

Flow Control System

FCS[®]

Thermal Series



From FCS® Supplier To Total Solution Company for Gas Supply Systems



Korea Service Center



China Service Center



Tsukuba Advanced Technology Center



Taiwan Service Center



America Service Center



Fujikin Vietnam



Global Support and Services

**Fujikin's
FCS® (Flow Control System) series
leads the way in
flow control technology.**



FCS® (Flow Control System) Series

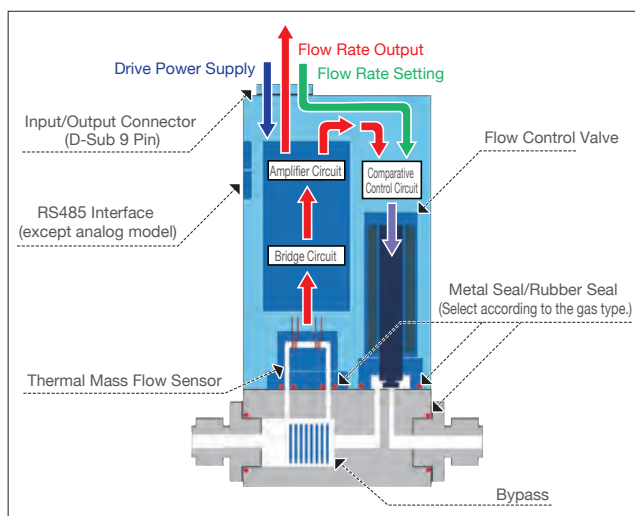
Fujikin's **FCS®** Series is gas flow rate control equipment for all industries. The **FCS®** Series includes **FCS®-Pressure Series** (pressure control system) and **FCS®-Thermal Series** (thermal flow sensor control system), two product line-ups offering two methods of control. This catalog covers the **FCS®-Thermal Series**, also known more generally as a Mass Flow Controller (MFC).

What is a Mass Flow Controller?

A Mass Flow Controller is a device that controls the mass flow rate. In the past, a volume flow meter was used to measure and control the flow of fluids. However, because the volume flow rate is affected by temperature and pressure, mass flow meters that are less affected by temperature and pressure changes are used when precise measurement and flow control is required. Fujikin's **FCS®-Thermal Series** provides Mass Flow Controllers (MFC) that match a range of customer needs.

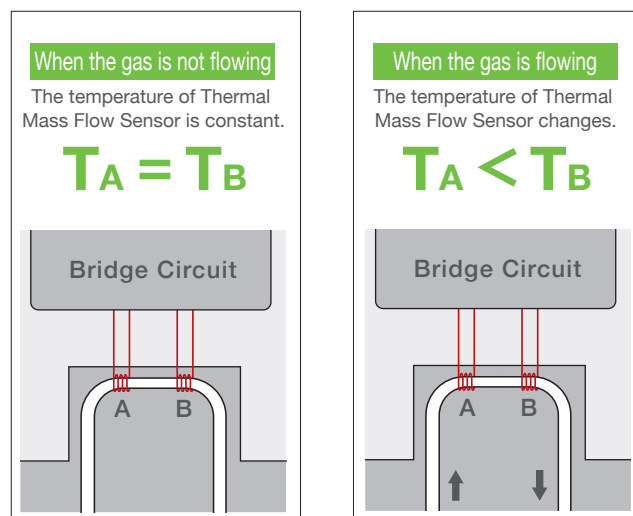
Operating Principles

The Mass Flow Controller (MFC) loads externally set input signals and flow rate output signals detected by a thermal mass flow sensor into a comparative control circuit and drives a flow control valve to always keep them equal (set value = output value). A range of digital control devices as well as analog control products are part of the line-up in Fujikin's **FCS®-Thermal Series**.



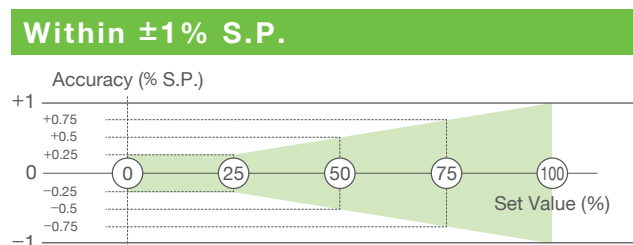
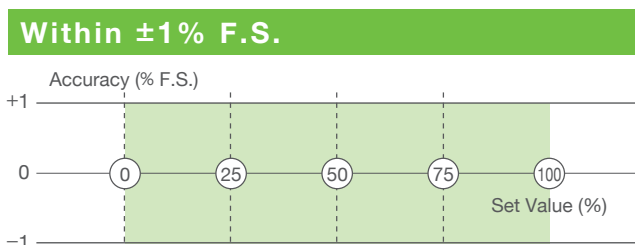
Thermal Mass Flow Sensor

As fluid runs, a temperature difference (impedance value change) occurs in the heating element between the upstream side (A) and downstream side (B) of the Thermal Mass Flow Sensor. The difference is in the rate at which the heating element is cooled, depending on the kind of gas. The mass flow rate is measured according to the principle that the rate of cooling is related to the mass flow rate.



Flow Rate Accuracy

The flow rate accuracy of Fujikin's mass flow controllers in general is $\pm 1\%$ F.S. (full scale) (within $\pm 1\%$ of maximal flow). If higher accuracy is needed, Fujikin offers products that guarantee accuracy to within $\pm 1\%$ S.P. (Set point).



Product Line-UP

Series		Mass Flow Controller				
						
Features		PI Function Model •Equipped with built-in pressure sensor •Insensitive to sudden pressure fluctuations (Pressure insensitive) •With MGMR function •Corrosion resistant Hastelloy sensor •Flow rate accuracy: Within ± 1.0 % S.P.	MGMR Model •MGMR (Multi Gas / Multi Range) function •Corrosion resistant Hastelloy sensor •Flow rate accuracy: Within ± 1.0 % S.P.	Standard Digital Model •Flow rate accuracy: ± 1.0 % F.S. •All flow rate areas: Response time ≤ 1 sec •24V drive model •Supports special specifications	High Flow Rate Model •Max. flow rate 1000 SLM (1000 SLM: Limited to certain gases) •Flow rate accuracy: ± 1.0 % F.S. •Response time: ≤ 3 sec	High Temperature Model •50 - 80 °C (Please consult Fujikin for use at temperatures above 80 °C.)
Series Name		FCS-T1000MP	FCS-T1000Z	FCS-T1000F	FCS-T1200F FCS-T1500F	FCS-T1000M(Z)F-HT FCS-T1200MF-HT
Flow Rate Range (N ₂ Equivalent)		10 SCCM - 50 SLM	10 SCCM - 50 SLM	10 SCCM - 50 SLM	51 - 1000 SLM	10 SCCM - 200 SLM
Seal Material		Metal	Metal Rubber	Metal Rubber	Metal Rubber	Metal
Flow Rate Accuracy		± 1.0 % S.P. (25-100 %) ± 0.25 % F.S. (2-25 %)	± 1.0 % S.P. (25-100 %) ± 0.25 % F.S. (2-25 %)	± 1.0 % F.S.	± 1.0 % F.S. (T1200) ± 2.0 % F.S. (T1500)	± 1.0 % S.P. (25-100 %) (T1000MZF) ± 0.25 % F.S. (2-25 %) (T1000MZF) ± 1.0 % F.S. (2-100 %) (T1000MF, T1200MF)
Response Time		≤ 1 sec	≤ 1 sec	≤ 1 sec	≤ 3 sec	≤ 1 sec (10 SCCM-50 SLM) ≤ 3 sec (51-150 SLM)
PI Function		PI				
MGMR Function		MGMR	MGMR	MR MG *1		
Communication System	Analog	± 15 V drive (0 - 5 VDC)	± 15 V drive (0 - 5 VDC)	± 15 V drive (0 - 5 VDC)	± 15 V drive (0 - 5 VDC)	± 15 V drive (0 - 5 VDC)
		+24V drive (0 - 5 VDC)	+24V drive (0 - 5 VDC)	+24V drive (0 - 5 VDC)	+24V drive (0 - 5 VDC) For rubber type only	+24V drive (0 - 5 VDC) For T1000 only
		+24V drive (4 - 20 mA)	+24V drive (4 - 20 mA)	+24V drive (4 - 20 mA)	+24V drive (4 - 20 mA) For rubber type only	+24V drive (4 - 20 mA) For T1000 only
	Digital	RS485	RS485	RS485	RS485	RS485
		DeviceNet™	DeviceNet™	DeviceNet™	DeviceNet™	DeviceNet™ For T1000MF only
		EtherCAT®	EtherCAT® For metal type only	EtherCAT®	EtherCAT®	EtherCAT®
		PROFIBUS		PROFIBUS		
		CC-Link		CC-Link	CC-Link	CC-Link
Fittings	Union Gasket Type(UJR Type)		1/4 UJR	1/4 UJR	1/4 UJR	3/8 UJR(T1200) 1/2 UJR(T1500)
	Double Compression Ring Type(F900 Type)		—	1/4 F900	1/4 F900	3/8 F900(T1200) 1/2 F900(T1500)
	Integrated System Type (IGS® Type)		1.5 Wseal _® 1.125 Wseal _® 1.125 Cseal	1.5 Wseal _® 1.125 Wseal _® 1.125 Cseal	1.5 Wseal _® 1.125 Wseal _® 1.125 Cseal	—
Surface Finish		EP	EP For metal type only	EP For metal type only	EP For metal type only	EP Option
Compatible with RoHS		RoHS	RoHS	RoHS	RoHS	RoHS
Mass Flow Meter			Mass Flow Meter	Mass Flow Meter	Mass Flow Meter	Mass Flow Meter For T1000 only
Page		P.5~6	P.7~8	P.9~10	P.11	P.12

*1: MR specifications: Changeable to 1/3 flow of the specified full scale flow. MG specifications: Up to four kinds of gases and flow rates can be registered.

*2: Analog interface: D-sub 9 pin Note that TM39 HRS-made HR10A-7R-6P UPC or UPCUS has half pitch 20 P.

*3: Digital interface: For RS485 communications, FCS-T1000 Series has RJ11 connector; FCS-T2000 Series has RJ45 connector.

