OPERATION AND MAINTENANCE MANUAL

IMPORTANT

1. Read these instructions thoroughly prior to proceeding with installation.
2. Ensure that the installation conforms to all applicable local and national codes.
3. These instructions contain important information for the proper maintenance and repair of this equipment. Retain these instructions for future use.

SAFETY CONSIDERATIONS

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electric shock, or other occurrences, which may injure you or damage your property. The qualified installer or agency must use only factory-authorized kits or accessories when modifying this product.

• Follow all safety codes.
• Wear safety glasses and work gloves.

Be sure all power to equipment is shut off before performing maintenance or service. More than one disconnect may be present.

The power supply (v, ph, and Hz) must correspond to that specified in appropriate literature. The electrical supply provided by the utility must be sufficient to handle load imposed by this unit.

Refer to appropriate sheets for locations of electrical inlets, inlet and outlet piping connections, drain connections and required clearances before setting unit in place.

CONSTRUCTION

The body of GTV Series Filters are constructed of carbon steel and coated with a baked-on finish both inside and out (stainless steel body available). The body has 1''threaded inlet, outlet and rinse ports (3/4'' adapters supplied) for ease of assembly to the supply line, line to process and drain line All wetted components are constructed of either engineered plastics or non-corrosive metals, allowing for extended service life.

The standard control system consists of an GTFC 400 Controller, Differential Pressure Switch (DPS) and Solenoid Valve. The DPS has dry contacts and is supplied factory preset to 7 psi. The Solenoid Valve supplied is a 3-way normally open valve activated by 24 Vac with an energized indicator light.

OPERATING PRINCIPLES

Normal Flow Pattern - Clean Screen - The raw water enters the filter inlet from the bottom and passes into the filtration chamber. Water passes through a stainless steel fine screen assembly suspended in the center of this chamber. Filtered water then exits the filter through the port on the filter's side.

The fine screen is fabricated from stainless steel wire mesh in the form of a cylinder and supported by a perforated PVC shell. As the water passes through the screen, solids accumulate, creating a "cake" of dirt on the surface of the screen. This cake performs finer filtration than the screen itself which results in increased filter efficiency.

The cake also creates a pressure differential across the screen. The DPS, which is pre-mounted and pre-wired to the enclosure of the Controller, monitors this differential pressure via hydraulic tubing. A rinse cycle is activated once the preset differential pressure of 7 psi is reached.

Rinse Cycle Flow Pattern - Once the preset differential pressure is reached, a delay is imposed on the signal from the DPS to the Controller. This delay serves to eliminate any false rinse cycles that may be activated due to pressure fluctuations. If the differential pressure persists beyond this delay, the Controller energizes the Solenoid Valve. This activation relieves pressure on the 1" Rinse Valve causing it to open. This pressure relief also relaxes the Piston to allow the Dirt Collector Assembly to move. The Dirt Collector Assembly consists of a closed PVC tube with projecting nozzles on one end and a hydraulic motor on the other end. Opening the 1" Rinse Valve causes the hydraulic motor to rotate the Dirt Collector Assembly, and the Piston allows the Dirt Collector Assembly to move axially exposing the entire screen surface to concentrated spot cleaning action with nozzles that are in close proximity to the screen's surface.

During the rinse cycle, incoming water still passes through the screen. Some filtered water is drawn back through the screen to the dirt collector nozzles, while the remaining filtered water maintains flow to the outlet.

Some applications require a filter equipped with a Controlled Outlet Valve (COV) that will shut the outlet flow during rinse cycles to allow the entire incoming flow and pressure to be used for rinsing that results in more effective cleaning cycles. A COV is usually required when the flow is 5 gpm or less and/or when the inlet pressure is below 30 psig.

The rinse cycle duration is about 10-12 seconds. See the GTFC O&M Manual Supplement for programming instructions.

Upon completion of the rinse cycle, the Solenoid Valve is de-energized. Pressure is restored to the 1" Rinse Valve, which causes it to close, and to the Piston, which returns the Dirt Collecting Assembly to its normal position. If a COV is installed, it is opened at the end of the rinse cycle.

INSTALLATION PROCEDURES

Assembly - The filter is shipped assembled with an GTFC-400 Controller, DPS, Solenoid Valve 3-Position Mini-Valve and a Pressure Gauge all mounted on the Pressure Gauge Enclosure that is attached to the filter-mounting bracket. All hydraulic tubing lines have been connected. For low pressure or low flow applications a COV is also provided. The COV must be assembled to the filter's outlet, and the hydraulic tubing must be rerouted as shown on the attached Control Tubing drawing.

NOTE: Some systems are supplied with different OMNITROL Controllers or with the Controller and DPS detached from the Pressure Gauge Enclosure, to allow for remote mounting separately.

Piping Connections – Typical Filter Installation drawings are provided as a guide to a correct installation.

Unit Positioning – Typically, the GTV Series Water Filters should be installed in the upright position, as shown in the installation layouts, with the inlet port facing down.

Guidelines - For most efficient operation, the following guidelines should be observed:

1. For best results, the filter should be installed as near as possible to the system it is required to protect. However, if low filter inlet pressure is a concern, the filter may need to be installed closer to the pressure source or have a COV added.
2. Ensure that the filter inlet pressure will not fall below 25 psig during the rinse cycle with the Solenoid Valve open. Suggested minimum pressure is 30 psig.
3. Ensure that the upstream pipe size from the pressure source to filter is equal to or greater than filter inlet size.
4. An outlet isolation valve must be installed in all applications. An inlet isolation valve is also recommended.
5. Outlet and inlet isolation valves must be installed in situations where the pressure source cannot be shut down during maintenance.
6. Outlet, inlet and bypass valves must be installed in situations where a constant supply of water is required downstream during filter servicing.

