

# ARM FL

## High-Power Adjustable Ring Mode (ARM) Fiber Lasers with Beam Management

The ARM FL series of industrial, multi-kilowatt fiber lasers includes beam management to deliver superior results in a variety of challenging welding tasks.

The ARM technology features two individually controllable, co-axial beams from a single fiber, providing a new level of flexibility for applications such as zero-gap welding of zinc-coated steel, as well as the ability to weld aluminum without filler wire, with minimal spatter, and no hot cracking. The power levels in both central spot and surrounding ring are independently adjustable. This results in high speed and high throughput spatter-free processing and lowers overall production costs by largely eliminating the need for post-processing.

To maximize operational flexibility, ARM FL products are equipped with either a Fiber-Fiber-Switch (FFS) or Fiber-Fiber-Coupler (FFC).



### FEATURES

- Output power: 2,000 - 10,000 Watts
- Adjustable Ring Mode (ARM)
- Fiber-Fiber-Switch (FFS) or Fiber-Fiber-Coupler (FFC)
- Excellent stability over the entire power range (1% to 100%)
- Inherently back reflection safe
- Industry-leading closed loop power control for high process consistency
- Optimized power profile programming tool for welding processes
- Reliable and fast welding process with high efficiency
- Superior welding seam quality with minimal heat affected zones
- Maximized freedom for welding geometries
- Highest welded part quality with minimum reject rates
- Minimized operating costs

### APPLICATIONS

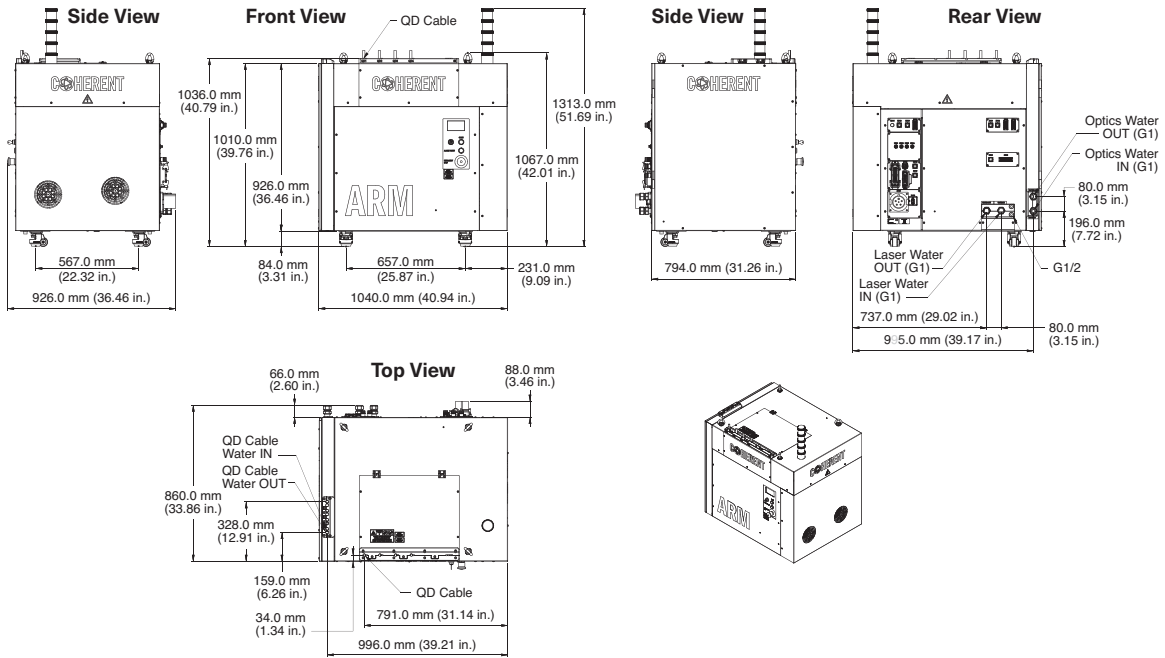
- High-quality welding of challenging materials like high-strength steel, aluminum, or copper
- Cutting

