IWAKI

Anti-gas lock pump unit

ESU

Eliminates gas lock caused by sodium hypochlorite!

The Heart of Industry

Eliminates gas lock caused by sodium hypochlorite!

The Iwaki ESU series anti-gas lock pump unit achieves precise measurement of pulsating flow using an Electromagnetic flow sensor and gas-lock free operation with its automatic air vent valve. This combination ensures accurate feedback control and precise chemical dosing.

Maintain target flow rate by feedback control

Electromagnetic Flow Sensor (EFS)

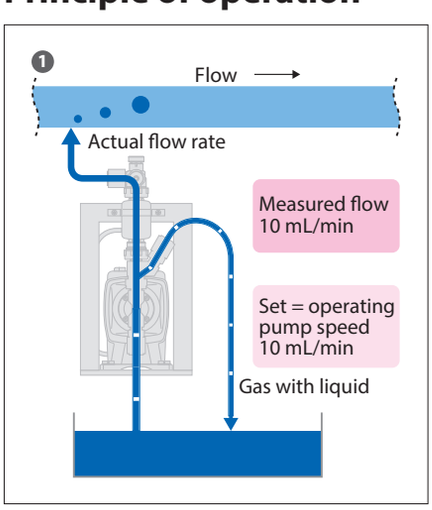
The EFS measures an accurate flow volume per shot. With the feedback control, this feature allows the target flow rate to be maintained even under pressure fluctuation. It also has an alarm output function in case of injection failure.

Forced discharge of mixed air

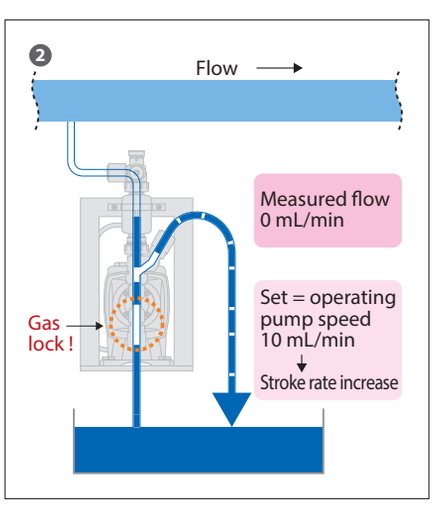
Automatic air vent valve (NAE)

The automatic air vent valve forcibly expels entrained air together with the delivered liquid. Thus, it is possible to dose gassing liquids such as sodium hypochlorite without flow interruptions due to gas lock.

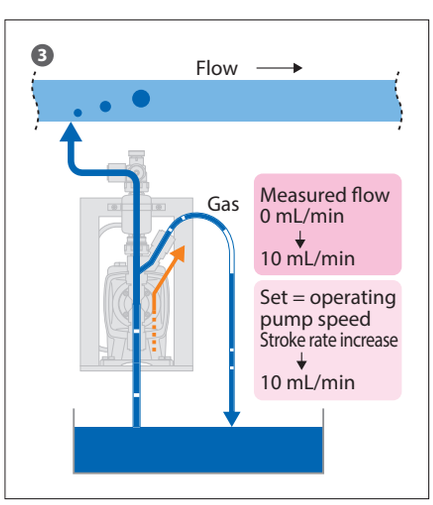
Principle of operation



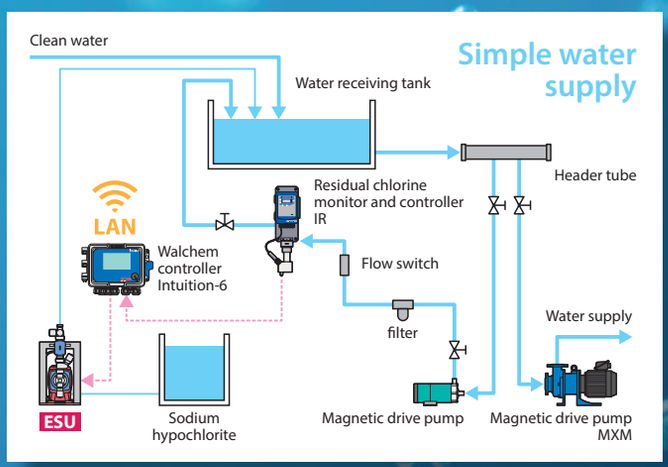
The automatic air vent valve takes gas and liquid out from the pump chamber. However, dosing capacity is maintained due to feedback control with the flow signal.

