

User's Guide No. 89.980.1

HYDRAULIC RESCUE EQUIPMENT



Certified acc. to:
ISO 9001:2000
prEN 13204
NFPA 1936

30
YEARS
RESCUE TOOLS
1974 | 2004

WEBER-HYDRAULIK

Table of Contents

Page

1. Notice before operating	3	
EC-Declaration of Conformity	4	
2. Putting into operation, Range of application, Important instructions		
Hydraulic power units	5	
Hydraulic power unit E 330 L		
Hydraulic power unit V 330	9	
High pressure hoses and snap couplings	10	
Spreaders	12	
Cutters / hand pump	16	
Double-acting rescue cylinders	18	
Combi-tool VARIO SPS 330	21	
3. Maintenance	25	
4. Malfunction – Possible reasons – Remedies		
Hydraulic power units	27	
Spreaders	28	
Cutters / hand pump	29 / 30	
Double acting rescue cylinders	31	
Combi-tool VARIO SPS 330	32	
5. Spare part drawings		
page	page	page
S 30 33	SPS 330 45	E 45 L 57
S 140 35	RZ 1, RZ 2, RZ 3 . . 47	V 45 L 59
S 180 37	RZT 2 49	SAV 20 61
SP 30 LS . . 39	Hydr. Hand pump . . 51	SAV 20 63
SP 40 41	E 330 L 53	E 45 L 65
SP 50 43	V 330 55	V 45 L 67
6. Description of the tools		
Technical Data		
Product range survey		

Notice before operating

Attention:

Read and follow this manual and safety regulations prior to operation.
The tools must be used by trained personnel only.

Regarding the technique of application we refer to the existing training documents in addition to the present regulations for preventing accidents.

The operating personnel has to wear protective clothing, helmet with visor and gloves.

The original specification of WEBER-HYDRAULIC rescue equipment must remain unchanged for operation. No modification in shape or in performance is allowed. Changing the pressure relieve valve of the hydraulic power units is not permitted.

All hydraulic rescue tools are only designed for the use described in this manual under the heading „Application“. Any other applications are absolutely forbidden.

In case of maintenance work or troubleshooting after unexpected failure the power supply must be cut for safety reasons (e.g. switch relay valve into neutral position, turn off the motor, pull out the mains plug, uncouple the tool). When replacing the accessories (for example the spare tips or pulling devices) safety measures have to be taken in order to prevent accidental starting.

The chain sets must be used exclusively for pulling operations, but not for lifting or stopping actions.

Take care that the control knobs are in neutral position when the tools are not in use.

Persons who are not involved in the operation must stay out of the danger area. Avoid multiple risks if working with several tools simultaneously. Take special care when working with splintering materials. Beware of splitting parts!

EC declaration of conformity

EC DECLARATION OF CONFORMITY

according to Directive 89/392/EEC

We,

WEBER-HYDRAULIK GMBH

Industriegebiet 3 + 4, A-4460 Losenstein, OÖ,

declare under our sole responsibility, that the "**Hydraulic Rescue Tools**"

SPREADERS	SP 30 L, SP 30 LS, SP 40, SP 45, SP 50
CUTTERS/VARIO	S 30, S 70, S 90 L, S 140, S 150, S 180, S 300, SPS 330
RESCUE CYLINDERS	RZ 1 up to RZ 3, RZT 2-1370
POWER UNITS	E 330, V 330, E 45 ..., V 45 ...
HANDPUMP / ACCESSORIES	DPH 1005 SA and attachment to all tools

to which this declaration relates correspond to the relevant basic safety and health requirements of the Directive 89/392/EEC, and to the requirements of the other relevant Directives:

EC MASHINE DIRECTIVE	89/392/EEC	91/368/EEC	93/44/EEC
EC LOW VOLTAGE DIRECTIVE	73/23/EEC		

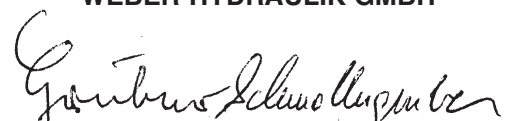
For the relevant implementation of the safety and health requirements mentioned in the Directives, the following standard(s) and/or technical specification(s) has (have) been respected:

ÖNORM EN-292-1	ÖNORM EN-292-2
DIN 14751 PART 1 - 3	NFS 61.571

The tools are tested by TÜV-SW-Germany according to DIN 14 751.

Losenstein, 1997-03-25
(replaces edition 1997-01-10)

WEBER-HYDRAULIK GMBH


Günther Gruber i.A. Johann Schmollngruber
(Managing Director) (Construction Manager)

Hydraulic power units without hose reels

Typ	Model	Part No.	Spare Parts Drawing
E 45 L	2-stage	059.928.0	384.000.0
V 45 L	2-stage	059.924.7	383.999.0

Hydraulic power units with hose reels

E 45 L + SAH 20	2-stage	180.365.4	383.998.2
V 45 L + SAH 20	2-stage	180.364.6	383.997.4

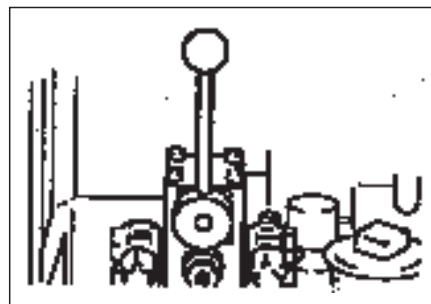
Hydraulic power equipped with one pressure relief plug each (ref. to page 10).

Hand pump, type DPH 1005 SA, refer to page 10 + 16.

Before operating:

Switch relay valve of the power unit into neutral (central) position (see drawing):

Remove protective caps from the coupling halves, join high pressure hoses, and plug together protective caps to prevent dirt penetration.



For the operating instructions of the petrol engine please refer to the enclosed leaflet of the manufacturer Briggs & Stratton.

Hydraulic power units are delivered with gasoline tanks empty. Before initial operation they must be filled with fuel according to the manufacturer's instructions.

Use the ignition aid (automatic choke) at temperatures below -20° and open the starting throttle valve at least half.

Putting into operation:

Bring relay valve into neutral position
Start motor

Bring relay valve into the desired position:

Control handle turned anticlockwise = oil flow in the red pair of hoses.

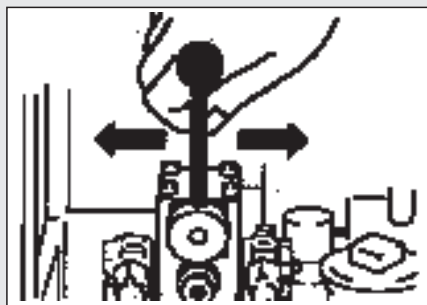
Control handle turned clockwise = oil flow in the yellow pair of hoses.

If necessary put control handle into another control position.

Upon completion of your work:

Bring relay valve into neutral position. Stop resp. switch off the motor.