	Mass Flow Controller			Pressure Controller		Flow Ratio Controller
						
	Quick Response/ Analog Economy Model ·Economy model exclusively used for 0-5V control voltage ·Flow rate accuracy: ±1 % F.S. ·Response time: ≤1 sec	Analog Economy Model ·Economy model exclusively used for 0-5V control voltage ·Limited to certain gases ·Models with integrated control power supply is also available.	High Precision Model with Piezo Actuator ·Flow rate accuracy: Within ±1 % S.P. ·Low temperature Thermal Mass Flow Sensor ·Applicable to minute flow rates ·Compatible with SDS ·Economy model	Auto Pressure Controller ·Pressure control at the upstream side or downstream side by a signal from the external pressure sensor ·Output flow rate	Auto Pressure Controller ·Pressure control at the upstream side or downstream side by an internal pressure sensor ·High temperature specification ·With a mass flow meter (option)	Gas Distribution Ratio Control Model ·Corrosion resistant Hastelloy sensor
	FCS-T1000L	FCS-G200	FCS-T2000	PCS-T1000F	UPC® UPCUS®	FRC-T (R) 1000MF FRC-T (R) 1200MF
	10 SCCM - 50 SLM	10 SCCM - 5 SLM	5 SCCM - 150 SLM	10 SCCM - 50 SLM	—	10 SCCM - 150 SLM
	Metal Rubber	Rubber	Metal	Metal Rubber	Metal	Metal
	±1 % F.S. (10 SCCM-30 SLM) ±2 % F.S. (31 SLM-50 SLM)	±2 % F.S.	±1 % S.P. (25-100 %) ±0.25 % F.S. (2-25 %)	±1 % F.S.	—	—
	≤1 sec (10 SCCM-30 SLM) ≤2 sec (31-50 SLM)	≤6 sec (Central value)	≤1 sec (Central value)	—	—	≤4 sec
	±15V drive (0 - 5 VDC)	±15V drive (0 - 5 VDC)	±15V drive (0 - 5 VDC)	±15V drive (0 - 10 VDC)	±15V drive (0 - 5 VDC)	±15V drive (0 - 5 VDC)
	+24V drive (0 - 5 VDC)			+24V drive (0 - 10 VDC)		
	+24V drive (4 - 20 mA)					
			RS485	RS485		RS485
			DeviceNet™		DeviceNet™	DeviceNet™
	1/4 UJR	1/4 UJR	1/4 UJR (T2000) 3/8 UJR (T2150)	1/4 UJR	1/4 UJR	1/4 UJR
	1/4 F900	1/4 F900	—	1/4 F900	—	—
	1.5 Wseal® 1.125 Wseal® 1.125 Cseal	—	1.5 Wseal® 1.125 Wseal®	1.5 Wseal® 1.125 Wseal® 1.125 Cseal	1.5 Wseal® 1.125 Wseal®	—
	EP For metal type only		EP	EP For metal type only		EP Option
	RoHS	RoHS	RoHS	RoHS	RoHS	RoHS
	Mass Flow Meter		Mass Flow Meter			
	P.13	P.14	P.15~16	P.17	P.18	P.19

Note 1: External leak rate: Metal seal: 1×10^{-11} Pa·m³/sec He, Rubber Seal: 1×10^{-7} Pa·m³/Sec He

Note 2: Please consult Fujikin for use under other conditions.

Note 3: DeviceNet™ is a registered trademark of the Open DeviceNet Vendor Association, Inc.

Note 4: PROFIBUS is a registered trademark of the PROFIBUS Organization.

Note 5: EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

Note 6: CC-Link is a registered trademark of the CC-Link Partner Association.

PI Function Model

FCS-T1000MP Series



Main Function and Specifications

Metal	F.S.	PI	MGMR	Analog control	Digital control	EP	Meter
Rubber	S.P.			±15V drive (0 - 5 VDC)	RS485		
				+24V drive (0 - 5 VDC)	DeviceNet™		
				+24V drive (4 - 20 mA)	EtherCAT®		
					PROFIBUS		
					CC-Link		

Note: Not compliant with the specifications of the XXX mark.

Features

PI (Pressure Insensitive)

Built-in pressure sensor eliminates influence of inlet pressure fluctuations to actual flow by the original control algorithm.

Multi Gas / Multi Range (MGMR)

Users can optionally change the gas type and the full scale flow rate with 8 flow rates ranging from 10 SCCM to 50 SLM.

Hastelloy Sensor

Improved corrosion resistance against halogen gas.

High Flow Rate Accuracy

±1% S.P. (25 - 100%)

Specifications

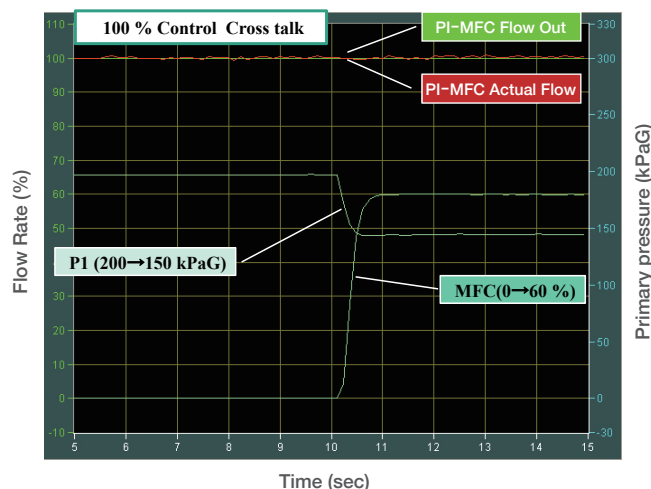
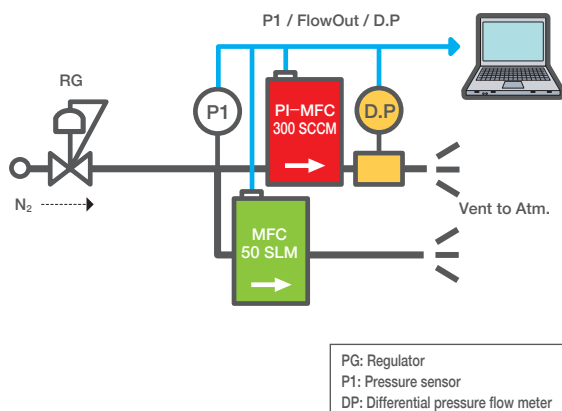
Model Number	FCST1005MPF (C)	FCST1030MPF (C)	FCST1050MPF (C)
Flow Rate Range (N ₂ Equivalent)	Bin1: 10 - 30 SCCM Bin2: 31 - 100 SCCM Bin3: 101 - 300 SCCM Bin4: 301 - 1,000 SCCM Bin5: 1,001 - 3,000 SCCM	Bin6: 3,001 - 10,000 SCCM Bin7: 10,001 - 30,000 SCCM	Bin8: 30,001 - 50,000 SCCM
Seal	Metal seal		
Valve Type	N/O: Normally open, N/C: Normally closed		
Controlled Volume Range	2 - 100 % F.S.		
Flow Rate Accuracy	±1 % S.P. (25 - 100 %), ±0.25 % F.S. (2 - 25 %) (Accuracy guaranteed range: 15 - 35 °C)		
Repeatability	±0.2 % F.S.		
Response Time *	≤1 sec		
Required Pressure Difference	50 - 300 kPa (Ar: 100 - 300 kPa)	N/O 100 - 300 kPa (Bin6) 150 - 300 kPa (Bin7) N/C 100 - 300 kPa (Bin6, 7) (Ar: 200 - 350 kPa)	200 - 300 kPa (Ar: 250 - 450 kPa)
MAX Operating Pressure	400 kPaG (Ar: 500 kPaG)		
Guaranteed Operating Temperature Range	5 - 50 °C		
Communication System	Analog: 0 - 5 VDC (Supply power voltage: ±15 VDC) Digital: RS485, DeviceNet™, EtherCAT®		

*: Response time refers to the time to reach from minimum flow rate to ±2% F.S. of setting flow rate.

Note 1: At Fujikin, flow rates (SCCM, SLM) are converted to values at 0°C and 101.3 kPa abs. (1 atm) for calibration.

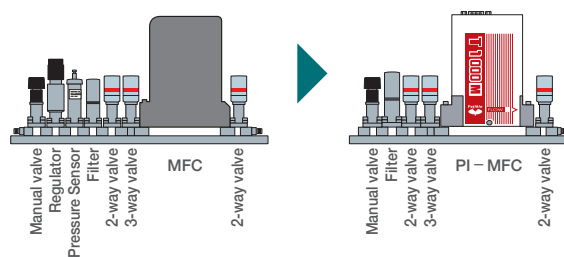
PI (Pressure Insensitive) Function Equipped

A FCS-T1005MPFC MFC equipped with the PI function is connected in parallel with another MFC not equipped with the PI function to reproduce cross talk. The MFC equipped with the PI function eliminates the influence of sudden inlet pressure fluctuations to realize stable flow rate control.

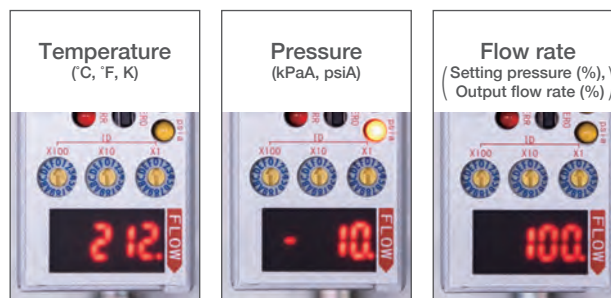


Downsizing & Cost Reduction

By omitting the pressure system equipment from the gas system, footprint size and costs are reduced.



With a Display



Product Code

FCST 1005 MP F C - 4J2 - F10 - N2 - R1 - U * - D** - EP**

- | | |
|-------------------------------------|--|
| ① FCS: Thermal | ● FCST: Mass Flow Controller |
| ② Flow Rate Range | ● 1005: 10-3,000 SCCM ● 1030: 3,001-30,000 SCCM ● 1050: 30,001-50,000 SCCM |
| ③ Seal/Function | ● MP: Metal seal/PI type |
| ④ Control System | ● F: Analog / Digital ● E: EtherCAT® ● 2D: Device Net™ |
| ⑤ Valve Mode | ● Blank: Normally open ● C: Normally closed |
| ⑥ Fittings (Face to face dimension) | ● 4J2: 1/4 UJR(124 mm) ● 4WS2: 1.5 Wseal _g (92 mm)
● 4CW2: 1.125 Wseal _g (92 mm) ● 4CL2: 1.125 Cseal(92 mm) |
| ⑦ Full Scale | ● F10: 10 SCCM ● F10L: 10 SLM |

- | | |
|-------------------------------|--|
| ⑧ Gas Type | Example: N2 |
| ⑨ MGMR | ● Blank: Single gas / Single range
● R1 to R8: Multi gas / Multi range (MGMR) |
| ⑩ D-sub 9 pin connector screw | ● Blank: M3 ● U: Inch |
| ⑪ User Specifications | Example: 006, 25 °C, 1 atm ● Flow rate unit: CCM, LM |
| ⑫ Communication Specification | ● Blank: RS485 ● D*: Device Net™ ● E*: EtherCAT® |
| ⑬ Surface Finish | ● EP: Electro-Polished |

MGMR Model FCS-T1000Z Series



Main Function and Specifications

Metal	F.S.	PI	MGMR	Analog control	Digital control	EP	Meter
Rubber	S.P.			±15V drive (0 - 5 VDC) +24V drive (0 - 5 VDC) +24V drive (4 - 20 mA)	RS485 DeviceNet™ EtherCAT® PROFIBUS CC-Link	(For metal type only)	

Note: Not compliant with the specifications of the **XXX** mark.

