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Art. no.: 00602-3-234

Operating Manual – Tined Weeder Pro VS 150 M1, VS 300 M1

Please read carefully before start-up!

TRANSLATION OF THE ORIGINAL OPERATING MANUAL

www.apv.at ®

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1 EC Declaration of Conformity

in accordance with Machinery Directive 2006/42/EC

APV-Technische Produkte GmbH
Dallein 15
3753 Hötzelsdorf, Austria

hereby declares that the series of mounted implements designated below complies with the essential health and safety requirements of the directive cited above, due to their concept and design, as well as in the versions that you have placed on the market.

If the mounted implements are modified without prior consultation with **APV-Technische Produkte** this declaration shall lose its validity.

Designation of the series of mounted implements:

Tined Weeder Pro VS 150 M1
Tined Weeder Pro VS 300 M1

Year of manufacture: from **2020**

Serial number(s): from 07027-01000 (VS 150 M1)
Serial number(s) from 07028-01000 (VS 300 M1)

Relevant EC directives:
Directive on machinery – Machinery Directive 2006/42/EC

In the planning, design, construction, and placement on the market, in addition to the directives, the following harmonized European norms have also been applied, in particular:

EN ISO 12100:2010 Safety of machinery – General principles for design – Risk assessment and risk reduction
EN ISO 13857:2020 – Safety distances to prevent hazard zones being reached by upper and lower limbs
ISO 13849-1:2015 – Safety of machinery – Safety-related parts of control systems

Responsible for the technical documentation: Planing and Design department, Dallein 15

Ing. Jürgen Schöls
Managing Director
(Authorized person in the EU)

Dallein/Hötzelsdorf, on 02/2021

2 Identification of the implement

The Tined Weeder Pro 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 inside of the main frame, to the left in the direction of travel, on the front hollow profile (see Figure 1).

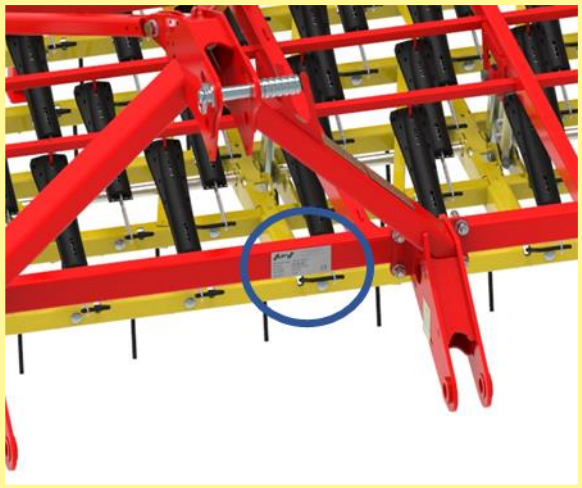


Figure 1: Location of the type plate

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

Figure 2: Structure of the type plate

The information on the type plate has the following meaning:

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

NOTE!
Please provide us with your implement's production number/serial number for inquiries or warranty claims.

3 Service

Contact us at our Service address in the following cases:

- If in spite of the information in this operating manual you have questions concerning the handling of the Tined Weeder Pro
- To order spare parts
- To commission service and maintenance tasks

Service address:

APV - Technische Produkte GmbH
HEADQUARTERS
Dallein 15
3753 Hötzelsdorf
AUSTRIA

Telephone: +43 (0) 2913 8001-5500
Fax: +43 (0) 2913 8002
Email: service@apv.at
Web: www.apv.at

4 Guarantee

When taking delivery of the device, check it immediately for any transport damage. Subsequent complaints arising from transport damage can no longer be acknowledged.
Based on a warranty activation (see point 4.1), we provide a six-month factory warranty, starting from the date of first use (your invoice is the warranty 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 warranty 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.

4.1 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.

5 Safety instructions

This chapter 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.

5.1 Intended use

The Tined Weeder Pro VS 150 M1 or VS 300 M1 is designed and built for use in agricultural operations.
It is designed so that its tines penetrate into the soil, loosen it up, and remove weeds that may be present in the soil.

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 with the implement and have been instructed with regard to the hazards. Please pass on all safety instructions to other users as well.

The relevant, country-specific accident prevention regulations and other generally recognized safety, occupational health and safety, and road traffic regulations must be complied with.

Unauthorized changes to the implement exclude any and all liability on the part of the manufacturer for the resulting damage.

5.2 General safety information and accident prevention regulations

- **The operator must have read and understood this operating manual before using the tined weeder.**
- **The operator must train and instruct the operator's personnel, if necessary. Personnel must have read and understood the operating manual before they use the tined weeder.**
- Always keep the operating manual in the vicinity of the tined weeder for reference purposes.
- When passing on the tined weeder, be sure to pass on the operating manual.
- Do not use the implement if you are tired or under the influence of drugs, alcohol or medications.
- **Check the implement and the tractor for roadworthiness and operational safety before every start-up!**
- Inspections before and during operation, as well as regular care and maintenance of the implement, must be performed.
- 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!
- Never leave the driver's platform while 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)!
- For parts that are adjusted manually, always ensure that the implement is stable!
- 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!
- Swing in and lock the packer catch arms before road transport!
- Lock the track marker in transport position!
- View of the attached tined weeder and the dangerous movement zone must be ensured (to monitor the process).
- We recommend a cleaning in accordance with the maintenance instructions. In this regard you must proceed as specified in the maintenance manual and protective equipment must be used.

- Do not work under the implement.
- The operator must regularly check the implement (before each use) for breakage, cracks, abrasion points, leaks, loose bolts and threaded connections, vibrations, abnormal noises, and proper function.
- 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 vehicle speed must be maintained between 4 and 12 km/h when performing work operations.
- If necessary, use additional lighting (e.g. hand lamp) for repair or maintenance tasks.

5.3 Attached 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!
- At installation, the operator must connect the tined weeder to the tractor via a metal connection.
- The operator must ensure that no one is standing near the tined weeder when it or its components are moved via the tractor hydraulic system. The driver must perform a visual inspection!

5.4 Hydraulic system

- **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!**
- 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, 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!
- 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!

