

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



<b>General</b>	1	Manufacturer	Boreal Laser Inc.	
	2	Analyzer Model No.	GasFinder3-OP (Portable Open Path) Assembly (e.g. BL-GF3-OP-____-____)	
	3	Warranty Period	10 years on Laser (Light Source) and 3 years Full Warranty	
<b>Detector Specifications</b>	4	Detection/Operating Principle	Tunable Diode Laser Absorption Spectroscopy (TDLAS)	
	5	Sensor Type	One (1) Semiconductor Diode Laser which emits Laser Light in the Near Infrared (NIR)	
	6	Eye Safety	Class 1 AEL under IEC 60825-1	
	7	Function	Detects/monitors free gaseous molecules of one (1) specific target gas	
	8	Calibration	Factory calibrated with no requirement for periodic/inherent calibration	
	9	Field Calibration	None Required or Available	
	10	Automatic Validation	Internal Reference Cell (interrogated once a minute)	
	11	User Function Testing	External Response Cell to "bump", "test" or "challenge" (Optional Accessory)	
	12	Response Time	One sample per second	
	13	Recovery Time	Instantaneous (Each sample is independent of the last)	
	14	Accuracy	±2% of Reading	
	15	Internal Temperature Compensation	Dynamic (Piezo Resistive) or Manual Entry: -55°C to +150°C (-67°F to +302°F)	
	16	Internal Pressure Compensation	Dynamic (MEMS) or Manual Entry: 50 to 200 KPaA (7.25 to 29 PSiA)	
	17	Drift	±0.1% over operating temperature and pressure ratings	
	18	Warm-up / Start-up Time	2 Minutes	
	<b>Enclosure Specifications</b>	19	User Intervention on Start-up	None Required
		20	Active Measurement Path - Temperature	-55 to +300°C (-67 to 600°F)
21		Active Measurement Path - Humidity	0-100% RH (Non-Condensing)	
22		Active Measurement Path - Pressure	50 to 200 KPaA (7.25 to 29 PSiA)	
23		Fault Diagnostics	Fail Safe Operation with Status Codes visible via HMI Service Module, Interface and Logfiles	
24		Internal Data Logging	User has access to 20 years worth of storage capacity via USB Stick	
25		Obscuration / Beam Block	Operates down to 97% Obscuration (40x Turndown)	
26		Solar Blind	No False Positives from Solar Interference	
27		Area Classification	General Purpose	
<b>Power Requirements</b>	28	Operating Temperature Range	-55 to +65°C (-67 to 149°F)	
	29	Storage Temperature	-55 to +65°C (-67 to 149°F)	
	30	Ingress Protection	Weather Tight	
	31	Enclosure Material	Potted Aluminium	
	32	Enclosure Dimensions (LxWxH)	260 x 200 x 160 mm (10.2 x 7.9 x 6.3 in)	
	33	Enclosure Weight	5.0 kg (11.0 lbs)	
	34	Mounting Hardware Configuration	Bottom mount with one (1) 3/8" - 16 and four (4) 0.281" - thru holes	
	35	Cable Glands/Fittings	Military Connectors for Power and Communication	
<b>Analog Output</b>	36	Power/Communication Terminals	12 or 24 VDC Power Supplies with Military Connector for Power Connection	
	37	Input Voltage	24 VDC (24-30 VDC)	
	38	Power Consumption	20 Watts under Normal Operation	
	39	In-Rush Current	2.5A for 100ms	
	40	Recommended External Fuse	4A Fast Blow Fuse	
	41	Number of Analog Loops	One Analog Loop (0-20mA)	
	42	Supply of Loop Power	Active/Source (Device Powered Loop)	
<b>MODBUS</b>	43	Configurable Analog Output Options	Concentration (ppm-m, ppm, or mg/Nm3), Light Level (Rx), & R2 Confidence Factor (R2)	
	44	Analog Range Settings	User Programmable via HMI Touchscreen	
	45	Analog Load Impedance	1,000 ohms (4 Devices)	
	46	Analog Range	0-20 mA	
