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WD3000N Water Filling Station
INSTALLATION & SUPPORT MANUAL

Revision: 1.10

PREPARED BY

ABBERFIELD GROUP
SYDNEY AUSTRALIA

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Document Control Sheet

AMENDMENT RECORD

Revision	Change History	Release Date	Names
1.0	Initial Release	26/07/15	John Colyer
1.1	Added suggested slab design Minor changes	04/08/16	Emily Langley SSmith
1.2	Added external RPZ	02/06/17	MC Colyer
1.3	Added machine orientation	09/08/17	John Colyer
1.4	Added Solar Panel	14/02/18	John Colyer
1.5	100m version and minor changes	29/05/18	John Colyer
1.6	Terminal switch plate wire colour change, solar panel wattage and dimensions (Appendix 5), plus machine mounting (Appendix 4)	18/06/18	John Colyer
1.7	Plumbing installation amendments Revision solar panel Added cage details	10/02/19	John Colyer
1.8	Optional anchor plate New photos of RPZ and tabernacle	16/06/20	John Colyer
1.9	Addition of Heat Mitigation	25/05/21	John Colyer
1.10	Addition of alternate outlets, surge protection, pressure relief valves, Soft start/stop, Power relays, plumbing pressure test certificate, expansion switch plate terminal wiring, Enhance functionality	08/09/21	John Colyer

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1. DOCUMENT PURPOSE

This document provides an installation guide for the WD3000N Series Water Filling Stations.

Information provided is typical for an 80mm plumbing supply.

100mm plumbing systems are also available, fitting within the same cabinet and onto the same ground plate.

Included are appendix on Features and Settings, plus Maintenance, Service and Fault Diagnosis.

2. MACHINE ORIENTATION

To assist the electronics handle summer heat it is recommended that if possible the customer interface (face of the machine) is pointing south. In this way the credit card reader will not receive direct sun exposure. West or north-west allows late afternoon sun to reach the credit card reader. In any other direction, even facing north, the top-mounted sun/heatshield keeps the card reader in the shade.

Although the electronics is rated at 75 degrees centigrade, the card reader is rated at 50 degrees centigrade and direct sun should be avoided, if possible. Very effective heat mitigation measures are now fitted and west facing machines operate successfully, but perhaps with a reduced operating life.

3. DELIVERY

The machine consists of a ground plate securely attached to a concrete slab and on to the ground plate the plumbing and cabinet are individually attached. Plumbing can enter the cabinet on either side (right or left).

Delivery is expected to be in three parts:

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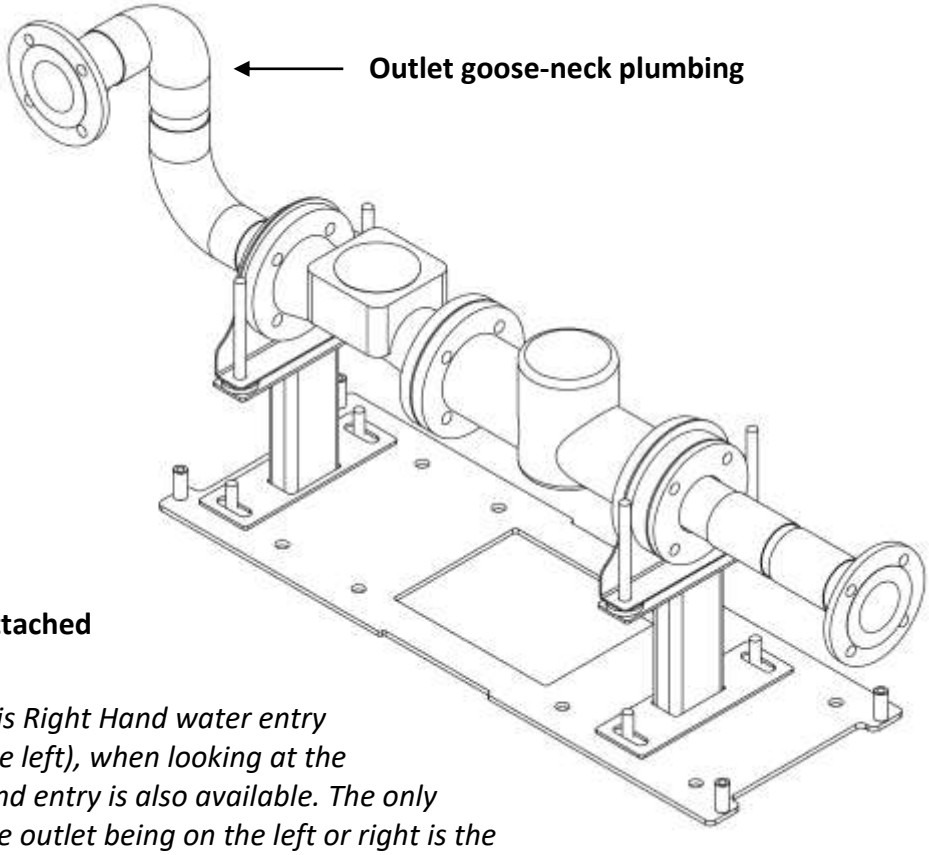
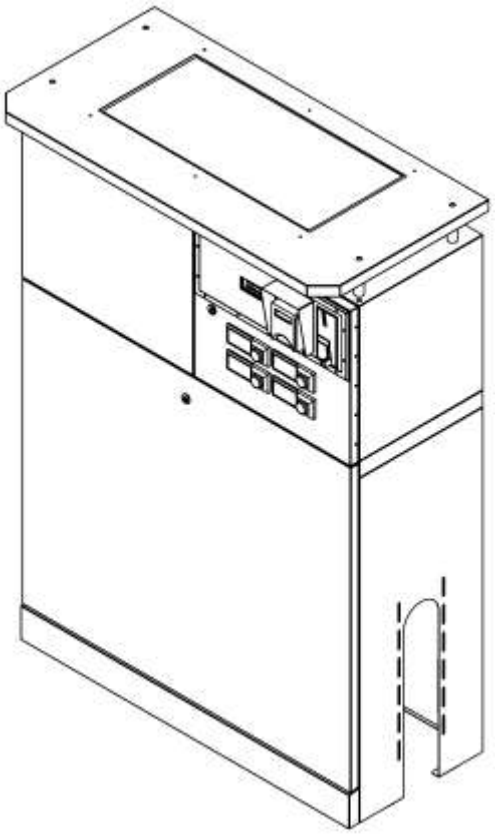


1. Ground plate with plumbing attached

Note: Plumbing shown is Right Hand water entry (outlet taps on the left), when looking at the machine. Left Hand entry is also available. The only item dictating the outlet being on the left or right is the outlet goose-neck plumbing positioning left or right. This item is held by bolts each end and therefore is easily exchanged before installation.



2. **Cabinet**

Note: Cabinet cut outs allow plumbing to enter on either side (right or left). Drawing has the optional cabinet mounted solar panel.

3. Tap assembly and stand

The typical outlets are 80mm and 25mm or 100mm and 25mm.

*Note: Plumbing shown is right hand water entry to the cabinet (outlet on the left side when looking at the Water Filling Station). Left hand entry is also available. The Tap assembly stand can be converted from **left to right or right to left**. This is achieved by:*

- *Turning the 80mm gear head tap around by 180 degrees*
- *Rotating the stainless steel ring 180 degrees.*
- *Rotating or reversing the front fascia 180 degrees (to point in the opposite direction).*
- *The 25mm tap handle will now be on the bottom side but can be accessed and operated. Optional refit the 25mm tap.*

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ALTERNATE OUTLETS

The standard outlet is a cam lock for tanker filling (80mm or 100mm), plus a 25mm tap for general public use. Alternatives are available on request.

Increasingly common is an 80mm cam lock, plus a 50mm cam lock and a 25mm tap.

Sometimes customers require the Filling Station for tanker drivers only and just one outlet is provided.

Occasionally Storz fitting outlets are required and 65mm is just one option.

STAINLESS STEEL PLUMBING

The standard plumbing uses B press copper fittings. These fittings and other plumbing devices are designed to operate with water pressure up to 1000KPA, (but are rated to 1600KPA) with most installations being less than 500KPA.

Where higher surge pressures are expected, or where corrosive stainless steel B press is used, this option is rated at 2000KPA.

WATER SURGE PROTECTION

Needle Valves (optional fitment)

The water valves used have a soft open and soft closed action, to prevent water hammer. Sometimes a greater degree of soft open or closed action is required. This achieved by installing needle valves on the inlet or outlet side of the pilot valve, or both sides. These needle valves can be adjusted to vary the rate of opening or closing. Contact Abberfield for details or supplies of these needle valves.

Surge Arrestors (optional fitment)

These are hydraulic dampeners, essentially a piston in a tube acting against sealed air pressure or spring. When a water surge pressure hits the plumbing the piston moves to absorb the hydraulic shock.

The arrestors are fitted to a fabricated stainless steel collar that is installed inside the Water Filling Station cabinet.

Arrestors come in different sizes, but 50mm diameter, the largest commercially available, is used in Abberfield Water Filling Stations.

Pressure Relief Valves (optional fitment)

Sustained or particularly high pressure surges may overpower a surge arrestor and the fall back option is to install a Pressure Relief Valve, together with or instead of a surge arrestors.

These Pressure Relief Valves are mounted into a fabricated stainless steel collar, in a similar manner to the surge arrestor. The standard relief valve is 25mm diameter, but is particularly damaging surges are expected a 50mm diameter Pressure Relief Valve can be fitted.

Both the Surge Arrestor and the Pressure Relief Valve can be mounted on t the same fabricated stainless steel collar, a more effective method is to mount the Surge Protector external to the cabinet as part of the Residual Pressure Zone device (RPZ) installation. Mounted with the RPZ discharge water from the Pressure Relief Valve is discharged to the open ground, in the same way as happens for the RPZ.

If the Pressure relief Valve is mounted inside of the cabinet it should be plumed to discharge water outside of the cabinet.

ELECTROLYSIS

Recognising that electrolysis can occur between dissimilar metals that are constantly wet, Abberfield allows a barrier to dissimilar metals (although the risk is less than some believe). The incoming isolation ball valve is in brass (expected to be connected to the incoming copper piping); - then between the ball valve and the stainless flow meter is a flange gasket. This gasket prevents metal to metal contact in the wetted area, reducing to near zero any electrolysis action. Decades of reliable operation can be assured.

4. HEAT MITIGATION

Water Filling Stations are usually installed in locations of direct sunlight, without any form of shading. The operating temperature of the electronics is extreme and considerable engineering is employed to allow reliable operation.

Lighter colours will better reflect the excess sun's rays. It is recommended that dark cabinet colours are avoided, bright colours should be chosen with acid green the default colour.
It is also highly recommended that trees are planted adjacent to the Filling Stations, to provide shade, particularly from the midday or afternoon sun.

Better still would be shelter over the cabinet, although with over 200 installations to date, none have a shelter.

5. SITE ASSEMBLY

OPTIONAL ANCHOR PLATE

The Filling Station stainless steel anchor plate can be fastened by any normal means, including chem set stainless steel studs (studs available from Abberfield). However, use of the optional anchor plate is the ultimate in security.

Anchor plates for embedding into the concrete slab come in two forms; just for mounting the Filling Station, or for mounting the Filling Station and the Abberfield recommended Residual Pressure Zone device (RPZ).

Before installing it is necessary to determine which way the water enters the Filling Station and hence, on which side of the cabinet is the outlet stand. Then, the anchor plate is embedded in the concrete to match the water flow direction.

If using the full anchor plate for the Filling Station plus the RPZ, the correct orientation of the anchor plate is easily determined, water first into the RPZ before the Filling Station.

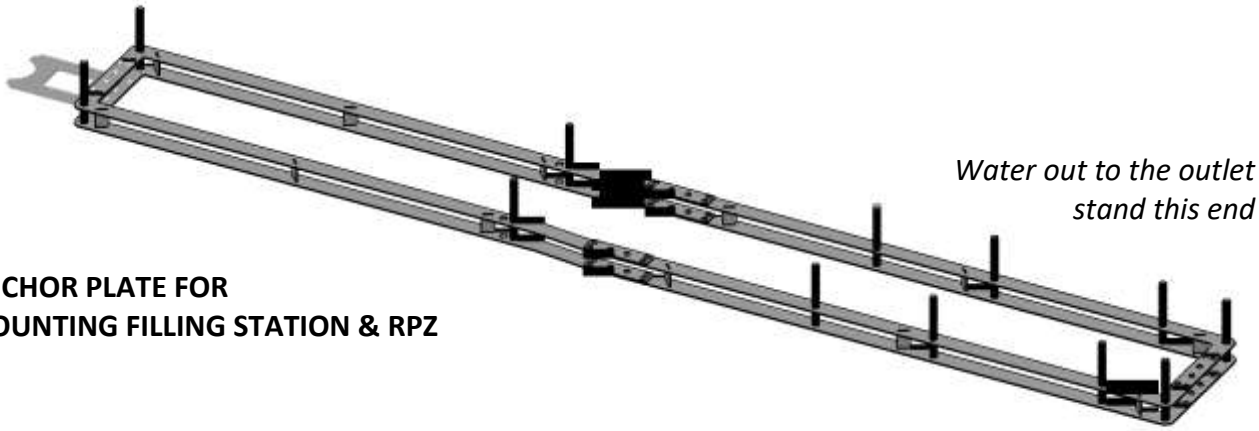
However, if only installing the anchor plate for the Filling Station this is not so clear and care should be taken to get the orientation right. The quick check is that the riveted plate is the OUTLET side of the cabinet.

When embedding in concrete it is recommended that there is 50mm of concrete above the anchor plate. This would leave approximately 30mm of stainless steel thread above the concrete for installing the Filling Station Ground Plate. When concreting the ground plate in positron, first tape the threads to prevent concrete filling the thread.

Also, make sure that the slab is level over the whole area of the Filling Station and not building up around the mounting threaded studs.
When mounting the Filling Station, first coat the M16 threaded stainless steel studs with anti-seize (or grease), to prevent the nut that may occasionally "gall" and lock in position.

RPZ *Cabinet* *Outlet Stand*

Water in to the RPZ this end



Water out to the outlet stand this end

ANCHOR PLATE FOR MOUNTING FILLING STATION & RPZ

Water in to the cabinet this end

ANCHOR PLATE FOR MOUNTING FILLING STATION ONLY

Water out to the outlet stand this end

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STEP 1

- Install inlet plumbing so that the RPZ base has 300mm clearance to ground ((legal requirement).

Note: If Abberfield supply the RPZ it will be on substantial stainless-steel stands with up and down adjustment. The plumbing of the Filling Station will be at a lower level and adapted by a goose-necked pipe. Adaption pipes are available from Abberfield (as optionally are RPZ and cage assemblies).