Immediately after disconnecting the high pressure hoses plug in the protective caps.



Application:

Hydraulic power units can drive:

Spreaders, cutting tools, combitool VARIO and hydraulic cylinders of our brand.

Units of other brands cannot be combined with our products because of different nominal pressures and/or synthetic hydraulic oils.

Get in contact with us to clarify the feasibilities of combination if nominal pressures are identical and mineral hydraulic oils are used.

Important Instructions:

If the hydraulic power unit fails during the rescue operation the hand pump (of the cutting tool), type DPH 1005 SA, part-no. 014.239.5 can complete the operation.

Never tilt a hydraulic power unit or lay it on its side since this will cause oil to leak out of the oil tank vent.

During operation the power unit should not exceed an angle of 30° to horizontal in any direction. The unit generating the nominal pressure (630 bar) comprises a valve-controlled radial piston pump with built pressure limiting valve.

Drive:

- Electric motor, single phase/alternating current, 230 V, 50 Hz, 1,1 kW, protection class IP 54, construction version V 1, motor protection, ON - and - OFF switch.
- Four-stroke petrol engine made by Messrs. Briggs & Stratton, cylinder capacity 190 cu.cm, power output 3,3 kW at 3100 r.p.m.⁻¹.

On no account should a readjustment of the pressure limiting valves be carried out.

The devices have to be examined according to German GUV 67.13 every 3 years resp. to the local regulations.

Hydraulic power units without hose reels

Type	Model	Part No.	Spare Parts Drawing
E 45	2-stage	059.940.9	384.184.7
V 45	2-stage	059.939.5	384.182.0

Hydraulic power units with hose reel

E 45 + SAH 20	2-stage	180.384.0	384.186.3
V 45 + SAH 20	2-stage	180.383.2	384.185.5

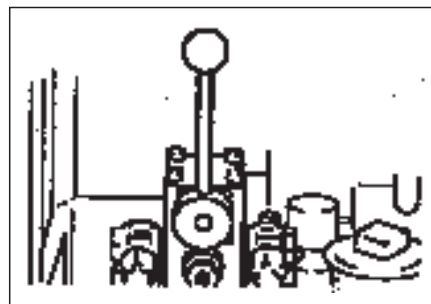
Hydraulic power units equipped with one pressure relief plug each (ref. page 10).

Hand pump, type DPH 1005 SA, refer to page 10 + 16.

Before operating:

Switch relay valve of the power unit into neutral (central) position (see drawing):

Remove protective caps from the coupling halves, join high pressure hoses and plug together protective caps to prevent dirt penetration.



For the operating instructions of the petrol engine please refer to the enclosed leaflet of the manufacturer Briggs & Stratton.

Hydraulic power units are delivered with gasoline tanks empty. Before initial operation they must be filled with fuel according to the manufacturer's instructions.

Use the ignition aid (automatic choke) at temperatures below -20° and open the starting throttle valve at least half.

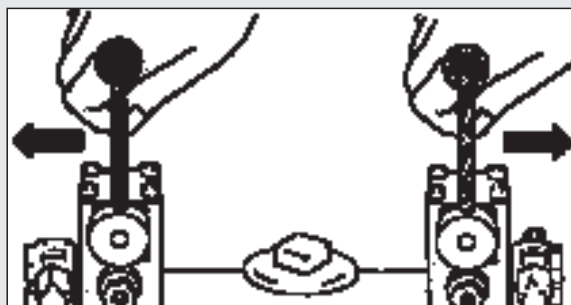
Putting into operation:

Bring control handle into neutral position:
Start motor

Bring relay valve into the desired position:

Left hand – Control handle turned anti-clockwise = oil flow in the red pair of hoses.

Right hand – Control handle turned clockwise = oil flow in the yellow pair of hoses.



Upon completion of your work:

Bring both control handles into neutral position.

Stop resp. switch off the motor.

Immediately after disconnecting the high pressure hoses plug in the protective caps.

Application:

Hydraulic power units can drive:

Spreaders, cutting tools, combitool VARIO and hydraulic cylinders of our brand.

Units of other brands cannot be combined with our products because of different nominal pressures and/or synthetic hydraulic oils.

Get in contact with us to clarify the feasibilities of combination if nominal pressures are identical and mineral hydraulic oils are used.

Important Instructions:

If the hydraulic power unit fails during the rescue operation the hand pump (of the cutting tool), type DPH 1005 SA, part-no. 014.239.5 can complete the operation.

Never tilt a hydraulic power unit or lay it on its side since this will cause oil to leak out of the oil tank vent.

During operation the power unit should not exceed an angle of 30° to horizontal in any direction. The unit generating the nominal pressure (630 bar) comprises a valve-controlled radial piston pump with two separate cycles with built pressure limiting valve.

Drive:

- Electric motor, single phase/alternating current, 230 V, 50 Hz, 1,1 kW, protection class IP 54, construction version V 1, motor protection, ON - and - OFF switch.
- Four-stroke petrol engine made by Messrs. Briggs & Stratton, cylinder capacity 190 cu.cm, power output 3,3 kW at 3100 r.p.m.⁻¹.

On no account should a readjustment of the pressure limiting valves be carried out.

The devices have to be examined according to German GUV 67.13 every 3 years resp. to the local regulations.

Type	Model	Part. No.	Spare Parts Drawing
E 330 L	two-stage, 230 Volt	059.930.1	383.969.9
E 330 L	two-stage, 110 Volt	059.931.0	384.227.4
V 330	two-stage	059.925.5	383.844.7

Hydraulic power units equipped with one pressure relief plug each (ref. to page 10).
Hand pump, type DPH 1005 SA, refer to page 10 + 16.



Before operating:

Switch relay valve of the power unit into neutral (central) position (see drawing):
Remove protective caps from the coupling halves, join high pressure hoses and plug together protective caps to prevent dirt penetration.

For the operating instructions of the petrol engine please refer to the enclosed leaflet of the manufacturer Kawasaki.

Hydraulic power units are delivered with gasoline tanks empty. Before initial operation they must be filled with fuel according to the manufacturer's instructions.

Use the ignition aid (automatic choke) at temperatures below -20° and open the starting throttle valve at least half.

Putting into operation:

Bring control handle into position 0 (see drawing):

Start motor

Bring control handle into position 1.

Upon completion of your work:

Bring control handle into position 0

Stop resp. switch off the motor

Application:

The hydraulic power units E 330 L und V 330 are mainly used for driving the combitool VARIO SPS 330. Nevertheless it is possible to drive our complete hydraulic rescue equipment by means of this hydraulic power unit. With the spreader SP 50 and the cutter S 180 however the max. opening and closing times required by the DIN-standard 14 751/part 1 and 2 cannot be met.

Units of other brands cannot be combined with our products because of different nominal pressures and/or synthetic hydraulic oils.

Get in contact with us to clarify the feasibilities of combination if nominal pressures are identical and mineral hydraulic oils are used.

