

REDFOOT®

LEVELLING

24V EQ Smart-Level User Manual



Updated: August 2024

WARNING!

This is a 24VDC System **DO NOT** connect to your 12Volt House Battery

Warning:

Redfoot Levelling does not promote the use of our levelling systems as a 'Tyre Jack' solution. If the owner/user were to use the levelling system to lift the vehicle off the ground to have access underneath the vehicle or for changing a tyre, they must use Jack Stands as the primary support. Jack Stands should be always in use as the primary support when wheels are off the ground for long durations.

Modification of any factory-supplied item may result in the denial of all warranty claims. Call Redfoot Levelling Solutions Technical Support prior to any modifications. Redfoot Levelling Solutions offers full installation support for authorised approved Installers only. End user installers must read and accept our Warranty and Terms and Conditions on the Invoice issued with this purchase.

Danger:

With any hydraulic application, holding position on a cylinder must be done with safety in mind. System failure may cause the jack(s) to retract or extend suddenly. When working under or near the vehicle, always use jack stands of appropriate rating to support the weight of the vehicle

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Panel Indicator LED's

There are a total of ten (10) LED indicators on the Redfoot Keypad. The function of the LED's is detailed below.

During typical operation, the LEDs on the bottom left-hand corner of the keypad should NOT be illuminated. The only LED that should illuminate is the OPERATING LED.

| | |
|--|---|
| POWER' LED | Red when the power is ON Blank when power is OFF Flashing every 1 sec while in SLEEP mode |
| JACK' LED (1 for each cylinder) | Red when jacks(s) are deployed Blank when jack(s) are stowed |
| OPERATING' LED | Red when auto levelling, or All retract Blank when not operating |
| LOW VOLTAGE' LED | Red when voltage is below 21V DC Blank when voltage is at operating level |
| ENGAGE PARK BRAKE' LED | Red when park brake is not engaged Blank when park brake is engaged |
| IGNITION ON' LED | Red when ignition is switched ON Blank when ignition is OFF |
| EXCESS SLOPE' LED | Red following an auto level attempt if system cannot overcome slope (full extension of cylinder(s)) Blank if in normal operation |

If the LOW VOLTAGE, ENGAGE PARK BRAKE, IGNITION ON or EXCESS SLOPE LED's illuminate, you have an 'error' condition that must be corrected prior to operating the jacks.

Setting the Null

Null is the term used to indicate the desired level outcome of the vehicle. The null has been preset at the factory but will most likely need to change. If the vehicle is not level following an attempt to Auto-Level, you will need to manually level it and reset the null. To set the null, push and release the Power button on the Keypad to engage power. The LED light next to the Power button should be RED when the power is on. Level the vehicle by deploying jacks manually, or by simply parking the vehicle on a level site. You do not need to have the jacks deployed to set the null. Use a bubble level on a flat surface in the centre (or close to) of the vehicle as a reference. Once the vehicle is level, turn the power off at the panel. Press and hold the Auto-Level button and press and release the Power button and listen for a series of beeps. After the Keypad has beeped 5 to 6 times, release the Auto Level button (the Keypad will continue to beep if the Auto-Level button is held). The new null has been set, and the panel will maintain this setting. Press and release the All Retract button to retract the jacks to the stowed position. You will now be able to auto level to that set null. Scan the QR code below with your phone to watch video tutorial.



Operating Instructions

Power On:

Push and release the Power button to engage power. All lights will come on then most will go out. The LED light next to the Power button should be RED when power is on. You will need to have the ignition key in the “off” position and your handbrake engaged to extend the jacks. If you attempt to extend jacks manually or with the Auto Level button, you will hear a deny tone from the keypad if the ignition key is in the improper position or handbrake not engaged.

Planting the Jacks:

Using the Down Keypad button, extend the jacks in pairs until they contact the ground (this is referred to as “planting” the jacks). Note: Jacks can only be operated in pairs, not individually. As you extend the jacks, an LED light on the Keypad will indicate the jacks are out of the “stowed” position.

Do not manually overextend the jacks, this may cause unwanted stress on the motorhome or the jacks themselves.

Retracting the Jacks: You must use the All Retract function to retract the jacks prior to travel.

