Hoeing

SCHMOTZER

Hoeing

Ecologically and economically worthwhile

Why hoeing?

Good Reasons

Soil Maintenance

- Higher aeration and root growth through cracked crusts
- Improved water absorption due to less erosion
- Increased micro-organism activity mobilizes nutrients
- Improved mineralization

Plant Care

- Improved root growth by loose and moist soil
- Less growth problems and leave damage cause by the use of herbicides (e.g. necrosis on beet leaves)

Removal of chemical resistant weeds or secondary growth
(e.g. blackgrass)

Suppression of weather based late weed growth

Cost savings due to reduce herbicide application
100% for organic farming, up to 70% for usual farming

What is important when hoeing?

- Slim blade – hilling effect of the hoeing tool has to be minimized
- Vibration effect – exposes weed
- Shallow, root saving, capillary water saving and consistent hoeing

Advantages of today's hoeing

- Enhanced ground performance due to working widths up to 24 metres
- Driving speed up to 15 km/h with opto-electronic steering and vibro-blades
- Tandem-hoes: perform two drilling widths in one working step
- Reduced cost for machinery
- Reduced cost for herbicides
- 8 times increased durability based on slide bearings made of high tech synthetic material (iglidur ©) in combination with a hardened steel bushing. Schmotzer uses this in all hinges.
- Hoeing between the rows using fingers and/or blades

dynamic

Speeds up to 15 km/h

Relaxed and comfortable thanks to camera steering

professional

More than 90 years of hoeing experience

Used worldwide in every conceivable soil and climate condition

efficient

Hoeing all-round the plants using duck foot shares and finger hoes for use between the rows, with adjustable angle of inclination, for tackling aggressive weeds.

qualified

Precision production at the Bad Windsheim plant, with guaranteed top quality material.

flexible

Row widths of between 16 and 200 cm

Unlimited variation thanks to the choice of blades

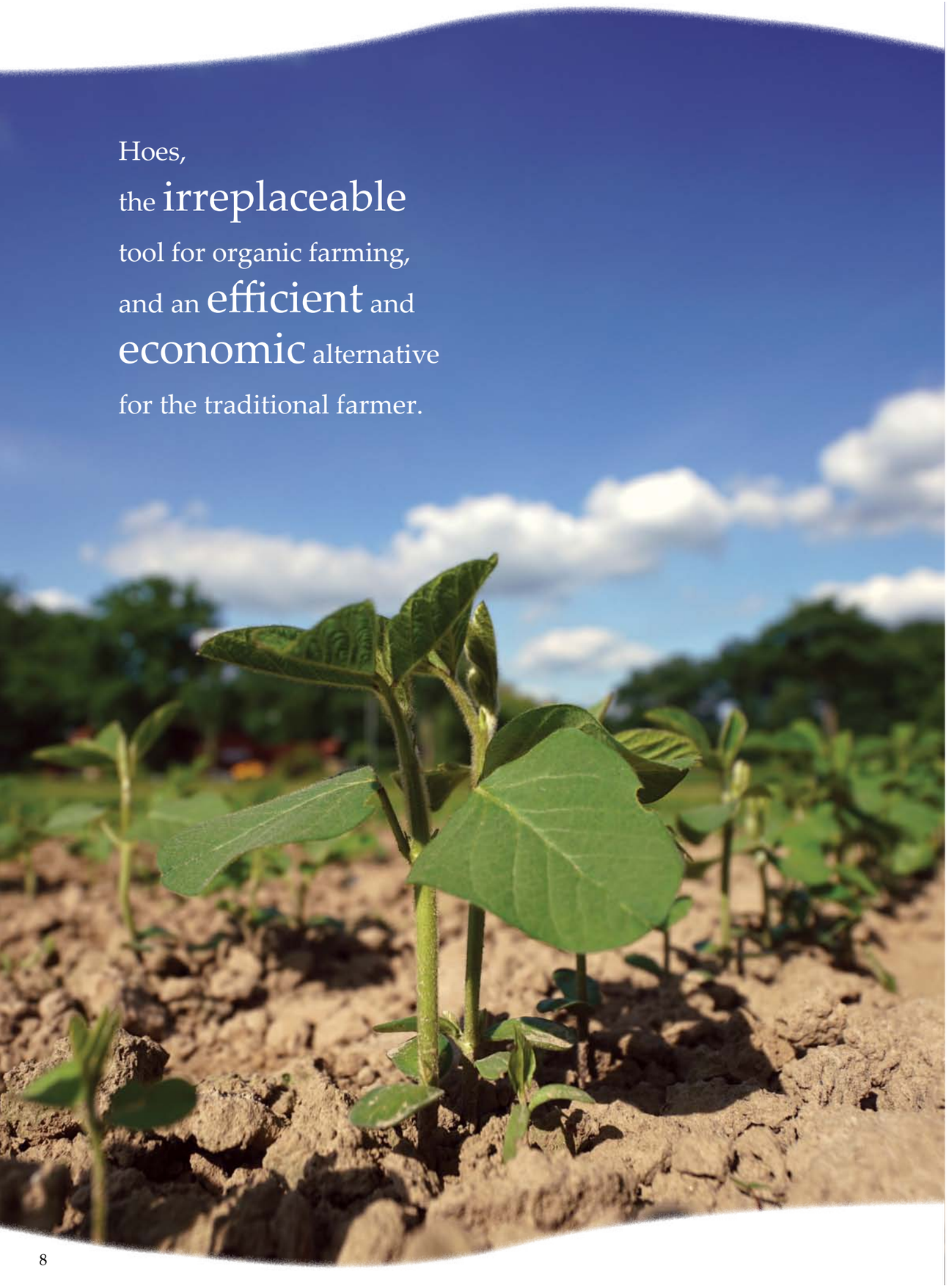
Working widths of up to 24 m

Hydraulic parallelogram lifting device

Latch coupling for multiple hoe sets

consistent

Vibro blades ensure even hoeing depth, lower fuel consumption and reduced blade wear due to even hoeing.

