**SOLAR PUMP INSTALLATION – LA GRUE OLIVES 2017**

La Grue Olives has installed a solar submersible irrigation water transfer pump to move water from a catchment dam in a valley to a header dam up near the house where it is used to water 1000 olive trees.

The solar pump replaces a diesel engine driving a Kelly Lewis pump which we used for 15 years prior, hence the bulk fuel tank at the side of the pump shed.

In this project Ruth and I were helped by many friends. Chief was John Simmons [he is an engineer], his son Matt still studying, Wendy and Richard [qualified kayak operators] and Bill Russell helper. A few other people came to observe after the work started.

First it was necessary to clear 3 selected trees at the site where they could shade the solar panels which are located to the left of this photo [see stakes]. This view is north west.

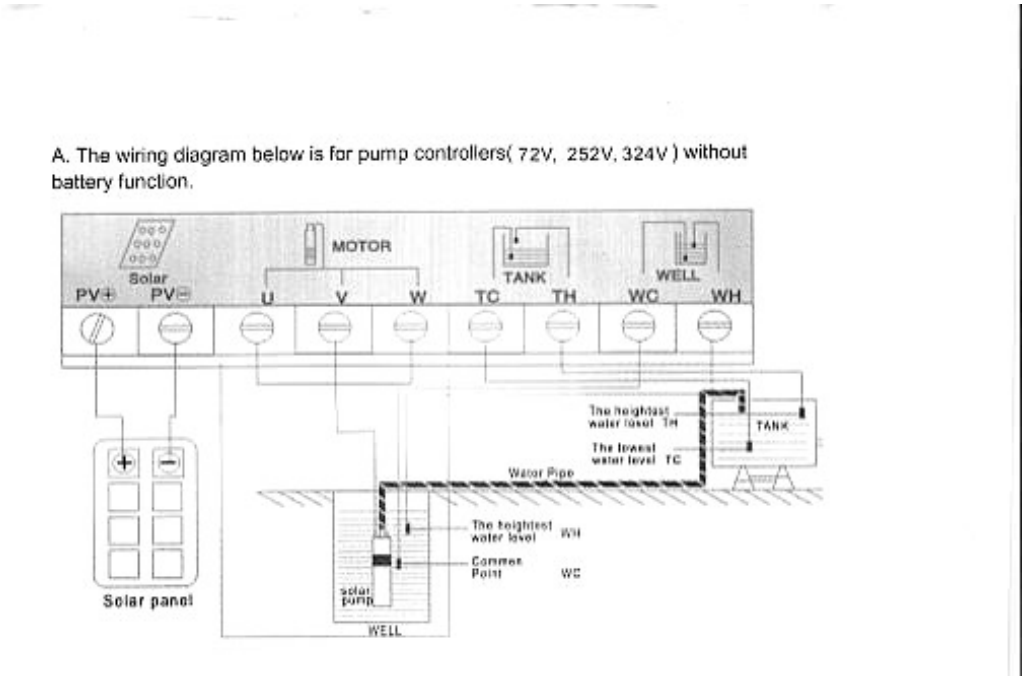
The major elements of the installation are

- An array of 6 solar panels to produce 75 V DC (loaded)
- A solar controller to "condition" the power
- A submersible solar bore pump

We constructed a float with a filter-box for the pump suspended in the dam.
An existing pipe transfers water 500M and up 50M.

What did we install?