To retract all jacks, press and release the All Retract button. All jacks will automatically retract and return to the stowed position. The pump will run in retract mode until all jacks are fully stowed (the pump will continue to run for a few seconds after this has occurred). The jacks down LEDs will turn off, indicating the jacks are in the “stowed” position. If required, you may stop the All Retract by pressing any button on the keypad. For levelling purposes only, jacks may be retracted in pairs by using the UP button. However, the All Retract function must be used to fully stow the jacks prior to travel.

It is always the responsibility of the motorhome operator to visually confirm that the jacks are fully retracted and safe for travel.

Auto-Level Operation

Press the Auto Level button and release. The system will send out a continuous series of beeps and the “Operating” LED will be RED to let you know Auto Level is in operation and will automatically level the motorhome. Please refrain from moving inside the motorhome during the Auto level process. When completed, the Keypad will signal the successful completion with a dual-stage tone. The system will only Auto-Level from the retract position (jack lights are blank) otherwise you will hear a denied tone. The Keypad may be left on once level has been achieved as it will enter “sleep mode” after five minutes of inactivity.

Manual Operation

Levelling the Motorhome:

Use a bubble level on a flat surface in the centre of (or close to) the motorhome. Level the vehicle by using the Down or Up Keypad buttons until the vehicle is level, the Jack’s will operate in pairs. Do not attempt to lift the vehicle’s tyres off the ground. The Keypad may be left on once level has been achieved. The Keypad will enter “sleep mode” after five minutes of inactivity.

Note: There are specific instances when manual extension of one or more jacks is inhibited (deny tone when Down is depressed). This situation is caused by the ‘anti- twist’ protocol in the software installed in the Controller. Simply stated, the ‘anti-twist’ protocol denies jack extension if the system senses that a specific corner of the motorhome is approximately 3 degrees higher than the rest. You will be able to extend the other jacks to overcome the slope. If the system incorrectly senses excessive slope, this can be overcome by re-setting the null. This will allow manual extension of all jacks.

Helpful Hints

- If your motorhome is equipped with air suspension, it is recommended to start your motorhome and allow the chassis air to build before pressing All Retract. This will ensure adequate air supply to the chassis air valves.
- Do not allow excessive motion in the motorhome during the Auto-Level operation (do not move around in the motorhome). This could cause the system to level improperly.
- The Auto-Level is a microprocessor-controlled system. Proper and adequate battery voltage and permanent chassis ground are essential.
- Your system may be equipped with a manual override option. Refer to the procedure for proper operation of this option. It is usually better to review this procedure prior to its actual use, rather than having to learn a new procedure in difficult environments.
- If the system has not been used (with the jacks stowed) for over 24 hours, it is recommended that you engage the All Retract button prior to travel to re-pressurise the system.
- A lubricant, like BOESHIELD T-9 is recommended to clean and lubricate the cylinder shafts/rods and avoid corrosion.

Manual Override

7702 MO Pump

Refer to Figure 2. This pump is equipped with a manual override. Locate the 4 valves on the left side of the manifold. Locate the screws recessed at the end of the appropriate cartridge valves. Using a 1/8th hex Key, turn the screw(s) clockwise until seated in.