Features

- Multi Gas / Multi Range (MGMR)**
 Users may change gas and full scale flow rate easily with 8 flow rates ranging from 10 SCCM to 50 SLM.
- Hastelloy Sensor**
 Improved corrosion resistance against halogen gas.
- High Flow Rate Accuracy**
 ±1% S.P. (25 - 100%)

Specifications

Model Number	FCST1005 (M) ZF (C)	FCST1030 (M) ZF (C)	FCST1050 (M) ZF (C)
Flow Rate Range (N ₂ Equivalent)	Bin1: 10 - 30 SCCM Bin2: 31 - 100 SCCM Bin3: 101 - 300 SCCM Bin4: 301 - 1,000 SCCM Bin5: 1,001 - 3,000 SCCM	Bin6: 3,001 - 10,000 SCCM Bin7: 10,001 - 30,000 SCCM	Bin8: 30,001 - 50,000 SCCM
Seal	Metal seal, rubber seal		
Valve Type	N/O: Normally open, N/C: Normally closed		
Controlled Volume Range	2 - 100 % F.S.		
Flow Rate Accuracy	±1 % S.P. (25 - 100 %), ±0.25 % F.S. (2 - 25 %) (Accuracy guaranteed range: 15 - 35 °C)		
Repeatability	±0.2 % F.S.		
Response Time *	≤1 sec		
Required Pressure Difference	50 - 300 kPa (Ar: 100 - 300 kPa)	N/O 100 - 300 kPa (Bin6) 150 - 300 kPa (Bin7) N/C 100 - 300 kPa (Bin6, 7) (Ar: 200 - 350 kPa)	200 - 300 kPa (Ar: 250 - 450 kPa)
MAX Operating Pressure	400 kPaG (Ar: 500 kPaG)		
Guaranteed Operating Temperature Range	5 - 50 °C		
Communication System	Analog: 0 - 5 VDC (Supply power voltage: ±15 VDC), 0 - 5 VDC (Supply power voltage: +24 VDC), 4 - 20 mA (Supply power voltage: +24 VDC) Digital: RS485, DeviceNet™, EtherCAT® (For metal seal only)		

*: Response time refers to the time to reach from minimum flow rate to ±2% F.S. of setting flow rate.

Note 1: Specifications are for MFC only. For specification about Mass Flow Meter, please consult Fujikin.

Note 2: At Fujikin, flow rates (SCCM, SLM) are converted to values at 0°C and 101.3 kPa abs. (1 atm) for calibration.

Multi Gas / Multi Range (MGMR)

Users can optionally change the gas type and the full scale flow rate in the flow rate range that corresponds to the specified Bin number. Choose from 8 bin numbers to match the one with the flow rate range in use.

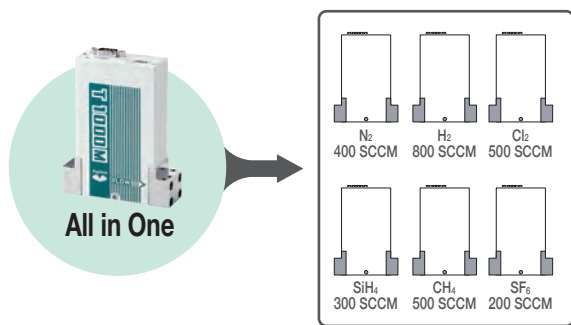


Table of Bin Numbers

Model Number	Bin Number	Flow Rate Range (N ₂ Equivalent)
FCST1005 (M) Z	R1	10 – 30 SCCM
	R2	31 – 100 SCCM
	R3	101 – 300 SCCM
	R4	301 – 1,000 SCCM
	R5	1,001 – 3,000 SCCM
FCST1030 (M) Z	R6	3,001 – 10,000 SCCM
	R7	10,001 – 30,000 SCCM
FCST1050 (M) Z	R8	30,001 – 50,000 SCCM

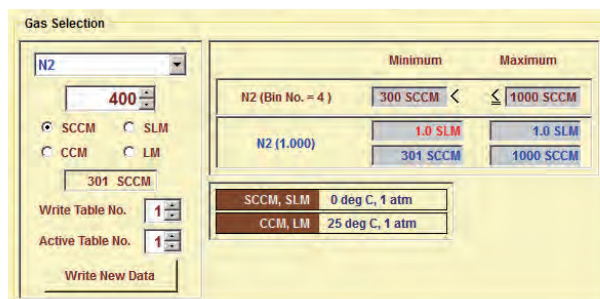
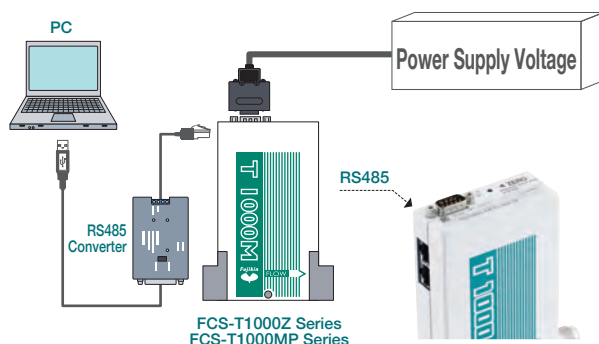
Change the gas type and the full scale flow rate.

Both emergency responses and spare stock can be reduced.

Cost reduction

Configuration Software

Configuration software allows for changing the gas type and the full scale flow rate.



Bin Number: R4 Connection Screen

Product Code

FCST 1005 M ZF C - 4J2 - F10 - N2 - R1 - CR - U * - V - D** - EP**

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮

- ① **FCS**: Thermal • FCST: Mass Flow Controller • FCSTM: Mass Flow Meter
- ② **Flow Rate Range** • 1005: 10-3,000 SCCM • 1030: 3,001-30,000 SCCM • 1050: 30,001-50,000 SCCM
- ③ **Seal Material** • Blank: Rubber • M: Metal
- ④ **Control Method** • ZF: Analog / Digital • ZD: DeviceNet™ (Horizontal connection)
• ZDT: DeviceNet™ (Top connection) • ZE: EtherCAT®
- ⑤ **Valve Mode** • Blank: Normally open • C: Normally closed
- ⑥ **Fittings (Face to face dimension)** • 4J2: 1/4 UJR (124 mm) • 4J1: 1/4 UJR (106 mm)
• 4F2: 1/4 F900 (127 mm) • 4CW1: 1.125 Wseal_® (79.8 mm)
• 4CW2: 1.125 Wseal_® (92 mm) • 4WS1: 1.5 Wseal_® (79.8 mm)
• 4WS2: 1.5 Wseal_® (92 mm) • 4CL2: 1.125 Cseal (92 mm)
- ⑦ **Full Scale** • F10: 10 SCCM • F10L: 10 SLM

- ⑧ **Gas Type** Example: N2
- ⑨ **MGMR** • Blank: Single gas / Single range
• R1 to R8: Multi gas / Multi range (MGMR)
- ⑩ **O-Ring Material** • Blank: FKM • CR: Chloroprene rubber
- ⑪ **D-sub 9 pin connector screw** • Blank: M3 • U: Inch
- ⑫ **User Specifications** Example: 006, 25 °C, 1 atm • Flow rate unit: CCM, LM
- ⑬ **Power Supply Analog Output** • Blank: ±15 VDC (0-5 VDC) • V: +24 VDC (0-5 VDC)
• VI: +24 VDC (4-20 mA)
- ⑭ **Communication Specification** • Blank: RS485 • D**: Device Net™ • E**: EtherCAT®
- ⑮ **Surface Finish** • Blank: Machined Finish • EP: Electro-Polished

*: • corresponds only to metal seal type.

Standard Digital Model

FCS-T1000F Series



Main Function and Specifications

Metal	F.S.	PI	MGMR	Analog control	Digital control	EP	Meter
Rubber	S.P.			±15V drive (0 - 5 VDC) +24V drive (0 - 5 VDC) +24V drive (4 - 20 mA)	RS485 DeviceNet™ EtherCAT® PROFIBUS CC-Link	(For metal type only)	

Note: Not compliant with the specifications of the XXX mark.

Features

● Quick Response

Response Time: ≤ 1 sec for any given set point

● Flow Rate Control and Monitoring Software

By connecting to a PC, an application that allows digital control up to 9 channels can be made available.

● Applicable to Various Communication Modes

● Supports special specifications

(Example) High pressure specification, low differential pressure specification, high differential pressure specification, application to minute flow rate, etc.

Specifications

Model Number	FCST1005 (M) F (C)	FCST1030 (M) F (C)	FCST1050 (M) F (C)
Flow Rate Range (N ₂ Equivalent)	10 SCCM - 5 SLM	6 - 30 SLM	31 - 50 SLM
Seal	Metal seal, rubber seal		
Valve Type	N/O: Normally open, N/C: Normally closed		
Controlled Volume Range	2 - 100 % F.S.		
Flow Rate Accuracy	±1 % F.S. (Accuracy guaranteed range: 15 - 35°C)		
Repeatability	±0.2 % F.S.		
Response Time *	≤1 sec		
Required Pressure Difference	50 - 300 kPa	N/O 100 - 300 kPa (6 - 10 SLM) 150 - 300 kPa (11 - 30 SLM) N/C 100 - 300 kPa (6 - 30 SLM)	200 - 300 kPa
MAX Operating Pressure	400 kPaG		
Guaranteed Operating Temperature Range	5 - 50 °C		
Communication System	Analog: 0 - 5 VDC (Supply power voltage: ±15 VDC), 0 - 5 VDC (Supply power voltage: +24 VDC), 4 - 20 mA (Supply power voltage: +24 VDC) Digital: RS485, DeviceNet™, EtherCAT®, PROFIBUS, CC-Link		

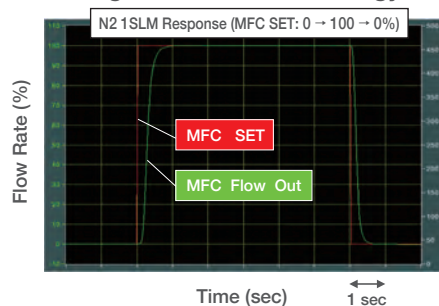
*: Response time refers to the time to reach from minimum flow rate to ±2% F.S. of setting flow rate.

Note 1: Specifications are for MFC only. For specification about Mass Flow Meter, please consult Fujikin.

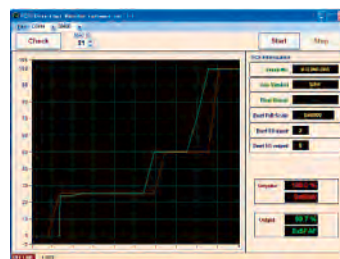
Note 2: At Fujikin, flow rates (SCCM, SLM) are converted to values at 0°C and 101.3 kPa abs. (1 atm) for calibration.

Quick Response

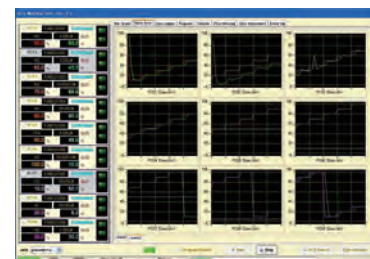
Response Time: ≤ 1 sec for any given set point; Progressive PID Technology



Application



1ch Monitoring Software for DeviceNet™



9ch Monitoring Software Corrugated Chart

Applicable to Various Communication Modes



0-5 VDC
(4-20 mA)



RS485



DeviceNet™



EtherCAT®

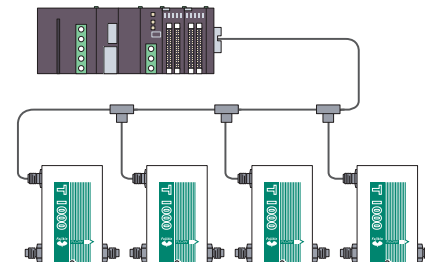


PROFIBUS



CC-Link

PLC (Programmable Logic Controller)



Single gas specification, MR specification, MG specification

Control System	Specifications	Description
Digital / Analog Model	Single gas specification	Calibration is performed using the gas type and the flow rate specified by the customer (fixed).
	MR (Multi Range) specification	The flow rate can be changed to even 1/3 of the specified full scale flow rate.
	MG (Multi Gas) specification	It's possible to register up to four kinds of gas table (gas and flow rate).

