

# SmartQD FIBER OPTIC CABLE

## 1030 nm to 1090 nm High-Power Beam Delivery

The SmartQD fiber optic cable fulfills the European Automotive Industry standard interface. Due to a patented design, the connector monitors light returning from the work piece, enabling early warning of process variations.

The QD fiber connector is water-cooled to optimize the performance, including its superior power loss capability. The built-in mode stripper generates a well-defined beam without any cladding power. With the reinforced and extremely durable fiber hose it is well-suited for dynamic robot applications.



### FEATURES

- Integrated process monitoring
- Up to 20 kW (CW)
- Mode-stripper
- AR-coated end cap
- Scattered light detection
- Superior power loss handling
- Round or square fiber core
- Plug-and-play within 10  $\mu\text{m}$

### APPLICATIONS

- Welding
- Cutting
- Surface Treatment
- Cladding
- 3D Additive Manufacturing

## SmartQD FIBER OPTIC CABLE

Specifications	SmartQD
Maximum Power CW (kW)	20
Wavelength (nm)	1030 to 1090
Numerical Aperture $NA_{\text{fiberacc}}$	0.05 to 0.20
Fiber Core Dimensions ( $\mu\text{m}$ )	$\leq 1000$
Fiber Concentricity ( $\mu\text{m}$ )	$\leq 10$
Z-position Tolerance ( $\mu\text{m}$ )	$\pm 50$
Pointing/Angular Deviation <sup>1</sup> (mrad)	
Core Diameter $> 200 \mu\text{m}$	$\leq 10$
Core Diameter $\leq 200 \mu\text{m}$	$\leq 20$
Power Loss Capability <sup>2</sup> (kW)	
10 seconds	2.0
10 minutes	1.0
Continuously	0.5
Transmission Losses <sup>3</sup> (%)	$< 3$
SmartQD Sensor Data	
Connector	X-coded M12, Ethernet (100Base-TX)
Communication Protocol	TCP/IP
Command Protocol	SCPI
Sensor Data Encoding	WAV stream
Sample Rate (kHz)	3 x 800
Sensors	Plasma / Visible Temperature / NIR Laser back-reflection
Operating Voltage (V DC)	24
Current Consumption (mA)	$< 500$
Fiber Cable Properties	
Cable Lengths (m)	$\leq 200$
Maximum Torsion ( $^{\circ}/\text{m}$ )	90
Cooling	
Cooling Method	Water
Flow Rate (l/min)	2.0
Maximum Input Pressure (bar)	8.0
Pressure Drop (bar at 2.0 l/min)	1.1
Safety Interlock	
Interlock Circuit Resistance	3.3 kOhm $\pm 5\%$ +2 Ohm/m cable length
Thermoswitch	Yes, 70°C $\pm 5^{\circ}\text{C}$ , reset temp $> 30^{\circ}\text{C}$

1 Pigtail fibers: Cladding diameter up to and equal 500  $\mu\text{m}$ :  $\leq 20$  mrad.

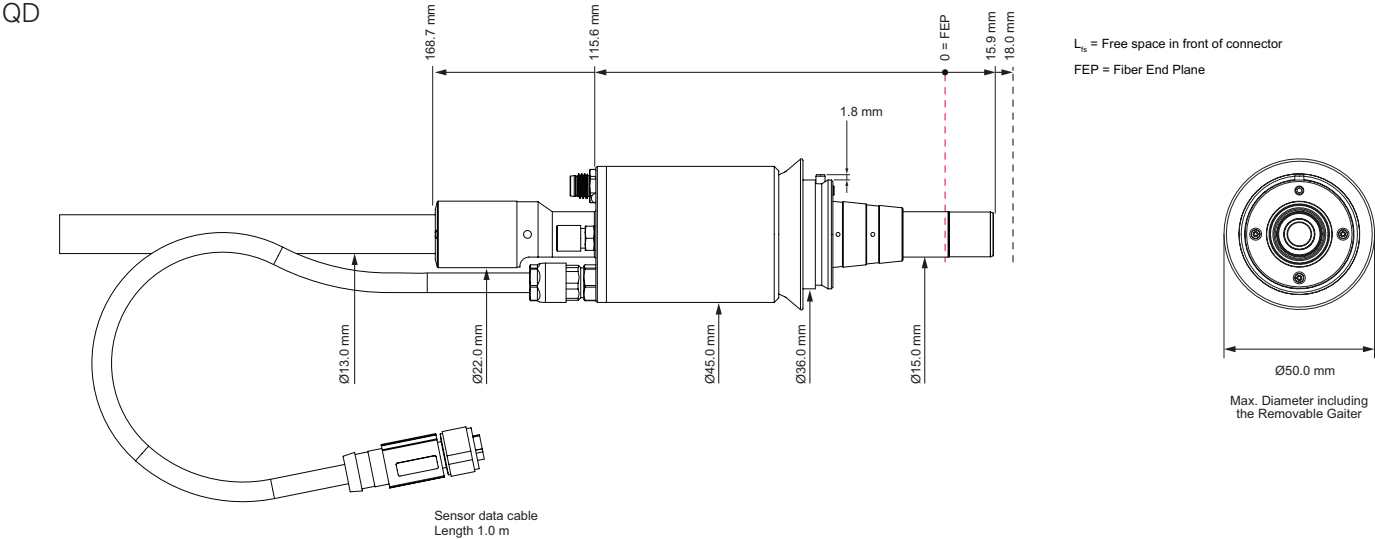
2 Within specified fiber NA.

