

SERIES WD2500

Water Dispensing Station

INSTALLATION & SUPPORT MANUAL

Revision: 2.8



**Installers
please read
Advice to Installers
pg 67 of this
Installation Manual**

PREPARED BY



ABBERFIELD INDUSTRIES PTY LTD
ABN - 61 000 112 569
ABBERFIELD TECHNOLOGY PTY LTD
ABN - 31 050 336 091

Role	Name	Revision
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1. INTRODUCTION



WD2500 INSTALLED ON-SITE



Photograph has taps straight out. Taps are recommended to be at 45 degrees. This gives less strain on the outlet hoses, ensures contaminated water does not pool in the outlet fillings and gives a neater appearance.

Abberfield's policy of producing the highest quality of design and manufacture means that improvements are made whenever opportunity permits.

NEW STAINLESS PLUMBING

One improvement is using a stainless steel plumbing system in place of brass and the layout of the component parts has also changed.



Each system is preassembled pressure tested to simplify the installation. To ensure that the plumbing survives rough handling in transport, where possible the plumbing pipe connections will be welded. Other threaded connections will be bound together with a very special watermark approved two pack epoxy sealant.

Welded or epoxy glued the plumbing system becomes rigid, not intended for adjustment. However if adjustments are needed (such as if the incoming plumbing is out of position), there is a way.

1. The output side plates slide up and down by approximately 80mm. Front to back there is some movement, but for the best appearance the front of the side plates needs to align with the front edge of the cabinet.
2. To adjust the relationship of the output pipes with input, there are split unions on each outer vertical leg, one on the flow meter and one on the double check valve. Slightly loosening the top and the bottom of each split union will allow the plumbing to rotate around each split union, moving the outlet forward or backward or the outer vertical parts towards each other or apart as required.

EXTERNAL BACKFLOW PROTECTION

For sites with existing backflow protection the stainless system is available without the testable double check valve. These are physically interchangeable with the normal plumbing as the inlet out outlet pipes will align one with the other.

Photo to be added

EXTERNAL FITTED RPZ

Abberfield provide an option to have an RPZ installed external but concealed behind the cabinet.

Positioned here, with a protective and decorative integrated enclosure the RPZ can discharge water outside of the cabinet. The internal plumbing remains as described.



WD2500 fitted with 25mm plumbing only

Note: The Installation Manual has been written for the more normal 50mm plumbing system, but 25mm generally uses the same instructions.

2. DOCUMENT PURPOSE

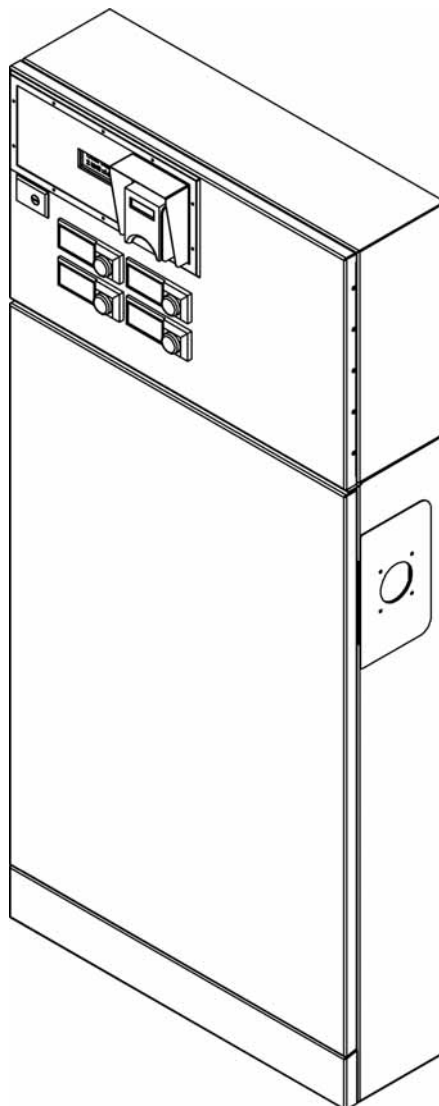
This document provides a system overview for the WD2500 Series Water Dispensing Stations and guidance for installation. Included are appendix on Features and Settings, plus Maintenance, Service and Fault Diagnosis.

3. DELIVERY

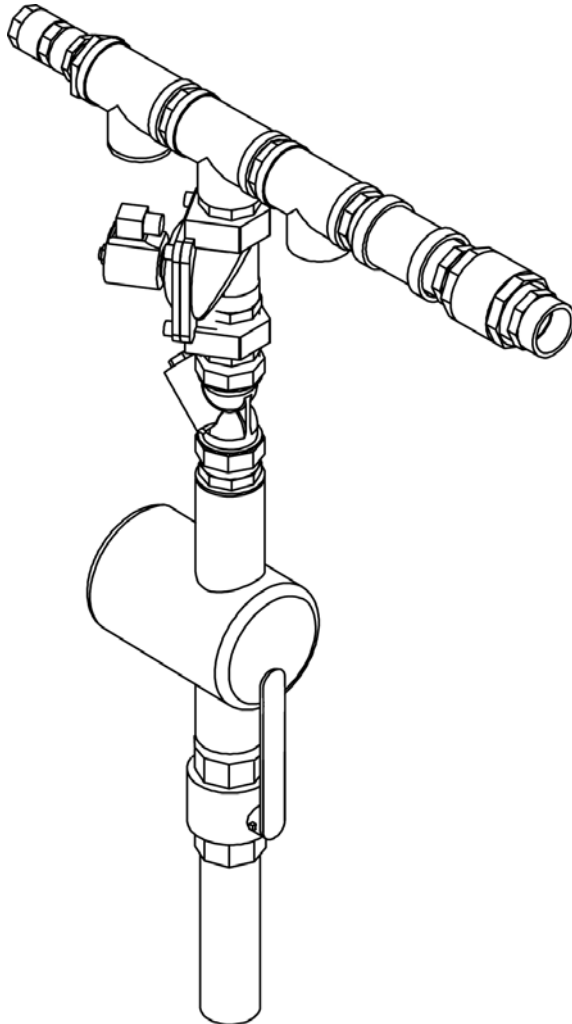
The machine consists of a ground plate securely attached to a concrete slab; the plumbing assembly rising through the ground plate and the cabinet are individually attached to the ground plate itself.

Delivery is expected to be in two parts:

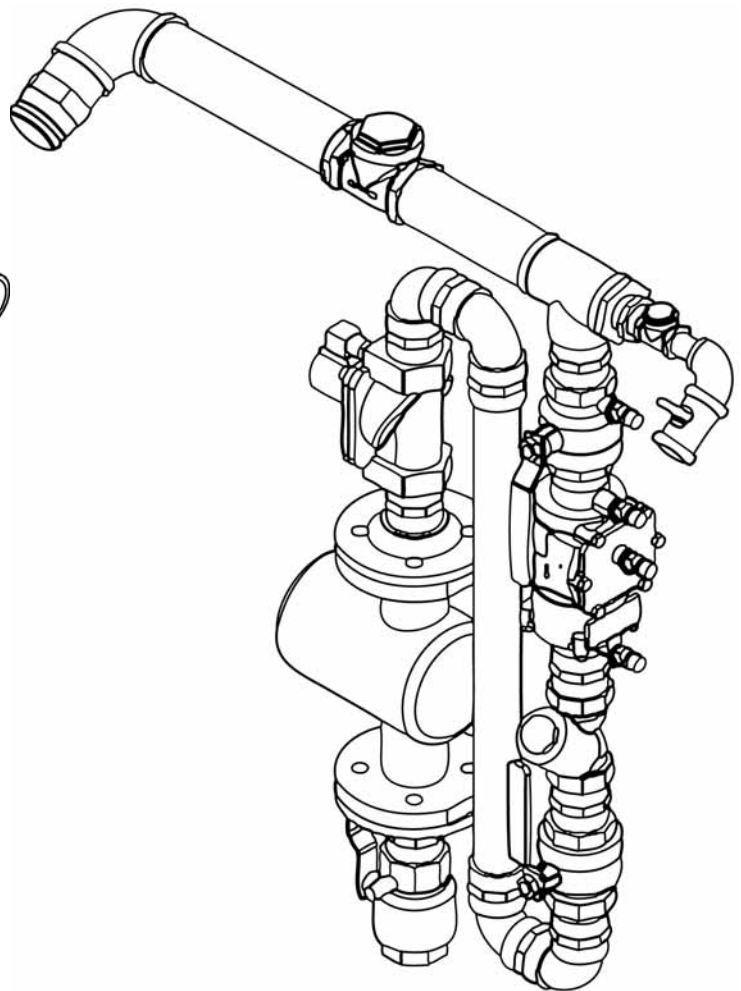
Ground Plate and Cabinet



Plumbing Assembly



External Backflow Protection



Internal Backflow Protection

Drawing shows flanged fittings, not typically used.
Later versions use screwed plumbing split unions.

Note: Plumbing systems can be supplied with or without backflow protection.

As delivered the cabinet will be pre-assembled with the ground plate attached to a purpose built pallet. This way the cabinet can be easily handled by a fork lift or a pallet lifting device.

The pre-assembled and pressure tested plumbing will be supplied separately.

It will be necessary to dis-assemble the cabinet. See next page for dis-assembly instructions.

Note: The plumbing assembly can be removed from the cabinet as a single item. Therefore, make sure that all wiring is positioned **behind** the plumbing, **not** in front of the plumbing.

If the backflow protection is external, it can come from a pre-existing device or it can be from a Residual Pressure Zone device (RPZ) integrated with the Filling Station, mounted behind the cabinet, with its own separately lockable housing. External mounting is because RPZ's will discharge flushing water and need to lay horizontal (not possible inside of the cabinet).

The typical plumbing is a 50mm system; however other pipe sizes can be installed.

Increasingly common is 25mm used for tourist information or waste disposal sites frequented by Recreational Vehicles.

25mm plumbing system photo to be added

STAINLESS STEEL VERSUS BRASS

Typically plumbing systems were in screwed brass, still available, but the trend is to screwed stainless steel or even welded stainless steel.

