

IWAKI
HI-TECHNO
PUMPS

IX-D





IX-D300TCFJ

IX-D300TCR

D300

Capacity: 0.4 - 300 L/hr



IX-D150TCFJ

IX-D150TCR

D150

Capacity: 0.2 - 150 L/hr

PVDF
head

Output range of 0.2-300 L/hr

High-precision control in larger sized IX Series metering pumps

Hi-Techno Pump IX-D

Iwaki's IX-D series are digitally controlled direct-drive diaphragm pumps.

New models of the IX-series metering pumps featuring extreme accuracy, energy efficiency, and high resolution.

Broad range of flow rates from 0.2 to 300 L/hr.

The IX-D series meet today's demand for automated chemical delivery in industries from water treatment to chemical process.

750:1

Turn down ratio

300 mPa·s

Max. viscosity

±1%

High accuracy

UP TO 70%

Energy savings

1 MPa

Degassing ability



IX-D300S6FJ

IX-D300S6R

D300

Capacity: 0.4 - 300 L/hr



IX-D150S6FJ

IX-D150S6R

D150

Capacity: 0.2 - 150 L/hr

SUS
head

Advanced drive technology reduces energy consumption

Precise chemical dosing in an Eco-friendly solution



High turn down ratio

Full motor control varies the discharge and suction speeds independently to provide a full turndown ratio of 750:1.

D150 Capacity
0.2 - 150L/h

D300 Capacity
0.4 - 300L/h

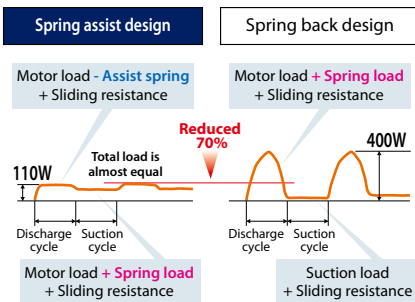


IX-D150TCR

IX-D300TCR

Efficient and Eco-friendly

Helical gears and spring assistance reduce power consumption by 70% compared to conventional spring-back designs.



Precise chemical dosing

The valve design maintains precise dosing over the flow range while the motor regulates discharge and suction speeds, combining to achieve high accuracy (+/-1%) in a cost-effective, mechanically-driven diaphragm pump.

High Compression Pump Head Design

A fixed (full) stroke length maintains maximum compression resulting in fast priming and eliminating air lock at any flow or rated pressure.

Maximum suction lift:

2m

With an open discharge line and dry valve condition.

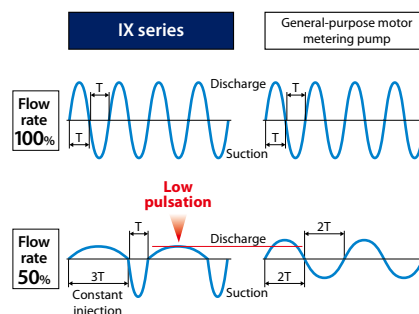
Degassing ability:

D150: 1.0 MPa, D300: 0.5 MPa

With a standard tubing layout.

Smooth dosing with low impact

Flow control is done by discharge speed adjustment only (suction speed remains fixed). This provides the smoothest injection at any flow rate and reduces inertial forces, pulsations, and loads on piping.



Viscous liquids

Standard IX series pumps are capable of pumping liquids with viscosities up to 300mPa·s. Contact us for higher viscosity applications.

World Standard Compliant

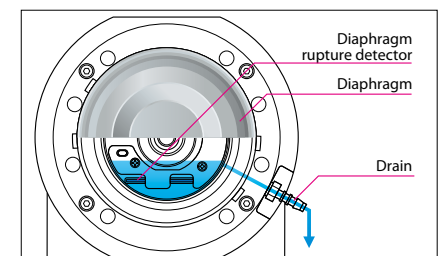
The IX pumps are compatible worldwide, featuring multi-voltage operation (100-240VAC). Compliant to both UL and CE standards.

IP65

Drive and control units are each sealed separately to IP65 standards.

Safety design

All IX Series pumps feature standard safety features with alarm capability. Diaphragm rupture detection protects both users and the environment. Abnormal operation detection protects the pump and piping from high discharge pressure situations (clogged, reduced or closed piping). A drain hole protects the pump even if the diaphragm ruptured.



