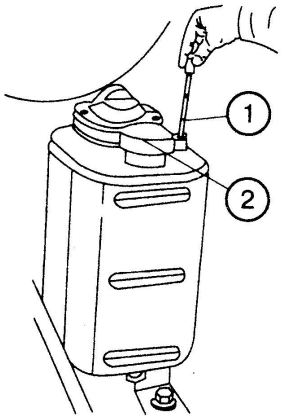
**CAUTION ! While working with machines fitted with hydraulic systems of great capacity, the oil level in the hydraulic system tank should reach the upper edge of the sight glass.**

**CAUTION ! Do not start the tractor if the oil level is below the lower edge of the sight glass.**

**OPERATION Nr 5. Oil level in the steering system tank.**

**CAUTION ! Prior to checking the oil level in the steering system place the tractor on the horizontal surface, stop the engine and activate the parking brake.**

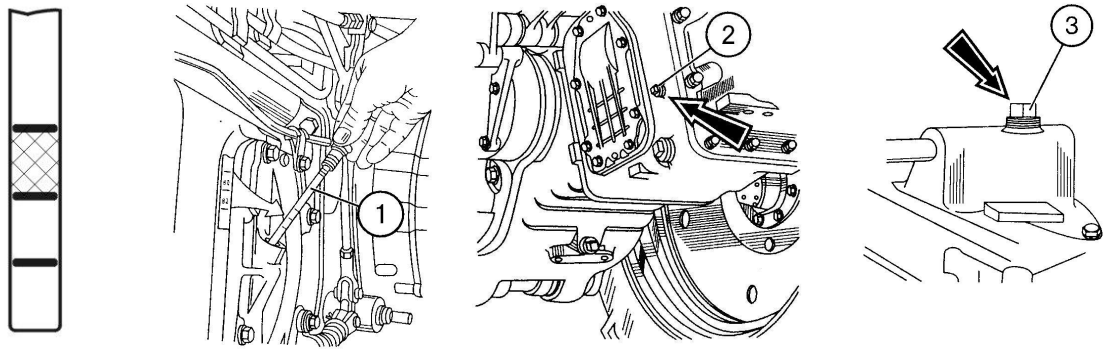
The steering system oil tank is situated under the engine air filter.




The hydraulic oil level in tractors **PRONAR** is checked visually on the rod indicator **1**, situated in the hydraulic system tank. The oil level should lie between lower and upper mark on the indicator, otherwise unscrew the plug **2** from the filling hole and add oil up to required level.

**OPERATION Nr 6.** **Oil level in the gearbox and the rear axle.**

**PRONAR-82A II, 82SA II, 82TSA II:**

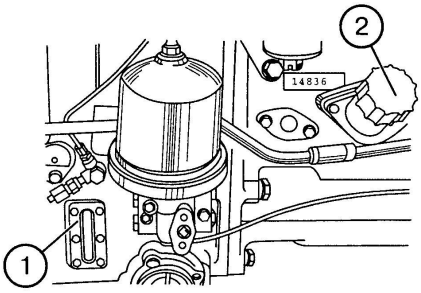



The oil level is checked visually on the rod indicator **1**, which has three marks. The oil level should lie between central and upper mark on the indicator, otherwise add oil up to required level.

If the tractor is fitted with a reduction gear for crawling gears, check the oil level through the inspection plug **2** on the right gearbox side. The oil level should reach the lower edge of the inspection opening **2**.

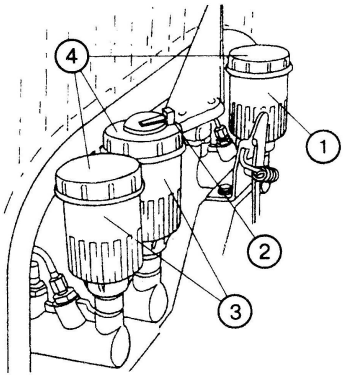
To replenish oil unscrew the plug **3** in the gearbox cover under the cab floor and add proper quantity of oil.

**PRONAR-1025A II:**




The oil level is checked visually on the indicator glass **1**, situated at the gearbox housing. The oil level should lie between marks „**O**”, and „**П**” on the indicator. If the oil level is below the mark „**O**”, replenish it so that the level reaches the mark „**П**”. For this purpose unscrew the plug **2** the filling hole and add oil up to required level.

**OPERATION Nr 7.** **Fluid level in the hydraulic system for controlling of brakes & clutch.**




Check visually the fluid level in the tank **1** of the clutch control system and in tanks **3** of the brake control system. The oil level should be between marks „min” and „max” on tanks (i.e. 15 ± 5 mm below the upper edge of the tank after removal of covers **4**).

If necessary, remove covers **4** and replenish the fluid up to required level.

**Use only the brake fluid DOT-3 or DOT-4.**

The tank is fitted with a fluid level sensor **2** installed in one of the tank covers.

**CAUTION! It is recommended to replace the brake fluid every 2 years at least.**

**OPERATION Nr 8.** **Engine, steering szstem, brake system and other assemblies and components.**

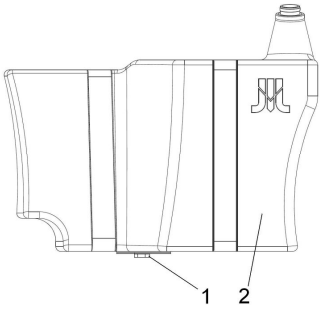
The engine should work stable within the entire rotation speed range. When the engine stops after longer operation, a murmur can be heard from the oil filter body; it is caused by rotation of the rotor.

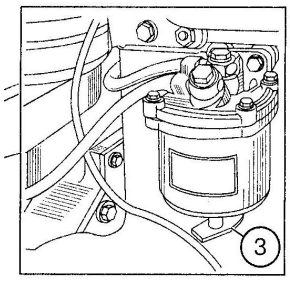
Steering system elements, steering system, brakes, lighting & signalling system, wipers etc. should be reliable and in good technical condition.

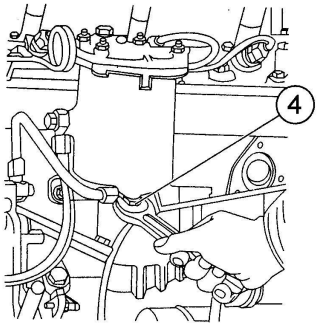
## TECHNICAL INSPECTION (P-2) AFTER 125 MTH

**Perform all actions of the technical inspection PC and:**

**OPERATION Nr 9. Deposit in the decanters of coarse and fine fuel filters and in the fuel tank.**




To remove deposits (impurities) unscrew:

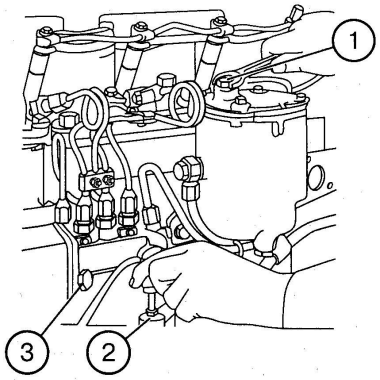
- the drain plug **1** of the fuel tank **2**
- the drain plug **3** of the coarse fuel filter;
- the drain plug **4** of the fine fuel filter
-

and drain the deposit to a previously prepared tub, until pure fuel starts to flow. Now screw in the plugs **1, 3 and 4** and check their tightness.

Deaerate the fuel system, if necessary.

**Deaeration of the fuel system.**

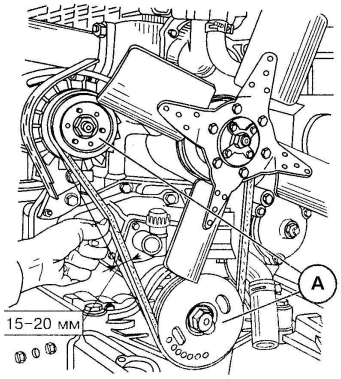
To deaerate the fuel system:

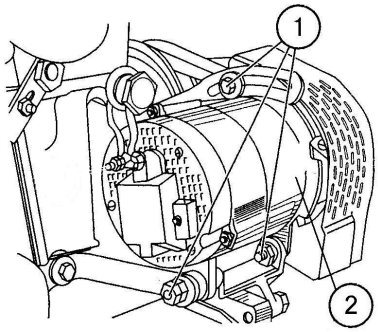



- unscrew the plug **1** on the fine fuel filter cover by one or two turns
- unscrew the handle of the manual fuel pump **2**
- check, if fuel tank cocks are open and if there is fuel in the tank
- with the lever of the manual fuel pump **2** pump over the fuel until fuel without air bubbles starts to flow from under plugs **1** and **3**. Then screw in the plug **3** of the fuel pump and, still pumping, screw in the plug **1** on the fuel filter.
- unscrew the handle of the manual fuel pump **2**
-

**CAUTION:** If engine start-up is still difficult, deaerate fuel conduits supplying fuel to injectors. For this purpose loosen nuts of fuel conduits at injectors and then start the engine with starter for 10-15s, and pump over fuel from conduits. When the engine stops tighten nuts fastening fuel conduits.

**OPERATION Nr 10. Tension of the V-belt driving the fan and the alternator.**

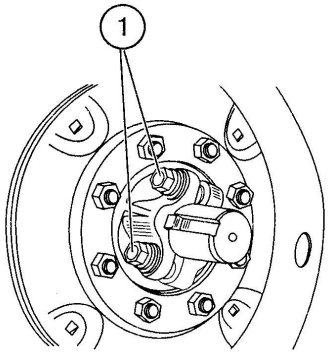



Tension of the V-belt measured through its deflection in the place shown on the figure (between the alternator pulley and the pulley of engine's crankshaft **A**). When loaded with the force of **30÷50 N** (3÷5 kG), the V-belt should deflect by **15÷20 mm**.

The V-belt tension is adjusted through displacement of the alternator **2**, previously unscrewing the screws **1**. When the pulley is set, screw in the screws **1.**

**OPERATION Nr 11. Tightening of screws of rear wheel hubs.**




Check tightening of screws **1** of hubs of both rear wheels. The screws should be tightened with the torque of 300 Nm (30 kGm).
Check and tighten screws, if necessary:
- fastening of front & rear wheels to hubs wuth the torque of 200÷250 Nm

**OPERATION Nr 12. Technical condition of tyres and tyre pressure.**

Check tyre thread condition and tyre pressure. Check if the thread and the side walls of tyres are not damaged. Match the tyre pressure with already performed work and wheel load.

**Admissible load capacity of tyres at 30 kph and corresponding tyre pressure values:**

| Rear wheels | Tyre load capacity at pressure in MPa and speed 30 kph | | | | |
|---|---|---|---|---|---|
| | **0,10** | **0,12** | **0,14** | **0,16** | **0,20** |
| 18.4 R34 Stomil | 2365 | 2575 | 2785 | 2995 | 4200* |
| 18.4 R34 Taurus | 2275 | 2530 | 2770 | 2995 | 4200* |
| 16.9 R38 Stomil | 2175 | 2370 | 2560 | 2755 | 3860* |
| 16.9 R38 Taurus | 2095 | 2330 | 2550 | 2755 | 3865* |
| **Front wheels** | | | | | |
| 360/70 R24 Stomil | 1270 | 1380 | 1495 | 1605 | 2250* |
| 360/70 R24 Taurus | 1220 | 1350 | 1485 | 1605 | 2250* |

*- for speeds below 10 kph
**- for PRONAR-1025A II

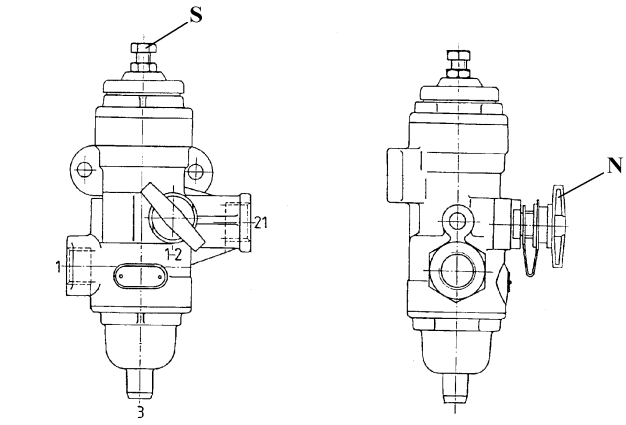
While working with a front loader the pressure in front wheels should be set to the maximal value.

Admissible tyre load change in relation to tractor speed.

| Max. admissible speed [kph] | Admissible tyre load change of driven wheels [%] |
|---|---|
| 10 | + 40 |
| 20 | + 20 |
| 25 | + 7 |
| 30 | 0 |
| 35 | - 10 |

**1. Do not exceed recommended pressure, because this may cause tyre damage (blow up) dangerous for the operator, tractor and environment.**
**2. Do not repair tyres while on the rim, and do not repair rims (especially with a welder) while the tyre (tube) is on the rim.**

To pump the tyres perform following actions:
- release air from the system by pressing the blow-off valve of the air tank;
- remove the protective nut **N** from the pressure controller stub;
- connect the pumping hose with the stub and with the deflation valve of the tyre;
- start the compressor (if is off);
- pump the tyre up to required pressure value;
- stop the compressor, disconnect the pumping hose and screw in the protective nut **N**.



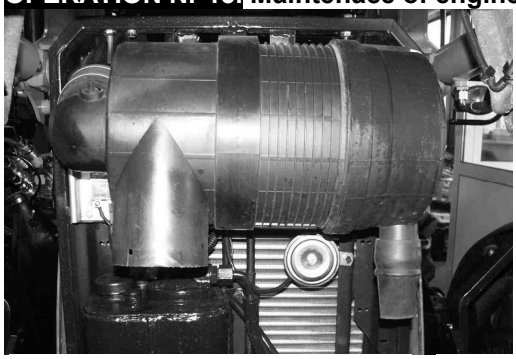

The pressure controller is fitted with an air filter for separation of solid impurities.