The first move was to have welded outlet piping for neatness, leak proofing and to prevent theft of the plumbing. The outlet plumbing screws into the cabinet mounted plumbing and theft is prevented by using a hose clamp around the pipe inside of the cabinet. Then the quality of brass fittings became a concern, being subject to cracks and the angular bends being much less than 90 degrees, plus the lead content understood to be greater than 2.5%.

Screwed stainless proved superior, but at a higher cost.

Now welding of the internal stainless is implemented, because even stainless elbows are less than 90 degrees (better than brass and by welding they can be made square). In particular, welding ensures a ridged structure better able to withstand rough treatment in cartage to distant locations.

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.

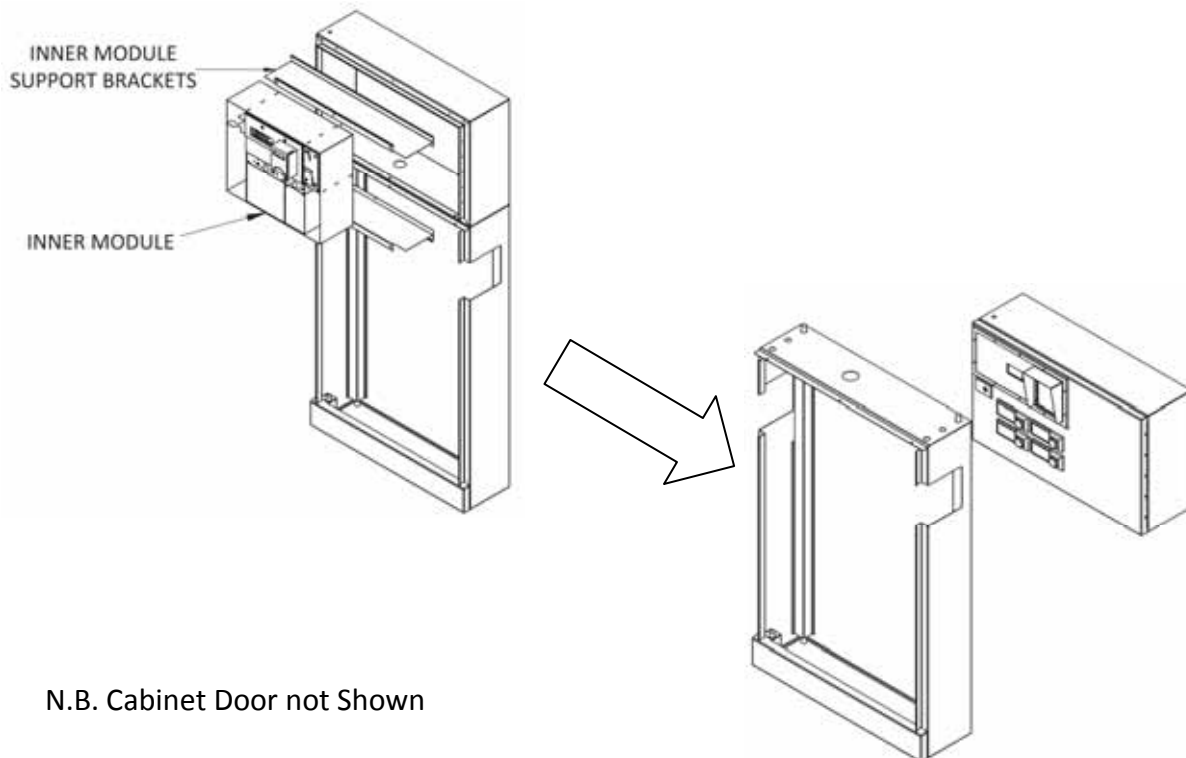
It is also highly recommended that trees are planted adjacent to the Filling Stations, to provide shade, particularly from the midday or afternoon sun.

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

5. PREPARATION

5.1. Dis-assembly of Cabinet

1. Remove stand door and plumbing cover plates.
2. Remove inner module.
3. Disconnect antenna and wiring harness plug behind the power supply.
4. Remove the lower inner module support brackets to access nuts holding the cabinet ground plate (no need to remove the top support bracket).
5. Remove nuts and bolts holding cabinet to stand, remove cabinet from the stand.
6. Lift stand off the ground plate.



N.B. Cabinet Door not Shown

Alternatively, Step 2 (separating the cabinet from the stand) can be avoided; it saves removing wires between the cabinet and the stand. But it increases the difficulty of installing the machine over the ground plate top-down mounting threaded rods (more man power to lift the cabinet assembly over the mounting threaded section, or use of a Hiab or similar lifting device).

6. CONSTRUCTION

6.1. Preparation of Area

Prepare a concrete slab which should be large enough to provide physical security. Services of water and electricity can enter through the concrete or through a preformed clearance hole in the concrete slab. This preformed slab-opening allows plumbing and electricals to enter (or to be added later), without less strain on fixtures if the slab is disturbed.

When preparing the slab (precast or in situ formed), ensure that it is level, with an even, flat surface, or the cabinet will lean. This also prevents cabinet distortion on installation.

The outside edges of the slab may be slightly angled down to shed spilt water but the slab must be flat in the area under the cabinet.

Consideration might be given to incorporating a drain under each tap outlet to carry away dripping water.

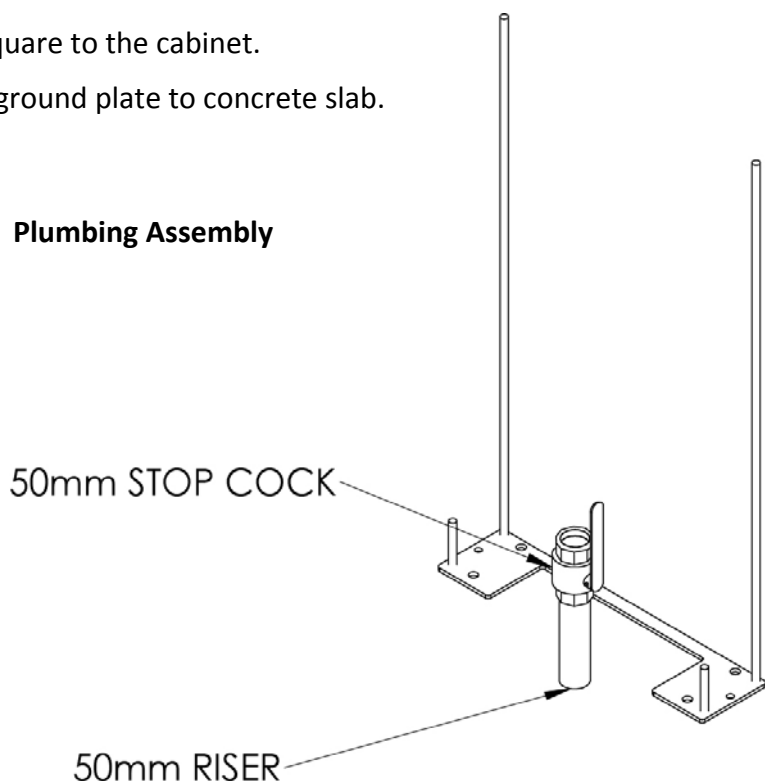
Note: If required a retrofittable drip tray can be added to the cabinet.

6.2. Plumbing and Ground Base

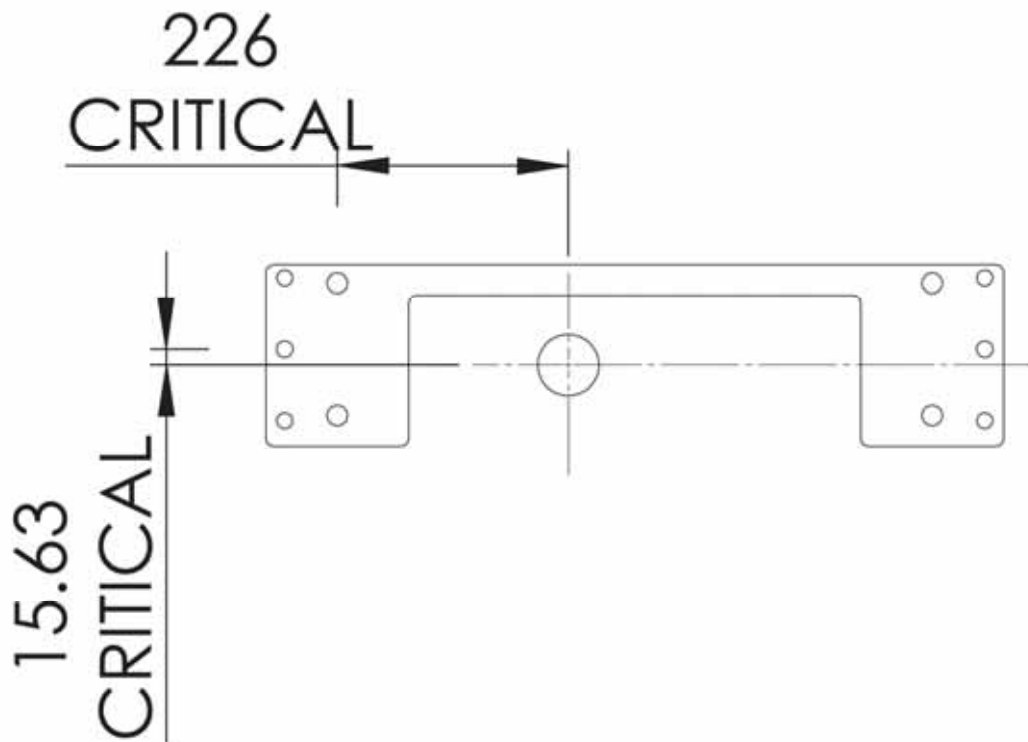
Inlet plumbing must be installed vertical, with the minimum angular movement or the riser and tap outlets will not align correctly.

The handle for the stop cock should be to the right side and set to operate vertical for open and towards the rear (clockwise) for close.

