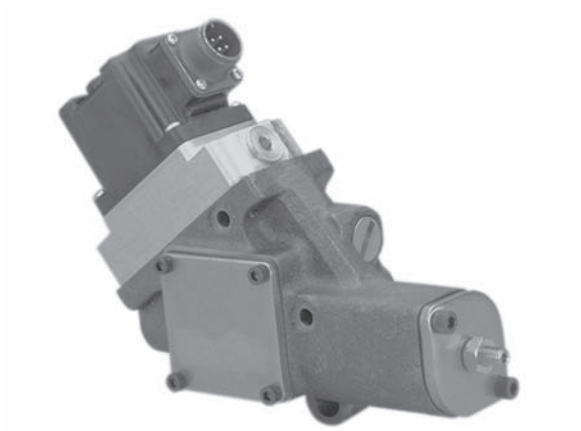
MCV105C
Electrical Displacement Control - MDT

DESCRIPTION

The MCV105C Electrical Displacement Control (EDC) is a two-stage electrohydraulic pump stroke control which uses mechanical feedback to establish closed loop control of the swashplate angle of Danfoss 46 cc Medium Duty Pumps.

The first stage is a MCV116A torque-motor actuated, double-nozzle flapper valve that produces a differential output pressure proportional to the applied electrical signal. The second stage uses the differential pressure to drive its double spool arrangement and port oil to the pump servo pistons. The second-stage rotary spool configuration allows a null deadband (for machine safety) in the pump's output while maintaining optimum dynamic response to control commands.



FEATURES

- Single command source can be used to control both hydrostatic pump and motor.
- Servo control deadband independent of signal null deadband: offers safety combined with accurate and responsive control.
- Resistance to the environment: silicone oil filled torque motor prevents moisture condensation, environmentally sealed first/second stage interface, full environmental testing.
- Minimum long term null shift.
- Pilot supply screens in series. Upstream screen is externally serviceable.
- Plugged first stage orifice will not drive pump towards full stroke.
- First and second stages can be individually replaced in the field.
- Single or dual coil torque motor.

ORDERING INFORMATION

The standard EDC is a single coil (one input to the torque motor) Packard connector device. The first option is a dual coil, which allows two command sources to be compared at the torque motor, the resulting signal being the algebraic sum between the two. Connectors are the second connector option available. Dual pilot coils are available with both connector types. See Wiring, page 8.

All MCV105C orifices will be provided through Danfoss, Ames, Iowa.

Order the EDC either factory installed on pumps or as an individual control.

Order replacement parts through Danfoss, Minneapolis, MN. See Table C and D - Service Parts , page 3 to 4, for item number, part number and description correspondence.

MCV105C directly replaces MCV105B. The MCV105C housing is designed to firmly maintain the O-rings while mounting. All MCV105C models are factory shipped with O-rings installed, while the MCV105Bs were not. See Table C - Service Parts, page 3, for the appropriate installation kit if required.

TABLE A - INFORMATION NECESSARY TO SPECIFY THE EDC.

MCV105C 3 0 **XX**

STANDARD EDC CASTING

PILOT STYLE

PILOT STYLE	DESCRIPTION
22	Single coil, 23 ohm, Packard Weather Pack connector
23	Dual coil, Packard Weather Pack connector
26	Single coil, 23 ohm MS connector
27	Dual coil, 23 ohm MS connector
46	Single coil, 643 ohm, Packard Weather Pack connector

TECHNICAL DATA

ELECTRICAL

THRESHOLD

6.25 ± 0.75 mA (single coil, 643 ohm)
16 ± 3.5 mA (single coil, 23 ohm)
23 ± 4.6 mA (using one of the dual coils)
11.5 ± 2 mA (using the dual coils in series)
23 ± 4 mA (using the dual coils in parallel)

DEADBAND

12.5 ± 1.5 mA (single coil, 643 ohm)
32 ± 7 mA (single coil, 23 ohm)
46 ± 9 mA (using one of the dual coils)
23 ± 4 mA (using the dual coils in series)
46 ± 9 mA (using the dual coils in parallel)

FULL STROKE CURRENT

18 ± 1.5 mA (single coil, 643 ohm)
90 ± 12 mA (single coil, 23 ohm)
130 ± 18 mA (using one of the dual coils)
65 ± 9 mA (using the dual coils in series)
130 ± 18 mA (using the dual coils in parallel)
For sizing drive sources, use 100 mA in computations for single coil EDCs. See Input Current vs. Pump Swashplate Angle, page 3.

COIL RESISTANCE @ 24° C (76 ° F)

23 ohms (single coil, optional)
643 ohms (single coil)
20 ohms (A, B terminals) (dual coil)
16.5 ohms (C, D terminals) (dual coil)

COIL RESISTANCE @ 104° C (220° F)

29 ohms (single coil)
842 ohms (single coil)
24.7 ohms (A, B terminals),
19.7 ohms (C, D terminals) (dual coil)

SUGGESTED DRIVE VOLTAGES

The MCV105A EDC uses a pilot valve that is current-driven. Since coil resistance is a function of temperature, as the pilot's coil temperature increases, a higher input voltage is required to drive the pilot to full stroke. Table B - Suggested Voltage Drives, below, demonstrates this relationship and lists the suggested voltage drives for two coil temperatures.

MAXIMUM CONTINUOUS VOLTAGE THAT WILL NOT DAMAGE THE DEVICE

6.0 Vdc @ 200 ° F (93.3 ° C) (dual coil)
7.5 Vdc @ 200 ° F (93.3 ° C) (single coil, 23 ohm)
30 Vdc @ 200° F (93.3 ° C) (single coil, 643 ohm)

COIL INDUCTANCE

0.085 Henries (single coil, 23 ohm)
0.062 Henries (A, B terminals 20 ohm) (dual coil)
0.047 Henries (C, D terminals 16.5 ohm) (dual coil)
2.372 Henries (single coil, 643 ohm)

HYDRAULIC

OIL VISCOSITY

40 - 6000 SSU

FLUID

Automatic transmission fluid or hydraulic oil, such as Mobil DTE 24 or equivalent. Fluid cleanliness is ISO 4406 code 18/15 or better.

