

RO400FC Reflow Oven

Version 3.2 • May 2017

Configuration

| | | RO400FC | RO400FC-C |
|--------------------|--------------------------|--------------------|-----------|
| Machine base | Convection heating zones | 4 | 4 |
| | Convection cooling zones | 1 | 1 |
| PCB Handling | Mesh belt conveyor | ● | |
| | Pin (chain) conveyor | | ● |
| | SMEMA interface | | ○ |
| | Middle rail support | | ○ |
| ● standard feature | | ○ optional feature | |

Specifications

| | | RO400FC | RO400FC-C | |
|-------------------------------|---|--|---|--|
| Control | Type | Microprocessor | | |
| | Languages | English, German, French | | |
| | Temperatures selectable | °C, °F | | |
| | Program capacity | 49 (10x preset standard, 10x preset leadfree, 10x preset curing, 19x free) | | |
| | Board counter | optional with sensor or standard with SMEMA option | | |
| | Gas temperature adjustment | Adjustable from 20° to 290°C (68° to 554°F) for each zone | | |
| Substrate dimensions | Max. reflow width | 400 mm (15.8") | | |
| | Max. Substrate width | 10-400 mm (0.39-15.8") | 60-400 mm (2.4" - 15.8") | |
| | Max. substrate width without middle rail support | 400 mm | Approx. 250 - 300mm (9.84 - 11.81") by 1.5mm (0.06") PCB material | |
| | | | | |
| Conveyor | Transport direction | left to right | | |
| | Pin length | - | 3 mm (0.12") | |
| | Conveyor speed range | 100-800 mm / min (3.9" - 31.5" / min), see slow speed option for slower speed | | |
| | Conveyor speed repeatability | +/- 2 mm (0.079") / min | | |
| | Conveyor motor type | 24V DC with encoder | | |
| | Rail parallelism | - | +/- 0.3mm (0.012") from 20 to 290°C | |
| | In feed length | 300 mm (11.8") | | |
| | Out feed length | 200 mm (7.9") | | |
| | Entrance height (max) | 30 mm (1.18") | | |
| | Free space below substrate | 0 | 20 mm (0.79") | |
| | Process dimensions | Heated length | 1'620 mm (63.8") | |
| | | Length of heating zone | 400 mm (15.75") | |
| Length of active cooling zone | | 250mm (9.84") | | |
| Overall length cooling zone | | 450mm (17.72") | | |
| Process data | Total Air circulation heating zones | 2'575 m ³ /h (1'515 cfm) | | |
| | Air circulation per heating zone | 515 m ³ /h (303 cfm) | | |
| | Air circulation peak zone | 1'030 m ³ /h (606 cfm) | | |
| | Air circulation cooling zone | 300 m ³ /h (177 cfm) | | |
| Machine dimensions | Footprint | 2'800x914mm (110.2x36") | | |
| | Machine height | 1'350 mm (53.2") | | |
| | Weight | 660 kg (1455 lb) | 760 kg (1675 lb) | |
| Supplies | Electrical | EU: 3x400 VAC, 50Hz, 25 A, circuit breaker not required | | |
| | | US: 3x480/277/249/209 VAC, 60Hz, 25 A (with transformer), 3 phase circuit breaker required in front of transformer | | |
| | | | | |
| | Power consumption | 5.8 kW continuous, 11.6 kW (during initial heat up, 15 min) | | |
| | Minimum exhaust volume | 2x150 m ³ /h = 300 m ³ /h (2x88 cfm=176 cfm) | | |
| | Recommended exhaust volume | 2x250 m ³ /h = 500 m ³ /h (2x150 cfm=300 cfm), option RO400FC-VNT recommended. | | |
| | Filter / Air Cleaning Systems | No / must be added in the exhausting system | | |
| Exhaust specifications | 1 each at entry and exit, distance 2.075 m (81.69"), diameter 150 mm (5.9"), length 50 mm (1.97"), gas temperature at exhaust <45°C (<113F) | | | |



Specifications (cont.)

| | | RO400FC | RO400FC-C |
|-------------|------------------------|--|-----------|
| Environment | Noise level | 70 dB (A) maximum | |
| Features | Emergency stop buttons | 2 (on left and right side of the machine) | |
| | Main power disconnect | 1 with undervoltage circuit breaker | |
| | Overheat security | Overheat temperature control for each zone (permanent breaker) | |
| | Safety standards | CE, EN 954-1 Class 3 | |
| | Color | White (RAL9002) silky lustre, fine structure | |

Heating zone specifications

| Temperature Profile | Preheat 1 | Preheat 2 | Preheat 3 | Reflow | Cooling |
|--|-----------------|----------------|----------------|----------------|-----------------|
| Type | Convection | Convection | Convection | Convection | Convection |
| Max. gas temperature setting | 290°C (554°F) | 290°C (554°F) | 290°C (554°F) | 290°C (554°F) | -- |
| Heating power | 3000 W | 3000 W | 3000 W | 2x3000 W | -- |
| Regulation (Reflow conditions) | +/- 3°C | +/- 3°C | +/- 3°C | +/- 3°C | -- |
| Ramp times (FR4 inboard measurment.) | 1.8-2°C /sec | 1.8-2°C /sec | 1.8-2°C /sec | 2-3°C /sec | 2.5-3°C /sec |
| Temperatur measurement | in airstream* | in airstream* | in airstream* | in airstream* | -- |
| Heating up time from 20°C (68°F) to set temperature 160–160–160–235°C (320-320-320-455°F) (Typical used Profile) | 9 min | 7 min | 7 min | 18 min | -- |
| ΔT within 400 mm (15.8") conveyor width | <4°C (39.2°F) | <4°C (39.2°F) | <4°C (39.2°F) | <4°C (39.2°F) | -- |
| Cold start warm up to 235°C (455°F) | 21 min | 15 min | 15 min | 18 min | -- |
| Cold start warm up to 290°C (554°F) | 35 min | 26 min | 26 min | 30 min | -- |
| Max temp difference between two adjacent zones | ← 270°C (518°F) | ← 80°C (176°F) | ← 80°C (176°F) | ← 80°C (176°F) | ← 260°C (500°F) |
| Blower rpm | 2600 | 2600 | 2600 | 2x2600 | 2600 |

