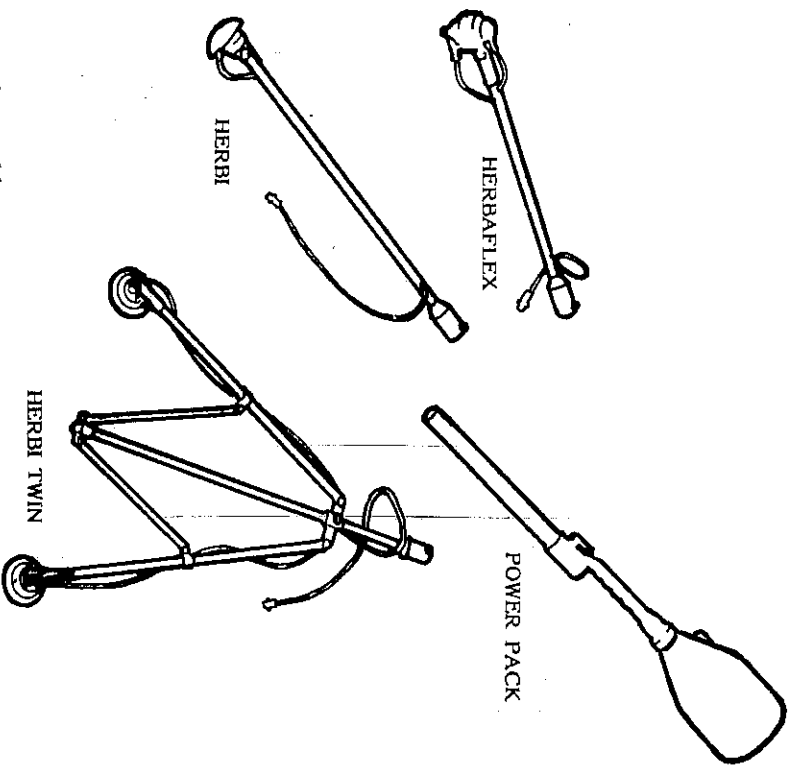


# *the* MICROFIT system



designed & manufactured by:

# MICROFROON

Micron Sprayers Limited,  
Three Mills, Bromyard,  
Herefordshire HR7 4HU  
England.

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# *the* MICROFIT HERBI TWIN system



WEED CONTROL BY

# MICROFROON

## DESCRIPTION

The Microfit Herbi Twin is a lightweight (5kg) hand-held sprayer, designed to apply herbicides in a controlled droplet size range around 250 microns (about 4 times the diameter of a human hair) and swath width adjustable from approximately 1.2m (4ft) to 2.4m (8ft.) These controlled droplets give an even distribution and ensure minimum drift for ultra-low-volume application. The spray mixture can contain contact, residual or hormone herbicides for continuous spraying of large areas of weeds.

The 2½ litre bottle gives up to 20 minutes spraying time at the standard flow rate of 60 ml/min per head. This flow rate can be achieved with various thicknesses of mixture by changing the nozzle. At a walking speed of 1 m/sec this will give an approximate coverage of 10 litres/hectare.

The Microfit Herbi Twin is supplied complete with a shoulder strap and a screw-in connector for use with a backpack.

## CONSTRUCTION

The Microfit Herbi Twin is constructed in two main assemblies – the power pack (handle), and the sprayer lance assembly. This has been done so that any of the interchangeable lances available from MICROFIT may be fitted to the Microfit power pack, thus offering great versatility. The lance and bottle can be removed from the power pack leaving a length of 0.86m (2ft 10ins), making transportation and storage easy.

The construction of the Microfit sprayer lance allows for the adjustment of relative positions of the 2 heads giving swath widths ranging from approximately 1.2m (4ft) to 2.4m (8ft).

## SPRAYING TECHNIQUES

### WARNINGS WHEN HANDLING AND SPRAYING CHEMICALS

1. Wear rubber gloves and boots.
2. Follow chemical manufacturers' safety precautions.
3. Do not empty cleanings from machine into ponds, ditches etc.
4. Wash hands and all exposed parts of the body after use.

### BEFORE SPRAYING FOR THE FIRST TIME:-

Before using the Microfit Herbi Twin for the first time, ease the two spray heads apart (see 'positioning spray heads' overleaf) to spraying position (Fig. 1), remove atomiser covers, fit batteries, half fill the bottle with clean water and a little detergent. Fit bottle to sprayer, switch on motors and open flow control valve. Spray on one spot, preferably on clean dry concrete: 2 wet rings will appear on the ground - for selective weedkillers, the edges of the rings of spray should just touch, but not overlap. If a narrower swath (Fig. 2) is required in the case of total weedkillers, adjust sprayhead positions accordingly. Re-check spray pattern using the chemical to be sprayed.

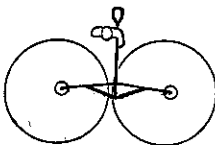


Fig. 1.

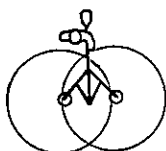


Fig. 2.

