# FILTRATION

## **F600 GRAVEL FILTRATION SYSTEM**

**SERVICE & MAINTENANCE MANUAL** 



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F600

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## **1. Gravel Filtration Systems: General Description**

Gravel filtration is a process where water, contaminated with silt, sand and organic materials flows through a media of small gravel at a relatively slow rate. These systems have an effective and efficient design whose high quality filtration and easy/efficient backwash mechanism ensures the user of a consistent, credible water supply for the long term.

Gravel Filtration Systems have proven to be one of the best filtration solutions for water from a variety of sources that is used for micro-irrigation applications.

The F600 Series Gravel Filters have been designed to provide high quality and cost effective filtration solutions for water with a high contamination of organic material and algae.

For agricultural applications, the gravel media in the filter is provided in a layer of 40 cm depth. This means that when the water passes through the media, most of the dirt is trapped on the upper surface of the media while small particles of dirt and other floating organic materials are trapped along the way on the media particles. The end product water is therefore free from dirt and will not clog or disrupt irrigation accessories.

The F600 Series Gravel Filters are manufactured and available with a full scale of filtration surface sizes allowing for flexible design of filtration systems. The scale of filtration surface sizes is appropriate for any required flow rate ranging from small properties to large farms.

The filters can also be used with single or multi-media such as volcanic gravel, granite, quartz sand, active carbon anthracite and other types of catalytic media.



## 2. F600 Series Gravel Filter



The F600 Series Gravel Filter is a tank with a known diameter and includes an upper service opening, side service opening, upper inlet water diffuser, gravel filtration media (in most agricultural applications this will be 40 cm of volcanic gravel No. 1), inner filtration chamber floor with filter elements, and outlet opening for the filtered water.

## Media Specifications

| Media Type      | Media Mesh | Effective Particle | Specific Weight | Standard Packing |
|-----------------|------------|--------------------|-----------------|------------------|
|                 | Index No.  | Size               | (gr/cm³)        | p/sack           |
|                 |            | (mm)               |                 | (kg)             |
| Volcanic Gravel | 1          | 0.8 - 1.2          | 1.5             | 25               |
| Volcanic Gravel | 1-2        | 1.2 – 2.0          | 1.5             | 25               |
| Quartz Sand     | 0          | 0.5 – 0.8          | 1.5             | 25               |
| Quartz Sand     | 1          | 0.8 - 1.2          | 1.5             | 25               |

## **Technical Specifications:**

| Model | Filt<br>Diam<br>(in) | ter<br>leter<br>(mm) | Conne<br>Diam | ConnectionFiltrationNo of<br>GravelFlow Rate at<br>Filtration SpeedDiameterSurface25 kg |                   | on<br>Filtration<br>Surface<br>Area<br>Strange<br>25 kg |      | ate at<br>Speed<br>/h) | Back Wash<br>Flow Rate<br>(m <sup>3</sup> /h) |                           |
|-------|----------------------|----------------------|---------------|---|-------------------|---|------|------------------------|---|---------------------------|
|       | (111)                | (11111)              | (in)          | (mm)  | (m <sup>2</sup> ) | (55 lb)   | Filt | tration<br>(m/ł        | າ Speed<br>າ)*                                | Flush<br>Speed<br>(m/h)** |
|       |                      |                      |               |   |                   |   | 45   | 55                     | 65  | 85                        |
| F605  | 12                   | 300                  | 1             | 25  | 0.07              | 2   | 3    | 4                      | 5   | 6                         |
| F610  | 16                   | 400                  | 1.5           | 40  | 0.12              | 3   | 6    | 7                      | 8   | 10                        |
| F620  | 20                   | 500                  | 2             | 50  | 0.20              | 5   | 9    | 11                     | 13  | 17                        |
| F630  | 20                   | 500                  | 3             | 80  | 0.20              | 5   | 9    | 11                     | 13  | 17                        |
| F635  | 25                   | 610                  | 2             | 50  | 0.30              | 7   | 14   | 17                     | 20  | 26                        |
| F636  | 25                   | 610                  | 3             | 80  | 0.30              | 7   | 14   | 17                     | 20  | 26                        |
| F640  | 30                   | 750                  | 3             | 80  | 0.44              | 12  | 20   | 25                     | 29  | 37                        |
| F650  | 36                   | 900                  | 3             | 80  | 0.63              | 16  | 28   | 35                     | 41  | 54                        |
| F655  | 42                   | 1050                 | 3             | 80  | 0.87              | 21  | 39   | 48                     | 57  | 74                        |
| F660  | 48                   | 1200                 | 4             | 100   | 1.13              | 23  | 51   | 62                     | 74  | 96                        |



## \*<u>Filtration Velocity</u>

45 m/h per 1 square meter of filter is the commonly accepted standard for low speed filtration, such as in the case of fairly heavily contaminated water with a high load of organic material.

In this case, a lower filtration speed will give better results. However, it will have to be evaluated on a cost-effective basis to determine whether other pretreatment for the water is required (i.e. sedimentation or chemical dosing).

55 m/h per 1 square meter of filter is the average recommended filtration speed for most agriculture applications. However, each design must consider its specific requirements for water quality.

65 m/h per 1 square meter of area is the highest recommended filtration speed. In filtration speed higher than this, the water will pass through the media with very poor filtration results and most of the dirt will break through the media and flow out with the water.

## \*\*Flush Velocity

85 m/h per 1 square meter filter is a calculated parameter. In this speed the media will float and shake inside the filter but will not flush out. Higher flow speed than this can cause the media to flush out of the filter. Lower flow speed will result in less effective flushing and the duration of the process will be very long.



## Pressure loss at 120 micron



## **4. Gravel Filtration - Process Description**

## 4.1 The Filtration Process

Water enters the filter via the inlet and spreads equally on the media.

In the filter there is a layer of 40 cm volcanic gravel with an effective size of 0.8mm - 1.2mm. The water passes through this media.

The media inside the filter has to be 40 cm deep, **no less**, but <u>also not more than this</u>. The depth of the media is one of the most critical parameters of filtration quality. As result of the 40 cm depth and wide surface area of the media layer, dirt particles and organic materials are trapped on the media surface. Most of the dirt will be stopped on the upper surface. Other small particles and floating materials will be trapped on the media particles surface all along the 40 cm depth.

The water that passes through, and flows out via the filter elements will be free from all dirt and will not block irrigation accessories such as micro-sprinklers and drippers. If the depth were less than 40 cm, part of the organic material would pass through and accumulate in the drippers.





## 4.2 The Cleaning Process

The cleaning process is a backwash that has to be performed when the differential pressures reaches the preset 0.5 bar (7 psi) or according to a preset timetable. The backwash process is done by shutting the inlet of the filter with the 3-way backwash valve.

This creates a situation where the water enters via the outlet. The water flows from the bottom all the way through the media and drains out via the inlet and through the 3-way backwash valve to the drain.

The cleaning process is embedded in the functioning of the filter. This process when done in a timely and accurate method allows maximum effectiveness in filtration and contributes to the long life of the product.

As a part of the filtration process, the media is filled with the contaminants that have been trapped, by design, in it. If unattended to, this accumulation of dirt will cause partial clogging of the filter. A clogged filter, in turn, is unable to stop the dirt and the water flow may literally push the dirt through the media. This situation is more likely to occur when the  $\Delta P$  pressure difference across the filter is higher than 0.5 bar (7 psi).

Therefore, as part of ongoing routine operations, we clean the filter. In order to clean the filter, we change the direction of water flow and cause the flow to pass through the filter from the "bottom up" throughout the media.

This process needs to be performed at a flow speed which will cause the media to float and "shake" or move inside the filter. With this floating and shaking, the dirt will be "shaken" out of the media and flushed out of the system with the upstream water flow.





