

# **Model TSC-Series** **(Normal open type)** **User's Manual**



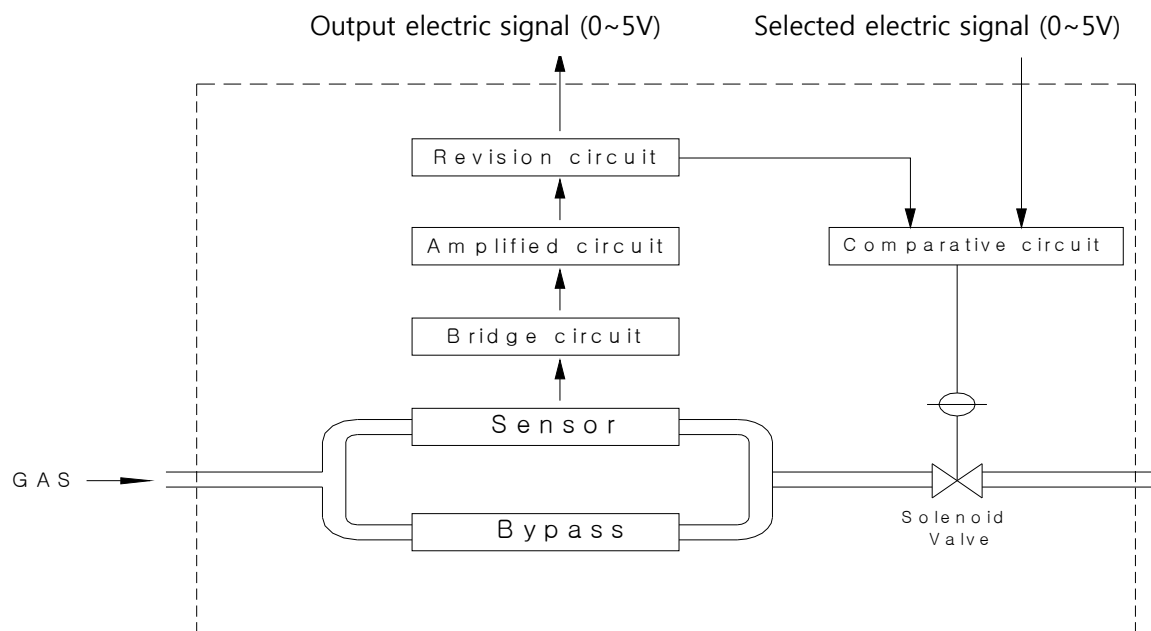
# **Table of Contents**

1. Overview
2. Specifications
3. Dimensions
4. Wiring diagrams
5. Ordering Information
6. Usage method
7. Handling precaution
8. Warranty

## 1. Overview

### 1.1 Features

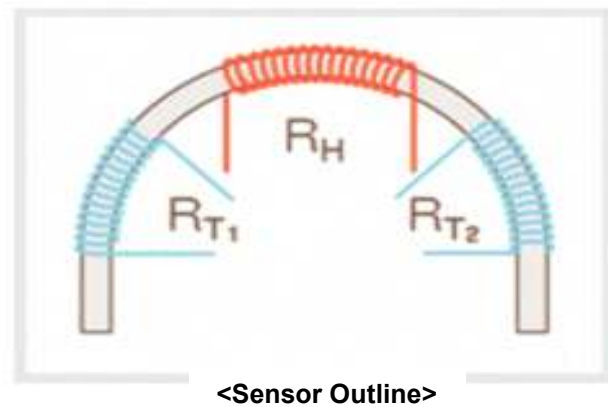
TSC- Series are independently developed (possess various patents) MFC by Original Korean Technology. Depending the model, it can be applied up to 100 bar in pressure, it has characteristic to directly measure and control gas mass flow almost having no problem or no bearing to the pressure and the temperature changes with the sensor principle. TSC Series can practically use from the applied flow ranges of small flow (5sccm) to large flow (2500lpm), and for the special model, it is possible to manufacture MFC that can function in a very small pressure gauges. Nearly 10 years of R&D and production experiences, TSC Series is acknowledged for its product quality that supplies major domestic user companies such as Samsung Electronics, Hynix, and other public enterprises and exporting globally.



