

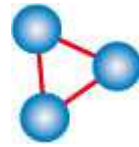
The ELMATECH UP-power sources have basically the following advantages:



- Considerably higher control frequency with a range from 300Hz to 5 kHz, compared to common power sources
- Digitally, selectable process parameters regarding dynamic and choke effect during the process phases (ignition, welding)
- Digital selection of the power source Characteristic CC or CV (constant current and constant voltage)
- Unlimited automation features regarding communication with an industrial PLC (programmable logic control)
- High degree of efficiency > 90% and with it up to **30 % lower energy** consumption compared to common Power sources
- Excellent welding characteristics, at MAG operation and UP operation
- Due to the modular construction of the Cabinet, a small floor space is required. Footprint for 1500 A: 600 x 800x 2000 mm (D x W x H)
- Flexible capacities (1000 A, 1500 A, 3000 A)
- Ripple at UP – operation (Constant current < 0,1 %)

Technology:

Air-cooled, secondary clocked power source in modular construction with an output frequency of 80 kHz (see attachment)



ELMATECH VARIO UG 1500

Load circuit connection

Continuously variable regulation:	from 50 A to 1500 A at 20 V to 44 V
Continuous load (100% duty cycle):	1500 A / 44 V
Open circuit voltage:	approx. 95 V
Branch line, per connection:	3 x 120 mm ² Cu

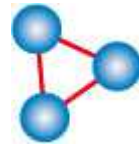
Three-phase mains connection

Line voltage:	3 x 500 V 50 Hz
Continuous output:	83 kVA
Continuous current:	102 A
Power factor cos.phi.:	0,95
Mains fuse (delay-fuse):	120 A
Power efficiency:	>90 %
Mains cable cross section:	4 x 50 mm ² Cu
Dimensions (without eyebolts):	(H x W x D) 2000 x 800 x 600
Weight:	approx. 580 kg
Cooling air requirements:	approx. 1m ³ / sec.
Protection classification:	IP 20
Type of cooling:	AF
Insulation class:	F

Information on the acoustic emission level

The welding current source produces a sound level of < 65 dB (A), if idle and off < 65 dB (A) at the maximum admissible operating point during standard load in accordance with VDE 0544-1 and EN 60974-1, respectively. The sound label is measured in accordance with DIN 45635. The sound level is measured in a distance of 1 m from the welding current source.

A workplace-related sound level during operation could not be specified, as it is influenced by the type of the process and the surroundings. It mostly depends on a multitude of parameters, such as machines in the vicinity, peripherals units, weld head, etc.



ELMATECH VARIO TS UG 3000

Load circuit connection

Continuously variable regulation:	from 50 A to 3000 A at 20 V to 44 V
Continuous load (100% duty cycle):	3000 A / 44 V
Open circuit voltage:	approx. 95 V
Branch line section, per connection:	3 x 120 mm ² Cu

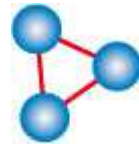
Three-phase mains connection 2x

Line voltage:	3 x 500 V 50 Hz
Continuous output:	83 kVA
Continuous current:	102 A
Power factor cos.phi.:	0,95
Mains fuse (delay type):	120 A
Power efficiency:	>90 %
Mains cable cross-section:	4 x 50 mm ² Cu
Dimensions (without eyebolts):	(H x W x D) 2000 x 800 x 600
Weight:	approx. 580 kg
Cooling air requirements:	approx. 1m ³ / sec.
Protection classification:	IP 20
Type of cooling:	AF
Insulation class:	F

Information on the acoustic emission level

The welding current source produces a sound level of < 65 dB (A), if idle and off < 65 dB (A) at the maximum admissible operating point during standard load in accordance with VDE 0544-1 and EN 60974-1, respectively. The sound label is measured in accordance with DIN 45635. The sound level is measured in a distance of 1 m from the welding current source.