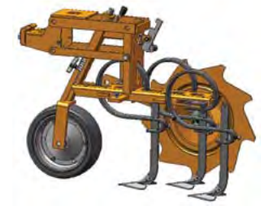


Hoes,
the **irreplaceable**
tool for organic farming,
and an **efficient** and
economic alternative
for the traditional farmer.

The Parallelograms

Kombi-PP - The Allrounder — KPP

row widths 25 to 200 cm
working width up to 24 m
clearance up to 80 cm
maintenance-free hinges
setting: 1 to 5 hoeing blades
row widths of 150 cm and more 10 blades
press wheel 300 x 100 mm



Small Kombi-PP EKP - The Specialist — EKP

row widths 20 to 40 cm
(wider rows use more parallelogramms per row)
working widths up to 24 m
clearance 60 cm
press wheel 200 x 67 mm (EKP-H 300 x 100 mm)

precise soil adjustment thanks to the single vibro blade guidance

no chance for sleeping weeds

Multi-Purpose-PP - The Well Proven — MPP

row widths 25 to 60 cm
working widths up to 12 m
clearance 60 cm
press wheel Farmflex 200 x 65 mm

Especially made to use mid-mounted

Einzel-PP - The Slim — EPP

row widths 16 to 30 cm
(wider rows use more parallelogramms per row)
working widths up to 6 m
press wheel 200 x 65 mm

precise soil adjustment thanks to the single vibro blade guidance

Especially made for hoeing grain and specialized cultivation

4 row hoe for salad in Norway

30 row cereal hoe in Frankonia
3 row hoe for cucumbre in Austria
8 row hoe for corn with camera in Switzerland

A single hoe blade per parallelogram offers the best ground adaptation and an even hoeing depth.

Hydraulic parallelogram lifting device

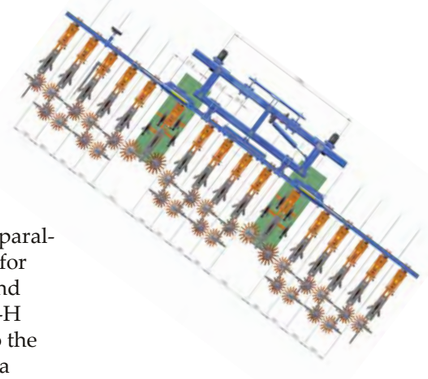
On uneven field surfaces, the parallelogram can be lifted from the driver's position so that the crop plants are undamaged in the edge strip and in the headland.

Opt for manual or GPS operation with an in-built tractor terminal connected via isobus socket or Schmotzer terminal. Combined with RTK GPS, in the headland area, the individual parallelograms can be raised subject to individual width control.

Setting of the vibro blades

Only with vibro blades - patented!

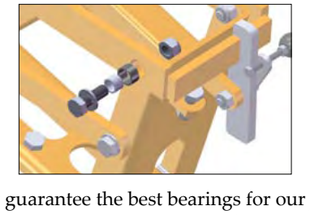
row widths	n°/size of blades
> 15 cm	1 blades 80 mm
> 20 cm	1 blades 120 or 180 mm
30 to 60 cm	1 x 200 mm, 300, 400 or 3 x 140/160 mm
60 to 100 cm	5 x 160, 180 or 200 mm
100 to 150 cm	6 x blades at choice
150 to 200 cm	10 x blades at choice



The EKP, the small combi parallelogram, is ideally suited for narrow rows. The shape and passage height of the EKP-H (high) has been adapted to the large Kombi-PP, allowing a combination of the two parallelograms on a single hoe.

Wide rows and the tractor track can be hoed across the entire width using multiple EKPs per row or in combination with a Kombi-PP.

Single screw, twin bearing, maximum hold!



We guarantee the best bearings for our parallelograms and protective rollers

- 8 times longer useful life than ball bearings
- Tried and tested in the Kombi-PP for 18 years
- Bearings only adjustable by Schmotzer; over the last 50 years, readjustment work has been successfully carried out more than 100,000 times. All bearings maintenance free.

MPP

12-row front hoeing machine for sugar beets

Grain hoe with MPP along the tyre track

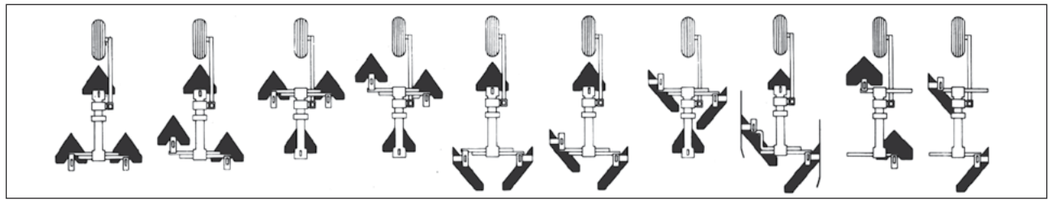
The lateral stability and huge adjustability of the MPP enable the use of a wide range of tools.