### TO START SPRAYING:-

To start spraying, lower the spray heads, switch on the motors and open flow control valve to continuous spray position. As soon as the mixture reaches the nozzles, spraying will commence - start walking immediately, keeping atomisers horizontal.

A walking speed of 1 m/sec and flow rate of 60 ml/min per head will produce an approximate coverage of 10 litres/hectare. To increase spray volume it is preferable to walk more slowly rather than increase flow rate.

Fig. 3 shows the normal angle for the Microfit Herbi Twin - held at about 35° to 40°, with the heads angled slightly away from the operator.

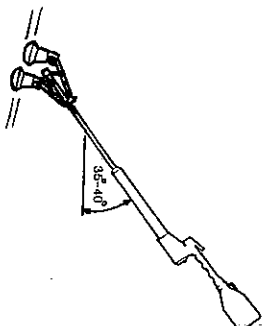


Fig. 3.

### TO STOP SPRAYING:-

To stop spraying temporarily, close flow control valve and switch off motors.

When spraying is to be stopped for longer periods, close flow control valve, switch off motors, slowly raise sprayer heads to about 45°, open flow control valve, allow all fluid to drain back into bottle and close flow control valve.

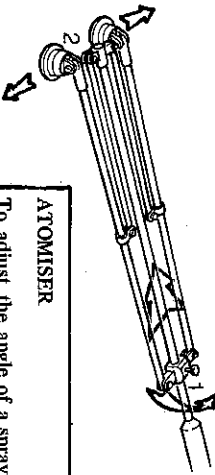
## PREPARATION FOR SPRAYING

1. Fit 4 batteries, (R20PP). Positive terminal to switch end.
2. Remove atomiser covers.
3. Check by hand that atomisers turn freely.
4. Check that motors run constantly.
5. Mix spray in appropriate number of bottles and replace caps.
6. Fit first spray bottle, keeping spray heads above bottle until ready to spray.
7. Check spray emission rate: this can be adjusted by fitting different sized nozzles:-
  - blue for thin liquids
  - yellow for medium liquids
  - orange for thicker liquids
  - red for thick liquids

The ideal chemical flow rate is 60 ml/min per spray head and this can be tested by removing the nozzles from the spray heads (but leaving them still attached to the hose), holding the Herbi Twin in spraying position with the heads together and, with the nozzles in a measuring jug, opening flow control valve for 30 seconds. The total chemical in the measuring jug should be close to 60 ml to give a flow rate of 60 ml/min per head. If the rate is not close to 60 ml/min per head, change nozzle and recheck flow rate.

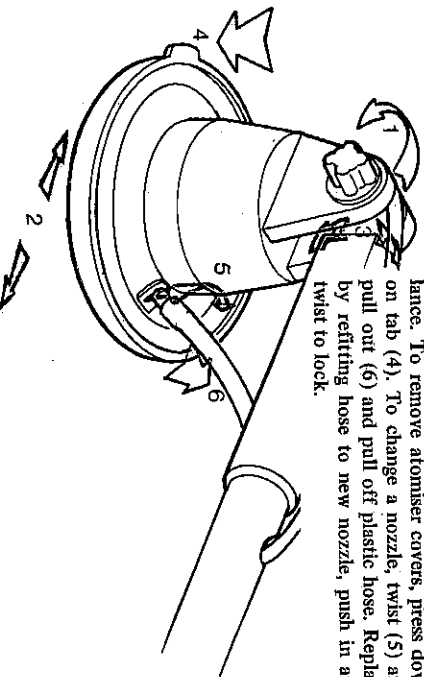
## POSITIONING SPRAY HEADS

Slacken thumb screw (1) and ease the two Herbi Twin heads (2) apart, push sliding bracket forward until heads are positioned for spraying. Fix in position using thumb screw. Do not overtighten.

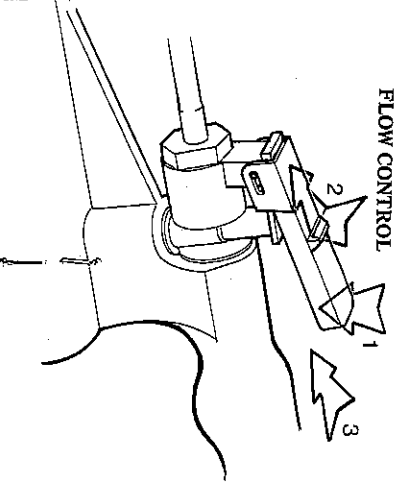


## ATOMISER

To adjust the angle of a spray head from side to side, slacken nut (1), adjust angle (2) and re-tighten nut. To adjust a spray head angle forwards and backwards, rotate head (3) on lance. To remove atomiser covers, press down on tab (4). To change a nozzle, twist (5) and pull out (6) and pull off plastic hose. Replace by refitting hose to new nozzle, push in and twist to lock.