Easy operation in a Variety of applications

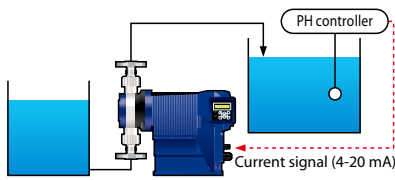


Automatic control

The IX pump can operate in analogue, pulse, batch or interval batch control modes.

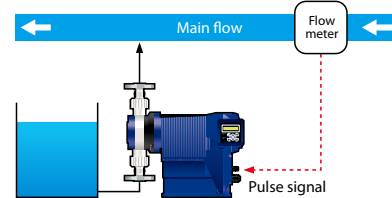
Analogue operation

The pump operates in response to an Analogue (4-20mA) signal from a controller.



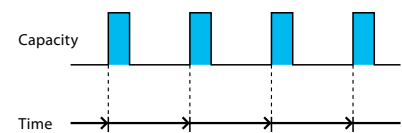
Pulse operation

The pump output is paced in proportion to a digital input pulse from a flow meter, contact head water meter, other control device, etc.



Interval batch operation

Repeated batch dispensing is possible with simple volume and interval time programming via the keypad. Program is initiated with pulse signal.



Cavitation prevention

The suction stroke speed can be manually set lower for operation with highly viscous liquids and to prevent cavitation (Programmable to 75%, 50% or 25% of full speed).

Degassing

Keypad operation or an external contact signal (AUX) runs the pump at maximum speed, regardless of mode, for quick priming and degassing.

Calibration

The pump is calibrated prior to shipment at maximum ratings. Field calibration is recommended after installation due to system variances. Calibration is easy with the built-in program.

Operation history

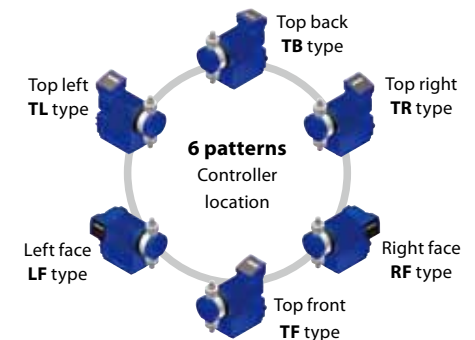
Controller memory logs the total power connection time, operating time, number of strokes and number of power-up events.

Maintenance mode

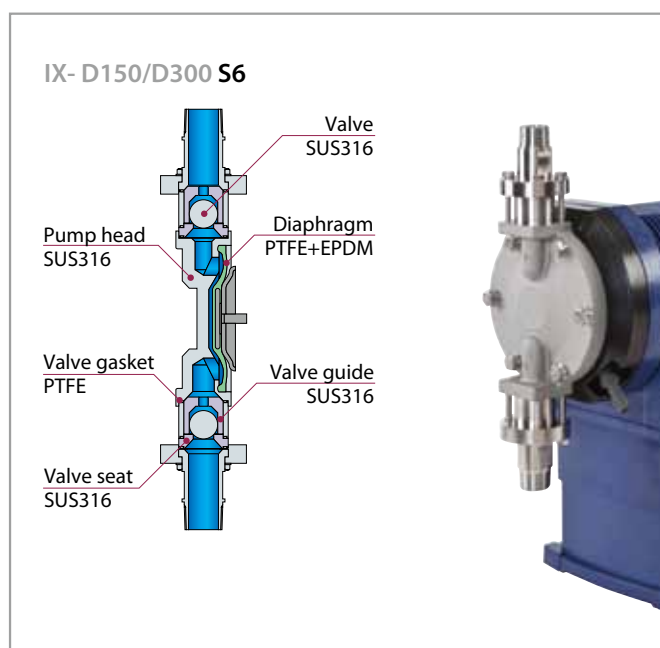
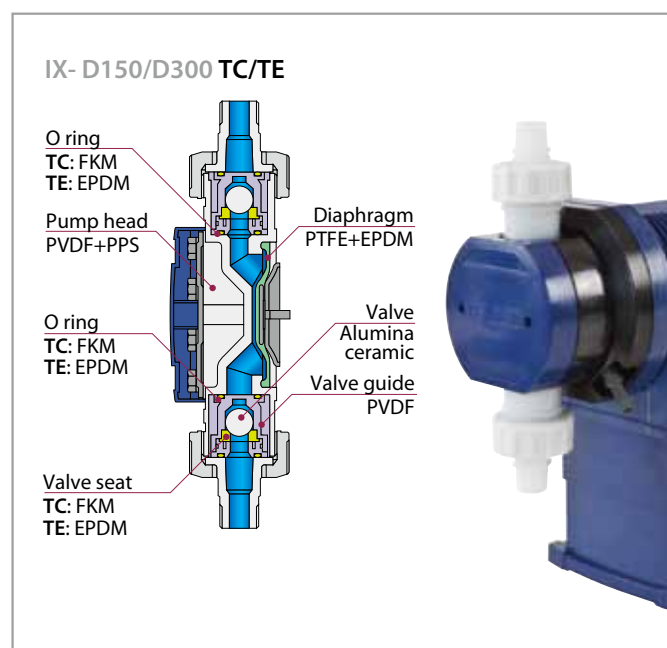
Keypad operation enables the diaphragm to be moved and held out facilitating easy diaphragm replacement.

