



OMCLEANSEP

for Clean-Sep Filtration System

CLEAN-SEP

OPERATORS MANUAL



Northern Lights

4420 14th Ave N.W.

Seattle, WA 98107

Tel: (206) 789-3880

Fax: (206) 782-5455

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OPERATOR'S MANUAL for Clean-Sep Filtration System

*Read this operator's manual thoroughly before starting to operate your equipment.
This manual contains information you will need to run and service your new unit.*

Table of Contents

1. INSTALLATION.....	1
2. INITIAL START-UP	6
3. OPERATION	9
4. TROUBLESHOOTING & ADJUSTMENTS	12
5. SERVICE.....	12
6. WARRANTY.....	13
7. PARTS.....	13
8. DRIVE QUICK REFERENCE GUIDE	14
9. PUMP EXPLOSION DIAGRAM.....	16
10. AUTOMATIC AIR VENT VALVE	17

Proprietary Information

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INSTALLATION

1. INSTALLATION

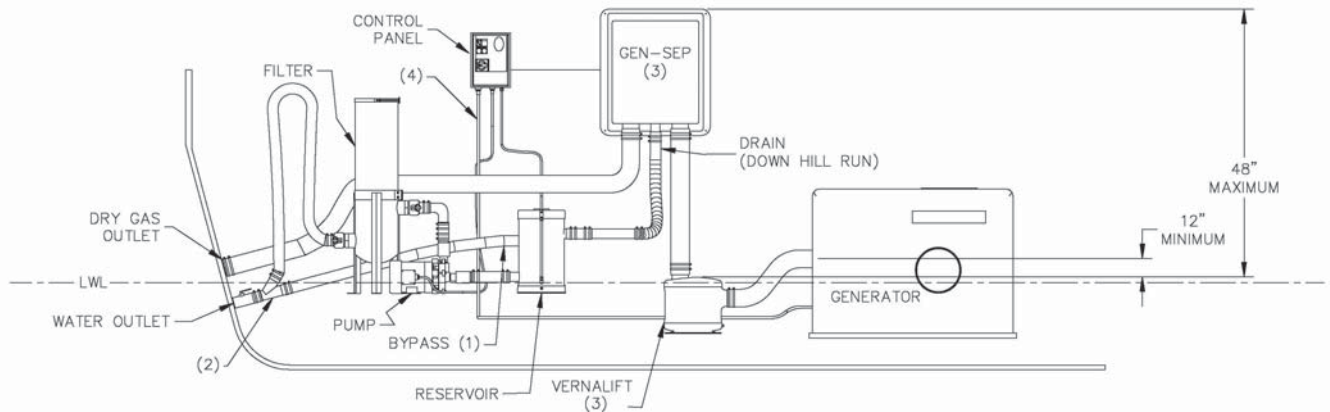
A – Installation Checklist:

Following is a checklist containing the key steps involved in the installation of the Clean-Sep System. Please review these steps in conjunction with the general installation guidelines and instructions following the checklist.

1. Verify that existing generator, muffler and water separator are installed and functional.
2. Map out optimal physical installation layout given the characteristics of the engine room.
Closely consider layout guidelines and suggestions provided on the following page.
3. Install Control Panel.
4. Install Reservoir Unit.
5. Install bypass hose from reservoir to bypass port.
6. Install Pump.
7. Install hose from reservoir to pump.
8. Install filter canister unit.
9. Install hose from pump to filter canister unit.
10. Install hose from filter outlet to discharge port.
11. Install incoming power wiring to control panel.
12. Install 3Ø pump power wiring.
13. Terminate reservoir level wiring.
14. Check pump rotation (see detail instructions on following pages).
15. Test in Bypass mode (see detail instructions on following pages).
16. Test in Filtering mode (see detail instructions on following pages).

Physical System Layout:

- Illustrated below is a typical layout of the Clean-Sep Component System

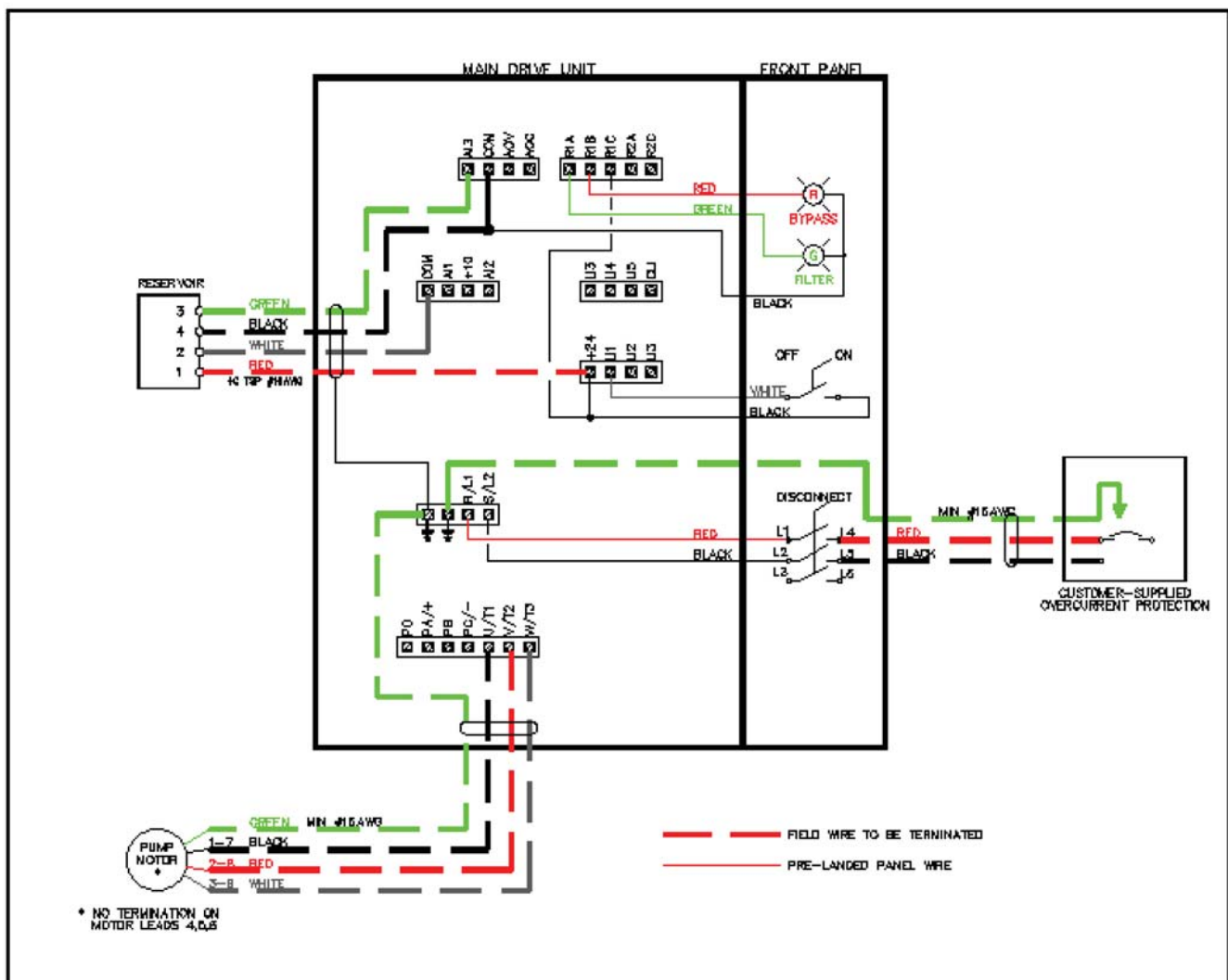


- The control panel should be mounted such that it is readily accessible.
- The muffler/separator water outlet must be in-line with (or higher than) the reservoir inlet.
- The Clean-Sep pump must be mounted below the reservoir pump outlet.
- The reservoir should be positioned so that the water will constantly flow downward from the bypass outlet to the port going overboard.
- Always try to limit the number of elbows and bends used in the installation.
- Some custom bracket or mounting devices may be required. These should be used as required to assure the proper elevations of components necessary for a failsafe installation.
- To maximize even filter usage, a loop should be installed in the filter-to-discharge hose which rises as high as the top of the filter canister before dropping back down to the discharge location. This loop, in conjunction with the automatic air vent valve, will ensure that the filter canister remains flooded during operation.

INSTALLATION

B – Wiring Installation:

The control panel requires 208-240 volts, single phase (1Ø) input. The drive input is not phase sensitive; however the output of the drive is unique in that it does provide a three phase (3Ø) output to the pump which is phase sensitive.



1. Input Power Wiring:

- Use 2 wire plus ground, minimum 16AWG wire size.
- From the ship's power distribution panel, a 10A breaker is recommended.
- Terminate input power wiring to L1 & L2 on the front panel disconnect switch inside the control panel.
- Terminate ground wire.

2. Pump Power Wiring:

- Use 3 wire plus ground, minimum 16 AWG wire size.
- Connections are made within the motor junction box.

- Pay careful attention to the wire-to-wire connections going to the pump in the event that you should need to change or remove a wire. On a three phase (3Ø) motor, switching any two leads will reverse the motor rotation

3. Reservoir Wiring:

- 4 conductor 18 AWG shielded cable (25') is supplied with the unit.
- Field splicing of additional cable is permissible with water-tight connectors.

INSTALLATION

C – Pump Rotation:

- It is imperative that the rotation of the pump be checked before bringing the system completely on-line.
- Motor and/or pump and pump seal damage can occur if the pump runs in the wrong direction.
- When looking at the pump's center inlet, the correct rotation is Counter-Clockwise and an arrow indicating that direction is **stamped on the pump housing**.
(see diagram/photo below).



- *Note: A Phase and Rotation Meter, used to check for proper rotation can be purchased at most electrical supply stores such as Radio Shack etc.*

Popular models include the following:

- Fluke – Model #9040
- ExTech – Model #48044
- Hioki – Model #3126-01

2. INITIAL START-UP

A – Step one - System "OFF" Test:

The initial test is to verify that the exhaust system will continue to function with the Clean-Sep System disabled. To execute this test, disable the Clean-Sep System by switching off the main power to the system. Then, operate the generator and verify that the exhaust system is functioning normally.

B – Step two - "BYPASS" Mode:

- With power to the Control panel on, the switches should initially be set to the following positions:
 - Selector Switch - "OFF" position
 - System Mode - "BYPASS" position
- The display will show "rdy" indicating that it is "Ready". (see photo below).

In this position, the system will function as a normal (non-filtering) water separator and the exhaust water will exit through the "bypass" on the reservoir



INITIAL START-UP

C – Step three - "FILTERING" Mode:

- With main power to the Control panel on, the switches should now be set to the following positions:
 - Selector Switch - "ON" position
 - System Mode - "FILTERING" position
- Initially, when the generator is NOT running, the display will show "0.0" indicating that the system is in a "static" condition and that there is no water flowing into the reservoir.
(see photo below).



- When the generator is operating, you will see this number fluctuating in the lower end of the 0-60 Hz range –this range may vary somewhat depending on the system GPM flow. This is the normal range of operation. You should also see that the level in the sight glass has settled to an almost constant level.

