

TINED WEEDER

**AS 300 M1, AS 450, AS 600 M1, AS 900 M1,
AS 1200 M1**

OPERATING MANUAL



PLEASE READ CAREFULLY BEFORE START-UP!

Translation of the original operating manual

Version: 3.0 EN-US; item number: 00605-3-001026



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EC Declaration of Conformity

Manufacturer: **APV – Technische Produkte GmbH**
Dallein 62
3753 Hötzelsdorf, Austria

hereby declares that the mounted implement series designated below complies with the relevant essential health and safety requirements of the directives cited above, by virtue of its design and construction, and in the version we have placed on the market.

This declaration loses its validity if there are any changes to the implement that are not approved by **APV – Technische Produkte GmbH**.

Designation of the mounted implement series: **Tined Weeder**
AS 300 M1 | AS 450 | AS 600 M1
AS 900 M1 | AS 900 M1 scissors folding | AS 1200 M1

Year of manufacture: from 2022

Serial numbers: from 07034-01000 | 07042-01000 | 07017-01000
07016-01000 | 07021-01000 | 07015-01000

Relevant directives: 2006/42/EC Machinery Directive

For the planing, design, construction, and marketing of the implement, the following harmonized European standards have been applied:

EN ISO 12100:2010	Safety of machinery – General principles for design – Risk assessment and risk reduction
EN ISO 4254-1:2015	Agricultural machinery – Safety – Part 1: General requirements
EN ISO 13854:2019	Safety of machinery – Minimum gaps to avoid crushing of parts of the human body
EN ISO 13857:2019	Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs
EN 60204-1:2018	Safety of machinery – Electrical equipment of machines – Part 1: General requirements

The special technical documents belonging to the implement in accordance with Appendix VII, Part A have been prepared.

Responsible for the technical documentation: APV - Technische Produkte GmbH

Dallein / Hötzelsdorf, 04/2026



Ing. Karl Heinz Steindl
Managing Director (authorised person in der EU)

1 IDENTIFICATION OF THE IMPLEMENT

The Tined Weeder can be clearly identified through the following information on the type plate.

- Designation
- Model
- Production number

Position of the type plate

The type plate is on the main frame by the top link coupling point (see Figure 1).



Figure 1

The illustration below (Figure 2) shows the structure of the type plate:

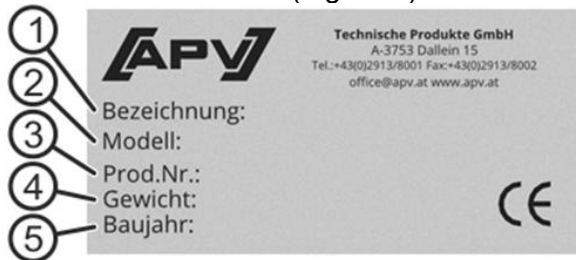


Figure 2

The information on the type plate has the following meaning:

- 1: Designation
- 2: Model
- 3: Product number / serial number
- 4: Weight
- 5: Year of manufacture



NOTE!

Always specify your implement's production number / serial number for inquiries or warranty claims.



CAUTION!

Printing errors excepted, all information without guarantee!

2 SERVICE

Contact us at our Service address in the following cases:

- If you still have questions regarding the handling of the Tined Weeder after reading the information provided in this operating manual.
- For spare parts orders.
- To commission service and maintenance tasks

Service address:

APV - Technische Produkte GmbH
Zentrale: Dallein 62
3753 Hötzelsdorf
AUSTRIA

Telephone: +43 2913 8001-5500
Fax: +43 2913 8002
Email: service@apv.at
www.apv.at

3 WARRANTY

When taking delivery of the device, check it immediately for any transport damage. Subsequent complaints arising from transport damage can no longer be acknowledged.

We provide a six-month factory guarantee starting on the delivery date (your invoice or the delivery note are considered as the guarantee certificate).

This guarantee shall apply in the event of material or design errors and does not extend to parts that become damaged through normal or excessive wear.

The guarantee shall become null and void under the following circumstances

- If damage occurs due to external force
- In the event of an operating error
- If the kW/HP limit is significantly exceeded
- If the implement is altered, extended or fitted with third-party spare parts without our authorization.

3.1 WARRANTY ACTIVATION

Every APV implement must be registered immediately after delivery. The registration activates the claim for warranty performances and thus APV can guarantee the best service.

To activate the warranty for your implement, simply scan the QR code with your smartphone – you will then be taken directly to the Service area of our website.



Of course, you can also activate the warranty through our website www.apv.at in the Service area.

4 SAFETY INSTRUCTIONS

This section contains general rules of behavior for proper use of the implement and safety instructions that you must strictly comply with for your own safety.

The list is quite extensive, and some information does not just pertain to the provided implement. However, the summary of the information will often remind you of safety rules that are unconsciously disregarded when using the machines and implements in day-to-day work.

4.1 INTENDED USE

The implement has been built exclusively for customary use in agricultural tasks (intended use).

Any use that beyond this is non-intended use. The manufacturer shall not be liable for damage that is incurred through non-intended use; the user alone bears the associated risk.

Intended use also includes compliance with the operation, service and maintenance conditions that are prescribed by the manufacturer.

The implement must only be used, maintained and repaired by people who are familiar with the implement and have been instructed with regard to the hazards. Please pass on all safety instructions to other users as well.

The applicable domestic and international accident prevention regulations as well as the other generally acknowledged safety-related, occupational health and road traffic regulations must also be complied with. Unauthorized changes to the implement exclude any and all liability on the part of the manufacturer for the resulting damage.

The implement is intended for outdoor operation in dry weather, within a temperature range from +5 °C to 40 °C. Water ingress must be prevented. Do not use the implement in rainy conditions!

