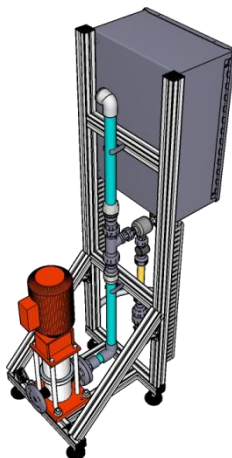




Ferti-Gator™ **SOLO** system - Installation and Operators Guide

This guide relates to the installation and operation of the Ferti-Gator™ **SOLO** being a compact, simple and modular fertigation control system for use in both greenhouses and open field irrigation applications.



PRINCIPLE OF OPERATION

Ferti-Gator™ SOLO has been designed to accurately inject plant nutrients into the irrigation water using a single Venturi type fertilizer injector. By varying the motive flow through the Venturi injector unit, the injection rate (suction) of liquid fertilizer can be controlled. A change in flow is achieved by regulating the speed of the booster pump using a variable speed drive fitted to the pumps electric motor.

The control of the injection process can be performed in one of several manners including; proportional injection of fertilizer to irrigation water (flow on flow) or by EC / pH control. The electronics in the Ferti-Gator™ SOLO system control these parameters and automatically adjust the pumps performance to match the required injection rate.

The Ferti-Gator™ SOLO system can be used as an independent (stand alone) fertigation machine which can be operated in hand mode, controlled by external irrigation controller in auto mode or fully integrated with the with the iGator™ PC based Irrigation Control System.

NOTES ON SAFETY



- Read this document thoroughly and follow instructions as set out in this document.
- Make certain any power source connected to the unit is fully isolated before accessing any electrical enclosures to carry out the installation or maintenance processes.
- Before attempting any installation or maintenance work on the injectors or pipe work, close all manual valves at the fertilizer tank outlet and depressurize the system.
- A qualified electrician is required to carry out any electrical connections above 30 Volts AC.
- Make certain the unit is grounded (less than 1Ω resistance measured between the unit and ground) before applying any power to the unit.
- Ferti-Gator™ system has been designed to inject dissolved chemicals. Some of these chemicals can be dangerous when in contact with the skin or when inhaled. To prevent this, use protective eyewear, rubber gloves and gas mask as is required.
- Follow all applicable local regulation relating to the storage and handling of chemicals.

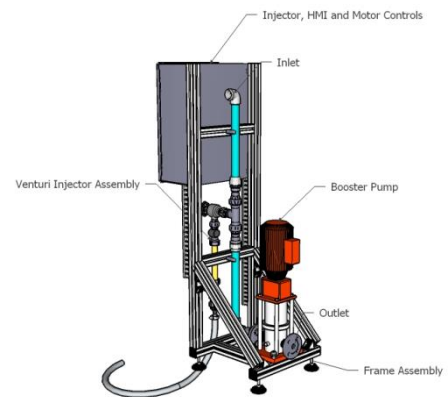


Ferti-Gator™ SOLO system - Installation and Operators Guide

MAIN SYSTEM COMPONENTS

A standard Ferti-Gator™ SOLO unit consists of the following components or sub assemblies:

- The venturi Injector assembly comprising of the Venturi Injector unit, a manual diaphragm valve, a flow sensor with electronic pulse output, a rotameter (variable area flow meter), a non return valve and a flexible suction hose assembly with inlet and outlet fittings
- The inlet pipe work (upstream of the venturi injector)
- The outlet pipe work (downstream of the venture injector)
- The booster pump
- The control panel comprising of the HMI (human – machine – interface), system electronics and the pumps motor controls
- The aluminium support frame assembly



ASSEMBLING THE UNIT

In most cases the Ferti-Gator™ SOLO unit should be fully assembled requiring only plumbing to the irrigation main line, connection to the liquid fertilizer supply tank and to be provisioned with a suitable power source. If the unit is not fully assembled, follow these steps –

