

# Flow control valve

## FCV-M/MCV-M

- FCV-M / MCV-M are small and grease free flow control valve with wide range of temperature capability.
- FCV-M is 2 ports flow control valve and MCV-M is 3 ports control valve.
- Utilizing unique design of valve structure with enhanced AD converter has enabled high precision and high resolution control.
- Together with Tofpine system it provides freedom in design of liquid distribution (except MCV-M)



NEW PRODUCTS

### Model number selection

	Std.	Connection size	Orifice	Temperature zone	O-ring *1	Fluids	I/O	Option	For specialized item
<b>FCV-M</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<b>2 way valve</b> 								<b>B</b> Bracket *3	
								<b>A</b> 4-20 mA	
								<b>T</b> 1-10 V	
								<b>V</b> 1-5 V	
							<b>1</b> Water	<b>9</b> For specialized fluid *2	
						<b>N</b> NBR	<b>E</b> EPDM		
						<b>F</b> FKM	<b>S</b> Si		
						<b>S</b> 0 - +60°C (Standard type)			
						<b>HA</b> 0 - +130°C (High specific type)			
						<b>CA</b> -20 - +100°C (High specific type)			
					<b>CB</b> -40 - +130°C (High specific type)				
			<b>30</b> φ3.0			<b>74</b> φ7.4			
			<b>45</b> φ4.5			<b>95</b> φ9.5			
			<b>60</b> φ6.0			<b>168</b> φ16.8			
			<b>01</b> Rc1/4"			<b>04</b> Rc3/4"			
			<b>02</b> Rc3/8"			<b>05</b> Rc1"			
			<b>03</b> Rc1/2"						
			Orifice size			Connection size			
	<b>25</b>		φ3.0, φ4.5, φ6.0, φ7.4			Rc1/4", Rc3/8", Rc1/2"			
	<b>32</b>		φ7.4, φ9.5			Rc1/2", Rc3/4"			
			φ16.8			Rc3/4", Rc1"			

	Std.	Connection size	Orifice	Temperature zone	O-ring *1	Fluids	I/O	Option	For specialized item
<b>MCV-M</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<b>3 way valve</b> 								<b>B</b> Bracket *3	
								<b>A</b> 4-20 mA	
								<b>T</b> 1-10 V	
								<b>V</b> 1-5 V	
							<b>1</b> Water	<b>9</b> For specialized fluid *2	
						<b>N</b> NBR	<b>E</b> EPDM		
						<b>F</b> FKM	<b>S</b> Si		
						<b>S</b> 0 - +60°C (Standard type)			
						<b>HA</b> 0 - +130°C (High specific type)			
						<b>CA</b> -20 - +100°C (High specific type)			
					<b>CB</b> -40 - +130°C (High specific type)				
			<b>00</b> φ10.0						
			<b>168</b> φ16.8						
			<b>04</b> Rc3/4"						
			<b>05</b> Rc1"						

※ Consult with us for using this product with negative pressure.

\*1: Please refer "O-ring selection table"

\*2: Please specify a type of fluid.

\*3: Optional part for High-spec type.