**Depending on vehicle's working conditions, i.e. working conditions of the controller, it is recommended to disassembly the lower part of the housing and wash the filter 2-4 times a year.**

The filter can be washed with gasoline or a solvent and blow with compressed air. Install the dried filter in the controller. Besides, the controller requires no maintenance during tractor's operation.

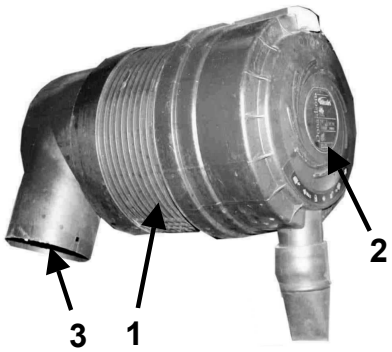
**CAUTION ! The air pressure controller should be repaired only in an authorised service station for products made by the VISTEON Poland SA according to the Repair Manual.**

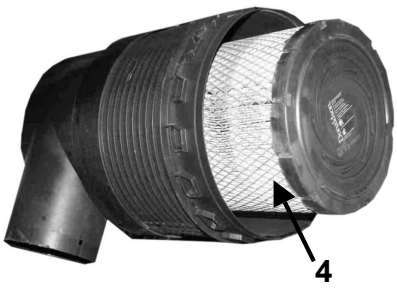
**OPERATION Nr 13. Maintenace of engine air filter.**

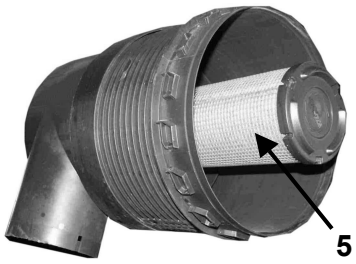


The engine air filter is installed in the front part of the engine. It consists of the internal **4** and the external **5** filtering elements. To check the air filter perform following actions:

- remove the air filter cover **2**;
- remove the outer filtering element **4** from the body **1,**
- check the pollution level of the internal filtering element **5,** <u>without removing it.</u>




**CAUTION!** It is not recommended to remove the filtering element **5** from the filter body **1**. Pollution of the internal filtering element **5** shows that the coat of the external filtering element is damaged (tear, loose elements); in this case wash or replace the internal filtering element **5** and replace the external filtering element **4.**

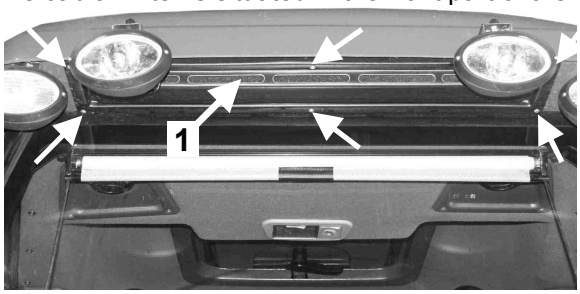
**CAUTION ! If the tractor works in very dusty conditions, the filter should be maintained every 20 mth.**

**Having cleaned the air filter check the tightness of connections of the engine air filter.**

For this purpose cover the filter inlet 3 with a hand, while the engine works at medium speed i.e. ca. 1000 rpm. If all connections are tight, the engine should stop. If not, tighten all filter fastening elements so as during next check obtain the required effect.

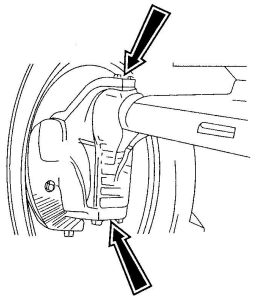
**OPERATION Nr 14. Cleaning of the cab air filter.**

The cab air filter is situated in the front part of the cab roof..



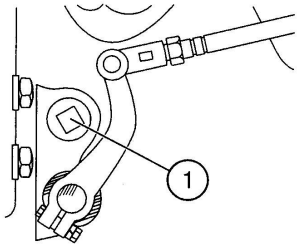

To remove the filter unscrew screws fastening the filter cover and remove the filter **1**. Cleaning consists on shaking out the dust and blowing with compressed air.
In the case of heavy pollution rinse the filter in the water with addition of detergents and dry it. Install the filter in the cab in reverse order.

**OPERATION Nr 15. Bearings pivots of steering knuckles of the spur gear.**



Lubricate with solid grease bearing pivots (upper and lower) of steering knuckles of front axle spur gear with 4 ÷ 6 shots of a greaser.

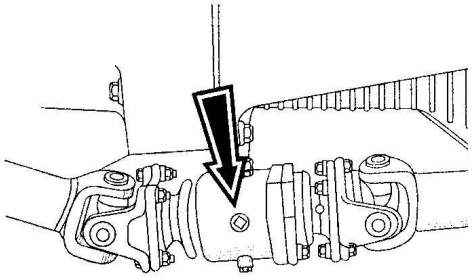
**OPERATION Nr 16. Clutch bearing.**




Unscrew the plug **1** from the clutch housing on the left tractor side, insert the greaser tip into the opening and press solid grease into the nipple with 4 ÷ 6 shots.

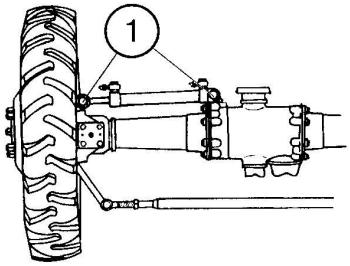
**CAUTION!** Do not press excessive quantity of grease, for its surplus will accumulate in the clutch housing and may cause slip of the disc.

**OPERATION Nr 17. Oil level in the intermediate bearing of the front axle drive shaft (except of PRONAR-1025A II).**



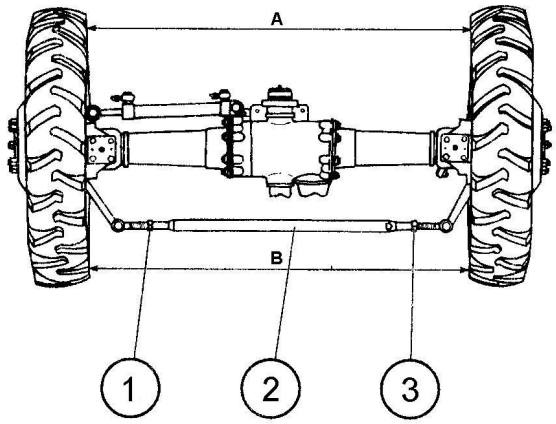
Oil level in the intermediate bearing of the front axle drive shaft (except of PRONAR-1025A II) should reach the lower edge of the inspection opening **1**. Replenish oil up to required level, if necessary.

**OPERATION Nr 18. Articulated joints of the steering system cylindre.**




Lubricate with solid grease joints **1** of the hydraulic cylindre of the steering system with 3 ÷ 5 shots of a greaser.

**OPERATION Nr 19. Front wheels (toe-in).**

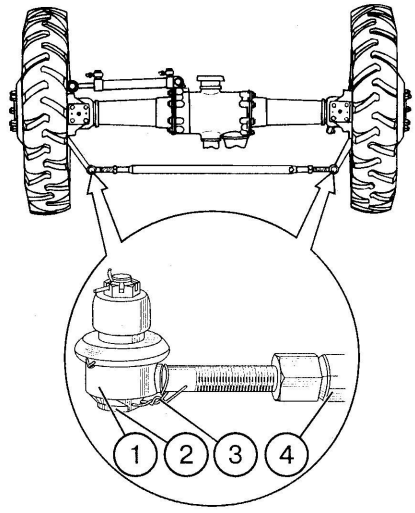



Prior to adjustment of toe-in of front wheels, position the tractor on flat horizontal hardened surface, and front wheels as for driving forward (in central position). Next carry out following actions:

- unscrew securing nuts **1**;
- by turning the rod **2** (shortening or lengthening it) set required toe-in;
- verification of the toe-in consists in measurement, at the height of wheel centres, of the distance **B** between internal hub edges (not tyres), marking of the measurement point (e.g. with chalk), rolling of the tractor by half turn of wheels and measurement of the distance **A** in previously marked places;
- the difference between dimensions **B** and **A** (**B** - **A**) is the toe-in of front wheels and should amount to **0** ÷ **8 mm**.
- having adjusted the toe-in tighten the securing nuts **1**.

**CAUTION ! After each change of the front wheel track set their toe-in.**

**OPERATION Nr 20. Play in joints of steering rod.**




When the engine is on load the steering system with variable loads (by turning the steering wheel from one extreme position to the other one). Play in joints **1** of the steering rod **4** are inadmissible.
The play in the joint **1** can be eliminated by screwing in the slide **2** after removal of the securing wire **3**. When the play is eliminated secure the slide **2** with the securing wire **3**.

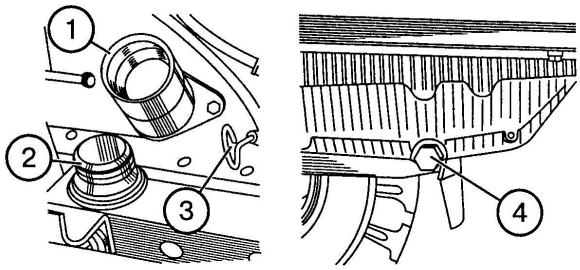
**If it is impossible to eliminate the excessive play replace worn or damaged elements of stering system joints.**

Check also tightening of screws and nuts fastening steering legs of the steering system to the body of steering knuckles.

## TECHNICAL INSPECTION (P-3) AFTER 250 MTH

**Perform all actions of previously described technical inspections and:**

**OPERATION Nr 21. Engine oil replacement.**

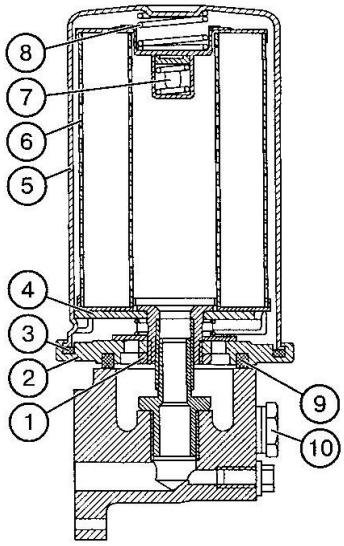



Prior to oil replacement place the tractor on the horizontal surface and activate the parking brake. Start the engine for so long so as to obtain the coolant temperature ca. 70°C (it is recommended to replace oil just after work, when the engine is hot). Stop the engine, unscrew the filling plug **2**, and then unscrew the drain plug **4** and drain oil to a previously prepared tub (tank).

Wait ca. 10÷15 min. so that the entire old oil flows out from the engine. Tighten the **4** and fill the engine with recommended oil type through the filling hole **1** up to required level. Tighten the oil filling plug **2** and start the engine for a few minutes. Stop the engine and after 10 minutes check the oil level with the rod indicator **3**, replenish, if necessary.

**OPERATION Nr 22. Replacement of engine oil filter.**

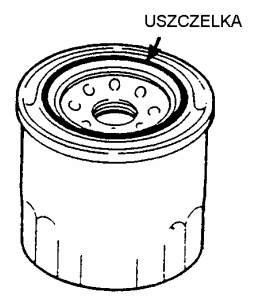
The engine oil filter is situated on the right engine side. Replace the filtering element simultaneously with replacement of engine oil.




In the case of the **filter with replaceable filtering insert** carry out following actions:

- unscrew the cover **5** together with the paper filtering insert
- unscrew the nut **1** and remove the bottom **2** together with seals **3** and **9**
- press the fastening plate **4** and move it inside the cover **5** by 3-4 mm, then turn it to make its removal possible
- remove the filter insert **6**, the valve **7**, and the spring **8**
- wash all parts with a washing agent
- install the new insert in reverse order
- replace seals **3** and **9**, if necessary
- tighten the nut **1** with the torque of 50-70 Nm.
- wet the seal **9** with oil, screw the filter in (when the body **10** comes into contact with the seal **9** make ¾ turn more)

**Caution! Screw in the filter manually, without help of any tools.**




In the case of the **filter withot an insert (integral)** carry out following actions:

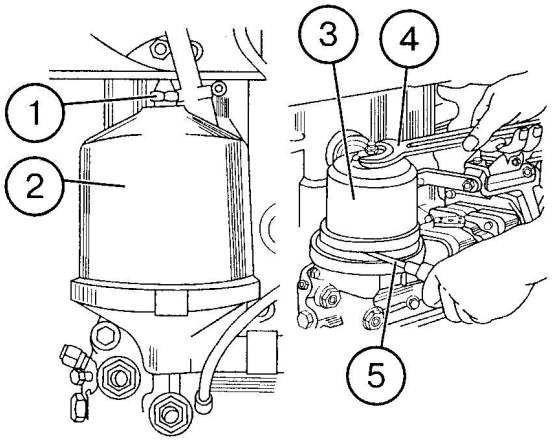
- unscrew the polluted filter;
- spread a few drops of oil over the sealing ring of the new filter
- screw in the new filter until the sealing ring comes in contact with the body, and then make half turn more (do not screw to tight).