D – Step four - Final Installation Review

At this point, you should have a normally functioning Clean-Sep system. We strongly suggest that you utilize the following check-list to verify and re-check the installation to ensure that all aspects have been correctly addressed.

1. _____ Control Panel securing mounted in accessible location.
2. _____ Reservoir, Filter Canister and Pump securely mounted.
3. _____ Wiring Secured – (a) all termination points snug and secure
(b) all wire runs secured
4. _____ Hose connections inspected for leakage.
5. _____ System Off Test Completed.
6. _____ Bypass Mode Test Completed.
7. _____ Filtering Model Test Completed.
8. _____ Dry gas outlet operation verified (no water in dry exhaust).
9. _____ Extra filters on-board and available for next filter change.
10. _____ Enjoy sheen-free water around your vessel!

3. OPERATION

A – Filtering Mode vs. Bypass Mode:

The Clean-Sep System is generally designed to operate without the need for operator intervention. The system may be left “on” at all times regardless of the status of the generator. The Clean-Sep will automatically engage when needed without operator intervention.

However, there may be times when you do not wish to have the Clean-Sep System actively filtering the generator exhaust. In such situations, switching from Filtering Mode to Bypass Mode is a simple matter.

BYPASS MODE: Turn the selector switch from “On” to “Off”. This will disengage the Clean-Sep System and allow the system to function as a passive gas/water separator system.

FILTERING MODE: Turn the selector switch from “Off” to “On”. This will enable the Clean-Sep System and allow the system to filter the exhaust from the generator.



Bypass Mode



Filtering Mode

Important: To maximize filter life, always switch the Clean-Sep System to Bypass Mode when traveling or docking in shallow waters or in any condition that may cause the filters to be clogged with water-borne material other than exhaust particles. Propulsion and thruster propellers may stir bottom sand and sediment, which is then pulled through the generator cooling water system. This can happen from the propeller or thrusters of your own vessel, or from other vessels docking or maneuvering nearby. If the Clean-Sep System is in Filter Mode, these sediments will be captured by the filter system and cause premature demise of the filter media.

B – Changing Filters:

The life of the filters in your Clean-Sep System will vary depending on the amount of time in Filtering Mode along with the specific operating characteristics of your generator.

1. How to determine if the filters need to be changed:

Initially, you will need to monitor the Hz reading on the system control panel. Generally, when this reading reaches 60 or higher, this is a good indicator that the filters are likely at or near their full life.

After several filter change cycles, you should begin to have a good profile of how many hours of “filtering mode” will result in the complete use of your filters. The number of hours for your system will directly depend on the characteristics of the exhaust produced by your generator. Some generators burn relatively cleanly and thus the filter life will be longer while others produce more contaminated exhaust which will result in shorter filter life.

2. Monitoring the # of hours of filtering operation:

The system automatically the number of hours of operation in filtering mode. The following steps will allow you access this information on the drive.

Step 1: Press “ENT” (Enter)

Step 2: Using Arrow Key, Scroll to “FUn” (Function)

Step 3: Press “ENT”

Step 4: Using Arrow Key, Scroll to “rtH” (Run Time Hours)

Step 5: Press “ENT”

Step 6: The Display will indicate the Total Hours the motor has run.

Step 7: Use the “ESC” Key (Escape) to exit the program.

OPERATION

The Run time counter can be reset to Zero (0) by using the “rPr” parameter in the “FLt” menu. Step by step instructions are as follows:

- Step 1: Press “ENT” (Enter)
- Step 2: Using Arrow Key, Scroll to “FLt”
- Step 3: Press “ENT”
- Step 4: Using Arrow Key, Scroll to “rPr”
- Step 5: Press “ENT”
- Step 6: Using Arrow Key, Scroll to “rtH”
- Step 7: Press “ENT” (to reset counter to “0”)
- Step 8: Use the “ESC” Key to exit the program.

3. To replace used filters with new filters, follow these steps:

- Step 1: Turn the main power to the system off.
- Step 2: Carefully loosen the band clamp which secures the top of the filter canister.
- Step 3: Remove each filter and place in a bag or other container.
(we recommend use of a water tight plastic bag)
- Step 4: Insert new filters in same locations. Make certain that each filter is situated on the filter guide at the bottom of the canister.
- Step 5: Re-install the top of the filter canister and secure with the band clamp.
- Step 6: Dispose of used filters. We recommend that the filters be disposed of in accordance with local and state regulations. These filters should be regarded the same as disposing of a used oil filter or used oil. Due to the chemical bonding of the hydrocarbons to the filter, these filters will not leach out contaminants.

TO ORDER REPLACEMENT FILTERS

- Call: 1-800-762-0165 -

- Email: info@northern-lights.com -

- Website: www.northern-lights.com -

4. TROUBLESHOOTING & ADJUSTMENTS

System/Pump Will Not Come On:

If the system pump will not automatically engage, it is likely due to a higher than expected water level in the system.

The remedy for this situation is to temporarily override the system controller to manually run the pump and evacuate the reservoir. To initiate this, follow these steps:

- Step 1: While the control panel (drive) read-out shows "0.0", Press "ENT"
 - Step 2: Scroll to "SEt" and press "ENT"
 - Step 3: Scroll to "LSP", and press "ENT"
 - Step 4: The "LSP" setting will be "0.0", use the scroll up button to increase this setting to "60" and press "ENT"
 - Step 5: The pump will start running. Use the scroll button to reset the setting back to "0.0", Press "ENT".
 - Step 6: Once you see that the sight glass has complete emptied, press "ENT"
 - Step 7: Now use the "ESC" button to escape out of the system all together.
- At this point, the system should be operating normally.