4.2 GENERAL SAFETY INFORMATION AND ACCIDENT PREVENTION REGULATIONS

- **The operator must have read and understood this operating manual before handling the implement.**
- **The owner must train and instruct their personnel. Personnel must have read and understood this operating manual before handling the implement.**
- Always keep the operating manual in the vicinity of the implement for reference purposes.
- When passing on the implement, always pass on the operating manual.
- Do not use the implement if you are tired or under the influence of drugs, alcohol or medications.
- **Before each use, the folding device and its securing devices (securing chain) must be checked for proper function and effect.**
- Check the implement and the tractor for roadworthiness and operational safety before every start-up!
- Comply with the generally valid safety and accident prevention regulations!
- Warning signs and information signs that are installed on the implement provide important information for safe operation; for your own safety comply with warning signs and information signs!
- Comply with applicable regulations when using public roads!
- Before beginning work, familiarize yourself with all the devices, activating elements, and their functions. It is too late to do so during work implementation!
- The user should wear close-fitting clothing! Avoid wearing loose clothing!
- Keep the implements clean to prevent a fire hazard!
- Check your immediate surroundings before start-up! (Children!) Ensure that you have an adequate view!
- Carrying passengers while working and transporting them on the implement are prohibited!
- Properly hitch the implement and fasten only to the prescribed fixtures!
- Special care is required when coupling and uncoupling implements onto or from the tractor!
- Place the support devices in their respective positions during mounting and dismounting the implement! (Stability)
- Always install the weights properly at their designated fastening points!
- Comply with the permissible axle load, total weight, and transport dimensions!
- Check and install transport equipment, such as lighting, warning devices, and any protective devices!
- Release parts for fast couplers must be freely suspended, and they must not release on their own in the low position!
- Never leave the driver's platform while implement and tractor are in motion!
- Handling, steering, and braking capability are also affected by mounted or attached implements and ballast weights. Consequently, ensure that there is adequate steering and braking capability!
- Take into account the wide load and/or the implement's oscillating mass when turning!
- Only operate the device when all protective devices are installed and in the protective position!
- Do not position yourself in the work area!
- Do not position yourself in the implements turning and swivel range!
- Hydraulic folding frames must only be activated if no one is in the swivel range.
- There are crushing and shearing points on power-operated parts (e.g. hydraulically-operated parts)!
- Always ensure that you have a secure, safe stance when using implements with manual folding!
- For high-speed implements with ground-driven tools - the oscillating mass that continues running poses a hazard after lifting-out! Only approach implement after it has come to a complete standstill!
- Before exiting the tractor, park the implement on the ground, turn off the engine and remove the ignition key!
- Do not allow anyone to enter the area between the tractor and implement without securing the vehicle from rolling off via the parking brake and/or the wheel chocks!
- Secure the folded-in frame and lift-out units in transport position!
- Swing in and lock the packer catch arms before road transport!


- Lock the track marker in transport position!
- The view of the attached Tined Weeder and of the dangerous movement zone must be ensured (to monitor the process).
- We recommend a cleaning in accordance with the maintenance instructions. The procedures in the maintenance manual must be complied and personal protective equipment must be used.
- Do not work under the implement.
- The implements and lines must be checked regularly by the operator (before each use) for any fractures and cracks, chafe marks, leaks, loose bolts and connections, vibration, unusual noise and to ensure that they function correctly.
- Safety goggles and hearing protection must be used.
- During mounting, the operator must particularly ensure compliance with tractor requirements regarding power, axle loads, and weight distribution as stipulated in the operating manual, and the operator must ensure that the connections are properly established as specified in the operating manual.
- The operator must carefully and cleanly establish the connections to the tractor hydraulic system when installing the implement.
- According to the operating manual, the tractor speed must be maintained between 6 and 12 km/h when performing work operations.
- If necessary, use additional lighting (e.g. hand lamp) for repair or maintenance tasks.

4.3 RISKS INVOLVED WITH USE (MOUNTED IMPLEMENTS)

- Before mounting and dismounting implements on the three-point linkage, bring the operating devices into a position that prevents unintentional lifting or lowering!
- For three-point mounting, the attachment categories for the tractor and implement must match or be agreed!
- There is a risk of injury due to crush and shear points in the three-point linkage area!
- Do not step between the tractor and implement when activating the external control operating unit for the three-point attachment!
- Always ensure that the tractor three-point linkage is adequately arrested on the side when the implement is in transport position!
- For road travel with lifted implement, the operating lever must be locked to prevent lowering!
- The operator must connect the Tined Weeder to the tractor via a metal connection during installation.
- The operator must ensure that no one is standing close to the Tined Weeder when it or its components are being moved by the tractor hydraulic system or when the side wings are lifted or lowered. The driver must perform a visual inspection!
- When driving on roads, which is only permitted with the Tined Weeder lifted and with folded side wings, the control block on the hydraulic cylinder prevents lowering of the Tined Weeder and of the folded up side wings (additionally secured with a chain). This is also ensured in the event of a tractor hydraulic system failure.

4.4 HYDRAULIC SYSTEM

- The hydraulic system is under high pressure!
- Ensure that the hydraulic hoses are connected as required when connecting hydraulic cylinders and hydraulic motors!
- When connecting the hydraulic hoses to the tractor hydraulic system, ensure that the hydraulics on both tractor and implement are depressurized!
- For hydraulic function connections between tractor and implement, the coupling sleeves and coupling connectors must be marked so that the possibility of operating errors can be excluded! Mixing up the connections reverses the function (e.g. lifting/lowering)! – Danger of accident!
- Regularly inspect hydraulic hose lines and replace them if they are damaged or ageing! The replacement hoses must meet the technical requirements specified by the implement manufacturer!
- Due to the danger of injury, use the appropriate aids when looking for leaks!
- Liquids that escape under high pressure (hydraulic oil) can penetrate the skin and cause severe injuries! If there are injuries, seek medical attention immediately! (Danger of infection!)

- 
- Before tasks on the hydraulic system, set down the implement, depressurize the system, and turn off the engine!
 - Only detach the securing chains after they have been slackened! (The cylinder must be filled with oil)

4.5 RISKS WHEN PERFORMING MAINTENANCE (SERVICE, TIRES)

- Always perform repair, maintenance and cleaning tasks, and eliminate malfunctions when the is drive powered off and the engine is at a standstill! – Remove the ignition key!
- Regularly check nuts and bolts for firm seat and retighten if necessary!
- When performing maintenance tasks on the raised implement, always secure it through the appropriate support elements!
- Use the appropriate tool and gloves that are cut-resistant when replacing work tools with cutting edges!
- Properly dispose of oil, grease, and filters!
- Always disconnect the power supply before working on the electrical system!
- Disconnect the cables on the generator and battery when performing electrical welding tasks on the tractor and mounted implements!
- Spare parts must at least meet the technical requirements specified by the implement manufacturer! Original parts meet these requirements!
- Water or compressed air must be used for cleaning. Perform cleaning when the implement is lowered, shut down, and safeguarded against restart.
- For tasks on tires, ensure that the implement has been safely parked and secured against rolling off (wheel chocks).
- Installing wheels and tires requires adequate knowledge and the prescribed installation tools!
- Repair tasks on the tires must only be performed by specialists and with the appropriate assembly tool!
- Regularly check the tire pressure! Pay attention to the prescribed air pressure!

5 SAFETY SIGNS

Pay attention to the stickers on the implement; they alert you to particular hazards!