Depending on the soil conditions, one, two or three tools can be deployed either in a rigid or sprung configuration. Depth adjustment is regulated by a Farmflex roller with a diameter of 200, 280 or 300 mm.

The tines can be drawn into the soil via adjustable spring tension, in five stages. Duck foot shares combined with cutting discs are particularly suitable for small plants. The L-blade with cropped leg allows damage-free hoeing of larger plants, without protective discs.

The numerous combinations of hoeing blades for optimum adaptation to the soil conditions experienced in practice appear in the illustration.

Various tool combinations for the MPP



1 Rigid tines are situated in strong tine holders. The displacement of opposite blades up to 85 mm allows working without blocking.

2 Straight legs (no weed catcher) and large sliding scale for the depth adjustment of the blades ensure a good flow even if high amounts of weed or stones are present.

3 Strong and heavy parallelograms (22 kg) allow a better entering and a constant working depth of blades.

4 All kinds of mounting options of duckfoot and L blades are possible for working widths from 10 cm to 70 cm.

5 A double-spring load with 5 positions allows penetration in all soil conditions.

6 Robust fixation of the Schmotzer parallelogram to the strong toolbar.

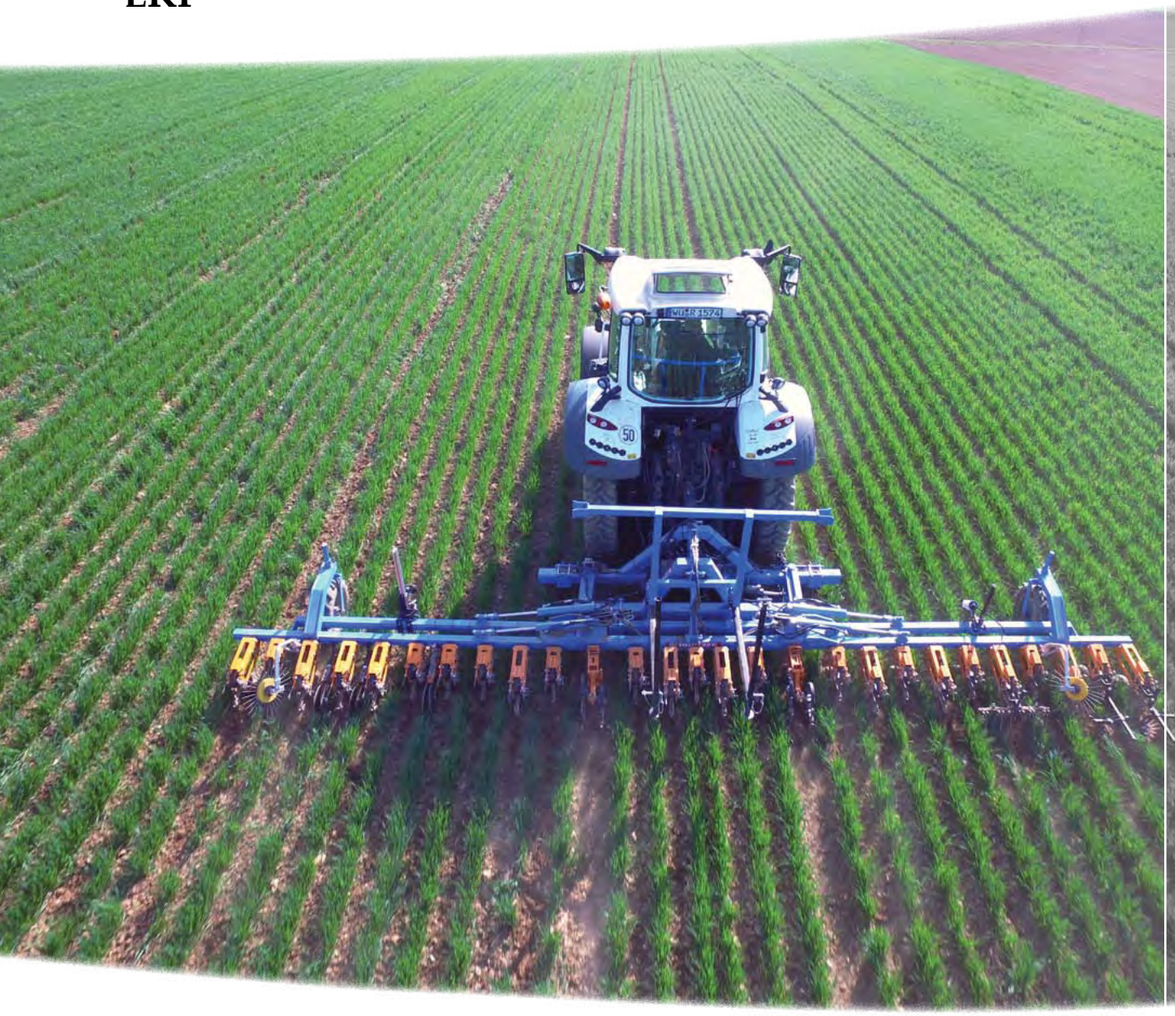
7 Guiding discs with self cleaning farmflex wheels (diameter of 200 mm)

8 Exceptional directional stability due to the use of cross link plates and adjustable bushes.

9 High stability of the toolbar (Schmotzer is the only manufacturer using solid materials for its toolbar)

10 Improved lifting height by a limitation screw

11 For Schmotzer hoeing machines any movement of the parallelograms can be restricted by using adjustment screws with an internal lock nut system.