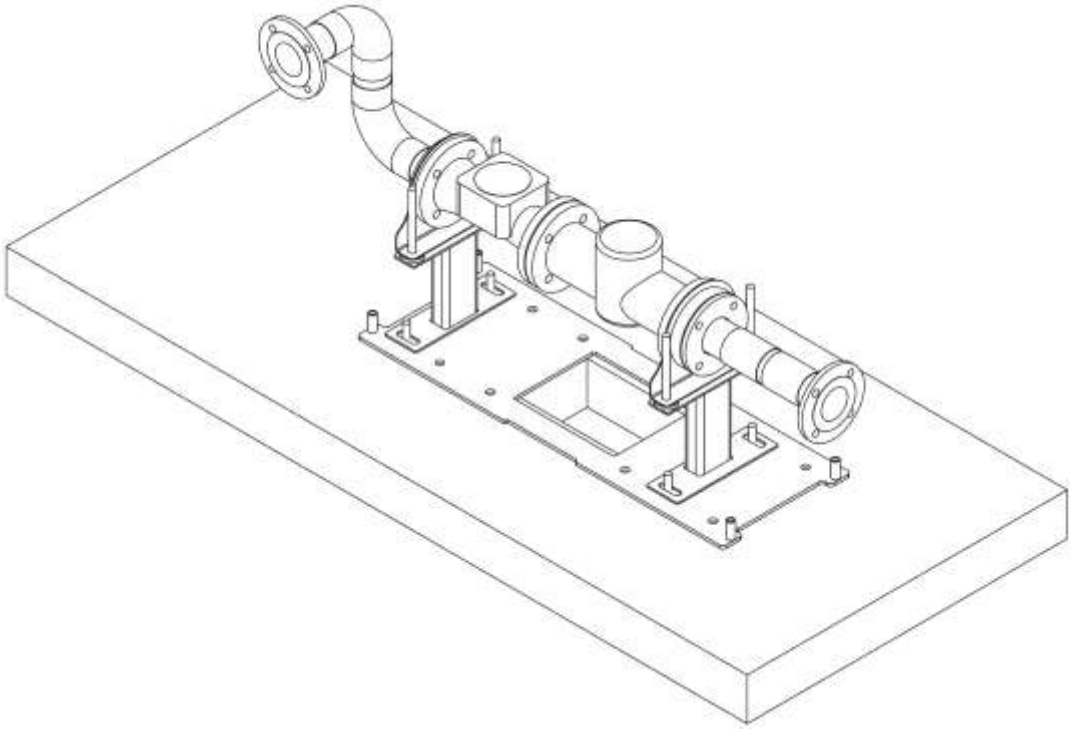
ADJUSTABLE STAND WITH PLUMBING MOUNTING

RPZ TO CABINET HEIGHT EQUALISER

Typically, this assembly means that the centre line of the cabinet plumbing will be approximately 360mm above ground and has limited height adjustment.

STEP 2

- Mount plumbing to concrete slab.

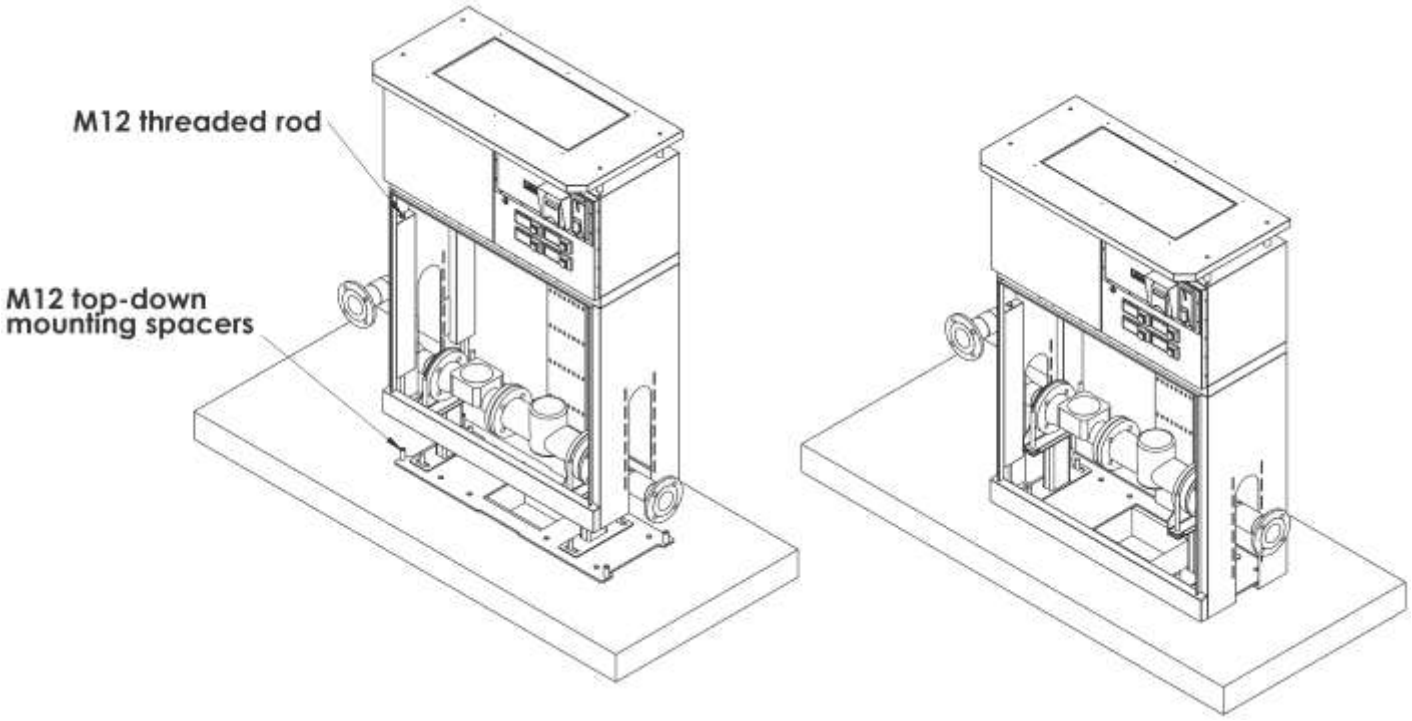


Note: Slab can be reversed to allow for plumbing to enter from the left hand side. Height of the plumbing can be adjusted by raising or lowering the mounting plates with the M16 nuts on the 4 threaded rods.

The plumbing base should be mounted relative to the inlet plumbing if that already exists. Once the base is mounted the pluming assembly has limited sideways adjustment.

STEP 3

- Lower machine over the plumbing.
- Secure the M12 threaded rod to the ground plate top-down mounting spacers.

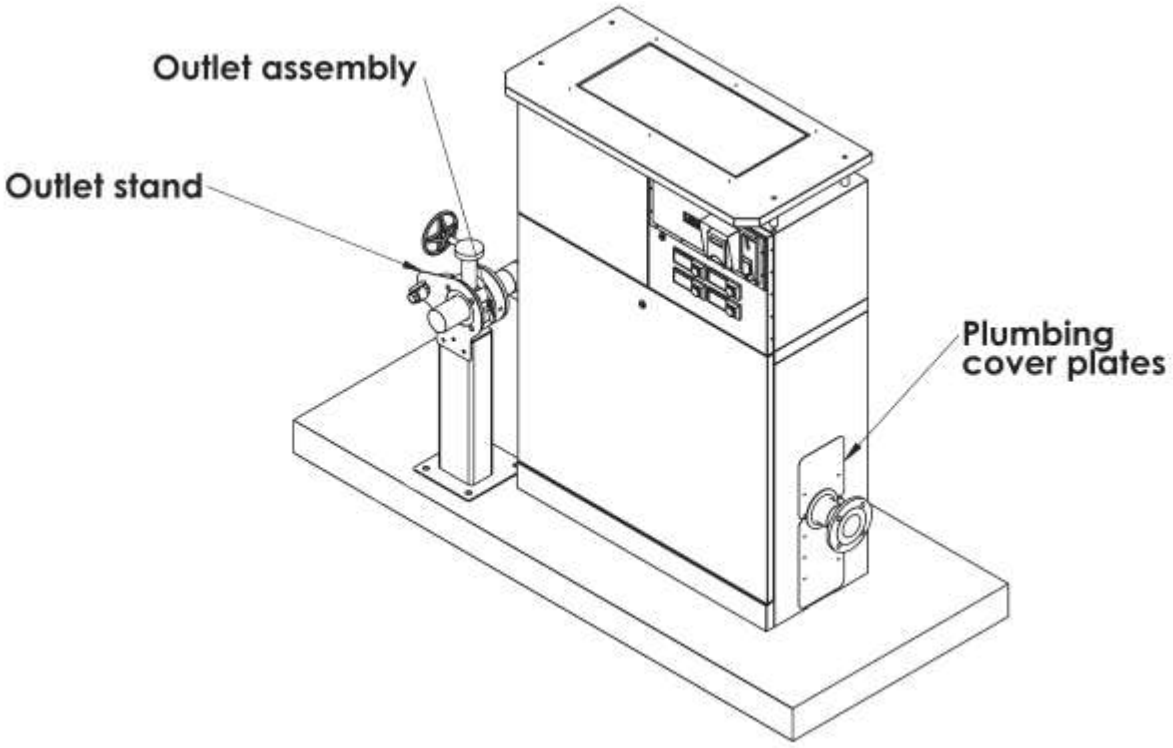


STEP 4

- Install outlet assembly and outlet stand. Secure using supplied S/S M16 hex head bolts and nuts.
- Adjust outlet height as required.

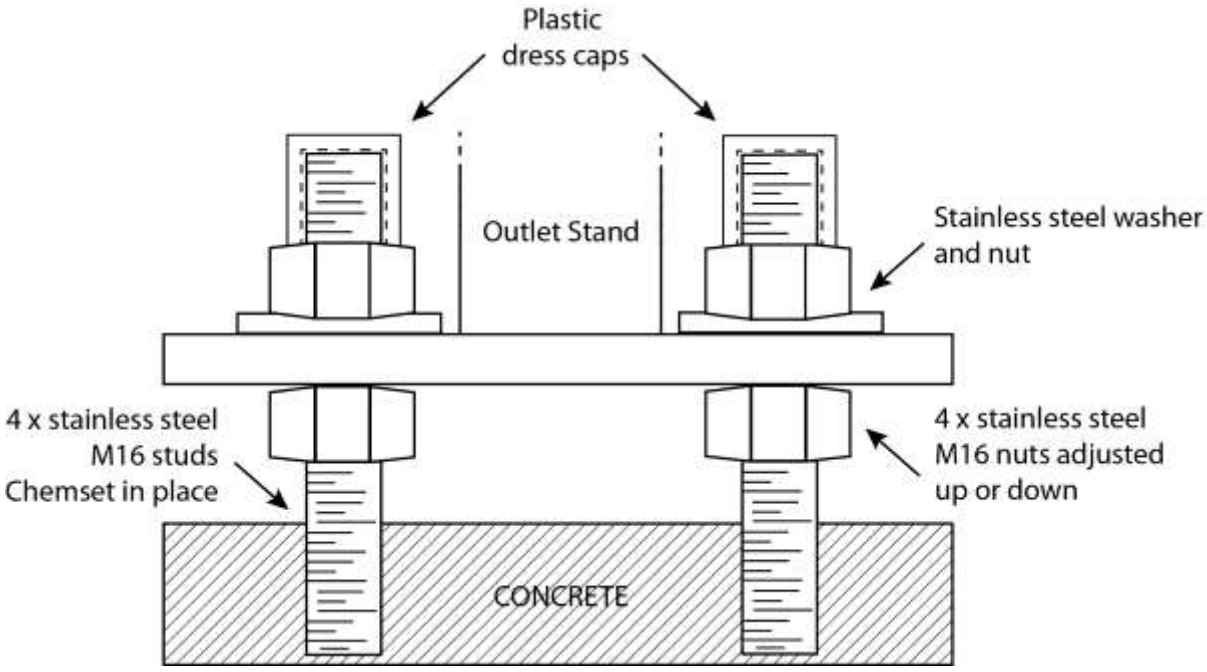
STEP 5

- Install plumbing cover plates. Secure using M5 S/S nuts supplied by Abberfield.
- Adjust outlet height as required.



It is normal to have the outlet pointing down slightly to ensure any dirt or contaminant flushes free of the plumbing system. The method of installation is common for 80mm or 100mm systems, although the 100mm tap assembly and stand will mount slightly forward and further away from the cabinet.

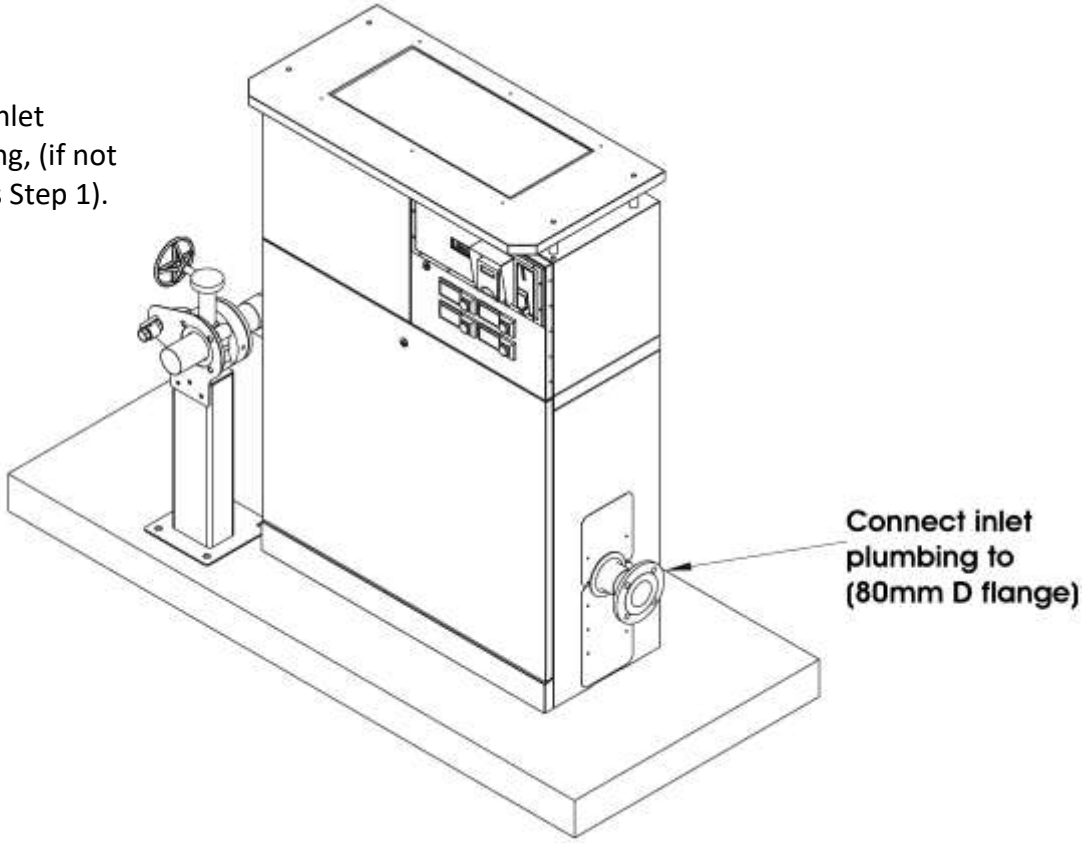
Height adjustment of the outlet stand can be by under-stand packing with fibre cement or equivalent, before fitting ground fasteners, or by use of stainless adjusting studs that are available from Abberfield.



Installation is completed by neatly parging in the underside of the outlet stand with sand and cement, finishing with a smooth 45-degree bevelled edge.

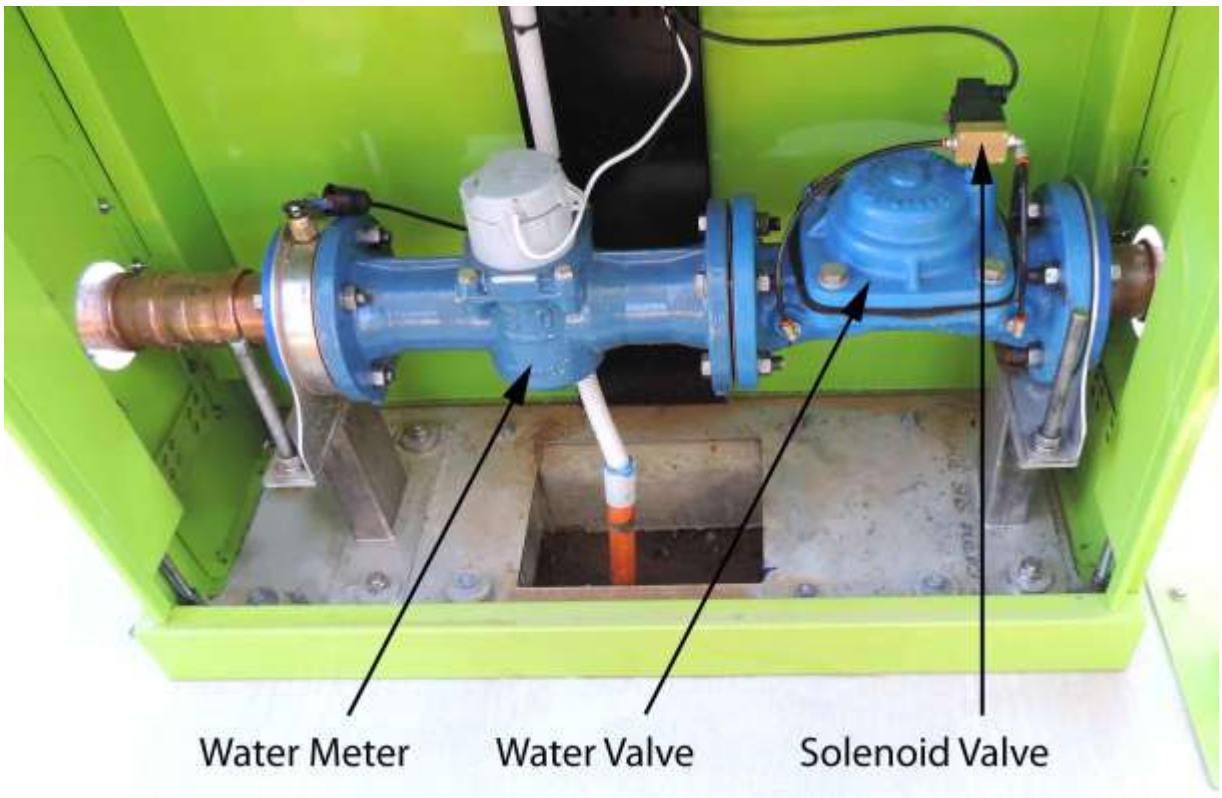
STEP 6

- Install inlet plumbing, (if not done as Step 1).



