OPERATING INSTRUCTIONS
MANAKAR

Modelle: MANKAR-P 30-50 Flex, MANKAR-P 50
MANKAR-P 60-80, MANKAR-P 70-110
MANKAR-GP 60-80 , MANKAR-GP 70-110

ULV- Applicator for weed control
in areas of specialised cultivation such as nurseries, orchards and vineyards, ornamental plant and vegetable gardens, as well as agricultural, forestry, communal and non-cultivated lands.

The unit has been developed for the *undiluted* application of ROUNDUP® products (Glyphosate).

Important:
Before application, carefully read the usage instructions for the unit and the plant protective agent!
Observe safety instructions!
For questions regarding plant protective agents, consult the manufacturer!
Observe the requirements and regional regulations for the use of herbicides and, if necessary, obtain approval from the responsible authorities (e.g. environmental conservation agency)!
Application is to be performed only by a competent user.

Remarks about usage of the unit:
Settings: This system is not suitable for the application of water.
Use herbicides for testing the spray action and calibration of the flow rate.
Usage: Position the spray hood directly above the ground –
if the spray hood is held too high, the danger of spray driftage exists.
Cleaning: Do not clean the unit with a high-pressure spray or an intense water jet spray.

Noise emission from the unit equates to less than 70 dB(A).

Manufacturer:

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MANKAR
For the undiluted application of Roundup® products (Glyphosate)

The instructions on this page are valid for all MANKAR applicator units. Details regarding assembly, use and replacement parts are provided on the following pages:

MANKAR-P 30-50 FLEX,	MANKAR-P 50:	Pages 4-5
MANKAR-P 60-80,	MANKAR-P 70-110:	Pages 6-7
MANKAR-GP 60-80,	MANKAR-GP 70-110:	Pages 8-9

Intended usage:
Weed control in areas of specialised cultivation such as nurseries, orchards and vineyards, ornamental plant and vegetable gardens, as well as agricultural, forestry, communal and non-cultivated lands.

Before application, carefully read the usage instructions for the applicator unit and pesticides.
Observe safety instructions.
For questions regarding pesticides, consult the manufacturer!
Observe the requirements and regional regulations for the use of herbicides.

Noise emission from the unit equates to less than 70 dB (A).

Protective measures
Observe the remarks in the pesticide usage instructions regarding user safety and wear recommended body protection. Wear protective gloves when filling the chemical substance.
Do not eat, smoke or drink while working with pesticides.
Avoid chemical spillage without fail. Thoroughly clean hands and face after completion of work.
Thoroughly clean and dry the unit immediately following its usage. Never use the mouth to blow out nozzles or other small parts!

Keep pesticide applicators and chemical substances away from children.

Assembly and preparation for initial application
Unit assembly is described for the individual models.
Prior to initial deployment of the applicator unit, charge the battery for at least 16 hours.
Attention! Follow the sequence without fail:

1. Depress the switch in the powerpack; the lamp illuminates.
2. Insert the plug jack into the charger socket.
3. Insert the charging unit into the 230 volt power outlet.

The battery has reached its full voltage capacity after approx. 16 hours charging time. When the charging process is complete, first unplug the charging unit from the 230 volt power outlet, and then remove the applicator unit plug from the charger socket.

Spray duration when operating one segmental atomiser
with one 6 V-7 Ah battery approx. 16 hours

Spray duration when operating two segmental atomisers
with one 6 V-7 Ah battery approx. 8 hours

A powerpack with two batteries can be installed in order to double the unit's operating duration.
Art. No.: 100467
It must be noted that, with this powerpack option, the required charging time will also double.

The spray width should subsequently be checked - ideally with a piece of cardboard laid out on the ground - and the flow rate adjusted (see below for details).
The battery should be recharged immediately after using the applicator unit.

General remarks regarding applicator unit function and deployment
Pesticides: This applicator unit was originally designed for the undiluted application of Roundup products (Glyphosate). Practical experience has shown, however, that other herbicides can also be deployed in conjunction with this technology. Considering the many products on the market with their differing formulations, it is not possible to provide a complete list with application rate recommendations. Specifications for adjusting the unit listed on the following pages relate to the usage of Roundup UltraMax (Glyphosate 450 gr/ltr). In general, all products with a comparable viscosity are suitable. If it is intended to use a product other than Roundup UltraMax, its application should be first tested over a small area on a trial basis. Usage instructions for the chosen herbicide should be observed in every case, along with local requirements.

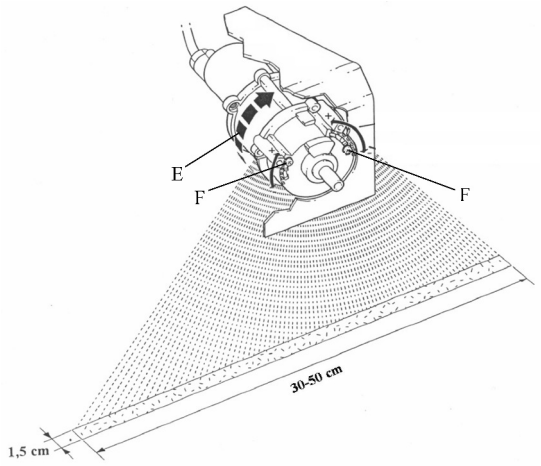
Applicator unit function: Segmental atomisers are driven by means of a rechargeable battery. Metering on all the units mentioned is path-dependent and takes place by means of a wheel driven pump. Droplets are formed by the centrifugal force of the rotating atomiser. The droplets are discharged downwards by the segmental atomiser through a continuously variable, adjustable segment. Residual chemical in the tank not intended for application is approx. 50 ml. This residual fluid can be refilled back into the original herbicide container.

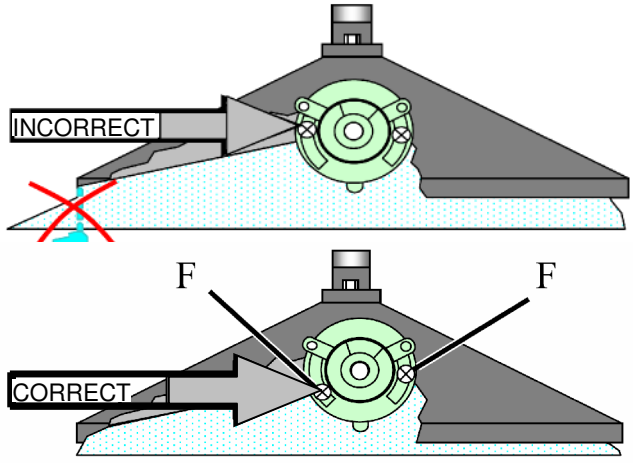
Checking applicator unit function: Chemical solutions may flow quicker or slower due to temperature fluctuations, for which reason the flow rates in the metering table should be checked and corrected as necessary. This system is not suitable for the application of water. Please use herbicides at all times for testing the spray process and calibrating the flow rate. Check the rotating atomiser on a daily basis for cleanliness and free turning motion. Check the output volume from time to time throughout the season.

Deployment of the applicator unit: Adjust the height of the spray hood in such a manner that it is as close to the ground as possible - if it is set too high, the risk of spray driftage exists. During operation, chemical fluid will collect in the segmental atomiser reservoir and will continue to drip for approx. 30 seconds after the shut-off valve has been closed if the unit is tilted. In order to avoid damage to cultivated plants due to dripping, we recommend closing the shut-off valve at the end of a row, for example, then folding the spray hood upwards and waiting approx. 30 seconds until the reservoir has emptied.