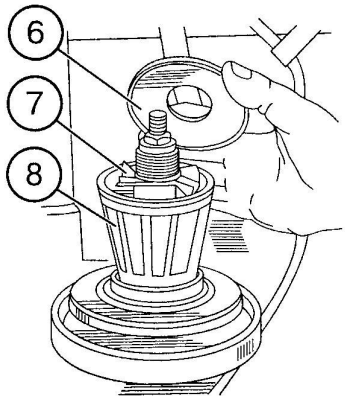
**CAUTION! When unscrewing the filter do not use a hammer, a chisel etc., for this may cause damage of the filter body or the engine block. Use only filters recommended by the engine manufacturer (original).**

**Caution! Screw in the filter manually, without help of any tools.**

In the case of **a centrifugal engine oil filter** perform the same actions as for maintenance of the centrifugal gearbox oil filter **for tractors** PRONAR-1025A II (see **Operation Nr 23**)

**OPERATION Nr 23.** **Rotor of the centrifugal gearbox oil filter (only for PRONAR-1025A II).**




Unscrew the nut **1** and remove the filter housing **2**. With the wrench **4** and the screwdriver **5** remove the rotor housing **3**, remove the cover **6**, the rotror **7** and the filter sieve **8**.

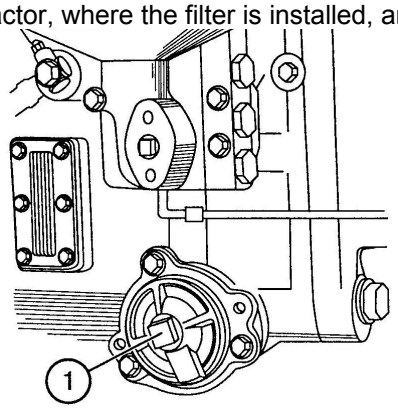
**Caution ! Work carefully – oil can run out.**

Remove deposits from the housing **3** and the sieve **8** and wash with a washing agent. Assembly the filter in reverse order.

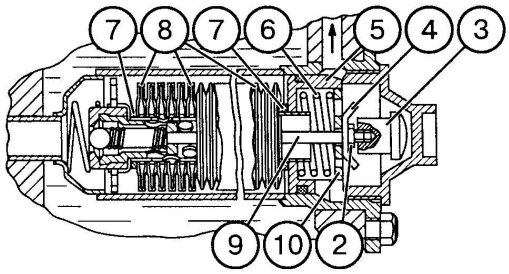
**CAUTION ! The sign of normal operation is a light murmur caused by the rotating rotor. The murmur can be heard for 30÷60s after engine stop.**

**OPERATION Nr 24.** **Coarse gearbox oil filter. (only for PRONAR-1025A II).**

Prior to maintenance of the coarse garbox oil filter prepare a clean tub (or tank) and place it under the tractor, where the filter is installed, and then carry out following actions:




- unscrew the cover **1** with a wrench **(oil runs out)**.
- remove the complete filter holding the grip **3** from the gearbox housing;
- disassembly the filter by unscrewing the grip **3** and the nuts **2** and **4**;
- remove the cover **10**, the spring **6**, the spring housing **5**, the seal **7**, filtering elements **8** and the second seal **7**;
- clean and wash all elements of the filter together with filtering elements in a washing agent (filtering elements should be washed with a long-hair brush);
- assembly the filter in reverse order; pay attention to condition of seals **7** (installed on both ends of the set of filtering elements); replace them, if necessary;




- prior to installation of the filter in the gearbox housing pay attention to cleanliness of the cover thread **1** and the thread in the gearbox body. **<u>They must be perfectly clean</u>**.

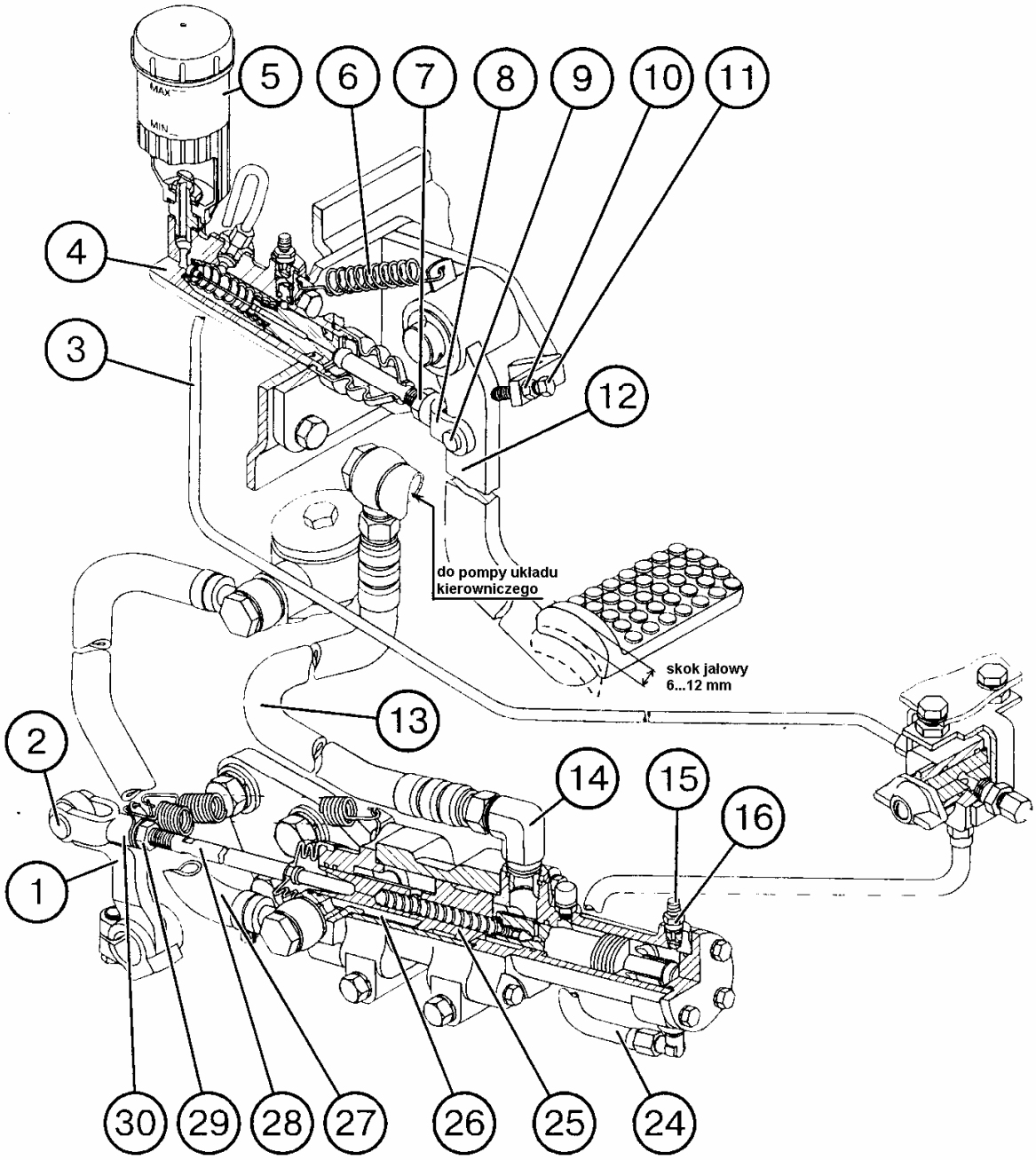
Check condition of the cover seal **1**, replace, if necessary;

- install the filter in the gearbox housing and screw in the cover **1**;
- fill the drive gear with oil.

**OPERATION Nr 25. Lost motion of the clutch pedal.**

Adjust the lost motion of the clutch pedal as follows:

- unlock and remove the bolt (**9**)
- disconnect the fork (**8**) from the pedal (**12**)
- by screwing in or out the fork (**8**) adjust the length of the cylinder piston rod (**4**) so as to obtain required lost motion of the pedal within the range of ca. 6...12 mm.
- Tighten the securing nut (**7**), and install and secure the bolt (**9**)
- unlock and remove the bolt (**2**)
- disconnect the pull rod (**28**) from the lever (**1**)
- unscrew the lever (**1**) counterclockwise as far as it will go
- move the lever (**28**) backwards as far as it will go simultaneously slipping the piston rod, and then by screwing out the fork (**30**) align openings of the lever (**1**) and the fork (**30**)
- turn the fork (**30**) by 5...5,5 turn, and connect it with the lever (**1**) using the bolt (**2**)
- tighten the securing nut (**29**) and secure the bolt (**2**).




After clutch adjustment fill the system with brake fluid and deaerate it.

**Deaeration of the clutch hydraulic system.**

To deaerate the system carry out following actions:

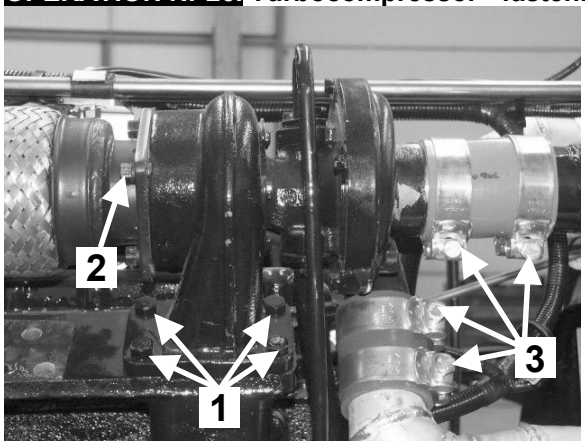
- remove the cap (**15**) and pull on a flexible conduit on vent's end; immerse one end of the conduit in a tank with brake fluid
- fill the tank (**5**) with brake fluid to the upper line „max"
- pres the clutch pedal (**12**) a few times, and – with the pedal in lower position – turn the vent (**16**) by one turn and let out air bubbles into the tank with brake fluid. The clutch pedal will move upwards. When the pedal is in upper position close the vent. Repeat the action until in the vent appears brake fluid without air bubbles.

**CAUTION:** While deaerating the system keep the brake fluid level in the tank (**5**) between marks „min" and „max" or 15±5 mm from the upper edge of the tank.

- remove the flexible conduit from the vent and put on the cap (**15**)
- replenish the fluid in the tank (**5**) to required level.

**CAUTION! During lost motion the pedal must not stop.**

**OPERATION Nr 26. Turbocompressor - fastening (except of PRONAR-82A II , 82SA II).**




Check tightening of screws fastening the turbocompressor **1**, exhaust pipe **2** and all screws **3** fastening conduits supplying air to the air filter and caarying out air to the air cooler. The tightening torque for screws **1** and **2** should amount to 35÷40 Nm (3.5÷4.0 kGm)

**Avoid loosening of screws fastening the turbocompressor and the exhaust pipe.**

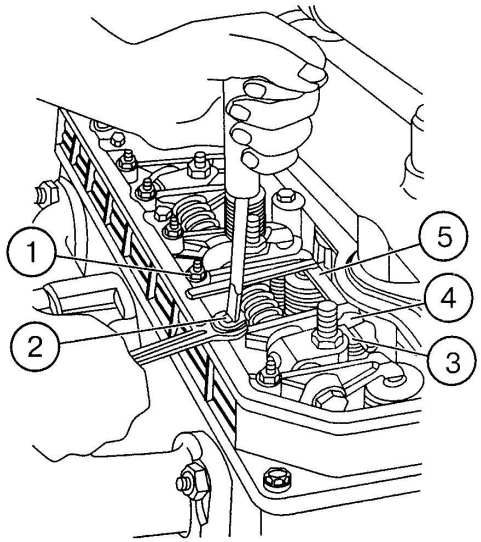
## TECHNICAL INSPECTION (P-4) AFTER 500 MTH

**Carry out all actions of previously described technical inspections and:**

**OPERATION Nr 27. Engine valve play.**

**Adjust the valve play when the engine is cold; first check the tightening torque of the engine head.**

Prior to adjustment remove the valve cover and check tightening of console nuts of the valve lever rotation axle. The nuts should be tightened with the torque of 60 ÷ 90 Nm (6.0 ÷ 9.0 kGm). To adjust the valves carry out following actions:




- with a socket spanner turn the crankshaft until the valves of the first cylindre overlap [suction valve opens, outlet valve shuts], and adjust play of 4th, 6th, 7th and 8th valve counting from the fan;
- the valve play is measured with help of the gap gauge **5** between the valve stem **3** and the valve lever **4**. To set the valve play loosen the securing nut **1** of the adjustment screw **2** on the valve lever. By screwing in or out the adjustment screw **2** set required valve play, and measure it with the gap gauge **5**.

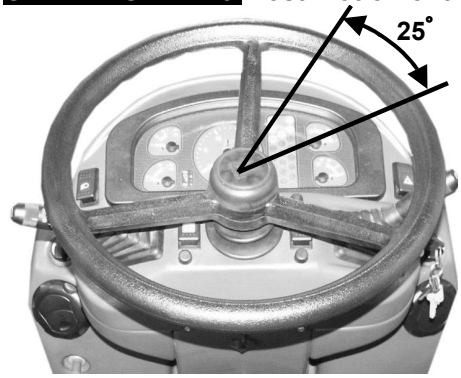
  Having adjusted the play and tightened the securing nut **1** check the play once again by turning the push rod bar;
- rotate the crankshaft by 1 turn (360°), so that the valves of the 4th cylinder overlap and adjust the play of 1st, 2nd, 3rd and 5th valve.

**Valve play measured on cold engine should amount to:**
**PRONAR-82A II, 82SA II:**
**- for the suction valve 0.25 ÷ 0.30 mm;**
**- for the outlet valve 0.25 ÷ 0.30 mm.**
**PRONAR-82TSA II, 1025A II:**
**- for the suction valve 0.25 ÷ 0.30 mm;**
**- for the outlet valve 0.40 ÷ 0.45 mm.**

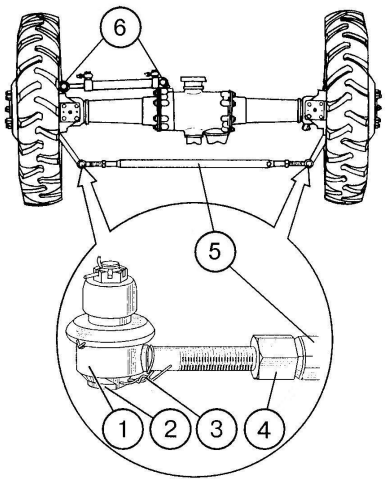
Having adjusted the valve play install the valve cover and new seal, if necessary.

