

UNIVERSITY OF KERALA

DEPARTMENT OF PHYSICS KARYAVATTOM, THIRUVANANTHAPURAM, INDIA – 695581. e-mail: kuphysics76@gmail.com, Phone 0471 – 2308920

PHY/DKG/SPG /2/24-25

13/06/2025

TENDER NOTICE

Sealed competitive tenders are invited from competent vendors/suppliers for the supply of Mass Flow Controllers with the following specifications

Mass Flow Controller – 2 no.

Sl.No	Gas	Flow rate	Quantity (No.)
1.	Non-corrosive gases including Air, Nitrous Oxide, Methane, Carbon Dioxide, Carbon Monoxide, Ethane, Oxygen, Deuterium, Sulfur Hexafluoride	10 SLPM	1
2.	Corrosive gases including Ammonia, Hydrogen Sulfide, Nitric Oxide, NO ₂ , Nitrogen Trifluoride, Butylene	100 SCCM	1

Detailed Technical specifications

1.	Corrosive and non-corrosive	The Corrosive Mass flow controllers should be calibrated for gases			
	mass flow controllers	; NH3, NO2, H2S, NO, Air, N ₂ , He, CH ₄ , H ₂ , CO, CO ₂ , Ar, LPG,			
	$(1, \dots, 1)$	$70\% C_4H_{10} + 30\% C_3H_8$, $2\% CO2 + 98\% Ar$, $10\% CH4 + 90\% Ar$,			
(1 no. each)		3.7% O2 + 15% CO2 + 80.3% N2+1% Ar etc			
		The Non-corrosive Mass flow controllers should be calibrated for			
		gases; Air, N ₂ , He, H ₂ , CO, CO ₂ , Ar, LPG, 70% C ₄ H ₁₀ + 30% C ₃ H ₈ ,			
		2% CO2 + 98% Ar, 3.7% O2 + 15% CO2 + 80.3% N2 + 1% Ar et			
		LCD display with integrated touchpad should display Mass Flow,			
		Volumetric Flow, Pressure, Temperature and Set point and			
		Percentage of Valve Opening simultaneously with Gas totalizer			
		option on the Front panel Display.			
		Controllers should have individual inbuilt LED /LCD / digital			
		display with flow control switch and stand-alone power supply			
		adapter to plug into power socket and use.			
		The resolution of the device should have two to three decimals for			
		fine tune to operate the input set point and can be possible to			
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increase or decrease the decimal option through Front Panel Display.
MFC should have the option for Personalized gas mixing compositions for accurate mixed gas measurement and switch between selected gases on the fly without any need for recalibration of the mass flow controller.
Software: A PC based software program that should interface with the RS-232 and RS 485 communication. The graphical user interface (GUI) should provide automatic configuration, session saving for easy Configuration and experiment setup reloads, data capturing and logging (including a graphing tool),simple and advanced script building for automating meter sequences, software alarms and support for multiple devices
Operating Pressure: Max 160 PSIA
Downstream pressure: 0.25 kg/cm ² (G) and vacuum
Proof Pressure: 175 PSIA
Temperature range of operation: -10 °C to 60 °C
Humidity Range: 0 to 95% non-condensing
Wetted and Seal Material: Recommended Body material and seals suitable for the gas preferably SS302 and Viton for non-corrosive and 316LSS, FFKM for corrosive gases
Accuracy: $\pm 0.7\%$ or (0.6% of Reading $\pm 0.1\%$ of Full Scale)
Repeatability: \pm (0.1% of Reading + 0.02% of Full Scale)
Pressure sensitivity: 0.01% of full scale / PSI
The Analog Input/Output of the controller should be 0-5 VDC
Digital Input/Output of the controller should be RS-232 or RS- 485
The controller should be provided with circuit protection
It should be operated in the power supply of 230 V AC, 50 Hz
The controller should have the connection of ¹ / ₄ inch Swagelok compression gas fittings
Setting Flow Ramp up programming cycle should be possible by interfacing through the in - built LCD display and keypad on the MFC
Manufacturer should have their own Re-Calibration and Service Centre in India.
Warm-up Time: < 1 Second
Typical Response Time <10 ms
Operating Range : 1% to 100% Full Scale

		Electrical Connection Options: DB9 Pin				
		All connecting cables/chords/interfaces ports and necessary power supply (110V to 230V converter) should be supplied along with the instrument. Necessary accessories such as Power Supply, Communication cable, ¹ / ₄ " SS tube Connector Fittings with computer Controller software should be provided for trouble free operation of the instrument				
2	User manual	Detailed service manual and operating manual with circuit diagram should be provided along with the instrument				
3	Warranty	Minimum 1 year				
4	List of institutes inside and outside Kerala where vendor has supplied the MFCs	Has to be provided.				

For more details, please log on to www.keralauniversity.ac.in. Last date for the receipt of tenders is **04.00 P.M. on 25.06.2025**. Tender forms can be downloaded from the University web site www.keralauniversity.ac.in.