FLUID TEMPERATURE

The valve will be functional and undamaged at oil temperatures of -40 ° to 121° C (-40° to 250 ° F). The valve will meet performance specifications with a fluid temperature of 21° to 82° C (70° to 180° F).

FILTRATION

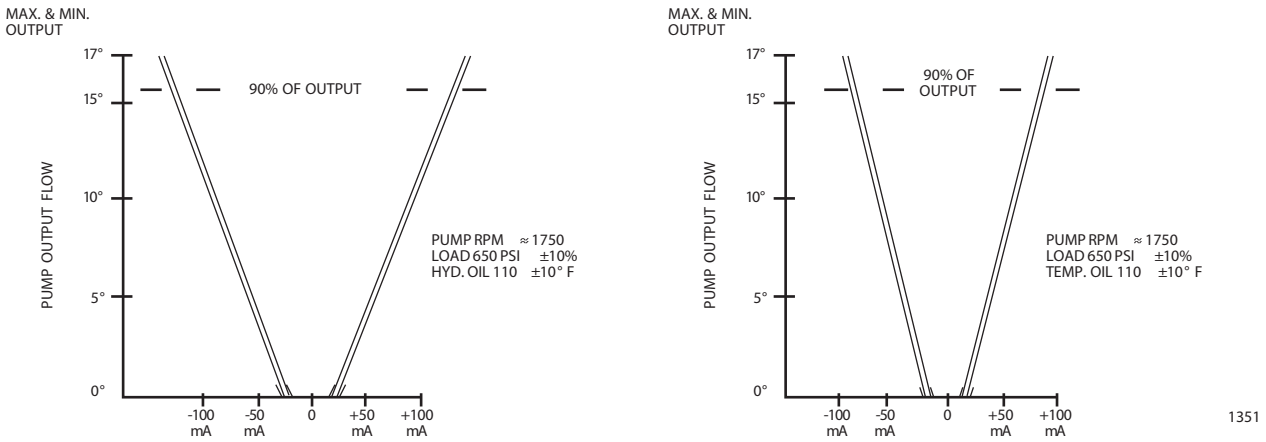
The system hydraulics will have a filtration rating of ß = 2 or better [10]

TABLE B - SUGGESTED VOLTAGE DRIVES.

	120° F (49 °C) OIL TEMPERATURE		180°F (82°C) OIL TEMPERATURE	
COIL	**CURRENT (mA)**	**VOLTAGE (Vdc)**	**CURRENT (mA)**	**VOLTAGE (Vdc)**
SINGLE (23 ohm)	90	2.2	90	2.5
SINGLE (643 ohm)	18	13.2	18	14.7
DUAL (Coil A) (A, B terminals)	132	2.7	132	3.0
DUAL (Coil B) (C, D terminals)	132	2.2	132	2.5
DUAL (In Series)	66 *	2.4	66 *	2.6
DUAL (In Parallel)	132 *	1.2	132 *	1.3

* Algebraic sum of currents in the two coils.

INPUT CURRENT VS. PUMP SWASHPLATE ANGLE



Input current vs. pump swashplate angle. Pump RPM is 1750 and the output load is 650 psi. Left curve is a dual coil EDC and right is a single coil.

SERVICE PARTS

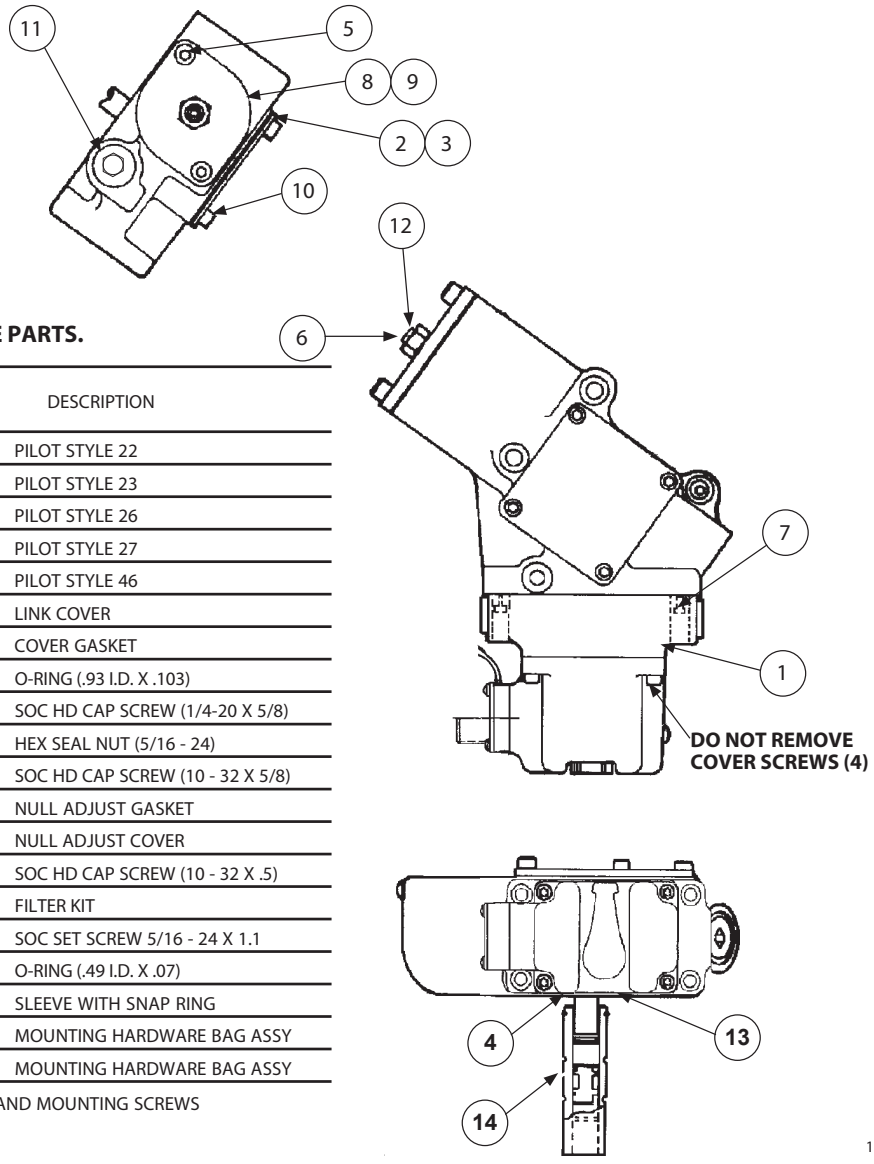


TABLE C - SERVICE PARTS.