User friendly design

The controller position can be ordered in six different positions for operator convenience. It has a back-lit LCD display with optimized key positions and features multiple language display.

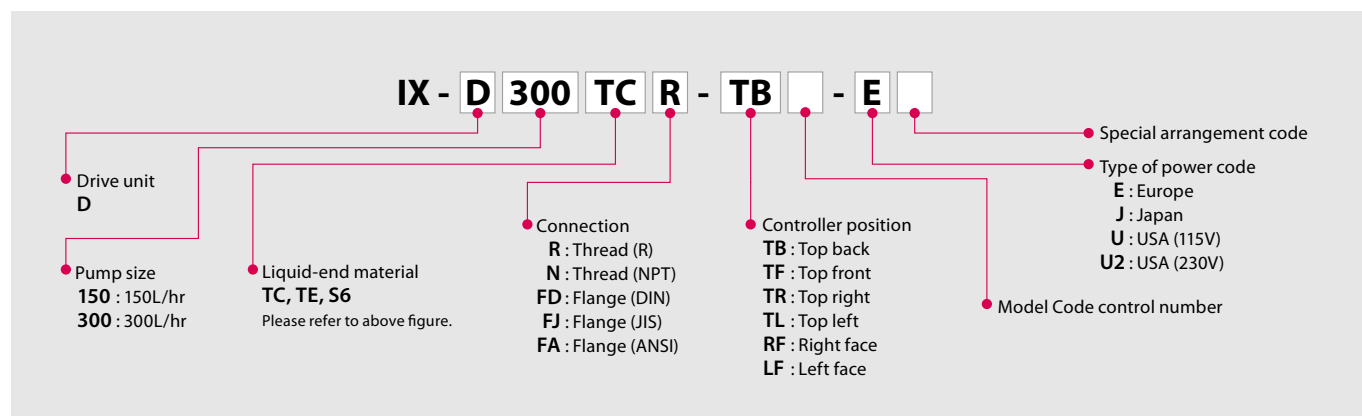


Liquid-end materials



The pump head PPS and diaphragm EPDM are not liquid-end materials.

Pump identification



Specifications of pump

Model	Capacity L/hr	Max. pressure MPa	Max. viscosity mPa·s	Liquid temperature range °C	Connection		Power consumption W	Current A	Mass kg
					Thread	Flange			
IX-D150	TC/TE S6 ^{Note1}	0.2 ~ 150	1.0	300 ^{Note2}	R: R3/4 N: 3/4NPT	FJ: JIS10K20A FD: DIN PN10 DN20 FA: ANSI 150Lb 3/4"	110	1.3	14.5
									15 (Thread)
									17 (Flange)
IX-D300	TC/TE S6 ^{Note1}	0.4 ~ 300	0.5	300 ^{Note2}	R: R1 N: 1NPT	FJ: JIS10K 25A FD: DIN PN10 DN25 FA: ANSI 150Lb 1"	110	1.3	15.5
									17 (Thread)
									19.5 (Flange)

- The max. discharge capacity is obtained in operation with clear water at ambient temperature and the max. discharge pressure. It gets higher as the pressure gets lower.
- Operating temperature range: 0-50 °C (Indoor use only)
- Operating humidity range: 0-90%RH (Non condensing in the controller)
- Contact us for other plumbing connections

Note 1: For the IX-D150S6, accuracy is not guaranteed at flows below 1.5 L/h. For the IX-D300S6, accuracy is not guaranteed at flows below 3.0 L/h.