* For part numbers, please contact Fujikin.

Product Code

FCST 1005 M F C - 4J2 - F10 - N2 - CR - U * - V - D** - EP**

- ① FCS_g-Thermal ● FCST: Mass Flow Controller ● FCSTM: Mass Flow Meter
- ② Flow Rate Range ● 1005: 10 SCCM-5 SLM ● 1030: 6 SLM-30 SLM ● 1050: 31 SLM-50 SLM
- ③ Seal Material ● Blank: Rubber ○ M: Metal
- ④ Control Method ● F: Analog / Digital ● FD: DeviceNet™ (Horizontal connection)
- FDT: DeviceNet™ (Top connection) ● E: EtherCAT_g ● PB: PROFIBUS ● C2: CC-Link
- ⑤ Valve Mode ● Blank: Normally open ● C: Normally closed
- ⑥ Fittings (Face to face dimension) ● 4J2: 1/4 UJR (124 mm) ○ 4J1: 1/4 UJR (106 mm)
- 4F2: 1/4 F900 (127 mm) ○ 4CW1: 1.125 Wseal_g (79.8 mm)
- 4CW2: 1.125 Wseal_g (92 mm) ● 4WS1: 1.5 Wseal_g (79.8 mm)
- 4WS2: 1.5 Wseal_g (92 mm) ○ 4CL2: 1.125 Cseal (92 mm)

- ⑦ Full Scale ● F10: 10 SCCM ● F10L: 10 SLM
- ⑧ Gas Type Example: N2
- ⑨ O-Ring Material ● Blank: FKM ● CR: Chloroprene rubber
- ⑩ D-sub 9 pin connector screw ● Blank: M3 ● U: Inch
- ⑪ User Specifications Example: 006, 25 °C, 1 atm ● Flow rate unit: CCM, LM
- ⑫ Power Supply Analog Output ● Blank: ± 15 VDC (0-5 VDC) ● V: +24 VDC (0-5 VDC)
- Vt: +24 VDC (4-20 mA)
- ⑬ Communication Specification ● Blank: RS485 ● D**: Device Net™ ● E**: EtherCAT_g
- P**: PROFIBUS ● C**: CC-Link
- ⑭ Surface Finish ● Blank: Machined Finish ○ EP: Electro-Polished

*: ○ corresponds only to metal seal type.

High Flow Rate Model FCS-T1200F, FCS-T1500F Series



Main Function and Specifications

Metal	F.S.	PI	MGMR	Analog control	Digital control	EP	Meter
Rubber	S.P.			±15V drive (0 - 5 VDC) +24V drive (0 - 5 VDC) +24V drive (4 - 20 mA)	RS485 DeviceNet™ EtherCAT® PROFIBUS CC-Link	(For metal type only)	

Note: Not compliant with the specifications of the **XXX** mark.

Features

● High Flow Rate Model

Applicable up to the maximum flow rate of 500 SLM (N₂ equivalent).
(Please consult Fujikin for use at flow rate above 500 SLM.)

● Flow Rate Accuracy

±1.0 % F.S. (F.S. 200 SLM or less)

● Response Time

≤ 3 sec

Specifications

Model Number	FCST1200MF (C)	FCST1200F (C)	FCST1500FC
Flow Rate Range (N ₂ Equivalent)	60 - 150 SLM (200 SLM) *2	60 - 200 SLM	201 - 500 SLM (1000 SLM) *3
Seal	Metal seal	Rubber seal	
Valve Type	N/O: Normally open, N/C: Normally closed		N/C: Normally closed
Controlled Volume Range	2 - 100 % F.S.		
Flow Rate Accuracy	±1.0 % F.S. (Accuracy guaranteed range: 15 - 35°C)		±2.0 % F.S. (Accuracy guaranteed range: 15 - 35°C)
Repeatability	±0.2 % F.S.		
Response Time *1	≤3 sec		
Required Pressure Difference	100 - 300 kPa (60 - 100 SLM) 150 - 300 kPa (101 - 150 SLM) 250 - 450 kPa (151 - 200 SLM)	100 - 300 kPa	150 - 300 kPa (201 - 500 SLM) 300 - 450 kPa (501 - 1000 SLM)
MAX Operating Pressure	700 kPaG		
Guaranteed Operating Temperature Range	5 - 45 °C		
Communication System	Analog: 0 - 5 VDC (Supply power voltage: ±15 VDC) Digital: RS485, DeviceNet™, EtherCAT®, CC-Link	Analog: 0 - 5 VDC (Supply power voltage: ±15 VDC) 4 - 20 mA (Supply power voltage: +24 VDC) Digital: RS485, DeviceNet™, EtherCAT®, CC-Link	

*1: Response time refers to the time to reach from minimum flow rate to ±2.0 % F.S. of setting flow rate.

*2: For the flow rate range of 200 SLM, the gas type is limited.

*3: For the flow rate range of 1000 SLM, the gas type is limited. Since working pressure conditions vary depending on the gas type, please consult Fujikin.

Note 1: Specifications are for MFC only. For specification about Mass Flow Meter, please consult Fujikin.

Note 2: At Fujikin, flow rates (SCCM, SLM) are converted to values at 0 °C and 101.3 kPa abs (1 atm) for calibration.

Product Code

FCST 1200M F C - 6J3 - F100L - N2 - CR - U * - V - D** - EP**

①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬
① FCS₀-Thermal	● FCS ₀ : Mass Flow Controller	● FCS _{TM} : Mass Flow Meter										
② Flow Rate Range / Seal	○ 1200M: 51 SLM-150 SLM, metal seal	● 1200: 51 SLM-200 SLM, rubber seal										
	● 1500: 201 SLM-(1000 SLM), rubber seal											
③ Control System	● F: Analog / Digital	● FD: DeviceNet™ (Horizontal connection)										
	● FDT: DeviceNet™ (Top connection)	● E: EtherCAT®	● C2: CC-Link									
④ Valve Mode	● Blank: Normally open	● C: Normally closed										
⑤ Fittings (Face to face dimension)	● 6J3: 3/8 UJR (192.4 mm)	● 6F3: 3/8 F900 (192.5 mm)	● FCS-T1200F									
	● 8J3: 1/2 UJR (199 mm)	● 8F3: 1/2 F900 (204.6 mm)	● FCS-T1500F									
⑥ Full Scale	● F100 L: 100 SLM	● F500L: 500 SLM										
⑦ Gas Type	Example: N2											
⑧ O-Ring Material	● Blank: FKM	● CR: Chloroprene rubber										
⑨ D-sub 9 Pin connector screw	● Blank: M3	● U: Inch										
⑩ User Specifications	Example: 006, 25 °C, 1 atm											
⑪ Power Supply Analog Output	● Blank: ±15 VDC (0-5 VDC)	● V: +24 VDC (0-5 VDC)										
	● VI: +24 VDC (4-20 mA)											
⑫ Communication Specification	● Blank: RS485	● D**: Device Net™	● E**: EtherCAT®									
	● C**: CC-Link											
⑬ Surface Finish	● Blank: Machined Finish	● EP: Electro-Polished										

*: ○ corresponds only to metal seal type.

High Temperature Model

FCS-T1000M(Z)F-HT, FCS-T1200MF-HT Series



Main Function and Specifications

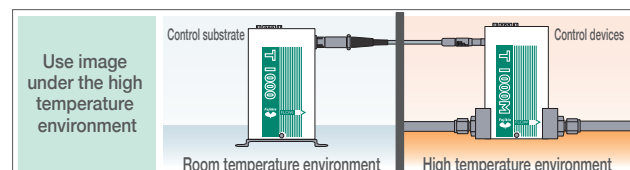
Metal	F.S.	PI	MGMR	Analog control	Digital control	EP	Meter
Rubber	S.P.			±15V drive (0 - 5 VDC)	RS485	(Option)	
				+24V drive (0 - 5 VDC)	DeviceNet™		
				+24V drive (4 - 20 mA)	EtherCAT®		
					PROFIBUS		
					CC-Link		

Note: Not compliant with the specifications of the XXX mark.

Features

Supports high temperatures.

Temperature range: 50 - 80 °C
(Please consult Fujikin for use at temperatures above 80 °C.)



Specifications

Model Number	FCST1005MZF (C)-HT FCST1030MZF (C)-HT FCST1050MZF (C)-HT	FCST1005MF (C)-HT FCST1030MF (C)-HT FCST1050MF (C)-HT	FCST1200MF (C)-HT
Flow Rate Range (N ₂ Equivalent)	10 - 3,000 SCCM 3,001 - 30,000 SCCM 30,001 - 50,000 SCCM	10 SCCM - 5 SLM 6 - 30 SLM 31 - 50 SLM	51 - 150 SLM
Seal	Metal seal		
Valve Type	N/O: Normally open, N/C: Normally closed		
Controlled Volume Range	2 - 100 % F.S.		
Flow Rate Accuracy	±1 % S.P. (25 - 100 %) ±0.25 % F.S. (2 - 25 %)	±1 % F.S.	
Repeatability	±0.2 % F.S.		
Response Time *1	≤1 sec		≤3 sec
Required Pressure Difference *2	Based on Digital Multi Gas Model FCS-T1000MZF Series	Based on Standard Digital Model FCS-T1000MF Series	Based on Digital High Flow Rate Model FCS-T1200MF Series
MAX Operating Pressure	400 kPaG (Ar: 500 kPaG)	400 kPaG	700 kPaG
Guaranteed Operating Temperature Range	50 - 80 °C (We can calibrate the customer-specified temperature.)		
Communication System	Analog: 0 - 5 VDC (Supply power voltage: ±15 VDC) 0 - 5 VDC (Supply power voltage: +24 VDC) 4 - 20 mA (Supply power voltage: +24 VDC) Digital: RS485, DeviceNet™ (for T1000MF only), EtherCAT®, CC-Link		Analog: 0 - 5 VDC (Supply power voltage: ±15 VDC) Digital: RS485, DeviceNet™, CC-Link

*1: Response time refers to the time to reach from minimum flow rate to ±2 % F.S. of setting flow rate.

*2: For controlling gases with low vapor pressure such as liquid materials, please consult Fujikin.

Note 1: Specifications are for MFC only. For specification about Mass Flow Meter, please consult Fujikin.

Note 2: At Fujikin, flow rates (SCCM, SLM) are converted to values at 0 °C and 101.3 kPa abs. (1 atm) for calibration.

