

## Tipdressers – general information



In the automotive industry resistance robot welding guns are used to weld the parts of the car body.

In this automated welding process the welding current melts the car body parts on the contact surface so that they are permanently connected at the welding spot.

The welding electrodes are supplied with replaceable electrode caps. They easily wear due to thermal and mechanical strain, which affects the quality of the welding spots. After a given number of welding spots, the electrodes are treated in a tip dresser unit. The original form of the caps is restored so that the welding spots comply with the requested quality with respect to size, form and stability. To dress the rotationally symmetrical electrode caps the robot arm swings the weld gun towards the tipdresser. After a short period the gun closes and the caps are renewed by erosion of 0.1 – 0.15 mm in a dressing process of only 2 seconds.



A pneumatic system keeps the swarf that develops during this procedure from the operation spot and leads it into a collection unit (swarf collection unit). No cooling lubricants are used during the dressing process.

Tip dressers abe3600..., abe3610..., and the combined tip dresser and form system abe3610 can be used for the mechanical treatment of electrode caps. If fixed stationary weld guns are used, the above machines can be mounted onto the swing unit abe1000; abe1500; abe1600... or onto the docking device abe6000....

This enables the machines to be swung or transported accurately and repeatedly to the operation spot.

Different milling heads can be used in the tip dresser. Hence, it is possible to dress almost every rotationally symmetrical cap geometry. Detailed figures of the different variants are listed in Appendix „Table: Numbering system for milling heads“.

### Advantages for the operator:

- ☺ Increased endurance for electrode caps
- ☺ Increased number of welding spots carried out by one pair of electrodes
- ☺ Optimisation of servicing intervals
- ☺ Increased quality of welding spots
- ☺ Diameter of the lens remains constant
- ☺ Reduction of machine stoppages when changing electrodes
- ☺ Reduction of production defects
- ☺ Increased safety during welding process
- ☺ Optimisation and stabilisation of technical parameter for welding control system



### Standard values for dressing intervals:

The following parameters determine the possible quantity of welding spots:

- The material of the metals to be welded
- Sheet thickness
- Surface treatment of the used metal material (structure, cleanness)

In comparison, see the following approximate values for dressing intervals: (not considering the metal sheet thickness)

	<b>Material</b>	<b>Quantity of welding spots</b>
☺	ungalvanised	200 - 800
☹	double galvanised	75 - 200
☹	aluminium	15 – 75

### Drive:

#### *Control box*

A small control box is attached to the stand of the electrode tip dresser. It houses the engine protection plate, contractor, and relay for the actuators. All signals for the control including the monitoring devices, the limit switch, etc. are wired to a connector block. In this case, the INTERBUS Rugged Line DIO Module on the robot controls the signals.

#### *Interbus module*

Another control device is the starter module (IBS RL 400 MLR R DIO6/1 LK) from the product line INTERBUS Rugged Line by Phoenix Contact.

#### Advantages when using the Rugged Line starter module:

- ☺ The tip dresser can be easily integrated into an already existing Rugged Line Installation.
- ☺ The module is integrated in an IP67 zinc diecasting shell. The module is protected from spatter formation– hence, it can be installed next to weld guns.
- ☺ The module is clipped-on to the mounting plate and can be easily changed in case of a defect.
- ☺ Quick and effective connection of the power supply with IP67.
- ☺ Motor current parameters via process data

### Optional additional components:

#### **Optical sensor**

The optical sensor (reflection light optical scanner) serves as quality assurance of the surface of the welding caps after dressing. Two reflection light optical scanners (adjustable in sensitivity) test the lens of the dressed electrode cap.

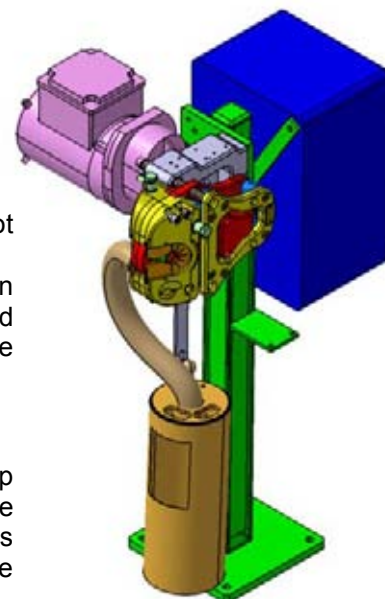
#### **Force sensor**

This sensor monitors whether the weld gun develops the requested pressure within a given time. The sensor measures the pressure on the electrodes.

#### **Current sensor**

This sensor monitors the welding current.

# Electrode tip dressing system abe3600...



**Application:**

Stationary tip dressers are used for the mechanical dressing of spot welding electrodes.

The tip dresser is attached to the stand of the robot weld gun on an infinitely height-adjustable stand. Different milling heads can be used with the machine, so every rotationally symmetrical cap form can be dressed.

**Milling procedure:**

The weld gun that is attached to the robot arm is moved to the tip dresser to restore the required cap form and geometry. After the electrodes are positioned near the milling head, the weld gun closes and the electrode caps are moved into the milling head and can be dressed.

