Flow Controller

FLC600 Series

- Precise programmable control of liquid flow rate from 0.5–5, 1–10 or 2–20 L/min
- Useable to 60°C, 60 psi
- Integrated axial-flow turbine flowmeter
- Fast, responsive PID controller rotates vane to maintain precise control at selected flow rates
- Actual flow rate is displayed on control readout; analog outputs to and dual programmable alarm flows can be linked to external controllers.

FLC	TYPE	-	STYLE	FLUID	-	UNITS	FLOW	-	PIPE		OPTIONS
										B	Adds Mounting Bracket – only for built-in device
										S	Adds 2m cable for output signal for built-in device.
									01		Rc 1/4 or 1/4" FNPT
									02		Rc 3/8 or 3/8" FNPT
									03		Rc 1/2 or 1/2 FNPT
									04		R 1/2
							NO ENTRY		No entry for Models 605, 610 or 620		
							MAX		Enter maximum flow rate for Model 600 with external flow sensor		
						NO ENTRY	No entry for Models 605, 610 or 620				
						B	L/min				
						Z	Specify units required at and of model number				
				1		Water					
				9		State liquid type at end of model number					
			0	Unified construction, as illustrated above							
			1	Built-in version without integrating cover – see below							

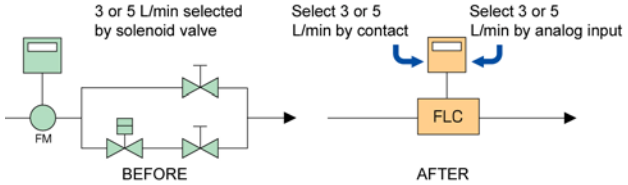
TYPE	Flowmeter	Flow Rate	Pipe Size
600	For use with external flow sensor.	*Contact tech@proteusind.com to review sensor requirements.*	
605	Integral helical flow sensor	0.5 ~ 5 L/min	Rc ¼,⅜,½, R½ or 1/2" FNPT
610		1 ~ 10 L/min	Rc ¼,⅜,½, R½ or 1/2" FNPT
620		2 ~ 20 L/min	Rc½, R½ or 1/2" FNPT

Example of Model Number - *Refer to the FLC600 Price List for detailed product descriptions*

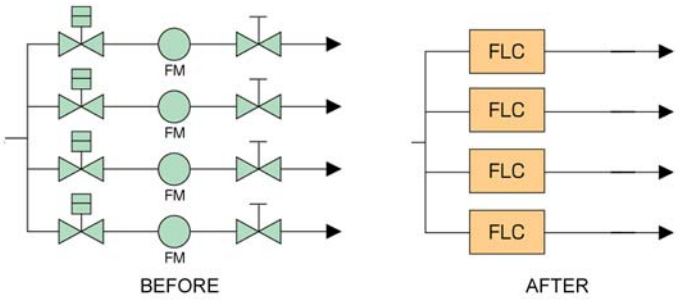
FLC	600	-	0	1	-	B	10	-	02	-	B	-	S	-	Fluid characteristics if not water etc

Remote control of flow rate – a signal from your system controller allows precise and repeatable selection of flow rates in challenging cooling situations. Program multiple flows – or shut off the flow completely!

Select multiple flow rates – replace variable flow valves and associated switching valves with a single component.



Achieve consistent flows through parallel paths – changes in downstream restrictions in multiple paths can be easily accommodated by placing a flow controller in each path.