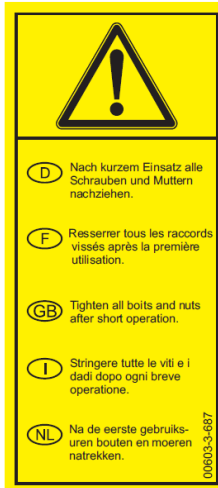
 <p>Do not position yourself in the danger zone (swivel area)!</p>	 <p>Do not stand on the implement while it is moving!</p>	 <p>Ensure that the engine is turned off and that the key is removed before performing maintenance tasks!</p>	 <p>Read and comply with the operating manual before start-up!</p>
 <p>Lift the implement off of the ground and only fold it in or fold it out slowly.</p>	 <p>Loading hook Fasten the cable or chains here when loading the implement!</p>	 <p>Be careful if high-pressure fluid escapes! Comply with the instructions in the operating manual!</p>	 <p>Nobody is allowed between the machines when hitching the implement and when activating the hydraulic system!</p>



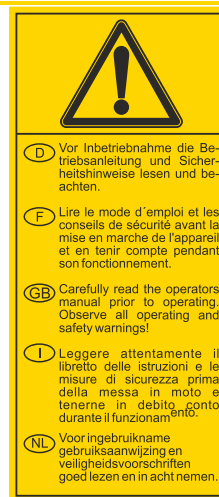
Do not stand on turning parts; use the provided climbing aids!



Attention, crush hazard!
Never reach into the crush hazard zone as long as parts are moving in this zone!



Retighten all bolts and nuts after brief use.



Read and comply with the operating manual before start-up!



Attention, crush hazard!
Do not position yourself in the danger zone (swivel area)!

6 OPERATING MANUAL

6.1 IMPLEMENT DESCRIPTION

The Tined Weeder AS 300 M1 | AS 450 | AS 600 M1 | AS 900 M1 | AS 900 M1 scissors folding | AS 1200 M1 is a soil tillage implement that can be attached to a towing vehicle by means of the three-point hitch.

6.1.1 INSTRUCTIONS FOR THE AS 300 M1

The AS 300 M1 Tined Weeder is not foldable and has no hydraulic system. Please note that the AS 300 M1 may only be combined with the Single Disc Spreader ES and Multi-Metering System MDP.

6.2 ATTACHMENT ON THE TRACTOR

Additional wheel weights can be advantageous for difficult operating conditions. See the operating manual provided by the manufacturer of the tractor.

To ensure steering and braking capability, the tractor must be adequately equipped with ballast weight on the front. At least 20% of the unladen vehicle weight is required on the front axle.

The lifting struts must be adjusted at the same height on the left and right. The implement must be mounted on the tractor's 3-point linkage.

Hook in the top link in such a manner, that the top link is also inclined toward the tractor in work operation. (Comply with the information provided by the manufacturer of the tractor.)

Adjust the side linkage so that the implement can oscillate freely in the field but becomes fixed in place in lifted-out status.

6.3 SAFE PARKING AS 300 M1

For machine variant AS 300 M1 (Figure 3), first swing down the rear parking support (as shown in Figure 8). The support leg must be secured with the spring cotter on the pin to prevent accidental loosening. The parking surface must be suitable for parking, e.g. paved and level ground so that the feet do not sink into the ground, and so the harrow cannot roll off.

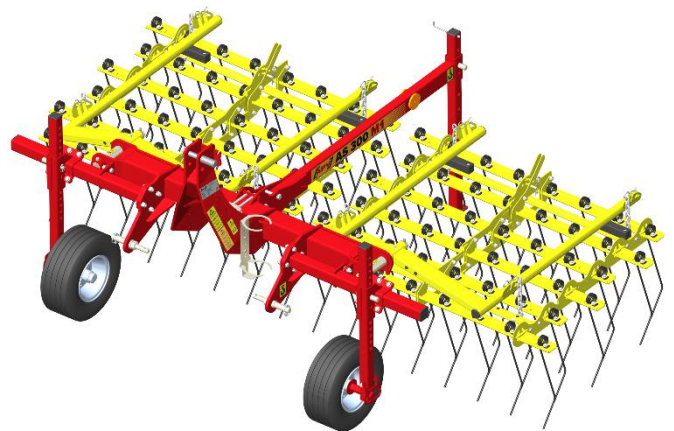


Figure 3: AS 300 M1

6.4 SAFE PARKING AS 450 / AS 600 M1 / AS 900 M1 RIGID

For machine variant AS 450 (Figure 4), first swing down the rear parking support (as shown in Figure 8). The support leg must be secured with the spring cotter on the pin to prevent accidental loosening. For implement variants AS 600 M1 (Figure 5) and AS 900 M1 rigid (Figure 6), first swing down the two parking supports (as shown in Figure 7). The rear parking support must also be moved down. All support feet must be secured with the spring cotter pin on the bolt to prevent them from loosening unintentionally. The parking surface must be suitable for parking, e.g. paved and level ground so that the feet do not sink into the ground, and so the harrow cannot roll off.

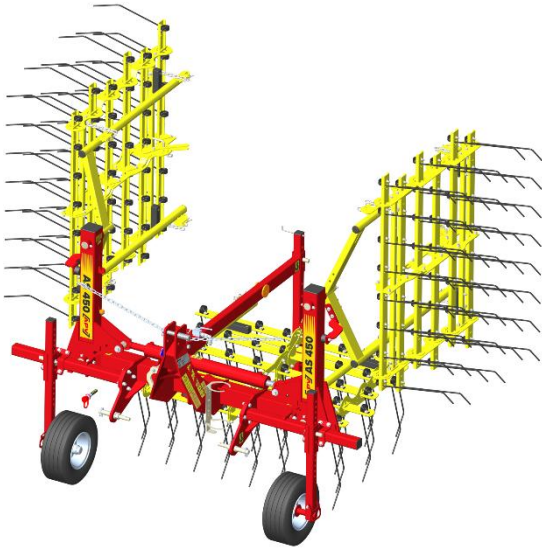


Figure 4: AS 450

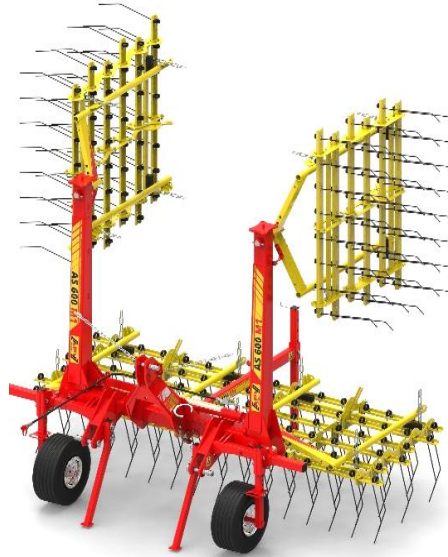


Figure 5: AS 600 M1



Figure 6: AS 900 M1 rigid

For hydraulic folding, the securing chains must be hooked into the side wings, and in addition the shut-off valve (if present) that is located on the folding cylinder must be closed. Thereafter the hydraulic hoses to the tractor must be depressurized.



