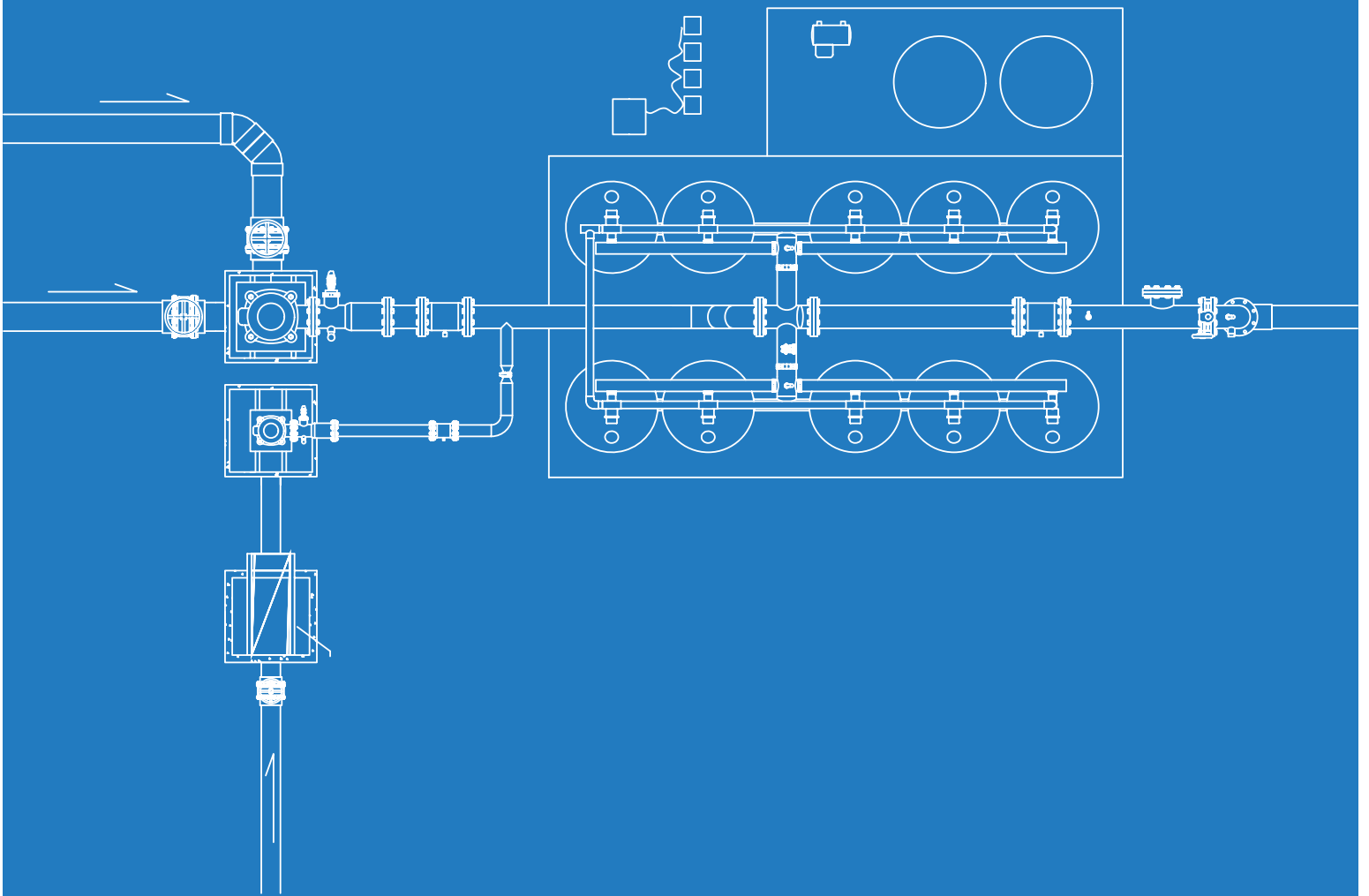


Digital Farming SDI-E Layout and Installation Guide



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Safety Notes

- All safety regulations must be applied.
- Ensure that the installation is carried out in a manner that prevents leaks from the FERTIKIT, the fertilizer/acid tanks and lines, the peripherals and the accessories, contaminating the environment, soil or ambient area.
- Electrical installation must be performed by an authorized electrician only.
- The electrical installation must comply with the local safety standards and regulations.
- Protection provided by the equipment can be impaired if the equipment is used in a manner other than that specified by the manufacturer.