The cost of the tender form ₹673/- (Rupees six hundred and seventy three only) and the Earnest Money Deposit of Rs. 3800/- (Rupees three thousand, eight hundred only) should be remitted by way of Demand Draft issued from a nationalized/scheduled bank, drawn in favour of The Finance Officer, University of Kerala, payable at State Bank of India, Kerala University Office Campus Branch (SBIN0070292). The tender documents, along with separate DD towards the cost of the tender form and the EMD should be submitted/sent to Dr.Deepa K.G, Department of Physics, University of Kerala, Kariavattom, Thiruvananthapuram 695581.

The rate quoted should be inclusive of all charges such as packing, forwarding, freight, loading/unloading/handling and Government duties leviable, if any. The University reserves the right to accept or reject any or all the tenders without assigning reasons whatsoever.

Dr. Deepa K.G. Assistant Professor Department of Physics University of Kerala Thiruvananthapuram-695 581



PHY/DKG/SPG/2/ 24-25

13/06/2025

<u>TENDER</u>

Containing General Conditions and Schedule for the Supply of Mass Flow Controller

Name of Tenderer: Dr. Deepa K.G., Department of Physics

Address:

Department of Physics

University of Kerala, Kariavattom Campus

Signature of Tenderer:

Dr. Deepa K.G. Assistant Professor Department of Physics University of Kerala Thiruvananthapuram-695 581



FORM OF TENDER

То

From

.....

Sir,

Yours faithfully (Signature)

(Address)	••••
Date:	

* To be scored in cases where no earnest money deposit is furnished.

Important: This tender form may be printed on A4 size paper. Editing of the pre- printed text in the tender form in any way other than as indicated (like ticking, filling in with ink/typing, scoring off inapplicable material etc.) will render the tender form invalid and liable for rejection.

GENERAL CONDITIONS

Sealed tenders are invited for the supply of the materials as specified in schedule attached below.

1. The tenders should be addressed to the Dr. Deepa K.G., Department of Physics, University of Kerala, Kariavattom campus, Thiruvananthapuram in a sealed cover with the tender number and name – "Tender for the supply of MFC" duly superscribed on the cover on or before 25/06/2025, 04.00 PM

2. Tenders which are not in the prescribed form are liable to be rejected and the cost of tenderforms once paid will not be refunded.

3. Intending tenderers should send their tenders so as to reach the officer mentioned in the tender notification, on or before the due date and time noted therein. No tender received after the specified date and time will be accepted on any account. The rates will be considered firm for acceptance till the date mentioned therein. Tenders not stipulating period of firmness and tenders with price variation clause and/or 'subject to prior sale' condition are liable to be rejected.

4. a. Every tenderer who has not registered his name with the State Government (Stores Purchase Department), should send along with his tender, an earnest money of Rs.3800/-. The amount may be paid in the form of Demand Draft drawn in favour of the Finance Officer, University of Kerala, Thiruvananthapuram. **Cheques will not be accepted.** The earnest money of unsuccessful tenderers will be returned as soon as possible after the tenders are settled.

b. Tenderers whose names are registered with Government (Stores Purchase Department) are generally exempted from furnishing earnest money for such articles for which they have registered their names. If they tender for stores other than those for which they have registered their names, they will have to furnish earnest money as in the case of unregistered firms. Registered firms will have to quote invariably in every tender they submit, the registration number assigned to them by the Stores Purchase Department. Attested copy of registration certificate may be enclosed with the tender for reference.

c. Small Scale Industries and Cottage Industries within the Kerala state, which are certified as such by the Director of Industries and Commerce or by the Regional Joint Director of Industries and Commerce will be exempted from furnishing earned money against tenders for supply of stores manufactured by them.

5. If any tenderer with draws from his tender before the expiry of the period fixed for keeping the rates firm for acceptance, the earnest money, if any deposited by him will be forfeited to University of Kerala or such action taken against him as the University think fit.

6. The final acceptance of the tender rests entirely with the University who do not bind themselves to accept the lowest or any tender. But the tenderers on their part should be prepared to carry out such portion of the supplies included in their tender as may be allotted to them.

7. In cases where a successful tenderer, after having made partial supplies, fails to fulfil the contracts in full, all or any of the materials not supplied may at the discretion of the Registrar, be purchased by means of another tender/quotation or by negotiation or from the next higher tenderer who had offered to supply already and the loss, if any, caused to the University shall thereby, together with such sums as may be fixed by the University towards damages, be recovered from the defaulting tenderer.

8. Payment will be made only after the supplies are actually verified and taken to stock.
9. The contractor shall not assign or make over the contract or the benefits or burdens thereof to any other person or body corporate. The contractor shall not underlet or sublet to any person or persons or body corporate the execution of the contract or any part thereof without the consent in writing of the Registrar who shall have absolute power to refuse such consent or to rescind suchcontent (if given) at any time if he is not satisfied with the manner in which the contract or the sub-contractor upon such recession. Provided always that is such consent be given at any time, the contractor shallnot be relieved from any obligation, duty or responsibility under this contractor.

10. The tenderer shall undertake to supply materials according to the standard sample and/ or specifications

11. No representations for enhancement of rates once accepted will be considered.

12. Any attempt on the part of the tenderers or their agents to influence the University in their favor by personal canvassing with the officers concerned will disqualify the tenderers.

13. Samples would be forwarded if called for and unapproved samples got back by the tenderers at their own cost. Samples sent by V.P. Post for 'freight to pay' will not be accepted. The approved samples may or may not be returned at the discretion of the undersigned. Tenderers whosesamples are received late will not be considered. Tenders for the supply of materials are liable to be rejected unless samples if called for, of the materials tendered for are forwarded.

Dr. Deepa K.G. Assistant Professor Department of Physics University of Kerala Thiruvananthapuram-695 581



Technical Specifications

SI.No	Item Name & Technical Specifications			Unit Price (₹) (Incl. GST)	Total Amount (₹) (Incl. GST)
1	1. Corrosive and non-corrosive mass flow controllers (1 no. each)	The Corrosive Mass flow controllers should be calibrated for gases ; NH3, NO2, H2S, NO, Air, N ₂ , He, CH ₄ , H ₂ , CO, CO ₂ , Ar, LPG, 70% C ₄ H ₁₀ + 30% C ₃ H ₈ , 2% CO2 + 98% Ar, 10% CH4 + 90% Ar, 3.7% O2 + 15% CO2 + 80.3% N2+1% Ar etc			
		The Non-corrosive Mass flow controllers should be calibrated for gases; Air, N ₂ , He, H ₂ , CO, CO ₂ , Ar, LPG, 70% C ₄ H ₁₀ + 30% C ₃ H ₈ , 2% CO ₂ + 98% Ar, 3.7% O ₂ + 15% CO ₂ + 80.3% N ₂ +1% Ar etc	1		
		LCD display with integrated touchpad should display Mass Flow, Volumetric Flow, Pressure, Temperature and Set point and Percentage of Valve Opening simultaneously with Gas totalizer option on the Front panel Display.			
		Controllers should have individual inbuilt LED /LCD / digital display with flow control switch and stand-alone power supply adapter to plug into power socket and use.			
		The resolution of the device should have two to three decimals for fine tune to operate the input set point and can be possible to increase or decrease the decimal option through Front Panel Display.			
		MFC should have the option for Personalized gas mixing compositions for accurate mixed gas measurement and switch between selected gases on the fly			

	without any need for recalibration	
	Softwares A DC has 1 as from	
	program that should interface with	
	the RS-232 and RS 485	
	interface (GUI) should provide	
	automatic configuration, session	
	experiment setup reloads, data	
	capturing and logging (including a	
	advanced script building for	
	automating meter sequences,	
	multiple devices	
	Operating Pressure: Max 160 PSIA	
	Downstream pressure: 0.25 kg/cm ² (G) and vacuum	
	Proof Pressure: 175 PSIA	
	Temperature range of operation: - 10 °C to 60 °C	
	Humidity Range: 0 to 95% non- condensing	
	Wetted and Seal Material:	
	seals suitable for the gas preferably	
	SS302 and Viton for non-corrosive	
	gases	
	Accuracy: $\pm 0.7\%$ or (0.6% of	
	Reading $\pm 0.1\%$ of Full Scale)	
	Repeatability: $\pm (0.1\% \text{ of})$ Reading $\pm 0.02\%$ of Full Scale)	
	Pressure sensitivity: 0.01% of full scale / PSI	
	The Analog Input/Output of the controller should be 0-5 VDC	
	Digital Input/Output of the	
	RS-485	

		The controller should be provided with circuit protection It should be operated in the power supply of 230 V AC, 50 Hz The controller should have the connection of ¼ inch Swagelok compression gas fittings Setting Flow Ramp up programming cycle should be possible by interfacing through the in - built LCD display and keypad on the MFC Manufacturer should have their own Re-Calibration and Service Centre in India. Warm-up Time: < 1 Second Typical Response Time <10 ms Operating Range : 1% to 100% Full Scale Electrical Connection Options: DB9 Pin All connecting cables/chords/interfaces ports and necessary power supply (110V to 230V converter) should be supplied along with the instrument. Necessary accessories such as Power Supply, Communication cable, ¼" SS tube Connector Fittings with computer Controller software should be provided for trouble free operation of the instrument	
2	User manual	Detailed service manual and operating manual with circuit diagram should be provided along with the instrument	
3	Warranty	Minimum 1 year	
4	List of institutes inside and outside Kerala where vendor has	Has to be provided.	

supplied the MFCs		

Rate quoted should be inclusive of all charges such as packing, forwarding, freight, loading/unloading/handling or installation charges and Government duties leviable, if any.

Period within which goods should be delivered: As per the Delivery Schedule in the Purchase Order.

Other special conditions: Defective items, if any, supplied should be rectified/replaced to the satisfaction of the University by the suppliers at their own cost.

Dr. Deepa K.G. Assistant Professor Department of Physics University of Kerala Thiruvananthapuram-695 581