Important Instructions:

If the hydraulic power unit fails during the rescue operation the hand pump (of the cutting tool), type DPH 1005 SA, part-no. 014.239.5 can complete the operation.

Never tilt a hydraulic power unit or lay it on its side since this will cause oil to leak out of the oil tank vent.

During operation the power unit should not exceed an angle of 30° to horizontal in any direction. The unit generating the nominal pressure (630 bar) comprises a valve-controlled radial piston pump with built pressure limiting valve.

Drive:

- Electric motor, single phase/alternating current, 230 V, 50 Hz, 0,5 kW, alternativ 110 V, protection class IP 54, motor protection, ON - and - OFF switch.
- Four-stroke petrol engine made by Kawasaki, cylinder capacity 76 cu.cm, power output 1,3 kW at 3100 r.p.m.⁻¹.

On no account should a readjustment of the pressure limiting valves be carried out.

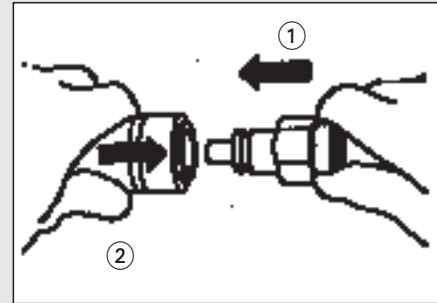
The devices have to be examined according to German GUV 67.13 every 3 years resp. to the local regulations.

The red and yellow colour of the hoses serve for a better differentiation of the lines to the cutting tool and to the spreader while operating alternately or simultaneously.

Operation:

Connecting:

Remove the protective caps from the coupling male ① (part-no. 060.835.1) take hold of the coupling female (part-no. 035.795.2) by the knurled sleeve cover ② and pull out the protective plug. With one hand take hold of sleeve cover of the coupling female, with the other grasp the coupling male (black) by the hex nut, bring the two parts together and press the sleeve cover lightly against the coupling male until the ball bearings engage.



Disconnecting:

Grasp the coupling male (black) by the hex nut with one hand and with the other take hold of the sleeve cover and draw it back. The disconnecting will cause a few drops of

Important Instructions:

The hoses may not be exposed to pulling forces, for example by being stretched tautly between two fixed points.

Avoid forcible kinking, bending and spiral winding. The minimum bending radius of the high pressure hoses is 60 mm.

In order to avoid flow resistance and an accumulation of pressure, never allow the hoses to become kinked. When keeping the hydraulic power unit stored with hoses still attached, take care to ensure that hoses are not left in a tangle.

The coupling halves can only be connected and disconnected when there is no pressure in the high pressure hoses. There is no pressure in the hoses if the relay valve is in neutral position.

The hoses have to be replaced according to German GUV 67.13 every 10 years resp. according to the local regulations. The date (quarter of a year and year) is stated on the hoses and on the fixing.

Caution:

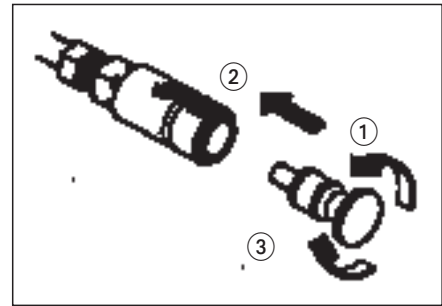
Do not allow the hoses to make contact with chemical fluids (e.g. brake fluid).

The function of the pressure relief plug:

The hydraulic power units and the hand pumps are equipped with a pressure relief plug. A rise in temperature causes pressure increases in cutting and spreading tools, hydraulic cylinders and the combitool VARIO if they are left uncoupled as well as in the extension hoses. (1° Celsius rise in temperature = 9 bar pressure increase).

For example:

The devices are left standing in sunlight or the equipment is operated in winter conditions and subsequently put away for storage under higher temperatures. As a consequence the coupling halves will not connect. Take pressure relief plug, turn knurled-headed screw right back as far as it will go ①, connect the pressure relief plug with the coupling female ② and turn knurled-headed screw clockwise ③ until a few drops of oil are seen to escape and thus the pressure will subside. Now reconnect the coupling halves.



Dual extension hoses:

To extend high pressure hoses with couplings, extensions of 5 m, 10 m or 20 m can be inserted (max. hose length causing no considerable decrease of pressure = 50 m). Extension hoses are always filled with hydraulic oil.

Units of other brands cannot be combined with our products because of different nominal pressures and/or synthetic hydraulic oils.

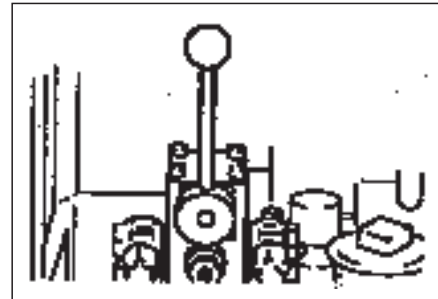
Get in contact with us to clarify the feasibility of combination if nominal pressures are identical and mineral hydraulic oils are used.

The hoses have to be examined according to German GUV 67.13 resp. according to the local regulations.

Type	Model	Part No.	Spare Part Drawing
SP 30 LS	Spreading way 610 mm	059.605.1	312.654.4
SP 40	Spreading way 710 mm	059.952.2	384.498.6
SP 50	Spreading way 810 mm	059.960.3	384.612.1

Before operating:

Switch relay valve of the hydraulic power unit into neutral position, remove protective caps and plugs from coupling halves, connect high pressure hoses and connect protective caps to prevent dirt penetration.



Putting into operation:

The operation is controlled by a push-button safety-switch with automatic central position reset (dead man's control), incorporated in the control handle.

Neutral position: The push-button is held in the central position by means of a spring.

Opening: ←|→ press wedge-end knob – spreader arms open.

Closing: →|← press spherical knob – spreader arms close.

To stop movement: Release push-button. The spreader arms stop moving immediately (neutral position). The operating pressure built up in the spreader by the load remains. The idle oil flow passes only through the control handle with the result that the spreader can be stopped and left in any operating position without running back under the load.

To re-start, press push-button side marked "open" or "close" as required. After using the spreader or in stand-by position close the spreader arms only up to approx. 3 mm.

The operating speed of the spreader arms and the pressure build-up can be controlled by more or less pressing of the push-button; this means that the maximum speed and the

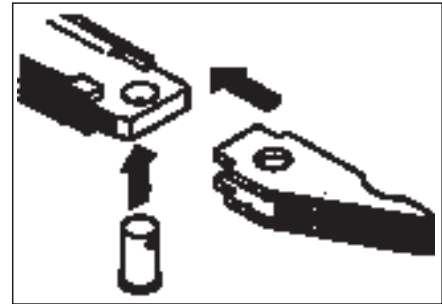
Application:

The spreaders are especially designed hydraulic rescue tools for spreading, pushing (squeezing), and pulling. They are used to rescue trapped or endangered casualties: To force doors – to move back seats – to lift vehicles – to press away and move parts of vehicles or loads into horizontal and vertical direction – to squeeze pipes and pillars (beams) – to press away steering columns – to create an access opening.

