ENGINEERING
TOMORROW

Catalog

FLOCS
(Fast Lube Oil Change System)

FD14 Series
Oil Drain Coupling

FLOCS application

Danfoss' FD14 Drain Coupling is designed to serve as a drain port for use with Danfoss' FLOCS (Fast Lube Oil Change System) as well as providing a purging port for use during pre-fill operations. The FD14 provides a leak free push to connect operation for improving speed and efficiency for oil evacuation systems.

Product Features

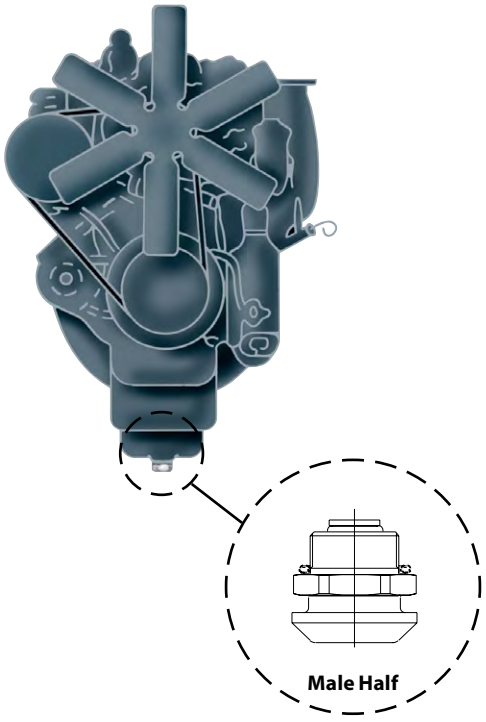
- Low-Profile design with multiple sealing mechanisms
- Push-To-Connect socket/female half for easy one-hand operation
- Broad range of standard thread styles for plug/male half
- Utilizes a Copper-Crush gasket to seat against the port face
- Standard plug/male half seal material: FKM
- Standard socket/female half seal material: Buna-N
- Standard body material: High resistance carbon steel with zinc trivalent plating with zinc die-cast valve

Physical Characteristics

Body Size	Max. Operating Pressure		Min. Burst Pressure Connected		Vacuum Connected Only	Rated Flow	
(in)	(bar)	(psi)	(bar)	(psi)	(in./Hg)	(lpm)	(gpm)
3/8	3.5	50	7.0	200	28	12	3

Applications & Markets

- Automated oil evacuation systems
- Gravity drain oil evacuation systems



FD14 Series
Oil Drain Coupling

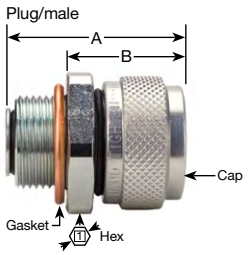


Figure 1

Dimensions (English Thread)

Body Size	Thread Size	Fig.	Dimensions A		B		Hex ①		Min. Assy. Torque		Part Number Assembly (includes Gasket & Cap)	Gasket (Copper-Crush)	Cap (Brass)
	P		mm	(in)	mm	(in)	mm	(in)	N-m	(lbs-ft)			
3/8	1 1/16-12 UN-2A	1	39.1	(1.54)	24.4	(.96)	38.1	(1 1/2)	41-81	(30-60)*	FD14-4002-20-06	FD14-1206-08	FD14-1210-06
3/8	1 1/4-18 UNEF-2A	1	39.1	(1.54)	24.4	(.96)	38.1	(1 1/2)	41-81	(30-60)*	FD14-4002-05-06	FD14-1206-11	FD14-1210-06
3/8	1 1/8-12 UNF-2A	1	39.1	(1.54)	24.4	(.96)	38.1	(1 1/2)	41-81	(30-60)*	FD14-4002-14-06	FD14-1206-09	FD14-1210-06
3/8	1/2-14 DRYSEAL NPTF	1	40.6	(1.60)	24.4	(.96)	27.0	(1 1/16)	-	-	FD14-4002-27-06*	None Needed	FD14-1210-06
3/8	1/2-14 UNS-2A	1	38.6	(1.52)	24.4	(.96)	27.0	(1 1/16)	27-33	(20-24)*	FD14-4002-22-06*	FD14-1206-01	FD14-1210-06
3/8	1/2-20 UNF-2A	1	38.6	(1.52)	24.4	(.96)	27.0	(1 1/16)	27-33	(20-24)*	FD14-4002-01-06*	FD14-1206-01	FD14-1210-06
3/8	1-18 UNS-2A	1	39.1	(1.54)	24.4	(.96)	31.8	(1 1/4)	41-81	(30-60)*	FD14-4002-06-06	FD14-1206-07	FD14-1210-06
3/8	3/4-14 DRYSEAL NPTF	1	43.8	(1.72)	24.4	(.96)	31.8	(1 1/4)	-	-	FD14-4002-26-06	None Needed	FD14-1210-06
3/8	3/4-16 UNF-2A	1	39.1	(1.54)	24.4	(.96)	31.8	(1 1/4)	41-68	(30-50)*	FD14-4002-09-06	FD14-1206-04	FD14-1210-06
3/8	5/8-18 UNF-2A	1	38.6	(1.52)	24.4	(.96)	27.0	(1 1/16)	27-54	(20-40)*	FD14-4002-08-06*	FD14-1206-03	FD14-1210-06
3/8	7/8-14 UNF-2A	1	39.1	(1.54)	24.4	(.96)	31.8	(1 1/4)	41-81	(30-60)*	FD14-4002-10-06	FD14-1206-06	FD14-1210-06
3/8	7/8-18 UNS-2A	1	39.1	(1.54)	24.4	(.96)	31.8	(1 1/4)	41-81	(30-60)*	FD14-4002-07-06	FD14-1206-06	FD14-1210-06
3/8	9/16-18 UNF-2A	1	38.6	(1.52)	24.4	(.96)	27.0	(1 1/16)	27-54	(20-40)*	FD14-4002-12-06*	FD14-1206-02	FD14-1210-06

*⚠CAUTION: Failure to meet minimum assembly torque could result in fluid leakage.

Dimensions (English Thread)

Body Size	Thread Size	Fig.	Dimensions A		B		Hex ①		Min. Assy. Torque		Part Number Assembly (includes Gasket & Cap)	Gasket (Copper-Crush)	Cap (Brass)
	P		mm	(in)	mm	(in)	mm	(in)	N-m	(lbs-ft)			
3/8	M12 X 1.5 6g	1	38.6	(1.52)	24.4	(.96)	27.0	(1 1/16)	27-33	(20-24)*	FD14-4002-23-06*	FD14-1206-01	FD14-1210-06
3/8	M12 X 1.75 6g	1	38.6	(1.52)	24.4	(.96)	27.0	(1 1/16)	27-33	(20-24)*	FD14-4002-25-06*	FD14-1206-01	FD14-1210-06
3/8	M14 X 1.25 6g	1	38.6	(1.52)	24.4	(.96)	27.0	(1 1/16)	27-33	(20-24)*	FD14-4002-03-06*	FD14-1206-02	FD14-1210-06
3/8	M14 X 1.5 6g	1	38.6	(1.52)	24.4	(.96)	27.0	(1 1/16)	27-33	(20-24)*	FD14-4002-24-06*	FD14-1206-02	FD14-1210-06
3/8	M18 X 1.5 6g	1	38.6	(1.52)	24.4	(.96)	31.8	(1 1/4)	27-33	(20-24)*	FD14-4002-02-06*	FD14-1206-04	FD14-1210-06
3/8	M20 X 1.5 6g	1	39.1	(1.54)	24.4	(.96)	31.8	(1 1/4)	41-81	(30-60)*	FD14-4002-16-06	FD14-1206-05	FD14-1210-06
3/8	M22 X 1.5 6g	1	39.1	(1.54)	24.4	(.96)	31.8	(1 1/4)	41-81	(30-60)*	FD14-4002-18-06	FD14-1206-06	FD14-1210-06
3/8	M24 X 1.5 6g	1	39.1	(1.54)	24.4	(.96)	31.8	(1 1/4)	41-81	(30-60)*	FD14-4002-19-06	FD14-1206-07	FD14-1210-06
3/8	M24 X 2 6g	1	39.1	(1.54)	24.4	(.96)	31.8	(1 1/4)	41-81	(30-60)*	FD14-4002-11-06	FD14-1206-07	FD14-1210-06
3/8	M25 X 1.5 6g	1	39.1	(1.54)	24.4	(.96)	31.8	(1 1/4)	41-81	(30-60)*	FD14-4002-17-06	FD14-1206-07	FD14-1210-06
3/8	M27 X 2 6g	1	36.3	(1.43)	24.4	(.96)	38.1	(1 1/2)	41-81	(30-60)*	FD14-4002-29-06	FD14-1206-06	FD14-1210-06
3/8	M30 X 1.5 6g	1	39.1	(1.54)	24.4	(.96)	38.1	(1 1/2)	41-81	(30-60)*	FD14-4002-21-06	FD14-1206-10	FD14-1210-06

*⚠CAUTION: Failure to meet minimum assembly torque could result in fluid leakage.

