



# NATIONAL PRIDE EQUIPMENT REVERSE OSMOSIS SYSTEM USER'S MANUAL



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NPE RO SYSTEM

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# INTRODUCTION

This User's Manual outlines installation, operation, maintenance and troubleshooting details vital to the sustained performance of your system.

The test results which are included with this User's Manual indicate your system's permeate and concentrate test results.

If your system is altered at the site of operation or if the feed water conditions change, contact NPE to determine the proper recovery for your application.

NOTE: IN ORDER TO MAINTAIN THE MANUFACTURER WARRANTY, AN OPERATING LOG MUST BE MAINTAINED AND COPIES WILL NEED TO BE SENT TO NATIONAL PRIDE EQUIPMENT FOR REVIEW.

NOTE: PRIOR TO OPERATING OR SERVICING THE RO SYSTEM UNIT, THIS USER'S MANUAL MUST BE READ AND FULLY UNDERSTOOD.

NOTE: IT IS UNSAFE TO OPERATE OR SERVICE THIS DEVICE WITHOUT FIRST READING AND UNDERSTANDING THE ENTIRE USER'S MANUAL. KEEP THIS MANUAL AND OTHER ASSOCIATED DOCUMENTATION FOR FUTURE REFERENCE.

## SAFETY

This Safety section of this User's Manual outlines the various safety headings used throughout this manual's text and are enhanced and defined below:

NOTE: INDICATES STATEMENTS THAT PROVIDE FURTHER INFORMATION AND CLARIFICATION.

CAUTION: INDICATES STATEMENTS THAT ARE USED TO IDENTIFY CONDITIONS OR PRACTICES THAT COULD RESULT IN EQUIPMENT OR ANY TYPE OF PROPERTY DAMAGE.

WARNING: INDICATES STATEMENTS THAT ARE USED TO IDENTIFY CONDITIONS OR PRACTICES THAT COULD RESULT IN INJURY OR LOSS OF LIFE. FAILURE TO FOLLOW WARNINGS COULD RESULT IN SERIOUS INJURY OR EVEN DEATH.

WARNING: DO NOT REMOVE ANY CAUTION, WARNING, OR OTHER DESCRIPTIVE LABELS FROM THE EQUIPMENT.

WARNING: DO NOT REMOVE ANY PAGES FROM THE SUPPLIED READING MANUALS OR OTHER INFORMATIONAL DOCUMENTS.

# SAFETY

WARNING: EYE PROTECTION SHOULD BE WORN AT ALL TIMES WHEN OPERATING THE RO SYSTEM AS UNIT HAS HIGH PRESSURE WATER LINES AND MEMBRANE HOUSINGS WHICH MAY LEAK IF FITTINGS LOOSEN OVER TIME.

WARNING: UNIT INSTALLATION MUST ADHERE TO ALL LOCAL ELECTRICAL AND PLUMBING CODES.

WARNING: ALL MAINTENANCE AND REPAIR ACTIONS ARE TO BE PERFORMED BY MAINTENANCE PERSONNEL WHO HAVE BEEN TRAINED AND FULLY READ THE DOCUMENTATION FOR ALL SYSTEM INFORMATION.

CAUTION: TO AVOID ANY ELECTRICAL SHOCK HAZARD, DO NOT OPERATE THIS DEVICE WHEN COVERS OR CONTROLLER ENCLOSURE IS OPENED.

CAUTION: ALL ELECTRICAL POWER MUST BE TURNED OFF AND THE LOCK OUT PROCEDURE MUST BE UTILIZED TO ENSURE ALL POWER IS SHUT OFF PRIOR TO SERVICING OR PERFORMING SYSTEM MAINTENANCE TO ANY PORTION OF THE EQUIPMENT.

CAUTION: DO NOT OPERATE THIS DEVICE IN AN EXPLOSIVE ENVIRONMENT OR IN THE PRESENCE OF FLAMMABLE MATERIALS.

WARNING: MOVEMENT OR VIBRATIONS DURING SHIPMENTS MAY CAUSE CONNECTIONS TO LOOSEN. PLEASE CHECK ALL CONNECTIONS PRIOR TO TURNING ON THE POWER.

WARNING: DO NOT OPERATE THIS UNIT IN ENVIRONMENTS WHERE TEMPERATURES MAY BE BELOW 40 DEGREES F OR ABOVE 90 DEGREES F.