Note 2: The discharge rate may be reduced when pumping viscous liquids. Some allowance should be given when selecting pumps for these applications.

Note 3: No viscosity change, Non freezing, No slurry.

Controller Specifications

Operation mode	MAN (Manual)		Use the UP and DOWN keys to set a flow rate.	
	EXT	Analog fixed operation	4 to 20, 0 to 20, 20 to 4, 20 to 0 mA (Proportional to the discharge rate)	
		Analog variable operation	Programmable 2-point setting (Input signal DC 0–20 mA, proportional to the discharge rate)	
		Pulse control ^{Note1}	0.01560mL/PLS - 300mL/PLS (D150)	0.03120mL/PLS - 600mL/PLS (D300)
		Batch control ^{Note1}	15.6mL/PLS - 300L/PLS (D150)	31.2mL/PLS - 600L/PLS (D300)
		Interval batch control ^{Note1}	Day: 0 - 9, Hour: 0 - 23, Minute: 1 - 59 15.6mL - 300L (D150), 31.2mL - 600L/PLS (D300)	
		Profibus control	Communication protocol: Profibus-DP-compliant international standard: EN50170 (IEC61158)	
Monitors	LCD	16 digits × 2 lines, backlit character LCD		
	LED	OPERATE	Lights in green colour during pump operation.	
			Lights in orange colour when a Pre-Stop signal is input.	
			Lights in red colour when the pump has stopped or flashes when overload is detected.	
	ALARM	Red: Lights up when Alarm1 or Alarm2 is output		
Operation	Keypads		Start/Stop, MENU, ESC, Enter, Up, Down, Left and Right keys	
Control function	STOP	Operation stops with input contact ^{Note2}		
	PRIME	Max spm operation by pressing the UP and DOWN keys		
	Keylock	Password setting to lock and release operation keys		
	Interlock	Operation stops with input contact ^{Note2}		
	AUX	Pump operates at the set discharge rate with input contact.		
	Maximum discharge rate	Arbitrarily set the upper discharge limit in each operation mode.		
	Buffer memory function	Store the number of pulses entered in batch operation.		
Input	Analog input value display		Display the analog input value.	
	STOP/Pre-Stop	No-voltage contact or open collector ^{Note3}		
	AUX	No-voltage contact or open collector ^{Note3}		
	Interlock	No-voltage contact or open collector ^{Note3}		
	Analogue	0 - 20mADC (Internal resistance is 200ohm.)		
	Pulse		No-voltage contact or open collector Max pulse frequency is 100Hz.	
Output	Alarm1 (OUT1)		Non-voltage contact (mechanical relay): AC 250 V, 3 A (resistive load) Each output item is selected by Enable/Disable. Batch complete ^{Note4} /STOP/Pre-Stop/Interlock/Leak Detection/Motor Overload/Drive Error	
	Alarm2 (OUT2)		Non-voltage contact (photo relay): AC/DC 24 V, 0.1 A (resistive load) Each output item is selected by Enable/Disable. Volume Prop. PLS ^{Note5} /Batch complete ^{Note4} /STOP/Pre-Stop/Interlock/Leak Detection/Motor Overload/Drive Error	
	External power supply		DC 12 V, 30 m A or less	
	Current		DC 0 to 20 mA, Two-point setting (allowable load resistance: 300 Ω)	
Power voltage ^{Note6}			100 to 240VAC 50/60Hz	

Note 1: The minimum settings for pulse operation, batch operation, and interval batch operation are the flow rates per stroke corrected by calibration.

Also, the change rate of the setting value per pulse is the flow rates per stroke corrected by calibration.

Note 2: Switches to pump operation with input contact if default state is changed in the controller settings.

Note 3: The maximum voltage and current applied to the contact are 12 V and 5 mA. If you use a contact such as a relay, the minimum applicable load must be 5 mA or less.

Note 4: When Batch Complete (batch operation complete output) is set to Enable, the other functions will be set to Disable.

Note 5: When Volume Prop. PLS (Volume proportional pulse) is set to Enable, the other functions will be set to Disable.

Note 6: Do not apply voltage out of the specified range. Doing so may cause malfunction or failure. The allowable voltage supply range is 90-264VAC only.