1. Mount plumbing stop cock square to the cabinet.
2. Position correctly and install ground plate to concrete slab.



3. Accurately position the ground plate relative to the inlet plumbing, as this controls the position of the cabinet.



Ground Plate / Inlet Valve Positioning

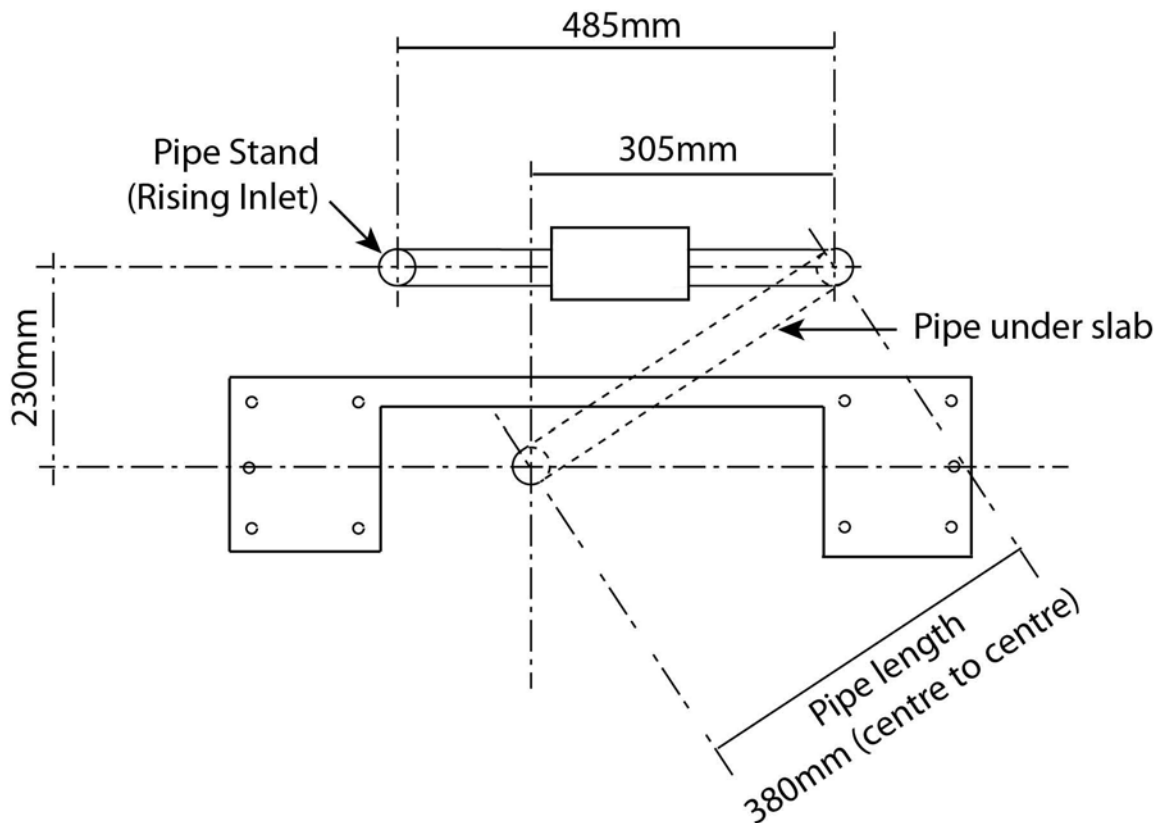
Securing the ground plate to the concrete slab should be done with care.

Note: The position of the ground plate to the plumbing is **important**, or the plumbing may not fit inside the cabinet.

The ground plate must be very secure; the load imparted to secure the cabinet will be a lifting motion directly to the mounting attachment. One option is to imbed an anchor plate into the slab.

If an external residual pressure device is used there will be a U section plumbing part concreted into the base to accept uprising mains water, through the RPZ, down again and back up into the Filling Station cabinet. This provides the greatest straight plumbing before water reaches the flow meter, giving laminar rather than turbulent flow and provides the most accurate flow measurement.

Photo to be added



It is recommended that the incoming plumbing is positioned before the concrete slab is poured. Then it is the ground plate relative to the plumbing that finally sets the cabinet position.

Note: If an in-concrete anchor plate is used the position of the plumbing and anchor plate need careful setting to ensure a successful installation.

One option is to have the plumbing into and from the RPZ, plus into the Filling Station cabinet rise through voids in the concrete slab.

If the pipes are concreted directly it is recommended that they be lagged with a protective membrane as they pass through the concrete slab.

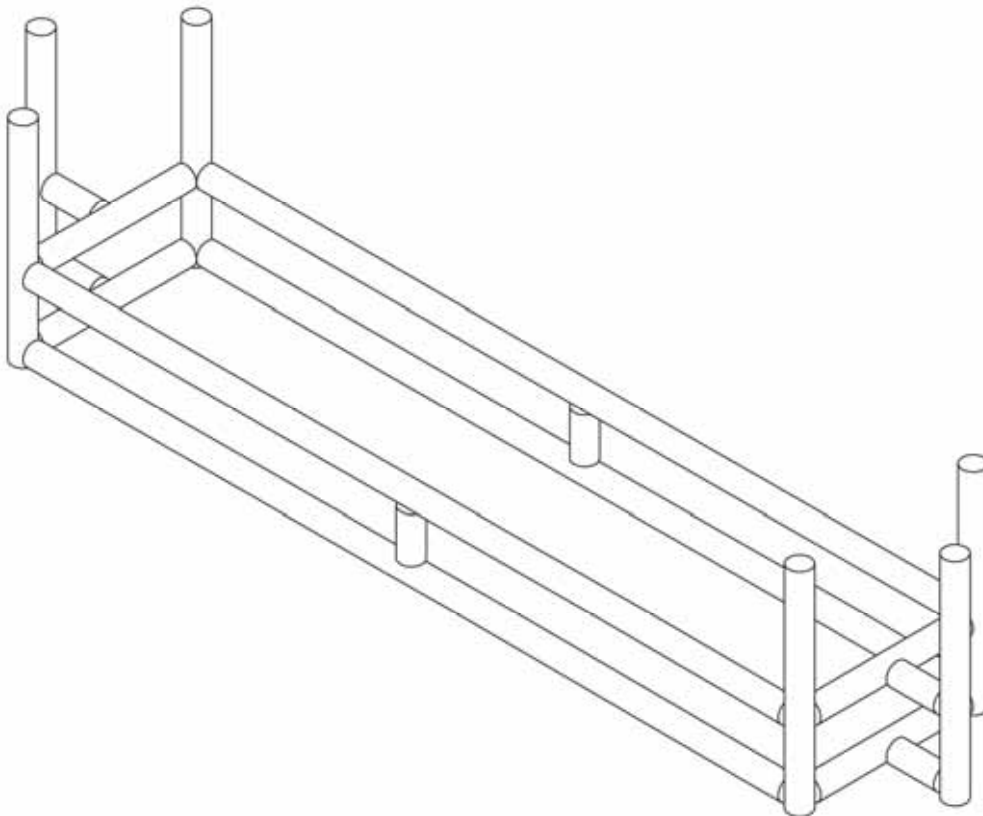
6.3. Anchor Plate (Optional)

Embedded into the concrete at time of construction this anchor plate will provide maximum security.

When installing ensure that concrete does not pile around the mounting bolts as this will prevent secure and flat mounting of the ground plate.

It is suggested that the stainless steel mounting bolts are taped during slab construction to keep the thread free of cement.

The mounting nuts must be greased. Plated steel will rust, stainless on stainless can molecular bond on a neat fit and be impossible to tighten or undo. Special silicon based anti-seize grease is supplied with each cabinet.



Anchor Plate

6.4. Plumbing Assembly

Above and below the flow meter is a split union which when loosened allows rotational movement of the remaining plumbing assembly.

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



6.5. Install Plumbing

This plumbing is usually connected to the incoming mains by removal of the lower split union (to the flow meter) and connecting the ball valve to the incoming supply. Then the plumbing system, as supplied without the outlet piping, is lifted into place and connected to the ball valve.

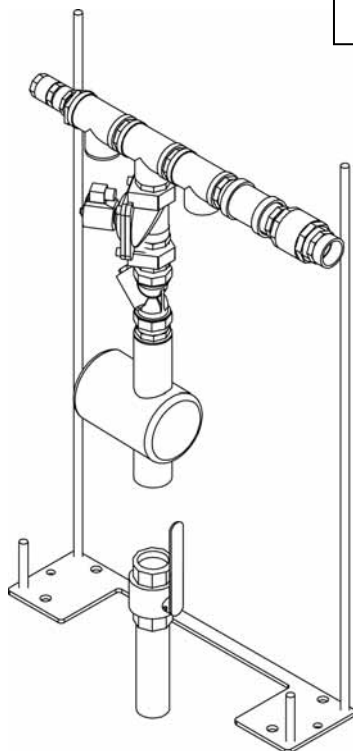
Note 1: If more convenient, the plumbing can be installed after the stand and cabinet.

Note 2: The plumbing system is designed so that it can be removed as a fully assembled item. This is achieved by undoing the split union just above the incoming isolation taps, plus undoing the side dress plates and then lifting the plumbing free from the cabinet. Therefore, make sure that the incoming mains or solar cables are carried up **behind**, not in front of the plumbing.

Install plumbing:

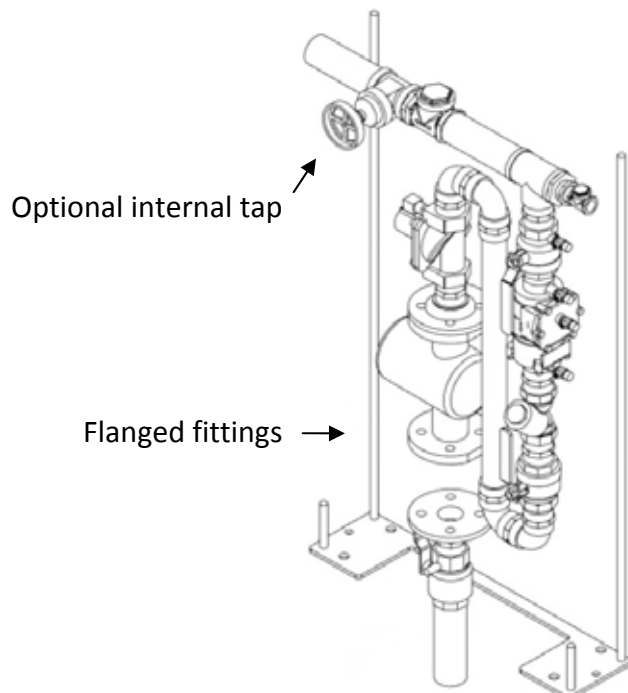
First generation plumbing.