Dimensions (Socket/Female Half NPTF, Valved)

Body Size	Thread Size	Fig.	Dimensions A		B		Hex ①		Part Number Assembly
	P		mm	(in)	mm	(in)	mm	(in)	
3/8	3/4-14 Dryseal NPTF	2	46.5	(1.83)	45.7	(1.80)	33.0	(1 5/16)	FD14-1001-12-06

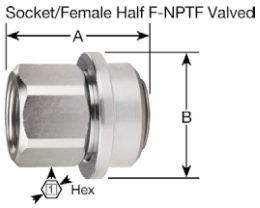


Figure 2

Dimensions (Socket/Female Half Assembly, Non-Valved)

Body Size	Hose Size	Fig.	Dimensions A		B		Part Number Assembly
	P		mm	(in)	mm	(in)	
3/8	5/8"SOCKETLESS™	3	59.4	(2.34)	38.1	(1.50)	FD14-4003-10-06

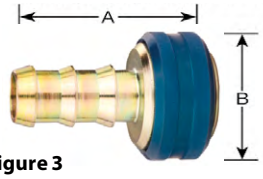


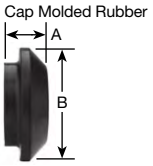
Figure 3

FD14 Series
Oil Drain Coupling

Dimensions (Cap Molded Rubber)

Body Size	Fig.	Dimensions A		B		Part Number Cap (Buna-N)
		mm	(in)	mm	(in)	
3/8	4	13.2	(.519)	35.6	(1.40)	FD14-1204-06

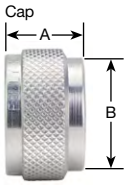
Figure 4



Dimensions (Cap)

Body Size	Fig.	Dimensions A		B		Part Number Cap (Buna-N)
		mm	(in)	mm	(in)	
3/8	5	18.4	(.726)	31.8	(1.25)	FD14-1210-06

Figure 5



Swivel Joint

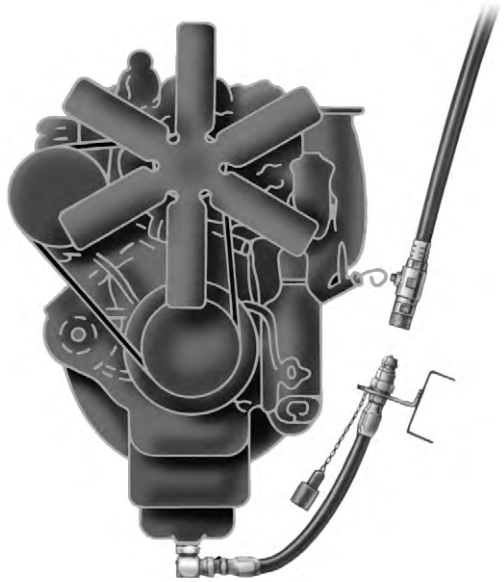
Body Size	Fig.	Thread Size	Cap	Part Number (Buna-N)
3/8	6	3/4-14	Dryseal NPTF	FD14-1004-12-12

Figure 6

Access Methods

Remote Access

The FLOCS Remote Access Conversion Kit replaces the old drain plug with a 90 degree pan adapter, hose assembly and quick-disconnect coupling.



Installation:

1. Remove old drain plug.
2. Replace with the proper size FF1187 pan adapter.
3. Install mounting bracket (and optional 90˚ adapter).
4. Attach hose assembly to FF1187 pan adapter and mounting bracket.
5. Attach coupling and dust cap.

Your installation is now complete.

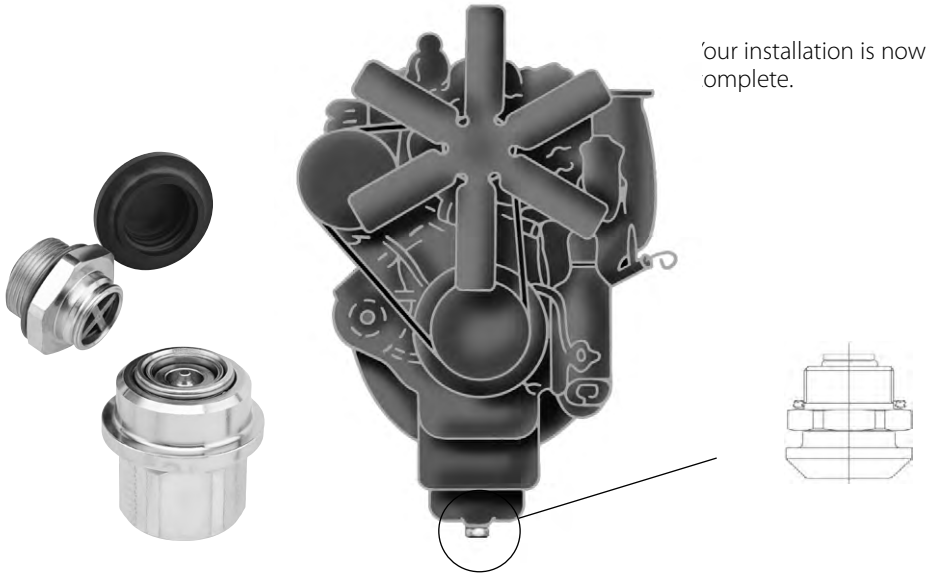
Evacuation:

When it is time to change the oil:

1. Remove the dust cap.
2. Connect the evacuation hose to the quick-disconnect coupling.
3. Activate the pump, and the used oil is quickly evacuated to storage tanks.
4. Disconnect the evacuation hose and replace the dust cap.

Direct Access

The FLOCS Direct Access Conversion Kit uses the Danfoss-developed FD14 Drain Coupling as an alternative to the standard remote hose kit. This coupling design permits easy, one-hand connection and disconnection of the evacuation unit's hose.



Installation:

1. Remove old drain plug.
2. Replace with the proper size FD14 Drain Coupling.
3. Install protective cap.

'our installation is now omplete.

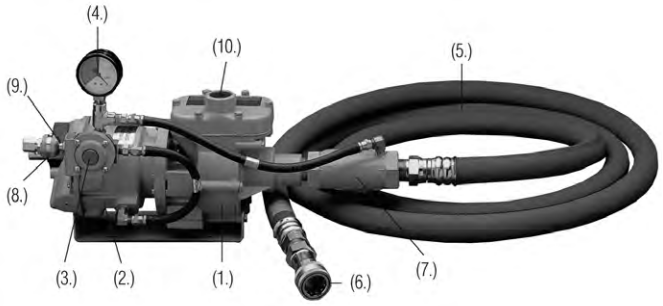
Evacuation:

When it is time to change the oil:

1. Remove the protective cap.
2. Connect the evacuation hose to the FD14 Drain Coupling.
3. Activate the pump, and the used oil is quickly evacuated to storage tanks.
4. Disconnect the evacuation hose and replace the protective cap.

Evacuation Systems

FLOCS 30A
Air-powered Unit



1. Piston pump
2. 5 cfm air-operated motor (80-150 psi)
3. Override button
4. Cycle gauge
5. 15' of 1" I.D. suction hose*
6. Coupling half**
7. Suction strainer
8. 1/4" air-supply coupling
9. 1/4" air-supply nipple
10. 1" NPT discharge port

(Part No. FF9330A-01) Remote Access
(Part No. FF9330A-19) Direct Access

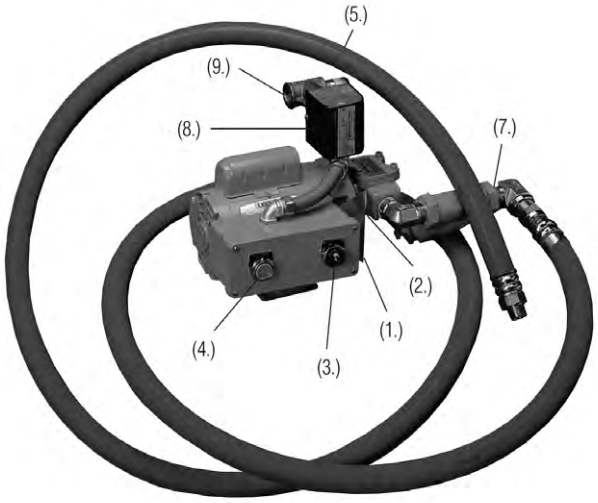
The FLOCS 30A Oil-evacuation Unit is a versatile, air-powered unit designed to be used where an air-power source is available, and electrical units may present a fire hazard. The unit can be adapted for use either on a lube truck or in a maintenance bay.

