

Installation Guide

MCH Control Handle Instructions for Addition or Replacement of Parts

Installing New Center Switch

1. Install cam with hub to the outside. (Do not tighten setscrew).
2. Install switch so that the switch body is toward the radius side of the notch in the cam. (See Location of Radius).
3. Move cam switch until roller is in notch of cam.
4. Tighten switch mounting screws to fasten switch.
5. SEE WARNING. Adjust cam to ensure switch is actuated when the handle is within $3^\circ \pm 1^\circ$ of neutral or detented position.
6. Tighten setscrew on cam.
7. SEE WARNING. Recheck actuating angle of CAM. If not within $3^\circ \pm 1^\circ$ of neutral or detented position, loosen CAM setscrew and readjust.
8. Wire as desired.

WARNING

Failure to calibrate switches within the specified angles may result in the switch being activated when the handle is not in the proper position. (Example: If the switch is a center off switch and is not calibrated per specifications, the machine function controlled by that handle may be activated when the handle is in the neutral position.)

Installing New Auxiliary Switch

1. Determine desired switching angle and mount switch.
2. SEE WARNING. Adjust switch to within $\pm 1^\circ$ of desired switching angle.
3. Tighten switch mounting screws. Do not adjust auxiliary switches by moving cam, as this will destroy center switch adjustment.
4. Wire as desired.

WARNING

Failure to calibrate switches within the specified angles may result in the switch being activated when the handle is not in the proper position. (Example: If the switch is a center off switch, and is not calibrated per specifications, the machine function controlled by that handle may be activated when the handle is in the neutral position.)

Replacing Existing Switches

1. Identify and record wire positions.
2. Remove wires from switch.
3. Remove switch. (Do not remove cam.)
4. SEE WARNING 1. Install switch, as described above.

5. SEE WARNING 2. Install wires in the original positions.

WARNING

1. Failure to calibrate switches within the specified angles may result in the switch being activated when the handle is not in the proper position. (Example: If the switch is a center off switch, and is not calibrated per specifications, the machine function controlled by that handle may be activated when the handle is in the neutral position.)
2. Failure to replace wires or electrical components to their original positions may result in an electrical failure which could burn out the handle or valve, or cause the function to be reversed from its original action, or in the elimination or bypassing of a function.

Replacing Spur Gear

1. Identify and record wire positions of switches.
2. Remove wires from switches.
3. Remove cam assembly.
4. Remove switch side plate.

[On friction-held handles, take precautions to prevent the loss of the detent spring and ball.](#)

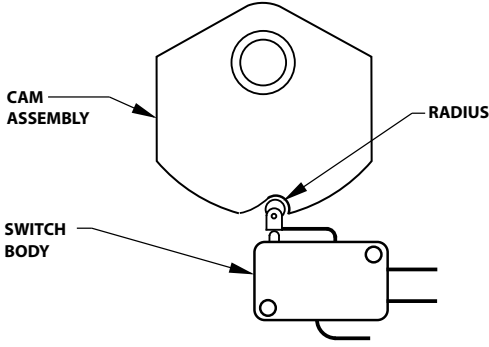
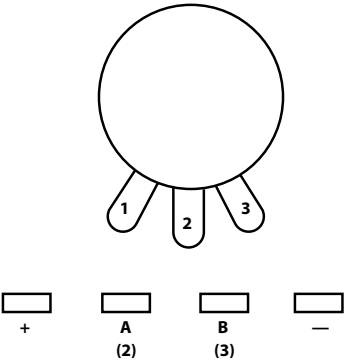
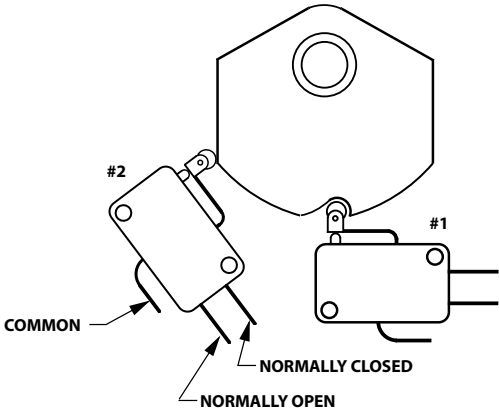
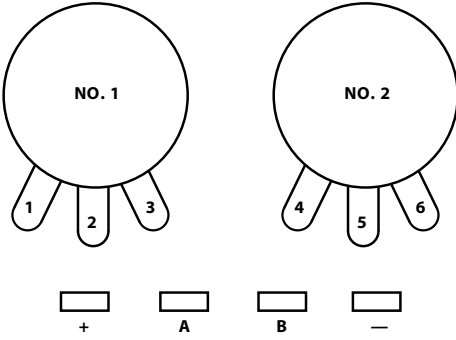
5. Remove spur gear.
6. Install new spur gear by aligning teeth with gear segment. (Do not tighten setscrew.)
7. Electrically null potentiometer. (See "Replacing Potentiometer", Step 13.)
8. Tighten spur gear setscrew.
9. Replace detent spring and ball. (Friction-held handles only.)
10. Replace switch side plate.