The tools are also used for industrial purposes.

a) Spreading – Spreader Tips

The spreader Tips are attached to the spreader arms by means of pivot pins. To replace the spreader Tips drive out the pivot pin held in position by a spring-loaded ball. After replacing the spreader Tips drive the pivot pin right through. In either case be sure to locate the pivot pins correctly and drive them right home. Insert the pivot pins of SP 30 LS from below, the pivot pins of SP 40/50 from above.



The arms of the spreader SP 30 LS and all spreader Tips are ribbed on the outside and on the inside, in order to prevent sliding. It is recommended to use the ribbed areas for spreading or squeezing.

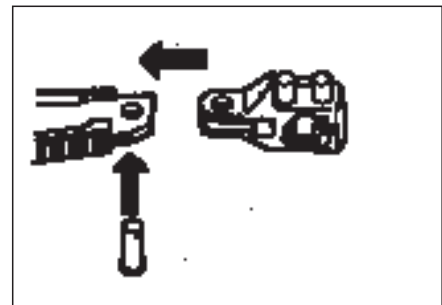
By inserting the spreader repeatedly into the opening slipping and breaking through of the Tips can be avoided and the spreading force can be increased.

b) Peeling

For special rescue operations as for example to create an access opening in case of bus or rail accidents it's possible to use the spreader tips for peeling.

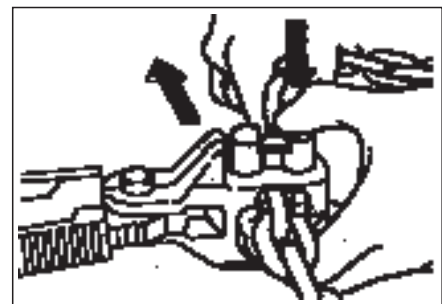
c) Pulling – Pulling chains

Connecting the pulling chains: Remove the spreader Tips – open the spreader. Loop the ends of the chains together with the hooks around the pulling or fixing point (e.g. steering column and front axle). Put the chain-lock into the spreader arms with showing up catch – secure with the pivot pin.



In order to tighten the chain push the catch any one time – tighten the chain always as strong as possible – close the spreader.

If the pulling way is not sufficient, safeguard with the tighten chain or in another way – open the spreader – tighten the chain again – pull again.



Ensure straight pulling. Take special care during pulling operation. There exists an increased risk of accidents close to the pulling chains.

Store the chains after having fastened the locks approx. 10 – 20 cm from the end of the chains.

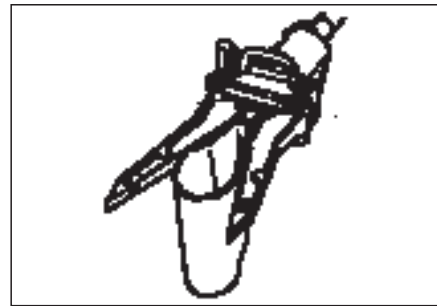
d) Crushing

By closing the spreader arms pipes and other hollow spaces can be crushed:

- with the type SP 30 LS on the ribbed inside of the arms,
- with the types SP 40 und SP 50 on the ribbed inside of the spreader tips.

Note:

Crushing objects may suddenly crack off.
Persons should not stay within the working area of the spreader.



e) Raising

If the ground is not very firm use a supporting block to lift vehicles or other movable loads.

Ensure that the vehicle to be raised is firmly secured in position. Place spreader tips far enough under the load to be lifted. Open spreader arms.

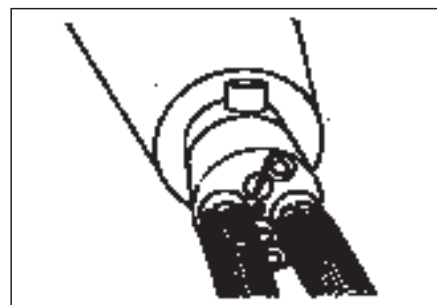
Carefully observe load during lifting because it may tilt, drift away or load position may change. Lifted vehicles and loads must immediately and safely be supported in the correct manner the moment they have been raised.

Important Instructions:

Operation of the pressure relief valve in the control handle of the spreader

If the snap couplings have not properly engaged, preventing the return flow of oil, a pressure relief valve incorporated in the control handle automatically comes into action to protect both equipment and operator. This causes a leak of oil at the end of the handle.

Immediately switch relay valve of the hydraulic power unit to neutral position and reconnect the couplings correctly.



Disconnection of the Operating Spreader

To disconnect the coupling halves between spreader and hydraulic power unit the relay valve must be switched to the neutral position. The spreader can now be disconnected and another tool can be connected.

Re-connecting the spreader later on has also to be done while the relay valve is in neutral position.

Spreader arms

Observe possible deformations of the spreader arms during the operation. If required stop the working action and reset the tool. If a continuous deformation occurs the working operation must be interrupted. In this case get in contact with the manufacturer or with one of his authorised service agents.

Emergency operation

Spreaders should not be operated by hand pumps.

(Exception: emergency situations, i.e. power failure, to complete a rescue operation with the handpump.)

Units of other brands cannot be combined with our products because of different nominal pressures and/or synthetic hydraulic oils.

Get in contact with us to clarify the feasibility of combination if nominal pressures are identical and mineral hydraulic oils are used.

The devices have to be examined according to German GUV 67.13 resp. according to the local regulations.

Type	Model	Part No.	Spare Part Drawing
S 30	33 mm opening width	281.538.9	384.219.3
S 140	140 mm opening width	180.558.4	385.031.5
S 180	185 mm opening width	059.947.6	384.315.7
DPH 1005 SA	hand pump	014.239.5	304.486.6

Before operating:

Remove protective caps from coupling halves. Open the pressure relief valve on the hand pump, ensure neutral position of the relay valve on the hydraulic power unit and connect the couplings. Fix holding device in working position required or for short-time operation remove backwards over the hoses.

Refer to pages 5, 6, 7, 8 and 9 if a hydraulic power unit is used.

Operating the Hand Pump:

Producing pressure to open and close shear blades:

Turn pressure relief valve anticlockwise to open, operate pump lever up and down several times without load, using full travel of the lever. This action vents the pump. Close pressure relief valve by turning clockwise and continue pumping.



While pump is in operation care should be taken to ensure that it is not tilted more than 30° off the horizontal in any direction. The pressure relief valve must not be opened while the cutter is in operation.

Operating the Cutting Tool:

The operation is controlled by a push button safety switch with automatic neutral (central) position reset (dead man's control), incorporated in the control handle.

Neutral position: The push-button is held in neutral position by means of a spring.

Closing: →|← press wedge-end knob – shear blades close.

Opening: ←|→ press spherical knob – shear blades open.

