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Sensor Installation Overview

NOTE: THE FOLLOWING INFORMATION IS INTENDED TO PROVIDE THE USER WITH A PREVIEW OF WHAT WILL BE REQUIRED TO INSTALL THE MODEL SA877 SENSOR ASSEMBLY. PLEASE REVIEW THE DIAGRAM AND GUIDELINES BEFORE PROCEEDING.

Typical Sensor Installation Diagrams:

Sensor Installation Guidelines:
[1]. Install the pH sensor in pipe or vessel between 15˚ and 90˚ from horizontal.
[2]. Select a suitable junction box (optional) for the service area.
[3]. Connect union, nipple, and flex conduit with adequate service loop to sensor fitting or junction box.
[4]. Mount junction box as close to the pH sensor as possible.
[5]. Connect the sensor cable to the extension cable inside the junction box.
[6]. Keep cable run between junction box and pH / ORP instrument as short as possible.
[7]. Disconnect sensor cable in junction box prior to removing the pH sensor for service.
Sensor Assembly Instructions—Stage 1

BEGIN STAGE #1 ASSEMBLY OF THE MODEL SA877 SENSOR BY FOLLOWING THE STEP-BY-STEP INSTRUCTIONS [A] THROUGH [F] IN ORDER AS SHOWN BELOW:

[Step A]. INSTALL PACKING GLAND O-RING, ITEM NO. (2), INTO PACKING GLAND BODY, ITEM NO. (2).

[Step B]. SLIDE PACKING GLAND, ITEM NO. 3, INTO SHEATH, ITEM NO. 4. KEEP LOCKING NUT AND FERRULES LOOSE BUT ATTACHED TO PACKING GLAND.

[Step C]. STRETCH O-RINGS, ITEM NO. 1, INTO GROoves ON SENSOR.

[Step D]. THREAD SENSOR CABLE THROUGH SHEATH AND SLIDE THE SENSOR INTO SHEATH UNTIL IT STOPS AGAINST FLARED END.

[Step E]. STRETCH O-RING, ITEM NO. 1a, INTO GROOVE ON COUPLER TUBE, ITEM NO. 1.

[Step F]. THREAD SENSOR CABLE THROUGH COUPLER TUBE, ITEM NO. 1, THEN SLIDE COUPLER TUBE INTO SHEATH UNTIL IT CONTACTS SENSOR.

PLEASE NOTE
REFER TO PAGES 15 AND 16 OF THE SENSOR ASSEMBLY AND ITEMIZED PART LIST FOR ALL THESE COMPONENTS.
Sensor Assembly Instructions—Stage 1 (Continued)

CONTINUE STAGE #1 ASSEMBLY OF THE MODEL SA877 SENSOR BY FOLLOWING THE STEP-BY-STEP INSTRUCTIONS [G] AND [I] IN ORDER AS SHOWN BELOW:

[Step H]. INSTALL SUITABLE FLEX CONDUIT OF SUFFICIENT LENGTH TO PROVIDE A SERVICE LOOP LONG ENOUGH TO ALLOW FOR SERVICING OR REPLACEMENT OF SENSOR. FLEX CONDUIT TO BE CONNECTED TO A JUNCTION BOX SUITABLE FOR AREA OF APPLICATION AND LOCATED AS CLOSE AS POSSIBLE TO THE pH SENSOR. INSTALL A UNION BETWEEN THE FLEX CONDUIT AND THE SENSOR AS SHOWN BELOW TO FACILITATE SENSOR REPLACEMENT (SEE SERVICE INSTRUCTIONS).

[Step G]. THREAD COUPLER TUBE INTO SENSOR TAKING CARE NOT TO CROSS THREAD OR TO EXCESSIVELY TWIST CABLE.

THE COUPLER TUBE AND SENSOR SHOULD BE THREADED TOGETHER UNTIL BOTH ARE SEATED AGAINST THE ENDS OF THE SHEATH, AS SHOWN AT RIGHT.

