

Electromagnetic Diaphragm Metering Pump E Series — Installation, Operation & Maintenance Manual

Dosing pumps for RO antiscalant, biocide, pH correction and CIP chemical feed

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Applies to: E-series electromagnetic metering pumps (single head, 0.5–11 L/h, up to 1.5 bar)

Supplied by Rong Water (Shenzhen Qiukanghong Technology Co., Ltd. — manufacturer, est. 2012)

This manual covers unpacking, installation, commissioning, daily operation and maintenance of the E-series electromagnetic diaphragm metering pump. Read it completely before installing or servicing the pump. Keep it with the equipment for the life of the installation.

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1. Safety precautions

Before any work on the pump: depressurise the suction and discharge lines and drain and flush the pump head. Chemical remaining in the head can be ejected when a fitting is loosened.

1.1 Qualified personnel

Only trained personnel may adjust, service or repair the metering pump. Untrained or unauthorised persons must not operate it.

1.2 Protective equipment

Wear the protective equipment required by the dosing chemical when working on or near the pump. Read the chemical supplier's Safety Data Sheet (MSDS) and follow its precautions — eye protection, chemical-resistant gloves and, where required, a face shield and apron.

1.3 Ventilation

When dosing toxic or volatile liquids, the surrounding air can change composition. Ventilate the pump room and, where required, route the degassing/bleed line to a safe discharge point.

1.4 Fittings and threads

Hand-tighten all connections. Over-tightening or the use of pipe wrenches can damage the fittings or the pump head. PTFE tape, where used, belongs on the pipe thread only — never on the sealing face and never on the valve seats.

Before start-up, confirm that every tube is firmly seated on its fitting. Check the tubing regularly for cracks and replace it when needed.

1.5 Electrical connection

To reduce the risk of electric shock, connect the pump only to a supply that matches its electrical data and that is properly earthed, in accordance with local electrical codes. Isolate the supply before opening the terminal cover.

2. Product overview and structure

The E series is an electromagnetic (solenoid-driven) diaphragm metering pump. A solenoid drives a PTFE diaphragm; each stroke displaces a fixed volume, so the delivered flow is set by stroke rate and stroke length rather than by system pressure. This makes the pump suitable for accurate, repeatable dosing of antiscalant, biocide and pH-correction chemicals on RO and purified-water systems.

2.1 Main assemblies

Assembly	Function
Solenoid drive	Converts the electrical pulse into a linear stroke; the stroke rate sets the dosing frequency.
Diaphragm	PTFE-faced diaphragm; hermetically separates the drive from the chemical. A diaphragm failure is the only wear item that can leak.
Pump head	PVC or PVDF (stainless steel on request). Contains suction and discharge valve seats.
Valves	Spring-loaded ceramic/glass ball check valves — one on suction, one on discharge. They set the dosing direction.
Control panel	4-digit display, START/STOP key and UP/DOWN keys: stroke rate, operating mode and (on pulse models) external signal scaling.
Foot valve / injection valve	Accessories: foot valve with level switch in the tank; injection valve with back-pressure spring at the injection point.

2.2 Operating modes

- **Manual** — stroke rate set from the keypad, expressed in percent of maximum flow.
- **Pulse (external)** — one stroke per external pulse, with multiply/divide scaling (e.g. from a water meter or flow transmitter).
- **4–20 mA (optional)** — flow proportional to an analogue signal from a controller or analyser.

3. Technical data

Parameter	Value
Type	Electromagnetic diaphragm metering pump, single head
Flow range	0.5 – 11 L/h (model dependent)
Turndown ratio	1 : 100
Max. discharge pressure	1.5 bar (0.15 MPa) standard range; higher-pressure variants on request
Max. stroke rate	180 strokes/min
Power supply	220–240 V / 50 Hz (110 V / 60 Hz on request)
Power consumption	24 W (typical, at rated flow)

Wetted materials	Pump head: PVC or PVDF · Diaphragm: PTFE-faced · Valves: ceramic / glass
Connections	Hose barb for 4×6 mm or 6×8 mm tubing; threaded G1/2 on request
Control	Keypad, 4-digit display; external pulse input standard on pulse models; 4–20 mA optional
Enclosure protection	IP65 (indoor use, splash-proof)
Ambient temperature	5 – 40 °C
Chemical temperature	0 – 40 °C (PVC head) / 0 – 60 °C (PVDF head)
Viscosity	up to 200 mPa·s (higher with suction-side assistance)

Which figures apply to your unit? Flow and pressure depend on the head/valve combination ordered. The nameplate on the pump and the datasheet issued with your order are authoritative — use the values on the nameplate for calibration, not the ranges above.

3.1 Nameplate (example)

Field	Reading
Type	E0211AA1
Flow	11 L/h
Pressure	1.5 bar
Power	220 V / 50 Hz · 24 W
Serial number	Stamped per unit — quote it in all spare-parts enquiries

4. Installation

4.1 Location

- Mount the pump horizontally on a rigid bracket or tank lid, with the control panel accessible and readable.
- Keep the pump below the liquid level of the dosing tank (flooded suction) wherever possible — this is the single biggest factor in reliable dosing.
- Protect the pump from direct sunlight, rain and washdown spray; ambient 5–40 °C.
- Leave 100 mm clear around the pump head for service.

