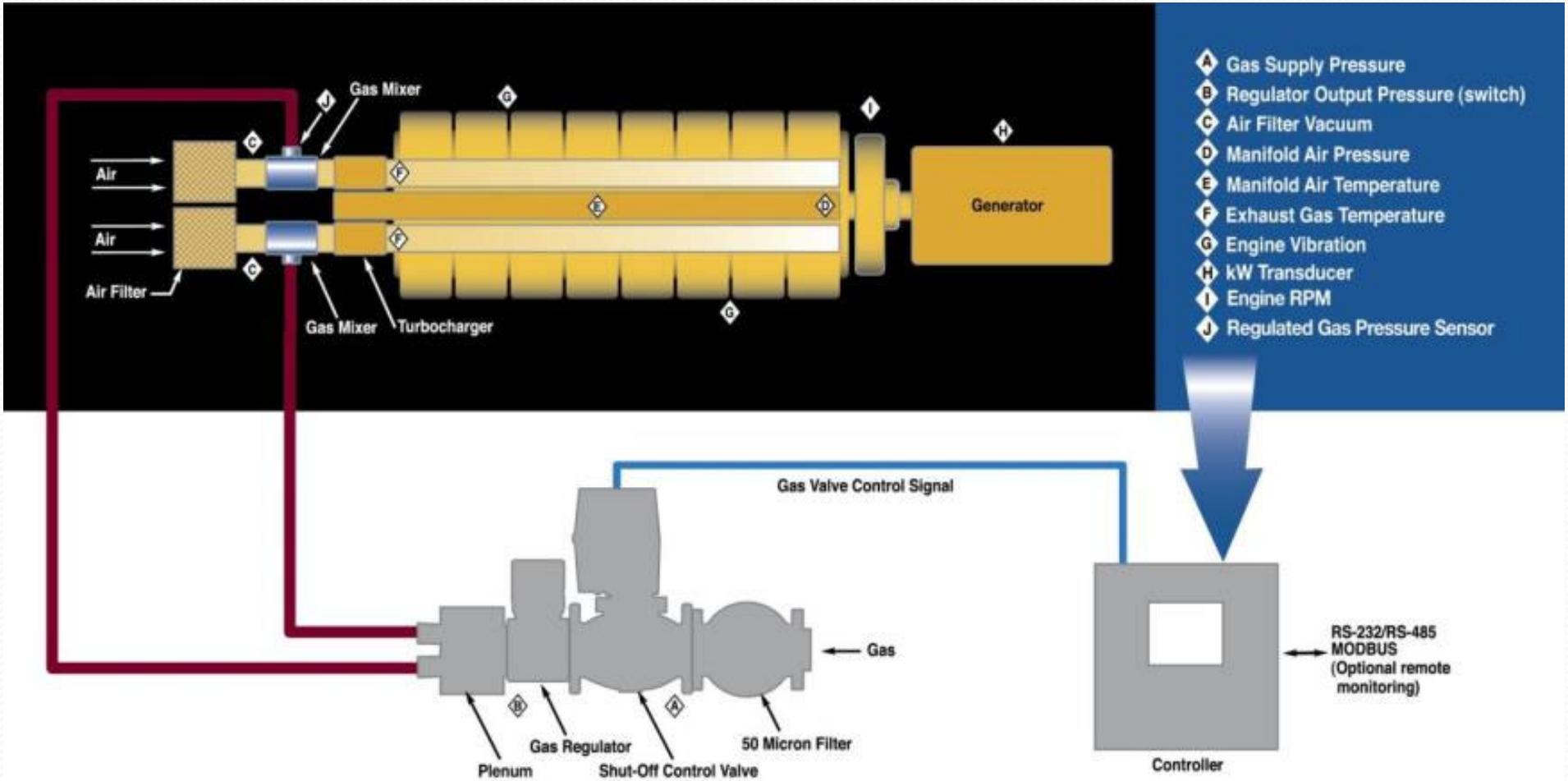
ECO/AFS Bi-Fuel Instruction & Maintenance

GTI+ Schematic



Basics of System operation

- Power on, green light on, system is in operation between 13 -70% of load

Power On , No lights on. White Screen Unit is controlled out , Unit should turn itself back on in a few minutes or when it returns to correct parameter's. If not Push (Next) Button to see what is holding unit out.