Differential Pressure Switch (DPS) Connections – Refer to the attached Control Tubing drawing and verify that the control tubing to the pre-mounted DPS have been connected as follows:

1. The high side of the DPS must be connected to the inlet port at the filter housing's bottom.
2. The low side of the DPS must be connected to the outlet port on the filter housing's side.
3. The DPS has been factory preset to a 7 psi differential.

NEVER ADJUST!!

PRESSURE GAUGE & 3-POSITION MINI-VALVE

The supplied 3-Position Mini-Valve with Pressure Gauge and Enclosure is used to assist in troubleshooting and commissioning of the filter. The 3-Position Mini-Valve allows for three independent pressure sources to be individually monitored with the use of a single pressure gauge. The 3-Position Mini-Valve serves as a selector for three ports located on alternating sides of the hex body of the 3-Position Mini-Valve, one for inlet pressure, one for hydraulic motor chamber pressure and one for outlet pressure. A common port is connected to the pressure gauge. The three ports are clearly labeled.

The procedure for reading the three pressures is as follows:

1. To read inlet pressure: Rotate knob until the arrow points to **HIGH PRESSURE**.
2. To read hydraulic motor chamber pressure: Rotate knob until the arrow points to **CHAMBER PRESSURE**.

Note: During normal operation, the hydraulic motor chamber pressure should be equal to the inlet pressure. During the rinse cycle, the hydraulic motor chamber pressure should drop to 25-40% of the inlet pressure.

3. To read outlet pressure: Rotate knob until the arrow points to **LOW PRESSURE**.

Note: With a clean screen, the outlet pressure should be the same or slightly less than the inlet pressure. As particulates built up on the screen the outlet pressure will decrease. To determine differential pressure across the filter, subtract the outlet pressure from the inlet pressure.

FIRST COMMISSIONING & ROUTINE START-UPS

NOTE: The DPS has been factory preset to 7 psi.
NEVER ADJUST!!

First Commissioning - Check the following prior to startup:

1. Check that the line pressure will always be at least 25 psig at the filter inlet during the rinse cycle with the Solenoid Valve energized (the preferred minimum is 30 psig).

2. Check that there are no upstream pipeline restrictions.
3. Check that the filter is mounted in the correct flow orientation as indicated by the arrows on the filter body.
4. Check that the Solenoid Valve vent tubing is open to the atmosphere and not kinked or bent.
5. Check that tubing connections are completed as shown on the attached installation drawings.
6. Check that the Solenoid Valve has been properly wired as indicated in the schematic provided with the GTFC O&M Manual Supplement.
7. Check that the filter inlet and outlet isolation valves are closed, and the bypass valve is open.
8. Refer to the GTFC O&M Manual Supplement and set the rinse duration to about 10 seconds.

Start-Up - To start-up the filter, use the following procedure:

1. Slowly open the inlet isolation valve to the filter, allowing the filter to pressurize.
2. Check for any external leakages and eliminate them.
3. Check to ensure that the filter inlet pressure is higher than 25 psig (a minimum of 30 psig is preferred).
4. Close the bypass valve to deadhead the filter.
5. Initiate a manual rinse cycle as described in the following section.
6. If the filter's rinse cycle appears to be completed OK, then open the outlet valve for normal flow and filtering.
7. Observe LOW pressure and verify that this pressure drops. When this pressure drops by about 7 psi, an automatic rinse cycle should start. It is recommended that at least one automatic rinse cycle be observed to ensure that the system is operating properly.

MANUAL FLUSHING PROCEDURES

Periodically, it may be necessary to activate a manual rinse cycle of the filter. Some typical reasons are:

- Routine inspection of proper filter operation.
- Emergency cleaning of the filter.
- Troubleshooting/start-up.
- Drainage of the filter prior to maintenance.

Using the GTFC- 400 - The manual rinse is activated with the Controller by pressing the **RESET** button on the side of the controller enclosure.

SHUT DOWN AND DRAINAGE PROCEDURES

The filter may have to be shut down periodically, for several reasons, including servicing, winterizing, etc.

When the filter is to be shut down for a long period of time, such as protection for the winter, it is recommended to be sure that the filtration chamber, Solenoid Valve and control tubing are emptied of water. The screen should also be removed, cleaned, dried and reinstalled.

Shut Down - To shut down the filter, use the following procedure:

1. Open the bypass valve.
2. Close the isolating valve on the outlet of the filter.
3. Initiate a manual rinse as described previously.
4. Close the isolating valve on the inlet of the filter.
5. Initiate an additional manual rinse cycle to relieve the pressure in the filter.

Drainage Procedure - To empty the filter, use the following procedure:

1. Perform the shut down procedure as described above.
2. Check the pressure in the filter housing to ensure that it is atmospheric. If not, initiate manual rinses until the pressure is atmospheric.
3. Remove the tubing from the fitting on the filter's cover to vent the filter.
4. Remove the tubing, fitting and brass mini-filter at the port at the bottom of the filter to allow any remaining water in the filter to drain.
5. After draining, replace tubing, fitting & filter.

