

# F8941 - PRV Commissioning Check Sheet



Unitywater

# F8941 - PRV Commissioning Check Sheet

## Document Details

This document is only valid on the day it was printed.

Document Owner	Manager Capital Delivery
References	F8922 PRV Commissioning Worksheet End to End Test Sheet

## Contents

<b>Contents</b> .....	<b>2</b>
<b>General</b> .....	<b>3</b>
<b>Vendor Verification</b> .....	<b>3</b>
General .....	3
Mechanical .....	3
Factory Acceptance Testing (FAT) .....	4
Electrical, Instruments and Control (E, I & C) .....	4
<b>Pre-commissioning</b> .....	<b>5</b>
Preliminaries Checklist .....	5
Pre-commissioning Checklist .....	6
General .....	6
Network .....	6
Electrical, Instruments and Control (E, I & C) .....	6
Mechanical .....	8
<b>Wet Testing</b> .....	<b>10</b>
Commissioning Schedule .....	10
General .....	10
PRV Control Checks .....	10
Wet Testing Signoff .....	11
<b>SAT / Performance Testing</b> .....	<b>12</b>
SAT Schedule .....	12
General .....	12
PRV Control Checks .....	12
SAT Signoff .....	13

# F8941 - PRV Commissioning Check Sheet

## General

In using this document, due consideration of all other relevant Unitywater Standard Drawings and Unitywater Standard Specifications should be adhered to.

## Vendor Verification

<b>PROJECT TITLE:</b>			<b>FINANCE NO:</b>
<b>General</b>			<b>Result / Init. / Date</b>
<b>Mechanical</b>			
1. Valve test results have been reviewed and conform with applicable standards/specifications			OK <input type="checkbox"/>
2. Flowmeter Calibration certificate received			OK <input type="checkbox"/>
<b>CONSTRUCTOR</b>			
Name:	Position:	Signature:	Date:
<b>UNITYWATER SIGNOFF</b>			
Name:	Position:	Signature:	Date:

## F8941 - PRV Commissioning Check Sheet

<b>PROJECT TITLE:</b>		<b>FINANCE NO:</b>	
<b>Factory Acceptance Testing (FAT)</b>		<b>Result / Init. / Date</b>	
<b>Electrical, Instruments and Control (E, I &amp; C)</b>			
<b>Switchboards</b>			
1. The switchboard manufacturer has been provided with current Unitywater Standard Switchboard Drawings (OR, if "Design and Construct", the 'For Construction' drawings have been reviewed by Unitywater and provided to the switchboard manufacturer)		OK <input type="checkbox"/>	
2. The switchboard manufacturer has undertaken a full point-to-point test on all switchboard wiring		OK <input type="checkbox"/>	
3. The switchboard manufacturer has provided evidence of point-to-point testing in the form of marked up wiring drawings (each connection highlighted as tested)		OK <input type="checkbox"/>	
4. Any changes, outcomes or additional detail resulting from FAT testing have been marked on the drawings with the highlighted test connections. Mark-ups include all available circuits, inputs, power supply voltages, labels, wire numbers, terminals etc. These marked-up drawings are labeled 'FAT'.		OK <input type="checkbox"/>	
5. Cabinet and paintwork have been inspected for any visual damage		OK <input type="checkbox"/>	
6. The following is as per current drawings: <ul style="list-style-type: none"> <li>• Incomer arrangements</li> <li>• Cable entry provisions</li> <li>• Interlocking provisions</li> <li>• Incomer protection (Fault current rating) and discrimination</li> </ul>		OK <input type="checkbox"/>	
7. Switchboard rating nameplate is attached		OK <input type="checkbox"/>	
8. Switchboard Test Certificate has been checked		OK <input type="checkbox"/>	
9. Software used during FAT is available		OK <input type="checkbox"/>	
10. Any deficiencies have been recorded to a 'FAT punchlist register' and rectified		OK <input type="checkbox"/>	
<b>Instrumentation</b>			
11. Calibration certificates have been received for instruments		OK <input type="checkbox"/>	
<b>Software</b>			
12. Software for Outstation Type is loaded		OK <input type="checkbox"/>	
13. Software blocks have been fat tested (if non standard)		OK <input type="checkbox"/>	
<b>CONSTRUCTOR</b>			
Name:	Position:	Signature:	Date:
<b>UNITYWATER SIGNOFF</b>			
Name:	Position:	Signature:	Date:

# F8941 - PRV Commissioning Check Sheet

## Pre-commissioning

PROJECT TITLE:		FINANCE NO:	
<b>Preliminaries Checklist</b>		<b>Result / Init. / Date</b>	
1. Check all commissioning personnel have been inducted to site		OK <input type="checkbox"/>	
2. Check risk assessments and SWMS have been produced for all Pre-commissioning and Commissioning activities		OK <input type="checkbox"/>	
3. The site is safe for commissioning works to commence. Safety requirements include: <ul style="list-style-type: none"> <li>• Covers and grills installed and flush</li> <li>• Davit mounting points certified</li> <li>• Fall arrest mounting points certified</li> <li>• Handrails, fencing, gates and chains installed correctly</li> <li>• Emergency procedures available</li> <li>• Safety signage in place (PPE, Electricity, SWL, Danger etc.)</li> </ul>		OK <input type="checkbox"/>	
4. Check "danger electric" marker bricks are installed at ground level and painted yellow where applicable		OK <input type="checkbox"/>	
5. 'As Constructed' survey by licenced surveyor complete		OK <input type="checkbox"/>	
6. Changes to any detail as shown on the 'For Construction' drawings noted on a set of 'For Construction' drawings and marked 'As Constructed'		OK <input type="checkbox"/>	
7. Current Unitywater Standard Drawings are on site (OR, if "Design and Construct", the 'For Construction' drawings have been reviewed by Unitywater)		OK <input type="checkbox"/>	
8. All required civil works testing (ITPs) completed by Contracts Inspector		OK <input type="checkbox"/>	
9. Operation and Maintenance Manuals have been received for Vendor supplied components and the Functional Specification is available		OK <input type="checkbox"/>	
10. Electrical supply and metering available on site (if powered site)		OK <input type="checkbox"/>	
11. Pole / pillar termination method meets all requirements		OK <input type="checkbox"/>	
12. Check operation of all locks on switchboards		OK <input type="checkbox"/>	
13. Test documentation for Mechanical equipment and Instrumentation has been received. These generally include: <ul style="list-style-type: none"> <li>• Factory test results</li> <li>• Test compliance certificates</li> <li>• Instrument calibration certificates</li> <li>• Warranty information</li> </ul>		OK <input type="checkbox"/>	
14. FAT completed and critical punchlist items rectified		OK <input type="checkbox"/>	
<b>CONSTRUCTOR</b>			
Name:	Position:	Signature:	Date:
<b>UNITYWATER SIGNOFF</b>			
Name:	Position:	Signature:	Date:

## F8941 - PRV Commissioning Check Sheet

<b>PROJECT TITLE:</b>	<b>FINANCE NO:</b>									
<b>Pre-commissioning Checklist</b>	<b>Result / Init. / Date</b>									
<b>General</b>										
1. Check Preliminaries Checklist completed and signed off	OK <input type="checkbox"/>									
<b>Network</b>										
1. Check Commissioning Plan has been approved by Unitywater	OK <input type="checkbox"/>									
2. Advise Network Operations and Control Room of commencement of pre-commissioning activities and proposed timing of performance and SAT testing	OK <input type="checkbox"/>									
3. Check Network Operations and Control Room are ready for performance and SAT testing and appropriate resources are available to assist	OK <input type="checkbox"/>									
4. Confirm Network Operations are aware of impact on downstream infrastructure	OK <input type="checkbox"/>									
5. Advise Operations of proposed timing of performance and SAT testing (fluctuating load)	OK <input type="checkbox"/>									
6. Check sufficient water is available for testing	OK <input type="checkbox"/>									
<b>Electrical, Instruments and Control (E, I &amp; C)</b>										
<b>Switchboards</b>										
<b>1. ENSURE SWITCHBOARD IS <u>NOT</u> ENERGISED</b>	OK <input type="checkbox"/>									
2. Check mains and earth cables are installed and connected	OK <input type="checkbox"/>									
3. Record the cable insulation resistance of the 3 phases	<table style="width: 100%; border: none;"> <tr> <td style="text-align: right;">L1</td> <td style="border-bottom: 1px solid black; width: 50px;"></td> <td style="text-align: right;">MΩ</td> </tr> <tr> <td style="text-align: right;">L2</td> <td style="border-bottom: 1px solid black;"></td> <td style="text-align: right;">MΩ</td> </tr> <tr> <td style="text-align: right;">L3</td> <td style="border-bottom: 1px solid black;"></td> <td style="text-align: right;">MΩ</td> </tr> </table>	L1		MΩ	L2		MΩ	L3		MΩ
L1		MΩ								
L2		MΩ								
L3		MΩ								
4. Record earth loop impedance	Ω									
5. Check point-to-point phase continuity	<table style="width: 100%; border: none;"> <tr> <td style="text-align: right;">R to L1</td> <td>OK <input type="checkbox"/></td> </tr> <tr> <td style="text-align: right;">W to L2</td> <td>OK <input type="checkbox"/></td> </tr> <tr> <td style="text-align: right;">B to L3</td> <td>OK <input type="checkbox"/></td> </tr> </table>	R to L1	OK <input type="checkbox"/>	W to L2	OK <input type="checkbox"/>	B to L3	OK <input type="checkbox"/>			
R to L1	OK <input type="checkbox"/>									
W to L2	OK <input type="checkbox"/>									
B to L3	OK <input type="checkbox"/>									
6. Check Incomer protection set as per design	OK <input type="checkbox"/>									
7. Check all CT and other links are in place	OK <input type="checkbox"/>									
8. Check correct glands have been utilised for cable entries	OK <input type="checkbox"/>									
9. Cable screens and earthing is as per design	OK <input type="checkbox"/>									
10. Ensure switchboard main Incomer is turned OFF and tagged	OK <input type="checkbox"/>									

## F8941 - PRV Commissioning Check Sheet

11. Check Multiple Earth Neutral (MEN) connection	OK <input type="checkbox"/>
12. Turn on mains switch	OK <input type="checkbox"/>
<b>13. ACKNOWLEDGE SWITCHBOARD IS NOW ENERGISED</b>	OK <input type="checkbox"/>
14. Check 3 phase voltages	<div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: right; padding-right: 10px;">           AB BC CA         </div> <div style="border-bottom: 1px solid black; width: 50px; margin-bottom: 2px;"></div> <div style="text-align: right; padding-right: 5px;">V</div> </div> <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: right; padding-right: 10px;"></div> <div style="border-bottom: 1px solid black; width: 50px; margin-bottom: 2px;"></div> <div style="text-align: right; padding-right: 5px;">V</div> </div> <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: right; padding-right: 10px;"></div> <div style="border-bottom: 1px solid black; width: 50px; margin-bottom: 2px;"></div> <div style="text-align: right; padding-right: 5px;">V</div> </div>
<b>Lighting and GPOs</b>	
15. Check light circuit breaker conforms to electrical drawings	OK <input type="checkbox"/>
16. GPO circuit breaker(s) conform to electrical drawings	OK <input type="checkbox"/>
17. Check earth leakage circuit breaker has been tested and results are available	OK <input type="checkbox"/>
18. Internal and external lights are connected and working	OK <input type="checkbox"/>
19. Internal and external GPOs are connected and working	OK <input type="checkbox"/>
<b>Flowmeters</b>	
20. Check calibration certificate has been received	OK <input type="checkbox"/>
21. Check mag flow head is connected to flowmeter converter	OK <input type="checkbox"/>
22. Check correct supply voltage available at converter	OK <input type="checkbox"/>
23. Check analogue output is correctly connected to RTU and operating correctly	OK <input type="checkbox"/>
24. Check totaliser output is correctly connected to RTU and operating correctly	OK <input type="checkbox"/>
25. Check mechanical (vandal) and UV protection installed on external cable	OK <input type="checkbox"/>
<b>Field Devices</b>	
26. Check calibration of all analogue signals (including flow and pressure transmitters)	OK <input type="checkbox"/>
27. Check setting of pressure and flow switches	OK <input type="checkbox"/>
<b>Radio</b>	
28. Check radio feeder & antenna installation and cable testing (antenna to radio) have been performed, and results certificate received	OK <input type="checkbox"/>
29. Check surge protection and fly lead is connected between antenna and radio	OK <input type="checkbox"/>
30. Check Communications earthing kits and earthing are installed on feeder and Surge Diverter respectively	OK <input type="checkbox"/>
31. Record radio system information Trio ER45051A01-D0                      Check & Verify Make & Model are correct <span style="float: right;">Record Serial #</span>	OK <input type="checkbox"/> <div style="border-bottom: 1px solid black; width: 50px; margin-left: 100px;"></div>
32. Check unit is powered with correct polarity and voltage 12V DC Supply	OK <input type="checkbox"/>