<b>Interface</b>	47	Low Light Alarm (Beam Block)	2.7 mA	
	48	General System Fault	3.6 mA	
<b>Interface</b>	49	MODBUS	RS-485 - See Address Register Map for more information	
	50	Commonly Used Registers	Concentration (ppm-m) - 41001, Light Level (Rx) - 41101, & Confidence Factor (R2) - 41061	
<b>Interface</b>	51	HMI Touchscreen	Full Interface Capabilities: Configuration, Alignment, Access to Logfiles, and Upload Firmware	

<b>Lo-Range Hydrogen Fluoride (HFL)</b>	52	Minimum Detectable Limit (MDL)	0.4 ppm-m
	53	Sensitivity	0.1 ppm-m
	54	Full Scale	250 ppm-m (analog range(s) are user programmable)
	55	Lowest Actionable Concentration	0.8 ppm-m (2x MDL)
	56	Lowest Recommended Alarm Threshold	2 ppm-m (5x MDL)
	57	Maximum Recommended Path Length	500 m
<b>Hi-Range Hydrogen Fluoride (HFH)</b>	58	Maximum Recommended Cable Length	300 m
	59	Minimum Detectable Limit (MDL)	4 ppm-m
	60	Sensitivity	1 ppm-m
	61	Full Scale	1,000 ppm-m (analog range(s) are user programmable)
	62	Lowest Actionable Concentration	8 ppm-m (2x MDL)
	63	Lowest Recommended Alarm Threshold	20 ppm-m (5x MDL)
<b>Lo-Range Ammonia (NH3L)</b>	64	Maximum Recommended Path Length	500 m
	65	Maximum Recommended Cable Length	300 m
	66	Minimum Detectable Limit (MDL)	8 ppm-m
	67	Sensitivity	2 ppm-m
	68	Full Scale	6,500 ppm-m (analog range(s) are user programmable)
	69	Lowest Actionable Concentration	16 ppm-m (2x MDL)
<b>Hi-Range Ammonia (NH3H)</b>	70	Lowest Recommended Alarm Threshold	40 ppm-m (5x MDL)
	71	Maximum Recommended Path Length	500 m
	72	Maximum Recommended Cable Length	300 m
	73	Minimum Detectable Limit (MDL)	40 ppm-m
	74	Sensitivity	10 ppm-m
	75	Full Scale	15,000 ppm-m (analog range(s) are user programmable)
<b>Ultra Hi-Range Ammonia (NH3UH)</b>	76	Lowest Actionable Concentration	80 ppm-m (2x MDL)
	77	Lowest Recommended Alarm Threshold	200 ppm-m (5x MDL)
	78	Maximum Recommended Path Length	500 m
	79	Maximum Recommended Cable Length	300 m
	80	Minimum Detectable Limit (MDL)	4,000 ppm-m
	81	Sensitivity	1,000 ppm-m
<b>Lo-Range Methane (CH4L)</b>	82	Full Scale	1,000,000 ppm-m (analog range(s) are user programmable)
	83	Lowest Actionable Concentration	8,000 ppm-m (2x MDL)
	84	Lowest Recommended Alarm Threshold	20,000 ppm-m (5x MDL)
	85	Maximum Recommended Path Length	500 m
	86	Maximum Recommended Cable Length	300 m
	87	Minimum Detectable Limit (MDL)	2 ppm-m
<b>Hi-Range Methane (CH4H)</b>	88	Sensitivity	0.5 ppm-m
	89	Full Scale	8,500 ppm-m (analog range(s) are user programmable)
	90	Lowest Actionable Concentration	4 ppm-m (2x MDL)
	91	Lowest Recommended Alarm Threshold	10 ppm-m (5x MDL)
	92	Maximum Recommended Path Length	500 m
	93	Maximum Recommended Cable Length	300 m
<b>Lo-Range Hydrogen Sulphide (H2SL)</b>	94	Minimum Detectable Limit (MDL)	100 ppm-m
	95	Sensitivity	25 ppm-m
	96	Full Scale	500,000 ppm-m or 10 LEL-m (analog range(s) are user programmable)
	97	Lowest Actionable Concentration	200 ppm-m (2x MDL)
	98	Lowest Recommended Alarm Threshold	500 ppm-m (5x MDL)
	99	Maximum Recommended Path Length	500 m
<b>Hi-Range Hydrogen Sulphide (H2SH)</b>	100	Maximum Recommended Cable Length	300 m
	101	Minimum Detectable Limit (MDL)	100 ppm-m
	102	Sensitivity	25 ppm-m
	103	Full Scale	100,000 ppm-m (analog range(s) are user programmable)
	104	Lowest Actionable Concentration	200 ppm-m (2x MDL) to 500 ppm-m
	105	Lowest Recommended Alarm Threshold	500 ppm-m (5x MDL)