ITEM NUMBER	PART NUMBER	QTY	DESCRIPTION
1	MCV116A3102	1	PILOT STYLE 22
1	MCV116A3204	1	PILOT STYLE 23
1	MCV116A3101	1	PILOT STYLE 26
1	MCV116A3201	1	PILOT STYLE 27
1	MCV116A3501	1	PILOT STYLE 46
2	K13340	1	LINK COVER
3	K13341	1	COVER GASKET
4	9004101-1190	1	O-RING (.93 I.D. X .103)
5	K07057	2	SOC HD CAP SCREW (1/4-20 X 5/8)
6	K11615	1	HEX SEAL NUT (5/16 - 24)
7	K04064	4	SOC HD CAP SCREW (10 - 32 X 5/8)
8	K08131	1	NULL ADJUST GASKET
9	K00944	1	NULL ADJUST COVER
10	K04167	4	SOC HD CAP SCREW (10 - 32 X .5)
11	K22582	1	FILTER KIT
12	K10057	1	SOC SET SCREW 5/16 - 24 X 1.1
13	K07006	2	O-RING (.49 I.D. X .07)
14	K22539	1	SLEEVE WITH SNAP RING
**	KK05602	1	MOUNTING HARDWARE BAG ASSY
***	KK05601	1	MOUNTING HARDWARE BAG ASSY

** BAG ASSEMBLY INCLUDES ITEMS 4 AND 13 AND MOUNTING SCREWS

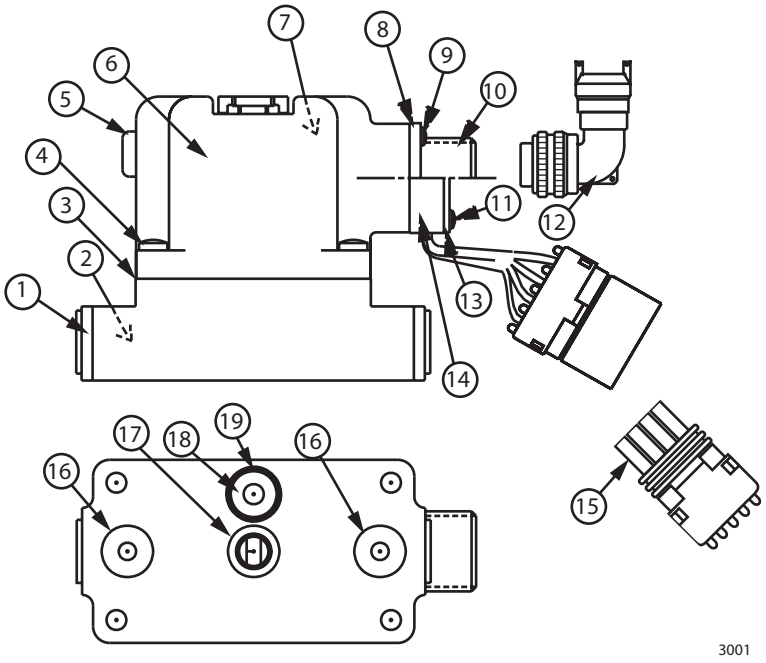
*** BAG ASSEMBLY FOR MCV105B MODELS

NOTE: The cover is filled with a silicone oil. In the event this oil is lost, it is recommended it be restored. The silicone oil is ordered under part number K21436, which includes instructions.

SERVICE PARTS *(continued)*

TABLE D - SERVICE PARTS.

ITEM	P/N	QTY	DESCRIPTION
1	K01291	5	SAE-6 Plugs
2	K07067	4	PCP Mounting Screws
3	K00860	1	PCP Cover Gasket
4	K02264	4	PCP Cover Screws
5	K00920	1	PCP Null Access Screw
6	K11423	1	PCP Cover
7	K21436	1	Silicone Oil Kit 4000 cs
8	K04196	1	Connector Gasket
9	K08687	4	Connector Screw for MS
10	K01314	1	Connector MS
11	K08688	4	Connector Screw for Packard
12	K08106	1	Mating Electrical Connector MS
13	K08014	1	Feed Through Assy Cover Plate
14	K07533	1	Feed Through Assy 4-pin Packard W-P
15	K03384	1	Mating Electrical Packard W-P
16	K00829	2	O-ring control port
17	K00830	1	O-ring return port
18	K08573	1	Filter Assy with O-rings
19	K08493	1	O-ring pressure port



SERVICE PARTS *(continued)*

Items referenced in Table D - Service Parts, page 4.

(1) Item 4.

WARNING

DO NOT Remove Cover Screws, unless replacing cover.

(2) Items 4, 6, 8, 9, 10, 11, 13, 14. The following steps are recommended when servicing those service parts listed in Table D - Service Parts, page 4.

Preferred service tools are:

- Screw driver TX 15 and TX 10
- Solder SN62
- Needle nose pliers, small tip
- Solder iron, electronic type
- Volt/ohm meter (VOM)
- Cleaning solvent, Chemtronics 2000 ES 1601
- Torque wrench, 0-50 in•lb (0-66 N•m)

REPLACING COVER AND/OR ELECTRICAL CONNECTOR

1. Wipe down external surface to ensure that loose contaminants will not fall inside the housing.

2. Place the valve in a firm position at 45° with the electrical connector tilted upwards (PCPs built after 1988 are filled with a silicon oil). Locate and remove the four connector screws (Item 9 if MS connector, or Item 11 if Packard connector).