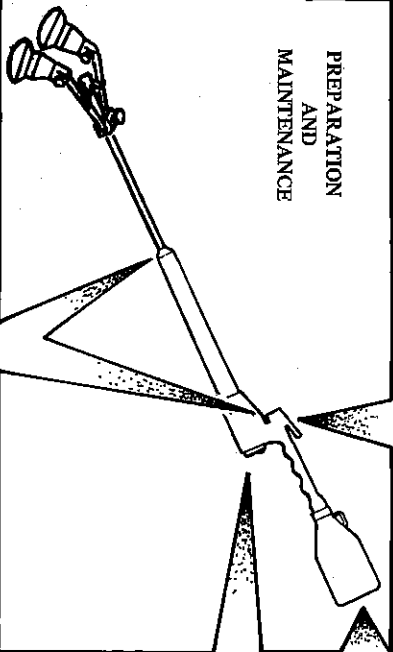


## FLOW CONTROL



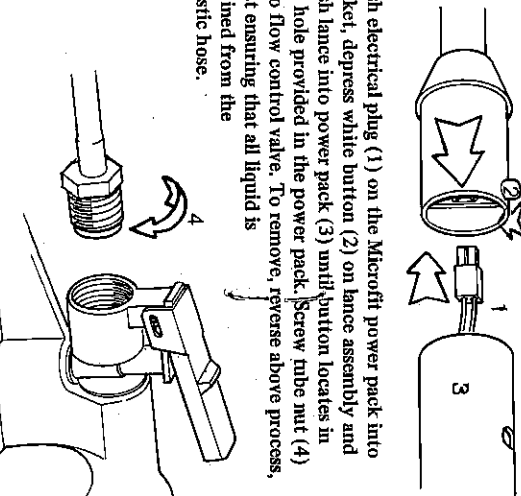
Press lever down (1) when spraying for short periods. Press down and forward (2) for continuous spraying. To stop flow, pull back lever and release. N.B. For safety, valve can be locked in off position by pushing lever forward (3).

## PREPARATION AND MAINTENANCE



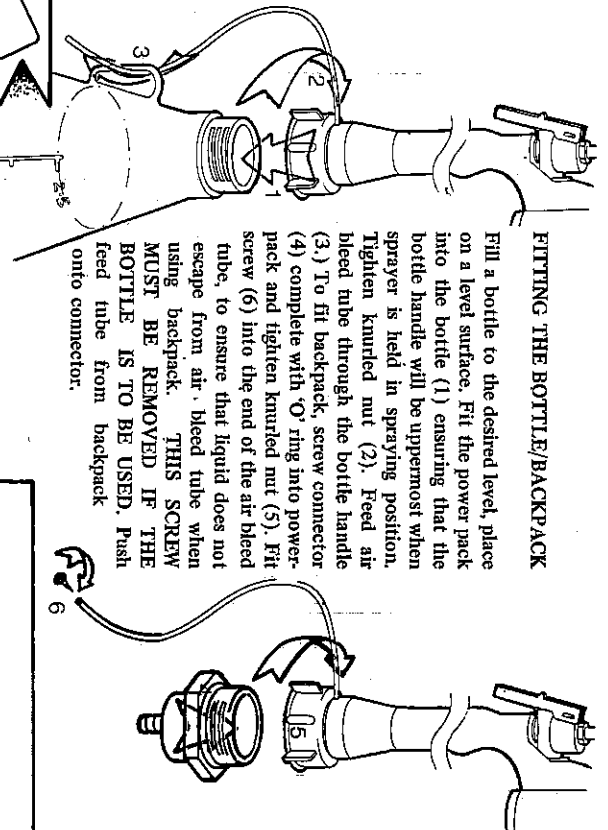
## FITTING SPRAYER LANCE

Push electrical plug (1) on the Microfit power pack into socket, depress white button (2) on lance assembly and push lance into power pack (3) until button locates in the hole provided in the power pack. Screw tube nut (4) into flow control valve. To remove, reverse above process, first ensuring that all liquid is drained from the plastic hose.



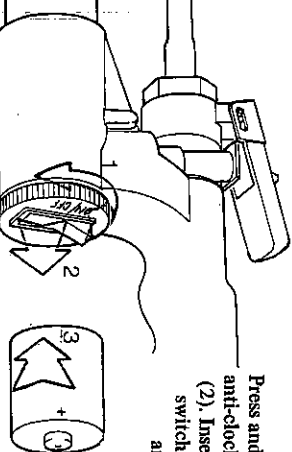
## FITTING THE BOTTLE/BACKPACK

Fill a bottle to the desired level, place on a level surface. Fit the power pack into the bottle (1) ensuring that the bottle handle will be uppermost when sprayer is held in spraying position. Tighten knurled nut (2). Feed air bleed tube through the bottle handle (3). To fit backpack, screw connector (4) complete with 'O' ring into power-pack and tighten knurled nut (5). Fit screw (6) into the end of the air bleed tube, to ensure that liquid does not escape from air bleed tube when using backpack. **THIS SCREW MUST BE REMOVED IF THE BOTTLE IS TO BE USED.** Push feed tube from backpack onto connector.