General Notes

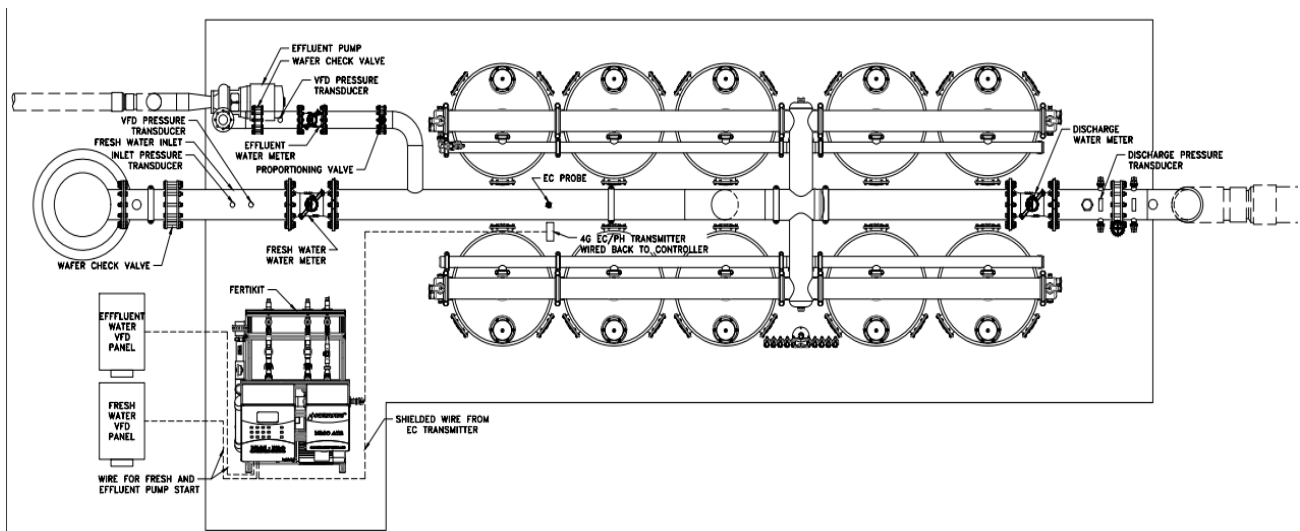
- This guide is to be used as a reference and does not display pipe, wire, filter or meter sizing. Contact an irrigation designer for specifications, each project will vary in size and design.
- Please reference the manufactures installation guides for all individual components.
- If further installation guidance is needed, please call your Netafim representative or contact the Digital Farming Team via:
 - Email – US-DF@netafim.com
 - Hotline # 559-540-8737

SDI-E Process Overview

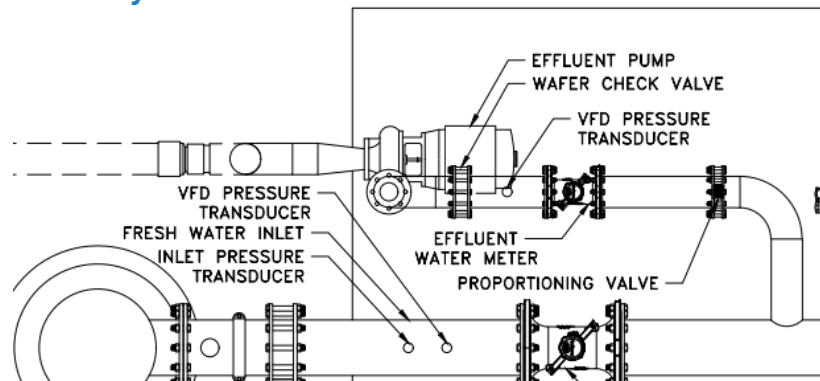
As per United States Patent No. 10143130:

The waters are mixed proportionally based on the EC of water measured downstream of the Mixing Valve. The NMC EC Pre-Control target is set in the dosing program. The NMC reads data delivered to it by the sensor transmitter, reacting by either opening the mixing valve to increase the EC level or by closing the mixing valve to reduce the EC level in the mix going to the field. Fresh and Nutrient-Rich Effluent Water samples are taken and analyses are done to determine nutrient content. The water is again measured as it goes out to the field by the Main Flow Meter. The manager adjusts EC (Nutrient Level) based on samples taken.