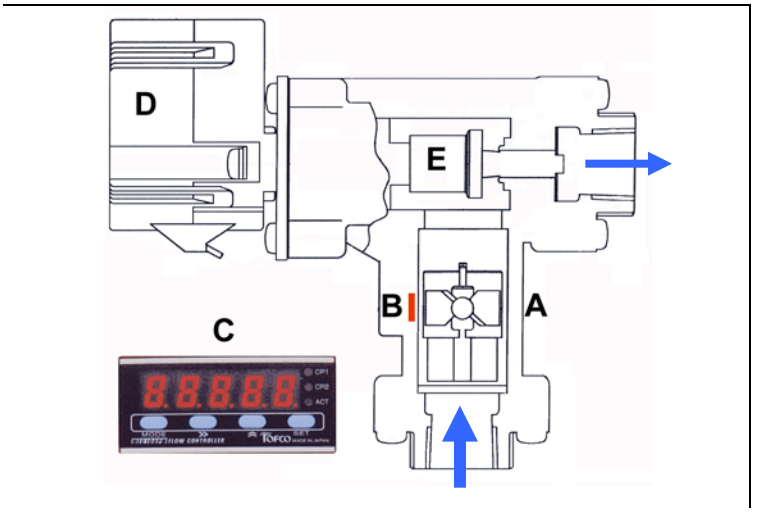


Outstanding flow controllers by TOFCO. **World-class support by Proteus.**

How it works

A helical turbine (A) is spun by the liquid entering the control valve assembly. Its rotational velocity is detected by a Hall Effect sensor, (B) that sends a pulse stream with a frequency proportional to the flow rate to the flow controller (C).

The controller circuit compares the measured flow rate with the selected control flow rate. Depending on whether the measured flow rate is greater or lesser than the selected control flow rate, a geared DC stepper motor (D) is pulsed to move a needle valve (E). Movement of the needle valve increases or decreases the outlet flow until the target flow rate is reached.



Flexible control capability - choose from 3 flow control modes

1. **Parameter Mode** – select the target flow rate through the controller's key panel.
2. **External Mode** – the target flow rate is selected from an external 4–20 mA, 0–5 or 1–5 VDC source.
3. **Preset Mode** – up to 4 user-selected flow rates are selectable by contact closure across 3 rear panel connections.

Controller key panel shown actual size

Valve can be fully closed

Selecting or programming a flow rate of 0 L/min causes the valve to become fully closed in ~ 3 seconds.

Faster response with an external shut off valve

The flow controller should be used with a separate shut off valve if faster or frequent shut off is required. When used in this manner the flow controller can be programmed to retain its previous needle valve position to quickly restore the controlled flow rate with minimal movement.

'Dead Zone' adjustment further extends valve life

Proper selection of this parameter prevents 'hunting' and achieves the desired control precision while minimizing movement of the needle valve.

Manifold versions manage multiple flows

Mount up to 4 FLC600 Series flow controllers from a single manifold. The flow in each outlet channel is controlled independently of demand. Total flow capacity can be up to 80 LPM.

Up to 3 manifold inputs are provided to accommodate the highest flow capacity requirements.

For further information see the data sheet for MH-FLC600 Series Manifolds

Built-in version for easy installation

Locate the valve where it can work most effectively in your system.

Got a tricky application and need help? Contact our flow management experts and get answers fast!
Contact Proteus Technical Support at (650) 964-4163 or tech@proteusInd.com for immediate, professional assistance.