6. COMPLETED INSTALLATION

The image below shows a completed installation for a WD3000N Tanker Filling Station



Soft Start / Stop

The electrically controlled water valve uses a pilot solenoid valve to direct mains pressured water onto the top of a valve diaphragm or to the discharge line. The valve is effectively opened and closed by water pressure. To avoid water hammer the rate of diverting water through the pilot solenoid valve provides a soft opening and closing the water valve. Normally this rate is factory set by choice of solenoid valve feed connection.

However, sometimes slower start and stop times are required and an adjustable bleed valve can be fitted to the solenoid or water valve port.

A bleed valve in the upstream line will adjust the shut off time and one in the downstream will adjust the turn on time.

The preassembled and pressure tested plumbing system comes with a test certificate.

PLUMBING PRESSURE TEST CERTIFICATE

Plumbing systems to which this certificate is attached have been assembled using

molybdenum disulfide coated stainless steel nuts and bolts,

tightened to 80 Newton Meters and pressure tested to 1100 KPA

Signature ..... **Date** .....

Signed on behalf of the Abberfield Group

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7. ELECTRICAL

The WD3000N can include a switchboard comprising:

- Mains switch
- RCD machine supply switch
- RCD power outlet

Electricians wire this in the locked cabinet provided to the rear of the machine and connect the flexible mains lead that is pre-wired to the control cabinet. The main earth lug (stainless M6 stud) should be used, additional to any other earth strapping. Cable size can be minimal as the operating current is negligible. However a 10 amp GPO is normally included for service purposes and this then dictates the main cable size.

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POWER BOARD

The switchboard cabinet has provision to include a meter board but there is no expectation of this ever being required, since the current draw is minimal and water services are considered an essential service.

If an on-board solar panel is fitted this will be pre-wired at the factory.

If an external solar panel is fitted, then the larger battery and regulator should be fitted inside of the switchboard and cables run through to the control cabinet. These are connected to the terminal plate where marked “external regulated battery + and –.”

Note: The connection to the terminal switch plate will be from the battery not the solar panel and a regulator should be fitted to protect the battery and the system electronics. If a machine is known to be using an external solar panel this cable will be pre-fitted.

If Abberfield supply the external solar, included would be the pre-wired battery and regulator.

Power relays (optional)

One customised feature is to include power relays on the switchboard (with voltage free contacts), used for varying functionalities including;-

- External wide area lighting, on/off controlled by Abberfield’s controller.
- Pump activation, controlled by Abberfield’s controller.

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TERMINAL SWITCH PLATE INSIDE CONTROL PANEL

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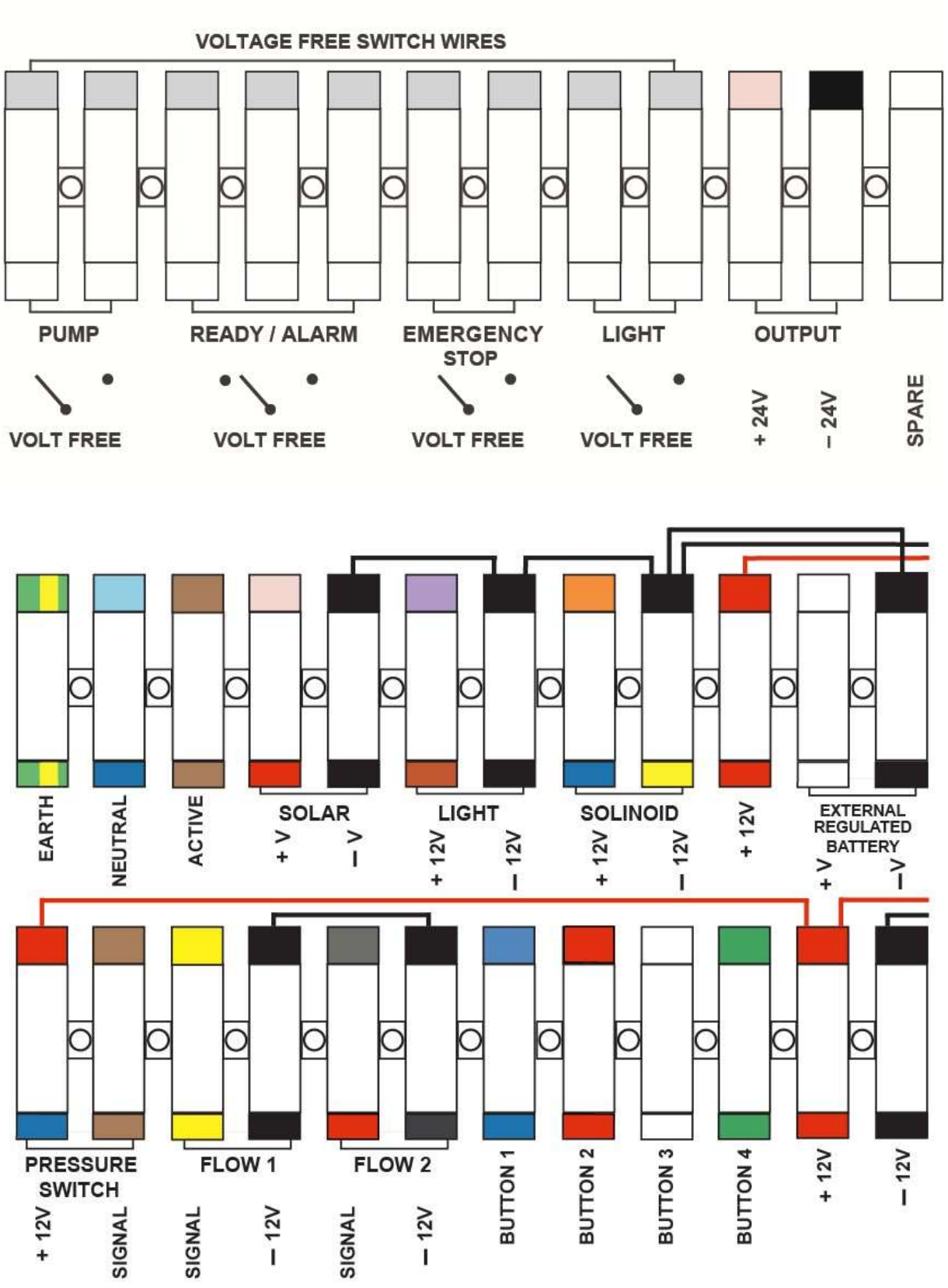
TERMINAL SWITCH PLATE WITH EXPANSION TERMINALS

INSIDE CONTROL PANEL

Note: wire colours to be added

TERMINAL SWITCH PLATE WIRING LABEL WITH EXPANSION TERMINALS



ENHANCE FUNCTIONALITY

Note the following is for special applications only, rarely required, but available on request.

Since Abberfield is a Research and Development based manufacturing company, customers' special requirements can be accommodated on a case by case basis. Sometimes this will mean the cable terminations are different, generally by adding to, rather than altering, the existing cable terminal plate connections. This is accommodated by having an **ENHANCED** termination plate as follows.

Pump Control

Primarily for where a pump is used to deliver water directly to the Filling Station and there is concern about water surge protection. Electrical pump control is available direct from Abberfield's controller, where the pump is only energised after a card payment transaction and only during the water delivery period, Pumps that maintain a pressure in the water line and are fitted with an accumulator tank and pressure switch generally do not need electrical pump control, although this can be fitted if required.

On validation of a card payment the Abberfield control electronics first turns on the electrically operated outlet water valve. After a very short (adjustable) time the pump is energised.

On completing water delivery the pump is turned off first, and then the water valve.

This process reduces the chance of a pump start up or flow stoppage creating surge pressures that may stress the plumbing infrastructure.

It is also normal to include water line surge protectors, either or both a water hammer arrestor, or a pressure relief valve (See plumbing section).

Alarm Output

Terminals can be provided that give a failsafe normally open electrical contact. These contacts close if the Filling Station is out of action, including if power is disconnected. The contacts are voltage free, allowing any external alarm circuit to be implemented (up to 2amps). The alarm contacts are rated at 5amps – 240 Volt capacity. However Abberfield most strongly recommend the contacts are used for low voltage only, it is not safe to introduce 240 Volts into a Filling Station Controller that operates on a nominal 12 Volts DC. It is not possible to monitor all conditions that cause inability to transact a card payment and water delivery, but the most likely are included.

Disable Circuit

An input is available to disable the Filling Station in case of need, such as water not available, external emergency stop etc.

External Flow Metering

Water Flow meter pulses are available for external monitoring, perhaps as an input to a third party PLC system. These contacts are separate to the pulses used by Abberfield for the Filling Stations normal operation. Abberfield's controller used Flow1 inputs and the external pulses are on terminals labelled FLOW2.

External Flow Control

These are voltage free contacts that operate when the electric water valve is operating.
One use is to operate a remote water valve but controlled by the Filling Stations controller.
Another is an external signal for a third party PLC or other means of externally knowing when water is being delivered.

External Flow Input

Very occasionally the Abberfield Filling Station needs to operate using an external water discharge line rather than by the Filling Stations internal plumbing. This may require a separate flow meter and Abberfield's controller can be made to switch from one controller to another.

INSTALLATION OF CONTROL ELECTRONICS

The electronics are usually fitted by Abberfield staff, just to ensure that the installation has been professionally carried out. All part of Abberfield Technology's total service support.

The primary and extensive part of commissioning relates to the back office data processing, configuring modems and end to end testing of Tripple dez data encryptions.

Having done that, installing the control electronics can be carried out by the customer.

There are 4 parts to the electronics;

1. Control Module.
2. Configuration Module.
3. Mains Power Supply (not needed if solar operated).
4. Battery Module (optional if only mains operated).

CONTROL MODULE

CONFIGURATION MODULE

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MAINS POWER SUPPLY

BATTERY MODULE

The Controller, Configuration Module and Battery Module plug into self-locating docking stations engaging large gold-plated contacts. They are held in place with two security screws.

The Configuration Module has 3 polarised plugs that engage sockets and are held in place by the substantial contact pressure.

INSTALLATION METHOD

1. **Remove all power from the Filling Station** (unplug green plugs top left corner of cabinet and any battery in the electronics area).
2. Ensure both switches on the Configuration Module are in the off position.
3. Plug in the Configuration Module.
4. This is done by feel as each of the plugs engage their matching socket. To secure the module press the Configuration module in the area of each plug assembly and ensure all plugs are fully engaged. The front face of the Configuration Module should then be parallel with the back plane circuit board.
5. Slide the Controller Module into place, connect the 2 aerials and secure the holding screws.
6. Slide the battery module into place and secure the holding screws.

   Installation Complete

- Then turn on the mains switch on the side plate underneath the Power Supply.
- Turn on the power switch on the face of the Power Supply.
- Turn on the system switch on the Configuration Module.

The controller should start up and make connection with the credit card and back office banking / control servers. Operate the Filling Station to confirm a successful installation.

Telephone support is (02) 9939 2844. Out of business hours wait for call diversion to the Duty Engineer.

8. INSTALLATION NOTES

8.1. NOTE ONE

Plumbing is able to enter the cabinet from either side (left or right). This is achieved by changing the goose neck outlet to face 180 degrees in the opposite direction.

The outlet tap assembly will also need 108 degree rotation (gear head handle and 25mm tap facing away from the cabinet).

8.2. NOTE TWO

The concrete slab should be flat so that the ground plate is not distorted when bolted in place. If there is doubt, then lay down a film of dry sand cement first to act as a bedding.

It may be necessary to bed the cabinet in dry sand cement as well.

8.3. NOTE THREE

The plumbing should be datum to the entry end of the ground plate where it should be pre-assembled on receipt. This is necessary to ensure there is room to remove the joining bolts to the plumbing fitting adjacent to the plumbing exit side of the cabinet. This is not essential, but avoids unnecessary removal of other plumbing devices first, should replacement to plumbing devices ever be required.

8.4. NOTE FOUR

Take care in lifting the cabinet by eye bolts (Hiab etc). Do not jerk the cabinet or apply excessive side load**.**

When lowering the cabinet into position ensure that it is accurately positioned. The top down mounting bolts must slot neatly into the mating ground plate threaded spacers

8.5. NOTE FIVE

The ground plate threaded spacers should already have Anti Seize Lubricant applied to their thread. If this is absent **add anti-seize or grease before installing to the top down bolts**. This ensures that seizing of the thread cannot occur (stainless does not rust but if the thread is a very tight fit, stainless has a habit of molecular bonding and 'freezing' tight).

Anti-seize or grease should be used on all bolts and nuts.

8.6. NOTE SIX

Once installed, the plumbing system door is fitted and checked to see that the top of the door aligns with the side of the cabinet. If offset then loosen the two front mounting bolts and adjust the cabinet front left or right so that the top of the plumbing door aligns correctly (the top of the door does not overhang the cabinet side, left or right).

Once the cabinet is mounted correctly, if further alignment is required, fit shim washers to the door 'feet' (left or right) as needed. If the lower door remains out of alignment contact Abberfield's technical support for advice on remedial action.
Phone: (02) 9939 2844 or email: contact@abberfield.com.au

9. INSTALLERS TO TAKE TO SITE

1. Dry sand cement
2. Ground fastening devices for the ground plate (up to 8 per ground plate). Use stainless steel fasteners and apply grease to the thread.
3. Kit of parts from Abberfield Industries comprising of:
    a. M12 security screws and M12 normal screws to replace eye bolts on top of the cabinet (unless Abberfield change these as part of the post installation commissioning)
    b. M16 studs and adjusting nuts for the outlet stand.
    c. 25mm ball valve outlet
    d. Machine keys
4. Installation Manual.

10. ITEMS TO RETURN TO ABBERFIELD INDUSTRIES

(If possible)

1. Purpose built pallets and joining plates.
2. Plumbing end blanking plates.
3. Eye bolts.
4. Any unused parts.

11. TELEPHONE SUPPORT

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APPENDIX 1 – WD3000N EXTERNAL RESIDUAL PRESSURE ZONE DEVICES (RPZ)

These water backflow devices are attached external to the WD3000N payment and delivery station. They can be to the left or right of the WD3000N, as a straight through connection.

For neatness the RPZ can be positioned behind the Filling Station.

Theft protection is provided by a lockable cage with a hinged lid.

ABBERFIELD SUPPLIED RESIDUAL PRESSURE ZONE DEVICE (RPZ)

Note: The height and lateral adjustable mounting system, all in stainless steel

CAGES

In keeping with the quality of the Filling Station Abberfield cages:

- Use a rectangular hollows section frame (not angle iron).
- Have the base section raised off the ground.
- Have stainless steel mounting feet plus locking strap.
- Hinges and lid restricting chains (2 off) are also in stainless steel.
- Lids are reversible for left or right hand entry.
- Built from galvanised steel and then powder coated.

