FlexWORKS
BY OPW FUELING CONTAINMENT SYSTEMS

Operating Instructions
Coupling Machine

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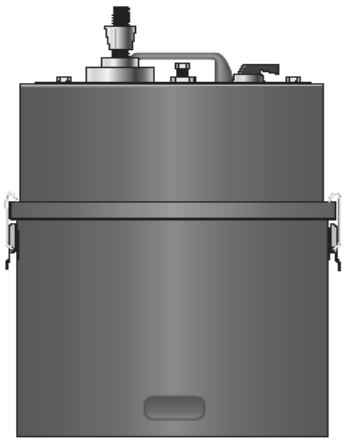
Pre-Assembly Instructions

Visually inspect all components for shipping damage. If any shipping damage is found, notify the carrier at once. Shipping damage is not covered by the warranty. The carrier is responsible for all repair or replacement cost resulting from damage in shipment. Read all CAUTIONS, WARNINGS, and INSTRUCTIONS included with, or attached to, the Coupling Machine.

Follow all safety precautions to avoid personal injury or property damage during the system operation. OPW FCS CANNOT BE RESPONSIBLE FOR DAMAGE OR INJURY RESULTING FROM UNSAFE USE OF THE COUPLING MACHINE, LACK OF MAINTENANCE OR INCORRECT PRODUCT AND SYSTEM APPLICATION. Contact OPW-FCS should you require any operating assistance.



WARNINGS

Do not use the coupling machine in the presence of flammable/combustible materials.

To avoid electrical shock, do not expose Coupling Machine to rain. Replace cover when not in use.

To avoid personal injury, do not use the Coupling Machine in an explosive atmosphere. Adhere to all local and national electrical codes.

To avoid injury, do not replace the hydraulic hose or fittings with replacements that have a pressure rating below the pump's maximum operating pressure.

The electric pump has a relief valve within the pump itself. The relief valve is factory adjusted and must not be repaired or adjusted except by qualified technicians.

CAUTION

To help prevent pump failure, check the dipstick to examine the fluid level prior to pump operation. Fluid should register on the dipstick after the unit extends and retracts 2 to 3 times. The dipstick will only register fluid when the cylinder is fully retracted. Use only Dexron ATF transmission fluid. Use of any other oils or fluids will void the warranty. Be sure the plug which the dipstick is attached to remains loose during usage, and is tight during transport.

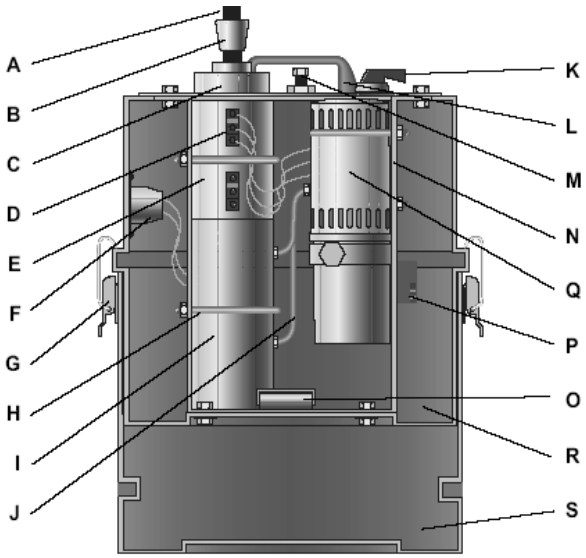
To prevent damage to the pump's electric motor, use the correct power source.

Coupling Machine Components

The OPW-FCS Coupling Machine is shipped completely assembled in a carton with all of the components necessary to couple 1.5" FlexWorks pipe with swivel fittings. The machine consists of the following sub-assemblies:

	Description	Qty.	Part No.
A.	Drive Shaft	1	CMS-3575
B.	Swage, 1.5"	1	CMS-1500
C.	Face Plate, 1.5"	1	EG-CM-0520
D.	Limit Switch	2	EG-CM-0420
E.	Mounting Block	1	EG-CM-0370
F.	Electrical Outlet	1	EG-CM-0430
G.	Latch	3	EG-CM-0340
H.	U-Bolt	3	EG-CM-0330
I.	Cylinder	1	EG-CM-0220
J.	Hydraulic Tubing	2	EG-CM-0560
K.	Up/Down/Off Switch	1	EG-CM-0350
L.	Handle	2	FG-MF-0070
M.	Bulk Head Fitting	1	EG-CM-0390
N.	Support Frame/Plate	1	EG-CM-0530
O.	Capacitor	1	EG-CM-0590
P.	Relay 110V. /220V.	1	EG-CM-0596/0595
Q.	Power Unit 110V. / 220V.	1	EG-CM-0230/0830
R.	Roto-molded Base	1	EG-CM-0580
S.	Roto-molded Cover	1	EG-CM-0570