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Technical Details

For flow rates > 20 L/min use FLC700 Series flow controllers

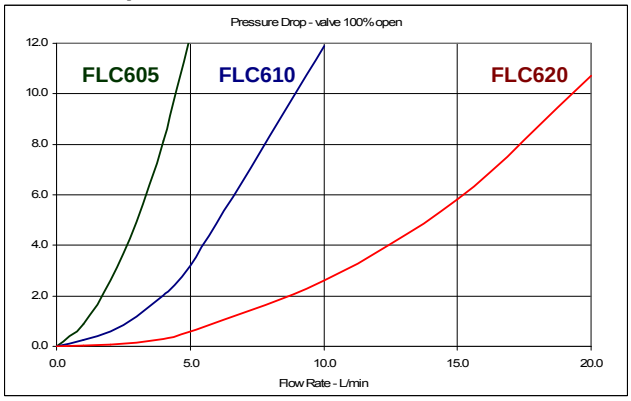
Model Number	**FLC605**	**FLC610**	**FLC620**	**FLC600 –** *for use with external flow meter*
Flow control range	0.5 ~ 5 L/min	1 ~ 10 L/min	2 ~ 20 L/min	*Depends on the external flow meter*
Liquids	Water, ethylene glycol/water and similar liquids.			
Flow Accuracy	± 5% of Full Scale			
Control pressure range	30 ~ 60 psi (0.2 ~ 0.4 MPa). Head pressure should be > 2 x ΔP at control flow rate See diagram below			
Withstand pressure	70 psi (0.5 MPa)			
Required ΔP	> 30 psi (0.2MPa)			
Liquid temperature range	0 ~ 60°C			
Withstand temperature	80°C			
Ambient temperature	0 ~ 50°C non-condensing, and free from freezing.			
Input Signals	**Pulse input**: from internal flowmeter	External flow meter: 0 ~ 300 Hz Open collector		
	External Analog Input. Control mode is user-selected from the controller 4–20 mA with input impedance 800Ω 0–5 or 1–5 VDC with input impedance of 1M Ω			
	Preset Inputs Up to 4 user-programmed flow rates can be selected by contact closure between 3 rear panel connections.			
Output Signals	**Analog output**. Mode is user-selected from the controller 4–20 mA Max. load resistance 300Ω 0–5 or 1–5 VDC Load resistance > 1M Ω			
	Alarm output. Relay output at two user selected flow rates can be user programmed as upper/lower, upper/upper or lower/lower limits. Maximum 0.1A at 35 VDC			
Fully Closed function	Valve is fully closed when a value of 0 L/min is entered or provided by the external controller.			
Display	Indicates either instantaneous or programmed flow rate.			
Power Supply	24 VDC ± 10%			
Power Consumption	Max consumption 450 mA. ~ 100 mA in idle mode			
Cable lengths	2m for stand-alone version. For built-in version, 1 m power cable, 2 m control signal cable			
Weight	Stand-alone version: ~ 1.2 lbs 0.8 Kg Built-in version: ~ 1.1 lbs 0.7 Kg			

Wetted Materials

Needle valve	304SS	Rotor	PPS
Seals	Fluoropolymer	Rotor Shaft	SS or alumina
Valve body	PPS	Bearings	sapphire

Got a material compatibility challenge? Contact our flow management experts for alternate solutions!

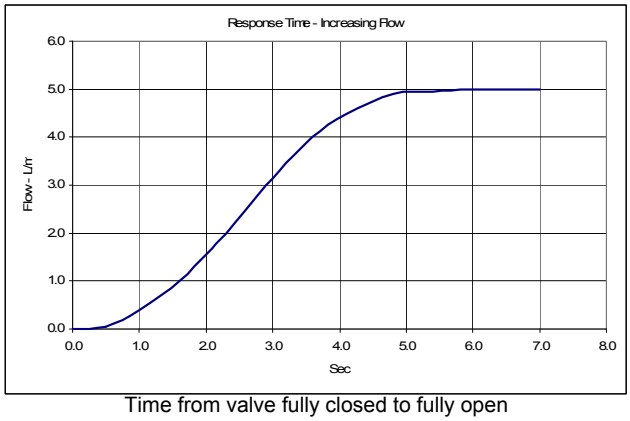
Pressure Drop Characteristics



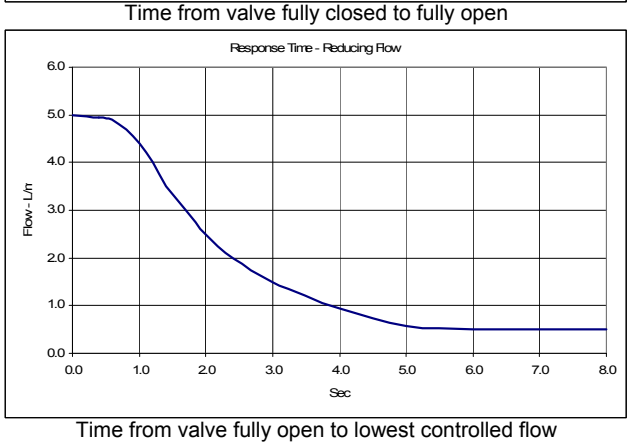
To achieve reliable and precise control inlet pressure should be around 3x the pressure drop across the flow controller.

For example, when flowing 3L/min with the FLC605 the pressure drop is approximately 5 psi. Pressure at the inlet to the flow controller should be >15 psi.