Basic Overview of an SDI-E Filter/Pump Station

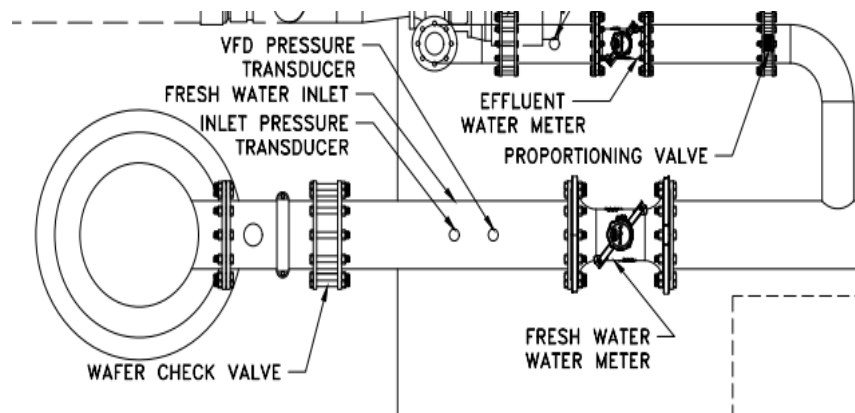


Effluent Water Inlet Layout



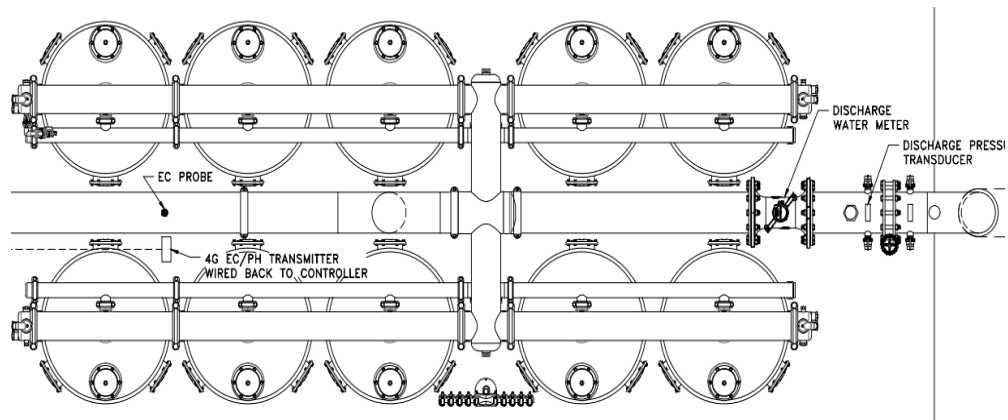
- ✔ **Effluent Pump** – Controlled by a VFD
 - Sized to over come the freshwater line pressure by 3-5psi
- ✔ **Wafer Check Valve** – Placed downstream of the Pump
- ✔ **VFD Pressure Transducer** - Placed downstream of the CV
 - Wired to the Effluent VFD Panel
- ✔ **Octave Water meter** - Placed downstream of the CV
 - Digital output wired to the NMC controller with a shielded two strand wire
- ✔ **Mixing Valve** - Placed downstream of the WM
 - Placed at least a foot downstream from the WM.
 - Wired back to the NMC controller with a shielded 4 strand wire

Fresh Water Inlet Layout



- ✔ **Fresh Water Pump** – Controlled by a VFD
 - Sized appropriately for frequent filter flushing
- ✔ **Wafer Check Valve** – Placed Downstream of the Pump
- ✔ **VFD Pressure Transducer** – Wired to the Fresh Water VFD Panel
- ✔ **Pressure Transducer** – Wired to the NMC Controller
- ✔ **Octave Water meter** (sized appropriately) Downstream of the CV
 - Digital output wired back to the NMC controller with a shielded two strand wire

Filter Station Inlet Layout



✔ Sandstorm Media Filter

- The filtration area is increased in order to properly filter the extremely poor water quality. By adding more tanks and filter area, the flow per tank is reduced allowing the filters more time to clean. Flow recommendations per 48-inch sand media tank, are in the range of 120-150 GPM rather than 200-300 range with good water quality.
- Due to the poor water quality an air compressor is required to operate the filter flush valves.