WARNING: IMPROPER WATER FLOW, WATER PRE-TREATMENT, MISUSE OR IMPROPER OPERATION OF THIS DEVICE WILL VOID THE MANUFACTURER'S WARRANTY.

**CAUTION: FAILURE TO FOLLOW ALL INSTRUCTIONS MAY RESULT IN DAMAGE TO EQUIPMENT OR PERSONAL INJURY.**

## OPERATING LIMITS

Minimum Feed Temperature	85	Maximum Free Chlorine PPM	0
Maximum Feed Temperature	40	Maximum TDS PPM	1000
Minimum Ambient Temperature	120	Maximum Hardness	0
Maximum Ambient Temperature	40	Minimum pH (Continuous)	11
Minimum Feed Pressure	85	Maximum pH (Continuous)	5
Maximum Feed Pressure	45	Minimum pH (Cleaning 30 Min)	12
Maximum Operating Pressure	120	Maximum pH (Cleaning 30 Min)	2
Maximum SDI Rating SDI	<3		
Maximum Turbidity NTU	1		

# SYSTEM LOG INFORMATION

## FACTORY DATA

Date Manufactured \_\_\_\_\_

Pump Model Number \_\_\_\_\_

RO Model Number \_\_\_\_\_

Pump Serial Number \_\_\_\_\_

RO Serial Number \_\_\_\_\_

## Factory Performance

Feed Water \_\_\_\_\_ PPM

Product Permeate \_\_\_\_\_ PPM

Product Rate \_\_\_\_\_ GPM

Drain Rate \_\_\_\_\_ PPM

Inlet Pressure \_\_\_\_\_ PSI

Pump Pressure \_\_\_\_\_ PSI

System Pressure \_\_\_\_\_ PSI

## Installation Data

Feed Water TDS \_\_\_\_\_ ppm TDS @ \_\_\_\_\_

Hardness \_\_\_\_\_

Iron \_\_\_\_\_

Misc. \_\_\_\_\_

Product TDS \_\_\_\_\_ ppm

% TDS Rejection \_\_\_\_\_

Product Rate \_\_\_\_\_ gpm

Drain Rate \_\_\_\_\_ gpm

Operating Pressure Pre-Membrane \_\_\_\_\_ psi

Tested By \_\_\_\_\_

Date \_\_\_\_\_

Approved By \_\_\_\_\_

Date \_\_\_\_\_



