



**Translation of the
original operating manual**

Grassland harrow

GS 300 M1 & GS 600 M1

Read carefully before initial operation!

Version: 01/2018, V1.12



Item no.: 00605-3-613

It may NOT

seem inconvenient and unnecessary to read and observe the operating instructions. It is not enough to hear and see from others that an implement is good, and then to buy it and believe that everything takes care of itself. The person concerned would then not only cause damage to himself, but also make the mistake of assuming that the cause of any problems is due to the implement, instead of himself. To ensure success, one has to go into the spirit of things, and instruct oneself about the purpose of all equipment on the implement and gain experience with its handling. Only then can one be satisfied both with the implement and oneself. These operating instructions aim to achieve this.

Leipzig-Plagwitz 1872

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EC Declaration of Conformity **according to the EC Machinery Directive 2006/42/EC**

We hereby declare that the implement described in the following meets the basic safety requirements in Annexe I of the EC Machinery Directive 2006/42/EC. This declaration loses its validity in cases of non-intended use and if changes are made to the implement that were not approved by the manufacturer.

Manufacturer: APV-Technische Produkte GmbH,
Dallein 15, A-3753 Hötzelstdorf

Designation of the product: **Grassland harrow GS 300 M1**
Number: **MA-5**
Serial number: all serial numbers for the
Grassland harrow GS 300 M1

Designation of the product: **Grassland harrow GS 600 M1**
Number: **MA-5**
Serial number: all serial numbers for the
Grassland harrow GS 600 M1

Legal authorised person
for the technical documents: APV-Technische Produkte GmbH,
Dallein 15, A-3753 Hötzelstdorf

Conformity procedure: **Machinery Directive 2006/42/EC Annex I**

Conformity with the following directives:
2006/42/EC Machinery Directive
2004/108/EC EMC Directive

Applicable standards:
EN 349 Safety of machinery – Minimum gaps to avoid crushing of parts of the human body
EN 60204-1 Safety of machinery – Electrical equipment
ISO 12100 Safety of machinery; General principles for design; Risk assessment and risk reduction
ISO 13857 Safety of machinery – Safety distances
ISO 14982 Agricultural and forestry machinery — Electromagnetic compatibility — Test methods and acceptance criteria

Dallein, 01/2018
City, Date



Ing. Jürgen Schöls
Management

1 Provisions

Dear customer!

We are pleased and congratulate you on your purchase and wish you lots of fun and success in working with this implement!

Please be sure to read all the instructions in this operating manual before operating the implement!

2 Warranty

Please check the implement for any transport damage immediately upon receipt. Later claims regarding transport damage can no longer be considered.

We provide a six-month factory warranty as of the date of delivery (your invoice or the delivery slip serve as a warranty certificate).

This warranty is applicable for cases of material or construction faults and does not include parts that are damaged by normal or excessive wear.

The warranty expires

- if damage is caused by external forces.
- in cases of operating errors.
- if the kW/HP limits are significantly exceeded.
- if the implement is modified, expanded or equipped with third-party spare parts without our permission.

3 Accident prevention

The general accident prevention regulations of the respective countries must be observed.

Always secure the parked implement against unintentional rolling.

The implement may only be used by persons who are informed of the hazards and who know the regulations for transport on public roads.

4 Transport on public roads (most important specifications)

The axle load and the total weight of the towing vehicle may not be exceeded.

The mounted implement must be identified with warning signs or stickers with red and white slanted lines (according to DIN, ÖNORM or respective STANDARDS) according to the regulations of the specific country.

Any part posing a traffic hazard or dangerous parts must be covered and additionally identified

with warning signs or stickers. Warning signs or stickers should be visible at a height of max. 150 cm above the road when driving.

Lighting equipment on the towing vehicle may not be hidden by the implement, otherwise they must be installed on the mounted implement.

The steering capacity of the tractor must not be impeded or reduced by the mounted implement!

Semi-mounted implements may only be towed on public roads with an operating permit.

Hydraulic implements must be folded in transport position.

Ensure that the stop tap is closed or the safety chains are hooked.

Also ensure that none of the safety splints were lost during operation.

Comply with the regulations of your country's legislation.

Only relieve the hydraulic hose at home by putting the tractor control unit into float position. The holder for the warning signs (additional equipment) is mounted on the bracket for the harrow array (see point 17 Accessories).

When driving on roads after field operation, the harrow arrays should be cleaned of harrowing residues (soil, grass, etc...).

5 Operating manual for the grassland harrow

5.1 Mounting on the tractor

Under difficult operating conditions, additional wheel weights can be useful. Please also refer to the operating manual from the tractor manufacturer.

The tractor should be equipped with sufficient ballast weight at the front to ensure the steering and braking capacity. At least 20 % of the empty vehicle weight is required on the front axle.

The lifting links must be adjusted to the same height on the left and on the right. The implement must be mounted on the 3-point linkage of the tractor.

Mount the top link so that it slants down towards the tractor during operation. (Observe the specifications from the tractor manufacturer.)

Adjust the side rods so that the implement can swing freely on the field, but is fixed when the implement is lifted.

5.2 Safe parking

To ensure safe parking of the implement, fold both parking supports down as shown in Fig.: 1. On the GS 600 M1, you also have to fold down the third parking support (rear). On the GS 300, either position the levelling plate further down or, if a pneumatic seeder is mounted, you can also use the third parking support.



Fig.: 1

With hydraulic folding, you must hook the safety chain onto the side wings and also lock the 2/2-way ball valve, which is located on the folding cylinder. Then the pressure in the hydraulic hoses to the tractor must be relieved.

5.3 Test folding of the grassland harrow (with hydraulic folding)

Couple the hydraulic line plugs (ensure that they are always kept clean). Fill the cylinder with oil. The cylinder is filled as soon as the safety chains are relieved. Unhook the safety chains and hook onto the other end of the chain. Ensure that no one is standing in the danger area and that you only fold the implement when it is lifted from the ground. When folding into transport position, the implement must also be lifted from the ground. Do not forget to hook on the safety chains or to close the stop tap.

6 Working position and setting the working depth

The height-adjustable levelling plate removes coarse unevenness in the grassland and spares the tines unnecessary strain.