Spray width

- Place an underlay (cardboard or paper) on the ground and prop up the unit on stands.
- Actuate the switch button on the powerpack while simultaneously turning the wheel and appraising the spray width obtained, initially at one location. The spray width must be set in such a manner that the droplets are discharged over the entire width of the spray hood. The optimal spray width under standard operating conditions is set by the manufacturer.
- Compensate for deviations is possible by loosening screw (F) and sliding the width adjustment on the atomiser (see drawing).
- Further details regarding operating width adjustment can be found on the respective pages for the individual applicator units.





Cleaning

Do not clean the applicator unit with a high-pressure sprayer or with an intense water jet spray.

Cleaning during the season: During short work breaks (a few hours), herbicide can remain in the system as long as the shut-off valve remains closed. After work completion: before cleaning, refill the chemical solution into its original container. Open the shut-off and set the metering pump to maximum. Fill the chemical tank halfway with water, then, with the unit positioned, turn the wheel smoothly 50 x and allow the fluid to drain into a collector tank or, operating the unit for approx. 100 m, apply the cleaning fluid to the already treated surface. Remove any remaining water from the tank and turn the wheel 50 x once again until the system is completely empty.

Cleaning at the end of the season: Rinse the unit with warm water as described above. Additionally: Unscrew filter and clean screen as necessary. The spray hood and the atomiser housing can be cleaned with a moist cloth, except the atomiser disc in order to avoid damage. With heavy contamination, the atomiser housing should be unscrewed to remove contaminants and plant parts. Connect the unit to the charging device (see below).

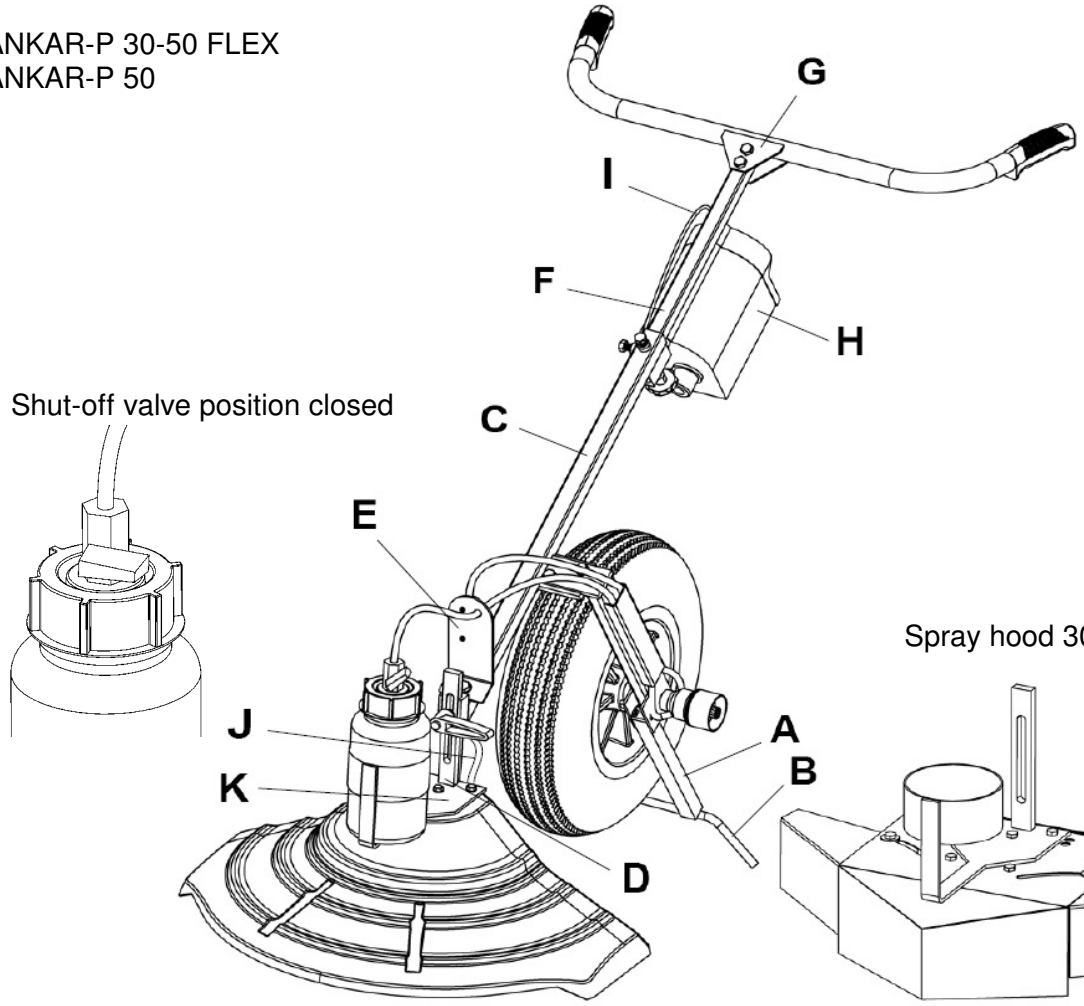
Charging the applicator unit and care of the accumulator

The applicator unit is outfitted with an automatic charging device. Trickle charging is possible.
In order to recharge a completely empty battery up to full capacity, approx. 16 hours charging time is required.
The battery should be recharged immediately after usage.

Battery charging	Minimum charging time	Time interval
Fully discharged	16 hrs.	immediately
Short-term usage	6 hrs.	immediately
Storage without usage	(2 hrs. 1 x per month)	or permanent charge

With a fully loaded battery, units with one atomiser can be deployed for 16 hours, while units with 2 atomisers can be deployed for approx. 8 hours.

MANKAR-P 30-50 FLEX
MANKAR-P 50



Shut-off valve position closed

Spray hood 30-50 FLEX

Assembly

1. Screw the applicator unit support stand (A) together with the stand foot (B).
2. Screw the spray hood together with the height adjustment (K) and the unit support beam (C).
3. Connect the electrical plug connectors (D) together.
4. Screw the flow rate control (E) onto the unit support beam (C).
5. Screw the handle bar (G) together with the handle bar extension (F)
6. Insert the handle bar extension (F) into the unit support beam (C) and tighten securely.
7. Slide the powerpack (H) into the designated bracket on the unit support beam (C) and tighten securely.
8. Insert the phone jack (I) into the plug socket on the powerpack (H).
9. Attach the hose (J) onto the lower side of the flow rate control (E).