**CAUTION ! Check and adjust the valve play after each removal of the engine head.**

**OPERATION Nr 28. Lost motion of the steering wheel.**




The play on the steering wheel (measured when the engine is on) should not exceed 25°. If the play is greater, remove play in articulated joints of the steering system, fastening of steering knuckle legs and hydraulic cylindre of the steering system.



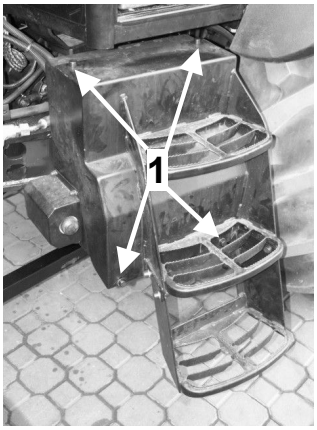

Eliminate play in:

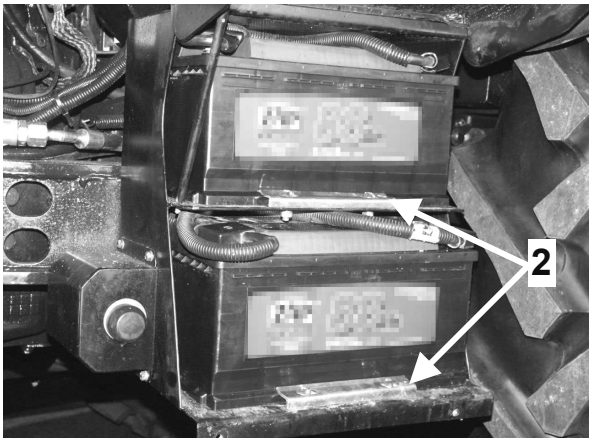
- articulated joints of the steering system through screwing in the slide **2** of the joint **1**; first remove the securing wire **3**;
- transverse rod through unscrewing securing nuts **4** and turning the rod **5**;
- fastening of steering legs to steering knuckles; check if nuts (3 pcs) and screws (2 pcs) fastening the steering knuckles are tightened with the torque of min. 140Nm (14 kGm)
- fastening of the cylindre of the steering system through unlocking and tightening of bolt nuts **6**;

Having carried out all actions connected with elimination of play in components influencing play in the steering system secure anew all previously unlocked screws and nuts.

**OPERATION Nr 29. Batteries.**

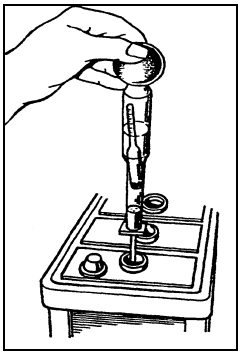
The batteries are situated on the left side of the tractor just behind the cab steps and under the cab door. To gain access to the battery unscrew four screws **1** fastening the battery cover **2**. Now remove the cover together with steps from the battery box. Unscrew consoles **2** fastening the batteries and pull them out. Now we have free access enabling maintenance.

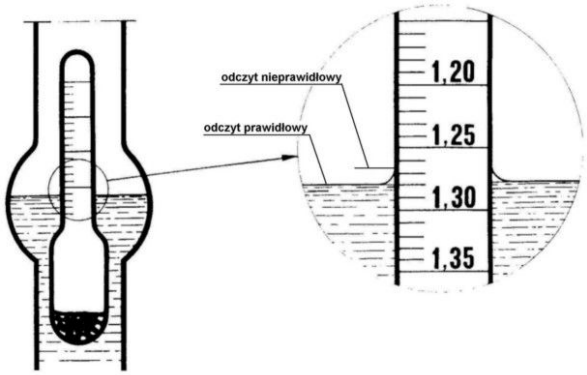



In the case of maintenance requiring batteries unscrew filling plugs and check the electrolyte level. The electrolyte level should be 12÷15 mm below the battery plates. If necessary, replenish the electrolyte with distilled water up to required value.

Check condition of terminals and vent holes in plugs, clean if necessary. Cleaned and clamped terminals should be protected with technical Vaseline

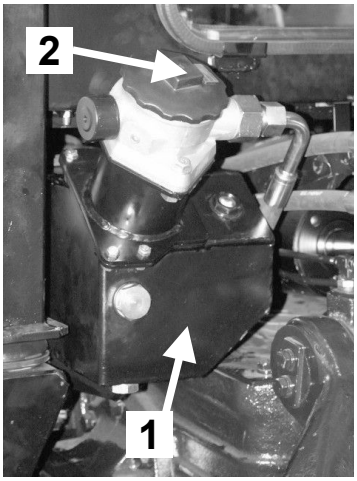


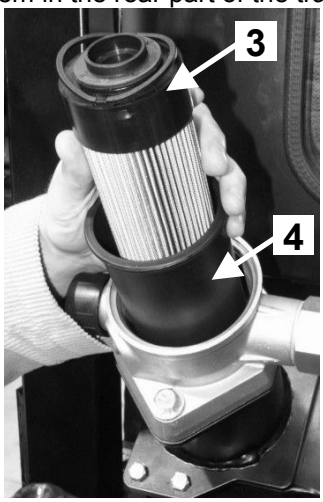


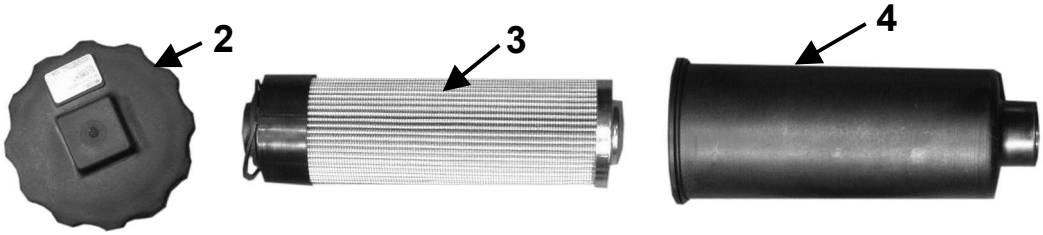

Battery charge level can be checked by measuring the electrolyte density. If we assume that 100% of charge corresponds to the density 1.28 g/cm$^3$, then the discharge by more than 50% (1.20 g/cm$^3$) in summer, and 25% (1.24 g/cm$^3$) in winter is inadmissible. The batteries should be charged with a rectifier ao as to obtain the required electrolyte density. Remove the batteries from the tractor for charging.

**OPERATION Nr 30** **Oil filter of the hydraulic system. (next every 1000 mth)**

The hydraulic oil filter is situated inside the tank **1** of the hydraulic system in the rear part of the tractor.



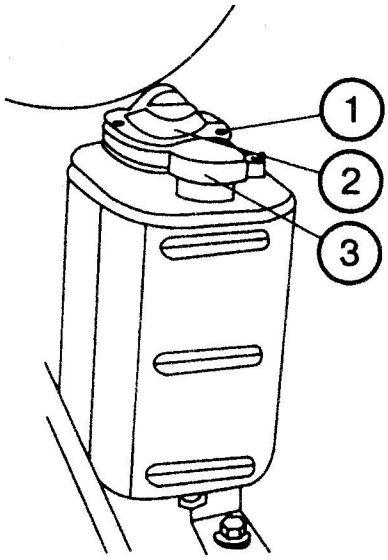




To replace the filtering elelent **3** of the hydraulic system do as follows:

- unscrew the filling plug **2** and remove the filtering element **3** together with the housing **4**;
- wash the filter housing **4** with a washing agent;
- insert the new filtering element **3** into the housing **4** and install the set inside the hydraulic tank;
- screw in the filling plug **2.**

**OPERATION Nr 31** **Oil filter of the steering system (next every 1000 mth)**

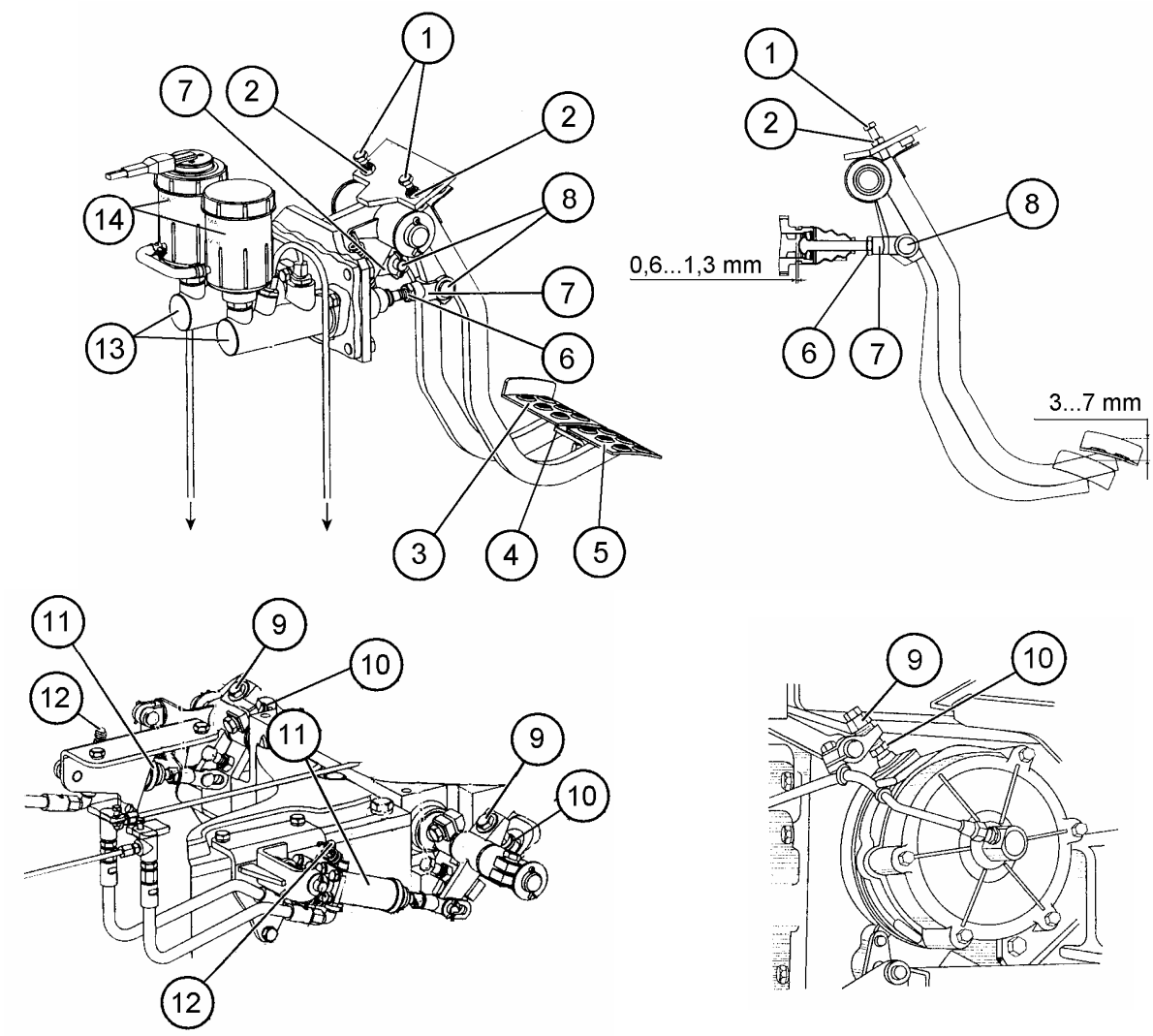



To replace the oil filter of the steering system:

- unscrew screws **1** fastening the filter cover
- remove the filter cover **2** and pull out the filtering element
- insert the new filtering element, install the cover **2** and tighten the screws **1**
- check oil level in the tank and replenish through the filling plug **3**, if necessary.

**OPERATION Nr 32. Brake system – inspection & adjustment.**

**Main brake**




**Adjustment of lost motion of the main brake**

To adjust lost motion of the main brake carry out following actions:

1. Loosen the nuts **2** and with adjustment screws **1** set the pads of both pedals (**3, 5**) within one plane (so that it is possible to lock them with the latch **4**),
   **CAUTION:** Brake pedals should not come into contact with cab elements.
2. Secure the adjustment screws **1** by tightening the nuts **2;**
3. Adjust the lost motion of the right pedal (**3)** within the range **4...8mm** with the fork **7** (the lost motion of the pedals corresponds with the play of 0,6...1,4mm between the piston and the piston rod of each actuator **9**). For this purpose:

- loosen the protective nut **6**, and unlock and remove the bolt **8;**
- disconnect the fork **7** from the pedal lever **3**
- now, screwing in or out the fork **7** adjust the length of actuator's piston rods **9**, so as to obtain required lost motion of the pedal;
- tighten the protective nut **6** and connect the fork **7** with the pedal lever **3** with the bolt **8**, and then secure the bolt with a cotter pin

4. Repeat the above actions for the left pedal **5**
5. Fill the brake system with brake fluid and **deaerate the system**. For this purpose:

- fill the brake system tanks **14** with required brake fluid up to the „max" level or 15±5 mm from the upper edge of the tank;
- clean and remove caps from the vents **12** of both brake cylinders **11**;

- put on tubes onto the vents, opposite ends of tubes immerse in a transparent vessel filled partially with brake fluid;
- couple both brake pedals with the latch **4**;
- unscrew the vent screws **12** of both brake cylinders **11** by 1/2...3/4 turn and press the brake pedals as far as it will go. Having pressed the pedals screw in the vent screws.
- release the pedals and repeat the action as long as air bubbles go from the tube

While deaerating watch the volume of brake fluid in tanks and take care so that the air is not sucked into the system. During deaerating take also care so that the tube end is still immersed in the brake fluid, and the vessel is positioned possibly high.