[Step I]. SENSOR CABLE TO BE CONNECTED TO EXTENSION CABLE FROM INSTRUMENT IN JUNCTION BOX.
Sensor Assembly Instructions—Stage1 (Continued)
(Optional Sensor Mounted Junction Box)

[Step H-Option]. REMOVE JUNCTION BOX COVER AND THERAD SENSOR CABLE THROUGH JUNCTION BOX ASSEMBLY (JUNCTION BOX AND PROVIDED PIPE NIPPLE). THREAD JUNCTION BOX ASSEMBLY PIPE NIPPLE INTO SENSOR COUPLER ASSEMBLY, ITEM NO. 1. INSTALL SUITABLE FLEX CONDUIT LONG ENOUGH TO ALLOW FOR SERVICING OR REPLACEMENT OF SENSOR.

[Step I-Option]. CONNECT SENSOR TC WIRES (BLACK AND WHITE) TO TERMINALS #1 AND #2 OF THE JUNCTION BOX 4-POSITION TERMINAL STRIP. CONNECT SENSOR SOLUTION GROUND TO TERMINAL #3. THREAD EXTENSION CABLE (SEE BELOW) THROUGH CONDUIT AND ATTACH TC WIRES TO TERMINALS #1 AND #2. AND SOLUTION GROUND LEAD TO TERMINAL #3. CONNECT COAXIAL CONNECTORS FROM SENSOR AND EXTENSION CABLE AND SLIDE PROTECTIVE INSULATING BOOT OVER CONNECTORS. FINALLY, REPLACE JUNCTION BOX COVER.

INSTALL OPTIONAL SENSOR MOUNTED JUNCTION BOX TO STAGE #1 ASSEMBLY OF THE MODEL SA877 SENSOR BY FOLLOWING THE STEP-BY-STEP INSTRUCTIONS [H-OPTION] AND [I-OPTION] IN ORDER AS SHOWN BELOW:
COMPLETE STAGE #1 ASSEMBLY OF THE MODEL SA877 SENSOR BY FOLLOWING INSTRUCTION [J] AS SHOWN BELOW:

THE STAGE #1 ASSEMBLY OF THE SA877 SENSOR IS NOW COMPLETE AND SHOULD APPEAR AS ONE OF THE TWO ASSEMBLIES SHOWN BELOW.

[Step J]. PERFORM A 2-POINT CALIBRATION WITH pH BUFFER SOLUTIONS BEFORE PROCEEDING FURTHER WITH THE ASSEMBLY AND INSTALLATION.

CONTINUE WITH THE STAGE #2 ASSEMBLY PROCEDURES TO COMPLETE THE FINAL ASSEMBLY.
BEGIN STAGE #2 ASSEMBLY OF THE MODEL SA877 SENSOR BY FOLLOWING THE STEP-BY-STEP INSTRUCTIONS [A] THROUGH [D] IN ORDER AS SHOWN BELOW:

PLEASE NOTE
REFER TO PAGES 15 AND 16 OF THE SENSOR ASSEMBLY AND ITEMIZED PART LIST FOR ALL THESE COMPONENTS.

[Step A]. THREAD THE REDUCER BUSHING, ITEM NO. 5, INTO BALL VALVE, ITEM NO.6, USING TEFLOX TAPE TO SEAL AND TIGHTEN IN PLACE.

[Step B]. THREAD THE NIPPLE, ITEM NO. 7, INTO BALL VALVE, ITEM NO.6, USING TEFLOX TAPE TO SEAL AND TIGHTEN IN PLACE.

[Step C]. THREAD THE NIPPLE, ITEM NO. 7, ALONG WITH BALL VALVE, ITEM NO. 6, AND REDUCER BUSHING, ITEM NO. 5, INTO WELDALET OR APPROPRIATE PROCESS FITTING. USE TEFLOX TAPE TO SEAL THREADS AND TIGHTEN IN PLACE.