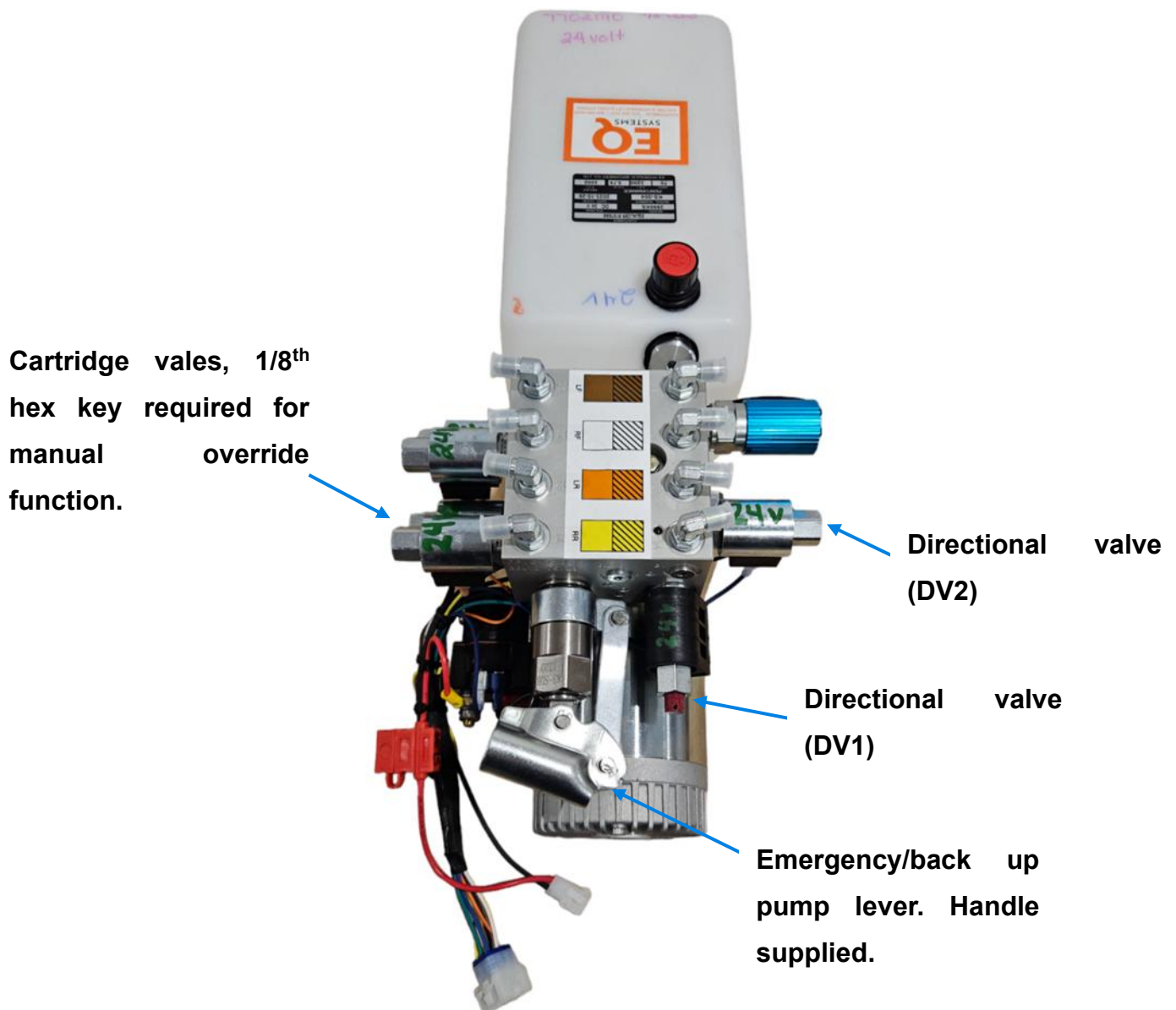
Using a 1/8th hex key, turn the recessed screw on the DV2 cartridge clockwise until seated. Turn and pull the red DV1 valve to approx. 180 °, this will allow the pump to be in retract mode. The valve knob will remain in the out position.

Place the pump handle into the emergency pump lever at the front of the pump. Crank the handle several times until all legs have retracted. This process will take some time to achieve full retract of the legs.

Scan the QR code below with your phone to watch video tutorial.



Figure 2. 7702 MO Pump



Caution!

Following manual override operation, failure to return all the valves to normal position may result in one or more of the jacks drifting down from their retracted position. Ensure all screws recessed

Basic Troubleshooting for Auto Level

Control Panel (Keypad)

Often the keypad is considered to be defective when it is not, rather another issue such as wiring. See the topics below for help in determining the true issue. Also note that some applications will not allow extension of the jacks. One of which is if the key is in the wrong position. Most systems will not allow the extension of the jacks if the key is in the 'on' position. There is also a park brake disable that will deny extension if the park brake is not applied. This park brake disable is not connected in all applications.

Keypad will not power up

Test all incoming power at the 3-pin plug behind the Keypad. If there is no power, (measure with a digital voltmeter at the red and black wires feeding to the controller from the pump), trace power wires at the pump and ensure all plugs are seated correctly.

If in doubt, call Redfoot Levelling for support, 07 5228 0211.

Often, a keypad that will not power up is due to being defective, no power or ground issue to the controller. If there is power and ground to the controller, then the controller is most likely at fault. There is sometimes no way for a tech in the field to determine this for sure (other than replacement) so a controller should be ordered if the wiring is found to be correct.

Keypad powers up then shuts down when other buttons are pressed

This is known as a power reset. This is caused by the voltage to the controller dropping very rapidly to below where the processor can operate. When the keypad is powered back up, the jacks down status LED's will be on. Press All Retract to clear it after the voltage issue is resolved.