3  $\leq 100$  m cable length.

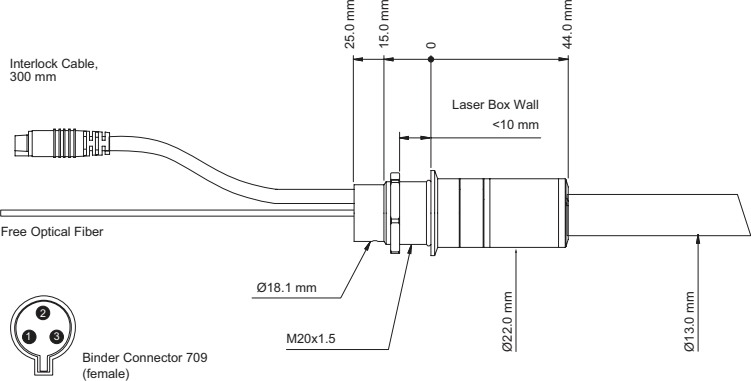
Dimensions & Weight	
Dimensions	See pages 3 to 4
Weight (kg)	
Fiber Connector	0.7
Per Meter Fiber Cable	0.2
Environmental Conditions	
Humidity (% RH)	<80
Operating Temperature (°C)	5 to 50 (non-condensing)
Storage Temperature (°C)	-20 to 70
Compliance Information	
RoHS	Directives 2011/65/EU and 2015/863/EU
REACH	Directive EC no 1907/2006