(Cutaway View)



Note: As new sizes of FlexWorks piping are developed, OPW-FCS will offer various sizes of *Swage Kits* to accommodate those pipe sizes from 3/4" to 4". The *Swage Kit* consists of one *Drive Shaft*, one *Swage* and one *Face Plate*. The kits are available in the following sizes: 3/4", 1", 1-1/2", 2", 3", swivel fittings and 1-1/2" and 2" coaxial fittings. For more information, contact OPW-FCS's Customer Service Department.

Coupling Machine Assembly / Installation

Step 1: Remove all components from the carton and check for any missing or damaged parts.

Step 2: Unlatch the three clamps and lift the cover from the base. Turn the cover over, insert the base into the cover and latch the clamps to allow for usage of the machine.

Step 3: Loosen the brass vent plug with an allen wrench. Cycle the machine up and down two to three times. Inspect the oil level in the reservoir with the cylinder fully retracted. The proper amount of fluid is inside the unit when fluid appears along the length of the dipstick. (If fluid does not register on the dipstick, add a small amount of Dexron Automatic Transmission Fluid into the vent hole).

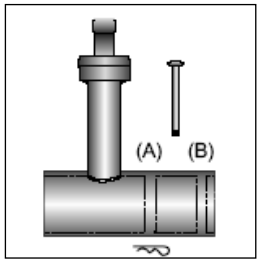
Step 4: Check that the Face Plate and nuts are tight. The threaded shaft must be completely turned into the cylinder before operation.

Step 5: When all coupling of FlexWorks piping is complete, be sure to fully retract the cylinder and tighten the brass vent plug with an allen wrench, then extend the cylinder one inch and turn the switch to the off position. This will allow the cover to be placed in its storage position with the threaded shaft and swage out of the way.

Pre-Coupling Procedure

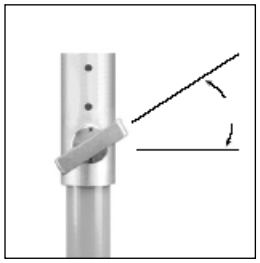
Stripping the Containment Jacket (Steel couplings only)

In order to install the Swivel Pipe Coupling to the end of the FlexWorks pipe section, it is necessary to strip off a 1-1/2" (38mm) section of the outer stand-off containment jacket. The following steps explain the stripping procedure using the OPW-FCS Jacket Cutter.



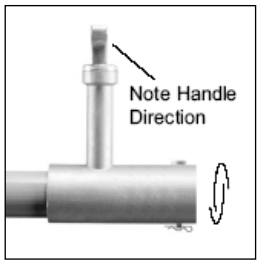
Step 1
Strip Length Setting

There are two sets of holes on the body of the jacket cutter for the installation of a "stop pin" used to set the length of the jacket to be cut off. The set of holes are used to strip off a shorter section for use with swivel couplings & fittings and the second set of holes are used to strip of a longer section for use with barbed fittings.



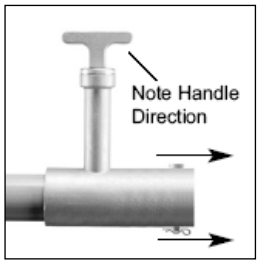
Step 2
Pre-stripping

Raise and turn the handle to 45 degrees so the blade will be above the surface of the pipe.



Step 3
Circular Cutting

Insert the end of the pipe section completely into the jacket cutter. Make sure the pipe bottoms against the stop pin. Next lower the handle so that it is perpendicular to the body of the jacket cutter. Rotate the cutter around the pipe two times to make a complete radial cut on the secondary jacket.



Step 4
Linear Cutting

Raise and turn the handle 90 degrees so the handle will be parallel with the jacket cutter body. Pull the jacket cutter off the end of the pipe to make the linear cut on the secondary jacket.

Step 5
Jacket Removal

Look closely for the linear cut down the pipe and peel the secondary jacket away at that point from the primary inner pipe.

IMPORTANT
It is necessary to use the OPW-FCS Jacket Cutter whenever preparing to attach a swivel coupling to FlexWorks Pipe. This tool is designed to allow the user to remove a specified amount of secondary while keeping the primary free from harm. Inspect outer surface of primary pipe after jacket removal.