When finished, remove deaerating tubes, cover the vents **12** with caps and replenish the fluid up to required level.

**Adjustment of total stroke of the main brake.**

**The total stroke of both pedals of the independent main brake should lie strictly within the range of 90 ÷ 110 mm when pressed with the force of 300±10 N (30±1 kG).**

Otherwise carry out adjustment of the total stroke of brake pedals as follows:

- loosen the counternuts **10** of adjustment screws **9** of the left and right brake
- by screwing in or out the adjustment screws **9** set the required total stroke for the left and the right brake separately;
- tighten the counternuts **10.**

Check correct adjustment of the main brake pedal stroke as follows:

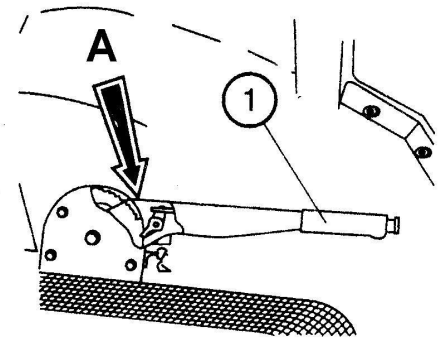
- couple both brake pedals with the latch **4**;
- accelerate the tractor to 20 kph ion dry and clean asphalt surface;
- press energetically the brake pedals to lock the wheels – then the braking distance should not exceed 6 m, and the difference between beginnings of braking tracks for each wheel should not exceed 0,5 m.

If difference between braking action between individual wheels is significant, loosen the nut **10** of the wheel, which braking action is delayed in relation to the other one and screwing in the adjustment screw **9** set required simultaneity of braking action. Secure the adjustment screw by tightening the counternut **10.** Take care so as the total stroke of pedals would not be lower than the required value, for this may lead to premature wear of brake lining and heating of brakes.

If the brake discs become oiled (the brake slides), disassembly the brakes, wash oiled discs with extraction gasoline and dry them for ca. 8 minut. Having assembled the brakes carry out their adjustment.

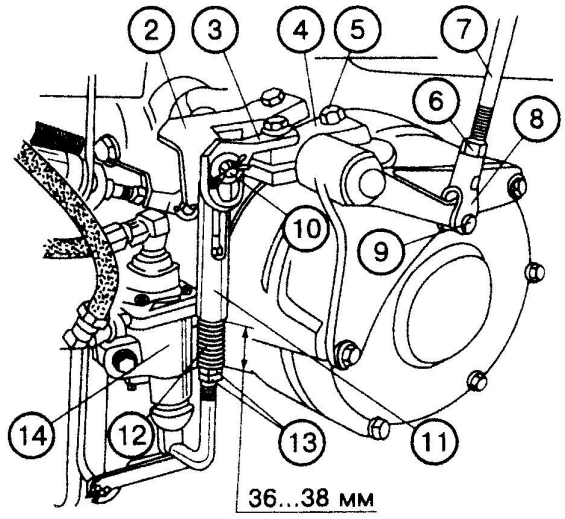
**Parking brake (manual)**

**Prior to inspection and adjustment of the parking brake check and adjust the main brake.**




The parking brake lever **1** should be firmly locked on 4th or 5th tooth of the latch **A**, when loaded with the force of 400±10 N (40±1 kG).
If the parking brake does not fulfil adjustment parameters, it must be adjusted as follows:

- position the tractor on horizontal surface, stop the engine and block the wheels with wedges.
- set the lever in the initial point of its motion (forward, from the operator);




- loosen the nut securing the adjustment screw **5**;
- loosen the securing nut **6** of the fork **8**;
- unlock and remove the bolt **9**;
- by screwing in or out the fork **8** set the length of the pull rod **7** so that the upper point of the bean-shaped opening in the lever **2** is aligned with the upper point of the bean-shaped opening in the lever **3**, and connect the pull rod **7** and the lever using the bolt **9**;
- by screwing in or out the adjustment screw **5** set it in such position that the parking brake lever **1** is firmly locked on 4th or 5th tooth of the latch **A**, when loaded with the force of 400±10 N (40±1 kG)
- after adjustment tighten all securing nuts.

Afeter adjustment check ifthe parking brake fulfils adjustment requirements.

**OPERATION Nr 33. Tightness of the pneumatic system.**

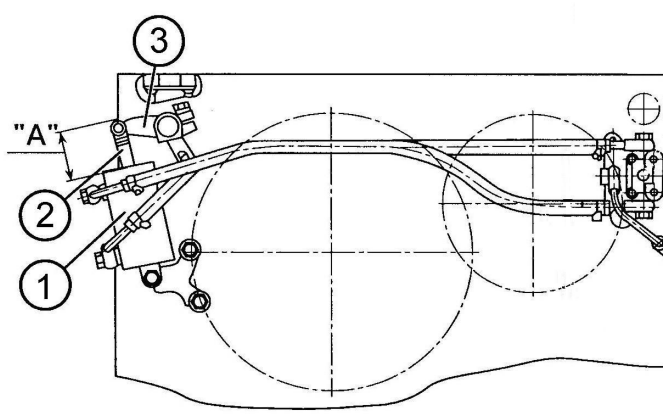
Tightness of tractor's pneumatic system is checked as follows:

- start the compressor and the engine, then raise the pressure to 0.60÷0.65 MPa (6.0÷6.5 kG/cm$^2$) as indicated at the manometer situated at tractor's control panel;
- set the control gears of trailer brakes in free position and stop the engine;
- after 10 min from the engine stop the pressure drop indicated on the manometer should not exceed 2% i.e. ca. 0,012÷0,013 MPa (0,12÷0,13 kG/cm$^2$).

During tightness check the pneumatic system of the tractor must not be connected to trailer's system (loaded).

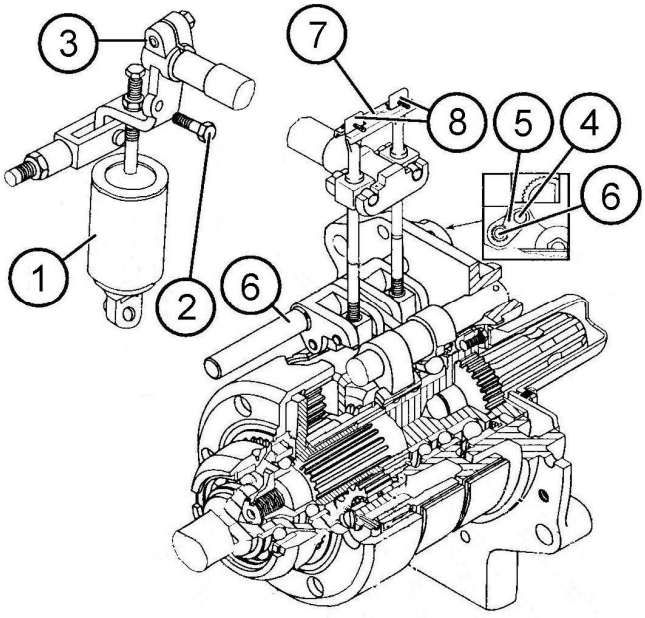
If the pressure drop is greater than the admissible value, find the reason and remove it.

**OPERATION Nr 34. Control gear of the rear PTS**




In the course of tractor's operation may appear necessity of adjustment of the PTS control system (band brakes) if:

- appears slip on the PTS (at the shaft end);
- the piston **2** is pulled out by less than 38 mm in position "PTS off"
- the piston **2** is pulled out by more than 90 mm in position "PTS on" (**dimension A on the drawing**)




**Basic adjustment of the PTS control system in tractors PRONAR**

To adjust the control system:

- set axles of the eccentric **6** together with the fixing plate **5** in extreme position, where the buffer is deflected to right from the vertical axis and tighten the screw **4**;
- set the rocker lever **3** in neutral position – the opening in the lever **3** and in the rear axle body should be locked with a bolt of 8 mm diameter or with the screw **2 M10x60** mm (the bolt and the screw are not supplied with the tractor);
- adjust position of brake bands (in relation to drums) through tightening of screws **8** with the torque of 10 Nm (1 kGm), and then unscrewing by 1,5 ÷ 2 turn (acces to the screws **8** – unscrew five screws and remove the cover situated in the upper part of the body of main transmission gear of the rear axle);
- when the PTS is properly adjusted, then with the engine on the piston should be pulled out in relation to the cylindre cover **1** (**dimension A, see drawing**) by:

position PTS off – 42 mm to 46 mm
position PTS on – 62 mm to 66 mm

- check (remove the lock) if the lever **3** moves freely.

**CAUTION ! After adjustment secure all connections in the PTS control system.**

**External adjustment of PTS in tractors PRONAR**

Carry out the adjustment if in the course of tractor's operation appears slip on the PTS or if the piston **2** is pulled out by less than 38 mm in position "PTS off" or if the piston **2** is pulled out by more than 90 mm in position "PTS on" (**dimension A, see drawing**).

To adjust PTS:

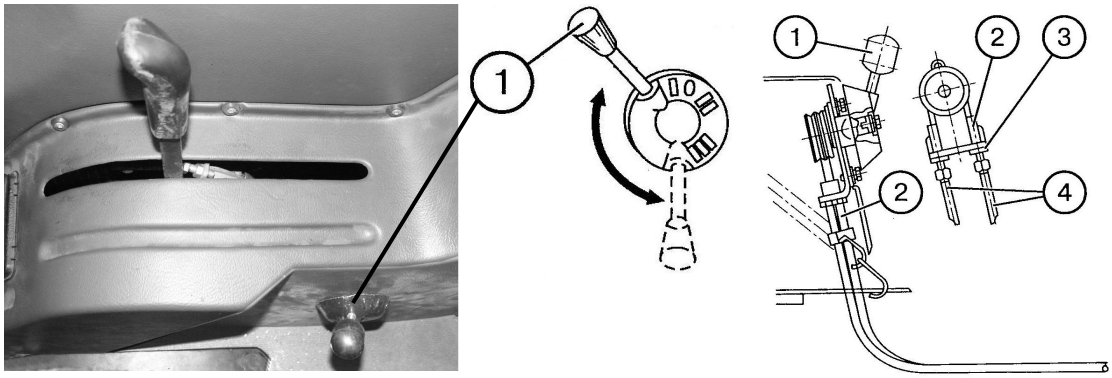
- remove the PTS shield
- unscrew the screw **4** and remove the fixing plate **5** from the axle of the eccentric **6**
- with a wrench (13 mm) turn the axle (with brake bands) clockwise to eliminate play between brake bands and drums. The play would be eliminated if it would be impossible to turn the PTS end with hand
- install the fixing plate **5** and tighten the screw **4**;
- remove (screw out) the bolt (screw) from the lever **3**.
- install the PTS shield

After a few adjustments carried out as described above, the axle of the eccentric **6** may reach such extreme position, that the fixing plate **5** would be deflected to left from the vertical axis, waht indicates end of adjustment range. Then turn the axle of the eccentric **6** counterclockwise so that the fixing plate **5** is in initial position and deflected to right from the vertical axis.

After setting of the fixing plate **5** carry out the adjustment as described in "**Basic adjustment of the PTS control system in tractors PRONAR**"

**CAUTION ! After adjustment secure all connections in the PTS control system.**

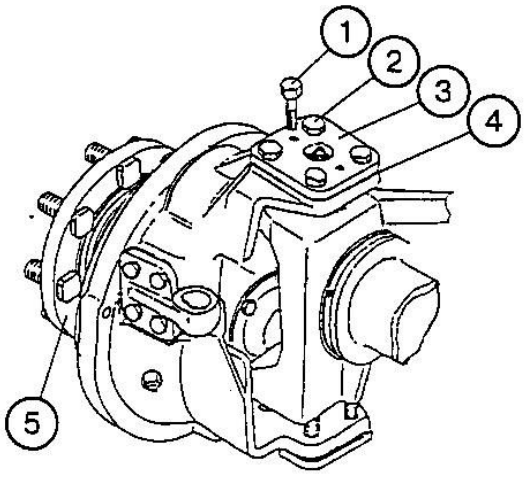
**OPERATION Nr 35. Control of mixed adjustmant (PRONAR-1025A II)**




Lift the rear hitch to upper extreme position. The lever **1** should rotate within the range marked with **I** and **III** on the lever housing. If not, adjust the lever as follows:

- lift the rear hitch to upper extreme position;
- loosen nuts **3** and by screwing in or out the adjustment screw **2** set required length of cables **4**, so that the lever moves within required range;
- tighten the counternuts **3.**

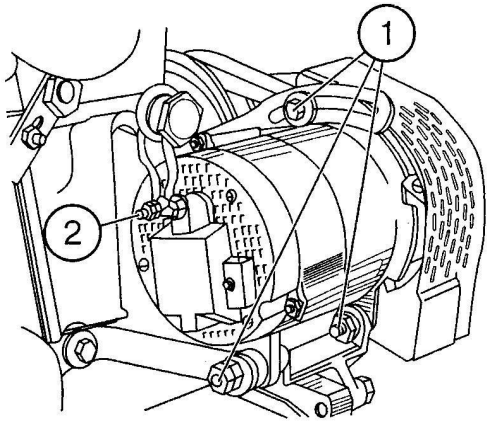
**OPERATION Nr 36. Bearings of steering knuckle pivots of the front axle spur gear**




Check and adjust tension of pivot bearings, if necessary. The bearing tension force should be so adjusted that the rotation of the spur gear on the pivots would be possible with the force ca. 60÷80 N (6÷8 kG) applied to the wheel hub **5**. Otherwise adjust the tension as follows:

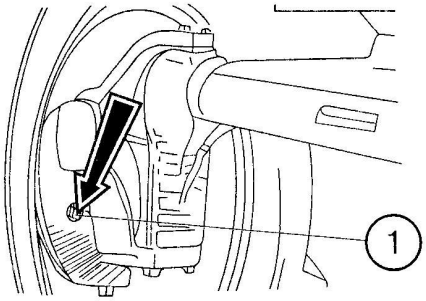
- unscrew four screws **2** and screw in two M10 disassembling screws **1** into technological openings;
- set proper number of washers **4;**
- screw out the disassembling screws **1** and screw in the screws **2** uniformly with the torque of 120÷140 Nm (12÷14 kG)

**OPERATION Nr 37. Cleaning of the alternator.**

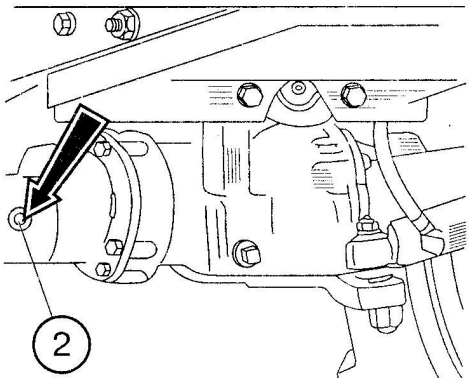



Clean the alternator. Check screws **1** fastening the alternator, check electrical connections **2**.

