

**LASER BASED - OPEN PATH GAS DETECTOR
ISA DATA SHEET**



Highlighted Specifications (Quick Glance Guide)	1	Manufacturer / Product Name / Model	Boreal Laser Inc. / GasFinder3 Line-of-Sight / GasFinder3-SP
	2	Technology Type (Measurement Principle)	Laser Based - Open Gas Detector (Tunable Diode Laser Absorption Spectroscopy)
	3	Warranty Period	10 years on Laser (Light Source) and 3 years Full Warranty
	4	Hazardous Area Classification	UL Certified (US/CAN): Class 1, Zone 1, AEx db ib IIC T5 Gb - Pending Certification
	5	Eye Safety	Class 1 AEL under IEC 60825-1 (e.g. No Engineering Safeguards or PPE Required)
	6	Safety Integrity Level	SIL2 Capable Hardware as per FMEDA Analysis in IEC/CSA-C22.22.2 No. 61508
	7	Performance Standards	Verified per ANSI ISA-92.00.04-2014 Performance Requirements for Open Path Toxic Gas Detectors
	8	Material of Construction	6061-T6 Aluminum, Powder Coating Tiger Drylac 138 (All External Components)
	9	Ingress Protection	IP 66 & NEMA Type 4X
	10	Operating Temperature Range	-50 to 65°C (-58 to 149°F)
	11	LED Status Indication (Front & Back)	Status Conditions: Green = Fully Functional, Yellow = Misaligned/Beam Block or Fault, Red: Gas Alarm
	12	LCD Display	Concentration, Light Level (Alignment), Status (Beam Block, Fault, & Gas Alarm), Time Delay Settings
	13	Communication Outputs	HART 7 (over Analog), Dry-Contact Relay, & MODBUS
	14	Mounting Orientation Relative to Structure	Top Mount, Bottom Mount, or Side Mount (Hanging, Perched, or Vertical)
	General Mechanical Information	15	Tools Required to Perform Alignment
16		Components Included	GasFinder3 Line-of-Sight: Instrument Enclosure, Sunshield, and Alignment Mount
17		Material of Construction	6061-T6 Aluminum, Powder Coating Tiger Drylac 138 (All External Components)
18		Overall Dimensions (LxWxH)	57 x 29 x 29 cm (22.4 x 11.5 x 11.5 inches)
19		Instrument Weight	6.5 kg (13 lbs)
20		Alignment Mount Weight	4 kg (9 lbs)
21		Overall Weight	10.5 kg (23 lbs)
Enclosure Specifics	22	Shipping Weight	12 kg (26 lbs)
	23	Material of Construction	6061-T6 Aluminum, Powder Coating Tiger Drylac 138 - Instrument Enclosure, and Sunshield
	24	Hazardous Area Classification	Class 1, Zone 1, AEx db ib IIC T5 Gb
	25	Method of Protection	Two Parts: Explosion Proof (XP Enclosure) and Intrinsic Safety (IS Section)
	26	Ingress Protection	IP 66 & NEMA Type 4X
	27	Operating Temperature Range	-50 to 65°C (-58 to 149°F)
	28	Storage Temperature	-50 to 65°C (-58 to 149°F)
Alignment Mount	29	Cable Entries and Size	Three (3) - 3/4" FNPT Entries
	30	Cable Glands/Fittings	Not included and to be supplied by End-User to meet local electrical standards and area classifications