1. Assemble the aluminium frame using the pre cut aluminium sections and the fasteners included in the pack by following the frame assembly instructions provided.
2. Mount the booster pump on to the frame using the four bolts supplied. Note that the outlet of the pump (delivery side) should face away from the frame assembly. Do not tighten the holding bolts at this time.
3. Attach the outlet flange to the booster pumps outlet using the rubber flange packing and the four bolt/nuts provided.
4. Attach the pipe work which has been provided between the venturi injector's downstream union and the booster pumps suction inlet flange. Clip this pipe work into the holding saddles on the frame. Use the rubber flange packing and the four bolt/nuts provided.
5. Attach the inlet pipe work which has been provided to the venturi injector's upstream union. this pipe work into the holding saddles on the frame.
6. Mount the control panel which houses the HMI, electronics and motor controls onto the frame using the fasteners provided.

POSTIONING THE MACHINE

Position the Ferti-Gator™ SOLO unit on its feet on a flat solid surface which will remain clear of standing water or fluid and under roof (the unit is not rain resistant). Attempt to locate the machine with acceptable clearance around it to make movement possible when servicing the machine in the future (see Fig.1).

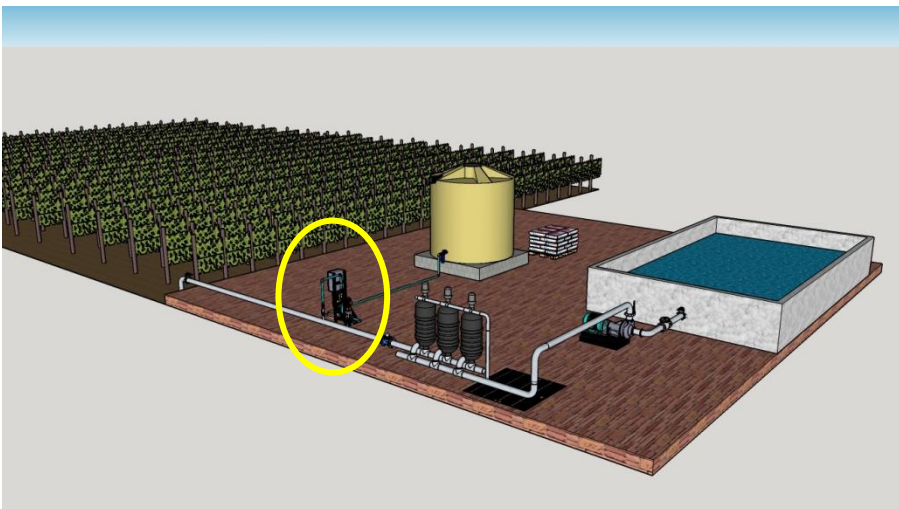


Fig. 1



Ferti-Gator™ **SOLO** system - Installation and Operators Guide

PLUMBING THE UNIT INTO THE IRRIGATION SYSTEM

The Ferti-Gator™ SOLO unit is equipped with 1" female threaded BSP inlet and outlet ports as noted in Fig. 2.

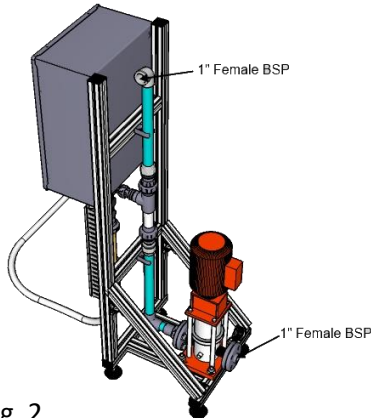


Fig. 2

2 x 1" off take points should be made available on the irrigation mainline spaced between 0.8 and 1.0m apart as noted in Fig. 3. It is highly recommended that these off take points are fitted with isolation valves allowing the system to be completely isolated for future maintenance without the need to shut the main irrigation system down. It is also highly recommended that non return valves are fitted to these two off take points as noted in Fig. 3. below.