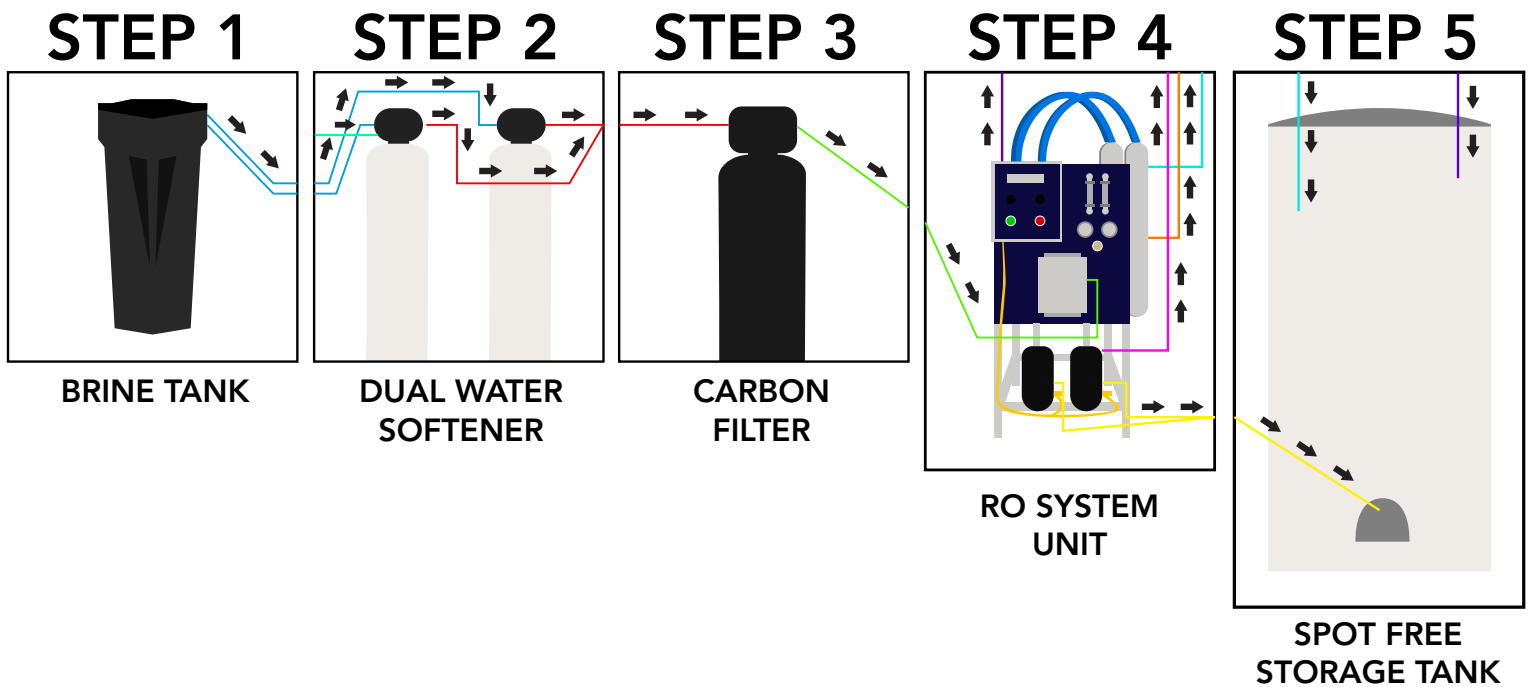
## SYSTEM OVERVIEW

National Pride Equipment has developed and manufactured a proprietary RO System to provide a spot free rinse for car wash applications.

This RO System has been engineered to allow for a long longevity of issue free operation and low life cycle cost for the operator. The system utilizes commercial low temperature (high efficiency) RO membranes which operate at low pressure. In addition, all the components (chlorine filter, sediment filter, pumps, etc.) have been selected to improve the system reliability, minimize energy use and reduce required maintenance.

Please review the entire Manual prior to installation, start-up, servicing or operating the RO System. This manual will include step by step instructions, general overview, replacement parts for the system and overall guidelines.

# RO SYSTEM LAYOUT



## RO SYSTEM PLUMBING LAYOUT KEY

### Step 1

Tubes go from the Brine Tank to the Dual Water Softener (Blue)

### Step 2

Fresh Water Supply into Dual Water Softeners (Green)

Tubes from the Brine Tank to the Dual Water Softeners (Blue)

Soft Water Discharge from Dual Water Softener to Carbon Filter (Red)

### Step 3

Soft Water Discharge from Dual Water Softener to Carbon Filter (Red)

Carbon Filter Flex Line from Carbon Filter to RO Unit (Green)

### Step 4

Carbon Filter Flex Line from Carbon Filter to RO Unit (Green)

Flex Line from RO Unit to the Spot Free Storage Tank (Blue)

Concentrate Saver Flex line to Sewage (Orange)