5. SERVICE

Your Clean-Sep System should serve you well for many years with a minimal amount of maintenance. In cases where you require assistance or replacement parts, please contact Northern Lights directly and we will promptly provide assistance.

1-800-762-0165 - info@northern-lights.com - www.northern-lights.com

WARRANTY**6. WARRANTY**

Your Clean-Sep System comes with the Northern Lights One (1) Year No-Hassle Warranty.

**Northern Lights, Inc.
Clean-Sep™ System No-Hassle Warranty**

Northern Lights, Inc. warrants its Clean-Sep systems for a period of one (1) year from the date of original sale. Since Northern Lights cannot exercise control over the installation and application of this product, this limited warranty is in lieu of all other expressed or implied warranties or warranty of merchantability or fitness for a particular use or the results or effects of such use. Under no circumstances will Northern Lights be liable for any consequential damages, damage by improper handling, damage during installation or damage in shipping.

Northern Lights' liability is limited to the replacement or repair of the product and such liability will not exceed the original purchase price. Northern Lights must authorize the return of any alleged defective Product, and such return must be made within 30 days of the receipt of that authorization. A reasonable proof of purchase date must accompany all returned products.

PARTS**7. PARTS**

Following are a list of replacement parts for the Clean-Sep System:

Part Description	Part #
Set of 7 Replacement Filters (100 MICRON)	24-30000
Pump & Motor Assembly	2100001
1.5 HP Motor (motor only)	4005184
Pump Head (head only)	4005184
Pump Shaft Seal	1700153
Pump Impeller	1700163
Shims	1700164
SS Filter Canister	8-MXC7
Spring Assembly	8-CSA-BC
SS Hold Down Plate	8-32127-48-6
Band Clamp	8-09888T

8. DRIVE QUICK REFERENCE GUIDE

Altivar® 31 Quick Reference Guide

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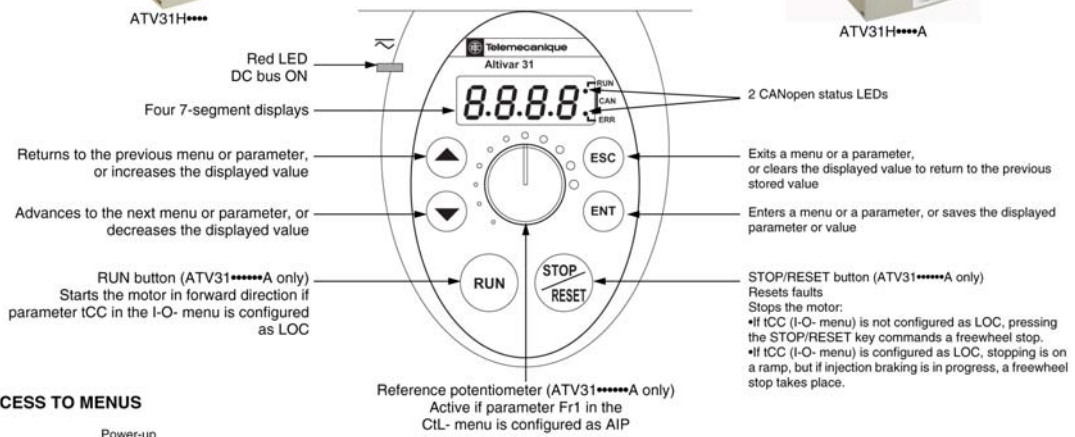
ATV31H****

Note: Please refer to the ATV31 Installation Guide (VVDED303041US) and the ATV31 Programming Manual (VVDED303042US) for complete installation and programming instructions.

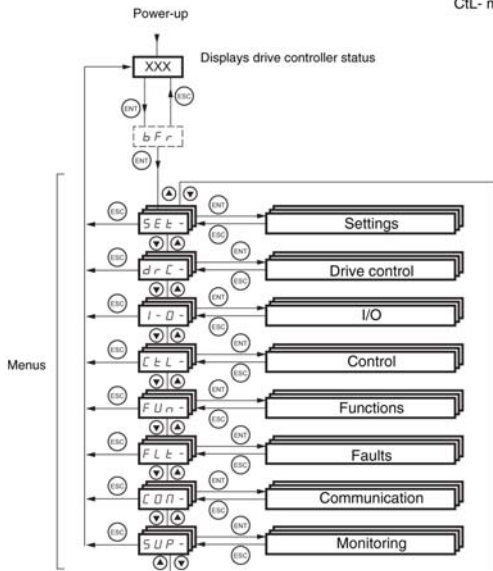


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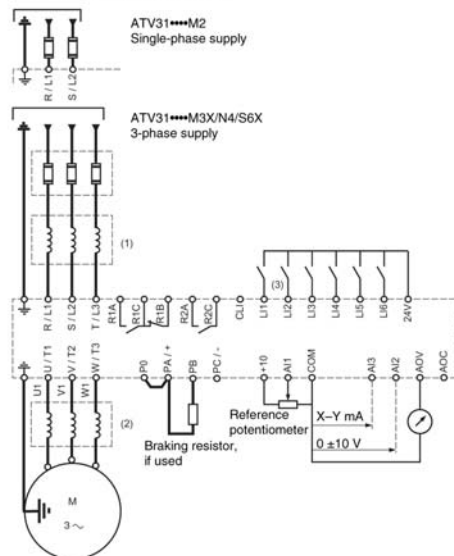
KEYPAD OPERATION