**Milling parameters:**

Minimum electrode force:	1,0 kN
Recommended electrode force:	1,2 kN
Milling time (initially):	2 x 1,5 s
Milling time (normal):	0,8 – 1,5 s

**Electrical data:**

Rated voltage (V):	3 ~ 400	3 ~ 415	3 ~ 460	3 ~ 480
Frequency (Hz):	50	50	60	60
Rated current (A):	2,0	1,95	1,74	1,68
Output:	0.7kW – S3 – 5%			
Motor speed n2 (RPM)	390	390	465	465
Tip dresser speed, unloaded (RPM):	301	301	362	362
cos phi:	0,82	0,82	0,82	0,82
Control voltage:	24 V DC			
Compressed air supply:	6 – 12 bar (oil-free)			

**Information on milling parameters:**

The electrode forces and especially the milling times depend on the form (geometry) and material of the electrode caps or welding spot electrodes. Other influencing variables include the geometry of the cap to be milled (the slope of its flank and the forepart diameter), the time to build up pressure in the cylinder of the gun and the number of weldings between welding cycles (enlargement of forepart diameter, dirt accumulation and application of the caps). The above-mentioned milling parameters are standard values, the optimum values for the particular milling job have to be determined by optimising the machine

# Aufbauvarianten bei stationären Kappenfräsern

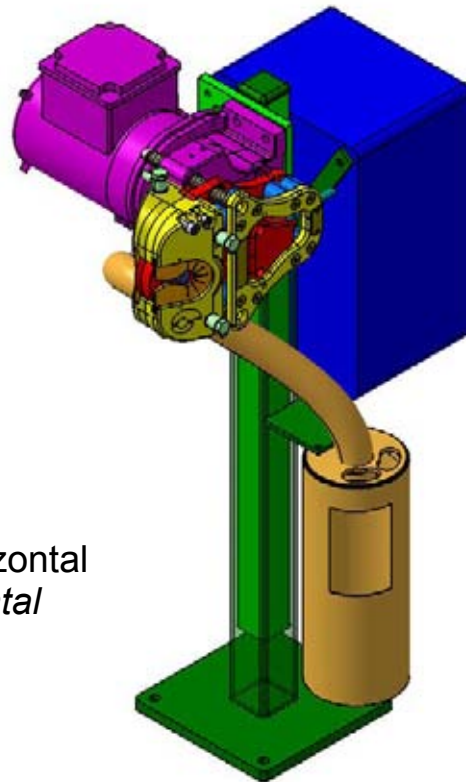
*Set-up variants – stationary tip dresser*



## **Variante V1** (Vorzugsvariante/preferred)

Fräserlage vertikal 180°

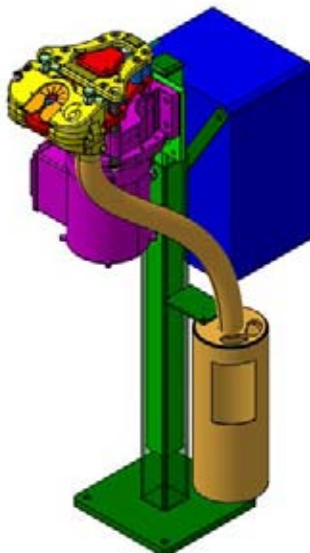
*Dresser vertical 180°*



## **Variante H**

Fräserlage horizontal

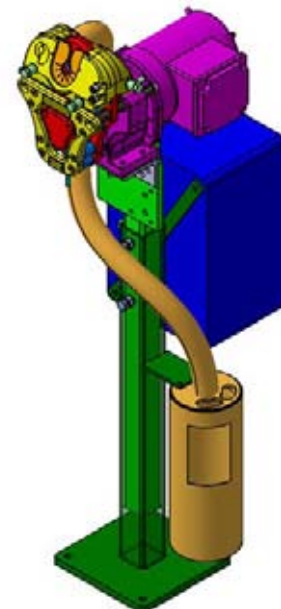
*Dresser horizontal*



## **Variante V2**

Fräserlage vertikal 90°

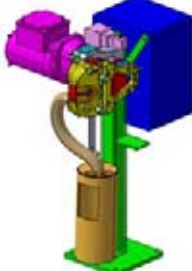






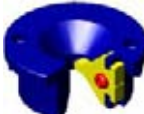
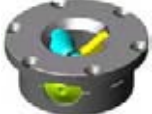


*Dresser vertical 90°*



Für vertikale Aufbauvarianten ist ein Vertikalwinkel (Best.-Nr.: 89040000010012) notwendig.  
*Vertical variants require an additional vertical angle (order number: 89040000010012)*



Dieses Merkblatt ist allgemeingültig und dient nur zur schematischen Darstellung der Aufbauvarianten. *This technical bulletin is generally accepted and serves as a schematic representation of the set-up variants only.*



