GENTEC®
GENSTAR TECHNOLOGIES

Operation and Maintenance Manual for GENTEC® Neonatal, Perinatal and Specialty Flowmeters

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CAUTION: United States Federal law restricts this device to sale by or on the order of a physician.

IMPORTANT SAFETY INSTRUCTIONS.

READ AND UNDERSTAND THESE INSTRUCTIONS COMPLETELY BEFORE OPERATING THIS EQUIPMENT.

If you do not understand any of these instructions, or if you have any questions regarding the use of this product, please contact your facility's training manager, your supervisor, the medical equipment dealer from whom the product was purchased, or the manufacturer before operating the equipment.

Do not attempt to repair this device if you have not been properly trained. Doing so may create a hazardous situation that may result in death or serious injury.

Carefully inspect and test this product before each use to ensure proper operation. Do not use the product if there are signs of damage or if it does not pass the initial inspection.

It is imperative that your hands and all tools used to clean and free of any oil or other contaminants before working on these products. Wear appropriate protective clothing when working on medical gas and vacuum products and systems.

Outlets are under pressure; use care when removing flowmeters. Do not stand in front of the outlet when inserting or removing the flowmeter.

Genstar Technologies Co., Inc. (GENTEC®) manufactures several types of Neonatal, Perinatal and Specialty medical gas flowmeters. The FM293 Series comes in Oxygen and Air and are manufactured from an acrylic block. The 200cc and 1LPM models are designed for perinatal and neonatal applications where extreme accuracy under very low flow is required.

- 200cc oxygen
- 1 LPM oxygen
- 3 LPM oxygen
- 16 LPM oxygen
- 75 LPM oxygen
- 16 LPM air
- 75 LPM air

Each flowmeter is calibrated for the specific gas service for which it is designed and marked. Calibration is preformed at 50 PSI, 70˚F (21˚C), with the metering tube within 10 degrees of vertical. All testing of flow rates should be performed under the same conditions, with the gas for which the flowmeter was designed (i.e. oxygen flowmeters should be calibrated using oxygen, air with air, etc.)

Flowmeters are used to provide a specific rate of flow of a medical gas to a patient, as determined by the position of the center of the float ball in the metering tube. The setting should always be read along the center line of the float ball.

FLOWMETER USE AND MAINTENANCE

Always make sure that the flowmeter is turned off before attaching to the outlet. This is accomplished by turning the flow control knob fully counterclockwise.

Flowmeters should be checked for proper latching at each use. Insert the flowmeter into the medical gas outlet until you hear and feel the outlet latch onto the flowmeter adapter. Lightly tug on the flowmeter to confirm that it is properly seated in the outlet. In the case of DISS outlets, ensure that the fitting is fully threaded onto the outlet. Do not use a wrench to tighten the nut. Refer to the back page of this manual to confirm your connection type.

The flowmeter tube should be within 10 degrees of vertical when installed at the outlet to ensure proper flow rates.

Never stand in front of the outlet with inserting or removing a flowmeter. Always gasp the flowmeter firmly with one hand, and release the outlet latch mechanism with the other.

Never tug on any tubing or other equipment which may be attached to the flowmeter. Always turn the flowmeter off before removing tubing.

Medical gas outlet flow rates and pressures should be checked periodically (at least once per year) as incorrect flows and/or pressures at the outlet can affect the accuracy of the flowmeter. Testing should be carried out in accordance with NFPA *99 "Health Care Facilities", CSA Z305.1-92 "Nonflammable Medical Gas Piping System"* and state and local codes, by authorized personal only.

Flowmeters are shipped from the factory cleaned for oxygen use, in individual sealed bags. The outside of the flowmeter may be cleaned with a mild detergent or wiped with a disinfectant that is compatible with the polycarbonate hood assembly. DO NOT USE OIL OR PETROLEUM-BASED PRODUCTS AT ANY TIME ON ANY MEDICAL GAS OR VACUUM PRODUCTS.

Flowmeters should be stored in a clean space when not in use. Try to keep them in a closed bin or covered with plastic if possible. Even small amounts of debris can create a hazardous situation when subjected to high pressures.

High concentrations of oxygen will support combustion. An oxygen-safe leak detector should be used to confirm that all connections are leak-free before using the flowmeter.

When turning the flowmeter off, rotate the knob counterclockwise only until the knob stops. Do not over-tighten the knob, doing so may damage the needle valve.

SPECIFICATIONS

Flowmeter: ISO 15002-2008
Accuracy: ± 10% of indicated setting
Transport / Storage Temperature Range: -20˚C to 60˚C
Calibration pressure: 50psi
Maximum Flowmeter Pressure: 100psi
Outlet Connection: 9/16-18UNF
Flow control valve: Needle Valve for FM293 models
Back pressure compensated: Calibrated for 50psi
Flow range: 0-200CC/M, 0-1 L/min, 0-3 L/min, 0-16 L/min, 0-75 L/min on FM293 model

Specifications are subject to change with out prior notice

MAINTENANCE / TROUBLESHOOTING

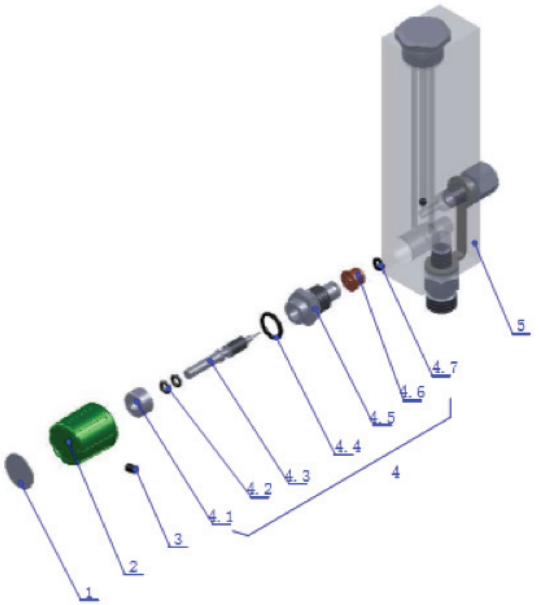
- Inspect the equipment for dirt, dust, oil or grease, especially in the area of the inlet connection every use. Do not use if any contamination is found and contact your service representative immediately to properly clean.
- The flowmeter or pressure gauge is a measuring device and should be calibrated every year or subject to the relevant regional or national standards.
- Repairs are to be carried out by an authorized accredited repairer only.

TROUBLESHOOTING

Problem	Probable Cause	Description
No flow or very little flow goes through outlet	Cylinder valve is closed or not open entirely	Open the cylinder valve
	Flowmeter (needle valve) is not open appropriately	Readjust the flow control knob to desired flow
	The cylinder is depleted of gas	Change cylinder
Leaks in the cylinder connection	Connection is not tightened	Tighten connection, ensure pins on the Yoke connection is properly aligned to the post valve
	Contaminants between the connections	Clean or replace
	The sealing surface of the regulator is damaged	Send back to factory or qualified personnel for repair
	The sealing surface of the cylinder valve is damaged	Change cylinder
	The thread on the cylinder valve is damaged and the knob cannot be screwed on securely	Change cylinder
Leaks in vent hole in regulator body	Diaphragm may be contaminated	Send back to factory or qualified personnel for repair

EXPLODED DIAGRAM

Main Components Listing (Model FM293-1L-X shown below)



No.	Description	Part No.	Material	Note	No.	Description	Part No.	Material	Note
1	Knob Label	303004510	PP		4.6	Seal Seat	C62400171	C3602	For 200CC
2	Knob	C14200300	ABS				C62400610		For 1L
3	Nut M5	300603620	304				N/A		For 3L, 16L & 75L
4	Needle Valve	B12100010	Assembly	For 200CC	4.7	"O" Ring (5*1.8)	300700620	Rubber	
		B12100040		For 1L	5	Flowmeter Assembly	N/A for Repair		
		200610410		For 3L					
		200610400		For 16L & 75L					
4.1	Nut (7/16"-28UNEF)	300627531	C3602						
4.2	"O" Ring (2.9*1.8)	300700460	Rubber						
4.3	Valve Stem	C31000330	304	For 200CC					
		C31000940		For 1L					
		301501780		For 3L					
		301501770		For 16L & 75L					
4.4	"O" Ring (9.0*2.65)	300760040	Rubber						
4.5	Valve Nut	C23000310	C3602	For 200CC					
		C23000310		For 1L					
		301501791		For 3L, 16L & 75L					