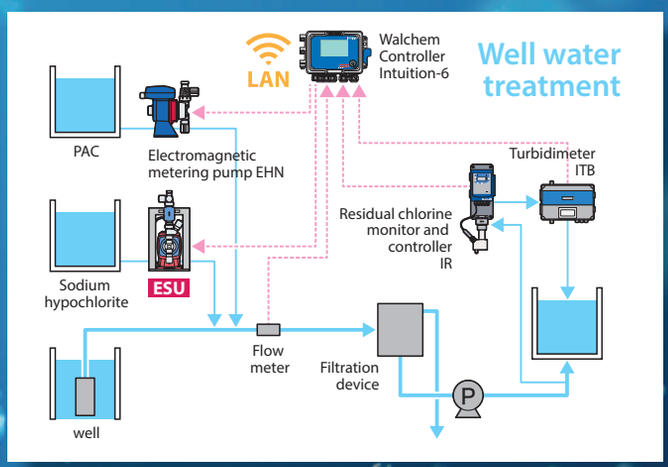


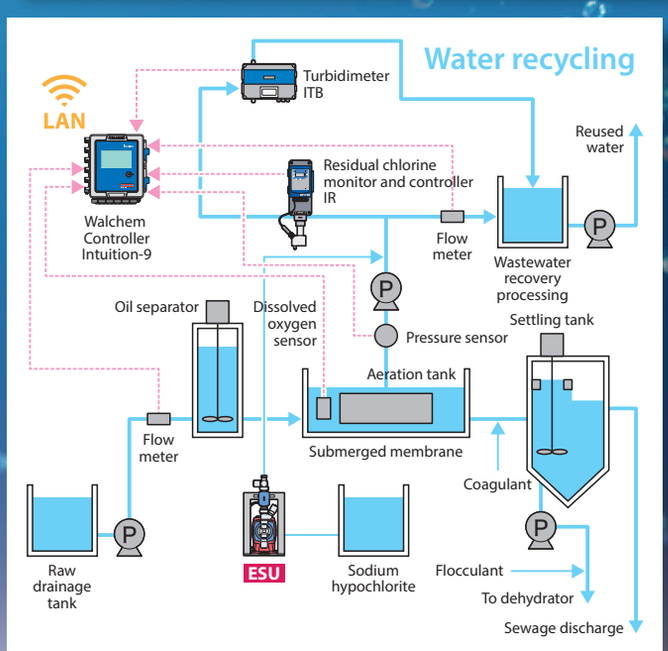
When large volume of gas comes into the pump chamber, pump discharge capacity will be "zero" until bleeding the gas out. The feedback control increases stroke rate, thus gas bleeding time will be in short time.

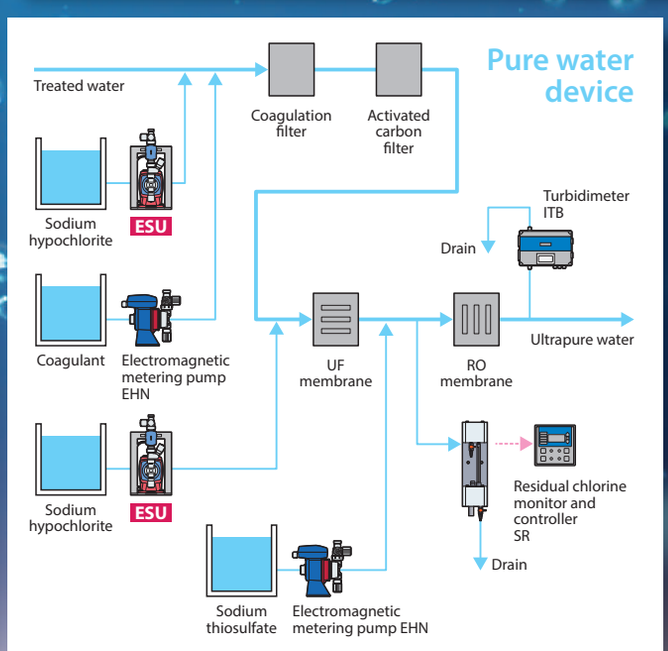


When the gas bleeding is completed, the pump discharge volume returns to the setting value immediately by the feedback control with the flow signal.