<p><b>TIP dresser complete unit</b> Stand and E-box, without Milling Head</p>  <p>Type: abe 3600.037.00A order-Nr.: F-3600.037.00A ( With E-Box ) Type: abe 3600.037.01A order-Nr.: F-3600.037.01A ( With engine start module )</p>	<p><b>Milling base unit</b> gear with height equalization and drive without milling head</p>  <p>Type: abe 3600.K005.0001A order-Nr.: 8160050001A</p>	<p><b>Swarf lead system</b></p>  <p>Type: SAS-3600-13 order-Nr.: 850.3600.13</p>		<p><b>Milling head with Cutter Blade(s)</b> double-cutter system</p>  <p>Type: 4716.106.00 order-Nr. 830471610600</p>
<p><b>TIP dresser f. swing in unit</b> gear with height equalisation drive, pneumatic swarf lead system without Milling head</p>  <p>Type: abe 3600.037.11A order-Nr.: F-3600.037.11A</p>	<p><b>Electric</b> switch box with connection cable for drive and proximity switch cable for tip dresser</p>  <p>Type: NSB-3000-038.3 order-Nr.: 8653383</p> <p><b>engine start module:</b> order-Nr.: 86090000000700 ( 400 V ; 2MB RAM )</p>	<p><b>Stand</b></p>  <p>Type: (Standart; RAL 9002) <b>height 700 mm</b> order-Nr.: 89040590101200 <b>height adjustable 700 - 1000 mm</b> order-Nr.: 89040590000700</p>	<p><b>Milling head with cutter AIR-LESS-Milling System</b></p> <p>single-cutter system</p>  <p>Type: 1416.106.00 order-Nr.: 830141610600</p>	<p><b>LC-Head Lap-Cut-System</b> ( EURO-patent protected ! )</p>  <p>Type: 3616.106.00 order-Nr.: 835361610600</p>
			<p><b>Pneumatic Valve</b> for swarf blow-out ( with connection cable )</p>  <p>Type: 2/2 way Valve type: Bräuer order-Nr.: 87100000000500</p>	<p><b>Vertical angle</b> for vertical set-up variant V2</p>  <p>color: black order-Nr.: 89040000010012</p>

Power DATA / Connected Loads				
Operating voltage	3 ~ 400 V	3 ~ 415 V	3 ~ 460 V	3 ~ 480 V
Frequency	50 Hz	50 Hz	60 Hz	60 Hz
Rated Current	2,0 A	1,95 A	1,74 A	1,68 A
Output	0,7 kW - S3 - 5%			
Tip Dresser revolutions ( load free )	301 rpm	301 rpm	362 rpm	362 rpm
cos phi	0,82			
Control voltage	24 V DC			
Compressed air input	4 - 6 bar (oil free)			
Air consumption during swarf blow-out	ca.: 400 l/min			
Energy consumption tip dresser	ca.: 0,3 Wh (load=1,5 kN / milling duration t = 1,5 seconds)			

Milling Parameter ( guiding values )		LC- parameter
Min. Electrode power	1,0 kN	1,6 kN
recommended electrode power	1,2 kN ( max. 1,5 kN )	1,8 kN (max. 2 kN)
Milling duration start dressing	2 * 1,5 sec.	2 x 1,5 Seconds
Milling duration normal dressing	0,8 - 1,5 sec	2-4 Seconds

Supplies Options	Besonderheiten	DRIVE VARIANTS	Revolutions
specially Color <input type="checkbox"/> O.-Nr. specially Valve <input type="checkbox"/> O.-Nr. screw f. LC-UNI-Head <input type="checkbox"/> O.-Nr. 310000030085 Sensor-unit kpl. <input type="checkbox"/> O.-Nr. 8605106 welding current sensor <input type="checkbox"/> O.-Nr. 8605500 optical sensor <input type="checkbox"/> O.-Nr. 8053600001006 welding -force sensor <input type="checkbox"/> O.-Nr. 8605501	 	Variant C Variant F	386/301 rpm 720/563 rpm