## **5. Gravel Filtration System: Components and Structure**

## **5.1** Filtration System Components

Each gravel filter has its own criteria and flow rate specifications. In each case, the flow rate will meet the criteria of the irrigation demand. Therefore, a filtration system can be a single gravel filter or a battery (array) of filters. We install the filters whether single or a large battery, as part of the system design and delivery.

Each system is supplied and delivered with a detailed packing list. When you receive the system, please verify that you have received all the system components detailed in the packing list.

## The system includes the following components:

- Gravel Filters according to the designated flow rate.
- Gravel Sacks as required for the filter media.
- Inlet Manifold delivers the irrigation water to the filters.
- Backwash Hydraulic Valves to allow us to control the process of filtration and back flush one valve for each filter.
- Outlet Manifold collects the filtered water from all the filters and passes it to the irrigation system.
- Backup filter to protect the irrigation system if any of the media filter elements has been damaged or jumped out.
- Air Valve drains air from the system and maintains "proper hydraulic function".
- Drain Manifold collects the backwash water from the filter and passes it to the drain.
- Flows Control Valve controls the flow rate of backwash and prevents the backwash flow rate from becoming too high.
- Water Control Head includes a small filter for the hydraulic control accessories, a 3way ball valve, and a pressure gauge to check the pressure at the inlet and the outlet of the system.
- Backwash Electronic Controller with a set of solenoid valves controls the back flushing intervals and back flushing duration for each filter.
- Hydraulic P.E. Command Tube, Fittings, Couplings, Gaskets and Bolts all as required for gravel filtration system installation.
- See complete list on the system table page 16.



## 5.2 3-Way Backwash Valve

In order to control the processes of filtration and backwash, a backwash valve is installed on each filter inlet.

This hydraulic valve allows the water, during filtration, to pass inside the filter while shutting down the flushing outlet.

During flushing process the inlet is closed while the flushing outlet is open.

## Bermad Model 350P (2x2, 3x3, 4x4)



A Hydraulic Command [1], which pressurizes the Upper Control Chamber [2], forces the Diaphragm [3] actuated Plug Assembly [4] to move towards the Supply Port Seat [5], eventually sealing it drip tight. This allows flow from the filter through the Drain Port Seat [6]. Venting the upper control chamber causes the line pressure, together with the Spring [7] force, to move the Valve back to filtration mode.



A Hydraulic Command [1], which pressurizes the Lower Control Chamber [2], forces the Diaphragm [3] actuated Plug Assembly [4] to move towards the Supply Port Seat [5], eventually sealing it drip tight. This allows flow from the filter through the Drain Port Seat [6]. Venting the upper control chamber causes the line pressure, together with the Spring [7] force, to move the Valve back to filtration mode.

## 5.3 Backwash Secondary Screen Filter

The Backwash Secondary Screen Filter plays an important role in the system's ability to maintain filtration results. In the event of "dirt breakthrough" where cleaning processes were not performed as required, the Backwash Secondary Screen Filter keeps the dirt from flowing into the irrigation system and its accessories. In the unlikely event that one of the filter elements inside the filter becomes damaged or unplugged and gravel flows out of the filter with the water flow, the Secondary Screen Filter will trap it and prevent it from flowing into the irrigation system and its accessories.



### Series F100 (Pressure loss at 130 micron)

## **Components Description & Spare Parts ordering information**

|    | Description           | Model             |                   |                   |  |  |
|----|-----------------------|-------------------|-------------------|-------------------|--|--|
|    | Filter                | F120R F130R       |                   | F140R             |  |  |
|    | Filter body           | 6"                | 6"                | 8"                |  |  |
| 1  | Filter body           | N/A               | N/A               | N/A               |  |  |
| 2  | Handle                | E6020106000       | E6020106000       | E6020106000       |  |  |
| З  | Tightening bracket    | 6012006000-P      | 6012006000-P      | 6012108000-P      |  |  |
| 4  | Cover                 | 5320010603-P      | 5320010603-P      | W5320010801-01P   |  |  |
| 5  | Cover gasket          | 5312060100-060-01 | 5312060100-060-01 | 5312160100-150-01 |  |  |
| 6  | Filter screen         | W5003600400-01R*  | W5003600402-01R*  | W5004600400-01R*  |  |  |
| 7  | Centering gasket      |                   |                   | 5312160100-161    |  |  |
| 8  | Screen gasket         | 5312140100-080    | 5312140100-100    | 5312160100-300    |  |  |
| 9  | Pressure testing port | E5412023901-01    | E5412023901-01    | E5412023901-01    |  |  |
| 10 | Ball valve            | 4504007100-01     | 4504007100-01     | 4504007100-01     |  |  |
| 11 | Elbow                 | 4170070300        | 4170070300        |                   |  |  |







|        | Description            | Model           |                 |                 |  |  |
|--------|------------------------|-----------------|-----------------|-----------------|--|--|
| Filter |                        | F160 F180       |                 | F110            |  |  |
|        | Filter body            | 10"             | 12"             | 14"             |  |  |
| 1      | Filter body            | N/A             | N/A             | N/A             |  |  |
| 2      | Handle                 | E6020106000     |                 |                 |  |  |
| 3      | Tightening bracket     | 6012006000-P    |                 |                 |  |  |
| 4      | Cover                  | W5320010801-03P | W5331011004-01P | W5331011401-01P |  |  |
| 5      | Cover gasket           | 5312160100-135  | 5311250100      | 5311400100      |  |  |
| 6      | Internal Filter screen |                 |                 |                 |  |  |
| 7      | Ext. Filter Screen     | E7004600404-01* | E7004600404-01* | E7006604003-01* |  |  |
| 8      | Centering gasket       |                 |                 |                 |  |  |
| 9      | Screen gasket          | 5312160100-310  |                 |                 |  |  |
| 10     | Pressure testing port  | E5412023901-01  | E5412023901-01  | E5412023901-01  |  |  |
| 11     | Ball valve             | 4504015100-01   | 4504020100-01   | 4504020100-01   |  |  |
| 12     | Quick coupling         | 4150104000-03P  |                 |                 |  |  |
| 13     | Cover                  | 5320010402-P    |                 |                 |  |  |
| 14     | Stud                   |                 | 5292143007-048  | 5292143007-048  |  |  |
| 15     | Washer                 |                 | 4122140301      | 4122140301      |  |  |
| 16     | Nut                    |                 | 4112140301      | 4112140301      |  |  |
| 17     | O-Ring                 |                 | 4081202100-445  | 4081266100-450  |  |  |

Warnings! Important safety instructions: -Maximum pressure is 8 bar.

- Do not open the filter cover without first performing the following actions:

1. Close both the inlet and outlet valves.

2. Open the filter drain and be certain that the filter is fully drained and the pressure is 0.

3. The filter cover can now be carefully opened

\*when ordering please specify filtration grade \*\*Filter body standard connections - 2" - threaded socket, 3", 4" - Flange

\* FILTRATION GRADE. Please mention as follow: R8- 80mic S0-100mic S2-120mic S5-150mic T2-200mic T4-400mic T8-800mic





## **Backwash Secondary Screen Filter**

The Backwash Secondary Screen Filter plays an important role in the system's ability to maintain filtration results. In the event of "dirt breakthrough" where cleaning processes were not performed as required, the Backwash Secondary Screen Filter keeps the dirt from flowing into the irrigation system and its accessories. In the unlikely event that one of the filter elements inside the filter becomes damaged or unplugged and gravel flows out of the filter with the water flow, the Secondary Screen Filter will trap it and prevent it from flowing into the irrigation system and its accessories.