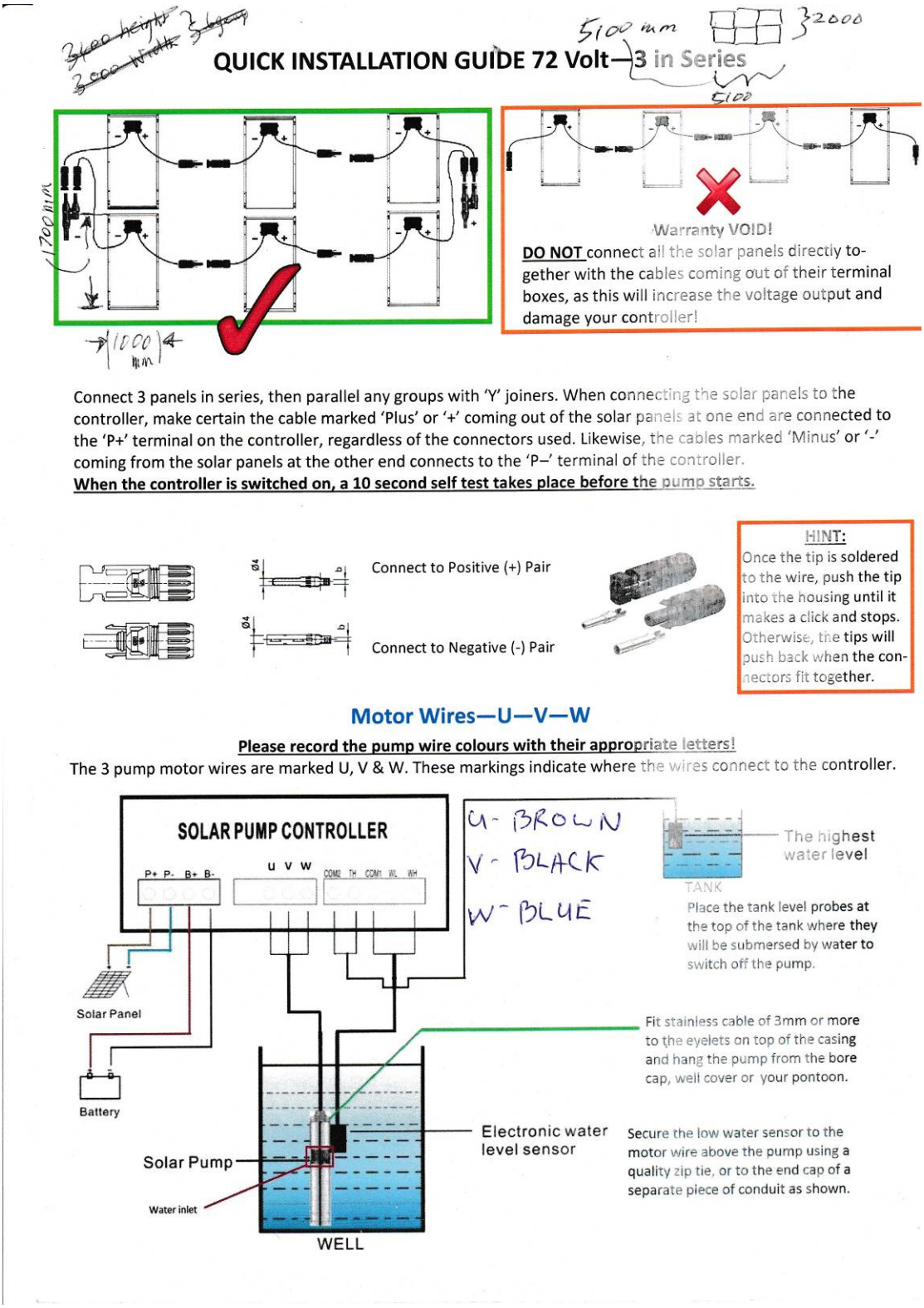
This schematic shows the 4 parts of the system – PVs, submersible pump, tank (upper dam) and well (lower valley dam). Not shown in the schematic is the PV Controller (of which this is a diagram of the connections panel).




At La Grue we have a lower dam [for well] and an upper dam [for tank]. We did not buy and install "full tank" or "low well" sensors. We have eyes and we can retro-fit sensors later if we want. We have 6 PV panels.

Instructions (on wiring especially).

The following instructions were received from the supplier – Commodore Australia.




In the event, the cable to the pump was not brown, black, blue but actually brown, yellow/green and blue. (In extending the length of the cable, the dealer changed the black conductor to yellow/green.)

Solar Pump control box and isolator inside the pump shed.

At this stage of the installation, the wiring has not been secured. [A wet day job].

Float and delivery pipe (from the submerged pump) in the source dam.

The plastic empty containers are tied to the delivery pipe to keep it more or less horizontal over 20M from float to the shed. Close inspection shows the power cable tied to the delivery pipe. The white cord running across the dam was/is used to keep the float positioned over the deep water and straight out from the shed [behind camera].

Connection [inside shed] of the solar pump delivery pipe into the “main.

This connection causes the water to go up the hill.  There is a non-return valve on the solar pump delivery line going out of the shed to the right, so that the pump does not have to push all the water in the long pipe upon start-up and the water in the long pipe “up the hill” will not run back into the supply dam via the solar pump.

Another non-return valve is planned for the “old main” [to the right of this connection] so that solar pumped water and water in the pipe over-night will not go to the Kelly Lewis pump and leak out.