Identification

ESU	-	B	11	VC	1	-	FT
1		2	3	4	5		6

1 Series name
ESU series

2 Drive unit
(Average power consumption)
B : 20W
C : 24W

3 Diaphragm diameter
11 : Ø10mm
16 : Ø15mm
21 : Ø20mm

4 Wet end materials
VC, **VH**
Please refer to the material table for details.

5 Tube connection size (ID×OD)
1 : Ø4mm×Ø9mm
2 : Ø4mm×Ø6mm
3 : Ø6mm×Ø8mm

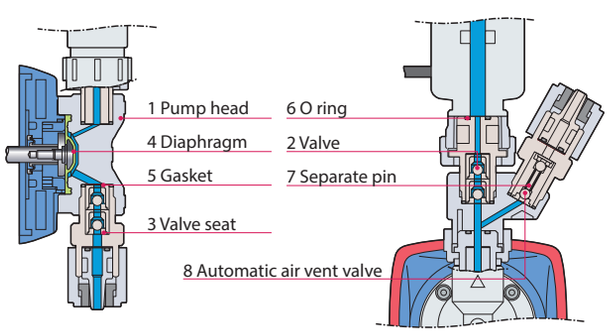
6 Electromagnetic flow sensor

Material	Body	Electrode	O ring	Sensor type	Pump material
FT	PVDF	Titanium	FKM	EFS-05-FT	VC
FF	PVDF	Hastelloy C22 or equivalent	FKM	EFS-05-FF	VC
FH	PVDF		EPDM	EFS-05-FH	VH

Wet-end materials

	VC	VH
1 Pump head	PVC	
2 Valve	Alumina ceramic	Hastelloy C276
3 Valve seat	FKM	EPDM
4 Diaphragm	PTFE+EPDM	
5 Gasket	PTFE	
6 O ring	FKM	EPDM
7 Separate pin	Titanium	Hastelloy C276 or equivalent
8 Automatic air vent valve	Zirconia ceramic	

- Please note that it cannot be used for strongly acidic liquids.
- Refer to the model identification for the material of the electromagnetic flow sensor.



Specifications of controller

Operation mode	MAN control	Operation at MAN speed	0.1 to 100.0% (1 to 360spm)
		Feedback control	0.1 to 999.9mL/min 0.001 to 59.994L/H 0.001 to 15.828GPH
	EXT control	ANA.R (analogue rigid)	4-20, 20-4, 0-20, 20-0mA (proportional operation with stroke rate)
		ANA.V (analogue variable)	2 point setting (Analogue input 0 to 20mA, flow rate or stroke rate)
		BATCH (batch operation)	0.1 to 99999.9mL 0.001 to 99.999L 0.001 to 26.385G
		PLS (pulse operation)	2 point setting (Pulse input 0-500Hz, flow rate or stroke rate)Note1
Display	LCD		14×5 backlit LCDNote2 indicates operating conditions, a flow rate and units.
	LED	ON Green/Orange ×1	Lights orange as powered on. Blinks green while ready for operation
		STOP Red/Orange ×1	Lights red at STOP signal input, Lights orange at Pre-STOP signal input
		OUT Red ×1	Flashes at each output
Keypad	5 keys		START/STOP, EXT, ▲, ▼, Disp
Control function	STOP/Pre-STOP		Pump keeps running during Pre-STOP signal input, Operation stop at STOP signal inputNote3
	PRIME		Max spm operation by pressing ▲and▼ keys
	Key lock		Keypad lock and release
	Inter lock		Operation stop at contact inputNote3
	Buffer		BATCH Buffer on/off, Accumulated to the maximum volume at each rate
	Upper limitNote4		Stroke rate 100.0% (360spm) fixed rate
Input	Buffer pulseNote5		Dry contact or open collectorNote6
	Analogue		0 to 20 mADC (input resistance 220Ω)
	STOP/Pre-STOP (level sensor)		Dry contact or open collectorNote6
	AUX		Dry contact or open collectorNote6
	Interlock		Dry contact or open collectorNote6
	Batch Start/Stop		Dry contact or open collectorNote6
	Pulse		Dry contact or open collectorNote6
Output	OUT1		Dry contact (mechanical relay) 250VAC at 3A (resistance load), Enable or disable the alarms of STOP, Pre-STOP, Interlock, Batch, Out of measurement and Poor flow (Factory default: STOP)
	OUT2		Dry contact (photoMOS) 24 VAC/DC at 0.1A, Enable or disable the alarms of STOP, Pre-STOP, Interlock, Batch, Out of measurement and Poor flow or Synchronous output (sensor/pump) Note7 (Factory default: OFF)
	Analogue		4 to 20mADC (The max load resistance is 500Ω)
Buffer memory			Nonvolatile memory
Power voltageNote8			100 to 240VAC 50/60Hz

