# HighLight FS Series

## Multi-kW Fiber Laser for Copper, Aluminum, and HSS welding

This ARM laser offers different beam configurations than previously available, thus providing an expanded toolset for precise optimization of a wider range of welding tasks. For example, one new delivery fiber option has a higher brightness ring beam and a larger gap between ring and center than any other ARM fiber. This unique combination delivers more precise temperature control and greater stability of the welding process, especially when utilized in some scanner (beam motion) applications. It is particularly well-suited for challenging welding tasks involving copper and aluminum, including busbars, and can/cap and can/lid welding of prismatic and cylindrical batteries.

The laser is availabe as standard version with beam management (fiber-fiber-switch FFS or fiber-fiber-coupler FFC) and as compact version with spliced fiber.


### FEATURES

- Output power: 4,000 - 5,000 Watts
- Adjustable Ring Mode (ARM) and Standard Beam Profile available
- Compact and Standard Version with Beam Management
- Excellent stability over the entire power range (3% to 100%)
- Inherently back reflection safe
- Industry-leading closed loop power control for high process consistency
- Optimized power profile programming tool for welding processes

### BENEFITS

- Enables precise power control for process optimization
- Ideal for scanner applications
- Larger beam diameter available for gap bridging
- Eliminates filler wire, and reduces cracking, porosity, and spatter

### APPLICATIONS

- Can/cap welding
- Foil-to-tab welding
- Busbar welding
- Hairpin welding
- Battery enclosure welding

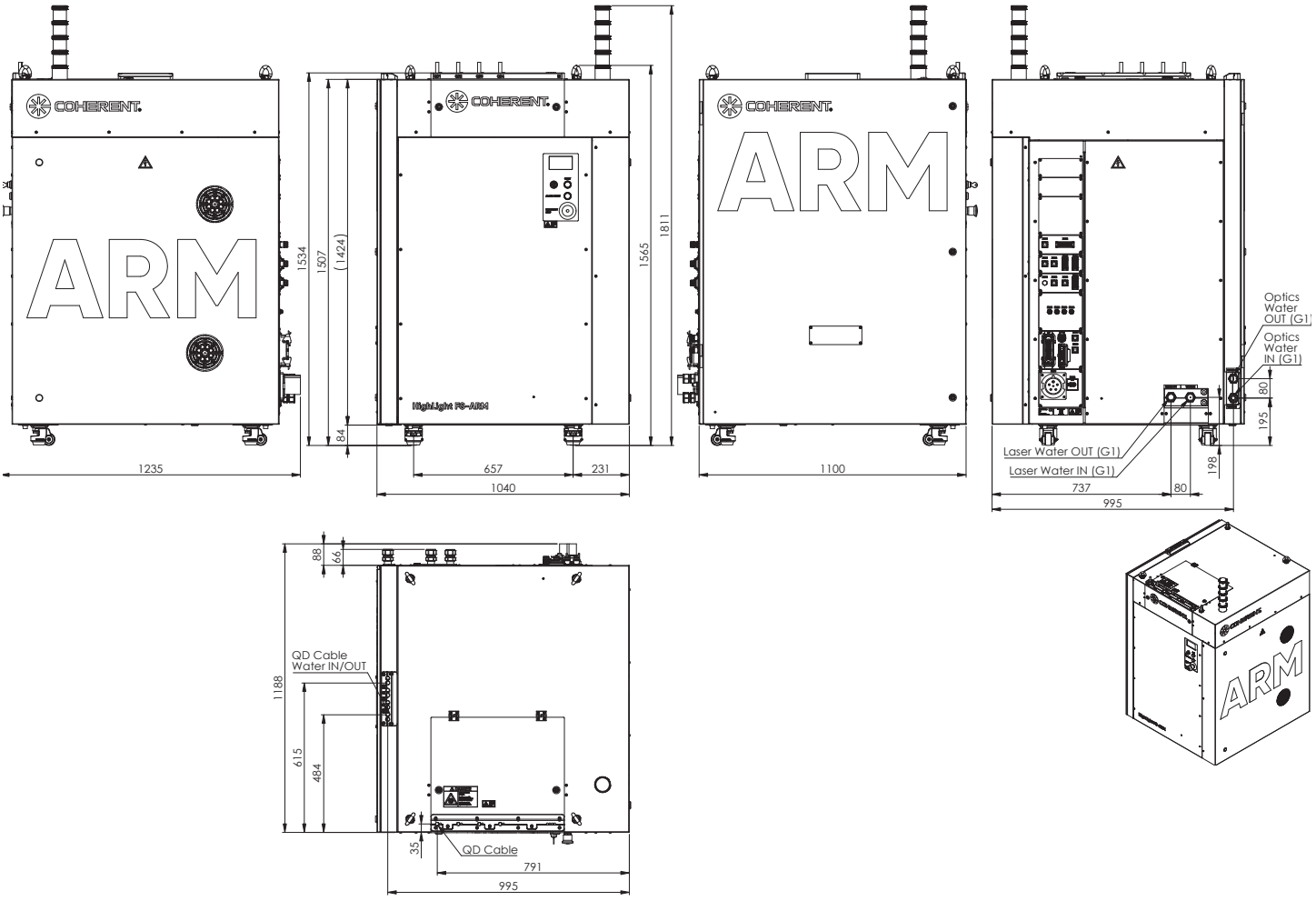
COHERENT®
Superior Reliability & Performance