CAGE

ON-SITE PHOTO OF RPZ & CAGE (RPZ and cage by customer not by Abberfield)

ON-SITE PHOTO OF RPZ & CAGE (Abberfield supplied RPZ and cage)

The RPZ with control taps is preassembled and mounted on two substantial stainless steel stands. The height is adjustable with 16mm nuts.

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APPENDIX 2 – SUGGESTED CONCRETE PLINTH DIMENSIONS (MACHINE ONLY)

These suggested concrete plinth dimensions do not constitute an engineered design, but merely provide a suggestion for the slab design. Please consult with an engineer for specific installation requirements. As always Abberfield is available for assistance.

Note 1: *When pouring the concrete it is recommended (but not essential) that the outer edges taper down slightly to prevent pooling of water. However the plinth should be level over the entire area of the Filling Station cabinet to ensure the cabinet sits evenly.*

Note 2: *It is recommended that the plinth is partially embedded and partially above ground, to prevent surrounding soil encroaching on to the plinth.*

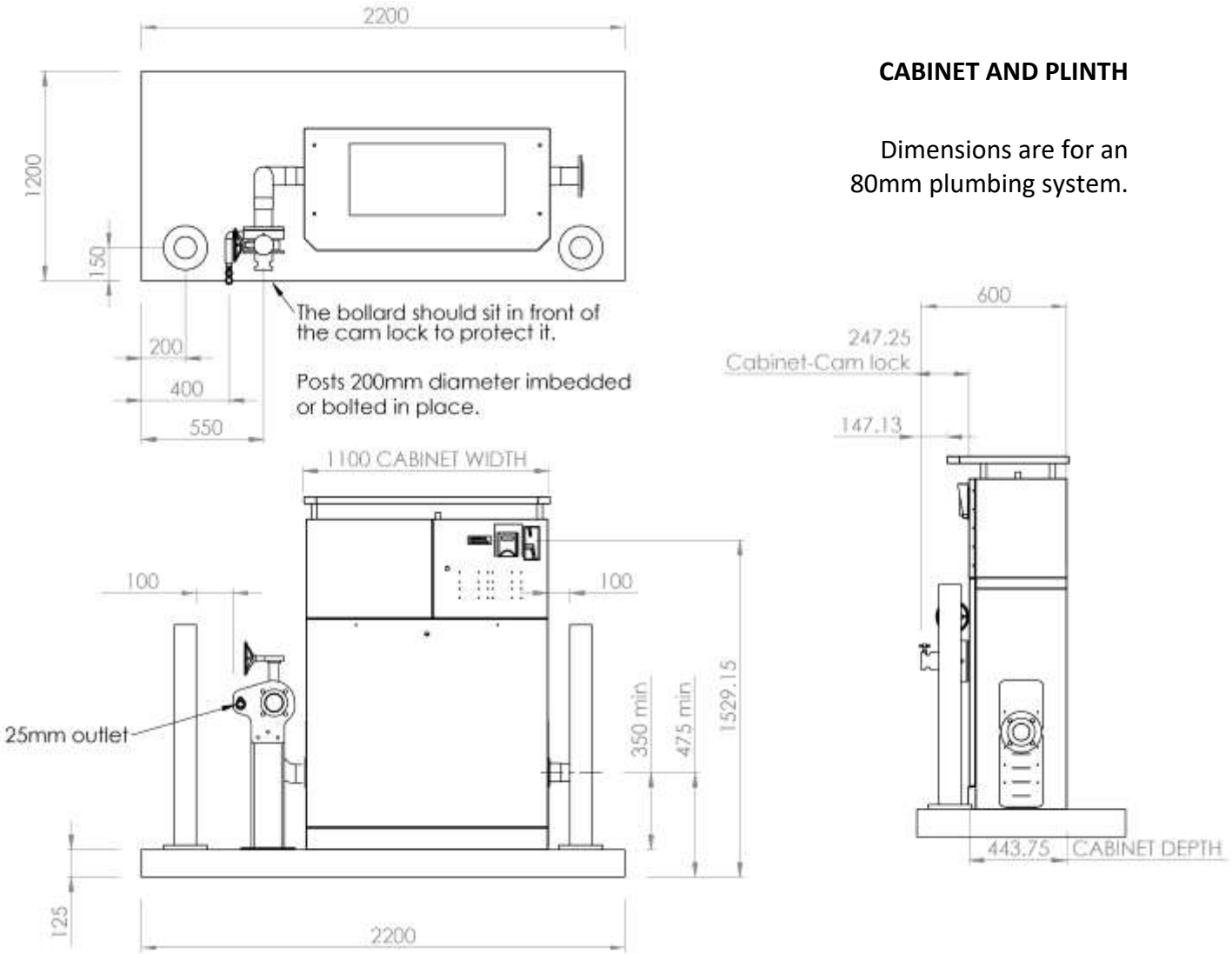
Note 3: *Plinth should include perimeter ribs (perhaps 100mm x 100mm) or similar protection to resist sheer loading.*

Note 4: *For maximum protection, large bollards should be embedded in their own footing separate to the cabinet concrete plinth.*

Note 5: *Smaller bollards (frangible posts) can be bolted to the slab directly if the risk of vehicle collision is limited.*

CABINET AND PLINTH

Dimensions are for an 80mm plumbing system.

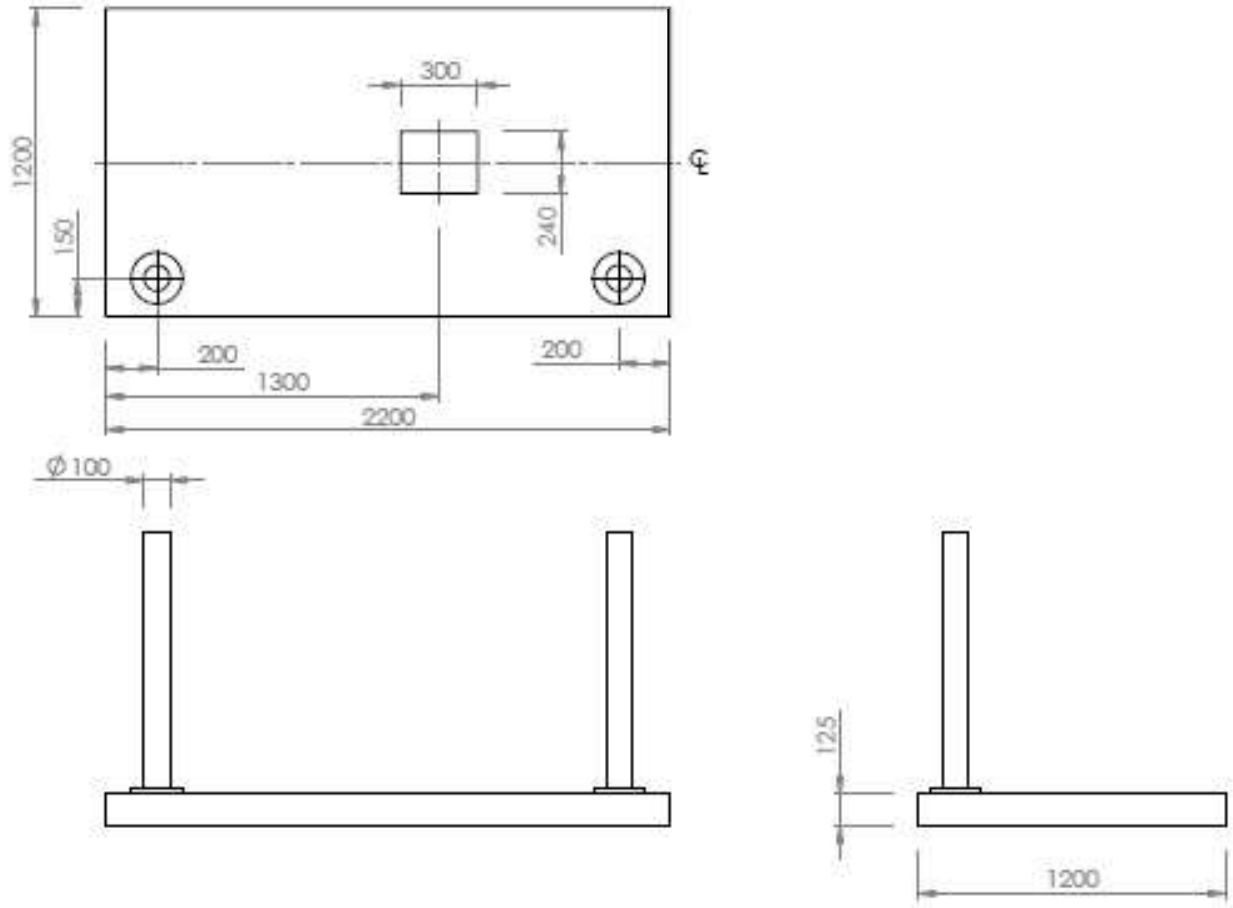


100mm plumbing system varies slightly, although the same cabinet is used.

Note: Right hand entry plumbing shown. Plinth is symmetrical so can be spun 180 degrees to accommodate left hand entry plumbing.

If bolted (as shown) they are 'frangible' posts, designed as sacrificial, to fail before the slab moves. Frangible posts provide reasonable protection and act as visible markers to keep vehicles clear.

PLINTH ONLY



*Note 1: The 300 x 240mm void is **optional**, used to facilitate cable entry and to allow drainage in case of need.*

Note 2: Plinth is symmetrical so can be spun 180 degrees to accommodate left hand entry plumbing.

Note 3: The drawing is for right hand water entry. Left hand entry is the same, with the 300 x 240mm void moved to the other end of the slab.

Note 4: Provision should be made for sheer loads (hit by vehicle etc.). Suggest casting edge ribs or integral or adjacent sheer pegs.

Note 5: *Bollards can be set in concrete separate to the mounting plinth. This has the advantage that vehicles hitting the bollards impart no load on the plumbing system. Bollard diameter and distance for the slab vary dependant on the level of protection chosen.*

Note 6: *The outlet stand can be positioned to the left side of the cabinet or the right side, when looking at the Filling Station.*

It is normal practice to position the stand on the left side. This allows the stand to be to the rear of the tanker when the vehicle is parked in front of the Filling Station.

In physically tight locations positioned to the left may allow the driveway to be a little shorter than if positioned to the right.

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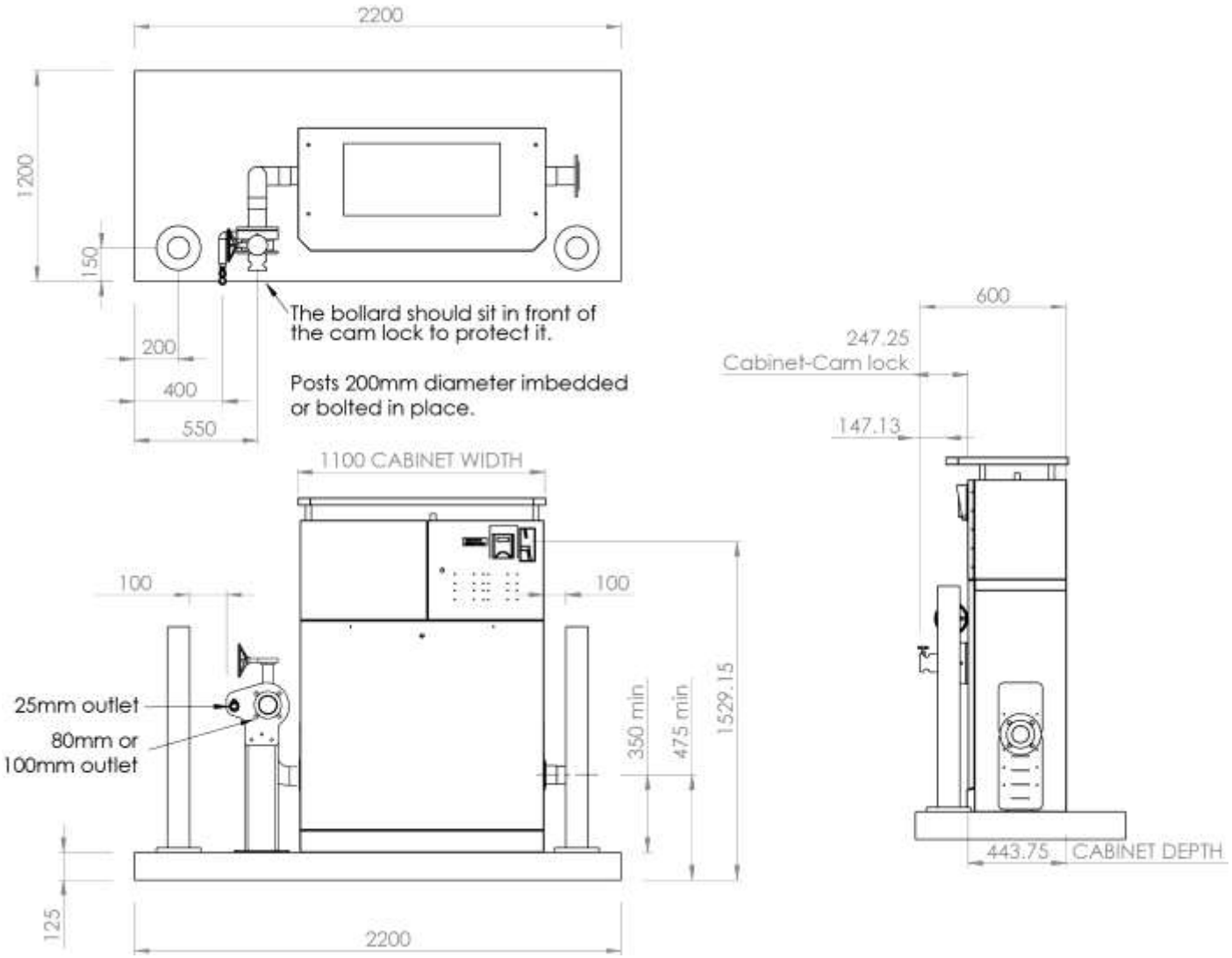
APPENDIX 3 – SUGGESTED CONCRETE PLINTH DIMENSIONS (MACHINE & RPZ WITH CAGE)

These suggested concrete plinth dimensions do not constitute an engineered design, but provide a suggestion for the slab design. Please consult with an engineer for specific installation requirements. As always Abberfield is available for assistance.

CABINET AND PLINTH



Note: Right hand entry plumbing shown. Plinth is symmetrical so can be spun 180 degrees to accommodate left hand entry plumbing. However, it is recommended that when looking at the face of the Filling Station the water flows from right to left, as shown in the above drawing. This allows a tanker to park adjacent to the Filling Station and RPZ, with the Filling Station outlet then adjacent to the rear of the tanker and the tankers fill point.

If the outlet were reversed the tanker must park further forward, necessitating a longer driveway, with a consequent space and cost increase.

Plinth should include perimeter ribs or similar protection to resist sheer loading.

MACHINE MOUNTING - WITH ANCHOR PLATE

The recommended method of attachment of the machine ground plate is on to an anchor plate (supplied by Abberfield) encased in the concrete slab. This presents stainless steel threaded rods over which the machine ground plate is positioned and locked into place. Use anti-seize lubricant on the threads of all bolts.

