

FSA

FILTER SYSTEMS AUSTRALIA

Industrial Reverse Osmosis Water Filter

System – 1500 GPD – 5,650L/Day

GT1-99 – LSRO-1500G



Table of Contents

Chapter One – Safety Precautions	3
I. Important Warnings.....	3
II. Electricity Warning	3
III. Chemical Cleaning & Handling	3
Equipment Specification	3
I. System Specification	3
II. Feed Water Conditions	4
III. Water Output Operating Data	4
IV. Drain Water Operating Data.....	4
V. Operating Pressure & Pressure Difference.....	4
VI. System Design Foundation	4
Chapter Two – Installation Precautions.....	5
I. Connecting Feed Water Pipes.....	5
II. Connecting Drain Water Pipes	5
III. Connecting Wires.....	5
IV. Trial Operation Check	5
V. Trial Operation Notice	5
VI. Checking Procedure after Start-Up.....	5
Chapter Three – RO Shut-Off Preparation	6
I. Short Term Shut-Off – One Week	6
II. Long Term Shut-Off – Over One Week	6
Chapter Four – Control Panel Instruction	6
I. Control Button Instruction	6
Chapter Five – RO System Instruction LSRO-1500G	7
I. RO System Procedures.....	7
(1) Preparation Before Operation.....	7
(2) Manual Operation Mode	7
II. RO System Medicament Procedure	7
(1) RO Medicament.....	7
(2) RO Chemical Flushing	8
Chapter Six – Equipment Maintenance	8
I. RO Equipment Maintenance.....	8
II. Replacement Cartridges & Consumables.....	9
III. System Spare Parts.....	9
Chapter Seven - Troubleshooting	10

Chapter One – Safety Precautions

I. Important Warnings

For the correct operation of this appliance, it is essential to observe and adhere to the manufacturer's instructions.

This system is designed to be mounted on a solid base in a vertical position.

All electrical wiring and installation must be done by a qualified electrician and adhere to Australian Electrical Standards.

Failure to follow the manufacturer's instructions may result in personal injury or death and may cause property damage. This may void warranty and insurance.

II. Electricity Warning

1. The system will require earthing when it is hardwired into power. This must be done by a qualified electrician.
2. The systems electrical components must be protected from coming into contact with water. If the electrical components come into contact with water, it may cause a short circuit and may result in electric shock.
3. Please contact the manufacturer if any components are to be modified, disassembled or repaired. FSA is not liable for any property or personal damage sustained during modifications, disassemble or repair if not first notified and confirmed.
4. During all works on the unit, the power must be turned off to the system. The system will require 2 people to operate for safety.

III. Chemical Cleaning & Handling

1. If chemicals come into contact with skin, refer to the MSDS of the specific chemical to treat correctly.
2. Use Safety Glasses, Chemical Resistant Gloves and other required PPE when handling chemicals as per the MSDS.
3. Ensure that chemicals are not mixed unless a qualified person is handling the chemicals.

Equipment Specification

I. System Specification

Manufacturer:	Lan Shan
Part Number:	LSRO-1500G
FSA Part Number:	GT1-99
Water Production:	0.25m ³ /Hr (4.15L/Min)
Recovery %:	50%
Membrane Housing:	4040*1 (SUS304)
RO Membrane:	TFC 4040*1
High Pressure Pump:	1Hp Pump + PROCON 2507X Pump
High Pressure Pipe:	KAI TAI Pipe & High Pressure Nylon Tube
Low Pressure Pipe:	US Regular SCH80 PVC Pipe
Control Device:	IC Box
Water Quality Meter:	PPM Digital
Flow Rate Meter:	Area Instantaneous flow metre *2
Solenoid Valve:	Inlet + Flush ½" NPT
Pre-Filter:	5uM 20" x 2.5" PP Filter*1
Frame Material:	SUS304

Function:	1. Automatic Flushing Device 2. Low Pressure Water Protection 3. Operating Pressure Adjustment 4. Automatic Shut-off when Closed Circuit 5. Pump set with protecting device 6. Automatic Control 7. Water quality detecting system with indication lights 8. Back-Flow adjust device & Pump outlet water Adjust
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II. Feed Water Conditions