Product Code

FCST 1005 MF C - 4J2 - F10 - N2 - U *** - V - D** - HT - EP

①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬
①FCS- Thermal	●FCST: Mass Flow Controller	●FCSTM: Mass Flow Meter					⑧D-sub 9 Pin connector screw	●Blank: M3	●U: Inch			
②Flow Rate Range	It's based upon each model.						⑨User Specifications	Example: 006, 25 °C, 1 atm				
③Seal Material / Control System	●MF: Metal seal, Analog / Digital						⑩Power Supply Analog Output	●Blank: ±15 VDC (0-5 VDC)				
	●MFD: Metal seal, DeviceNet™ (Horizontal connection)							●V: +24 VDC (0-5 VDC)				
④Valve Mode	●Blank: Normally open							●VI: +24 VDC (4-20 mA)				
	●C: Normally closed						⑪Communication Specification	●Blank: RS485				
⑤Fittings (Face to face dimension)	It's based upon each model.							●D**: Device Net™				
⑥Full Scale	●F10: 10 SCCM							●E**: EtherCAT®				
⑦Gas Type	Example: N2							●C**: CC-Link				
							⑫High Temperature Specification	●HT Guaranteed Operating Temperature Range: 50 to 80 °C				
							⑬Surface Finish	●Blank: Machined Finish				
								●EP: Electro-Polished				

Quick Response/Analog Economy Model

FCS-T1000L Series



Main Function and Specifications

Metal	F.S.	PI	MGMR	Analog control	Digital control	EP	Meter
Rubber	S.P.			±15V drive (0 - 5 VDC) ±24V drive (0 - 5 VDC) ±24V drive (4 - 20 mA)	RS485 DeviceNet™ EtherCAT® PROFIBUS CC-Link	(For metal type only)	

Note: Not compliant with the specifications of the **XXX** mark.

Features

- **Flow Rate Accuracy**
±1 % F.S. (F.S. 30 SLM or less)
- **Input/Output**
Analog (0 - 5 VDC, 4 - 20 mA)
- **Quick Response**
≤ 1 sec (F.S. 30 SLM or less)

Specifications

Model Number	FCST1005 (M) L (C)	FCST1030 (M) L (C)	FCST1050 (M) L (C)
Flow Rate Range (N ₂ Equivalent)	10 SCCM - 5 SLM	6 - 30 SLM	31 - 50 SLM
Seal	Metal seal, rubber seal		
Valve Type	N/O: Normally open, N/C: Normally closed		
Controlled Volume Range	2 - 100 % F.S.		
Flow Rate Accuracy	±1 % F.S. (Accuracy guaranteed range: 15 - 35°C)		±2 % F.S. (Accuracy guaranteed range: 15 - 35°C)
Repeatability	±0.2 % F.S.		
Response Time	≤1 sec		≤2 sec
Required Pressure Difference	50 - 300 kPa	N/O: 100 - 300 kPa (6 - 10 SLM) 150 - 300 kPa (11 - 30 SLM) N/C: 100 - 300 kPa (6 - 30 SLM)	200 - 300 kPa
MAX Operating Pressure	400 kPaG		
Guaranteed Operating Temperature Range	5 - 50 °C		
Communication System	Analog: 0 - 5 VDC (Supply power voltage: ±15 VDC, +24 VDC), 4 - 20 mA (Supply power voltage: +24 VDC)		

*: Response time refers to the time to reach from minimum flow rate to ±2% F.S. of setting flow rate.

Note 1: Specifications are for MFC only. For specification about Mass Flow Meter, please consult Fujikin.

Note 2: At Fujikin, flow rates (SCCM, SLM) are converted to values at 0°C and 101.3 kPa abs. (1 atm) for calibration.

Note 3: When converting values to 20 (25)°C and 101.3 kPa (1 atm) for calibration, please consult Fujikin.

Product Code

FCST 1005 M L C - 4J2 - F10 - N2 - CR - U * - V - EP**

① FCS- Thermal	● FCST: Mass Flow Controller ● FCSTM: Mass Flow Meter	⑦ Full Scale	● F10: 10 SCCM ● F10L: 10 SLM
② Flow Rate Range	● 1005: 10 SCCM - 5 SLM ● 1030: 6 - 30 SLM ● 1050: 31 - 50 SLM	⑧ Gas Type	Example: N2
③ Seal Material	● Blank: Rubber ○ M: Metal	⑨ O-Ring Material	● Blank: FKM ● CR: Chloroprene rubber
④ Control System	● L: Analog	⑩ D-sub 9 pin connector screw	● Blank: M3 ● U: Inch
⑤ Valve Mode	● Blank: Normally open ● C: Normally closed	⑪ User Specifications	Example: 006, 25 °C, 1 atm ● Flow rate unit: CCM, LM
⑥ Fittings (Face to face dimension)	● 4J2: 1/4 UJR (124 mm) ● 4F2: 1/4 F900 (127 mm) ○ 4CW1: 1.125 Wseal _® (79.8 mm) ○ 4CW2: 1.125 Wseal _® (92 mm) ○ 4WS1: 1.5 Wseal _® (79.8 mm) ● 4WS2: 1.5 Wseal _® (92 mm) ○ 4CL2: 1.125 Cseal (92 mm)	⑫ Power Supply Analog Output	● Blank: ±15 VDC (0-5 VDC) ● V: +24 VDC (0-5 VDC) ● VI: +24 VDC (4-20 mA)
		⑬ Surface Finish	● Blank: Machined Finish ○ EP: Electro-Polished

*: ○ indicates that it is applicable only to the metal seal.

Analog Economy Model FCS-G200 Series



Main Function and Specifications

Metal	F.S.	PI	MGMR	Analog control	Digital control	EP	Meter
Rubber	S.P.			+15V drive (0 - 5 VDC) +24V drive (0 - 5 VDC) +24V drive (4 - 20 mA)	RS485 DeviceNet™ EtherCAT® PROFIBUS CC-Link		

Note: Not compliant with the specifications of the XXX mark.

Features

- Allows flow rate measurement by analog signal and the control function.
- Supports integrated power supply source.

Specifications

Model Number	FCSG205
Flow Rate Range (N ₂ Equivalent)	10 SCCM - 5 SLM
Practicable Gases	N ₂ , Ar, He, Air, O ₂ , SF ₆ , H ₂
Seal	Rubber seal
Valve Type	N/O: Normally open
Controlled Volume Range	5 - 100 % F.S.
Flow Rate Accuracy	±2 % F.S. (Accuracy guaranteed range: 15 - 35 °C)
Repeatability	±0.2 % F.S.
Response Time	≤6 sec (Central value)
Required Pressure Difference	50 - 300 kPa (5 SLM)
MAX Operating Pressure	300 kPaG
Maximum allowable working pressure	1 MPa G
Guaranteed Operating Temperature Range	5 - 50 °C
Communication System	Analog: 0 - 5 VDC (Supply power voltage: ±15 VDC)

*: Please consult Fujikin about use of the gas which isn't mentioned.

Note 1: At Fujikin, flow rates (SCCM, SLM) are converted to values at 0°C and 101.3 kPa abs. (1 atm) for calibration.

Product Code

FCSG205 - 4F2 - F10 - N2 - U ***

①

②

③

④

⑤

⑥

① FCS - Thermal

● FCSG205: Normally open

② Fittings (face to face dimension)

● 4J2: 1/4 UJR (124 mm) ● 4F2: 1/4 F900 (127 mm)

③ Full Scale

● F10: 10 SCCM

● F1L: 1 SLM

④ Gas Type

Example: N₂ etc

⑤ D-sub 9 pin connector screw

● Blank: M3 ● U: Inch

⑥ User Specifications

Special specifications, etc.

High Precision Model with Piezo Actuator

FCS-T2000 Series



Main Function and Specifications

Metal	F.S.	PI	MGMR	Analog control	Digital control	EP	Meter
Rubber	S.P.			±15V drive (0 - 5 VDC)	RS485		
				+24V drive (0 - 5 VDC)	DeviceNet™		
				+24V drive (4 - 20 mA)	EtherCAT®		
					PROFIBUS		
					CC-Link		

Note: Not compliant with the specifications of the XXX mark.

Features

- Equipped with piezo actuator
- Low temperature Thermal Mass Flow Sensor
Effective for high reaction gases and low stability gases (O₃, etc.).
- Applicable to minute flow rates
Special models: 1, 2, 3 SCCM F.S.

Specifications

Model Number	FCST2005 (C)	FCST2020 (C)	FCST2050 (C)	FCST2150 (C)
Flow Rate Range (N ₂ Equivalent)	5 SCCM - 5 SLM	10 SLM - 20 SLM	30 SLM - 50 SLM	100 SLM - 150 SLM
Seal	Metal seal			
Valve Type	N/O: Normally open, N/C: Normally closed			N/C: Normally closed (Solenoid actuator)
Controlled Volume Range	2 - 100 % F.S.			
Flow Rate Accuracy	±1 % S.P.(25 - 100 %), ±0.25 % F.S. (2 - 25 %)			±2 % F.S.
Repeatability	±0.2 % F.S.			
Response Time	≤1 sec (Central value)			
Required Pressure Difference	50 - 300 kPa	N/O: 50-300 kPa (10 SLM) 100-300 kPa (20 SLM) N/C: 100-300 kPa (10 SLM) 200-300 kPa (20 SLM)	100-300 kPa (30 SLM) 150-300 kPa (50 SLM)	200-350 SLM (100 SLM) 250-350 kPa (150 SLM)
MAX Operating Pressure	300 kPaG			350 kPaG
Guaranteed Operating Temperature Range	5 - 50 °C			
Communication System	Analog: 0 - 5 VDC (Supply power voltage: ±15 VDC) Digital: RS485, DeviceNet™			Analog: 0 - 5 VDC (Supply power voltage: ±15 VDC)

Note 1: Specifications are for MFC only. For specifications of Mass Flow Meter, please consult Fujikin.

Note 2: At Fujikin, flow rates (SCCM, SLM) are converted to values at 0°C and 101.3 kPa abs. (1 atm) for calibration.

Product Code

FCST 2005 D C - 4J2 - F10 - N2 - U ***

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

- ① FCS_{Thermal} • FCST: Mass Flow Controller • FCSTM: Mass Flow Meter
- ② Flow Rate Range • 2005: 5 SCCM-5 SLM • 2020: 10-20 SLM • 2050: 30-50 SLM • 2150: 100-150 SLM
- ③ Control System • Blank: Analog / Digital • D: DeviceNet™(Horizontal connection) • DT: DeviceNet™(Top connection)
- ④ Valve Mode • Blank: Normally open • C: Normally closed
- ⑤ Fittings (Face to face dimension) • 4J2: 1/4 UJR(124 mm) • 4J1: 1/4 UJR (106 mm)
- 4CW1: 1.125 Wseal_® (79.8 mm) • 4CW2: 1.125 Wseal_® (92 mm)
- 4WS1: 1.5 Wseal_® (79.8 mm) • 6J2: 3/8 UJR (163.4 mm) (for 51 to 150 SLM only)

- ⑥ Full Scale • F10:10 SCCM • F10L:10 SLM
- ⑦ Gas Type • Example: N2
- ⑧ D-sub 9 Pin connector screw • Blank: M3 • U: Inch
- ⑨ User Specifications

SDS™ (Safe Delivery Source) Model FCSDS-T2000 Series



■ Main Function and Specifications

Metal	F.S.	PI	MGMR	Analog control	Digital control	EP	Meter
Rubber	S.P.			±15V drive (0 - 5 VDC) +24V drive (0 - 5 VDC) +24V drive (4 - 20 mA)	RS485 DeviceNet™ EtherCAT® PROFIBUS CC-Link		

Note: Not compliant with the specifications of the **xxx** mark.