| SPECIFICATIONS | HighLight FS4000-ARM (1.3+2.7) | HighLight FS5000-ARM (2.5+2.5) |
|---|---|---|
| Nominal Power (W) | 4,000 | 5,000 |
| Power Range (%) | 3 - 100 | |
| Laser Beam Quality (BPP) at Collimator (mm x mrad) | For 100/290µm + FFC/FFS: Center ≤ 4, Ring ≤ 14 | |
| Power Stability (%) | ± 1 | |
| Pulse Frequency Range (kHz) | 5 | |
| Wavelength (nm) | 1080 ± 10 | |
| **ELECTRICAL RATINGS** | | |
| Voltage (VAC) | 400/440 ±10 | |
| Connected Load (kVA) | 17.1 | 22.9 |
| Effective Power at Nominal Power (kW) | 15.6 | 20.8 |
| Max. Current Consumption at 400 V (A) | 22.5 | 30 |
| Fuses Type NH (A) | 32 | 63 |
| **COOLING** | | |
| Recommended Cooling Capacity Laser (kW) | 11 | 15 |
| Recommended Cooling Capacity FFC/FFS and QHB/QD (kW) | FFS2: 1.0<br>FFS4: 1.0<br>FFC: 1.0 | |
| Flow Rate Laser (l/min) | 56 | 73 |
| Flow Rate for FFS/FFC and QBH/QD (l/min) | FFS2: 8.0<br>FFS4: 15.0<br>FFC: 6.0 | |
| Temperature Laser (°C) | 25 ± 1 | |
| Temperature for FFS/FFC and QBH/QD (°C) | For 100/290µm + FFC/FFS: 24 – 40 | |
| Max. Pressure Laser (MPa) | 0.5 | |
| Max. Pressure FFS/FFC and QBH/QD (MPa) | 0.4 | |
| Typical Pressure Drop Laser (MPa) | 0.3 | |
| **FIBER DELIVERY SYSTEM** | | |
| Interface | QBH/QD | |
| Diameter (µm) | Center D 100, Ring OD 290 or | |
| Length (m) | 20, 30 (other lengths on request) | |
| **DIMENSIONS & WEIGHTS** | | |
| Laser Dimension (L x W x H) (mm) (without signal tower) | 1100x1040x1507 | |
| Laser Weight (kg) | <500 | |
| **ENVIRONMENTAL CONDITIONS** | | |
| Ambient Temperature (°C) | 5 - 40 | |
| Humidity (°C) | Environmental conditions always below the dew point. Condensation to laser, QHB/QD and optics must be avoided during the operation, storage and transport. | |
| **CUSTOMER INTERFACE** | | |
| Digital Signals (V DC) | 24 | |
| Power Control (V DC) | 0 - 10 V | |
| Trigger Control (V) | 24, rise/fall time < 30 µs | |
| **OPTIONS LASER** | | |
| | Field bus (Ethernet/IP, Profinet, Profibus, Devicenet, Ethercat), Scanner control interface | |