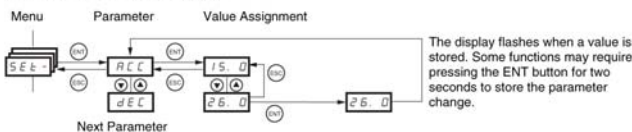
ACCESS TO MENUS



TYPICAL CONNECTIONS



ACCESS TO PARAMETERS



Altivar® 31 Quick Reference Guide

S E t - SETTINGS Menu

Parameter	Code	Factory Setting
Speed ref. from remote	LFr	-Hz
Internal PI regulator ref.	rPI	-Hz
Acceleration ramp time	ACC	3 s
Acceleration ramp time 2	AC2	5 s
Deceleration ramp time 2	dE2	5 s
Deceleration ramp time	dEC	3 s
Start custom accel. ramp	tA1	10%
End custom accel. ramp	tA2	10%
Start custom decel. ramp	tA3	10%
End custom decel. ramp	tA4	10%
Low speed	LSP	0 Hz
High speed	HSP	0 Hz
Thermal current	TH	Varies w/rating
IR compensation	UFr	20%
Gain	FLG	20%
Stability	StA	20%
Slip comp.	SLP	100%
DC injection curr	IdC	0.7 In
DC injection time	tIdC	0.5 s
Auto. DC injection time	tAdC1	0.5 s
Auto. DC injection curr	SdC1	0.7 In
Auto. DC injection time 2	tAdC2	0 s
Auto. DC injection curr 2	SdC2	0.5 In
Skip freq.	JF	0 Hz
Skip freq. 2	JF2	0 Hz
Jog operating freq.	JGF	10 Hz
PI regulator prop. gain	rPG	1
PI regulator int. gain	rIG	1/s
PID coeff	FbS	1
PID inversion	PIC	n0
2nd preset PI reference	rP2	30%
3rd preset PI reference	rP3	60%
4th preset PI reference	rP4	90%
Preset speed 2	SP2	10 Hz
Preset speed 3	SP3	15 Hz
Preset speed 4	SP4	20 Hz
Preset speed 5	SP5	25 Hz
Preset speed 6	SP6	30 Hz
Preset speed 7	SP7	35 Hz
Preset speed 8	SP8	40 Hz
Preset speed 9	SP9	45 Hz
Preset speed 10	SP10	50 Hz
Preset speed 11	SP11	55 Hz
Preset speed 12	SP12	60 Hz
Preset speed 13	SP13	70 Hz
Preset speed 14	SP14	80 Hz
Preset speed 15	SP15	90 Hz
Preset speed 16	SP16	100 Hz
Current limit	CL1	1.5 In
Current limit 2	CL2	1.5 In
Low speed oper. time	tLS	0 (no time limit)
Restart error threshold	rSL	0
Motor 2 IR compen.	UFr2	20%
Motor 2 freq. loop gain	FLG2	20%
Motor 2 freq. loop stabil.	StA2	20%
Motor 2 slip compen.	SLP2	100%
Frequency Lev.Att	FLd	bFr
Thermal Level Att.	tLd	100%
Current Level Att.	CLd	In
Display para. scale factor	SdS	30
Sw. Freq	SFR	4 kHz

d r C - DRIVE CONTROL Menu

Parameter	Code	Factory Setting
Motor frequency	bFr	50 Hz
Nom. motor volt	UnS	Varies w/rating
Nom. motor frequency	FrS	50 Hz
Nom. motor current	nCr	Varies w/rating
Nom. motor speed	nSP	Varies w/rating
Motor CosPhi (power fact.)	CoS	Varies w/rating
Cool state stator resistance	rSC	n0
Auto tuning	tUn	n0
Auto tuning status	tUS	tAb
Voltage/frequency ratio	UFt	n
Noise reduction	nrd	YES
Switching frequency	SFR	4 kHz
Maximum frequency	tFr	60 Hz
Suppress speed loop filter	SrF	n0
Save the configuration	SCS	n0
Return to factory settings	FCS	n0

I - O - I/O Menu

Parameter	Code	Factory Setting
Terminal strip config	tCC	2C
Type 2 wire	tCt	trn
Reverse operation	rrS	if tCC=2C: L12 if tCC=3C: L13 if tCC=LOC: n0
AI3 low speed	CrL3	4 mA
AI3 high speed	CrH3	20 mA
Analog output config	AOIt	oA
Analog/logic output	dO	n0
Relay R1	r1	FLt
Relay R2	r2	n0

C t L - CONTROL Menu

Parameter	Code	Factory Setting
Function access level	LAC	L1
Ref 1 config	Fr1	AI1
Ref 2 config	Fr2	n0
Ref switching	rFC	Fr1
Separate ctrl/ref channels	CHCF	SIM
Ctrl channel 1 config	Cd1	tEr
Ctrl channel 2 config	Cd2	Mdb
Ctrl channel switching	CCS	Cd1
Copy channel 1 to channel 2	COP	n0
Ctrl via remote keypad	LCC	n0
Stop priority	PSt	YES
Direction of operation	rOt	dFr