[Step D]. INSURE THAT THE VALVE IS IN THE CLOSED POSITION AS SHOWN BELOW BEFORE PROCEEDING TO NEXT STEP.
Sensor Assembly Installation Instructions—Stage 2

(Continued)

COMPLETE STAGE #2 ASSEMBLY OF THE MODEL SA877 SENSOR BY FOLLOWING THE STEP-BY-STEP INSTRUCTIONS [E] AND [F] IN ORDER AS SHOWN BELOW:

[Step E]. Apply Teflon tape to pipe threads of packing gland fitting and slide fitting to sensor end of sheath. Install Stage #1 subassembly into valve, taking care not to force the sensor into the ball portion of the valve to prevent breakage of the glass sheath.

[Step F]. Securely tighten packing gland fitting into valve assembly to provide a proper seal.

The stage #2 assembly of the sensor is now complete and should appear as shown. Do not tighten packing gland locking nut or open ball valve until sensor assembly is ready to go on-stream.
Sensor Assembly In-Service Instructions—Stage 3

COMPLETE STAGE #3 ASSEMBLY OF THE MODEL SA877 SENSOR BY FOLLOWING THE STEP-BY-STEP INSTRUCTIONS [A] THROUGH [C] IN ORDER AS SHOWN BELOW:

[Step A]. TO PLACE ASSEMBLY INTO SERVICE OPEN BALL VALVE COMPLETELY.
Caution: OPENING VALVE SUBJECTS SENSOR ASSEMBLY TO LINE PRESSURE. IF THE SENSOR IS NOT RETRACTED COMPLETELY AGAINST STOP, OPENING THE VALVE COULD RESULT IN THE SENSOR SUDDENLY RETRACTING THE REMAINING DISTANCE CAUSING DAMAGE TO THE SENSOR ASSEMBLY OR INJURY TO THE SERVICE PERSON.

[Step B]. INSERT STAGE #1 SUBASSEMBLY INTO PROCESS.

[Step C]. SECURE SENSOR IN PLACE BY TIGHTENING LOCKING NUT AND FERRULES OF GLAND FITTING, ITEM NO. 3.
DO NOT INSERT TIP OF SENSOR BEYOND INSIDE WALL OF PROCESS PIPE TO AVOID TORQUE AND POSSIBLE BREAKAGE.

THE FINAL ASSEMBLY IS NOW READY TO BE PLACED INTO SERVICE, WITH PACKING GLAND LOCKING NUT ENGAGED BUT NOT TIGHTENED AND SENSOR IN THE RETRACTED POSITION.

PLEASE NOTE
REFER TO PAGES 15 AND 16 OF THE SENSOR ASSEMBLY AND ITEMIZED PART LIST FOR ALL THESE COMPONENTS.

THE IN-SERVICE ASSEMBLY SHOULD APPEAR AS SHOWN BELOW.
Sensor Service Instructions

BEFORE SERVICING REMOVE THE SENSOR FROM SERVICE FOLLOWING THE STEP-BY-STEP INSTRUCTIONS [A] AND [B] IN ORDER AS SHOWN BELOW:

[Step A]. LOOSEN LOCKING NUT AND FERRULES OF GLAND FITTING, ITEM NO. 3.
Caution: THE SENSOR ASSEMBLY IS STILL UNDER PRESSURE. LOOSENING THE LOCKING NUT COULD RESULT IN THE SENSOR RETRACTING SUDDENLY AND WITH A GREAT DEAL OF FORCE. THIS COULD CAUSE DAMAGE TO THE SENSOR ASSEMBLY OR INJURY TO THE SERVICE PERSON.

[Step B]. FULLY RETRACT STAGE #1 SUB-ASSEMBLY SHAFT.
CONTINUE SERVICING OF THE MODEL SA877 SENSOR BY FOLLOWING THE STEP-BY-STEP INSTRUCTIONS [C] AND [D] IN ORDER AS SHOWN BELOW:

[Step C]: Close ball valve completely.

