

## SilverSPATZM600LL/M600LW Medium Frequency Inverter Power Source

The *SilverSPATZM600LL/M600LW* weld timer and 1,000 Hz MFDC inverter is specially designed for applications in the automotive industry by reducing its capabilities to the basic needs. In combination with an external MFDC transformer it is a cost efficient power supply for resistance welding for a welding current range of 3 kA to 30 kA. The *SilverSPATZM600LL/M600LW* weld timer and middle frequency inverter is housed in a compact IP20-protected housing for switch cabinet mounting.

Each welding operation is feedback controlled during the weld procedure. The control process has short reaction time, which is based on the 1 kHz inverter frequency. Actual values are compared with target values every 0.5 ms. The output power is adapted during the welding process if targets are not being met.

Constant current control (CCC), constant power control (CPC), constant voltage control (CVC), constant trigger angle Control (CTC) and the **adaptive MASTER** control process can all be used.

During each weld cycle the controller checks whether all of the welding parameters are within the defined limits. Using the **MASTER** control mode there is only one reference weld schedule for each sheet combination necessary. In total up to 63 reference weld schedules can be stored. If the spot number related weld schedule selection is activated and the timer is running in **MASTER** control mode then for each individual weld spot number a fine adjustment can be done.

As a standard the *SilverSPATZ* equipment includes signal inputs for welding current and electrode voltage and one proportional valve output. The internal welding data recorder keeps details of the last 10,000 welding passes. For each of weld it records details of the welding parameters, such as



### Technical Data

Welding spot selection	32 Bit
No. of programs	63
Welding impulses / program	16
Control modes	<b>MASTER</b> , CCC, CPC, CVC
Weld parameter monitoring	yes
Stepper function	for CCC, CPC, CVC
Force schedule	yes
Slope up / slope down	yes
Signal inputs	current, voltage
Sensor monitoring	yes
1 x Output for proportional valve	0 - 10 V DC or 4 - 20 mA
Mains voltage $U_1$	3~400 V - 500 V or 3~690 V 50/60 Hz
Max. power $S_{max}$	300 kVA with 400 V
Nominal power $S_N$	150 kVA with 20 % duty cycle, 400 V 90 kVA with 50 % duty cycle, 400 V
Output voltage $U_{2N}$	500 V / 1,000 Hz
Output current $I_{2max}$	650 A
Interfaces	<b>BG-02</b> , <b>MASDAT</b> , RS232, PROFIBUS-DP, ETHERNET
Optional accessory	INTERBUS
Digital inputs	13
Digital outputs	8
Cooling system <i>SilverSPATZM600LL</i>	air-cooled ambient air temperature max. 50 °C / 122 °F
Cooling system <i>SilverSPATZM600LW</i>	water-cooled 2 l / min at 20 °C - 25 °C, max. 10 bar 1 gal (US) / min at 68 °F - 77 °F, max. 145 PSI
Type of protection	IP20
Dimensions (H x W x D)	390 x 200 x 345 mm 15.4 x 7.9 x 13.6 in
Weight <i>SilverSPATZM600LL</i>	21 kg / 46.3 lb
Weight <i>SilverSPATZM600LW</i>	17 kg / 37.5 lb
Included in delivery	- documentation - connecting kit



welding current, electrode voltage, energy and current time. Each data set gets a time stamp with time and date. In addition it also stores weld expulsions, counter reset, changing of target values, changing of the control parameters, details of fault status and instances where limits were exceeded.

The whole tip dresser management (initial tip dressing, following tip dressing) and tip dresser supervision (duty cycle supervision, tip dress result supervision, ELK test and Nugget-Index) can be done with the *SilverSPATZM600LL/M600LW*.

For the coupling to a robot controller or line PLC the *SilverSPATZ* weld timer is equipped with a PROFIBUS-DP slave according to EN 50170, including automatic baud rate detection and slave address

assignment. As an option an INTERBUS-S, a Device-Net or PROFINET interface is available, too. In addition 13 digital inputs and 8 outputs as a standard ensure a reliable data exchange with 24 V DC signals via standard protocols.

The *SilverSPATZ* is available as air-cooled (*M600LL*) or water-cooled (*M600LW*) version.

For communications between the *SilverSPATZM600LL/M600LW* and a line PC, an ETHERNET connection has been implemented, using the *AutoSPATZAS-32* software. Communication with a local PC is possible via the RS232 interface, using the *AutoSPATZAS-01* PC-software. In addition a hand held graphic operating device, the **SPATZBG-02**, is available.

The features of the *SilverSPATZM600LL/M600LW* are:

- Adaptive **MASTER** control
- 32 Bit (max. 4,294,967,296 spots) weld spot number selectable via field bus
- 63 **MASTER** reference weld schedules, can be related to the individual spot numbers
- Different weld schedules easy to configure, e.g. several squeeze and hold times, several current times - different in length and amplitude -, slope up and down, several pause times, force schedules
- Constant trigger angle Control  
Constant Current Control **CCC**  
Constant Power Control **CPC**  
Constant Voltage Control **CVC**
- Signal inputs for current and voltage
- 0 - 10 V or 4 - 20 mA analog output, e.g. for proportional valve
- Weld parameter limit checking for all weld parameters like weld current, electrode voltage, current time, total energy, final resistance, trigger angle; optionally for force and penetration
- Internal welding data recorder for the last 10,000 welding for quality assurance
- Automatic investigation for limit setting **MASlim**
- Tighten weld parameter limit checking via **Signature Supervision**
- Schedules and check of minimum and maximum force before current time start
- Sensor fault detection for electrode voltage and weld current sensor
- Input for weld stop within 0.5 ms
- 63 independent electrode life counters with stepper function
- 63 independent tip dress counters
- Tip dresser management and control
- Tip dresser supervision via **ELK-Check** and **NUGGETIndex**
- Interface for weld gun identification system **MASDAT**
- Battery buffered real time clock and counter values
- Parallel-I/O interface 24 V DC, 13 digital inputs, 8 digital outputs
- External 24 V DC power supply for digital outputs and peripherals e.g. via robot
- PROFIBUS-DP interface for I/O handling
- As an option: INTERBUS-S, Device-Net or PROFINET interfaces available
- ETHERNET interface for communication with line PC, TCP/IP protocol
- Interfaces for local PC (RS232) and **SPATZBG-02** hand held programming device
- Firmware update via PC / Internet
- Air-cooled / water-cooled