## Specifications

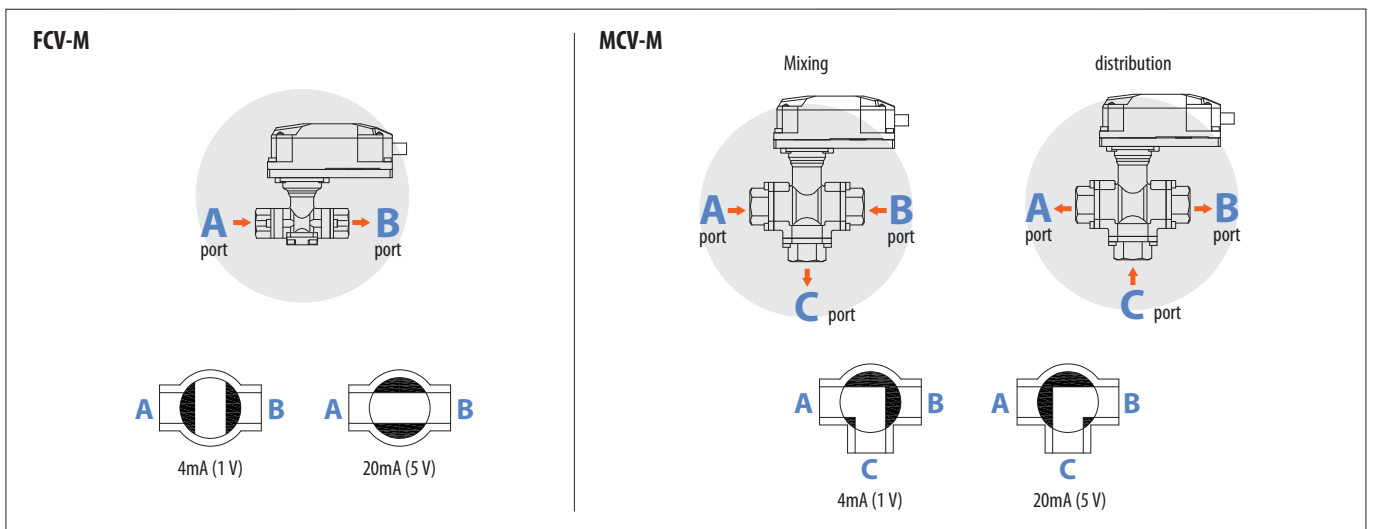
Item		Description							
Valve design		2 way ball valve						3 way ball valve	
Model number selection		FCV-M25				FCV-M32		MCV-M32	
Orifice size		φ3.0	φ4.5	φ6.0	φ7.4	φ7.4	φ9.5	φ16.8	φ10.0 φ16.8
Cv Value (Max.)		0.36	0.85	1.68	2.61	2.61	4.63	13.0	3.71 9.34
Connection size		Rc1/4", Rc3/8", Rc1/2"				Rc1/2", Rc3/4"		Rc3/4", Rc1"	
Fluid type		WATER, etc.							
Fluid temperature		0 – +60°C / 0 – +130°C / -20 – +100°C / -40 – +130°C							
Operating temperatures, humidifies		Temperature: 0°C – +50°C Humidity: 30 – 85%RH (Non condensing & No freezing at use of Inside installation)							
Pressure limit		0.4MPa							
Withstand pressure		1.0MPa(G)							
Power source		DC24 V ± 10% Max. 250 mA							
Analog I / O		4 – 20 mA / 1 – 5 V / 1 – 10 V (Option)							
Input impedance		20 Ω (4 – 20 mA) / 1M Ω (1 – 5 V, 1 – 10 V)							
Output Allowable Load Resistance		Below 300 Ω in use for 4 – 20 mA and over 1 kΩ for 1 – 5 V / 1 – 10 V							
Drive system		Stepper motor							
Resolution of Valve Movement		approx. 3400 steps							
Response Time (0 to 100% Open)		approx. 7s				approx. 14s		approx. 7s	approx. 14s
Valve hysteresis width		Below 1.5%							
IP grade		Equivalent to IP67							
Installation orientation		Vertical · Horizontal (Actuator should NOT be in upside down position)							
Wetted materials		SCS13, SUS304, PTFE(PTFE-filled), NBR / FKM / EPDM / Si							
Grease used for wetted materials		Grease Free (Standard)							
Product description (standard)		Valve unit, Amplifier, Power cable (≒ 1 m), Control signal cable (≒ 2 m), I / O signal cable (≒ 2 m)							
Weight	Valve unit	approx. 1500 g				approx. 1700 g		approx. 1800 g	
	Amplifier	approx. 100 g							
	Cables	approx. 350 g							

