Technical Specification Stand-Alone-Router
SAR-800-B 1-CL
for Quotation No. dated

SAR-800-B 1-CL – Status: February 2013

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CONTENT

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1. Description of the SAR-800-B1-CL base machine

- Sturdy, low-vibration welded frame without sheet metal covering
- Compact system with enclosed electrical control cabinet at rear of machine
- Protective sheet metal hood with swivelling front door (door locked by door switch with operator protection)
- Linear motor XZ milling system consisting of horizontal axis for horizontal milling movement and vertical milling axis for fast and precise stroke movement
- Precision milling spindle 0.6 kW for end milling cutter
- Flexible milling brush holder for stabilizing and fixing the PCB during milling
- Linear motor simple shuttle system for multi-panel transportation and horizontal milling movement. Mounting plate for holding work piece carriers
- Manual slide cover for loading and unloading space
- IPC controller with Windows XP operating system, path controller, DIN-66025 programming for milling program production
- Digital drive regulators from Bosch Rexroth for axis drives
- Pneumatic cells with maintenance unit, control valves and pressure control for pneumatic actuators
- Operator post with 17"-TFT screen, keyboard, mouse and control keys on the front right side. Operator panel swivels to the right
- Machine capability test
- Maintenance kit
- Documentation in German, 1 copy on CD ROM

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2. Possible options for SAR-800-B1-CL

- Automatic slide cover for loading and unloading space
- Touch screen for machine control
- Milling spindle 1.1 kW, speed range up to 50,000 rpm
- External dust extraction
- Vacuum monitoring for dust extraction system
- Manual dust extraction
- Vision system for recognition of PCB position
- Automatic tool change with 5 stations
- Broken tool detection.
- Milling cutter control for different levels
- Monitoring of milling cutter diameter
- Automatic monitoring of milling brush
- Deep recess machining (only for multi-panel size 430x350)
- Red dot detection for NOK parts
- Remote maintenance via Netviewer
- Ionization
- Manual scanner for automatic program selection
- Automatic scanner
- Milling brush-quick changer (only for milling spindle 1.1 KW)
- Lamp for interior of machine
- Triple tower light
- Workpiece carrier coding
- Active glass door to the left in the protective cover
- Magnoplate magnetic workpiece carrier
- Workpiece carrier starter kit
- Customer-specific workpiece carrier based on plastic carrier with 100 pins including production of milling program
- Customer-specific Schnaidt workpiece carrier based on aluminum carrier with removal plate and cover including production of milling program
- Good/bad parts processing
- CAD/CAM system
- Panes with ESD protective finish
- Special finish

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3. Description of function

A single shuttle system and workpiece carrier forms the basis of the separation process. The operator manually places the multi-panel on the shuttle axis' workpiece carrier. After closing the sliding cover, the shuttle axis moves into the milling position. A camera system located on the milling head (optional), determines the position of the multi-panel in the workpiece carrier and transfers the misalignment to the milling axis system and a corresponding position correction takes place. Multi-panel or PBC codes (bar code or data matrix code) are identified and verified by an optional automatic scanner. Then, with the corresponding milling program, the multi-panel is separated by the milling system and the shuttle axis.

After the cutting process, the work piece carrier is moved back into its loading position by the shuttle axis. In this position, the workpiece carrier is manually unloaded and reloaded by the operator once the slide cover has been opened.

Once the workpiece carrier has been reloaded, a new cycle can start. Dust produced during the milling process is extracted by means of a suction system mounted on the milling head. The dust extraction system is installed externally behind or beside the machine.

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4. Technical data

4.1. Machine dimensions

- Width   800 mm
- Depth   1,810 mm
- Height   1,850 mm
- Operator height   approx. 985 mm
- Weight   approx. 700 kg

4.2. Power supply

- Voltage   400 V / 50 Hz / 16 A
- Compressed air   0.6mPa (6bar), oil-free, filtered and dry
- Compressed air consumption   approx. 100 l / min
- Ambient temperature   +18°C to + 40°C
- Relative humidity   10% to 80%

RC Connection not possible (consultation)

4.3. Noise level

- Measured at a distance of 1.2 m
  around the machine   < 72 db (A)

4.4. Speed

- Travel speed of the linear axes   1,000 mm/s

4.5. Levels of accuracy

- Repeat accuracy $\pm$ 0.02 mm
- Position accuracy $\pm$ 0.02 mm
- Milling accuracy $\pm$ 0.15 mm (without camera)
                                         $\pm$ 0.10 mm (with camera)

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4.6. Depanelling capacity

❑ Under optimum conditions (depending on PCB material, PCB format, stability, cutter diameter, feed rate and spindle speed), cutting speeds of up to 1 m/min can be achieved (up to 2 m/min with optional 1.1 kW milling spindle).

Cycle times:

The following cycle times, whose achievement we assure you, were theoretically determined by GAS and can be proven at all times by GAS in a practical trial.