Check the battery and the connections from the battery to the pump assembly. Both the positive and/or the ground connections could be at fault. Check the power and ground wires (and their connectors) feeding the controller from the pump assembly.

Keypad powers up, seems to operate, but pump does not come on to extend jacks

First verify that no disables are on (Key switch or park brake in wrong position). Locate the blue wire at the motor solenoid. Using a digital voltmeter, measure for voltage at the blue wire when an extend is attempted. There should be at least 21 VDC +. If there is no voltage check the blue wire back through the harness to the controller. If there is no issue with the blue wire but still no voltage, then the controller is defective. If there is voltage on the blue wire but won't operate, then the solenoid or the motor may be defective.

Keypad powers up, seems to operate, but pump does not come on to retract jacks

On Bi-Rotational pumps locate the green wire at the motor solenoid or contactor. Measure for voltage at the green wire when retract is attempted. There should be at least 21 VDC+. If there is no issue with the green wire but still no voltage, then the controller is defective. If there is voltage at the green wire but won't operate, then the solenoid or the motor may be defective.

On Uni-Directional units the blue wire at the motor solenoid is connected to the green inside of the pump harness through a diode. Check for voltage at the green and blue wires. There should be at least 21 VDC +. If there is no voltage, check the green wire back through the harness. If there is no issue with the green wire but still no voltage, then the controller is defective. If there is voltage at the green wire but won't operate, then the solenoid or the motor may be defective.

Keypad powers up, seems to operate, and pump motor runs but one or more jack legs do not extend or retract

Locate the manifold cartridge valve(s) and coil(s). There is one for each cylinder. Locate the proper valve/coil(s) for the leg(s) that do not operate. Each coil will have different coloured wires feeding them. Measure voltage across the coil terminals when trying to operate the jack(s) that do not operate. There should be at least 21 VDC+. If there is no voltage check the wire(s) back through the harness to the controller and the coil ground wire(s). If the wire(s) is good but still no voltage, then the controller is defective. If there is voltage across the two terminals at the coil and the jack(s) do not operate then there is an issue with the coil, valve or other hydraulic control issue.

NOTE All electrical testing of the Auto-Level control circuit must be done using a digital multi-meter. The use of "test lights" is not recommended- as they cannot provide a true voltage reading and could cause damage to the keypad or controller.

Keypad Status Lights

Jack down Status LED's will not go out or jack down LED's go out and pump quits prior to jacks being fully retracted

There is a "Jack Status" light near each set of manual operation up and down arrows that indicate (when illuminated) the jacks are not fully stowed. This issue is created by a problem with the pressure switch circuit. This could be a defective pressure switch, issue with the controller, or the yellow/black wire from the controller to the pressure switch could be shorted to ground. To test for this, remove the yellow/black wire from the pressure switch and using a digital voltmeter, measure for voltage at the yellow/black wire with the control panel turned on. There should be close to battery voltage (24VDC +). If there is no voltage either the controller is defective, or the yellow/black wire is shorted to ground. To further verify this, press the all-retract button (with the yellow/black wire disconnected and protected from contact with a ground source). The jack status lights should go out within a few seconds after the pump comes on. If the Jacks Down LEDs do not go out, then you have confirmed that the issue is with the controller, or the yellow/black wire is shorted to ground. To check the pressure switch, check for continuity across the pressure switch terminals with the yellow/black wire disconnected. If the jacks are extended, you should have continuity (switch is closed). Push the all-retract switch on the keypad and the pressure switch should go open (no continuity) shortly after all the jacks have reached full retraction. If the switch stays closed, then the pressure switch is defective.

Jack Down status lights come on during travel (see troubleshooting guide)

Generally, this is caused by a loss of fluid pressure in the retract side of the hydraulic system. Its most likely cause is an external fluid leak at a hose/fitting connection at a cylinder, a defective cylinder or the check valve at the pump.

Operating light

When Auto-Level or All Retract is pressed, the operating light should come on with a steady pulse (blink) and accompanying beep can be heard from the control panel. It will stop when the process is complete, or a fault has occurred. If there is a fault, other lights will most likely come on as an aid in defining what the issue was.

Low Voltage

This light will come on if the voltage to the controller falls below approximately 21 VDC. It will stay on until cleared by a press of any button on the control panel. When this light comes on the pump may shut off as the voltage to the unit has fallen below proper operational limits. The main cause of this is generally weak batteries or poor connections.