## Series F200 (Pressure loss at 130 micron)



## **Components Description & Spare Parts ordering information for 200 Series**

|    | Description           | Model             |                   |                   |  |  |
|----|-----------------------|-------------------|-------------------|-------------------|--|--|
|    | Filter                | F220R             | F220R F230R       |                   |  |  |
|    | Filter body           | 6"                | 6"                | 8"                |  |  |
| 1  | Filter body           | N/A               | N/A               | N/A               |  |  |
| 2  | Handle                | E6020106000       | E6020106000       | E6020106000       |  |  |
| 3  | Tightening bracket    | 6012006000-P      | 6012006000-P      | 6012108000-P      |  |  |
| 4  | Cover                 | 5320010603-P      | 5320010603-P      | W5320010801-01P   |  |  |
| 5  | Cover gasket          | 5312060100-060-01 | 5312060100-060-01 | 5312160100-150-01 |  |  |
| 6  | Filter screen         | W5003600400-01R*  | W5003600402-01R*  | W5004600400-01R*  |  |  |
| 7  | Centering gasket      |                   |                   | 5312160100-161    |  |  |
| 8  | Screen gasket         | 5312140100-080    | 5312140100-100    | 5312160100-300    |  |  |
| 9  | Pressure testing port | E5412023901-01    | E5412023901-01    | E5412023901-01    |  |  |
| 10 | Ball valve            | 4504007102-01     | 4504007102-01     | 4504007102-01     |  |  |
| 11 | Elbow                 | 4170070300        | 4170070300        |                   |  |  |







|    | Description            | Model           |                 |                 |  |  |
|----|------------------------|-----------------|-----------------|-----------------|--|--|
|    | Filter                 | F260            | F260 F280       |                 |  |  |
|    | Filter body            | 10"             | 12"             | 14"             |  |  |
| 1  | Filter body            | N/A             | N/A             | N/A             |  |  |
| 2  | Handle                 | E6020106000     |                 |                 |  |  |
| 3  | Tightening bracket     | 6012006000-P    |                 |                 |  |  |
| 4  | Cover                  | W5320010801-03P | W5331011004-01P | W5331011401-01P |  |  |
| 5  | Cover gasket           | 5312160100-135  | 5311250100      | 5311400100      |  |  |
| 6  | Internal Filter screen |                 |                 |                 |  |  |
| 7  | Ext. Filter Screen     | E7004600404-01* | E7005604007-01* | E7006604003-01* |  |  |
| 8  | Centering gasket       |                 |                 |                 |  |  |
| 9  | Screen gasket          | 5312160100-310  |                 |                 |  |  |
| 10 | Pressure testing port  | E5412023901-01  | E5412023901-01  | E5412023901-01  |  |  |
| 11 | Ball valve             | 4504015100-01   | 4504020100-01   | 4504020100-01   |  |  |
| 12 | Quick coupling         | 4150104000-03P  |                 |                 |  |  |
| 13 | Cover                  | 5320010402-P    |                 |                 |  |  |
| 14 | Stud                   |                 | 5292143001-048  | 5292143001-048  |  |  |
| 15 | Washer                 |                 | 4122140301      | 4122140301      |  |  |
| 16 | Nut                    |                 | 4112140301      | 4112140301      |  |  |
| 17 | O-Ring                 |                 | 4081202100-445  | 4081266100-450  |  |  |

Warnings! Important safety instructions: -Maximum pressure is 8 bar.

- Do not open the filter cover without first performing the following actions:

1. Close both the inlet and outlet valves.

2. Open the filter drain and be certain that the filter is fully drained and the pressure is 0.

3. The filter cover can now be carefully opened

\*when ordering please specify filtration grade \*\*Filter body standard connections - 2" - threaded socket, 3", 4" – Flange \* FILTRATION GRADE. Please mention as follow: R8- 80mic S0-100mic S2-120mic S5-150mic T2-200mic T4-400mic T8-800mic







## **1.4 Water Control Head**



| ITEM | DESCRIPTION                 |
|------|-----------------------------|
| 1    | NIPPLE DOUBLE GALVANIZED ¾" |
| 2    | ELBOW GALVANIZED ¾"         |
| 3    | T GALVANIZED ¾"             |
| 4    | VALVE 3 WAY ¼"              |
| 5    | PRESSURE GAUGE SST          |
| 6    | BALL VALVE ¾" BSP           |
| 7    | FILTER PLASTIC ¾"           |
| 8    | TEFEN PIPE BUSHING ¾"       |
| 9    | TEFEN MAIL ELBOW 1/8 *8     |
| 10   | TEFEN PIPE HEX NIPPLE       |
| 11   | TEFEN HEX THREADED PLUG     |
| 12   | TEFEN MALE RUN T            |



- 2. ELBOW 3/4"
- 3. 3/4" M.F. BALL VALVE
- 4. MANOMETER
- 5. 3/4" P.P. FILTER
- 7. 3-WAY BALL VALVE
- 8. BUSHING 3/4" × 1/4"
- 9. MALE CONNECTOR 1/8"
- 10. SOLENOID



## 6. Installation and Operation

## 6.1 Safety instructions

- 1. Before handling any part of the system carefully read the instructions and act accordingly.
- 2. Please note: The maximum working pressure of the filtration system is 8 bar.
- 3. Check and be sure that pumps and valves will not exceed the tolerances of the system and match the requirements of the system pressure rate and flow rate specifications.
- Do not perform maintenance operations or open filter covers before the pressure in the system is fully released.
   For draining purposes, use the drain valve of the Secondary Screen Filter, check the pressure gauge to be sure it is at 0 before proceeding.
- 5. Be sure that prior to any maintenance procedures, all electrical connections to the system are unplugged (AC controller, pumps, etc').
- 6. Work only with proper and standard tools.
- 7. Use only original parts that were supplied by YAMIT are approved by YAMIT.

## 8. Sodium Hypo-Chloride:

- a. <u>WARNING: Sodium Hypo-Chloride is a toxic, corrosive liquid. Store and</u> <u>handle it according to safety regulations.</u>
- b. Before handling <u>Sodium Hypo-Chloride</u> carefully read all the specific safety, health protection and first aid information and instructions.
   Be sure you have all required first aid at the site, as instructed.
- c. The concentrated liquid Sodium Hypo- Chloride can damage metal including the filters and their coating. Be careful when applying it and avoid any part of the liquid spilling onto metal parts or coating. Should any of the liquid come in contact with metal parts or coating, wash thoroughly with fresh water.
- 9. Electrical connections and wiring must be done by authorized electricians only.



## 6.2 **Prior to Installation**

7.3 Be sure that the site is accessible by the water supply, from the source to the system, and from the system to the irrigation site. Check that all engineering (hydraulic and agronomist) requirements are met.

**NOTE:** The gravel filtration system, while working with water, will weigh from 250 kg up to a few tons. The system foundation must take into consideration the working weight of the system in its design

7.3 In most cases, a concrete platform 10 cm thick with proper reinforcement, anchored to the ground, will be sufficient.

## 6.3 Installation

All system components are shipped to the site packed in pallets and boxes with installation drawings, user manual, and a packing list.

The manifolds are marked with letters and numbers on their wraps and inside matching their marks in the drawings.

1. Position the gravel filter on the platform according to the dimensions in the attached drawings.

## Note: In systems where quick couplings are used – keep the quick coupling bolts untightened until all system parts are assembled and fit together.