Apparatus located in the lower dam

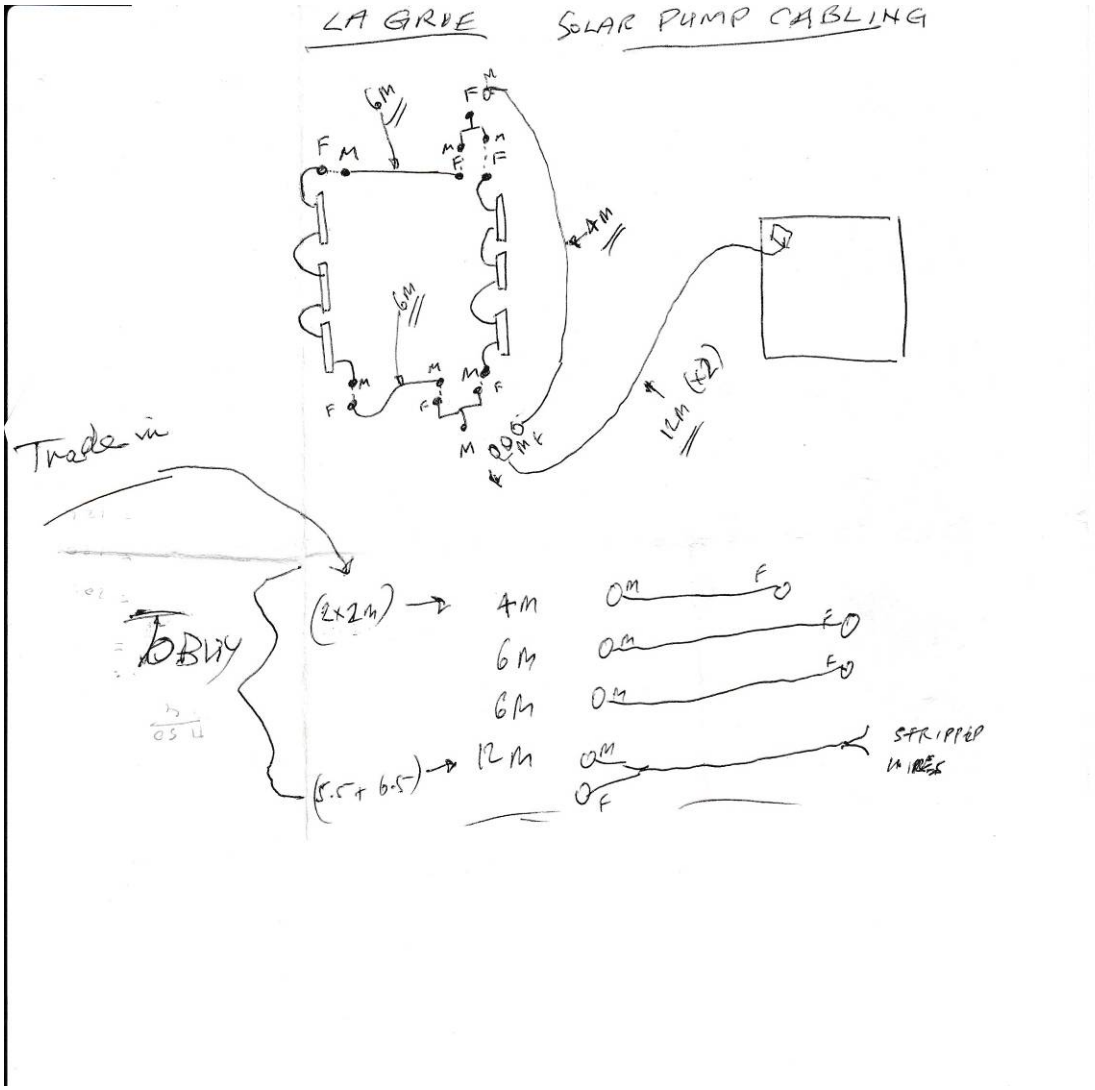
Richard is displaying the submersible pump cylinder (25kg) with its power input cable, laying next to the filter box. We made the filter box out of 3 soft-drink cases tied together with cable ties and wrapped in shade cloth. The filter box is downside up in this photo. The float made out of hard poly-pipe is nearest camera.

We cut out enough room inside the soft-drink crates to fit the submersible pump. The Xmas stocking effect is the bottom of the filter box [a trap for filtered stuff and also a buffer "sock" to prevent the pump ever sinking into the mud in the dam]. The pump delivery pipe is not yet attached to the top of the pump in this photo in Richard's hand.

The view south west from our farm shed [at the house] is of the back of The Dandenongs showing, behind our neighbour's strawberry farm which is beyond the olive trees and next door's lemon orchard which is beyond the 100 foot pine tree on the property boundary. From this view, it is clear that we have some "head" to overcome to get water up to this high point from the valley dam. [50M vertical and 500M west of this point].

Working wiring diagram and shopping list.

John Simmons converted and re-drew the manufacturer's diagram and assessed what we had received and what we needed to get.



Adding floatation to the in-dam unit.

Wendy and Richard added additional floatation tubes to the top of the “in-dam assembly” before our second attempt to launch the suction assembly across the Cumbungi fringe of the dam. The additional hard poly floatation pipes also have the pump’s delivery pipe [inch and a quarter soft-poly] tied to them to reinforce the delivery pipe.

The power supply cable to the pump is secured to the delivery pipe at half meter intervals along its length (20M) with cable ties. Both delivery pipe and the cable go into the pump shed in which there is a solar control panel and access to the “main”.