Conversion formula : Cv = Kv × 1.167

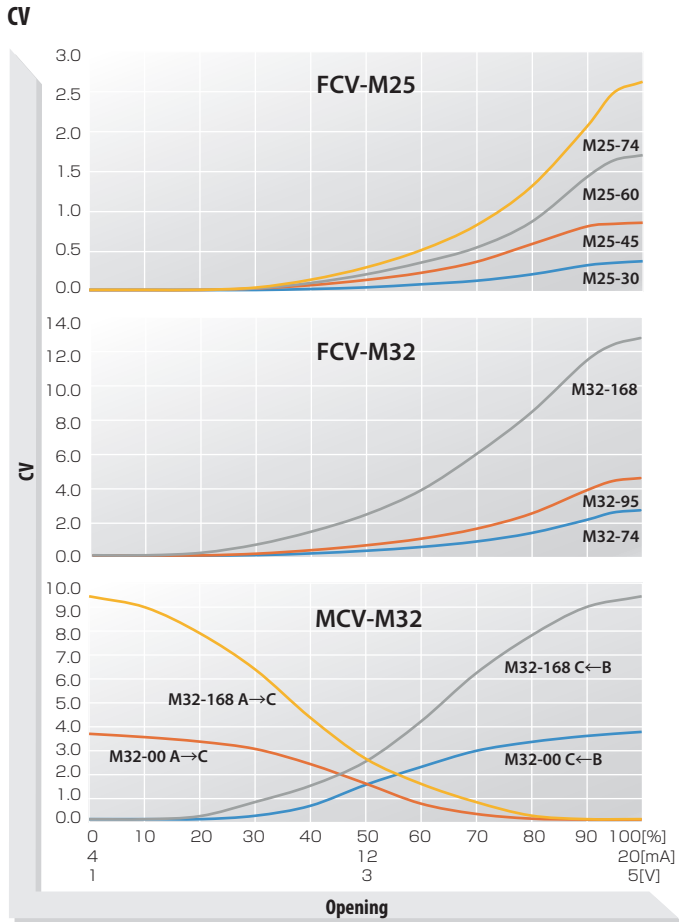
## Oring Selectiton Table

material	Temperature Range (O-ring itself)	Temperture Zone (Symbol)	Feature (As reference)
NBR (Category 1 type A)	-30°C – +100°C	S / CA	Excel in oil and abration resistance
FKM (Category 4 Type D)	-15°C – +200°C	S / HA	Excel in oil, chemical and heat resistance
EPDM	-45°C – +130°C	S / HA / CA / CB	Excel in weather and ozone resistance
Si (Category 4 Type C)	-50°C – +200°C	S / HA / CA / CB	Excelin heat and cold resistance