Response Characteristics

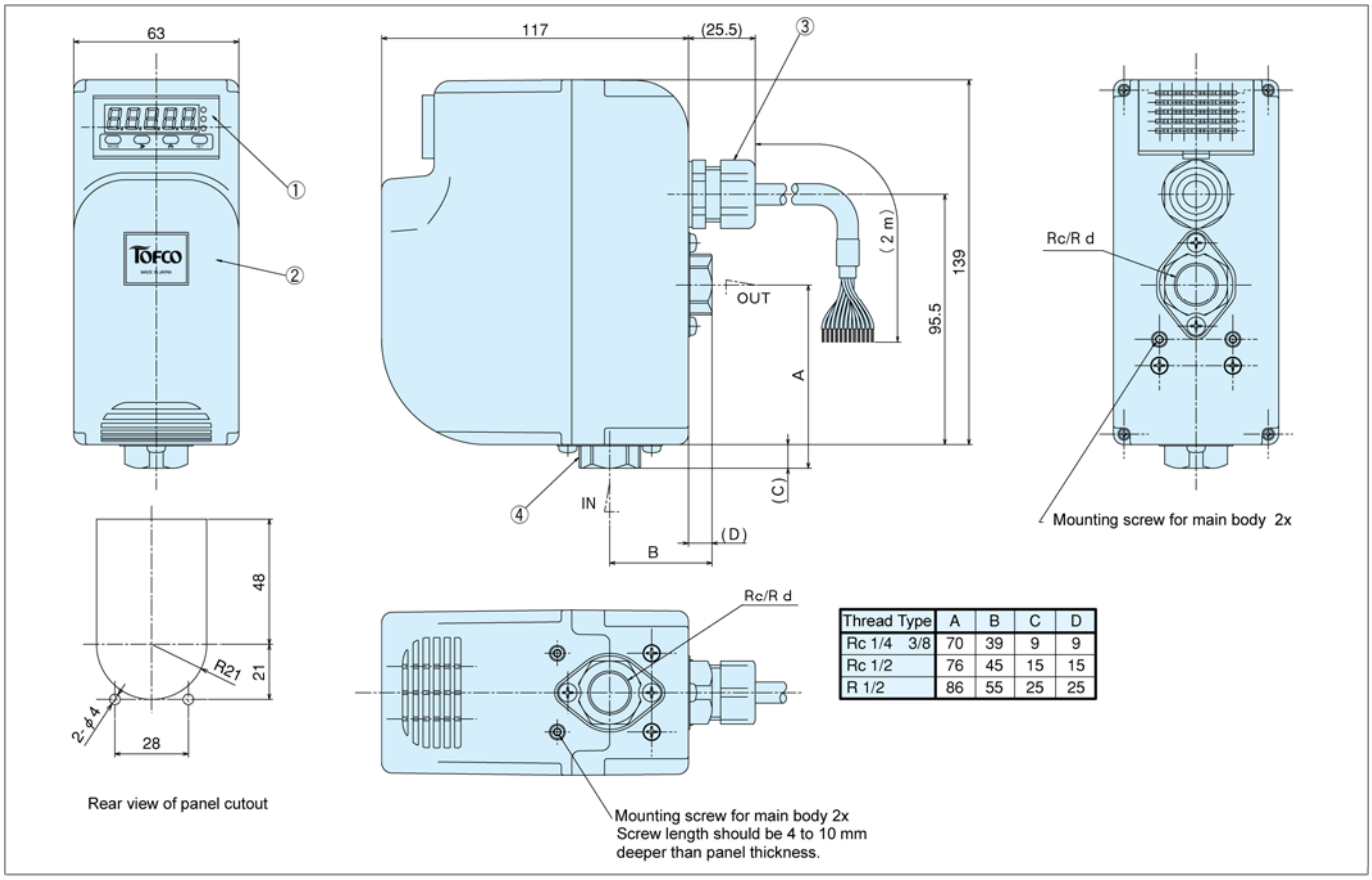


Time from valve fully closed to fully open