5.5 Maintenance

- 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!
- The maintenance tasks themselves must only be performed by trained specialists and must never be performed alone. The utmost caution is required when replacing defective components or tools.

- To avoid the risk of injuries, a clearly visible and legible sign "Caution: Maintenance tasks" must be affixed when performing maintenance tasks.
- 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 attached 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.

5.6 Tires

- 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 (2.1 bar)!

5.7 Attached seeders

- When using a seeder, all the instructions provided by the implement manufacturer must be complied with.
- The seeder can be reached easily via a ladder and a platform. The ladder and platform must be clean and dry for use.
- While driving, it is strictly prohibited to stand on the platform or on its access ladder.
- When not in use, the ladder must be swung upward and secured.

5.7.1 Filling the seeder

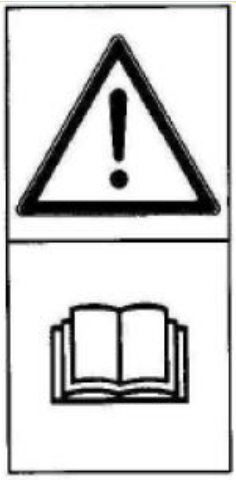
- The seeder is filled using a supply vehicle.
- The platform kit must not be used to fill the seeder or used as a storage area for objects or seed. When filling the seeder, never stand under a suspended load!
- When driving up to the implement with seed, ensure that no one is standing on or around the implement.
- The platform kit may only be accessed to open the seed sack after the load above the opening of the seed hopper has been stabilized.
- During the loading procedure, avoid any contact with the treated seed; wear gloves, a dust mask, and safety goggles.

CAUTION!
Printing errors excepted, all information without guarantee.

6 Information signs / hazard labels

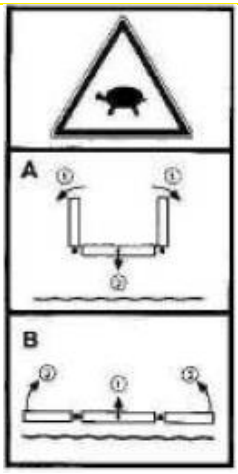
Pay attention to the stickers on the implement; they alert to particular hazards!

6.1 Information signs



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

Do not position yourself in the danger zone (swivel area)!

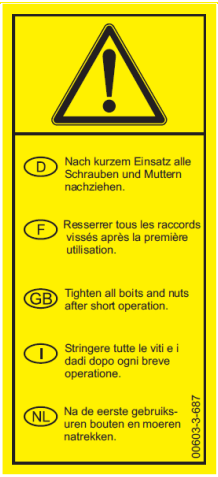


Only lift the implement off of the ground slowly

Do not stand on the implement while it is moving!

Loading hook. Fasten the cable or chains here when loading the implement!

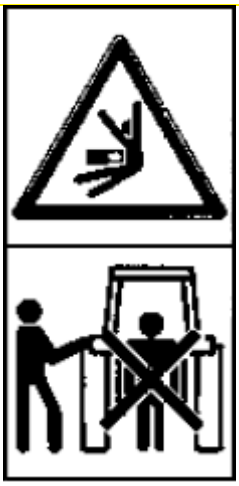
Ensure that the engine is turned off and that the key is removed before performing maintenance tasks!



Retighten all bolts and nuts after brief use.

Labelling of the grease nipple position

6.2 Hazard labels

			
Be careful if high-pressure fluid escapes! Comply with the instructions in the operating manual!	Nobody is allowed between the machines when hitching the implement and when activating the hydraulic system!	Do not stand on turning parts; use the provided climbing aids!	Caution, crushing area! Never reach into the crush hazard area as long as parts are moving in this area!

7 Operating manual for the Tined Weeder Pro

7.1 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 3-point linkage of the tractor.
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 tractor manufacturer).

To ensure correct connection of the hydraulic hoses for tine pre-tension, the hoses must be labelled as follows:

- 1 red cable tie: Return (A)
- 2 red cable ties: Flow (B)

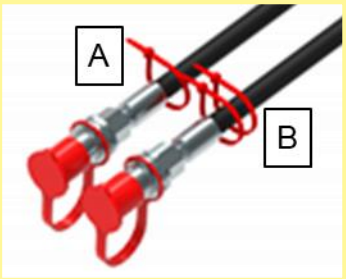


Figure 3

7.2 Safe parking

1. The parking area must be suitable for parking. The substrate must be paved and level, so that the feet of operating personnel do not sink into the ground, and so that the tined weeder cannot roll off.
2. To ensure safe parking of the implement, lower the support stands at the rear of the tined weeder.
3. In this process, to prevent tine damage, ensure that the tines do not touch the ground.
4. Each support stand must be secured with the spring cotter pin on the bolt to prevent it from loosening unintentionally.
5. Then the hydraulic hoses to the tractor must be depressurized and uncoupled.

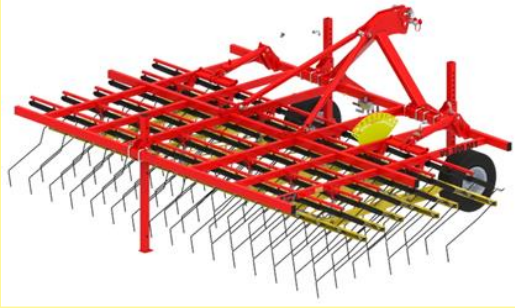


Figure 4

NOTE!
When uncoupling the hydraulic hoses for the tine pre-tension under pressure, first close the stop tap, and only after this has been done, unplug the hydraulic hoses. This ensures that the tines remain in the desired position, even in parked status.

7.3 Securing the top link pin

If the Tined Weeder Pro will be attached on the tractor, the washer marked in Figure 5
must always be placed on the spring cotter on the top link! Without the washer it is possible that the implement can come off the hitch.

Figure 5

7.4 Working positionand adjusting the working depth

Weeding intensity is adjusted with the pre-tension of the spring assembly. Adjustment occurs hydraulically and is executed conveniently from the tractor seat. On the scale (see Figure 6), the driver can read-off the level that is currently set. In this regard, note that the springs are not pre-tensioned at positions -3 to 0. Pre-tension begins at 0, and full pre-tension is reached at position 6. At position -3, the tines are folded up, which means that the tines are in transport position.