F U n - APPLICATION FUNCTIONS Menu

Parameter	Code	Factory Setting
RPC submenu		
Ramp type	rPt	LIn
Start CUS accel ramp	tA1	10%
End CUS accel ramp	tA2	10%
Start CUS decel ramp	tA3	10%
End CUS decel ramp	tA4	10%
Accel ramp time	ACC	3 s
Decel ramp time	dEC	3 s
Ramp switching	rFS	n0
Ramp switch. thresh	FrT	0
Accel ramp time 2	AC2	5 s
Decel ramp time 2	dE2	5 s
Decel ramp adaptation	brA	YES
StC submenu		
Normal stop	Stt	Stn
Fast stop	FSt	n0
Decel ramp coef.	dCF	4
DC injection stop	dCI	n0
DC injection current	IdC	0.7 In
DC injection time	tIdC	0.5 s
Freewheel stop	nSt	n0
AdC submenu		
Auto DC injection	AdC	YES
Auto inject. time	tAdC1	0.5 s
Auto inject. level	SdC1	0.7 In
Auto inject. time 2	tAdC2	0 s
Auto inject. level 2	SdC2	0.5 In
SAI submenu		
Summing input 2	SA2	AI2
Summing input 3	SA3	n0
PSS submenu		
2 preset speeds	PS2	if tCC=2C/LOC: L13 if tCC=3C: L14
4 preset speeds	PS4	if tCC=2C/LOC: L14 if tCC=3C: n0
8 preset speeds	PS8	n0
16 preset speeds	PS16	n0
JOG submenu		
Jog operation	JOG	if tCC=2C/LOC: n0 if tCC=3C: L14
Jog oper. reference	JGF	10 Hz
UPd submenu		
Plus speed	USP	n0
Minus speed	dSP	n0
Save references	Sr	n0
PI submenu		
PI regulator feedback	PIF	n0
PI regul. proport. gain	rPG	1
PI regul. integral gain	rIG	1
PI feedback coeff.	FbS	1
Reverse PI regul. direction	PIC	n0
2 preset PI references	Pr2	n0
4 preset PI references	Pr4	n0

F U n - APPL. FUNCTIONS Menu (cont.)

Parameter	Code	Factory Setting
PI submenu (cont.)		
Preset PI ref. 2	rP2	30%
Preset PI ref. 3	rP3	60%
Preset PI ref. 4	rP4	90%
Restart after error thresh.	rSL	0
Internal PI regul. ref.	rPI	n0
Internal PI regul. ref.	rPI	0
bLC submenu		
Brake control config.	bLC	n0
Brake release freq.	brL	Varies w/rating
Release current thresh.	lbr	Varies w/rating
Brake release time	brt	0.5 s
Brake engage freq. thresh.	bEr	n0
Brake engage time	bEt	0.5 s
Brake release pulse	bIP	n0
LC2 submenu		
Current limit 2 switching	LC2	n0
Current limit 2	CL2	1.5 In
CHP Motor Switching	CHP	n0
LSt Limit switch management		

F L t - FAULTS Menu

Parameter	Code	Factory Setting
Automatic restart	AR	n0
Max restart duration	tAr	5
Reset fault	rSF	n0
Catch on fly	FLr	n0
External fault	EF	n0
External fault stop mode	EPL	YES
Motor phase loss fault config.	OPL	YES
Line phase loss fault config.	IFL	YES
Drive overheat fault stop mode	OHL	YES
Mtr overload fault stop mode	OLL	YES
Modbus serial link fault stop	SLL	YES
CANopen serial link fault stop	COL	YES
Auto-tune fault config.	tFL	YES
Signal loss fault stop	LFL	n0
Fallback speed	LFF	10 Hz
Undervoltage derated oper.	dUn	n0
Mains power loss stop	StP	n0
Fault inhibit	InH	n0
Reset oper. time to zero	rFr	n0

C O n - COMMUNICATION Menu

Parameter	Code	Factory Setting
Modbus drive address	Add	1
Modbus transmission speed	tbr	19200
Modbus commun. format	tFO	8E1
Modbus timeout	tTO	10 s
CANopen drive address	AdCO	0
CANopen transmission speed	bCO	125
CANopen error registry	ErCO	n0
Forced local mode	FL	n0
Ref & ctrl channel selection in forced local mode	FLOC	AI1 ATV31****A: AIP

S U P - DISPLAY Menu

Parameter	Code	Factory Setting
Speed ref. from remote	LFr	-Hz
Internal PI reference	rPI	-Hz
Freq. ref before ramp	FrH	-Hz
Output freq. at motor	rFr	-Hz
Output value in cust. units	SPd1 SPd2 SPd3	
Motor current	-A	LFr
Motor power	-%	OPr
Line voltage	-V	ULn
Motor thermal state	-%	tHr
Drive thermal state	-%	tHd
Last fault	-%	LFr
Motor torque	-%	OTr
Operating time	-hr	rTh