3. Hold the electrical connector and untwist wires by rotating the connector CCW two turns while gently pulling away from the housing.

4. Clean the solder connections inside connection of the electrical connector with degreaser. Unsolder the wires, noting which pin goes to which wire color (i.e., Pin A to black, Pin B to red, Pin C to brown, etc.). With the connector held firmly, place the solder iron against the base solder cup if MS, and pin if Packard, until the wires can be gently pulled away.

5. The cover can now be removed and replaced if required. Be sure the cover gasket (Item 3) is firmly seated into the cover base and is in good condition before cover is installed. Torque cover screws to 12-15 in•lb (16-20 N•m).

6. Verify that wire to pin connections are correct before soldering wires. Also ensure that the connector gasket (see Table D - Service Parts, Item 3, page 4) is in place before soldering.

7a. For the MS style connector, ensure that the cups have sufficient solder (approximately level). If additional solder is required, place solder iron against the base of the cup and add solder. While solder is still liquid, place wire in the cup, remove iron and let cool for several seconds while holding wire firmly.

7b. For the Packard style connector, the wire should extend around and contact the terminal post for at least 180° (1/2 wrap to a maximum of 270°). When ready to solder, heat the terminal and add solder, remove iron, and let cool for several seconds while holding wire firmly.

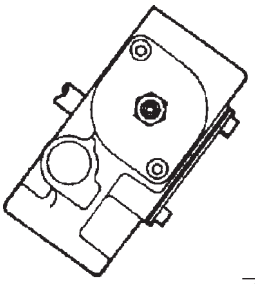
8. After soldering, ensure that terminals and wires do not contact one another.

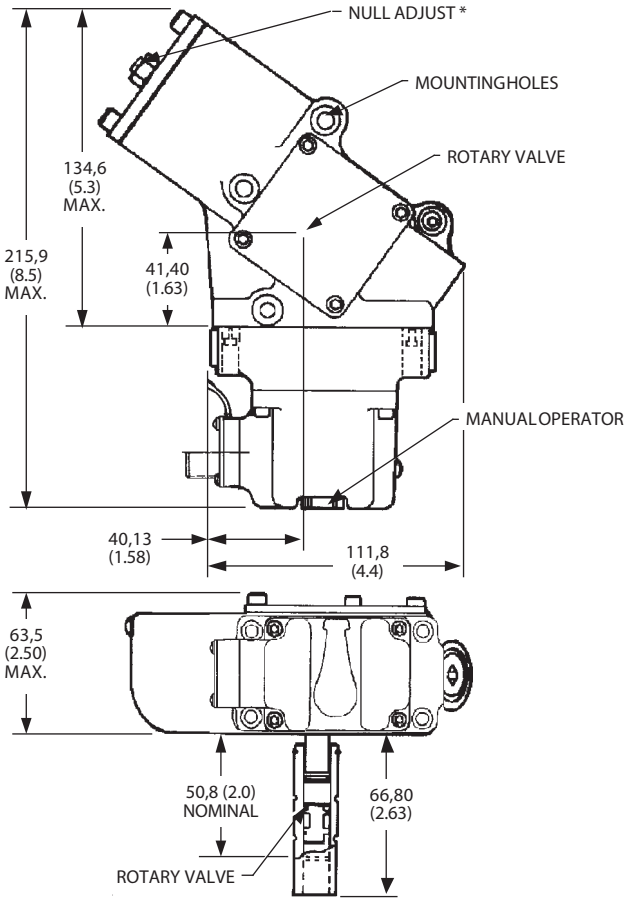
9. If silicone oil is to be added, do so at this step with the connector not yet attached to cover. Tilt cover upward and add 45-cc of oil from container. The container (P/N K21436) holds enough for 3 fills.

10. Before attaching the connector to the cover, rotate connector CW two turns. This will bundle the wires together, finishing with the notch up when viewed from the outward side of the MS connector, and lead wires down for Packard connector (see MS Connector Pin Orientation, page 9). Insert connector screws and torque to 8-10 in•lb (11-13 N•m).

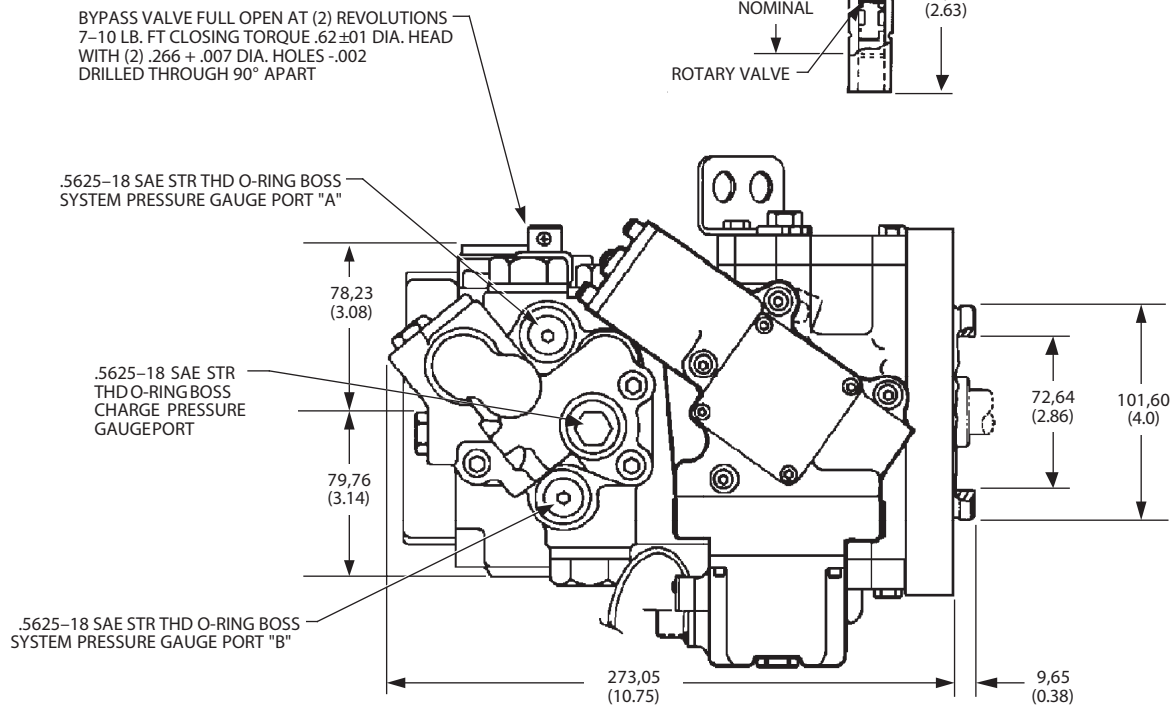
11. With a VOM, check for proper coil resistance between terminals A and B, and between C and D if PCP is a dual coil.