Engage Park Brake

There is an optional connection to the park brake switch that will turn this light on if the park brake is released. If the keypad is powered up and the park brake is engaged, the light should go out. Not all manufactures of all vehicles connect this to operate. If the park brake is applied and the light is on, locate the black wire with the yellow trace. On most units it will exit the harness near to the keypad connection. To test, locate the black wire with the yellow trace. This wire is looking for ground to turn the light off. If this wire is disconnected from the ground the light will be on. If the black/yellow wire is connected to ground and the light is on, check the wire back to the connector at the controller. If the wire is good and the light will not go out, then the controller is defective. Also note that if this light is on, jacks will not extend from the manual down arrows and Auto-Level will not function. If the wire is not being connected to ground when the park brake is applied, then there is an issue with the chassis side of the circuit.

Ignition ON

This light will be on if the ignition key is turned to the ON position and the keypad is powered up. The light should go off when the ignition key is in the off position. To test, locate the pink wire, it should break out of the harness near the keypad. It should have 24 VDC + applied to it when the ignition key is on (engine run) position. There should be no voltage to it when the ignition key is in the off position. If this is not correct the issue is with the connection to the chassis harness or switch.

Excessive slope

This light will come on after an unsuccessful attempt of Auto-Level. Basically, it means that the system was unable to level the vehicle to within the specification of .5 degrees front to rear and left to right. Or one or more of the jacks have run out of travel (maximum extension) prior to the vehicle being level within the specified time allowance.

| Troubleshooting Guide | | |
|--|---|---|
| Symptoms | Possible Cause | Solution |
| Keypad will not turn on | Blown fuse at pump harness | Replace fuse 20A |
| | Faulty ground or 24VDC power | Trace and repair |
| | Low battery voltage - min. 21 | Charge batteries |
| | Defective keypad or controller | Call Redfoot Levelling |
| | Defective keypad or controller harness | Trace and repair |
| Keypad turns on but jacks will not operate | Low battery voltage to pump | Charge batteries |
| | Faulty ground or 24VDC power | Trace and repair |
| | Defective keypad or controller | Call Redfoot Levelling |
| | Defective pump motor or solenoid | Replace motor and/or solenoid |
| | Other system defect | Call Redfoot Levelling |
| Jacks will extend but will not retract | Low battery voltage - min. 21 | Charge batteries |
| | Park brake not set | Set park brake |
| | If bi-rotational pump, bad motor or solenoid | Replace motor and/or solenoid |
| | Anti-twist software protocol has stopped further action | Lower opposite side of vehicle and/or reset Null and then level vehicle |
| | Ignition switch in wrong position | Check and change as needed |
| | Defective keypad or controller | Call Redfoot Levelling |
| | Faulty ground or 24VDC power | Trace and repair |
| | System defect | Call Redfoot Levelling |
| AUTO Level will not level | System Null is to set | Set Null |
| | Controller has been set wrongly or has moved | Check controller orientation |
| | Ignition switch in wrong position | Check and change as needed |
| | Damaged or defective keypad or controller harness | Call Leveling Jacks Australia |
| | Defective keypad or controller | Call Redfoot Levelling |
| | Other system defect | Call Redfoot Levelling |

Troubleshooting Guide

| Symptoms | Possible Cause | Solution |
|---|---|--------------------------------------|
| Auto-Level stops mid-cycle | Low battery voltage - min. 21 | Charge batteries |
| | Excessive motion during leveling sequence | Reset keypad and retry |
| | Damaged or defective controller | Check and change if needed |
| | Damaged or defective keypad or controller harness | Call Redfoot Levelling |
| | Other system defect | Call Redfoot Levelling |
| Jack LED's on keypad staying on | Defective pressure switch or wiring | Trace/Repair or replace |
| | Defective keypad/controller or pump harness | Trace and repair or replace |
| | Defective keypad or controller | Call Redfoot Levelling |
| | Low system pressure caused by fluid leak or low fluid level | Correct fluid level or leak |
| Hydraulic pump inoperative | Low battery voltage - min. 21 | Charge batteries |
| | Blown 20A fuse on pump harness | Replace fuse or breaker |
| | Faulty ground or 24VDC power | Trace/Repair or replace |
| | Defective pump motor or solenoid | Replace |
| Jack(s) bleed down from levelled or stowed position | Air in hydraulic system | Purge/bleed air |
| | External fluid leak | Trace and repair |
| | Defective valve in pump | Clean or replace valve |
| | Defective hydraulic jack/cylinder | Replace hydraulic cylinder |
| Jack(s) are jerky or noisy when extending or retracting | Air in hydraulic system | Purge/bleed air |
| | Fluid level low | Check fluid level and top up |
| Jack's will not retract from extended position | Low battery voltage - min. 21 | Charge batteries |
| | Low battery voltage or poor ground | Change batteries/check ground return |
| | Damaged/Defective harness from keypad to controller or controller to pump | Trace and repair |
| | Fluid level low | Correct fluid level and add |
| | Defective pump motor or solenoid | Replace |