Grain hoe with EKP long and EKP short, the tyre track is processed by MPPs

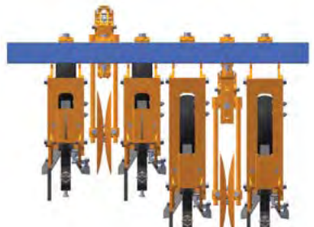
The new EKP single parallelogram has an integrated vibro blade guide. At any row width, be it 20 cm, 50 cm or 75 cm, this guarantees a precise blade depth. This is essential for organic farming as it brings to the surface small, dormant weed seeds (light-dependent germinators). If multi-blade parallelograms are used, weed tangles can be created. This is prevented with the single-blade configuration on the EKP.

For the first time, this new EKP parallelogram can also be fitted with finger hoes and weed tines. For tractors with limited lifting height, the drop height can be adjusted in three stages.

EKP short with finger hoe

EKP short with weed tines

EKP long



EKP double

EPP mid mounted on Fendt GT

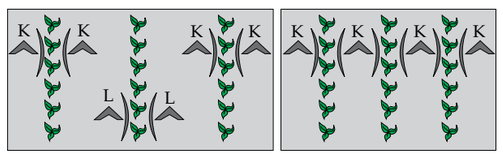
Hoe for marjoram with EPP and round protection discs

EPP short EPP long

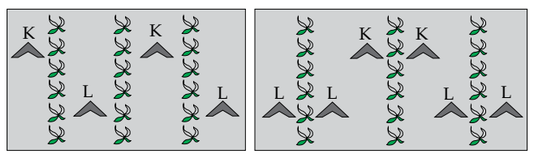
The single configuration of the cutting blades in the parallelogram ensures a precise hoeing depth, irrespective of cut width and row numbers.

This prevents weeds being drawn through as well as preventing clods being deposited on the rows. Any weeds are cut through completely, and laid on the surface.

The multilevel adjustable spring tension ensures perfect adaptation to the soil. Alternated mounting of short and long version EPP units allows hoeing without clogging. The EPP can also be equipped with vibro springs or can be combined with the MPP for larger row widths, for example mid mounted on the Fendt F 220 GT, for maize.



Sketch 1 – If **protection discs** are used, the blades on the left and right of the row must operate at the same height as the discs. In that case, EPP short and EPP long are used as in the configuration sketch above.



Sketch 2 – If **no protection discs** are used, we recommend the alternated mounting of EPP short and EPP long.

K = EPP short L = EPP long

The Vibro Blade

Vibro blades are semi-sprung tools which permit precise working depths and clog-free use in practice.

The thickness and shape of the top vibro springs are designed in such a way that as the tool advances, the most favourable entry angle is achieved without any change to the working depth.

No spring back, just vibration!

The vibro springs increase the cultivation effect, the uprooting of the weeds, and even allow the tools to be adjusted individually, for example deeper at tractor tracks and shallower at plant rows. Centimetre markings on the legs assist in precise adjustment.

The vibro blades work at a flat angle and as a result generate higher capillary water savings than traditional spring tines. This considerably reduces soil dehydration.

Above all with larger plants, the vibro blades offer improved root protection. Thanks to the flat working depth, above all dormant weed seeds are not raised to the surface, which could otherwise cause late weed growth.

The hoe leg, in various thicknesses, is positioned perpendicular to the soil. The vibration of the upper spring shakes the weeds loose.

The Hoe Shares

The A and O

The share and the leg form a single unit. A simple screw connection creates extra play, and with hard soil conditions the hoe share is forced upwards. Stubborn weeds are then drawn through the share, as is the case with spring tines.

Schmotzer offers three variants to avoid these problems:

1. Permanent rivets
Blade and leg are permanently riveted. The Schmotzer riveting hammer makes a blade change quick, and easy.

2. Permanently welded
Blade and leg are indivisibly welded. When worn, simply weld on a new part or dispose.

3. Rapido quick change
New quick change connection and improved share plate surpass existing systems.

Duck foot or L-blade

Sizes available 80, 100, 120, 140, 160, 180, 200, 220, 240, 300, 340 and 380 mm

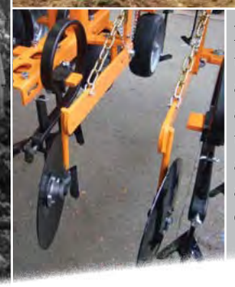
High wear-resistance thanks to oil hardening of the share tip

All hoeing blades can be combined with the Schmotzer vibro spring, even in different sizes, within the hoeing width (advantage as compared with spring tines).

Precision made centimetre setting marks enable even more precise hoeing depth.

rotatable share leg

The Hoeing Protection Discs



Hoeing protection discs are universally adjustable. Rotary linkages are available at additional cost.

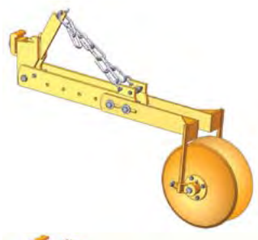
HSZ mounting on support arm, for rows of small but broad-growing plants.

HSZ mounting on the parallelogram support arm for tall but narrow-growing plants.

