KENCO ENGINEERING COMPANY

P.O. BOX 470426 TULSA, OK 74147-0426 PHONE: (918) 663-4406 FAX: (918) 663-4480
website: www.kenco-eng.com • email: info@kenco-eng.com

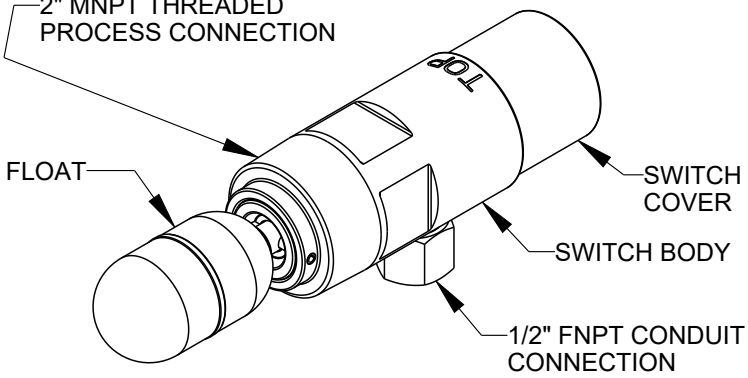
MODEL KEFS LIQUID LEVEL FLOAT SWITCH
INSTALLATION / OPERATION INSTRUCTIONS

PRINCIPLE OF OPERATION

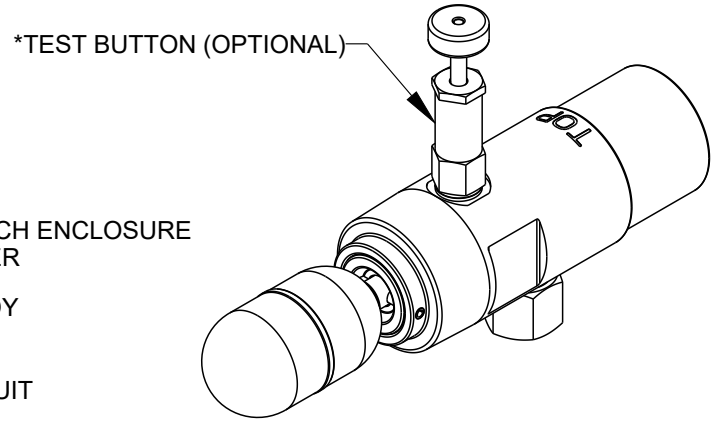
The Model KEFS uses a float to determine the presence or absence of liquid at the process connection. The float arm assembly consists of a float at one end and a magnet at the other. As the level rises, the float rises, and the magnet falls. The magnet actuates a second magnet on the other side of the pressure boundary. This second magnet causes the switch to change state.

The pressure boundary contains no seals. It is a solid stainless steel barrier that passes a magnetic field, but no liquids. It is impossible for the process liquid to enter the switch enclosure through this barrier. This arrangement has CSA Single Seal approval.

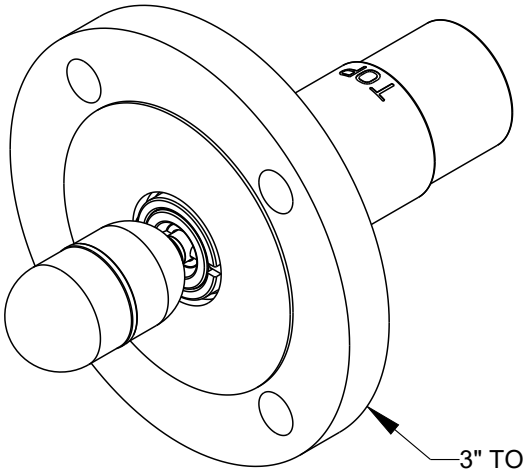
The electrical contacts consist of a microswitch that can be either a single-pole, double-throw (SPDT) or double-pole, double-throw (DPDT) configuration. The SPDT switch is available with either a 5 Amp or 8 Amp current load. The DPDT is available with a 4 Amp current load (See Switch Types and Ratings in the Product Specifications for more details).