SEE WARNING 1 below. If the handle has the center lock option, replace the side plate and check the center lock action. If it does not function, readjust the side plate and recheck until it works properly.

SEE WARNING 2 below. Check for free handle movement in both directions. If it does not function, readjust the side plate and recheck until it works properly.
11. Adjust switches. (See above.)

WARNING

1. *Failure to calibrate the center lock function may result in the handle passing through the center position without locking.*
2. *Failure to ensure free handle movement in both directions may result in limited movement in one direction or (if spring returned) may cause the handle to stick in one direction.*

LOCATION OF THE RADIUS	SINGLE POTENTIOMETER TERMINAL
 <p>CAM ASSEMBLY</p> <p>RADIUS</p> <p>SWITCH BODY</p>	 <p>1 2 3</p> <p>+ A (2) B (3) -</p>
LOCATION OF THE #2 SWITCH	DUAL POTENTIOMETER TERMINAL
 <p>#2</p> <p>COMMON</p> <p>NORMALLY CLOSED</p> <p>NORMALLY OPEN</p> <p>#1</p>	 <p>NO. 1 NO. 2</p> <p>1 2 3 4 5 6</p> <p>+ A B -</p>

Replacing Potentiometer

1. Identify and record wire positions on switches and potentiometer.
2. Remove wires and switches from potentiometer.
3. Remove cam assembly.
4. Remove switch side plate.

On friction-held handles, take precautions to prevent the loss of the detent spring and ball.

5. Remove spur gear.
6. Remove potentiometer.
7. Install new potentiometer. (Do not tighten.)
8. Install spur gear. (Do not tighten.)
9. Adjust gear mesh by sliding potentiometer toward gear segment to contain minimum backlash.
10. Tighten potentiometer.
11. SEE WARNING 1 below. Rewire potentiometer and switches to original positions.
12. If the control handle has (2) switches and there is a resistor in line with the common terminal of the #2 switch, disconnect the common lead. (See location of #2 switch).
13. SEE WARNING 2 below. Electrically null potentiometer. If the handle is a bi-directional device with a single potentiometer, null the potentiometer using the following method (see Single Potentiometer Terminal). Place the handle in the center or detented position. If the handle has a center off switch, connect a jumper wire from "+" on the terminal strip to potentiometer terminal #1. Connect the power lead from the machine to "+" on the terminal strip and the ground lead from the machine to "-" on the terminal strip. Using a voltmeter, connect the "+" on the meter to the "A" on the terminal strip, and the "-" on the meter to "B" on terminal strip. Rotate the potentiometer until the meter reads 0 ± 1 volts. Tighten setscrew on spur gear. Recheck the value at the center position. If not in specification, repeat the nulling procedure. If a jumper wire was used between potentiometer terminal #1 and "+", remove it.
If the handle is a bi-directional device with dual potentiometers, null the potentiometers using the following method (see Dual Potentiometer Terminal). Place the handle in the center or detented position. If the handle has a center off switch, connect a jumper wire from "+" on the terminal strip to potentiometer terminal #1. Connect power from the machine to "+" on the terminal strip, and ground from the machine to "-" on the terminal strip. Using a voltmeter, connect "+" to potentiometer terminal #1 and "-" to potentiometer terminal #3, and read the voltage. Move the "+" lead from the meter to potentiometer terminal #2. Divide the original voltage by 2. Turn the #1 potentiometer shaft until the meter reads that