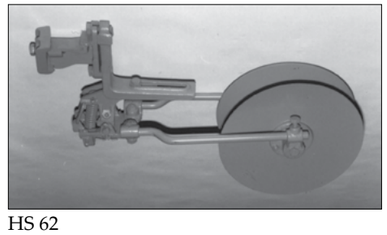
Protection discs are necessary on all crops, up to the moment that soil is completeley covered by the plants' leaves. They protect the plant from clods of earth and dust, and allow higher operating speeds.

Since the plants remain undamaged, both the round and indented protection discs from Schmotzer can be chain-link balanced.

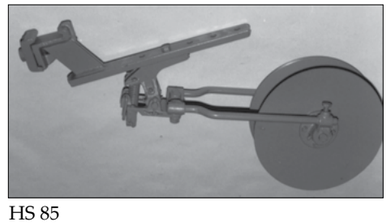
With large-leafed plants such as sugar beet, the protection discs are driven by the leaves, and rotate at the same speed. The indented protection disc is adjustable for wide or narrow operation.



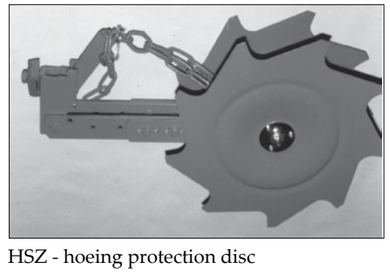
all-round adjustable rotary linkages



HS 62



HS 85



HSZ - hoeing protection disc

The Finger Hoes

Finger hoes hoe in between plant rows, where traditional hoe shapes do not reach. Two finger hoes made from specially hardened synthetic material work through the rows of plants, removing the weeds. Dormant weed seeds are covered over thereby starving them of the light they need to grow.

The hoe parallelogram ensures the precise hoeing height is maintained.

The working angle of the Schmotzer finger hoes can also be adjusted, thereby adapting the degree of aggressiveness of the hoeing itself, according to the size and stability of the crop plants.

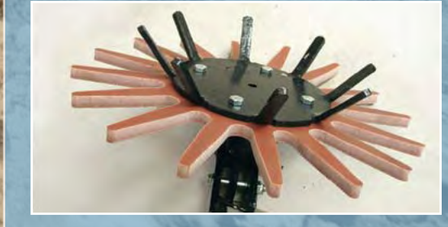
For young and sensitive crops, an adjustment angle of 40° is recommended. This directs the rotating force into the soil.

For larger crops and higher weed intensity, an adjustment angle of 20° is recommended. The rotating force is then directed at the plants.

In this process, in the initial radius, the weeds are drawn out of the row and in the second radius, the soil is moved back. This process effectively covers over the roots and any weeds left behind.

At Schmotzer, the finger hoes are ground at an angle. Test results confirm that this grinding improves weed control results. Request a copy of the test report.

Typical Schmotzer
Specially hardened gear fingers and ball bearing drive plates for a long useful life

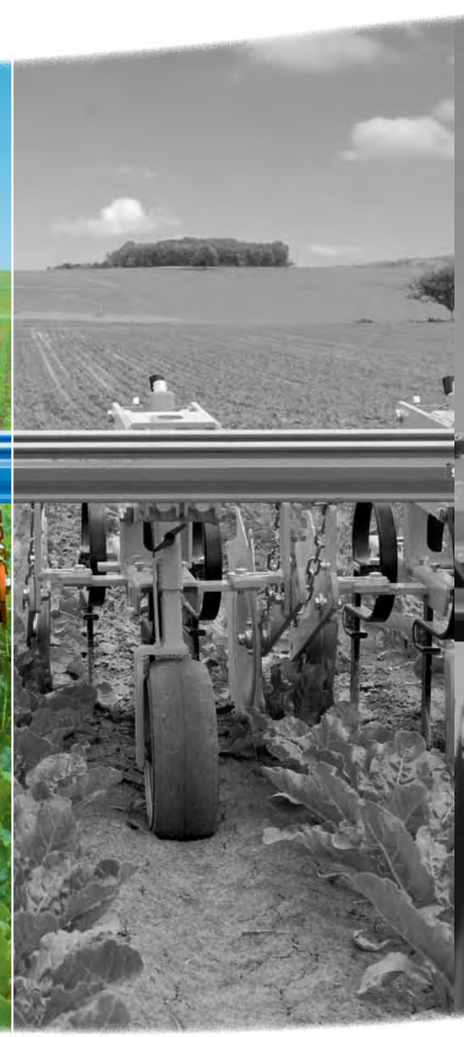


Staying on track...

No lateral drift on slopes

Effectively hoe on a gradient of up to 40% with AV5 parallel adjustment frame and camera steering

Steering systems for rear-mounted hoes



Camera Steering Optitronic (Claas E-Systems)

At a rate of 25 pictures per second, the 3D camera analyses the row pattern, and transmits any necessary correction signals to the hydraulic steering wheels or the side shift, which makes the steering corrections.

The system can be operated direct from the driver's seat, via a user-friendly monitor.

The various frame types for the cameras appear on the next page.