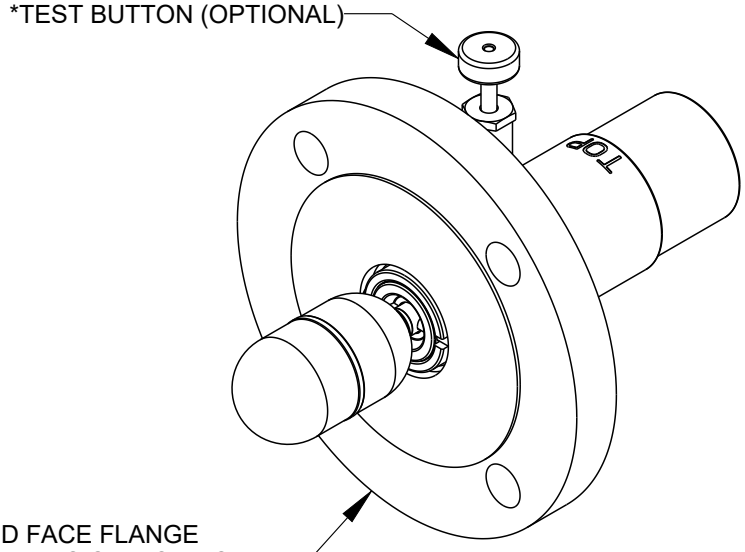
STANDARD KEFS



KEFS WITH TEST BUTTON

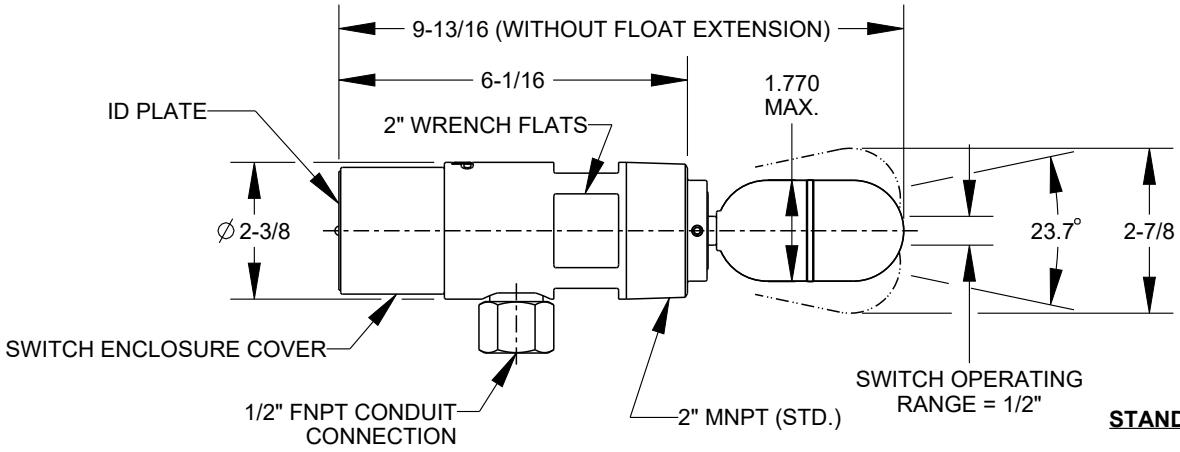


KEFS WITH FLANGED PROCESS CONNECTION

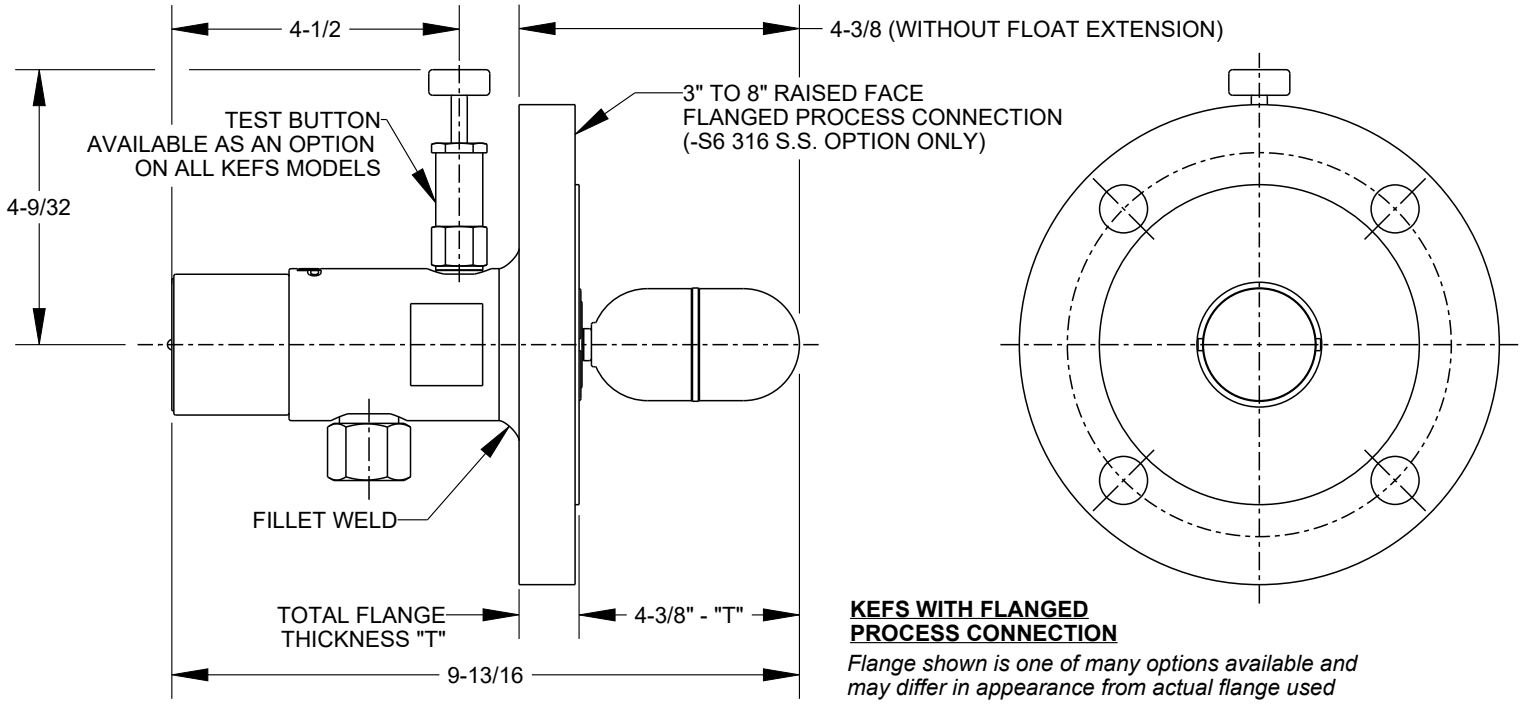


KEFS WITH FLANGED PROCESS CONNECTION AND TEST BUTTON

*For details on the optional Test Button, see the "Test Button Manual" on Kenco Engineering Website



STANDARD KEFS



KEFS WITH FLANGED PROCESS CONNECTION

Flange shown is one of many options available and may differ in appearance from actual flange used

INSTALLATION

Unpack the switch carefully. Inspect the unit(s) for damage. Report any damage to carrier immediately. Check the contents against the packing slip and purchase order. Inspect model number on ID Plate to verify it matches the model number ordered.

Operational Check: Before installing the switch, a simple operational check should be performed as follows:

1. Apply red thread locking compound (included) to float rod threads. Screw float onto rod and firmly hand tighten. If a float extension is used, apply thread locker to the external threads of float extension and float rod. Wipe off any excess thread locker to make sure it does not run into the pivot area of the float. Warning! If thread locker gets into the pivot point of the float, it will lock up the float and render the KEFS inoperable! Take the steps necessary to prevent this when applying the thread locking compound.
   Note: Adding the included 11/16" (0.690") long float extension will raise the minimum operating specific gravity from 0.53 to 0.66. See Specific Gravity in Product Specifications for more details.
2. Remove the Switch Enclosure Cover.
3. Connect an Ohmmeter to terminal block contacts CM1 and NC1 (See Wiring section).
4. With the conduit connection pointing downward, the “TOP” label facing upward, and the float downward (at rest), the Ohmmeter should be showing approximately 0 ohms.
5. Lift the float up. The Ohmmeter should be showing infinite ohms (some digital meters will show OL).
6. Disconnect the Ohmmeter

