FLT93 Series Flow and Level Switches

Instructions for Conversion/Replacement of Through-Hole Electronics (P/N 5294 type)
With New Surface Mount Electronics (P/N 5208 type)

This guide is provided to owners of FCI’s FLT93 Series who are replacing through-hole type electronics circuit boards with FCI’s newer surface mount type electronic circuit boards within FCI’s standard, single and dual conduit port aluminum and single conduit port stainless steel enclosures. This procedure is intended to be performed by qualified instrument or electronics technicians with access to proper tools.

Retrofit Kits P/N K5208-A1AA, K5208-A1BA, K5208-A3AA, and K5208-A3BA include the following items:

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WASHER. INTERNAL TOOTH, #10 (P/N H52-0210)</td>
</tr>
<tr>
<td>1</td>
<td>SCREW, PAN HD PHILLIPS, NO. 10-32 x .25 LG (P/N H10-021104)</td>
</tr>
<tr>
<td>2</td>
<td>SPACERS, ROUND .312 (.312 dia x .125 LG) (P/N 022141-01)</td>
</tr>
<tr>
<td>1</td>
<td>TUBE LOCTITE (BLUE NO .242) (P/N 010821-20)</td>
</tr>
<tr>
<td>2</td>
<td>STANDOFF, MALE, 5/16 INCH HEX x .125 LG, NO. 8-32 UNC, SST (P/N 022143-01)</td>
</tr>
<tr>
<td>2</td>
<td>WASHERS, SPILT-LOCK, SST, NO.8 (P/N H51-0109)</td>
</tr>
<tr>
<td>1</td>
<td>MAIN CIRCUIT BOARD (ASSEMBLY 5208)</td>
</tr>
<tr>
<td>1</td>
<td>WIRING TERMINAL BOARD, (P/N 020786-01)</td>
</tr>
<tr>
<td>1</td>
<td>TERMINAL BOARD INSULATOR (P/N 021929-01)</td>
</tr>
<tr>
<td>2</td>
<td>STANDOFF, F/F 5/16 INCH HEX x .906 LG, NO. 8-32 UNC, SST (P/N 022142-01)</td>
</tr>
</tbody>
</table>

Kits P/N K5208-A1AB, K5208-A1BB, K5208-A3AB, K5208-A3BB (Required if FLT93 enclosure is stainless steel type) also include:

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>STAINLESS STEEL ENCLOSURE LID, (P/N 000434-03)</td>
</tr>
</tbody>
</table>

Tools and Supplies Required (Not included):

<table>
<thead>
<tr>
<th>Qty</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WIRE STRIPPER/CRIMPER (PREFERABLY WITH 32AWG SLOT)</td>
</tr>
<tr>
<td>1</td>
<td>PHILLIPS HEAD SCREW DRIVER</td>
</tr>
<tr>
<td>1</td>
<td>MULTIMETER (DMM) FOR FINDING THE AS FOUND SETPOINT VOLTAGES ON THE OLD CIRCUIT BOARD AND SETTING NEW SETPOINT VOLTAGES IN YOUR NEW CIRCUIT BOARD.</td>
</tr>
</tbody>
</table>
SAFETY NOTES FOR INSTALLED UNITS

- OPERATION OF POSSIBLE FALSE ALARMS FROM FLT 93 DURING THIS RETROFIT. BEFORE DEENERGIZING UNIT, SET TO CAL AND RECORD SWITCH POINT VOLTAGES
- ! DISCONNECT POWER SUPPLY TO FLT 93 POWER INLETS AND TO RELAY CONTACTS
- ENSURE NO UNINTENDED PROCESS OPERATION CAN OCCUR
- THE RETROFIT DOES NOT EFFECT ANY AGENCY APPROVALS FOR HAZARDOUS AREAS
- FOLLOW ALL LOCK -OUT/TAG-OUT PROCEDURES

Before installing the new electronics obtain and record the switch point settings from the circuit board that is being replaced

Be advised this procedure will cause the relay(s) to change state and may cause an undesired or unintended trip signal. To ensure this does not happen before proceeding disconnect the relay outputs or make connections that bypass the FLT 93’s switch relays in a Jbox or PLC input. Refer to your Model FLT93 Owner’s Manual (IO&M) to find locations of the testpoints, potentiometers and indicator lamps.