Optional accessories



DIN 5-pin connector cable
External control signal cable (5m)
(External control signal input)
Selection No. IX0018



DIN 4-pin connector cable
STOP signal and AUX signal cable (5m)
(STOP signal input)
Selection No. IX0019



DIN 4-pin connector cable
Output signal cable (5m)
(Signal output)
Selection No. IX0020



Profibus converter
Profibus communication

Points to be observed in pump installation and piping

IX Series Hi-Techno pumps are positive-displacement, reciprocating pumps.

Reciprocating pumps generate pulsation in the suction and discharge piping. Special consideration, (different from the ordinary centrifugal pumps), should be given to this point when planning the pump installation and piping.

• Prevention of pipe vibration

Discharge side inertial resistance $P_{id} < 0.1$ MPa

• P_{id} : Inertial resistance on discharge side

Inertial resistance means the pulsated impact force generated by the flow just upon entering discharge stroke. It is a phenomenon particular to a reciprocating pump which is generated as a result of the sudden application of acceleration to the liquid in the discharge piping. The condition " $P_{id} < 0.1$ MPa" is given above as an approximate standard. If P_{id} becomes 0.1MPa or higher, vibration on the pipe is generated. So measures should be taken to cope with the influence of vibration on the pump, too.

Measures

1. Install pulsation prevention device (air chamber).
2. Enlarge the diameter and shorten the length of the discharge piping.

• Prevention of overfeeding

Pump differential pressure > Inertial resistance P_i

• The larger one of the suction side or the discharge side

Overfeeding means excessive flow of the liquid due to abnormal functioning of the check valve caused by pulsation of the liquid in the piping. Check carefully in case the differential pressure is low and in case the piping is too long even with the differential pressure value at 0.03 MPa.

Measures

1. Install air chamber.
2. Install back pressure valve

• Prevention of suction failure

$NPSH_a > NPSH_r$

$NPSH_a = P_a - P_v \pm P_{hs} - P_{is} \text{ * MPa}$

*Or P_{fs} : whichever is the larger. (NPSH : Net positive suction head)

If $NPSH_a$ is not sufficient, the pump may be damaged by the flow-break or cavitation generated under such conditions.

- **NPSH_a**: Absolute NPSH (MPa)
- **NPSH_r**: Required NPSH (value particular to the pump) (MPa)
- **P_a**: Absolute pressure onto the tank liquid surface (MPa)
- **P_v**: Liquid vapour pressure (MPa)
- **P_{hs}**: Pressure caused by the height of the suction side (MPa)
(Flooded suction : +, Negative suction : -)
- **P_{is}**: Inertial resistance on the suction side (MPa)
- **P_{fs}**: Piping resistance on the suction side (MPa)

See the table below for NPSH_r, inertia resistance(P_i) and applicable chambers.



Compressed air dissolves in solutions in a chamber. Supply air into the chamber periodically, or its performance may reduce.
It takes longer time for air to be compressed enough to deliver liquid as a flow rate gets lower.

• Pump/Piping protection

Install a relief valve to protect the pump and piping from overpressure.

Performance

Model	Discharge line inertia resistance P_{id}		Suction line inertia resistance P_{is}		NPSH _r	Viscosity	Priming lift	Applicable chamber Materials	
	L/hr	MPa/1m	(%)	MPa/1m				SUS	PVC
IX-D150	~150	6.3×10^{-3}	100	6.3×10^{-3}	0.08 MPaA	300 mPa·s	2 m	5.0 L	5.0 L
	~113	2.3×10^{-3}	75	3.6×10^{-3}					
	~75	7.0×10^{-4}	50	1.6×10^{-3}					
	~15	1.8×10^{-5}	25	4.0×10^{-4}					
IX-D300	~300	7.2×10^{-3}	100	7.2×10^{-3}	0.08 MPaA	300 mPa·s	2 m	5.0 L	5.0 L
	~225	4.1×10^{-3}	75	4.1×10^{-3}					
	~150	8.0×10^{-4}	50	1.8×10^{-3}					
	~30	2.0×10^{-5}	25	4.5×10^{-4}					

• P_i : Inertia resistance per meter (based on clean water, suction line I.D. should be equal to the pump suction connection as a minimum.)

Calculate inertia resistance per meter using the following formula.

