



# **IRRISAFE™**

## **EFFLUENT IRRIGATOR SHUT OFF SYSTEM**

# **INSTRUCTIONS**



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**Thank you for purchasing the Irrisafe™ Effluent Shutoff System. We have devoted a great deal of time and effort towards the development of this product and it is with satisfaction that we are able to offer it to the farmer, with the intention of making farming one step easier.**

**The system has been developed with several design goals in mind:**

**Simplicity** – the system utilises basic fluid and mechanical principles to monitor irrigator malfunction and to switch off pump supply.

**Low maintenance** - solid construction, hot dip galvanised chassis, plain bushed transport wheels, fully sealed and grease packed ball bearing ground-speed wheel, stainless steel and galvanised shafts and fastenings, plastic and rubber components.

**Working environment compatibility** - an operating system robust enough to operate reliably in an environment of effluent spray and demanding outdoor conditions.

**No power source at the irrigator** - liquid effluent flow and pressure are the power sources.

**No GPS, no radio signals** - many farms are unable to maintain consistent phone signal coverage due to topography. A change in effluent flow rate is the signal used between the Irrisafe™ trailer unit and the supply pump.

**Cost effectiveness** - emphasis has been placed on achieving;

- a low capital cost, by avoiding complex design and operating principles;
- no ongoing use fees;
- a low initial set up cost, uncomplicated flow sensor installation, Irrisafe™ trailer attaches to the irrigator camlock coupling and the drag hose is coupled to the rear of the Irrisafe™ trailer.

**To work in accordance with current FDE good practice guidelines.**

**Irrisafe™ works like this....**

the Irrisafe™ trailer unit is towed behind a travelling irrigator. Liquid effluent is piped from the supply pump to the Irrisafe™ trailer unit (ITU) and then through the ITU, to the irrigator. The irrigator then moves forward while dispensing liquid effluent to the ground. If the

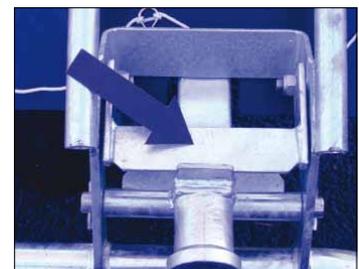
irrigator fails to move forward, stops forward motion or has reached the end of a run, the ITU's ground speed wheel stops rotating and a rotary viscous device, mounted to the wheel and connected to a valve by linkages, allows the valve to close down, stopping liquid effluent flowing from the pump to the irrigator. This lack of flow is detected by a sensor at the supply pump and the pump is automatically shut down.

▲ **Figure 1** (main pic above) Irrisafe™ trailer unit with transport wheels down and ground speed wheel (centre wheel) elevated.

▼ **Figure 2** (below) Irrisafe™ trailer unit with transport wheels retracted, acting as stabilisers, when the ground speed wheel is on the ground (ignore the unfastened poly cover).

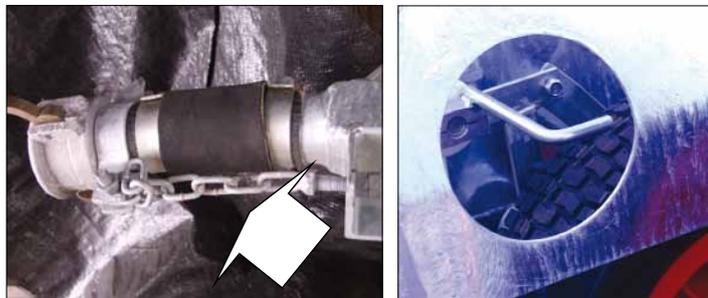


**Figure 3** (right) the latch plate is raised and the pipe handle is moved rearwards to set the transport wheels in place as stabilisers. In this position the drag hose camlock coupling cannot be accessed. To remove the drag hose, the handle is moved forwards,