Specifications	ARM FL2	ARM FL4
Nominal Power (W)	2000	4000
Power Range (%)	1 to 100	
Typical Laser Beam Quality (BPP) at Collimator (mm x mrad)	For 100/290 μm + FFC/FFS: Center ≤4, Ring ≤14 For low NA 100/290 μm + FFC: Center ≤2.5, Ring ≤12 For 50/200 μm + FFC: Center 2.5, Ring ≤10	
Power Stability (%)	±1	
Pulse Frequency Range (kHz)	CW - 10	
Wavelength	1070 ±10	
<b>Electrical Ratings</b>		
Voltage (VAC)	400/440/480 ±10%	
Connected Load (kVA)	9.8	13.9
Effective Power at Nominal Power (kW)	9.6	13.7
Max. Current Consumption at 400 V (A)	13.8	19.8
Fuses Type NH (A)	32	
<b>Cooling</b>		
Recommended Cooling Capacity Laser (kW)	4.4	8.9
Recommended Cooling Capacity FFC/FFS and QHB/QD (kW)	FFS2: 1.0 FFC: 1.0	
Flow Rate Laser (l/min.)	43	
Flow Rate for FFS/FFC and QBH/QD (l/min.)	FFS2: 8.0 FFC: 6.0	
Temperature Laser (°C)	25 ±1	
Temperature for FFS/FFC and QBH/QD (°C)	For 100/290 μm + FFC/FFS: 24 to 40 For 50/200 μm + FFC: 24 to 35	
Max. Pressure Laser (MPa)	0.5	
Max. Pressure FFS/FFC and QBH/QD (Mpa)	0.4	
Typical Pressure Drop Laser (MPa)	0.25	
<b>Fiber Delivery System</b>		
Interface	QBH/QD	
Diameter (μm)	Center D 100, Ring OD 290 or Center D 50, Ring OD 200	
Length (m)	20, 30 (other lengths on request)	
<b>Dimensions and Weights</b>		
Laser Dimension (L x W x H) (mm) without Signal Tower	Midi: 794 x 1040 x 1067	
Laser Weight (kg)	FFC: <460, FFS: <520	
<b>Environmental Conditions</b>		
Ambient Temperature (°C)	5 to 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.	
<b>Customer Interface</b>		
Digital Signals (V DC)	24	
Power Control (V DC)	0 to 10	
Gate Control (V DC)	24, rise/fall time <30 μs	
<b>Options Laser</b>		
Ambient Temperature (°C)	Field bus (Ethernet/IP, Profinet, Profibus, Devicenet, Ethercat), Scanner control interface, Multi station interface	

Specifications	ARM FL6	ARM FL7.5	ARM FL8	ARM FL10
Nominal Power (W)	6000	7500	8000	10,000
Power Range (%)	1 to 100			
Typical Laser Beam Quality (BPP) at Collimator (mm x mrad)	For 100/290 μm + FFC/FFS: Center ≤4, Ring ≤14 For low NA 100/290 μm + FFC: Center ≤2.5, Ring ≤12 For 50/200 μm + FFC: Center ≤2.5, Ring ≤10			
Power Stability (%)	±1			
Pulse Frequency Range (kHz)	CW - 10			
Wavelength	1070 ±10			
<b>Electrical Ratings</b>				
Voltage (VAC)	400/440/480 ±10%			
Connected Load (kVA)	20.8	24.4	27.6	36.2
Effective Power at Nominal Power (kW)	20.6	24.2	27.4	36
Max. Current Consumption at 400 V (A)	29.7	35	39.6	52
Fuses Type NH (A)	63			
<b>Cooling</b>				
Recommended Cooling Capacity Laser (kW)	13.3	16.7	17.8	22.2
Recommended Cooling Capacity FFC/FFS and QHB/QD (kW)	FFS2: 1.0 FFC: 1.0			
Flow Rate Laser (l/min.)	65		84	
Flow Rate for FFS/FFC and QBH/QD (l/min.)	FFS2: 8.0 FFC: 6.0			
Temperature Laser (°C)	25 ±1			
Temperature for FFS/FFC and QBH/QD (°C)	For 100/290 μm +FFC/FFS: 24 to 40 For 50/200 μm +FFC: 24 to 35			
Max. Pressure Laser (MPa)	0.5			
Max. Pressure FFS/FFC and QBH/QD (Mpa)	0.4			
Typical Pressure Drop Laser (MPa)	0.25			
<b>Fiber Delivery System</b>				
Interface	QBH/QD			
Diameter (μm)	Center D 100, Ring OD 290 or Center D 50, Ring OD 200			
Length (m)	20, 30 (other lengths on request)			
<b>Dimensions and Weights</b>				
Laser Dimension (L x W x H) (mm) without Signal Tower	Maxi: 794 x 1040 x 1565			
Laser Weight (kg)	FFC: <530, FFS: <590	FFC: <560, FFS: <620		
<b>Environmental Conditions</b>				
Ambient Temperature (°C)	5 to 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.			
<b>Customer Interface</b>				
Digital Signals (V DC)	24			
Power Control (V DC)	0 to 10			
Gate Control (V DC)	24, rise/fall time <30 μs			
<b>Options Laser</b>				
Ambient Temperature (°C)	Field bus (Ethernet/IP, Profinet, Profibus, Devicenet, Ethercat), Scanner control interface, Multi station interface			

**Mechanical Specifications**

Midi: ARM FL2-4



Maxi: ARM FL6-10