### 1.2 Function principle

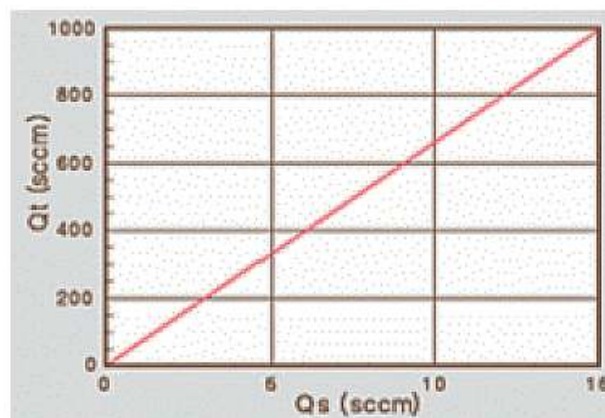
MFC(mass flow controller) is composed of sensor, actuator, and control circuit. When the flow passes through the MFC, there will be differences in the temperature on top and bottom part of the sensor area that works to decide generating power ratio of the flow, then by comparing with the external setting signal and the power output, MFC automatically opens the valve to control. These consecutive movements make the equal signal.

### 1.3 Major parts – Sensor



1. Utilizes tube structures that was made by the ultra-precision processing technology
2. Carries two installed precision sensors which help to perform the sensitive sensing.
3. Selected sensor structure that can make an absolute external balance.
4. Applied structure technology that perfectly harmonizes the tube and bypass.
5. Designed to make sure that its characteristics do not change in the long time usage.

### 1.4 Major parts – Bypass



Bypass parts has applied a manufacturing technology that applied the patent technology to give the perfect alignment with guarantee. Flow measurements are done by the sensor, yet most of the flow flows by the bypass and is structured to have an alignment relationship where it can measure the entire flow.