■ Features

- **Compatible with SDS**
Low differential pressure control from 0.8 kPa is possible.
- **Supports Multi Gas Model.**
Gas type can be changed with a rotary switch.

■ Specifications

Model Number	FCSDST2050 (C)		
Flow Rate Range (N ₂ Equivalent)	2 SCCM - 10 SCCM	20 SCCM	30 SCCM
Practicable Gases	AsH ₃ , BF ₃ , PH ₃ , SiF ₄ , GeF ₄ etc.		
Valve Type	Piezo actuator: N/O: Normally open, N/C: Normally closed		
Controlled Volume Range	2 - 100 % F.S.		
Flow Rate Accuracy	± 1% F.S. (Accuracy guaranteed range: 15 - 35°C)		
Repeatability	±0.2 % F.S.		
Response Time	2 sec (Central value)		
Required Pressure Difference	0.8 kPa - 133.3 kPa	1.07 kPa - 133.3 kPa	1.33 kPa - 133.3 kPa
MAX Operating Pressure	133.3 kPa (1000 Torr)		
Guaranteed Operating Temperature Range	5 - 50 °C		
Communication System	Analog: 0 - 5 VDC (Supply power voltage: ±15 VDC) Digital: RS485		

Note 1: At Fujikin, flow rates (SCCM, SLM) are converted to values at 0°C and 101.3 kPa abs. (1 atm) for calibration.

Note 2: Accuracy guaranteed flow rate: 1SCCM or more.

Note 3: Please specify the installation direction when placing an order.

Note 4: For multi gas specifications, please consult Fujikin.

■ Product Code

FCSDST2050C - 4J2 - F10 - ASH3 - H1 - U ***

① ② ③ ④ ⑤ ⑥ ⑦

- | | |
|-------------------------------------|---|
| ① FCS- Thermal | ● FCSDST2050: Normally open ● FCSDST2050C: Normally closed |
| ② Fittings (Face to face dimension) | ● 4J2: 1/4 UJR (124 mm) ● 4CW2: 1/4 1.125 Wseal (92 mm) ● 4WS2: 1/4 1.5 Wseal (92 mm) ● 4CL2: 1/4 1.125 Cseal (92 mm) |
| ③ Full Scale | ● F5: 5 SCCM ● F30: 30 SCCM |
| ④ Gas Type | Example: ASH3, BF3, PH3. etc. |
| ⑤ Installation Direction | Example: H1, H2, V1, etc. |
| ⑥ D-sub 9 Pin connector screw | ● Blank: M3 ● U: Inch |
| ⑦ User Specifications | Pressure conditions, etc. |

Auto Pressure Controller (External Pressure Signal Control)

PCS-T1000F Series



Main Function and Specifications

Metal	F.S.	PI	MGMR	Analog control	Digital control	EP	Meter
Rubber	S.P.			±15V drive (0 - 10 VDC) +24V drive (0 - 10 VDC) +24V drive (4 - 20 mA)	RS485 DeviceNet™ EtherCAT® PROFIBUS CC-Link	For metal type only	

Note: Not compliant with the specifications of the XXX mark.

Features

- Pressure control at the upstream side or downstream side by a signal from the external pressure sensor
- Flow rate output
0 - 5 VDC

Specifications

Model Number	PCST1005 (M) F (C)	PCST1030 (M) F (C)	PCST1050 (M) F (C)
Flow Rate Range (N ₂ Equivalent)	10 SCCM - 5 SLM	6 - 30 SLM	31 - 50 SLM
Seal	Metal seal, rubber seal		
Valve Type	N/C: Normally closed		
Pressure Signal Input Level	0 - 10 VDC F.S.		
Pressure Acknowledgment Signal	Proportional to pressure: 0.2 - 10 VDC		
Pressure Accuracy *1	±1 % F.S. (Accuracy guaranteed range: 15 - 35°C)		
Flow Rate Accuracy	±1 % F.S. (Accuracy guaranteed range: 15 - 35°C)		
Flow Rate Output Signal	0 - 5 VDC		
Response Time *2	≤3 sec		
MAX Operating Pressure	400 kPaG		
Guaranteed Operating Temperature Range	5 - 50 °C		
Communication System	Analog: 0 - 10 VDC (Supply power voltage: ±15 VDC, +24 VDC), 0 - 5 VDC (option) Digital: RS485		

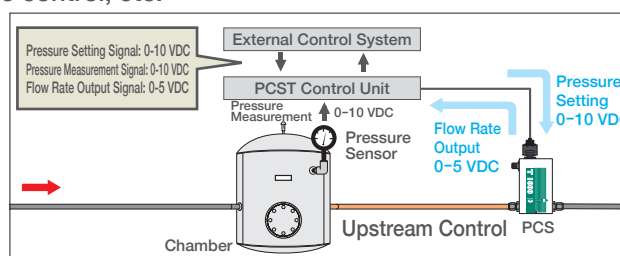
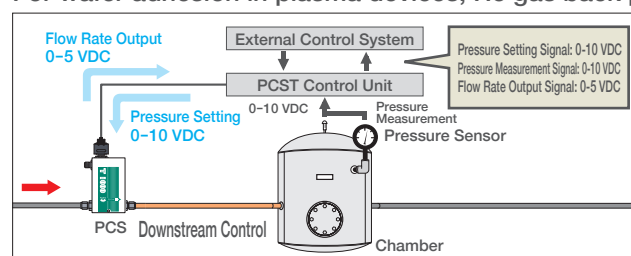
*1: The accuracy of pressure values depends on the accuracy of the pressure sensor used.

*2: In the case of the upstream side pressure control, response time refers to the time to reach from the maximum control pressure value to ±2 % F.S. of the setting pressure value. In the case of the downstream side pressure control, response time refers to the time to reach from minimum control pressure value to ±2 % F.S. of the setting pressure value. There are cases where response adjustment is necessary depending on conditions such as the pipe volume.

Note 1: At Fujikin, flow rates (SCCM, SLM) are converted to values at 0°C and 101.3 kPa abs. (1 atm) for calibration.

Application Examples

For wafer adhesion in plasma devices, He gas back pressure control, etc.



Product Code

PCST 1005 M F C - 4J2 - F10 - N2 - CR - U * - V - EP**

① PCS-Thermal	● PCST: Pressure controller	⑦ Full Scale	● F10: 10 SCCM ● F10L: 10 SLM
② Flow Rate Range	● 1005: 10 SCCM - 5 SLM ● 1030: 6 SLM - 30 SLM ● 1050: 31 SLM - 50 SLM	⑧ Gas Type	Example: N2
③ Seal Material	● Blank: Rubber ● M: Metal	⑨ O-Ring Material	● Blank: FKM ● CR: Chloroprene rubber
④ Control System	● F: Analog / Digital	⑩ D-sub 9 pin connector screw	● Blank: M3 ● U: Inch
⑤ Valve Mode	● Blank: Normally open ● C: Normally closed	⑪ User Specifications	Example: Pressure, flow rate, etc.
⑥ Fittings (Face to face dimension)	● 4J2: 1/4 UJR (124 mm) ● 4J1: 1/4 UJR (106 mm) ● 4F2: 1/4 F900 (127 mm) ● 4CW1: 1.125 Wseal® (79.8 mm) ● 4CW2: 1.125 Wseal® (92 mm) ● 4WS1: 1.5 Wseal® (79.8 mm) ● 4WS2: 1.5 Wseal® (92 mm) ● 4CL2: 1.125 Cseal (92 mm)	⑫ Power Supply Analog Output	● Blank: ±15 VDC (0 - 10 VDC) ● V: +24 VDC (0-10 VDC)
		⑬ Surface Finish	● Blank: Machined Finish ● EP: Electro-Polished

*: ○ indicates that it is applicable only to the metal seal.

Auto Pressure Controller (with Built-in Pressure Sensor)

UPC, UPCUS Series



Main Function and Specifications

Metal	F.S.	PI	MGMR	Analog control	Digital control	EP	Meter
Rubber	S.P.			+15V drive (0 - 5 VDC)	RS485		
				+24V drive (0 - 5 VDC)	DeviceNet™		
				+24V drive (4 - 20 mA)	EtherCAT®		
					PROFIBUS		

Note: Not compliant with the specifications of the XXX mark.

Features

- The controller controls pressure at the upstream or downstream side using the signals from the built-in sensor.
- Applicable to high temperatures
150 °C, 220 °C
- UPC® with Mass Flow Meter (UPCM Series)

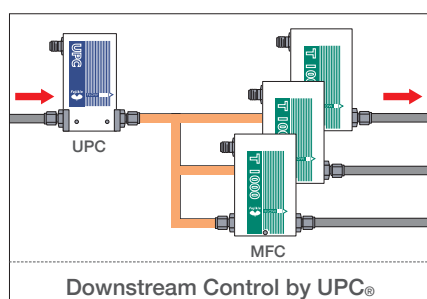
Specifications

Model Number	UPC® (Downstream pressure controller)	UPCUS® (Upstream pressure controller)
Pressure Range	F.S. 13.3 kPa abs (100 Torr)	F.S. 150/300/500 kPa abs
Control Pressure Range	1 - 100 %	1 - 100 % *1
Control Valve Cv Value		L type: 0.0055 / M Type: 0.011 / H Type: 0.03
Pressure Adjusting Accuracy (After auto zeroing)	1 - 40 %: ±0.2 % F.S. 40 - 100 %: ±0.5 % S.P.	F.S. 150 kPa abs. [1 - 40 %: ±0.2 % F.S., 40 - 100 %: ±0.5 % S.P.] F.S. 300/500 kPa abs. [1 - 20 %: ±0.1 % F.S., 20 - 100 %: ±0.5 % S.P.]
Maximum Pressure	200 kPaG	1 MPaG
Permissible Operating Temperature Range	0 - 50 °C (Accuracy guaranteed temperature range: 15 - 35 °C) *2	
Pressure Setting / Output Signal	Analog: 0.1 - 10 VDC/0 - 10 VDC (Supply power voltage: ±15 VDC) Digital: DeviceNet™	Analog: 0.05 - 5 VDC/0 - 5 VDC (Supply power voltage: ±15 VDC) Digital: DeviceNet™

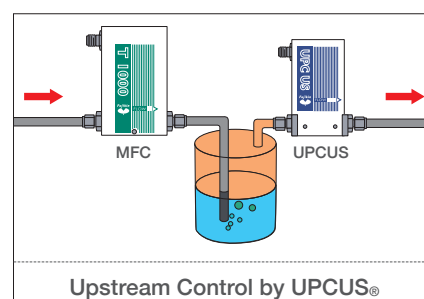
*1: Control range: The pressure control range of the UPCUS changes under different conditions. Please consult Fujikin for more information.