To stop movement: Release push-button. The shear blades stop moving immediately (neutral position). The operating pressure built up in the cutting tool by the loads remains. The idle oil flow passes only through the control handle with the result that the cutting tool can be stopped and left in any operating position without running back under the load.

To re-start press push-button side marked "open" or "close" as required. After using or in stand-by position open completely the shear blades.

The operating speed of the shear blades and the pressure build-up can be controlled by the accurate control-pressure of the push-buttons, i.e. the maximum speed and the maximum cutting forces can only be reached by complete insertion of the push-button

Application:

The cutters are rescue tools especially designed for cutting body parts of vehicles. They are used to rescue trapped or endangered casualties: To cut door or roof pillars, door posts and sills, the steering wheel and the spokes of the wheel. For the cutting of solid materials (e.g. structural steel) the blades are especially grooved (bolt cutter).

With the cutter S 180 especially all current and existing door side - impact bars can be cut.

The cutters are also used for industrial purposes, e.g. to cut pipes, structural steel, sectional steel, sheet metal, and cables.

Important Notes:

Risk of accident

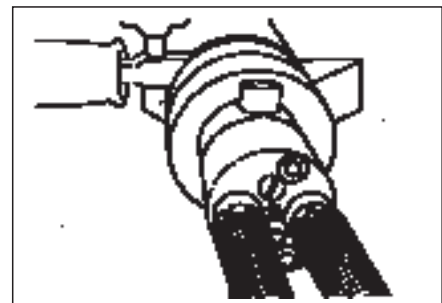
No attempt should be made to cut steering columns, high-strength bumper brackets, shock absorbers, track rods, hinges or similar parts. High-tensile materials cutting may damage the shear blades.

In shearing objects which have one free end, care should be taken to ensure against injury caused by flying pieces.

When cutting, the blades must not have a gap of more than 5 mm at the tips. Interrupt cutting if they do so and look for a better working position (possibly check the turning moment of the central bolt – see the spare part drawing).

Operation of the pressure relief valve in the control handle

If the snap couplings have not properly engaged, preventing the return flow of oil, a pressure relief valve incorporated in the control handle automatically comes into action to protect both equipment and operator. This causes a leak of oil at the end of the handle. Immediately switch the relay valve of the hydraulic power unit into neutral position and connect couplings correctly.



Disconnection of the operating Cutter

To disconnect the coupling halves between cutting tool and hydraulic power unit the relay valve must be switched into the neutral position. The cutter can now be disconnected and another tool can be connected.

Re-connecting the cutter later on has also to be done while the relay valve is in neutral position.

Avoid unauthorized adjustment of the pressure relief valves on the hand pump.

Units of other brands cannot be combined with our products because of different nominal pressures and/or synthetic hydraulic oils.

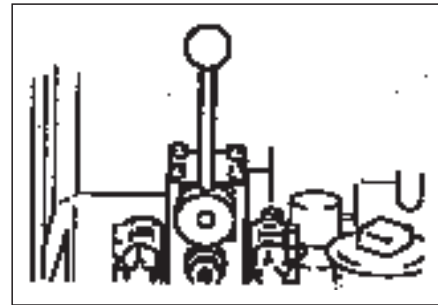
Get in contact with us to clarify the feasibilities of combination if nominal pressures are identical and mineral hydraulic oils are used.

The devices have to be examined according to German GUV 67.13 resp. according to the local regulations.

Type	Model	Part No.	Spare Part Drawing
RZ 1 – 850	Stroke 320 mm	059.921.2	} 384.231.2
RZ 2 – 1250	Stroke 500 mm	059.922.0	
RZ 3 – 1600	Stroke 500 mm	059.923.9	
RZT 2 – 1065	Stroke 525 mm	059.999.9	} 384.823.0
RZT 2 – 1370	Stroke 720 mm	059.983.2	

Before operating:

Switch relay valve of the hydraulic power unit into neutral position, remove protective caps and plugs from coupling halves, connect high pressure hoses and connect protective caps to prevent dirt penetration.



Putting into operation:

The operation is controlled by a push-button safety-switch with automatic central position reset (dead man's control), incorporated in the control handle.

Neutral position: The push-button is held in the central position by means of a spring.

Extension: ←|→ press wedge-shaped knob – piston rod extends.

Retraction: →|← press spherical knob – piston rod retracts.

To stop movement: Release push-button. The piston rod stops moving immediately (neutral position). The operating pressure built up in the cylinder by the load remains constant. The idle oil flow passes only through the control handle with the result that the cylinder can be stopped and left in any operating position without running back under the load.

To re-start, press desired push-button side. After using the cylinder or in stand-by position first insert the piston rod completely and then extend approx. 3 mm.

The operating speed of the piston rod and the pressure build-up can be controlled by the accurate control-pressure of the push-buttons; this means that the maximum speed and the maximum force can only be reached by complete insertion of the push-button required.

Application:

The hydraulic cylinders are rescue tools especially designed to rescue trapped or endangered casualties. They are used to push up steering columns, roofs of vehicles and similar parts, to push away front parts of vehicles, for supporting, strutting and pulling.

The rescue cylinders supplement the spreader. For example they are used whenever the opening of the spreader arms is no more sufficient.

Using one after the other spreader, RZ 1, RZ 2, RZ 3, RZT 2 enables to move loads step by step horizontally or vertically from 0 to 1600 mm.

There are available special accessories for RZ 1 – 3 in order to optimize the operating.

a) Raising – pressing

If necessary it is possible to turn the thrust carrying piece on the piston rod while the piston rod is extended to ensure a better point of reference. As to RZT 2 the whole piston rod has to be turned, cause the thrust carrying piece is firmly fixed to the piston rod.

Ensure that the cylinder is placed in the middle of and as rectangular as possible to the load to be raised.

Raised loads must immediately be supported in appropriate and safe manner. Ensure that they are firmly secured in position. Staying under raised loads is not allowed.

b) Pulling

Pulling is only possible with RZ 1, RZ 2, and RZ 3 in conjunction with special adapters (accessories).

Remove pushing head – attach adapter to piston rod – extend piston rod – loop the ends of the chains together with the hooks around the pulling resp. fixing point. Attach the chain locks to the adapters and secure by pivot pins.

In order to tighten the chain push the catch any one time – tighten the chains as strong as possible – retract piston rod.

If the pulling way is not sufficient, re-extend the piston rod – tighten the chains again.

Ensure straight pulling. Take special care while pulling, there exists an increased risk of accidents close to the pulling chains.

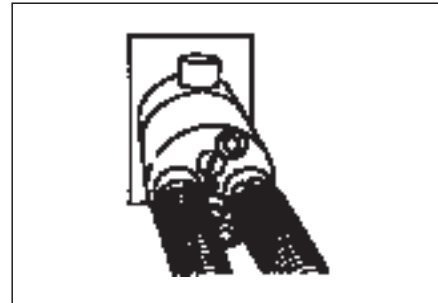
Store the chains after having fastened the locks approx. 10 – 20 cm from the end of the chains.