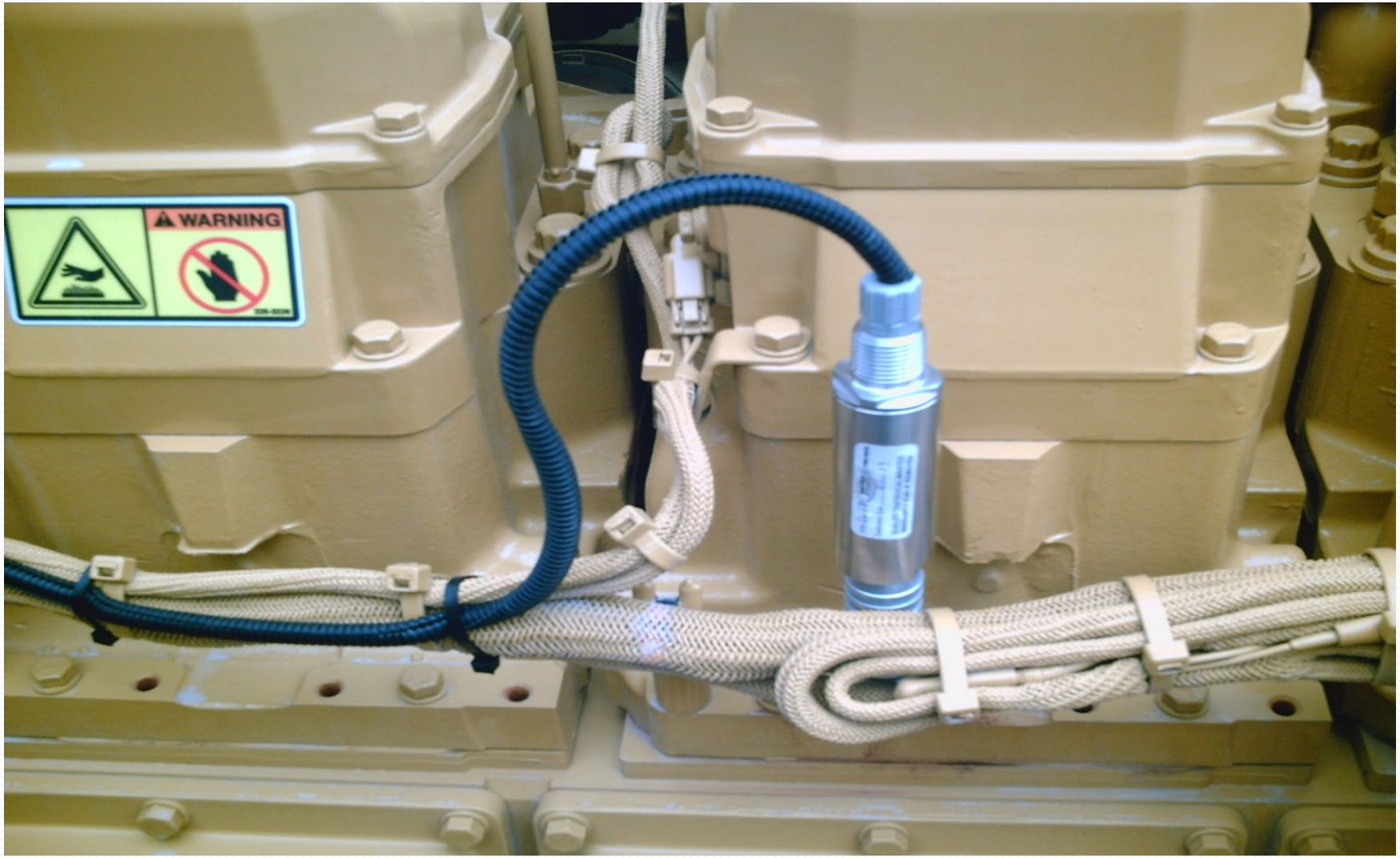
- **Power On Red Light On with Red Screen, Unit has Faulted Out and has Shut Down , Record Fault and Time , Push Reset If Fault Continues Turn Power Off , Close Ball Valve and Call ECO-AFS**

