Annexure-Y	DETAILED DATA / SPECIFICATION SHEET SOLAR POWERED FIELD MOUNTED ELECTRONIC GAS FLOW COMPUTER
1.0 General	
1.1 Required Quantity Gas Flow Computers (Complete units in all respects)	**30 nos.**
1.2 Service	Custody Transfer
1.3 Volume (Maximum flow)	0-100 MMSCFD
1.4 Manufacturer's Product manufacturing experience of same type of material	Minimum10 years
1.5 Operating Temperature (ambient)	Minimum -5 °C to +60°C (14 °F to +140 °F)
1.6 Mounting	Supplioed with 316 SS mounting bracket for mounting flow computer on 2" pipe.
1.7 Security	Multi-level role-based access, user account authentication, password encryption.
2.0 Electrical Specification	
2.1 Power source (Primary)	Solar Power System including Solar panels,charge controlar rechargeable batteries[should be provided by vendor/supplier]
2.2 Power Supply	6 - 28 VDC with auotomatic selectable power modes betwen low and standard power modes.
2.3 Power Consumption	Less than 5 watt
2.4 Data back up battery	Lithium coin cell type [Life expectancy of 5–7 years with power & 1year without power]
2.5 Electrical Area Class	Class 1, Division 2, Group C & D or (Exia) T4
3.0 Computational Functionality	
3.1 Gas Flow calculations for computation of mass, volume, and energy flow rates.	• AGA 3 1992/2013 or latest revision for volume, mass/density, and mass/relative API14.3, API14.9, API 5 with latest revisions • ISO 5167 1991/1998/2003 (orifice, Venturi, and nozzle) • AGA 7 2006 (pulsed turbine, PD, and ultrasonic) • AGA 11 2013 (Coriolis pulses) • AGA 8 1994 (Detailed, Gross 1 and Gross 2) • NX-19 1962, MOD, VDI/VDE 2040 • ISO 12213 2009 (parts 2 and 3) • GPA standards / 2172 2009 (including saturated vapor calculation) and ASTM D3588. • ISO 6976 1995 (Superior and Inferior, incorporating Technical Corrigendum 2 [1997] and 3 [1999]).
3.2 Measurement Units	US and Metric units should be individually selectable by user for each variable.
3.3 Measurement accuracy of analog to digital conversions (ADC),	If used, shall be better than **0.05%** of span for analog input and **0.1%** of analog output
3.4 Fiscal (FC) Measurement Accuracy	shall be within **±0.005%** of span for analog input and **±0.1%** of analog output.
3.5 Algorithm and rounding off error for computation of fiscal quantities	Shall be within **±0.005%** of the computed value.
3.6 Super Compressibility calculations	AGA-8, Gross I or Gross II or detailed, ISO 12213 2009 (Part 2 & 3).
4.0 Functionality	

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4.1	The primary function of the FC	To compute instantaneous flow rates of gas by receiving inputs of the following: i) Differential pressure against orifice plate, ii) Static pressure, iii) Temperature of gas [direct input from RTD] iv) Receive Gas Chromatograph data, validate against configured limits and use for calculations if validation result is O.K. Otherwise use last good data or manually entered data. v) Moisture analyzer/ dew point Analyzer. Flow Copmuter shall have integral Multi variable sensor for measuremt of DP and static pressure. Temperature signal will come dirctly to an RTD input of flow computer for 2, 3 or 4-wire RTD selectable by user.
5.0 Flow Computer Technical specs / Features		
5.1	Solar Powered field mounted Microprocessor-based gas flow computer	Field mounted solar powered (CPU) of FC minimum: • NXP Kinetis K61 series CPU with an ARM Cortex M4 processor. • IEC 61131 capability • API 21.1 compliance for Custody transfer, • Built-in WIFI for connection to laptop / PC.
5.2	Diagnostics	Battery & external voltage monitor, SRAM battery status etc
5.3	Memory	SRAM minimum 8 MB, for holding current states of all variables and historical archives. Flash 128 MB,for firmware image and configuration files.
5.4	Clock Type	Real-time clock and Watchdog Timer min 1000 milliseconds
5.5	Hazardous Area Certifications	CSA C/US, ATEX and IECEx Certification Class1, Div 2 Groups A, B, C, D, Temperature Code T4
5.6	Housing / Enclosure	Explosion proof and flame-proof made die-cast Aluminum. Protection class NEMA 4X / IP66.
5.7	Report Generation	Current, hourly, daily and monthly reports, Live inputs from GC, HCDP and Moisture analyzers with date and time stamps, Alarming, data & Event logging Current, hourly, daily and monthly reports of PT, TT, DPT, Total volume/energy(MMSCF/MMBTU), Maintain cumulative contract month (batch) and daily totals. etc.
5.8	Local Display	LCD /LED type 16-20 characters per line, Minimum 4 lines in display for displaying totalized gross volume MMSCFD, Energy MMBTU, orifice differential pressure, temperature, Static pressure, density (Sp.Gravity) , GC and HCDP/ moisture analyzer data etc.
5.9	Standard/ Base Inputs & Outputs	**Yes** with minimum following I/Os: (02) nos. Analog channels 4 to 20 mA or 1 to 5 Vdc accuracy of **0.05%** of span for analog input and o.1% of span for analog output. (02) nos. Discrete channels (01) no. RTD/PRT