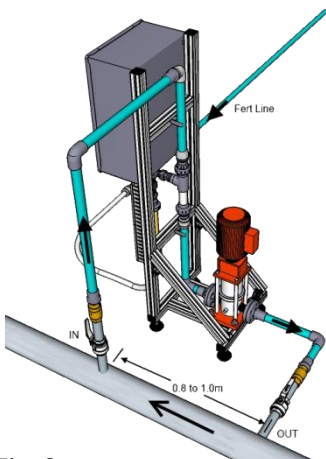


Fig. 3

In systems where the inlet pressure may exceed 8.0Bar, it is most advisable to install a pressure reducing valve on the inlet to the system and to set this valve at 5.0Bar. This valve can be either a direct acting pressure reducing valve or a conventional hydraulic valve fitted with a pressure reducing pilot valve.

Note!!! Keep the pipe line lengths between the off take points on the irrigation mainline and the Ferti-Gator™ SOLO units ports as short as practically possible to avoid generating excessive head loss.

CONNECTING THE FERTILIZER SUPPLY LINE

It is recommended to place the liquid fertilizer supply tanks on an elevated surface at a minimum of 300mm above the floor level thus ensuring that the supply pipework (suction intake) to the Ferti-Gator™ SOLO is below the tanks outlet. This also eases the installation of the tanks outlet isolation valve and outlet filter which we highly recommend is fitted to each tank as seen in Fig. 4 below.



Ferti-Gator™ SOLO system - Installation and Operators Guide

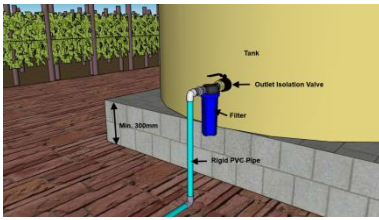


Fig. 4

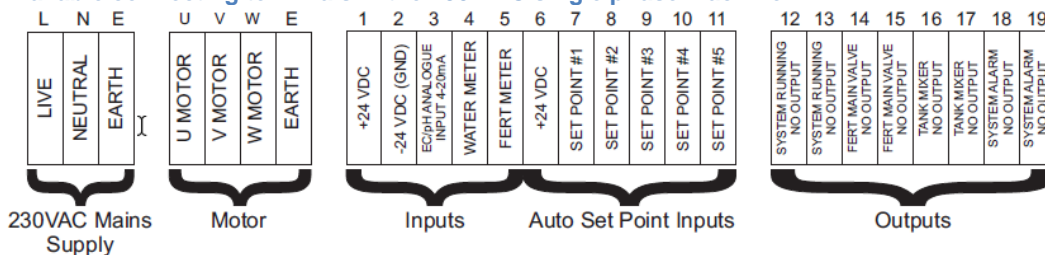
Keep the length of the pipework between the tanks outlet and the Ferti-Gator™ SOLO suction inlet as short as practically possible. If the transparent reinforced flexible PVC hose that is supplied with the unit is too short to connect to the fertilizer tank directly, make use of a high class (high pressure rating) rigid PVC pipe with a diameter of DN25 or DN32 to make up the shortfall.

ELECTRICAL CONNECTIONS

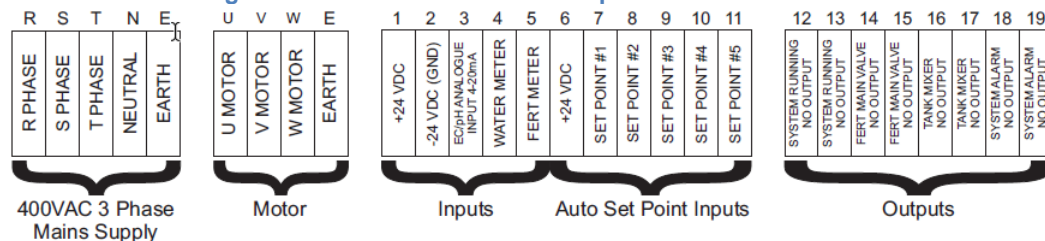
Ferti-Gator™ SOLO machines are available in two voltage versions namely: 230 Volt AC single phase or 400 Volt AC 3 phase. The mains supply connection terminals are the only difference between the two machine models.

Each machine is equipped with a row of electrical terminals as shown in the two terminal schematics below.