Camera Steering Schmotzer Okio (WLAN)

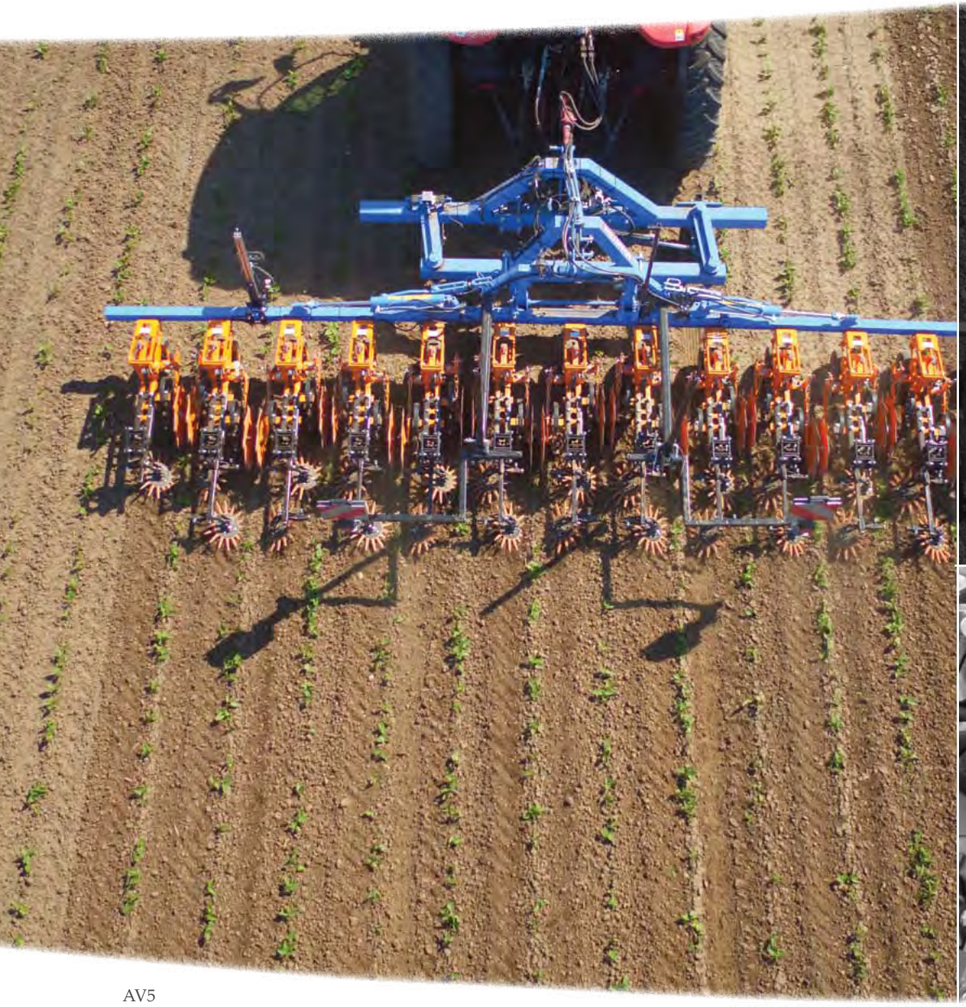
The Schmotzer Okio camera recognises the crop plants by their leaf shape, at a rate of 30 pictures per second, and passes on the data to the terminal. From there, signals are transmitted to the steering wheels or the side shift, to steer along the rows. Row recognition is based on ultramodern algorithms used in industrial image processing, that are also capable of recognising different colour tones (light, dark) thereby ensuring reliable distinction between crop plants and weeds.

Precise row recognition is even possible of steep gradients. The parallelogram shift can be extremely precisely steered along the rows on slopes, without the tractor drifting off line.

An intelligent tilt sensor ensures secure hoe guidance even on hill slopes.

The camera is operated and updated via user-friendly WLAN connections.

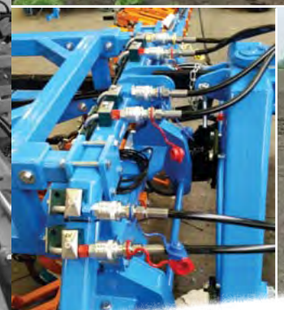
Steering systems for rear-mounted hoes



AV5

Using the new AV5, the mechanical hoe slides across two off-set lifting arms over a hydraulic cylinder, which acts on the centre of the lifting arm. Using just half of the hydraulic force required with traditional linear slide systems, the row adjustment can be carried out very precisely.

latch coupling
for AV4 & AV5



Aeroquip for
various hoeing tools

AV4

AV10 precision control with steering wheels

AV1 precision control
without hydraulics

Shift frames for camera steering

AV4 - parallelogram side shift < 6 m
The bar with the hoe parallelogram is adjusted by three stainless steel shafts, acting against the three-point bracket (= linear shift). On the one hand this configuration allows manual steering by a second operator, or on the other hand automatic steering with an optoelectronic camera system. The maximum side shift is 40 cm and is sufficient for small row widths and working widths. An optional latch coupling allows rapid tool change.

AV7 or AV10 - 12 m
Wheel or dual-wheel steering, manual or camera-based

AV5 – parallelogram side shift 5 - 9 m
For working widths of between 5 and 9 metres and double-bar hoes, the AV5 is the ideal steering system. Maximum shift travel is up to 64 cm. On slopes, the track is stabilised using coulter discs. Via the parallelogram, very precise and easy steering along the plant rows is achieved. With camera-based steering, on slopes with a gradient of 40% and with larger working widths, the AV5 offers huge advantages. The optional latch coupling allows for rapid tool changes. Even for multiple hoeing sets/row widths, only one basic device is required.