Spot Free Re-Pressure Line

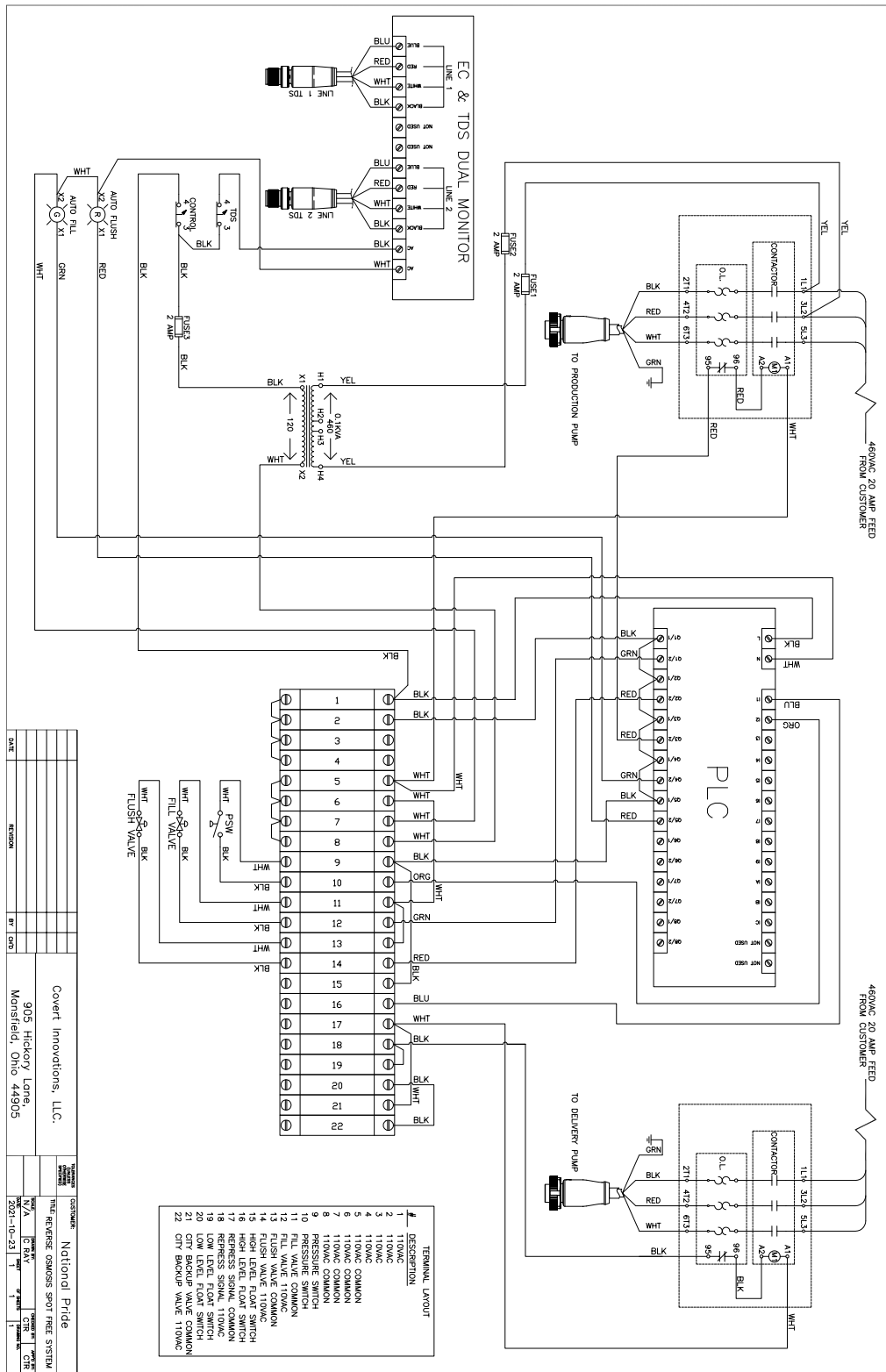
From Spot Free Pump Outlet to Rain Bar Solenoid Valves (Pink)

### Step 5

From Spot Free Re-Pressure Pump to Rain Bat Solenoid Valves. (Yellow)