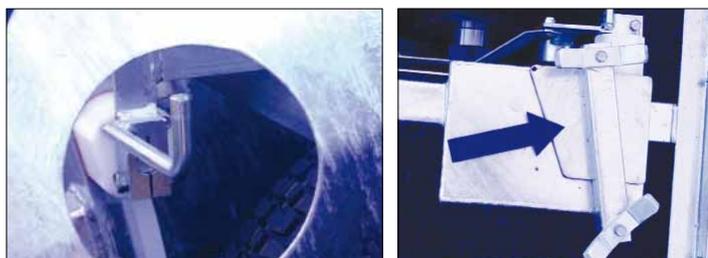
## IRRISAFE™ EFFLUENT IRRIGATOR SHUT OFF SYSTEM

lowering the transport wheels and exposing the camlock coupling for removal. This situation is intentional so that the transport wheels will be lowered/ground speed wheel raised, for relocation of the trailer unit. The ground speed wheel is to be elevated during relocation and, although fitted with a slip clutch, it is not intended that it rotates faster than when travelling behind an irrigator dispensing effluent.



▲ **Figure 4** (above left) When first coupling the Irrisafe™ trailer unit to an irrigator, adjust the tow chain so that the chain is taking the strain during towing.

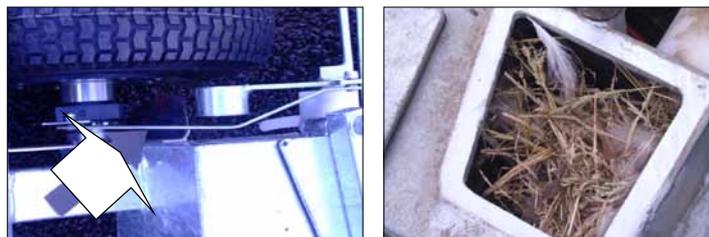
▲ **Figure 5** (above right) The reset handle will be at this position if the irrigator has failed to move forward or stopped during a run due to a mechanical failure, or stopped after completing a run. At this position the Irrisafe™ trailer valve will have halted the effluent flow from the pump to the irrigator and therefore shut the pump off. To reset the handle, pull outwards, rotate backwards and allow to retract inwards, where it will remain in the vertical position (figure 6). Note: if it is suspected that the drag hose has effluent head pressure it is advisable to lower the transport wheels (raise the handle), uncouple the camlock coupling, take two paces rearwards, grab the drag hose and pull it so the coupling comes apart, releasing the liquid effluent. Failure to do this will result in the reset handle being difficult to move ... and after doing so the irrigator booms may release effluent over the operator.



▲ **Figure 6** (above left) The reset handle will be at this position ready for the start of an irrigation run or if the supply pump has been switched off midway through a run. If during a run the supply pump is switched off, the Irrisafe™ trailer valve will remain open (the handle remains set at this position) ready for the supply pump to be switched on again to continue the run. Handle resetting is only required if the irrigation run has been completed or a mechanical failure occurs and the irrigator fails to move forward from rest or stops moving forward during a run.

▲ **Figure 7** (above right) Valve body access plate can be removed to clean or inspect the valve interior. Typically this would be used for cleaning the valve when the Irrisafe™ unit is out of use, i.e. the herd has dried off, or large pieces of debris may have jammed the internal valve mechanism. (this has never happened to date). It is recommended that the Irrisafe™ trailer unit be inspected periodically for damage and general mechanical condition and flushed out annually when not in use. To flush out the unit, high pressure water may be introduced into the front coupling connection and allowed

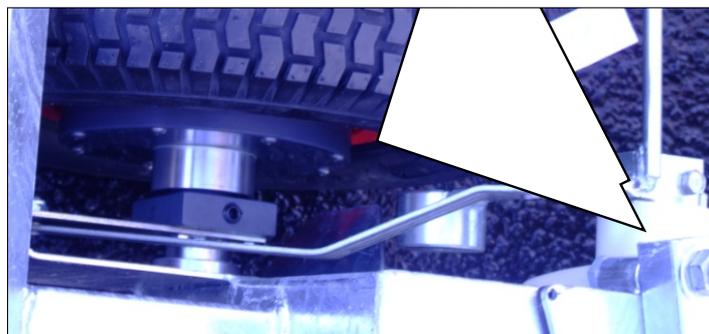
to “back flush” the galleries and valve body..... Remove the valve body access plate for a thorough clean out. When replacing the access plate, tighten the wing nuts evenly and firmly. i.e. tightly by hand.