A FLOCS 30A unit can be used with equal effectiveness on vehicles with small oil-pan capacities (taxicabs, delivery trucks, school buses, etc.), medium capacities (highway equipment, tree-harvesting equipment, etc.) or large capacities (mining or construction equipment, etc.). Speed, ease of operation and versatility make the FLOCS 30A the best rapid oil-evacuation unit for many applications.

* FLOCS 30A Oil-evacuation Unit with 25' hose assembly is ordered by part number FF9330A-100 (Remote Access), FF9330A-20 (Direct Access).

** Differs with access method.

FLOCS 15
Electric-powered Unit



1. 3/4" hp electric motor, 115V AC, 20 amp
2. Gear pump
3. Cycle-run starter button
4. Cycle-run signal light
5. 15' of 1" I.D. suction hose*
6. Coupling half**
7. Suction strainer
8. 115V AC flow-control switch
9. Backflow check valve with a 3/4" NPT discharge port

(Part NO. FF9315-01) Remote Access
(Part No. FF9315-28) Direct Access

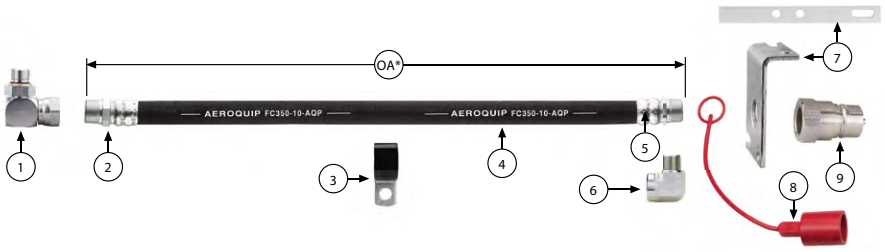
The FLOCS 15 Oil-evacuation Unit is electric powered and is designed for use in fleet maintenance service bays. Used in conjunction with overhead oil-dispensing reels, the FLOCS 15 speeds oil changes in large fleets. In some multilane maintenance shops, the FLOCS 15 concept has been used to implement a "fast-lane" operation, with one lane set aside for high-frequency, routine maintenance functions, leaving the other lanes free for more complex and time-consuming operations.

The FLOCS 15 is compatible with existing oil service equipment and can be installed quickly, without interrupting normal maintenance operations. It discharges old oil into existing storage tanks and shuts off automatically when the old oil has been evacuated. A signal light goes off when the evacuation is complete.

* FLOCS 15 Oil-evacuation Unit with 30' hose assembly is ordered by part number FF9516-01 (Remote Access), FF9516-02 (Direct Access).

** Differs with access method.

Remote Access
(Aeroquip)
Conversion Kits



Standard Vehicles

All kits are designed to accommodate manual drain when necessary.

These components are common to each kit regardless of the part number.

Item #	Part #	Description
Item # 2	4412-8-10S	Hose Fitting (Reusable)
Item # 2	FJ3152-0810S	Hose Fitting (Crimp)
Item # 3	900729-6	Hose Clamp
Item # 4	FC350-10	Hose
Item # 5	4412-12-10S	Hose Fitting
Item # 5	FJ3152-1210S	Crimp
Item # 6	2089-12-12S	Connection At Mounting Flange
Item # 7	FF9363-01S	Bracket
Item # 8	5657-12	Dust Cap
Item # 9	5602-12-12S	Coupling Half

Kit Numbers are selected by matching the drain port thread size with the oil pan adapter of the same thread.

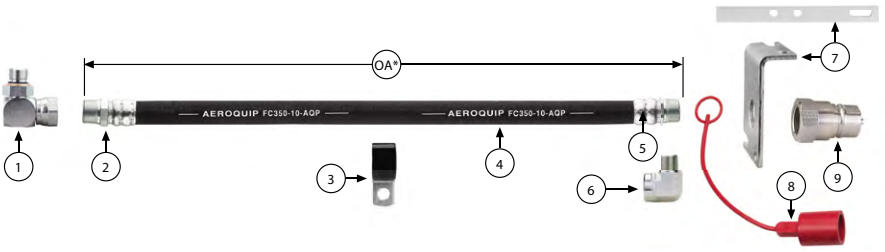
Thread Size	#1 Oil Pan Adapter & Gasket	Hardware Kit (Includes Items 1, 3, 6, 7, 8, & 9)	Assembled Kit* (Includes Items 1 through 9)
1/2 - 20	FF1187-0801S	FF428	FF400-OA
m 18 x 1.5	FF1187-0802S	FF429	FF401-OA
m 14 x 1.25	FF1187-0803S	FF430	FF402-OA
m 10 x 1	FF1187-0804S	FF431	FF403-OA
1 1/4 - 18	FF1187-0805S	FF432	FF404-OA
1 - 18	FF1187-0806S	FF433	FF405-OA
7/8 - 18	FF1187-0807S	FF434	FF406-OA
5/8 - 18	FF1187-0808S	FF435	FF407-OA
3/4 - 16	FF1187-0809S	FF436	FF408-OA
7/8 - 14	FF1187-08010S	FF437	FF409-OA
9/16 - 18UNF - 2A	FF1187-08012S	FF11042	FF11041-OA
1 1/8 - 12UNF - 2A	FF1187-08014S	FF11301	FF10452-OA
1 1/8 - 12UNF - 2A	**FF1187-08015S	FF11303	FF11302-OA
m 20 x 1.5	FF1187-0816S	FF11499	FF11498-OA
m 25 x 1.5	FF1187-0817S	FF11826	FF11825-OA
3/8 - 18 NPT (Pipe)	2047-8-6S	FF439	FF411-OA
1/2 - 14 NPT (Pipe)	2047-8-8S	FF440	FF412-OA
3/4 - 14 NPT (Pipe)	2047-8-12S	FF441	FF413-OA

* OA indicates overall length of hose assembly in inches. (Available to Aeroquip only.)

** Long Drop Version for oil pans covered by sound attenuation shields.

Large-capacity Vehicle Kit

All kits are designed to accommodate manual drain when necessary.



These components are common to each kit regardless of the part number.

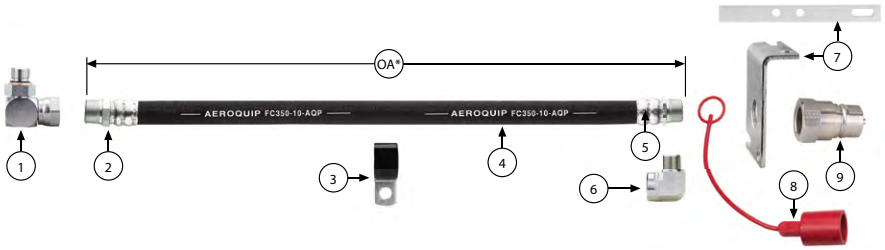
Item #	Part #	Description
Item # 2	4412-8-12S FJ3152-08125	(Reusable) (Crimp)
Item # 3	900729-8	Hose Clamp
Item # 4	FC350-10	Hose
Item # 5	4412-12-12S	Hose Fitting
Item # 5	FJ3152-1212S	(Crimp)
Item # 6	2089-12-12S	Connection At Mounting Flange
Item # 7	FF9363-01S/ FF9270-01S	Bracket
Item # 8	5657-12	Dust Cap
Item # 9	5602-12-12S	Coupling Half

Kit Part Numbers are selected by choosing the appropriate drain port thread size.

Items Thread Size	#1 Oil Pan Adapter & Gasket	#2 Hose Fitting	Hardware Kit (Includes Items 1, 3, 6, 7, 8, & 9)	Assembled Kit* (Includes Items 1 through 9)
3/4 - 14 NPT (Pipe)	2047-8-12S	4412-8-12S	FF943	FF293-OA
3/8 - 18 NPT (Pipe)	2047-8-6S	44112-8-12S	FF945	FF322-OA
7/8 - 18	FF1187-0807S	4412-8-12S	FF944	FF317-OA
7/8 - 14	FF1187-0810S	4412-8-12S	FF946	FF380-OA
1 - 18	FF1187-0806S	4412-8-12S	FF947	FF395-OA
1 - 11 1/2 NPT (Pipe)	2024-16-12S	4411-8-12S	FF948	FF833-OA
1/2 - 14 NPT (Pipe)	2024-8-12S	4411-8-12S	FF949	FF834-OA

* OA indicates overall length of hose assembly in inches. (Available to Aeroquip only.)

Remote Access (Weatherhead) Conversion Kits



Standard Vehicles

All kits are designed to accommodate manual drain when necessary.

These components are common to each kit regardless of the part number.