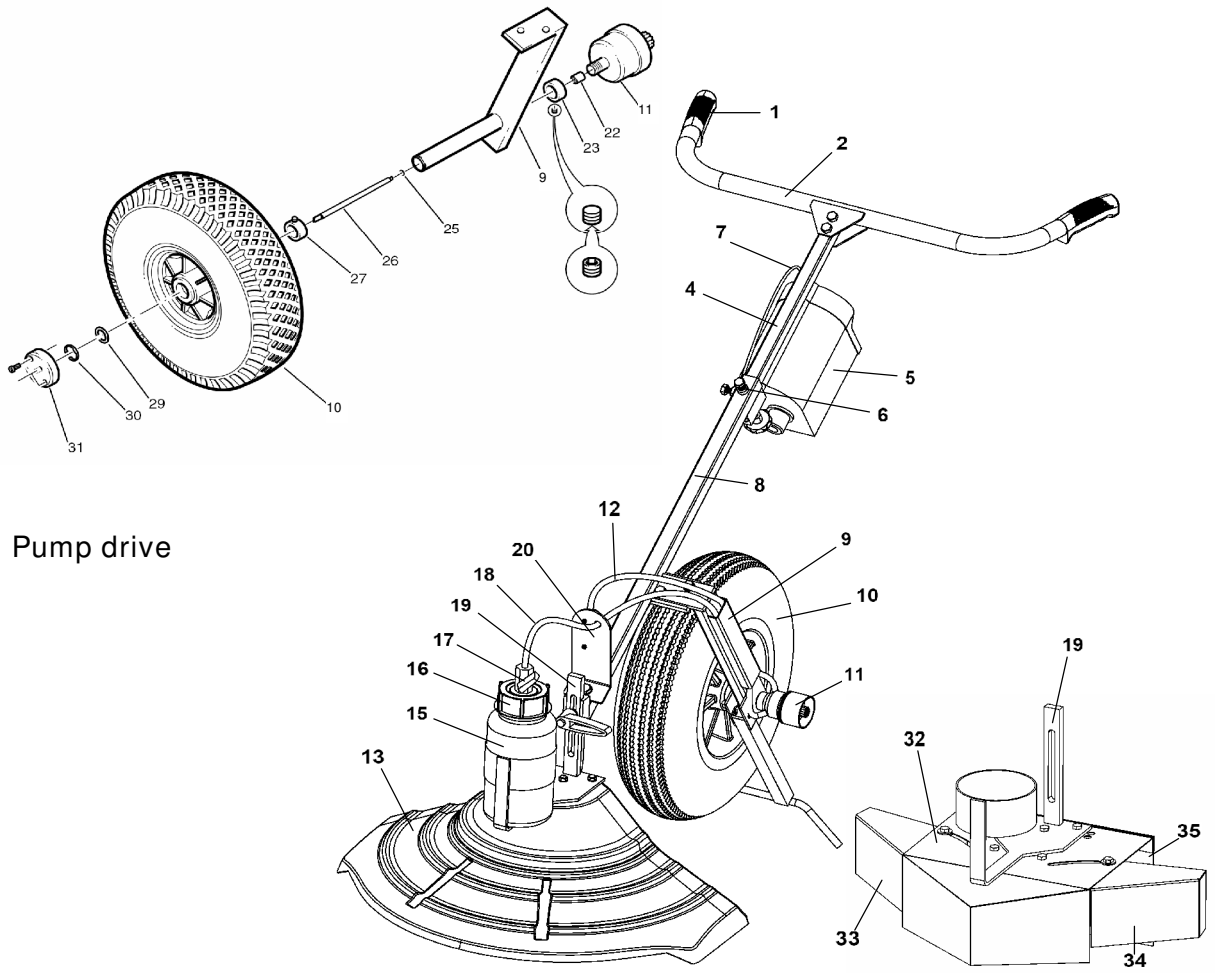
Metering table
Roundup UltraMax application rate at 20 °C

Roundup UltraMax	Metering adjustment knob position	Required output volume in ml per atomiser with 50 wheel revolutions
2 l/ha	E	approx. 6.3
3 l/ha	H	approx. 9.5

Checking the output volume

1. Place an underlay (e.g. cardboard or paper) on the ground and prop up the unit on stands.
2. Fill the chemical tank with herbicide - undiluted.
3. Remove the hose from the lower side of the flow rate control and place a measuring cup underneath.
4. Open the shut-off valve, initially setting the metering adjustment knob to the maximum flow rate and simultaneously turning the wheel; wait until the chemical solution is evenly applied.
5. Set the chemical solution volume according to the output table.
6. Volume calibration: Collect the chemical solution from 50 wheel revolutions into a measuring cup. If the desired volume is not reached, set a larger or a smaller volume with the pump metering adjustment knob.
7. Perform volume calibration again.
8. Reconnect the hose on the lower side of the flow rate control.
9. The unit is now ready for deployment.