DIMENSIONS





*CAUTION: DO NOT ADJUST NULL ON PILOT STAGE.
USE SECOND STAGE NULL ADJUST.



Dimensions of the MCV105C EDC in millimeters (inches).

THEORY OF OPERATION

The MCV105C Electric Displacement Control (EDC) is a two-stage electrohydraulic pump stroke control which uses mechanical feedback to establish closed loop control of the swashplate angle of Danfoss Medium Duty Pumps.

The first stage, the MCV116A Pressure Control Pilot, is a torque motor actuated, double-nozzle flapper valve that produces a differential output pressure proportional to the applied electrical signal. The second stage uses the differential pressure to drive a linear motion piston which actuates a rotary spool through a cam and ports oil to the pump servo piston. The second stage spool configuration allows a null deadband (for machine safety) in the pump's output while maintaining optimum dynamic response to control commands.

A command source such as a control handle or electronic controller applies a dc current signal to the pilot stage of the MCV105C Electric Displacement Control. The input current commands the pilot's torque motor stage, a bridge network consisting of an armature mounted on a torsion pivot and suspended in the air gap of a magnetic field. Two permanent magnets polarized in parallel and a connecting plate form a frame for the magnetic bridge. At null the armature is centered in the air gap between the magnet's opposing poles by the equivalence of their magnetic forces and the null adjust centering springs. As input current rises, the end of the armature becomes biased either north or south, depending on the direction of the current. The resulting armature movement is determined by the amperage of control current and the differential pressure feedback forces.

The magnetic bridge output, flapper torque, in turn controls the hydraulic bridge ratio. At null, the flapper is centered between two nozzles. Upstream from each nozzle is an orifice which provides a nominal pressure drop when the system is at null. Between the nozzle and the orifice on each side is a control port. As the torque motor shifts the flapper away from one nozzle toward the other, a differential control pressure results, the high side being the one nearer the flapper. Fluid pressure rises on this side and moves the flapper back towards null. When the torque output from the motor equals the torque output from the pressure feedback, the pilot system is in equilibrium. It is this pressure feedback that makes the pilot a stand-alone closed loop pressure control valve.

The second stage of the EDC uses a piston and rotary valve arrangement that serves to separate the null deadband from the feedback, giving both safety against null drift and quick dynamic response to command changes.

The second stage's null adjust is set with the modulating spring compressed to the equivalent of 12 psi, which is the amount of differential pressure required to move the actuator spool one direction or the other. This is a factory setting that defines the width of the actuator spool deadband and cannot be changed. By tightening or loosening the null adjust screw, the fixed deadband is moved toward or away from the "A" control port.

As differential control pressure (C1 - C2) rises beyond the 12 psi deadband, the actuator piston moves in one direction or the other, pivoting a cam which turns a rotary valve. When the valve turns far enough, oil is ported to the pump servo piston, causing rotation of the swashplate in one direction or the other. As the swashplate turns, an attached valve sleeve, concentric with the rotary valve, turns and closes off the oil being ported to the servo piston. Thus the swashplate angle is forced to follow the angular input of the rotary valve.

PERFORMANCE

RATED CASE PRESSURE
40 psi operating pressure

MAXIMUM HYSTERESIS
3 mA (single coil, 643 ohm)
15 mA (single coil, 23 ohm)
18 mA dual coil

SYMMETRY
Input current required to reach rated output in each direction must be equal within 10%.

LINEARITY
10% maximum of swashplate angle change between any two points except within 5 % of the threshold current.

NEUTRAL LEAKAGE
0.65 gpm maximum at 200 psi across the valve with oil of 145 - 160 SUS at 38° C (100 ° F).

POLARITY
A positive voltage applied to terminal B (single coil) or terminals B or D (dual coil) will cause a pressure rise at the C2 port.

NOMINAL FREQUENCY RESPONSE
90° phase lag and negative 6db amplitude ratio at greater than 1.5 Hz (defined without orifices in A and B ports and a charge pressure of 300 psi. The average current input is 40 mA with a sine wave input of ±15 mA.) See the Amplitude and Phase Response Curves.

STEP RESPONSE (Null to 63% full stroke)
The response to a current step input of plus or minus 85 mA will result in a pump stroke response time of 0.5 ±0.1 second to 63% of full stroke.

STEP RESPONSE (full to full), maximum
The response from full forward stroke to full reverse stroke varies per orifice size:

Orifice Size In Inches	Response In Seconds (± .9 seconds)
No Orifice	1.2
0.037	2.7
0.047	1.7
0.055	1.3
0.064	0.9

PERFORMANCE *(continued)*

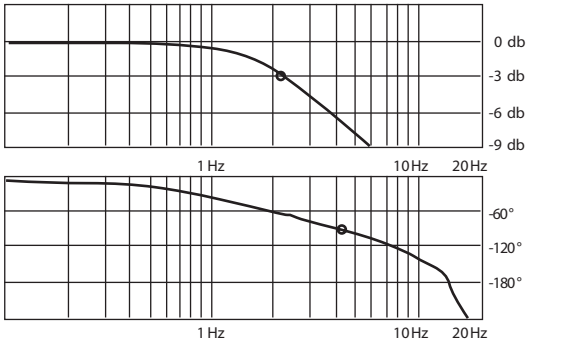
SENSITIVITY

The valve will respond to a 2% change in input current throughout the rated current range except for the deadband region.