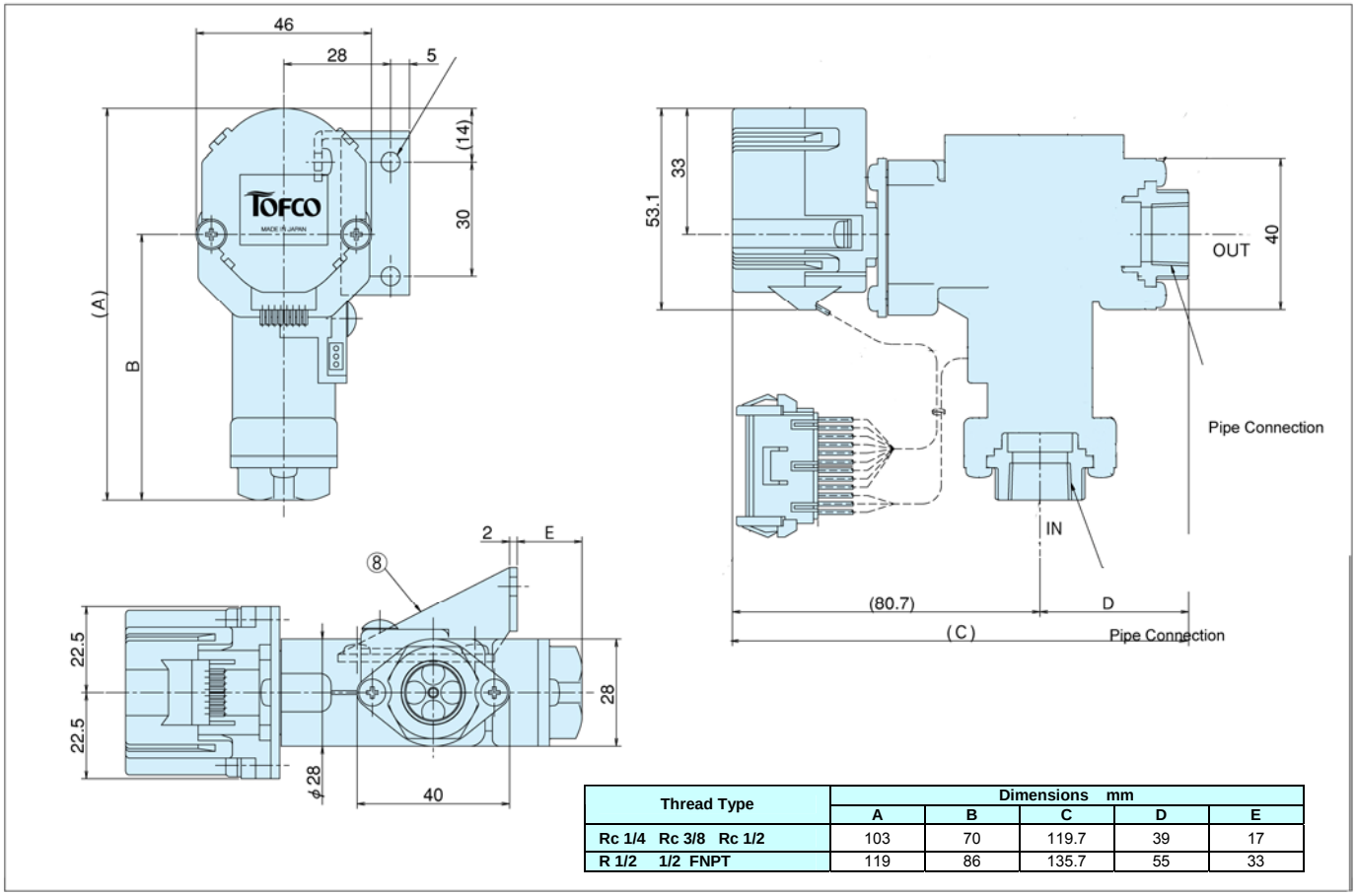
Time from valve fully open to lowest controlled flow