<b>Hydrogen Chloride (HCl)</b>	106	Maximum Recommended Path Length	500 m
	107	Maximum Recommended Cable Length	300 m
	108	Minimum Detectable Limit (MDL)	1,000 ppm-m
	109	Sensitivity	250 ppm-m
	110	Full Scale	500,000 ppm-m (analog range(s) are user programmable)
	111	Lowest Actionable Concentration	2,000 ppm-m (2x MDL)
<b>Hydrogen Cyanide (HCN)</b>	112	Lowest Recommended Alarm Threshold	5,000 ppm-m (5x MDL)
	113	Maximum Recommended Path Length	500 m
	114	Maximum Recommended Cable Length	300 m
	115	Minimum Detectable Limit (MDL)	2 ppm-m
	116	Sensitivity	0.5 ppm-m
	117	Full Scale	2,500 ppm-m (analog range(s) are user programmable)
<b>Hydrogen Cyanide (HCN)</b>	118	Lowest Actionable Concentration	1 ppm-m (2x MDL)
	119	Lowest Recommended Alarm Threshold	10 ppm-m (5x MDL)
	120	Maximum Recommended Path Length	200 m (2-Channels Only)
	121	Maximum Recommended Cable Length	300 m (2-Channels Only)
	122	Retro-Array Requirements	Limited to Wafer Retro-Array and Cornercube Retro-Array
	123	Minimum Detectable Limit (MDL)	8 ppm-m
<b>Hydrogen Cyanide (HCN)</b>	124	Sensitivity	2 ppm-m
	125	Full Scale	5,000 ppm-m (analog range(s) are user programmable)
	126	Lowest Actionable Concentration	16 ppm-m (2x MDL)
	127	Lowest Recommended Alarm Threshold	40 ppm-m (5x MDL)
	128	Maximum Recommended Path Length	500 m
	129	Maximum Recommended Cable Length	300 m

<b>Lo-Range Carbon Monoxide (COL)</b>	130	Minimum Detectable Limit (MDL)	8 ppm-m
	131	Sensitivity	2 ppm-m
	132	Full Scale	8,500 ppm-m (analog range(s) are user programmable)
	133	Lowest Actionable Concentration	4 ppm-m (2x MDL)
	134	Lowest Recommended Alarm Threshold	40 ppm-m (5x MDL)
	135	Maximum Recommended Path Length	50 m with one (1) OPX Head and 20m with two (2) OPX Heads
	136	Maximum Recommended Cable Length	5 m (2-Channels Only)
	137	Special Note	Visible Laser function from Optical Multi-Meter will not work with COL Transceivers
<b>Hi-Range Carbon Monoxide (COH)</b>	138	Retro-Array Requirements	Limited to Wafer Retro-Array and Cornercube Retro-Array
	139	Minimum Detectable Limit (MDL)	250 ppm-m
	140	Sensitivity	60 ppm-m
	141	Full Scale	500,000 ppm-m (analog range(s) are user programmable)
	142	Lowest Actionable Concentration	500 ppm-m (2x MDL)
	143	Lowest Recommended Alarm Threshold	1,250 ppm-m (5x MDL)
	144	Maximum Recommended Path Length	500 m
<b>Ultra Lo-Range Carbon Dioxide (CO2UL)</b>	145	Maximum Recommended Cable Length	300 m
	146	Minimum Detectable Limit (MDL)	0.4 ppm-m
	147	Sensitivity	0.1 ppm-m
	148	Full Scale	250 ppm-m (analog range(s) are user programmable)
	149	Lowest Actionable Concentration	0.8 ppm-m (2x MDL)
	150	Lowest Recommended Alarm Threshold	2 ppm-m (5x MDL)
	151	Maximum Recommended Path Length	Saturation will occur over a 0.5m Path Length if measuring ambient concentrations
<b>Lo-Range Carbon Dioxide (CO2L)</b>	152	Maximum Recommended Cable Length	20 m
	153	Special Note	2-Channels Only & Atmospheric Concentrations can vary from 400-1,000 ppm
	154	Minimum Detectable Limit (MDL)	120 ppm-m
	155	Sensitivity	30 ppm-m
	156	Full Scale	60,000 ppm-m (analog range(s) are user programmable)
	157	Lowest Actionable Concentration	240 ppm-m (2x MDL)
	158	Lowest Recommended Alarm Threshold	600 ppm-m (5x MDL)
<b>Hi-Range Carbon Dioxide (CO2H)</b>	159	Maximum Recommended Path Length	100 m
	160	Maximum Recommended Cable Length	20 m