# RO ELECTRICAL LAYOUT

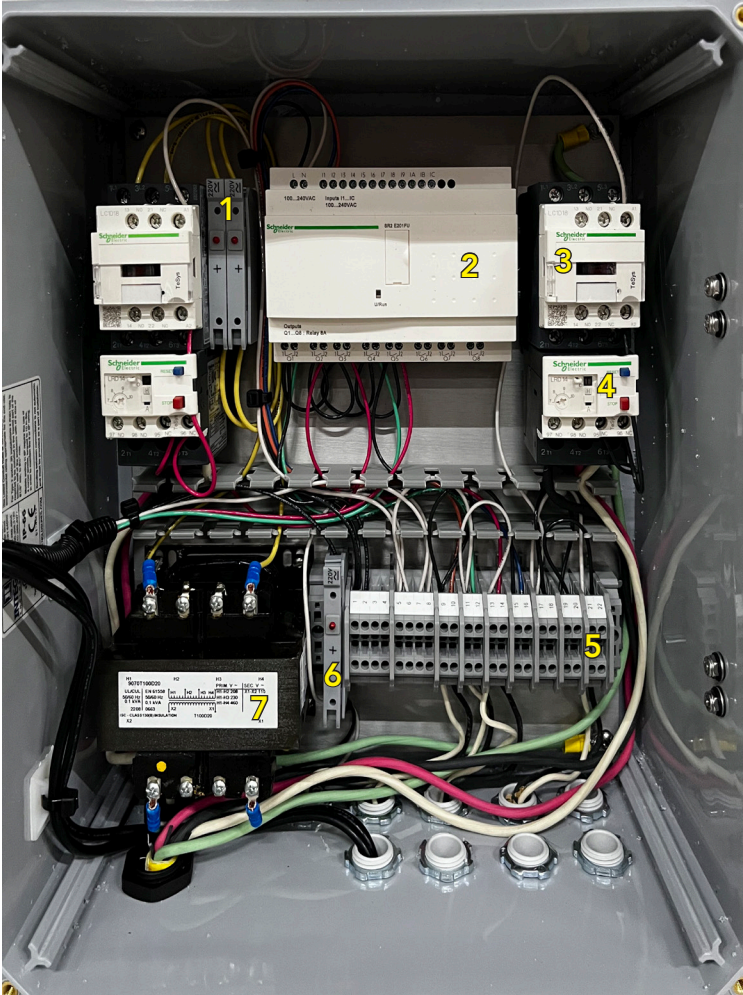


# SYSTEM LAYOUT



Product Name	Product ID
1. LED Light	IL-110-Red
2. LED Light	IL-110-Green
3. Toggle ON/OFF	XBSAD21
4. TDS Reader	HMDPSC-60D
5. Non Adjustable Flometer	F-44750LE-8
6. Adjustable Flometer	F-44750LA-8
7. 400 PSI Gauge	GL400RF
8. Membrane Housing	TW208419
9. Membrane Inside	TW30XLE-4040
10. 4" Conduit Clamp	NERCH900B

# SYSTEM LAYOUT



Product Name	Product ID
1. 2 AMP FUSE	AGAZ
2. Smart Relay	SR2E201FU
3. 120 VAC 18amp Contractor	LC1D18G7
4. Overload	LRD14
5. Terminal Blocks	3044076
6. 2AMP Fuse	AGAZ
7. Transformer	9070T100D20

# SYSTEM LAYOUT



Product Name	Product ID
1. Filter Housing	TW1502237BL
2. Sediment Filter	TWBB1005
3. Booster Pump	SRHP520H3-01
4. Fill Valve	ASC8238T410-120
5. Pressure Gauge	GNL100B
6. Pressure Gauge	GNL100B

# RO SYSTEM FEATURES

## SPOT FREE Production Unit

At National Pride, we are committed to bringing you premium grade equipment that is reliable, durable, and easy to operate.

Our saving space design helps units fit into tight or small pump rooms and range from 2,000 to 12,000 gallons per day. Each unit is thoroughly tested before shipment, ensuring that you receive a product of the highest quality.

## STANDARD FEATURES

- Stainless steel floor mount frame
- Built-in TDS meter
- 12" x 48" carbon tank
- Stainless steel multi-stage pump
- Float switch
- Heavy duty PVC membrane housings
- XLE 4040 membranes
- 5 Micron pre-filter and housing
- 1.5 cubic feet carbon d e-chlorinator
- Float kit
- Pre-Filter



MODEL NO	GPD	HOUSING	MEMBRANE	AUTOFLUSH	HP
NPRO2000S	2,000	Heavy Duty PVC	(2) XLE - 4040	Yes	Sta-Rite 2.0 HP
NPRO4000S	4,000	Heavy Duty PVC	(2) XLE - 4040	Yes	Sta-Rite 2.0 HP
NPRO6000S	6,000	Heavy Duty PVC	(3) XLE - 4040	Yes	Sta-Rite 2.0 HP
NPRO8000S	8,000	Heavy Duty PVC	(4) XLE - 4040	Yes	Sta-Rite 2.0 HP
NPRO10000S	10,000	Heavy Duty PVC	(5) XLE - 4040	Yes	Sta-Rite 3.0 HP
NPRO12000S	12,000	Heavy Duty PVC	(6) XLE - 4040	Yes	Sta-Rite 3.0 HP