Due to the narrow line distances of these individual tines (75 mm for 10/12 mm tines and 50 mm for 8 mm tines), the sward is optimally prepared and the plants can germinate rapidly after reseeding.

The two front tine rows tear up the sward. The rear tine rows produce an optimal seedbed for the new grasses.

If the rear tines should work more aggressively, you can choose one of four levels. At an optimal forward speed, the tines make an elliptical motion. The steeper the position of the tines, the smaller the motion. The flatter the position of the tines, the larger the motion. If the sward is dense and intense tillage is required, the tines should be positioned more steeply (see Fig.: 2).

The front and rear tine rows should penetrate the soil to the same depth (working depth).

If the 10/12 mm tines should work more intensively, position the feeler wheels higher up.

If the 8 mm tines should work more intensively, extend the top link.

The tine aggressiveness is set using an adjustment lever. One adjustment lever per row and array (Fig.: 2). Depending on the soil type, more load can be applied to the tines through the array and the frame.



To scatter molehills effectively, front scraping plates are offered (for an additional charge). The mounting position of these front scraping plates is shown in Fig.: 3. Stop bars are inserted in the joints of the side wings (see Fig.: 4). On hilly terrain, these can be removed to achieve better ground adaptation. The stop bars can be stored in the accessories roll. Repositioning of the stop bars is only possible in transport position.



Fig.: 3



CAUTION: Driving in curves is not permitted. If it should be necessary after all, these curves must be driven in a very large radius.

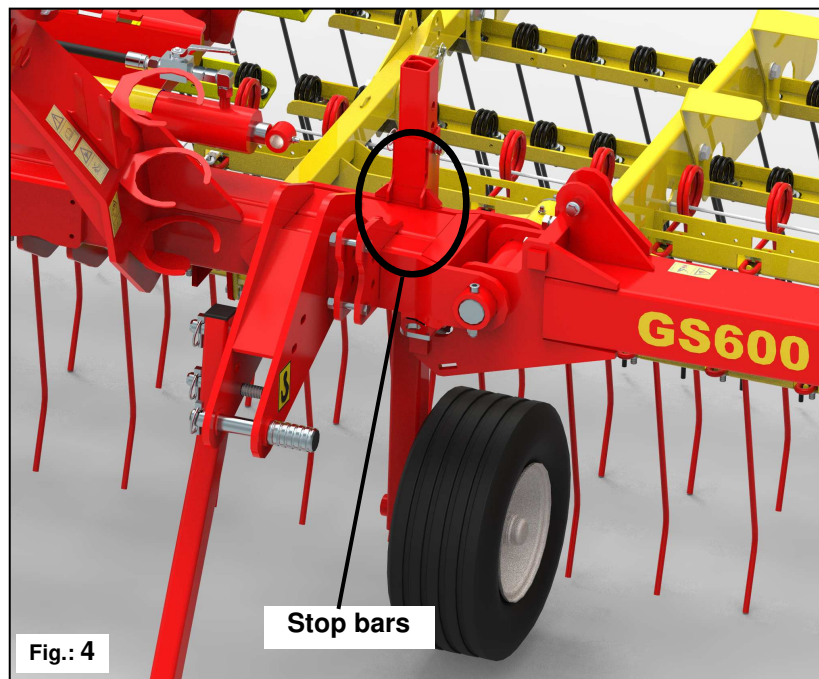


Fig.: 4

6.1 Levelling plate (optional)

The levelling plate (optional) eliminates molehills after the winter and serve to roughly level the grassland. The height should be adjusted so that it runs along the sward just above the ground. It should not scratch into the sod.

To adjust the levelling plate, the pins must first be removed. If you have the GS 600 M1, then you can adjust the two outer wings by hand. To be able to adjust the larger centre array, it is better to remove the pins and to adjust the height of the levelling plate with the tractor hydraulic system. When the desired working height is reached, the plate is fastened again with the pin and linch pin.

The design of the levelling plate on the GS 300 M1 is the same as the centre array of the GS 600 M1.



Fig.: 5

To optimise the guidance of the levelling plates/harrow arrays, the feeler wheels also have to be adjusted. This is achieved as follows:

- Use the supplied adjustment handle.
- Put the handle into position as shown in Fig.: 5 and clamp or fix it with the pin.
- Remove the pin that holds the feeler wheel and use the hook to move it to the desired position.

7 Adjustment spindle

To simplify the adjustment of the middle levelling plate, the "Adjustment spindle accessories kit" can be purchased. To do this, the spindle is turned up until the pins that secure the levelling plate are relieved. Then the pins are removed and the levelling plate can be moved to the desired depth. The pins are inserted back into the adjustment grid and the spindle is turned up/down until it is relieved again.



Fig.: 6

8 Maintenance and care

When the implement is lifted off of the ground, the two side wings of the frame should be pointing slightly down. If this is not the case or if the wings are pointing down too much, the stop bolts on the joint must be adjusted.

To maintain the implement in good condition even after a long service life, the following instructions must be observed:

- ✓ In the supplement "For your safety..." you will find some basic safety regulations for maintenance work.
- ✓ Original parts and accessories are designed especially for the machines or implements.
- ✓ Please note that parts and accessories not supplied by us have also not been tested and approved by us.
- ✓ The installation or use of such products can therefore possibly negatively change or impede the constructional properties of your implement. The manufacturer rules out any liability for damages resulting from the use of non-original parts and accessories.
- ✓ The manufacturer is not liable for any unauthorised modifications and the use of components and auxiliary parts.
- ✓ All bolted connections should be re-tightened at the latest after 3 operating hours and again after 20 hours, and then checked regularly. Loose bolts can cause significant consequential damage, which is not covered by the warranty.
- ✓ The grease points on the joints and bearings must be lubricated regularly (approx. every 10 operating hours with universal grease).
- ✓ For implements with fast coupler, the guide slots must also be lubricated.