$P_i = P_{id} \text{ (or } P_{is}) \times \text{Specific gravity} \times \text{Pipe length (m)} \div (\text{Pump I.D.} \div \text{Pipe I.D.})^2 (\text{MPa})$

• Suction speed is set to 100% as the default setting. Reduce speed when handling viscous or gaseous liquids to prevent the possibility of cavitation.

Note the suction speed is used to control maximum discharge capacity.

e.g.) If suction speed is set to 75%, maximum discharge capacity is correspondingly reduced to 75% (113 L/h for IX-C150).

• Discharge capacity may be reduced from rated performance when pumping highly viscous liquids. Select a suitable pump size according to liquid viscosity.

Contact us if handling liquid viscosities of over 300 mPa·s.

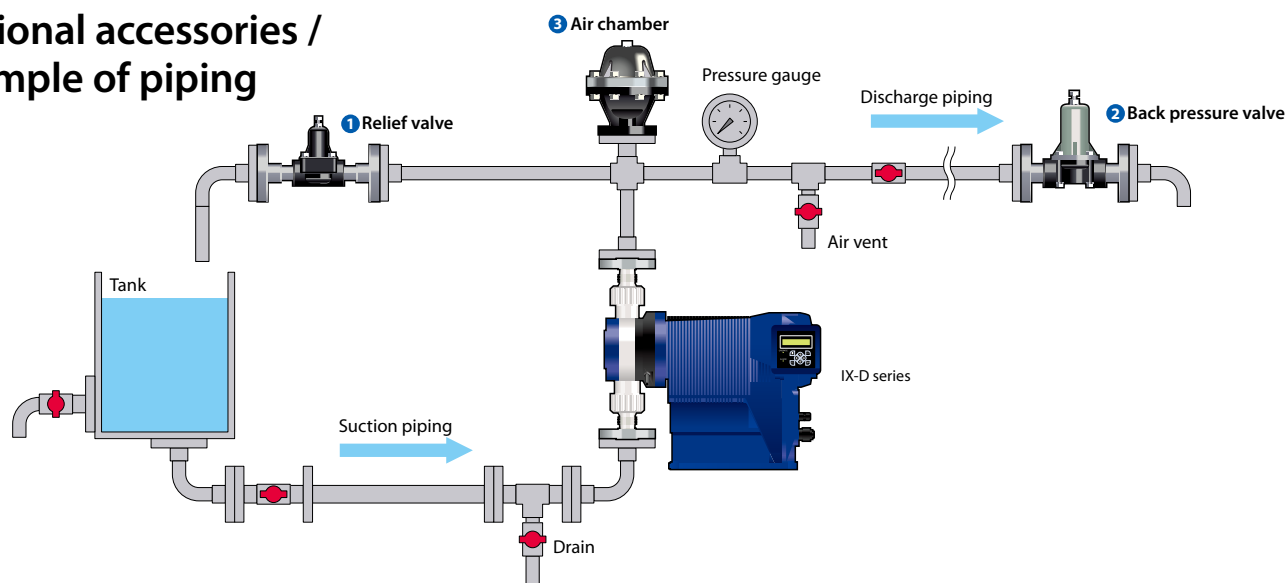
• Applicable chamber: Capacities are based on Iwaki standard chamber sizes. Contact us for chamber materials.

• High accuracy: $\pm 1\%$ (This accuracy may not be met at flows below 1.0 L/h for the IX-C150S6. For model IX-C060S6, accuracy may not be met at flows below 0.4 L/h)

• Liquid temperature range: 0-50 °C (TC/TE type), 0-80 °C (S6 type) No viscosity change, Non freezing, No slurry

Accurate calibration may not be possible with liquid temperatures over 60°C and discharge pressures over 0.8MPa. For optimum accuracy, calibration must be performed below these parameters.

Optional accessories / example of piping



1 Relief valve Model RV

Positive displacement pumps keep operating even in a closed-discharge condition, resulting in piping breakage or pump failure from overpressurization without a relief valve. Always install a relief valve to prevent overpressure in the discharge line.