## BATTERY AND SWITCH

Press and rotate switch holder anti-clockwise (1) and remove (2). Insert batteries (3). Refit switch holder by pushing in and turning clockwise. To operate atomiser motors turn rocker switch on.



## AFTER SPRAYING

1. Close flow control valve, switch off motors, slowly raise sprayer heads to about 45°, open flow control valve, drain all fluid back into the bottle, close flow control valve.
2. Either store chemical safely or dispose of in accordance with chemical manufacturers' instructions.
3. Clean sprayer before chemical dries as follows:-
  - (a) Thoroughly clean spray bottle with kerosene when using oil-based chemicals, or water and detergent for other chemicals.
  - (b) Refit to sprayer, switch on motors and spray on a non-crop area until the bottle is empty.
  - (c) Wipe machine clean.
4. If the machine is not to be used again for a long period, wipe down with kerosene moistened cloth, remove batteries and store in a dry place. NEVER immerse a spray head for any reason as damage to the motor will result.
5. If a nozzle is blocked, remove it and soak in kerosene when using oil-based chemicals, or water and detergent for other chemicals.
6. If excessive chemical build-up or physical damage has occurred to an atomiser, pull it off and clean with appropriate material as above or replace.
7. If a disc does not spin, check that batteries are correctly fitted and the terminals are clean.
8. After cleaning the machine or after spraying, wash hands and all exposed parts of the body.



**POWER PACK ASSEMBLY PARTS LIST**

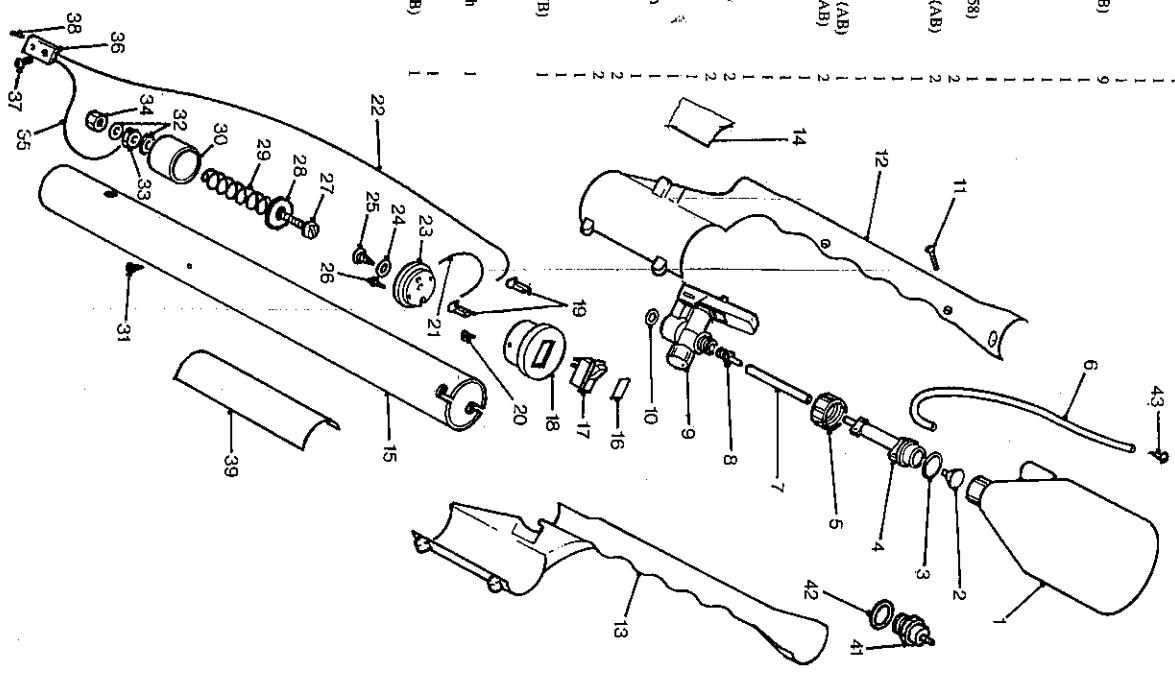
Item No.	Part No.	Description
1	4390	Bottle with cap, 2 1/2 litre
2	5063	Deflector, air bleed
3	5148	O' ring
4	4904	Bottle holder
5	4940	Bottle securing cap
6	3374/40	Tube (nylon) 7/8" o.d. - 0.4m
7	4309/14	Tube (PVC), 7/8" i.d. - 0.14m
8	4912	Hose connector 12mm
9	4917A	Valve + O' ring (5057)
10	5057	O' ring
11	4806	Screw, No. 6 x 3/8", panhead S/T (B)
12	4899L	Handle, left hand
13	4899R	Handle, right hand
14	5957	Label, battery
15	5108	Battery case - 0.445m
16	4958	Label, on/off
17	4918	Switch
18	4906A	Switch end piece + screws (2 x 4758)
19	5050	Tag, 1/2" flag
20	4758	Screw, No. 4 x 1/2", panhead, S/T (AB)
21	4368/08	Electric wire, red (thick) 0.08m
22	4368/61	Electric wire, red (thick) - 0.61m
23	4905	Switch cover
24	4954	Washer, 1/2" x 1/2" brass
25	4802	Screw, No. 14 x 1/2", panhead, S/T (AB)
26	4939	Screw, No. 4 x 1/2", panhead, S/T (AB)
27	4318	Screw, 2 BA x 1", panhead
28	3168	Washer, 1/2" i.d.
29	3070	Spring, battery
30	4315	Centre connector
31	3456	Screw, No. 6 x 1/2", S/T (B)
32	4877	Washer, 2 BA flat
33	3673	Nut, 2 BA hex.
34	4420	Nut, 2 BA nyloc
35	4134/20	Electric wire, black (thick) - 0.20m
36	5095A	Plug electric, radius/Rat
37	5109	Screw, P.T. dia. 3 x 6
38	5104	Connector socket
39	5130	Label, Microfit
40	5037	Filter Gauge
41	5170	Screw, No. 4 x 3/16", panhead, S/T (B)