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.

The feeler wheels can be moved on the frame, depending on the desired track width. Clearance and tine angle can be adjusted via the hole pattern in the feeler wheels.

Figure 6

The higher the feeler wheels are moved up in the frame, the smaller the distance between the frame and the ground and the steeper the position of the tine ends relative to the ground will be.
To adjust all of the feeler wheels, including those at the rear, to the same height, the same number of holes must be visible above the bracket.

Figure 7: Working position

NOTE!
When the feeler wheels are moved further downward, clearance is increased and the tine angle becomes steeper, and therefore more aggressive. In this process the tine pressure remains the same.

NOTE!
In this regard an approximate right angle (90° - 100°) between the wear end of the tine and the ground is ideal (see Figure 8 – center). Due to the pre-tension, this angle will only be reached while driving.

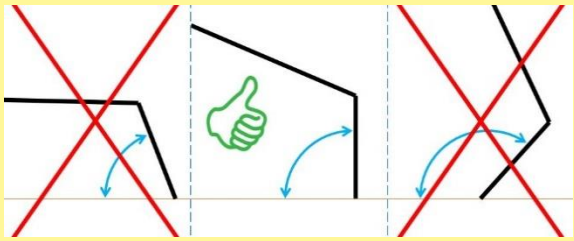


Figure 8: An angle of 90° - 100° is ideal

All tine rows should penetrate into the soil the same distance (working depth), this means the frame must be guided parallel to the ground.
To achieve this, the extension of the top link must also be adjusted. The parallelism of the frame to the ground can be read-out on the spirit level on the center frame, provided that you are on a horizontal plane.

CAUTION!
Only set the tined weeder with pre-tensioned springs 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!
Do not push back or roll back the tined weeder with the tractor when the tined weeder is lowered; this can damage the tines and the bearing points.

CAUTION!
After a longer road transport or standstill period, differences in the pre-tension can occur due to oil temperature changes in the hoses. Therefore, completely pre-tension the tines and then loosen them completely two times. After this has been done, set the desired pre-tension (e.g. Level 2). This must occur when the implement is lowered onto the ground.

CAUTION!
Avoid cornering. However, if cornering cannot be avoided, then the curves must be driven in a very large radius.

7.5 Hydraulic tine adjustment

The tines are adjusted with one hydraulic cylinder (VS 150 M1) or with two hydraulic cylinders connected in parallel (VS 300 M1). With hydraulic tine adjustment tine pre-tension can be adjusted while driving.
All hydraulic cylinders (Figure 9) are integrated in an oil circuit. Adjustment occurs via a double-acting control unit and the flow divider on the center frame.

Figure 9

7.6 Conversion to front mounting

VS 150 M1 and VS 300 M1 can be used both as a front-mounted implement, and a rear-mounted implement.

Execute the following steps to change from rear mounting to front mounting:

1) The implement must be lifted out with the maximum lift via the lifting unit of the tractor.
2) All feeler wheels must be moved downwards and out of the brackets.

   The following must be complied with for feeler wheels that are used in front mounting:
   - For front mounting, only pivoting feeler wheels should be used.
   - Ether two or four pivoting feeler wheels must be used:

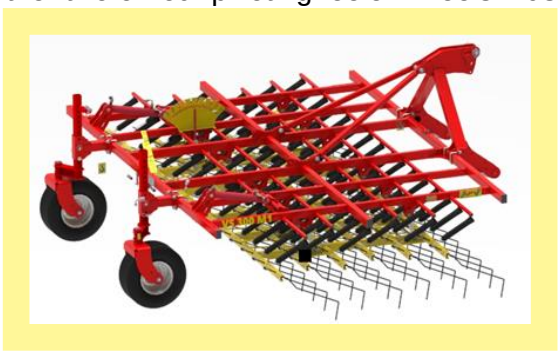


Figure 10: Front mounting with 2 feeler wheels

Figure 11: Front mounting with 4 feeler wheels

   - Pivoting feeler wheels that are already used for rear mounting can also be used for front mounting.

3) All of the brackets to be used are turned around as follows:
   - Remove the bolt on the wheel mount marked in FigureFigure 12.
   - Turn the wheel mount 180° as shown in Figure Figure 12. This ensures sufficient distance between the tire and the tine.

Figure 12: Turning the wheel mount around

4) The pivoting feeler wheels to be used are inserted into the brackets.
5) When all of the pivoting feeler wheels are mounted at the desired positions, the Tined Weeder Pro can be safely parked and uncoupled from the tractor as described in chapter 7.2.

6) In the next step, the headstock is dismounted. To do this, the bolted connections marked in Figure 13 are unscrewed on both sides.

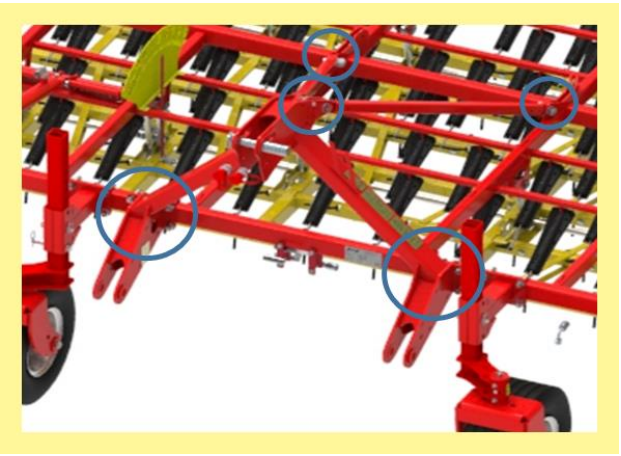


Figure 13: Dismounting the headstock

7) The headstock and the tension struts must now be installed on the rear side of the Tined Weeder Pro, as shown in Figure 14. Tightening torque
   - for the M12 U-bracket is 87 Nm
   - for M16 bolts is 210 Nm.