FM293-3L-XX

FM293-16L-XX

FM293-75L-XX

FM293--200cc-XX

Inlet Fitting (Back Fitting)	Maximum Flow Rate Scale / Gas Service						
	200CC OXYGEN	1 LPM OXYGEN	3 LPM OXYGEN	16 LPM OXYGEN	75 LPM OXYGEN	16 LPM AIR	75 LPM AIR
1/8NPTF	FM293-200CC-X	FM293-1L-X	FM293-3L-X	FM293-16L-X	FM293-75L-X	FM293-16L-Q	FM293-75L-Q
CHEMETRON	FM293-200CC-X-CH	FM293-1L-X-CH	FM293-3L-X-CH	FM293-16L-X-CH	FM293-75L-X-CH	FM293-16L-Q-CH	FM293-75L-Q-CH
DISS HEX	FM293-200CC-X-DS	FM293-1L-X-DS	FM293-3L-X-DS	FM293-16L-X-DS	FM293-75L-X-DS	FM293-16L-Q-DS	FM293-75L-Q-DS
DISS HANDTIGHT	FM293-200CC-X-DH	FM293-1L-X-DH	FM293-3L-X-DH	FM293-16L-X-DH	FM293-75L-X-DH	FM293-16L-Q-DH	FM293-75L-Q-DH
OHMEDA	FM293-200CC-X-OH	FM293-1L-X-OH	FM293-3L-X-OH	FM293-16L-X-OH	FM293-75L-X-OH	FM293-16L-Q-OH	FM293-75L-Q-OH
PURITAN-BENNETT	FM293-200CC-X-PB	FM293-1L-X-PB	FM293-3L-X-PB	FM293-16L-X-PB	FM293-75L-X-PB	FM293-16L-Q-PB	FM293-75L-Q-PB
OXEQUIP MEDSTAR	FM293-200CC-X-OE	FM293-1L-X-OE	FM293-3L-X-OE	FM293-16L-X-OE	FM293-75L-X-OE	FM293-16L-Q-OE	FM293-75L-Q-OE

	200CC OXYGEN	1 LPM OXYGEN	3 LPM OXYGEN	16 LPM OXYGEN	75 LPM OXYGEN	16 LPM AIR	75 LPM AIR
Accuracy	±10 cc from 25-100 cc ±15 cc form 100-200 cc	±.05 lpm	±.15 lpm from 1/4 to 2 lpm ±.25 lpm above 2 to 3 lpm	±.25 lpm from 1/2 to 4 lpm ±.5 lpm above 6 to 15	5 lpm (starts at 5 lpm)	±.25 lpm from 1/2 to 4 lpm ±.5 lpm above 6 to 15	5 lpm (starts at 5 lpm)

- Outlet for all flowmeters are DISS Male (9/16" - 18UNF)
- ISO flowmeters are available
- Models with additional inlet connectors are available

Statement of Warranty for Oxygen and Air Flowmeters

Genstar Technologies Co., Inc., (GENTEC) warrants its Oxygen and Air Flowmeters to be free of defects in material and workmanship for a period of five (05) years from the date of shipment. This warranty is conditional upon compliance with all inspection and preventive maintenance procedures as set by applicable government agencies and as specified by GENTEC. This warranty is extended by GENTEC to the first purchaser of the product from either GENTEC or from an authorized GENTEC distributor.

In the event of a product defect, malfunction or failure to perform, the customer shall return the product to the distributor from whom it was purchased, or to GENTEC if purchased direct.

During the first thirty-six (36) months of the warranty period, GENTEC will, at GENTEC's sole discretion, either repair or replace the defective product without cost to the purchaser. NOTE: It is the customer's responsibility to ensure compliance with applicable laws regarding the shipment of medical products and biohazards. Any flowmeter that are returned to GENTEC and have not been sterilized in accordance with applicable law will be destroyed, with no compensation to the customer. Refer to DOT regulations for additional information.

Should the returned product not be defective, or be determined to be defective or malfunctioning due to any reason other than defects in material or workmanship, GENTEC shall notify the customer, and it shall be the customer's responsibility to advise GENTEC or their authorized distributor as to the disposition of the product.

During the last twenty-four (24) months, GENTEC will ship the needed parts to the customer at no charge for the parts. Shipping and installation costs are the sole responsibility of the customer.

This warranty specifically excludes any malfunction or damage resulting from accident, alteration, misuse or abuse of the product (including but not limited to failure to perform all established maintenance procedures; improper storage; use of the product beyond the design limits), or improper use by untrained persons.

GENTEC shall not be liable for any consequential damages, nor for any other loss, damage, or costs incurred as a direct or indirect result of using this product.

GENTEC has not authorized any other firm or person to make any representations, either verbally or in writing, concerning this product or the warranty thereof.

Latch Assembly & Adapter Identification

Adapter		Latch Assembly
	Oxequip Medstar Compatible	
	Ohio (Ohmeda) Compatible	
	DISS (Diameter Index Safety System	
	Chemetron Compatible	
	Puritan-Bennett Compatible	

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