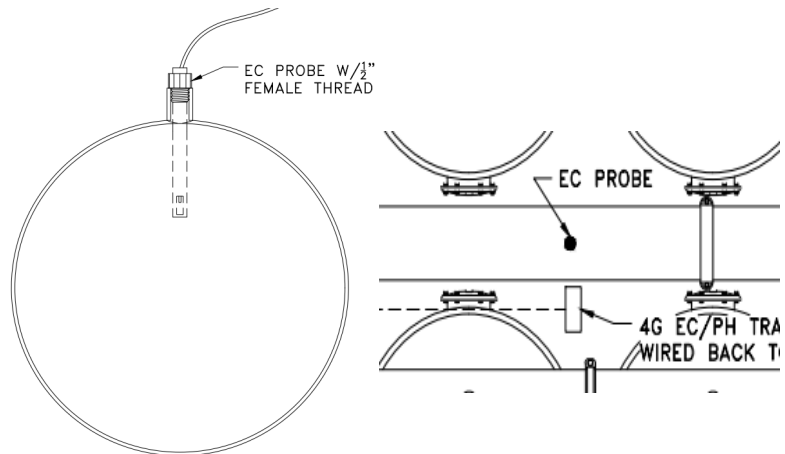
✔ Discharge Octave Water meter (sized appropriately)

- Digital output wired back to the NMC controller with a shielded two strand wire

✔ Discharge Pressure Transducer – Wired to the NMC Controller

- When utilizing fertilizer injection, make sure the water meter is upstream of the injection points and at least 4' before the drop for proper mixing during sampling.

EC Monitor and EC Probe Layout



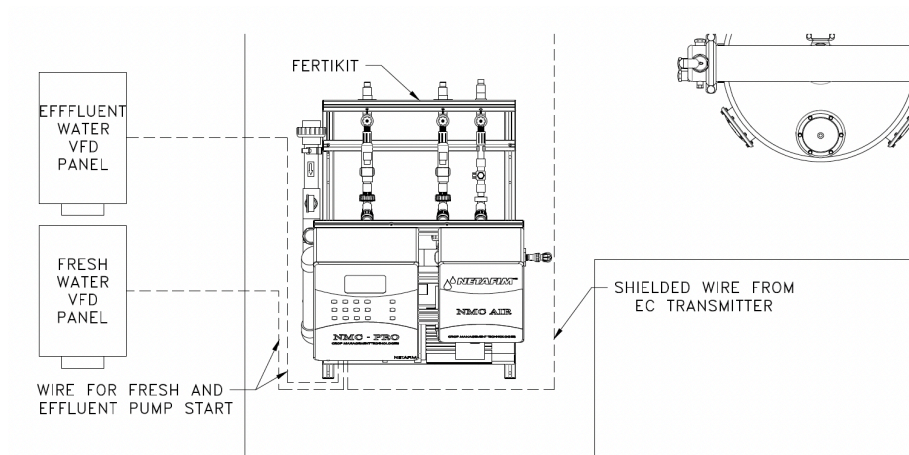
✓ EC/PH Monitor/Transmitter

- Wired back to the NMC controller with a shielded 4 strand wire (2 wires for the 24VAC and 2 wires for the 4-20mA signal)
- Should be mounted close enough to the probe so that the probe wire does not have to be extended.
- The Monitor should be grounded to earth or to the NMC Controller.

✓ EC Probe

- Installed as close to the inlet of the filter station as possible or in other words, as far downstream from the mixing valve yet before the inlet of the filter station.
- The probe needs to be set as deep into the pipe as possible (please note the picture to the left) For reference, the probe has a 1/2" male plastic thread.
- The probe is wired to the EC/PH monitor

NMC Pro or Fertikit Layout



✓ NMC Pro or Fertikit

- Fertikit Plumbing - inlet 1 ½" - outlets 1" (see Fertikit install guide)
- NMC Pro requires 120VAC power (see NMC pro install guide)
- Fertikit Requires 3-phase 220 or 440VAC power in addition to 120VAC (see Fertikit install guide)
- 2 wires should be run from the controller to both Fresh water and Effluent VFD's panels for the pump start. A relay maybe needed (check with the VFD manufacture, the NMC controller will send a 24VAC signal).
- Shielded 4 strand wire needs to run from the controller to the EC Monitor
- Shielded 2 strand wire to each water meter
- 4 strand wire to the mixing valve
- 2 wires for each pressure transducers
- 2 wires for all irrigation valves and or filter valves if applicable.