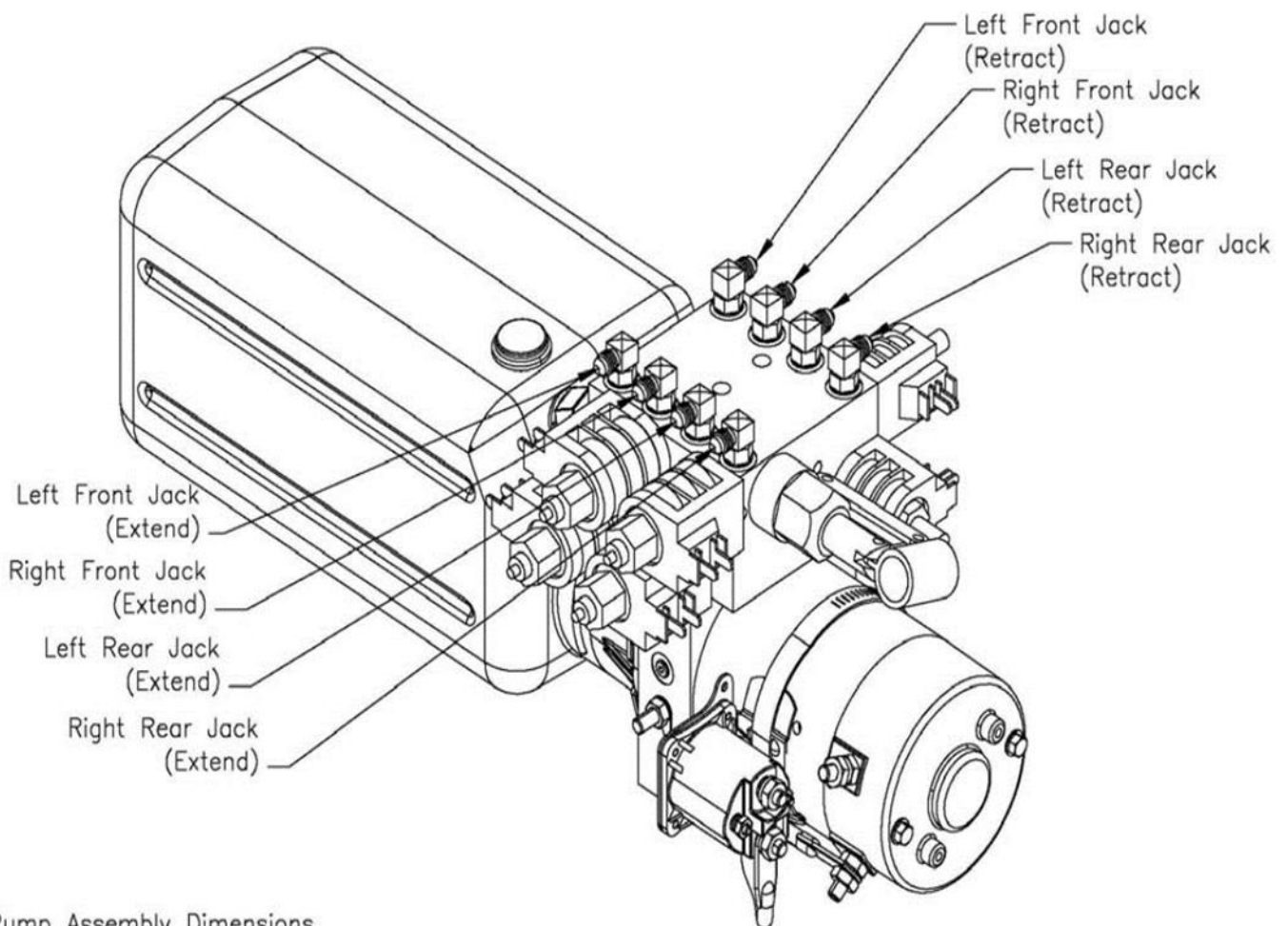
Installation of Hoses to the Manifold

Jack Leg

Left Front-Top
 Left Front-Bottom
 Right Front-Top
 Right Front Bottom
 Left Rear-Top
 Left Rear-Bottom
 Right Rear-Top
 Right Rear-Bottom

