



## GasFinder MC Commissioning Checklist

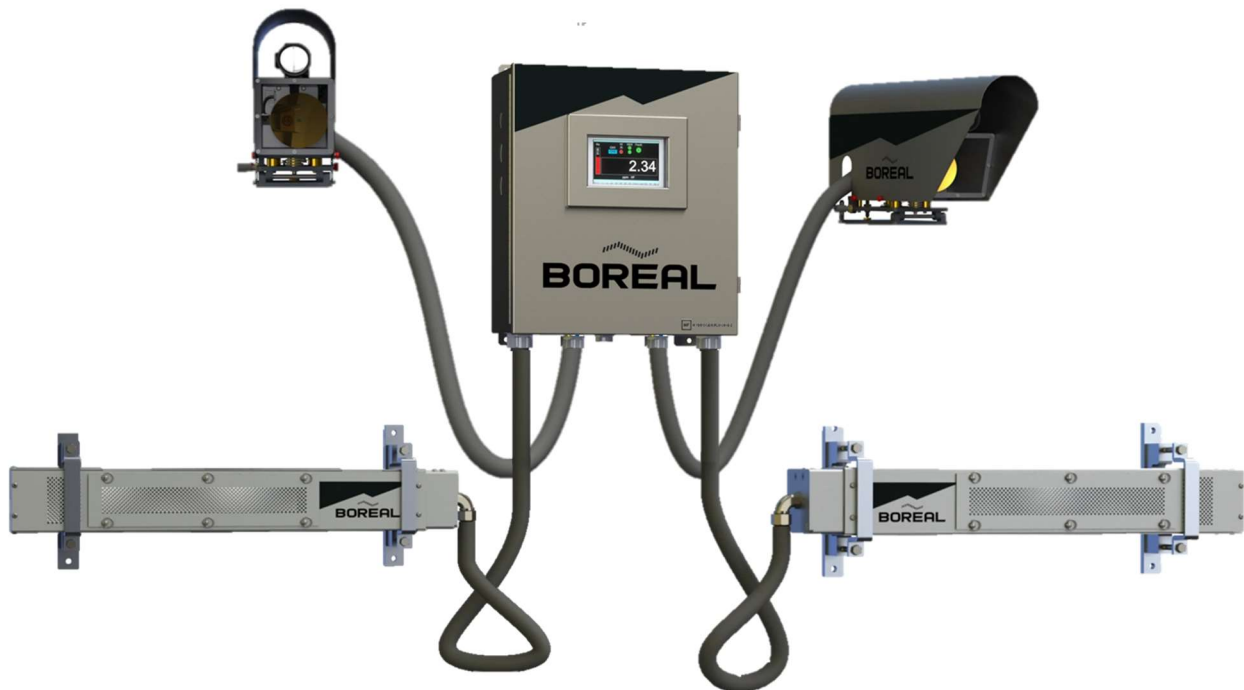
Date:

Boreal Technicians:

Client:

System Serial Number:

Tag Number:





Instrument Tag #: \_\_\_\_\_ Serial #: \_\_\_\_\_

## 1.0 Cables

1.0.1 Fiber and Coax path cables connected from OPX to MC	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
1.0.2 Liquid-tight connectors installed and tightened OPX and MC	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA

## 1.1 GasFinder DC Analyzer

1.1.1 _____ number of channels configured	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
1.1.2 Junction box installed and wired	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
1.1.3 Power source connected (120VAC, 24VDC)	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
1.1.4 Verify CCU powered up with good reference quality	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
1.1.5 Commissioning parameters recorded	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
1.1.6 Commissioning parameter defaults saved in GasFinder (6019)	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA

## 1.2 IO Module

1.2.1 _____ Analog _____ Relay Modules configured	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
1.2.2 Analog/Relay Module installed, powered and wired	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
1.2.3 4-20ma isolators specified and wired	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
1.2.4 Site connections wired	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
4-20mA	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
Dry contact relays	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
Modbus	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
1.2.5 Output modules configured for customer set points	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
1.2.6 4-20mA function test performed	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
1.2.7 Digital output relay function test performed	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
1.2.8 Modbus function test performed	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
1.2.9 IO configuration transferred and saved	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA

## 1.3 Data Communication

1.3.1 Communication with GasView demonstrated	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
1.3.2 Logging computer setup completed	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
1.3.3 Log files and Array transfers captured	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA

## 1.4 Functionality

1.4.1 All programmed channels have good Rx levels	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
1.4.2 All programmed channels outputting readings and R2	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
1.4.3 PM sheet filled out and gone over	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
1.4.4 Training with site personnel	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA



## 2.0 System Quality Checks

2.1 Reference Check: Quality = \_\_\_\_\_%  $R^2$  = \_\_\_\_\_ Light = \_\_\_\_\_

*Since system may be at a different temperature than during calibration, Ref check may read anywhere within acceptable limits of 5% - 500%, typically between 80% and 120%,  $R^2$  should be >80.*

2.2 Ramp DC Offset Recorded = \_\_\_\_\_

## 3.0 Final Check

3.0.1 Doors/covers closed, and tightened	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA
3.0.2 OPX covers installed and screws tightened	<input type="checkbox"/> Yes/ <input type="checkbox"/> No/ <input type="checkbox"/> NA



## Function Tests

### 4-20mA Function Test

The system is equipped with 4-20mA outputs, which are active source (4-20mA) unless optionally isolated from the customer's system.

*4-20mA Configuration*

IO	MC Channel #	Configuration (ppmm,ppm Rx, R2)	4 mA	20 mA
AM1-AO1			0	
AM1-AO2			0	
AM1-AO3			0	
AM1-AO4			0	
AM2-AO1			0	
AM2-AO2			0	
AM2-AO3			0	
AM2-AO4			0	

### 4-20mA Function Test

IO	0%	Reading mA <sup>1</sup>	50%	Reading mA <sup>2</sup>	100%	Reading mA <sup>3</sup>	0%	Reading mA <sup>4</sup>	Low Light Fault mA <sup>5</sup>	System Fault mA <sup>6</sup>
AM1-AO1										
AM1-AO2										
AM1-AO3										
AM1-AO4										
AM2-AO1										
AM2-AO2										
AM2-AO3										
AM2-AO4										

1. Target reading is 4 mA
2. Target reading is 12 mA ( $4+50\%*(20-4)=12$ )
3. Target reading is 20 mA
4. Target reading is 4 mA for ppm2 and ppm1 and ~17mA for Light
5. Target reading is ~2.7 mA
6. Target reading is 3.6 mA

4-20mA Module output Test     Pass/  No/ NA

Initial: \_\_\_\_\_



## Relay Function Test

The system is equipped with digital output relays, which can be user configured. All systems come programmed with relays set to Failsafe operation.

### *Alarm contact configuration*

IO	MC Channel #	Configuration (Hi, Hi-Hi, Fault, Rx)	Set	Clear
IM1-DO1				
RM1-DO1				
RM1-DO2				
RM1-DO3				
RM1-DO4				
RM1-DO5				
RM1-DO6				

<b>NO FAULT TEST</b>				
IO	Relay N/O (Red)	Relay N/C (White)	IO Module LED (red/green)	Pass (y/n)
IM1-DO1				
RM1-DO1				
RM1-DO2				
RM1-DO3				
RM1-DO4				
RM1-DO5				
RM1-DO6				

\*N/O in powered state is closed with no fault

\*\*N/C in powered state is open with no fault

<b>UNDER FAULT TEST</b>				
IO	Relay N/O (Red)	Relay N/C (White)	IO Module LED (red/green)	Pass (y/n)
IM1-DO1				
RM1-DO1				
RM1-DO2				
RM1-DO3				
RM1-DO4				
RM1-DO5				
RM1-DO6				

Relay Module Test

Pass/  No/ NA

Initial \_\_\_\_\_



## MODBUS Function Test

The system is equipped with RS485 serial MODBUS output. The values output follow the register map below.

### Standard Modbus Output Registers for GasFinder Analyzers

Mode: Slave, Binary/RTU, Decimal Integers.

Com Port Out: RS485 1/Variable Baud/8/N/1

#### Register assignments GAS A (RS485):

Channel	ppmm High	ppmm Low	ppmm Decimal	R2	Distance Decimeter	Light	Seconds	Status High	Status Low	ppm	ppm Decimal
1	41001	41021	41041	41061	41081	41101	41121	41141	41161	41181	41201
2	41002	41022	41042	41062	41082	41102	41122	41142	41162	41182	41202
3	41003	41023	41043	41063	41083	41103	41123	41143	41163	41183	41203
4	41004	41024	41044	41064	41084	41104	41124	41144	41164	41184	41204
5	41005	41025	41045	41065	41085	41105	41125	41145	41165	41185	41205
6	41006	41026	41046	41066	41086	41106	41126	41146	41166	41186	41206
7	41007	41027	41047	41067	41087	41107	41127	41147	41167	41187	41207
8	41008	41028	41048	41068	41088	41108	41128	41148	41168	41188	41208
9	41009	41029	41049	41069	41089	41109	41129	41149	41169	41189	41209
10	41010	41030	41050	41070	41090	41110	41130	41150	41170	41190	41210
11	41011	41031	41051	41071	41091	41111	41131	41151	41171	41191	41211
12	41012	41032	41052	41072	41092	41112	41132	41152	41172	41192	41212
13	41013	41033	41053	41073	41093	41113	41133	41153	41173	41193	41213
14	41014	41034	41054	41074	41094	41114	41134	41154	41174	41194	41214