## 2. Specifications

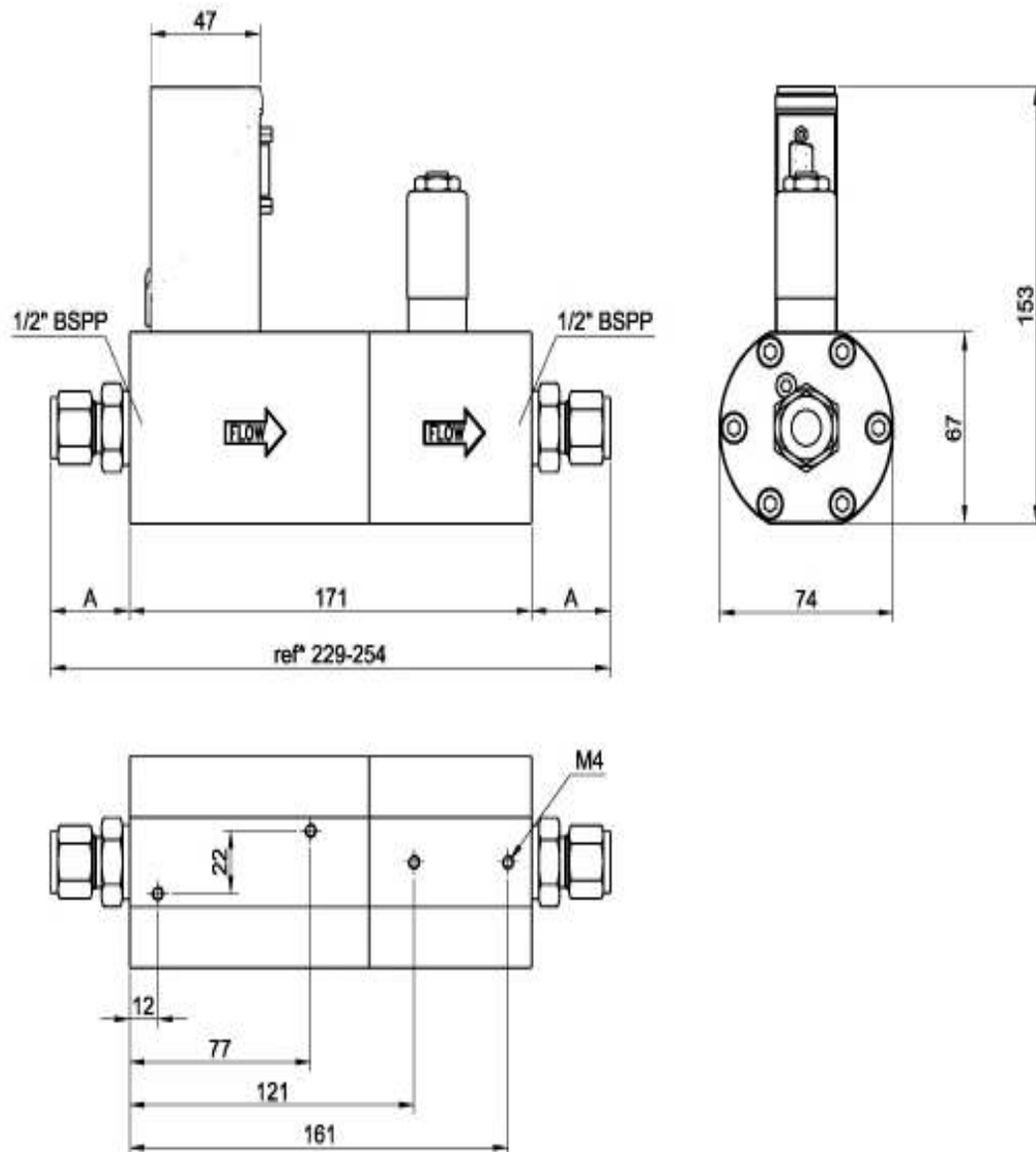
Flow range	0 ~3000 LPM
Flow rate control range	2~100%
Accuracy	±1.0% of F.S.
Linearity	±0.2% of F.S.
Repeatability	±0.2% of F.S.
Response time	less than 1~ 2 seconds
Warm up time	15min (previous measurement 30 min)
Circuit type	Analog
Power supply	+15VDC~ +24VDC
Input/output signal	4~20mA
Connector	D-sub 9 pin
Control valve type	Solenoid valve ( <b>Normally Opened</b> )
Standard fittings	SWLok Type
Operating temperature	0~50°C ( recommended temp. range 15 - 30°C )
Max. operating pressure	Max. 100 bar(g)
Operating humidity	less than 85%RH
Material	SUS316L

### ※ NOTE

- a) Apply the conversion factors when applying for gases other than the nitrogen, and air.  
For the detailed information, refer to the homepage. ([www.mcmflow.co.kr](http://www.mcmflow.co.kr) )
- b) For the detailed specifications per model, refer to the homepage. ([www.mcmflow.co.kr](http://www.mcmflow.co.kr))

### 3. Dimensions

- Model : **TSC-150-VO** (unit: mm)



#### ※ NOTE

a) Special specification can be produced.

b) For the detailed specifications per model, refer to the homepage. ([www.mcmflow.co.kr](http://www.mcmflow.co.kr))