1. Obtain a standard multimeter and place it in DC volts (<10Vdc) and attach its test leads to P1 pins 1 & 2, which is a black plastic plug on the circuit board, Pin1 is positive (+), pin2 is negative (-). These bottom two pins are the flow voltage in run mode and the “CAL” voltage in calibration mode. Those modes are selectable via S1, which is a two position slide switch just below the transformer and next to R24, the “CAL” potentiometer.
2. Record your current (old) board as found flow voltage in run mode for future reference. These same steps apply to the temperature output but those points are on P1 pins 3(+) and pin 4(-).
3. With the voltmeter test leads still on pins 1 & 2 and slide S1 to the left. Record this voltage. This voltage is generated by the circuit board and will be is used to calibrate the setpoints on the new electronics and as described in the IO&M, chapter 3 “Numerical Alarm Setpoint Adjustment”. You will use it to trip the alarms now and record that voltage, it is your setpoint for that alarm, either flow, level, or temperature. The voltage at which the Red and Green LED lamps turn on & off is your trip point voltage and will be used to set the same setpoints on your new circuit card. Retain the recorded voltages for use in Step 9.
4. Record the position of all configuration jumpers, temperature compensation settings, and the positioning of the current power and relay wiring in a safe and secure place before beginning this retrofit procedure. Retain these for use in Step 9.

Installation Procedure

Step 1: Remove existing top circuit board from the mounting socket.
Step 2A: Remove the A/C power leads from the 12 pin socket and remove Ground Terminal lead from the lug.

Step 2B: Remove the six (6) sensor element leads from 12 pin socket terminations

Step 2C: Remove the two socket mounting screws and LIFT the 12 pin socket from enclosure base.

Step 2D: (Using wire cutter) Cut sensor element wire leads at the end of the insulation of the termination wire lugs to ensure the proper wire length is maintained. Slide the white wire marker back or remark to ensure the word labeled is maintained.
Step 2E: Using the wire stripping tool, preferably with a 32AWG slot*. Strip all sensor wires approximately ¼ inch (6.35 mm).

*Caution: A clean, sharp stripping tool with a 32 AWG slot is recommended. The sensor wires are special Kapton insulated steel, 32 AWG, stranded wire. Do not use a 34AWG or smaller slot which will cut the entire wire.

Step 2F: If single conduit port enclosure, remove existing ground terminal lug from enclosure; discard the screw and retain the lug. If dual conduit port enclosure, go to Step 3.

Step 3: Locate from the retrofit kit the following items:
Qty. 1 Washer. Internal Tooth, #10 (P/N H52-0210)
Qty. 1 Screw, Pan HD Phillips, NO. 10-32 x .25 LG (P/N H10-021104)

Step 4: Using the items retained in Step 2F and those found in step 3, re-install the ground terminal lug into the enclosure into the 10-32 threaded hole located just below where the prior ground terminal lug was removed.
Step 5a: Locate from the retrofit kit the following items

- Qty. 2 Spacers, Round .312(.312 dia x .125 LG) (PN#022141-01)
- Qty. 1 Tube Loctite (Blue No. .242) (PN#10821-20)
- Qty. 2 Standoff, Male, 5/16 inch Hex x .125 LG, No. 8-32 UNC, SST (PN#022143-01)
- Qty. 2 Washers, Split-lock, SST, NO.8 (PN# H51-0109)

Step 5b: Apply Loctite to threaded end of standoff that will be threaded into enclosure. (Fig 11)

Step 5c: Using the existing holes from which the two socket mounting screws were removed on step 2C, place a Spacer (PN#022141-01) at each of the threaded mounting screw holes first, then a Split-Lock washer (PN# H51-0109) and insert, thread and tighten the male standoff’s into enclosure. (Fig 12 or Fig 13)
Step 6a: Locate the following items from the retrofit kit:
Qty. 1 Wiring Terminal Board (P/N 020786-01)
Qty. 1 Terminal Board Insulator (P/N 021929-01)
Qty. 2 Standoff, F/F 5/16 Inch Hex x .906 LG, NO. 8-32 UNC, SST (P/N 022142-01)

Step 6b: Place Insulator (P/N 021929-01) on the bottom of the enclosure aligning holes over the installed standoffs. (Fig 14 or Fig 15)

Step 6c: Place the Wiring Terminal Board (P/N 020786-01) on top of Insulator (aligning holes) over the previously installed male standoffs. Using 1 female Standoff (P/N 022142-01) tighten (snugly) the Wiring Terminal Board into the enclosure. (Fig 16 or 17).
Step 7: Reinstall trimmed sensor wires into new wiring terminal board