MACHINE MOUNTING - WITHOUT ANCHOR PLATE

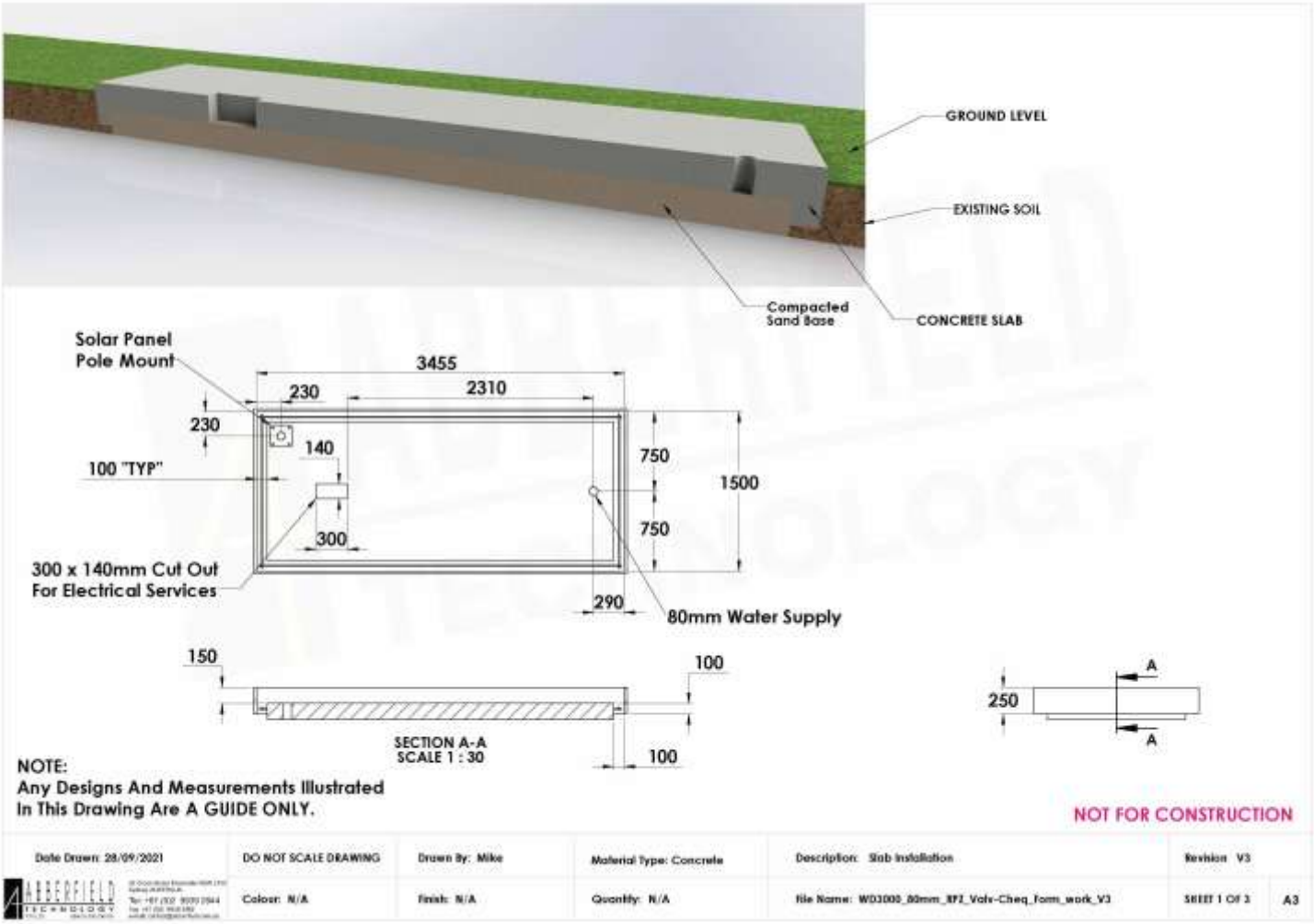
If an anchor plate is not employed, the method of attachment is as follows:

1. Using a machine template (supplied by Abberfield) or using the machine ground plate as a template, mark the mounting positions for the ground plate.
2. Drill a hole 16mm or above to an adequate or convenient depth.
3. Set in stainless steel threaded studs in Chemset or epoxy (threaded studs available from Abberfield).
4. When the threaded rods are firmly set, position the ground plate and secure firmly.
5. Remember stainless steel threads should have anti-seize applied.

Alternatively, if conventional fasteners are used, please ensure these are of stainless steel, in keeping with the quality of the system.

CUSTOMISED SUPPORT

Following is an example of quality extended throughout, whether visible or concealed. This design is used by a major customer and utilises an Abberfield anchor plate to accept a Residual Pressure Zone Device (RPZ - for backflow prevention) and the Abberfield machine.



Formal engineer's plans available by negotiation.

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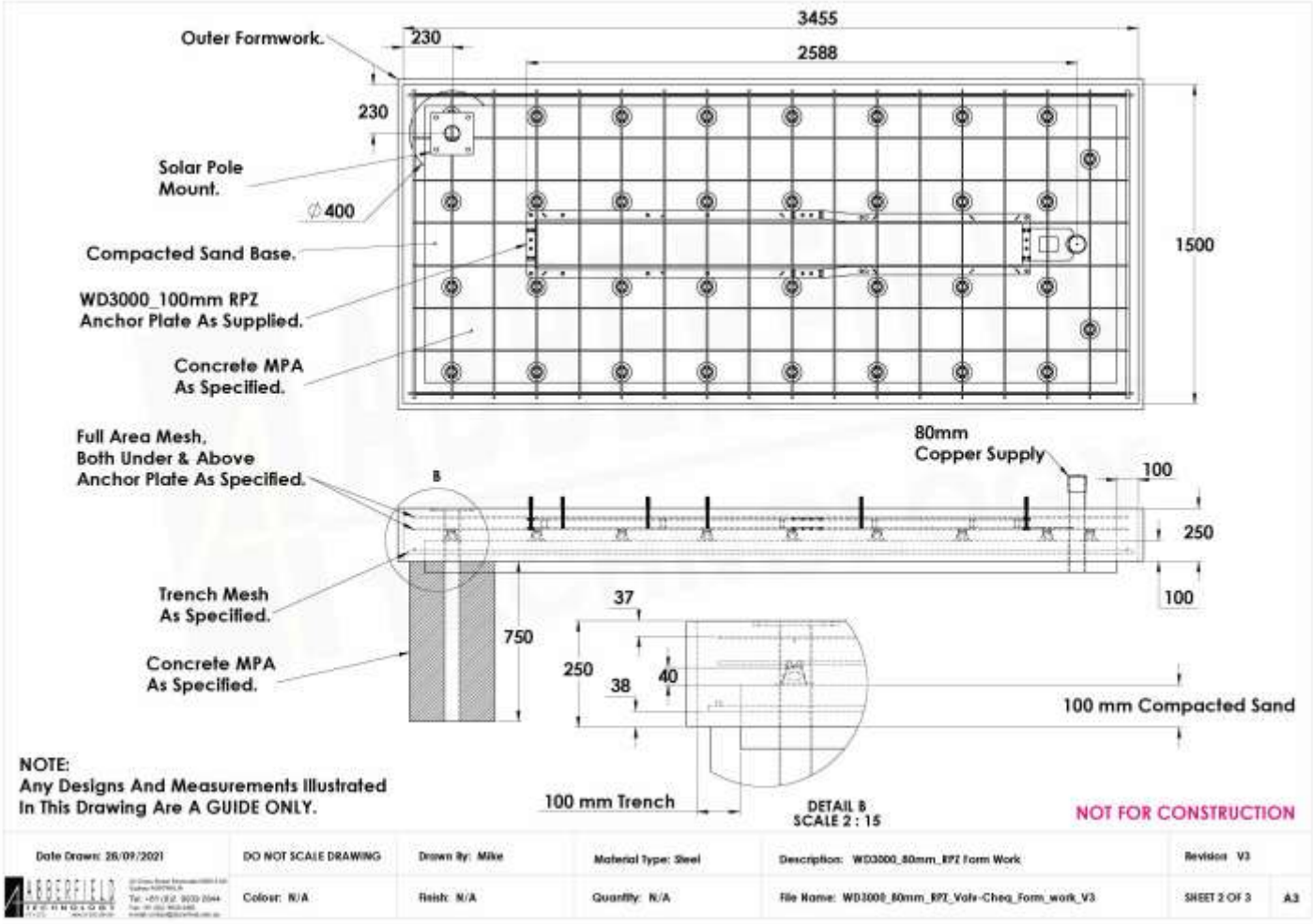
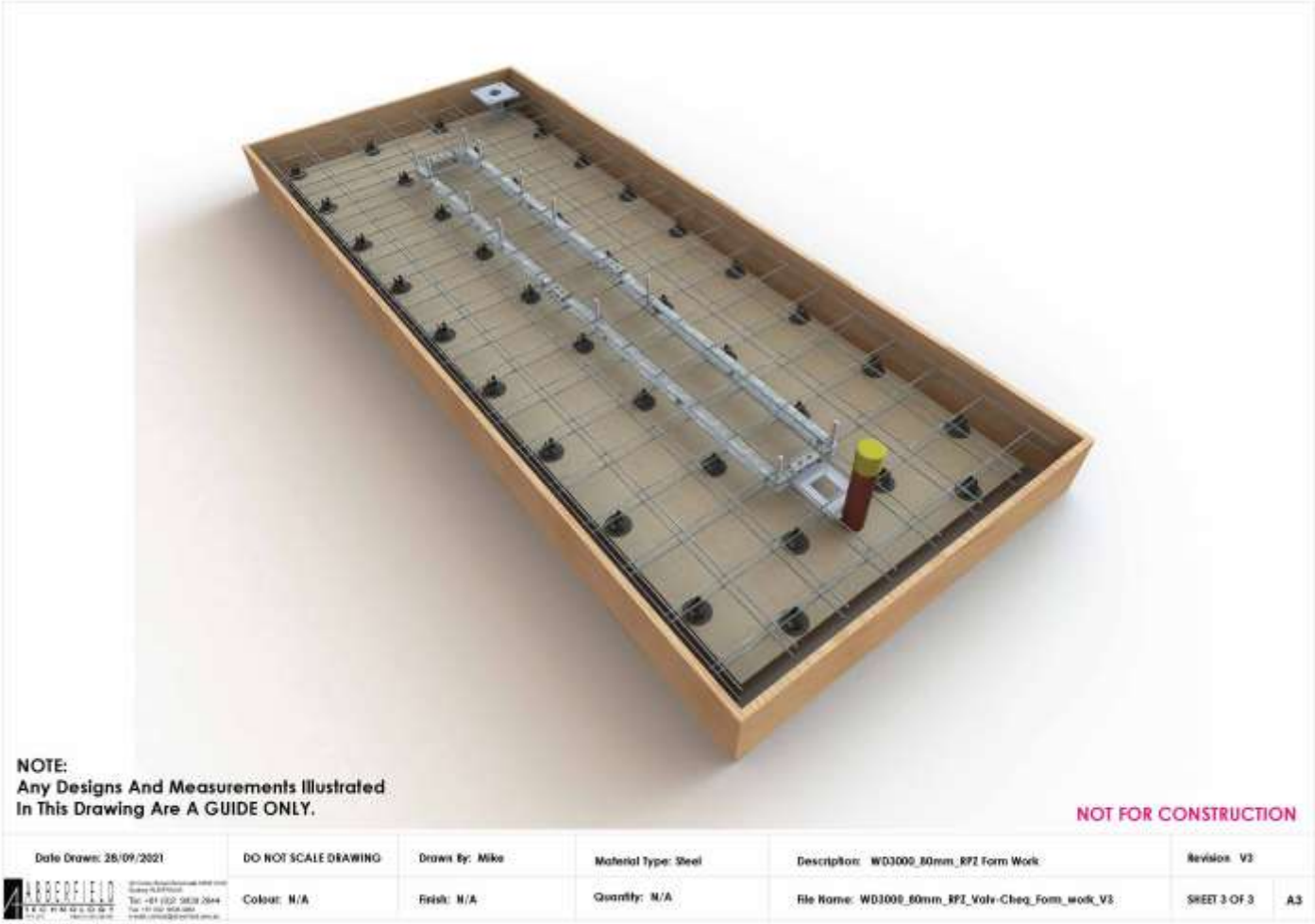


Formal engineer's plans available by negotiation.



Whilst this installation manual is for information only, formal certified drawings can be provided by Abberfield to meet any customer's requirements.

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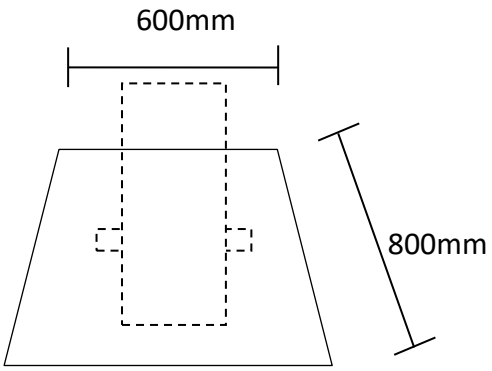
APPENDIX 4 – RECOMMENDED BOLLARDS SPECIFICATION (for maximum impact resistance loaded tanker protection)

INTERIOR REINFORCING MESH

- 300mm diameter
- 1200mm above ground
- 660mm imbedded
- 8mm wall thickness
- Seamless mild steel
- Galvanised
- Painted powder coat - safety yellow
- Open top, concrete filled with optional reinforced mesh inner
- Minimum footing 600mm x 600mm or 600 diameter / 800mm deep
- Foundation undercut recommended



UNDERCUT RECOMMENDED

Optional reo rod

BOLLARD **CUTAWAY**

12. APPENDIX 5 – SOLAR PANELS

Most Water Dispensing Stations can have a solar panel added on top, with sufficient capacity to allow the machines to operate in sleep mode (wake up for each operation).

ON-BOARD SOLAR PANEL

Note: Even if the on-board solar panel is not intended, the supporting mechanical hardware and internal wiring, plus control software is pre-fitted.

Therefore post installation fitting of an on-board solar panel only requires:-

1. Remove the top heat shield.
2. Drop the solar panel into its pre-installed nest, having first plugged in the connecting wires.
3. Fit the new top heat shield with cut out for the solar panel.
4. Slide in the battery box.

To operate machines full time, a larger pole mounted panel is needed. Sometimes customer supplied, but also available from Abberfield.

There are two solar pole options available:

Option 1: Galvanised pole concreted directly into the ground and the solar panel mounting head bolted directly to the pole.

Option 2: Stainless steel pole with mounting plate for bolting to an in-concrete encased mounting base, or alternatively bolted directly to a pre-existing concrete slab.

The head assembly then bolts over the pole in a manner that allows adjustment of panel orientation.

Option 3: With option 2 a tabernacle can be added to provide ease of installation or subsequent solar panel service, if ever needed.

Note: Option 2 is normally used and tabernacles are becoming common.

SOLAR POLE SYSTEM Option 1

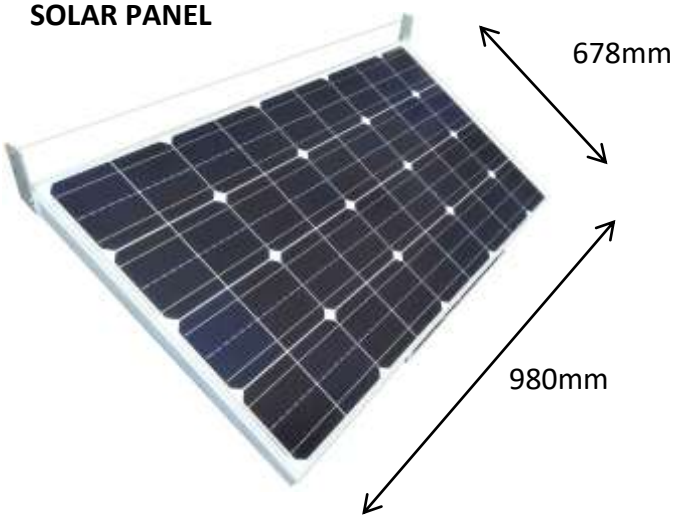
The external kit comprises:

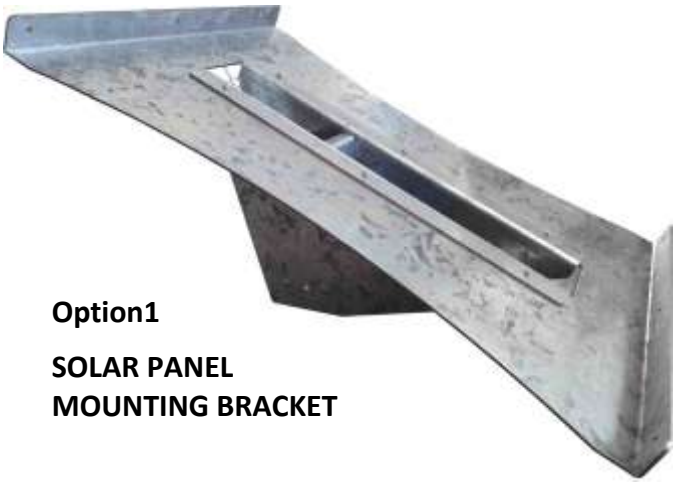
Galvanised pole, 75mm diameter concreted directly into the ground and the solar panel mounting head bolted directly to the pole.