*2: Options available for temperature specifications of 50 °C. Please consult Fujikin for more information.

Application Examples



Controls the pressure across branched gas supply lines.



Maintains constant pressure in a liquid source tank and improves stability of the vaporized gas.

Product Code

UPC D - HT50 - 4J2C - C150 L

① ② ③ ④ ⑤ ⑥

① UPC® Series

- UPC: Downstream pressure control
- UPCUS: Upstream pressure control

② Control System

- Blank: Analog ● D: DeviceNet™

③ Accuracy Guaranteed Temperature Range

- Blank: 15 - 35 °C ● HT50: 15 - 50 °C

④ Fittings (Face to face dimension) ● 4J2C: 1/4 UJR (124 mm) ● 4J1C: 1/4 UJR (106 mm)

● 4WS1: 1.5 Wseal® (79.8 mm) ● 4CW2: 1.125 Wseal® (92 mm)

⑤ Full Scale Pressure Range ● C150: 150 kPa abs ● C300: 300 kPa abs ● C500: 500 kPa abs

⑥ Control Valve Cv Value ● L: 0.0055 ● M: 0.011 ● H: 0.03

Note: Please consult Fujikin when using the product under the pressure range of F.S. 13.3 kPa abs (100 Torr).

Mass Flow Controller

Mass Flow Meter

Pressure Controller

Flow Ratio Controller

Dimensions

Mass Flow Controller Signal Connector

Accessories and Other Related Devices

Gas Distribution Ratio Control Model

FRC-TR1000MF Series



Main Function and Specifications

Metal	F.S.	PI	MGMR	Analog control	Digital control	EP	Meter
Rubber	S.P.			±15V drive (0 - 5 VDC)	RS485	(Option)	
				+24V drive (0 - 5 VDC)	DeviceNet™		
				+24V drive (4 - 20 mA)	EtherCAT		
					PROFIBUS		
					CC-Link		

Note: Not compliant with the specifications of the **XXX** mark.

Features

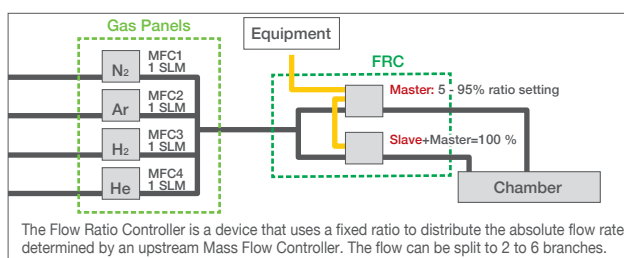
● Accurate Distribution Performance

Possible to control the introduction of gas at an accurate flow distribution ratio.

● Hastelloy Sensor

Improved corrosion resistance against halogen gas.

● Possible to Split the Flow to 2 to 6 Branches



Specifications

Model Number	FRCTR1005MF	FRCTR1030MF	FRCTR1050MF	FRCTR1200MF
Flow Rate Range (N ₂ Equivalent)	10 - 3,000 SCCM	3,001 - 30,000 SCCM	30,001 - 50,000 SCCM	50,001 - 150,000 SCCM
Seal	Metal seal			
Valve Type	N/O: Normally open			
Flow Rate Branching Ratio	5 - 95 % (* The setting range differs depending on the number of branches and amount of gas.)			10 - 90 %
Repeatability	±0.2 % F.S.			
Response Time *	≤4 sec			≤8 sec
Guaranteed Operating Temperature Range	10 - 40 °C			
Max. Inlet Pressure	20 kPaG			64 kPaG
Communication System	Analog: 0 - 5 VDC (Supply power voltage: ±15 VDC) Digital: RS485, DeviceNet™			

*: Response time refers to the time to reach from minimum flow rate to ±2% F.S. of setting flow rate.

Note 1: At Fujikin, flow rates (SCCM, SLM) are converted to values at 0°C and 101.3 kPa abs. (1 atm) for calibration.

Note 2: The above are the specifications of one UNIT that configures FRC.

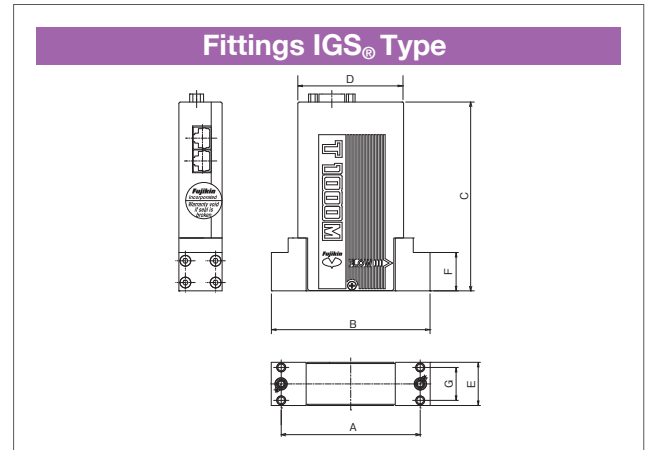
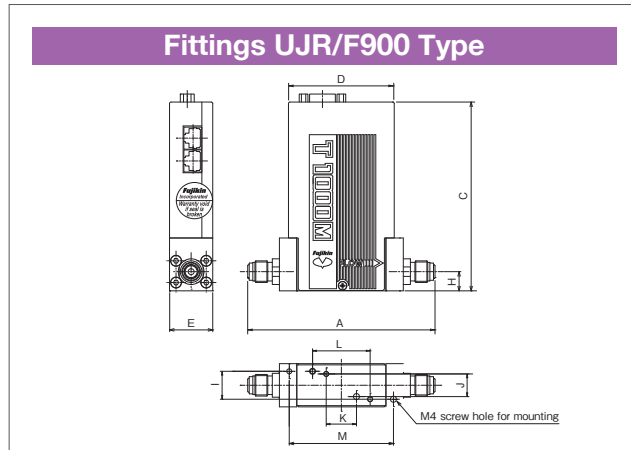
Note 3: The inlet side of FRC requires a Mass Flow Controller.

Product Code (In case of 2 branches)

FRCT 1030 M F - 4J2 - F4L/F4L - N2 - * - M - EP**

①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪
①FRC-Thermal	● FRCT(R): Flow Ratio Controller					⑥Full Scale Flow Rate Master	● F10: 10 SCCM	● F4L: 4 SLM		
②Flow Rate Range	● 1005: 10-3,000 SCCM	● 1030: 3,001-30,000 SCCM				⑦Full Scale Flow Rate Slave	● F10: 10 SCCM	● F4L: 4 SLM		
	● 1050: 30,001-50,000 SCCM	● 1200: 50,001-150,000 SCCM				⑧Gas Type	Ordering number is "N2" regardless of the gas type.			
③Seal/Function	● M: Metal seal					⑨User Specifications	Example: 006, 25 °C, 1 atm			
④Control System	● F: Analog / Digital	● FD: DeviceNet™				⑩UNIT	● M: Master	● S0*: Slave		
⑤Fittings (Face to face dimension)	● 4J2: 1/4 UJR (124 mm)					⑪Surface Finish	● Blank: Machined Finish	● EP: Electro-Polished		

Dimensions



Fittings UJR/F900 Type

Model Number	A		C	D	E	H	I	J	K	L	M
	UJR	F900									
FCST1000MP	124	—	127	82.5	28.6	12.7	18.5	15	20	38.1	—
FCST1000Z/F/L	124	127	125	77	32	12.7	18.5	—	—	—	69
FCST1000MZ/MF/ML/ M(Z)F-HT	124(*1)	127	125	70	28.6	12.7	18.5	15	20	38.1	69
FCST1200F	192.4	192.5	127	—	50	15	25.5	—	—	—	90
FCST1200MF	192.4	—	154	116	38	15	25.5	—	—	—	90
FCST1500F	199	204.6	140	—	50	24	25.5	—	—	—	90
FCSG200	124	127	105.2	76	25.5	12.7	18.5	—	—	—	69
FCSTM39	122.5	126.1	56.5	70	27(30.8)	12.5	10	—	—	—	56
FCST2000/G300	124(*1)	—	131	71	28.6	13/12.7	18.5	—	—	38	—
FCST2150	163.4	—	136	108	42	17	—	25.4	—	68	—
PCST1000F	124	127	125	77	32	12.7	18.5	—	—	—	69
PCST1000MF	124(*1)	127	125	70	28.6	12.7	18.5	15	20	38.1	69
UPC® / UPCUS®	124(*1)	—	128	70.5	28.1	12.7	18	—	0	—	—

*1: Please consult Fujikin for using short UJR fittings (face-to face dimension 106 mm).
Note: Please consult Fujikin for the dimensions of the Mass Flow Meter.

Fittings IGS® Type

Model Number	A	B	C	D	E		F	G		Cap Bolt	
					1.5 Wseal®	1.125 Wseal®		1.5 Wseal®	1.125 Wseal®	1.5 Wseal®	1.125 Wseal®
FCST1000MP	92	105	127	82.5	39	28.6	25.4	30	21.8	①	②
FCST1000Z/F/L	92	105	127	77	39	—	37	30	—	③	—
FCST1000MZ/MF/ML/ M(Z)F-HT	92(*2)	105	125	70	39	28.6	25.4	30	21.8	①	②
FCST2000	92(*2)	105	131	71	39	28.6	25.4	30	21.8	③	②
PCST1000F	92	105	127	77	39	—	37	30	—	③	—
PCST1000MF	92(*2)	105	125	70	39	28.6	25.4	30	21.8	①	②
UPC® / UPCUS®	92(*2)	105	128	70.5	—	28.5	28	—	21.8	—	④

*2: Please consult Fujikin for using short IGS® fittings (face-to face dimension 79.8 mm).
Note 1: Please consult Fujikin for the external dimensions of digital communication models other than RS485.
Note 2: Fix Flow Rate Control System and Pressure Control System with four cap bolts for each system. ①CB-M5×30 ②CB-M4×29 ③CB-M5×40 ④CB-M4×10

Mass Flow Controller Signal Connector

Analog

D-sub 9 pin Male Connector		
Pin Number	Signal Name	Description
1	Valve Opening and Closing Input	+15 VDC: Fully open, -15 VDC: Fully closed
2	Flow Rate Output Voltage: 0 - 5 VDC	Flow Rate Output Voltage Plus Side: 0 - 5 VDC
3	Power Supply: +15 VDC	Positive Power Supply Feed Line: 50 mA
4	Power Supply: 0 VDC	±15 VDC Common Line
5	Power Supply: -15 VDC	Negative Power Supply Feed Line: 200 mA
6	Flow Rate Setting Voltage: 0 - 5 VDC	Flow Rate Setting Input Plus Side: 0 - 5 VDC
7	Flow Rate Output Voltage: COMMON	Common Line of Flow Rate Output Voltage
8	Flow Rate Setting Voltage: COMMON	Common Line of Flow Rate Setting Voltage
9	N.C.	Unused Pin (Please don't connect.)

*1: Signal connector of FCS-T1000 Series

*2: Pin 7 and Pin 8 are connected inside FCS.

*3: Pin 9 can be designated as "Valve Test PT" by special specification.