4.2 Suction line

- Keep it as short and as straight as possible; avoid loops that can trap air.
- Fit a foot valve with a level switch so the pump stops before the tank runs dry.
- Install the suction line with a slight rise towards the pump — no high points where gas can collect.

4.3 Discharge line

- Route the discharge into the main line at a point of stable pressure, ideally on the suction side of the RO booster pump or into the feed tank with mixing.
- Fit an injection valve (with back-pressure spring) at the injection point, and a pulsation dampener on long lines.
- Install a pressure-relief or bleed valve so the discharge line can be depressurised before service.
- Never install a shut-off valve between the pump and the injection point that can be closed while the pump runs.

4.4 Electrical

- Connect to a supply matching the nameplate; earth the pump.
- For pulse control, use screened cable for the external signal and keep it away from motor and VFD cables.
- Provide a means of isolation (switch or breaker) adjacent to the pump.

5. Commissioning and calibration

1. **Flush and prime.** With the discharge line open to drain, run the pump at 100 % until chemical appears at the discharge — normally under a minute at flooded suction.
2. **Set the operating mode** (manual / pulse / 4–20 mA) from the keypad and confirm the display shows the expected value.
3. **Calibrate by volume** — the only reliable method:
 - Draw suction from a graduated container of known volume (e.g. 1,000 mL).
 - Run for a measured time at the intended setting (e.g. 10 min).
 - $\text{Flow (L/h)} = \text{volume drawn (L)} \times 60 \div \text{time (min)}$.
 - Adjust the stroke rate until the measured flow matches the dose required, and record the setting on the commissioning sheet.
4. **Record** the setting, the chemical, the dose (ppm) and the calibration date; re-calibrate whenever the chemical or the duty point changes.

Dosing-rate check for RO antiscalant: $\text{dose (L/h)} = \text{feed flow (m}^3\text{/h)} \times \text{dose rate (ppm)} \div \text{concentrate factor}$.
Confirm the figure against the antiscalant supplier's recommendation for your water chemistry before start-up.

6. Daily operation

- Check that the pump is stroking (audible/visible pulse) and that the display matches the set value.
- Check the dosing tank level and the foot-valve strainer weekly.
- Watch for air in the suction line — repeated loss of prime usually means a worn foot valve or a loose fitting.
- Log the tank consumption against the theoretical dose; a sudden change is the earliest warning of a diaphragm or valve problem.

7. Maintenance and spare parts

Item	Interval	Action
Fittings and tubing	Monthly	Check for weeping, hardening or cracks; replace tubing annually as a minimum.
Foot valve / strainer	Monthly	Clean; replace if the ball no longer seals.
Valve assemblies	6–12 months	Clean or replace suction and discharge valve cartridges.
Diaphragm	12 months, or on leak	Replace as a set with the diaphragm support washer.
Calibration	6 months	Re-check by volume; adjust the setting if flow has drifted more than 5 %.

Diaphragm replacement: isolate and depressurise, drain and flush the head, then remove the head bolts evenly. Do not prise the head. Fit the new diaphragm without grease or oil on the PTFE face, re-tighten the bolts diagonally in stages, and re-prime before returning the pump to service.

7.1 Recommended spares to hold

- Diaphragm kit (diaphragm + support washer)
- Suction and discharge valve cartridge set
- Foot valve with strainer; 2 m of suction/discharge tubing
- Set of head O-rings

Quote the pump type and serial number from the nameplate with every spare-parts order.

8. Troubleshooting

Symptom	Likely cause	Remedy
Pump runs but no flow	Air in the suction line; foot valve stuck; valves fitted the wrong way round	Re-prime; clean or replace the foot valve; check valve orientation

Flow lower than set	Clogged suction strainer; worn valves; cavitation at high stroke rate	Clean the strainer; replace valve cartridges; reduce stroke rate or raise suction head
Flow fluctuates	Gas coming out of the chemical; pulsation on a long discharge line	Degas the tank; fit a pulsation dampener; shorten/re-route the discharge line
Leak at the head	Diaphragm failure; loose head bolts; damaged O-ring	Replace the diaphragm kit; re-torque diagonally; replace O-rings
No display / no stroke	No supply; fuse blown; control board fault	Check supply and earthing; replace fuse; contact service
Pump strokes continuously in pulse mode	Excessive pulse frequency or wrong scaling	Set the multiply/divide factor correctly; screen the signal cable

9. Ordering information and support

When ordering a pump, spare kit or a replacement head, please state:

1. Pump type and serial number (nameplate)
2. Chemical being dosed, its concentration and temperature
3. Required flow (L/h) and discharge pressure (bar)
4. Control mode required — manual, pulse or 4–20 mA

Rong Water · Parts & Consumables

Supplied by Rong Water (Shenzhen Qiukanghong Technology Co., Ltd., est. 2012 — our own factory).

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RW-DP-E-EN Rev 1.0 · This manual describes standard E-series electromagnetic metering pumps as supplied by Rong Water. Specifications are confirmed per unit on the nameplate and the order datasheet. Rong Water reserves the right to change construction details without notice.