- ✓ After the first 10 operating hours and subsequently every 50 operating hours, the hydraulic units and tube lines must be checked for leaks and the bolted connections must be tightened if necessary.
- ✓ Check the hydraulic hoses for wear before every operation.
- ✓ Caution!!! Liquids escaping under high pressure can penetrate the skin. For this reason, a physician must be consulted immediately in case of accident!!!
- ✓ After cleaning, lubricate all of the grease points and distribute the grease evenly in the bearing points (e.g. perform a short test run).
- ✓ Do not use a high pressure cleaner to clean bearing and hydraulic parts.
- ✓ The paint can be damaged by cleaning with excessive pressure.
- ✓ During the winter, the implement should be protected against rust with an environmentally-friendly product.
- ✓ Park the implement protected from weather conditions.
- ✓ Hydraulically as well as mechanically folded implement must only be parked in a folded state.
- ✓ Put down the implement in a way that the tines are not needlessly strained.
- ✓ Occasionally check the tyre inflation pressure (tyres 16x6.50 approx. 2 bar, 18x8.50 approx. 3 bar).

9 Location of the rating plate

The rating plate is found on the main frame beside the mounting frame bracket.

In cases of inquiries or warranty claims, please always tell us the production number of your implement.



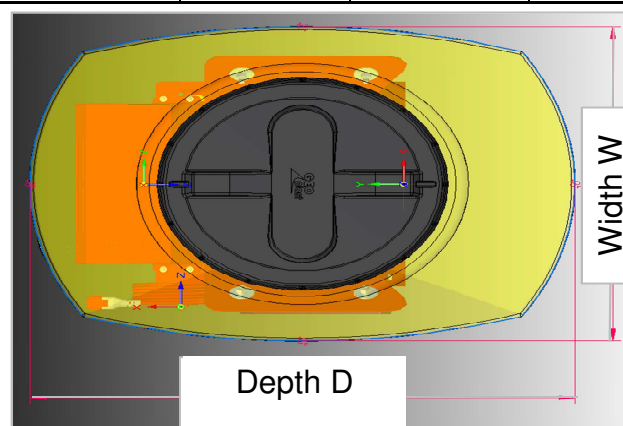
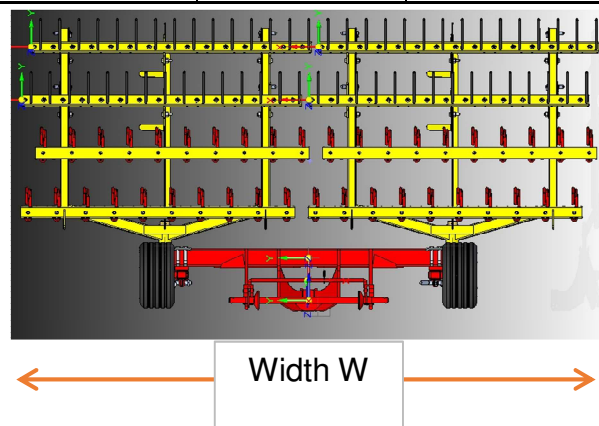
Fig.: 7

10 Technical Specifications

Type designation:	GS 300 M1 GS 600 M1
Mode of action:	Levelling with leaf springs with wear plate 2 rows of aggressive 10 or 12 mm round spring tines 2 rows of 8 mm round spring tines
Working width:	3 m 6 m
Transport width:	3 m
Dimensions (W x H x D in m):	3 x 1.3 x 1.9 3 x 3 x 1.9 (folded)
Working depth:	0-30 mm
Number of tines [Ø8 / Ø10 / 12 mm]:	60/40 tines 120/80 tines
Line distance [Ø8 / Ø10 / 12 mm]:	50 mm 75 mm
Mounting/hitch (three-point,...):	Mounting – Cat II/Cat IIN
Net weight:	300 kg for the GS 300 M1 700 kg for the GS 600 M1
Leading tools:	Levelling is spring-suspended and height-adjustable (optional)
Working tools:	Round spring tines
Ground adaptation:	Individual harrow arrays with a width of 1.5 m Oscillating bearing → Ground adaptation of 7 cm height is possible
Minimum tractor performance:	20 kW 50 kW
Special accessories:	Lighting for the warning signs Spring-mounted levelling plate Access platform for the PS series Front headstock Operating hours counter Mounting kit for PS 120–300 Sensor set – Wheel + top link lifting unit sensor PTO shaft fan accessories kit Accessories kit for the adjustment spindle
Can be equipped with:	PS 120 M1, PS 200 M1, PS 300 M1 with electric or hydraulic fan

TD combination options GS – PS

					PS120 E	PS200 E	PS200 H	PS300 E	PS300 H	Parts for mounting
GS/PS	Dimensions (delivery) LxWxH [m]	Dimensions (road transport) LxWxH [m]	Dimensions (road transport) LxWxH [m]	GS weight [kg]	Dimensions HxWxD [cm]	Dimensions HxWxD [cm]	Dimensions HxWxD [cm]	Dimensions HxWxD [cm]	Dimensions HxWxD [cm]	
		Without PS	With PS300	Without PS	90x60x80	100x70x90	100x70x110	110x80x100	110x80x115	
GS300	1.85x3.00x1.30	1.85x3.00x1.16	1.83x3.00x1.95	~ 300	YES	YES	YES	YES	YES	Mounting kit PS120-300
GS600	2.00x3.00x2.34	2.00x3.00x2.94	2.00x3.00x2.94	~ 700	YES	YES	YES	YES	YES	



11 Hydraulic diagram GS 600 M1

Hydraulic folding of the GS 600 M1:

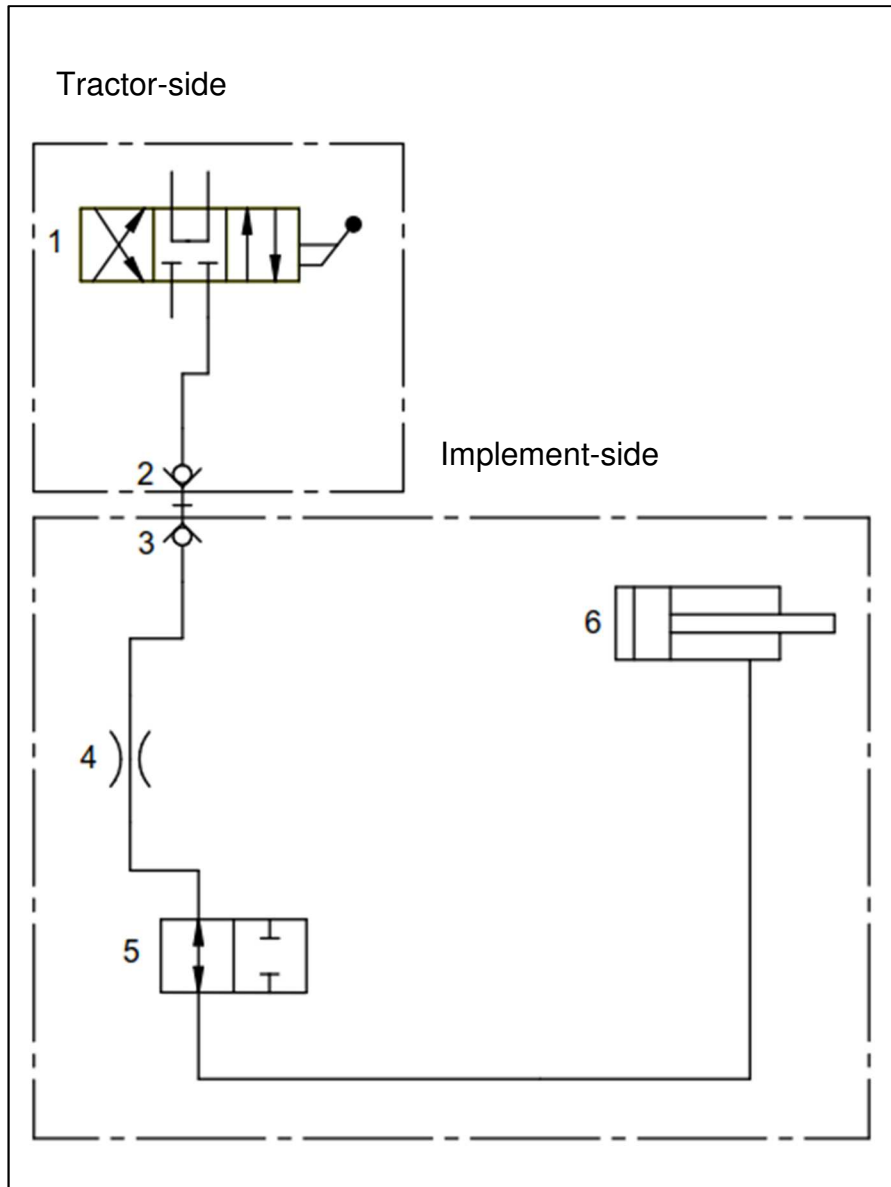


Fig.: 8

1	Control unit
2	Coupling sleeve BG 2
3	Coupling plug BG 2
4	Throttle disc
5	2/2-way ball valve
6	Hydr. folding cylinder

12 Changing the tines

To replace broken or worn tines, all you have to do is loosen the nut and take out the tine (for 8 mm and 10/12 mm tines).

- As shown in the image on the left (Fig.: 9), you must hook on the new 10/12 mm tines and re-tighten the nuts.
- As shown in the image on the right (Fig.: 10), the 8 mm tines must be fastened with the bolt. Ensure that the bolt rests firmly on the tine and that all tines form a straight line. The large flat washer should rest on the tine.



Unscrew the nut



13 Tine safety

As a standard, the GS series is equipped with a tine safety that prevents loss of the 10/12 mm tines by means of a rope. It protects the tines so that they do not get lost on the pasture or on the field. This also prevents damage to other implements, e.g. the mower or the baler.



14 Road transport of the GS 300 M1/ GS 600 M1

14.1 General

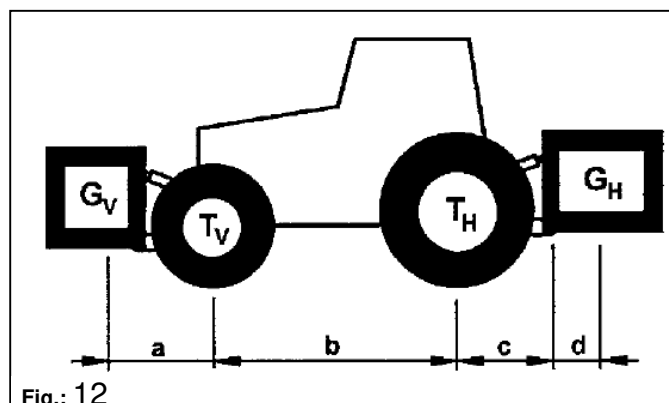
- Check that none of the safety splints or similar were lost during operation.
- Comply with the regulations of your country's legislation.
- Only relieve the hydraulic hoses at home by putting the tractor control unit into float position.
- The holder for the warning signs with lighting (additional equipment) is mounted on the bracket for the harrow array.

14.2 Calculation of the weight ratios

If you want to drive with an implement that is attached to the 3-point linkage, you must ensure that you do not exceed the tractor's permissible axle loads and tyre load capacities with the mounted implement.

The front axle of the tractor must be loaded with at least 20 % of the net weight of the tractor.

All of these values can be determined with this calculation:



Specifications:

- T_L Tractor net weight
 T_V Front axle load for the empty tractor
 T_H Rear axle load for the empty tractor
 G_H Total weight of the rear-mounted implement
 G_V Total weight of the front-mounted implement

- a Distance from the centre of gravity of the front-mounted implement to the centre of the front axle
 b Wheelbase of the tractor
 c Distance from the centre of the rear axle to the centre of the lower link ball
 d Distance from the centre of the lower link ball to the centre of gravity of the rear-mounted implement

Weight calculations

1. Calculation of the minimum front ballast for rear-mounted implements $G_{V \min}$:

$$G_{V \min} = \frac{G_H \cdot (c + d) - T_V \cdot b + 0,2 \cdot T_L \cdot b}{a + b}$$

This result is entered in the table on the next page.

2. Calculation of the minimum rear ballast for front-mounted implements $G_{H \min}$:

$$G_{H \min} = \frac{G_V \cdot a - T_H \cdot b + 0,45 \cdot T_L \cdot b}{b + c + d}$$

This result is also entered in the table.