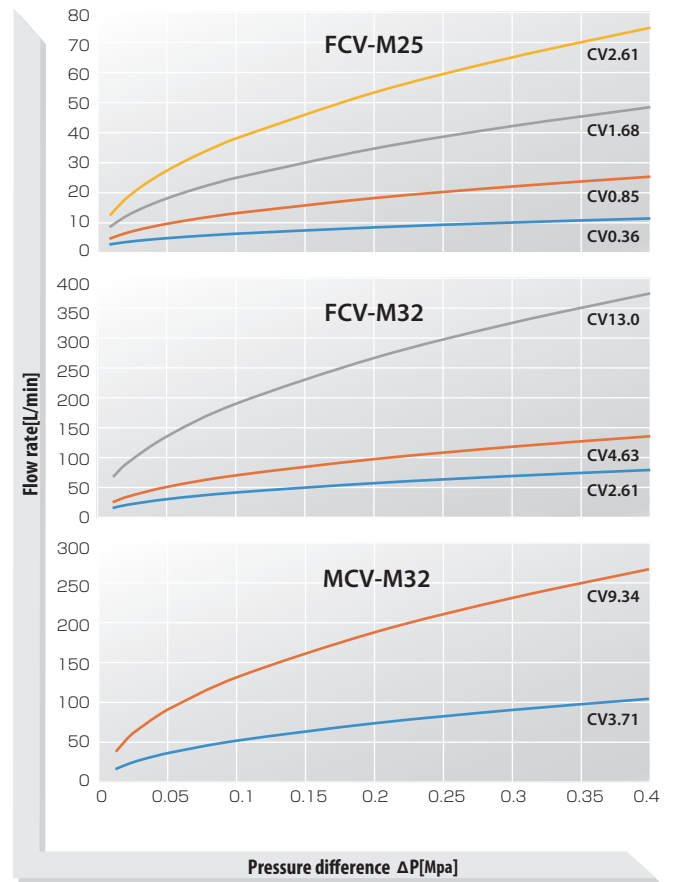
## Switching form



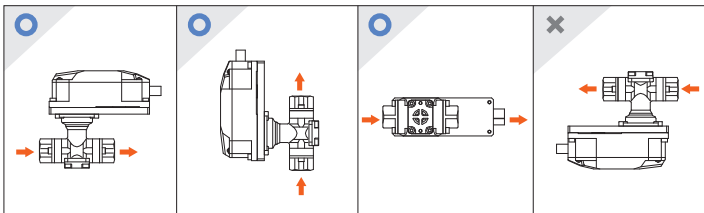
Flow characteristic



Flow conversion chart

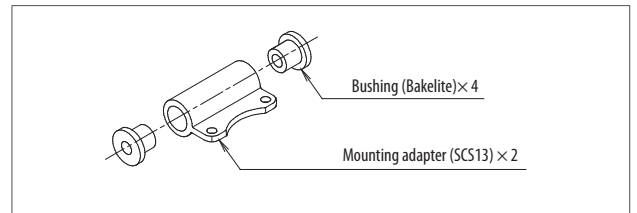


Installation attitude



※ Do not install actuator for both FCV / MCV downward

Securing Bracket (Option)



LED light

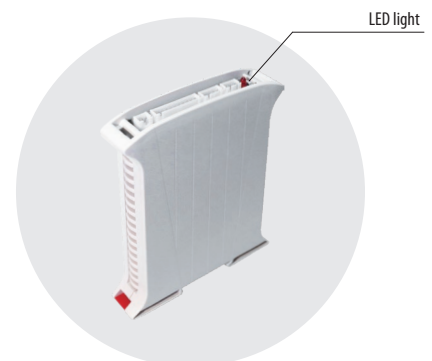
LED (Red): Power and error

	LED	Description
Turned off		Power OFF
Turned on		Power ON
Fast blinking		Memory error
Slow blinking		Over current error on motor