# RO SYSTEM REPLACEMENT PARTS

Product ID #	Product Description
800886	Phoenix End Bracket
3044076	Phoenix UT2.5 Term Block
3047167	Phoenix ATP-UT Partition Plate
1050020-110	Zack Marker Strip 1-10
1050020-1120	Zack Marker Strip 11-20
16G-16MPX	1" MPT Swivel Crimp On Fitting
21534A	Float Switch Weight
69WR3	Reverse Action Pressure Switch
83400N2	Delran Receptacle Straight Male
9070T100D20	SQD Transformer 110V Secondary
ABP-1412	Aluminum Back Panel 14 x 12
AGA2	2 AMP Glass Fuse
ALT5308901	1/2" Cord Grip
ALT8113305	O-ring for 5308901 Cord Grip
ASC8238T405-120	ASCO 1/2" NC Valve 120v Din
ASC8238T410-120	ASCO 1" NC Valve 120v
ASC88122403	ASCO S Series Din Connector
CAFL4U-220	Terminal Block w LED 220v
CIS205015	1/2" x 1-1/2" SCH 80 PVC Nipple
CIS205030	1/2" x 3" SCH 80 PVC Nipple
CIS805005	1/2" SCH 80 PVC Tee
CIS808005	1/2" SCH 80 PVC Elbow
CIS850005	1/2" SCH 80 PVC Plug
CZ14D68F012N	90 Degree Female Cord Set
EPCAL4U	End Plate
F-44750LA-8	Flow Meter 1/2" Adjustable
F-44750LE-8	Flow Meter 1/2" Non-Adjustable
GG2DW2000	Mechanical Switch - ABS Housing
GL400RF	Pressure Gauge Liquid Filled
GNL100B	Pressure Gauge Non-Liquid
H141206HLL	14 x 12 x 6 Poly Enclosure, Hinged
HG0124	Hose 1" 1 Wire Black
HMDPSC-60D	Basic Dual TDS Controller
IL-110-GREEN	LED Indicator Light Green
IL-110-RED	LED Indicator Light Red
LC1D18G7	Telemecanique Contractor

# RO SYSTEM REPLACEMENT PARTS

Product ID #	Product Description
LRD14	7-10A Overload Relay
MCM69915K55	3/4" Cord Grip
MCM7513K241	1/2" Cord Grip Conduit Locknut
MCM9565K27	Square Finish Plug
MM20055	Nickel Plated Push lock Fitting
MM20063	Male Straight Connector
MM20082	Male Elbow 90Dg
MM20092	Male Elbow 90Dg
MM28002	Barstock Fittings 90Dg Pipe Elbow FxF 1/4"
MM28004	Barstock Fittings 90 Pipe Elbow FxF 1/2"
MM28027	Barstock Fittings Union Tee F x F x F 1/2"
MM28044	Barstock Fittings Female Pipe Cross 1/2"
MM28106	Barstock Fittings Pipe Bushing 1/2" x MPT 1/4" FPT
MM28112	Barstock Fittings Pipe Bushing 1" MPT x 1/4" FPT
MM28114	Barstock Fittings Pipe Bushing 1" MPT x 1/2" FPT
MM28154	Barstock Fittings Long Pipe Nipple 1/2" Diameter x 2/5" Long
MM28212	Barstock Fittings Hex Nipple MxM 1/4"
MM28214	Barstock Fittings Hex Nipple
MM28216	Barstock Fitting Hex Nipple MxM
MM32022	Barstock Fittings 3/4" hose to 1/2" MPT
MM32023	Barstock Fittings 3/4" House to 3/4" MPT
MM32035	Barstock Fittings 1" Hose to 1" MPT
MM32316	Barstock Fittings 3/4" to 1" Hose
NERCH900B	4" Conduit Clamp
PRO-STM7/8	Single Tube Mount
SP12-HS	Hose Clamp 9-16" - 1-1/4"
SR2E201FU	100-240VAC Smart Relay
SRHPS20H3-01	Sta-Rite Booster Pump
SUT-FEET	Plastic Feet for Equipment
T-1.0B	Barstock Fittings Brass Tee 1"
TW150061	Axeon Gray Housing Bracket
TW1502237BL	10" Big Blue Filter Housing
TW1G5002	RO Ultra 4.5" Filter Housing Wrench
TW208419	Axeon Membrane
TW30XLE-4040	RO Membrane
TWBB1005	RO Membranes Sediment Filters
XB5AD21	2 Pos NC Selector Switch