**BACKPACK CONNECTOR KIT**

42	5087A	Connector, backpack, complete with O' ring (5111)
43	5111	O' ring
44	4622	Screw, No. 6 x 1/4", panhead, S/T (B)

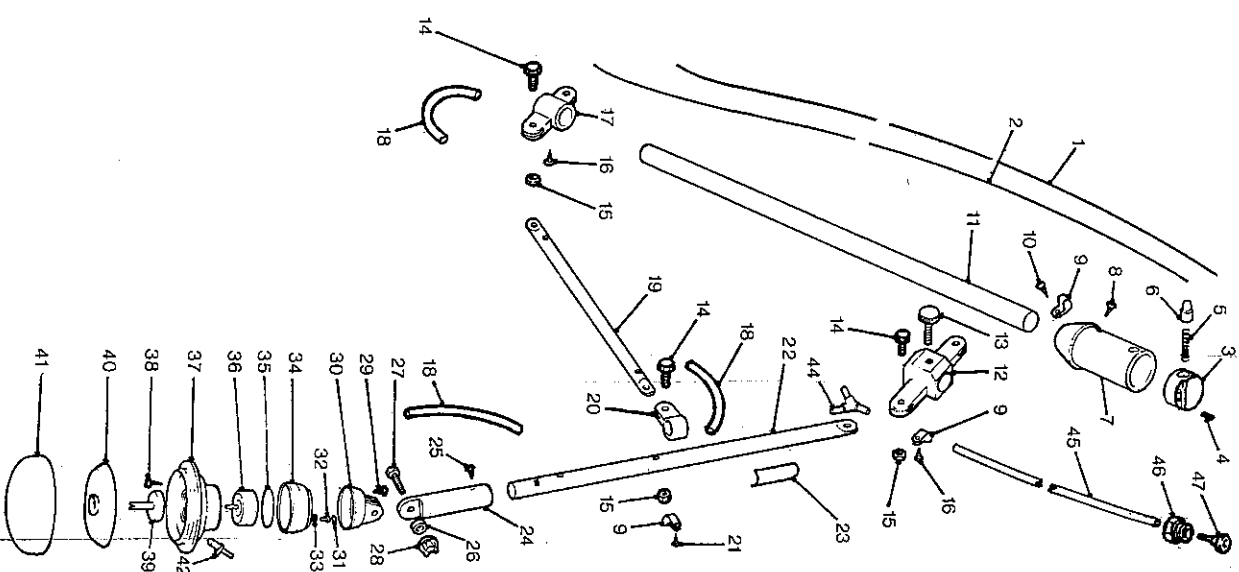
**OPTIONAL EXTRAS**

4722	4969A	Bottle with cap, 1 litre (contcut)
5107A	5107A	Backpack, 5 litre complete
5137A	5137A	Shoulder strap complete
5207A	5207A	Measuring cup and cap
		Backpack, 10 litre, complete