PULSE WIDTH MODULATION

When using a pulse width modulated current input, do not exceed 110 mA for single coil devices or 150 mA (algebraically summing the currents in coil A and B) for dual coil devices. Avoid pulse width modulated frequencies between 300 and 500 Hz, which approach the pilot's resonant frequency of 400 Hz.

AMPLITUDE AND PHASE RESPONSE



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Amplitude and phase response of the MCV105C tested over the given frequency range with supply pressure of 225 psi. Amplitude response curve is on top; phase lag is on bottom. The amplitude at low frequency is 40±15 mA and the load is 650 psi. Frequency response varies with the applied load. Curves are shown with a current driver.

ENVIRONMENTAL

SHOCK

50 G's for 11 milliseconds. Three shocks in both directions of the three mutually perpendicular axes for a total of 18 shocks.

VIBRATION

Withstands a vibration test designed for mobile equipment control consisting of two parts:

1. Cycling from 5 to 2000 Hz in each of the three axes.
2. Resonance dwell for one million cycles for each resonance point in each of the three axes.

Subject to acceleration levels of 1 g to 46 G's. Acceleration level varies with frequency.

HUMIDITY

After being placed in a controlled atmosphere of 95% humidity at 49° C (120° F) for 10 days, the EDC will perform within specification limits.

WIRING

Two wiring styles are available: MS and Packard connectors. The MS connector has four pins, only two of which are used (A and B) for single coil devices. (Note: device MS connector is not field-replaceable.) Its mate is part number K08106 bag assembly (MS3106E-14S-2S). See MS Connector Pin Orientation, page 9, for proper pin locations. With both designs, phasing is such that a positive voltage on the Red wire (Pin B) will cause a pressure rise at the C2 port for single coil valves.

The mating Packard connector is part number K03383 bag assembly comprised of:

1. 2 (or 4) 14-16 gauge sleeves
2. 2 (or 4) 18-20 gauge sleeves
3. 1 plastic housing
4. 2 (or 4) gray cable seals
5. 2 (or 4) green cable seals
6. 2 (or 4) blue cable seals

See Ordering Information, page 1.

To assemble the female tower connector, use the following directions:

1. Isolate the wires that extend from the command source to the EDC.

2. Strip back the insulation 5.5 millimeters on both sides.

3. Push a ribbed cable seal over each of the wires with the smaller-diameter shoulder of the seals toward the wire tip. Select the pair of seals that fits tightly over the wires. The distance from the tip of the wires of the first (nearest) rib should be 9.5 millimeters. Thus the insulation should just protrude beyond the seal.

4. Select the larger of the two sets of pins, as measured at Dimension A. See Dimension A diagram, page 9, if using 14-16 gauge wire. Choose the smaller if using 18-20 gauge. Place the wire into the socket so that the seal edge is pushed through and extends slightly beyond the circular tabs that hold it in place. See Packard connector Crimp, page 9, crimp in the locations shown with a Packard 12014254 crimp tool.

5. Manually insert the assembled wires into the back end (large hole) of the plastic housing. Push until the wire detents with an audible click, then pull back slightly to

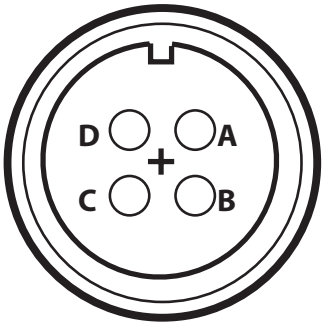
WIRING *(continued)*

ensure proper seating (observe the proper phasing of the wires when installing: Black wire to "A" hole, Red wire to "B", Brown to "C" and Orange to "D"). Terminals may be removed from the connector bodies with a Packard 12014012 removal tool.

6. Swing the holder down into the detented position to trap the wires in the housing. The third rib should be sealed into the housing.

7. Plug the shroud connector from the valve into the tower connector just constructed. They are sealed with a double (or quadruple) plug seal over the double (or quadruple) barrel of the tower assembly. The two connector halves should detent into each other. See Packard Connector Parts, below.

MS CONNECTOR PIN ORIENTATION



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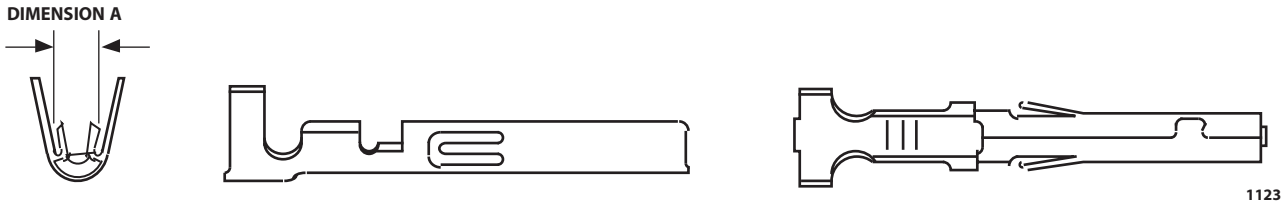
Pin orientation of the optional MS Connector.

DIMENSION A



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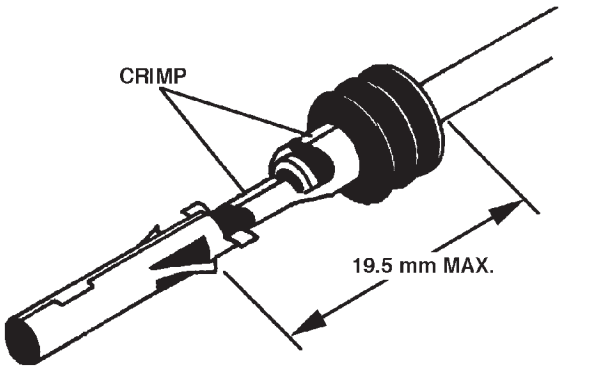
Dimension A for selecting correct terminal.