Maximum allowable wheel pressure 3.5 bar



Pump drive

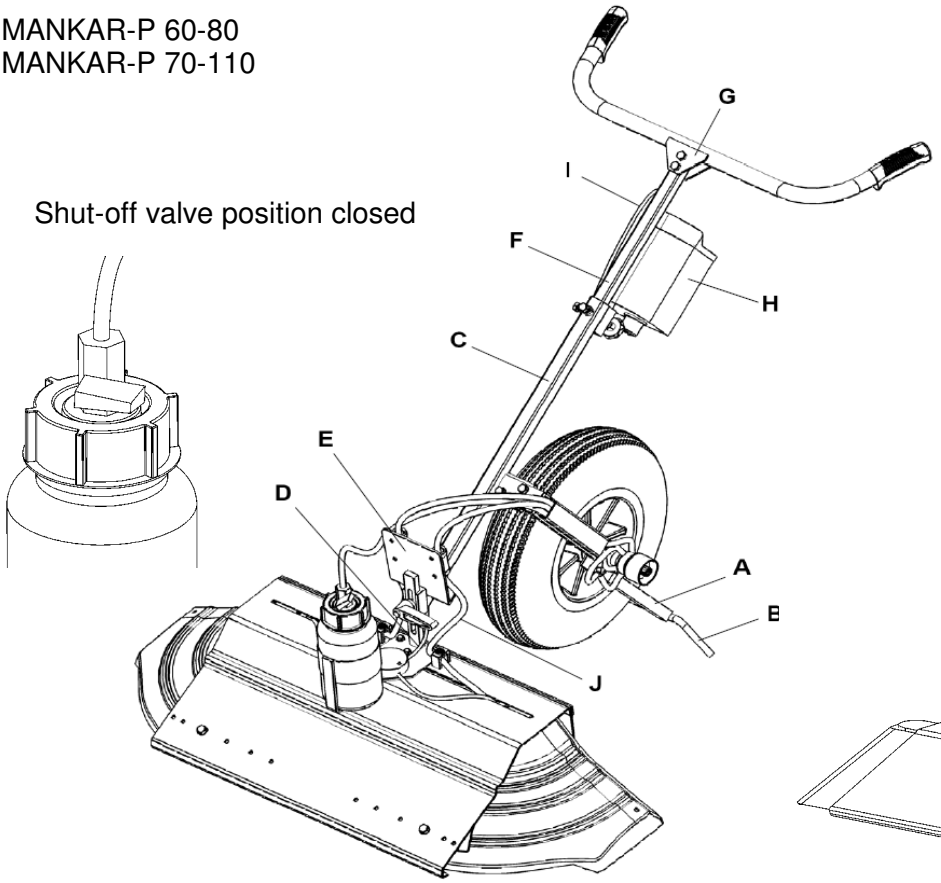
Part Art. No. Designation

102360 MANKAR-P 30-50 FLEX

101093 MANKAR-P 50

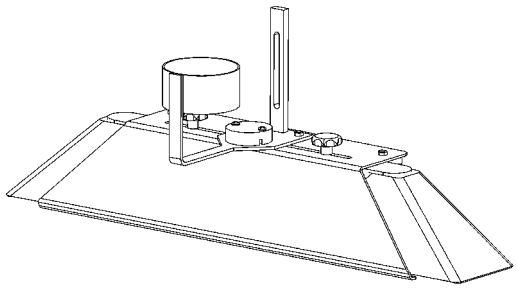
1	100349	Rubber hand grip for MANKAR
2	101272	Handle bar for MANKAR
4	101273	Handle bar extension for MANKAR
5	100459	Powerpack with 1 battery, 6 V - 7 Ah, for MANKAR
6	100368	Star grip screw M 8 x 25 mm
7	100387	Phone jack with cable, 1050 mm, MANKAR
8	101274	Unit support beam VA for MANKAR-P
9	101275	Pump carrier VA incl. stand for MANKAR-P
10	100402	Wheel 400 x 100 mm, pneumatic-tyred
11	100492	Metering pump MAFEX-3, capacity 2 - 20 ml/min
12	- - - - - -	Pressure hose 4 x 2 mm
13	100351	Spray hood 50 cm, for MANKAR-P and MANTRA
15	100434	Tank 1 L, MANKAR, without lid
16	100441	Tank lid, 1 L with hole for MANKAR units
17	100390	Ball valve 1/4" i/i
18	- - - - - -	Suction hose 4 x 2 mm
19	101276	Height adjustment for MANKAR-P, with tank holder
20	100397	Flow rate controller, complete, for all MANKAR units, without holder
22	100392	Pump threaded sleeve for MAFEX / MANKAR pumps
23	100389	Clamping bush for wheel axle/pump
25	100141	O-ring 4.48 x 1.78 mm for pistons, MAFEX/MANKAR pumps
26	100393	Cardan shaft, MS, for MANKAR units
27	100377	Retaining collar 20.5 mm for wheel axle, MANKAR and mounted units
29	100457	Adjusting washer 20x28x1 mm for pump drive
30	100394	Retaining ring A 20 for pump carrier, MANKAR / FLEXOMANT
31	100375	Entrainer disk for MANKAR units
32	102248	Spray hood, metal 30-50 Flex, complete, MANKAR P
33	102327	Spray hood 30-50 cm, right chamber, VA
34	102326	Spray hood 30-50 cm, left chamber, VA
35	102394	Rubber skirt for spray hood 30-50 cm, MANKAR

MANKAR-P 60-80
MANKAR-P 70-110



Shut-off valve position closed

Spray hood 60-80



Assembly

1. Screw the applicator unit support stand (A) together with the stand foot (B).
2. Screw the spray hood together with the height adjustment (B) and the unit support beam (C).
3. Connect the electrical plug connectors (D) together.
4. Screw the flow rate control (E) onto the unit support beam (C).
5. Screw the handle bar (G) together with the handle bar extension (F)
6. Insert the handle bar extension (F) into the unit support beam (C) and tighten securely.
7. Slide the powerpack (H) into the designated bracket on the unit support beam (C) and tighten securely.
8. Insert the phone jack (I) into the plug socket on the powerpack (H).
9. Attach the hose (J) onto the lower side of the flow rate control (E).

Metering table
Roundup UltraMax application rate 2 l/ha at 20 °C

Spray width in cm	Metering adjustment knob position	Required output volume in ml per atomiser with 50 wheel revolutions
60	A	approx. 3.8
70	B	approx. 4.4
80	C	approx. 5.0
90	D	approx. 5.6
100	E	approx. 6.3
110	F	approx. 6.9

Calculating divergent application rates:

Factor x Spray width in cm = Required volume per atomiser in ml with 50 wheel revolutions

Factor for 1 l/ha: 0,031
Factor for 2 l/ha: 0,063
Factor for 3 l/ha: 0,094

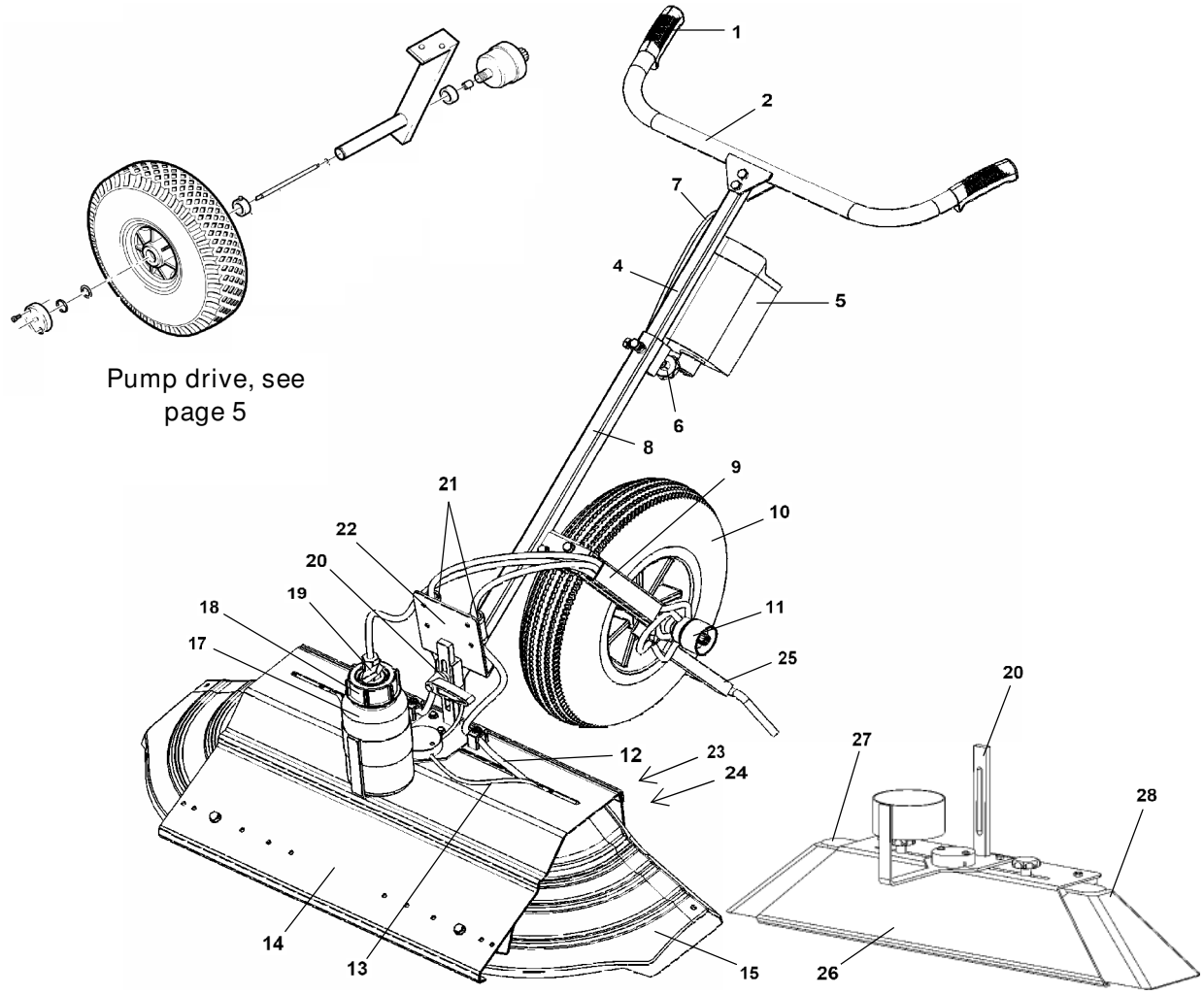
Adjusting the spray width

a) Loosen the spray hood screws in the elongated holes on the upper side of the sheet metal skirt and unscrew the screws from the front side of the sheet metal skirt.
b) Adjust the segmental rotation atomiser to the desired width (see page 3 of the Operating Instructions).
c) Retighten the screws.