- 2. Connect the backwash valve to each gravel filter. Be sure that the connection positions are according to the flow arrows marked on the valve.
- 3. Connect the adaptor galvanized nipple / quick coupling to each gravel filter outlet. (If there is one.)
- 4. Connect the outlet manifolds to the Quick coupling according to the marks on the manifolds and the installation drawings use the short supports legs to support the manifold.
- 5. Connect the inlet manifold to the backwash valves according to the marks on the manifolds and the installation drawings.
- 6. Connect the drain manifold to the backwash valves according to the marks on the manifolds and the installation drawings.



**IMPORTANT:** If the drained backwash water needs to be disposed of at a distance of more than 10 meters, then the drain pipe should be with higher diameter than the outlet manifold.

## NOTE: This is the time to secure the installed quick couplings.

- 7. Connect the hydraulic flow control valve to the outlet of the backwash manifold– be sure that its position is according to the flow direction arrow marked on the valve.
- 8. Connect the inlet "S" manifold and secure it, connect the air valve to the socket on the top of the "S" manifold.

At this stage do a final check to confirm that the position of the system is where it should be relative to the inlet and outlet main pipelines.

- 9. Install the water head control in the <sup>3</sup>/<sub>4</sub>" socket on the inlet "S" manifold.
- 10. Secure the stand of the backwash controller in place so that it is close to the water head control (make sure that it will meet your needs for both operations and maintenance).
- 11. Secure the backwash controller and the solenoids battery in place on the stand. Make sure that the position of the controller is at"eye level" for easy handling. The battery of the solenoid valves has to be installed on the same stand and below the controller.
- 12. Connect the P.E. 8 mm command tubes:
  - a. From the outlet of the water control head to the common inlet "live pressure" of the solenoids.
  - b. From each solenoid command outlet to the hydraulic backwash valve.
  - c. From one of the outlets on the 3-way ball value in the water control head to the  $\frac{3}{2}$  socket on the outlet manifold of the gravel filtration system.
  - d. Connect a short drain tube (no more than 2 meters) to the common vent of the solenoids battery.
  - e. The P.E. closures should be used to secure the P.E. 8mm command tubes in an organized and tidy fashion along the length of the filter.
- 13. Connect the controller to the electricity source (AC to a water secure socket, DC connect the ports to the electric battery inside the controller).

## 6.4 Initial Operation

- 1. Close all the gravel filtration system outlets (outlet manifold and backwash manifold) and run the system with water.
- 2. Check all the manifolds and filter connections for water leaks re-fit, re-connect and re-secure if necessary.
- 3. Check all the command tube connections for leaks re-fit, re-connect, and re-secure if necessary.
- 4. Set the backwash controller to a short flushing duration and turn it to "manual flush" make sure the command activates on time and passes in sequence from filter to filter.
- 5. Set the controller to a short interval (10 minutes) and check that flushing starts at the proper time interval.
- 6. Turn off the water, drain the system and open all the gravel upper service openings.
- 7. Fill the gravel filters with gravel. Fill each tank to the 40 cm level of the media. Refer to the media level marked on the filter housing.
- Be sure that the surface of the upper service opening is clean from any remaining gravel particles and shut the upper cover.
  Tighten the shutter handle gently, the gasket is hydraulic and no force is required in order to seal the cover.
- 9. Re-set the back flushing controller to 10 minutes intervals and 2 minutes flushing time.
- Turn on the water and let the system run with water at this "setup" for 1 hour. (This process is necessary in order to clean dirt and dust from the media, and allow the media to settle properly in the filters).
   At this stage he sure that the water from the filters is drained and not running.

## At this stage be sure that the water from the filters is drained and not running into the irrigation system.

Check the backup filter/s for the existence of gravel.
 If gravel is present, empty the gravel filter and replace the damaged filter element inside the filter.

**Before emptying the gravel from the filter** – be sure that the gravel you see is not just "gravel dust" that washed out during the initial operation, and that it is actually quantities of gravel that are "running out" from the gravel filter.

- 12. Set the controller according to the water quality and your irrigation program, and turn on the water for irrigation (refer to the controller manual).
- 13. The filtration interval should be up to  $\Delta P = 5$  meter / 0.5 bar
- The flushing duration should be as long as required until the water from the backwash manifold is coming out clean (typically this will be between 2 - 3 minutes).





## 7. Maintenance

## 7.1 Once a Week

While the system is working:

- 1. Check the water head control filter and clean it (blockage of this filter will cause a malfunction of the backwashing process of the filtration system).
- 2. Perform manual flushing and check that the backwashing happens in sequence according to your backwash controller setup.
- 3. Check that during the last 10 seconds of the backwash of every filter, the water from the backwash manifold runs out freely and clean.
- 4. Check for leaks from connections and fittings.
- 5. Shut down the inlet and outlet of water to the system.

Important! Before opening filter covers, be sure that the system pressure was released, pumps are shut down and any electrical accessories such as controller, pumps etc. and are disconnected from the current source.

- 6. Open the backup screen filter and check its condition if necessary, clean it with water and a soft brush. After checking, close the filter.
- 7. If you found any leaks, fix them and re-secure the connections if required.
- 8. Check the filtration system visually for any mechanical damage on the paint. Clean any damaged area or spot with sandpaper and paint it with a basic antirust paint.



## 7.2 At the End of the Irrigation Season

- 1. Perform all actions as described in the weekly maintenance section.
- 2. Be sure that the inlet and outlet of water to the system are closed.
- 3. Release the pressure, if it exists using the drain valve of the backup Screen Filter, check the pressure gauge to see that the pressure read is 0 before further actions.
- 4. Open all the upper service covers and drain the filtration system (use an existing valve on the downstream pipeline or use the drain valve that are installed on the backup screen filter).
- Check the media height (gravel) inside the media filters. If the media is lower than the required 40 cm.
  <u>do not add at this stage, see 3a in the Troubleshooting section, page 30.</u> Check the backup filter/s for gravel. If there is gravel, empty the gravel filter and replace the damaged filter element.
- 6. Add sodium hypo-chloride liquid to each media filter according to the table on the page that follows.
- 7. Shut the drain valves, shut the media filter covers, shut the downstream water outlet and apply water into the system until it is full.
- 8. Allow the chlorinated water to remain in the filter for one hour.
- 9. After one hour, perform a manual backwash of the system, using the manual option in the controller.
- 10. Turn off the water.
- 11. Open the backup screen filter/s, take out the screen/s, clean them, store them in a dry and safe place with the all filter covers and handles make sure that cover gaskets are dry before storage. (Only in the manual filters) if semi-automatic or automatic filter open the filter and check all the inner elements.
- 12. Lubricant all the screws and bolts of the system. In particular carefully oil the screws of the shutter units in the gravel filter and the backup screen filter.(if it is manual filter)
- 13. In environments where <u>freezing conditions occur</u>, open all gravel filters covers, drain the water totally out of the filtration system (preferable by using the bottom plug that is installed in each media filter). When the filter is drained, shut the upper covers.
- 14. Disconnect the electricity source of the backwash controller.