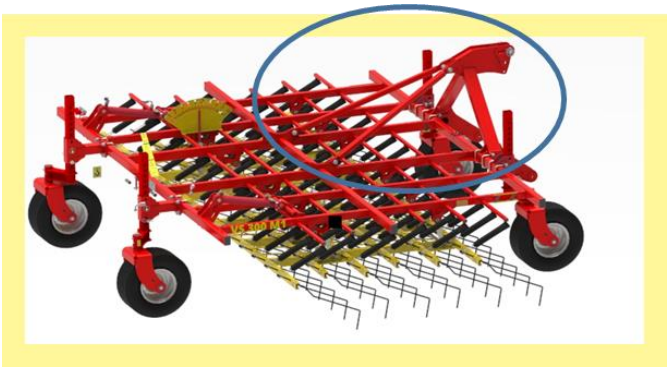


Figure 14: Mounting the headstock and the tension struts

The conversion is now concluded. If the Tined Weeder Pro should be converted from front mounting to rear mounting, the steps must be performed in the reverse order.

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:

- 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.
- Unauthorized changes, as well as use of components and add-on parts on the implements, exclude any and all liability on the part of the manufacturer.
- **Check the hydraulic hoses for wear, damage, and ageing before every start-up.**
- When replacing the hydraulic hose lines, lines 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.
- Park the implement in a manner that prevents unnecessary load on the tines.
- **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.**

8.2 Instructions for regular maintenance

- 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 and pipeline for leaks and retighten the threaded connections, if necessary.
- Occasionally check the tire pressure (2.1 bar).
- The platform kit and its access ladder must be visually inspected on a regular basis.
- The rubber for fixation of the access ladder of the platform kit must be checked regularly for wear and replaced if necessary. It should only be replaced by trained specialists and with original parts.

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 facing too far downwards, the stop screws on the joint must be adjusted.

8.3 Replacing the tines

How to change broken or worn tines:

1. Unscrew the nut (1) on the plastic piece (2).
2. Pull the bearing unit (bolt + nut + bearing shell) and the tines out of the frame.
3. Assembly occurs in the reverse order.
4. The recommended tightening torque for the nut is 3 Nm. Ensure that the nut is not tightened too tightly, so that the tine can fall downward due to its own weight. If this is not the case, the tine cannot work properly at low pre-tension.

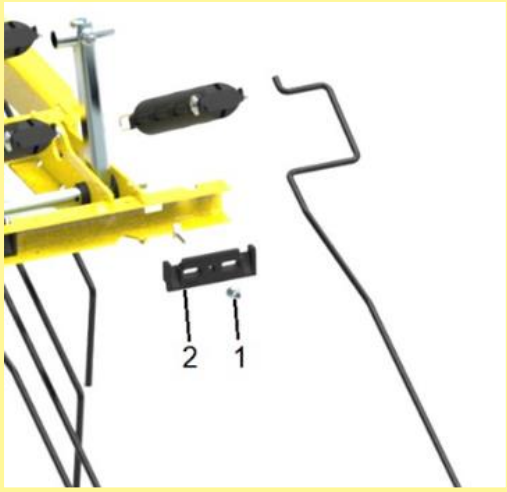
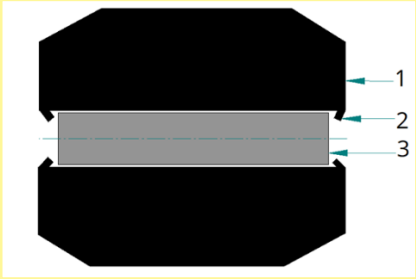


Figure 15: 1 = nut, 2 = plastic part

8.4 Changing the springs

Overview: Diagram of the spring fastening



1: Plastic half shell
2: Snap-fit
3: Fastening bolt

Figure 16: Diagram of the spring fastening

1. Step
Unlock the snap-fit on one side of the spring assembly. To do this, press a screw or a bolt (8 mm diameter) laterally into the hole in the spring assembly – as shown in Figure Figure 17 – until the two bolts touch. This disengages the press-fit elements on one side.

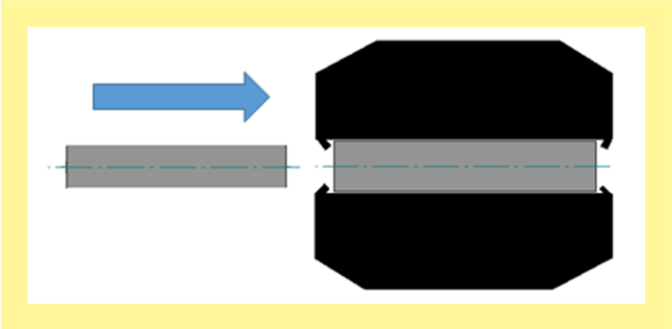


Figure 17: 1st step

2. Step
Push the bolts out of the spring assembly. To do this, on the opposite side of the spring assembly, press a screw or a bolt (8 mm diameter) into the hole in the spring assembly. Thus all bolts can be pulled out of the spring assembly and the entire spring assembly detaches from the frame.

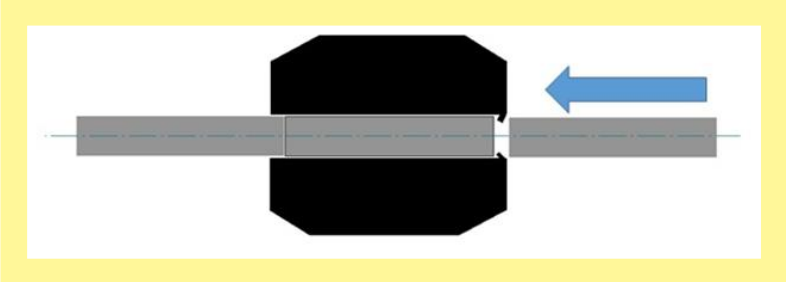


Figure 18: 2st step

3. Step
To mount the new spring assembly, it must first be brought into position.
Then the fastening bolt, as shown in Figure 19, is pressed into the hole in the spring assembly.

Ensure that all snap-fit elements are again locked. This will be the case if the fastening bolt has been pressed far enough into the hole. It may be necessary to push a little further with a screw or bolt (8 mm diameter).