Mounting (All)

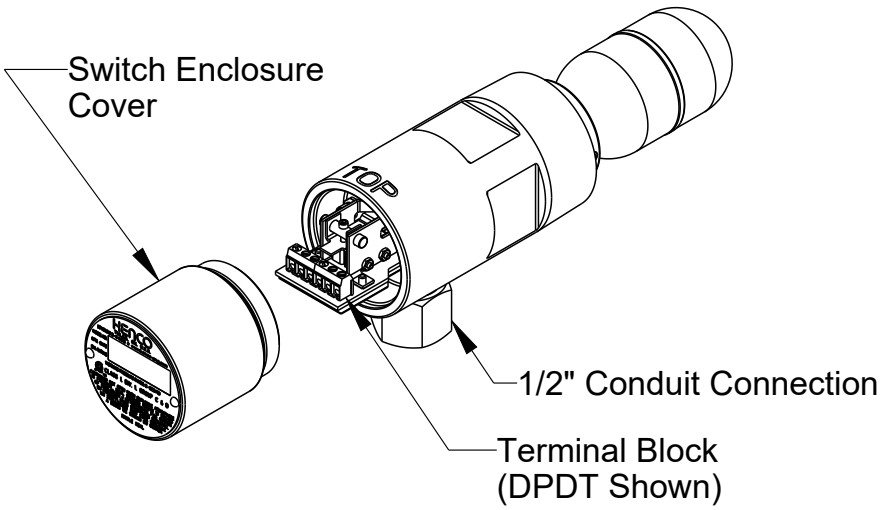
Make sure the float travel will not be obstructed by the coupling, vessel wall or other vessel components when the KEFS is installed.

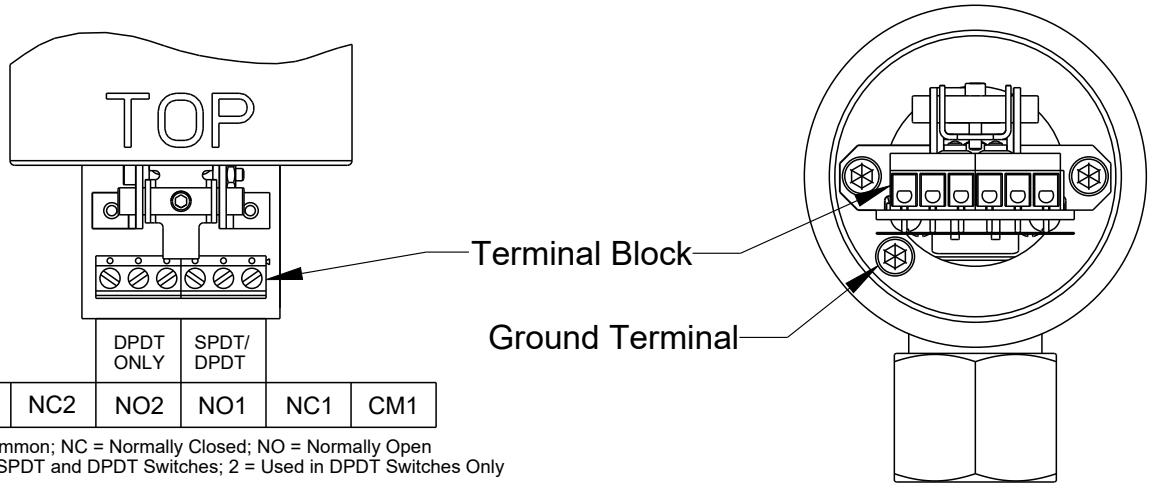
Mounting (2" MNPT Threaded Process Connection)

1. To prevent galling, Kenco recommends the use of a pipe sealant with PTFE. Apply pipe sealant liberally to the external threads of the KEFS and the internal threads of the coupling.
2. Screw the KEFS into the process vessel by hand until snug. Wrench tighten at least one full turn until switch is level and the ½ FNPT conduit connection is on the bottom at the 6 o'clock position. Place a level on the wrench flats to verify proper operating orientation.