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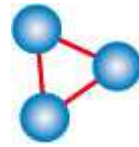
AC-Source



- Considerably higher control frequency with a range from 300Hz to 5 kHz, compared to the common power sources
- Digitally selectable process parameters regarding dynamic and choke effect during the process phases (ignition, welding)
- Digital selection of the power source Characteristic CC or CV (constant current and constant voltage)
- Unlimited automation features regarding communication with an industrial PLC (programmable logic control)
- High degree of efficiency > 90% and with it up to **30 % lower energy** consumption compared to common power sources
- Free selection of the current wave form, AC-Sinus, AC-Square. Digital selection of the AC-Balance, temporally as well as current value in the polarity switch
- Due to the modular construction of the Cabinet, a small floor space is required. Footprint for 1200 A: 600 x 800x 2000 mm (D x W x H)
- Flexible capacities (1200 A, ...)
- Ripple at UP – operation (Constant current < 0,1 %)

Technology:

Air-cooled, secondary clocked power source
 In modular construction with an output frequency of 80 kHz (see attachment)



ELMATECH VARIO TS UG AC 1200

Load circuit connection

Continuously variable regulation:	from 50 A to 1200 A At 20 V to 44 V
Continuous load (100% duty cycle):	1200 A / 44 V
Open circuit voltage:	approx. 85 V
Branch line, per connection:	3 x 120 mm ² Cu

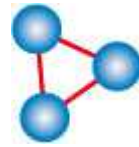
Three-phase mains connection

Line voltage:	3 x 500 V 50/60 Hz
Continuous output:	66 kVA
Continuous current:	76 A
Power factor cos.phi.:	0,9
Mains fuse (delay-fuse):	80 A
Power efficiency:	>90 %
Mains cable cross section:	4 x 50 mm ² Cu
Dimensions (without eyebolts):	(H x W x D) 2000 x 800 x 600
Weight:	approx. 580 kg
Cooling air requirements:	approx. 1m ³ / sec.
Protection classification:	IP 20
Type of cooling:	AF
Insulation class:	F

Information on the acoustic emission level

The welding current source produces a sound level of < 65 dB (A), if idle and off < 65 dB (A) at the maximum admissible operating point during standard load in accordance with VDE 0544-1 and EN 60974-1, respectively. The sound label is measured in accordance with DIN 45635. The sound level is measured in a distance of 1 m from the welding current source.

A workplace-related sound level during operation could not be specified, as it is influenced by the type of the process and the surroundings. It mostly depends on a multitude of parameters, such as machines in the vicinity, peripherals units, weld head, etc.



General Information:

With the possibilities of the Virtual Machine and due to the access to the static and dynamic characteristic of the power sources, a higher weld speed with much better seam quality can be effectuated.

Thanks to secondary clocked power section technology and identical construction, independent on mains- line voltages, a world wide use is possible. The handling with all Bus and communication tools for customer specific implementation is possible.

With the Ethernet interface the operation of all functions can be integrated via ELMA-Explorer into the visual processor. This means access to all process parameters from every computer with internet connection and active process development thanks to the Virtual Machine for AC as well as DC range on base of physical, digital adjustable values.

- 30% less energy consumption at the same output power rating compared to conventional PS.
- Constant current and voltage control in each power source
- User-defined current wave linearity as well as phase synchronisation in the angle of 0-180° at the AC Power- Sources
- Up- and down turns at the mains- line voltage have no influence on the electric arc process

General construction:

Machine control „Virtual Machine“



Control

Communication:

- Display control
- Ethernet interface
- Ethercat, Profibus, Interbus, Device net etc.



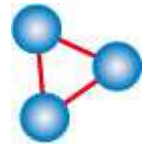
Secondary circuit

- modular power sections with own current sensor each
- independent from mains- voltage at identic construction



Primary circuit

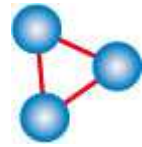
- Rugged mains transformer construed on self-cooling
- High performance silicium rectifier for the supply of the open circuit voltage