Cycle time product: xxxxxxxxxxxxx

⇨ xxxxxxs/multi-panel
⇨ xxxxx s/PCB
⇨ The feed rate speed is xx m/min

The exact cycle time is to be calculated with a deviation of +/- 10%.

4.7. Characteristics of spindle and separating tool

❑ End milling cutter holder   ∅ 3.175mm
❑ End milling cutter diameter   ∅ 1.0 – 2.5 mm
❑ Spindle speed, 0.6 kW spindle   up to 40,000 rpm
❑ Spindle speed, 1.1 kW spindle (option)   up to 50,000 rpm
❑ Pneumatic clamping of end milling cutter

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4.8.   Working range and PCB characteristics standard shuttle axis

- Max. milling area   430 mm x 350 mm
- Max. multi panel size   430 mm x 350 mm
- PCB thickness: 0.5 mm to 3.2 mm
- Max. component height spindle 0.6 kW   top side: 10 mm
- Max. component height spindle 1.1 kW   top side: 15 mm
- Maximum component height   bottom side: 35 mm (standard shuttle)
- Max. panel thickness above
  work piece carrier - base plate: 70 mm
- Locating holes within the individual PCB,
  Optimal min. 2 holes/PCB with at least   ∅ 1mm
- Max. distortion of printed circuit board   1% of length/width
- Printed circuit board materials: CEM, FR4, IMS(AL), CU

4.9.   Shuttle system standard shuttle axis

- Format per workpiece carrier 1300   555 mm x 380 mm x 12 mm
- Product change time/tooling time   < 4 min

4.10.   Working range and PCB characteristics high shuttle axis (option)

- Max. milling area   430 mm x 400 mm
- Max. multi panel size   430 mm x 400 mm
- PCB thickness: 0.5 mm to 3.2 mm
- Max. component height spindle 0.6 kW   top side: 10 mm
- Max. component height spindle 1.1 kW   top side: 15 mm
- Maximum component height   bottom side: 115 mm (high shuttle)
- Max. panel thickness above
  workpiece carrier - base plate: 140 mm
- Locating holes within the individual PCB,
  Optimal min. 2 holes/PCB with at least   ∅ 1mm
- Max. distortion of printed circuit board   1% of length/width
- Printed circuit board materials: CEM, FR4, IMS(AL), CU

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4.11. Shuttle system high shuttle axis

- Format per workpiece carrier 800 HS   450 mm x 420 mm x 12 mm
- Format per workpiece carrier 1000 CL   442 mm x 215 mm x 10 mm
- Product change time/tooling time   < 4 min

4.12. Availability and CE standard

- ❑ Technical availability   > = 98%
- ❑ MCT (machine capability test)
- ❑ CE version

4.13. Active milling brush holding-down device

The cylinder-controlled active milling brush holding-down device ensures that the milling brush is in contact with the printed circuit board during the entire milling process. As a result – depending on the size of the separated components - a holding–down device in the workpiece carrier, e. g. a cover, can often be omitted.

4.14. System controller

- ❑ Beckhoff IPC controller with DIN-66025 milling programming
- ❑ Windows XP operating system
- ❑ Path control
- ❑ 17" TFT monitor
- ❑ Machine control via keyboard, mouse, emergency stop button and control push buttons

4.15. Operating modes

- ❑ Service mode (manual record)
- ❑ Manual operation
- ❑ Reference run
- ❑ Automatic operation

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4.16. Applied norms and directives

EC Machinery Directive 2014/30/EC

Applied harmonized norms:

- DIN EN ISO 12100 : 2011-03
- DIN EN ISO 13850 : 2016-05
- DIN EN 13849 - 1 : 2016-06
- DIN EN 60204 - 1 : 2007-06 and DIN EN 60204- 1
  Amendment 1: 2010-05
- DIN EN 60825 - 1 : 2015-07

4.17. Paint finish

- ❑ Main surfaces powder-coated in light grey : RAL 7035
- ❑ Special finish available for an additional charge

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5. Technical data, options

5.1. Dust extraction

- ❏ External
- ❏ External dust design in accordance with the ATEX Product Directive 94/9/EC
- ❏ Rotary filter H13
- ❏ Capacity of dust bag 30 l
- ❏ Dust disposal in filter fleece bag
- ❏ Level monitoring by means of viewing window in lid
- ❏ Protection class IP 67
- ❏ Noise level 66 dB(A)

5.2. Vacuum monitoring for dust extraction system

- ❏ Differential pressure socket as pressure monitoring for external dust extraction system

5.3. Manual dust extraction

- ❏ Fork with 3 m long suction hose, curved hand tube and joint nozzle for cleaning the interior of the machine

5.4. Milling spindle 1.1 kW

- ❏ Milling spindle 1.1 kW
- ❏ Speed 50,000 rpm
- ❏ For increased milling speed up to 2m/min