Figure 7: front parking supports



Figure 8: Rear parking support

6.5 SAFE PARKING AS 900 M1 SCISSORS FOLDING / AS 1200 M1

To also ensure safe parking for implement variants AS 900 M1 scissors folding and AS 1200 M1, the two rear parking supports on these versions must be taken out of the holders (Figure 9) and pushed into the hollow profile with the hole (Figure 8). The required height is selected using the hole pattern on the support outriggers and pegged by means of pins. The pins are secured against unintentional loosening with a spring cotter.

As specified for the above-mentioned implement variants, the parking area must also be suitable for parking the implement, i.e. have a firm and level surface so that the supports do not sink in and the weeder does not roll.

Moreover, when parking the implement, ensure that the two inner feeler wheels have sufficient tire pressure (max. 3.4 bar), so that they do not go flat while they are parked.

For hydraulic folding, the securing chains must be hooked into the side wings, and in addition the shut-off valve (if present) that is located on the folding cylinder must be closed. Thereafter the hydraulic hoses to the tractor must be depressurized.



Figure 9



Figure 10

6.6 TINED WEEDER TRIAL FOLDING (FOR HYDRAULIC FOLDING)

CAUTION!

Ensure that no one is standing in the danger area!

CAUTION!

Fold the implement only when it is lifted off the ground.

Proceed as follows for the test folding (unfolding and folding):

- 1) Couple the hydraulic line connectors. Ensure that they are always kept clean!
- 2) Then fill the cylinders with oil (fold the Tined Weeder together). The cylinder are filled as soon as the securing chains are offloaded.
- 3) Now unhook the securing chain.
- 4) When **folding** into transport position, the **implement** must also be lifted off the ground and the tines **MUST NOT be pre-tensioned**.
- 5) Fold the Tined Weeder together.
- 6) Hook the securing chain back in.
- 7) The Tined Weeder is now folded.

CAUTION!

Only fold the weeder when the weeder tines are retracted and are NOT fully pre-tensioned.

CAUTION!

In working position (during the entire working procedure), the tractor's control unit for the weeder's folding cylinder must be depressurized.

6.7 WORKING POSITION AND SETTING THE WORKING DEPTH

The working speed has a significant determining influence on the intensity of the weeding. The normal speed range is between 4 and 12 km/h, depending on crop sensitivity and growth stage. Optimum results are achieved starting at a speed of 6 km/h.

The tine position can be adjusted using the hole pattern on each tine section (see Figure 11) and is pegged using a pin and cotter pin.

The 6 tine rows with a total of 48 tines and a line spacing of 31.25 mm per tine section ensure uniform weeder cultivation results.

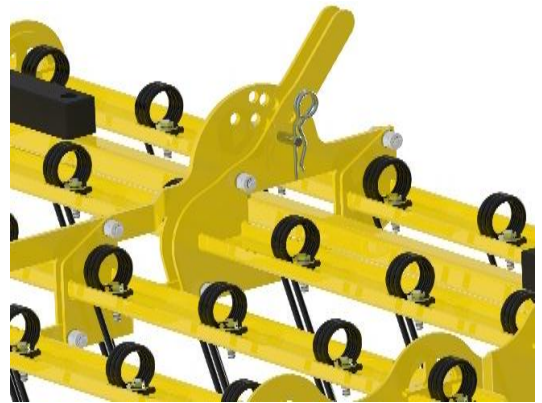


Figure 11



NOTE!

In this regard an approximate right angle (90° - 100°) between the wear end of the tine and the ground is ideal (see Figure 12 – center). Due to the preload, the right angle is only reached while driving.

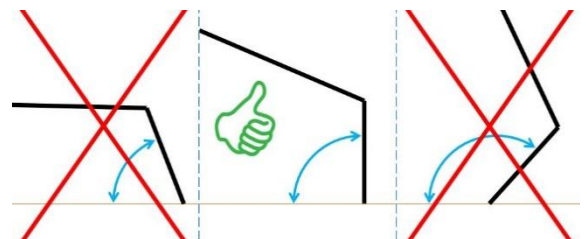



Figure 12: An angle of 90° - 100° is ideal

The feeler wheels are an important component of the ground adaptation and therefore they must be adjusted correctly. The feeler wheels can be moved on the frame, depending on the track width. The



further upwards the feeler wheels are placed on the frame, the deeper the working depth. Here, the tine adjustment and the extension of the top link must also be changed as well.

All of the tine rows should penetrate the soil at the same depth to achieve a uniform working depth across the entire working width.

Depending on the soil type, an additional load can be applied to the tines through the frame and the sections by extending the top link. In doing so, the weeder frame and the tine section forks are tilted to the rear and thus apply additional pressure on the tine sections.

To prevent damage during this process, plastic jaws have been installed on the tine sections.

The chains of the tine sections must be uniformly hooked onto the weeder section forks and secured with the spring cotter pin.



CAUTION!

When the weeder is lowered, do not push it back or roll it back with the tractor. This can severely damage the tines and tine sections.



CAUTION!

Only place the weeder on the ground when the vehicle is already in motion. If the tined weeder is set down on the ground too rapidly at standstill, the implement can be damaged.



CAUTION!

After longer road transport or standstill, there may be differences in the hydraulic tine adjustment due to a change in temperature of the oil in the hydraulic lines. Consequently, completely preload the hydraulic time adjustment and the completely offload it twice. Then set the desired tine position. This must occur when the implement is lowered onto the ground.



CAUTION!

Avoid cornering. However, should it be necessary, then these curves must be driven in a very large radius.

6.8 HYDRAULIC TINE ADJUSTMENT

With the hydraulic tine adjustment (can be retrofitted for AS 450 to AS 1200 M1), a double-acting hydraulic cylinder is mounted on each tine section. With hydraulic tine adjustment unit the tine position can be adjusted while moving.

All hydraulic cylinders are interconnected in one oil circuit and are activated in series. (Adjustments are made via a double-acting control unit). As a result, all the hydraulic cylinders always have the same pressure.

When you lower the weeder so that the tines of the tine sections are standing on the ground and then activate the double-acting control unit for the hydraulic tine adjustment, the oil pressure in the hydraulic cylinders of the respective tine sections is equalized among the sections. In addition, the tine pressure is adjusted uniformly across the entire working width.