SCHEDULE OF PREVENTIVE MAINTENANCE AND INSPECTIONS

Annually:

1. Remove screen and clean any stubborn or deeply embedded particles that may be in the screen's mesh.
2. Inspect the screen for damage and replace if required.
3. Re-assemble and trigger a manual rinse cycle and check for proper filter function.

ELECTRICAL CONTROL SYSTEMS

The ***GTFC- 400*** is a powerful, yet simple Controller, which provides for control for the filter. Power is 110 Vac or 220 Vac. Most ORV Series filters are supplied with this controller.

The ***GTFC-150*** is a powerful, yet simple Controller, which provides for control for up to two filters in parallel. Power is from two 9V batteries. This controller is used whenever AC power is not available.

Other GTFC controllers are available for special applications or installations. Please consult with the main office listed below.

SPECIAL INSTALLATIONS

The prior sections of this manual describe typical filters and typical installations. Since every installation is different, this section describes unusual conditions and the special instructions that need to be followed to correctly install the filter(s) and special options and accessories.

Pneumatic Control Conversion - Occasionally, conditions may arise that require the use of compressed air to operate the filter control system rather than filtered water. We refer to this system as a pneumatically controlled filter. Some typical applications are:

- To provide freeze protection when a filter is to be installed outdoors.
- To insure proper filter rinsing when available water pressure is too low.
- When water quality precludes the use of water in the Control System.

In this system, dry, filtered compressed air is distributed as the working fluid in the Control System, rather than pressurized vessel water. The pneumatic control system utilizes most of the same components as the standard control system, allowing it to be easily retrofitted to existing installations.

The following changes occur when installing a pneumatic control system in a GTV series filter:

- The Normally Open 3-way solenoid valve is supplied with air rather than water at inlet pressure. The air pressure should be approximately 10-15 psig higher than the inlet pressure to the filter for proper operation.
- A fluid filled absorber tank is added to the piston's control tubing line to act as a shock absorber between the air and the piston head.
- The Differential Pressure Switch (DPS) remains as the only component that requires water for proper operation. For freeze protection, precautions must be taken to ensure that these lines are adequately protected against freezing.

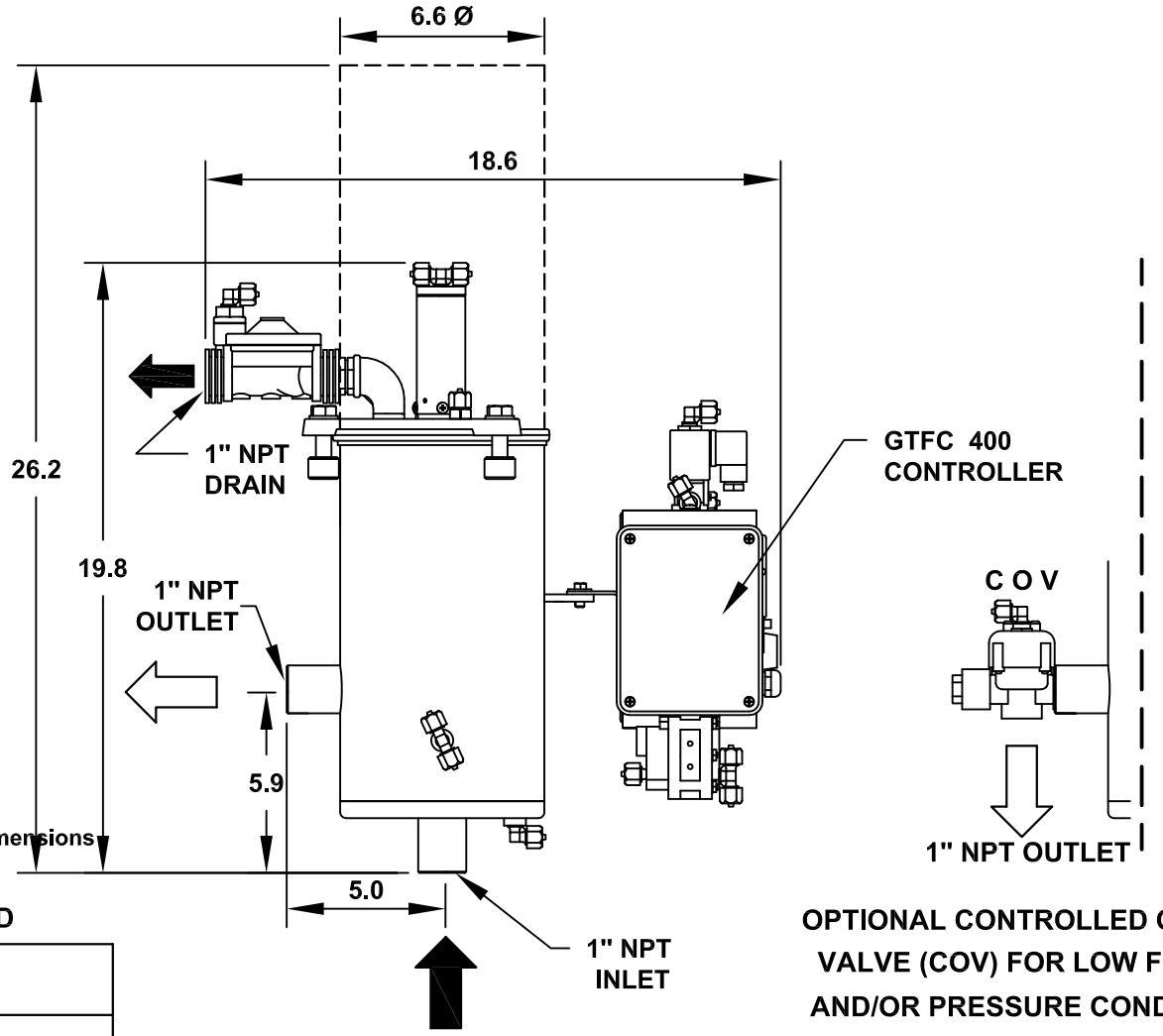
To install a pneumatic control system on a new filter, the following steps should be followed:

1. Disconnect all tubing connections to the 3-way mini valve and remove the tubing from the opposite end.
2. Replace the 1/8" TEE fitting on the solenoid's top with a 1/8" elbow.
3. Replace the 1/8" TEE fitting at the filter's inlet with a 1/8" elbow and connect tubing to the high side of the Differential Pressure Switch. For freeze protection, use heat traced stainless steel tubing and fittings.
4. Replace the 1/4" TEE fitting on the filter's lower side with a 1/4" elbow and connect tubing to the low side of the Differential Pressure Switch. For freeze protection, use heat traced stainless steel tubing and fittings.
5. Remove the 1/4" elbow on the filter's upper section and replace it with a 1/4" plug.
6. Connect a dry compressed air line (at least 10-15 psig higher than filter inlet pressure) to the 1/8" elbow fitting at the top of the solenoid valve.
7. Mount the absorber tank with its side fill port facing up. Locate this tank near the piston and slightly higher than the piston.
8. Connect the control tubing to the 1/8" side elbow fitting of the solenoid as per the pneumatic control tubing diagram. A TEE fitting from this tubing branches the pressure from the solenoid to the Rinse Valve and the Hydraulic Piston.
9. Connect the Piston in series with the absorber tank (branch of TEE to the top of tank, bottom of tank to the piston).
10. Use a 50/50 water/anti-freeze mixture to fill the absorber tank and piston cylinder. Remove the absorber tank's side fill port plug and slowly fill the tank with the fluid mixture. Plug the port when the fluid overflows.
11. Apply the compressed air supply to the top of the solenoid. This will force some of the fluid in the tank into the line to the piston and will push the piston downward and fill the pistons cylinder with the fluid.
12. Remove the air pressure from the top of the solenoid, then remove the tank's plug and refill the port until overflowing, and plug the port.
13. Continue with the installation of the filters following the instructions in the O&M Manual.

Using a Controlled Outlet Valve (COV) - A Controlled Outlet Valve (COV for short) is a valve installed on the outlet of the filter, and is used to control the flow through the filter during the rinsing cycle. A COV is used when inlet pressures are low or drop below the 30 psi minimum with the rinse valve open. In most cases, the Controller will activate the COV prior to rinse valve activation. This throttles the flow out of the filter's outlet, to develop more inlet pressure to better provide adequate pressure for a proper rinse.

A COV is installed on the outlet leg of the filter, usually before the outlet isolation valve. For multiple filter installations, the COV is located at a point on the main line after the multiple filter outlets are rejoined.

FREE SPACE REQUIRED
FOR MAINTENANCE



John Deere Green Tech reserves the right to modify filter dimensions without prior notice.

ALL DIMENSIONS IN INCHES UNLESS INDICATED

TECHNICAL DATA

MAXIMUM FLOW RATE:	27 G.P.M.
AVAILABLE SCREEN MICRON SIZES:	5, 10, 15, 25, 30, 40, 50, 80, 100, 120, 150, 200, 400, 800, 1000, 1500, 3000
OPEN AREA STD. SCREEN :	42 SQ. INCHES
OPEN AREA HIGH PERFORMANCE SINTERED MULTI-LAYERED SCREEN:	63 SQ. INCHES
MAXIMUM WORKING PRESSURE:	120 PSIG
MINIMUM INLET PRESSURE REQUIRED DURING RINSE CYCLE:	30 PSIG
MAX. WORKING TEMPERATURE:	150°F
INLET/OUTLET CONNECTIONS:	3/4" & 1" N.P.T.
DRAIN VALVE CONNECTION:	3/4" & 1" N.P.T.
DRAIN HEADER SIZE:	1" MINIMUM
APPROX. EMPTY WEIGHT: APPROX. FULL OF WATER WEIGHT:	52 LBS. 65 LBS.