## 7.3 Sodium Hypo-Chloride (NaOCl ) for Chlorination

For chlorination of the filtration system, apply these quantities of liquid sodium hypo-chloride into the filter tanks, as described below.

| FILTER<br>MODEL | FILTER DIAMETER |      | QUANTITY OF SODIUM<br>HYPO- CHLORIDE<br>Domestic Liquid – 3%<br>Concentration | QUANTITY OF SODIUM<br>HYPO- CHLORIDE<br>Technical Liquid – 10%<br>Concentration |
|-----------------|-----------------|------|---|---|
|                 | (inch)          | (mm) | (Liter)   | (Liter)   |
| F605            | 12              | 300  | 0.18  | 0.06  |
| F610            | 16              | 400  | 0.33  | 0.10  |
| F620            | 20              | 500  | 0.53  | 0.16  |
| F635            | 25              | 610  | 0.80  | 0.24  |
| F636            | 25              | 610  | 0.80  | 0.24  |
| F640            | 30              | 750  | 1.15  | 0.35  |
| F650            | 36              | 900  | 1.65  | 0.50  |
| F655            | 42              | 1050 | 2.30  | 0.70  |
| F660            | 48              | 1200 | 3.00  | 0.90  |



## 7.4 At the Beginning of the Next Irrigation Season

- 1. Check all covers, gaskets and screen/s that were stored after the season. Clean them and wash with fresh water.
- 2. Check the gravel inside the filters. The level of media should be 40 cm add if required.
- 3. Install the screen/s and cover/s in the backup screen filter/s.
- 4. Connect the electricity source to the controller (for DC controllers replace the old battery with a new one) and perform manual backwash be sure that the controller sends signals in sequence to the solenoids valves and that the solenoids are reacting.
- 5. Clean the control screen filter in the water head control with fresh water.
- 6. Lubricant all the screws and bolts of the system. In particular carefully oil the screws of the shutter units in the gravel filter and the backup screen filter.
- 7. Keep the filtration system downstream water outlet shut and fill the system with water up to the height of the media in the filters.
- 8. Add liquid sodium hypo-chloride [NaOCI] to each media filter according to the table above.
- 9. Shut the drain valves, shut the media filter covers, shut the downstream water outlet and add water into the system.
- 10. Allow the water to remain in the filter for one hour.
- 11. Perform 3 manual backwash cycles of the system using the manual option in the controller.
- 12. Open the downstream water outlet and let the system run according to the irrigation program.



## 8. Troubleshooting

## 1. If the pressure difference across the filtration system is over 5 meter/ 0.5 bar and the flushing cycle does not reduce it:

- 1. Check that the flushing flow rate is 85m/h/1per 1 square meter (please refer to the table in <u>Technical Specifications</u>, page 4 ).
- **2.** Adjust the flow control valve if necessary.
- **3.** Make sure that the water from the backwash manifold is running free.
- 4. Check the duration of backwash and that the water that drains in the last 10 seconds of flushing is clean. If water is dirty at the end of the flushing increase the duration of flushing if required, increase the back wash duration and perform 3 consecutive flushing cycles.

## 2. If the flushing cycle does not start but the controller is initiating the flushing signal and the solenoids are reacting ("clicking"):

- 1. Check the control screen filter in the water control head. Clean it if necessary and perform manual flushing.
- 2. Check for clogging inside the solenoid valves clean if possible or replace with a new solenoid.
- **3.** Check for clogging of the hydraulic control tubes open the clogs and clean if necessary.

## 3. If the drippers are clogged:

**1.** Check the level of gravel inside all the filters and check that the media height is 40 cm above the filter elements.

If there is less than 40 cm, check the backup filter to determine if gravel is stuck in it.

If there is gravel in the backup filter, empty the media from the gravel filter, and replace the damaged filter element.

- 2. Check the duration of the backwash and be sure that the water that drains during the last 10 seconds of flushing is clean. If the water is dirty at the end of the flushing increase the duration of flushing and perform 2 manual flushing cycles.
- 3. Check for the presence of bacteria in the media grab the media with your hand the media should be soft and "flow" between your fingers if it is "sticky", perform the chlorination process as described in the maintenance chapter section entitled "Before The Next Irrigation Season"
- Check for "channels" inside the gravel. If they exist perform the chlorination process as describe in the maintenance chapter section entitled "Before The Next Irrigation Season"

## 4. If the media (gravel ) is running out from the filters during backwash:

- **1.** Adjust the flow control valve on the backwash manifold and reduce the flow until the media stops running out.
- 2. Check the level of media (gravel) inside the filters. Add media if the level is less than 40 cm, or take out media if the level is more than





Model: F640-F660



| IPB  | Model     | Cat. No.        | Description                                   |  |  |
|------|-----------|-----------------|---|--|--|
| 1    | F600      | N/A             | Filter body                                   |  |  |
| 2    | F600      | E6020106000     | TIGHTENING HANDLE 6"/8"                       |  |  |
| 2    | F605      | 6012006000-P    | TIGHTENING BRACKET 6" F100-400 2"/3",F605     |  |  |
| 5    | F610-F680 | 6012108000-P    | TIGHTENING BRACKET 8" F100-400 4"/6",F500-600 |  |  |
| 4    | F605      | 5320200601-P    | COVER 6" F100-300 2"/3",F605,FT05/10/150/300  |  |  |
| 4    | F610-F680 | 5320010800-P    | COVER 8" F500,F610-680                        |  |  |
| 5    | F605      | 5311150600-040  | COVER GASKET 6" F605,FT05/10/150/300          |  |  |
| 5    | F610-F680 | 5311200600-120  | HYD GASKET F/SERVICE HOLE 8" F500,F610-680    |  |  |
| 6    | F600      | 4000016500      | FILTER NOZZLES PP [P1](0.5) L=20/20 15/16"    |  |  |
| 7    | F600      | 5312000600-280  | GASKET FOR FILTER NOZZLE 15/16" F600          |  |  |
|      | F605      | 4180100300      | PLUG 1"BSP GALVANIZED                         |  |  |
| 8    | F610      | 4180150300      | PLUG 1.1/2"BSP GALVANIZED                     |  |  |
|      | F620-F680 | 4180200300      | PLUG 2"BSP GALVANIZED                         |  |  |
|      | F605      |                 |   |  |  |
|      | F610      |                 |   |  |  |
|      | F635      | 5512007000-009  | RUBBER BASE FOR LEG F515/520,F605/610/635/636 |  |  |
|      | F636      |                 |   |  |  |
| 9    | F620      |                 |   |  |  |
|      | F630      | 5512007000-008  | RUBBER DASE FUR LEG FSSU-550,F020/050         |  |  |
|      | F640      |                 |   |  |  |
|      | F650      | E5312030600-067 | RUBBER BASE FOR LEG F640-660                  |  |  |
|      | F660      |                 |   |  |  |
|      | F605      | 4240106000-120  | PVC RISER 1"*12cm BSP F605                    |  |  |
| 10   | F610      | 4240156000-150  | PVC RISER 1.1/2"*15cm BSP F610                |  |  |
| 10   | F620      | 4240206000-200  | PVC RISER 2"*20cm BSP F620                    |  |  |
|      | F635      | 4240206000-250  | PVC RISER 2"*25cm BSP F635                    |  |  |
|      | F605      | 4170106501      | ELBOW 1"BSP PLASTIC                           |  |  |
|      | F610      | 4170156501      | ELBOW 1.1/2"BSP PLASTIC                       |  |  |
| 11   | F620      | 4170206501      |   |  |  |
| 11   | F635      | 4170200301      | ELBOW Z BSP PLASTIC                           |  |  |
|      | F630      | 6226002000      | ELBOW NIPPLE 2"BSP PVC F630                   |  |  |
|      | F636      | 6226003000      | ELBOW NIPPLE 3"BSP PVC F636                   |  |  |
| 12   | F610-660  | 5320010600-P    | SERVICE HOLE COVER 6" F610-660,FT060          |  |  |
| 13   | F610-660  | 5311150600-045  | HYD GASKET F/SERVICE HOLE 6" F610-660,FT060   |  |  |
| 14   | F610-660  | 4102110401-030  | BOLT HEX HEAD 5/16"NC*1.1/4" HOT GALVANIZED   |  |  |
| 15   | F610-660  | 4122110401      | WASHER 5/16" HOT GALVANIZED                   |  |  |
| 16   | F610-660  | 4112110401      | NUT 5/16"NC HOT GALVANIZED                    |  |  |
| 17   | F605      | E220010401 D    |   |  |  |
| 17   | F680      | 5320010401-P    | COVER 4 VIC                                   |  |  |
| 10   | F605      | 4150104000 020  |   |  |  |
| ΤŎ   | F680      | 4150104000-03P  | QUICK COUPLING 4" MODEL 75                    |  |  |
| 10   | F605      | 4094040200      |   |  |  |
| 19 - | F680      | 4084040200      |   |  |  |



## 10. Appendixes

## 10.1 ARI Air Valve

A.R.I.