LEL Detection on each Gas Train is in place to shut off incoming gas to the Motor Shed and Boiler, If the LEL gauge is tripped it will show warning lights and the Altronic Panel will show Ch. 14 Gas Detection. Any gas leaks MUST BE Repaired before resetting Fuel Valve

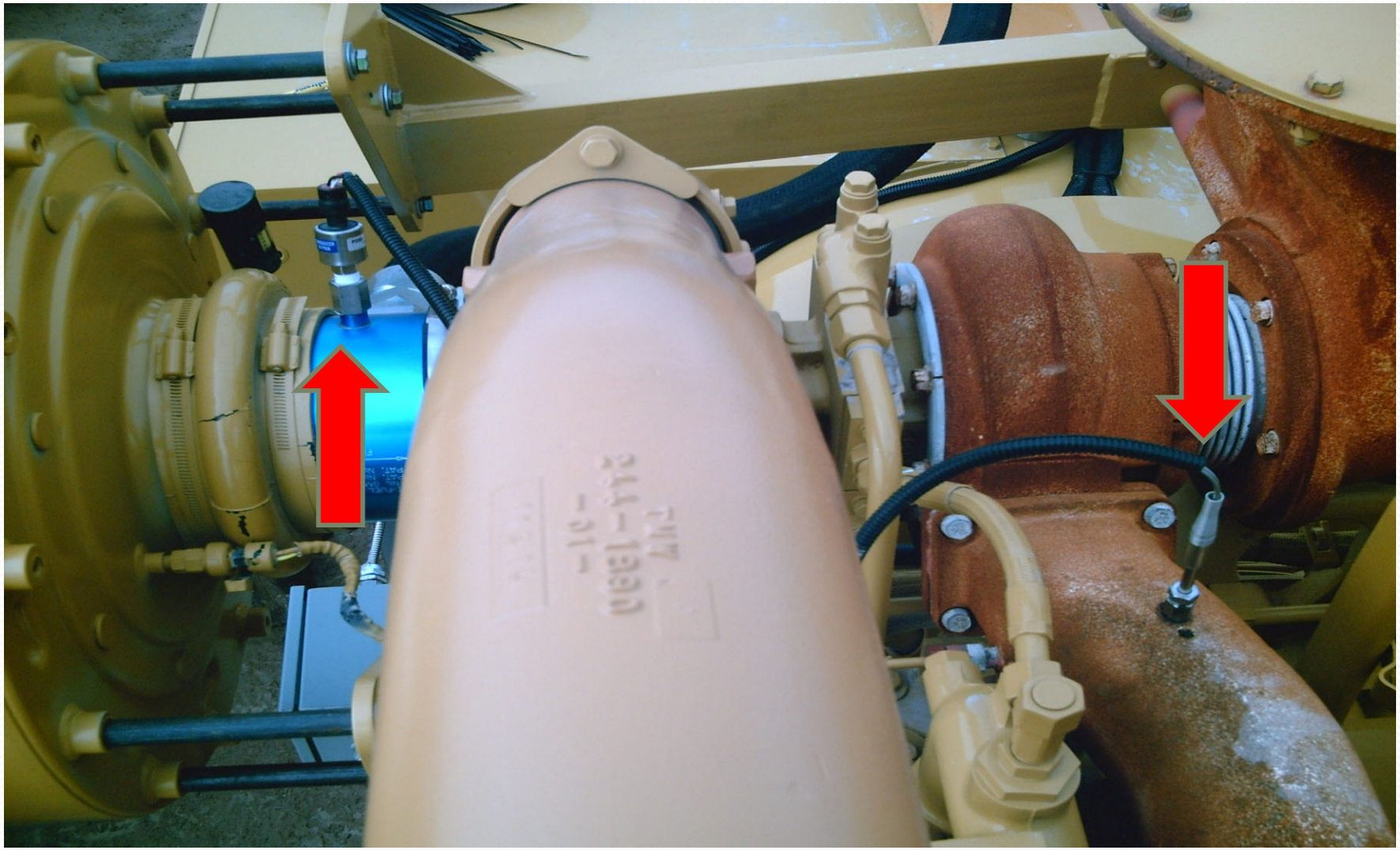
- Gas detection set at 10%

- Fuel Shut Down Valve

Sensor on both right and left bank of engine monitors Vibration, Knock or Detonation if to much Gas is being delivered.