	31	Sunshield	Standard sunshield included. Extended shroud available as optional accessory.
	32	Material of Construction	6061-T6 Aluminum, Powder Coating Tiger Drylac 138
	33	Mounting Orientation Relative to Structure	Top Mount, Bottom Mount, or Side Mount (Hanging, Perched, or Vertical)
Alignment Tools	34	Locking Mechanism	Integrated Handle on the Alignment Mount to provide mechanical advantage needed
	35	Adjustment Mechanism	Integrated Adjustment Knobs
	36	Connecting Enclosure to Alignment Mount	3/16" hex Coupling/Extractive Bolt to easily affix or remove the Enclosure
	37	Degrees of Adjustments	18° total angle pitch and yaw
	38	Tools Required to Perform Alignment	None - Everything needed to perform the alignment is integral to the GasFinder3 Line-of-Sight
Optical Specifications	39	Status/Operability During Alignment	GasFinder3 Line-of-Sight remains fully functional and maintains its area classification
	40	Rough Alignment (Integrated Tool)	Iron Sights located on top of the GasFinder3 Line-of-Sight
	41	Coarse Alignment (Integrated Tool)	LED Status Indication located on the front and back of the GasFinder3 Line-of-Sight
	42	Fine Alignment (Integrated Tool)	LCD Display provides indication of amount of received Laser Light (Rx)
General Performance Specifications	43	Function	Detects free gaseous molecules of one (1) specific target gas within the Active Measurement Path
	44	Detection/Operating Principle	Tunable Diode Laser Absorption Spectroscopy (TDLAS)
	45	Sensor Type	One (1) Semiconductor Diode Laser which emits Laser Light in the Near Infrared (NIR)
	46	Eye Safety	Class 1 AEL under IEC 60825-1 (e.g. No Engineering Safeguards or PPE Required)
	47	Optical Configuration	Transceiver and Retro-Reflector (Mono-Static)
	48	Beam Divergence (Laser Dot Size)	0.05° / 0.9 milliradian (milliradian x path length (m) = laser dot size (mm))
	49	Obscuration / Beam Block	Operates down to 97% Obscuration (40x Turndown)
	50	Solar Blind	No False Positives from Solar Interference
	51	Active Measurement Path - Temperature	-50 to 300°C (-58 to 600°F)
	52	Active Measurement Path - Humidity	0-100% RH (Non-Condensing)
	53	Active Measurement Path - Pressure	50 to 200 kPaa (7.25 to 29 psia)
General Performance Specifications	54	Window Material	Lexan, Mylar, or Teflon
	55	Safety Integrity Level	SIL2 Capable Hardware as per FMEDA Analysis in IEC/CSA-C22.22.2 No. 61508
	56	Performance Standards	Verified per ANSI ISA-92.00.04-2014 Performance Requirements for Open Path Toxic Gas Detectors
	57	Response Time	1.6 Seconds per Sample
	58	Recovery Time	Instantaneous (Each sample is independent of the last)
	59	Beam Block Time Delay	Default - 30 Seconds (Configurable Range: 0-300 Seconds)
	60	Gas Alarm Time Delay (Relay Output Only)	Default - 3 Seconds (Configurable Range: 0-5 Seconds)
	61	Accuracy	±2% of Reading
	62	Drift	±0.1% over operating temperature and pressure ratings
	63	Warm-up / Start-up Time	~2 Minutes @ 20°C (68°F) - variable for colder ambient temperatures
	64	Communication Outputs	HART 7 (over Analog), Dry-Contact Relay, & MODBUS
65	EMI/RFI	Pending	

Intervention, Calibration, Diagnostic, and Fail-Safe Capabilities	66	Calibration	Factory calibrated with no requirement for periodic/inherent calibration
	67	Field Calibration	None Required or Available
	68	Automatic Validation	Internal Reference Cell (interrogated once a minute to ensure laser light emitted is at correct wavelength)
	69	User Function Testing	External Response Cell to "bump", "test" or "challenge" response to the target gas (Optional Accessory)
	70	Fault Diagnostics	Fail Safe Operation - Status Codes via Outputs, LEDs, LCD Display, HMI Service Module, and Logfiles
	71	User Intervention on Start-up	None Required (if Aligned)
	72	LED Status Indication (Front & Back)	Green = Fully Functional, Yellow = Misaligned/Beam Block, or Fault, Red = Gas Alarm
	73	LCD Display	Concentration, Light Level (Alignment), Status (Beam Block, Fault, & Gas Alarm), Time Delay Settings
	74	Internal Data Logging	User has access to 20 years worth of storage capacity via USB Stick
Power Requirements	75	Accessing Logfiles and Arrays	USB Thumb drive will automatically download daily Logfiles/Array at midnight each night
	76	Input Voltage Required	24 VDC (24-30 VDC)
	77	Input Power Wiring Options	4-Wire Isolated (Passive/Sink), 3-Wire (Active/Source), and 3-Wire (Passive/Sink)