\$GFDBG	Internal Temp	Internal Temp Decimal	DC Offset	Ref Qual	Ref R2	Ref Status High	Ref Status Low	Supply Voltage	Amb Pressure High	Amb Pressure Low
	41300	41301	41302	41303	41304	41305	41306	41307	41308	41309



**Register assignments GAS B (RS485):**

Channel	ppmm High	ppmm Low	ppmm Decimal	R2	Distance Decimeter	Light	Seconds	Status High	Status Low	ppm	ppm Decimal
1	41501	41521	41541	41561	41581	41601	41621	41641	41661	41681	41701
2	41502	41522	41542	41562	41582	41602	41622	41642	41662	41682	41702
3	41503	41523	41543	41563	41583	41603	41623	41643	41663	41683	41703
4	41504	41524	41544	41564	41584	41604	41624	41644	41664	41684	41704
5	41505	41525	41545	41565	41585	41605	41625	41645	41665	41685	41705
6	41506	41526	41546	41566	41586	41606	41626	41646	41666	41686	41706
7	41507	41527	41547	41567	41587	41607	41627	41647	41667	41687	41707
8	41508	41528	41548	41568	41588	41608	41628	41648	41668	41688	41708
9	41509	41529	41549	41569	41589	41609	41629	41649	41669	41689	41709
10	41510	41530	41550	41570	41590	41610	41630	41650	41670	41690	41710
11	41511	41531	41551	41571	41591	41611	41631	41651	41671	41691	41711
12	41512	41532	41552	41572	41592	41612	41632	41652	41672	41692	41712
13	41513	41533	41553	41573	41593	41613	41633	41653	41673	41693	41713
14	41514	41534	41554	41574	41594	41614	41634	41654	41674	41694	41714

\$GFDBG	Internal Temp	Internal Temp Decimal	DC Offset	Ref Qual	Ref R2	Ref Status High	Ref Status Low	Supply Voltage	Amb Pressure High	Amb Pressure Low
	41800	41801	41802	41803	41804	41805	41806	41807	41808	41809



Record ID	Confidence Factor	Receive Power	Serial Number	Checksum				
\$GFDTA,	11.1,	98,	10,	2500,	2014/11/19 23:00:00,	CH4OP-10003,	1	*A5
	↑	↑	↑	↑	↑	↑	↑	↑
	Gas Concentration	Path Length	Date/Time	Status Code				

**ppmm** – Concentration of gas will be represented with 32-bits and an extra 16-bits for decimal.

**R2** – Confidence factor from 0-100.

**Distance in Decimeter** – Path length will be multiplied by 10 to get rid of decimal numbers.

**Light** – Received power as reported by the IPM.

**Seconds** – Heartbeat indicator. This will be the “seconds” in Date/Time field of the DATA statements. 0-60.

**Status** – 32-bit of Status Code from the DATA statements.

**ppm** – Concentration of gas divided by the path length. 16-bit for the whole number, and extra 16-bit for decimal.

Record ID	Ramp DC Offset	Ref Confidence Factor	V <sub>supply</sub> Monitor	Date/Time					
\$GFDBG,	32.1,	1500,	8800,	98,	2C00,	1205,	101325,	2014/11/19 23:00:00	*A5
	↑	↑	↑	↑	↑	↑	↑	↑	↑
	Internal Temperature	Ref Quality	Ref Status Code	Ambient Pressure					Checksum

**Internal Temp** – Internal temperature. 16-bits for whole number and 16-bits for decimal.

**DC Offset** – Ramp DC Offset.

**Ref Qual** – 16-bit of Reference Quality.

**Ref R2** – Reference Confidence Factor from 0-100.

**Ref Status** – 32-bit of Status Code after Line Centering.

**Supply Voltage** – Supply voltage is already displayed as x100 to get rid of decimal numbers. Keep it as such.

**Ambient Pressure** – 32-bit of Ambient Pressure.

Channel 13 is now assigned to Reference Channel 1.

Channel 14 is now assigned to Reference Channel 2.

Note: For all high and low registers when the high bit is set or is nonzero. To reconstitute the value, you must multiply the high register value by 65536 and add the value of the low register.

MODBUS output test

Pass/  No/ NA

Initial