**TIP dresser complete unit**  
Stand 700 mm and E-box,  
without Milling Head

Type: abe 3600.037.15A  
order-Nr.: F-3600.037.15A

**Milling base unit**  
gear with height equalization  
and drive  
without milling head

Type: abe 3600.K001.0000A  
order-Nr.: 8160010000A

**Milling head with  
Cutter Blade**  
single-cutter system

Type: 2716.106.00  
order-Nr.: 830271610600

**Milling head with  
Cutter Blade(s)**  
double-cutter system

Type: 4716.106.00  
order-Nr.: 830471610600

**Milling head with cutter  
AIR-LESS-Milling System**  
single-cutter system

Type: 1416.106.00  
order-Nr.: 830141610600

**LC-Head  
Lap-Cut-System  
(EURO-patent protected !)**

Type: 3616.106.00  
order-Nr.: 835361610600

**Electric**  
switch box with connection  
cable for drive and proximity  
switch cable for tip dresser

Type: NSB-3000-038.3  
order-Nr.: 8653383

**engine start module:**  
order-Nr.: 86090000000700  
( 400 V ; 2MB RAM )

**Stand**

Type: (Standart; RAL 9002)  
**height 700 mm**  
order-Nr.: 89040590101200

**height adjustable  
700 - 1000 mm**  
order-Nr.: 89040590000700

**Pneumatic Valve**  
for swarf blow-out  
( with connection cable )

Type: 2/2 Valve Bräuer  
orderl-Nr.: 87100000000500

**Vertical angle**  
for vertical set-up variant V2

color: black  
order-Nr.: 89040000010012

Power DATA / Connected Loads				
Operating voltage	3 ~ 400 V	3 ~ 415 V	3 ~ 460 V	3 ~ 480 V
Frequency	50 Hz	50 Hz	60 Hz	60 Hz
Rated Current	2,0 A	1,95 A	1,74 A	1,68 A
Output	0,7 kW - S3 - 5%			
Tip Dresser revolutions ( load free )	301 rpm	301 rpm	362 rpm	362 rpm
cos phi	0,82			
Control voltage	24 V DC			
Compressed air input	4 - 6 bar (oil free)			
Air consumption during swarf blow-out	ca.: 400 l/min			
Energy consumption tip dresser	ca.: 0,3 Wh (load=1,5 kN / milling duration t = 1,5 seconds)			

Milling Parameter ( guiding values )		LC- parameter
Min. Electrode power	1,0 kN	1,6 kN
recommended electrode power	1,2 kN ( max. 1,5 kN )	1,8 kN (max. 2 kN)
Milling duration start dressing	2 * 1,5 sec.	2 x 1,5 Seconds
Milling duration normal dressing	0,8 - 1,5 sec	2-4 Seconds

Supplies Options	Besonderheiten
specially Color <input type="checkbox"/> O.-Nr. specially Valve <input type="checkbox"/> O.-Nr. screw f. LC-UNI-Head <input type="checkbox"/> O.-Nr. 310000030085 Sensor-unit kpl. <input type="checkbox"/> O.-Nr. 8605106 welding current sensor <input type="checkbox"/> O.-Nr. 8605500 optical sensor <input type="checkbox"/> O.-Nr. 8053600001006 welding -force sensor <input type="checkbox"/> O.-Nr. 8605501	

DRIVE VARIANTS	Revolutions
Variant A	386/301 rpm
Variant C	386/301 rpm

# Double head tip dresser system abe3610...



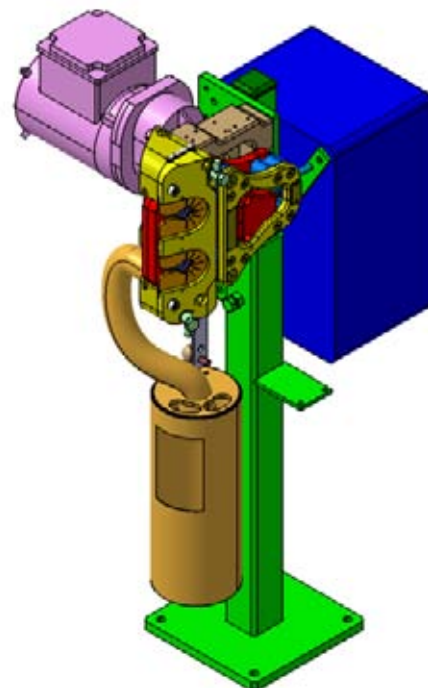
**Application:**

Stationary tip dressers are used for the mechanical dressing of spot welding electrodes. The tip dresser is attached to the stand of the robot weld gun on an infinitely height-adjustable stand. Different milling heads can be used with the machine, so every rotationally symmetrical cap form can be dressed.

**Milling procedure:**

The weld gun that is attached to the robot arm is moved to the tip dresser to restore the required cap form and geometry. After the electrodes are positioned near the milling head, the weld gun closes and the electrode caps are moved into the milling head and can be dressed.

Afterwards, the second milling head can be used to mill a cap pair of another gun.



**Milling parameter:**

Minimum electrode force:	1,0 kN
Recommended electrode force	1,2 kN
Milling time (initially):	2 x 1,5 s
Milling time (normal):	0,8 – 1,5 s

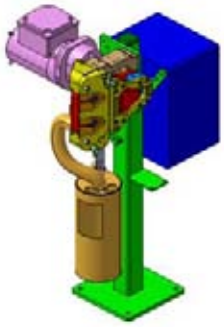










**Electrical data:**

Rated voltage (V):	3 ~ 400	3 ~ 415	3 ~ 460	3 ~ 480
Frequency (Hz):	50	50	60	60
Rated current (A):	1,92	2,0	1,75	1,85
Output:	0,7 kW – S3 – 5%			
	390	390	465	465
Tip dresser speed, unloaded (RPM):	301	301	362	362
cos phi:	0,82	0,82	0,82	0,82
Motor speed n2 (RPM):				
Control voltage:	24 V DC			
Compressed air supply:	6 – 12 bar (oil-free)			

**Information on milling parameters:**


The electrode forces and especially the milling times depend on the form (geometry) and material of the electrode caps or welding spot electrodes. Other influencing variables include the geometry of the cap to be milled (the slope of its flank and the forepart diameter), the time to build up pressure in the cylinder of the gun and the number of weldings between welding cycles (enlargement of forepart diameter, dirt accumulation and application of the caps). The above-mentioned milling parameters are standard values, the optimum values for the particular milling job have to be determined by optimising the machine.