Important instructions:

Operation of the pressure relief valve in the control handle of the cylinder

If the snap couplings have not properly engaged, preventing the return flow of oil, a pressure relief valve incorporated in the control handle automatically comes into action to protect both equipment and operator. This causes a leak of oil at the end of the handle.

Immediately switch the relay valve of the hydraulic power unit to neutral position and reconnect the couplings correctly.



Disconnection of the operating cylinder

To disconnect the coupling halves between cylinder and hydraulic power unit the relay valve must be switched to the neutral position. Now the cylinder can be disconnected and another tool can be connected.

Re-connecting the cylinder later on has also to be done while the relay valve is in neutral position.

Units of other brands cannot be combined with our products because of different nominal pressures and/or synthetic hydraulic oils.

Get in contact with us to clarify the feasibility of combination if nominal pressures are identical and mineral hydraulic oils are used.

The devices have to be examined according to German GUV 67.13 resp. according to the local regulations.

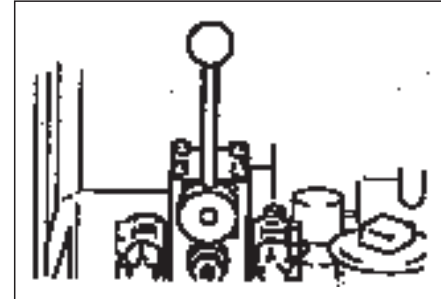
Type	Model	Part No.	Spare Part Drawing
SPS 330	spreading way 330 mm, pulling way 400 mm	593.012.0	385.327.6



Before operating:

Switch relay valve of the hydraulic power unit to neutral position, remove protective caps and plugs from coupling halves, connect high pressure hoses, connect protective caps to prevent dirt penetration.

Refer to pages 5, 6, 7, 8 and 9 if a hydraulic power unit is used.



Operating the hand pump:

Producing pressure to open and close shear blades (arms):

Turn pressure relief valve anticlockwise to open, operate pump lever up and down several times without load, using full travel of the lever. This action vents the pump. Close pressure relief valve by turning clockwise and continue pumping.

While pump is in operation care should be taken to ensure that it is not tilted more than 30° off the horizontal in any direction.

The pressure relief valve must not be opened while the VARIO is in operation.

Operating the VARIO:

The operation is controlled by a push-button safety switch with automatic neutral (central) position reset (dead man's control), incorporated in the control handle.

Neutral position: The push-button is held in neutral position by means of a spring.

Closing: →|← press wedge-end knob (below) – shear blades (arms) close.
(Cutting/pulling)

Opening: ←|→ press spherical knob (above) – shear blades (arms) open.
(Spreading)

To stop movement: Release push-button. The shear blades (arms) stop moving immediately (neutral position). The operating pressure built up in the VARIO by the loads remains. The idle oil flow passes only through the control handle with the result that the VARIO can be stopped and left in any operating position without running back under the load.

To re-start press push-button side marked "open" or "close" as required. After using or in stand-by position close the shear blades (arms) only up to approx. 3 mm.

The operating speed of the shear blades (arms) and the pressure build-up can be controlled by the accurate control-pressure of the push-buttons, i.e. the maximum speed and the maximum pressure resp. cutting/pulling force can only be reached by complete

Application:

The VARIO has been designed as an universal combitool for rescuing entrapped casualties. It is used to cut door and roof pillars, door-posts and sills, the steering wheel and the spokes of the wheel. The blades are provided with a special cutter for round bar at the rear ends.

The VARIO can also be used for spreading, pushing and pulling operations, to open doors, to push back seats, to lift vehicles, to push and move parts of vehicles and loads in vertical and horizontal direction.

The tool is also used for industrial purposes, e.g. to cut pipes, structural steel, sectional steel, sheet metal and cables.

Cutting

Never cut steering columns, high tensile steel e.g. mountings of the bumpers, shock absorbers, hinges or similar materials with the VARIO tool. Cutting high-tensile steel may damage the blades (arms).

Don't cut things with both ends loose, as there is the danger that persons will be hurt by parts flying away.

While cutting the blades must not have a gap of more than 5 mm at the tips. Interrupt cutting if they do so and look for a better working position (possibly check the turning moment of the central bolt – see the spare part drawing).

Spreading

The blades (arm) are ribbed at the tips out- and inside in order to avoid slipping. It is advantageous to spread within this sector.

Inserting the tool gradually into the gap avoids slipping or bursting of the tips, on the other side, the spreading force is increasing.

Lifting

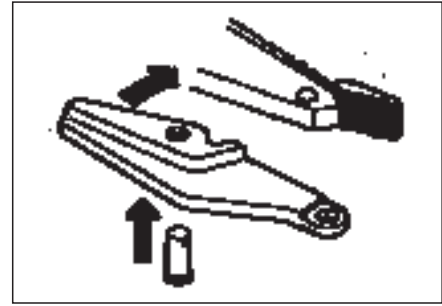
If the ground is not very firm use a supporting block to lift vehicles or other movable loads.

Ensure that the vehicle to be raised is firmly secured in position. Place shear blades (arms) far enough under the load. Open shear blades.

Carefully observe load during the lifting because it may tilt, drift away or the load position may change. Lifted vehicles and loads must immediately and safely be supported the moment they have been raised.

Pulling – pulling chains

Mounting the chain: Open the VARIO – fasten the pulling devices with the pivot pin. Loop the ends of the chains with the hooks around the pulling or fixing point (e.g. the steering column and front axle). Put the chain-lock into the pulling device with showing up catch – secure with the pivot pin.



In order to tighten the chain push the catch any one time – tighten the chain as strong as possible – close the blades (arms).

If the pulling way is not sufficient, secure with tighten chain or in another way – open the VARIO – tighten the chain again – pull again.

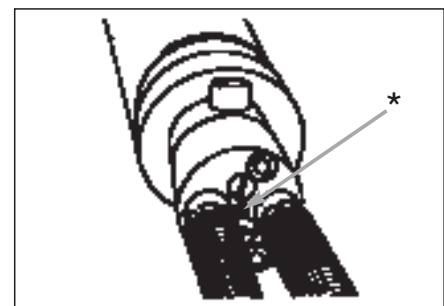
Ensure straight pulling. Take special care while pulling, as there exists an increased risk of accident close to the chain.

Store the chains after having fastened the locks approx. 10 – 20 cm from the ends of the chains.

Important Instructions

Operation of the pressure relief valve in the control handle

If the snap couplings have not properly engaged, preventing the return flow of oil, a pressure relief valve incorporated in the control handle automatically comes into action to protect both equipment and operator. This causes a leak of oil at the end of the handle.



Immediately switch the relay valve of the hydraulic power unit into neutral position and reconnect the couplings correctly.