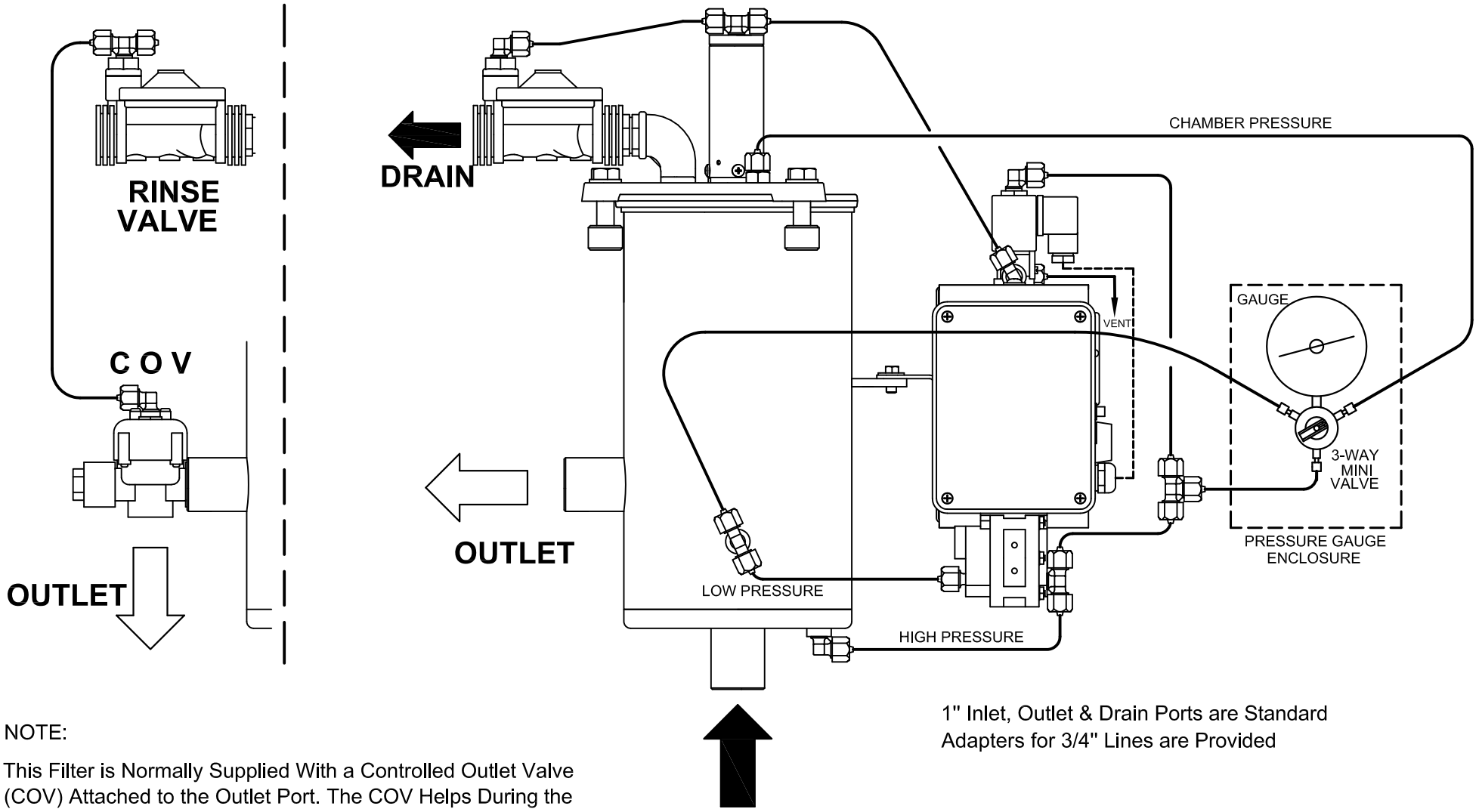
OPTIONAL CONTROLLED OUTLET VALVE (COV) FOR LOW FLOW AND/OR PRESSURE CONDITIONS 1" INLET, OUTLET AND DRAIN PORTS SHOWN. 3/4" ADAPTERS WILL ALSO BE SUPPLIED.

DATA SHEET

GTV-01-LE

AUTOMATIC SELF-CLEANING FILTER

JOHN DEERE GREEN TECH
3 Chrysler
irvine, CA 92618
TEL (800) 427-0779
www.johndeeregreentech.com



1" Inlet, Outlet & Drain Ports are Standard
Adapters for 3/4" Lines are Provided

NOTE:

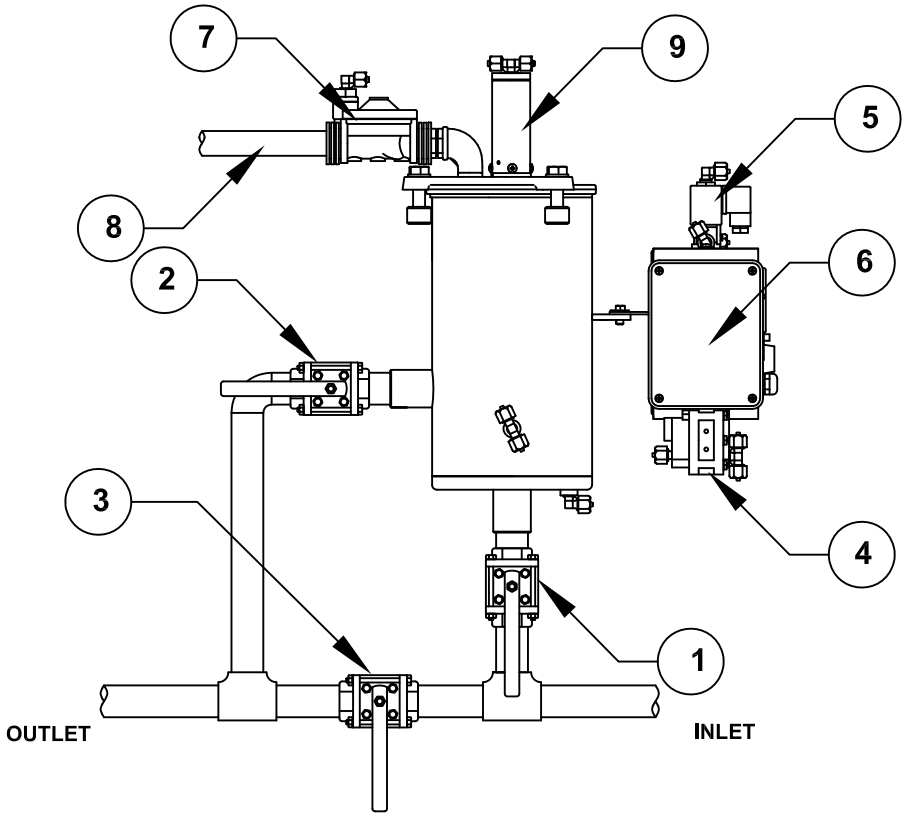
This Filter is Normally Supplied With a Controlled Outlet Valve (COV) Attached to the Outlet Port. The COV Helps During the Rinsing Cycle by Dead-Heading the Filter to Provide Higher Pressure & Flow. For Those Conditions Requiring a COV, it will be Provided. Minor Tubing & Fitting Changes are Required. The Elbow Fitting in the Rinse Valve is Replaced with a TEE Fitting, and a Hydraulic Tubing Line Connects the Rinse Valve to the COV. The Required Tubing & Fittings are Supplied with the COV. See the Sketch Directly Above.