# TROUBLESHOOTING

Symptom	Solution
<b>Low RO Water Production</b>	<p><b>Check Water Pre-Treatment Equipment</b> Improperly pretreated water can cause the membrane to have low water production.</p> <p><b>Check Pressure Pre-Membrane</b> if Pressure Pre-Membrane is not maintained between 120-200 psi, loss will occur</p>
<b>Unable to Keep Pressure Pre-Membrane Between 120-200 psi</b>	<p><b>Check Reject Control Valve</b> With the RO running, shut off the reject control valve. Pressure should climb above the minimal pressure. If pressure does not increase, pinch off RO drain hose. If pressure still does not increase, the pressure pump needs to be replaced. If the pressure does increase, the reject control valve needs to be replaced.</p>
<b>Spot Free Water is Spotting</b>	<p><b>Check Product Water TDS</b> Test the product water as it is being produced. Sample the water as it moves to the storage tank. If the TDS is high, it could mean the membrane has been compromised.</p> <p><b>Check Product Water TDS</b> The storage tank is an atmospheric storage container which can make it prone to the contamination. Routine cleaning of the tank will eliminate this problem.</p>
<b>RO Display Shows TANK FULL When the Tank is Not Full</b>	<p><b>High Level Float Switch is not Working</b> Using a jumper wire, jump the tank float terminals 15 &amp; 16. If the RO does change to RO running, check wires from control box to float switch. If wire is OK, replace high level float switch.</p>



# TROUBLESHOOTING

Symptom	Solution
<b>Production Pump Won't Start</b>	<p><b>No Power to RO System</b> Check RO Controller's Smart Relay is working. If it is not working, check the source power.</p> <p><b>Blown Fuse in the Control Box</b> Check if either of the fuses look blown. If blown, replace the fuse.</p> <p><b>RO Fault Condition Exists</b> The Production Pump will not start for the displays of TANK FULL, LOW FEED PRESSURE or BAD FLOAT.</p> <p><b>High Level Float Switch is not Working</b> Add a jumper wire to the tank float switch terminals 15 &amp; 16. If the RO pump does not stop replace the smart relay. If the RO Pump stops, replace the high level float switch to fix the issue.</p>
<b>RO Display Shows High TDS</b>	<p><b>Check Product Water TDS</b> Test the product water as it is being made. Sample the water as it goes to the storage tank. If the TDS is high it could mean that the membrane has fouled.</p> <p><b>Check Storage Tank TDS</b> The storage tank is an atmospheric storage container which can make it prone to the contamination. Routine cleaning of the tank will get rid of this problem.</p>

# MAINTENANCE

## RO System Maintenance Log

The operation and maintenance of an RO machine requires regular data recording and routine preventative maintenance. It is vitally important that the daily log sheet be filled out during each operational shift of use. A startup sheet / log should be filled out containing the informational facts about the operation of your machine. These records are kept strictly for reference. If you have questions concerning the operation of your machine or the method of the data recording, contact the manufacturer.

NOTE: A log is included with this manual.

## RO System General Maintenance Guide

As a part of the routine maintenance program, it is suggested that performance data of your RO System is recorded on a regular basis. By recording the performance data, diagnosing and performance problems at a later date will be much easier.

### Replace Pre-Filter Cartridges

The standard rule is that once a month the 5 Micron pre-filter should be replaced. The frequency can vary depending on the production demands of the RO System. This filter protects the membrane elements from particles, which may be located in the feed water.

NOTE: A Pressure drop of 8 psi or more during operation indicates that the pre-filter cartridge needs replacing. Use filters rated at 5 micron or less.

### Membrane Element Replacement

Membrane life expectancy will vary from site to site depending on the water quality. TDS reading of 30 or less is considered to be spot free. Anything above this reading, the membranes should be replaced.

# RO SYSTEM WARRANTY

## National Pride Equipment RO System

National Pride Equipment warrants to the original consumer / purchaser against defects in material and/or workmanship from the date of original Manufacture as follows:

Limited Warranty, covering materials and workmanship for 1 year from the date of installation, subject to user's to compliance with manufacturers operating and maintenance instructions. Filter and Membranes are excluded by Warranty, and National Pride Equipment responsibility is limited to any Warranty provided by the filter or membranes manufacturer.

National Pride Equipment shall not be held liable for any special, incidental or consequential damages, and will at its option, repair or replace any defective components.

Any parts used for replacement are warranted for the remainder of the original warranty period.  
**THIS WARRANTY DOES NOT COVER DEFECTS CAUSED BY ACCIDENT, FIRE, FLOOD, ACTS OF GOD, MISUSE, MISAPPLICATION OR NEGLIGENCE.**

Shipping expenses to National Pride Equipment at 905 Hickory Lane, Mansfield, Ohio 44905 are the responsibility of the consumer. National Pride Equipment will ship the repaired or new component at the consumer's expense and will not be responsible for any labor charges or other costs resulting from the removal or installation of the repaired or replaced part.