5.5. Automatic sliding cover

- ❏ Automatic opening and closing of the sliding cover of the loading and unloading space via pneumatic cylinders
- ❏ Locking in closed condition via pneumatic cylinders, monitoring by means of safety switches

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5.6. Triple tower light

- Machine states are displayed by triple tower light
- States:

Yellow flashing light:	Operator request / shortage of parts
Red continuous light:	System stopped
Red flashing light:	Fault
Green continuous light:	System in automatic mode, no fault
Green flashing light:	System moving to the starting position

5.7. Ionization

- Balance regulated ion nozzles from Keyence

5.8. Automatic tool change

- Tool magazine for 5 tools on the shuttle axis
- Automatic tool change in the event of a broken tool or at the end of the cutter service life

5.9. Automatic broken tool check

- Forked light barrier for automatic milling cutter breakage control
- Alert in case milling cutters break and in the event of automatic milling cutter changes
- Broken milling cutter or cutter with expired tool life laid into the reject milling box

5.10. Automatic monitoring of milling cutter diameter

- Automatic diameter monitoring via laser fork light barrier after milling cutter changes due to tool breakage, expired tool life or program-dependent milling cutter changes
- Error message with machine standstill in case the milling cutter diameter is incorrect
- Ascertainable difference in diameter >= 0.2 mm

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5.11. Automatic monitoring of milling brush

- ❑ Cyclical control of the wear of the milling brush by means of a light barrier
- ❑ Z position, degree of wear as well as the frequency of the monitoring can be defined by the customer
- ❑ Alert without machine standstill in the event of a worn out brush

5.12. Automatic milling cutter length reduction

Software module for milling at different heights to utilize the entire length of the milling cutter

5.13. Manual scanner

- ❑ Standard manual scanner (bar code and data matrix code)
- ❑ Automatic program selection possible
- ❑ Workpiece carrier coding possible
- ❑ Database connection possible (e.g. for good/bad part machining)

5.14. Automatic scanner

- ❑ Standard automatic scanner (bar code and data matrix code) mounted on the top side of the milling system
- ❑ Automatic program selection possible
- ❑ Workpiece carrier coding possible
- ❑ Database connection possible (e.g. for good/bad part machining)
- ❑ Monitoring of the presence of multi-panels possible

5.15. Vision system for position correction

- ❑ Vision system on the top side mounted on the milling system
- ❑ Position recognition via fiducial marks, drilled holes or corners
- ❑ Position correction of milling programs
- ❑ Activation/deactivation of the camera function in the NC program

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5.16. Red dot detection for good/bad part machining

- Laser sensor on the milling head for the detection of NOK components in the multi-panel which are marked with red dots
- No countersinking of the NOK components (stay in remaining frames)

5.17. Deep recess machining

- Recognition of tool length by means of a measuring sensor
- Recognition of the multi-panel surface by means of a pneumatically operated measuring sensor
- The multi-panel surface and the tool length are factored into the determination of high precision depth milling
- Depth accuracy 0.05 mm with corresponding workpiece carrier quality (optimal: workpiece carrier with cover)
- Multi-panel thickness in workpiece carrier 48.1 mm (measured from the lower edge of the workpiece carrier to the lower edge of the multi-panel)
- Only possible for multi-panel sizes 430 x 350 mm

5.18. Magnet workpiece carrier SAR-800 standard

- Working range 343 mm x 261 mm
- Automatic placement of the fixing pins
- 42 fixing pins with foot magnet diameter 12.5 mm (3 magazines)
- 48 fixing pins with foot magnet diameter 15 mm (4 magazines)
- 14 supporting pins with foot magnet diameter 11 mm (1 magazines)
- 2 fixed zero point pins screwed into the baseplate
- 6 pluggable system pins (geometry like the zero point pins)
- 1 placing pin

5.19. Magnetic workpiece carrier SAR-800

- Working range 417 mm x 310 mm
- Automatic placement of the fixing pins
- 42 fixing pins with foot magnet diameter 12.5 mm (3 magazines)
- 60 fixing pins with foot magnet diameter 15 mm (5 magazines)
- 14 supporting pins with foot magnet diameter 11 mm (1 magazines)
- 2 fixed zero point pins screwed into the baseplate
- 6 pluggable system pins (geometry like the zero point pins)
- 1 placing pin

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5.20. Do-it-yourself-workpiece carrier kit

- Customer production of workpiece carriers based on plastic carrier plate with holding pins
- Production of drilling programs by means of multi-panel dxf via a CAD/CAM system
- Drilling of the carrier plate on the depanelling system with cutter milling head
- Delivery of workpiece carrier baseplate based on plastic with drilling bushings for central positioning on the shuttle axis, holding pins, drill and driver tool for pins

5.21. ESD safety

- Safety covers or cladding
  which come into contact with the product are fitted with conducting
  ESD material (optional)

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