## F8941 - PRV Commissioning Check Sheet

33. Check radio is programmed to the correct channel	Record frequency	OK <input type="checkbox"/>
		_____ MHz
34. Check radio configuration including stream id serial paramaters are set correctly for the Outstation and record		OK <input type="checkbox"/>
		_____
		_____
		_____
35. Check data radio diagnostics communication working correctly		OK <input type="checkbox"/>
<b>Remote Telemetry Units (RTU)</b>		
36. Check unit is powered with correct polarity and voltage DC Supply(ies)		OK <input type="checkbox"/>
37. Check the UPS battery is connected and charging		OK <input type="checkbox"/>
38. Check communication is working		OK <input type="checkbox"/>
39. Check I/O is operational and conforms with current drawings		OK <input type="checkbox"/>
<b>Control System</b>		
40. Record type of control system installed (i.e. SCADAPack, MultiSmart, MT2-PC)		_____
41. Record controller information	Manufacturer	_____
	Model type	_____
	Serial no	_____
	Firmware rev	_____
	Software rev	_____
<b>End to End Testing (by Unitywater)</b>		
42. Notify control room of impending end-to-end test (minimum 5 days notice)		OK <input type="checkbox"/>
43. Check end-to-end test sheet has been reviewed and approved by control room		OK <input type="checkbox"/>
44. Complete <b>End-to-End Test Sheet</b> to verify communication to SCADA		OK <input type="checkbox"/>
<b>Mechanical</b>		
<b>General</b>		
45. Check layout conforms with 'For Construction' piping drawings		OK <input type="checkbox"/>
46. Undertake visual examination of installation and finish of all pipework, mechanical devices, valves and fittings		OK <input type="checkbox"/>
47. Check accuracy of tagging and labelling		OK <input type="checkbox"/>
48. Ensure pipework is free of debris capable of causing damage to mechanical equipment when flow commences		OK <input type="checkbox"/>
49. Check accessibility of access covers and equipment for operational and maintenance purposes		OK <input type="checkbox"/>
50. Check equipment is guarded appropriately		OK <input type="checkbox"/>



## F8941 - PRV Commissioning Check Sheet

51. Check that all Vendor Manuals are available	OK <input type="checkbox"/>		
52. Check that manufacturers' requirements have been met (i.e. min. distance to nearest valve/bend, orientation, alignment, lubrication, preparation, priming etc.)	OK <input type="checkbox"/>		
53. Check instrumentation nozzles are provided in accordance with design (correct side of equipment e.g. US/DS)	OK <input type="checkbox"/>		
54. Check installation and operation of instrument isolation valves	OK <input type="checkbox"/>		
55. Check directional requirements (i.e. valve direction)	OK <input type="checkbox"/>		
56. Check commissioning pressure transmitters or gauges on either side of control valve are operational	OK <input type="checkbox"/>		
<b>Flowmeter</b>			
57. Flowmeter calibration certificate received	OK <input type="checkbox"/>		
58. Check earthing straps are installed accross both flowmeter flanges, earthing rings and to earth as specified by the equipment manufacturer	OK <input type="checkbox"/>		
<b>CONSTRUCTOR</b>			
Name:	Position:	Signature:	Date:
<b>UNITYWATER SIGNOFF</b>			
Name:	Position:	Signature:	Date:

# F8941 - PRV Commissioning Check Sheet

## Wet Testing

PROJECT TITLE:	FINANCE NO:	
<b>Commissioning Schedule</b>	Result / Init. / Date	UW Witness / Initials
<b>General</b>		
1. Check Pre-commissioning Checklist completed and signed off	OK <input type="checkbox"/>	
2. Record Top of Slab RL (m) and distance from Top of Slab to each pressure transmitter in <b>Commissioning Worksheet</b>	OK <input type="checkbox"/>	
3. Record distance from Top of Slab to control valve centreline in <b>Commissioning Worksheet</b>	OK <input type="checkbox"/>	
<b>Fill and Bleed Main</b>		YES <input type="checkbox"/>
4. Calculate volume of water required to fill main	OK <input type="checkbox"/>	
5. Ensure sufficient source water available to fill main and perform operation test	OK <input type="checkbox"/>	
6. Charge main and bleed air from main and PRV valve body	OK <input type="checkbox"/>	
7. Perform visual inspection of all piping, fittings and flanged joints for leakage	OK <input type="checkbox"/>	
<b>Alarm Level Settings</b>		
8. Confirm pressure indicated by the transmitter is reflective of the actual pressure	OK <input type="checkbox"/>	
9. Confirm upstream and downstream pressure alarm level settings (low, low low, high and high high)	OK <input type="checkbox"/>	
<b>PRV Control Checks</b>		
<b>Pressure Control (SCADA adjustable pressure setpoint)</b>		YES <input type="checkbox"/>
10. Check pressure controller (EPC) settings	OK <input type="checkbox"/>	
11. Set a pressure setpoint (downstream pressure to be maintained)	OK <input type="checkbox"/>	
12. Manually override downstream pressure value to value above pressure setpoint	OK <input type="checkbox"/>	
13. Open PRV isolation valves and close bypass valves	OK <input type="checkbox"/>	
14. Confirm control valve closes (and confirm 'fail to meet setpoint' alarm is activated after time delay?)	OK <input type="checkbox"/>	
15. Manually override downstream pressure value to value below pressure setpoint	OK <input type="checkbox"/>	
16. Confirm control valve opens fully	OK <input type="checkbox"/>	

## F8941 - PRV Commissioning Check Sheet

17. Remove manual override on downstream pressure transmitter value	OK <input type="checkbox"/>		
18. Confirm valve operates to maintain pressure setpoint	OK <input type="checkbox"/>		
19. Alter flowrate (upstream pressure conditions) and confirm valve operates to maintain pressure setpoint	OK <input type="checkbox"/>		
20. Confirm failure mode (on loss of pressure signal and loss of power) is as per specification	OK <input type="checkbox"/>		
<b>Pressure Control (pilot controlled pressure setpoint)</b>		YES <input type="checkbox"/>	
21. Confirm pilot is set to desired pressure setpoint	OK <input type="checkbox"/>		
22. Open PRV isolation valves and close bypass valves	OK <input type="checkbox"/>		
23. Confirm valve operates to maintain pressure setpoint	OK <input type="checkbox"/>		
24. Alter flowrate (upstream pressure conditions) and confirm valve operates to maintain pressure setpoint	OK <input type="checkbox"/>		
<b>Control Valve Position Indicator</b>		YES <input type="checkbox"/>	
25. Position indicator?	OK <input type="checkbox"/>		
<b>Opening/Closing Speed Control</b>		YES <input type="checkbox"/>	
26. Opening/closing speed control?	OK <input type="checkbox"/>		
<b>Manual Open/Close Bypass</b>		YES <input type="checkbox"/>	
27. Manual open/close bypass?	OK <input type="checkbox"/>		
<b>Other (project specific testing)</b>		YES <input type="checkbox"/>	
28.			
29.			
<b>Wet Testing Signoff</b>			
<b>CONSTRUCTOR</b>			
Name:	Position:	Signature:	Date:
<b>UNITYWATER WITNESS</b>			
Name:	Position:	Signature:	Date:
Name:	Position:	Signature:	Date:
Name:	Position:	Signature:	Date:

## F8941 - PRV Commissioning Check Sheet

### SAT / Performance Testing

<b>PROJECT TITLE:</b>	<b>FINANCE NO:</b>
<b>SAT Schedule</b>	<b>Result / Init. / Date</b>
<b>General</b>	
1. Check Pre-commissioning Checklist completed and signed off	OK <input type="checkbox"/>
2. Record Top of Slab RL (m) and distance from Top of Slab to each pressure transmitter in <b>Commissioning Worksheet</b>	OK <input type="checkbox"/>
3. Record distance from Top of Slab to control valve centreline in <b>Commissioning Worksheet</b>	OK <input type="checkbox"/>
<b>PRV Control Checks</b>	
<i>Pressure Control (SCADA adjustable pressure setpoint)</i>	
4. Check pressure controller (EPC) settings	OK <input type="checkbox"/>
5. Set a pressure setpoint (downstream pressure to be maintained)	OK <input type="checkbox"/>
6. Manually override downstream pressure value to value above pressure setpoint	OK <input type="checkbox"/>
7. Open PRV isolation valves and close bypass valves	OK <input type="checkbox"/>
8. Confirm control valve closes (and confirm 'fail to meet setpoint' alarm is activated after time delay?)	OK <input type="checkbox"/>
9. Manually override downstream pressure value to value below pressure setpoint	OK <input type="checkbox"/>
10. Confirm control valve opens fully	OK <input type="checkbox"/>
11. Remove manual override on downstream pressure transmitter value	OK <input type="checkbox"/>
12. Confirm valve operates to maintain pressure setpoint	OK <input type="checkbox"/>
13. Alter flowrate (upstream pressure conditions) and confirm valve operates to maintain pressure setpoint	OK <input type="checkbox"/>
14. Confirm failure mode (on loss of pressure signal and loss of power) is as per specification	OK <input type="checkbox"/>
<i>Pressure Control (pilot controlled pressure setpoint)</i>	
15. Confirm pilot is set to desired pressure setpoint	OK <input type="checkbox"/>
16. Open PRV isolation valves and close bypass valves	OK <input type="checkbox"/>
17. Confirm valve operates to maintain pressure setpoint	OK <input type="checkbox"/>
18. Alter flowrate (upstream pressure conditions) and confirm valve operates to maintain pressure setpoint	OK <input type="checkbox"/>

## F8941 - PRV Commissioning Check Sheet

<b>Control Valve Position Indicator</b>			
19. Position indicator?			OK <input type="checkbox"/>
<b>Opening/Closing Speed Control</b>			
20. Opening/closing speed control?			OK <input type="checkbox"/>
<b>Manual Open/Close Bypass</b>			
21. Manual open/close bypass?			OK <input type="checkbox"/>
<b>Other (project specific testing)</b>			
22.			OK <input type="checkbox"/>
23.			OK <input type="checkbox"/>
<b>SAT Signoff</b>			
To verify completion of all SAT items to the satisfaction of Stakeholders.			
<b>CONSTRUCTOR</b>			
Name:	Position:	Signature:	Date:
<b>UNITYWATER WITNESS (Commissioning)</b>			
Name:	Position:	Signature:	Date:
<b>UNITYWATER WITNESS (Operations)</b>			
Name:	Position:	Signature:	Date:
<b>UNITYWATER WITNESS (Electrical)</b>			
Name:	Position:	Signature:	Date:
<b>UNITYWATER WITNESS (SCADA)</b>			
Name:	Position:	Signature:	Date:
<b>UNITYWATER WITNESS (Mechanical)</b>			
Name:	Position:	Signature:	Date: