



MFTC

SERIES PURGE DEVICE

Operation Manual

MFTC- DT- JS- 1040- 2020(A)



Preface

Thank you for choosing the products of Dandong TOP Electrical Appliance (Group) Co.

This instruction manual provides you with important information on installation, connection and commissioning as well as for maintenance, troubleshooting and storage. Please read it carefully before installation and commissioning and keep it close to the instrument as an integral part of the product, so that you can refer to it at any time.

You can download this instruction manual by entering the version number at www.ddtop.com.

If the instrument is not operated in accordance with these instructions, the protection provided by the instrument may be impaired.

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During the warranty period, Dandong Top Electronics Instrument (Group) Co., Ltd. is responsible for repairing or replacing the equipment free of charge for the buyer (or owner) if the product is returned with quality problems and the claim made is determined to be covered by the warranty after inspection by the manufacturer.

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Dandong Top Electronics Instrument (Group) Co., Ltd. has passed the ISO9001 quality system certification. The whole production process is carried out in strict accordance with the provisions of the quality system to provide the strongest guarantee for the quality of products and services.

目录

1 安全提示	错误!未定义书签。
1 Safety Tips	6
1.1 爆炸可能会导致死亡或严重伤害。	错误!未定义书签。
1.1 An explosion may cause death or serious injury.	6
1.2 过程泄漏可能导致严重伤害或死亡。	错误!未定义书签。
1.2 Serious injury or death may result from process leakage.....	6
1.3 不遵守安全安装准则可能导致死亡或严重受伤。	错误!未定义书签。
1.3 Failure to comply with safety installation guidelines may result in death or serious injury.6	
2 吹扫装置概述	错误!未定义书签。
3 结构和测量原理	错误!未定义书签。
3 Structure and measuring principle	6
3.1 入口吹扫装置测量原理-图 1.....	错误!未定义书签。
图 1	错误!未定义书签。
3.2 出口吹扫装置测量原理-图 2.....	错误!未定义书签。
3.2 Outlet Purge Device Measuring Principle -Figure 2.....	8
图 2	错误!未定义书签。
Figure 2 Schematic Diagram of the Outlet Purge Device Measurement Principle.....	8
4 产品特点	错误!未定义书签。
5 技术指标	错误!未定义书签。
5 technical parameters.....	9
6 典型应用	错误!未定义书签。
6 Typical Applications.....	9
Figure 4 Diagram of Guided Wave Radar Installation Location in Conical Bottom Tank	10
7 吹扫装置安装注意事项.....	错误!未定义书签。
7 Precautions for installation of Purge Device.....	10
8 吹扫装置的操作要点.....	错误!未定义书签。
8 Key points for the operation of the purge device	11
9 维护与保养.....	错误!未定义书签。
9 Maintenance and repair.....	11
9.1 定期检查项目	错误!未定义书签。
9.1 Periodic inspection items.....	11
9.2 故障诊断.....	错误!未定义书签。
9.2 Troubleshooting.....	12
10 拆卸	错误!未定义书签。
10 Disassembly	12
10.1 警告	错误!未定义书签。
10.1 Warnings.....	12

10.2 废物清除	错误!未定义书签。
10.2 Waste removal	12

1 Safety Tips

Unauthorized modification or alteration of the product is expressly forbidden for safety reasons. Repair or replacement is permitted only with parts specified by the manufacturer.

1.1 An explosion may cause death or serious injury.

When installing equipment in explosive atmospheres, always follow applicable local, national, and international standards, codes, and procedures. Ensure that equipment is installed in accordance with intrinsically safe or non-flammable site work procedures.

1.2 Serious injury or death may result from process leakage.

If the process seal is damaged, leakage of media may occur at the connection.

1.3 Failure to comply with safety installation guidelines may result in death or serious injury.

All operations described in these instructions must be performed by trained and qualified or end-user appointed personnel.

2 Overview of the blowing unit

MTFC10 series purge device adopts variable area flow meter and constant flow valve to form a purge device, which realizes flow measurement and stable output in occasions of pressure fluctuation. The device adopts all-metal structure, with the characteristics of small volume, small pressure loss and large range ratio (10:1). It can be used in various industries in complex and harsh environments, as well as the flow measurement and process control of micro flow, low flow rate, and various harsh medium conditions. It is especially suitable for measuring turbid, opaque or corrosive fluids, or flow measurement with vibration occasions. According to different user needs and different occasions, there are a variety of measurement forms for users to choose from. According to the output form, there are local indication type and remote transmission type. According to the constant-flow valve form, there are inlet constant flow valve type, export constant flow valve type.

3 Structure and measuring principle

3.1 Inlet Purge Device Measuring Principle-Figure 1

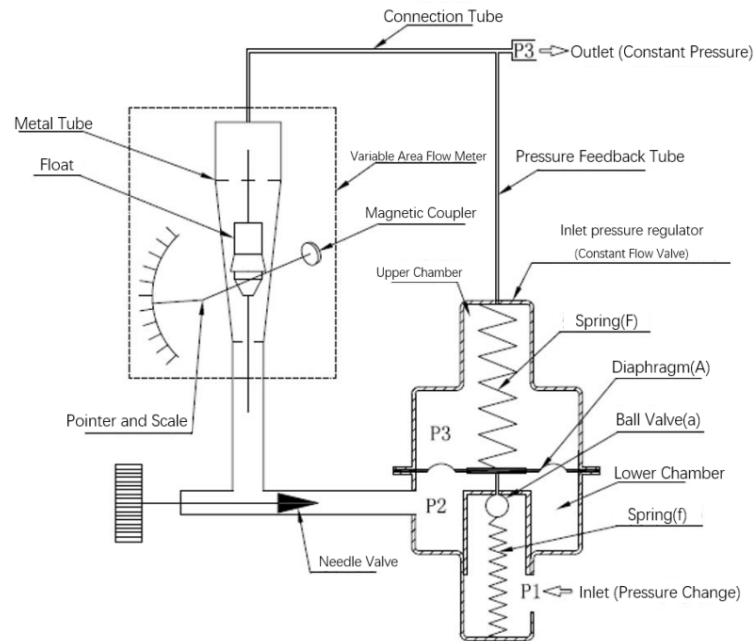


Figure 1 Schematic Diagram of the Inlet Purge Device Measurement Principle

$$(1) P_2A + P_1a + f$$

As shown in the Purge Device Schematic Diagram: (RH Inlet Constant Flow Valve)
Elastic diaphragm is subjected to upward force:

$$(2) P_3A + P_2a + F$$

When the pressure is balanced, that is (1) = (2)

$$(3) P_2A + P_1a + f = P_3A + P_2a + F$$

Elastic diaphragm is subjected to downward force:

$$(4) P_2 - P_3 = (F - f) / A - (a/A) (P_1 - P_2)$$

Since the flow rate is determined by the pressure on both sides of the diaphragm, $P_2 - P_3$, the following formula can be obtained by the formula in (3):

Since $A \gg a$, $(a/A) (P_1 - P_2)$ is negligible, and F , f , and A are constant values, so $P_2 - P_3$ is constant value, then the flow rate will not change due to the pressure change at the inlet.

When the medium is an incompressible liquid, the RE inlet can be applied to the outlet pressure variation. For (4), P_1 is constant and P_3 is changing, so P_3 becomes $P_3 + \Delta P$, P_2 becomes $P_2 + \Delta P$, so $P_2 - P_3 = C$ is a constant value.

3.2 Outlet Purge Device Measuring Principle -Figure 2

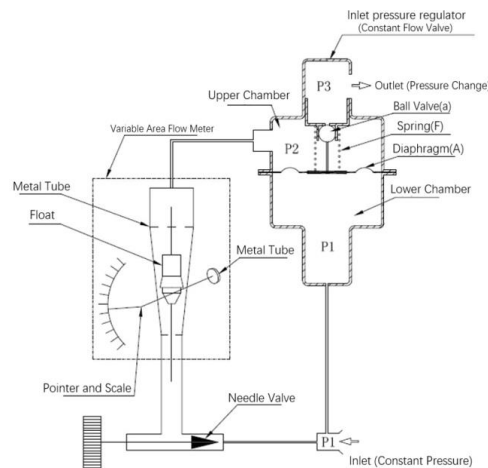


Figure 2 Schematic Diagram of the Outlet Purge Device Measurement Principle

$$P2A+P3a+F$$

As shown in the Purge Device Schematic Diagram: (CH Outlet Constant Flow Valve)

Elastic diaphragm is subjected to downward force:

$$P2A+P3a+F$$

$$P2A+P3a+F= P1A+P2a$$

Elastic diaphragm is subjected to upward force:

$$P1A+P2a$$

When the pressure is balanced, that is (1) = (2)

$$P2A+P3a+F= P1A+P2a$$

$$P1-P2=F/A-(a/A) (P2-P3)$$

Since the magnitude of the flow depends on the difference $P1-P2$ of the pressure regulator diaphragm, we can get by (3):

$$P1-P2=F/A- (a/A) (P2-P3)$$

In the case of incompressible liquids, the CH outlet constant flow valve can be used for inlet pressure changes. For (4), $P2$ is constant and $P1$ is variable, so $P1$ becomes $P1+ \Delta P$, $P2$ becomes $P2+ \Delta P$, so $P2-P3=C$ is a constant value.

In the formula above:

A: Diaphragm cross-sectional area

A: Control valve spool (ball) cross-sectional area.

F/f: Spring pressure (spring force).

ΔP : Change in $P2$ or $P3$

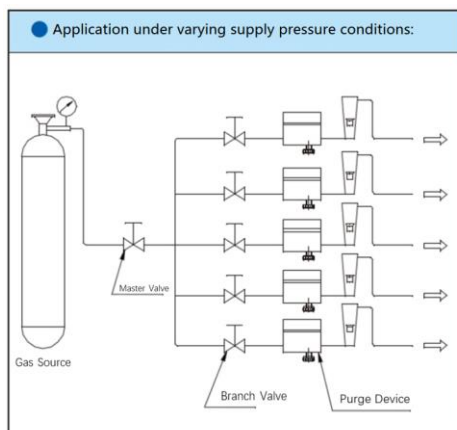
4 Product Features

1. Single-/ double-/ multiple-channel forms (optional)
2. Single-table installation, panel installation (optional)
3. NPT 1/4, ferrule, thread, flange connection (optional)
4. 6mm, 8mm, 10mm, 12-25mm pipeline (optional)
5. Suitable for corrosive media or environments
6. Both mechanical and digital options available
7. Can be used where there are pressure fluctuations in the inlet and outlet.

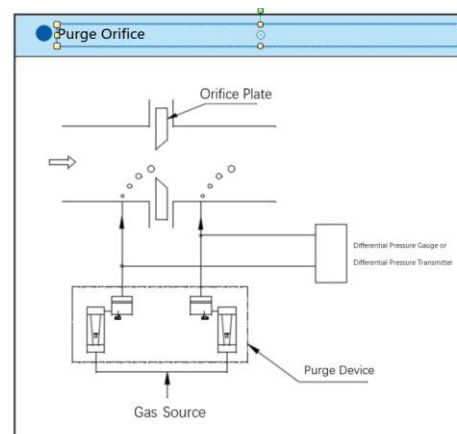
5 technical parameters

1. Measurement range: water (20°C) (0.3 to 100)L/h; air (20°C 101325Pa) (1.2 to 3400)L/h
2. Range ratio: 10:1
3. Accuracy level: Level 4
4. Maximum working pressure: 2.5 MPa (can be increased as required)
5. Temperature of the medium: -40 to +150°C
6. Ambient temperature: -25 ~ +70°C
7. Connection: 1/4" NPT female thread or $\Phi 6$ ($\Phi 8$) ferrule connection or horizontal/vertical connection according to customer's requirement.
8. Limit alarm: 1 to 2 alarm switches (optional)
9. Dimensions: Horizontal mounting center distance: 70mm

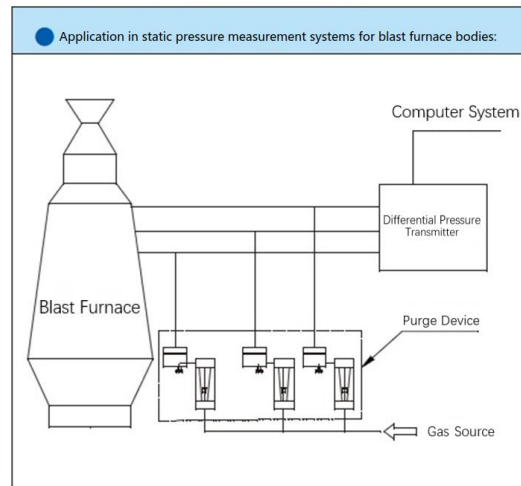
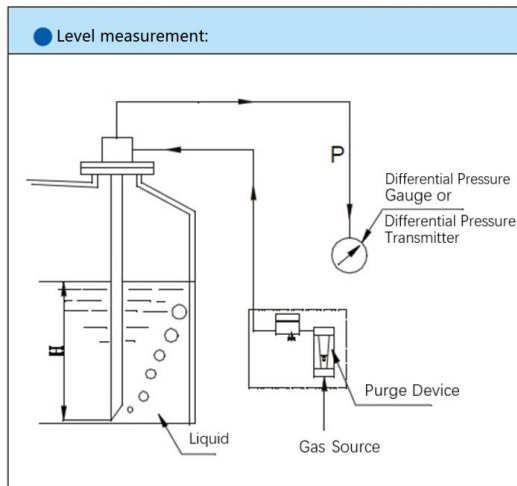
6 Typical Applications



As shown in the diagram above, one main air supply is divided into multiple branch air supply sources. If one or more of the branch sources stops supplying or adjusts the flow, a change in the main source pressure will occur. An inlet (primary pressure) pressure change control type purge device maintains its



When using the orifice plate to measure the flow of corrosive liquids or liquids containing solid particles, a double-mounted Purge Device is used to continuously and quantitatively blow air into the pressure ports before and after the orifice plate to ensure that corrosive liquids or liquids containing solid particles do not flow into the pressure



This is a method of detecting the level of liquid by measuring the back pressure at the end of the blowpipe. The Purge Device, which uses the outlet (secondary pressure) pressure change control type, continuously and quantitatively blows gas into the measurement object. A differential pressure transmitter or manometer is usually used to display the liquid level.