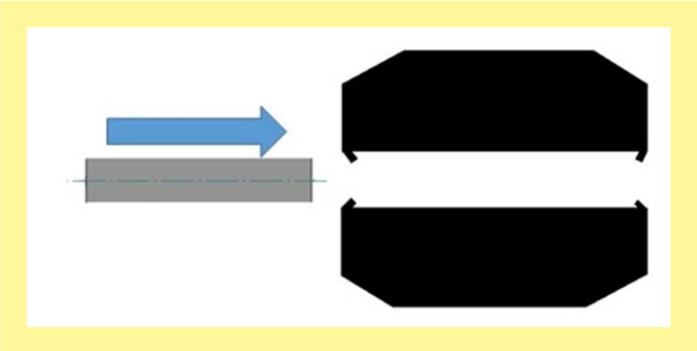


Figure 19: 3st step

8.5 Repair and maintenance

Contact the manufacturer if the Tined Weeder Pro fails or is damaged. The contact data is provided in chapter 3.

9 Information on nature conservation and environmental protection

Reduction of noise exposure in use
Any loose parts (such as chains) should be fastened to avoid unnecessary noise.

Energy-efficient use
The tines of the Tined Weeder Pro should not penetrate any deeper into the soil than is 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.

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 frame, tine section, tines, etc.) and they can be removed and recycled by a waste disposal company.

10 Technical data

Type designation:	**VS 150 M1**	**VS 300 M1**
Mode of operation:	With its unique tine spring system, the Tined Weeder Pro is a crop cultivation implement that adapts precisely to the ground. The weeder tines can be lifted out and are pivot-mounted, so that the weeder can only give way up and down, not to the left and right.	
Working width:	1.7 m	3.2 m
Transport dimensions (depending on the accessories and the adjustment) (L x W x H in m):	2.36 x 1.82 x 1.25	2.36 x 3.29 x 1.25
Working depth:	All models: 0-30 mm (depending on the soil conditions)	
Number of tines:	50 tines	218 tines
Tine diameter:	All models: 8 mm	
Tine length:	All models: 520 mm	
Line spacing:	All models: 35 mm	
Attachment/suspension (three-point, etc.):	Attachment – CAT 1/2	
Feeler wheels	2 feeler wheels	2 feeler wheels
Unladen weight:	250 kg	370 kg
Parking stands:	All models: 2 stands, if rear feeler wheels are not used	
Work tools:	Cranked tines with a diameter of 8 mm	
Ground adaptation:	Occurs through the unique tine spring system	
Minimum tractor power:	11 kW / 15 HP	22 kW / 30 HP
Accessories: (see page 28)	Mounting option for PS120 M1, PS 200 M1, and MDP 100 M1 Warning signs with lighting (only VS 300) Warning sign with lighting for front mounting (only VS 300) Platform kit for PS 120 M1, PS 200 M1 Platform kit for MDP 100 M1 Dispersion plate installation for PS 120 M1, PS 200 M1 Dispersion plate installation for MDP 100 M1 Rear feeler wheels Front headstock Hydraulic hose extension for front mounting Feeler wheels for front mounting Top link sensor Wheel sensor GPSa sensor Carbide tines Manual tine lifting	

Type designation:	VS 150 M1	VS 300 M1
Can be equipped with:	PS 120 M1 – PS 200 M1 MDP 100 M1	

CAUTION!
The VS 300 is more than 3 meters in width! When driving on public roads, the applicable country-specific regulations must be complied with.

10.1 Tine section widths

VS 150 M1:

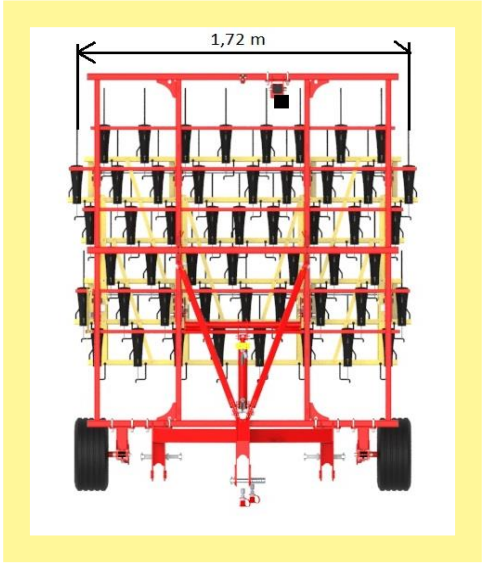


Figure 20: Tine section width VS 150 M1

VS 300 M1:

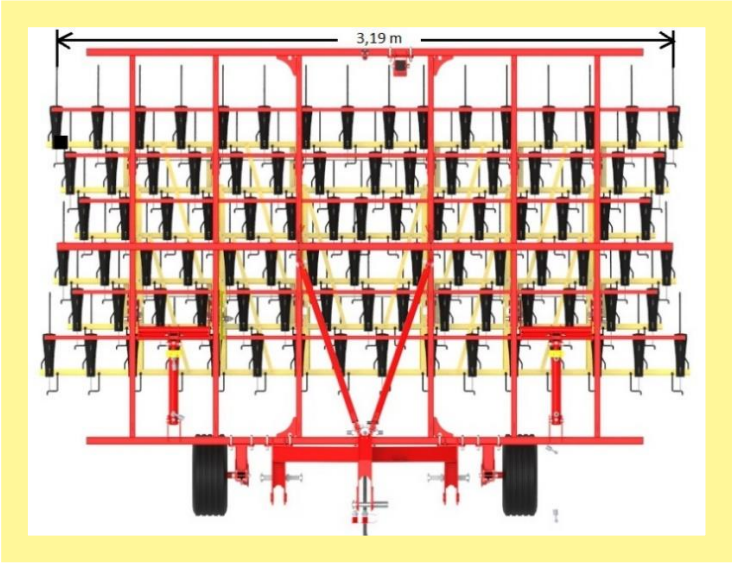


Figure 21: Tine section width VS 300 M1

10.2 Combination possibilities Tined Weeder Pro with a pneumatic seeder / Multi-Metering System

PS	PS 120 E	PS 200 E	PS 200 H	PS 300 E	PS 300 H	PS 500 E	PS 500 H	MDP 100	
Dimensions for PS HxWxD [cm]	90x60x80	100x70x90	100x70x110	110x80x100	110x80x115	125x80x120	125x80x125	105x55x55	Part for mounting
Weight [kg]	45	60	83	70	93	93	116	30	
VS	**Combined status: Dimensions HxWxD [cm] and weight [kg]**								
VS 150 M1 (250 kg)	165x182x236	175x182x236	175x182x236	NO	NO	NO	NO	180x182x236	Mounting kits for PS see point 16
	295	310	233					280	
VS 300 M1 (370 kg)	165x329x236	175x329x236	175x329x236	NO	NO	NO	NO	180x329x236	Mounting kit for PS see point 16
	415	430	453					400	