CAUTION
Exercise care when using any cutting tools as injury may result from improper handling.

Coupling Machine Operation

1. Keep all power cords reasonably short to avoid power losses between the outlet and the pump motor. The pump motor will function at low voltage, but motor speed and oil flow will be slower than normal. For peak performance use the shortest possible power cords.

2. The CME-0110 and CME-0110R model Coupling Machines require a 5 amp, 110V. grounded circuit. The CME-0220 model Coupling Machine requires a 3 amp, 220 V. grounded circuit. See **Page 3** for more information on the CME-0110, CME-0110R and CME-0220 models.

3. Open the Vent Plug located on the top of the machine (1 or 2 complete turns). **The vent plug must be loose whenever the pump is running. Close the vent when transporting the Coupling Machine.**

4. The pump Retract/Extend Switch is located on top of the machine next to the vent plug. It is a three position switch: the left position is "UP", the middle is "OFF" and the right position is "DOWN". Turning the switch to the right position will retract the cylinder, turning the switch to the left position will extend the cylinder and placing the switch in the center position will shut the power off. The power unit will automatically turn off when the cylinder fully extends or retracts.

5. The electric motor drives a pump which operates a double-acting hydraulic cylinder. Turning the switch in the "DOWN" position pulls the shaft and swage assembly into the hydraulic cylinder with sufficient force and stroke length to pass through and expand the coupling onto the pipe. Turning the switch to the "UP" position returns the shaft and swage to the start position.

IMPORTANT
Connect machine to a properly grounded outlet only.

Pipe Coupling Procedures

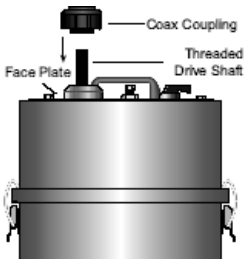
5-Step Installation Procedure

The OPW FCS FlexWorks Piping System requires the use of the OPW-FCS Coupling Machine for proper installation of the Pipe Coupling. **Be sure to use only OPW-FCS Couplings and coupling equipment to couple the ends of the piping.** Coupling Machines are available in both 110 and 220 volt models. Consult your local OPW-FCS Distributor for the availability for rental or purchase of these Coupling Machines.

The following 5-step installation procedure should be observed when coupling OPW FCS FlexWorks piping.

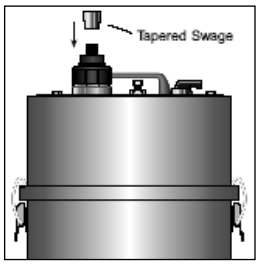
IMPORTANT
Be sure that the Threaded Drive Shaft is completely threaded into the cylinder before each use.

CAUTION
Make sure that the "Vent Screw" is loose before operating the Coupling Machine to avoid damaging the pump. Tighten the "Vent Screw" prior to transporting the machine.



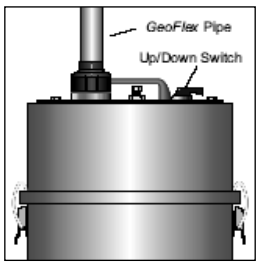
Step 1 Positioning Pipe Coupling

Apply white Lithium grease to the inside of the coupling. Unscrew and remove the "Tapered Swage" from the threaded Drive Shaft. Place the Pipe Coupling Assembly over the Drive Shaft and push it down onto the Face Plate.



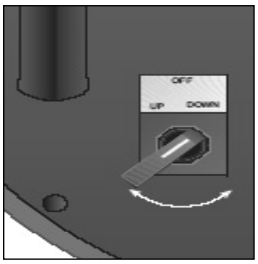
Step 2 Installing The Tapered Swage

Thread the "Tapered Swage" onto the Drive Shaft until it meets the back of the *Pipe Coupling Assembly.* Lubricate the outside of the Tapered Swage using white Lithium grease. **NOTE**: Do not use silicone based lubricants. Be sure the Swivel Nut of the Pipe Coupling Assembly is flush against the face plate for steel couplings, and the insert is flush against the face plate for coaxial couplings.



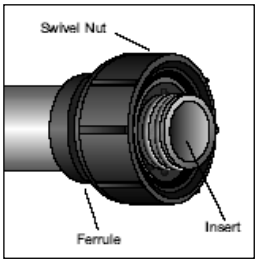
Step 3 Inserting The Pipe

Insert the end of a flexible pipe section inside the Pipe Coupling until it bottoms out. Inspect the entire assembly making sure the Swivel Nut is flush against the face plate and the Pipe Coupling and section of pipe are totally vertical prior to switching on the machine.