Item #	Part #	Description
Item # 2	0A10E-108	Hose Fitting
Item # 3	900729-6	Hose Clamp
Item # 4	H56910	Hose
Item # 5	069	Hose Fitting Adapter for 90
Item # 6	2089-12-12S	Connection At Mounting Flange
Item # 7	FF9363-01S	Bracket
Item # 8	5657-12	Dust Cap
Item # 9	5602-12-12S	Coupling Half

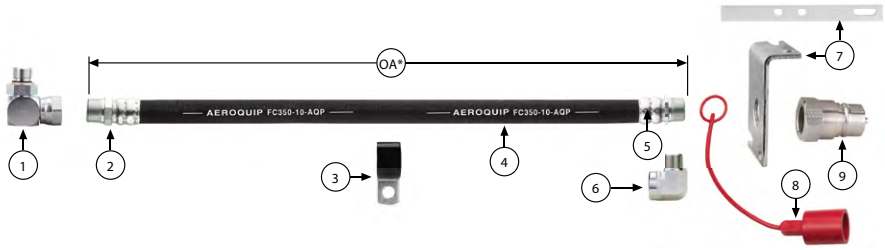
Kit Numbers are selected by matching the drain port thread size with the oil pan adapter of the same thread.

Thread Size	#1 Oil Pan Adapter & Gasket	Hardware Kit (Includes Items 1, 3, 6, 7, 8, & 9)
1/2 - 20	FF1187-0801S	FF428
m 18 x 1.5	FF1187-0802S	FF429
m 14 x 1.25	FF1187-0803S	FF430
m 10 x 1	FF1187-0804S	FF431
1 1/4 - 18	FF1187-0805S	FF432
1 - 18	FF1187-0806S	FF433
7/8 - 18	FF1187-0807S	FF434
5/8 - 18	FF1187-0808S	FF435
3/4 - 16	FF1187-0809S	FF436
7/8 - 14	FF1187-08010S	FF437
9/16 - 18UNF - 2A	FF1187-08012S	FF11042
1 1/8 - 12UNF - 2A	FF1187-08014S	FF11301
1 1/8 - 12UNF - 2A	**FF1187-08015S	FF11303
m 20 x 1.5	FF1187-0816S	FF11499
m 25 x 1.5	FF1187-0817S	FF11826
3/8 - 18 NPT (Pipe)	2047-8-6S	FF439
1/2 - 14 NPT (Pipe)	2047-8-8S	FF440
3/4 - 14 NPT (Pipe)	2047-8-12S	FF441

** Long Drop Version for oil pans covered by sound attenuation shields.

Large-capacity Vehicle Kit

All kits are designed to accommodate manual drain when necessary.



These components are common to each kit regardless of the part number.

Item #	Part #	Description
Item # 2	069	Hose Clamp
Item # 3	900729-8	Hose
Item # 4	H56912	Hose
Item # 5	069	Hose Fitting
Item # 6	2089-12-12S	Connection At Mounting Flange
Item # 7	FF9363-01S/ FF9270-01S	Bracket
Item # 8	5657-12	Dust Cap
Item # 9	5602-12-12S	Coupling Half

Kit Part Numbers are selected by choosing the appropriate drain port thread size.

Thread Size	#1 Oil Pan Adapter & Gasket	Hardware Kits (Includes Items) 1, 3, 6, 7, 8, & 9)
3/4 - 14 NPT (Pipe)	2047-8-12S	FF943
3/8 - 18 NPT (Pipe)	2047-8-6S	FF945
7/8 - 18	FF1187-0807S	FF944
7/8 - 14	FF1187-0810S	FF946
1 - 18	FF1187-0806S	FF947
1 - 11 1/2 NPT (Pipe)	2047-8-16S	FF948
1/2 - 14 NPT (Pipe)	2047-8-8S	FF949

Oil Thief System

Providing easy access to oil samples for spectrographic analysis.

With the spectrographic analysis of engine oil being increasingly required, the problem of obtaining oil samples quickly, economically and efficiently has demanded more attention.

With the push of a button, an oil sample can be taken during the evacuation cycle of any FLOCS unit and collected in a standard sampling bottle for analysis. It takes less than 15 seconds to collect an oil sample with the Oil Thief.

Because oil-analysis facilities provide differing oil sample bottles, the FLOCS Oil Thief is available with a sample bottle port thread to match your needs. (Refer to the sample bottle thread sizes and corresponding Oil Thief part numbers listed in this chart.)

Physical Characteristics:

Buna-N Seals for -40 to +225 Degrees Fahrenheit Service. Vacuum Capable to 28" Hg.

In a typical FLOCS system, a Male NPTF-to-Male NPTF adapter (2083-12-12s) is used on one end of the Oil Thief to connect to the female quick-disconnect coupling.

Operating Instructions:

The Oil Thief is compatible with any FLOCS evacuation unit. Simply install an Oil Thief between the evacuation hose line and the coupling half; then attach a sample bottle. Wait a few seconds after starting the evacuation cycle (to flush away any oil from the last evacuation); then depress the sample collection button for approximately ten seconds. Release the button and remove the sample bottle. Clean the Oil Thief sample bottle port, attach another bottle and you are ready for the next sample.

Note: When not in use, the Oil Thief should have a spare sample bottle attached to maintain valve cleanliness.

Features:

- Push-button operation
- Light weight
- Repairable seals
- Accepts a wide variety of sample bottle threads

Benefits:

- No-mess oil sample
- Economical – one Oil Thief per maintenance bay evacuation pump
- Allows oil sampling while oil is still hot, without employee hazard

Oil Thief Part Number	Sample Bottle Thread Size (In Inches)
FF9300-75-0001	1.480-6 (or 38mm)
FF9300-75-0002	2.070-6
FF9300-75-0003*	1.580-6
FF9300-75-0004*	1.750-6 (or 45mm)

*Available by special order.

Remote Access Conversion Kit Installation

1. Selecting the Conversion Kit

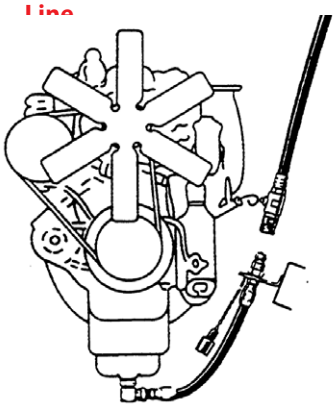
Remove the oil pan drain plug and drain engine oil. Measure the thead on the pan plus with a thread gauge. The thread size will determin the specific conversion kit to bbe used. Kits are available in two styles: 1) assembly kits (contain mounting hardware and hose assembly), and 2) oil pan drain fitting and coupling with mounting bracket (installer must funish hose assembly). Hose length in inches ("L") is added to the basic part number when ordering assembled kits.

2. Installation

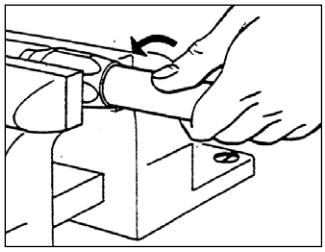
Determine the length of hose required for your vehicle. If the hose length is not known, mount the quick disconnect coupling and bracket and route the hose from the coupling bracket to the oil pan drain. Refer to step 5 for proper routing, mark and cut the hose to length. Following step 3 install the hose fittings to complet the hose assembly. intall the oil pan drain fitting (per step 6) and the hose assembly.

Pan Plug Thread Size	Assembled Kit No.	Hardware Kit No.
1/2-20	F400-L	FF428
18 x 1.5 mm	FF401-L	FF429
14 x 1.25 mm	FF402-L	FF430
10 x 1.mm	FF403-L	FF431
1 1/4-18	FF404-L	FF432
1-18	FF405-L	FF433
7/8 - 18	FF406-L	FF434
24 x 2.mm	FF410-L	FF438
9/16 - 18	FF952-L	FF453
3/8 - 18 NPT (Pipe)	FF411-L	FF439
1/2 - 14 NPT (Pipe)	FF412-L	FF440
3/4 - 14 NPT (Pipe)	FF413-L	FF441

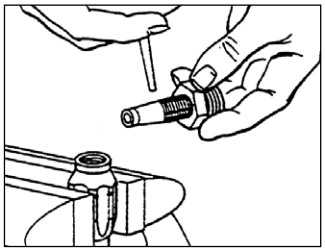
3. Assembling the Hose Line



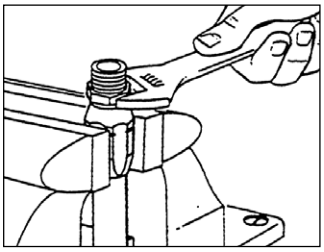
A. Put the socket in vise and screw hose into socket counterclockwise until it bottoms. Back off 1/4 turn.



B. Oil nipple threads and inside of hose liberally. Use heavy lube oil.



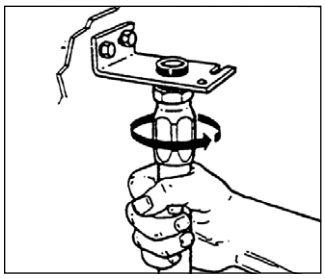
C. Screw nipple clockwise into socket and hose. Keep hose from turning while assembling nipple. Leave 1/32" to 1/16" clearance between nipple hex and socket.