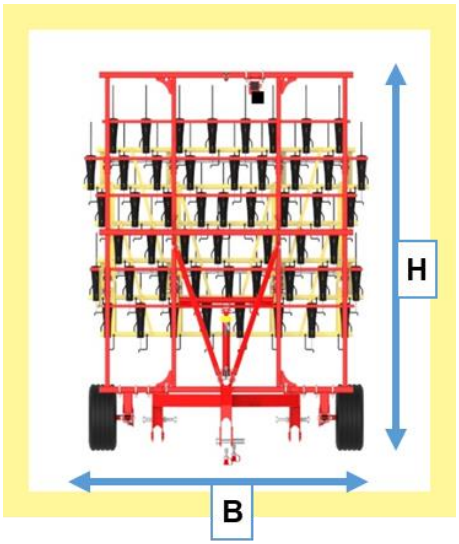


Figure 22: Tined Weeder Pro – view from above in transport position

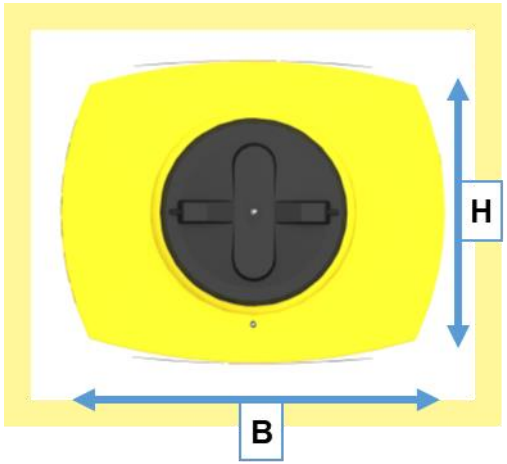


Figure 23: Pneumatic seeder – view from above

W: Width
D: Depth

11 Hydraulic system diagram

VS 150 M1

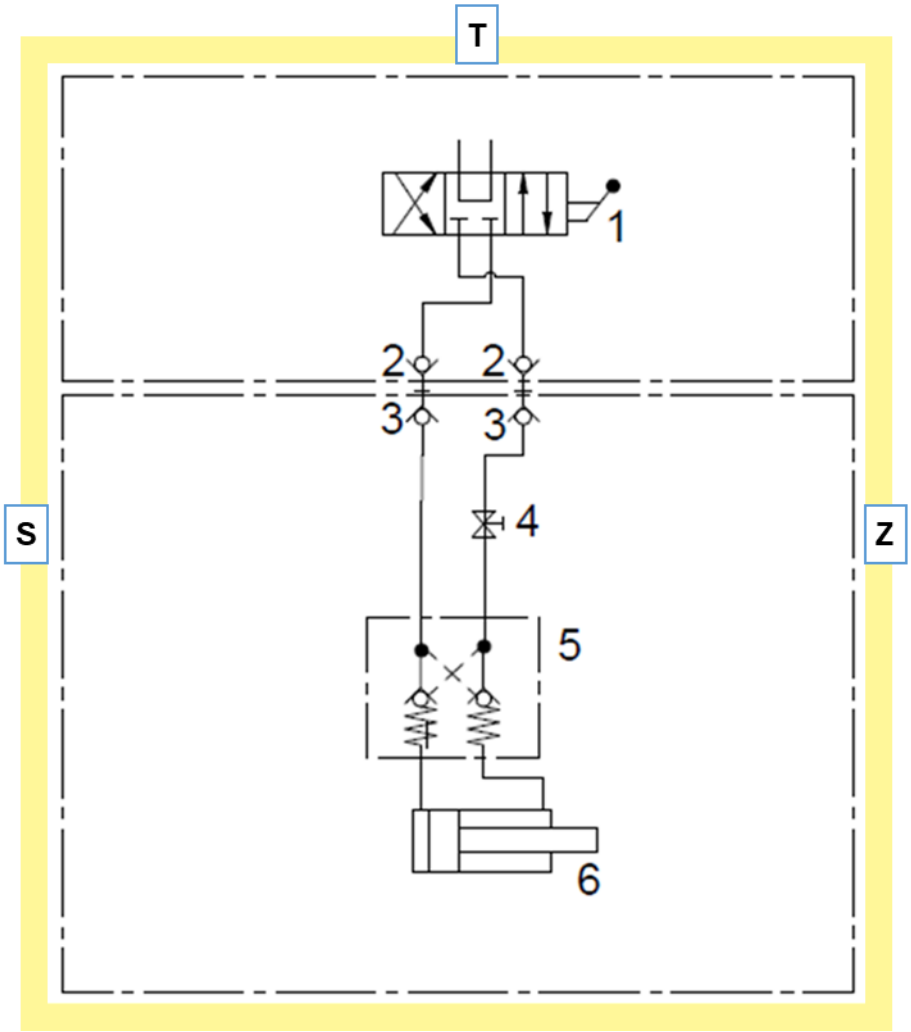


Figure 24: Hydraulic system diagram VS 150 M1

T	Tractor side	3	Coupling connector BG 2
W	Weeder side	4	Stop tap
W A	Weeder adjustment	5	Shut-off unit
1	Control unit	6	Double-acting cylinder for tine adjustment
2	Coupling sleeve BG 2		