Model	Wet-end materials		Max. capacity L/min (L/hr)	Setting pressure MPa	Connection JIS10K Flange	Mass kg
RV-7TV-15	PVDF	PTFE	7.5 (450)	0.3 ~ 0.8	15A	5
RV-7TE-15						
RV-7TV-25					25A	
RV-7TE-25						
RV-2S6-15	SUS316	PTFE	2.0 (120)	0.3 ~ 0.8	15A	3.5
RV-2S6B-15				0.8 ~ 1.5	15A (JIS16K)	
RV-7S6-25			7.5 (450)	0.3 ~ 0.8	25A	6
RV-7S6B-25				0.8 ~ 1.5	25A (JIS16K)	
RV-3P-15	PVC	PTFE	3.0 (180)	0.3 ~ 1.0	15A	0.6
RV-3P-20					20A	
RV-3P-25					25A	0.9

2 Back pressure valve Model BV

Install a back pressure valve when discharge-line pressure is less than 0.03 MPa or less than suction-line pressure. Pump check valves may otherwise not operate correctly and overfeeding may result. Differential pressure between discharge and suction lines must be 0.03 MPa or more and also greater than the inertia resistance (Pid or Pis, whichever greater). Differential pressure (0.03 MPa or more) > Inertia resistance (Pid or Pis, whichever is greater)



Model	Wet-end materials		Capacity L/min (L/hr)	Setting pressure MPa	Connection JIS10K Flange	Mass kg	
BV-7TV-15	PVDF	PTFE	FKM	0.2 ~ 7.0 (12 ~ 420)	0.05 ~ 0.8	15A	5
BV-7TE-15			EPDM				
BV-7TV-25			FKM				
BV-7TE-25			EPDM				
BV-2S6-15	SUS316 SCS14	PTFE	0.02 ~ 2.0 (1.2 ~ 120)	0.05 ~ 0.8	15A	3.5	
BV-7S6-25			2.0 ~ 7.5 (12 ~ 450)		25A	6	
BV-3NV-15	PVC	FKM	0.03 ~ 3.0 (1.8 ~ 180)	0.1 ~ 0.3	15A	0.6	
BV-3NV-20					20A		
BV-3NV-25					25A		
BV-3NE-15		EPDM			15A	0.6	
BV-3NE-20					20A		
BV-3NE-25					25A		0.9

Contact us for use at smaller flow rates than the above.

3 Air chamber Model A

The air chamber reduces flow pulsation to prevent piping vibration and overfeeding. An air chamber designed for slurry transfer is also available. Contact us for detail.



SUS type



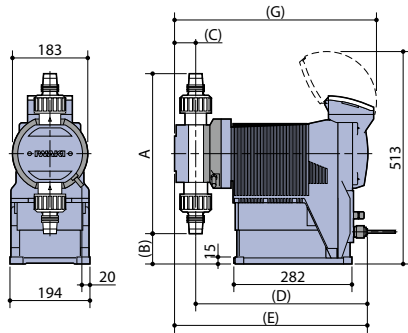
PVC type

Model	Wet-end materials	Capacity L	Max. pressure MPa	Connection JIS10K Flange	Mass kg
A-1S6-15	SUS316	1.5	0.9	15A	5
A-1S6-20				20A	
A-1S6-25				25A	
A-2VV	PVC	2.0	0.5	15 ~ 25A shared	2.5
A-2VE					
A-5S6-25A	SUS316	5	0.9	25A	12
A-5VV	PVC	5	0.5	25A	5
A-5VE					

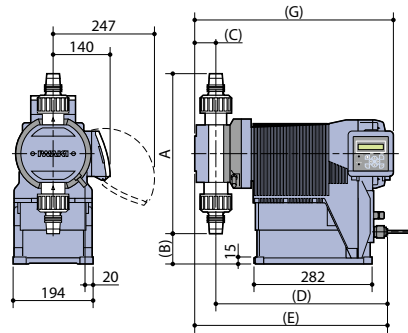
FKM O rings (A-2VV) and EPDM O rings (A-2VE) are not wet end materials. Please contact us for other materials.