**Mechanical Specifications**

**Connector Dimensions**



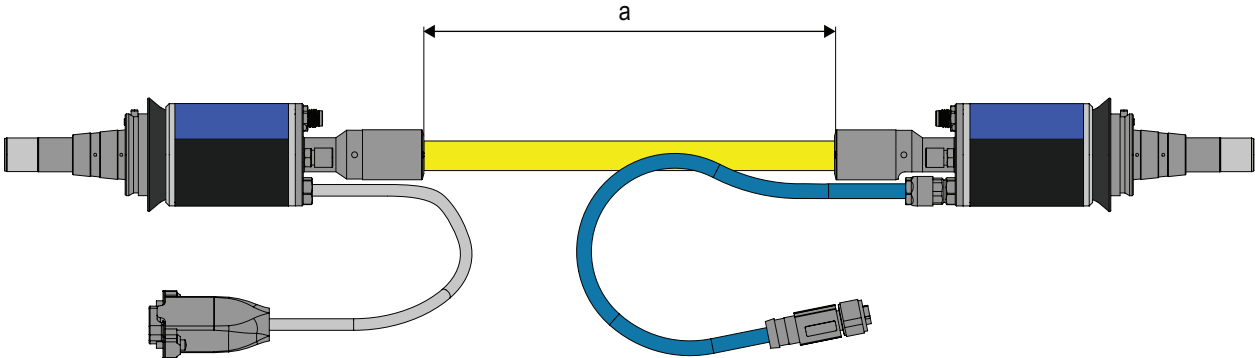
**Pigtail Ending**



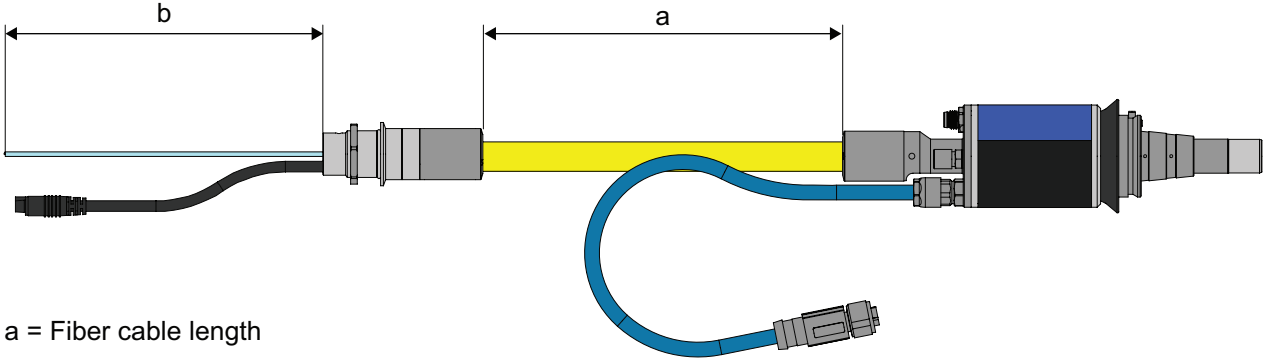
Mechanical Specifications

Length Definitions

Two Connectors



One Connector (Pigtail)



a = Fiber cable length  
b = Free optical fiber length

**Part Numbers**

**Circular Fiber Core, Two Connectors**

	5m	10m	15m	20m	30m	35m	50m
50 μm	2337935	2337936	2337937	2337938	2337939	2337940	2337941
100 μm	2337942	2337943	2337944	2337945	2337946	2337947	2337948
150 μm	2337949	2337950	2337951	2337952	2337953	2337954	2337955
200 μm	2337956	2337957	2337958	2337959	2337960	2337961	2337962
300 μm	2337963	2337964	2337965	2337966	2337967	2337968	2337969
400 μm	2337970	2337971	2337972	2337973	2337974	2337975	2337976
600 μm	2337977	2337978	2337979	2337980	2337981	2337982	2337983
800 μm	2337984	2337985	2337986	2337987	2337988	2337989	2337990
1000 μm	2337991	2337992	2337993	2337994	2337995	2337996	2337997

**Circular Fiber Core, One Output Connector (Pigtail)**

	2m	3m	5m	10m	15m	20m	25m
20/395 μm	2337998	2337999	2338000	2338001	2338002	2338003	2338004
50/360 μm	2338005	2338006	2338007	2338008	2338009	2338010	2338011
100/360 μm	2338012	2338013	2338014	2338015	2338016	2338017	2338018

Note: Free fiber length b>1.0m

**Square Formed Fiber Core, Two Connectors**

	5m	10m	15m	20m	30m	35m	50m
100x100 μm	2338019	2338020	2338021	2338022	2338023	2338024	2338025
200x200 μm	2338026	2338027	2338028	2338029	2338030	2338031	2338032
400x400 μm	2338033	2338034	2338035	2338036	2338037	2338038	2338039
600x600 μm	2338040	2338041	2338042	2338043	2338044	2338045	2338046
800x800 μm	2338047	2338048	2338049	2338050	2338051	2338052	2338053
1000x1000 μm	2338054	2338055	2338056	2338057	2338058	2338059	2338060

Customized lengths and dimensions are available upon request.

Fiber Optic Cable Accessories

Accessory	Part Number
QD Protection Window, Input Side, 1030 to 1090 nm	2217239
QD Protection Window, Output Side, 1030 to 1090 nm	2216860

Hybrid Fibers

The flexible Coherent fiber cable design makes it possible for us to not only offer fiber cables with same type of connectors on both sides but also hybrid fibers where customer select input and output connectors. For many end-users, this is a simple and cost-efficient way to connect laser and process head even in cases where they don't share the same fiber interface. For pigtail fibers, it is possible to have the pigtail termination for splicing at either input or output side of the fiber cable.