<p><b>TIP dresser complete unit</b> Stand and E-box, without Milling Head</p>  <p>Type: abe 3610.037.00A order-Nr.: F-3610.037.00A <input type="checkbox"/></p>	<p><b>Milling base unit</b> gear with height equalization and drive without milling head</p>  <p>Type: abe 3610.K005.0000A order-Nr.: 81610050000A <input type="checkbox"/></p>	<p><b>Swarf lead system</b></p>  <p>Type: SAS-3610-13 order-Nr.: 850.3610.13 <input type="checkbox"/></p>	<p><b>Milling head with Cutter Blade(s)</b> double-cutter system</p>  <p>Type: 4716.106.00 order-Nr. 830471610600 <input type="checkbox"/></p>	<p><b>Milling head with cutter AIR-LESS-Milling System</b> single-cutter system</p>  <p>Type: 1416.106.00 order-Nr.: 830141610600 <input type="checkbox"/></p>	<p><b>LC-Head Lap-Cut-System</b> (EURO-patent protected !)</p>  <p>Type: 3616.106.00 order-Nr.: 835361610600 <input type="checkbox"/></p>
<p><b>TIP dresser f. swing in unit</b> gear with height equalisation drive, pneumatic swarf lead system without Milling head</p>  <p>Type: abe 3610.037.11A order-Nr.: F-3610.037.11A <input type="checkbox"/></p>	<p><b>Electric</b> switch box with connection cable for drive and proximity switch cable for tip dresser</p>  <p>Type: NSB-3000-038.3 order-Nr.: 8653383 <input type="checkbox"/></p> <p><b>engine start module:</b> order-Nr.: 86090000000700 ( 400 V ; 2MB RAM ) <input type="checkbox"/></p>	<p><b>Stand</b></p>  <p>Type: (Standart; RAL 9002) <b>height 700 mm</b> order-Nr.: 89040590101200 <input type="checkbox"/></p> <p><b>height adjustable 700 - 1000 mm</b> order-Nr.: 89040590000700 <input type="checkbox"/></p>	<p><b>Pneumatic Valve</b> for swarf blow-out ( with connection cable )</p>  <p>Type: 2/2 Valve Bräuer order-Nr.: 87100000000500 <input type="checkbox"/></p>	<p><b>Vertical angle</b> for vertical set-up variant V2</p>  <p>color: black order-Nr.: 89040000010012 <input type="checkbox"/></p>	

Power DATA / Connected Loads				
Operating voltage	3 ~ 400 V	3 ~ 415 V	3 ~ 460 V	3 ~ 480 V
Frequency	50 Hz	50 Hz	60 Hz	60 Hz
Rated Current	2,0 A	1,95 A	1,74 A	1,68 A
Output	0,7 kW - S3 - 5%			
Tip Dresser revolutions ( load free )	301 rpm	301 rpm	362 rpm	362 rpm
cos phi	0,82			
Control voltage	24 V DC			
Compressed air input	4 - 6 bar (oil free)			
Air consumption during swarf blow-out	ca.: 400 l/min			
Energy consumption tip dresser	ca.: 0,3 Wh (load=1,5 kN / milling duration t = 1,5 seconds)			

Milling Parameter ( guiding values )		LC-parameter
Min. Electrode power	1,0 kN	1,6 kN
recommended electrode power	1,2 kN ( max. 1,5 kN )	1,8 kN (max. 2 kN)
Milling duration start dressing	2 * 1,5 sec.	2 x 1,5 Seconds
Milling duration normal dressing	0,8 - 1,5 sec	2-4 Seconds

Supplies Options	Besonderheiten
<p>specialy Color <input type="checkbox"/> O.-Nr.</p> <p>specialy Valve <input type="checkbox"/> O.-Nr.</p> <p>screw f. LC-UNI-Head <input type="checkbox"/> O.-Nr. 310000030085</p> <p>Sensor-unit kpl. <input type="checkbox"/> O.-Nr. 8605106</p> <p>welding current sensor <input type="checkbox"/> O.-Nr. 8605500</p> <p>optical sensor <input type="checkbox"/> O.-Nr. 8053600001006</p> <p>welding -force sensor <input type="checkbox"/> O.-Nr. 8605501</p>	

DRIVE VARIANTS	Revolutions
Variant A	386/301 rpm
Variant C	386/301 rpm





# Hand-operated electrode cap milling system abe2400... with pneumatic drive

### Application/use:

The hand-operated electrode cap milling cutter was developed especially for the mechanical finishing of electrode caps in hand-held transformer welding guns and cable welding guns.