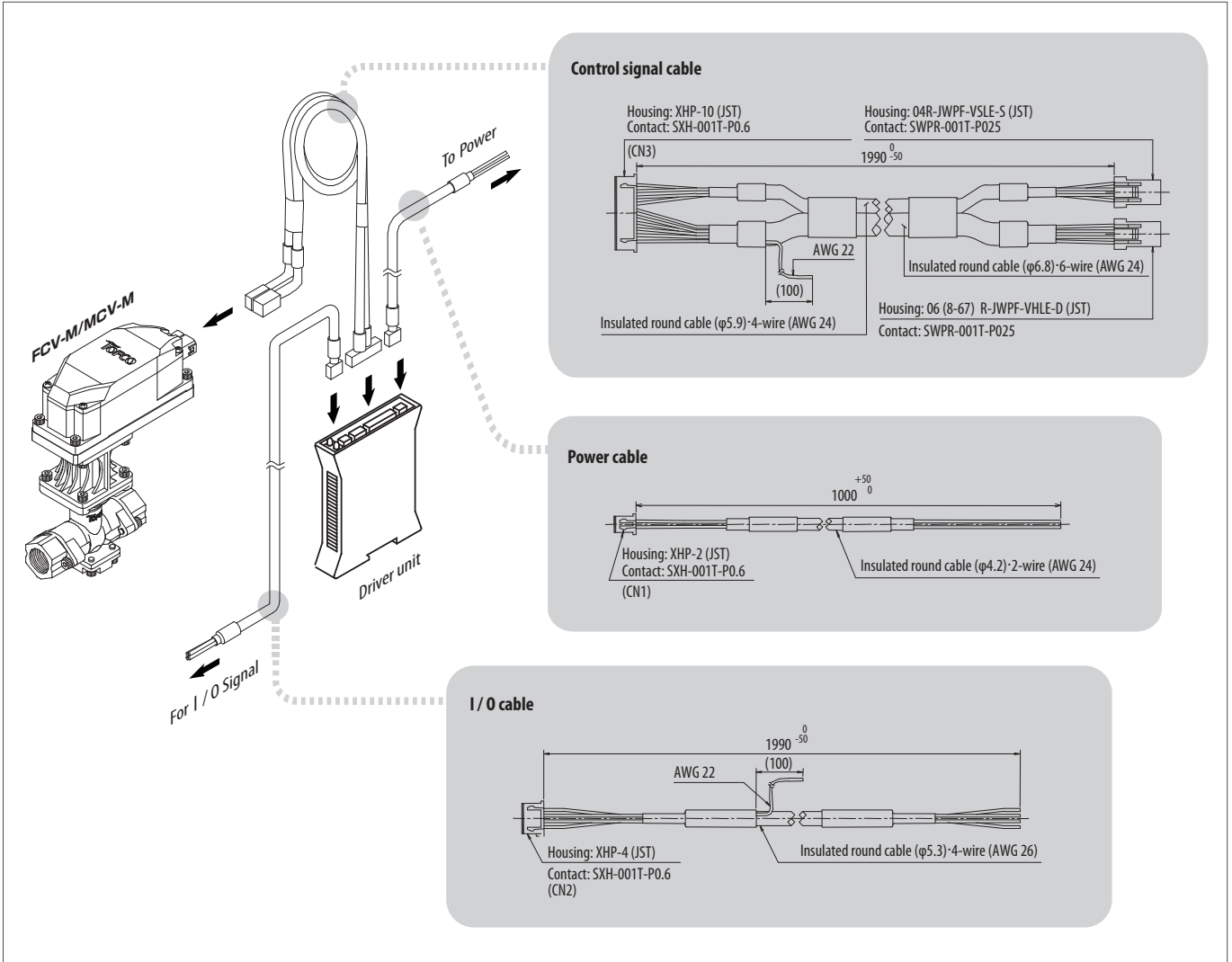
LED (Green): Valve potion

	LED	Valve position
Turned off		0%
Slow blinking		Narrow
↕		↕
Fast blinking		Wide
Turned on		100%