Mounting (Flanged Process Connection)

Install Flanged KEFS using the appropriate mounting studs/bolts, nuts and gasket per the application piping requirements. Make sure the 1/2" FNPT conduit connection is on the bottom at the 6 o'clock position. Place a level on the flats to verify proper orientation.





CM = Common; NC = Normally Closed; NO = Normally Open
1 = Used in Both SPDT and DPDT Switches; 2 = Used in DPDT Switches Only

Wiring

It is recommended that conduit be installed into the ½" FNPT connection of the switch body. A seal drain fitting should be used to prevent moisture from entering the switch. All wiring, conduit, and electrical fittings must conform to local electrical codes for the location selected. If the switch is to be used in a Hazardous Area, the applicable sections of the National Electrical Code or CSA must be followed as well.

Note: The SPDT5-400 high temperature option is wired differently than the other KEFS models. It does not have a terminal block and uses four 18 AWG color coded wires instead. It has a separate wiring instruction sheet that is included as an addendum to this one. In addition to this, the high temperature SPDT5-400 option is not CSA certified to be installed in a hazardous location.

1. Remove the switch enclosure cover.
2. Feed wire through the conduit (user supplied), KEFS 1/2" FNPT conduit opening and out through the opening below the terminal block. Take care not to damage insulating paper on bottom of circuit board inside unit.
3. Do not use any more wire than is necessary to make the connections. Make sure that any excess wire is stored below the terminal block / circuit board. Too much wire inside the switch enclosure cover could interfere with the operation of the switch mechanism.
4. The terminal block is designed to handle 16 AWG to 22 AWG stranded/insulated wire. Be sure to size the wire appropriately for your electrical loads. If in doubt, use 16 AWG. Strip approximately ¼" of insulation off of the wire.
5. See the following table for the switch connections:

Media Level	**Switch Contact State**	
	NC/CM	**NO/CM**
Below Setpoint (Float Down)	Closed	Open
Above Setpoint (Float Up)	Open	Closed