1. 85 watt solar panel.
2. 6 meter galvanised pole, 75mm Diameter.
3. Solar regulator.
4. Larger battery.

The solar panel has a purpose-built mounting bracket that connects the panel to the top of the pole, bolted in position.

SOLAR PANEL





Option1

SOLAR PANEL MOUNTING BRACKET

ELECTRICAL

Electrical connections at the solar panel are via 2 polarized and weatherproofed plugs and sockets, one for positive and the other for negative.

The solar panel will have the connections already made and supplied separately will be the mating plugs / sockets to attach to the customer supplied interconnecting lead.

Abberfield supply a connecting lead from panel to cabinet, 11 meters in length.

If a longer lead is needed the Abberfield supplied lead can be extended using a large diameter conductor to minimise voltage transmission loss.

SOLAR PANEL CABLES

It is recommended that a stainless-steel cable is attached to the solar panel mounting bracket with clamps. If the outgoing electrical cable is attached to this stainless-steel cable, or a shackle with heat shrink tube or cable ties, if the cable is accidently dropped down the pipe it can be recovered.

Installing with spare cable stored down the pole may allow later removal of the panel (via a cherry picker or similar) and lowering the panel to ground level, to affect a repair or replacement.

MECHANICAL

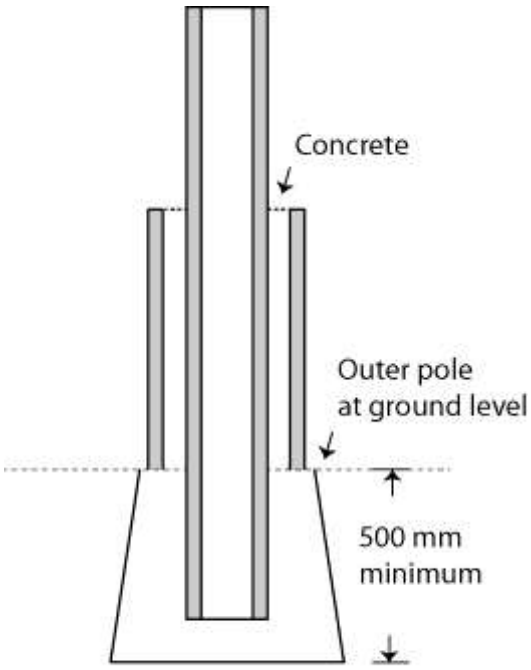
6-meter-long poles are supplied and should be concrete in a ground footing to a depth of at least 500m and diameter of 500mm, dependant on the nature of the ground. Preferably, the footing should have an undercut to provide greater stability and security.

The panel is angled at 45 degrees and should face north or slightly north-west.

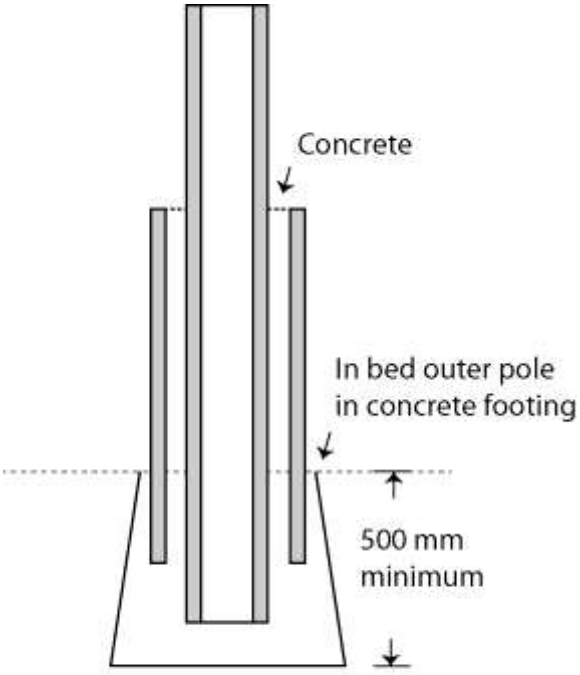
In many installations a pole length less than 6 meters is sufficient and the pole can be cut down as required. The lower the pole the more wind stable is the assembly.

THEFT PROTECTION

In some areas solar panels on poles are at risk of being stolen, typically by cutting off the pole near ground level. This risk can be minimised or overcome by fitting the pole within a shorter, larger diameter pole and filling the void with high MPA pea-gravel concrete. This extra pole considerably increases stability in windy conditions.



Theft Protection

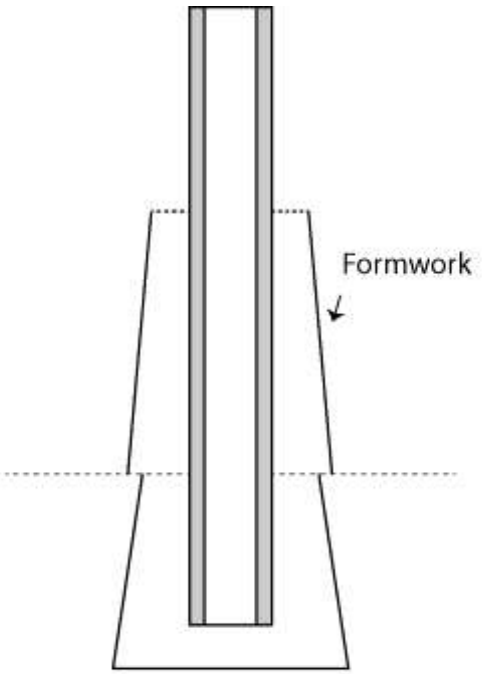


Theft and Wind Protection

The outer galvanized pipe should be fitted at the time of the initial installation. However, for an existing pole, formwork can easily be created to cast a base of pole concrete support, probably a square section and probably tapered vertically.

It is recommended that the lower section of the base be at least 300mm across, as even diamond tipped concrete cutting saws would not have a cutting depth sufficient to sever the pole.

For maximum protection include large diameter vertical reinforcing rods.



Fitting cast concrete support to existing pole

SOLAR POLE SYSTEM Option 2

CONCEPT

1. The pole is made of stainless steel fitted with a base plate.
2. Mounting is direct to a concrete slab or to an imbedded footing.
3. A stainless-steel footing for imbedding in concrete includes a re-enforced pole mounting plate with protruding studs. Alternatively, the pole baseplate can be bolted directly to an existing concrete slab.
4. Between the pole base and the ground mounting can be fitted an optional tabernacle (whether bolted direct to concrete or to an imbedded footing).
   This tabernacle allows the pole to be hinged down, facilitating installation or service.

   Included is an option to padlock the tabernacle.

   The tabernacle can be retrofitted at any time.

5. The head assembly attaching the panel to the pole can be rotated for best orientation.

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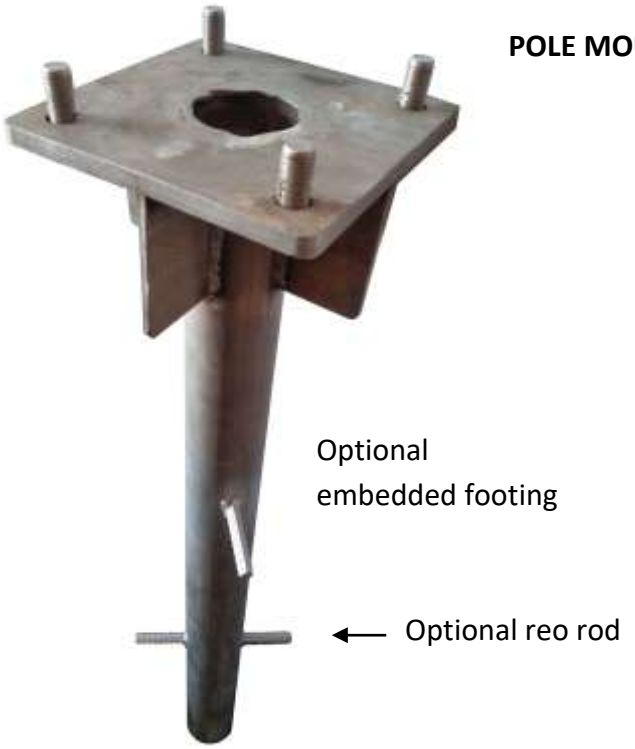
DIMENSIONS

- Pole height 4.1 Meters (other lengths by negotiation).
- Pole diameter 73mm
- Footing depth 1 meter.
- Solar Panel 678 mm x 890 mm, 85 Watt output.
- Solar panel 1150 mm x 650 mm, 120 Watt output.

Note: 85 Watt is considered adequate for Abberfield Water Filling Stations applications in northern latitudes. In southern latitudes or for shaded positions the large panels (120 Watt) can be installed; however, a thicker wall section pole is normally used to satisfy windage protection.

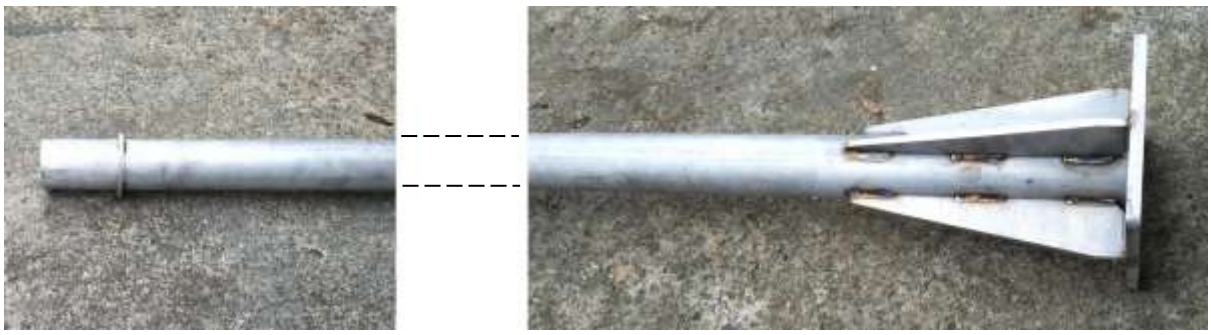


POLE MOUNT

SOLAR MOUNT HEAD ASSEMBLY
(with hinged dress panels)

SOLAR PANEL

POLE



POLE MOUNTING

The solar pole can be mounted directly to the concrete slab or to an imbedded stainless-steel footling assembly.

DIRECT MOUNTING

Perhaps the easiest method is to Chemset 4 x M16 stainless steel studs into the ground and when set attach the pole directly. Studs, washers and nuts form part of the kit supplied by Abberfield and the under plate and above plate nuts can be used to adjust the pole being square.

STUD AND NUT ASSEMBLY

EMBEDDED FOOTING

This footing is for imbedding at the time of pouring the concrete. Made of stainless steel it will not rust, so the thickness of the concrete around the footing is less important.

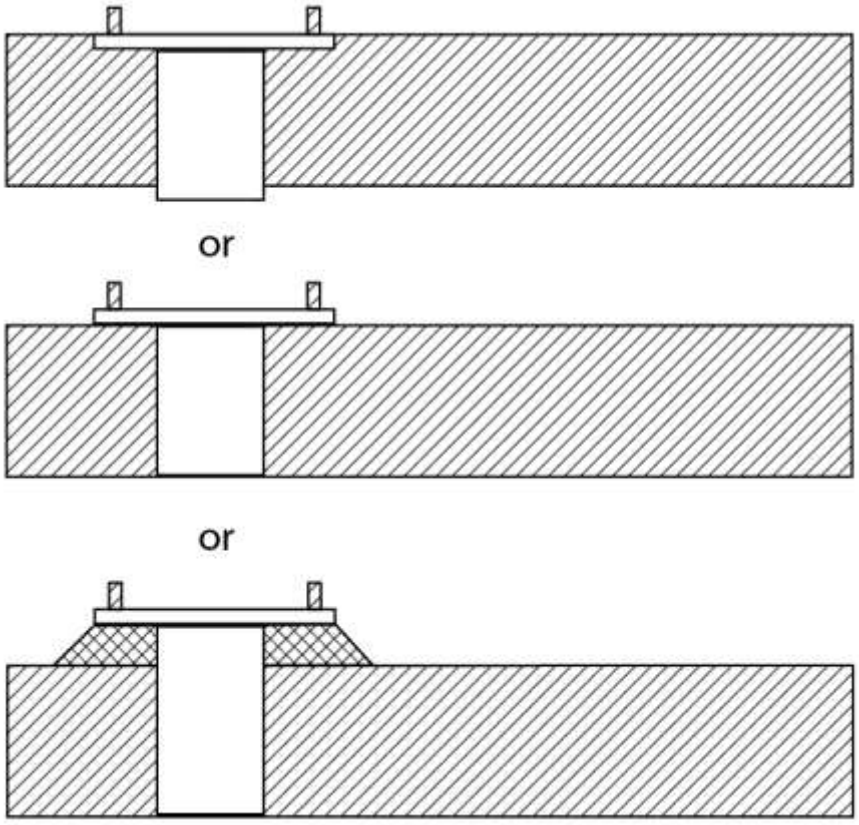
This stainless-steel assembly needs to be mounted square when embedded in concrete, or the pole will not be vertical.

It is recommended that as the concrete is poured a small spirit level is used on the mounting plate and if necessary, the footing is moved around during the pour to finish square and both forward and backwards as well as sideways. However, if not square when the concrete is set shim washers can be used to provide adjustment.

For neatness, mount the footing so that the square top plate aligns with the surrounding footing.

POLE MOUNT

The plate can be embedded flush with the concrete surface or elevated slightly, if this simplifies concreting. If elevated, the gap can be filled with sand cement and parged with a neat 45-degree edging.



CABLE PROVISION

When installing the imbedded footing a conduit for the solar voltage cables should be added. There are 2 ways to implement this conduit.

1. Via a conduit down the full length of the footing.
2. A conduit passing through the wall in the footing just below ground level.

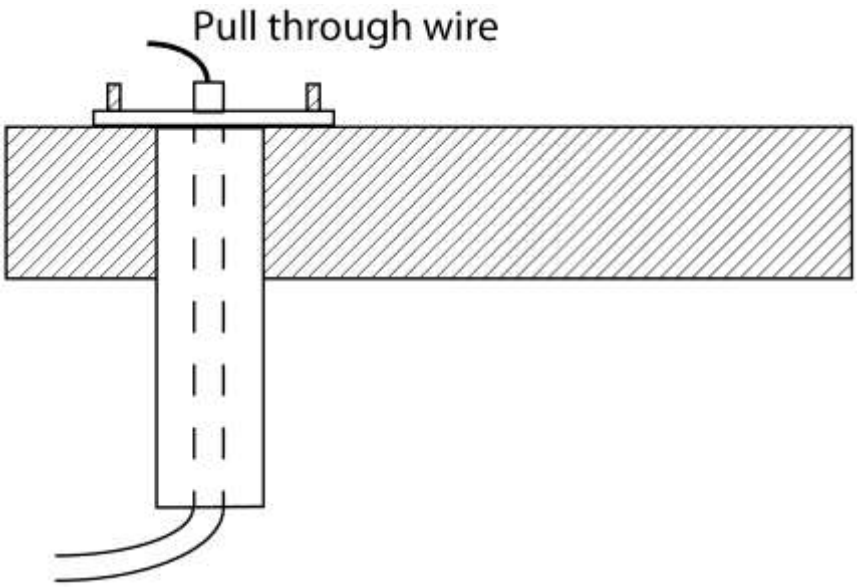
Either method should leave the conduit finishing just above the ground level of the footing, to protrude into the solar pole.

FULL DEPTH FOOTING

The conduit should be continuous with long radius bends, instead of separate elbows.