Checking the output volume

1. Place an underlay (e.g. cardboard or paper) on the ground and prop up the unit on stands.
2. Fill the chemical tank with herbicide - undiluted.
3. Remove the hose from the lower side of the flow rate control and place a measuring cup underneath.
4. Open the shut-off valve, initially setting the metering adjustment knob to the maximum flow rate and simultaneously turning the wheel; wait until the chemical solution is evenly applied.
5. Set the chemical solution volume according to the output table.
6. Volume calibration: Collect the chemical solution from 50 wheel revolutions into a measuring cup. If the desired volume is not reached, set a larger or a smaller volume with the pump metering adjustment knob.
7. Perform volume calibration again.
8. Reconnect the hose on the lower side of the flow rate control.
9. The unit is now ready for deployment.

Maximum allowable wheel pressure 3.5 bar



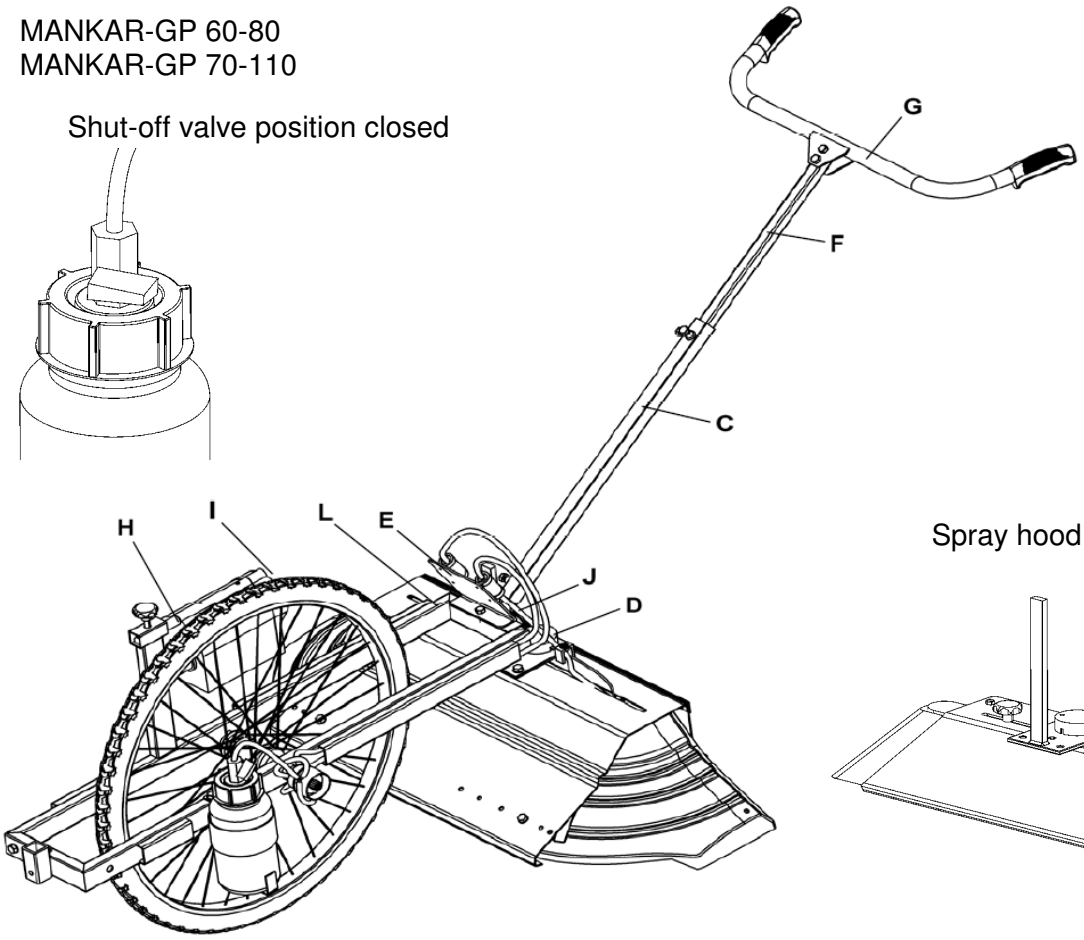
Part Art. No. Designation

101094 MANKAR-P 70-110
102391 MANKAR-P 60-80

1	100349	Rubber hand grip for MANKAR
2	101272	Handle bar VA for MANKAR-P VA, -110P VA
4	101273	Handle bar extension VA for MANKAR-P VA, -110P VA
5	100459	Powerpack with 1 battery, 6 V - 7 Ah, for MANKAR-P,-110P
6	100368	Star knob screw M 8 x 25 mm
7	100387	Phone jack with cable, 1050 mm, MANKAR
8	101274	Unit support beam VA for MANKAR-P VA and -110 P VA
9	101275	Pump carrier VA incl. stand for MANKAR-P VA, -110P VA
10	100402	Wheel 400 x 100 mm, pneumatic-tyred
11	100522	Metering pump MANKAR-3, capacity 5 - 10 ml/min
12	- - - - - -	Pressure hose 4 x 2 mm
13	100388	Cable, Atomiser cable, Mankar/Flex/Var/Mafex
14	100363	Sheet metal skirt, 600mm for spray hood 70 - 110 cm
15	100400	Spray hood, split, 25 cm wide, left for spray hood 70 - 110 cm
	100426	Spray hood, split, 25 cm wide, right for spray hood 70 - 110 cm
17	100434	Tank 1 L, MANKAR, without lid
18	100441	Tank lid, 1 L with hole for MANKAR units
19	100390	Ball valve 1/4" i/i
20	101276	Height adjustment for MANKAR-P, with tank holder
21	100397	Flow rate controller, complete, for all MANKAR units, without holder
22	100415	bracket for 2 flow rate controllers, MANKAR-110 P
23	100381	Clamping strip for rubber skirt, spray hood 70 - 110 cm, MANKAR
24	100380	Rubber skirt for spray hood MANKAR-110 P, -110 GP
25	100433	Stands for MANKAR units
26	101436	Spray hood 60-80 cm complete for MANKAR P with 2 atomisers, height adjustment with tank holder
27	102551	Spray hood, 30cm with guide rail, left for spray hood 60-80cm
28	102552	Spray hood, 30cm with guide rail, right for spray hood 60-80cm

MANKAR-GP 60-80
MANKAR-GP 70-110

Shut-off valve position closed



Spray hood GP 60-80

Assembly

1. Screw the spray hood together with the height adjustment (K) and the unit support beam (C).
2. Connect the electrical plug connectors (D) together.
3. Screw the flow rate control (E) onto the unit support beam (C).
4. Screw the handle bar (G) together with the handle bar extension (F)
5. Insert the handle bar extension (F) into the unit support beam (C) and tighten securely.
6. Connecting piece (C)
7. Slide the powerpack (H) into the designated bracket on the unit support beam (C) and tighten securely.
8. Insert the phone jack (I) into the plug socket on the powerpack (H).
9. Attach the hose (J) onto the lower side of the flow rate control (E).