**OPERATION Nr 38. Oil level in the body and spur gears of the front drive axle.**



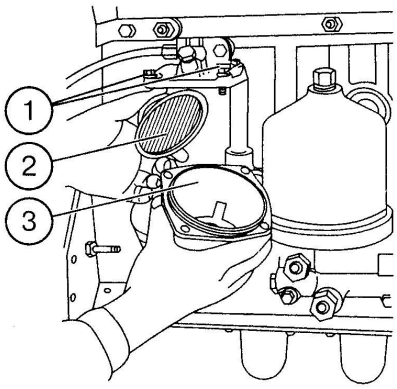

The oil level in the front axle spur gears should reach the lower edge of the inspection / filling hole **1**. If necessary, replenish the oil through the hole **1**.




The oil level in the main gear of the front axle should reach the lower edge of the inspection / filling hole **2**. If necessary, replenish the oil through the hole **2**.

**OPERATION Nr 39. Coarse fuel filter.**

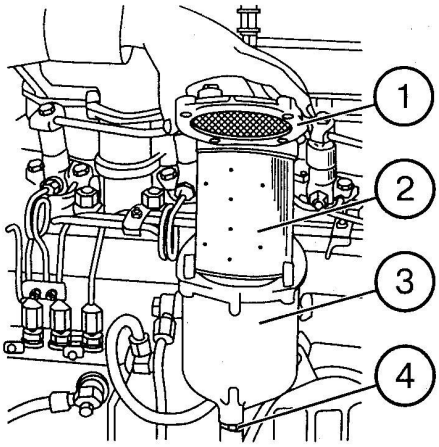
To clean the coarse fuel filter follow the procedure below:




- close cocks of fuel tanks;
- clean (wash) the filter from outside;
- unscrew the screws **1** and remove the filter housing **3** together with the sealing ring**;**
- unscrew the filtering element together with the separator **2**;
- clean and wash the filtering element, the separator and inner filter surfaces with washing agent;
- assembly the filter in reverse order. If the sealing ring is damaged replace it with a new one;
- open the fuel cocks and with the manual fuel pump fill the fuel system; then deaerate the system.

**OPERATION Nr 40. Fine fuel filter.**

The period of filter use depends mainly on purity of used fuel. If we suspect that the fuel is not so pure, check the filter and replace the filter insert more frequently. During each conversion to other fuel type in the autumn–winter or winter-spring seasons (but every 500 mth at least), replace the insert of the fine fuel filter.




To replace the filter insert:

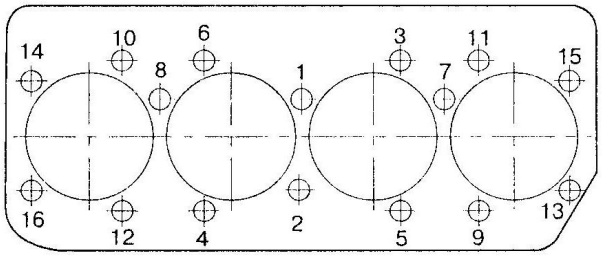
- close cocks of fuel tanks;
- screw out the drain plug **4** and drain the fuel from the filter together with deposits to a previously prepared tub;
- unscrew nuts, remove the filter cover **4** and remove the filtering insert **2**;
- rinse and clean the cover and the inside of the filter with a washing agent;
- install the new filtering insert and assembly the filter;

open the fuel cocks and deaerate the fuel system;

## TECHNICAL INSPECTION (P-5) AFTER 1000 MTH

**Carry out all actions of previously described technical inspections and:**

**OPERATION Nr 41. Tightening of engine head screws.**

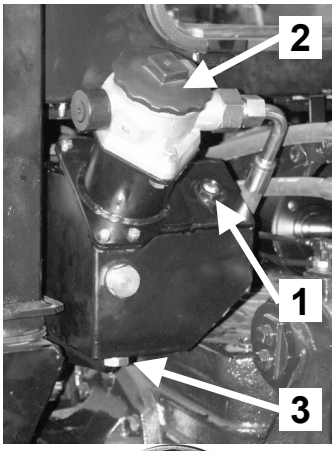



Check tightening of engine head screws when the engine is hot and according to order given on the drawing. Tightening torque 190÷210 Nm (19÷21 kGm).

**After tightening of engine head screws check and adjust engine valve play.**

**OPERATION Nr 42. Replacement of oil and filter of the hydraulic system.**

**CAUTION ! Prior to oil replacement place the tractor on the horizontal surface. Replace the oil in the steering system just after work, when the engine is stoped.**



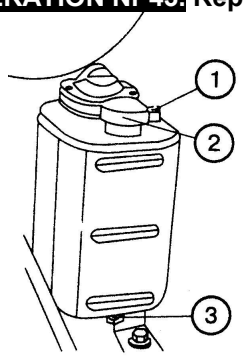

To replace oil and filter in the hydraulic system:
- unscrew the filling plug **2**
- screw out the drain plug **3**
- drain oil from the tank to a previously prepared tub
- replace the filter insert **(see OPERATION 30).**
- pour new oil into the tank up to the required level on the sight glass **1**, situated on the hydraulic tank.

Oil level should reach central part of the sight glass.

**CAUTION ! While working with machines fitted with hydraulic systems of great capacity, the oil level in the hydraulic system tank should reach the upper edge of the sight glass.**

**CAUTION ! Do not start the tractor if the oil level is below the lower edge of the sight glass.**

**OPERATION Nr 43. Replacement of oil and filter of the stering system.**




Replace the oil in the steering system just after engine stop:
- unscrew the filling plug **2**
- screw out the drain plug **3** and drain oil from the tank to a previously prepared tub
- replace the filter insert **(see OPERATION 31)**
- screw in the drain plug **3** and pour new oil through the filling plug **2** up to the required level **(see OPERATION 5)**
- tighten the filling plug **2**

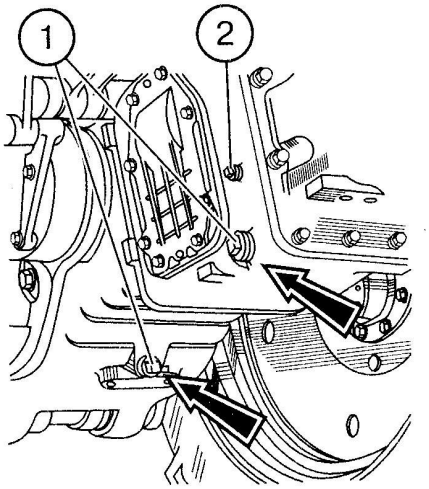
**CAUTION ! Do not start the tractor if the oil level is below the required value.**

**OPERATION Nr 44. Replacement of oil in the gearbox and in the rear axle.**

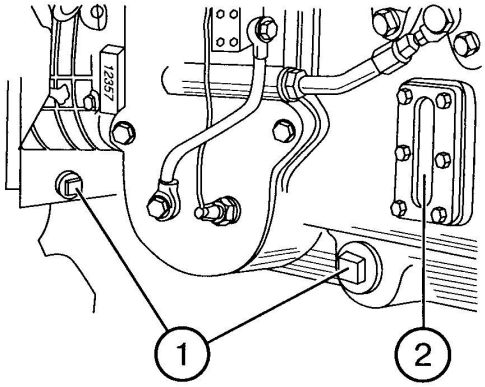
Replace the oil just after the work, when engine is stopped. Place the tractor on the even horizontal surface and activate the parking brake. To replace the oil:

- unscrew the inspection plug **2** (**PRONAR-82A II / 82SA II / 82TSA II)** and drain plugs **1** in the gearbox and in the rear axle;
- drain the oil to a previously prepared tub
- screw in the drain plugs **1**;
- pour the new oil through the filling plug **2** up to required level (**see OPERATION Nr 6**)
- screw in the inspection plug **2** (**PRONAR-82A II / 82SA II / 82TSA II)**;

**PRONAR-82A II / 82SA II / 82TSA II**



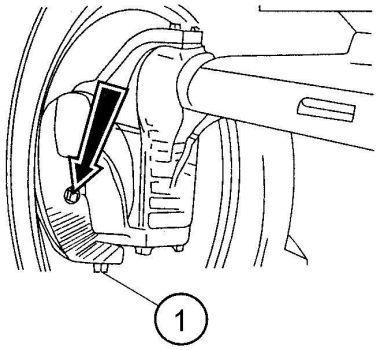

**PRONAR-1025A II**



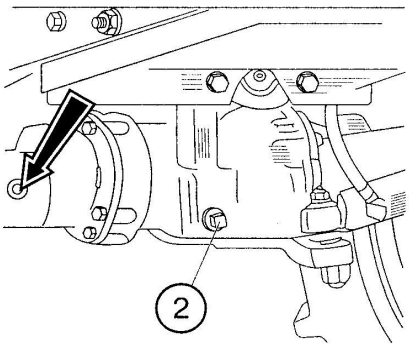

**OPERATION Nr 45. Replacement of oil in the body and spur gears of the front axle and in the intermediate bearing of the front axle drive shaft.**

Replace the oil just after the work, when engine is stopped. Place the tractor on the even horizontal surface and activate the parking brake.

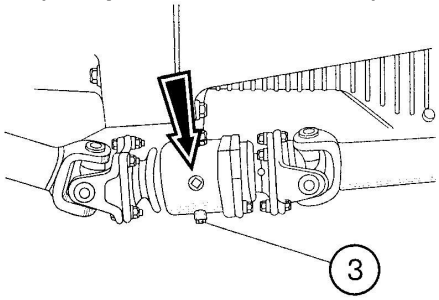
**spur gear**




**front axle body**



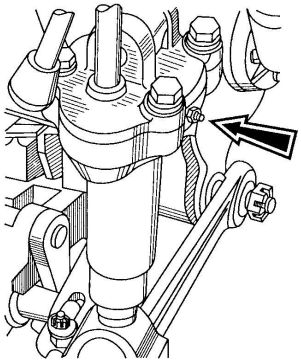

**intermediate bearing (except of PRONAR-1025A)**




To replace the oil:

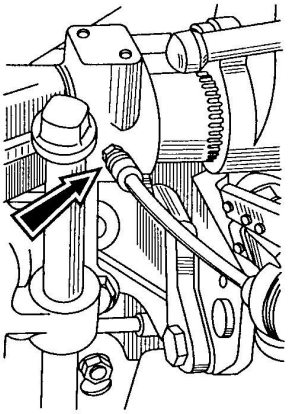
- unscrew inspection plugs (pointed with arrows on drawings) and drain plugs from spur gears of the front axle **1**, front axle body **2** and from the intermediate bearing of the front axle drive shaft **3 (except of PRONAR-1025A)**.
- drain the oil to a previously prepared tub and screw in the drain plugs **1**, **2**, **3**.
- pour the new oil up to the level of lower edges of inspection plugs;
- tighten all inspection plugs.

**OPERATION Nr 46. Right hanger of the 3-point hitch.**



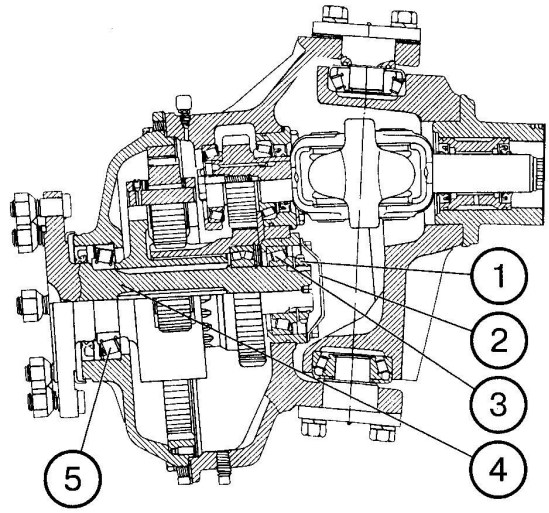
Press grease into the nipple of the right hanger with 4 ÷ 6 shots of a greaser.