3. Calculation of the actual front axle load $T_{V \text{tat}}$:

If the required minimum front ballast ($G_{V \min}$) is not reached with the front-mounted implement (G_V), the weight of the front-mounted implement must be increased to the weight of the minimum front ballast!

$$T_{V \text{tat}} = \frac{G_V \cdot (a + b) + T_V \cdot b - G_H \cdot (c + d)}{b}$$

Now enter the calculated actual front axle load and the permissible front axle load specified in the tractor operating manual in the table.

4. Calculation of the actual total weight G_{tat} :

If the required minimum rear ballast (G_H) is not reached with the rear-mounted implement ($G_H \min$), the weight of the rear-mounted implement must be increased to the weight of the minimum rear ballast!

$$G_{\text{tat}} = G_V + T_L + G_H$$

Now enter the calculated total weight and the permissible total weight specified in the tractor operating manual in the table.

5. Calculation of the actual rear axle load $T_{H \text{tat}}$:

$$T_{H \text{tat}} = G_{\text{tat}} - T_{V \text{tat}}$$

Now enter the calculated actual rear axle load and the permissible rear axle load specified in the tractor operating manual in the table.

6. Tyre load capacity:

Enter the doubled value (two tyres) for the permissible tyre load capacity (see e.g. tyre manufacturer documents) in the table.

The minimum ballast must be attached to the tractor as a mounted implement or ballast weight!
The calculated values may not be higher than the permissible values!

Table:

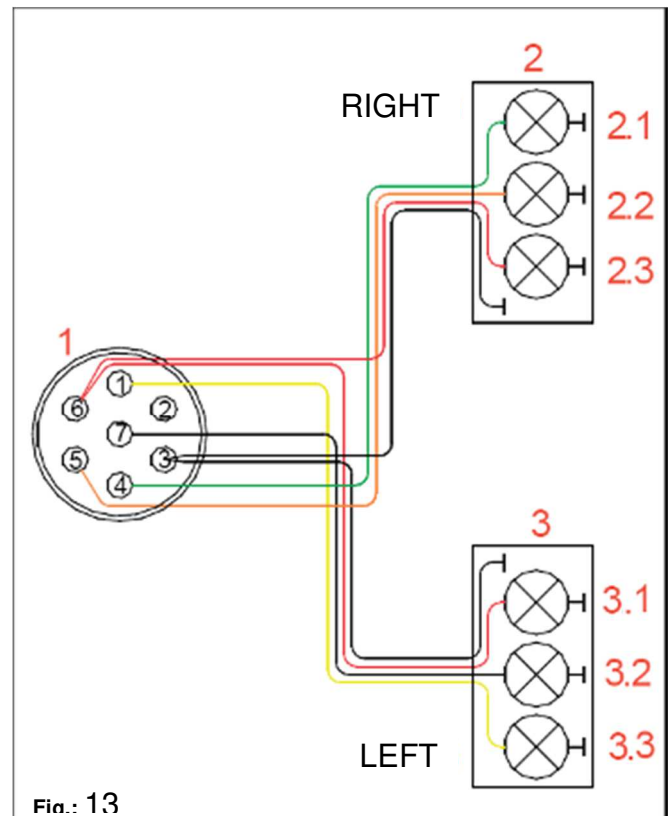
	Actual value acc. to calculation		Permissible value acc. to operating manual		Double the permissible tyre load capacity (2 tyres)
Minimum ballast front/rear	kg				
Total weight	/ kg	≤	kg		kg
Front axle load	kg	≤	kg	≤	kg
Rear axle load	kg	≤	kg	≤	kg

15 Lighting circuit diagram

- 1 12 V plug, 7-pin
- 2 Rear light, right
- 2.1 Turn signal
- 2.2 Rear light
- 2.3 Brake light
- 3 Rear light, left
- 3.1 Brake light
- 3.2 Rear light
- 3.3 Turn signal

Plug and cable assignment:

No.	Des.	Colour	Function
1	L	Yellow	Turn signal, left
2	54g	---	---
3	31	White	Earth
4	R	Green	Turn signal, right
5	58R	Brown	Rear light, right
6	54	Red	Brake light
7	58L	Black	Rear light, left



16 Cropping tips for using the GS 300 M1/ GS 600 M1

Seedbed preparation is always required before reseeding. With the grassland harrow GS 300 M1 / GS 600 M1, this procedure is optimally accomplished with 4 tine rows.

With its thorough and effective mode of action, the GS 300 M1 / GS 600 M1 can be optimally integrated in your overall management concept.

The goal of your concept will be to improve yields and to increase the valuable grasses.

Other effects of tilling your fields with the GS 300 M1 / GS 600 M1, such as

- Soil aeration,
- Regulation of the water balance,
- Incorporation of the seed and
- Promoting tillering

make a significant contribution to the formation of good crops.

The success of weed control without chemicals and high yields, however, depend very strongly on you, as you will be required to closely observe the processes in your soil.

Reseeding of grassland is theoretically possible during the entire frost- and snow-free period. Gaps in the crops should already be reseeded in the spring to prevent weed competition. As a matter of principle, you should reseed more frequently and therefore work less aggressively and reduce the seed quantity.

Reseeding can be performed in the spring as soon as the soil has warmed up a little. The soil must have good trafficability, i.e. the seed should not be "smeared in" in any case.

Reseeding in the spring has the advantage that the spring humidity and the disturbed soil can be used as a seedbed. However, despite good germination, the grass can dry out during a summer drought, and the pressure of the old sod is greater in the spring due to the stronger growth spurt.

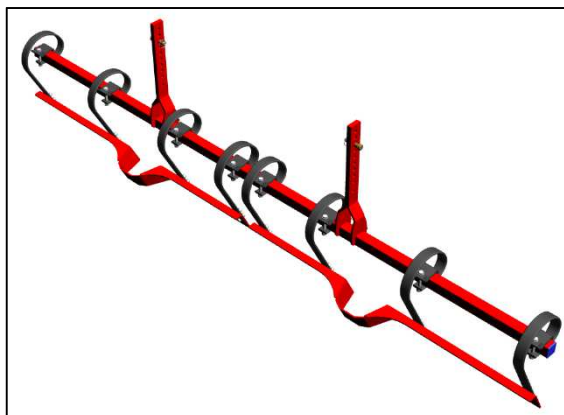
The optimal strength and depth setting, forward speed and the adjustment of the tines and seeding rate must be set with your understanding of the correlations between the soil properties and weather conditions, which can vary greatly in different regions.