Netafim System Components Checklist (PN given when applicable)

- ✓ Octave Water Meters - Sized Appropriately - minimum of three units (Discharge, Fresh water inlet, Effluent inlet)
- ✓ (1) NMC Pro - Irrigation Controller (74340-003095)
- ✓ (1) Fertikit – Ferigation Machine, includes NMC Pro
- ✓ High Flow - 33200-050030
- ✓ Low Flow - 33200-049000
- ✓ (1) EC/PH Monitor Wall mount (74340-003580)
- ✓ (1) EC Probe (45000-006705) included with the EC/PH Monitor Kit
- ✓ Sand Media Filters – Sandstorm (Sized Appropriately)
- ✓ (2) Wafer Check Valves – One for each the Fresh and Effluent water lines
- ✓ (2 minimum) Air Relief Valves (Sized and Placed Appropriately)
- ✓ (2) Pressure Transducers – (Placed Appropriately)
- ✓ (1) Mixing Valve (72300-00682)
- ✓ (1) Fresh Water Pump with VFD
- ✓ (1) Effluent Water pump with VFD
- ✓ (1) Air compressor for flush valve actuation
- ✓ (1) NMC Air + kit

Components – Water Meters

Water Meters

It is essential to monitor flow in order to monitor the operation of your system and crop water use. The SDI system is designed to produce a specific flow rate at a given pressure. Changes in the flow rate may indicate leaks in the system, emitter plugging, improperly set pressure regulating valves or even changes in the well and pumping plant.

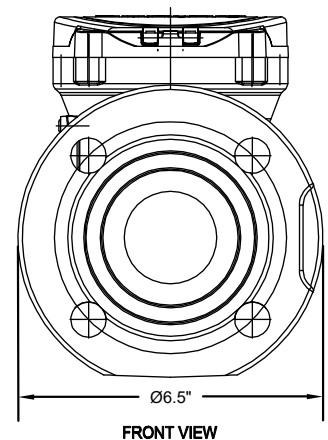
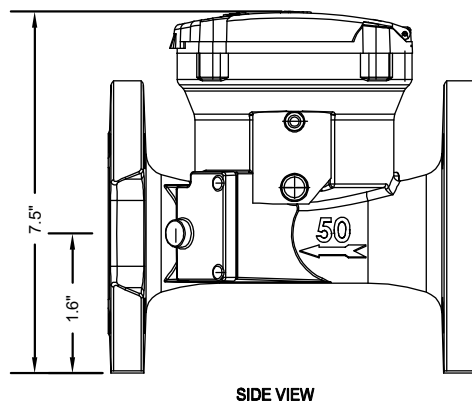
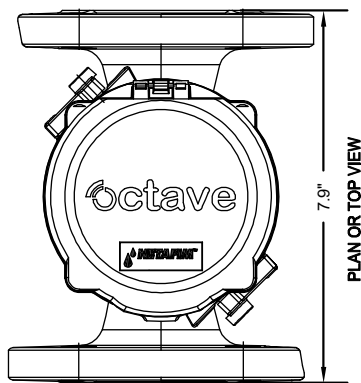


Application and Blending

Application of effluent water from Confined Animal Feeding Operations (CAFOs) requires the blending of freshwater with effluent water. For control purposes, we need to measure both the effluent and freshwater being delivered to the head control and also measure the water going out to the field. Therefore, in an effluent water application system, there would be three meters, the main meter measuring water ultimately being delivered to the crop and both effluent and freshwater meters measuring water coming into the system.

Octave Water Meters

The Octave Ultrasonic Water Meter provides highly accurate flow readings with double-beam ultrasonic sensors and no impeller or moving parts in the flow path.



Components – Pressure Gauges and Mixing Valve

Pressure Gauges

The use of pressure gauges in key locations on the system will help to ensure optimum performance and long life of your system.

Mixing Valve

Envelope butterfly valves are designed to isolate or regulate flow. As they are electrically powered, they can be controlled remotely. The butterfly valves are made from PVC and have been provided with an EPDM gasket to enable them to withstand contact with corrosive substances. The valves are also available with Viton® gaskets if needed.



Mixing Valve

The axle is connected to an electric motor for convenient operation of the valve. This motor has a supply voltage of 24VAC. Motors with a supply voltage of 230 Volts are available on request. The motor can rotate bidirectionally and is controlled by the phase of the supply voltage. Alternating the phase causes the valve to open or close, respectively. The final position of the valve is limited by two built-in limit switches. The motors are bi-stable, which means that if the valve is rotating to a specific position and the power supply is cut off, the valve will remain in this position. An indicator in the motor shows the position of the valve (large or small flow-through).