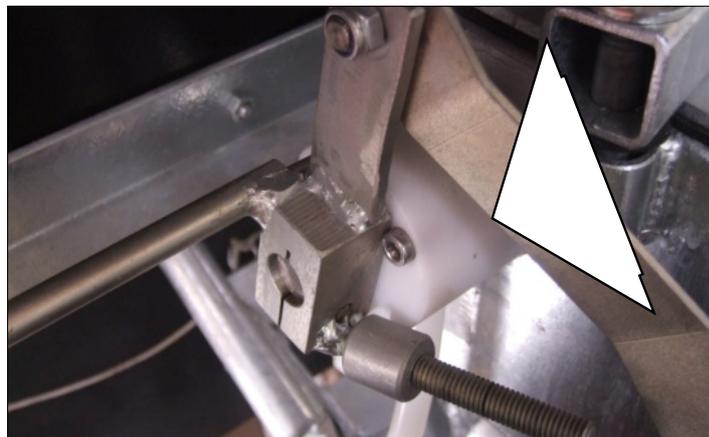
▲ **Figure 8** (above left) The link connecting the ground speed wheel viscous device to the valve lever has to operate freely and must be “rattly” throughout it’s full range of travel.

▲ **Figure 9** (above right) A birds nest in what seemed like a suitable place to raise a family.

▼ **Figure 10** (below) When cleaning the Irrisafe™ trailer unit avoid directing high pressure water at the ground wheel viscous device. This component is splash proof and able to tolerate normal environmental conditions but may have it’s service life compromised if subjected to water pressures that force moisture into some of the internal working surfaces.



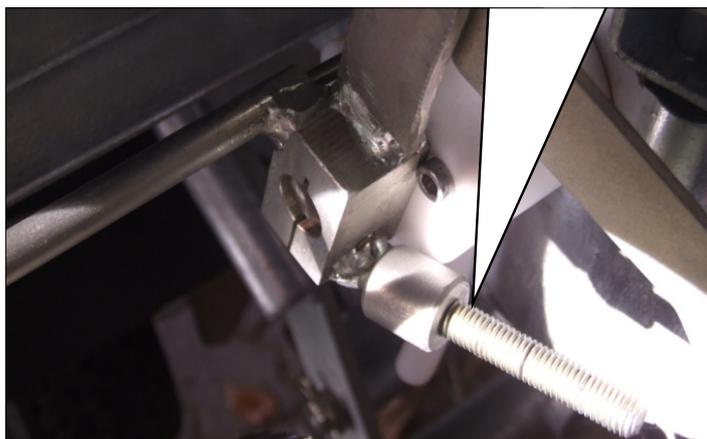
▼ **Figure 11** (below) The cap screw head, protruding from the plastic bearing assembly (in front of the lever boss), is a retaining stop for the valve lever. It’s protrusion regulates the amount of effluent pressure it takes to position the valve lever ready to descend and close the valve down. This adjustment is set at the factory and it is recommended that it not be altered unless a particular situation makes this absolutely necessary. Such a situation would occur if the pipe line delivery pressure is lower than the factory preset value. A symptom of this is when the Irrisafe unit fails to shut down the effluent flow to the irrigator after an emergency stop or end of



## IRRISAFE™ EFFLUENT IRRIGATOR SHUT OFF SYSTEM

run halt. The cure is to wind (5mmAF allen key) the cap screw stop in by a half to a full turn initially, and by half turns from then on (only if necessary, but check to see that there is not debris within the valve body restricting valve action )..... the factory setting is based on what is considered to be a minimum pressure by which most irrigators would work correctly . The clear tube beneath the plastic bearing assembly directs effluent ground wards. The dribbling of effluent from this tube is intentional.

▼ Figure 12 (below) This thread and any weights along it's length, are used to fine tune the valve shut down speed and needn't be altered unless it is deliberately intended to shorten or lengthen the time it takes for valve closure after the ground speed wheel stops rotation. There are usually multiple weights on the threaded shaft, but not necessarily.



### A FEW THINGS TO REMEMBER:

- Keep the tyres adequately inflated, particularly the ground speed wheel. About 30PSI is fine;
- Don't relocate the Irrisafe™ trailer unit with the ground speed wheel down;
- Between seasons be aware that your Irrisafe trailer unit may become the living quarters for rodents or birds.

### TROUBLE SHOOTING :

- If the supply pump shuts down not long after sending effluent to the irrigator; check to see if the transport wheels been retracted on the Irrisafe™ trailer unit and check that there has not been too much initial slack in the winch wire.
- If the supply pump continues to send effluent to the Irrisafe™ trailer unit after it has stopped moving forwards, due to irrigator mechanical failure or the end of an irrigation run; check for free movement of the valve to viscous device linkage/ levers, and that the connecting linkage has free movement ( "rattles" ) ... OR... remove the valve body hatch plate and check for large pieces of debris hindering the free movement of the internal mechanism. Another reason for failure to halt effluent flow, especially upon first using the Irrisafe unit, is described in the text relating to figure 11, where the pipeline delivery pressure is lower than the factory preset actuation pressure. The factory setting is the minimum pressure that most irrigators would require to operate effectively in accordance with FDE guidelines. The end of pipeline delivery pressure (to irrigator) on many farms, is less

than that required to run irrigators at their best (spread pattern and delivery rate as specified by manufacturer). We therefore make it possible to compensate for this by careful adjustment of the stop.....A caution for the enthusiastically heavy handed - if the stop screw is wound in that it fails to restrain the valve lever, the Irrisafe shut off valve closes down and effluent will not flow to the Irrigator.... the supply pump will start and then stop after the allotted start run on time.

- Be sure that the Kelco flow sensor start-up function and run-on function, have been set appropriately. We suggest a start-up time of approx. three minutes, by which time the pumping flow rate should have become stable, and we suggest a pump run on time of approx thirty seconds after the Irrisafe unit has halted effluent flow from the irrigator to the supply pump. Particular circumstances may necessitate variations to these times.
- Kelco sensor mounting in an effluent pipeline. The Kelco flow sensor is installed in the effluent pipeline in a practical situation close to the supply pump outlet and within reach of a power supply. There are different ways to fit the sensor into a supply pipeline, depending on pipe size and material. There is no exact science to this, as circumstances vary, but there are some basic requirements, and they are:
  - that the paddle be trimmed to have the tip positioned no further than the pipe centre line. The flow rate of a farm effluent system is such that the paddle need not even be in as far as the centre line and in some circumstances this may be desirable ie. to decrease sensitivity
  - that the paddle movement not be restricted by incorrect installation