## DG-10 PN 10 D-040 PN 16

## Combination Air Valve

### Description

The D-040 series Combination Air Valve has the features of both an air release valve and an air & vacuum valve.

The air release component is designed to automatically release small pockets of air to the atmosphere as they accumulate at peaks or along a pipeline or piping system when it is full and operating under pressure.

The air & vacuum component is designed to automatically discharge or admit large volumes of air during the filling or draining of a pipeline or piping system. This valve will open to relieve negative pressures whenever water column separation occurs.

### Applications

- Pump stations: after the pump and after the check valve.
- On main lines and heads of systems.
- At the end of lines and at the end of a sub main
- On strainers and filters.

### Operation

The air & vacuum component, with the large orifice, discharges air at high flow rates during the filling of the system and admits air into the system at high flow rates during its drainage and at water

column separation.

High velocity air will not blow the float shut. Water will lift the float, which seals the valve.

At any time during system operation, should internal pressure of the system fall below atmospheric pressure, air will enter the system.

The smooth discharge of air reduces pressure surges and other destructive phenomena.

The intake of air in response to negative pressure protects the system from destructive vacuum conditions and prevents damage caused by water column separation. Air entry is essential to efficiently drain the system.

The air release component releases entrapped air in pressurized systems.

## Without air valves, pockets of accumulated air may cause the following hydraulic disturbances:

 Restriction of effective flow due to a throttling effect as would a partially closed valve. In extreme cases this will cause complete flow stoppage.

- Obstruction of efficient hydraulic transmission due to air flow

- disturbances.
- Accelerate cavitation damages.
- Pressure transients and surges.

- Corrosion in pipes, fittings and accessories.
- Danger of a high-energy burst of compressed air.
- Inaccuracies in flow metering.

## As the system starts to fill, the valve functions according to the following stages:

1. Entrapped air in the pipeline is discharged by the valve.

Liquid enters the valve, lifting the float which pushes the sealing mechanism to its sealing position.

 Entrapped air, which accumulates at peaks and along the system, rises to the top of the valve, which in turn displaces the liquid in the valve's body.

The float descends, unsealing the rolling seal. The air release orifice opens and the accumulated air is released.

 Liquid enters into the valve and the float rises, pushing the rolling seal back to its sealing position.

## When internal pressure falls below atmospheric pressure (negative pressure):

 The float will immediately drop down, opening the air & vacuum and air release orifices.

2. Air will enter the system.

### Main Features

- Working pressure range: DG-10 0.1-10 bar. D-040 0.2-16 bar
- Testing pressure: DG-10 16 bar. D-040 25 bar.
- Maximum working temperature: 60° C.
- Maximum intermittent temperature: 90° C.
- Reliable operation reduces water hammer incidents.
- Dynamic design allows for high velocity air discharge while
- preventing premature closure.
- Lightweight, small dimensions, simple and reliable structure.
- The discharge outlet enables removal of excess fluids.
- The large size of the automatic air release orifice relative to the air valve body;
- Discharges air at high flow rates.
- Lessens the danger of its obstruction by debris.
- Following the following to the following the
- Enables the usage of the patented rolling seal mechanism, making it less sensitive to pressure differential than a direct float seal.

 The body is made of high-strength composite materials and all operating parts are made of specially selected, corrosion- resistant materials.

- Due to its light weight, the valve may be installed on plastic piping systems, as well as other lightweight piping systems.



A.R.I.

## DG-10 / D-040

### Valve Selection

The air valve is available with:

- Wide size range: 1/2", 3/4", 1", 2" threaded male connections, NPT or BSPT.

- Ball valve tap, BSPT or NPT male connection.

The valve is available with a one-way check valve.

Upon ordering, please specify: model, size, working pressure, threads standard and type of liquid.



AUTOMATIC AIR RELEASE FLOW RATE

### AIR AND VACUUM FLOW RATE

### AUTOMATIC AIR RELEASE FLOW RATE





## 29



## DG-10 / D-040











DG-10 2"

DG-10 1"

D

D-040 1"

### DIMENSIONS AND WEIGHTS

| Nominal      | Dimensi | ons mm | Connection        | Welght | Orlfice A | Area mm <sup>2</sup> |
|--------------|---------|--------|-------------------|--------|-----------|----------------------|
| Size         | Α       | в      | С                 | Kg.    | Auto.     | A/V                  |
| 1/2" 3/4" 1" | 100     | 143    | 3/8" BSP Female   | 0.33   | 7.8       | 100                  |
| 2"           | 183     | 215    | 11/2" BSP Fernale | 1.10   | 12        | 804                  |



### PARTS LIST AND SPECIFICATION

| No.   | Part                      | Material                |
|-------|---------------------------|-------------------------|
| 1.    | Body                      | Reinforced Nylon        |
| 2.    | Discharge Outlet          | Polypropylene           |
| 3.    | 1/2" 3/4" 1" Rolling Seal | E.P.D.M.                |
|       | 2" Rolling Seal Assembly: |                         |
|       | 3a. Screws                | Stainless Steel SAE 304 |
|       | 3b. Plug Cover            | Reinforced Nylon        |
|       | 3c. Rolling Seal          | E.P.D.M.                |
|       | 3d. Plug                  | Reinforced Nylon        |
| 4.    | Clamping Stem             | Reinforced Nylon        |
| 5.    | Float                     | Foamed Polypropylene    |
| 6.    | O-Ring                    | BUNA-N                  |
| 7.    | Base                      | Reinforced Nylon        |
|       |                           | / Brass ASTM B124       |
|       |                           | / St.St. SAE 316        |
|       |                           |                         |
| Optio | nal Ball valve            | Brass ASTM-B-124,       |

Brass ASTM-B-124, Nickel plated.









350 Series

## 10.2 BERMAD – Filter Backflushing Hydraulic Valve

## **BERMAD** Irrigation

## **Filter Backwash** Hydraulic Valve

2X2 Plastic

IR-2x2-350-P

The BERMAD Model IR-2x2-350-P is a compact 3-port valve, in a T configuration. It is double chambered, hydraulically operated, and diaphragm actuated. Designed for automatic backwashing of filtration systems, the BERMAD Model IR-2x2-350-P is available in Angle flow (A) and Straight flow (S) configurations.