**SPRAYING LANCE ASSEMBLY PARTS LIST**

Item No.	Part No.	Description
1	4629/154	Electric wire, flat (win - 1.54m)
2	3280/150	Obsolete
3	5085	Socket
4	5103	Pin connector
5	5101	Spring
6	5086	Push button
7	4898	Tube/handle connector
8	4647	Screw, No. 6 x 1/2" CSK S/T (B)
9	4747	Tube clip
10	3472	Screw, No. 6 x 1/4", S/T (AB)
11	5117	Tube, aluminium, central 7/8" o.d.
12	5090A	Bracket, double, sliding assembly
13	5113	Screw, thumb, M6 x 15
14	5110	Screw, M5 x 20 hex.
15	5112	Nut, M5 nyloc thin
16	3456	Screw, No. 6 x 1/2", flangehead S/T (B)
17	5091	Bracket, double fixed
18	4941/15	Obsolete
19	5119	Tube, aluminium strut, 1/2" o.d.
20	5092	Bracket, single
21	4646	Screw, No. 6 x 3/8", flangehead, S/T (AB)
22	5118	Tube, aluminium, extension 7/8" o.d.
23	5131	Label, Herbil Twin
24	5125	Hex piece
25	5127	Screw, No. 4 x 1/2", slotted, panhead, S/T (B)
26	5147	Locking plate
27	5029	Screw, M5 x 25 hex.
28	4907	Nut, wing
29	5027	Screw, No. 4 x 1/8", panhead, S/T (AB)
30	4985	Head mounting bracket
31	5044	O' ring
32	5045	Eyelet 9/32" terminal connecting
33	4457	Spring 7/32" terminal connecting
34	4984	Motor cover
35	5077	Motor housing
36	4922A	Motor Herbil + slinger (5022)
37	4983	Screw, No. 4 x 1/2", panhead S/T (AB)
38	4939	Slinger/dummy shaft
39	5022	Atomiser disc
40	5021	Atomiser protective cover
41	4462	Feed nozzle, blue
42	5038	Feed nozzle, yellow
	5040	Feed nozzle, orange
	5041	Feed nozzle, red
43	4309/66	Tube (PVC), 7/8" i.d. - 0.66m
44	5192	Y piece
45	4309/109	Tube (PVC), 7/8" i.d. - 1.09m
46	5102	Nut, union
47	5088	Valve/hose connector



For instructions on how to use the machine see MICROFIT HERBI TWIN instruction manual.

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## MICROFIT HERBI TWIN Instruction manual supplement - November 2000

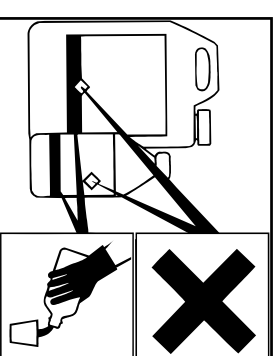
### SAFETY

Using agrochemicals is a hazardous process. Operators should comply with all relevant legislation and/or regulations governing the use of agrochemicals and should use appropriate personal protective equipment (see 'OPERATOR PROTECTION').

The MICROFIT HERBI TWIN can be used with most conventional herbicides, as well as specific CDA formulations (only available in some countries) to provide a closed transfer system to improve operator safety.

Always read the product label carefully to discover:-

- ◆ approved applications
- ◆ maximum dose rates
- ◆ maximum number of treatments
- ◆ operator protection required
- ◆ necessary environmental protection measures



NB 'Dose rate' refers to the amount of chemical product applied per hectare.

Never eat, drink or smoke when working with agrochemicals. After using agrochemicals or handling equipment wash your hands thoroughly. Keep people (especially children) and animals out of areas being sprayed.

Always store agrochemicals safely to protect people and animals and to safeguard the environment (take special care to avoid water pollution).

### OPERATOR PROTECTION

Always wear the protective clothing items listed on the product label for mixing and filling. The minimum protective clothing required for spraying with the MICROFIT HERBI TWIN is:-

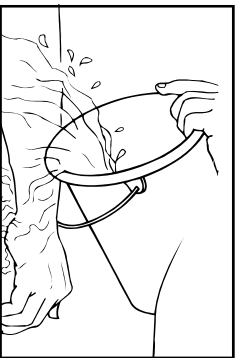
- ◆ rubber gloves
- ◆ boots/shoes and long trousers
- ◆ eye protection
- ◆ long sleeved shirt

## MIXING, FILLING AND CALIBRATION

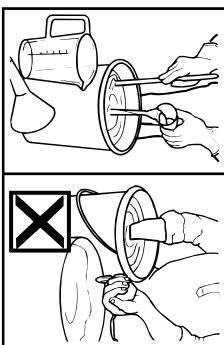
Mixing and filling is generally the most hazardous process in the spraying operation. **Always** follow the label instructions. **Always** use a filter (fitted in the Micron *Micropak* backpacks) and use a funnel if filling a container with a small neck. **Only** mix enough spray for the area to be treated thereby avoiding the need for disposal of unused spray mix.



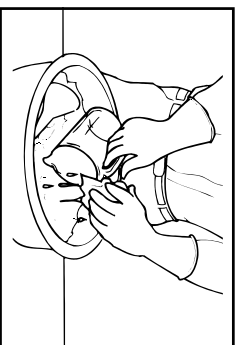
**Always** wear gloves when handling agrochemicals and equipment.



**Always** wash off any skin contamination.



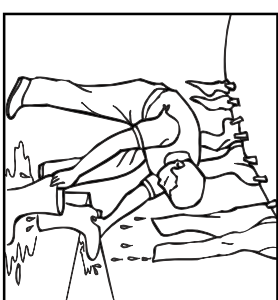
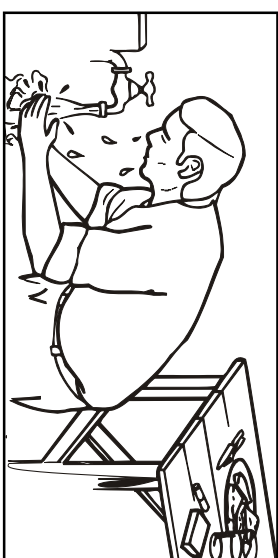
**Always** use the correct equipment when mixing and measuring.