	78	Polarity Protection	Internal biasing diode for reverse polarity protection
	79	Power/Communication Terminals Size	16 AWG recommended, 14-24 AWG
	80	Power Consumption	20 Watts under Normal Operation
	81	In-Rush Current	Non-Hydrogen Fluoride (HF): 2.5A for 100ms & Hydrogen Fluoride (HF): 3.1A for 100ms
	82	Recommended External Fuse	4A Fast Blow Fuse
Analog Output	83	Number of Analog Loops	One (1) HART 7 over Analog Loop
	84	HART	PV = ppm-m, SV = Light Level (Rx), TV = R2 Confidence Factor (R2), QV = 2nd ppm-m (Full Scale)
	85	Device Drivers	Available for download at www.boreal-laser.com
	86	Supply of Loop Power	4-Wire Isolated (Passive/Sink), 3-Wire (Active/Source), and 3-Wire (Passive/Sink)
	87	Configurable Analog Output Options	Concentration (ppm-m, ppm, %, or mg/Nm3), Light Level (Rx), & R2 Confidence Factor (R2)
	88	Analog Range Settings	Gas Specific, See Gas Specifications
	89	Analog Load Impedance	1,000 ohms (4 Devices)
	90	Analog Range	0-20 mA
	91	Low Light Alarm (Beam Block)	2.7 mA
	92	General System Fault	3.6 mA
Relay Output	93	Number of Relay Outputs	One (1) Isolated Digital Relay
	94	Configurable Relay Output Options	Hi-Alarm, Hi-Hi-Alarm, Low Light (Low Rx), Alarm, & General System Fault
	95	Contact Relay Type	Voltage Free (24 V, 1A Max)
	96	Terminals	Normally Open (N/O), Normally Closed (N/C), and Common (COM)
	97	Alarm Threshold Settings	User Programmable via Wireless Interface, HMI Touchscreen, or HART Communicator
MODBUS	98	Alarm Delay	Default - 3 Consecutive Samples (User Programable from 0 to 5 Consecutive Samples)
	99	Beam Block Time Delay	Default - 30 Consecutive Samples (User Programmable from 0 to 300 Consecutive Samples)
	100	MODBUS	RS-485 - See Address Register Map for more information
Interface Options	101	Commonly Used Registers	Concentration (ppm-m) - 41001, Light Level (Rx) - 41101, & Confidence Factor (R2) - 41061
	102	LED Status on Front and Back	LED Status Colours: Green = Normal Operation, Yellow = Beam Block/Fault, Red = Gas Alarm
	103	Wireless Interface	Full Configuration & Alignment Capabilities: Wi-Fi Transmitted to Mobile/Tablet/Computer
	104	HMI Service Module (Optional Accessory)	Full Interface Capabilities: Configuration, Alignment, Access to Logfiles, and Upload Firmware
	105	HART Communicator (User Supplied)	Limited Interface Capabilities: Basic Commissioning including Alignment - Laser Light (Rx)
Retro-Reflector (Separate from the GasFinder3-LoS)	106	Retro-Enclosure - Material	304 Stainless Steel (SST), Powder Coated Steel, or Fiberglass Reinforced Plastic (FRP)
	107	Retro-Enclosure - Rain/Dust Hood	Included with Retro-Enclosure
	108	Retro-Enclosure - Temperature Range	-45°C to +120°C (-49°F to 248°F)
	109	Retro Enclosure - Cable Entry	None
	110	Retro Enclosure - Cable Glands	None
	111	Retro-Enclosure - Window Material	Lexan, Mylar, or Teflon (Gas/Application Dependent)
	112	Retro-Enclosure - Area Classification	None
	113	Retro-Enclosure - Ingress Protection	None, Weathertight
	114	Retro-Array - Short Path Lengths	Grey Tape (G) = 0.5-5 m or IMOS (M) = 5-20 m
	115	Retro-Array - Medium Path Lengths	Wafer Array = 20-50 m, Fourteen (14) Cornercube = 20-100 m
	116	Retro-Array - Long Path Lengths	Fourteen (14) Cornercube = 20-100 m or Twenty-One (21) Cornercube = 20-200 m
	117	Retro-Array - Cornercube Specification	63.5 mm (2.5") Cornercube at 30 arc-seconds
	118	Retro-Heater - Power Options	24 VDC @ 25W or 110-240 VAC @ 50W
	119	Retro-Heater - Thermostat	40°C Thermostat
Recommended Accessories	120	Retro-Heater - Area Classification	Class.1 Div.1 Gr.A,B,C,D T4
	121	Retro Heater - Termination	Heater and Thermostat are Mounted with flying leads (to be installed as per local electrical standards)
	122	Retro-Reflector - Total Weights - SST	Small SST - ___ kg (___ lbs) & Large SST - 15 kg (34 lbs): Includes Enclosure, Largest Array, and Heater.
	123	Retro-Reflector - Total Weights - FRP	Small FRP - ___ kg (___ lbs) & Large FRP - ___ kg (___ lbs): Includes Enclosure, Largest Array, and Heater.
	124	Post Mounted Bracket	Stainless Steel Bracket for mounting the GasFinder3-LoS onto a 4-6" Post (No Hardware Included)
Latest Revision	125	Response Cell	Used for Functional Testing - to "bump", "test" or "challenge" response to the target gas
	126	HMI Service Module	Handheld Touchscreen Display that connects via RJ12 Connector
	127	2024-05-30	