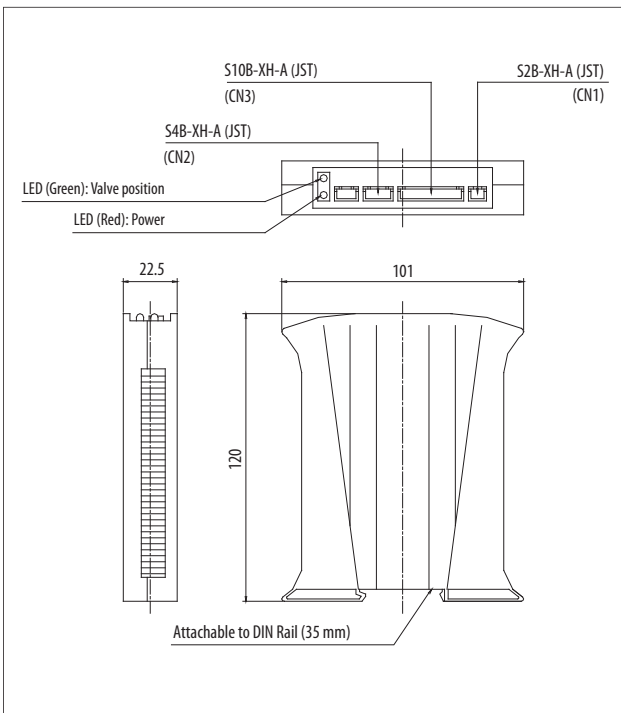
Driver unit



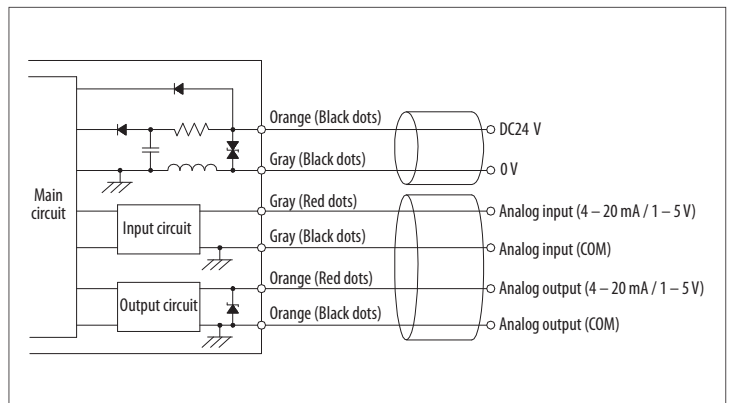
Electrical connections



Driver unit



I/O circuit diagram

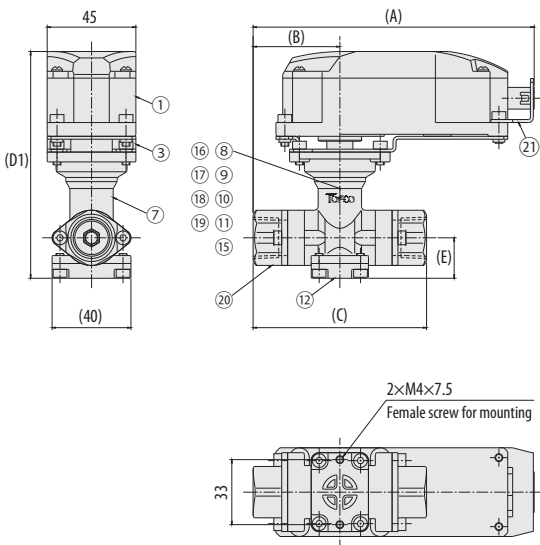


**Standard Dimensions**

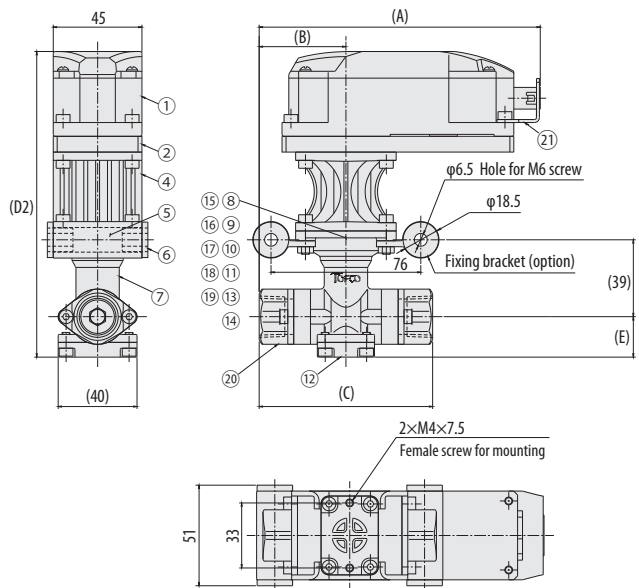
Std.	Connection size	Dimensions (mm)					
		A	B	C	D1	D2	E
FCV-M25	Rc1/4"	136.5	38	76	115	155	20.5
	Rc3/8"						
	Rc1/2"	142.5	44	88			
FCV-M32	Rc1/2"	146	47.5	95	117.5	157.5	20.5
	Rc3/4"						
FCV-M32 (φ16.8)	Rc3/4"	154	55.5	111	149	189	40.5
	Rc1"	166	67.5	135			
MCV-M32	Rc3/4"	154	55.5	111	163	203	54.5
	Rc1"	166	67.5	135	175	215	66.5