| SPECIFICATIONS | HighLight FS4000C-ARM (1.3+2.7) | HighLight FS5000C-ARM (2.5+2.5) |
|---|---|---|
| Nominal Power (W) | 4,000 | 5,000 |
| Power Range (%) | 3 - 100 | |
| Laser Beam Quality (BPP) at Collimator (mm x mrad) | For 70/180 µm: Center ≤ 2.5, Ring ≤ 9<br>For 50/140 µm: Center ≤ 2.5, Ring ≤ 6.5 | |
| Power Stability (%) | +/- 1 | |
| Pulse Frequency Range (kHz) | 5 | |
| Wavelength (nm) | 1080 ± 10 | |
| **ELECTRICAL RATINGS** | | |
| Voltage (VAC) | 400/440 +-10 | |
| Connected Load (kVA) | 17.1 | 22.9 |
| Effective Power at Nominal Power (kW) | 15.6 | 20.8 |
| Max. Current Consumption at 400 V (A) | 22.5 | 30 |
| Fuses Type NH (A) | 32 | 63 |
| **COOLING** | | |
| Recommended Cooling Capacity Laser (kW) | 11 | 15 |
| Flow Rate Laser (l/min) | 56 | 73 |
| Flow Rate QBH/QD (l/min) | 2 | |
| Temperature Laser (°C) | 25 ± 1 | |
| Temperature for QBH/QD (°C) | 25 - 45 | |
| Max. Pressure Laser (MPa) | 0.5 | |
| Max. Pressure FFS/FFC and QBH/QD (MPa) | 0.4 | |
| Typical Pressure Drop Laser (MPa) | 0.3 | |
| **FIBER DELIVERY SYSTEM** | | |
| Interface | QBH/QD | |
| Diameter (µm) | Center D 70, Ring OD 180 or<br>Center D 50, Ring OD 140 | |
| Length (m) | 20 (other lengths on request) | |
| **DIMENSIONS & WEIGHTS** | | |
| Laser Dimension (L x W x H) (mm) (without signal tower) | 1100x954x1322 | |
| Laser Weight (kg) | <450 | |
| **ENVIRONMENTAL CONDITIONS** | | |
| Ambient Temperature (°C) | 5 - 40 | |
| Humidity (°C) | Environmental conditions always below the dew point. Condensation to laser, QHB/QD and optics must be avoided during the operation, storage and transport. | |
| **CUSTOMER INTERFACE** | | |
| Digital Signals (V DC) | 24 | |
| Power Control (V DC) | 0 - 10 V | |
| Trigger Control (V) | 24, rise/fall time < 30 µs | |
| **OPTIONS LASER** | | |
| | Field bus (Ethernet/IP, Profinet, Profibus, Devicenet, Ethercat), Scanner control interface | |