Turbidity:	< 4 NTU
SDI:	< 5
Temperature:	< 30°C
Chlorine:	< 0.3 mg/L
Iron:	< 0.2 mg/L
Manganese:	< 0.1 mg/L
Hardness:	< 150 mg/L
TDS:	< 500 mg/L
Silicon:	< 10 mg/L
Feed Pressure:	> 25 psi

III. Water Output Operating Data

Water Production:	~ 4.15L/Min*
	* Based on inlet water meeting required specifications
Rejection Rate:	> 96%*
	* Rejection Rate = (Feed Water + Output Water) / Feed Water x100%

IV. Drain Water Operating Data

Drain Water Production:	~ 4L/Min
Recovery Rate:	~ 50%

V. Operating Pressure & Pressure Difference

Membrane Testing Pressure:	225 psi
Highest Pressure Difference:	20 psi
Operating pressure is subject to pure water flow	

VI. System Design Foundation

- Feed Water should remain constant at 25°C
- Feed Water quality must not exceed system specifications
- Feed Water must not have chlorine > 0.3 mg/L
- Using water outside the systems design may not provide the desired water quality. Running the system outside of the manufacturer's instructions may damage the RO system.

Chapter Two – Installation Precautions

I. Connecting Feed Water Pipes

It is recommended that the system is plumbed directly into the water to avoid any pressure or flow loss to the system as a result of another appliance drawing water. Low flow rate water may run the pump dry and cause damage, this also may cause frequent system shut off.

It is recommended to maintain ½" pipes and connections to avoid any reduction or fluctuation in feed water conditions.

Pipelines should stay parallel to prevent air inside the pipes. Air pockets may damage the pumps and RO system.

II. Connecting Drain Water Pipes

Ideal Drain Water Lines need to stay parallel and the end pipe should always remain open to prevent back pressure in the system.

Drain Water Lines should be equipped with an anti-siphon device to prevent pipe and device damage.

III. Connecting Wires

Electrical equipment installation must conform to Australian Regulations, the unit will require earthing as part of this process. All electrical installations must be conducted by a qualified electrician.

Ensure that the voltage and electric current is correct while testing.

IV. Trial Operation Check

- Ensure that the voltage is correct
- Make sure all connections are installed correctly in accordance with Australian Electrical Regulations.
- Check the pump direction.
- Make sure all valves are installed correctly and in the correct position.
- Pre-soak and flush the pre-filter cartridges before use.

V. Trial Operation Notice

- Pre-filter equipment and pipes need to be cleansed before equipment start-up to prevent RO membrane from contamination.
- Use Low Pressure and Low Flow to eliminate air in the system.
- Adjust the water output, drain water output and recycled water output to original settings. Make sure the system operating pressure is not exceeding specifications.
- New RO membranes should be washed for 1-2 hours by low pressure water, then soaked in pure water for 8 hours. Do not use anti-scalants while washing.
- Run the system to ensure the correct outlet water quality is being achieved before using the water.
- Use manual mode on the system for the initial use. You can switch to automatic mode once the system has stabilised.

VI. Checking Procedure after Start-Up

1. Check the pipes for leaks/
2. Check the electrical circuit is correct (using an electrician)

Chapter Three – RO Shut-Off Preparation

I. Short Term Shut-Off – One Week

1. Flush membrane using collected pure water into the flush inlet
2. Turn off the power
3. Turn off the valves
4. Repeat steps every 24 hours to prevent bacteria growth

II. Long Term Shut-Off – Over One Week

1. Flush membrane using collected pure water into the flush inlet
2. Dip RO membrane with 1% food grade sodium bisulfite to prevent bacteria growth (pH should not be below 3)
3. Preservation Liquid should be checked every 3 months. Change the liquid if it becomes turbid or 6 months elapse.
4. RO Membrane will require the standard cleansing before re-installation. Run the system until the outlet water quality stabilises.