[Step D]: Completely unthread gland fitting, item no. 4, from valve assembly.
Sensor Service Instructions (Continued)


[Step G]. TO TEST SENSOR PERFORM A 2-POINT CALIBRATION WITH pH BUFFER AS SHOWN BELOW.

IF THE SENSOR TESTS WITHIN ACCEPTABLE LIMITS REINSTALL AND PLACE SENSOR BACK IN SERVICE BY FOLLOWING ASSEMBLY INSTRUCTIONS FROM STAGE #2 STEP “D” TO THE COMPLETION OF STAGE #3 (pages 6-8).

IF TESTING PROVES SENSOR TO BE FAULTY CONTINUE WITH THE SERVICE INSTRUCTIONS FOR SENSOR REPLACEMENT.

[Step F]. BEFORE TESTING THE SENSOR BE SURE THAT IT IS CLEAN.

[Step E]. REMOVE STAGE #1 ASSEMBLY FROM VALVE ASSEMBLY.

WITH THE STAGE #1 SUBASSEMBLY COMPLETELY REMOVED FROM THE VALVE ASSEMBLY THE SENSOR MAY NOW BE TESTED OR REPLACED.

CLOSED

CLEANING SOLUTION

BUFFER SOLUTION
Sensor Replacement Instructions

REPLACE THE pH SENSOR BY FOLLOWING THE STEP-BY-STEP SENSOR REPLACEMENT INSTRUCTIONS [A] THROUGH [F] IN ORDER AS SHOWN BELOW:

[Step A]. DISCONNECT SENSOR CABLE INSIDE OF JUNCTION BOX FROM EXTENSION CABLE TO INSTRUMENT.

[Step B]. UNCOUPLE UNION FITTING

[Step C]. UNTHREAD SENSOR CABLE FROM FLEX CONDUIT

[Step D]. AT THIS POINT THE SENSOR ASSEMBLY SHOULD BE COMPLETELY DETACHED FROM THE FLEX CONDUIT. UNTHREAD COUPLER TUBE BUT DO NOT COMPLETELY DIENGAGE FROM SENSOR.

[Step E]. WHILE FIRMLY GRIPPING SLEATH PUSH ON COUPLER TUBE ASSEMBLY TO UNSEAT SENSOR O-RINGS

[Step F]. COMPLETELY UNTAHAED COUPLER TUBE ASSEMBLY FROM THE SENSOR
Sensor Replacement Instructions
(Optional Sensor Mounted Junction Box)

TO DISASSEMBLE THE MODEL SA857 SENSOR WITH AN OPTIONAL SENSOR MOUNTED JUNCTION BOX, FOLLOW THE STEP-BY-STEP INSTRUCTIONS [A-OPTION] THROUGH [D-OPTION] IN ORDER AS SHOWN BELOW:

[Step A-Option]. REMOVE JUNCTION BOX COVER. DISCONNECT SENSOR TC AND SOLUTION GROUND WIRES FROM TERMINALS 1, 2 AND 3. UNPLUG SENSOR COAXIAL CABLE CONNECTOR FROM EXTENSION CABLE.

[Step B-Option]. WHILE FIRMLY GRIPING THE SENSOR AND THE SLEEVE AT THE SAME TIME UNTHERED THEM FROM THE COUPLER ASSEMBLY BUT DO NOT COMPLETELY DISENGAGE THREADS.

[Step C-Option]. WHILE FIRMLY GRIPING SLEEVE PUSH ON COUPLER TUBE - JUNCTION BOX ASSEMBLY TO UNSEAT SENSOR O-RINGS.

[Step D-Option]. COMPLETELY UNTHERED SENSOR FROM COUPLER TUBE ASSEMBLY. CONTINUE WITH SERVICE INSTRUCTIONS AT STEP "N".

Models SA877 & SA878 Retraction Sensor Assemblies
Sensor Replacement Instructions (Continued)

DISASSEMBLE THE ASSEMBLY INTO THE COMPONENT PARTS AS SHOWN IN ONE OF THE ILLUSTRATIONS BELOW.