Dimensions in mm

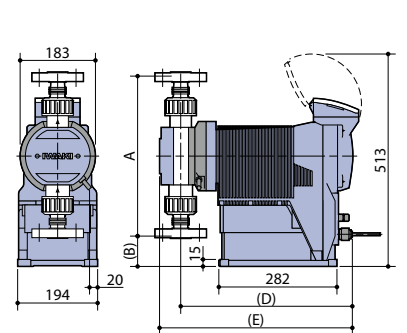
IX- (D150/D300) (TC/TE) R - TB



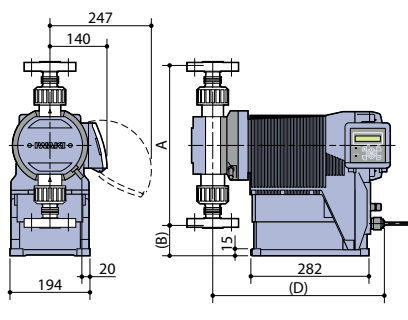
IX- (D150/D300) (TC/TE) R - RF



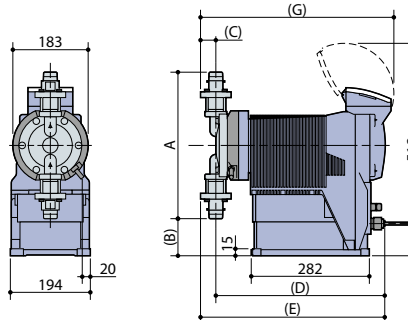
IX- (D150/D300) (TC/TE) FJ - TB



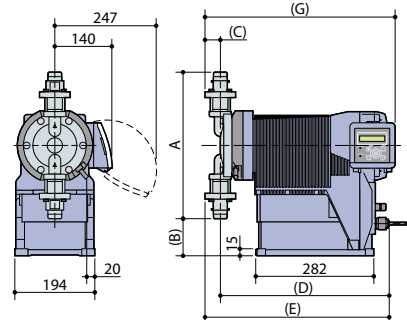
IX- (D150/D300) (TC/TE) FJ - RF



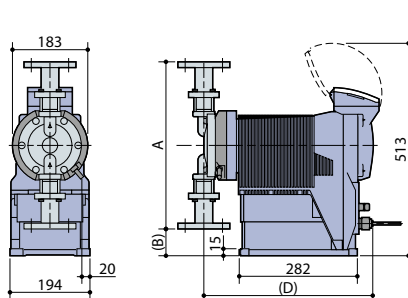
IX- (D150/D300) S6R - TB



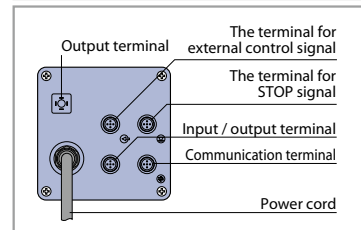
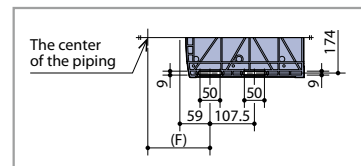
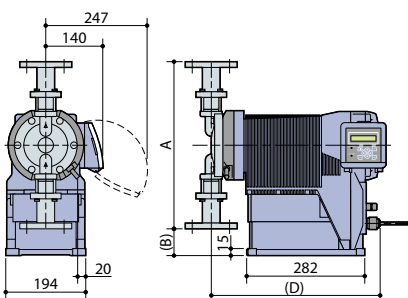
IX- (D150/D300) S6R - RF



IX- (D150/D300) S6FJ - TB



IX- (D150/D300) S6FJ - RF



Model	A	B	C	D	E	F	G
IX-D150 TC R-RF	317	108	42	409	450	144	465
IX-D300 TE R-RF	384	74	52	415	467	151	482
IX-D150 TC R-TB	317	108	42	409	450	144	472
IX-D300 TE R-TB	384	74	52	415	467	151	489
IX-D150 TC FJ-RF	340	97	—	409	—	144	—
IX-D300 TE FJ-RF	383	66	—	415	—	151	—
IX-D150 TC FJ-TB	340	97	—	409	—	144	—
IX-D300 TE FJ-TB	383	66	—	415	—	151	—

Model	A	B	C	D	E	F	G
IX-D150 S6 R-RF	315	108	30	401	431	136	453
IX-D300 S6 R-RF	355	88	37	408	445	143	460
IX-D150 S6 R-TB	315	108	30	401	431	136	460
IX-D300 S6 R-TB	355	88	37	408	445	143	467
IX-D150 S6 FJ-RF	363	84	—	401	—	136	—
IX-D300 S6 FJ-RF	405	63	—	408	—	143	—
IX-D150 S6 FJ-TB	363	84	—	401	—	136	—
IX-D300 S6 FJ-TB	405	63	—	408	—	143	—

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Caution for safety use:
Before use of pump, read instruction manual carefully to use the product correctly.

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