Figure 13

7 ROAD TRANSPORT

7.1 TRANSPORT ON PUBLIC ROADS (GENERAL INSTRUCTIONS)

- When driving on roads directly after field operation, the tine sections should be cleaned immediately of weeding residues (soil and grass, etc.).
- Comply with the statutory regulations of your country.
- The mounted implement must be labeled with country-specific warning signs or foils with white-red slanted bars (in accordance with DIN, ÖNORM or applicable standards).
- Any parts posing a traffic hazard or dangerous parts (tines) must be covered and additionally identified with warning signs or stickers.
- Do not allow the implement to conceal the tractor unit's lighting equipment; otherwise the lighting equipment must be installed on the implement.
- Warning signs or foils should be no higher than 150 cm above the road surface in driving operation.
- The holder for the warning signs (supplemental equipment) is mounted on the center frame (see section 15).
- Do not exceed the axle load and the total weight of the tractor unit.
- Do not allow the implement to impair or reduce the tractor's steerability!
- Hitched equipments may only be towed on public roads with an operating permit.
- Fold in the hydraulic equipment to transport position.
- Ensure that the shut-off valve (if present) is closed or that the securing chains are mounted.
- Wait until you are just before unhitch the tractor unit to discharge the pressure in the hydraulic hoses; this is done via the float position of the tractor control unit.
- Only dissipate the pressure of the hydraulic hose at home, via the float position on the tractor control unit.
- Also ensure that securing cotter pins have not been lost due to work implementation.

7.2 CALCULATION OF THE WEIGHT RATIOS OF AXLE LOADS ON THE TRACTOR UNIT AND BALLASTING

Implements with a 3-point mounting change the total weight and the axle loads of the tractor unit. These values must not exceed the permissible dimension. In this regard, also comply with the load-bearing capacity of the tires. The front axle of the tractor must be loaded with at least 20% of its own weight.

You can calculate the necessary ballasting and the actual axle loads with the following formulas:

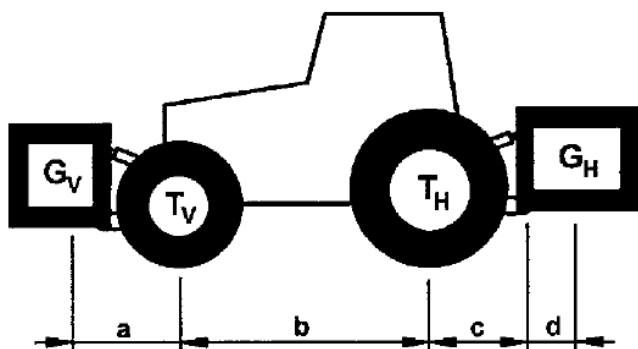


Figure 14

Information:

- T_L Unladen weight of the tractor
 - T_V Front axle load of the unladen tractor
 - T_H Rear axle load of the unladen tractor
 - G_H Total weight of the rear-mounted implement
 - G_V Total weight of the front-mounted implement
 - a Distance from the front-mounted implement's center of gravity to mid front axle
 - b Tractor wheelbase
 - c Distance from the middle of the rear axle to the center of the lower link ball
 - d Distance from the center of the lower link ball to the center of gravity of the rear mounted implement
- ($d_{AS\ 300} = 93\text{ cm}$, $d_{AS\ 600} = 72\text{ cm}$, $d_{AS\ 900} = 74\text{ cm}$, $d_{AS\ 1200} = 105\text{ cm}$)

Weight calculations

1. Calculating the minimum front ballasting on rear-mounted implements $G_{V\ min}$:

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

Enter the result in the table below.

2. Calculating the minimum rear ballasting on front-mounted implements $G_{H\ min}$:

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

Also enter this result in the table on page 19.

3. Calculating the actual front axle load $T_{V\ tat}$:

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

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

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

4. Calculating the actual total weight G_{tat} :

If the required minimum rear ballasting ($G_{H\ min}$) is not achieved with the rear-mounted implement (G_H), then the weight of the rear-mounted implement must be increased to the weight of the rear minimum ballasting!

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

Now enter the calculated total weight and the permissible total weight that is specified in the tractor's operating manual in the table below.

5. Calculating the actual rear axle load $T_{H\ tat}$:

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

Enter the calculated, actual rear axle load and the permissible rear axle load that is specified in the tractor's operating manual in the table below.

6. Tire load:

Enter double the value (two tires) of the permissible tire load (for example, see the tire manufacturer's documents) in the table below.

CAUTION!

The minimum ballasting must be attached to the tractor as a mounted implement or ballast weight!

The calculated values must not exceed the permissible values!

7.3 TABLE OF WEIGHT RATIOS

	Actual value according to calculation		Permissible value according to operating manual		Doubled permissible tire load (2 tires)
Front/rear minimum ballasting	kg				
Total weight	kg	≤	kg		kg
Front axle load	kg	≤	kg	≤	kg
Rear axle load	kg	≤	kg	≤	kg

8 MAINTENANCE AND CARE

8.1 GENERAL MAINTENANCE INSTRUCTIONS

To maintain the implement in good condition, even after a longer period of operation, comply with the instructions listed below:

- In Point 4, you will find some basic safety regulations for maintenance tasks.
- Original parts and accessories are specifically designed for the machines, i.e. implements.
- We expressly state that parts and accessories that are not sold by us are not tested and approved by us either.
- Consequently, installing and/or using such products can negatively alter or affect the prescribed design characteristics of your implement. The manufacturer cannot be held liable for damage that occurs due to use of non-original parts and accessories.
- The manufacturer is not liable for any unauthorized modifications to the implement or for the use of components or attachments on the implements that were not purchased from APV.
- When replacing the hydraulic hose lines, original spare parts must be used that meet the technical requirements specified by the implement manufacturer.
- Caution! Liquids escaping under high pressure can penetrate the skin. Consequently, seek medical attention immediately if there is an accident!!!
- Lubricate all lubrication points after cleaning, and uniformly distribute the lubricant in the bearing points (e.g. perform a brief test run).
- Do not use a high-pressure cleaner to clean bearing parts and hydraulic parts.
- Cleaning with excessive pressure can damage the paint.
- Use environmentally-friendly agents to protect the implement from rust during the winter.
- Park the implement in a place where it is protected from the weather.

- **Hydraulic hose lines must be replaced at the latest 6 years after their manufacturing date. The manufacturing date of the hydraulic hose lines is specified on the press fittings.**
- Park hydraulically folded, and also mechanically folded implements in a folded state only.
- Park the implement in a manner that prevents unnecessary load on the tines.
- Occasionally check the tire pressure:
Tires 18x8.50: approx. 3 bar (AS 600 M1 – AS 1200 M1)
Tires 16x6.5: approx. 2.1 bar (AS 300 M1 – AS 450)

8.2 REGULAR MAINTENANCE TASKS

- Retighten all bolted connections no later than after 3 operating hours, then repeat the process after approx. 20 operating hours, and perform regular inspections afterwards. Loose bolts can cause significant secondary damage that is not covered by the guarantee.
- Regularly lubricate the lubrication points on the joints and bearings (with multipurpose grease approx. every 10 operating hours).
- After the first 10 operating hours and every 50 operating hours thereafter, check the hydraulic units (hoses and couplings) as well as pipeline for leaks and retighten the threaded connections, if necessary.
- **Check the hydraulic hoses for wear, damage, and ageing before every start-up. Damaged or faulty parts must be replaced immediately.**
- The hydraulic system must be inspected at least once a year by a qualified specialist.
- The platform kit and its access ladder must be visually inspected on a regular basis.