* Temperature measurement directly within air stream on PCB height

Option specification

| Option | Value | Specification |
|----------------------------|-----------------------------|---|
| Signal tower | Colours | 3 |
| | Audio signal | optional |
| Slow speed option | Order number | RO400FC-15 |
| | Conveyor speed range | 10-200 mm / min (0.4"-7.9" / min) |
| Flying thermocouples | Order number | RO400FC-1 |
| | Length | 5 m (16.4 ft) |
| | Quantity | 2 |
| | Temperature display | Directly on the on the integrated LCD Panel or optional importable into RO-Soft |
| RO-Soft profiling software | Order number | RO400FC-SOFT-2 |
| | Measure channels | 6 (2 for thermocouples, 4 for zone temperature) |
| | Recording time | up to 180 hours |
| | Data export format | .pdf (pdf writer necessary on the PC), .csv (for excel import) |
| | Delivered with | RS232 connection cable, SUB-D Adapter 25pin-9pin |
| | Data Connection | RS232 |
| | PC requirements | Pentium 3 or better |
| | System requirements | Option RO400FC-1 (Flying Thermocouples) |
| Exhaust incl. ventilator | Order number | RO400FC-VNT |
| | Scope of delivery | Covered exhaust fan with connection pipes to the two exhausting nozzles, Power cable connected to the oven |
| | Technical details | 500m ³ /h (300cfm) air exhausting, 230V 50/60Hz |
| | Customers side installation | 1 Pipe or tube to the outside or to air cleaning equipment Diameter 150mm (5.9"), max length 5.0m (16.4 ft). Fire proof and temperature resistant up to 70°C (158°F) |

Option specification (cont.)

| Option | Value | Specification |
|---------------------------------------|---|---|
| Exhaust Tubes (without Ventilator) | Scope of delivery | Connection pipes to the two exhausting nozzles. Diameter 150mm (5.9") with T connection on top, Diameter 150mm (5.9"). |
| | Customer side installation | Exhausting system with 1 Pipe or tube Diameter 150mm (5.9"), max length 5.0m (16.4 ft). Fire proof and temperature resistant up to 70°C (158°F) Technical requirements for exhausting system see on chapter "Exhausting" |
| Slide out unit | Order number | RO400FC-14, |
| | Sliding angle | adjustable with screws |
| PCB Counter | Sensor type | Optical polarized |
| | Order numbers: | Mesh belt RO400FC-3B Chain conveyor) RO400FC-3 |
| Middle support rail | Order number | RO400FC-9 |
| | Support Type | Steel rope |
| | Width adjustment | motorized |
| | Height adjustment | Motorized, 18mm (0.71") up-down |
| | Oiling system | not necessary |
| | Weight | 50 kg |
| Oiling System for Chain conveyor | Order number | RO400FC-10 |
| | Located | Directly on the two chain rails at the entrance side |
| | Type of used oil | High temperature oil up to 300°C (572°F) |
| | Oiling cycle | Daily to weekly (depending to operation time) |
| | Oil consumption | Depends from the oiling cycles |
| SMEMA Interface | Order number | RO400FC-12 |
| | Sensor | one at entrance and one at exit side |
| | Sensor type | Optical polarized |
| | Functions by side | Board counter |
| | Scope of delivery | SMEMA connectors at entrance and exit side of the oven, one SMEMA cable, two sensors |
| 3 color signal tower | Order number | RO400FC-13 |
| | Light colors | Red, yellow, green |
| | Standard with SMEMA interface | No, but recommended |
| PC monitor and keyboard support arm | Order no. | RO400FC-7 |
| | Located | At the entrance side of the oven, easy to handle from the operators place and moveable to the backside if not needed. |
| Universal transformer | Order number | RO400FC-20 |
| | Input voltage (primary side) | 3x480/277/240/208VAC, 60Hz, 25A |
| | Input connections | 3 phases, earth (neutral not connected) |
| | Power input | 16kWh max. |
| | Fuses | 25Amp. each phase |
| | Transformer wiring | Star with neutral at middle |
| | Output voltage (secondary) | 3x400V |
| | Output connections | 3 phases, earth, neutral (neutral generated by the transformer) |
| | Frequency | 50/60Hz |
| | Necessary circuit breaker (at customers side) | Yes, 3 phase breaker in front of transformer |
| | Location | Outside or built in into the housing of the oven |

Packing information

| Specification | Value |
|-------------------------------|--|
| Box (LxWxH) | 3090x1150x1600 mm (10.14x3.77x.25 ft) |
| Shipping weight (air freight) | 924 kg (2037 lb) with meshbelt |
| | 1024 kg (2258 lb) with pinchain conveyor |
| | 1074 kg (2368 lb) with pinchain conveyor and middle support rail |
| Shipping weight (sea freight) | 961 kg (2119 lb) with meshbelt |
| | 1061 kg (2339 lb) with pinchain conveyor |
| | 1111 kg (2449 lb) with pinchain conveyor and middle support rail |
| Additional weight | + 70kg (154 lb) with built-in transformer |

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