17 Accessories

- **Spring-suspended levelling plate for the GS 300**

To level molehills or undulations.

Item no.: 07001-2-022



- **Warning signs and lighting for the GS**

Is required when the GS is transported on public roads.

Item no.: 07000-2-018



- **Warning signs and lighting for the front-mounted GS**

Is required when the GS is transported on public roads.

Item no.: 07006-2-004



- **Operating hours counter**

A vibration sensor detects the vibrations of the implement and starts the operating hours counter.

Item no.: 00602-3-659



- **Mounting kit for the PS 120 – 300 M1 on the GS 300 M1**

Is used to mount a pneumatic seeder on the grassland harrow.

Item no.: 07000-2-008



- **Access platform for the GS**

When mounting on the GS 300, the mounting kit for the PS 120 – 300 M1 (item no.: 07000-2-008) must also be ordered (if not already available).

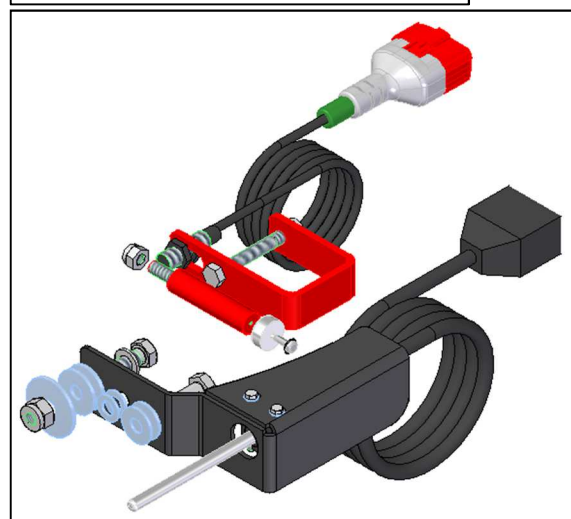
Item no.: 07000-2-019



- **Sensor set: Wheel sensor + tractor linkage upper bar sensor for the GS**

Is used for ground speed-dependent crop establishment or for stopping the spreading when the implement is lifted at the headlands.

Item no.: 07000-2-030



- **Access platform for GS 300 M1 front headstock**

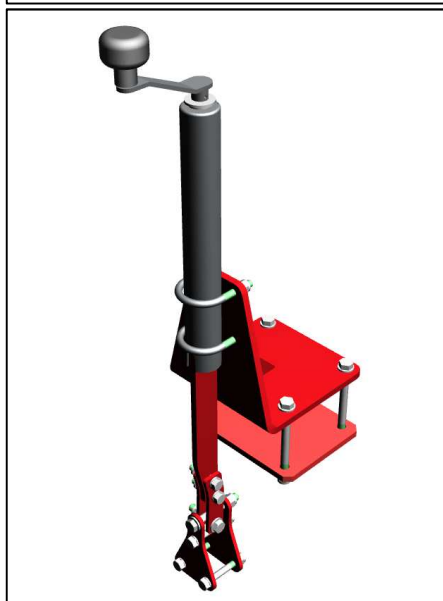
Item no.: 07007-2-001



- **Accessories kit for the adjustment spindle GS 300 M1**

Is used to facilitate height adjustments of the levelling plate.

Item no.: 07001-2-023



- **Front headstock GS 300 M1**

Incl. mounting kit for the PS 120 – 300 M1

For operating the grassland harrow GS 300 M1 at the front.

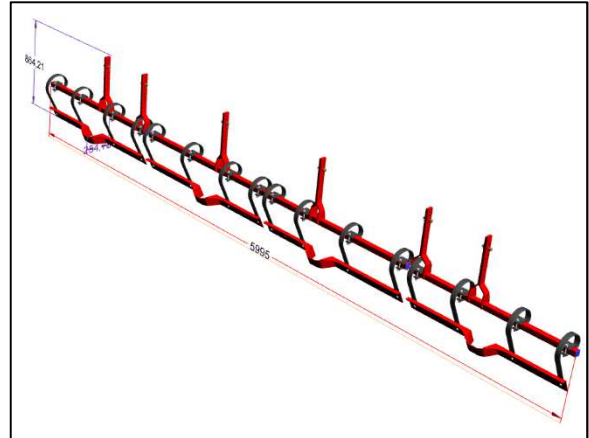
Item no.: 07007-1-001



- **Spring-suspended levelling plate for GS 600**

To level molehills or undulations.

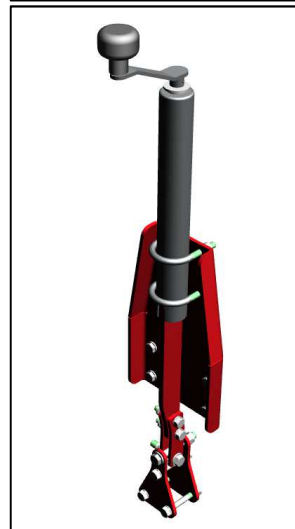
Item no.: 07002-2-036



- **Accessories kit for the adjustment spindle GS 600 M1**

Is used to facilitate height adjustments to the middle levelling plate.

Item no.: 07000-2-041

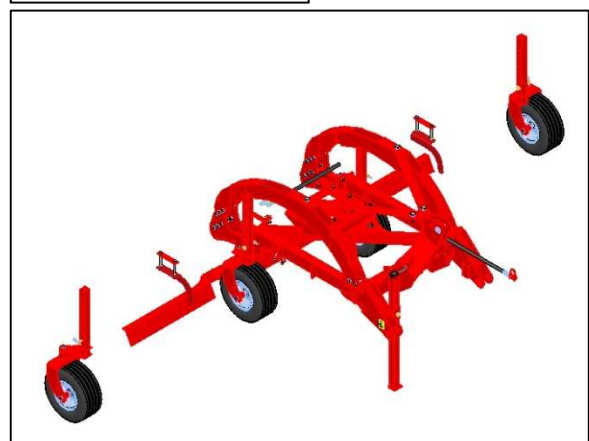


- **Front headstock GS 600 M1**

Incl. mounting kit for PS 120 - 300 M1

For operating the grassland harrow GS 600 M1 at the front.