Second and third generation to be shown in subsequent revisions and displayed on Abberfield's internet site.



External Backflow Protection

Drawing shows flanged fittings, not typically used.
 Later versions use screwed plumbing split unions.
 Internal tap also not typically used.



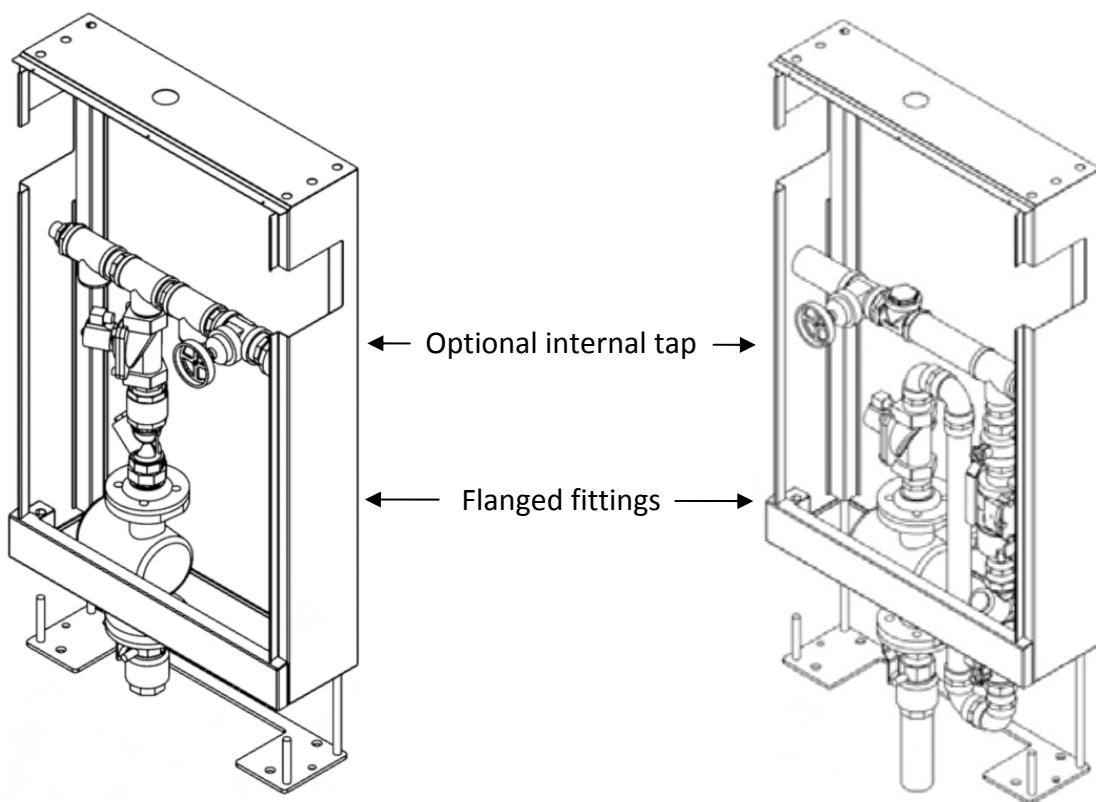
Internal Backflow Protection

6.6. Bottom Cabinet

1. Lower stand over ground plate and plumbing (or stand and cabinet if remaining together).

First generation plumbing.

Second and third generation to be shown in subsequent revisions and displayed on Abberfield’s internet site.



External Backflow Protection

Internal Backflow Protection

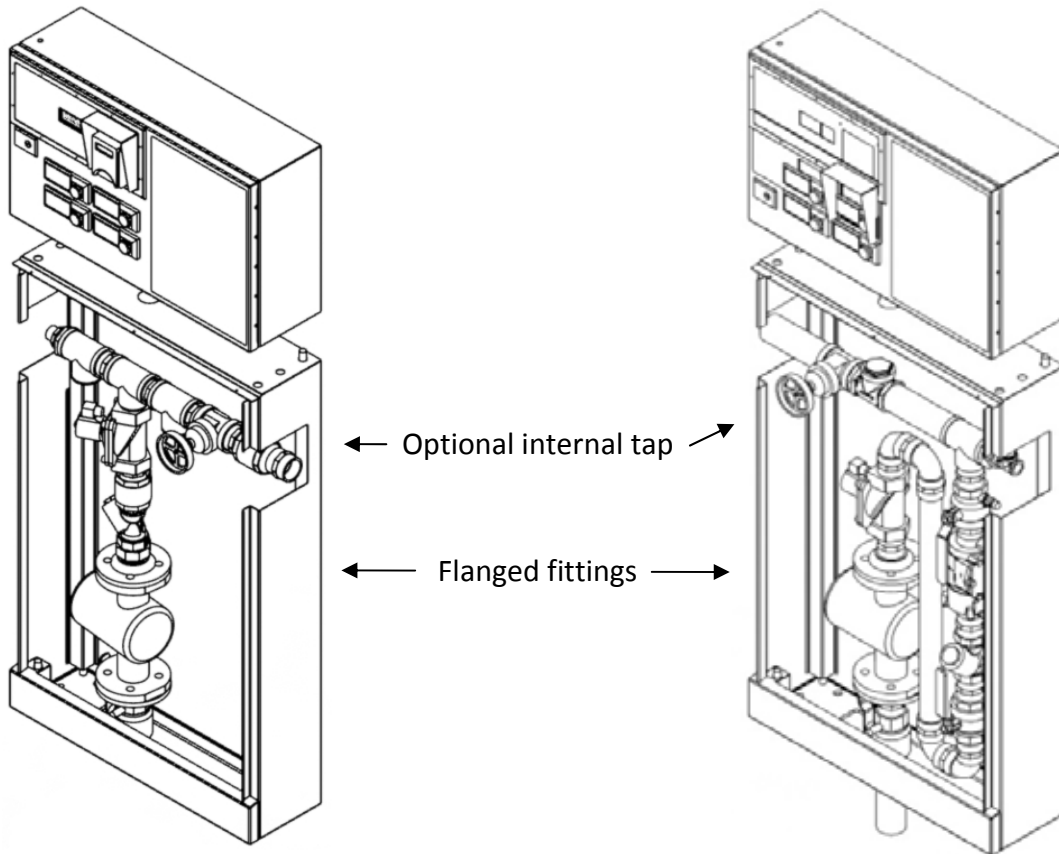
Drawings show flanged fittings, not typically used.
 Later versions use screwed plumbing split unions.
 Internal tap also not typically used.

6.7. Top Cabinet

1. Lower cabinet onto stand.
2. Secure using M16 nuts and bolts provided, use grease or anti-seize on the stainless steel bolts.
3. Connect mains power and the flow meter sensor to the flow meter.

First generation plumbing.

Second and third generation to be shown in subsequent revisions and displayed on Abberfield's internet site.



External Backflow Protection

Internal Backflow Protection

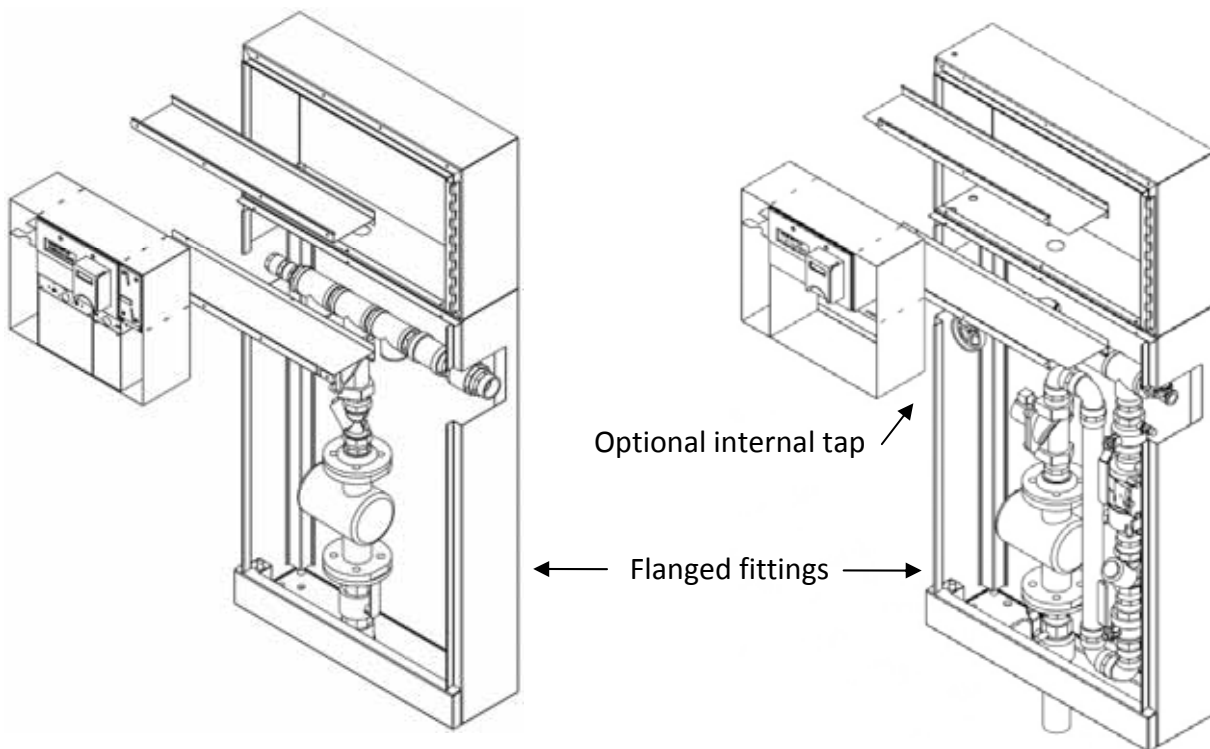
Drawings show flanged fittings, not typically used.
 Later versions use screwed plumbing split unions.
 Internal tap also not typically used.