Metering table
Roundup UltraMax application rate 2 l/ha at 20 °C

Spray width in cm	Metering adjustment knob position	Required output volume in ml per atomiser with 50 wheel revolutions
60	A	approx. 6.1
70	B	approx. 7.0
80	C	approx. 7.9
90	D	approx. 8.8
100	E	approx. 9.7
110	F	approx. 11.0

Calculating divergent application rates:

Factor x Spray width in cm = Required volume per atomiser in ml with 50 wheel revolutions

Factor for 1 l/ha: 0,050
Factor for 2 l/ha: 0,100

Adjusting the spray width

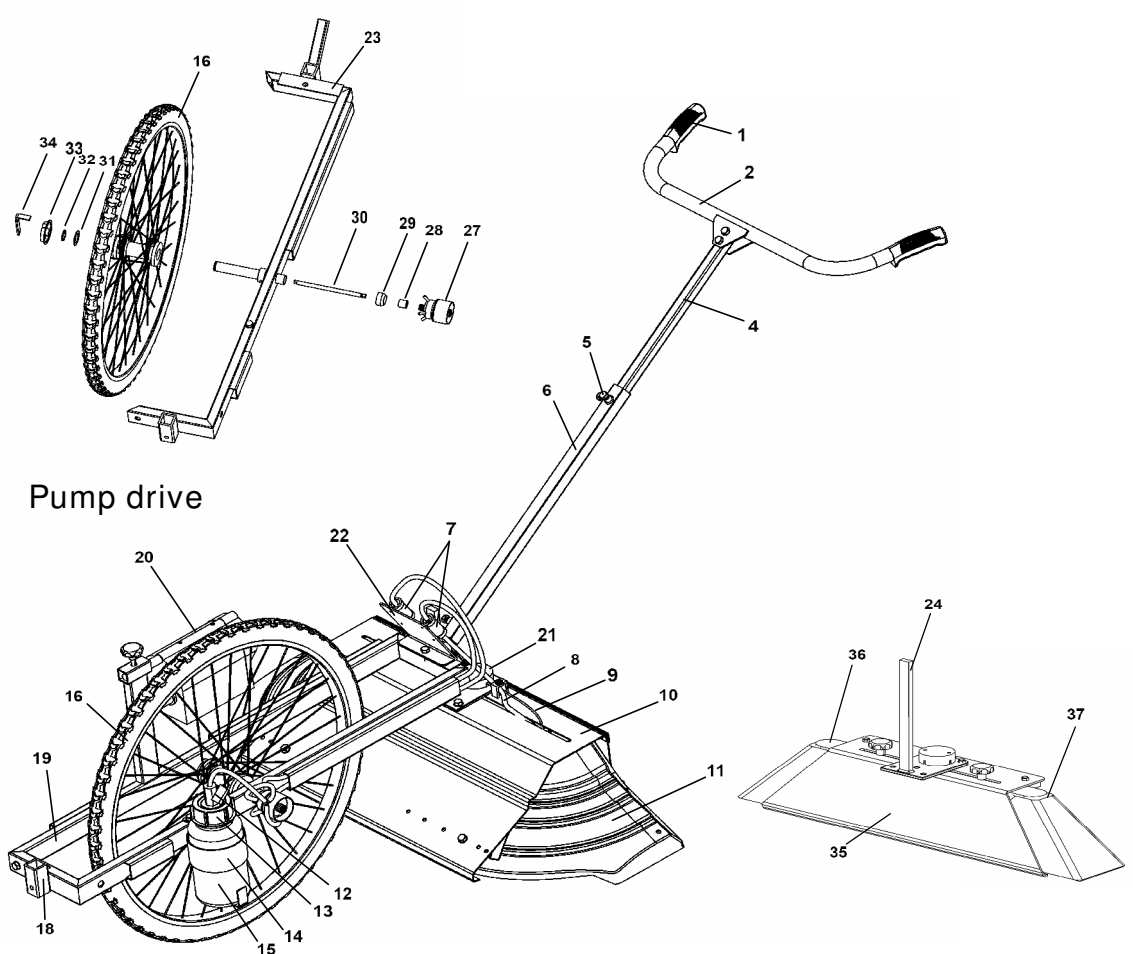
a) Loosen the spray hood screws in the elongated holes on the upper side of the sheet metal skirt and unscrew the screws from the front side of the sheet metal skirt.
b) Adjust the segmental rotation atomiser to the desired width (see page 3 of the Operating Instructions).
c) Retighten the screws.

Checking the output volume

1. Place an underlay (e.g. cardboard or paper) on the ground and prop up the unit on stands.
2. Fill the chemical tank with herbicide - undiluted.
3. Pull out the hoses from underneath the flow rate controls.
4. Open the shut-off valve, initially setting the metering adjustment knob to the maximum flow rate and wait until the chemical solution is evenly emitted.
5. Set the chemical solution volume according to the output table.
6. Volume calibration: Collect the chemical solution from 50 wheel revolutions into a measuring cup. If the desired volume is not reached, set a larger or a smaller volume with the pump metering adjustment knob.
7. Perform volume calibration again.
8. Reconnect the hoses on the lower sides of the flow rate controls.
9. The unit is now ready for deployment.