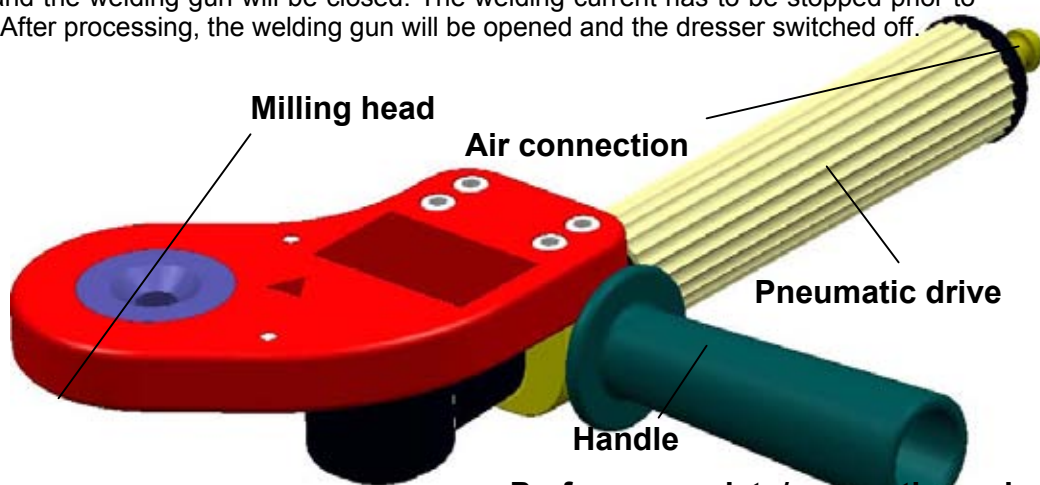
An interchangeable milling head allows you to process rotationally symmetrical electrode caps with different diameters and geometries simultaneously and on both sides.

### Requirements:

- disconnect welding current on welding gun before milling
- welding gun power has to be reducible (see milling parameters)
- recommended number of persons for milling procedure: 2 (1 person for welding gun / 1 person for tip dresser)

### Milling process:

For the milling process, the tip dresser will be adjusted manually to the locked electrode cap. Subsequently, the tip dresser will be started manually (by actuating the hand lever valve) and the welding gun will be closed. The welding current has to be stopped prior to milling. After processing, the welding gun will be opened and the dresser switched off.



### Milling parameters (guidelines):

Maximum electrode force:	1.1 – 1.4 kN
Milling time - initial milling:	3 x 5 s
Milling time – normal milling:	1.5-3 s

### Performance data/connection values:

Torque measurement (Nm):	60 / 90
Speed (RPM):	2120 / 170
Operating pressure (bar):	5.5 – 6.3
Compressed air consumption (l/min):	150 / 190
Weight (kg):	2.3
Air connection:	Plug nipple 1/4"

### Notes about milling parameters:

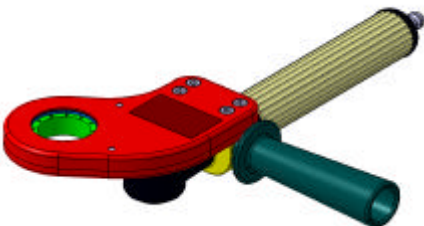
The electrode forces and the milling times in particular are heavily dependent on the shape (geometry) and the material of the electrode caps or spot welding electrodes. Other influencing variables include the geometry to be milled on the cap (steepness of the side and face-to-surface diameter), the pressure build-up time in the gripper cylinder, and of course the number of welds between milling cycles (expansion of face-to-surface diameter, dirt and alloys on the caps). Therefore, the above milling parameters are guidelines; the best values for each milling task can be determined and adjusted by optimising the system.

<b>Sales:</b>	
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# HAND - OPERATED TIP DRESSER abe 2400.000.10



**Tip Dresser**  
without Milling Head




Type: abe 2400.000.10  
Order-Nr.: F-2400.000.10

**Stand ; height adjustable**  
615 - 1000 mm




Typ: (Standart; RAL 9002)  
Bestell-Nr.: 89040590000800

**Milling Head with Cutterblade**  
single-cutter system



Type: 8616.106.20  
Order-Nr.: 830861610620

**Pneumatic Drive**



Type: abe 2400.K001  
Order-Nr.: 87024000001005

**Milling Head with Cutter**  
AER-LESS-Cuttersystem



Type: 1116.106.00  
Order-Nr.: 830111610600

**Milling Base Unit**



Type: abe 2400.K001  
Order-Nr.: 824001

**Guidance**



Order-Nr.: 83024000001009


**Handle**



Order-Nr.: 80524000001007

Power Data / Connected Loads	
weight	2,5 kg
torque	90 Nm
air pressure	5,5 - 6,3 bar (1/4")
air consumption	ca.: 400 l/min
noise emission value	73 dB ( A )

Milling Parameter ( Guiding values )	
Min. Elektrode force	1,0 kN
recommended elctrode force	1,2 kN
Cutt Time	5-10 sec.

Supplies / Options	
spezially Color	<input type="checkbox"/> B.-Nr.
spezially valve	<input type="checkbox"/> B.-Nr.
screw for Milling Head	<input type="checkbox"/> B.-Nr. 310000030085 
	<input type="checkbox"/> B.-Nr.
	<input type="checkbox"/> B.-Nr.
	<input type="checkbox"/> B.-Nr.