**OPERATION Nr 47. Rotation axle of hoist arms.**



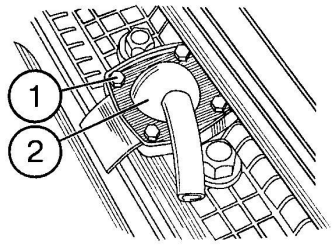
Press solid grease into left and right greaser until the grease appears on the axle

**OPERATION Nr 48. Bearings of front wheel hubs.**




Check and – if necessary – eliminate play in bearings **3** and **5** of the wheel hub as follows:
- unscrew screws and remove the cover **2**
- tighten the nut **1** with the torque of 180÷200 Nm (18÷20kG), and then unscrew by 15÷20°, so as to eliminate play in bearings;
- secure the nut **1**;
- install the cover **2**.

**OPERATION Nr 49. Engine vent.**



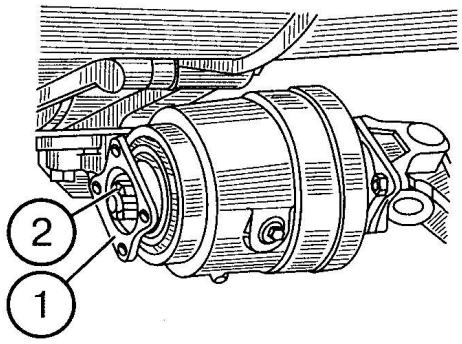

Unscrew the screws **1** and remove the body **2** of the vent. Remove the vent from the body, wash with washing agent and blow with compressed air. Pour small quantity of lubrication oil and let it trickle down. Install the vent and tighten covers.

**OPERATION Nr 50. Front axle drive shaft and intermediate bearing.**

Check all screwed connections of flanges on drive shafts between the distribution box and the main transmission gear of the front axle and condition of articulated joints of star-pieces.

The tightening torque for screws fastening the bearing of the front axle drive shaft should amount 120-150 Nm (12-15 kGm)

**CAUTION! Play in screwed connections and in bearings of star-pieces of the front axle drive shaft is inadmissible.**

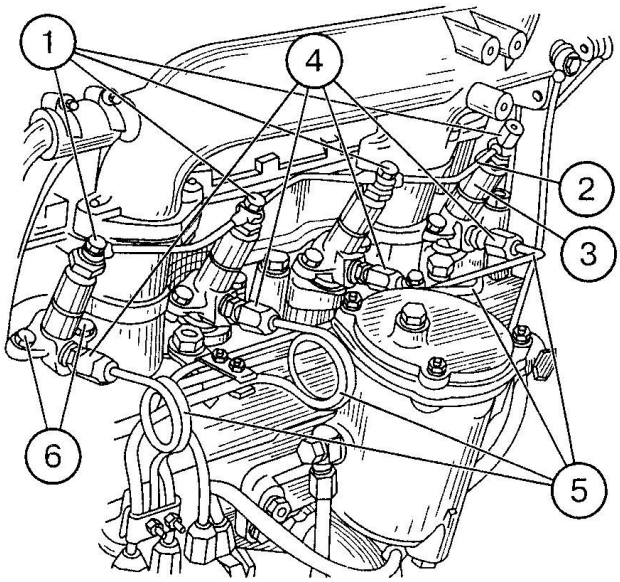



The intermediate bearing is fitted with an overload coupling (**except of PRONAR-1025A II**), which should be adjusted through the tightening torque of the nut **2**.
The torque should amount to 70÷75Nm (7,0÷7,5 kGm), what should allow to transfer via the coupling the torque of 400÷800 Nm (40÷80 kGm).
The value of torque transferred by the overload coupling corresponds to towing force of the front axle within the range of 8÷11 kN (800÷1100kG). Thus, the slip of the overload coupling at higher force applied to front axle drives is not the result of fault of the coupling or the axle.

**OPERATION Nr 51. Fuel injectors.**

**Inspection of injectors and injection pump should be commissioned to an authorised manufacturer's service station.**

To adjust injectors with special equipment first remove them from the engine:




To de-install the injectors:

- unscrew the nuts **4** of pump and injector stubs;
- remove high-pressure conduits **5** from injectors **3** and injection pump;
- screw out four screws **1** and remove the overflow conduit **2** (do not forget to remove sealing washer of screw);
- screw out the screws **6** and remove the injectors **3**.

Presser in initial injection phase should amount to $21{,}6^{+0{,}9}$ MPa. Spraying should be uniform. Appearance of a fuel stream or leakage disqualifies an injector end for future operation.

After inspection nad adjustment install the injectors in reverse order. When injectors are installed deaerate the fuel system.

**OPERATION Nr 52. Injection pump.**

In case of any defects of injection pump remove it and send to an authorised service station to check the quantity and uniformity of fuel forced by individual pump sections.

**Inspection of injectors and injection pump should be commissioned to an authorised manufacturer's service station.**

Adjustmant data of the engine injection pump:

| **Engine type**<br>**Pump type** | **D-245.43S2**<br>**773-40.09** | **D-245.5S2**<br>**773-40.02** | **D-245S2**<br>**773-01T** |
|---|---|---|---|
| Pump shaft rotation at nominal engine rotation speed, rpm: | 900 | 900 | 1100 |
| Average fuel dose at nominal engine rotation speed $mm^3$/cycle | 101±2 | 112±2 | 109±2 |
| Admissible irregularity of fuel dosing betwen sections at nominal pump rotation speed, %: | 6 | 6 | 6 |
| Pump shaft rotation, where the controller becomes on, rpm | 915...935 | 915...935 | 1115...1135 |
| Average fuel dose at engine rotation speed: $mm^3$/cykl | | | |
| - 800 rpm | 118±3,0 | - | - |
| - 700 rpm | - | 134±3,0 | 116±3,0 |
| - 600 rpm | 99,5±3,5 | 116,5±3,5 | 109,5±3,5 |
| - 500 rpm | 86,5±5,0 | 86,5±5,0 | 86,5±5,0 |
| Angle of start of fuel pumping through a pump section in relation to the upper dead centre of the pump piston, °: | 4,0±0,5 | 4,0±0,5 | 3,5±0,5 |

**CAUTION ! During next installation of the injection pump on the engine pour ca. 250 $cm^3$ engine oil into the pump body.**

**OPERATION Nr 53. Screwed connections of tractor's assemblies (external).**

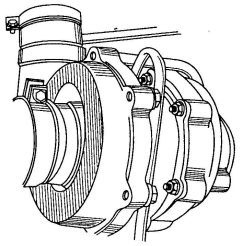
With help of suitable wrenches check the condition of external screwed connections of all tractor's assemblies. Check, among others:

- nuts fastening front and rear wheels and screws of rear wheel hubs;
- front axle console and frame;
- clutch frame and body
- engine block and clutch housing;
- clutch housing and gearbox housing;
- gearbox housing and rear axle housing;
- rear axle housing and rear hitch console;
- front and rear cab posts;
- console and bolts of steering system actuator
- rear axle securing tube and body;
- body and spur gear of the front axle;
- intermediate bearing of the front axle drive shaft
- screws (wedges) of the front axle;
- tightening of all screws fastening flanges of both shafts of the front axle drive;
- tightening of screws fastening the intermediate bearing of the front axle drive shaft. Screws should be tightened with the torque 140 Nm (14.0 kGm)

**It it is necessary to replace screws fastening flanges of drive shafts, replace it only with screws supplied by authorised points of sale or service stations.**

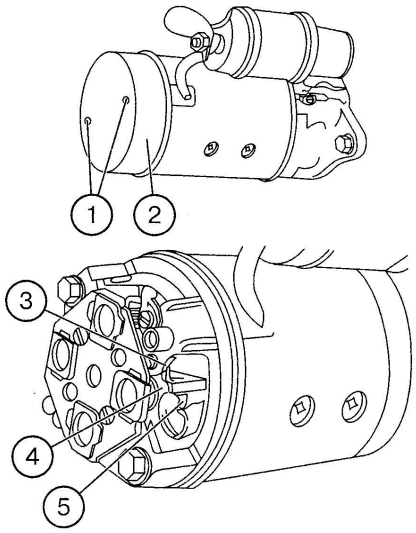
**Any play in screwed connections (external) of tractor's assemblies is inadmissible.**

**OPERATION Nr 54. Cleaning of the turbocompressor (Pronar 82TSA II / 1025A II)**



Dismount the turbocompressor and without disassembly imerse in a washing agent (or diesel) for two hours. Blow with compressed air, dry and install on the engine.

**OPERATION Nr 55. Inspection of the starter.**

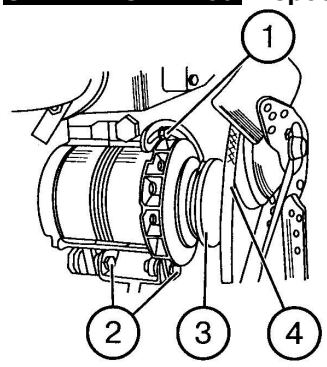



Unscrew the screws **1** and remove the cover **2** of the starter.

Inspect:
- brush holders **3** and force required for moving of a brush;
- check pressure of the springs **4** on the brushes **5** – should amount to 7.5 ÷ 10.0 N

In the case of significant wear of rotor's collector dismount the starter and commission the repair to a specialised workshop.

**OPERATION Nr 56. Inspection of the alternator.**



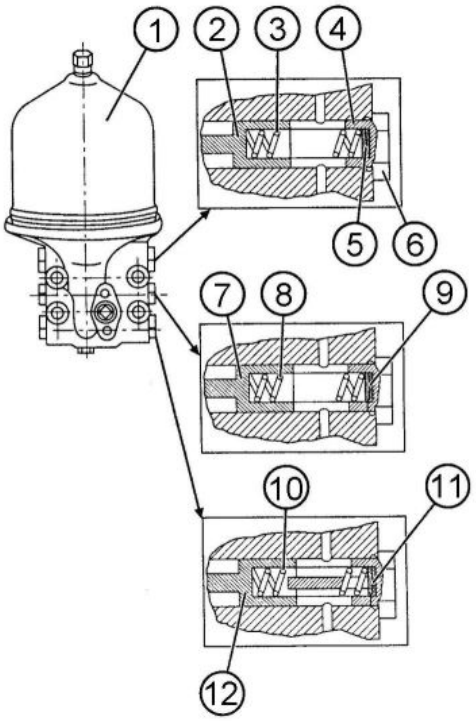

Loosen the screws **1** and **2** fastening the alternator, turn the alternator towards the engine block remove theV-belt **4** from the pulley **3.**

Check altrernator's rotor (play in bearings, rotation of the rotor) and condition of electrical connections.

If play in bearings is too big commission the repair to a specialised workshop.

## OTHER MAINTENANCE ACTIONS

**OPERATION Nr 57. Adjustment of the safety valve of the centrifugal gearbox oil filter (for PRONAR-1025A II)**




The valve **2** keeps the pressure within the range of 0,9÷1,0 MPa [9÷10 kG/cm$^2$]. If the pressure is lower than the above value, adjust the valve **2** with help of adjustment washers **5** betwen the spring **3** and the plug **6**.

**Caution! If pressure drops below 0,7 MPa [7 kG/cm$^2$] break operation of the tractor.**

The valve **7** keeps the pressure before the oil filter rotor. Its value amounts to 0,75 MPa [7,5 kG/cm$^2$]

The lubrication valve **12** is set for 0,2 ±0,05 MPa [2,0 ±0,5kG/cm$^2$] and keeps the oil pressure in the gearbox lubrication system. The valves **7** and **12** shoud be adjusted with help of adjustment washers **9** and **11**.

## TABLE OF ORDER OF TECHNICAL INSPECTIONS

| Inspection No. | P-1 | P-2 | P-3 | P-4 | P-5 |
|---|---|---|---|---|---|
| Number of mth from the beginning of use | 30 | 125 | 250 | 500 | 1000 |

**CAUTION ! Periods between inspections in motohours (mth) must not be exceeded by more than 10 mth.**

**After 1000 mth of operation the cycle of inspections should be repaeated within the range 125 ÷ 1000 mth.**

## TIGHTENING TORQUE FOR SCREWS AND NUTS

During maintenance, repairs and inspection of **PRONAR** tractors it is recommended to tighten screws and nuts with torque given in the table below as a function of thread diameter. If the operation manual or other manufacturer's documentation (e.g. repair manual) recomends tightening of screws or nuts with other torque value, then this value is the obligatory one.

| Nominal thread diameter [mm] | Torque [Nm] | Nominal thread diameter [mm] | Torque [Nm] |
|---|---|---|---|
| M6 | 6 ÷ 8 | M16 | 120 ÷ 140 |
| M8 | 14 ÷ 17 | M18 | 160 ÷ 190 |
| M10 | 30 ÷ 35 | M20 | 230 ÷ 360 |
| M12 | 55 ÷ 60 | M22 | 340 ÷ 360 |
| M14 | 80 ÷ 90 | M24 | 420 ÷ 480 |

## RECOMMENDED FUELS, OILS, GREASES AND OPERATIONAL FLUIDS FOR TRACTORS PRONAR

| Place of application | Quantity $dm^3$ | Season | Trade name | Replacement frequency mth |
|---|---|---|---|---|
| Fuel tank | 155 | summer - winter | Diesel:<br>DL- summer<br>DZ -winter | - |
| Engine<br>Oil sump | 15.0 | summer - winter | API: CD<br>SAE 15W/40<br>multi-season | 250 |
| Injection pump | 0.25 | | | |
| Engine cooling system | 20.0 | summer - winter | BORYGO NOWY | every 2 years at least |
| Drive system (gearbox, rear axle)<br>PRONAR-82A/82SA,82TSA | 40.0 | all | Parus GL4<br>SAE 80/90<br>multi-season | 1000 |
| PRONAR-1025A | 47.0 | | | |
| Hydraulic system | 35,0 | all | L-HL-32 | 1000 |
| Steering system | 6,0 | all | L-HL-32<br>or SAE 15W40 | 1000 |
| Clutch & brake actuator | ca. 1,5 | all | DOT-3 or DOT-4 | every 2 years at least |
| Front axle<br>Main transmission: | 4.5 | all | Parus GL4<br>SAE 80/90<br>multi-season | 1000 |
| Spur gears: | 2x2.0=4.0 | | | |
| Shaft bearing (except of PRONAR-1025A II): | 0.15 | | | |
| Front window washer | 2.0 | all | - | replenishment |
| Lubrication points | - | all | ŁT–42, ŁT–43 | - |

## PREPARATION OF THE TRACTOR FOR LONGER STANDSTILL

To prepare the tractor for longer standstill:

- wash the tractor;
- clean all greasers;
- place the tractor in a dry, well-aerated, closed room;
- drain oil from the engine, drive & hydraulic systems, and fill with fresh oil;
- drain fuel from tanks, remove deposits from filters and tanks and refuel the tractor with 10 $dm^3$ (l) fuel; start the engine for ca. 10 min. It is recommended to use a special fuel with preserving agents;
- drain the fluid from the engine cooling system and from the cab heating system;
- loosen the belt driving the alternator;
- cover the exhaust pipe outlet;
- remove the batteries and and store in a warm, dry place, where they can be periodically charged;
- place the tractor on supports under axles so that the tyres are not loaded; reduce the tyre pressure to 70% of the normal working value.