Manual steering units

AV1 - Precision control without hydraulics

For smaller working widths and light-weight machines, e.g. cereal hoes, the AV1 with mechanical steering is the ideal solution. Particularly suitable for tractors with no hydraulic connection.

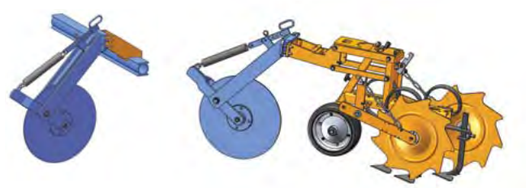
AV10 – Precision control with seat and steering wheel for second operator

The steering wheel with its oil motor is connected to the hydraulic guide wheels (7.00 x 12). With childlike ease, the operator can keep the cultivator on track. Metal seats or comfort seats are available.

Guide discs

For secure hoe control

Two self-guiding, spring-loaded guide discs are best operated at a working depth of 8 cm. The hoe itself is supported on the tractor's three-point hydraulic system. The straight-on alignment of the guide disc is adjusted using a set of screws. For working widths of 6 m or more, the guide discs are best replaced by type AV7 (7.00 x 12) guide wheels.



Types of Mounting and Frames

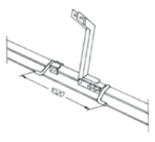
Types of mounting

Thanks to ever more reliable steering systems, more and more hoes are rear-mounted. Nonetheless, Schmotzer continues to also supply useful variants for front and mid mounting.

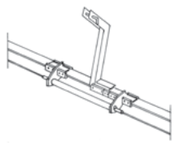
Mid mounting
Utilise the advantages offered by a Fendt tool carrier. Schmotzer equipment makes mounting simple. The following couplings are suitable for mid mounting:
Type A for Fendt GT 231
Type F1 up to 8 rows, for Fendt GT 231 - 380
Type F2 with pendulum compensator for Fendt GT 250 - 380

Front mounting
Front mounting applications offer the best view of the hoeing process and are available for a variety of front end carriers via a coupling triangle.

Type A



Type F1



Type F2

Front mounting application VB23 and VB2

Coupling triangle, front carrying wheels 4.00x8, 5.00x15 and Terra tyres

Frame types

The hydraulic, vertically folding variant [1] is a very simple and quick option for hoes with working widths up to 9 metres. In this version, the outer segments are folded up into a vertical position.

On hoes with the vertical folding system, multiple elements can be folded into a vertical position, in parallel. The advantage is that the hoeing parallelograms remain in a horizontal position, even when the outer segments are folded vertically. This allows faster road transport. The folding process is activated direct from the cockpit via a console, with just 1 double-acting valve.

All machines with a working width in excess of 9 m are adapted for horizontal travel via hydraulic transport wheels. An extension frame is available for transformation from horizontal transport mode to working mode, and vice versa. For details, see the separate brochure ‘Extension frames”.

1

Profile toolbars

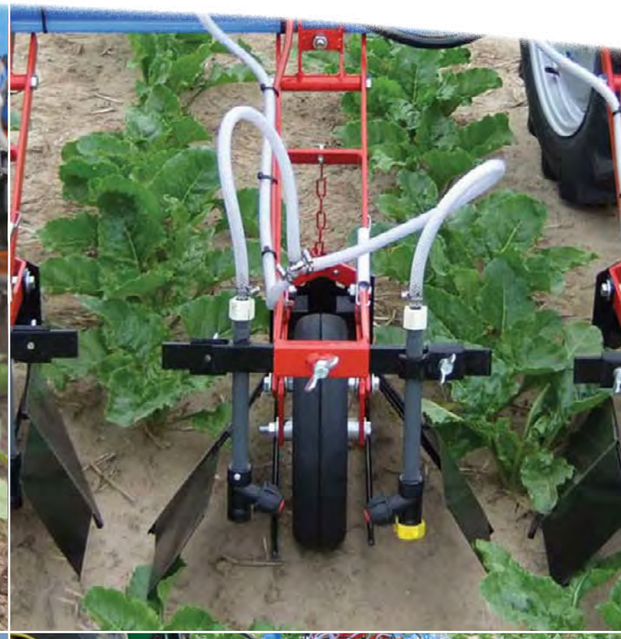
Simple row width adjustment using toolbars with two flange levels.

Tried and tested robust system from solid material.

The higher profile in the mid section of the toolbar ensures greater stability for hydraulically folding systems, and for rigid toolbars with a working width of 5 m or more. For larger machines, an extremely stable square bar steel frame construction is employed.

System of wheels with bolts in the direction of travel, for road use and fieldwork

Band and Underleaf Sprayers



Hoe & Spray combination

Conventional hoeing with savings of spraying agents of up to 70%

Spraying and hoeing are carried out in a single passage. In early stages spraying can be applied directly onto the row of plants, because because at this stage of development, beet and maize plants are still product resistant.

Later on, when the plants are larger and more sensitive, the specified reduced volume is sprayed under the leaves using two spray nozzles. The leaves are lifted using leaf lifters to protect the crop plant and to avoid slowing down growth.

Between the rows, the Vibro blades efficiently hose the weeds mechanically, without the use of chemicals, and loosen the soil for improved root aeration.

Spraying and hoeing are carried out by a single machine combination with each passage. This saves on both labour and spraying agent costs, and protects the environment. The working width of the Hoe&Spray combination depends on the sowing width. The system is available up to a width of 24 rows/12 metres.