PACKARD CONNECTOR CRIMP



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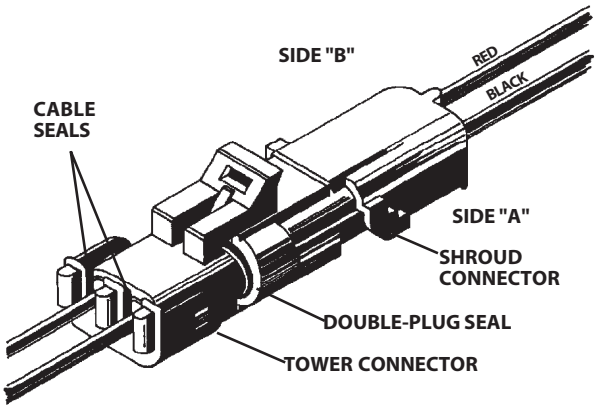
Crimp location and distance from tang to third rib of Packard Weather-Pack Connector.

PACKARD CONNECTOR PARTS



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Packard Weather-Pack interlocked connector halves with parts identified. Two wire connector shown.

MOUNTING

The following section refers to Danfoss pumps manufactured after April 1, 1986. These pumps have serial numbers whose first two digits are "03".

MCV105C models are factory shipped with the mounting O-rings installed. In the event O-rings are required, a bag assembly can be purchased separately (Danfoss part number KK05602) that also includes mounting bolts. See Table C - Service Parts, page 3, items 4 and 13 for O-rings only.

If there is a manual control mounted on the pump, it must be removed before the MCV105B is mounted. To do so:

1. Thoroughly clean all external surfaces of the pump and control with steam or solvent. Blow dry.

MOUNTING

2. Remove the bolt under the handle of the manual control. Lift off the handle, rotary spool and spring and bracket assembly. Use a vise grip to pull the old sleeve out of the pump. Remove the two pipe plugs from the pressure and return ports. Remove the inlet orifice in the pressure port.

If there is no manual control:

1. The EDC is shipped with an attached spool and sleeve assembly. Remove the sleeve from the valve. With the notch in the sleeve facing down and toward the pump shaft, place the sleeve in the pump valve bore until the attached snap ring bottoms out. See Sleeve Placement On Pump, below.

2. If there are caps over the pump's pressure and return ports, take them off.

3. Ensure O-rings are in place. See EDC O-Ring Placement, below.

4. With extreme caution, guide the EDC spool into the sleeve in the pump until the EDC's four bolt holes are properly aligned to the pump mounting holes. There is only one possible alignment.

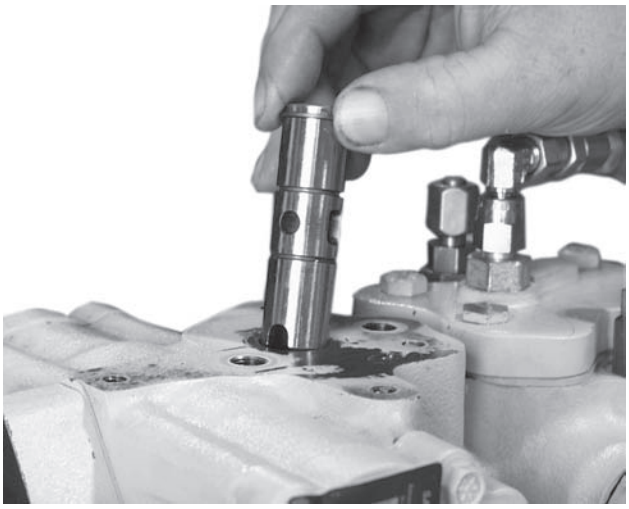
   Note: Any damage or nicks to the spool while installing could cause control to bind and produce erratic results.

5. Put the 2 short screws (1/4-20 x 3/4") through the bosses on the side of the valve. Put the two long screws (1/4-20 x 2.5") through the valve body. See Dimensions, page 6. Torque the four screws, in a cross pattern starting with the bolt closest to the pilot, to 10-11 ft. lbs.

   Note: Improper torqueing may cause control to bind and produce erratic results.

6. If needed, install control orifices under both servo covers.

SLEEVE PLACEMENT ON PUMP



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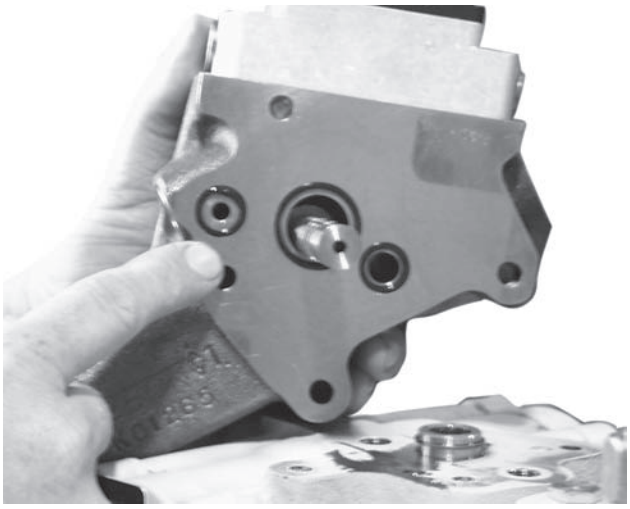
Sleeve placement on the pump.

EDC O-RING PLACEMENT



1356A

Electrical Displacement Control o-ring placement.

PUMP NEUTRAL ADJUSTMENT

Use the following procedure to bring the pump to neutral once the Electrical Displacement Control has been mounted.