<table>
<thead>
<tr>
<th>Tan/Red Wire</th>
<th>labeled (HTR10) to HTR+ termination, located on the T2B connector. (Fig 18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tan/Red Wire</td>
<td>labeled (HTR 7) to HTR- termination, located on the T2B connector</td>
</tr>
<tr>
<td>Tan Wire</td>
<td>labeled (SHLD) to SHIELD termination, located on the TB2B connector</td>
</tr>
<tr>
<td>Tan Wire</td>
<td>labeled (ACT 7) to ACT termination, located on the T2A connector. (Fig 19)</td>
</tr>
<tr>
<td>Two Tan Wires</td>
<td>labeled (COM8) to COM termination, located on the T2A connector</td>
</tr>
<tr>
<td>Tan Wire</td>
<td>labeled (REF 9) to REF termination, located on the T2A connector.</td>
</tr>
</tbody>
</table>

A completed sensor wire hook-up should look like Fig. 20 which follows
Step 8: Re-Installing Power Wires and Setting AC Input Power Jumpers

**AC Power:** Install the correct power jumper* to power configuration pin located next to the TB1 terminal block. (Figure 20). Then go to Step 8A

Install Blue Jumper for: 216 – 240 VAC

**DC Power:** Wire to TB4, + and – terminals. (Note: Position of AC power jumper has no effect on DC)

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Storage for alternate jumper

Install correct AC power jumper here. Example shows configured for 216-240 VAC. For 08-132VAC, swap out with red jumper.

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Step 8A: Install AC power wires to the wiring terminal board. (Fig 21 or 22)

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DC Power Input Terminals

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Figure 20

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Figure 21  
Single Port Enclosure

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Figure 22  
Dual Port Enclosure
Step 9: Installing the Top/Main Board (Fig. 23)

Step 9A: Install the new main/top board-assembly S208 into the switch housing. Align the slotted screw heads so they seat into the female standoffs on the wiring terminal board and firmly tighten.

Step 9B: Obtain the data you recorded in Step 1 and use it to re-set the switch points, configuration jumpers, and temperature compensation settings.

Figure 23
Existing aluminum FLT93 lid

**Note:** If you have an existing aluminum lid with the plastic safety button inserted you must remove it prior to putting the lid back on the enclosure (containing the new electronics). Failure to do so will cause damage to the electronics.

If FLT93 enclosure is stainless steel type

Discard the existing stainless steel lid and replace it with new lid P/N 000434-03 supplied in kits P/N K5208-A1AB, K5208-A1BB, 5208-A3AB, 5208-A3BB.

**Note:** Do not attempt to re-use existing lid as it will not fully seat, and if forced, will damage the new electronics.

If you ordered the kit without the lid and need the new lid, contact FCI and order P/N 000434-03.

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If you ordered the kit without the lid and need the new lid, contact FCI and order P/N 000434-03.
Customer Service / Technical Support

FCI provides full in-house technical support. Additional technical representation is also provided by FCI field representatives. Before contacting a field or in-house representative, please perform the troubleshooting techniques outlined in this document.

By Mail
Fluid Components International LLC
1755 La Costa Meadows Dr.
San Marcos, CA 92078-5115 USA
Attn: Customer Service Department

By Phone
Contact the area FCI regional representative. If a field representative is unable to be contacted or if a situation is unable to be resolved, contact the FCI Customer Service Department toll free at 1 (800) 854-1993.

By Fax
To describe problems in a graphical or pictorial manner, send a fax including a phone or fax number to the regional representative. Again, FCI is available by facsimile if all possibilities have been exhausted with the authorized factory representative. Our Fax number is 1 (760) 736-6250; it is available 7 days a week, 24 hours a day.

By E-Mail
FCI Customer Service can be contacted by e-mail at: techsupport@fluidcomponents.com.
Describe the problem in detail making sure a telephone number and best time to be contacted is stated in the e-mail.

International Support
For product information or product support outside the contiguous United States, Alaska, or Hawaii, contact your country’s FCI International Representative or the one nearest to you.

After Hours Support
For product information visit FCI’s Worldwide Web at www.fluidcomponents.com. For product support call 1 (800) 854-1993 and follow the prerecorded instructions.

Point of Contact
The point of contact for service, or return of equipment to FCI is your authorized FCI sales/service office. To locate the office nearest you, please go to www.fluidcomponents.com.