#### 4. Wiring diagram

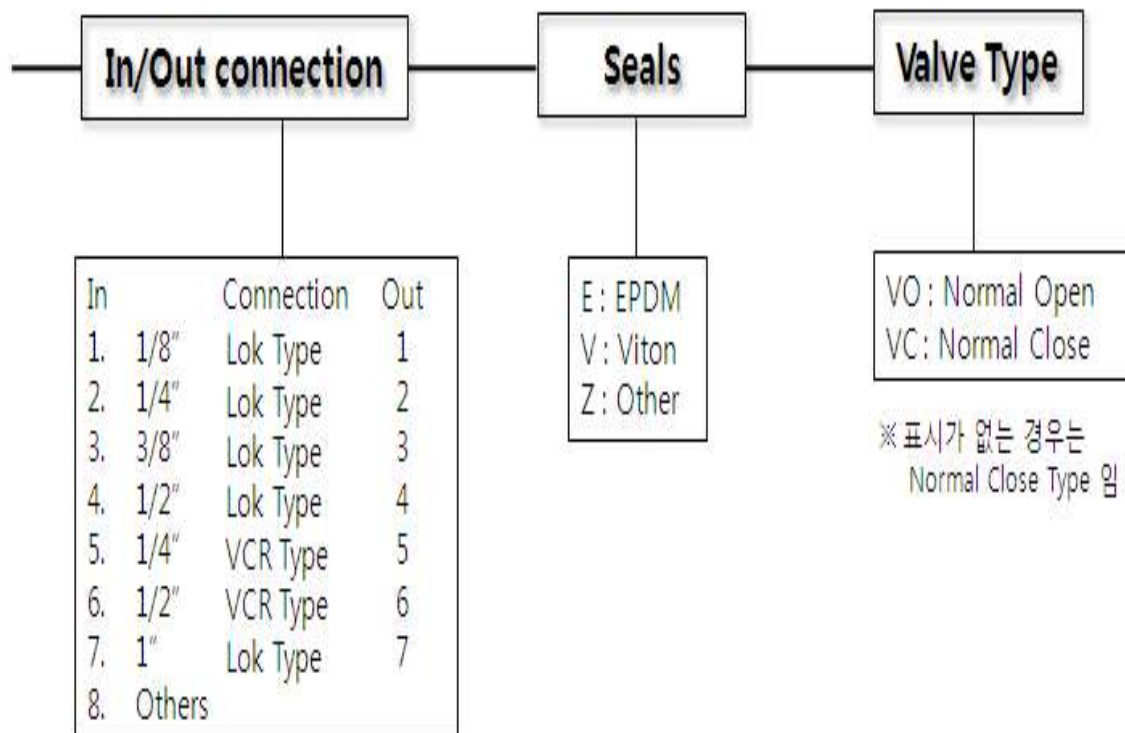
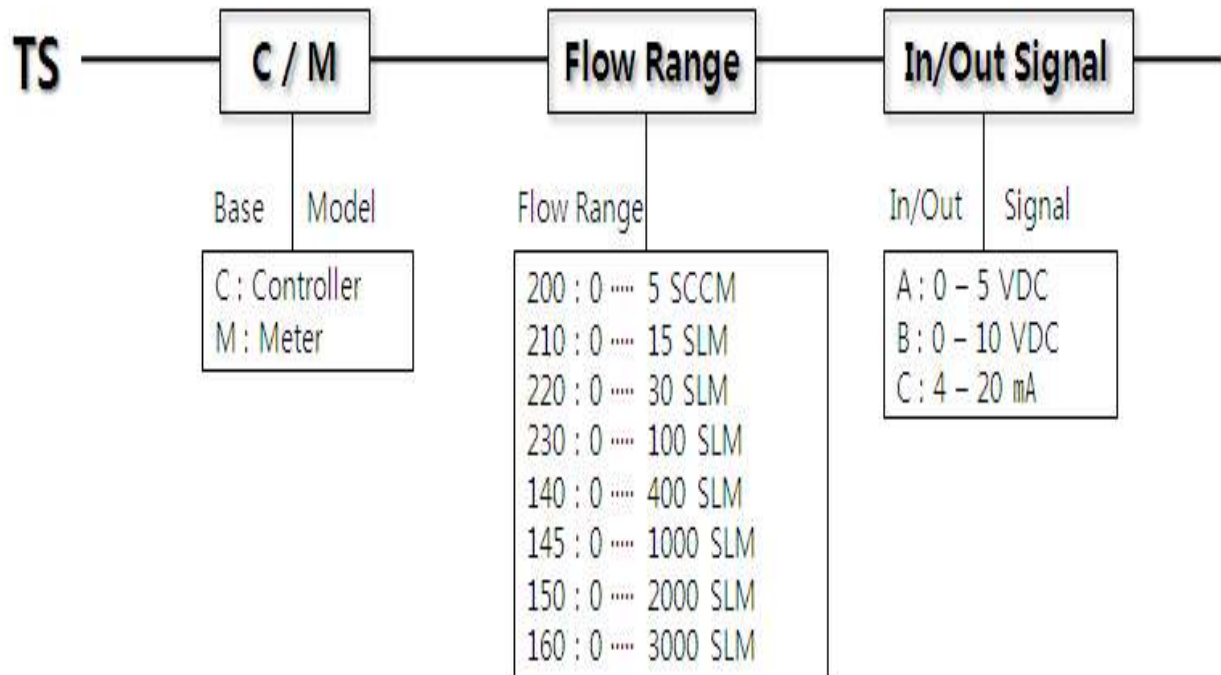
\* MFC Connector Out View : D-Sub 9 Male