Dimensions of Stand-Alone version



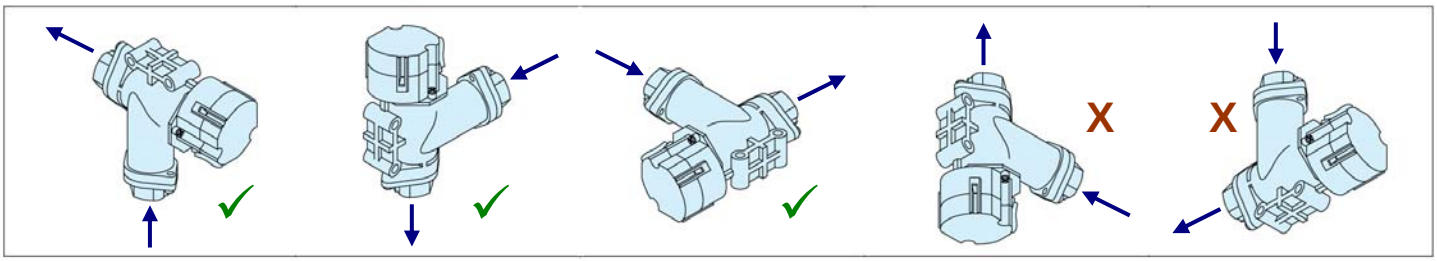
Thread Type	A	B	C	D
Rc 1/4 3/8	70	39	9	9
Rc 1/2	76	45	15	15
R 1/2	86	55	25	25

Dimensions of Built-In versions

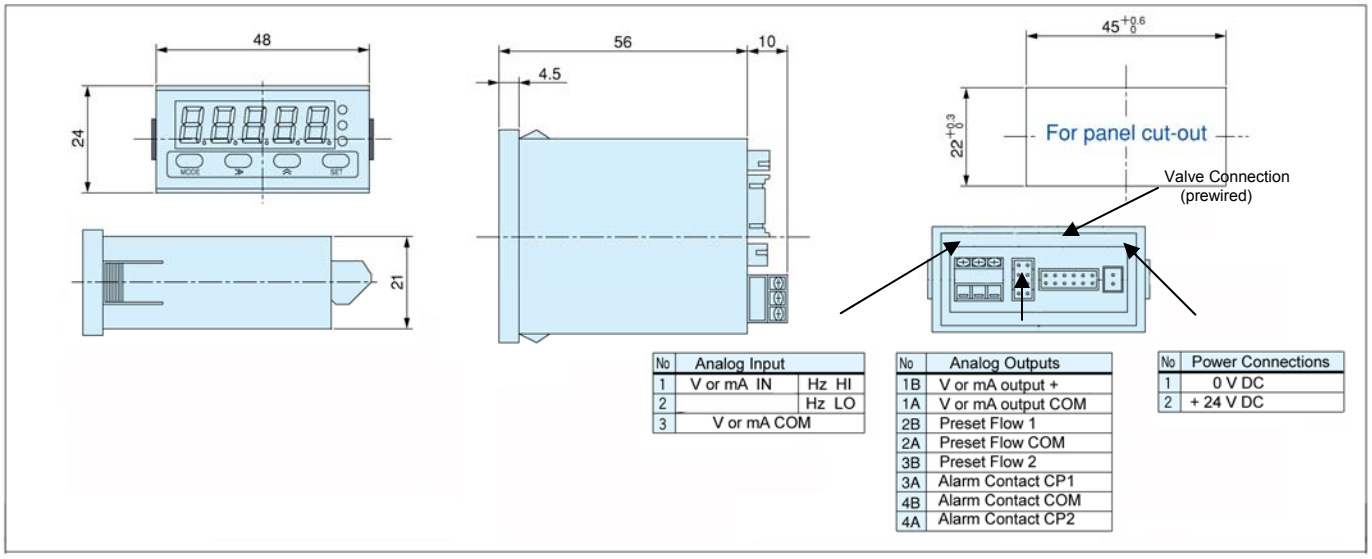


Thread Type	Dimensions mm				
	A	B	C	D	E
Rc 1/4 Rc 3/8 Rc 1/2	103	70	119.7	39	17
R 1/2 1/2 FNPT	119	86	135.7	55	33

Installation positions for built-in version



Controller Dimensions and Connections



No	Analog Input	
1	V or mA IN	Hz HI
2		Hz LO
3	V or mA COM	

No	Analog Outputs
1B	V or mA output +
1A	V or mA output COM
2B	Preset Flow 1
2A	Preset Flow COM
3B	Preset Flow 2
3A	Alarm Contact CP1
4B	Alarm Contact COM
4A	Alarm Contact CP2

No	Power Connections
1	0 V DC
2	+ 24 V DC

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 FLC600DS Rev 002 10/2007

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