Available connecting terminals in the 230 VAC single phase machine



Available connecting terminals in the 400 VAC three phase machine



MAINS SUPPLY CONNECTION

The mains supply electrical power connection to the Ferti-Gator™ SOLO unit should be carried out by a qualified electrician and failing to do so could deem the product warranty null and void. It is important to note that a neutral is required as well as the three phases on the 400VAC machine. If this is not available your electrician will need to install an additional transformer using two of the three phases to achieve 230VAC single phase power source.

NOTE!!! Do not use one of the phases the earth to obtain 230VAC single phase.

MOTOR CONNECTION

In most cases the Ferti-Gator™ SOLO unit should be fully assembled and as such the motor should already be wired to these terminals. If this is not the case, please consult with an Irri-Gator Products technician before you proceed.

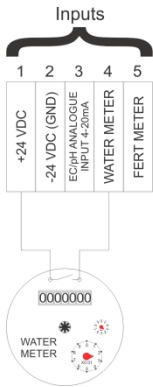
INPUTS

The Ferti-Gator™ SOLO unit has three back indication inputs – the system water meter, the units fertilizer meter and an analogue input for an EC or pH meter. These meters are to be wired as follows –



Ferti-Gator™ **SOLO** system - Installation and Operators Guide

The system water meter – The Ferti-Gator™ SOLO unit has been designed to work with any conventional water meter that provides a pulse type (reed switch) output. The water meters pulse output ratio to unit of measurement is not relevant as this can be set in the machines setup. Connect the water meters pulse output cable (also known as EV or EPC) to terminal 1 (+24VDC) and terminal 4 (Water Meter) as shown in the diagram below.



The system fertilizer meter – The Ferti-Gator™ SOLO unit has been designed to work with a high speed pulse type frequency any conventional fertilizer meter that provides a pulse type (reed switch) output. The water meters pulse output ratio to unit of

PROGRAMMING THE UNIT NAVIGATING THE HMI (HUMAN MAN INTERFACE)

OPERATING THE SYSTEM

- Apply 12VDC power to the AC Input Module.
- At power up, both the Power and Transmit LED will flash twice on the AC Input Module. The Power LED will remain on as long as this module has power.
- At power up, both LED's (LD1 and LD2) in the Serial Transmitter module will flash twice and go off.
- The Serial Transmitter Module will not transmit for around 50 seconds after power has been applied.
- Wait 1 minute then activate an output on the AC Input Module by sending a 24 VAC signal from the AC controller. This signal must carry a voltage $\geq 16\text{VAC}$ but $\leq 26\text{VAC}$ and must be on permanently while the output is active.
- When a change in an outputs state takes place on the AC Input Module, the transmit LED will flash once (instantaneously) at the time of this status change. In other words if an output is activated or deactivated, this LED will flash once when this change takes place. Note that this LED will not remain on all the time.



Ferti-Gator™ **SOLO** system - Installation and Operators Guide

- When a change in output status takes place on the AC Input Module the systems status is sent to the Serial Transmitter Module via the inter connecting Ethernet cable (LAN). The Serial Transmitter Module will transmit the new status to the field and during this transmission LED LD1 will illuminate for around 5 to 8 seconds.
- If a change in output status takes place on the AC Input Module immediately after a transmission has taken place on the Serial Transmitter Module, the new system output status may not be transmitted immediately and may be delayed by up to 15 seconds. This is a built in precautionary measure to avoid clogging the radio frequency.
- When the Serial Transmitter Module receives a new system output status, the module will transmit this new status several times (3 to 4 times) in rapid succession (about 15 to 25 seconds intervals). If no change in output state occurs a period of around 4 to 5 minutes will elapse before a further series (3 to 4 times) of transmissions in rapid succession (about 15 to 25 seconds intervals) takes place.
- The system is now ready for normal operation.

GENERAL NOTES

- Do not drop either of the modules as this could lead to permanent damage to the module enclosures or sensitive electronic components.
- Keep the components in the original packaging until they are on site and ready to be installed. This provides optimum protection to the equipment during the transport process.
- Avoid exposing the equipment to high vibration and or shock as this can lead to permanent damage to the equipment.
- Do not attempt to modify the equipment or the electronics as this will deem the warranty void and may lead to permanent damage of the equipment.