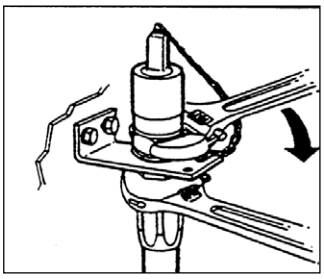
4. Mounting the Coupling

Note: The coupling bracket should be mounted so that the coupling valve is located above the oil level in the crank case. Make sure that the coupling is mounted firmly and located so that it will not be damaged during normal operation of the vehicle.

A. Attach mounting bracket to desired location on vehicle, preferably near the dipstick. Screw assembled fitting into bracket until enough thread is exposed on opposite side to assemble and tighten the quick disconnect coupling.



B. Assemble dust cap and coupling to mounted hose fitting. Use pipe thread sealant. Check for any leakage after kit is installed.

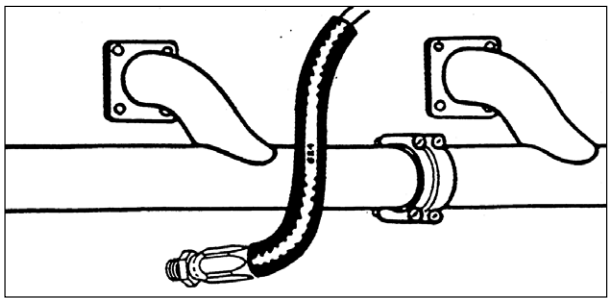


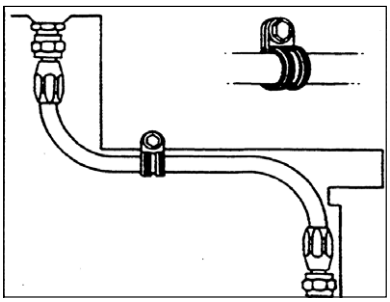
5. Routing the Hose

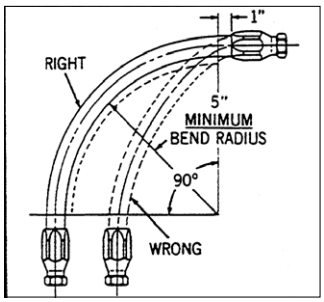
A. Avoid heat. If the hose must be routed past the manifold or exhaust pipe, use Firesleeve for heat protection.

B. Avoid sharp or abrasive edges. Use Danfoss protective coil/ sleeve if hose might be cut or chafed or use support clamp provided to avoid abrasion.

C. Avoid kinking. Tight bents may kink hose. Observe bend radius limitations.





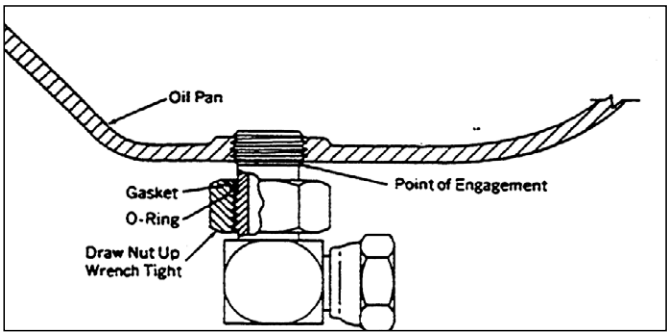


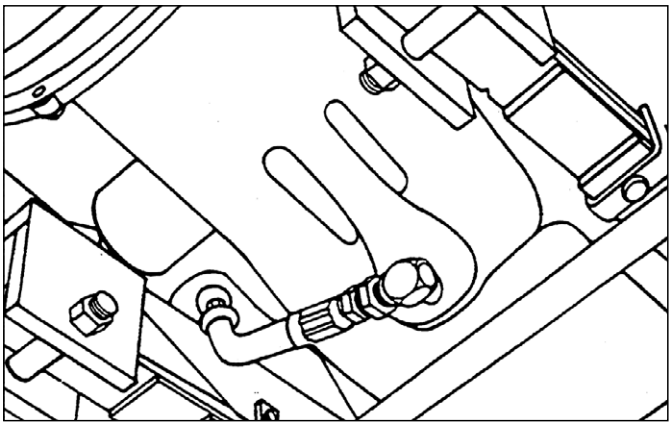
6. Installing the Oil Pan Drain Fitting

Lubricate the O-ring seal on the Oil Pan Drain Fitting. Screw the fitting into the oil pan until the last thread on the upper set of threads is engaged.

Position the elbow and tighten the jam nut (two wrenches needed). Screw the hose fitting into the elbow and tighten all connections.

Oil may be manually drained by disconnecting the hose fitting from the oil pan adapter.

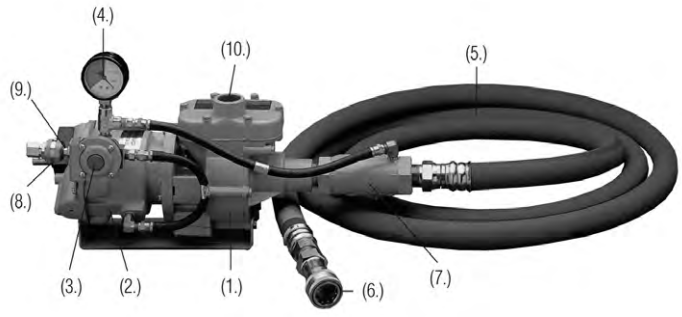




Air Units

Operation and Service Info

FLOCS 30A
Air-powered Unit



1. Piston pump
2. 5 cfm air-operated motor (80-150 psi)
3. Override button
4. Cycle gauge
5. 15' of 1" I.D. suction hose*
6. Coupling half**
7. Suction strainer
8. 1/4" air-supply coupling
9. 1/4" air-supply nipple
10. 1" NPT discharge port

Operation

The FLOCS 30A unit is a simple self-controlled automatic oil evacuator. Once it has been started it will operate until all the oil has been evacuated from the oil pan. The unit will stop automatically when air enters the suction hose.

This unit is controlled by a normally closed, air supply shut-off valve, which requires the pump vacuum to hold it open. At the end of the evacuation cycle air in the suction line destroys the vacuum causing the control valve to shut off the air pressure supply and stop the pump. The unit also incorporates a strainer to prevent large particles from damaging the pump.

To operate:

1. Attach the FLOCS 30A unit quick disconnect coupling to the mating conversion kit coupling half on the equipment.
2. Press the red override button to start the unit; hold for approximately 5 seconds. Cycle gauge will indicate run condition.
3. The unit will shut off automatically when all oil is evacuated. The cycle gauge will indicate when the unit is off. Disconnect the evacuation line.

Specifications

- Maximum discharge pressure: 1/5 of the input air pressure (power source).
- Recommended operating temperature of fluid: +60ºF. to 180ºF.
- Strainer screen size: size 35 mesh.
- Flow rate: see flow chart.
- Pump power source: 80 to 150 psi air at 5 CFM minimum.
- Fluid handling compatibility: all petroleum base fluids below 6000 SSU
- Minimum discharge line: size 1" I.D. (-16).
- Mounting requirements: see Fig. 3. page 3.
- 15' of 1" I.D. suction line standard.
- 5601-12-12 female coupling.

Installation Instructions

Mount the unit for easy accessibility to the vehicles to be serviced. It may be mounted in either a horizontal or vertical position. A mounting bracket is provided for rigid mounting of the pump (reference Figure 3 for detail dimensions). The pump motor operates on 80-150 psi air at 5 CFM minimum. The unit is to be mounted so that the cycle gauge is in full view of the operator and the override button and strainer cleanout are readily accessible.

1. Connect the used oil discharge line to the 1" pipe port at the top of the unit. The discharge line must be no higher than 10 feet above FLOCS unit. It is important to keep the discharge line large to maintain maximum efficiency.

Use a 1" I.D. pipe for lines 15' to 30' long and a 1 1/4" I.D. pipe for lines 30' to 100' long. Make sure the discharge line does not develop more head pressure than 1/5 of the air pressure source. (Example: air power source of 150 psi, discharge head pressure of 30 psi maximum.)

2. Connect the air supply line into the 1/4" NPTF port of the quick disconnect coupling supplied with the unit. The air supply line should be equipped with an air line water filter to prevent water from contaminating the pump control and/or causing freezing-up. A lubricator is also recommended for the air supply line (use non-detergent oil in the lubricator).