Sensors below monitor air intake and exhaust temperatures on each bank of engine



System allows end user to scroll all settings and parameters set by ECO/AFS, for example if you notice Left and Right exhaust temperatures differ more than 100 degrees this is a warning that a Injector is going bad or valve settings may need to be addressed.

This helps catch issues before they become major problem and expense.

View channels

How to view channels

- Press VIEW CHAN then arrow up to go thru the list of channels listed in following slides to see where you might be controlling out which can help you find solution or problem with Bi-Fuel kicking out. Air Filters, plugged Radiators or inner coolers or plugged gas lines are common problems.

Bi Fuel Faults and Shutdowns

14,a

Gas Detection

LEL Has been detected and has shut the incoming fuel and the Bi Fuel off on specific unit.

21,a

(GSP) Gas Supply Pressure

Incoming gas has been interrupted in conex or from Fuel Source (Well Head) Controls out at-0.5

22 a,b

(VAC) Air Filter Vacuum

Air filters or pre filters may be restricted , (Service) controls out at below -0.8

23,a

(MAP) Manifold air pressure

Engine intake pressure has exceeded the high shutdown

System controls out at 25psi

24,a

(MAT) Manifold Air Temperature

Engine intake temperature has exceeded high shutdown, Plugged cooler ,

Fan has been reversed for Cold Temps. Hot Temps, Thermo-Couple Failure

System controls out at 140 degrees

25 a,b

(EGT) Exhaust Gas Temperature

High Load for extended time , Hot Temps, Thermo-Couple Failure

System controls out at 1150 degrees, it is best to operate in the 40-55% of load if possible, general rule of thumb is 2 pumps 3 engines, 1 pump 2 engines.

26 a,b

(VIB) Engine Vibration

Gen Skid Vibration, Fast Load Swings, Detonation

System controls out at .80 and faults out at 1.2

27,a

(KW) Kilowatt Output of Gen.

Bi-fuel Turns On at 12 % KW and will Shutoff at 70% KW of Load

largest saving are in the 40-55% KW percent

Rig move prepartion

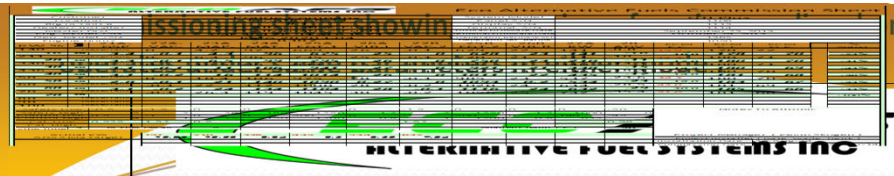
- When getting close to end of well shut off gas at the fuel source and then allow engines and boiler to suck down piping in Motor Shed and Boiler before shutting system off.
- This will assure that all lines are empty of NG when breaking connections for rig move

When a rig move is taking place all that will be required to do is disconnect hose between each motor shed, and unplug LEL power cord between each motor shed, BI-fuel panel turned off and gas valve closed. Check for leaks before each start up after rig move before turning system on.

Start up after rig move

After rig move is complete, leak check all piping and connections, make sure NG pressure is around 80#s.
Purge gas line and if no leaks are in piping open valve on system and turn on Bi-Fuel panel, system should take care of itself as long as BTU of gas has not changed.
Rig 531 was commissioned on 1100B.T.U. CNG
If B.T.U. has changed please call to discuss first.

issioning sheet shown nly in white column and with Bi-Fuel on in blue column at same load. Engine