- Line Pressure Driven
- Wide application range
- Dynamic Sealing Seals at very low pressure
- Prevents seal friction and erosion
- Engineered Plastic Valve Design
- Short Valve Travel
- Eliminates mixing of supply and waste water
- User- Friendly
- Can be installed in various orientations
- Simple in-line inspection and service

## Filter Stations Angle Flow

Straight Flow



## **Hydraulic Data**

|                  | Filtartion $1 \Rightarrow C$ |       | Backwash C⇒2 |       | $\Delta \mathbf{p} = \left(\frac{\mathbf{Q}}{\mathbf{K}\mathbf{v}}\right)^2$ |
|------------------|------------------------------|-------|--------------|-------|--|
| Angle<br>Flow    | <b>₩</b>                     |       | < <b>₽</b> ₩ |       | $Kv = m^3/h @ \Delta P of 1 bar$<br>Q= m <sup>3</sup> /h<br>ΔP = bar         |
|                  | Kv=52                        | Cv=60 | Kv=48        | Cv=56 |  |
|                  | Filtartion 2⇒C               |       | Backwash C⇒1 |       | $\Delta P = \left(\frac{Q}{Cv}\right)^2$                                     |
| Straight<br>Flow | <b>≁</b> ∰≁⊗≁                |       | <b>₩</b>     |       | $Cv = gpm @ \Delta P of 1 psi$<br>Q=gpm<br>$\Delta P = psi$                  |
|                  | Kv=46                        | Cv=53 | Kv=60        | Cv=70 | Cv = 1.155 KV  |









## Hydraulic Data

|                  | Filtartic    | on 1⇒C | Backwa   | sh C⇒2 | $\Delta p = \left(\frac{Q}{K_V}\right)^2$                                |
|------------------|--------------|--------|----------|--------|--|
| Angle<br>Flow    |              | ⊗+     | <b>▲</b> | •@•    | Kv = m <sup>3</sup> /h @ ΔP of 1 bar<br>Q= m <sup>3</sup> /h<br>ΔP = bar |
|                  | Kv=110       | Cv=127 | Kv=100   | Cv=115 |  |
|                  | Filtartic    | on 2⇒C | Backwa   | sh C⇒1 | $\Delta P = \left(\frac{Q}{Cv}\right)^2$                                 |
| Straight<br>Flow | * <b>*</b> * | •@•    |          | -⊗     | $Cv = gpm @ \Delta P of 1 psi$<br>Q= gpm<br>$\Delta P = psi$             |
|                  | Kv=93        | Cv=107 | Kv=122   | Cv=141 | Cv = 1.155 KV  |





## 31c - Lower Adapter assy groove (angle flow)



## BERMAD Irrigation 350 Series Flow Control & Pressure Reducing **Filter Backwash** Hydraulic Valve **4x4** Plastic IR-4x4-350-P

The BERMAD Model IR-4x4-350-P is a compact 3-port valve, in a "T" configuration. It is double chambered, hydraulically operated, and diaphragm actuated.

Designed for automatic backwashing of filtration systems, the BERMAD Model IR-4x4-350-P is available in Angle flow (A) and Straight flow (S) configurations.



Straight Flow



## Hydraulic Data



## Plastic Backwash Filter Valves, Double Chamber, Straight/Angle & Reverse Flow -

Model 350 4X4 (Page 10d in BERMAD's Spare Parts Guide)



\* ACCORDING TO VALVE TYPE



## 10.3 Flow Control Valve - Model IR-170-50-bDZ

## BERMAD Irrigation



with Hydraulic Control

IR-170-50-bDZ

### Description:

The BERMAD Normally Closed, Flow Control Valve with Hydraulic Control is a hydraulically operated, diaphragm Actuated control valve that limits system demand to a constant preset maximum flow rate. It is a Normally Closed valve, which opens in response to a remote pressure rise command and shuts in the absence of that command.



100 Series h¥flow



Pressure Differential [**P**] across the Differential Pressure Duct **[1]** is in direct proportion to demand. The Flow Pilot **[2]** continuously senses **[P**] and commands the Valve to throttle closed should demand rise above pilot setting. The Shuttle Valve **[3]** directs the pilot command into the main Valve Control Chamber **[4]**. Upon pressure rise command, the shuttle valve automatically switches, allowing pressurization of the control chamber, shutting the main Valve. The Manual Selector **[5]** enables local manual closing.



## 10.4 Filtron 1-10 (AC/DC)

## List of features

- The FILTRON 1-10 is a modular controller suitable for flushing 1 to 10 filters
- The FILTRON 1-10 is available in both DC or AC models
- The FILTRON 1-10 can be ordered with a built-in analog DP sensor that enables reading the actual value as well as triggering the flushing cycle by a preset value.
- By detecting a maximum number of automatic repeating cycles, endless looping problems are automatically eliminated.
- The FITRON 1-10 can also control a downstream pressure sustaining valve for the cases of systems suffering from pressure shortage.
- The FILTRON 1-10 is equipped with a large customized LCD display and keyboard.
- The FILTRON 1-10 keeps track of all flushing cycles triggered by DP, by time and manually.
- The FILTRON 1-10 is suitable for gravel filters, disc filters and screen filters
- In the DC model 4 standard "D" alkaline batteries or 12v DC from an external source
- In the AC model built-in 110V or 220V power supply

## Programming the Controller

The controller is equipped with an LCD display and 4 keys, as displayed below. When the unit is left untouched for a minute, the display switches off and a beep is heard every 20 seconds to indicate it is working. Holding down any of the keys for a few seconds will bring the screen back to life.



The screen consists of several fields. Some of them are editable and some of them are not.

To enter the EDIT MODE, press the key. The EDIT MODE is indicated by blinking of the currently editable field. Each time you press the key, the next editable field becomes active and starts blinking. Use the and keys to change the value in the active field. Press the key again to set the selected value for the current field and move to the next editable field. To return to a previous field during the process of passing through the editable fields, press the key repeatedly until you get back to the FLUSH TIME field, and

there are blinking fields. You can then begin

the process again.



## The chain of editable fields

The existence of the DP SET-POINT field depends on whether the System contains a built-in electronic DP or not.



## Flush time

Defines the duration of the flushing time per station. The following options are selectable:

5-20 sec. in steps of 1 sec.

20-55 sec. in steps of 5 sec.

1- 6 sec. in steps of 0.5 min

### The DP set point

At this field the user defines the pressure difference between the filter's inlet and outlet that when reached, a flushing cycle will take place. This field is meaningless when there is no built in electronic

DP sensor included, therefore, the user is expected to define the DP set point to be 00, as a result the actual DP value will appear as (--).

When the pressure is expressed in BAR the range of values is 0.1-2.0 BAR.

When the pressure is expressed in PSI the range of values is 1-3 PSI.

When the system does not include the built-in electronic DP sensor but uses instead and external DP sensor, the flushing request signal is in the shape of a closed dry contact at the appropriate input terminal.

### The flush mode

The Flush Mode defines how the flushing cycles are triggered. The selectable options are as follows:

- OFF no flushing will take place
- By time in this case the flushing cycle will be repeated in a selected interval or will be triggered by the DP signal depending on what happens first. No matter how was the flushing cycle started the interval to the next cycle will start to be measured again after each ending of a flushing sequence. The selectable intervals are as follows: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60 minutes
  - 2, 3, 4, 5, 6, 8, 12, 18, 24, 72, 120 hours
- dp flushing will be triggered by DP only
  - ✓ If the "+" and "-" keys are pressed and held down simultaneously, the "Flush Mode" filed will show the left time until next cycle, alternately hours and minutes.



### The accumulations

The unit accumulates and displays the number of flushing cycles caused by DP, by time, or manually. At each of the accumulation fields, the "+" or "-" keys may be used for cleaning the accumulated value.

## The configuration

In order to enter into the configuration process, press and hold down the ENTER key for at least 3 seconds. The unit will detect how many "plug-in" boards (each of 2 outputs) are used in each particular case. How will the outputs be allocated will depend on the definitions made during the configuration process described below. The following rules apply:

1- Back flush valves will be allocated starting from output 1 and up.

2- The last back-flush valve can be canceled and then its allocated output will be left unused.

3- Alarm output, Delay-Valve and Main-Valve when defined, will be allocated in this order, right after the last back-flush valve (whether in use or not).

### Example:

Assuming there are 3 "plug-in" boards, this makes 6 outputs for use. If there are no Alarm-output, no Delay-Valve and no Main-Valve all the 6 outputs will be allocated for back flush valves.