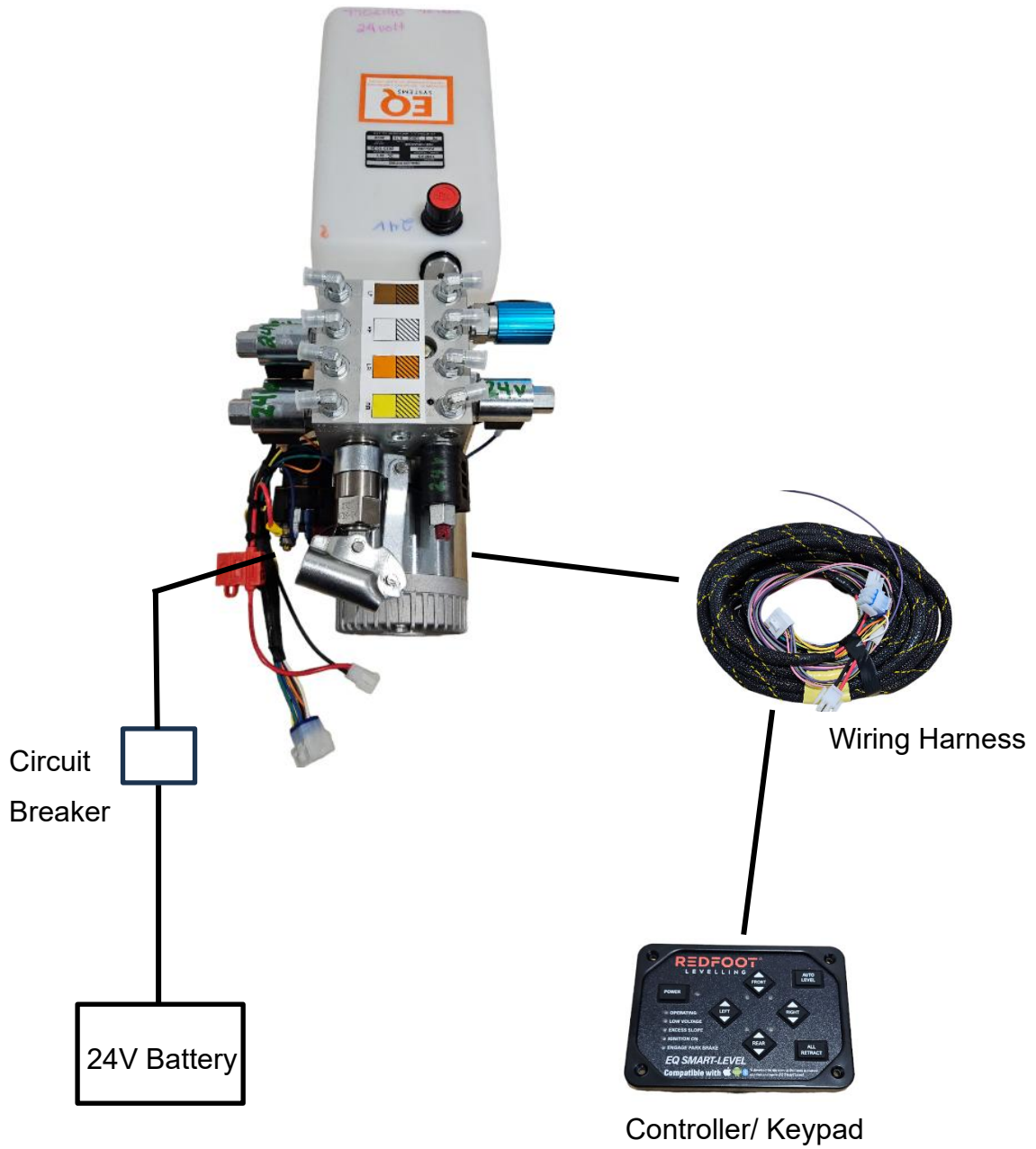
Manifold Connection

T-1 Brown Solid
 B-1 Brown Stripe
 T-2 White Solid
 B-2 White Stripe
 T3- Orange Solid
 B3- Orange Stripe
 T-4 Yellow Solid
 B-4 Yellow Stripe