Item no.: 07006-1-000



- **Access platform for GS 600 M1 front headstock**

Item no.: 07006-2-003



18 My idea

The **GS 300 M1 / GS 600 M1** were extensively developed and tested. It took a long time from the initial idea to serial production. It required lots of commitment from individual employees and the entire development team.

We collaborated with universities, specialists from the field and initiated research projects.

Nonetheless, the most valuable experience is gained in practice. Our motto:

"Inspired by Farmers & realized by Professionals."

For this reason, YOU are also the most important person for the development of agricultural machinery for practical use.

Without taking consideration of your opinions, experiences, enthusiasm, desires, and also your troubles, further development and constant improvement of our implements would not be possible.

We are now giving you the opportunity to effectively contribute to the development and improvement of our machines.

Tell us about the positive and negative experiences you have had with the machine.

Share your suggestions for improvement and your wishes!

Take pictures or draw a sketch, we are open and grateful for any information, no matter in what form.

Send this information to meineidee@apv.at, fax it to +43/2913/8002 or send us a letter to our address. Key word: My idea.

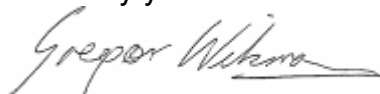
The information will be forwarded directly to our construction department and will be discussed and considered. Please do not forget to tell us the serial number of your machine.

Please understand that we cannot take suggestions for improvement by phone, since it requires too much organisation. However, if you still wish for personal contact, you can share your experiences with our sales representatives at fairs and field days. Of course, we are there for you at all times if you have an urgent problem. Please just call us or direct your inquiry to the nearest distribution partner.

Good ideas are important to us – and will therefore also be rewarded. If one of your ideas is implemented, you will receive a practical gift as a token of our appreciation.

I thank you in advance for your constructive suggestions and remain

Sincerely yours



Ing. Gregor Witzmann
Development / Engineering

19 Safety instructions



For your safety...

This supplement to the operating manual contains general rules of conduct for the intended use of the implement and safety-related information that should always be observed for your personal safety.

The list is very extensive, and some of the information does not apply exclusively to the delivered implement. However, the summary of the information often reminds you of unconsciously neglected safety regulations for the everyday operation of machines and implements.

19.1 Intended use

The implement is designed solely for normal use in agricultural operations (intended use).

Any other use is considered to be non-intended. The manufacturer is not liable for any resulting damage, the operator alone bears the associated risk.

Intended use also includes compliance with the conditions for operation, maintenance, and repairs prescribed by the manufacturer.

The implement may only be used, maintained and repaired by persons who have relevant experience and were instructed on the risks. The safety instructions must also be handed over to other users.

The applicable accident prevention regulations as well as the other generally safety-related, occupational health and road traffic regulations must also be observed. The manufacturer is not liable for any damage resulting from unauthorised modifications and the use of components and auxiliary parts.

19.2 General safety-related instructions and accident prevention regulations

- Check the implement and the tractor for road and operational safety before every use!
- Observe the generally applicable safety and accident prevention regulations!
- The warning and information signs applied to the implement provide important instructions for safe operation, observe them for the sake of your own safety!
- Observe the respective regulations when using public roads!
- Before starting work, get to know all of the equipment and operating elements as well as their functions. It is too late to do so during operation!
- The user should wear close-fitting clothing. Avoid wearing loose clothes!
- Keep the implements clean to reduce the risk of fire!
- Check the surrounding area before starting up and operating the implement! (Children!) Ensure sufficient visibility!
- It is not allowed to carry passengers on the implement during operation and transport!
- The implement must be coupled according to the instructions and only onto the specified devices!
- Special care must be taken when coupling and uncoupling implement to and from the tractor!
- When mounting and dismounting, put the support devices in their respective positions! (Stability)
- Always attach ballast weights at the intended attachment points according to the specifications!
- Observe the permissible axle load, total weight and transport dimensions!
- Transport equipment, e.g. lighting, warning signs and any protective equipment, must be checked and mounted!
- Triggers for fast couplers must be hanging loosely and must not trigger themselves when lowered.
- Never leave the driver's platform while driving!
- The driving behaviour, steering and braking capacity are also affected by mounted or towed implements and ballast weights. For this reason, always ensure sufficient steering and braking capacity!
- When driving in curves, take account of the wide radius and/or the centrifugal mass of the implement!
- The implement may only be operated when all of the protective devices are installed and in safety position!
- It is forbidden to stand in the working area of the implement!
- Do not stand near rotating and swivelling parts of the implement!
- Hydraulic folding frames may only be actuated when nobody is standing in the swivelling range.
- There are pinch and shear points on externally powered (e.g. hydraulic) parts!
- On implements with manual folding, always ensure that the implement is stable!
- For implements that are driven at high speeds with soil-driven tools - Danger after lifting due to the still rotating centrifugal mass! Only approach the implement when it has come to a standstill!

- Before exiting the tractor, lower the implement onto the ground, switch off the motor and remove the ignition key!
- Standing between the tractor and the implement is forbidden unless the vehicle is secured against rolling away using the parking brake and/or with wheel chocks!
- Folded frames and lifting devices must be locked in transport position!
- Packer catch arms must be swivelled in and locked before road transport!
- Lock the track markers in transport position!
- The view on the grassland harrow and the hazardous movement area must be clear (to check the procedure).
- Cleaning is recommended as specified in the maintenance instructions. The procedure in in maintenance instruction must be observed and protective equipment must be used.
- Working under the implement is forbidden.
- The implements must be checked regularly by the operator (before every use) for any fractures and cracks, chafe marks, leaks, loose bolts and connections, vibrations, unusual sounds, and to ensure they function correctly.
- Hearing protection should be used, if necessary.
- During assembly, the operator must ensure that the requirements for the tractor in terms of the power, axle loads and weight distribution as specified in the operating manual are met and that the connections specified in the operating instructions are made correctly.
- When mounting the implement, the operator must ensure that connections to the tractor hydraulic system are clean and carefully connected.
- When performing the work passes, the tractor's speed must maintained as specified in the operating manual. This can be between 6 and 12 km/h.
- Use additional lighting (e.g. flashlight) if necessary for repair or maintenance work!