Note1: The maximum frequency of the input pulse is 500Hz (Duty 50:50).
Note2: A push of any keypad lightens the backlit LCD. The LCD stops lightening 1 minute after the last key operation.
Note3: Operation resumption at contact input is also programmable.
Note4: The pump can not run over the upper limit even if set to run beyond that speed in an EXT mode.
Note5: The maximum frequency of the input pulse is 100Hz (Duty 50:50).
Note6: The maximum applied voltage is 12V at 2.3mA.
The minimum application load should be 1mA or below when using a relay.
Note7: Output can be programmed to open or colse with Alarm.
Note8: Observe the allowable voltage of 90 to 264VAC. Otherwise failure may result.

Specifications of pump

Model		ESU-B11	ESU-B16	ESU-B21	ESU-C16	ESU-C21
Max. discharge capacity	mL/min	30	55	85	65	110
	L/H	1.8	3.3	5.1	3.9	6.6
	mL/shot	0.04 - 0.08	0.08 - 0.15	0.12 - 0.24	0.07 - 0.18	0.12 - 0.31
Max. discharge pressure	MPa	1.0	0.7	0.4	1.0	0.7
Stroke length	%(mm)	50 - 100 (0.5 - 1.0)			40 - 100 (0.5 - 1.25)	
Stroke rate	%(spm)	0.1 - 100 (1 - 360)				
connection size (ID×OD)	mm	Ø4×Ø9, Ø4×Ø6, Ø6×Ø8				
Average current	A	0.8			1.2	
Average power consumption	W	20			24	

- Each discharge capacity shown above is at the max. discharge pressure (100% stroke rate and length) and it increase as the discharge pressure reduces.
- The performance is based on pumping clean water at the rated ambient temperature and the rated voltage.
- Liquid temperature: 0 - 40°C (no viscosity change, non-freezing, or no slurry)

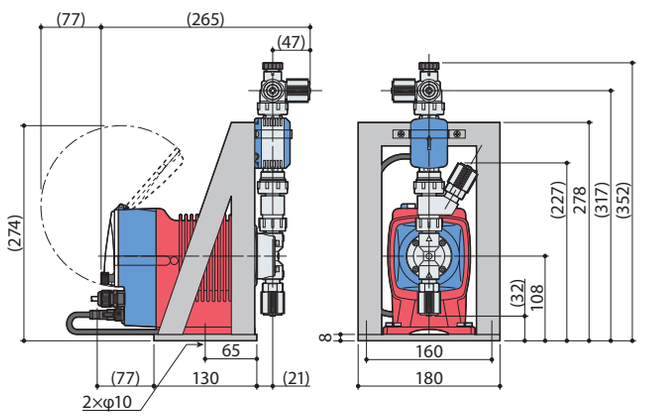
Specifications of flow sensor

Accuracy

Flow sensor model	Capacity	Accuracy
EFS-05-FT/FF/FH	Above 40mL/min	±5%RD
	Below 40mL/min	±2 mL/min

- Required conductivity: 1000mS/m or more

Dimension in mm



Accessories

Check valve

CBN type

Hose extension fittings

HJ type

- Install a CBN type check valve (sold separately) in the middle of the pipe when the discharge pipe is used with a length of 3m or more.

Cable for DIN connector (5m)

① External control signal cable (For EXT operation terminal)
② STOP signal cable (For STOP terminal and AUX terminal)
③ Output signal cable (For output terminal)

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

Actual pumps may differ from the photos. Specifications and dimensions are subject to change without prior notice. For further details please contact us.

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