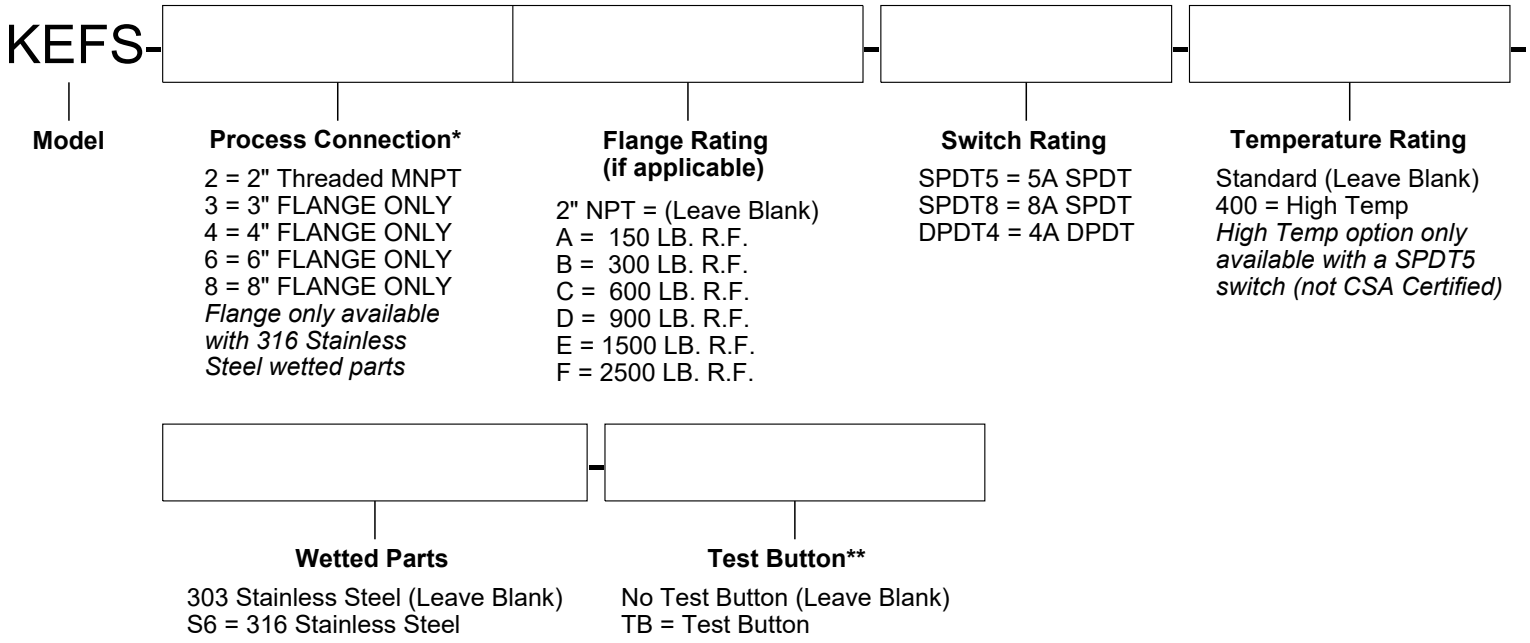
6. Insert the wire into the appropriate terminal, and tighten the screw. Make sure the screw is snug so the wire will not fall out of the terminal. Do not over tighten as damage to the terminal block could occur and render the switch inoperable!
7. Crimp a #8 ring terminal of the appropriate wire gage to the ground wire and attach to the ground terminal shown.
8. Carefully reinstall the switch enclosure cover, being careful not to pinch the wires.

Product Specifications

Description		Specification
Specific Gravity		0.53 Minimum (Without Float Extension Installed)*
Wetted Parts Materials	Standard	303 Stainless Steel (Not available with flanged process connection)
	Optional	316 Stainless Steel
Process Connection Size/Type	Standard	2" NPT External Pipe Thread (2" MNPT)
	Optional	3" to 8" Raised Face Flange (-S6 316 Stainless Steel Option Only)
Temperature Range	Standard	-67°F to 257°F (-55°C to 125°C)
	Optional**	-40°F to 400°F (-40°C to 205°C)
Process Pressure Range (Per Process Connection Type)	2" MNPT	Full Vacuum to 2000 psig
	Flanged	Full Vacuum to Flange Rating (2000 psig max.)
Switch Types & Ratings	Standard	SPDT5; 5A @ 250Vac; 5A @ 30Vdc Resistive
	Optional	SPDT8; 8A @ 250Vac; 12A @ 125Vac Resistive
	Optional	DPDT4; 4A @ 250Vac; 5A @ 30Vdc Resisitive
	Optional**	SPDT5-400; (High Temp. Option); 5A @ 250Vac; 0.3A @ 125Vdc
Conduit Connection		1/2"-14 FNPT
Hazardous Location Rating (CSA Certified)**		Class I, Div. 1, Groups C & D, Single Seal
Canadian Registration Number (CRN)		0F20409.52

**All KEFS units come with an 11/16" (0.690") long float extension that can be installed if needed. It is important to note that using the supplied 11/16" long extension will raise the minimum operating specific gravity from 0.53 to 0.66. For more information on the float extensions available and the effect the different lengths have on the minimum operating specific gravity, see the "KEFS Float Extensions" document on Kenco Engineering Website.*

***High temperature version of the KEFS with the SPDT5-400 option is not CSA certified.*



*2 represents a 2" MNPT threaded process connection. All other numbers are flange options. The smallest recommended flange size is 3". Consult factory if a 2" flange is desired.

**For details on the optional Test Button, see the "Test Button Manual" document on Kenco Engineering Website under "KEFS Electric Float Switch" and "Downloadable PDF's".