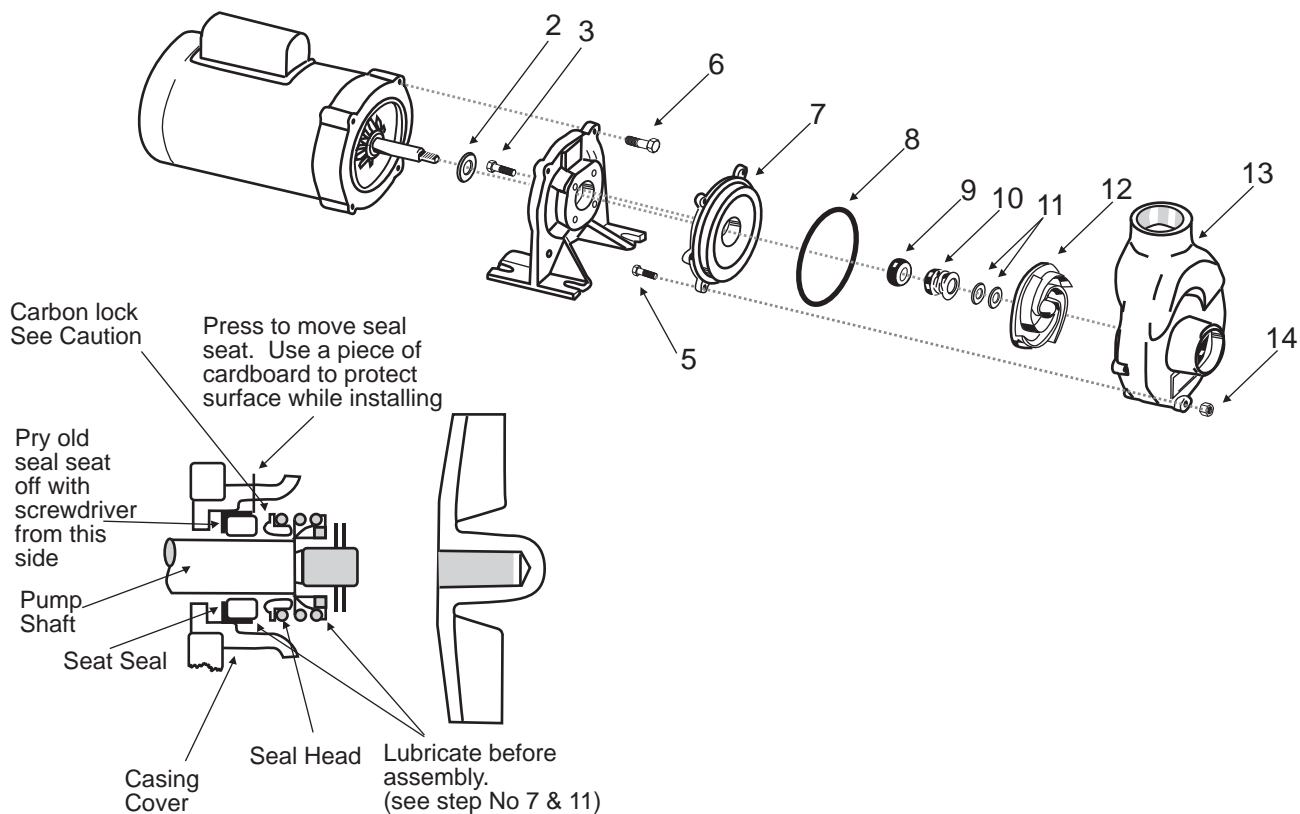
Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

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Schneider Electric USA
8001 Hwy 64 East
Raleigh, NC 27545
1-888-SquareD (1-888-778-2733) / www.us.SquareD.com

9. PUMP EXPLOSION DIAGRAM



Ref. #	Description	Part Number For Models					Qty.
		3880-97	3881-97	3882-97	3883-97	3884-97	
1.	Motor	1626-062-00	1626-063-00	1626-064-00	1626-065-00	1626-066-00	1
2	Slinger washer	*	*	*	*	*	1
3	Fastener	*	*	*	*	*	4
4	Adapter	1993-000-01	1993-000-01	1993-000-01	1993-000-01	1993-000-01	1
5	Fastener	*	*	*	*	*	6
6	Fastener	*	*	*	*	*	4
7	Casing Cover	2104-003-01	2104-003-01	2104-003-01	2104-003-01	2104-003-01	1
8	Casing Seal -Buna N(Standard) -Viton(Optional)	2104-004-00	2104-004-00	2104-004-00	2104-004-00	2104-004-00	1
		2105-023-00	2105-023-00	2105-023-00	2105-023-00	2105-023-00	
9&10	¹ Shaft Seal Assembly -Buna N(Standard) -Viton(Optional)	1640-161-90 1640-161-91	1640-161-90 1640-161-91	1640-161-90 1640-161-91	1640-161-90 1640-161-91	1640-161-90 1640-161-91	1
11	Shims (kit contains 0.010, 0.020 & 0.030 - 1 ea.)	1675-000-90	1675-000-90	1675-000-90	1675-000-90	1675-000-90	1
12	Impeller	2104-006-01	2104-006-02	3880-051-01	3880-052-01	2104-015-02	1
13	Casing	2104-000-01	2104-000-01	2104-000-01	2104-000-01	2104-000-01	1
14	Pipe Plug	*	*	*	*	*	1

(*) Standard hardware item, available locally

(¹) Seal asseby available as set only (includes sealbed and seat)

10. AUTOMATIC AIR VENT VALVE

ES-FV-4M1

For Hydronic Heating Applications

Job Name _____	Contractor _____
Job Location _____	Approval _____
Engineer _____	Contractor's P.O. No. _____
Approval _____	Representative _____

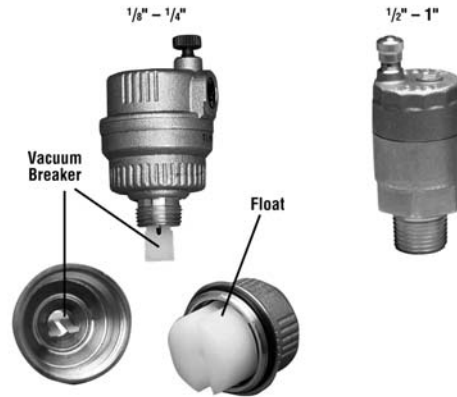
**Series FV-4M1
Automatic Air Vent Valves**

Sizes: 1/8" - 1" (3 - 25mm)

Series FV-4M1 Automatic Air Vent Valves provide automatic air venting for hot or cold water distribution systems. These vents purge air that may be in the water system.

The vent valve utilizes a float to actuate the valve plug which is located at the top of the valve. Once the air is displaced and the system pressure is sustained, the valve plug seals and prevents any water from escaping from the system.

The float vent can also operate as an anti-vacuum device since it will permit air to enter the system when it must be drained. It can also be installed to permit the separation and dispersal of air while fluid is actually circulating in the system.