**Structural drawing**

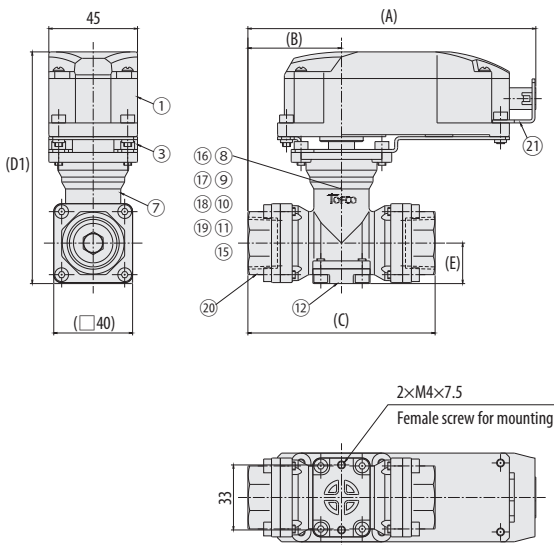
**FCV-M25 Standard type**



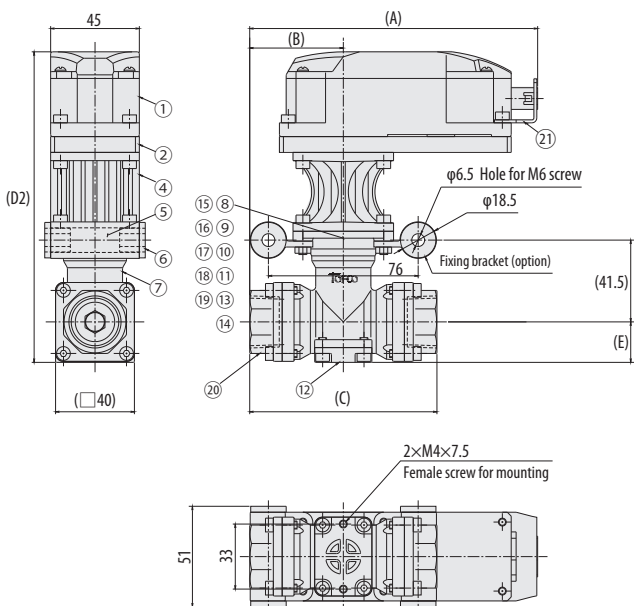
**FCV-M25 High specific type**



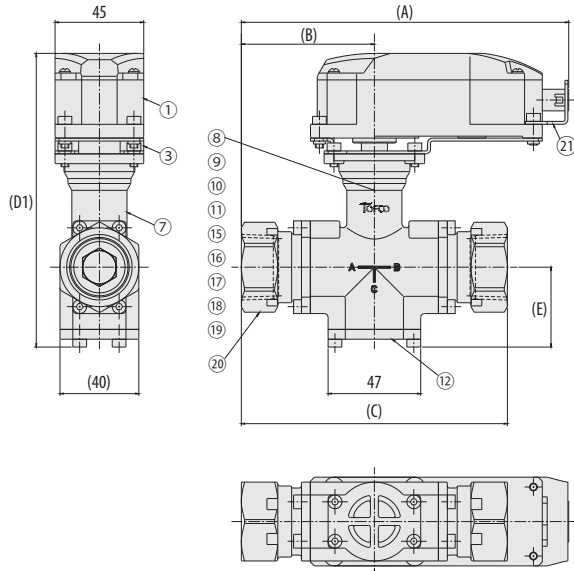
**FCV-M32 Standard type**



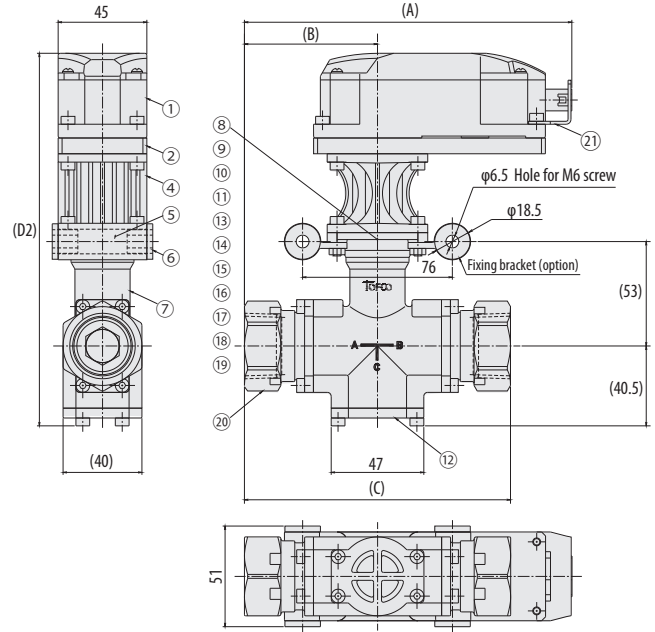
**FCV-M32 High specific type**



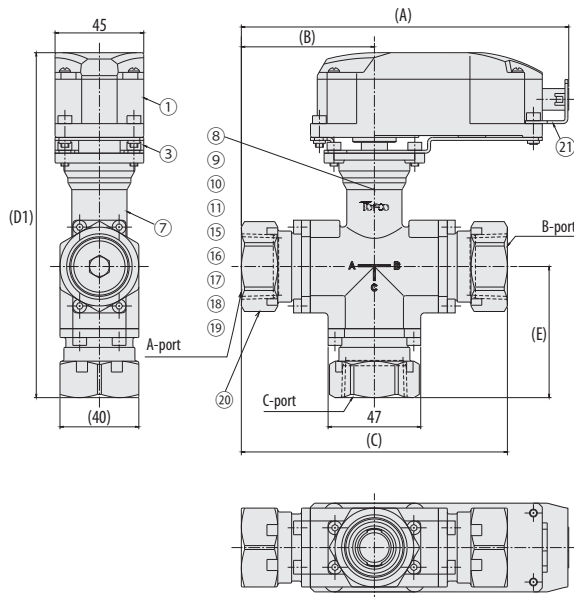
FCV-M32  $\phi$ 16.8 Standard type



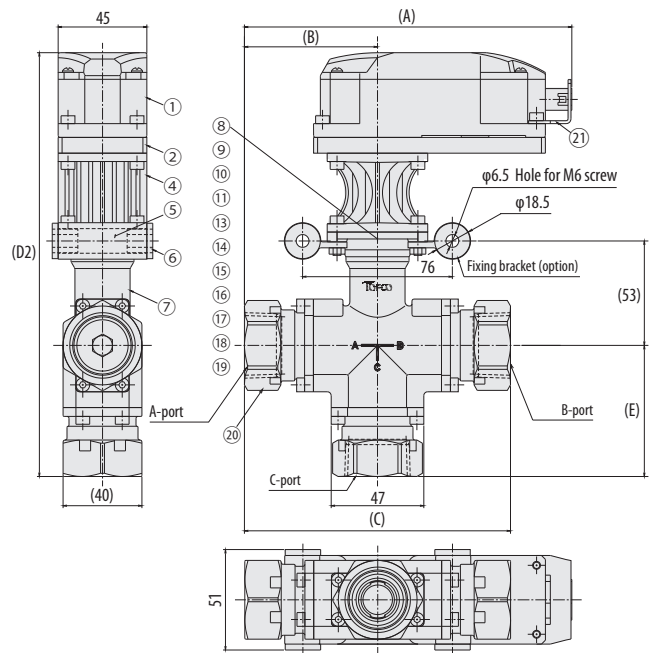
FCV-M32  $\phi$ 16.8 High specific type



MCV-M32 Standard type



MCV-M32 High specific type



Materials

No.	Names of parts	Material
1	Actuator	AL, etc.
2	Motor bracket	AL
3	Motor bracket	SUS430
4	Heat shield extension shaft	PPS
5	Mounting adapter	SCS13
6	Bushing	Bakelite
7	Valve body	SCS13
8	Ball retainer lockpacking	SCS13
9	O-ring	NBR / FKM / EPDM / Si
10	Ball shaft	SUS304
11	Ball packing	PTFE

No.	Names of parts	Material
12	Plug adapter	SCS13
13	Heat shield extension shaft	Zirconia
14	Collar	PPS
15	shaft retainer	SUS304
16	Spring	SUS304
17	Shaft packing fixture B	SUS304
18	Shaft packing	PTFE
19	Shaft packing fixture A	SUS304
20	Adapter	SCS13
21	Connector bracket	SUS430



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