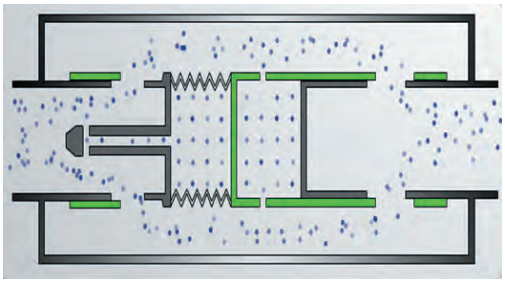
03

Flow control valve

Outline of Technology

The technique can control a flow of a desired fluid as necessary, and control an amount of flow to be maintained constant at all times regardless of abrupt system load changes.

<Schematic view of flow control valve>



Technique for not only adjusting flowrate but also maintaining a constant flowrate regardless of system load changes

<Prototype of an ultralight pressure-compensating flow control valve>

Manufacturing a prototype of ultralight pressure-compensating control valve by applying the flow control technique

Inventor
senior researcher à principal researcher, Tae-gyu Jung

Team
Department of launch vehicle propulsion control

Status of right
- US : 9092032
- JP : 4870799

Title
- FLOW CONTROL VALVE
- FLOW CONTROL VALVE

TLO of the KARI

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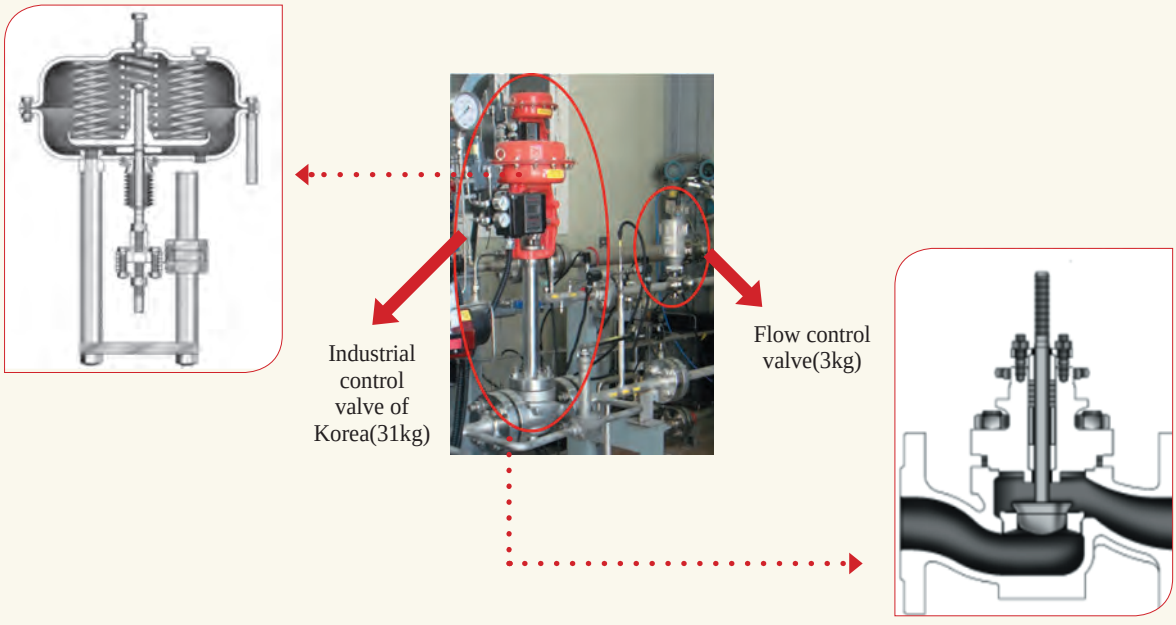
Technical features and advantages

Distinctiveness

• Even when a system load of a flow control valve is abruptly changed, an amount of flow is always constantly maintained, and a weight and size of the valve is reduced to about a tenth that of the conventional technique.

Technical effects

• Simple constitutions, easy control, less frequent malfunctions



Technical detail

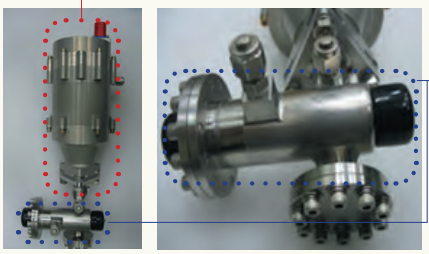
A prototype is manufactured based on this technique, and a modified technology is under development for improving manufacturing efficiency.

• While many conventional researches were conducted on using a mechanical feedback structure (mechanical compensation mechanism) to absorb a change in flow to maintain a constant amount of flow at all times, no technique has been found so far in which a simple constitution of an actuator reduces a weight and maintains a constant flow even when a pressure abruptly changes as disclosed in the subject technique.

Flow control valve

Technical detail

• Reduction of a driving force of an actuator leads to its size reduction, and therefore the entire valve is reduced in weight. Furthermore, an abrupt pressure change occurring at an inlet or outlet of the valve is absorbed by a mechanical feedback structure (compensation mechanism) so that it is possible to maintain a constant flow.

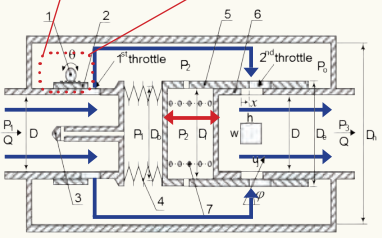


A flow control valve precisely controls an amount of liquid while ensuring a constant flow regardless of changes in system loads

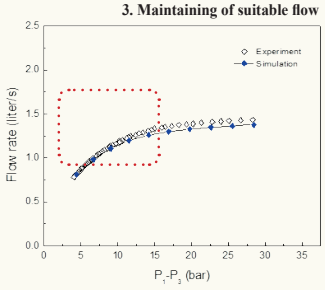
2. Miniaturization/ electronic control

2-1. Valve parallel to a flow path àResistance pressure, operational torque

2-2. Miniature valve can be manufactured



3. Maintaining of suitable flow



Market and future prospect

• The global market of industrial valves and actuators was 28.1 trillion won in 2015, and is expected to reach 40.6 trillion won in 2021. A market of specific valves will reach about 4 trillion won, which is a tenth of the global market.

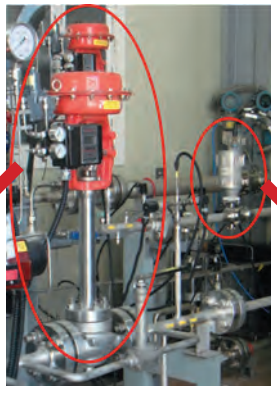
• The market of specific valves is monopolized by a few companies in the United States, Europe, and Japan.

Classification		Reference	Estimation					
		2015	2016	2017	2018	2019	2020	2021
Marker (Unit hundred millionwon)	Size	238,448	252,667	267,981	283,294	299,701	317,202	335,796
	Growth rate	5.87%	5.87%	5.87%	5.87%	5.87%	5.87%	5.87%

Applications

• Applicable to various fields of industrial valves such as marine shipbuilding, aviation, plants, construction, mechanics, etc.

Replacement of previously installed product



Industrial control valve of Korea(31kg)

Flow control valve(3kg)

Flow control valve

Performance enhancement

A market size of 28 tnillion won (as of 2015)