KEY:

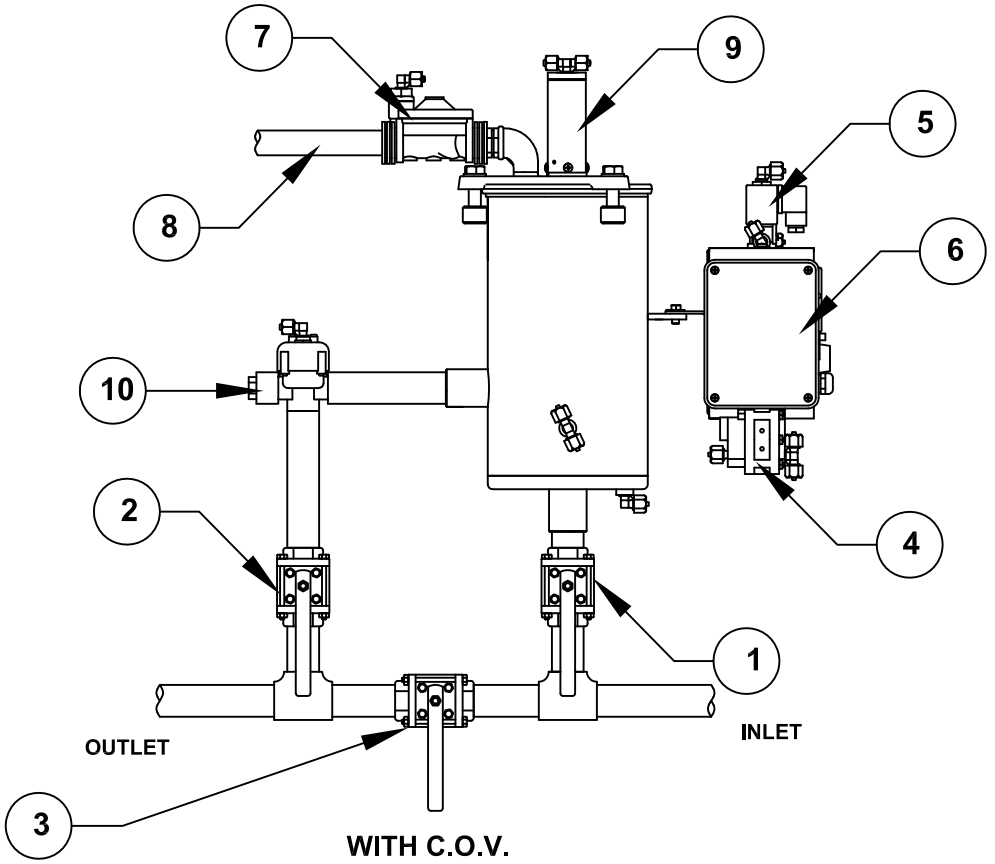
- Hydraulic Tubing
- Electrical Wiring

DWG. NO. EL1501	**SCALE: NONE**	**JOHN DEERE GREEN TECH** 3 Chrysler Irvine, CA 92618 TEL (800) 427-0779 www.johndeeregreentech.com
DRAWN BY: S. Fournier	**DATE:** 3.8.2010	**HYDRAULIC CONTROL TUBING CONNECTIONS FOR A GTV FILTER**

No.	Description	Notes	No.	Description	Notes
5	3- Way NO Solenoid Valve	24 Vac, 60 Hz, N.C.	10	C O V	Controlled Outlet Valve
4	Differential Pressure Switch	Preset to 7 psi	9	Piston	Allows Dirt Collector Motion
3	Bypass Valve	Customer Supplied	8	1" Drain Line	Customer Supplied
2	Outlet Isolation Valve	Customer Supplied	7	Rinse Valve	Normally Closed Diaphragm
1	Inlet Isolation Valve	Customer Supplied	6	Controller	OMNITROL 400 Shown