NOTE!

When the implement is lifted off of the ground, the two side wings of the frame should face downward slightly. If this is not the case or if the wings are pointing too far downward, the stop bolts on the joint or the set screws for the stop on the junction between the inner and outer side frame must be adjusted.

8.3 REPLACING THE TINES

How to change broken or worn tines:

- 1) Loosen the nut and pull the old tine upwards and out.
- 2) Push in the new tine.
- 3) Fasten the new tine in place with the bolt (see Figure 15)
- 4) Ensure that the bolt rests firmly on the tine and that all tines form a straight line. The large washer should rest on the tine. Recommended tightening torque: 40 Nm.
- 5) The new tine is now installed.



Figure 15

8.4 REPAIR AND CORRECTIVE MAINTENANCE

Contact the manufacturer if the Tined Weeder fails or is damaged. The contact data is provided in section 2.

9 TECHNICAL DATA

Type designation:	AS 300 M1	AS 450	AS 600 M1	AS 900 M1	AS 900 M1 scissors folding	AS 1200 M1
Mode of operation::	6 rows of round spring tines loosen the soil by lightly throwing up the soil in the 1 to 5 cm range					
Working width:	3 m	4.5 m	6 m	9 m	9 m	12 m
Transport width:	3 m for all models					
Dimensions (H x W x D in m) folded:	1.5 x 3 x 2.2	2.3 x 3 x 2.3	3 x 3 x 2.2	3.8 x 3 x 2.2	3.55 x 3 x 2.4	3.55 x 3 x 2.4
Working depth:	All models: 0 to 30 mm (depending on the soil conditions)					
Number of tines [pcs]:	96	144	192	288	288	384
Line spacing:	All models 31.25 mm					
Attachment/hitch:	Attachment – CAT 1 / CAT 2		Attachment – CAT 2 / CAT 3N			
Net weight [kg]:	380	560	670	945	1,200	1,300
Work tools:	Round spring tines (Ø6 / Ø7 / Ø8 mm)					
Ground adaptation:	Individual tine sections with a width of 1.5 m with chains hooked onto the frame. Floating bearing arrangement, enables ground adaptation					
Minimum tractor power [kW/hp]:	22/30	33/45	44/60	51/70	58/80	58/80
Can be equipped with:	ES, MDP	MDP, PS 120 M1 – PS 200 M1	PS 120 M1 – PS 500 M2			

9.1 POSSIBLE COMBINATIONS FOR THE TINED WEEDER WITH PNEUMATIC SEEDER

PS	PS 120 E	PS 200 E	PS 200 H	PS 300 E	PS 300 H	PS 500 E	PS 500 H
Dimensions for PS HxWxD [cm]	90x60x80	100x70x90	100x70x110	110x80x100	110x80x115	125x80x120	125x80x125
Weight [kg]	45	60	83	70	93	93	116
AS	Combined state: dimensions HxWxD [cm] and weight [kg]						
AS 450	230x300x230 780	230x300x230 795	230x300x230 818	Cannot be combined	Cannot be combined	Cannot be combined	Cannot be combined
AS600M1	300x300x220 890	300x300x220 905	300x300x220 928	300x300x220 915	300x300x220 938	300x300x280 938	300x300x280 961
AS900M1	Cannot be combined	Cannot be combined	380x300x280 1,208	Cannot be combined	380x300x280 1,218	Cannot be combined	380x300x280 1,241
AS 900 M1 scissors folding			355x300x300 1,468		355x300x300 1,478		355x300x300 1,501
AS1200M1			355x300x300 1,568		355x300x300 1,578		355x300x300 1,601

The mounting kits available for mounting PS on AS are provided in section 15 Accessories.

W: Width
D: Depth

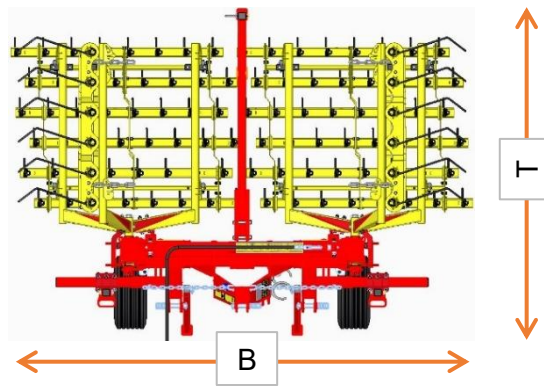


Figure 16: Tined Weeder – top view in transport position

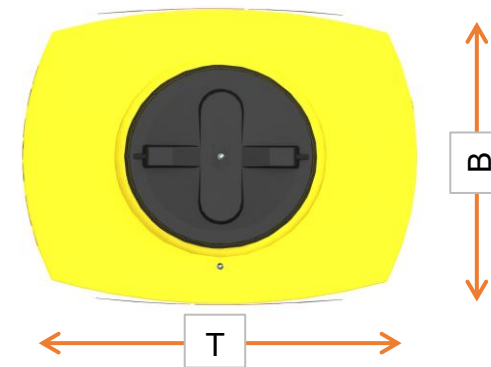


Figure 17: Pneumatic Seeder – top view

10 HYDRAULIC SYSTEM DIAGRAM

10.1 AS 450, AS 600 M1, AS 900 M1 RIGID (SINGLE-ACTING)

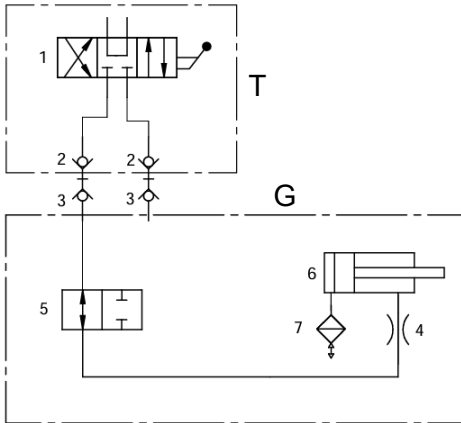


Figure 18

G	Implement side	4	Throttle plate
T	Tractor side	5	2/2-way ball valve
1	Control unit	6	Double-acting hydraulic cylinder for folding
2	Coupling sleeve BG 2	7	Vent valve
3	Coupling connector BG 2		