**Always** clean all equipment after use.

With the MICROFIT HERBI TWIN herbicides are usually applied in around 20 litres total spray volume per hectare, except for glyphosate which can be applied at volumes as low as 10 litres per hectare. These are lower volumes than recommended for high volume application with knapsack sprayers. Use the minimum dose rate recommended on the label for the intended treatment and add water to make up to the volume required for application with the MICROFIT HERBI TWIN.

- After working with agrochemicals, or handling spraying equipment, **always** thoroughly wash hands and exposed skin. All protective clothing should be washed separately from other clothing and stored. Contaminated gloves should be washed inside and out.



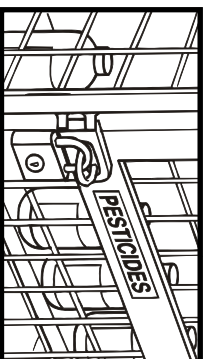
## TROUBLESHOOTING

- Atomiser discs spin but do not spray or spray irregularly. Check:
  - the feed nozzles. If a feed nozzle is blocked remove and soak in soapy water. **Never** blow through the nozzle with your mouth. Check that the feed nozzles give a flow rate within the operating range.
  - the atomisers discs are clean and undamaged. Clean or replace.
  - the flow valve for blockage. Rinse through with soapy water.
- Atomiser discs fail to spin or spin unevenly. Check:
  - that the batteries are fitted correctly.
  - the condition of the batteries. Replace if necessary.
  - that electrical terminals and contact points are clean and that electrical wires are not broken or corroded.
  - if an atomiser disc is rubbing on the motor base plate or the motor shaft is bent. Replace the discs or motors if necessary.
  - the motors for corrosion or obvious signs of wear. Replace if necessary.

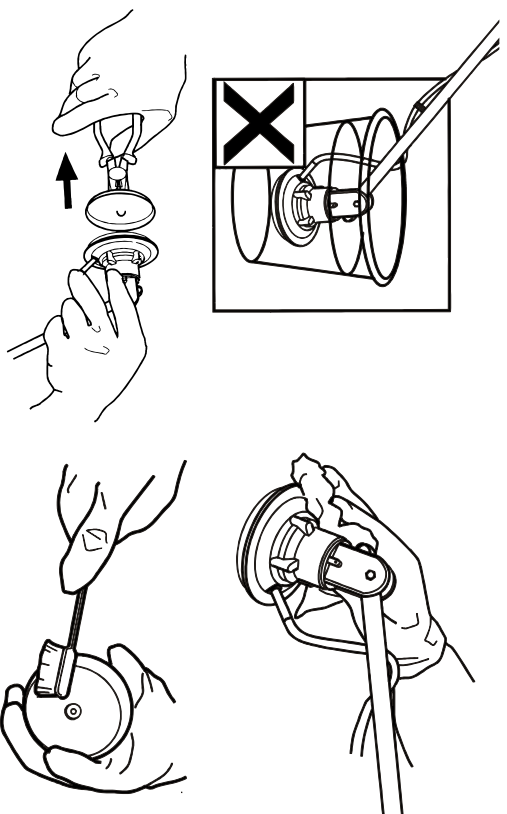
NB Battery condition can be checked with a torch (or a torch lightbulb and electrical wire).

## AFTER SPRAYING

1. Dispose of any surplus spray mix according to the product approval. Store products safely, locked up and out of the reach of children.



2. It is **essential** to clean the sprayer and tank thoroughly using water and detergent after use. **Never** immerse the spray heads in water or under a tap, since this will destroy the electric motors. A water and detergent mix should be put in the tank, swilled around and then sprayed out onto the treated area or an area of waste ground. The sprayer and tank should be wiped down externally using a cloth. Periodically remove the atomiser discs with a pair of pliers and clean with a soft brush.



For example, if the label recommends applying a minimum of 2 litres of product made up to 200 litres of water per hectare with a knapsack sprayer, use 2 litres of product made up to 20 litres for application with the MICROFTT HERBI TWIN, ie a spray mix concentration of 10%.

**Do not** use herbicide concentrations greater than the maximum recommended on the label (unless specific training or recommendations have been given) if the label:

- a) specifically prohibits use of 'Reduced Volumes' ie increased concentrations;
- b) has a statutory requirement for use of personal protective equipment when using the diluted product at high volumes (NB this will appear in the statutory box on the label); or
- c) carries one of the following hazard ratings: 'very toxic', 'toxic' or 'corrosive' or carries the warning 'risk of serious damage to the eyes' eg paraquat (Gramoxone) which is classified as toxic and should not therefore be used through the MICROFTT HERBI TWIN at concentrations greater than recommended on the label.