value. Tighten setscrew on spur gear. Move the "+" lead from the meter to "A" on the terminal strip, and the "-" from the meter to "B" on the terminal strip. Rotate the #2 potentiometer shaft until the meter reads 0 ± 1 volts. Tighten setscrew on spur gear. Move handle to full stroke in each direction, noting voltages. If the full stroke voltages are not within 10% of each other, loosen setscrew on potentiometer #1, rotate the shaft slightly, tighten the setscrew, and renull potentiometer #2. Repeat if necessary. If a jumper wire was used between "+" and potentiometer terminal #1, remove it.

If the handle is a uni-directional device, null the potentiometer using the following method (see Single Potentiometer Terminal).

Rotate the handle full clockwise when viewed from the potentiometer side. If the handle has an end off switch, jumper from the "+" on the terminal strip to potentiometer terminal #3. Connect the power lead from the machine to the "+" terminal, and the ground lead from the machine to the "-" terminal. Using a voltmeter, connect the "+" from the meter to potentiometer terminal #2, and the "-" from the meter to the "-" on the terminal strip. Rotate the potentiometer shaft slowly to decrease the voltage. When the meter reads $0 +.2/-0$ volts, tighten setscrew on spur gear. Recheck reading. Repeat procedure if necessary. If a jumper wire was used between "+" and potentiometer terminal #3, remove it.

14. If the common lead from switch #2 was removed, reconnect it. (See Location of #2 Switch).
15. Replace detent spring and ball.
16. SEE WARNINGS 3 AND 4 below. Replace switch side plate.
17. Adjust switches. (See Installing New Center Switch and Installing New Auxiliary Switch.)

WARNING

1. Failure to replace wires or electrical components to their original positions may result in an electrical failure which could burn out the handle or valve, or cause the function to be reversed from its original action, or in the elimination or bypassing of a function.
2. Failure to null potentiometer may result in an uneven output in each direction. The machine function controlled by the handle may be faster in one direction than in the other.
3. Failure to calibrate the center lock function may result in the handle passing through the center position without locking.
4. Failure to ensure free handle movement in both directions may result in limited movement in one direction, or (if spring returned) may cause the handle to stick in one direction.

Replacing Center Spring

1. Remove snap ring.
2. Remove Washers.

3. Remove bushing.
4. Remove spring.
5. SEE WARNING below. Install new spring. Tabs on spring may require bending to ensure minimum handle movement and proper center lock function in the neutral position.
6. Replace bushing.
7. Replace washers, nylon washer to the inside.
8. Replace snap ring.

WARNING

Failure to calibrate the center lock function may result in the handle passing through the center position without locking.

Replacing Brakes

1. Remove snap ring.
2. Remove and discard brake assemblies. Use existing spring, screw and nut.
3. Mount new brake assemblies.
4. Replace snap ring.
5. Tighten nut and screw (2) full turns after initial contact.