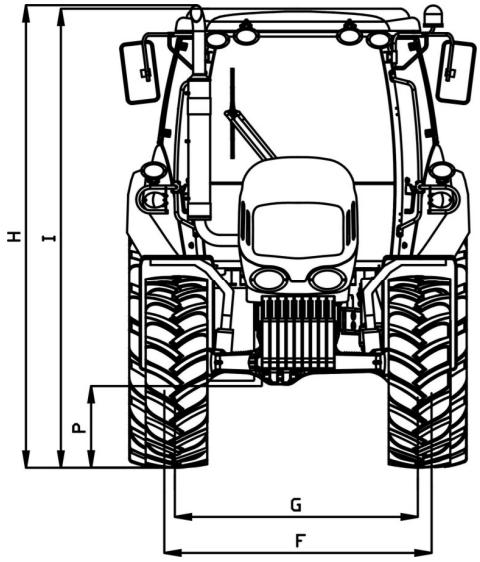
## PREPARATION OF THE TRACTOR FOR OPERATION AFTER LONGER STANDSTILL

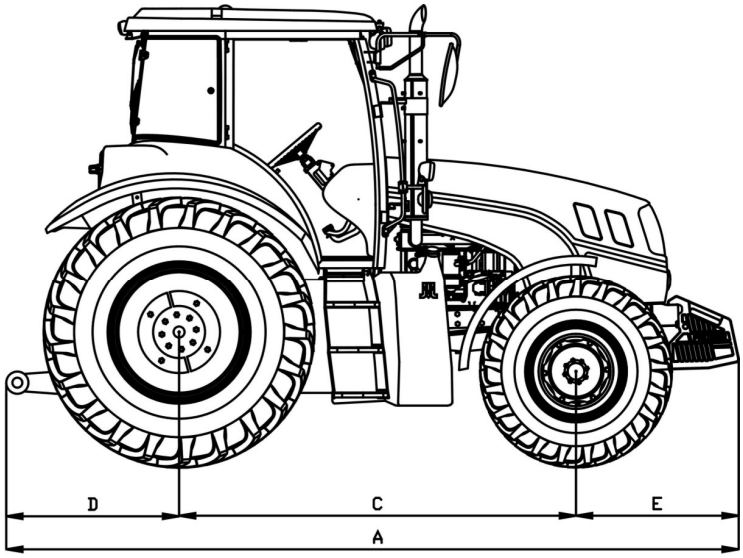
To prepare the tractor for work after longer standstill:

- pump the wheels up to normal working pressure;
- remove the tractor from supports;
- fill the fuel tanks;
- fill the cooling system and the cab heating system with suitable fluids;
- install fully charged batteries;
- chec the lubrication oil level in all tractor's components (engine, drive system, hydraulic system, front axle + spur gears;
- tension the alternator driving belt;
- remove the cover from the exhaust pipe outlet;
- start the engine and check indications of all indicators; check operation of control elements;
- perform a test drive without load, to make sure that the tractor and its assemblies work properly.

# G. TECHNICAL DATA






| BASIC DIMENSIONS (mm): | | TRACTOR TYPE | | | |
|---|---|---|---|---|---|
| | | **82A II** | **82SA II** | **82TSA II** | **1025A II** |
| Length | **A** | 3955-4120 | 4105-4590 | 4105-4590 | 4385-4870 |
| Width | **B** | 1970-2550 | 1970-2550 | 1970-2550 | 1970-2550 |
| Axle base | **C** | 2450 | 2450 | 2450 | 2570 |
| Rear overhang | **D** | 945-1010 | 1010-1120 | 1010-1120 | 1170-1280 |
| Front overhang | **E** | 560-660 | 645-1020 | 645-1020 | 645-1020 |
| Rear axle wheel track | **F** | 1400-2083<br>1400-2100 –technicaly admissible<br>1400-3014 – technicaly admissible for twin tyres | | | |
| Front axle wheel track | **G** | - Oś 822-2300020-04: 1350-1970<br>- Oś 822-2300020-02: 1470-2090 | | | 1350-1970 |
| Height | **H** | 2746-2781 | | | 2780-2802 |
| Height | **I** | 2744-2779 | | | 2754-2776 |
| Ground clearance | **P** | 310-360 | 310-360 | 310-360 | 415-465 |

| BASIC WEIGHTS (kg): | TRACTOR TYPE | | | |
|---|---|---|---|---|
| | **82A II** | **82SA II** | **82TSA II** | **1025A II** |
| Empty weight (without load,ready to work) | 4950 | 5050 | 4950 | 5115 |
| Weight distribution for axles: | | | | |
| - front | 2230 | 2193 | 2230 | 2232 |
| - rear | 2720 | 2857 | 2720 | 2883 |
| Admissible total weight | 5464-7000 | 5464-7000 | 5464-7000 | 5464-8000 |
| Admissible front axle load | 2360-2500 | 2360-2500 | 2360-2500 | 2360-2800 |
| Admissible rear axle load | 3104-4500 | 3104-4500 | 3104-4500 | 3104-5200 |
| Admissible towed weight w/o brakes | 3500 | 3500 | 3500 | 3750 |
| Admissible towed weight with inertial brake (overrun brake) | 3500 | 3500 | 3500 | 3750 |
| Admissible towed weights with brakes independent from towing vehicle (activated from operator seat) | 3500 | 3500 | 3500 | 3750 |
| Admissible towed weights with brake activated with one touch with tractor’s main brake | 18000 | 18000 | 18000 | 18000 |

| BASIC CAPACITIES (l): | TRACTOR TYPE | | | |
|---|---|---|---|---|
| | 82A II | 82SA II | 82TSA II | 1025A II |
| Fuel tank | 155 | | | |
| Engine lubrication system | 15 | | | |
| Drive system [ l ] | | | | |
| - gearbox; rear axle | 40 | | | 47 |
| - main transmission of the front axle | 4,5 | | | |
| - front axle spur gears [ l ] | 2 x 2,0=4 | | | |
| Hydraulic system [ l ] | 35 | | | |
| Steering system [ l ] | 6 | | | |

| ENGINE | TRACTOR TYPE | | | |
|---|---|---|---|---|
| | 82A II | 82SA II | 82TSA II | 1025A II |
| Model | D-245.43S2 | | D-245.5S2 | D-245S2 |
| Type | Four-stroke, with self-ignition | | | |
| Type of injection | direct | | | |
| Number of cylindres | 4 | | | |
| Cylinder diameter/piston stroke | 110/125 | | | |
| Cubic capacity, $cm^3$ | 4750 | | | |
| Compression ratio | 17±1 | | | |
| Elementary fuel consumption g/kWh | 229 | | 229 | 249 |
| Cooling | liquid | | | |
| Minimum rotation speed [rpm] | 800±50 | | | |
| Air filter | With replaceable filtering insert DONALDSON | | | |
| Turbocharging | yes | | | |
| Nominal engine rotation [rpm] | 1800 | | | 2200 |
| Nominal power (kW) at [rpm] | 58,7±2<br>1800 | | 66,7±2<br>1800 | 77±2<br>2200 |
| Max torque [Nm] /at [rpm] | 398/1400 | | 451/1400 | 429/1600 |

| DRIVE SYSTEM | TRACTOR TYPE | | | |
|---|---|---|---|---|
| | 82A II | 82SA II | 82TSA II | 1025A II |
| **Clutch** | | | | |
| Type | Friction, dry, single-stage | | | |
| Number of dics | 1 pc | | | 2 pcs. |
| **Gearbox** | | | | |
| Typ | Mechanical reductor, non-synchroni-sed | Mechanical, reductor, synchronised | | |
| Number of gears: | | | | |
| - forward | 18 | 14 | | 16 |
| - reverse | 4 | 4 | | 8 |
| **Rear axle** | | | | |
| Main transmission gear | Toothed, conical with evolvent teeth | | | |
| **Front axle** | | | | |
| Type | Beam type with planetary reductors | | | |
| Max. calculated speed at highest gear (kph) (tolerance 5% admissible) with tyres: | | | | |
| 15.5R38 | 37.11 | | | 34,30 |
| 16.9R38 | 39,58 | | | - |
| 18.4R34 | 38,09 | | | 35,22 |
| 11.2R42 | 37,11 | | | 34,30 |
| Max. measured speed at highest gear (kph) (tolerance 5% admissible) with tyres: | | | | |
| 15.5R38 | 42.02 | 40,0 | | 37,4 |
| 16.9R38 | 44,81 | 42,7 | | - |
| 18.4R34 | 43,13 | 41,1 | | 38,4 |
| 11.2R42 | 42,02 | 40,1 | | 37,4 |

| STEERING SYSTEM | TRACTOR TYPE | | | |
|---|---|---|---|---|
| | 82A II | 82SA II | 82TSA II | 1025A II |
| Kind | hydrostatic | | | |
| Type | With double-action cylindre | | | |
| Minimum turning radius w/o brakes, (m) | 10 | | | 11,3 |

| BRAKE SYSTEM | TYP CIĄGNIKA | | | |
|---|---|---|---|---|
| | 82A II | 82SA II | 82TSA II | 1025A II |
| Main brake | Foot-operated, with hydraulic-mechanical transmission to rear wheels. Dry brake with two or three discs, connected with wheel above the rear axle. Brake lining kevlar-based, without asbestos. | | | |
| Parking brake | Hand-operated, with mechanical transmission to rear wheels. Dry brake with two discs, differential, connected with wheel above the rear axle. Brake lining kevlar-based, without asbestos. | | | |

| HYDRAULIC SYSTEM | TRACTOR TYPE | | | |
|---|---|---|---|---|
| | 82A II | 82SA II | 82TSA II | 1025A II |
| Nominal pressure MPa | 18,5-20 MPa | | | |
| Pump output [$dm^3$/min] | 45 | | | |
| 3-point hitch | 2 cat. ISO | | | |
| External hydraulics | 3 pairs of quick-release connectors type ZSR | | | |
| Hoist lifting capacity (in the axis of openings in lower pull rods), kg | 3500 | 4500 | 3500 | 4500 |
| Hoist lifting capacity (at the distance 610 mm from the axis of openings in lower pull rods) | 2183 | 2750 | 2183 | 2795 |

| ELECTRICAL SYSTEM | TRACTOR TYPE | | | |
|---|---|---|---|---|
| | 82A II | 82SA II | 82TSA II | 1025A II |
| Battery | 2 pcs 12V, 88Ah | | | |
| Starter voltage/power | 24V/3,9kW | | | 24V/5,9kW |
| Alternator power [ W ] | 1000 | | | |

| POWER TRANSMISSION SHAFT | TRACTOR TYPE | | | |
|---|---|---|---|---|
| | 82A II | 82SA II | 82TSA II | 1025A II |
| Type | Independent and dependent | | | |
| Independent PTS rotation and corresponding engine rotation speed [rpm] | 540 / 1632<br>1000 / 1673 | | | 540 / 2037<br>1000 / 2157 |
| PTS end diameter WOM[mm] | 35 | | | |
| Number of splines | 6 (for 540 rpm)<br>21 (for 1000 rpm) | | | |

| HITCHES / BRACKETS | TRACTOR TYPE | | | |
|---|---|---|---|---|
| | 82A II | 82SA II | 82TSA II | 1025A II |
| Front bracket | Fork-type | | | |
| Agricultural bracket : | Fork-type, deflectable | | | |
| - max vertical load | 6,5 kN | | | |
| Upper transport bracket | Fork-type | | | |
| - max vertical load | 5 kN | | | |
| Lower transport bracket | „hich”-type, hoist-controlled | - | „hich”-type, hoist-controlled | |
| - max vertical load | 14 kN | - | 14 kN | 18 kN |

| ADDITIONAL EQUIPMENT | TRACTOR TYPE | | | |
|---|---|---|---|---|
| | 82A II | 82SA II | 82TSA II | 1025A II |
| Hydraulic system BOSCH (PRONAR-82SA II) | no | yes | no | no |
| Coolant heater | yes | yes | yes | yes |
| Reduction gear for crawling gears | yes | yes | yes | no |
| Air-condition | yes | yes | yes | yes |
| Seat type GRAMMER | yes | yes | yes | yes |
| Twin wheels | yes | yes | yes | yes |

**CAUTION: Due to constant improvement and modernisation of PRONAR products, technical data of manufactured tractors may differ slightly from above-mentioned**

NOTES

NOTES