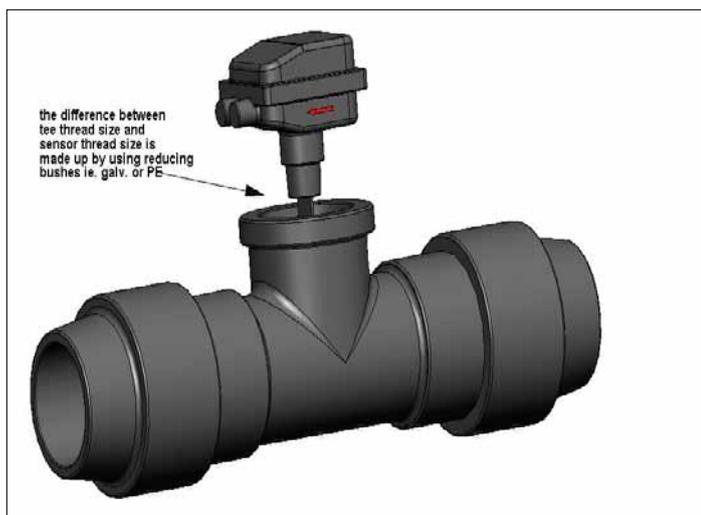
▲ Figure 13 (above left) This installation worked, but only just. The combination of welded nipple, socket, and reducing bush, created a situation where the vertical leg was long and the sensor paddle was contacting the welded nipple internal wall. The sensor was also screwed into the top socket too tightly. With thread tape applied, a gap of 4-5 mm between socket and hexagon shoulder is the minimum. A greater gap is OK if the thread feels adequately tight.

▲ Figure 14 (above right) This is the same effluent pipe size (50mm NB but could be a larger pipe size) with a nipple welded to it. Even though the nipple is a smaller size than that in figure 13, it does not restrict paddle movement due to the short overall length. Our suggestion would be to use the next size up nipple ( 1 ¼" BSP galv. ie. for 32mm NB pipe) and a reducing bush (1 ¼" BSP to 1" BSP galv or PE).

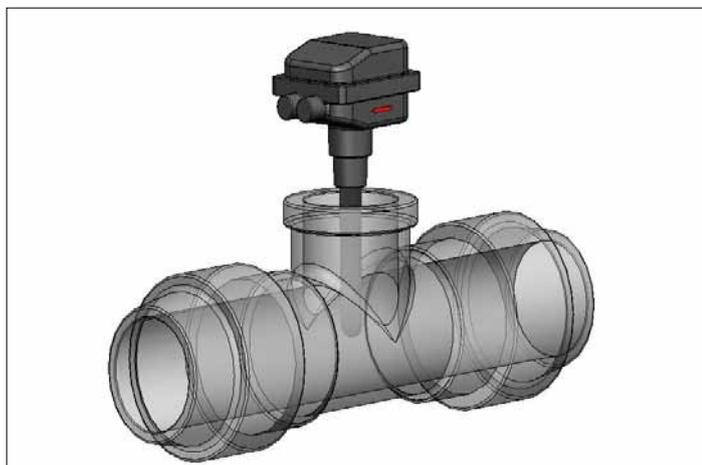
▼ Figure 15 (below) When welding a socket into an effluent pipe be sure that the cross sectional area of the hole, made in the wall of the effluent pipe, is at least as large as the socket's inside diameter.



▼ Figure 16 (below) Another method of sensor installation is to use a PE tee typical of a PE pipe system. This illustration is of a 3" NB PE pipe system (90mm) where the sensor is adapted to fit using appropriate reducing bushes, ie. 3"-2" and 2"-1".



▼ Figure 17 (below) The paddle is trimmed to the tee centreline and the paddle edges rounded.



In all installations it is suggested that ample wiring length, from source to sensor, be allowed for so that the sensor may be rotated several times for removal from the pipeline in case of a blockage or need for inspection..... with a properly install paddle sensor, blockages are extremely rare.

Full information on this switch is available at [www.kelco.com.au](http://www.kelco.com.au). The Kelco site is very well constructed and has all the information needed to install and set up a sensor.

If you have any queries or suggestions concerning this product please feel free to contact Kevin at [Kevin@technipharm.co.nz](mailto:Kevin@technipharm.co.nz) or the Technipharm main office, Rotorua 0800 80 90 98. We welcome the opportunity to be of assistance, to ensure that this product gives maximum value for money and achieves the goals we set for it.