If additionally a Main-Valve is defined, the first 5 outputs will be allocated for backflush valves and output No. 6 for the Main-Valve. Output No. 5 (of the last backflush valve) can be canceled and left unused. If additionally a Delay-Valve is defined it will be allocated to output 5 right before the Main valve, leaving the first 4 outputs for backflush valves, and once again output No. 4 (of the last backflush valve) can be canceled and left unused. If additionally and Alarm-Output is defined it will be allocated before the Delay-Valve leaving only 3 of the first outputs for backflush valves. No. 3 can again be canceled.

During the configuration process the following features are defined:

| Main valve (sustaining valve) | YES/NO. When the answer is YES the Pre Dwell delay between the             |
|-------------------------------|--|
|                               | main valve opening and the opening of Station nr. 1 can be defined. The    |
|                               | selectable delay steps are:  |
|                               | 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55 seconds.                         |
|                               | 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6 minutes                          |
| Duel time                     | delay between stations: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60 sec. |
| DP delay                      | the delay during which the DP sensor reading is expected to remain         |
|                               | stable before reaction:  |
|                               | 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60 sec                          |
| Looping limit                 | the number of consecutive flushing cycles triggered by the DP sensor       |
|                               | before deciding that there is an endless looping problem. The options are: |
|                               | 1-10 or "no" which means ignoring the looping problem.                     |
| Alarm                         | YES/NO – allocating one output for alarm activation                        |
| Delay valve                   | YES/NO – allocating an output for Delay Valve activation                   |



| View outputs    | it is special mode that enables passing through the list of outputs to see            |  |  |  |  |
|-----------------|---|--|--|--|--|
|                 | how each output was allocated. Use the + key to change the "no" for a                 |  |  |  |  |
|                 | "yes" and confirm by "Enter", then keep using the + key to pass through the           |  |  |  |  |
|                 | list. At the bottom left corner the ordinal number of the output is displayed         |  |  |  |  |
|                 | and its allocated function appears in large letters at the center of the              |  |  |  |  |
|                 | screen. Notice that the number of possible outputs that can be used is                |  |  |  |  |
|                 | always an even number since the result is from the number of "plug in"                |  |  |  |  |
|                 | boards (each of 2 outputs) included. However, if the number of outputs                |  |  |  |  |
|                 | needed is not an even number, then the last   |  |  |  |  |
|                 | valve allocated for flushing bay be canceled by use of the STOP manual operation key. |  |  |  |  |
| Pressure Unit=  | deciding about the units to be used for pressure measurement.                         |  |  |  |  |
|                 | Selecting between BAR or PSI.   |  |  |  |  |
| Calibration     | Zero calibration of the built in electronic DP sensor. While the sensor               |  |  |  |  |
|                 | ports are disconnected select Calibration = YES                                       |  |  |  |  |
| Version display | the last screen of the configuration supplies information about the                   |  |  |  |  |
|                 | software version of the controller. The version consists of 4 digits like             |  |  |  |  |
|                 | the following: 00,  |  |  |  |  |
|                 | 13  |  |  |  |  |

### Handling "endless looping" problems

As explained before, endless looping problems can be detected when the number of consecutive flushing cycles triggered by the DP sensor exceeds the "looping limit" set during configuration. The fact that endless looping problem was detected will be indicated on the display and will cause the activation of the ALARM output, additionally, the DP indication will no longer be considered as a trigger for flushing. The following flushing cycles will be triggered by the interval count down only.

The problem will be considered solved when the constant indication of the DP sensor will be removed.

### Connecting the DP sensor to the filter system

The DP sensor is connected to the filter system by 2 command tubes: one that comes from the filter inlet (high pressure) which will be connected to the red point; the other that comes from the outlet (low pressure) and will be connected to the black point. It is important to put a small filter of 120 mesh (*not supplied*) between the red point and the high pressure connecting point.





### Handling low pressure

When a closed contact indication is received at the low pressure input of the controller, a symbol will appear blinking at the display. All activities will stop, including the countdown to the next flushing cycle. If the low pressure happens while a flushing sequence is in process, when the low pressure condition finishes, the flushing sequence will start from the beginning rather than continuing from the stop point.

### Low battery

The unit has two options of low battery indication: a signal on the screen, when the battery voltage drops to the first level; and a shutdown of all outputs, when the battery drops further into the second level and the screen will be cleared, leaving only the low battery icon.

### Manual activation

A flushing sequence can be manually activated by the MANUAL key, and a "hand" will appear on the display. The same key will be used for manually ending of the sequence.

### **TECHNICAL DATA**

### **DC MODEL**

| Power source:          | 6v supplied by 4 x1.5 "D" size alkaline batteries           |
|------------------------|---|
|                        | or one 12v DC dry battery                                   |
|                        | or one 12v rechargeable battery with solar panel of 2 watts |
| Outputs:               | 12v DC latching solenoids                                   |
| DP:                    | embedded electronic analog DP sensor                        |
|                        | or external dry contact DP sensor.                          |
| Pressure sensor:       | dry contact pressure sensor                                 |
| Operating temperature: | 0-60 ° C.   |

### **AC MODEL**

| Power source:          | 220 or 110 v AC 50 o 60 Hz with built-in transformer to 24v AC. |
|------------------------|---|
| Outputs:               | 24v AC solenoids  |
| DP:                    | embedded electronic analog DP sensor                            |
|                        | or external dry contact DP sensor                               |
| Pressure sensor:       | dry contact pressure sensor                                     |
| Operating temperature: | 0-60 °C.  |



## Wiring diagram

## DC MODEL

The drawing shows the wiring of the DC model of the controller.

Notice that:

1. The external DP sensor is optional and it is intended for use in case there is no Embedded Electronic DP included.

- 2. The powering of the unit can be either 6v DC or 24v DC.
- 3. The solenoids are 12v DC latch





## DC MODEL – with GALSOL DC





## AC MODEL

The drawing shows the wiring of the AC model of the controller. Notice that:

- 1. The external DP sensor is optional and it is intended for use in case there is no Embedded Electronic DP included.
- 2. The powering of the unit is by 24v AC transformed from 220/110 v AC.
- 3. The solenoids are 24v AC.







## 10.5 Controller Installation – 2" (F605-635)

10/05/2020 16:58:33



## 3"-4" (F640-680)



10/02/2020 16:58:33



## **11.** Standard International Guarantee

YAMIT Filtration & Water Treatment Ltd.(hereinafter -" YAMIT ") guarantees to the customers who purchased YAMIT's products directly from YAMIT or through its authorized distributors, that such products will be free from defect in material and/or workmanship for the term set forth below, when such products are properly installed, used and maintained in accordance with YAMIT's instructions, written or verbal.

Should such products prove defective within one year as of the day it left **YAMIT**'s premises, and subject to receipt by **YAMIT** or its authorized representative, of written notice thereof from the purchaser within 30 days of discovery of such defect or failure - **YAMIT** will repair or replace or refund the purchase price, at its sole option, any item proven defective in workmanship or material.

YAMIT will not be responsible, nor does this warranty extend to any consequential or incidental damages or expenses of any kind or nature, regardless of the nature thereof, including without limitation, injury to persons or property, loss of use of the products, loss of goodwill, loss of profits or any other contingent liabilities of any kind or character alleged to be the cause of loss or damage to the purchaser.

This warranty does not cover damage or failure caused by misuse, abuse or negligence, nor shall it apply to such products upon which repairs or alterations have been made by other than an authorized **YAMIT** representative.

This warranty does not extend to components, parts or raw materials used by **YAMIT** but manufactured by others, which shall be only to the extent warranted by the manufacturer's warranty.

No agents or representatives shall have the authority to alter the terms of this warranty nor to add any provisions to it not contained herein or to extend this warranty to anyone other than **YAMIT**'s customers.

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