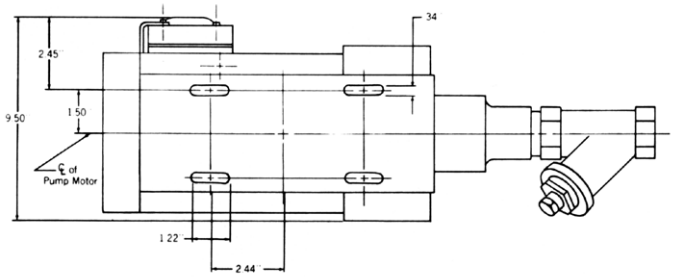


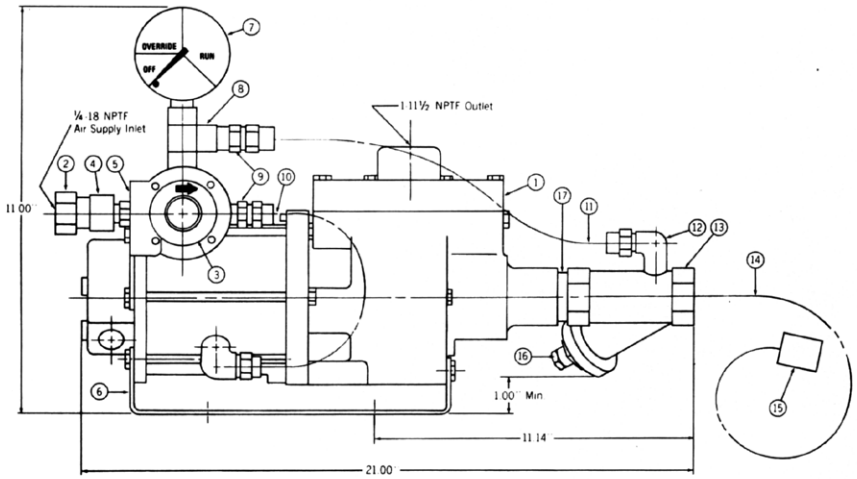
Figure 3

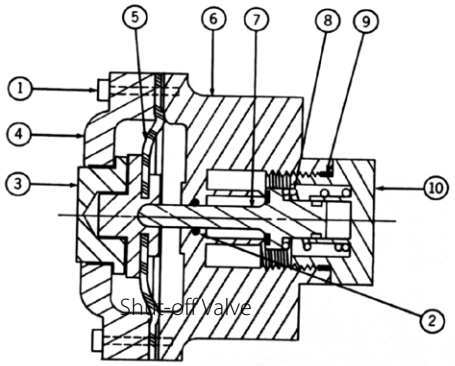
3. Install the 15' evacuation line by screwing the swivel hose fitting into the female thread on the strainer. Use pipe dope to insure a proper seal. Do not over tighten.

Note: The unit should not be mounted in a position requiring more then 10 feet of evacuation lift.

FLOCS 30A

Parts List and Assembly Drawing





Item No.	Quality Required	Description	Part No.	Basic Material
1	1	Pump	FF9330A-02	Cast Aluminum
2	1	Coupling Half	FD40-1000-04-04	Steel
3	1	Shut-off Valve	FF9330A-03	Aluminum
4	1	Coupling Body	FD40-1014-04-04	Steel
5	1	Bracket	FF9330A-14	Steel
6	1	Bracket	FF9330A-13	Steel
7	1	Cycle Gauge	FF9330A-11	Steel
8	1	Service Tee	2092-4-4S	Steel
9	1	Adapter	2021-4-4B	Brass
10	2	Hose Assembly	255603-4B-8	Brass Fittings
11	1	Hose Assembly	255603-4B-13	Brass Fittings
12	2	Adapter	2024-4-4B	Brass
13	1	Strainer	FF9330A-12	Steel
14	1	Hose Assembly	FA1552KMM1800	Steel Fittings
15	1	Coupling Half	5501-12-12S	Steel
16	1	Pipe Plug	2082-12S	Steel
17	1	Adapter	2084-16S-11/2	Steel

Shut-Off Valve Parts List

Item No.	Quality Required	Description	Part No.	Basic Material
1	4	Screw	FF9144-0110-12	Steel
2	1	O-ring	22550-008	Buna-N
3	1	Button	FF9330A-09	Aluminum
4	1	Cover	FF9330A-10	Aluminum
5	1	Diaphragm	FF9330A-08	Steel and Rubber
6	1	Valve Body	FF9330A-04	Cast Aluminum
7	1	Valve	FF9330A-05	Brass & Rubber
8	1	Spring	FF9330A-06	Spring Steel
9	1	O-ring	22550-018	Buna-N
10	1	Cap	FF9330A-07	Plastic

FLOCS 30A

Parts List and Assembly Drawing

Servicing Components

Instructions for Rebuilding Shut-Off valve (P/N FF9330A-03)

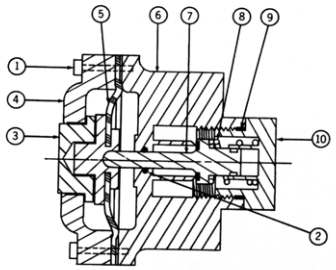


Figure 2

1. Remove the four cover screws, item #1; remove button, item #3; remove and replace diaphragm if necessary, item #5. For assembling, torque cover screws 25-30 in.-lbs.

2. Remove plastic cap, item #10; spring, item #8, and valve, item #7. Replace the O-ring seal, item #9, on the cap. Check the bonded seal on the valve, item #7; inspect for foreign particles or burrs and replace if necessary.

3. Replace O-ring seal, item #2, with a 22559-00B O-ring. Care must be taken not to scar the seal area upon removal of the O-ring.

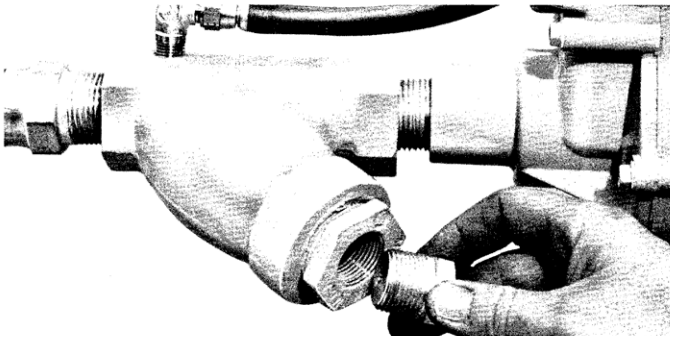
4. Lubricate all seals with petroleum jelly prior to installation. Make sure all metal parts are clean and not damaged.

5. Assemble in reverse order.

Note: A complete shut-off valve is available as an assembly for replacement.

Order by Part Number FF9330A-03.

Servicing the Strainer



The strainer should be serviced daily under normal fleet operation conditions. If the strainer becomes clogged or partially blocked with residue, the evacuation operation will slow down due to lack of oil flow to the pump.

1. Remove the strainer clean-out plug and screen.

2. Wash the plug and screen with clean fuel oil.

3. Replace the plug and screen. Tighten wrench-tight.

4. Be careful not to crack the castings or pipe bushings when reassembling the plug. Cracked and/or leaking castings will result in insufficient pumping.

Troubleshooting the FLOCS 30A

Problem

Unit will not run when override button is pushed.

Correction

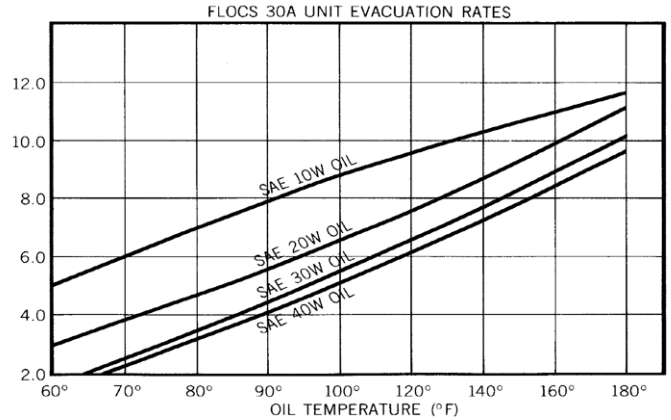
(A) Check the air supply line to see if it is connected and the air is turned on.

Problem

Unit will not continue running after the button is released.

Correction

(A) Button was not in override long enough; hold override button until cycle gauge indicates run.



(B) Check for vacuum leakage at strainer suction line, vehicle kit and/or hose fittings on control regulator.

(C) Check air pressure and CFM to make sure that the minimum 80 psi and 5 CFM are available to pump.

(D) Check the strainer for contamination.

(E) Check regulator for damaged seals or diaphragm. Reference Figure 5, page 6 for servicing.

(F) Check oil dipstick; oil pan may be empty.

Problem

Cycle gauge will not indicate the mode the pump is in.

Correction

(A) Check gauge to see if indicator hand is loose.

(B) Check for any leaks in thread and hose fitting connections.

Problem

Unit shuts off before all oil is evacuated.

Correction

(A) Check all threaded connections in suction line for vacuum leakage. Mount vacuum gauge in mating coupling half. Plug into end of suction line. Run pump to get a vacuum. Watch gauge. A sudden loss of vacuum indicates a suction leak.