View of the whole project site from the south-west.

Arrays [right], pump shed and suction float viewed from west side of dam

6 panel array.

Solar arrays working.  Note orange conduit to connect to control panel in pump shed.

Power cable location

This conduit is now buried, so this photo shows where!

Technical performance details.

# DC SOLAR PUMP

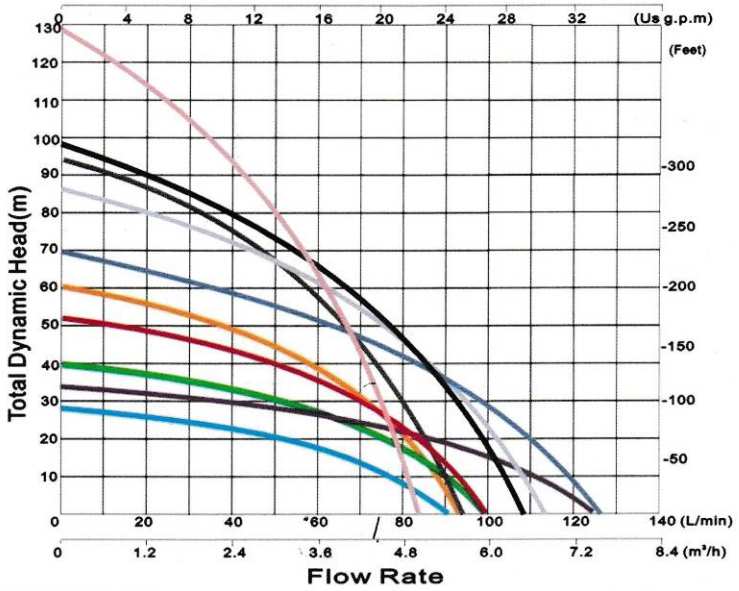
## 4 INCH CENTRIFUGAL PUMP

Motor filled with oil
Max.Flow:7.5 m³/h
Max.Head:128m
Max.immersible depth:40m

Prices Including Solar Panels to suit:

5-128

| | |
|---|---|
| JCS4-5.0-28 | $2490 |
| JCS4-6.0-40 | $3150 |
| JCS4-6.0-52 | $3250 |
| JCS4-7.5-34 | $3380 |
| JCS4-5.5-60 | $3380 |
| JCS4-5.0-128 | $4450 |
| JCS4-5.5-90 | $4450 |
| JCS4-6.7-88 | $4450 |
| JCS4-7.5-70 | $4450 |
| JCS4-6.5-98 | $4850 |




Materials:
Pump: SS 304
Motor: SS 304
Impeller: SS 316
Outlet: SS 304
Bearings: NSK

Accessories:
Pump Controller
Water Probes
Low Water Sensor
6m Solar Cable
Cable Connectors

PUMP PERFORMANCE

| TYPE | VOLTAGE (v) | POWER (w) | MAX FLOW (m3/h) | MAX HEAD (m) | OUTLET (inch) | DIAMETER (mm) |
|---|---|---|---|---|---|---|
| JCS4-5.0-28 | 24 | 250 | 5.0 | 28 | 1.25" | 100 |
| JCS4-6.0-40 | 48 | 500 | 6.0 | 40 | 1.25" | 100 |
| JCS4-6.0-52 | 48 | 600 | 6.0 | 52 | 1.25" | 100 |
| JCS4-7.5-34 | 48 | 750 | 7.5 | 34 | 1.25" | 100 |
| JCS4-5.5-60 | 48 | 750 | 5.5 | 60 | 1.25" | 100 |
| JCS4-5.0-128 | 72 | 1000 | 5.0 | 128 | 1.25" | 100 |
| JCS4-5.5-95 | 72 | 1000 | 5.5 | 95 | 1.25" | 100 |
| JCS4-6.7-88 | 72 | 1000 | 6.7 | 88 | 1.25" | 100 |
| JCS4-7.5-70 | 72 | 1000 | 7.5 | 70 | 1.25" | 100 |
| JCS4-6.5-98 | 72 | 1200 | 6.5 | 98 | 1.25" | 100 |

BRUSHLESS DC MOTOR TECHNOLOGY—SUPERIOR EFFICIENCY
MAXIMUM POWER POINT TRACKING SOLAR CONTROLLER—UP TO 30% MORE PUMPING PER DAY
SENSORS INCLUDED FOR FULL TANK & LOW WATER SOURCE
2 YEARS WARRANTY ON PUMP & CONTROLLER www.commodoreaustralia.com.au
20 YEARS SOLAR PANEL WARRANTY TO 80% OUTPUT

Annotations show which pump we installed at La Grue Olives -- JCS4-5.0 – 128.