Disconnection of the operating VARIO

To disconnect the coupling halves between VARIO and hydraulic power unit the relay valve must be switched into neutral position. The VARIO tool can now be disconnected and another tool can be connected.

Re-connecting the VARIO later on has also to be done while the relay valve is in neutral position.

Avoid unauthorized adjustment of the pressure relief valves on the hand pump.

Units of other brands cannot be combined with our products because of different nominal pressures and/or synthetic hydraulic oils.

Get in contact with us to clarify the feasibilities of combination if nominal pressures are identical and mineral hydraulic oils are used.

The devices have to be examined according to German GUV 67.13 resp. according to the local regulations.

General Instructions

To ensure that the equipment is ready for use at all times, the following should be carried out: After every use tools and accessories must be given a visual checkover. Particular attention should be paid to spreader tips, joints, shear blades, pulling chains, oil level, hoses and coupling halves.

Regular professional checks according to local regulations must be carried out on the tools to ensure their readiness for safe operation.

On no account try to readjust the pressure limit valves.

Remove the rubber sleeve from spreaders, cutting tools and VARIO from time to time; clean and grease joints, piston rods and pump plunger.

Keep all coupling halves and protective caps of high pressure hoses clean. Ensure careful cleaning after every use. Replace protective caps on the couplings when not in use. Ensure that coupling operation is smooth running.

Clean filter inset of hydraulic power units E/V-45 (see spare part drawing) from time to time.

Please observe maintenance instructions of petrol driven motors from Briggs & Stratton, resp. Kawasaki.

Hose Change

- The utmost care should be taken to ensure that the high pressure hose, length 0.5 m, with coupling male on the control handle is connected to "P", while the hose with coupling female is connected to "T".
- With hydraulic power units, the hose reels and the hand pumps the hose with coupling male must be connected to "T" (return connection) and the hose with the coupling female to "P" (pressure connection).

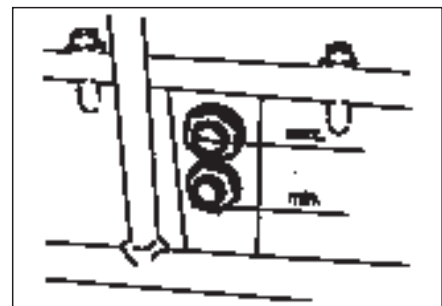
When keeping tool stored, care should be taken to ensure that hoses are not left tangled (min. sweep 60 mm).

Changing of Hydraulic Fluid

An oil change on hydraulic power units and hand pumps is recommended after 100 operating hours or latest after three years.

● Motor pumps

Switch relay valve of the power unit into neutral position. Remove drain plug in the base of the oil tank – drain the contents of the tank. If necessary rinse out oil tank (with petrol or Sangajo), close the feeder – unscrew the cover of the funnel tube – slacken off the screw with the plate marked "vent" approx. 3 turns, to allow trapped air to escape – refill oil (6 l resp. up to the middle of the upper oil lever gauge), screw in the cover of the funnel tube and the screw "vent".



● Vent

Connect hose pair "red" (circuit), start motor pump – switch relay valve in "red" position – let run for about 20 seconds.

Connect hose pair "yellow" (circuit), start motor pump – switch relay valve in "yellow" position – let run for about 20 seconds.

Disconnect couplings of both hose pairs – make operational test.

Maintenance

● Hand pump

Open handwheel (outflow).

Remove screw plug – drain the contents of the tank, if necessary rinse out oil tank (with petrol or Sangajol), refill oil (450 ccm resp. up to the lower border of the oil charging hole in horizontal position of the pump) – screw in the screw plug.

● Vent

Connect the hose pair (circuit) – pump about 5 times with drain valve open - close the drain valve – pump about 10 times.

Disconnect the couplings of the hose pair – make operational and load test.

Important note: Use only Aero-Shell-Fluid 4 or equivalent mineral oils. Under no circumstances refill synthetic oil, brake fluid, engine oil, or similar fluids.

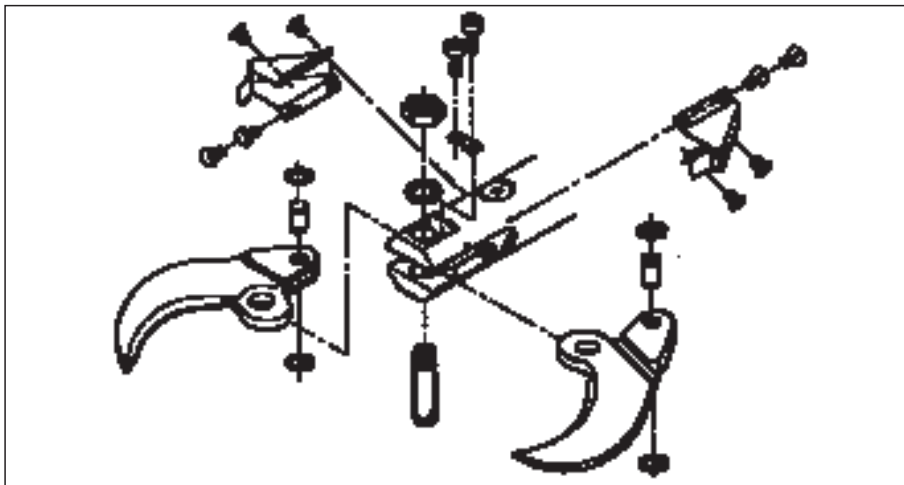
In case of power units with petrol engine follow the attached operating instructions of the manufacturer Briggs & Stratton resp. Kawasaki regarding motor oil and maintenance work.

Replacing Cutter Blades

Follow mounting instructions on the spare part drawing.

Remove guard plates/rubber sleeve – close cutter blades to the point at which pivot pin with snap ring are accessible – remove snap ring and disassemble pivot pin – subsequently remove rubber sleeve, hex nut and pivot pin – take out the blades.

Grease blades and pivot pins with Gleitmo 165 (molybdenum disulphide grease) – reassemble in reverse order. While tightening the hex nut observe the turning moment (e.g. 30 – 45 Nm/ S 140) resp. twisting the pivot pin through 15°.



Regrinding Cutter Blades

The cutter blades can be reground approx. 2 mm without re-hardening.

When regrinding, ensure that original cutting angle and cutting width are restored. Do not regrind inside (planeface) of blades.

**Repairing the devices is not allowed without any authorization!
Maintenance work should only be done by trained personnel.**

All tools and accessories should be stored in a dry and clean place.

Malfunction	Reasons	Corrective Action
no pressure build-up	relay valve in neutral position, adjusted to the wrong side or not completely pressed in	select required side
	not enough oil in the hydraulic pump	refill oil as prescribed in maintenance instructions
	pump not vented after oil change	venting see maintenance instructions
tools (e.g. spreader or cutter) can not be connected	relay valve not in neutral position while engine is on	set relay valve to neutral position
	coupling halves faulty	replace coupling halves
oil leak on hoses and hose fittings	leakage, may be damaged	replace hoses, see maintenance instructions
decomposition of hydraulic hose surfaces	contact with aggressive chemical fluids	replace hoses, see maintenance instructions
oil leak on coupling halves	leakage	replace coupling halves

Power unit free from defects, relay valve set on yellow hoses as required.