Features

- Body and cover are brass construction
- Air vent with silicone rubber seal
- Impurities do not usually affect function as maximum float line of water is always lower than the valve seal
- Float is high temperature resistant polyethylene
- Suitable for use with glycol systems
- Can be disassembled for inspection and cleaning

Pressure – Temperature

Minimum working pressure: 1.45psi (10 kPa)
 Maximum working pressure: 150psi (10 bars)
 Temperature Range: 33°F – 240°F (5°C – 116°C)

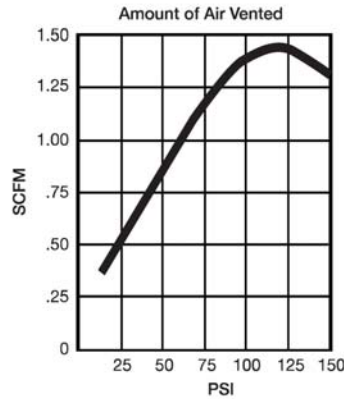
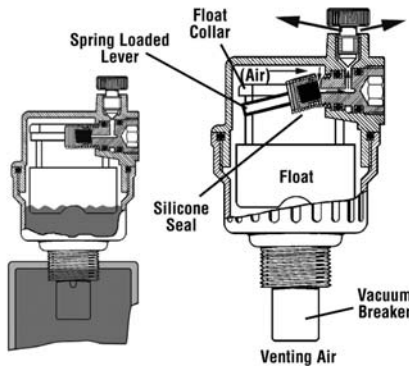


Diagram above shows the quantity of air vented by the "Float Vent" according to the pressure in the system.



Specifications

Air vent shall have brass body & cover and silicone rubber seal. Float shall be constructed of high temperature resistant polyethylene and shall be for use with glycol systems. Air vent shall be Watts Regulator Company Series FV-4M1.



Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Service. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.

Installation

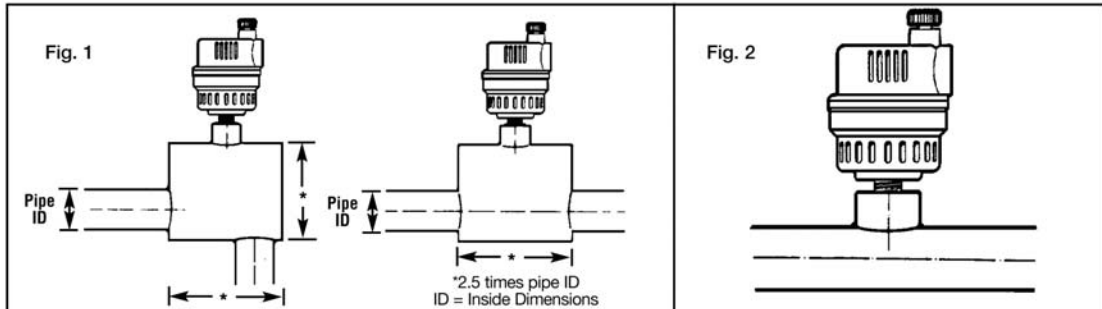


Figure 1 shows the installation of the FV-4M1 for the venting of air while the fluid is circulating in the system. The figure shows the required increase in pipe size in order to obtain proper separation of air from water. Watts Series AS Air Scoop which is designed for efficient separation of air from water in hydronic heating systems can also be installed. See Watts literature S-AS.

Figure 2 – When the FV-4M1 is installed as shown, the air will not be vented while the fluid is circulating in the system, but it can vent when the system is shut off.

The FV-4M1 should be mounted only in a vertical position as its operation is based on the vertical movement of the float (see Fig. 3).

Note: In order to get the best results in venting air from risers, use connecting pipes of at least 1/2" diameter between the "Float Vent" valves and the installation.

Maintenance

No maintenance is normally necessary. However, if the FV-4M1 is disassembled for inspection or cleaning it is important that when re-assembling to ensure that the spring loaded lever properly engages under the float collar (see reverse side).

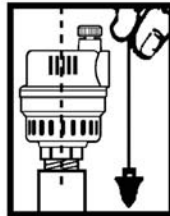


Fig. 3



Fig. 4

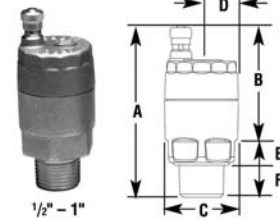
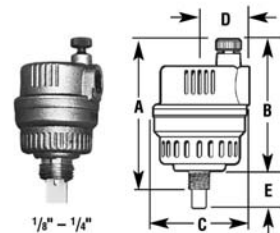


Operation: IMPORTANT!

After installing the FV-4M1, back off the small vent cap two turns (see Fig. 4). This is the proper operating setting which will allow air to be vented from the system. It is advisable to leave the cap on to prevent impurities from entering the valve.

Dimensions – Weights

SIZE (DN)		DIMENSIONS						WEIGHT							
in.	mm	A	B	C	D	E	F	lbs.	kg						
1/8	3	2 15/16	75	2 5/8	67	1 5/8	41	1 3/16	21	5/16	7.9	5/16	7.9	.40	.18
1/4	8	3 1/8	79	2 5/8	67	1 5/8	41	1 3/16	21	1/8	3.1	1/2	12.7	.43	.20
1/2	15	3 7/16	85	2 11/16	69	1 1/4	32	1 1/16	18	5/8	16	–	–	.44	.20
3/4	20	3 3/8	85	2 11/16	69	1 1/4	32	1 1/16	18	5/8	16	–	–	.45	.20
1	25	3 1/2	89	2 11/16	69	1 3/8	35	1 1/16	18	13/16	20	–	–	.47	.21



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4420 14th Ave N.W. Seattle, WA 98107

Tel: (206) 789-3880 | Fax: (206) 782-5455

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