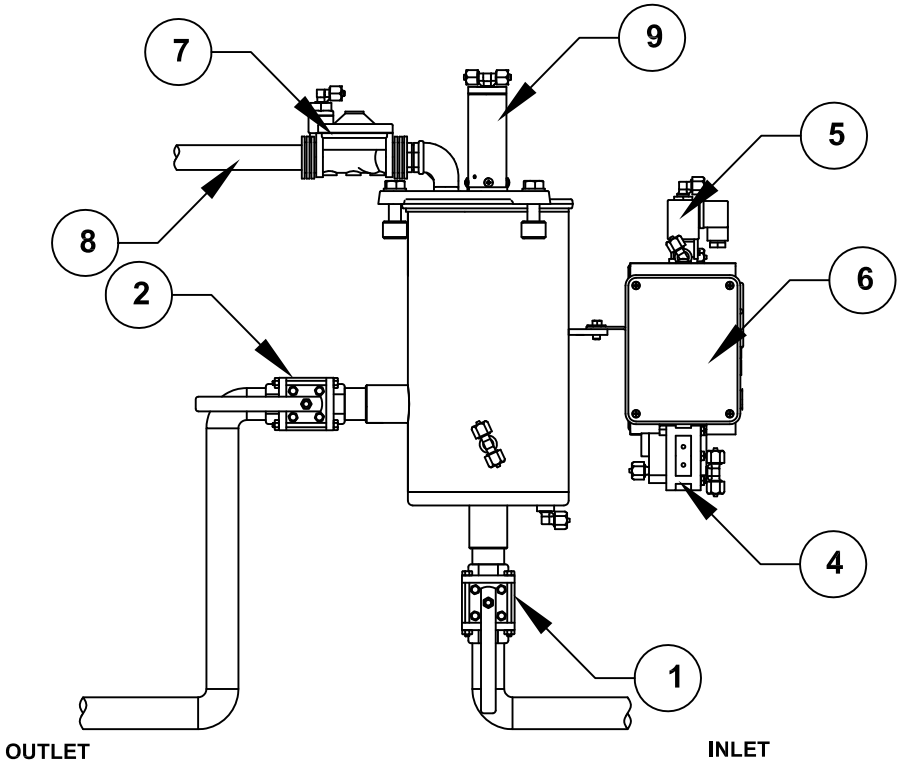
WITHOUT C.O.V.



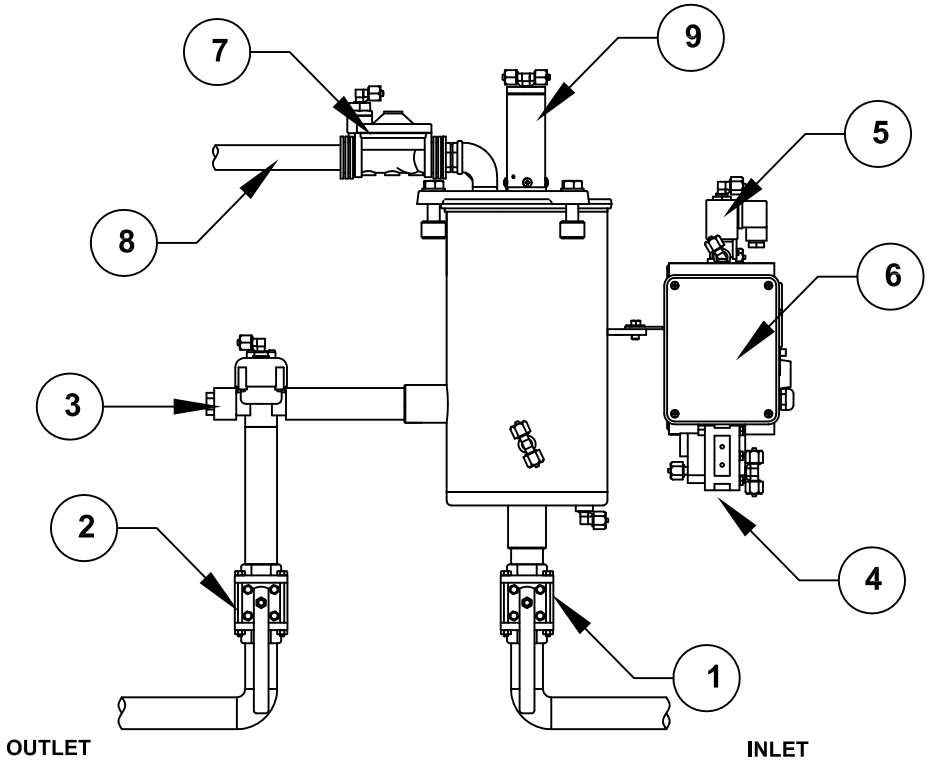
WITH C.O.V.

DWG. NO. 4001	SCALE: NONE	JOHN DEERE GREEN TECH 3 Chrysler Irvine, CA 92618 TEL (800) 427-0779
DRAWN BY: S.Fournier	DATE: 3.8.2010	TYPICAL GTV FILTER INSTALLATION WITH BYPASS

No.	Description	Notes	No.	Description	Notes
5	3- Way NO Solenoid Valve	24 Vac, 60 Hz, N.C.	9	Piston	Allows Dirt Collector Motion
4	Differential Pressure Switch	Preset to 7 psi	8	1" Drain Line	Customer Supplied
3	C O V	Controlled Outlet Valve	7	Rinse Valve	Normally Closed Diaphragm
2	Outlet Isolation Valve	Customer Supplied	6	Controller	OMNITROL 400 Shown
1	Inlet Isolation Valve	Customer Supplied	5	3- Way NO Solenoid Valve	24 Vac, 60 Hz, N.C.



WITHOUT C.O.V.