Malfunction	Reasons	Corrective Action
no max. performance of the spreader	push-buttons are not completely pressed in	press in push-buttons completely
no performance of spreader or opposite moving to the direction required	during replacing of hoses or couplings spare parts, oil pressure (P) exchanged with return flow of oil (T)	correct replacing as described in the maintenance instructions
spreader can not be connected	pressure build-up through temperature rise (this may cause oil leak at the boring between the hoses at the control handle)	use pressure relief valve, see operating instructions for high pressure hoses "importance of pressure relief valve"
	couplings damaged	replace couplings
oil leak at the control handle (at the boring between hose connections)	return hose is not properly connected	set relay valve of motor pump on center position, connect correctly
no performance of spreader despite operation of control knobs	pressure hose disconnected	set relay valve of motor pump on center position, connect correctly
when loaded, spreader moves in opposite direction	return safety device is faulty	tool should be serviced by approved repair agents
oil leak on hoses or hose fittings	leakage, may be damages	replace hoses, see maintenance instructions
decomposition of hose surfaces	contact with aggressive chemical fluids	replace hoses, see maintenance instructions
oil leak on coupling halves	leakage	replace couplings see maintenance instructions

Power unit free from defects, relay valve set on red hoses as required.

Malfunction	Reasons	Corrective Action
no max. performance of cutting tool	push-buttons are not completely pressed in	press in push-buttons completely
no performance of cutting tool or opposite moving to the direction required	during replacing of hoses or couplings spare parts, oil pressure (P) exchanged with return oil flow (T)	correct replacing as described in the maintenance instructions
cutting tool can not be connected	pressure build-up through temperature rise (this may cause an oil leak at the boring between the hoses at the control handle)	use pressure relief valve, see operating instructions for high pressure hoses "importance of pressure relief valve"
	couplings damaged	replace couplings
oil leak at the control handle (at the boring between hose connections)	return hose is not properly connected	set relay valve of motor pump on center position, connect correctly
no performance of spreader despite operation of control knobs	pressure hose disconnected	set relay valve of motor pump on center position, connect correctly
oil leak on hoses or hose fittings	leakage, may be damages	replace hoses, see maintenance instructions
decomposition of the hoses surface	contact with aggressive chemical fluids	replace hoses, see maintenance instructions
oil leak on coupling halves	leakage	replace couplings see maintenance instructions
blades are loose and gape while cutting	blades not properly fastened on cutter head	readjustment see maintenance instructions
opening width below required value	adjustment of cutter head shifted	readjustment see maintenance instructions
pressure built-up while opening or closing without being loaded	hex nut/central pin tightened too much	readjust see maintenance instructions
blades are damaged	break-out of blades	to be reground up to 2 mm see maintenance instructions – otherwise replace, see maintenance instructions

Malfunction	Reasons	Corrective Action
no pressure build-up	pressure relief valve is not closed	close pressure relief valve
	not enough oil in the hand pump	refill oil, see maintenance instructions
	pump not vented after oil changing	open pressure relief valve and vent the tool by operating the pump several times
hand pump runs tightly when opening the cutting tool or oil spurts out of the screw plug on the oil tank	too much oil in the hand pump	drain oil as prescribed in the maintenance instructions
tools (for example spreader or cutting tool) cannot be connected	pump is under pressure	open pressure relief valve (red handwheel)
	coupling halves defective	replace coupling halves
decomposition of the hose surface	contact with aggressive chemical fluids	replace hoses see maintenance instructions
oil leak on hoses or hose fittings	leakage, may be damaged	replace hoses, see maintenance instructions
oil leak on the coupling halves	leakage	replace coupling halves

Power unit free from defects, relay valve adjusted as required.

Malfunction	Reasons	Corrective Action
no max. performance of hydraulic cylinder	push-buttons are not completely pressed in	press in push-buttons completely
no performance of hydraulic cylinder or opposite movement to the direction required	during replacing of hoses or couplings spare parts, oil pressure (P) exchanged with return flow of oil (T)	correct replacing see maintenance instructions
hydraulic cylinder cannot be connected	pressure build-up through temperature rise (this may cause an oil leak at the boring between the hoses at the control handle) couplings halves defective	use pressure relief valve, see operating instructions for high pressure hoses "importance of the pressure relief valve" replace coupling halves
oil leak at the control handle (at the bore between the hose connections)	return hose not properly connected	set relay valve of motor pump on center position, connect correctly
no performance of hydraulic cylinder despite operation of control knobs	pressure hose is not connected	set relay valve of motor pump on center position, connect correctly
opposite movement of hydraulic cylinder being loaded	return safety valve is faulty	tool should be serviced by approved repair agents
oil leak on hoses or hose fittings	leakage, may be damaged	replace hoses see maintenance instructions
decomposition of the hose surface	contact with aggressive chemical fluids	replace hoses see maintenance instructions
oil leak on coupling halves	leakage	replace couplings halves

Power unit free from defects, relay valve adjusted to red or yellow hoses as required.

Malfunction	Reasons	Corrective Action
no max. performance of VARIO-tool	push-buttons are not completely pressed in	press in push-buttons completely
no performance of VARIO-tool or opposite moving to the direction required	during replacing of hoses or couplings spare parts, oil pressure (P) exchanged with return oil flow (T)	correct replacing see maintenance instructions
VARIO can not be connected	pressure build-up through temperature rise (this may cause an oil leak at the boring between the hoses at the control handle)	use pressure relief valve, see operating instructions for high pressure hoses "importance of the pressure relief valve"
	coupling halves damaged	replace coupling halves
oil leak at the control handle (at the bore between the hose connections)	return hose is not properly connected	set relay valve of motor pump on center position, connect correctly
no performance of VARIO despite operation of control knobs	pressure hose disconnected	set relay valve of motor pump on center position, connect correctly
being loaded VARIO moves into opposite direction	return safety device is faulty	tool should be serviced by approved repair agents
oil leak at the hoses or the hose fittings	leakage, may be damaged	replace hoses see maintenance instructions
decomposition of the hose surface	contact with aggressive chemical fluids	replace hoses see maintenance instructions
oil leak on coupling halves	leakage	replace couplings see maintenance instructions
blades are loose and gape when cutting	blades are not properly fastened on the cutter head	readjust see maintenance instructions
tool builds up pressure while blades are completely opened (neutral position)	adjustment of cutter head shifted	readjust see maintenance instructions
pressure built-up while opening or closing without being loaded	hex nut/central pin tightened too much	readjust see maintenance instructions
blades are damaged	break-out of blades	to be reground up to 2 mm see maintenance instructions – otherwise replace, see maintenance instructions