Step 4 Swaging

To begin the swaging process, turn the Switch to the **DOWN** position. Once the Tapered Swage passes through the Pipe Coupling Assembly, the motor will turn off. Turn the switch to the **UP** position to allow the drive shaft to return to the starting position.



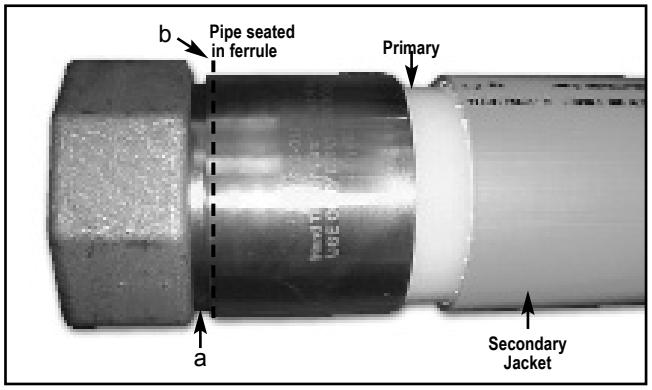
Step 5 Inspection

Inspect the installed Pipe Coupling Assembly **inside** and **out** to make sure the assembly has remained clean and there was no damage to the Insert, Ferrule or Swivel Nut during the swaging operation.

NOTE:
After the coupling procedure is completed, re-insert the thread protector into the coupling.

Properly and Improperly Installed Swivel Coupling

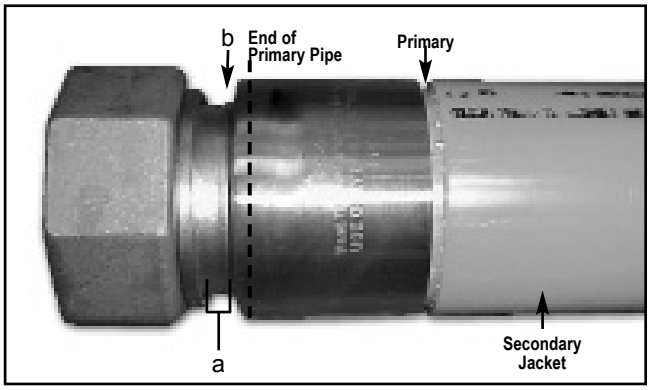
PROPERLY INSTALLED SWIVEL COUPLING



a. Ferrule properly seated to insert shoulder.

b. Primary pipe pushed to the front of the ferrule inside over all barbs at insert.

IMPROPERLY INSTALLED SWIVEL COUPLING



a. Notice ferrule not pushed to insert shoulder.

b. Piping not pushed over barbs completely.

Maintenance

1. Check reservoir hydraulic oil level before each use and at any time when leakage is noticed. Add Dexron ATF transmission fluid when necessary to have the fluid register on the dipstick. Only check level or add fluid when the cylinder is fully retracted.

CAUTION
Do not add transmission fluid when the Drive Shaft is fully extended as it will cause overfill damage to the reservoir when the Drive Shaft is retracted.

2. Completely drain the reservoir every 100 hours of operation. Refill with new Dexron ATF transmission fluid. If unit is operated in very dusty areas or at high temperatures, drain and refill more frequently.

3. To drain the reservoir, contact the OPW-FCS engineering department for procedure recommendation.

Description	CME-0110 / CME-0110R Models	CME-0220 Model
Max. Operating Pressure	0-3,000 psi	0-3,000 psi
Electrical Power Source	5 AMP, 110 V .50/60 Hz	3 AMP, 220 V. 50/60 Hz
Motor Rating	1/3 HP	1/3 HP
Flow Rate	3450/2850 RPM \	3450/2850 RPM
Max. Operating Temperature	180Þ F. (82.5Þ C.)	180Þ F. (82.5Þ C.)

IMPORTANT INFORMATION - FOLLOW ALL INSTRUCTIONS
Please contact your OPW-FCS sales representative or OPW-FCS customer service representative at 1-800-422-2525 for OPW-FCS products installation procedures. All OPW-FCS literature including installation instruction sheets and manuals can be accessed from the OPW-FCS website at: www.opwfcs.com.

The use of non-qualified personnel or any deviations from these recommended procedures could result in damage or leakage of the system.

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