Problem

Unit will not shut off after all the oil has been evacuated.

Correction

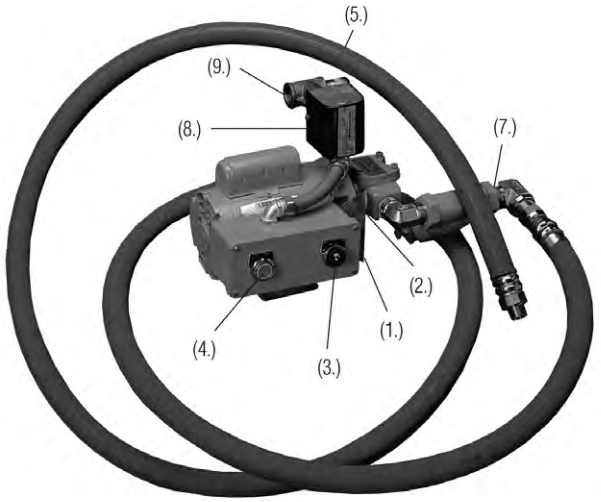
(A) Check for plugged coupling at vehicle kit.

(B) Check regulator for damaged seals or diaphragm. Reference Figure 5, page 6 for servicing.

Electric Units

Operation and Service Info

FLOCS 15
Electric-powered Unit



1. 3/4 hp electric motor, 115V AC, 20 amp

2. Gear pump

3. Cycle-run starter button

4. Cycle-run signal light

5. 15' of 1" I.D. suction hose*

6. Coupling half**

7. Suction strainer

8. 115V AC flow-control switch

9. Backflow check valve with a 3/4" NPT discharge port

The FLOCS 15 is a simple, almost totally automatic machine.

To operate:

1. Attach the suction line coupling half to the FLOCS coupling half on the vehicle. To connect the coupling, retract the knurled sleeve, push the coupling halves together and release the sleeve.

2. Press the cycle start button to start the unit. The cycle run light will come on.

3. The unit will shut off automatically when all oil is evacuated. The signal light will shut off. Disconnect the evacuation line.

Specifications

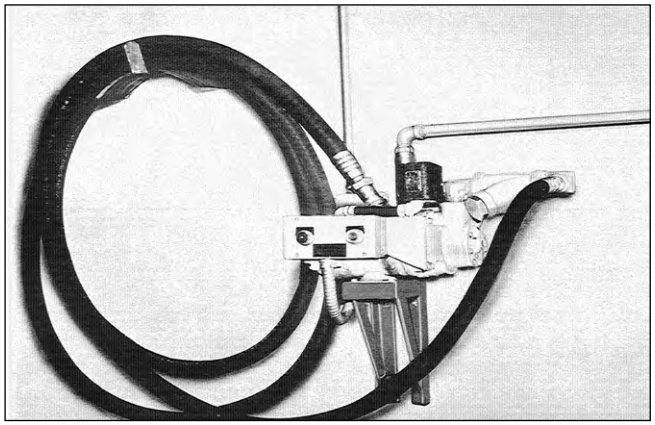
- Maximum discharge pressure-50 psi
- Maximum fluid lift-10ft
- Operating temperature (of fluid) +20ºF. to +180ºF.
- Strainer screen size-35 mesh
- Flow rate-see flow chart on back cover
- Motor electrical rating-115V., 60CY., 20 APM AC
- Fluid handling compatibility-all petroleum base fluids below 6000 SSU
- Minimum discharge line 3/4" I.D.
- Mounting requirements-per NEMA 56 C Frame

Installation Instructions

Mount the unit for easy accessibility to vehicles to be serviced. The pump motor operates on 115V AC 20 AMP. To install unit:

1. Remove cover plate from the control panel.

2. Drill an access hole on the side or the bottom of the control box (3/4" hole recommended for conduit). Run service wiring through access hole.



3. Connect a service grounding wire to one of the two bracket bolts on the side of the control box.

4. Connect the live wire to the 6" black lead.

5. Connect the neutral wire to the 6" white lead.

6. Tighten conduit or cord connector in 3/4" access hole.

7. Replace control panel and tighten in place.

8. Connect the old oil discharge line to the 3/4" NPT port on the check valve. NOTE: the check valve can be swung up or down for more direct routing.

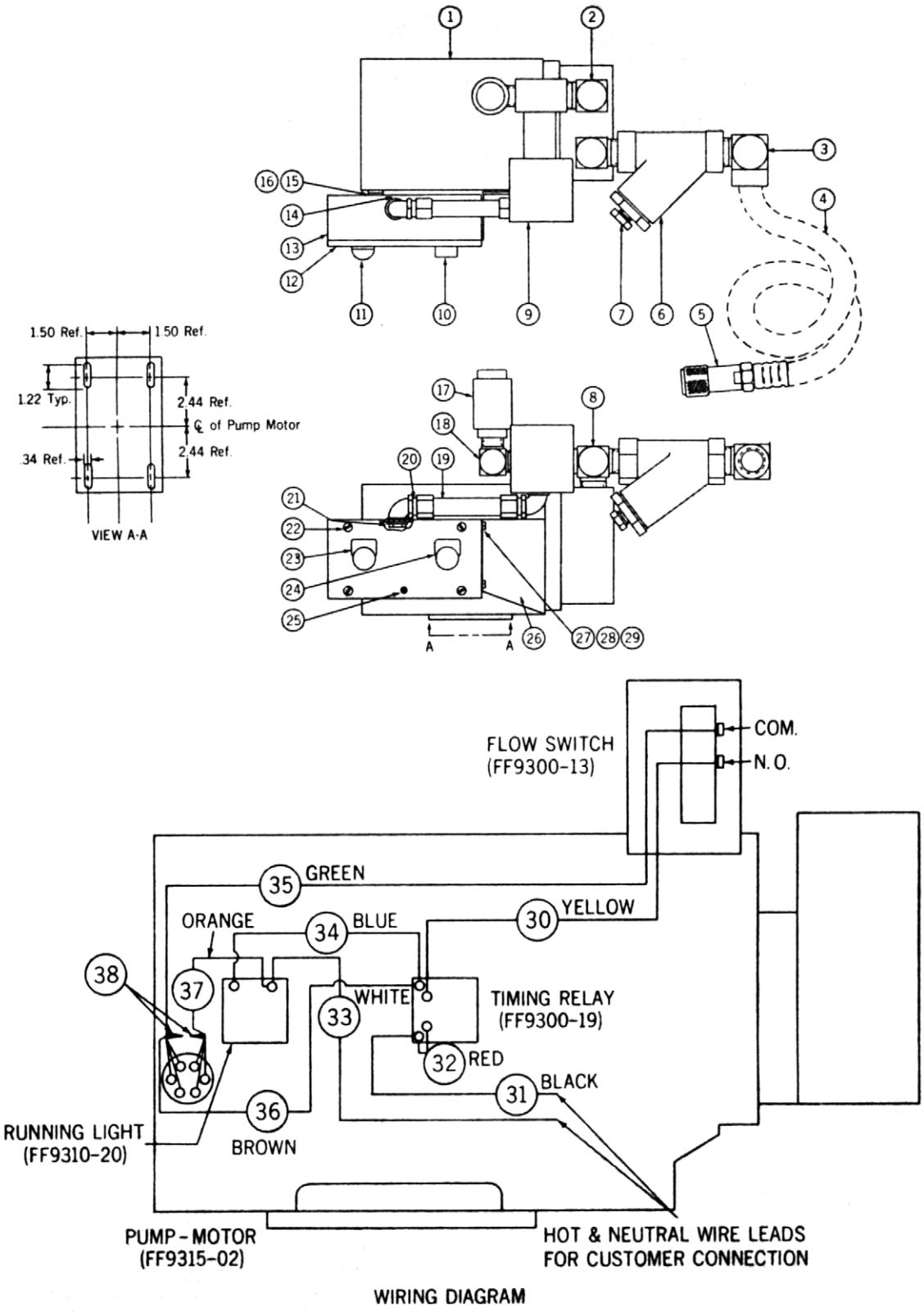
9. Install the 15' evacuation line by screwing the swivel hose fitting into the female NPT thread on the strainer adapter (a 90º adapter is available to suit installation). Caution: Do not over tighten pipe threads into strainer. The use of pipe sealant is recommended.

10. The timing relay (in the control box) is factory set for 25 seconds. The purpose of the timing relay is to keep the pump engaged until the initial flow of oil reaches the pump from the vehicle. For instructions on adjustment of the timing relay, see page 6.

Note: The unit should not be mounted more the 10 ft. above floor level to allow no more than 10 ft. of evacuation height. The discharge line should be plumbed so as not to cause more than 50 psi head pressure.