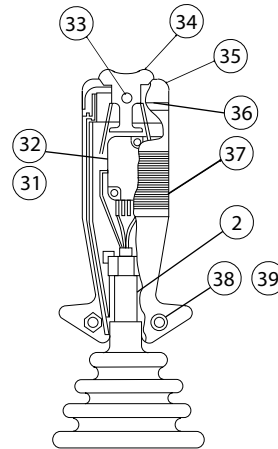
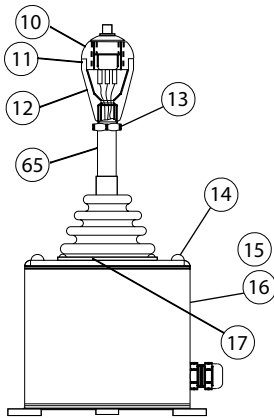
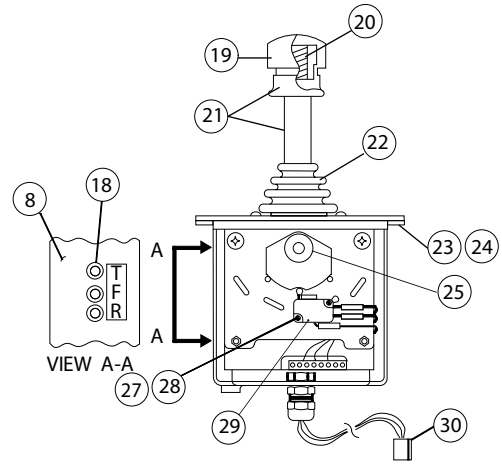
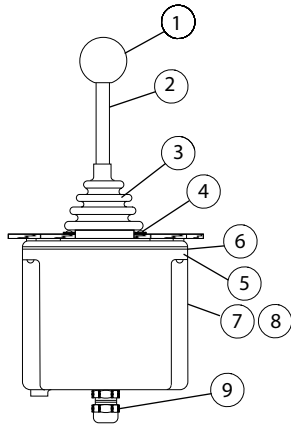
Replacement Parts