6.8. Inner Cabinet and Modules

1. Secure inner module support brackets using CSK S/S screw provided.
2. Install inner module to left of the cabinet secure using screws provided.

First generation plumbing.

Second and third generation to be shown in subsequent revisions and displayed on Abberfield’s internet site.



External Backflow Protection

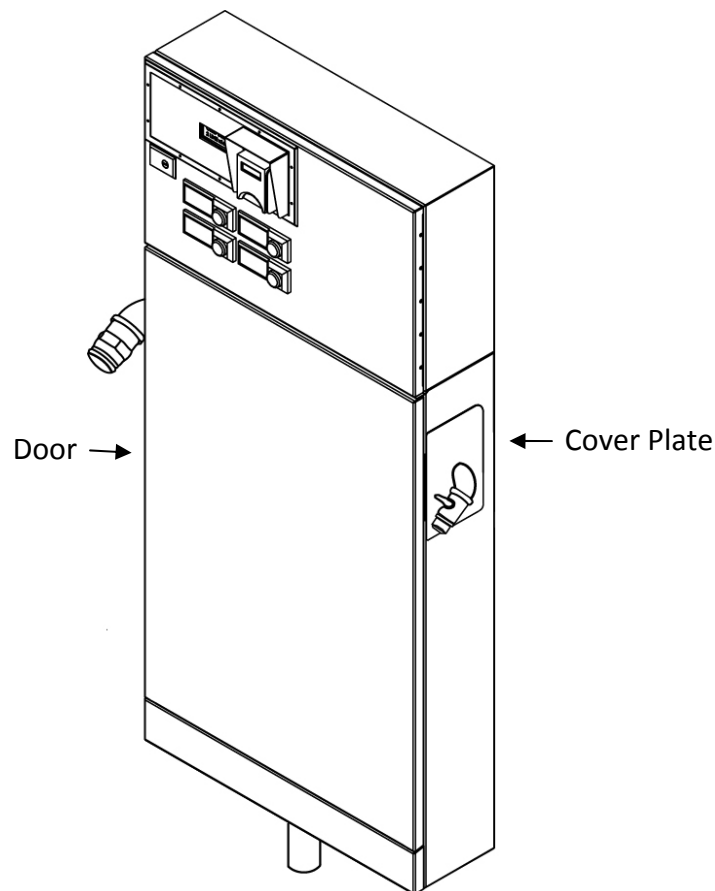
Internal Backflow Protection

Drawings show flanged fittings, not typically used.
 Later versions use screwed plumbing split unions.
 Internal tap also not typically used.

6.9. Covers and External Attachments

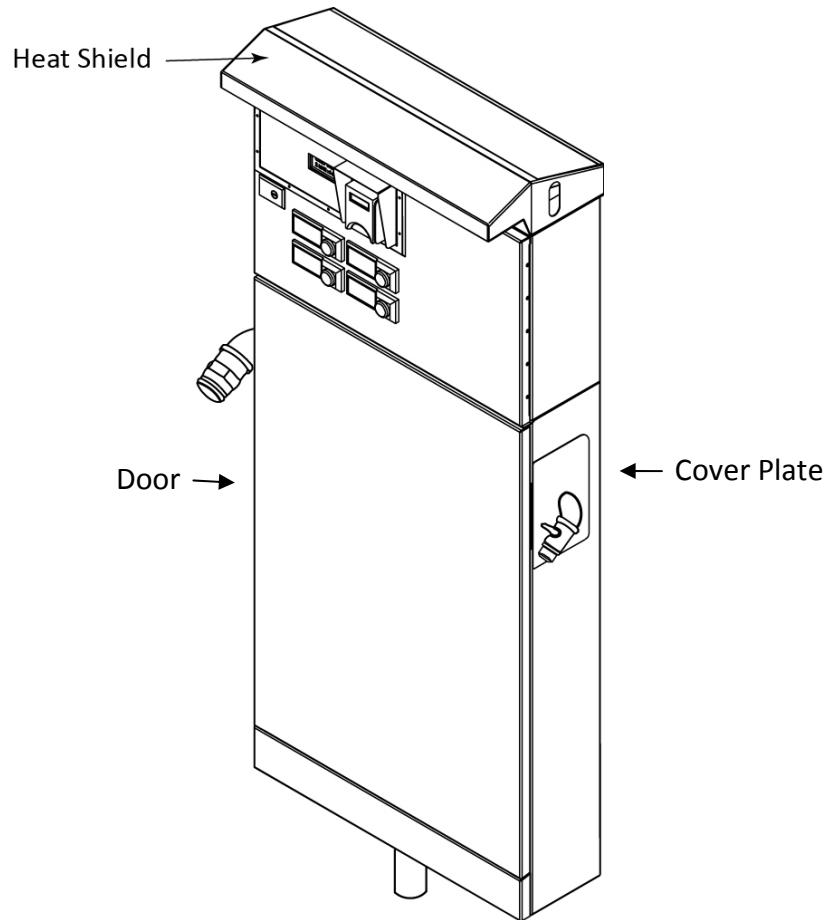
1. Install plumbing cover plates.
2. Screw in 25mm outlet and 50mm camlock, then add the outlet pipe assemblies (usually pre-welded stainless steel pipes).
3. Use the cover plates as a template to drill the cabinet and secure cover plates to cabinet with screws provided. *Note:* the template front edge should be level with the front edge of the cabinet.
4. Fit hose clamps to outlet pipes, inside the cover plates (to prevent theft).
5. Install stand door.

Note: **Outlet should face down at 45 degrees.** Straight out is wrong (too much strain on the hoses and pooling of contaminated water in the outlets can occur).



6.10. Heat Shield

1. Install heat shield



7. ELECTRICAL

The WD2500 can include a switchboard comprising:

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

Electricians wire this in the locked cabinet provided to the right of the controller 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 mains cable size.

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 external solar panel is fitted the input connects to the “solar + and –” inputs. The battery module slides into place under the controller.

If an external solar panel is fitted, then a larger battery and regulator / charger may be fitted external to the cabinet 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)

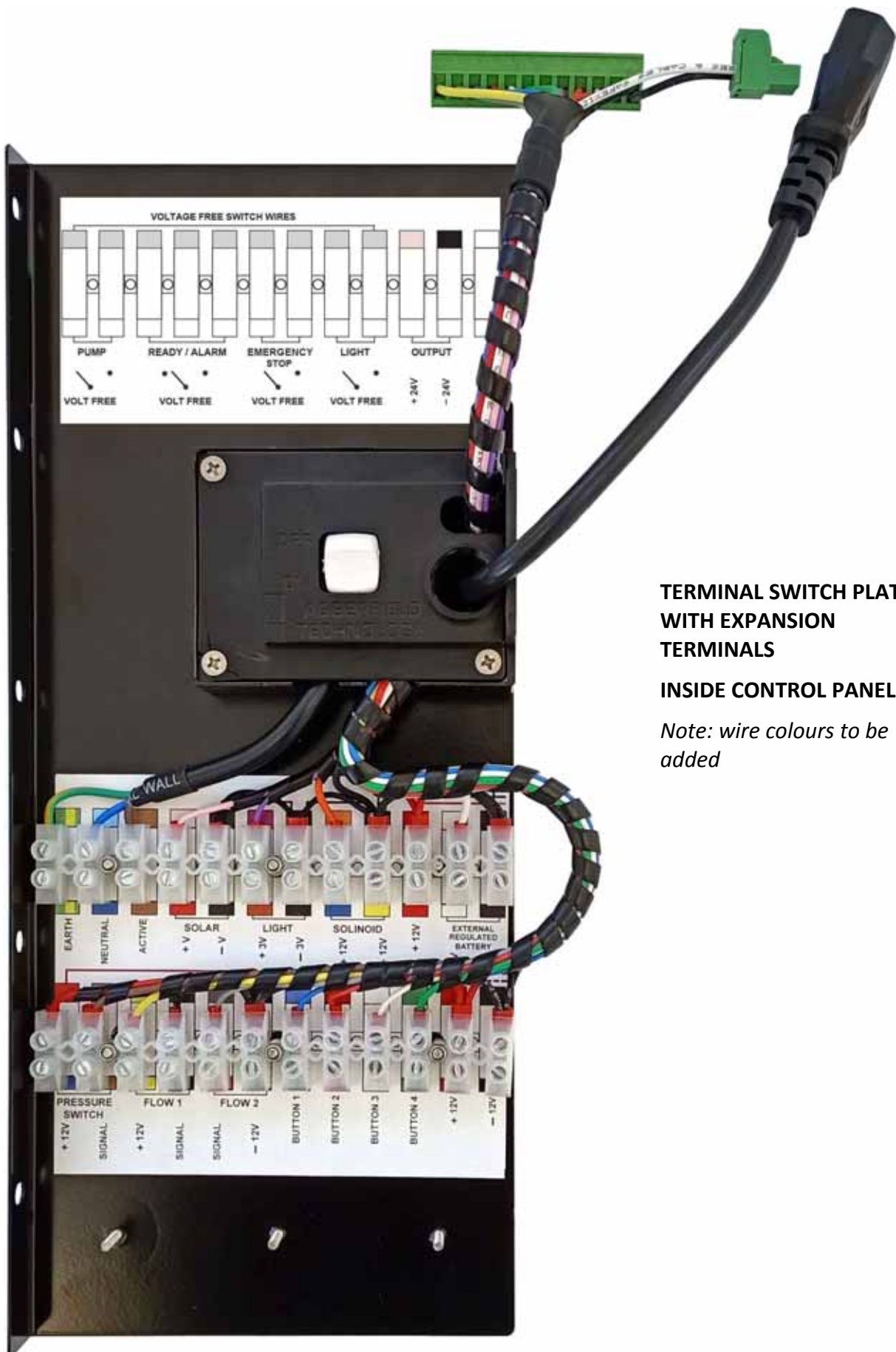
One customised feature is to include power relays on the switchboard (with voltage free contacts), used for varying functionalities including:-