FLOCS 15

Parts List and Assembly Drawing



WIRING DIAGRAM

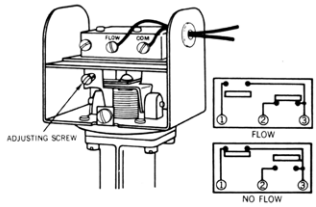
FLOCS 15

Parts List and Assembly Drawing

Item Number	Quantity Required	Description	Part Number	Basic Material
1	1	Pump Motor	FF9315-02	Steel
2	1	Adapter	2085-16-12S	Steel
3	1	Adapter	2089-16-16S	Steel
4	1	Hose Assembly	FA1552KMM1800	Steel
5	1	Coupling Half	5601-12-12S	Steel
6	1	Strainer	FF9315-03	Steel
7	1	Pipe Plug	2082-12S	Steel
8	1	Adapter	2085-16-16S	Steel
9	1	Flow Switch	FF9300-13	Steel
10	1	Timing Relay	FF9300-19	Steel
11	1	Running Light	FF9310-20	Steel
12	1	Cover	FF9315-20	Steel
13	1	Control Box	FF9315-05	Steel
14	1	Decal	FF9315-10	-
15	1	Conduit Nipple	FF9315-18	Steel
16	2	Lock Nut	FF9315-19	Steel
17	1	Check Valve	FF9315-24	Brass
18	1	Adapter	2085-12-12S	Steel
19	1	Conduit	FF9315-23	Steel & PVC
20	2	90º Angle Connector	FF9315-22	Steel
21	3	Reducing Washer	FF9315-21	Steel
22	4	Screw	210002-1-8-7S	Steel
23	1	Legend Plate	FF9315-07	Steel
24	1	Legend Plate	FF9315-06	Steel
25	1	Decal	FF9315-09	-
26	1	Bracket	FF9315-08	Steel
27	2	Bolt	FF9309-0110-04S	Steel
28	2	Lock Washer	210104-1-10S	Steel
29	2	Nut	FF9236-0110S	Steel
30	1	Wire Assembly	FF9315-11	Copper & Vinyl
31	1	Wire Assembly	FF9315-17	Copper & Vinyl
32	1	Wire Assembly	FF9300-30	Copper & Vinyl
33	1	Wire Assembly	FF9315-16	Copper & Vinyl
34	1	Wire Assembly	FF9315-13	Copper & Vinyl
35	1	Wire Assembly	FF9315-12	Copper & Vinyl
36	1	Wire Assembly	FF9315-25	Copper & Vinyl
37	1	Wire Assembly	FF9315-15	Copper & Vinyl
38	2	Wire Connector	FF9310-38	Steel & Plastic

Servicing Components

Servicing Components



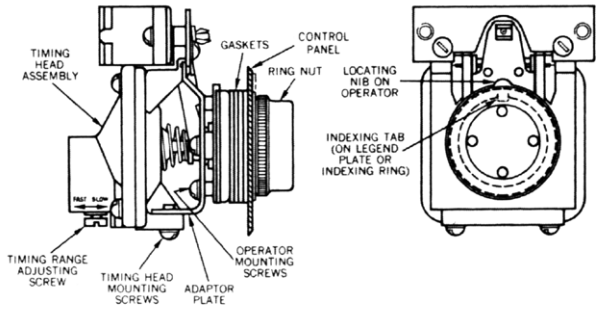
Instructions on adjustments of the flow switch:

1. Remove the black switch cover by loosening the two screws on the side and pull off the cover.

2. If a small amount of oil remains in the crankcase after the pump shuts off, the adjusting screw should be turned counterclockwise to decrease the sensitivity of the switch. DO NOT remove the screw completely or back it out so far as to cause interference with the replacement of the cover.

3. If the pump stays on when no oil is flowing, the adjusting screw should be turned clockwise until the pump shuts off.

Instructions on adjustment of the time delay-relay switch:



1. The timing relay is factory pre-set for a normal time delay on most applications (approximately 25 seconds).

2. To increase the time setting, turn the adjusting screw clockwise.

3. To decrease the time setting, turn the adjusting screw counterclockwise. A fraction of a turn will add or subtract 10-15 seconds of time.

Servicing Components

Servicing the Strainer:

The strainer should be serviced daily under normal operating conditions. If the strainer becomes clogged or partially blocked with engine residue, the evacuation operation will slow down due to lack of oil flow to the pump.

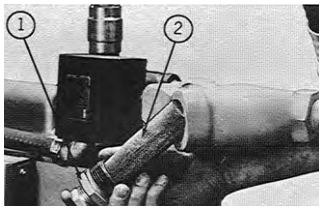


Figure 5

1. Remove the strainer clean out plug (Figure 7-1), and pull the screen (Figure 7-2) out.

2. Wash the plug and screen in clean fuel oil.

3. Place screen in plug counter bore and replace assembly in strainer housing. Tightening plug wrench tight. Use of pipe thread sealant is recommended.

Troubleshooting

Problem:

Unit operates approximately 25 seconds, then shuts off before all of the oil is out of the vehicle engine.

Correction:

(a) Oil may have too heavy viscosity due to a heavy weight oil or cold oil. The engine of the vehicle should be started and run to heat the oil to above 70ºF. or set the time delay switch to hold the pump engaged longer than the standard 25 seconds factory setting. See time delay switch adjustment (Figure 6).

(b) Strainer screen may be plugged with foreign material. Clean strainer screen in diesel fuel (Figure 7).

(c) The FLOCS unit may be trying to lift oil from too low a level. 10 feet lift is maximum. Move the FLOCS unit closer to the vehicle oil pan level.

(d) Hose connections may not be right at the vehicle pan plug. Check and tighten hose to plug union connection.

Problem:

Unit doesn't go into the evacuation cycle when "cycle run" button is pushed.

Correction:

(a) Check wiring to be sure there are no broken or disconnected wires.

(b) Check fuse on the power line to be sure power is being supplied to the unit.

Problem:

Evacuation is not fully completed when unit shuts off.

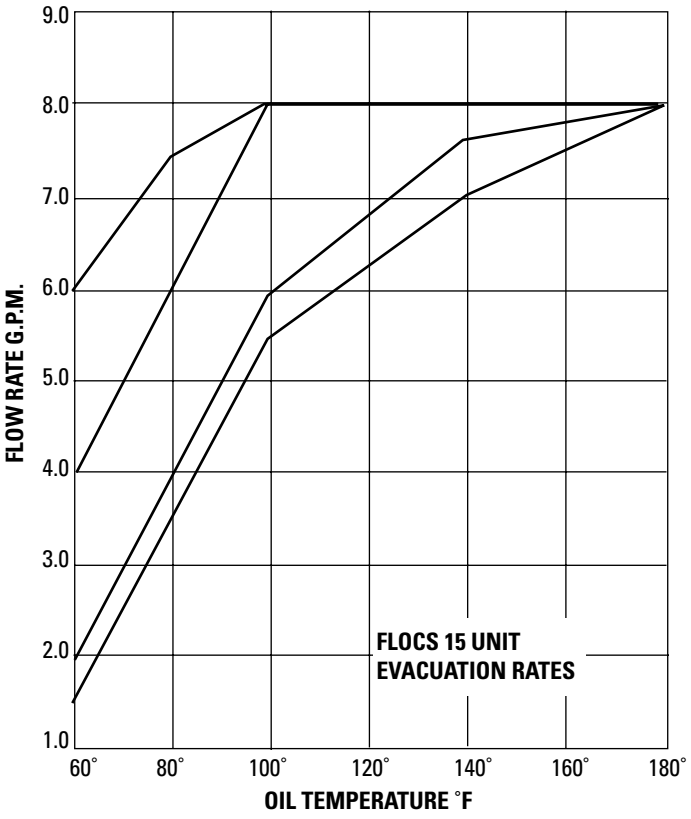
Correction:

(a) Flow switch may be set too high and be too sensitive to the lower stream of oil near the completion of evacuation. Adjust flow switch (Figure 5)

(b) Broad flat oil pans with drain connection coming out the side instead of the bottom can cause air to enter into the drain line causing premature shut off. Run a second cycle by resetting the cycle start button.

(c) Cold oil in the oil pan can cause slow drain down of the oil pan and allow the FLOCS unit to shut off prematurely. Start vehicle engine and warm oil above 70ºF. before evacuating.

Flow Rate Chart



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About
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Danfoss Power Solutions is a global manufacturer and supplier of high-quality hydraulic and electric components. We specialize in providing state-of-the-art technology and solutions that excel in the harsh operating conditions of the mobile off-highway market as well as the marine sector. Building on our extensive applications expertise, we work closely with you to ensure exceptional performance for a broad range of applications. We help you and other customers around the world speed up system development, reduce costs and bring vehicles and vessels to market faster.

We offer you expert worldwide support for ensuring the best possible solutions for outstanding performance. And with an extensive network of Global Service Partners, we also provide you with comprehensive global service for all of our components.

Danfoss Power Solutions – your strongest partner in mobile hydraulics and mobile electrification.

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