Pump Assembly Dimensions
 Length-24"
 Width-11"
 Height-10"

Wiring Harness



Product Warranty Guide

Redfoot Levelling Pty Ltd

1. Only warranty claims with prior written or verbal authorisation from Redfoot Levelling will be recognised, all other claims will be denied.
2. Redfoot Levelling warrants levelling system components for a period of **one year** from the date of original sale of the vehicle. This warranty covers defects in material and workmanship only. Redfoot Levelling is not liable for any damage due to abuse, neglect, misuse, negligence, misapplication, error of operation, accidental or purposeful damage or damage due to an “Act of God” such as, wind or rain damage, flood, lightning or other natural causes of the like. Redfoot Levelling limited warranty is applicable to the Redfoot Levelling components only and does not apply to the vehicle, apparatus, or property to which it is attached. Warranty parts will be shipped at no charge if the repair is authorised by Redfoot Levelling representative. Purchased components used in authorised warranty repairs will be reimbursed at the original purchase price. All returns must be preauthorised by a Redfoot Levelling representative. Connotes will be supplied for their return unless prior arrangements have been made. Installers must receive and accept the appropriate Scope of Works from Redfoot Levelling prior to the commencement of any work.
3. Labour and freight expenses due to warrantable parts defects or workmanship will be reimbursed for the period of **one year** from the date of the original sale of the vehicle. Freight expenses will either be prepaid by Redfoot Levelling or reimbursed at the road logistic rate only. Any additional shipping charges or requirements are the obligation of the vehicle owner or service centre performing the warranty repair. The owner or Service Centre’s obligation may include overseas shipping charges, border fees, and any other additional fee of the like.
4. Prior authorisation is required before parts may be returned to Redfoot Levelling. Redfoot Levelling will supply a connote for the return goods.
5. Labour, parts, and freight credit (if applicable) will be sent after the parts are tested and the warranty claim is validated. Returned parts that are found to be in normal operating condition are not warrantable and will be charged to the owner or service centre. Redfoot Levelling reserves the right to charge back the service centre for labour claim payments previously submitted if the installation of the warranted part is found to be inadequate later.
6. Warranty labour will be reimbursed only for claims that have prior written or verbal authorisation from a Redfoot Levelling representative. Time associated with learning about the repair or excessive diagnostic and installation time will not be reimbursed. Warranty labour will be reimbursed at the authorised service centre’s published shop rate for that region. Overtime labour will not be reimbursed without

exception.

7. Replacement parts are warranted under the same guidelines listed in this guideline for the remainder of the original warranty or 90 days, whichever is longer. Proof of warranty repair date and original vehicle purchase date are required. No additional warranties expressed or implied are authorised by Redfoot Levelling.
8. All warranty works are to be completed and invoiced within 3-months of the Scope of Works date of issue.
9. Parts that are required to be returned to Redfoot Levelling, must be returned upon job completion and prior to warranty invoicing. Parts not returned within this period will be billed to the installer. Claims will be denied if the date submitted is greater than **30 days** from the repair.
10. Complete systems are not warranted unless authorised by a Redfoot Levelling representative. There are absolutely no exceptions to this clause.
11. Consideration should be taken regarding the location and protection of Redfoot Levelling's components prior to installation. Please reference our installation manuals for recommended locations and maintenance or visit www.redfootlevelling.com.au for more information. The failure of any Redfoot Levelling components due to extreme environmental conditions, improper installation or lack of maintenance will not be covered under the warranty.
12. Warranty coverage for parts or systems sold by non-authorised resellers will be at the discretion of Redfoot Levelling.
13. This warranty begins upon the sale date of the vehicle and is transferable, with limitation, subsequent owners are to provide the original sale date of the vehicle and proof of purchase.
14. Redfoot Levelling is not liable for loss of time, manufacturing costs, labour, material, loss of profits, direct or indirect damages incurred by the vehicle manufacturer.
15. Excessive warranty labour resulting from inadequate access to the Redfoot Levelling product will not be reimbursed.
16. Redfoot Levelling will not pay mark-up on warranty parts unless required by law.
17. Travel expenses, hotel, telephone, fuel, or any other expense of the like are not covered under the warranty.

No additional warranties expressed or implied are authorised by Redfoot Levelling.

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