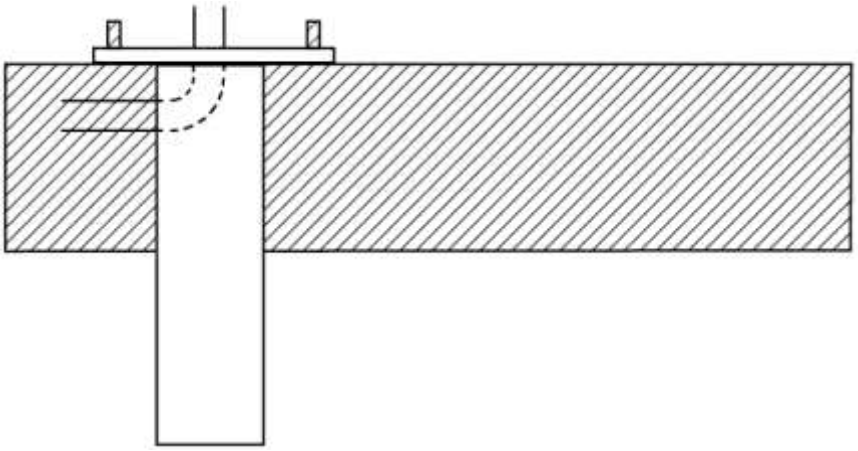
Down the conduit should be a pull through wire.

These measures ensure that a cable can be freely drawn through without catching on any obstructions.



NEAR SURFACE CONDUIT

Any size of conduit could be used but a larger conduit size is recommended, perhaps 32mm diameter. The conduit enters the footing pole through a large side hole and has an elbow to bring the conduit up the short distance to end just above ground level. The large diameter of the conduit and using the largest radius elbow ensures ease of feeding the solar supply cables.



ELECTRICAL

Electrical connections at the solar panel are via 2 polarized and weatherproofed plugs and sockets, one for positive and the other for negative.

The solar panel will have the connections already made and supplied separately will be the mating plugs/ sockets to attach to the customer supplied interconnecting lead.

SOLAR PANEL CABLES

Metre lead supplied with the solar pole

ADJUSTMENT FOR POLE

Before the solar panel head is fitted to the pole it should be tested and adjusted to be vertically square.

Without the head fitted this adjustment procedure is a one- or two-man process.

After the head is fitted the procedure is the same but lifting equipment or more man power is required.

First there should be a mounting based embedded into the concrete.

If not there should be 4 bolts Chemset into the concrete slab.

Either way there will be 4 x M16 stainless steel studs protruding.

ADJUSTMENT METHOD

1. Lift the pole over the studs.
2. Using a spirit level check for any lean on the pole.
3. Since the pole is symmetrical all around, lift and reposition the pole into all 4 orientations to determine which position gives the most upright result.
4. If necessary, remove the pole and using the washers provided use adjusting shim washers to pack one or more of the studs and repeat the steps 1-3.
5. When the best vertical result is achieved, mark the orientation of the pole before removing and continuing the assembly.

MOUNTING PANEL HEAD

The head is designed to rotate around a collar welded to the pole so that it can be adjusted for orientation and is secured against wind lifting the panel. There are two “dress panels” covering the mounting assembly.

DRESS PANELS CLOSED

DRESS PANELS OPEN

1. Remove the 4 x M6 bolts securing the dress panels.
2. Hinge open the dress panels.
3. Remove the long 2 x M12 bolts that clamp the head assembly.
4. Close the mounting assembly over the pole and positioned with the opposing slots over the collar.
5. Fit and secure the 2 x M12 x 130mm bolts, using the washers provided. Consider the required heads orientation relative to the pole's orientation, determined from the adjustment for pole procedure (the panel should face north or magnetic north).
6. Hinge the dress panels to their closed position and fit the 4 x M6 securing bolts.

FITTING CABLE

1. A doubly insulated 2 core cable should be fed down the pole cut to the required length or longer.
2. The two connecting plugs supplied should be fitted to the head assembly end. With the correct polarity so as to match the lead and plug assembly attached to the solar panel.
3. Not essential, but recommended, the cable could be secured by a cable tie to prevent it falling down the pole.

FITTING SOLAR PANEL

This is best done with the pole lying down, but the head assembly end lifted, perhaps with the pole resting on a stand of some form. This will allow freedom to position the panel without having to manipulate the pole head assembly at the same time. This procedure is best done with two workers, but can be done by one skilled person.

1. Remove the 4 x M6 bolts fitted to the arms of the head assembly, (used to attach the solar panel).
2. Connect the electrical plugs and sockets.
3. Consider which way around the panel is to mount. Although there can be two positions it is recommended that the junction box for the solar panel cable is to the top.
4. Take the panel and positioned at an angle to one of the head assembly wings one wing behind the panel mounting bracket, by rotating the panel to its square position.
5. Slide the panel up or down until the second arm aligns with cut-outs in the solar panel mounting bracket.
6. Slip the second arm behind the panel mounting bracket.
7. Align the panel so the mounting holes fit with the nuts on the arms and secure with the 4 x M6 securing bolts.
8. If required, refit the cable cover, intended to limit access by cockatoos who can hang upside down on the cables and chew through the cables.
9. If required, refit the bird roosting preventer.

SOLAR PANEL - BACK

Two cut-outs
to fit Solar Panel Head

MOUNTING POLE

1. Lay the panel with the mounting base close to the mounting studs.
2. Feed the electrical cable into the pre-positioned conduit and pull through.
3. Consider the orientation of the pole as determined by the first “adjustment for the pole” i.e. the best vertical alignment. Make sure that the shim washers needed to provide a vertical pole are in position, (if needed).
4. Using a lifting device or appropriate man power, raise the pole into position. It may assist to engage the first 2 mounting plate holes over the first two mounting studs, as the pole is rotated into position.
5. Fit washers, spring washers and mounting nuts.

Process Complete

OPTIONAL TABERNACLE (highly recommended)

- A device has been designed to go between the ground mounting studs and pole mounting footings. This hinged tabernacle allows hinging of the pole up and down **without lifting machinery**.

- Cost effective, as lifting machinery (cherry picker – sizer lift and additional labour etc. is not required).

- One person is able to install and erect a solar pole with a tabernacle.

- The base assembly bolts directly to the 4 x ground mounted M16 studs.

- The top assembly bolts directly to the solar pole base plate. When hinged into the vertical position 4 extra mounting bolts join the top and bottom plates.

- The solar cables are completely encased within the tabernacle and cannot be accessed by vandals.

- In the final assembled position, a hasp though the top plate allows fitting of a padlock.

- Made of 12mm thick stainless steel this tabernacle is designed to withstand cyclone conditions.

FITTING TABERNACLE AT TIME OF POLE INSTALLATION

As part of the pole assembly procedure the tabernacle should be secured to the ground mounted studs before the cable is passed down the conduit.

Then the assembly is generally as explained.

FITTING TABERNACLE TO EXISTING INSTALLATION

Since the tabernacle mounts to the in-ground anchor pole (or directly to the ground), the tabernacle can be mounted on those same fastenings, between the ground and the pole base plate. This allows for retrofitting to any installation.

The only consideration is the electrical cable.

1. Preferably cable should be removed, the tabernacle mounted, with the cable re-run through its centre clearance hole.
2. The cable is re-terminated.

Alternatively, the cable can be cut and re-joined after installation of the tabernacle.

1. For a new installation, first open the tabernacle (hinges like a book) and secure the base assembly to the ground.
2. With the lid open and the pole horizontal attach the base plate mounting screws and securely fasten.
3. Align the panel to the north, or just very slightly west of north, by loosening the clamp screws on the solar head assembly and secure firmly.
4. Hinge the pole to the vertical position by lifting the solar panel and “walking” the pole to the upright positon.
5. Holding the pole upright, secure the outside mounting bolts and fit the anti-theft padlock.
6. If the pole is not exactly vertical the pole can be lowered and washers fitted under one side of the pole baseplate.

   Note: If the ground is not level sand cement can be used to bed down the tabernacle to the ground, or washers can be used.

TABERNACLE

APPENDIX 6 – QUICK RELEASE MECHANISM

Many Water Filling Stations are sited by rivers, creeks or general flood plain areas and are at risk of being flooded.

For every Filling Station the electronic controller, power supply, configuration module and battery module can be quickly removed if flooding is anticipated. Each module is held in place by two retaining screws, just undo these and slide the module out, as the electrical gold-plated plug and socket contacts automatically disengage.

The quick release mechanism for removing the top cabinets from the base cabinet allows two or more people to take away all of the control system, allowing the plumbing to go under water and survive (after a clean-up operation).

Note: If the system is solar operated and if the battery is large (100amp hours and stored in the top mounted switchboard) this battery could be removed separately, or four people (instead of two) could lift the top cabinet off the base, literally in seconds.

The following label attaches to the quick release cabinets.

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Flood Damage Prevention
Quick Release Instructions

The quick release mechanism is to allow rapid removal of the top section of the WD3000N Water Filling Stations, for use in flood prone locations. With two men or a utility, the control cabinet and switchboard can be removed in seconds. This leaves the plumbing system to go under water which survives without issue.

The top cabinets are joined together and sit on a stainless frame, which connects to the plumbing cabinet by keyhole engaging corner locating pins.

Removal

1. Two (or more) able bodied persons.
2. Open switchboard.
3. Withdraw locking pin.
4. Push cabinets towards the control cabinet end (moves 40mm).
5. Lift cabinets off (electrical connections automatically disengage)

Reinstallation

1. Place cabinets in position (control circuit forward). (They will sit on four corner spacers).
2. Move cabinets 40mm towards the switchboard.
3. The cabinets will drop as the spacers align with mating holes.
4. Push cabinets towards the switchboard.
5. Insert the lock pin (if lost, any bolt or pin will do).

Details

Physical

The cabinets are located and held in place by four corner keyhole slots in a stainless steel adaptor frame, which is attached to the top cabinets. Matching grooved spacers are fitted to the lower cabinet. This assembly can be retrofitted to any cabinet, utilising preexisting bolt holes.

Electrical

Electrical connections automatically make by self-aligning plugs and sockets that duplicate the contacts for all low voltage circuits.

Electrical connections are terminated on screw terminal blocks, to facilitate ease of on-site conversions.

Alternate Electrical

Although the self-locating electrical plugs are recommended, an in-field conversion can also be achieved by utilising any in lead plug and socket arrangement that customers choose to use.

Post Flood Recommissioning

Should the machine go underwater (less the control cabinet as it was removed) the machine will need to be hosed down with fresh water, to remove the mud etc. Then the electrical plugs and lead will need to be carefully washed and allowed to dry. This includes the solenoid valve plug to the plumbing and the flow meter sensor, as well as the plugs and sockets forming connection to the control cabinet.

All of the electrical contacts should be washed with isopropyl alcohol or methylated spirits and perhaps coated with just a smear of Vaseline. This procedure should be sufficient; however for a really thorough clean the stainless steel tube on the plumbing cabinet top (that carries the electrical plugs / sockets) can be unscrewed, allowing cleaning of the internal connections.

Service Support

Telephone or email support is always available, phone: 02 9939 2844, email: contact@abberfield.com.au with office hours 7am to 5pm. After hours the telephone will transfer to a 24/7 emergency support number.

32 Cross St, Brookvale, Sydney 2100 Australia
contact@abberfield.com.au
Tel: (02) 9939 2844
www.abberfield.com.au

Brochure # 210727

INSTALLATION OF QUICK RELEASE MECHANISM

The cabinet installation is the same with or without a quick release mechanism, up until adding the mains or solar supply, as point of attachment is different for the quick release version of the Filling Station (increasingly solar operated replacing mains operation). All of the interconnection electrical wiring is factory installed and tested. Just add mains or solar input connections.

Note: It is normal for Abberfield to have a mains or solar test lead pre-installed in the Quick Release Mechanism Filling Stations. This lead can then be spliced to the incoming solar or mains cables, or the incoming connections can be made direct to the electrical termination strip.

Access to the electrical termination as as follows:

1. Remove the top cabinet as detailed.
2. A metal frame housing the electrical plugs and sockets will be found attached to top of the lower cabinet.
3. This will be pre-wired to the plumbing electrics, (a solenoid valve plug and a flow meter sensor), which the installer will need to connect.
4. The only requirement will be for the installer to add power (mains or solar panel input, or rarely the extra of an external regulated 12vDC supply).
   However, to facilitate testing a lead with mains or solar supply will most probably already be installed. The simplest means of installation will be for the installer to splice into the test lead.
   The alternative is to remove the six fastening nuts retaining this metal frame (mounting nuts accessed from inside of the base cabinet). This will allow the metal frame to be inverted and expose the interconnecting terminal block. Connect the mains or solar input (or optionally both) and re-install the metal frame. Ensure the cabinet is properly earthed, either through the earth terminal block or separately earthed.

   Job Done

   The installation is complete, just re-fit the top cabinet assembly and test to confirm correct operation.

POST FLOOD MAINTENANCE

The base cabinet will have gone underwater and every part will need a complete wash down and allowed to dry.

This particularly applies to the electrical connections. Thorough washing should prove adequate, but in case of need the metal frame can be removed (as explained) and the terminal block more thoroughly cleaned. It is recommended (but not essential) that the frame internal parts are sprayed with an electrical equipment cleaning solution.

However, it is highly recommended that the gold-plated electrical contacts are cleaned with isopropyl alcohol (or equivalent) cleaning solution.

Note: The alignment of the mating plugs and sockets is factory set, but if disturbed the fasteners on the metal frame attached to the base cabinet should remain loose until the top cabinet is engaged and in the “home” positon and only then tighten the metal frame mounting. This will ensure the best alignment of the blue self-guiding plugs and sockets and the mains plug and socket.

APPENDIX 7 – BATTERY MAINTENANCE

BATTERY TYPE

(As used in Abberfield Technology's Water Filling Stations)

The batteries used in Abberfield Technology's Water Filling Stations are quality Gel Cell or for the larger batteries may be glass fibre mat batteries.

Lithium batteries are not used because they incorporate internal electronics that disconnects their output when the battery voltage falls too low or when the battery gets hot. Since the Filling Station, positioned in the sun is hot most of the time, lithium batteries are not a practical solution.

BATTERY MODULE

Batteries can be mounted internally or external to the control cabinet.

If internal they will normally be in a metal housing that slides into position and self-engages the electronics via large gold-plated contacts.

Within the housing will be a battery charger and the charge voltage will be either from the mains derived low voltage (typically 15-17 volts) or from a solar panel (either on the cabinet or a pole or both).

If external to the control cabinet the battery charger will also be external and the incoming wires are connected to the "external regulated low voltage" terminals. This is normal for the larger Filling Stations (WD3000N) as larger batteries can be installed in the switchboard area.

BATTERY CHARGING

For solar charging the battery and the solar panel, battery and battery charger should be matched. Typically a solar panel on a pole has a 120 watt output rating, meaning that the battery charger should have at least a 10amp rating and the battery can be up to 100 amp hours capacity.

Varying from this arrangement depends on site specific details, latitude, machine usage and operating time requirements (with no charging occurring). For demanding situations, 200 watts of solar input is sometimes required.

BATTERY EXCHANGE

A quality battery permanently connected into an operative Filling Station should have an operating life of approximately five years, subject to normal usage. Towards the batteries end of life its capacity is reduced and premature “low voltage shutdowns” may occur.

When changing a battery, the terminals should be coated in Vaseline or battery terminal spray to prevent terminal corrosion.

BATTERY STORAGE

Batteries held in storage will slowly go flat and unless regularly charged the internal parts will become coated with a film that prevents current flow. This will progressively destroy even a new battery within 6 to 12 months of being left uncharged.

Therefore, batteries held in storage should either; -

1. Be permanently connected to a charge voltage.
2. Be charged every few months, typically 3 months, each 6 months starts to destroy batteries. How the battery is charged depends on the application but in case of need a charging station can be supplied by Abberfield Technology.
3. Batteries should not be stored with a charger attached as the charger may load the battery, causing premature battery discharge.

Longer batteries housed in the rear cabinet are usually free standing, but can also be housed in a moulded battery box.

BATTERY MODULE

This comprises the battery and the charger in one self-contained module.

This module includes multiple input and output sockets, including:-

- Solar inputs
- Volt Meter
- Anderson plug output
- Anderson plug input
- USB socket connection

Optional lead attachments allow simple onsite recharging of a low voltage battery. Simply connect to a car battery via a car fitted Anderson socket (if available) or clip directly to the car battery.