Chapter Four – Control Panel Instruction

I. Control Button Instruction

- No Fuse Breaker (Main Switch, Control Power, Pump Power)

Off: Power Off

On: Power On

- Button

* Power Button (Red): Press Down to turn on control power

- Switch Button

* Cam Switch

On: Automatic Controlled by System

Off: Forced Stop

- Light Indication Instruction

Green Light: Normal

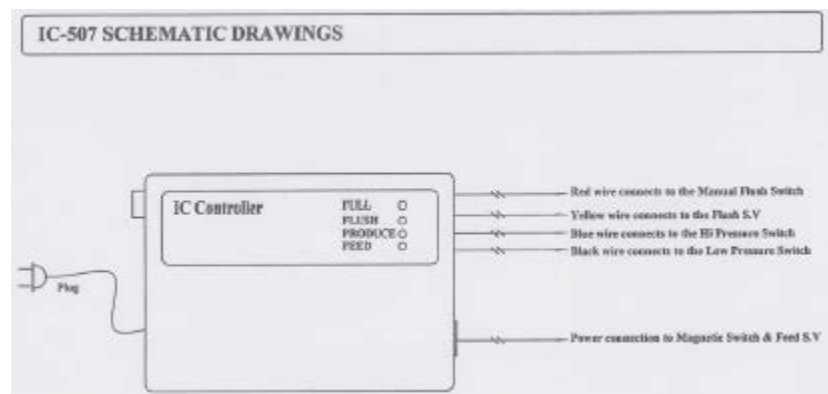
(Full Water, Water Source etc...)

Red Light: Abnormal

(Production Water etc...)

Yellow Light: Warning

(Flushing etc...)



Programming Function

30 Second Delay programming after “Power” Turns on & Before proceeding to next steps

30 Second Flushing after “Start” Begins → Activate “Produce”

After 1.5 Hour continuous operation it will trigger a 30 second flush → Resumes “Produce”

30 Second Flushing when water is at “Full” level → Full Level

Without Feed Water → Re-Activate “Produce”

30 Second Flushing when not in use for over 24 hours

	FEED	PRODUCE	FLUSH	FULL
START-DELAY	ON	OFF	OFF	OFFQ
PRODUCING FLUSHING	ON	ON	ON	OFF
PRODUCE	ON	ON	OFF	OFF
FULL FLUSHING	ON	ON	ON	ON
FULL	ON	OFF	OFF	ON
WITHOUT WATER	FLASH	OFF	OFF	OFF

Chapter Five – RO System Instruction LSRO-1500G

I. RO System Procedures

(1) Preparation Before Operation

- Turn on Feed Water, high pressure pump inlet valves and pure water output valves
- Half open recycling water valves and pressure adjustment valve & adjust water output and pressure after machine starts.
- Press down the power button to execute automatic operation.

(2) Manual Operation Mode

NOTE: Manual operation mode is not under any protection, please use this mode carefully. Manual mode should be operated by no less than 2 qualified persons. Monitor pump and inlet water.

- Manual Flushing Method 1: Switch the flushing button to manual and press down the power button to execute the manual operation.
- Manual Flushing Method 2: Switch the flushing button to automatic & press down the power button to execute the automatic operation.

II. RO System Medicament Procedure

(1) RO Medicament

- Record All data and concoct chemicals
- Switch the power control button to the off position
- Turn off the feed water inlet valves, pure water outlet valves and drain water output valves
- Open chemical wash inlet valves and chemical wash outlet valves to let chemical go into the chemical wash tank.
- Make sure all switched and buttons are in correct position and turn on the high-pressure pump (activate pump after eliminating the air)
- Wash RO membrane for 30 minutes

- Observe the drain water colour and note any precipitates or turbidity. Repeat process if further flushing is required to clean RO membrane. 30 minutes of dipping in solution then a further 30 minutes flushing.
- Ensure that the water temperature is below 35°C. If the temperature is above this, shut off the machine immediately to prevent damage to RO membrane. Restart when temperature is reduced.

(2) RO Chemical Flushing

- Proceed to chemical flushing process after chemical flushing RO system has finished.
- Turn off Chemical Flushing Inlet & Outlet Valve. Turn on Drain Water Valves. Keep other valves in chemical flushing status.
- Enter manual flushing status and flush the membrane housing until all remaining chemicals are flushed away.
- After flushing has completed, turn on pure water output valves & turn off drain output valves. Adjust all buttons and switched to normal water production position.

Chapter Six – Equipment Maintenance

I. RO Equipment Maintenance

Function Introduction

Reverse Osmosis Water Filtration is one of the most effective water filtration methods in current technology. The method of using high pressure and semi-permeable membranes to separate solvent and solute has been applied broadly to separation and condensation in every type of liquid.