Eco Alternative Fuels Commission Sheet

Customer	Prairie Company	System Model	GTI Plus
Location	Frontier # 24	Panel S/N	1108
Rig or Unit #	# 1	Display S/N	1113
Dealer/ Installer	ECO Alternative Fuels	Terminal S/N	1114
Master Dist.	ECO Alternative Fuels	Display Firmware Date	September 23, 2013
Eng. Model /SN	Cat 3512C LLAO-3571	Terminal Firmware Date	October 24, 2013
Gen. Model /SN	Kato 28203-04	Generator Rating (KW)	1365
Engine Hours	8387	Generator Ser. Rating	1050

KW %	Fuel	21A-GSP	22A-VAC-	23A MAP-	24A MAT-	25A EGT-1	26A VIB-L	22B VAC-2	25B EGT-2	26B VIB-R	27A KW	28 AGV	ECM F.C.	ECM C.T.	ECM O.P.	% Subst.
140	Diesel Only		0	4.7	97	669	26	-0.1	629	22	141	-8.8	13.0	178	72	
10	BI	3.4	-0.1	4.3	96	675	25	0	628	23	141	-10	10.0	178	70	-23%
211	Diesel Only		0	6.3	96	735	25	-0.1	720	21	211	-10	17.5	180	71	
20	BI	3.3	-0.1	6.5	99	795	26	0	750	23	210	-11	12.0	180	70	-31%
340	Diesel Only		0	10.5	96	844	25	-0.1	855	22	340	-14.3	25.5	180	71	
30	BI	3.1	-0.1	11	106	941	27	0	921	21	338	-15	14.5	180	69	-43%
436	Diesel Only		0	14	99	913	26	-0.1	929	23	436	-18.4	32.0	180	70	
40	BI	3.1	-0.2	16	114	1014	26	0	1011	22	435	-17	14.0	181	68	-56%
50	Diesel Only		0	18.4	106	975	28	-0.1	985	23	537	-23.6	38.3	180	70	
50	BI	2.8	-0.1	21	140	1090	0.27	0	1093	0.2	534	-23	18.0	183	67	-53%
60	Diesel Only		-0.1	22	112	1008	28	-0.2	1020	24	634	-28.5	45.0	181	69	
60	BI	3.1	-0.2	24	134	1104	28	-0.1	1116	24	632	-29	30.0	185	66	-33%
70	Diesel Only		-0.1	26.3	119	1045	30	-0.2	1056	25	732	-35.4	51.0	181	68	
70	BI															-100%
80	Diesel Only															
90	Diesel Only															
100	Diesel Only															

Safety Low	-0.5	-1.5	0	0	0	0	-1.5	0	0	0	-50
Safety High	5	2	28	180	1250	1.2	2	1250	1.2	1000	0
Control Low	0.5	-1	0	0	500	0	-1	500	0	140	-45
Control High	4	1	25	150	1200	0.8	1	1200	0.8	635	-4
Cal. Low	0.525	1.57	0.5				1.57				0.98
Cal. High											
Vibe Time	3	Bi Fuel Delay	5					Ambient Temp. (F.)			50

Notes To Altronic

Actual KW	141	210	338	435	534	632				
AGV5 Ma Target	10.82	10.52	9.84	9.3	8.35	7.04				

Project Manager (Kevin Skogen)

Project Installer (Nate, Wade, Derik)

Installation Date : 29-Aug-14

Commission Date : 9-Sep-14

Gas Conditioning and Metering Unit

Things To Check in GCMU

- Level In Black Tank Sight Glass, Have Tank Emptied when Half Full, The Red Fuel Valve Will Close at 3/4 Full and will not reset until emptied
- If any LEL is detected in Conex the Red Fuel Valve will Close and will stay Locked out until Leak is Repaired and LEL Monitor Is Cleared
- Battery Voltage On Total Flow, Keep Solar Panel clean and Lifted at Angle
- 110 volt Power To Conex is a **MUST**, **Green Light** on Power Supply Box On at all Times Conex is in Use
- Slugging Methanol to Conex from Fuel Source Each Tower During Cold Temps. Freeze off in Piping
- If Fuel Valve Closes and will not reset, Check Tank Level , LEL , Close Ball Valve on incoming Gas Then Reset

Please feel free to contact me with any questions.