Drive Variants	Revolutions
Variante A	170 rpm

Schweißtechnik Bräuer GmbH  
 Gewerbestraße 4  
 D 09488 Thermalbad Wiesenbad, OT Schönfeld  
 Phone: +49 (0) 3733 560-110  
 Fax: +49 (0) 3733 560-111  
 URL: www.schweisstechnik-sb.de



# Übersicht: Nummerierungssystem Fräsköpfe

## Chart: numbering system for milling heads

Beispiel: Fräskopf 2616.106.00  
 Example: milling head 2616.106.00

**Übersicht: Nummerierungssystem Fräsköpfe**  
**Chart: number-system milling heads**

No.: 26 16 .106 .00

**Schaltfahne zur Drehzahlüberwachung / Switching flag for number of revolutions monitoring**

0	1	2	3
ohne Schaltfahne without switching flag	1 x Schaltfahne oben 1 x Switching flag on the top	2 x Schaltfahne oben 2 x Switching flag on the top	1 x Schaltfahne unten 1 x Switching flag on the bottom

**Integrierte Führung der Elektrodenkappen / Integrated guidance of the electrode caps**

0	1	2	3
ohne Führung without guidance	Führung oben guidance on the top	Führung unten guidance on the bottom	Führung beidseitig guidance double-sided

**Fortlaufende Nummer / consecutive number**

**Elektrodenkappendurchmesser / Electrode cap diameter**

10	13	14	16	20
für KappenØ 10mm for caps diameter 10mm	für KappenØ 13mm for caps diameter 13mm	für KappenØ 14mm for caps diameter 14mm	für KappenØ 16mm for caps diameter 16mm	für KappenØ 20mm for caps diameter 20mm

**Fräskopfgrundkörper / milling head bases**

<b>11</b>  für abs32405 for abs2400 Schraubfräskopf AAA System Schraub-Schneidplatte / Bräuer-Flansch (Ø45 mm) Screw milling head AAA system / screw-cutter blade Bräuer-Flange (Ø45 mm)	<b>12</b>  Schraubfräskopf AAA System Schraub-Schneidplatte / Bräuer-Flansch (Ø45 mm) Screw milling head AAA system / screw-cutter blade Bräuer-Flange (Ø45 mm)	<b>13</b>  Sonderfräskopf für Spezial- zahnrad / Schraub-Schneidplatte / Special milling head for special watch gear / screw-cutter blade	<b>14</b>  Bajonettfräskopf AAA Syst. / Schraub-Schneidplatte / Bräuer-Flansch (Ø45 mm) Quick lock milling head AAA system / screw-cutter blade Bräuer-Flange (Ø45 mm)	<b>15</b>  Sonderfräskopf mit Bajonett / Schraub-Schneidplatte / Bräuer-Flansch (Ø45 mm) Special quick lock milling head / screw-cutter blade / Bräuer-Flange (Ø45 mm)	<b>17</b>  Sonder-Bajonettfräskopf / Schraub-Schneidplatte / Sonder-Flansch (Ø60 mm) Special quick lock milling head / screw-cutter blade / special-Flange (Ø60 mm)	<b>21</b>  Schraubfräskopf / Schraub- Schneidplatte / Bräuer- Flansch (Ø45 mm) Screw milling head / screw- cutter blade / Bräuer-Flange (Ø45 mm)
<b>23</b>  Zahnrad-Sonderfräskopf / Schraub-Schneidplatte / Gear wheel special milling head / screw-cutter blade	<b>24</b>  Bajonettfräskopf / Schraub- Schneidplatte / Bräuer- Flansch (Ø45 mm) Quick lock milling head / screw-cutter blade / Bräuer-Flange (Ø45 mm)	<b>25</b>  Schraubfräskopf / Schraub- Schneidplatte / Sonder- Flansch (Ø50 mm) Screw milling head / screw- cutter blade / special-Flange (Ø50 mm)	<b>26</b>  Schraubfräskopf / Klemm- Schneidplatte / Bräuer- Flansch (Ø45 mm) Screw milling head / clamp- cutter blade / Bräuer-Flange (Ø45 mm)	<b>27</b>  Bajonettfräskopf / Klemm- Schneidplatte / Bräuer- Flansch (Ø45 mm) Quick lock milling head / clamp-cutter blade / Bräuer-Flange (Ø45 mm)	<b>28</b>  Schraubfräskopf / Klemm- Schneidplatte / Sonder- Flansch (Ø60 mm) Screw milling head / clamp- cutter blade / special-Flange (Ø60 mm)	<b>29</b>  Bajonettfräskopf / Klemm- Schneidplatte / Sonder- Flansch (Ø60 mm) Quick lock milling head / clamp-cutter blade / special-Flange (Ø60 mm)
<b>36</b>  LC-System Bräuer-Flansch (Ø45 mm)	<b>40</b>  Sonderfräskopf / Klemm- Schneidplatte / Sonder-Flansch Special milling head / clamp- cutter blade / special-Flange	<b>43</b>  Sonderfräskopf / Klemm- Schneidplatten (2x) / Sonder- Flansch (Ø38x36 mm) Special milling head / clamp- cutter blades (2x) / special- Flange (Ø38x36 mm)	<b>46</b>  Schraubfräskopf / Klemm- Schneidplatten (2x) / Bräuer-Flansch (Ø45 mm) Screw milling head / clamp-cutter blades (2x) / Bräuer-Flange (Ø45 mm)	<b>47</b>  Bajonettfräskopf / Klemm-Schneidplatten (2x) / Bräuer-Flansch (Ø45mm) Quick lock milling head / clamp-cutter blades (2x) / Bräuer-Flange (Ø45 mm)	<b>49</b>  Bajonettfräskopf / Klemm-Schneidplatten (2x) / Sonder-Flansch (Ø60 mm) Quick lock milling head / clamp-cutter blades (2x) / special-Flange (Ø60 mm)	<b>50</b>  Sonderfräsköpfe Special milling heads
<b>56</b>  Sonder-Schraubfräskopf / Klemm-Schneidplatte / Sonder-Flansch (Ø50 mm) Special screw milling head / clamp-cutter blade / special-Flange (Ø50 mm)	<b>57</b>  Sonder-Bajonettfräskopf / Klemm-Schneidplatte / Sonder-Flansch (Ø50 mm) Special quick lock milling head / clamp-cutter blade / special-Flange (Ø50 mm)	<b>58</b>  Sonder-Bajonettfräskopf / Klemm-Schneidplatten (2x) / Sonder-Flansch (Ø60 mm) Special quick lock milling head / clamp-cutter blades (2x) / special-Flange (Ø60 mm)	<b>82</b>  Sonderfräskopf / minisystem / Klemmschneidplatte / Sonderflansch Special milling head for small milling forms / clamp-cutter blade / special-Flange	<b>86</b>  für abs3490 for abs3400 Schraubfräskopf / Klemm- Schneidplatte / Bräuer- Flansch (Ø45 mm) Screw milling head / clamp- cutter blade / Bräuer-Flange (Ø45 mm)		