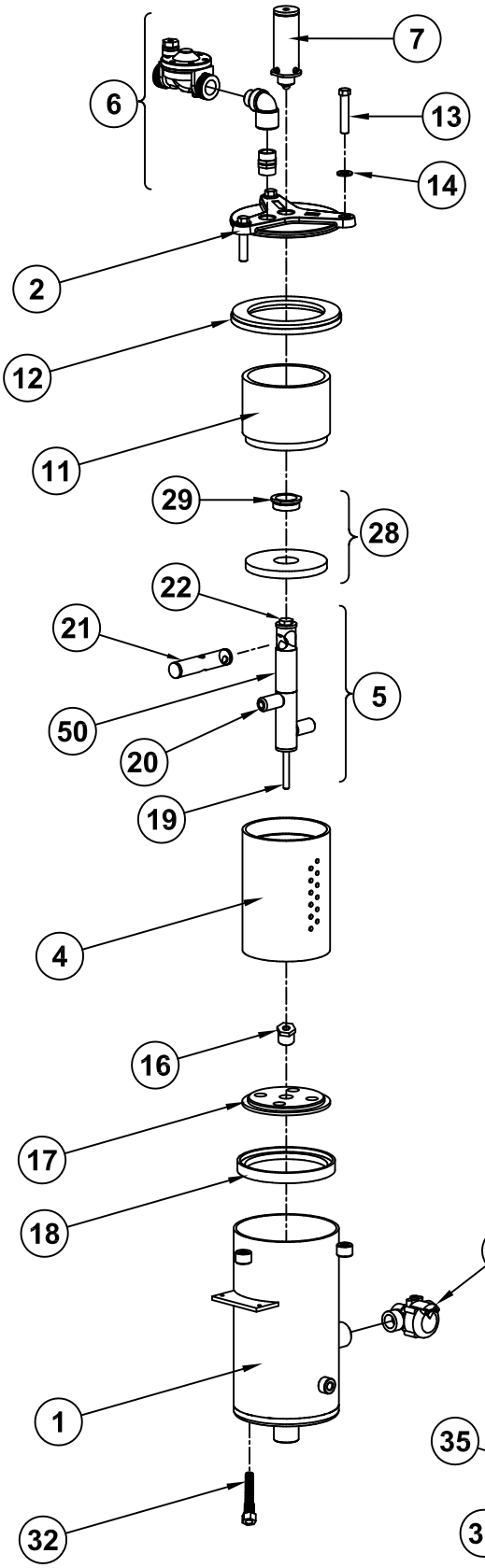


WITH C.O.V.

DWG. NO. 4002	SCALE: NONE	**JOHN DEERE GREEN TECH** 3 Chrysler Irvine, CA 92618 TEL (800) 427- 0779
DRAWN BY: S. Fournier	DATE: 2.8.2010	TYPICAL GTV FILTER INSTALLATION WITHOUT BYPASS

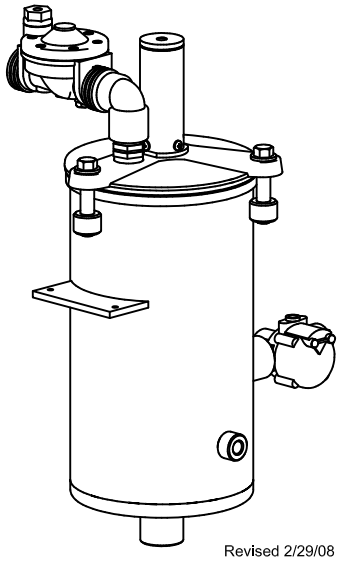
TYPICAL GTV SERIES FILTER ASSEMBLY

Exploded View For Models GTV-0.75-LE and GTV-01-LE



No.	Description	Part #
1	Filter body	----------
2	Cover	V02AE00
4	Fine Screen Assembly (50 - 3000 micron only)** Supplied with P/N 16BE00 and V17BE00	V4*AE00
5	Dirt Collector Assembly with Nozzles and St/St Shaft Supplied with P/N V21AE00, V22AE13 and V50AE13	V05AE00
6	1" Rinse Valve Assembly	G06AE00
7	Hydraulic Piston Assembly	V07AE13
11	Hydraulic Motor Chamber Spacer - PVC	V11AE00
12	Cover/Housing Seal	V12AE00
13	1/2" Cover Bolt - St/St	V13AE13
14	1/2" Cover/Housing Washer - St/St	14BE13
16	Shaft Bearing/Upper Bearing - Brass	16BE00
17	Fine Screen Handle	V17BE00
18	Fine Screen Inner Gasket	V18AE00
19	Dirt Collector Shaft - St/St	V19AE13
20	Dirt Collector Nozzle - PVC	V20AE00
21	Hydraulic Motor - PVC	V21AE00
22	Dirt Collector Plug - St/St	V22AE13
28	Separator Plate and Bearing Assembly	V28AE00
29	Dirt Collector Bearing - Brass	V29AE00
30	Differential Pressure Switch	30BE00
31	Solenoid Valve, 24 Vac, 3-Way, N.O.	31BE00
32	1/4" Mini Filter with 1/8" Port	G32AE00
33	Pressure Gauge Enclosure	G33AE00
35	OMNITROL 400 Controller	----------
37	Pressure Gauge	G37AE00
43	Three Way Mini Valve	43BE00
46	1" Controlled Outlet Valve	V46AE00
50	Dirt Collector Bearing Sleeve - St/St	V50AE13

* Z - 5 micron, Y - 10 micron, A - 15 micron, B - 25 micron, C - 30 micron, D - 40 micron, E - 50 micron, F - 80 micron, G - 100 micron, H - 120 micron, J - 150 micron, K - 200 micron, L - 400 micron, P - 800 micron, N - 1000 micron, P - 15000 micron, Q - 3000 micron



Revised 2/29/08