Generally, RO systems can have above 99.99% Rejection Rate of organics. For minerals, RO systems usually remove between 94% – 98%.

RO Systems require adequate pre-filtration to maintain the product life of the membrane which is an expensive and sensitive filter. Pre-filtration must remove chlorine, Reduce SDI, Reduce Turbidity, Hardness, and other impurities that may affect the life of an RO membrane.

Precautions

All users must adhere to the manufacturer's instructions and maintain the original design setting of the RO system. Users can use water production quality as a primary index which can be used to evaluate the effectiveness of the RO membrane and its current life span. Variable conditions such as feed water pressure, Water flow, Output Pressure, SDI, Temperature and condensation ratio will all directly affect the water output volume and quality.

During adjustment processes, users have to confirm output flow firstly, increase or decrease the water temperature to the optimal 25°C to maintain constant water flow through RO membrane.

Pre-filter Replacement Time

Replace filters every 3 months or when differential pressure is up 1Kg/cm², or insufficient water flow.

RO Membrane Replacement Time

Replace when rejection rate < 90% OR Water production quality or volume is below standard OR if medicament flushing does not rectify pure water quality.

Medicament Cleaning Time

When Water Production decreases by 10% or more

Feed Water and Concentrated water differential pressure increases by 15%

Rejection Rate decreases by 5% or more

Chemical Detergent

Inorganic:

- Citric Acid: 0.8Kg added to 20L of pure water
- Hydrochloric Acid: 0.2% HCL Solution 20L

Organic:

- Sodium Hydroxide: 0.1% Solution 20L

Chemical Cleansing Notes

All types of chemical cleaning materials must comply with recognised safety operation procedures and wastewater discharge legislation.

Chemical cleansing detergent should use Pure RO water as a dissolvent. Make sure the chemical cleansing detergent is totally dissolved with the RO water before cleansing.

pH Value should be pH 2-11 and the temperature should not be over 35°C during chemical cleaning.

II. Replacement Cartridges & Consumables

Filter 1:	GT2-47-5K - 5uM Polypropylene Spun Sediment Filter 20" x 2.5"
Filter 2:	GT4-10P – 5uM Coconut Carbon Block Filter 20" x 2.5"
Filter 3:	BW30-4040 – Brackish Water Reverse Osmosis Membrane 4040

III. System Spare Parts

Filtration Controller Head	AQT-56F, 1" 220V
Softener Controller Head	AQT-56S, 1" 220V
RO Water Meter	HW-321
RO IC Controller	IC-507
RO High Pressure Pump	PROCON 2507X
RO Pump	1Hp, 1" 230V/50Hz
Back Mount Pressure Gauge	0-6Kg & 0-20Kg

Chapter Seven - Troubleshooting

Problem	Items Inspected	Solution
Low product Flow rate	(a) Check operating pressure according to R.O membrane manufacturer's recommendation. (b) Feed temperature is lower than 25 °C.	(a) -Normal operating pressure : R.O Membrane block. Replace or chemical clean the R.O membrane. Adjust the recovery rate adequately to meet the requirement. -Abnormal operating pressure: Adjust the recycle valve and the pressure regulator until desired flow is achieved. Adjust the recovery rate. (b) Raise feed temperature 25°C and increase operating pressure.
Low inlet pressure	(a) Ensure feed ball valve is fully opened. (b) Check pre-filter(s) whether block need to replace. (c) Ensure feed booster pump is running.	(a) Open the feed ball valve fully. (b) If block then replace filters. (c) Turn on the feed booster pump.
Low operating pressure	(a) Check feed pressure is regular (1~3kgs/cm²). (b) Check inlet solenoid valve whether malfunction cannot work or low feed flow. (c) Return valve is too open or not. (d) Flush electric valve is malfunctioning or not or manually flushing. (e) Waste water discharge is too large.	(a) Increase inlet water pressure. (b) Replace the electric valve. (c) Adjust return valve properly. (d) Replace the S.V. or switch off the manual-flush switch. (e) Adjust waste water.
Motor dysfunction	(a) Check the electromagnetic switch protection whether without connect. (b) Motor without electric current. (c) Check Motor leakage.	(a) Reset the solenoid protection switch or replace the solenoid protection switch. (b) Check if there is a drop of wire, if any, return it back. (c) Check for poor wiring, bare wire or water leakage or poor internal motor insulation.