Band and underleaf sprayer

The Schmotzer sprayer tanks are available with volumes of 300, 400 and 600 l with a 70 l-pump and mounting parts for drilling and hoeing machines, for M-PP and Kombi-PP.

The band spraying systems are equipped with diaphragm nozzle bodies. For beets, maize and potatoes, type 8002 E nozzles and BV caps are available.

The underleaf sprayers are also equipped with diaphragm nozzle bodies. For beets, maize and potatoes, the underleaf nozzles of type UB 8502 and bayonet (BV) caps must be used.

For specific use as a band or underleaf sprayer, the spraying parallelograms are equipped with a 280 mm diameter compression wheel with clod deflector.

Terrain-following leaf lifters improve spray protection of the crop plants and the weed-killing effect (unique for bush sprayers).

Inter-row Fertilizer

skid blade

disc blade

Giants on the field
Large scale vegetable cultures in Northern Germany and Spain

Preconditions for precise fertiliser application, even with the lowest volume, are speed-dependent dosing rollers and slip-free drive gear.

The centrally driven dosing cylinder in the Schmotzer inter-row fertilisers rotates with a funnel-shaped outlet mounted on the fertiliser container. This construction method ensures constant and complete emptying even on hillside situations, and allows precise dosing for different fertiliser compositions.

Filling filters are integrated into the covers of the large-volume fertiliser hoppers, to prevent clogging with encrusted fertiliser or packaging material. By a simple rotation, the cap can be opened to the front or the back, alternatively. The required application volume can be easily adjusted with a chain gear system, to between 100 and 1,000 kg per hectare (depending on the fertiliser type).

Even at large working widths, the strake wheel behind the machine is reliably and precisely driven.

Any residual fertiliser can be emptied via a practical emptying flap.

The outlet hose fixed directly to the toolbar make it possible to connect any Schmotzer parallelogram.

Standard types of fertilizers:

Mechanical versions:
2 rows = 1 box à 175 l
3 rows = 1 box à 270 l
4 rows = 2 boxes à 175 l (350 l)
6 rows = 2 boxes à 270 l (540 l)
8 rows = 4 boxes à 175 l (700 l)
Other volumes upon request

Pneumtical versions:
One main fertilizer tank for front or rear mounting from 1,600 to 2,500 litres.

Ridge and Field Husbandry

Schmotzer offers two types of share ridger, type 62 for row widths of between 62.5 and 70 cm and type 75 for row widths of between 70 and 80 cm, as well as a disc ridger for row widths of between 65 and 80 cm.

For heavy soils that tend to clod, Schmotzer's disc ridgers are particularly suitable, with their height-adjustable mould boards. These are specially shaped at the bottom end, to break the soil once again, prior to depositing it on the ridge.

The excellent grip of the share tip, combined with the baffle mounted on the leg ensures solid ridge construction. The mould boards, with their upward tilt angle, ensure ease of use without damage to the plants, even if the rows are already covered.

For sandy, marshy or easily crumbling soils, the 500 mm-diameter disc ridger with the adjustable ridge width is recommended.

All types of ridgers can be mounted on a rear-mounted Kombi-PP or MPP parallelogram.

disc ridger, share ridger with gauge, spring mounted share ridger, rotatable share ridger

The Ridger

Disc ridgers cover weeds in the soya field

Disc ridger
In organic soya farming, the complete row is covered over using the new Schmotzer disc ridger. In the stage of growth up to 10 cm, the soya plants grow clear of the soil within a single day, while the weeds remain covered. No other form of mechanical weeding is more effective.

The disc ridgers from Schmotzer can be adapted to the crop plant rows and the soil conditions. Soil is built up into a ridge on the row of plants thereby depriving the weeds of the light they need to grow. A comparable weed prevention effect is achieved by raising ridges right up to the crop plant in field bean and maize farming.

Flat ridgers from Schmotzer are mounted on the vibro blade, immediately adjacent to the row of plants. An excellent ridging effect is achieved, while the plants are well protected and speed of operation can be adjusted.

The indented protection disc is responsible for the self-cleaning of the system.

Accessories

Curry combs

Curry combs are used to expose weeds, even in the plant rows. Curry combs can be combined with a finger hoe.

Rolling cultivator

Cutting discs for strawberries

Star parallelogram

For a better surface levelling alongside of the row and crosswise. Best weed control in the 2 to 3 cm working depth area.

Blind hoeing - better than combing

During the first days following the sowing of seeds, weed hoeing above the seeds over the entire surface area is 100% better than combing. On the EKP model, the hoeing blades are precisely height adjusted.

Best single-blade adjustment 3+2 or 10+2, 'blind' 5+2 or 10+4

Maize and cabbage 70/75cm: KPP with 3 blades in the middle + 2 EKP each with 1 blade outside

Pumpkin and strawberries e.g. 150cm:
KPP with 10 blades in the middle + 2 EKP each with 1 blade outside

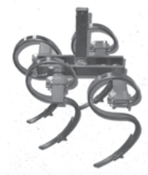
Result:
Best row and slope adjustment! Secure and level hoeing depth! Preserves capillary water! Light-requiring germinators remain covered! No subsequent weed growth!

Track loosener

Attached to the linkage drawbar

Variants:
1. Terminal strip with universal holder with solid chisel 35 x 15 x 520 mm

2. Terminal strip with spring-loaded tool holder, chisel and set of light spring tines



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