VS 300 M1

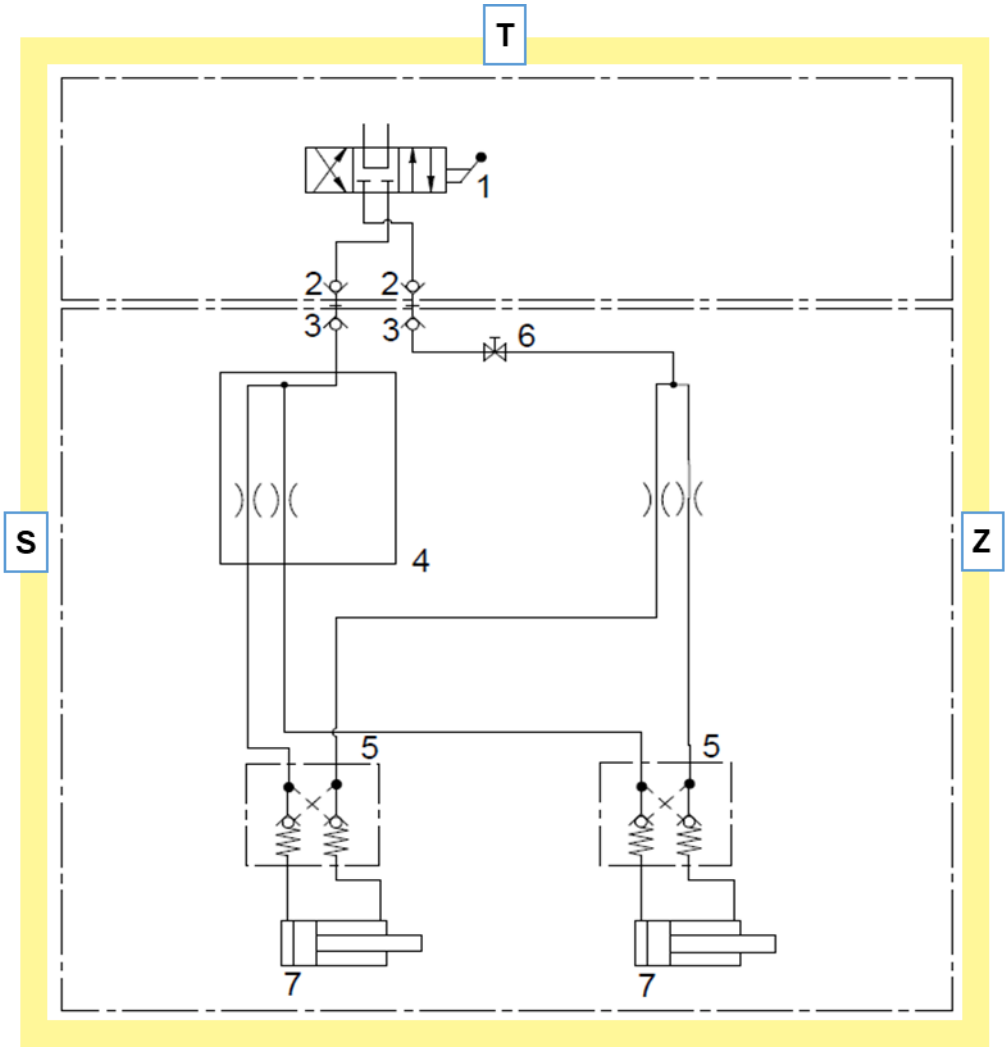


Figure 25: Hydraulic system diagram VS 300 M1

T	Tractor side	3	Coupling connector BG 2
W	Weeder side	4	Flow divider 2x
WA	Weeder adjustment	5	Shut-off unit
1	Control unit	6	Stop tap
2	Coupling sleeve BG 2	7	Double-acting cylinder for tine adjustment

12 Road transport of the Tined Weeder Pro

12.1 Transport on public roads (general instructions)

- For road travel, clean the tine sections so that the tines are free of residues (soil, grass, etc) after field use.
- 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).
- Parts that endanger traffic or are hazardous (tines) must be covered and additionally labeled.
- 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 installed on the center frame (see chapter 16.
- 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 (tine pre-tension).
- 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.

12.2 Calculation of the weight ratios of axle loads on the tractor unit and ballasting

Implements with a 3-point hitch 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:

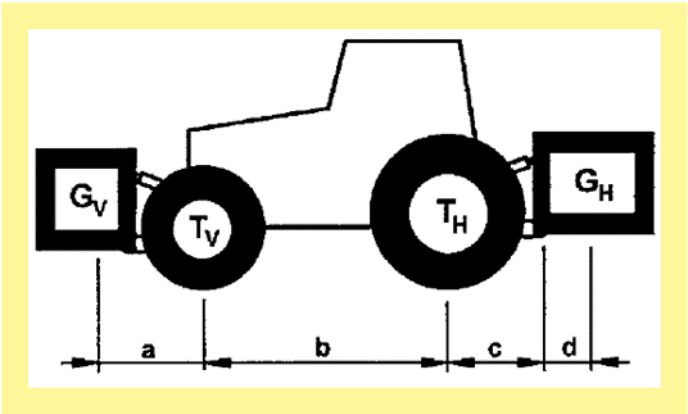


Figure 26

Information:

T_L Unladen weight of the tractor

T_V Front axle weight 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 Wheelbase of the tractor

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 = 97 cm)

Weight calculations

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

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

Enter this result in the table on the next page.

2. Calculating the minimum rear ballasting on front-mounted implements G_H min:

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

Also enter this result in the table on the next page.

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!

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

On the following page, now enter the calculated, actual front axle load and the permissible front axle load that is specified in the tractor's operating manual.

4. Calculating the actual total weight G_{tat}:
If the required minimum rear ballasting (GH min) is not achieved with the rear-mounted implement (GH), 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.

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.

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

CAUTION!
The minimum ballasting must be installed on the tractor in the form of a mounted implement or ballast weight!
The calculated values must not exceed the permissible values!