TECHNICAL SUPPORT

More technical information is available from the Abberfield Technology Support Team
Telephone: +61 (0)2 9939 2844 or Email: contact@abberfield.com.au

In case of need unanswered telephone calls to the office will transfer to the Duty Engineer 24/7.

APPENDIX 8 – EXCHANGE OF A WATER FILLING STATION CONTROL MODULE

(Rarely needed as this is usually carried by Abberfield Technology, either on site or as a factory exchange).

The Filling Station Control Module comprises:

1. The Electronic Controller.
2. The Credit Card Reader.
3. The Credit Card Modem known as the "Amit" (includes the SIM card).
4. The System Control and Audit Modem (includes the SIM card).

The **site identity** is the serial number of the **Credit Card Modem** (Amit).

Note: The serial numbers of **each** modem should be printed on a label attached to the rear of the Control Module metal housing. Otherwise, it is on a label on the rear of the Credit Card and the Audit Modem, but cannot be read without first removing the modems.

The SIM in the System Control Modem identifies the **customer** and may or may not identify the **site**. The serial number of the system controller is largely irrelevant.

The essential need when replacing a Control Module is to link the serial number of the Credit Card Module with the serial number registered for that site on the credit card processing server.

Therefore

When swapping out a Control Module, **either;**

1. Retain the Credit Card Modem (swap this from the original controller to the new controller).

or

2. Install the new Control Module with the new Credit Card Modem, **BUT**, advise Abberfield Technology of the new Credit Card Modem serial number and the site details, so that Abberfield Technology can arrange to have this new serial number registered on the credit card processing server.

Note: The SIM in the Credit Card Modem (Amit) serves no purpose except to pass forward the data and therefore, provided the Amit in the new Control Module has a SIM installed, this does not need to be swapped. However, if the new Amit SIM has not been activated for several months there may be a need to swap the Amit SIMs.

When swapping a Control Module also swap the SIM of the System Control Audit Modem.

PROCEDURE

1. Remove the Control Module from the cabinet (2 retaining screws and unscrew 2 x aerials connections).
2. On the rear of the Control Module there are 2 screws, remove to slide off the outer cover.
3. On the front of the controller there are 4 countersunk screws to be removed with care.
4. Lay the front panel down on its face, taking care not to place strain on the display wiring and plug connections.
5. Access to the Control Modem is via 4 screws in the left side of the Control Module. Remove the power plug to the modem and to the switch (the attached black box), plus the lead from the switch to the controller switch end only, depress side clip and withdraw. Also remove the plug from the connection that goes to the side of the controller. Removing these leads is only to allow the modem to be lifted from its mounted position.
6. To lift the modem and switch assembly free of the loose-fitting heat sink, just move it inwards and then upwards.
7. To the base there will be an aerial connection that can remain in place.
8. In the base will be the SIM card slot. Press the SIM, it will release and can then be replaced. Note this can only be fitted one way around.

TECHNICAL SUPPORT

More technical information is available from the Abberfield Technology Support Team
Telephone: +61 (0)2 9939 2844 or Email: contact@abberfield.com.au

In case of need unanswered telephone calls to the office will transfer to the Duty Engineer 24/7.

TRANSPORTATION – FILLING STATION DELIVERIES

Two parts; factory to customer, customer to site.

FACTORY TO CUSTOMER

Abberfield use own transport whenever possible, principally to ensure the Filling Stations' safe arrival, but also because Abberfield's staff are then available to assist customers with their installation enquiries.

Safe arrival comes from the Filling Stations being bolted directly to a purpose-built pallet, in the same manner as bolting the Filling Station to the ground. The pallet is then secured to a low-level trailer, for removal onsite by a forklift truck or by an overhead lift device (connecting to 4 corner-mounted lifting eyes).

Secured in this manner avoids use of hold-down straps and the Filling Stations arrive unmarked (wrapped in clear plastic film).

CUSTOMER TO SITE

Recommended is that customers use the same pallet means of transport but steadying of the Filling Station on the truck or trailer needs care. There will be corner holes on the palette that can be used to fore, aft and sideways hold the pallet. The lifting eyes can be used to tie the cabinet and prevent toppling in the event of rapid braking. However, please soft pad any tie downs that may (but may not) pass over any paintwork.

Alternately, Abberfield offer a loan of a stabilising bar that passes through the tie down eye bolts and then has end of bar eye bolts for tying down, which ensures paintwork protection.

POST INSTALLATION

As standard practice, Abberfield staff visit each site to assist with delivery, installation and commissioning sign off. Whenever practicable, Abberfield can then collect the purpose built pallets and any transportation hardware for subsequent re-use, as this avoids the need to add packaging costs to the Filling Station purchase price.

ADVICE TO INSTALLERS

If in doubt ASK

Abberfield Technology offer 24/7 support - ring or email. If the office telephone is unanswered, it will automatically transfer to the Duty Engineer's mobile.

Most installations are not carried out in accordance with Abberfield Technology's recommendations. Disappointing because Abberfield provide the best of quality materials and workmanship, intended for a long trouble-free operating life and this can be compromised by a sub-standard installation.

That is why Abberfield Technology try to visit every site after installation to address installation deficiencies and then submit a commissioning report to the customer.

Abberfield's reputation is "on the line" by the quality of manufacture and post installation support. Only fair that the installer's reputation should be equally "on the line".

APPENDIX 9 – FEATURES AND SETTINGS

ACCOUNT CARD OPERATED

For full details, see current versions of Brochures:
Account, Access & Stored Value cards - brochure no.180418.
Water Filling Stations plus Data Processing & Banking Overview - brochure no.180323.

- Operation by Account or Credit Cards or both.
- Account and Credit Cards processed through a common card reader (avoids customer confusion).
- Account Card as a Drought Relief Card.
- Typically used by tanker drivers receiving monthly accounts.
- Settings allow individual users, groups of users, restrictions to specific Filling Station locations, account limits, volume limits and more.

CREDIT CARD OPERATED

- Any Visa or MasterCard credit or debit card; includes branded cards (Australia Post etc.) as these are Credit Card based.
- Pre-registered Credit Cards (rejects all others).
- Combined pre-registered and un-registered Credit Cards (allows differential pricing).

ACCESS TIME RESTRICTIONS

- Limits operations to nominated hours. *

VOLUME PER CARD PER DAY

- Allows restrictions to volume of Account Cards or Credit Cards. *

WATER PRICES

- Account cards typically are at one price, but can be different prices per card or per site.
- Water prices are set over the internet-based portal.

FAULT REPORTING

- Critical reports emailed to Abberfield Technology and the back-office provider (Card Access Services), plus other nominated parties.

REPORTING

- Back-office reports of a transaction include water volume, card users and financial auditing.

Traceability of Credit Card activity is by recording four sequential card numbers, but otherwise no card details are recorded or even identified at any stage of a Credit Card process (triple DEZ encryption).

OPERATION

Any combination of mains, on-board solar, or remote solar, including mains with battery back-up.

If only on-board solar the panel size is too small for full time operation, so a machine can be set to operate in “sleep mode” (display says “device asleep. Press any button”).

Sleep Mode Settings (Over the portal).

1. Never asleep.
2. Sleep nominated hours.
3. Sleep on low battery voltage.
4. Sleep on nominated hours **or** low battery voltage.

Low voltage protected (display says “OUT OF ORDER -LOW VOLTAGE”).

Shut down voltage (and much more) set by the portal.

MAINTENANCE MENU

Key accessing Filling Stations allows use of a MENU button and scrolling via the UP and DOWN buttons.

Parameters include:

- Software version.
- Firmware version.

- Solar voltage.
- Battery 1 voltage.
- Battery 2 voltage
- Battery type (Gel cell or Lithium).
- Diagnostic details.
- Button test.
- Shut down (forces operating parameters to be recorded on the portal).

BY-PASS FUNCTION

The switch module includes a system power and a bypass switch. In By-pass the solenoid valve is activated without need for a card validation and this function exists even if the controller is removed.

On the larger Filling Stations the servo solenoid valve has a manual by-pass button (press in and twist). Manual bypass operates without consuming mains or battery voltage.

** Software currently under development.*

APPENDIX 10 – MAINTENANCE

Very little maintenance is required for the Water Filling Stations, but some is recommended and some is an insurance against adverse operating conditions.

Maintenance is at two levels:

Level One - To ensure reliable operating conditions.

Level Two - Ensures reliable equipment performance.

Level One is to prevent insect ingress, remove dust from operative parts and cleaning of the paint surfaces to prolong paint life. *Note:* the cabinet has a design life of 40 years, but the paint will fail first, unless protected.

Level Two includes oiling of the locking systems, cleaning electrical contacts, maintaining cabinet water seals, dismantling buttons for cleaning, plus a check list of system wide parameters and the resultant maintenance as required.

Experience is that without Abberfield Technology's assistance no maintenance will be carried out. The result will be long periods of trouble-free operation, until an event, such as insect damage to the electronics, causes equipment failure, plus a reduced whole of equipment life. It has therefore been Abberfield Technology's practice to monitor the critical alert notifications via the Card Access Services portal and respond to service or maintenance issues when necessary, or when travelling past customer's Filling Stations.

For detailed information, please see the Service and Maintenance section of the WD2500 - WD3000N WFS Operations Manual.

MAINTENANCE CONTRACT

As the number of Filling Stations in service increase the economics of customer support via a maintenance contract becomes a viable option and Abberfield Technology now offer contractual maintenance. Recommended each year, or perhaps six monthly, Abberfield Technology will visit site to carry out level one and level two maintenance, for a negotiated fee. The fee structure is customer dependent, reflecting the number and type of Filling Stations, their location, and other prevailing circumstances.

BREAK DOWN SUPPORT

Support is offered at three levels; telephone, factory, or field support. Note that the Filling Stations are designed so that the control electronics can be removed by unskilled labour for return to Abberfield's factory for repair if required and this permits distance support to all customers. Alternatively, Abberfield can travel to site in a mobile office and workshop, complete with comprehensive spare parts. A negotiated hourly rate may apply.

TELEPHONE SUPPORT

Unless support requirement becomes onerous, telephone support is free of charge.

Telephone support is offered all day, every day, with an expectation that late night calls are for emergencies only. Should calls to Abberfield Technology's telephone number (02) 9939 2844 be unanswered, the call will automatically divert to the duty engineer.

Customers' enquiry can be supported at many levels. This is made possible by the interaction between Abberfield Technology, Card Access Services, Nayax credit card processing server and consultant engineering services. Central to this capability is the Back Office Portal, as this allows machine operating data to be accessed along with the audit and reporting data.

The first line support is the Critical Alerts, such that Abberfield Technology and Card Access Services are informed by email of potential issues that may initiate an automatic response for support by Abberfield Technology or Card Access Services.

With the Critical Alerts will be a Filling Station status report, including but not limited to fault conditions, mains supply, battery one and two voltage, and the cabinet temperature.

The second line support is by Abberfield requesting information from the Nayax support team, such as wireless signal strength and much more.

The third line support is back to Card Access Services and a request to interrogate the Tanker Management System records to analyses procedural data. Sometimes this establishes that a fault report is in fact a card issue, or expired card, or non-credit card users etc.

The fourth line support is to Abberfield's engineers and external contractual services, to review the diagnostic logs. This is an in-depth evaluation of a Filling Station's transactional activity that comes down the Card Access Services portal. If given the time of incident

advice, to establish where in the logs to study the diagnostics, every machine activity can be retrospectively examined and a written report submitted.

Whilst this can be used to evaluate any machine issues, it more usually establishes customer error, such as;

- A customer did not press “Enter” and the Filling Station timed out.
- A customer pressed “Cancel” instead of “Enter”.
- After a successful pre-authorisation the customer took too long to take water and the Filling Station timed out.

APPENDIX 11 – FAULT DIAGNOSIS

This document is to help customers resolve issues, whether operational or Filling Station related.

In addition, Abberfield maintain a no cost telephone support service 24/7, with the expectation that late night contact is for emergencies only.

Call the Abberfield main line (02) 9939 2844 at any time and if unanswered the call will divert to the duty engineer.

FAULT	POSSIBLE CAUSE	REMEDY
No Display	No power	Check lights on the Configuration module Mains, Solar, Battery 1, Battery 2
	Combined Power switch on Configuration Module turned off?	Turn switch on
	Switch on the Power Supply turned off?	Turn switch on
	Switch on side plate under power supply off?	Turn switch on
	Overload switch in switchboard tripped (can trip through mains spikes)	Reset switch
	Fuse in power supply blown	Remove power supply fuse (spare is in slide out cartridge on inlet socket)
	Power supply not secured	Engage retaining screws
	Controller not secured	Engage retaining screws
Display on but will not start up	Antennae not connected	Attach on left side of controller
	Telstra network failure. Display may say “WAITING FOR CARD READER”	Check and await reconnection
	Nayax server failure	Contact Abberfield
	Card Access Services server failure (rare, has duplicated backup server).	Contact Abberfield
Account card rejected	Antennae disconnected	Reconnect antennae
	Unpaid account	Contact water supplier
	Credit limit exceeded	Contact water supplier

	Customer SIM inactive (unpaid, cancelled etc.)	Contact customer's IT department
	SIM Card contact issue	Remove SIM, wipe contacts and reinsert. See Abberfield for details
	Faulty modem	Contact Abberfield
Credit Card rejection	Expired card	Contact provider
	Card validated, but Enter not pressed to confirm (system times out and returned to idle screen).	Repeat card validation and press **ENTER**
	Credit or debit card, not Visa or Mastercard (can accept rebranded Visa or Mastercards such as Australia Post debit cards)	Use Visa or Mastercard cards
	EFPOST or other non-credit card usage	Use correct card
	SIM Card contact issue	Remove SIM, wipe contacts and reinsert. See Abberfield for details
	Usage other than those parameters configured for that Filling Station	Use correct card
Card approved, but water does not flow	Water turned off	Contact supplier (test by operating by-pass switch and the solenoid valve should click). Alternatively press the manual by-pass lever.
	Solenoid failed (rare)	Replace valve
	Time out between card validation and taking water too long and the system self-cancelled.	Connect hose before validating card
Buttons do not respond as expected	Accumulation of dirt around the stainless steel plunger.	Wash the outside of the button with brush / methylated spirits. Then lubricate the stainless steel plunger with silicon spray, or graphite powder or light machine oil. Buttons can be removed for more thorough internal cleaning, **one at a time**, as the buttons also hold the inside circuit board in place.

	Ribbon cable plug not connected properly	Wriggle cable ends pushing plugs in (not out)
Water flows all of the time	By-pass switch turned on	Turn switch off
	Manual by-pass turned on (if fitted)	Turn by-pass off (twist anticlockwise)
	Foreign object caught under the water valve diaphragm seat	Remove the cap on the water valve and remove the foreign object
	Ruptured diaphragm	Replace diaphragm
Water flows okay and manual meter on top of the flow meter reads, but customer display does not show the water dispensed	Flow meter pulse reader not connected to the flow meter	Connect flow sender on flow meter with 2 x screws
	Flow meter pulse sender not held firmly in place	Secure firmly
	On the WD3000N the transportation tag on the pulse reader not removed before installation	Remove tag
Water flows okay, but manual meter and customer display does not show any reading	On the WD3000N foreign object caught on the turbine impeller preventing it turning	Remove flow meter and take out foreign object
	On the WD3000N foreign object caught in the turbine impeller, but not large enough to stop it turning (gives inaccurate reading)	Remove flow meter and clean
Key sticking	Lock manufacturing swarf or dirt in tumblers of the lock	Place mouth over the lock fascia and blow hard. This will blow out most obstructions
		Spray silicon or oil or dry graphite lock lubricant down

		the lock barrel
Key difficult to withdraw	Lock rotational stop under the nut preventing the barrel turning to the "home" position	Sharply rotate key to the home position (clockwise), but not so hard that it may break the key – take care OR
		Loosen the lock nut just a fraction so that the location stop can rotate very slightly. Then, with the nut slightly loose, the lock rotational tabs must be securely in place
Key can be removed with door open but not with door closed	Cabinet distorted during installation	Contact Abberfield support team for advice on how to normalize the cabinet mounting