Maximum allowable wheel pressure 3,0 bar

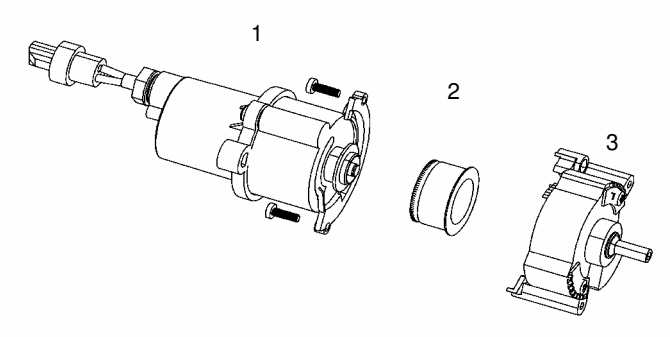
Factor for 3 l/ha: 0,150	



Part Art. No. Designation

102490 MANKAR-GP 60-80
100526 MANKAR-GP 70-110

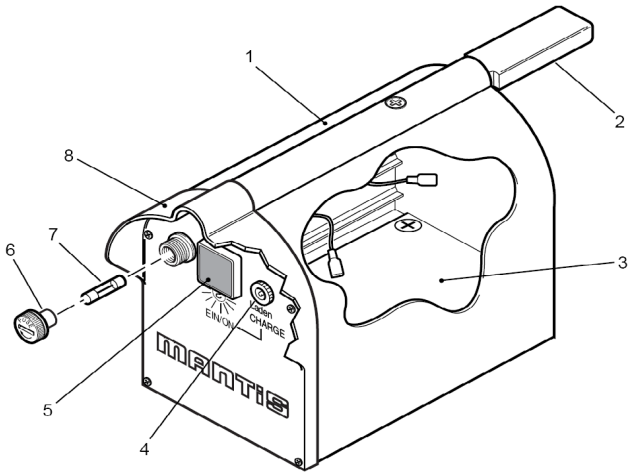
1	100349	Rubber hand grip for MANKAR
2 + 3	101272	Handle bar for MANKAR
4	100419	Handle bar extension, MANKAR GP
5	100990	Hexagon screw M 8 x 20 mm stainless steel
6	100429	Connection for handle bar extension MANKAR GP
7	100397	Flow rate controller, complete, for all MANKAR units, without holder
8	- - - - - -	Pressure hose 4 x 2 mm
9	100388	Cable, Atomiser cable, Mankar/Flex/Var/Mafex
10	100363	Sheet metal skirt, 600mm for spray hood 70 - 110 cm
11	100400	Spray hood, split, 25 cm wide, left for spray hood 70 - 110 cm
	100426	Spray hood, split, 25 cm wide, right for spray hood 70 - 110 cm
12	100390	Ball valve 1/4" i/i
13	100441	Tank lid, 1 L with hole for MANKAR units
14	102589	Tank holder for MANKAR GP
15	100434	Tank 1 L, MANKAR, without lid
16	100395	Wheel with bearing bush, 560 mm for MANKAR GP
18	100556	Pump carrier for MANKAR-110 GP
19	100558	criss beam with attachment bracket for powerpack, MANKAR GP
20	100459	Powerpack with 1 battery, 6 V - 7 Ah, for MANKAR
21	100379	Strain relief cover for spray hood 70-110 cm
22	100440	Holders for 2 flow rate controls, MANKAR GP
23	102491	Attachment bracket for spray hood MANKAR GP
24	100360	Height adjustment for spray hood MANKAR GP
25	100381	Clamping strip for rubber skirt, spray hood 70 - 110 cm, MANKAR
26	100380	Rubber skirt for spray hood 70-110, MANKAR
27	100527	Metering pump MANKAR-3, capacity 5 - 12 ml/min for MANKAR-110 GP
28	100392	Pump threaded sleeve for MAFEX / MANKAR pumps
29	100377	Retaining collar 20.5 mm for wheel axle, MANKAR and mounted units
30	100393	Cardan shaft, MS, for MANKAR units
31	100457	Adjusting washer 20x28x1 mm for pump drive
32	100394	Retaining ring A 20 for pump carrier, MANKAR / FLEXOMANT
33	100375	entrainer disk for MANKAR units
34	101718	angle for entrainer disk, MANKAR GP
35	101096	Spray hood 60-80 cm complete for MANKAR-110 GP with 2 atomisers and height adjustment
36	102551	Spray hood, 30cm with guide rail, left for spray hood 60-80cm
37	102552	Spray hood, 30cm with guide rail, right for spray hood 60-80cm



Part Art. No. Designation

100320 Atomiser for MANKAR

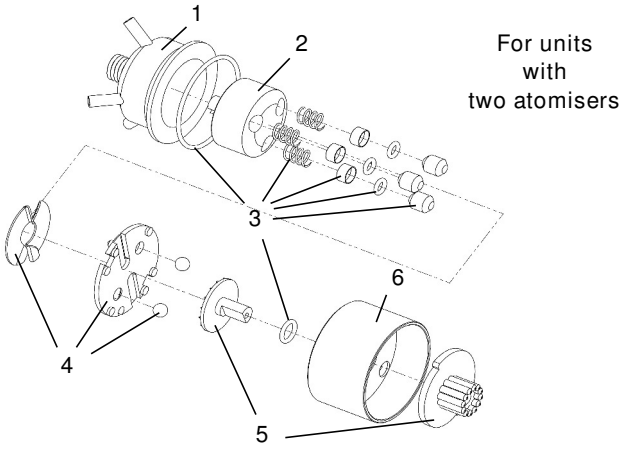
1	102417	Motor module for segmental atomiser MANKAR
2	100478	Atomiser disc for segmental atomiser
3	101996	Segment module for segmental atomiser



Part Art. No. Designation

100459 Powerpack with 1 battery, 6 V - 7 Ah, for MANKAR-P models
102312 Powerpack with 1 battery, 6 V - 7 Ah, for MANKAR-GP models

1	100469	Powerpack housing
2	100461	Clamping rail, round milled for MANKAR P powerpack
2a	101858	Clamping rail, round milled for MANKAR GP powerpack
3	100450	Battery 6 V - 7 Ah
4-8	101565	Cover for MANKAR powerpack, assembled
4	100693	Low voltage plug adapter
5	100464	Switch, green illumination, square, for powerpack and control box
6	100365	Fuse holder, complete for MINI-MANTRA / MANKAR FLEXOMANT / …
7	100730	Glass fuse 5X20 T 3.15A
8	100466	Powerpack cover

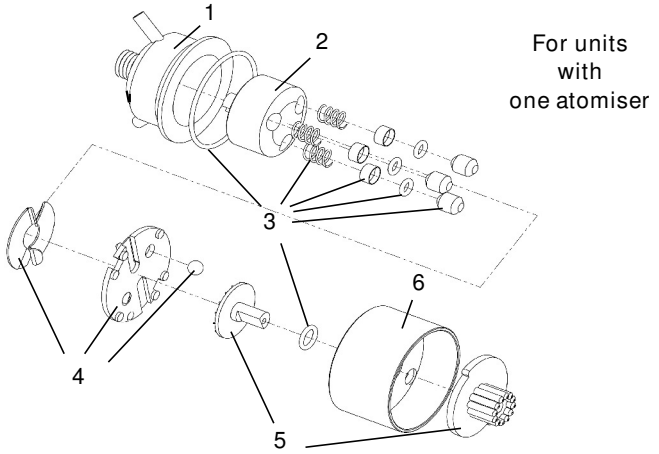


For units with two atomisers

Part Art. No. Designation

100522 Metering pump MANKAR-3, capacity 5 - 10 ml/min

1	100528	Housing, pump housing, MS for MANKAR
2	102209	Rotor-3, MS for piston pumps MAFEX / MANKAR
3	102373	Sealing set for MANKAR/MAFEX-3 metering pump
4	101626	Repair set, MANKAR metering pump, pressure plate/wobble plate
5	102429	Repair set, MANKAR metering pump, metering adjustment knob/selector disc
6	100534	Cover for piston pump



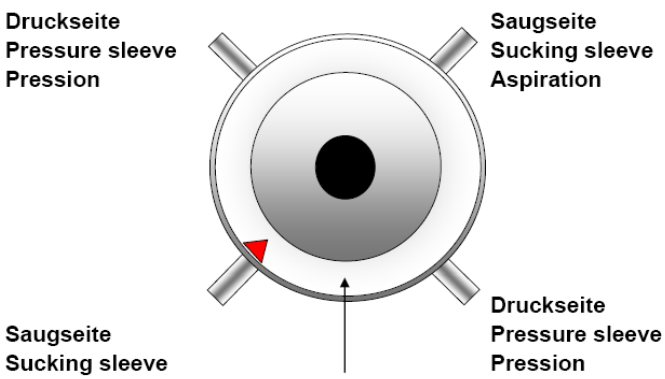
For units with one atomiser

Part Art. No. Designation

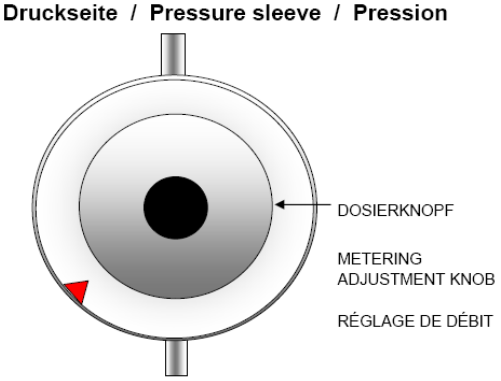
100492 Metering pump MAFEX-3, capacity 2 - 20 ml/min