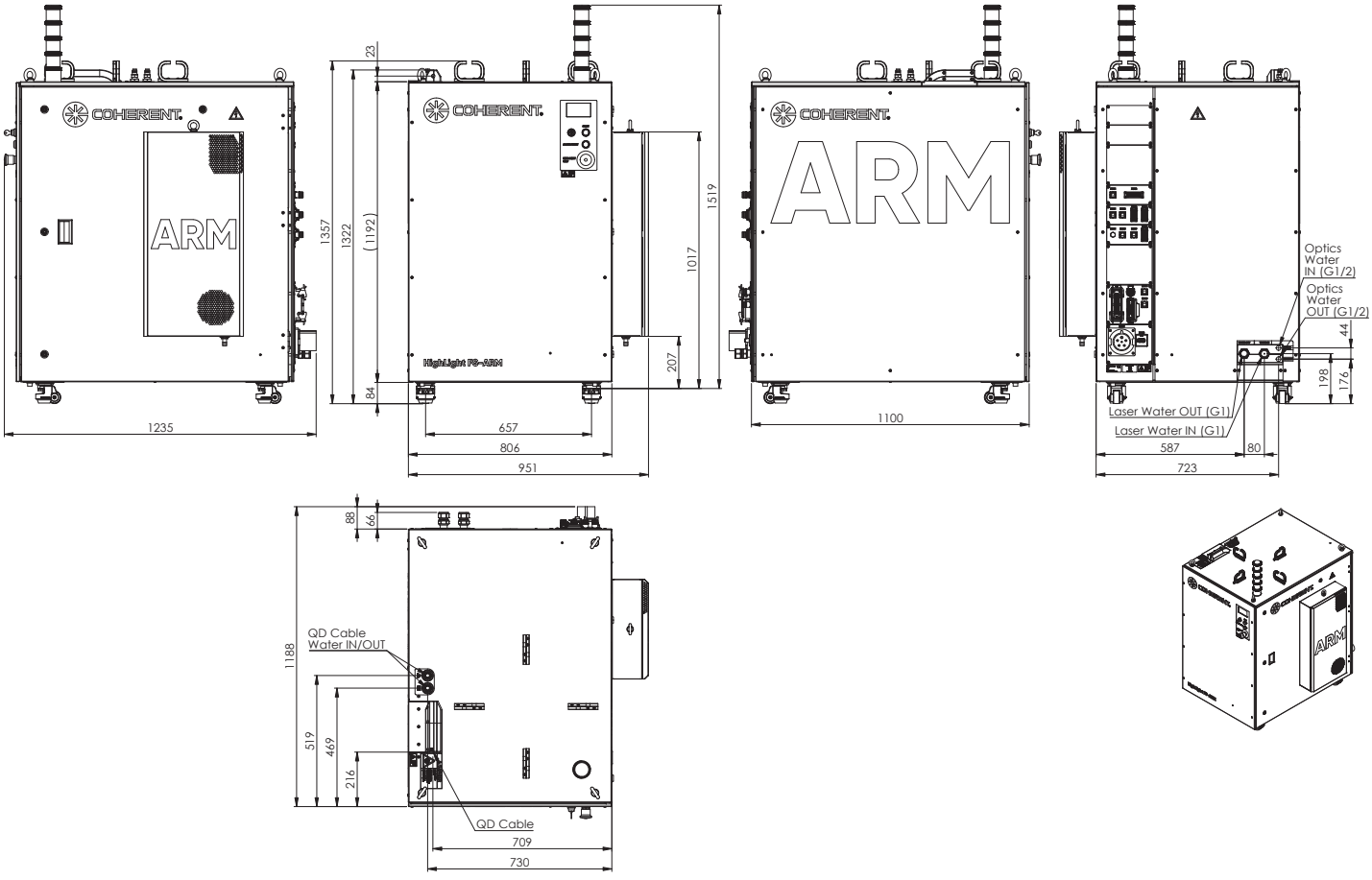
## MECHANICAL SPECIFICATIONS

### HighLight FS4000-ARM - HighLight FS5000-ARM



## MECHANICAL SPECIFICATIONS

### HighLight FS4000C-ARM - HighLight FS5000C-ARM

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Coherent industrial lasers are designed in strict accordance with the respective safety regulations. We certify that each laser manufactured by our company complies with FDA Radiation Performance Standards, 21 CFR Subchapter J and with IEC 60825. Warning labels as shown in the figure appear on each Coherent laser to indicate the respective classification.