10.2 AS 450, AS 600 M1, AS 900 M1 RIGID (DOUBLE ACTING)

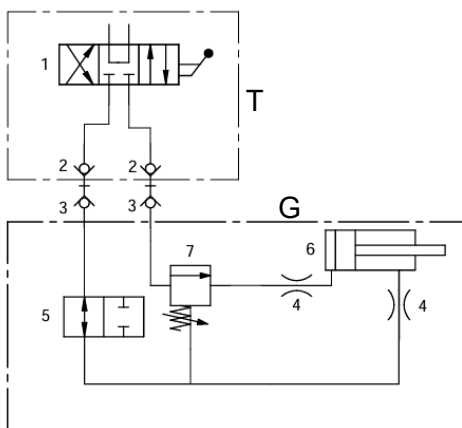
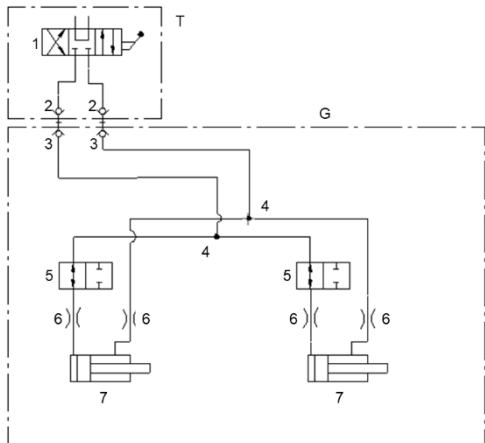


Figure 19

G	Implement side	4	Throttle plate
T	Tractor side	5	2/2-way ball valve
1	Control unit	6	Double-acting hydraulic cylinder for folding
2	Coupling sleeve BG 2	7	Pressure relief valve
3	Coupling connector BG 2		

10.3 AS 900 M1 SCISSORS FOLDING, AS 1200 M1



G	Implement side	4	T-threaded connection
T	Tractor side	5	Shut-off unit
1	Control unit	6	Throttle plate
2	Coupling sleeve BG 2	7	Double-acting hydraulic cylinder for folding
3	Coupling connector BG 2		

11 LIGHTING CIRCUIT DIAGRAM

Legend:

R	Right
1	Connector, 12 V, 7-pin
2	Right tail light
2.1	Turn signal
2.2	Tail light
2.3	Brake light
L	Left
3	Left tail light
3.1	Brake light
3.2	Tail light
3.3	Turn signal

Connector and cable pin assignment:

No.	Name	Color	Function
1	L	Yellow	Left turn signal
2	54 g	---	---
3	31	White	Ground
4	R	Green	Right turn signal
5	58R	Brown	Right tail light
6	54	Red	Brake light
7	58L	Black	Left tail light

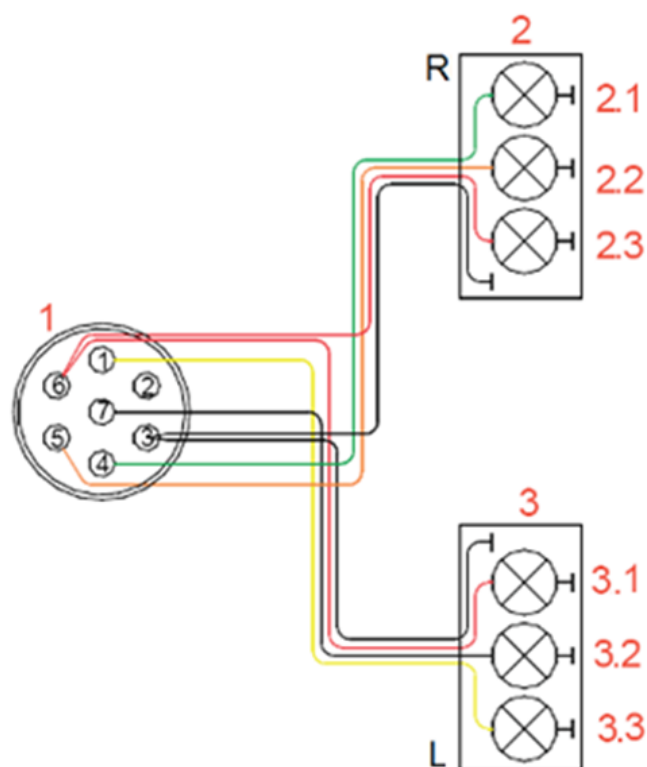


Figure 20



12 DECOMMISSIONING, STORAGE, AND DISPOSAL

12.1 DECOMMISSIONING THE IMPLEMENT

To ensure that the implement retains its full functionality, even during a longer period of non-operation, it is important to take precautions for storage:

The appropriate instructions for safe and proper parking of each implement version are provided under points 6.3 to 6.5.

12.2 STORING THE IMPLEMENT

- The implement must be stored in a dry and weather-protected location, so that it does not lose its functionality, even during a longer storage period.
- The implement must be parked in compliance with Point 6.3 to 6.5.
- Prevent the implement from rolling off unintentionally.
- Do not place or store anything on the implement.
- The implement must always be parked and stored in a secure area, to prevent unauthorized operation.

12.3 DISPOSAL

The implement must be disposed of in accordance with local waste disposal regulations for machines.

13 CROP CULTIVATION TIPS FOR USING THE TINED WEEDER

The harrow's effect is mainly based on burying, tearing out the weeds, and crumbling the soil surface. Moreover, it also stimulates tillering in cereals. Relative cultivators, the tined weeder has two great advantages: it operates in a row-independent manner, and it has a very high area efficiency.

There is an extremely close correlation between seeding depth and surface structure of the seedbed and success when harrowing against weeds. However, sowing too shallow excludes the possibility of any harrowing at pre-emergence. However, weeding can be performed again afterwards once the plants have firmly rooted themselves in the soil. At sowing depths of 3-4 cm, harrowing can also be performed at pre-emergence if the working depth is correspondingly shallower. However, the germinating seed must not be touched in the soil by the weeder tines when this work is being performed.

Generally, the important thing during the course of cultivation is to use the harrow to eliminate weeds in the cotyledon stage and at the same time protect the crops to the greatest extent possible. The best method for this depends to great extent on the soil, plant, and weather conditions. You can quickly find the best method that works independent of the location by adjusting the working depth and the variation of the working speed. As a basic configuration for the harrow, the tine ends must be set approximately perpendicular to the ground surface.

Warning indications of excessively intense harrowing are uprooted, buried or broken-off cultivated plants in orders of magnitude greater than 10%. Minor crop losses can be compensated by slightly increasing the seed rate in advance. In this process, the final crop density should not drop below the values required for crop cultivation after all work operations have been completed.