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



TERMINAL SWITCH PLATE INSIDE CONTROL PANEL



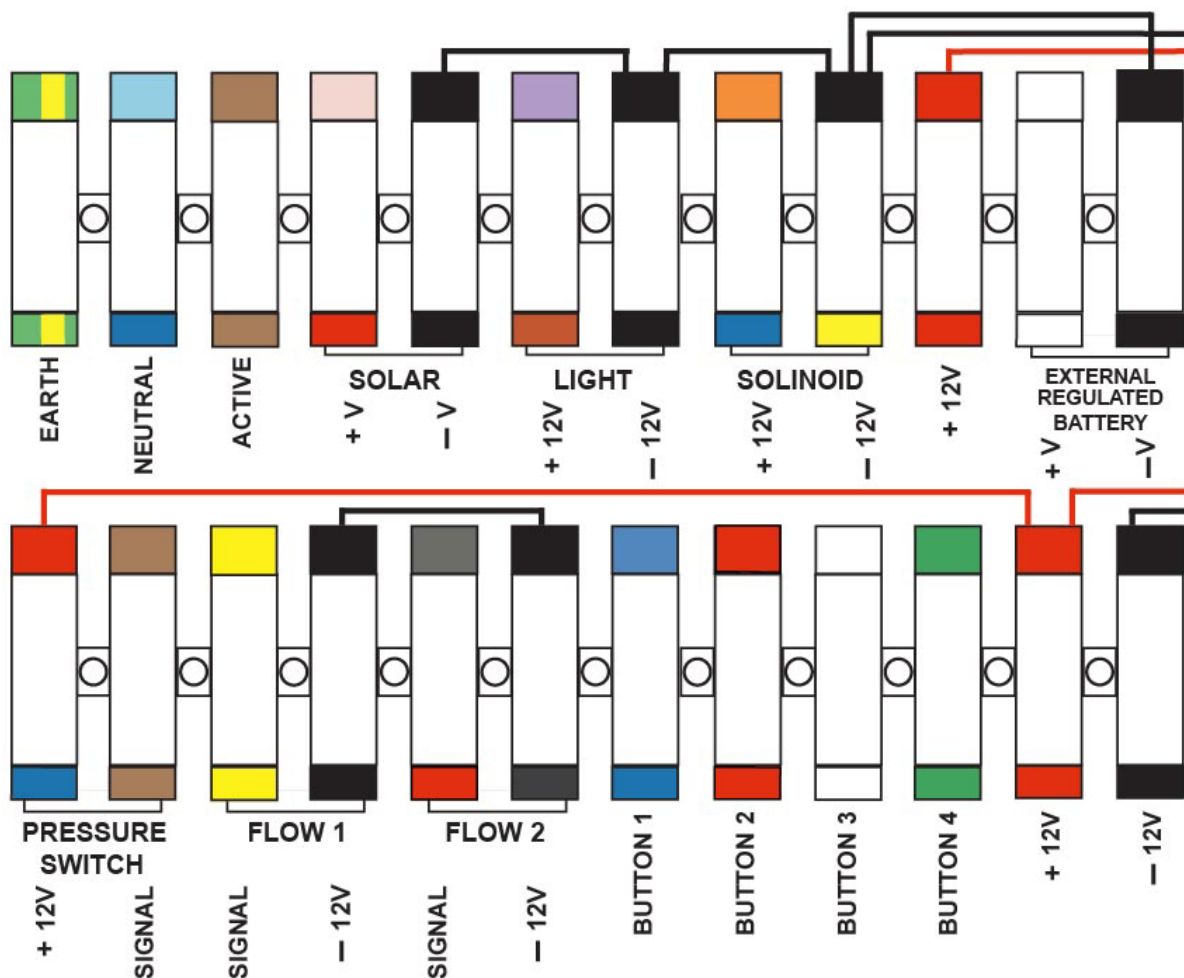
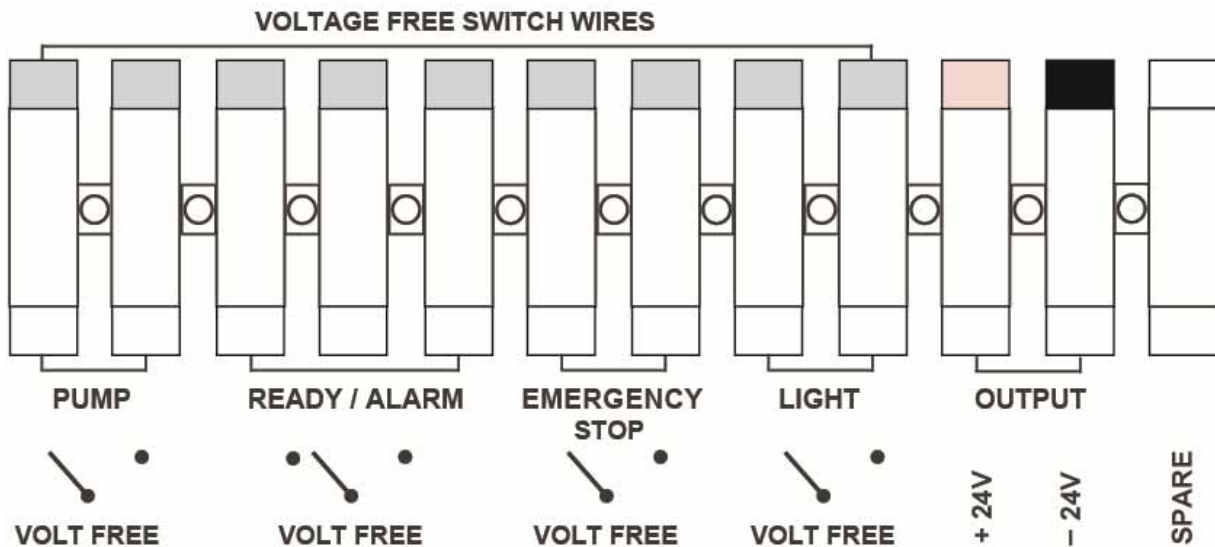


**TERMINAL SWITCH PLATE
WITH EXPANSION
TERMINALS**

INSIDE CONTROL PANEL

Note: wire colours to be added

TERMINAL SWITCH PLATE WIRING LABEL WITH EXPANSION TERMINALS



Since the plumbing can be removed from the cabinet as a whole assembly, it is recommend that incoming mains or solar cables are routed behind the plumbing.

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.

FLOW METER AND WATER VALVE

Electrical connections to these plumbing parts is all pre-wired and tested pre-delivery. However, as the plumbing assembly is delivered separate from the cabinet the electrical connections to these two items is unplugged. Part of the electrical installation is to locate these leads and plugs in the cabinet base and connect them, retaining each with the screws provided with the plugs.

Photo to be added

The leads are then neatly cable tied together.

Photo to be added

INSTALLATION OF CONTROL ELECTRONICS

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

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

Having done that, installing the control electronics can be carried out by the customer, if Abberfield are unable to attend site.

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





MAINS POWER SUPP



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.**
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.

8. ITEMS TO BE RETURNED TO ABBERFIELD

- Pallet
- Pallet attachment plates
- Unused bolt/nuts

9. SUPPORT INFORMATION

John Colyer
Laurie Kristo

Phone: (02) 9939 2844

Email: contact@abberfield.com.au

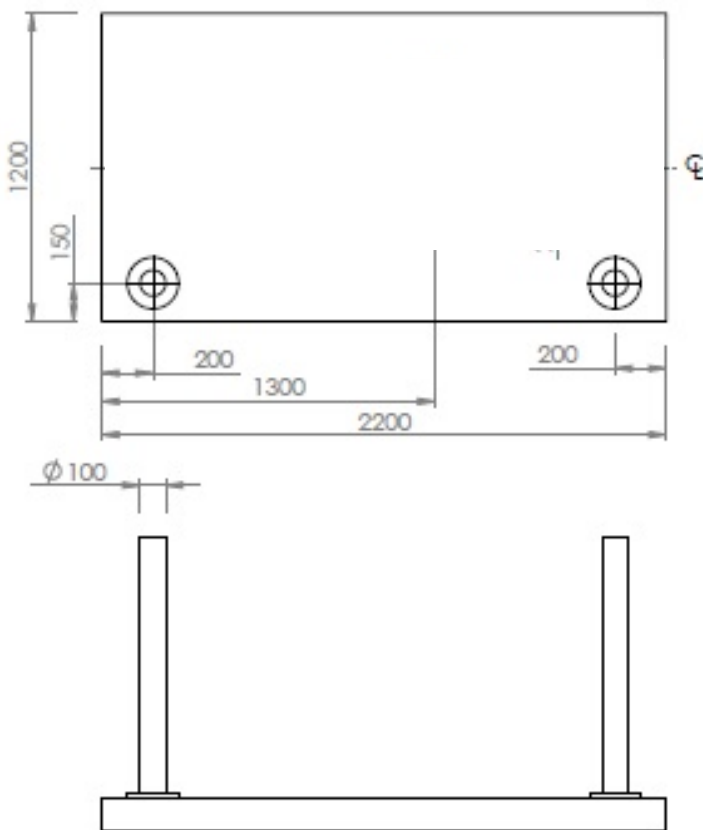
Mobile: 0414 427 708

APPENDIX 1 – SUGGESTED CONCRETE PLINTH DIMENSIONS (MACHINE ONLY)

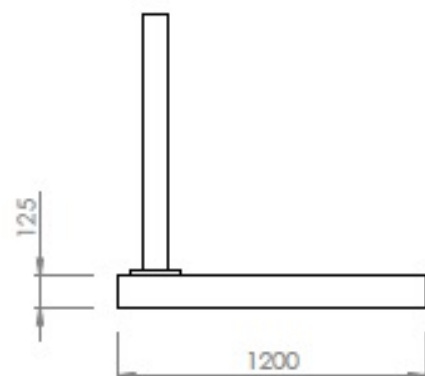
These suggested concrete plinth dimensions do not constitute an engineered design, but merely provide a suggestion for the slab design. Please consult with an engineer for specific installation requirements. As always Abberfield is available for assistance.