Power supply: +24 VDC_0 - 5 VDC		
Pin Number	Signal Name	Description
1	Valve Opening and Closing Input	+24 VDC: Fully open, 0 VDC: Fully closed
2	Flow Rate Output Voltage: 0 - 5 VDC	Flow Rate Output Voltage Plus Side: 0 - 5 VDC
3	Power Supply: +24 VDC (+12 to +25 VDC)	Power Supply Feed Line: 250 mA
4	Signal: COMMON	Signal Common Line: (Signal Common)
5	Power Supply: 0 VDC	Power Supply Common Line: (Power Common)
6	Flow Rate Setting Voltage: 0 to 5 VDC	Flow Rate Setting Input Plus Side: 0 to 5 VDC
7	Flow Rate Output Voltage: COMMON	Common Line of Flow Rate Output Voltage: (Signal Common)
8	Flow Rate Setting Voltage: COMMON	Common Line of Flow Rate Setting Voltage: (Signal Common)
9	N.C.	Unused Pin (Please don't connect.)

Power supply: +24 VDC_4 - 20 mA		
Pin Number	Signal Name	Description
1	Valve Opening and Closing Input	+24 VDC: Fully open, 0 VDC: Fully closed
2	Flow Rate Output: 4 - 20 mA	Flow Rate Output Voltage Plus Side: 4 - 20 mA
3	Power Supply: +24 VDC (+12 to +25 VDC)	Power Supply Feed Line: 280 mA
4	Power Supply: COMMON	Power Supply Common Line: (Power Common)
5	N.C.	Unused Pin (Please don't connect.)
6	Flow Rate Setting: 4 - 20 mA	Flow Rate Setting Current Plus Side: 4 - 20 mA
7	Signal: COMMON	Signal Common Line: (Signal Common)
8	RS485DX+	RS-485 2 Line System Send and Receive Plus
9	RS485DX-	RS-485 2 Line System Send and Receive Minus

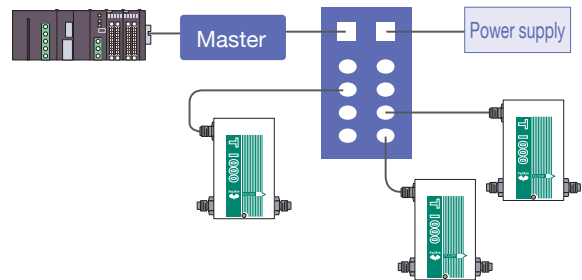
Digital

RJ11 Digital Communications Connector		
Pin Number	Signal Name	Description
1	N.C.	Unused Pin (Please don't connect.)
2	N.C.	Unused Pin (Please don't connect.)
3	Signal[-Txd/Rxd]	RS-485 2 Line System Send and Receive Minus
4	Signal[+Txd/Rxd]	RS-485 2 Line System Send and Receive Plus
5	N.C.	Unused Pin (Please don't connect.)
6	N.C.	Unused Pin (Please don't connect.)

RJ45 Digital Communications Connector * Only for FCST2000 Series		
Pin Number	Signal Name	Description
1	Signal COM	RS-485 Signal Common
2	Signal COM	RS-485 Signal Common
3	N.C.	Unused Pin (Please don't connect.)
4	Signal[-Txd/Rxd]	RS-485 2 Line System Send and Receive Minus
5	Signal[+Txd/Rxd]	RS-485 2 Line System Send and Receive Plus
6	N.C.	Unused Pin (Please don't connect.)
7	N.C.	Unused Pin (Please don't connect.)
8	N.C.	Unused Pin (Please don't connect.)

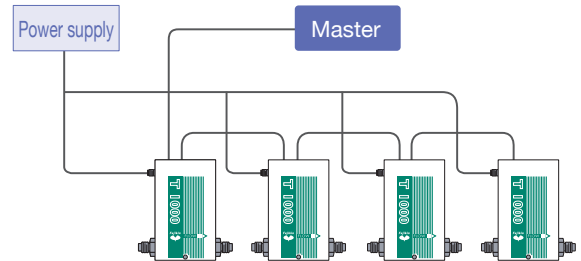
Device NET™

Pin Number	Signal Name	Description
1	DRAIN	Shield
2	V+	DC Power Supply Line: 24 VDC (+11 to +25 VDC)
3	V-	DC Power Supply Line
4	CAN_H	Signal Line
5	CAN_L	Signal Line



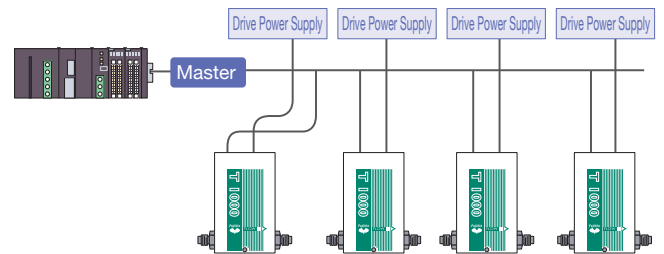
EtherCAT®

Pin Number	Signal Name	Description
1	24 V	DC Power Supply: +24 VDC (+13 to +25 VDC)
2	CHASSIS GROUND	Chassis Ground
3	POWER COMMON	Power Supply Ground
4	NC	Please don't connect.
5	NC	Please don't connect.



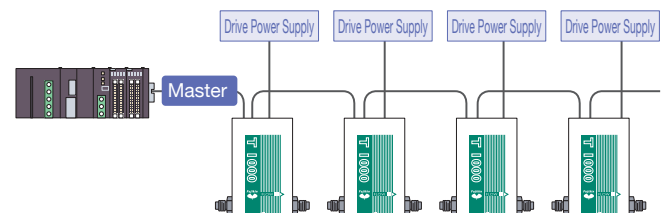
PROFIBUS

Pin Number	Signal Name	Description
1	N.C.	Unused Pin (Please don't connect.)
2	N.C.	Unused Pin (Please don't connect.)
3	Txd/Rxd+	Data Send and Receive Plus
4	CNTR-P	Repeater Direction Control
5	Digital Ground	Profibus Ground
6	V.P.	+5 VDC
7	N.C.	Unused Pin (Please don't connect.)
8	Txd/Rxd-	Data Send and Receive Minus
9	N.C.	Unused Pin (Please don't connect.)



CC-LINK

Pin Number	Signal Name	Description
1	DA	CC-Link Signal Input/Output
2	DB	CC-Link Signal Input/Output
3	DG	Signal Ground
4	SLD	Shield Ground
5	FG	Frame Ground



FCS®- Thermal Series Accessories



Power Supply (For connecting six FCS units)

Part Number FCS-T1000-PS 3/6/9



Digital Panelmeter

Part Number FCS-DPM-06-L100



Control Potentiometer

Part Number FCS-SET-02-L100



Power Supply Meter

Part Number FCS-PM1000A-SP



Connector Change Cable

Wide range of connectors supported



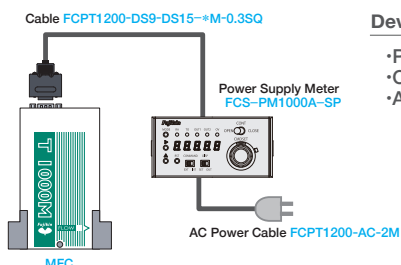
RS485-USB Conversion Cable

Part Number FCPT1000-SC-RS485-*M-ASSY

Note: Please note that the specifications are subject to change without prior notice for product improvement.

Connection Examples

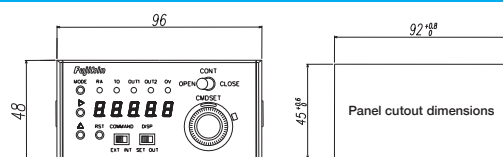
Single Analog Control



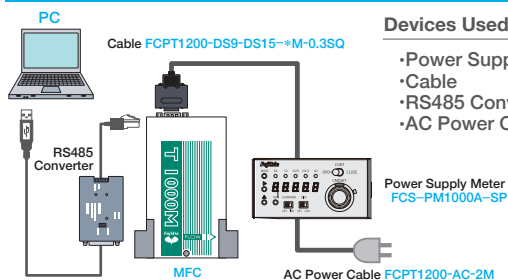
Devices Used

- Power Supply Meter
- Cable
- AC Power Cable

Power Supply Meter FCS-PM1000A-SP dimensions



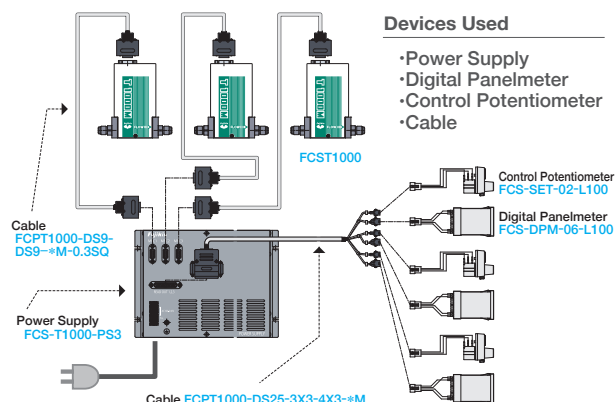
Single Digital Control



Devices Used

- Power Supply Meter
- Cable
- RS485 Converter
- AC Power Cable

Multiple Analog Control



Other Related Devices

Flow Control Systems (FCS®-Pressure Series)



FCS-P7000 Series

2007 4th Cho-Monodzukuri Grand Award for Parts
(Encouragement Award)



FCS Body for High Temperature Service (220 °C)

2010 7th Cho-Monodzukuri Grand Award for Parts
(Machinery Component Award)



FALVS® (Fujikin Advance Liquid Vaporize System)
(Gas Control System for Liquid Materials)

2015 12th Cho-Monodzukuri Grand Award for Parts
(Encouragement Award)

Mass Flow Controller

Mass Flow Meter

Pressure Controller

Flow Ratio Controller

Dimensions

Mass Flow Controller Signal Connector

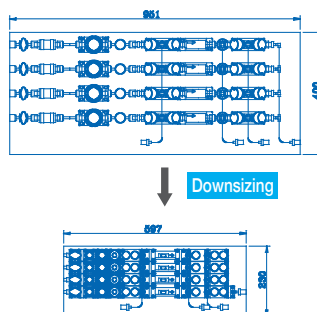
Accessories and Other Related Devices

Integrated Gas System IGS®

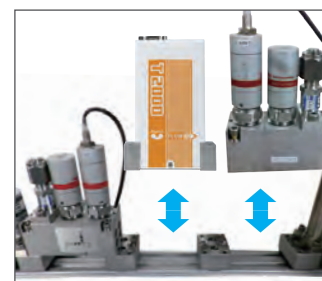


IGS®

2005 Prime Minister's Prize
1st Monodzukuri Nippon Grand Awards
(Excellence Award)



One third the size of conventional gas panels.



**Upper Part of Composition Parts
Perfect Attachment and Removal System**

All upper part assemblies can be attached or removed in upper one-way.

Stop Valves



NEW MEGA® Series

Metal Diaphragm Valve



Ball Valves Series

Filters



FUFL Series

Wetted parts are perfectly oil-free.
0.1, 0.5, 2, 5, 10 μ m are available as
element sizes.

MEMO

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