1. Install a 300 psi gauge in each servo pressure gauge port on the pump. See Location, Servo Gauge Port, page 11.

2. Using a 9/16-inch wrench, loosen the hex lock nut on the null adjustment screw. See Dimensions, page 6.

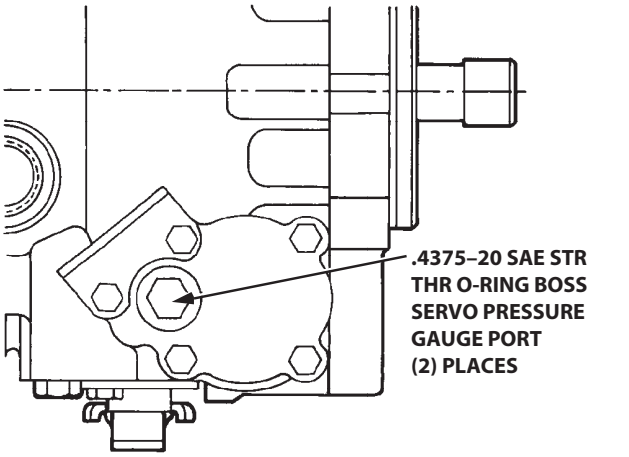
WARNING

To adjust neutral requires operating the pump. Take the necessary safety precautions such as having unnecessary personnel stand away from the machine. Maximum system pressure may occur upon start up, and the machine may move. Ensure that the operator is not in a position to be injured should the machine move.

PUMP NEUTRAL ADJUSTMENT *(continued)*

3. Disconnect the electrical line at the connector.
4. Start the prime mover and run at low idle.
5. Warm the system up for several minutes to bleed air.
6. Slowly increase the prime mover speed to rated rpm.
7. Slowly rotate the neutral adjustment screw, with a 5/32" Allen wrench, until the pressure is equal in both servo gauges.
8. Slowly rotate the neutral adjust screw until one of the servo gauges starts to increase in pressure.
9. Slowly rotate the neutral adjust screw in the opposite direction until the other servo gauge begins to increase in pressure. Note the amount the neutral adjust screw was turned in this step.
10. Turn the neutral adjust screw back one half the amount turned in Step 9.
11. Hold the neutral adjust screw and torque the lock nut to 25-30 in.-lbs.
12. Stop the prime mover.
13. Reconnect the electrical line.
14. Run the system briefly to ensure that it operates proportionally on both sides of the null command. Swashplate movement can be verified by watching movement of the swashplate feedback shaft, see Dimensions, page 6.

LOCATION, SERVO GAUGE PORT



Location of one of the servo gauge ports on the pump.

THROUBLESHOOTING

The MCV105C EDC is one component in a control system. When the system fails, check the most obvious failure modes first. Is the battery fully charged? Is there a hydraulic leak somewhere? Are all connections tightly fastened? Are O-rings in place?

When a process of elimination indicates that the system problem may reside in the EDC, the failure mode is likely to be one of the following six.

WARNING

Electrical actuation of the valve and/or hydraulic jogging of the valve may cause pump output and movement by the driven machine. Take precautions to ensure that no personnel are in a position to be injured by the machine if it should move.

TROUBLESHOOTING FAILURE MODES

A. NO PUMP OUTPUT

1. Check voltage or current supply to the pilot stage. If faulty, check the electrical system. If fine:
2. Check the coil resistance in the pilot at the input connector to the pilot. The resistance across the two Pins (A and B) should be 23 ohms for single coil pilots. For dual coil pilots, resistance is 20 ohms across A and B and 16.5 ohms across C and D. If resistance is infinite across either coil, the pilot should be replaced.
3. Jog the manual operator on the top of the pilot. If the hydraulic system does respond, the failure must be an electrical problem. If there is no response, check the service filter in the casting for the possibility of damage or plugging. See Dimensions, page 6. If the filter is dirty, replace it. If it is clean, replace the pilot.

B. THE PUMP CANNOT BE NULLED OR CREEPS SLOWLY IN ONE DIRECTION

1. Replace the pilot with a spare. If the problem is solved, the pilot is faulty. If the problem is not solved, unbolt the second stage from the pump and check the spool and sleeve for contamination or damage. If cleaning these parts clears up the problem there is a filtration problem. Check the charge pump filter and change pump oil.

TROUBLESHOOTING FAILURE MODES *(continued)*

C. THE PUMP RETURNS SLOWLY OR NOT AT ALL TO NEUTRAL

1. Check charge pump pressure. If sufficient:

2. Unbolt the second stage from the pump and check the spool and sleeve for contamination or damage. If cleaning these parts clears up the problem there is a filtration problem. Check the charge pump filter and change pump oil.

D. PUMP OPERATES IN ONE DIRECTION

1. Check the electrical signal from the command source. Current should flow in both directions. If not, there is an electrical problem.

2. Jog the manual operator on top of the pilot. This may free a contaminant in the pilot itself. If after several jogs to either side the pump continues to operate in only one direction, replace the pilot.

E. PUMP DOES NOT REACH FULL OUTPUT

1. Check the input current to the pilot. Verify that full drive current from the command source is at least as high as that specified. See Data, Electrical, page 2.

2. If the current drive is high enough, jog the manual operator on the pilot. If full output is attained, replace the pilot. If pump output is low on both sides of null, the filter may be plugged in the second stage. If the pump output is full on one side and low on the other, replace the pilot.

F. PUMP NULL DEADBAND IS ASYMMETRICAL

1. Adjust the second stage null using the null adjust procedure described previously.

2. If the problem persists and the noise from the pump on either side of null indicates that null is unstable (i.e., the pump creeps), replace the pilot.

   See Customer Service, below, for repairs and returns.

CUSTOMER SERVICE

IN NORTH AMERICA ORDER FACTORY INSTALLED EDC ON PUMP FROM

Danfoss (US) Company
2800 East 13th Street
Ames, Iowa 50010
Telephone: (515) 239-6000
Fax: (515) 239-6318

IN NORTH AMERICA ORDER INDIVIDUAL EDCs FROM

Danfoss (US) Company
Customer Service Department
3500 Annapolis Lane North
Minneapolis, Minnesota 55447
Phone: (763) 509-2084
Fax: (763) 559-0108

DEVICE REPAIR

For devices in need of repair or evaluation, include a description of the problem and what work you believe needs to be done, along with your name, address and telephone number.

RETURN TO

Danfoss (US) Company
Return Goods Department
3500 Annapolis Lane North
Minneapolis, Minnesota 55447

IN EUROPE ORDER FROM

Danfoss (Neumünster) GmbH & Co.
Order Entry Department
Krokamp 35
Postfach 2460
D-24531 Neumünster
Germany
Phone: 49-4321-8710
Fax: 49-4321-871355