- 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 shear 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.*

Slab recommended minimum dimensions



Note 1: Internal testable double check valves are usually used but very occasionally external Residual Pressure Zone Devices (RPZ) are used. These sit behind the cabinet and the minimum front to back dimension of 1200mm should become 1600mm. The slab should also have the rear central area scalloped rearwards to shed the RPZ discharged water away from the Filling Station cabinet.



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:

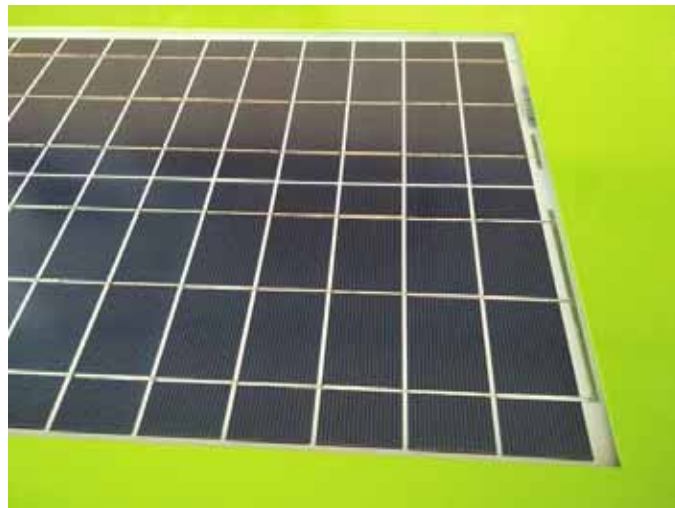
1. Using a machine template (supplied by Abberfield) or using the machine ground plate as a template, mark the mounting positions for the ground plate.
2. Drill a hole 16mm or above to an adequate or convenient depth.
3. Set in stainless steel threaded studs in Chemset or epoxy (threaded studs available 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.

APPENDIX 2 – SOLAR PANELS

It is possible to have a solar panel added on top, with sufficient capacity to allow the machines to operate in sleep mode (wake up for each operation). However, this normally only applies to larger Filling Stations as the WD2500 is smaller, the fitting of an on-board panel is not recommended. External solar panels on a pole are preferred.

ON-BOARD SOLAR PANEL



SOLAR ON A POLE

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 (lowest cost but least used method).
- 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

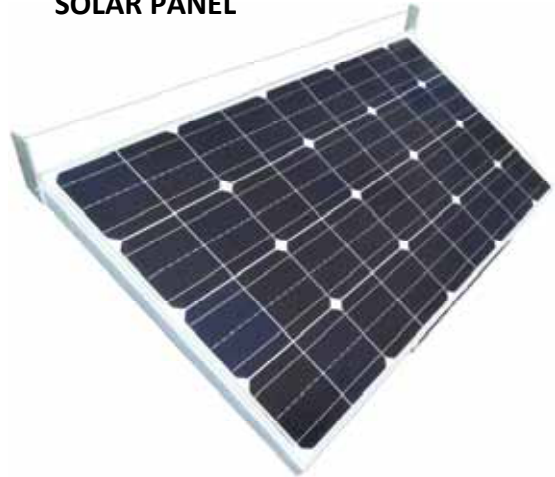
The external kit comprises:

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.



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 accidentally 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.

Note: These precautions are not needed if a tabernacle is used to mount the pole.

MECHANICAL

(Option 1) 6-meter-long poles are supplied and should be concrete in a ground footing to a depth of at least 500mm 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 (magnetic north).

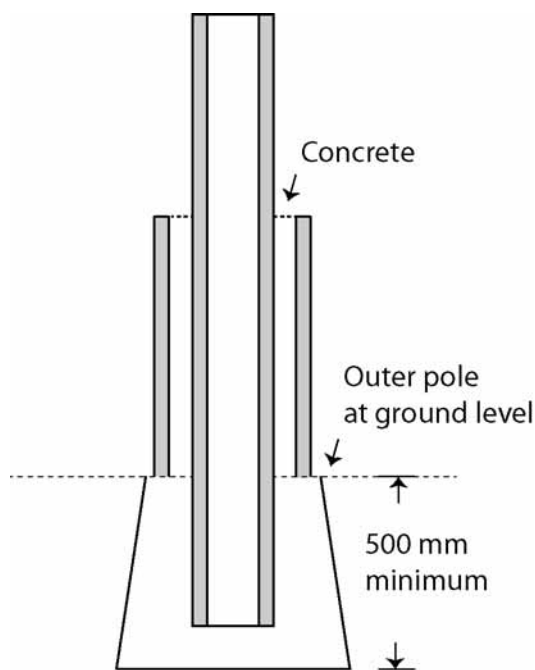
In many installations a pole length less than 6 meters is sufficient and the pole can be cut down as required. The lower the pole the more wind stable is the assembly.

THEFT PROTECTION

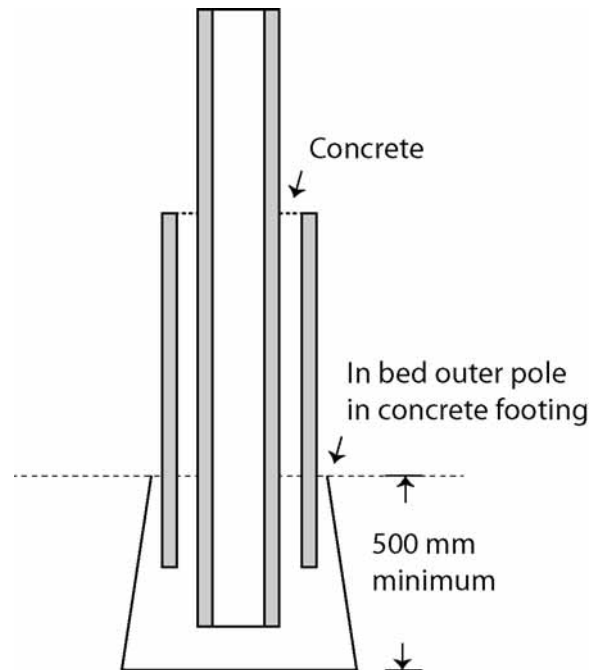
Some customers concerns about solar panel theft are increasingly less relevant.

If this concern remains the following protection can be used.

The small risk of poles being stolen 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

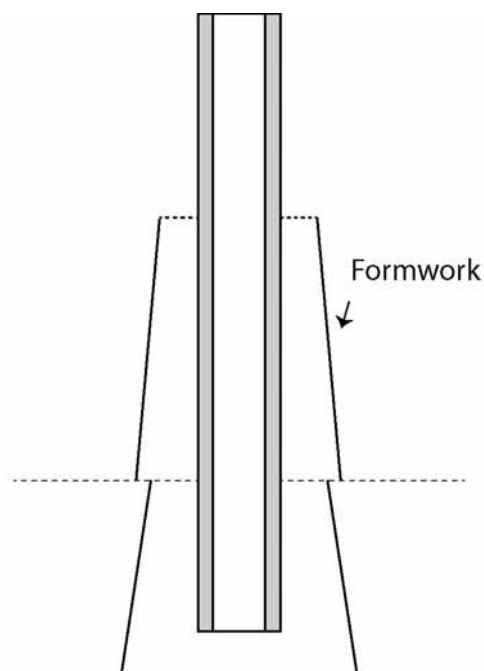


Theft and Wind Protection

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

(The more common solution)

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 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.

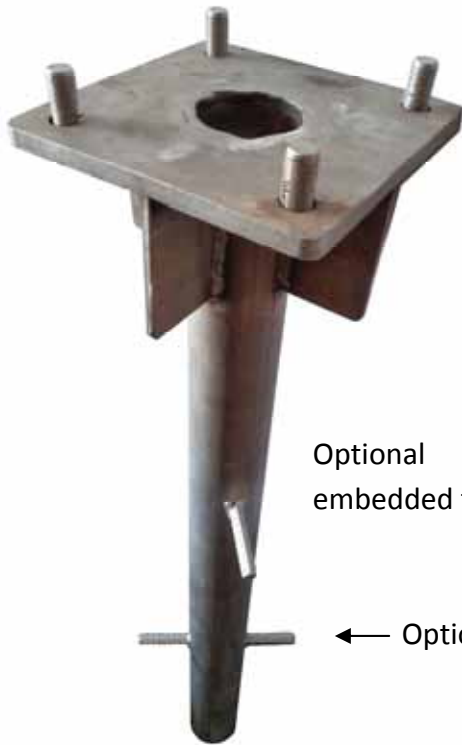
The tabernacle can be retrofitted at any time.

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

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 (recommended panel).

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

Optional
embedded footing

← Optional reo rod



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 footing 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 washers can be used to adjust the pole being square.



STUD AND NUT ASSEMBLY

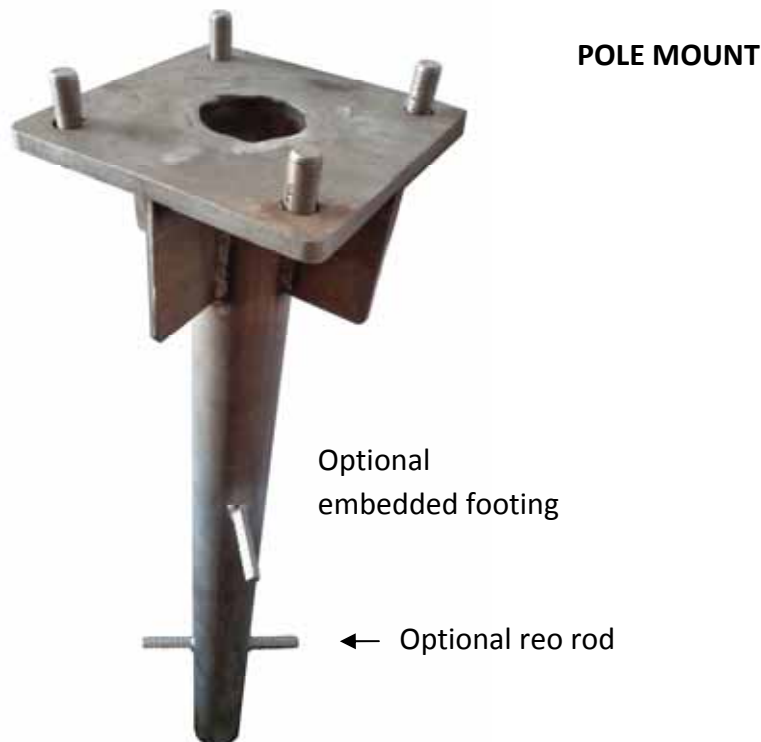
EMBEDDED FOOTING

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.