Micron do not generally recommend using spray mixes more than ten times the maximum concentration recommended for high volume application with knapsack sprayers. The safest product and lowest dose rate appropriate for the treatment should be used at all times.

To prepare the spray mix select the dose rate of product to be applied per hectare (from the product label) and mix in a suitable container.

### Examples of mixing spray – for 1 hectare

a) Glyphosate (360 g/l):	2 litres
add water:	+ <u>8</u> litres
Total volume:	10 litres
<i>i.e. 1 part glyphosate : 4 parts water</i>	

b) 2,4-D (500 g/l):	3 litres
add water:	+ <u>17</u> litres
Total volume:	20 litres
<i>i.e. 3 parts 2,4-D : 17 parts water</i>	

**Never** use leaking equipment. Take care to avoid spillage of the spray mix.

The table below indicates the relationship between total spray volume, flow rate and walking speed for the MICROFIT HERBI TWIN as per the following formula:

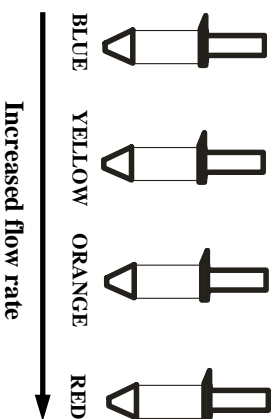
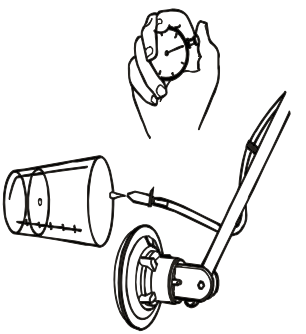
$$2 \times \text{flow rate per head (ml/min)} = 6 \times \text{total spray volume (l/ha)} \times \text{walking speed (m/s)} \times \text{band width (m)}$$

Total spray volume (l/ha)	Band width (m)	Feed nozzles	Flow rate (ml/min)	Walking speed (m/s)
10 (ie glyphosate)	2.4	2 x Blue	2 x 72	1
20 (ie other herbicides)	2.4	2 x Blue 2 x Yellow	2 x 72 2 x 144	0.5 1
10 (ie glyphosate)	1.8	2 x Blue	2 x 72	1.3
20 (ie other herbicides)	1.8	2 x Blue 2 x Yellow	2 x 72 2 x 144	0.7 1.3

Note: The flow rates in this table were measured with the spray head 65cm below the level of the liquid in the tank, using water only. The flow rate will vary with differences in this height and the viscosity of the spray mix (for very viscous spray mixes it may be necessary to use a larger feed nozzle).

### CALIBRATION

Choose and fit the feed nozzles that are likely to be required. The actual flow rates should be checked holding the MICROFIT HERBI TWIN in the spraying position with the spray heads level to equalise the flow to each spray head. Remove the feed nozzles from the spray heads by twisting and pulling out, then, once liquid has reached the feed nozzles, allow the liquid to flow into a suitable container for one minute and measure the volume dispensed. If the flow rates are not in the recommended flow rate range of 60 to 150 ml/min per nozzle change the feed nozzles and repeat the above procedure. NB It is preferable to walk more slowly to achieve the required spray volume than to use higher flow rates.



### Example:

Required spray volume rate = 20 l/ha; Flow rate measured = 86 ml/min per nozzle

$$\text{Walking speed (m/s)} = \frac{\text{Flow rate (ml/min)}}{6 \times 2.4 \times \text{total spray volume (l/ha)}} = \frac{86 \times 2}{14.4 \times 20} = 0.6$$

ie 0.6 m/s or 36 metres in one minute (0.6m x 60s)

Mark out a distance of 36 metres and practice walking it in one minute.

### BEFORE SPRAYING

Check the wind speed and direction (below 5 kph is safest). Take special care to avoid drift by keeping the spray heads as low as possible. Never spray into the wind and avoid walking into the spray. Always keep the spray heads at least 60cm from any part of the body to avoid direct contamination by the spray.

Before spraying for the first time use water only to check the spray pattern produced. Put some clean water in the tank and add a small amount of detergent. Check for leaks. Switch on the sprayer and then open the flow valve. Spray on one spot, preferably on clean dry concrete, for around 30 seconds with the spray head held about 20cm above the ground; wet rings should appear on the ground. Practice using the sprayer by walking along a few metres and then stopping spraying.

### TO START SPRAYING

Hold the spray heads level and about 20cm above the ground or weed foliage. Switch on the sprayer, check the atomiser discs start spinning (never touch the atomiser discs when spinning or hold the spray heads too close to the operator) and then open the flow valve. Start walking immediately the spray liquid reaches the feed nozzles.

The MICROFIT HERBI TWIN is normally held at an angle of around 35° to 40° to the ground with the heads inclined slightly away from the operator. Do not spray with the MICROFIT HERBI TWIN held on the shoulder, since spray may contaminate the operator. NB the machine will not spray with the spray heads above the level of liquid in the container.