TO INSTALL A NEW SENSOR AND RETURN THE MODEL SA877 TO SERVICE FOLLOW THE ASSEMBLY INSTRUCTIONS STARTING FROM STAGE #1 STEP “D” (PAGE 2) TO THE COMPLETION OF STAGE #3 (PAGE 7). (EXCLUDE STEP “E” OF STAGE #1 AND STEPS “A”, “B” AND “C” OF STAGE #2.)
ALL O-RINGS REQUIRE PROPER LUBRICATION PRIOR TO SERVICING. WE RECOMMEND USING PARKER O LUBE OR EQUIVALENT. FOLLOW THE LUBRICATION INSTRUCTIONS PROVIDED BY THE MANUFACTURER.

See Itemized List for Part Number & Description

OPTIONAL JUNCTION BOX ASSEMBLY

pH SENSOR (SEE MANUFACTURER'S SPEC SHEET)

PLEASE NOTE

1 REQUIRED

2 REQUIRED

3 REQUIRED

4 REQUIRED

5 REQUIRED

6 REQUIRED

7 REQUIRED

Models SA877 & SA878 Retraction Sensor Assemblies
Sensor Housing Assembly  (Continued)

These are the individual part numbers for the items shown in the exploded view on the previous page. Part numbers for a complete assembly are listed on next two pages, on the specific drawing.

<table>
<thead>
<tr>
<th>Item</th>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1    | *SA877-A-P100 | Coupler Assembly, Kynar (PVDF), N=7"  
This part number includes item 1a. |
| 1a   | SA857-A-P110 | O-ring, viton, size -019 |
| 2    | SA857-A-P111 | O-rings, viton, sensor, size -019, Pack of 10 |
| 3    | SA857-A-P115 | Compression Fitting, 316L SS, 1" Tube x 1" MNPT  
This part number includes items 3a-d. |
| 3a   | SA857-A-P116 | Compression Fitting, Nut |
| 3b   | SA857-A-P120 | Compression Fitting, Ferrule, Kynar (PVDF) |
| 3c   | SA857-A-P121 | Compression Fitting, Body, 316L SS |
| 3d   | SA857-A-P122 | Compression Fitting, O-ring, viton, size -120 |
| 4    | *SA857-A-P130 | Sheath, 316L SS, N=7" (also available in Titanium and Hastelloy) |
| 5    | SA857-A-P125 | Bushing, 316L SS, 1.25" MNPT x 1" FNPT |
| 6    | SA857-A-P150 | Ball Valve, Full Port, 316L SS, 1.25" NPT |
| 7    | SA857-A-P155 | Nipple, 316L SS, 1.25" NPT |
| Optional | SA857-A-P160 | Junction Box Assembly, Sensor Mount |
| Sensor | See Manufacturer’s Specs | pH Sensor |

* Items 1 and 4 (Coupler Assembly and Sheath) are also available in 11, 15, 21 and 27 inch lengths.
<table>
<thead>
<tr>
<th>Model No.</th>
<th>&quot;N&quot; Length Insertion Length</th>
<th>&quot;R&quot; Dimension Retraction Distance</th>
<th>&quot;C&quot; Dimension Minimum Clearance</th>
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<tbody>
<tr>
<td>SA877-6L07</td>
<td>7.0&quot;</td>
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<tr>
<td>SA877-6L27</td>
<td>27.0&quot;</td>
<td>38.75&quot;</td>
<td>40.0&quot;</td>
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</tbody>
</table>
Model No. | "N" Length Insertion Length | "R" Dimension Retraction Distance | "C" Dimension Minimum Clearance
---|---|---|---
SA878-6L07 | 13.25" | 13.75" | 17.50"
SA878-6L11 | 17.25" | 17.75" | 21.50"
SA878-6L15 | 21.25" | 21.75" | 25.25"
SA878-6L21 | 27.25" | 27.75" | 31.50"
SA878-6L27 | 33.25" | 33.75" | 37.50"