Process-computer-system VM2

- Rotation cycle 50µs (20kHz)
- Uninterruptible working Virtual Machine control unit
- Physical orientated high language with a least possible instruction code
- Program-Syntax and data base programming via excel file
- High protection of technology via specific compiler
- Segment- and Disc-structure for fast technology-adaption
- Data base orientation of all process parameters
- Cyclic working E/A-handler, complete E/A-field with each rotation
- Debugger for actual field, (easy control and troubleshooting)
- Workstation on base of an industrial-PC
- PC-Interface
- USB- and Ethernet Interface
- Demountable operation unit
- Conception and construction is in-house development, irreproducible
- Hardware-adjustment by cooperation partners





Static-dynamic

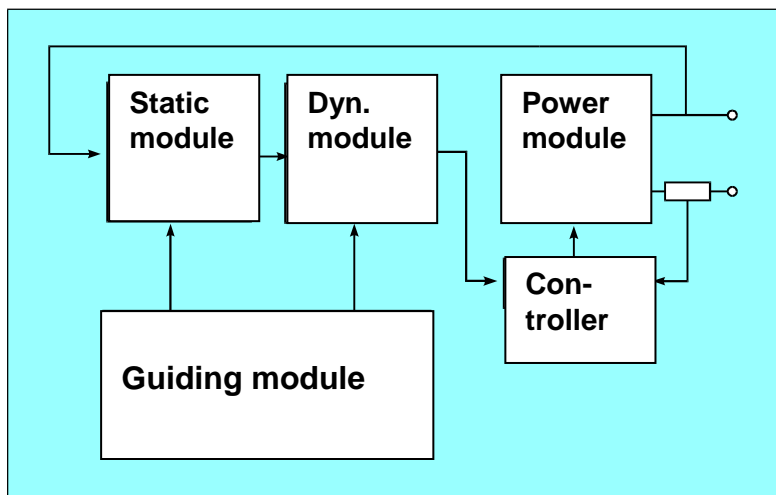
Principle:

- Control module to produce synthetic generator characteristics
- Static module to produce any internal resistance (static slope)
- Control module to produce any impedance
- Differentiable impedance effect for current upslope and current down slope
- Internal resistance and impedance are shown free of losses

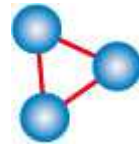
Practical consequence:

The power source can be adjusted optimally in its dynamic (impedance) and static (transformer coupling, internal resistant) characteristics to the respective process conditions (welding speed, material, gas, etc.) This results to higher welding speeds with a stable process and reduced spraying-formation.

By the sequential access on these characteristics the ignition process and the end seam could be optimised perfectly.

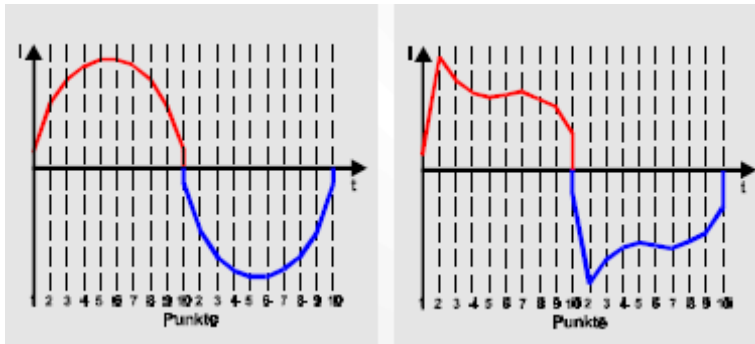


Principle of the control of a full electronic welding power sources, Patent DE 3200086 (Puschner, P., 5.1.1982)



UP-AC-Technology

- Synthesized static and dynamic characteristic
 - Loss-free illustration of internal resistance and inductance
 - High frequency-free re-ignition after zero-point
 - Physical variable adjustable wave form (Sinus to rectangle)
 - Voltage feedback of the contact point - Wire / contact tube -
 - Differentiate generator characteristic ignition / operation / end crater
 - Adjustable AC-frequency, balance of the amplitude and the time
 - Due to the possibility of the wave modulation there is the chance to modulate the zero point in current slope respectively current (plasma pressure)
- This enables the optimisation of the welding process and **seam geometry**.