Stand: 07/2006

# Datenblatt zur Fräskopfauswahl

## DATA SHEET for Milling Head Selection

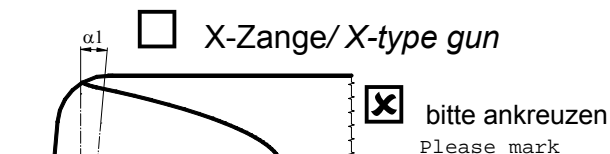
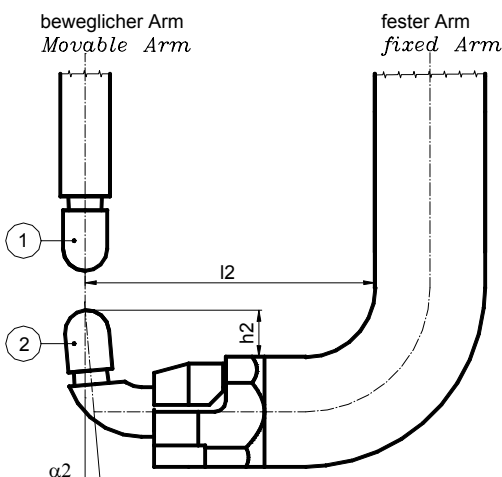


● **Informationen zur Schweißzange und zu den Originalkappen**

● Information about weld gun and original caps

C-Zange/ C-type gun

X-Zange/ X-type gun



Nr.: /No.:

fester Arm / fixed arm

beweglicher Arm / movable arm

oberer Arm / upper arm (\*)

unterer Arm / lower arm (\*)

①

②









Oberer/unterer Elektrodenarm nicht wie auf Zeichnung, sondern in Bezug auf Kappenfräser.

Hinweis: Es ist immer vorteilhafter, wenn der bewegliche Arm von oben in den Fräser einfährt und den Fräser beim Schließen der Zange auf den unteren Arm drückt

Lower/upper electrode arm not as in drawing, but with respect to the tip dresser.

Please note: It is always advantageous if the movable arm drives into the tip dresser from above, so the tip dresser is being pushed onto the lower arm when the gun closes.

Maß / Measure h1

Kappe / Cap 1 (\*\*)

Maß / Measure h2

Kappe / Cap 2 (\*\*)

(\*\*) Angaben zur DIN /ISO-Form / Größe, nach Werksnorm, oder nach Zeichnung usw.

Maß / Measure l2

(\*\*) Details about DIN / ISO shape/size according to customer specification, or drawing, etc.

Winkel / Angle ;1

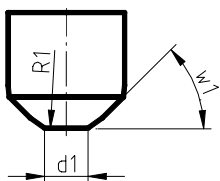
Winkel / Angle ;2

Minimale Zangenöffnung (Arbeitshub)

Minimum gun opening (working stroke)

● **Informationen zum gewünschten Fräsbild**

● Information about the requested dressing quality

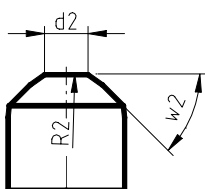


obere Kappe / upper cap

LinsenØ / Lens diameter d1

Radius des LinsenØ / Radius of lens diameter R1

Flankenwinkel / Flank angle w1



untere Kappe / lower cap

LinsenØ / Lens diameter d2

Radius des LinsenØ / Radius of lens diameter R2

Flankenwinkel / Flank angle w2