Other effects of working your areas with the tined weeder, such as

- Soil aeration,
- Regulating the water balance,
- Working in the seeds for nurse crops and
- Promoting tillering in cereals

play a crucial role in creating a good yield of crops.

Summary for efficient and successful harrow use:

- A level seedbed, adequately deep seed placement, uniform germination, a loose soil surface, few lanes, and dry weather are important prerequisites.
- You CANNOT compensate for neglecting to use the harrow.
- Harrowing does not have a lasting effect => multiple coordinated work operations are required.
- Optimum harrowing borders on the limits of crop tolerance; in case of doubt, count the crop losses.
- Factor in crop losses when sowing.
- The harrow's weed-regulating effect is already achieved in part at a lower vehicle speed (approx. 2 km/h and faster).
- The optimum harrow adjustment can take a lot of time.

Only the potential of harrow use is described here. The success of harrowing is ultimately brought about by the craftsmanship skills of the user.

14 INFORMATION ON NATURE CONSERVATION AND ENVIRONMENTAL PROTECTION

14.1 REDUCTION OF NOISE EXPOSURE IN USE

Any loose parts (such as chains) should be fastened to avoid unnecessary noise.

14.2 ENERGY-EFFICIENT USE

The tines of the Tined Weeder should not penetrate into the field deeper than necessary. This ensures that the load on the towing vehicle is no greater than the load that is strictly necessary and fuel can be saved.

14.3 RECYCLABLE RAW MATERIALS AND DISPOSAL

Many parts of the Tined Weeder Pro are made of steel or spring steel (such as the center frame, side frames, tine section and tines, etc.) and they can be removed and recycled by a waste disposal company.

15 ACCESSORIES

15.1 WARNING SIGNS AND LED LIGHTING

Warning signs with LED lighting are available as accessories for the Tined Weeder. These signs are required when you want to drive with the Tined Weeder on public roads.

Order number:

07042-2-001015 (AS 450)

07016-2-057 (AS 300 M1, AS 600 M1, AS 900 M1)

07015-2-140 (AS 1200 M1)

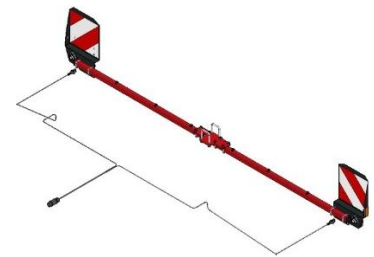


Figure 21

15.2 ACCESSORIES KIT AS 600 TO AS 900

With this accessories kit, the AS 600 M1 can be extended to an AS 900 M1. The working width is therefore increased from 6 m to 9 m.

Order number:

07017-2-009



Figure 22

15.3 ACCESSORIES KIT AS 900 TO AS 1200

With this accessories kit, the AS 900 M1 scissors folding can be extended to an AS 1200 M1. The working width is therefore increased from 9 m to 12 m.

Order number

07021-2-010



Figure 23

15.4 ACCESSORIES KIT FOR PS 120 – 300

Used to install a Pneumatic Seeder on the Tined Weeder. Please note that it must be mounted in compliance with the standards.

Order number:

07042-2-001025 (AS 450) (no PS 300 possible)

07017-2-006 (AS 600 M1)

07016-2-031 (AS 900 M1) (no PS 300 possible)

07021-2-018 (AS 900 M1 scissors folding)



Figure 24: Sample image

15.5 ACCESSORIES KIT FOR ES AND MDP

Used to mount a Single Disk Spreader ES or an MDP Multi-Metering System on the AS 300 M1 Tined Weeder. Please note that it must be mounted in compliance with the standards.

Order number:

07034-2-007 (AS 300 M1)

07042-2-001026 (AS 450) (no ES possible)

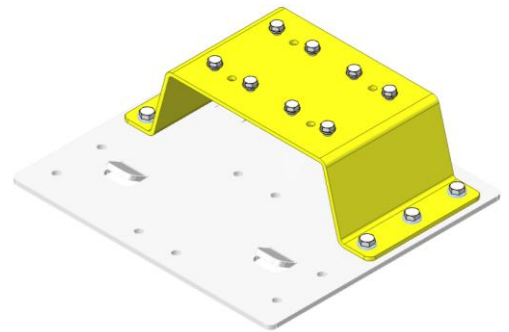


Figure 25

15.6 ACCESSORIES KIT FOR PS 120 – 500 WITH HEADSTOCK

In combination with the headstock, it is used for elevated mounting of a Pneumatic Seeder on the Tined Weeder. Please note that it must be mounted in compliance with the standards.

Order number headstock:

07015-2-018

Order number accessories kit for PS 120 – 500:

07017-2-007 (AS 600 M1)

07016-2-032 (AS 900 M1)

07021-2-019 (AS 900 M1 scissors folding)

07015-2-017 (AS 1200 M1)



Figure 26: Headstock



Figure 27: Sample image, accessories kit for PS 120 – 500

15.7 HYDRAULIC TINE ADJUSTMENT

For hydraulically adjusting the tine position, e.g. while driving.

Order number:

07042-2-001027 (AS 450)

07017-2-004 (AS 600 M1)

07016-2-030 (AS 900 M1)

07021-2-006 (AS 900 M1 scissors folding)

07015-2-016 (AS 1200 M1)



Figure 28

15.8 PLATFORM KIT FOR AS

For easier maintenance of the Pneumatic Seeder, a suitable platform kit is available for the accessories kit for PS (see item 15.4 and 15.6).

Please note that it must be mounted in compliance with the standards.

Order number:

For accessories kit PS without headstock (see item 15.4):

07016-2-052 (AS 300 M1, AS 600 M1, AS 900 M1)

07042-2-001024 (AS 450)

For accessories kit PS with headstock (see item 15.6):

07016-2-053 (AS 600 M1 | AS 900 M1)

07015-2-107 (AS 900 M1 scissors folding, AS 1200 M1)



Figure 29: Platform kit for accessories kit PS without headstock



Figure 30: Illustration, platform kit for accessories kit PS with headstock

15.9 ACCESSORIES KIT FOR A SECOND FEELER WHEEL PAIR

Additional pair of feeler wheels for the side frames.

Order number:

07017-2-005 (AS 600 M1)



Figure 31

16 SPARE PARTS

You have the option of ordering your desired spare parts directly through our online spare parts catalog. To do so, scan the QR code with your smartphone – you will be taken directly to our online spare parts catalogue. Please have your product number / serial number on hand.

You can also access our online spare parts catalog on our website www.apv.at in the Service area.



If you have any questions regarding spare parts or your order, our Customer Service (see point 2 for contact data) is also happy to assist you.

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