	161	Special Note	2-Channels Only & Atmospheric Concentrations can vary from 400-1,000 ppm
	162	Retro-Array Requirements	Limited to Wafer Retro-Array and Cornercube Retro-Array
	163	Minimum Detectable Limit (MDL)	500 ppm-m
	164	Sensitivity	150 ppm-m
	165	Full Scale	500,000 ppm-m (analog range(s) are user programmable)
<b>Oxygen (O2)</b>	166	Lowest Actionable Concentration	2,000 ppm-m (2x MDL)
	167	Lowest Recommended Alarm Threshold	2,500 ppm-m (5x MDL)
	168	Maximum Recommended Path Length	500 m
	169	Maximum Recommended Cable Length	300 m
	170	Special Note	Atmospheric Concentrations can vary from 400-1,000 ppm
<b>Oxygen (O2)</b>	171	Minimum Detectable Limit (MDL)	2,500 ppm-m
	172	Sensitivity	625 ppm-m
	173	Full Scale	1,000,000 ppm-m (analog range(s) are user programmable)
	174	Lowest Actionable Concentration	5,000 ppm-m (2x MDL)
	175	Lowest Recommended Alarm Threshold	12,500 ppm-m (5x MDL)
	176	Maximum Recommended Path Length	4.5 m (Full Scale Saturation at Atmospheric Concentrations)
	177	Maximum Recommended Cable Length	5 m
	178	Special Note	To meet FDA & Hazardous Area requirements, this laser has a power output limit of 0.5 mW

<b>Optical Components</b>	179	Optical Configuration	Transceiver and Retro-Reflector (Mono-Static)
	180	Physical Configuration	Integral to the GasFinder3-OP (Portable Open Path)
	181	Temperature (Laser Beam)	-45°C to +150°C (-49 to +300°F) Active Measurement Path / Process
	182	Beam Divergence	0.05° / 0.9 milliradian (milliradian x path length (m) = laser dot size (mm))
	183	Window Material	Lexan, Mylar, or Teflon
<b>Retro-Reflector</b>	184	Retro-Enclosure - Material	304 Stainless Steel (SST) or Fiberglass Reinforced Plastic (FRP)
	185	Retro-Enclosure - Rain/Dust Hood	Included with Retro-Enclosure
	186	Retro-Enclosure - Temperature Range	-45°C to +120°C (-49°F to 248°F)
	187	Retro Enclosure - Cable Entry	None
	188	Retro Enclosure - Cable Glands	None
	189	Retro-Enclosure - Window Material	Lexan, Mylar, or Teflon (Gas/Application Dependent)
	190	Retro-Array - Short Path Lengths	IMOS (M) Retro-Array 5-20 m (15-60 ft)
	191	Retro-Array - Medium Path Lengths	Wafer (W) Retro-Array 20-50 m (60-150 ft)
	192	Retro-Array - Long Path Lengths	Fourteen (14) Cornercube Retro-Array 50-100m (150-300 ft)
	193	Retro-Array - Extra Long Path Lengths	Twenty-One (21) Cornercube Retro-Array 100-200 m (300-600 ft)
	194	Retro-Array - Cornercube Specificaiton	63.5 mm (2.5") Cornercube at 30 arc-seconds
	195	Retro-Heater - Power Options	24 VDC @ 25W or 110-240 VAC @ 50W
	196	Retro-Heater - Thermostat	40°C Thermostat
	197	Retro-Heater - Area Classification	Class 1 Div 2 (Required to be installed as per local electrical code)
	198	Retro Heater - Termination	Heater and Thermostat are Mounted with flying leads (to be installed as per local electrical standards)
<b>Recommended Accessories</b>	199	Integral 4-20mA Output	BL-OP-420
	200	Tripod - GasFinder3-OP	BL-GFT
	201	Tripod - Small Retro-Enclosure	BL-SRT
	202	Tripod - Large Retro- Enclosure	BL-LRT
	203	GasFinder3-OP Carrying Case	BL-OPCC
	204	I-Beam Mounting Structure	BL-IMS
	205	Response Cell	BL-RC3-____-____ (Any two gases except HF)
	206	Tilt-Pan Scanner	BL-TPS
	207	Tilt-Pan Scanner Tripod	BL-TPT
	208	Remote Monitoring + Control Centre	BL-RMCC
	209	Calibration Certificate Extension	BL-QDRP
<b>Latest Revision</b>	210	8/18/22	