19.3 Mounted implements

- Before mounting and dismounting implements on the three-point linkage, move the operating devices into the position that excludes unintentional lifting or lowering!
- For three-point mounting, the mounting categories of the tractor and the implement must match or be adapted!
- There is a risk of injury due to crushing and shearing points in the area of the three-point linkage!
- Do not stand between the tractor and the implement when actuating the external controls for the three-point mounting!
- When the implement is in transport position, always ensure that the tractor three-point linkage is sufficiently locked to the sides!
- When driving on roads with the implement lifted, the operating lever must be locked against lowering!
- When mounting the grassland harrow, the operator must ensure that there is a metallic connection made to the tractor.
- The operator must ensure that no one is standing close to the grassland harrow when it or its components are being moved by the tractor hydraulic system or when the side wings are being lifted or lowered. Visual check by the driver!

- When driving on roads, which is only permitted with the grassland harrow lifted and with folded side wings, the control block on the hydraulic cylinder prevents lowering of the grassland harrow as well as of the folded up side wings (additionally secured with a chain). This is also ensured in case of failure of the tractor hydraulic system.

19.4 Hydraulic system

- The hydraulic system is under high pressure!
- When connecting hydraulic cylinders and motors, the specified connection of the hydraulic hoses must be observed!
- When connecting the hydraulic hoses to the tractor hydraulic system, make sure that the hydraulic system on the tractor and implement side is unpressurised!
- For hydraulic function connections between the tractor and the implement, coupling sleeves and connectors should be marked to rule out operating errors! If the connections are interchanged, the function will be inverted (e.g. lifting/lowering)! – Danger of accident!
- Inspect the hydraulic hose lines at regular intervals and replace in case of damage or wear! The replacement lines must comply with the technical requirements of the implement manufacturer!
- Due to the risk of injury, use suitable tools when searching for leaks!
- Liquids escaping under high pressure (hydraulic oil) can penetrate skin and cause serious injuries! Consult a doctor immediately in case of injury! (Risk of infection!)
- Before working on the hydraulic system, park the implement, depressurize the system and switch off the motor!
- The safety chain should only be unhooked when it is relieved of tension! (cylinder must be filled with oil)

19.5 Maintenance

- Maintenance, repair, and cleaning work as well as the elimination of malfunctions should always be performed when the drive is switched off and the motor is at a standstill! – Remove the ignition key!
- Check the nuts and bolts regularly for tight fit and retighten if necessary!
- When performing maintenance on the lifted implement, always ensure safety through suitable support elements!
- When changing work tools with sharp edges, always use suitable tools and gloves!
- Properly dispose of oils, grease and filters!
- Always cut the power supply when working on the electrical system!
- When performing electrical welding work on the tractor and mounted implement, disconnect the cable on the generator and the battery!
- Spare parts must at least comply with the technical requirements specified by the implement manufacturer! This is ensured with original parts!
- Cleaning must be performed with water or compressed air. Cleaning must be carried with the implement lowered, shut down and secured to prevent it being switched on again.

19.6 Tyres

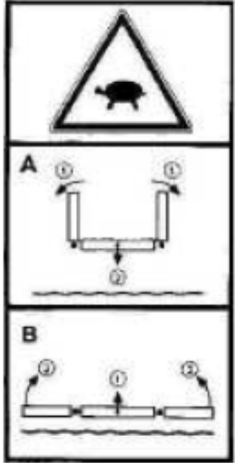
- When working on the tyres, it must be ensured that the implement is safely parked and secured against rolling away (wheel chocks).
- The mounting of wheels and tyres requires sufficient knowledge and proper installation tools.
- Repair work on the tyres may only be performed by specialists and with suitable installation tools.
- Check the inflation pressure regularly. Observe the prescribed inflation pressure.



PLEASE NOTE: Misprints, errors and omissions excepted.

20 Safety signs

Pay special attention to the stickers on the implement, as they warn you of specific dangers!



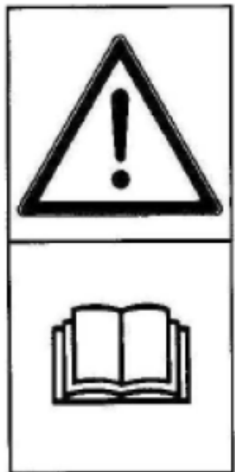
Lift the implement off the ground and slowly fold or unfold.



Standing in the danger zone (swivelling range) is forbidden.



Caution, risk of crushing!



Read and observe the operating manual before operating the implement!



Do not stand on the implement while driving!



Loading hooks. When loading the implement, attach the ropes or chains to these points!



Be careful with escaping high-pressure liquids! Observe the instructions in the operating manual!



Do not stand between the machines when connecting the implements and actuating the hydraulic system!



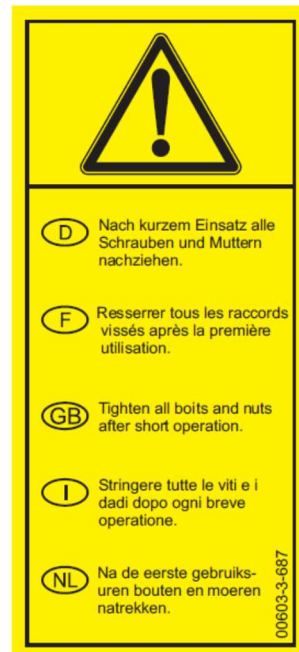
Do not climb onto rotating parts, use the intended access ladders!



Always switch off the engine and remove the key before maintenance work!



Never reach into the crushing danger zone as long as the parts can still move!



After a short period of operation, re-tighten all bolts and nuts.

21 Notes

A large rectangular area filled with a fine grid pattern, intended for writing notes. The grid consists of small, uniform squares covering the majority of the page's content area.

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