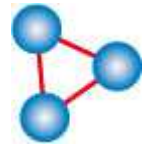


Modulated Sinus with modified user-defined wave-modulation adjustable zero point
Respectively 10 point each half-wave are free programmable.

- Variable selection of the AC frequency
- Synchronisation of the AC power sources from 0-180° phase angle adjustable by one grade steps instead of fixed 90 or 120° like at conventional power sources
- Secondary clocked, fast reacting, electronic power sources

UP-DC-Technology

- Synthesized static and dynamic characteristic
- Loss-free illustration of internal resistance and inductance
- Differentiate generator characteristic ignition / operation / end crater
- Voltage feedback of the contact point - Wire / contact tube -
- User-defined adjustment of the static characteristic of the power- source
- User-defined adjustment of the dynamic characteristic of the power- source
- Secondary clocked, fast reacting, electronic power source technology

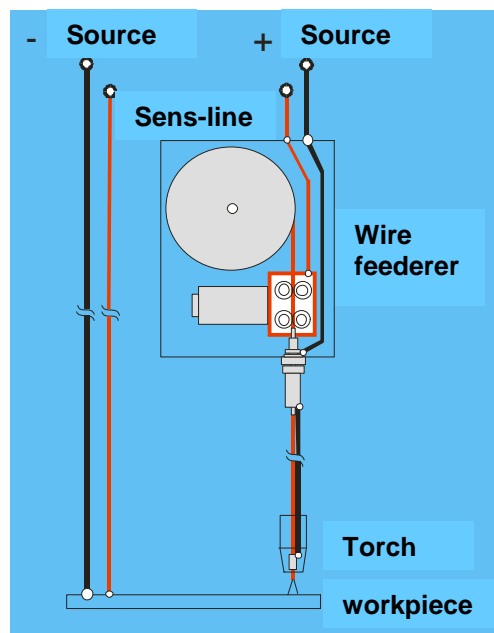


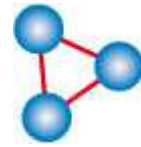
Sense-Line (DC and AC operation)

- Technology for handling the process-voltage during electric arc processes.
- Technical measurement registration of the wire voltage in the contact tube
- Advancement of the process stability by switching-off of the transfer resistance.

Practical consequences

By the registration of the voltage during the process, the intervention gets clearly precise.
Connection lines and transfer resistances are gate out.
With unaltered access to the processes, the electric arc becomes more constant and calm.





Concept

Welding process:

The complete welding process is regulated by the power source, additional controllers are not necessary. Due to the physical parameter data base, technical and reproducible know how is build.

Operation / remote diagnostics:

The data saving and operation of the power- sources is realised by Ethernet and a special control software on the workstation (PC).

The Customer has the possibility to access the power sources via internet from any computer all over the world.

Process signals:

The communication exchange main computer / power source could be connected via, e.g. Ethercat, ProfiBus, ProfNet with reduced transmission errors.

Energy consumption:

- Considerably less necessary connecting complexity (mains) at the AC power source (80 A fuse, instead of 160 A due to 30% less input power compared to conventional power sources).
- Beyond that, considerably less line perturbation by constant current input of all 3 phases and integrated condenser-buffer.
- Considerably less necessary connecting complexity (mains) at the DC power source (125 A fuse, instead of 200 A, thanks to 30% less input power consumption, compared to conventional power sources).

This means considerably cost savings from the installation to the operation of the power-sources.

Comparison technical data DC-Source Mains supply

Rectifier 1500A	Elmatech UG1500	Old technology
Line voltage	3x500V	3x500V
System load	83kVA	125kVA
Power input continuous current	102A	144A
Mains connection lead	4x50mm ²	4x95mm ²
Fuse	120A	160A
Power output	1500A/44V	1500A/44V

Comparison technical data AC-Source Mains supply

AC Power source 1200A	Elmatech UG AC 1200	Old technology
System load	3 Phases	2 Phases!
Line voltage	3x500V	3x500V
Power input continuous current	76A	196A
Mains connection lead	4x50mm ²	3x120mm ²
Fuse	80A	200A
Power output	1200A/44V	1200A/44V