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5.10	Communication ports:	(03) serial ports [support DNP3, MODBUS® RTU/ASCII, master or slave], (01) Ethernet port [supports Modbus over TCP/IP protocol] (01) one Wi-Fi port communications using DNP3 protocol. [Supports multiple communications protocols including DNP3, Modbus master and slave (ASCII and RTU) on the three serial ports and DNP3 on the Mobile SCADA port]. • COM1 – 4-wire serial communications. Software selectable for RS-232, RS-422, or RS-485 operation. • COM2 & COM3– 2-wire serial communications. Software selectable for RS-232 or RS-485 operation. • COM4 – Wi-Fi (802.11 b/g) communications • COM5 – Ethernet 10/100 Base-T supports up to 7 sessions (1 Modbus Master, up to 3 DNP3.
5.11	Connectivity and data communication	**Yes** with Gas Chromatagraph, HCDP, Moisture/ Dew point analyzers interface etc.
5.12	Alarms and Events & data logging	• 61 days hourly history • 10 months daily history • 10 months Weekly logs • 60 months Monthly logs The flow computer shall have standard periodic logs available providing hourly, daily, weekly, and monthly history including flow weighted average data, totals, and gas composition. The flow computer shall provide pre-formatted EFM reports for hourly, daily, weekly, monthly and calibration reports. The format of the reports can be .csv, and .pdf and secure pdf.
6.0 Sensors/ Transducer		
6.1	Integral built Multivariable Transmitters/Transducers	**Yes.** The integral MultiVariable sensor / Transmitter must have Static Pressure and Differential Pressure and has a stainless steel coplanar flange, a stainless steel (316L) diaphragm, and silicone fill fluid.
6.2	Static & Differential Pressure Accuracy	+ /- **0.075%** of user calibrated Spans
6.3	Process Temperature	- 40 to 230 Degree F
6.4	Static Pressure	0-3000 Psi
6.5	Differential Pressure	0-1000 inches H2O
6.6	Temperature Accuracy	+/- **0.15** Deg.C
7.0 Accessories		
Solar Power System		
7.1	Solar Power System	Vendor recommended complete solution including all accessories
7.2	Solar Power System Battery efficiency	07 days under normal operating conditions in case of non charging mode
7.3	Battery Enclosure	Battery will be mounted inside flow computer enclosure or [external enclosure should be provided by Vendor]
7.4	External Battery enclosure (If required)	Weatherproof suitable for Class I, Div II location
Configuration Machine		
7.5	Configuration machine (Laptop)	**Yes** (Qty: 07 nos.) Latest specification equipped with licenced configuration softwares & tools/ Flash files, Software and drivers for configuration of FC [if required], Detailed specsification at **Annexure- Z**
7.6	Configuration Software and drivers for configuration machine	Window based user friendly licensed software able to monitor, configure, service, maintenance, troubleshooting, calibration and saving reports. Can be installed on multiple machines.

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7.7	Interfacing for data Communication with Laptop/ Desktop	Flow computer shall be connected to Laptop/ desktop through WiFi connection from a distance of minimum Ten (15) meters distance
Manifold		
7.8	5 Valve Manifold	**Yes Total 30 nos.** Material 316 SS. Flanged transmitter ends and 1/2" NPT for connection to orifice fitting. Double bypass type natural gas industry pattern. Complete with flange seals and boltings for integral mounting to MVS sensor.
RTD		
7.9	RTD with threded barstock thermowell for 3/4" MNPT process connection for 4", 6",8" pipeline.	**Yes** with each FC. i) **08** Nos. for 4" line ii) **12** Nos. for 6" line iii) **10** Nos. for 8" line
8.0 PRE-COMMISSIONING & COMMISSIONING		
8.1	Istallation, Pre-Commissioning & Commssioning of all FCs	**Yes** at various OGDCL Field locations by Vendor/ Packager/ Supplier.
8.2	Performace Testing	**Yes,** Performace testing as per Vendor recommended procedures
8.3	Verification of FC Gas calculation results	**Yes,** After successwful commissioning and performance testing , verification of Gas Flow Calculation all FC shall be done using AGA-#3 certified 3rd party software.
9.0 Documentation		
9.1	Calibration Certificates	**Yes**
9.2	Certificate of Origin	**Yes**
9.3	Certificate of Conformity	**Yes**
9.4	Documentation	Startup/Configuration/O&M manual hard coppies and soft coppies on CD/ USB etc..
9.5	Vendor' Warrantees / Guarantees	**12 months** from commissioning or 18 months after shipment

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