The motor is equipped with an unlock button that can disconnect the motor and move the valve manually into whatever position. The butterfly valves are provided with metric flanges and collars. The gasket also serves as a seal.

Advantages

- Ample throughout capacity
- Low loss in pressure
- Bidirectional flow
- Little installation space needed
- Few parts
- Emergency manual operation override

Specifications

- Run times of 70 or 130 seconds at a rotation angle of 90 degrees
- Comes with Metric Flanges (adapter to US Standard Flange is needed)
- Optional: extra limit switches and/or a heating element

/ Components – Filtration

Filtration

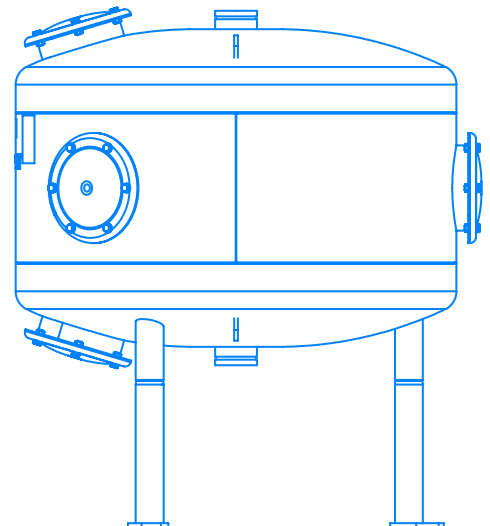
The filter system protects the drip system from the fine sand and other small particles that can plug the emitters. A well-conceived filter system provides the maximum operating life of the SDI system.

Recommended Filtration Method - Sand Media Filters

Screen and Disc filters are not recommended for long term SDI-E systems.

Sandstorm™ Single Chamber Metal Media

Built to last. Rugged tank design, industry leading anti-corrosion and UV resistance provide long-term rust protection.



Sand media filters utilize depth filtration which is most effective at removing suspended particles from the water. The filter system should be set up to clean automatically when the pressure differential across the media is too large or set at a predetermined time to flush. A pressure differential switch in combination with a flushing controller is a common approach for automation of filter cleaning.

For Effluent Water Application

Filtration Area

The filtration area is increased in order to properly filter the extremely poor water quality. By adding more tanks and filter area, the flow per tank is reduced allowing the filters more time to clean. Flow recommendations per 48-inch sand media tank, are in the range of 120-150 GPM rather than 200-300 range with good water quality.

Flushing Valves

Filters flush automatically either by pressure differential or by a set time interval. In order to open a specific flush valve an electric signal is sent to a solenoid on the flush valve that opens a small orifice letting water into the bonnet of the valve. This forces the valve from an open operation position to a closed flushing position. The orifices in the solenoid valves are very small requiring 120 mesh filtration. Therefore, we avoid using command filters for the effluent water, to operate the solenoid valves. We instead use a small air compressor in-order-to flush all valves pneumatically.

Media Sample Collection

Always collect a sample of the new media used. sand in this case, in order to compare the future with work sand in the tanks. Silica sand filters the water effectively, due to its sharp irregular angles. However, as water and particulate flow through the sand, the angular nature starts to wear, reducing filtration efficacy over time. Sand should be replaced every 3-5 years. Potentially more often with effluent water's high particulate load.

Components – Controller

NMC-Pro Controller

The NMC Pro System Manager does more than open and close irrigation valves – it integrates all of your control features in one easy-to-use unit. Operate, monitor, and maximize the performance of your irrigation system from one central location.

Features & Benefits

✔ Irrigation Programs

Repeat and modify your irrigation schedules as needed – with up to 60 valve run time programs using time or volume-based scheduling

✔ Irrigation Trigger Programs

Up to 15 external condition programs with programmable parameters for triggering irrigation events

✔ Pump Control Programs

Control multiple pumps, delay start or shut down times between pumps and valves

✔ Filter Flushing Programs

Schedules backflush programs eliminating the need for additional external backflush controllers

✔ Nutrient and Chemical Injection Programs

A range of dosing options are available – by time, quantity or proportional along with detailed alarm messages

✔ Alarm Programs

A range of alarms protects the system by isolating the problem and providing event details



Fertikit 3G

NOTE: Dealers must be trained and authorized to purchase Digital Farming Products. Please contact your Netafim USA Dealer Relationship Manager for information.



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