Pin Number.	Function
1	NC
2	Output Signal (4-20mA)
3	Setpoint (4-20mA)
4	Power Common
5	NC
6	NC
7	Power (+15VDC ~ +24VDC)
8	Power /Signal/PLC Common
9	FG

#### ※ NOTE

1. Power common pin must be directly connected by an independent line of the readout box or the common terminal of the electricity supply equipment.
2. FG pin must be connected to the sash ground.
3. For the detailed specifications, please refer to the homepage. ([www.mcmflow.co.kr](http://www.mcmflow.co.kr))
4. When you use PLC application you have to join pin8.

## 5. Ordering Information





## 6. Usage method

- 1) Keep attention to the flow and connect to MFC gas line.
- 2) Utilize power supply than can supply more than DC 200mA and exact power to MFC.
- 3) In general, it is okay to use the power supply directly. However, warm up for 15 minutes after supplying the power for the precision purpose.
- 4) Correctly establish the pressure.
- 5) Insert MFC control in.

$$\text{Setting Value(MFC Control in)} = \frac{\text{Needed flow}}{\text{mfc flow}} * 5.000V$$

## 7. Handling precautions

- 1) Within the valve there should never be liquids such as water, oil, vapors.
  - Each valve must supply clean gas without containing the dust. Dust will deteriorate the accuracy and cause the block which makes the control impossible.
- 2) Valve should not leak and should be installed after completing the purge procedures.
- 3) When connecting the valve (fitting), one must use the spanner and a vice.
- 4) For the MFC be safely remain with the pressure in the front/rear part, one should make the system or the equipment.
- 5) In order to completely shut the flow, it is preferable to install a manual valve.
- 6) Do not reach over 5V for the MFC control in.
- 7) Be careful connecting the electric power.
- 8) In the condition where the power is on, do not draw out the cable or reconnect. This can cause the mal function.
- 9) Do not use other gas other than what is used.- Contact if it is necessary.
- 10) Do not shock.
- 11) Keep it fixed when using it.
- 12) Do not disassemble.
- 13) TSC- Series converts the flow amount at 20℃, 1013hPa(1atm) or 0℃, 1013hPa(1atm) to calibrate 0 value.

## 8. Product warranty

### 1) Warranty period

Free repair or exchange when the product breaks within 1 year of the purchase.

### 2) Warranty range

Warranty is limited to the main frame, and the company will not be responsible for damage problems other than the body.

### 3) Warranty for the repaired parts

90 days after the repair, separate from the warranty period.

### 4) Exemptions

Company will not be responsible within the warranty period in cases stated below.

1. Damages due to the natural disaster
2. Damage caused by mistreatment
3. Damages caused due to the operation in an inappropriate environment.
4. Damages caused by the excess ranged setting.
5. Damaged occurred by other products

- Korea Instruments T&S disassembles and inspects A/S products to find out if it will be charged or free of charge for the repair.