12.3 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

13 Lighting circuit diagram

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

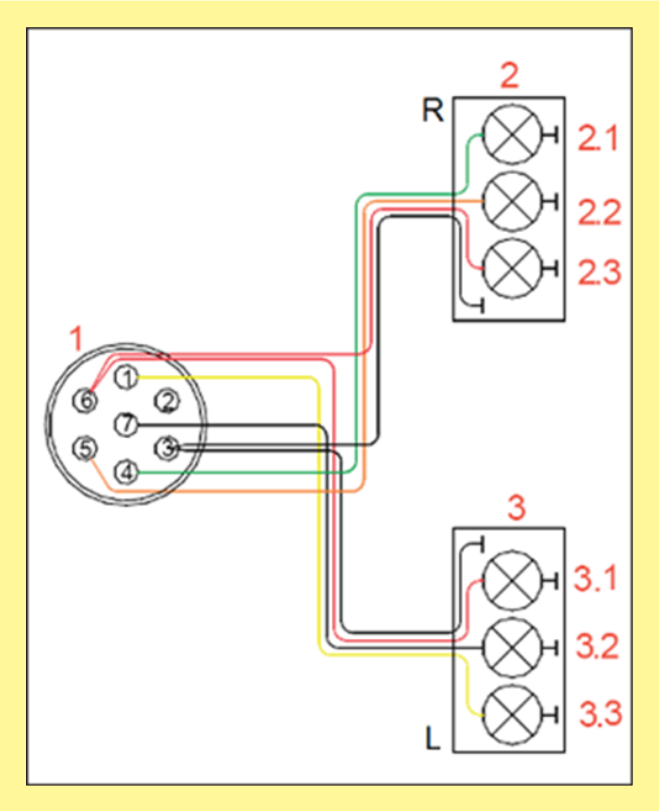


Figure 27: Circuit diagram

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

14 Decommissioning, storage, and disposal

14.1 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: Comply with the information in 7.2 in this regard.

14.2 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.

14.3 Disposal

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

15 Crop cultivation tips for using the Tined Weeder Pro

The effect of the Tined Weeder Pro is mainly based on burying, tearing out the weeds, and crumbling the soil surface. Moreover, it also stimulates tillering in cereals. Relative to 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 weeder to eliminate weeds in the white thread stage or 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 adjustment on the weeder, the tine ends must be set approximately perpendicular to the ground surface (see chapter 7.4 Working positionand adjusting the working depth).
Warning indications of over-intense weeding are increased numbers of uprooted, buried or broken-off cultivated plants. Minor crop losses can be compensated by slightly increasing the seed rate in advance by approx. +10%. 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 Pro, 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.

16 Accessories

- **Tines with a carbide coating**

To reduce tine wear, the VS 150 M1 / VS 300 M1 can be equipped with tines that have soldered-on carbide coating. Endurance tests show that these tines wear much more slowly. This considerably extends the service life of the tines before necessary replacement. The soldered carbide platelet is 60 mm long.

Carbide tine item no.:
07027-2-016: Accessory kit – carbide tines for VS 150 M1
07028-2-012: Accessory kit – carbide tines for VS 300 M1

Figure 28

- **Warning signs and lighting**

Warning signs with lighting are available as accessories for the VS 300 M1. Please specify your serial number for retrofits!
Please note that separate warning signs with lighting are available for front-mount operation of the VS 300 M1.

Item no.:
07028-2-024: Warning signs + lighting VS 300 M1
07028-2-025: Warning signs + lighting VS 300 M1 front

Figure 29

- **Accessories kit – feeler wheels**

For rear mounting the VS 150 M1 / VS 300 M1 can be equipped with pivoting feeler wheels. For front mounting, only pivoting feeler wheels must be used.
All feeler wheel brackets can be shifted in width and thus adjusted to the track width.

Item no.:
07027-2-018: Accessories kit – rear feeler wheels for VS 150 - 300 M1
07027-2-022: Accessories kit – front feeler wheels for VS 150 - 300 M1

Figure 30

- **Accessories kit – bracket for Pneumatic Seeder or Multi-Metering System**

This bracket is used to set up a Pneumatic Seeder PS 120 - 200 M1 or a Multi-Metering System MDP 100 M1 on the Tined Weeder Pro. Please note that setup must be executed in accordance with ISO 4254-1.

Item no.:
07027-2-019: Accessories kit – bracket for Pneumatic Seeder
07027-2-032: Accessories kit – bracket for Multi-Metering-System

Figure 31

- **Accessories kit – platform kit**

A suitable platform kit is available as an accessory for easier maintenance of the pneumatic seeder PS 120 - 200 M1 and multi-metering system MDP 100 M1. Please note that setup must be executed in accordance with ISO 4254-1.

Item no.:
07027-2-017: Accessories kit – platform kit VS 150 M1
07028-2-013: Accessories kit – platform kit VS 300 M1

Figure 32

- **Dispersion plate installation**

When a seeder is mounted on the VS 150 M1 / VS 300 M1, brackets are required for the dispersion plates. In the standard arrangement, the dispersion plates are positioned in front of the tine section. Everything is already installed in the factory.
Note: 8 dispersion plates are required when using a Pneumatic Seeder PS. When using a Multi-Metering System MDP, 6 dispersion plates are required.

Figure 33

Item no.:
07027-2-020: Accessories kit – dispersion plate installation 8 outlets for VS 150 M1 (for Pneumatic Seeder PS)
07027-2-021: Accessories kit – dispersion plate installation 6 outlets for VS 150 M1 (for MDP)
07028-2-014: Accessories kit – dispersion plate installation 8 outlets for VS 300 M1 (for Pneumatic Seeder PS)
07028-2-015: Accessories kit – dispersion plate installation 6 outlets for VS 300 M1 (for MDP)

- **Manual tine lifting**

With manual tine lifting, individual tines can be lifted, e.g. to avoid processing row crops that have already grown taller. As a result, the tine weeder is optimally adjusted for bed cultivation.
Either the entire tine weeder can be equipped with manual tine lifting or any number of tine lifting mechanisms can be selected. To actuate the tine lifting mechanism, the plate is simply pushed towards the tine.

Figure 34

Item no.:
07027-2-024: Accessories kit – tine lifting for VS 150 M1
07028-2-019: Accessories kit – tine lifting for VS 300 M1
07014-2-351: Individual tine lifting

- **Accessories kit - front headstock**

An additional headstock can be installed on the VS 150 M1 & VS 300 M1 to operate the tine weeder at the front and rear.

Figure 35

Item no.:
07027-2-008: Accessories kit – front headstock for VS 150 - 300 M1
07027-2-025: Accessories kit – hydraulic hose extension for VS 150 - 300 M1

17 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 3 for contact data) is also happy to assist you.

18 Index

Notes

Qualität für Profis

- seit 1997 -

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