By detecting the static pressure of each section of the blast furnace body and calculating the air permeability resistance index to forecast the furnace condition, so as to take timely measures to ensure normal smelting, thus achieving the purpose of increasing production and energy conservation.

Figure 4 Diagram of Guided Wave Radar Installation Location in Conical Bottom Tank

7 Precautions for installation of Purge Device

1. Please select the appropriate location for installation of the flow Purge Device to ensure easy adjustment, cleaning, and removal of the Purge Device.
2. As the float flow rate of the Purge Device is accompanied by a magnetic coupling drive, it is necessary to ensure that the disturbing magnetic field generated by other working equipment does not affect the measurement results of the flow meter.
3. When installing, ensure that the Purge Device is stable and, if necessary, fitted with a mounting bracket in an appropriate location.
4. The installation dimensions shall not exceed the given dimensions by too much or too little in order to avoid tensile or compressive forces acting on the Purge Device.
5. When the liquid medium contains ferromagnetic particles, a magnetic filter must be installed before the instrument.

6. To ensure proper operation of the instrument, the medium flowing through the instrument must be clean and free of impurities such as dust particles. Although our company installs a miniature filter, it is strongly recommended that customers install the filter upstream as it is not easy to disassemble and clean.

8 Key points for the operation of the purge device

1. Check that the primary and secondary pressures are within the specified range.
2. Check that the pressure variation range is in accordance with the specifications.
3. For constant primary pressure models, install a pressure reducing valve whenever possible. If the primary pressure deviates from the set value, adjust the pressure to reduce the deviation so that an accurate flow rate can be obtained.
4. Flow rate setting: When filling the purge device with a fluid or when adjusting the flow rate, a needle valve should be used. Before operating the purge device, close the valve tightly. When operating, open the valve slowly to avoid sudden changes in flow rate until the needle and dial of the flow meter indicate the set value. Do not close the valve provided with the purge device.
5. When operating, be careful not to allow fluid to be rapidly injected into the purge device through the valve on the flowmeter. Otherwise, the float in the flowmeter will rise rapidly and damage the flowmeter.
6. Particular attention must be paid to ensure that the medium flows in the same direction as that required by the instrumentation. Before installing the instrument, all the fine adjustment needle valve should be closed.
7. When measuring liquids, the pipeline should be drained and purged before operation to avoid shock effects. Open the valve slowly.
8. For gas measurement, open the valve slowly to adjust the pressure to the operating pressure.
9. For panel-type modular models, a pressure-reducing filter is usually installed at the inlet. It should be noted that in normal operation, the pressure value should be adjusted according to the requirements of the order.

9 Maintenance and repair

9.1 Periodic inspection items

The following table indicates standard maintenance items and intervals. The intervals will vary depending on the fluid and operating conditions. Please consider the actual operating conditions to determine the intervals and contents as appropriate.

Maintenance and Inspection Items	Methodology	General cycle
Check for leaks, etc.	Visual Inspection	12 Months
Confirmation of wiring port seals	Visual Inspection	12 Months
Confirmation of fluid indication	Compare with pump capacity, etc.	12 Months
Check whether constant flow is maintained	Check and repair	Daily
Check for internal corrosion	Disassembly and check	Periodic Maintenance
Check for internal buildup	Disassembly and check	Periodic Maintenance

9.2 Troubleshooting

After Installation of Instrumentation		
Failure	Reason	Solution
No Flow	Insufficient pressure on supply.	Increased pressure on supply.
	Foreign body contamination, blockage	Check and Clean.
	Flow is too small.	Flow confirmation.
Inadequate flow fluctuations	Insufficient pressure on supply.	Increased pressure on supply.
During Operation of Instrumentation		
Failure	Reason	Solution
Flow Interruption	Block	Wash and Clean
Fluctuating Flows	Mechanical fatigue or isolation breakage of internal parts of the constant flow valve.	Check and Replace

10 Disassembly

10.1 Warnings

Before disassembly, attention should be paid to hazardous process conditions, e.g., pressure in the vessel, hot, corrosive, or toxic media, etc.

10.2 Waste removal

Please follow the existing guidelines for waste disposal in your region.