1	100493	Housing, pump housing, MS for MAFEX
2	102209	Rotor-3, MS for piston pumps MAFEX / MANKAR
3	102373	Sealing set for MANKAR/MAFEX-3 metering pump
4	102436	Repair set, MAFEX metering pump, pressure plate/wobble plate
5	102437	Repair set, MAFEX metering pump, metering adjustment knob/selector disc
6	100534	Cover for piston pump

Dosierpumpe MANKAR
Metering pump MANKAR
Pompe doseuse MANKAR



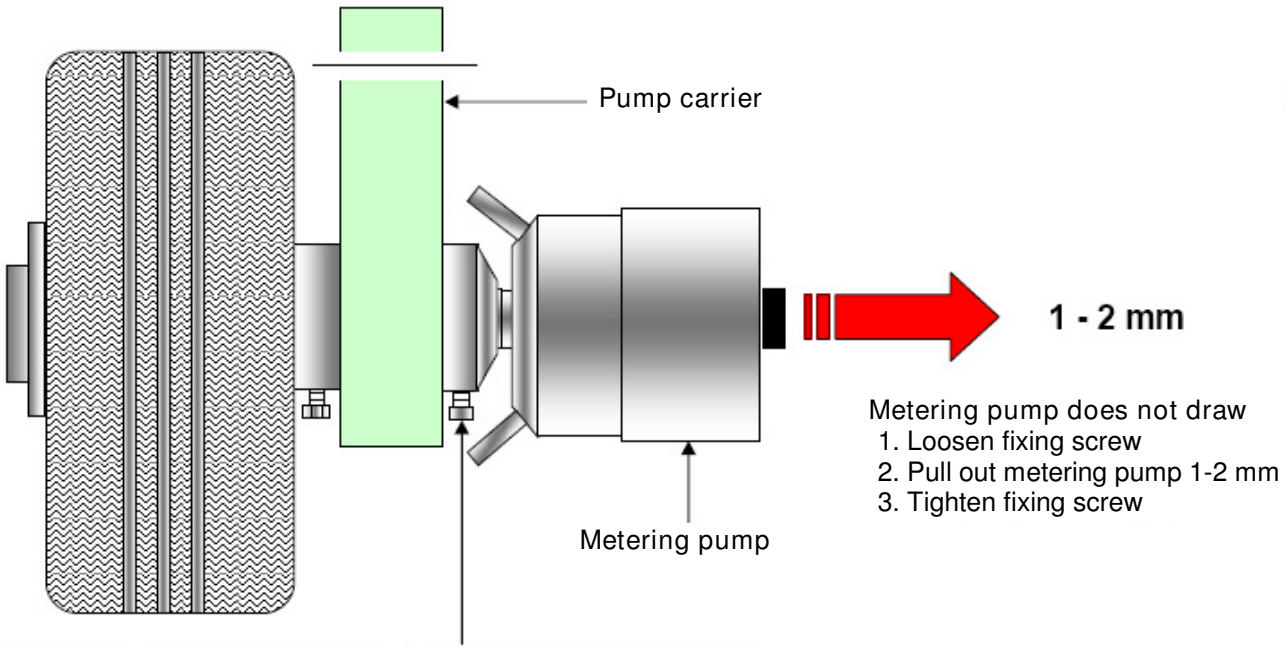
Dosierpumpe MAFEX
Metering pump MAFEX
Pompe doseuse MAFEX



Troubleshooting

Fault occurrence	Cause	Rectification
Atomiser disc not rotating	Atomiser contaminated	Thoroughly clean atomiser, remove plant parts as necessary
	Battery empty	Charge battery
	Fuse blown	Replace fuse on powerpack (Replacement fuses are located in the powerpack housing)
	No electrical contact	Check cable or connector contact
	Battery defective	Install new battery
	Atomiser motor defective	Install new motor
		Connect the brown cable to Plus (+).
Atomiser spray one-sided	Rotation disc turning in the wrong direction	Connect cable correctly! Selectively plug the brown cable onto the contact pin on the switch/valve unit. Connect the blue cable via the round pin plug. Check to ensure the battery connection to the powerpack is correctly poled, blue cable to Plus (+).
Atomiser spray too wide	Width adjustment improperly set	Loosen screws (F, see page 3) and correctly adjust the left or right width settings.
Atomiser drips	Metering valve incorrectly set	Check setting, see table
	Atomiser disc defective / contaminated	Replace / clean disc
	Atomiser spray discharge contaminated	Clean
Atomiser foams	Residual water in system	Completely empty container, hose, segmental atomiser.
Air in hose line	Hose connection	Shorten the hose slightly and set onto the hose nipple.
	/ Filter leaking	Re-tighten the screw on the filter.

Metering pump does not draw



Clamping bush fixing screw

GUARANTEE

The manufacturer guarantees that in accordance with the present state of technology the article of purchase is free from defects as regards raw materials and construction. Guarantee is valid for all machines and apparatus for 24 months. The period of guarantee begins from the date of purchase by the user.

The manufacturer will decide to repair or replace faulty parts or issue a credit note.
Parts damaged due to normal wear and tear will not be replaced under guarantee. Carriage costs are bourne by the manufacturer for faulty goods.
Unresolved claims do not entitle purchaser to withhold payments or set them against non-approved claims. Parts not manufactured by manufacturer are guaranteed by the original manufacturer under their terms. Warranty claims must be submitted in writing within 4 weeks of the damage being seen.
Repairs will carried out with original manufacturer spare parts by an approved dealer.

Acknowledgement of a claim by manufacturer is binding only when a written notice is issued. Unless the manufacturer cannot make a repair, there is no right to cancellation of orders or to mitigation. Compensation for direct or indirect damage will not be given.

Guarantee terminates if the article of purchase is altered by manipulation of third parties or by installing spare parts of extraneous origin and if the ascertained damage is directly caused thereby. Guarantee also terminates if orderer does not observe the operating instructions.
Guarantee does neither apply to natural wear, to damage caused during storage or by corrosion, nor to damage caused by negligent or improper handling. Guarantee does not apply to used machines or apparatus.

The operation instruction published by the manufacturer has been carefully prepared and is based on extensive tests.
Since manufacturer have no influence on installation and handling of apparatus, the company will not assume any responsibility for lack of success or for damages caused by the apparatus itself or by its use.

EG-Declaration of conformity
Council Directive 2006/42/EG

Mantis ULV-Sprühgeräte GmbH, Vierlander Straße 11 a, 21502 Geesthacht declares under our sole responsibility that the following products are in conformity with the provisions of the following Council Directive: 2006/42/EG

Typ	MANKAR-P, MANKAR-110-P, MANKAR-110-GP, MANKAR-L, MANKAR-110 SELECT EL
Typ	MANTRA, MINI-MANTRA / PLUS, MICRO-MANTRA, MICRO-VASO
Typ	FLEXOMANT-1W, FLEXOMANT-2W, FLEXOMANT-3W, FLEXOMANT-4W, FLEXOMANT-PLUS, VARIMANT-1, VARIMANT-2, VARIMANT-4 PLUS, VARIMANT-WINNER-TOP, VARIMANT-WINNER-UNO
Typ	MAFEX
Typ	ROFA

André Verder
Managing Director

Geesthacht January 2009

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(Place and date of signature) (Name, title and signature)