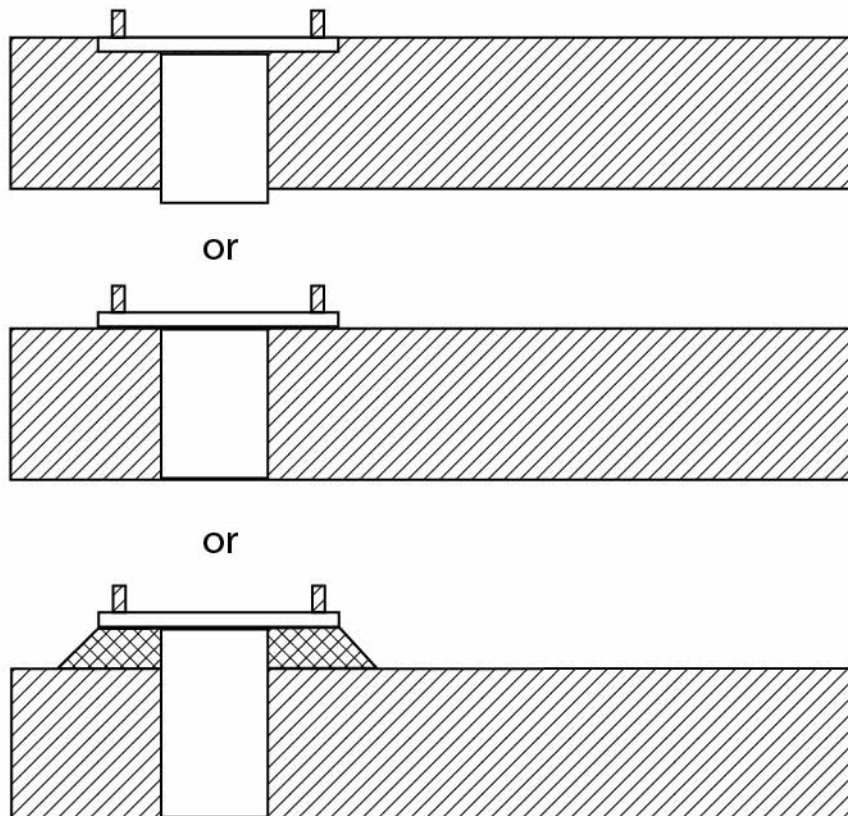
This stainless-steel assembly needs to be mounted square when embedded in concrete, or the pole will not be vertical.

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 concrete slab or other infrastructure (parallel to edge).



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.

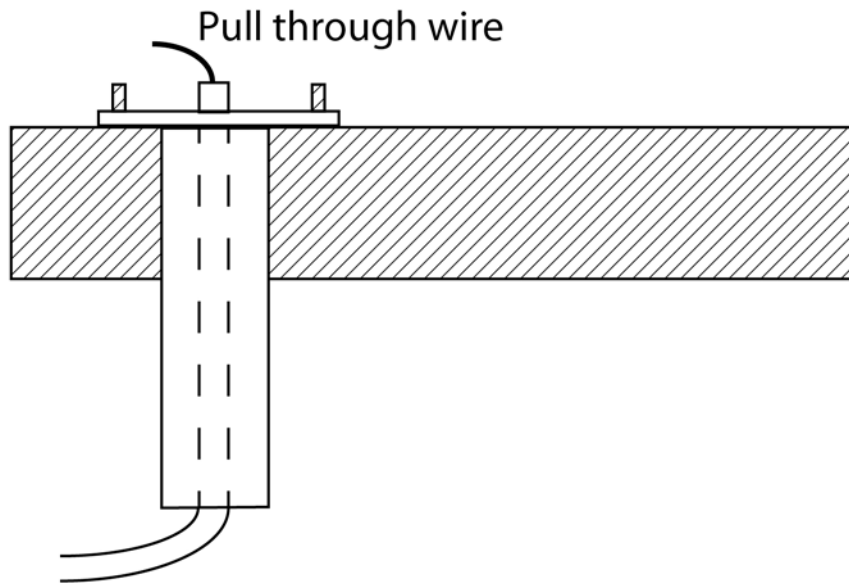
1. Via a conduit down the full length of the footing.
2. A conduit passing through the wall in the footing just below ground level. Either method should leave the conduit finishing just above the ground level of the footing, to protrude into the solar pole.

FULL DEPTH FOOTING

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

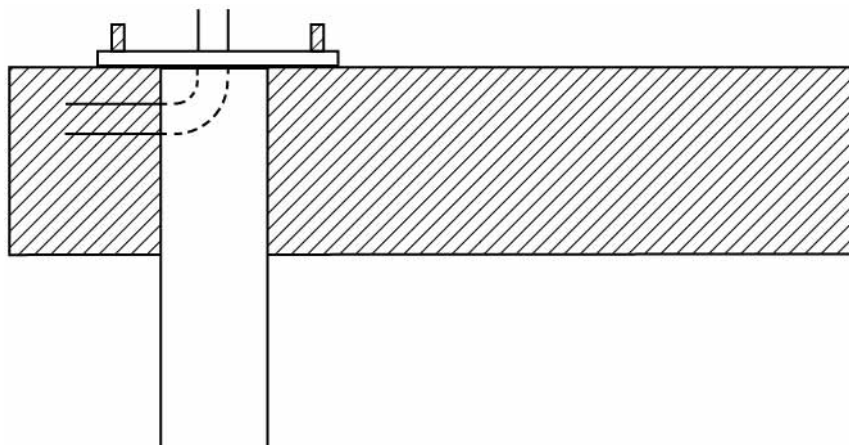
Down the conduit should be a pull through wire.

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. Ensure a large size cable is used to minimise voltage loss in transmission.



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.

1. Remove the 4 x M6 bolts securing the dress panels.



DRESS PANELS CLOSED



DRESS PANELS OPEN

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. Pre-prepared cables are available from Abberfield Technology.
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 that can hang upside down on the cables and chew through the cables.
9. If required, refit the bird roosting preventer.



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 through 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 position.
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 3 – COMMISSIONING

The design of the equipment allows for the commissioning to be carried out at Abberfield's factory and Card Access Service's administrative office.

This is because the mechanical, electrical and plumbing component parts are all pre-assembled and factory tested before delivery.

If these parts are site assembled as instructed all that remains is to slide in the controller parts and turn the Filling Station on.

Commissioning is primarily the setting up of the electronic controller's Filling Station identity for the credit card functionality, plus the account card usage, the banking system, plus the audit and critical alert capability. Only when this commissioning set up and testing is complete does Abberfield deliver or send the controller parts to site.

It is normal for Abberfield to deliver the controller and confirm that the installation has been correctly carried out, **BUT this is not a contractual obligation.**

The alternative is for Abberfield to forward the controller, the configuration module and if a solar operation also the battery / charger module. Then, the customer can slide these modules into place and turn on the power and water and the system can be functional. However, whenever possible Abberfield will visit the site, even at great distance, to all Eastern states. This is made possible by Abberfield having a mobile office workshop and delivery van, a converted Recreational Vehicle towing a large bogie delivery trailer "Go anywhere, anytime", in the interest of Abberfield's reputation supporting the companies valued customers.



This objective of a courtesy visit ought not to be abused by installers who only do part of their job, leaving it for Abberfield to complete the cabinet mounting and electrical connections of the plumbing solenoid and flow meter (both plug-in devices with the preinstalled and tested leads).

APPENDIX 4 – PACKING AND SHIPPING MATERIALS

The cabinets will come secured with internal bolts to a purpose-built pallet and to the top of the cabinet is bolted a stabilising bar. These and all other transport hardware are Abberfield's property, to be returned or collected during a follow-up visit to the customer.

APPENDIX 5 – POST INSTALLATION SUPPORT

Abberfield's one year warranty obligations are limited to customer's returning faulty equipment to Abberfield's premises for repair or replacement. Removal of much equipment is easily achieved by the component parts sliding into place as modules having no exposed electronic or delicate componentry.

In reality, Abberfield visit site and to date have made no charge for any support provided for equipment provided over the past five years. Continuance of the out of warranty support is possible because there is little equipment failure and is conditional on the continuance of the mutually respectful relations Abberfield enjoys with all Filling Station customers.

APPENDIX 6 – FILLING STATION MAINTENANCE CUSTOMER SUPPORT

Whilst Abberfield often attend sites to implement enhancements and may carry out some maintenance, customers should care for their Filling Stations with occasional support.

The Filling Stations may operate for decades, but for this the paintwork should be occasionally washed and wax or polished or the paint will fail before the rest of the equipment.

Insect infestation should be controlled by periodic application of surface spray and installing mothballs or camphor blocks inside the control cabinet.

APPENDIX 7 – ABBERFIELD SUPPORT

Alternative to customer support is engaging Abberfield to carry out that maintenance plus other maintenance and repair of any minor defeats.

With a fifty items checklist, if other repairs are needed the maintenance team can report to Abberfield for a service vehicle to follow.



ABBERFIELD TECHNOLOGY PROVIDING WHOLE OF LIFE SUPPORT

APPENDIX 8 – 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.

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, but for the WD2500 the standard internal battery module is considered sufficient. There are other options if required (refer Abberfield Technology).

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 a 10amp rating and the battery can be up to 100 amp hour's capacity.

Varying from this arrangement depends on site specific details, latitude, machine usage and operating time requirements (with no charging occurring). For demanding situations, up to 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.

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 9 – 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 SIM's.

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.

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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. To the top of the WD2500 will be a stabilising bar for transportation purposes.

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 stabilising bar can be used to prevent toppling in the event of rapid braking.

Using the stabilising bar 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 tries 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 10 – 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 11 – 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.

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 analyse 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 12 – 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
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
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