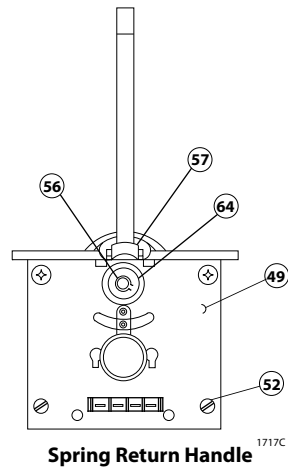
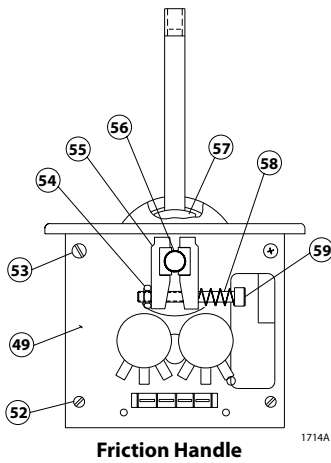
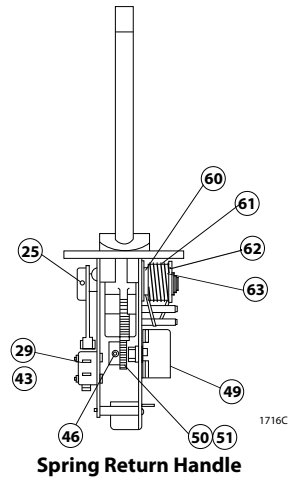
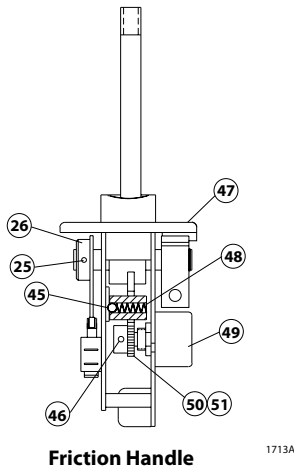
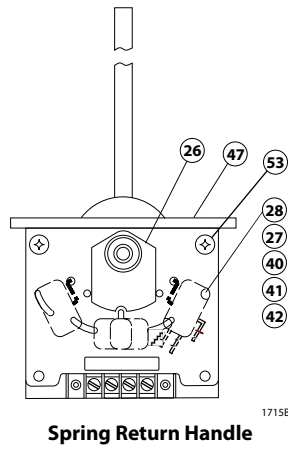
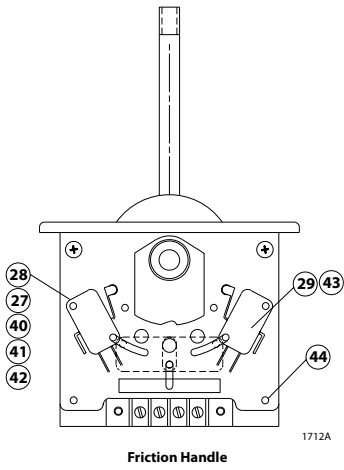
Item Number	Part Number	Description	Item Number	Part Number	Description
1	K00566	Knob Round 1 3/8 Dia.	34	K21567	Switch Actuator
2	K00564	Handle Standard	35	K08357	Boot Sealing Actuator
3	11146334	Boot, Non-locking	36	K08358	Boot Retaining Ring
4	K27328	Screw Metric, M5-13	37	K21580	Handle (2 Halves)
5	K00776	Plastic Case Fastener	38	K33940	Nut Hex Metric M4
6	K00559	Gasket Case Seal	39	K33939	Screw Socket Head Metric M4x10
7	K00754	Plastic Case Without Adj. Holes, 1 Wire Exit Hole	40	11044196	Screw 2-56 x 9/16 (subminiature mounting)
8	K00755	Plastic Case Without Adj. 3 Holes, 1 Wire Exit Hole	41	11048759	Spacer (subminiature mounting)
9	K00557	Leadwire Strain Relief	42	11048758	Nut Plate (subminiature mounting)
10	K03220	Switch and Top Knob Assembly	43	K01300	Switch Micro Subminiature (not shown)
11	K00387	Setscrew 4-40 x 1/8 cup point	45	K04821	Ball ss 0.219 dia.
12	K28194	Knob Bottom	47	10105814	Cover (top aluminum die cast plate)
13	K01263	3/18-16 Jam Nut	49	11036015	Potentiometer (200 Ω)
14	K27329	Screw Metric Tread Forming M5-16	50*	11023152	Spur Gear (fits 0.250 dia shaft)
15	K00558	Gasket Buna	51**	11023141	Spur Gear (fits 0.125 dia. shaft)
16	K02992	Case Assembly Surface Mount	52	K06276	Screw Pan Head 4-40 x 5/16
17	K00562	Collar Boot Retaining	53	K07220	Screw Thread Forming Metric
18	K04459	Cap	54	K00821	Nut Locking 10-32
19	K00617	Top Knob Piece	55	K02982	Brake Assembly
20	K00616	Spring Center Lock	56	K07213	Retainer Ring
21	K03545 / 11111350	Handle Center Lock Tube Assy	58	K01529	Spring Compression
22	11146335	Boot Locking	59	K04556	Screw Socket Head 10-32 x 3/4
23	K00636	Plate Top Mount	60	K00567	Bushing Inner Plastic
24	K00653	Gasket Neo. Foam	61	K00551	Spring
25	K07194	Setscrew Metric Cup Point M4-5.0	62	K00568	Bushing Outer Plastic
27	K00805	Speed Nut 4-40 (V3 mounting)	63	K00574	Washer Flat Nylon
28	K01445	Screw 4-40 x 5/8 (V3 mounting)	64	K04589	Washer Flat St.
29	K00548	Switch Micro V3	65	K22038	Hollow Shaft without Welded Nut
31	K08355	Switch Micro V3-115	66	K21715	Hollow Shaft with Welded Nut
32	K08689	Tape 2-Sided Foam			
33	K08360	Screw Socket Head Metric M4x30			

* Use with all MCH models except models MCHxxxB1004

** Use with only MCH models except models MCHxxxB1004

MCH Instructions for Addition or Replacement of Parts Installation Guide





Danfoss can accept no responsibility for possible errors in catalogues, brochures and other printed material. Danfoss reserves the right to alter its products without notice. This also applies to products already on order provided that such alterations can be made without subsequent changes being necessary in specifications already agreed. All trademarks in this material are property of the respective companies. Danfoss and the Danfoss logotype are trademarks of Danfoss A/S. All rights reserved.