Tech Note
T202501

Notes on commissioning the WTW turbidity analyzer

Turb PLUS 2000

Turbidity is one of the most important parameters in the assessment of drinking water quality and is therefore often continuously monitored. Xylem Analytics offers the WTW Turb PLUS 2000 turbidity analyzer for this purpose. For precise measurement results and to avoid unnecessary shifts in the signal and alarms, a few settings must be made during installation and commissioning. These are explained and evaluated in more detail below.

1. Setup

Figure 1 shows the turbidity analyzer with its components. The inlet and outlet must be connected during installation, the pressure regulator reduces the pressure to 1.03 bar and is preset on delivery, the shut-off clamp should be open during operation and the flow-through cuvette should be clean and correctly inserted. The desiccant inserted in the cuvette on delivery must be removed. The second, larger desiccant bag must be installed in accordance with the operating instructions.

Further information on commissioning can be found in this blog post

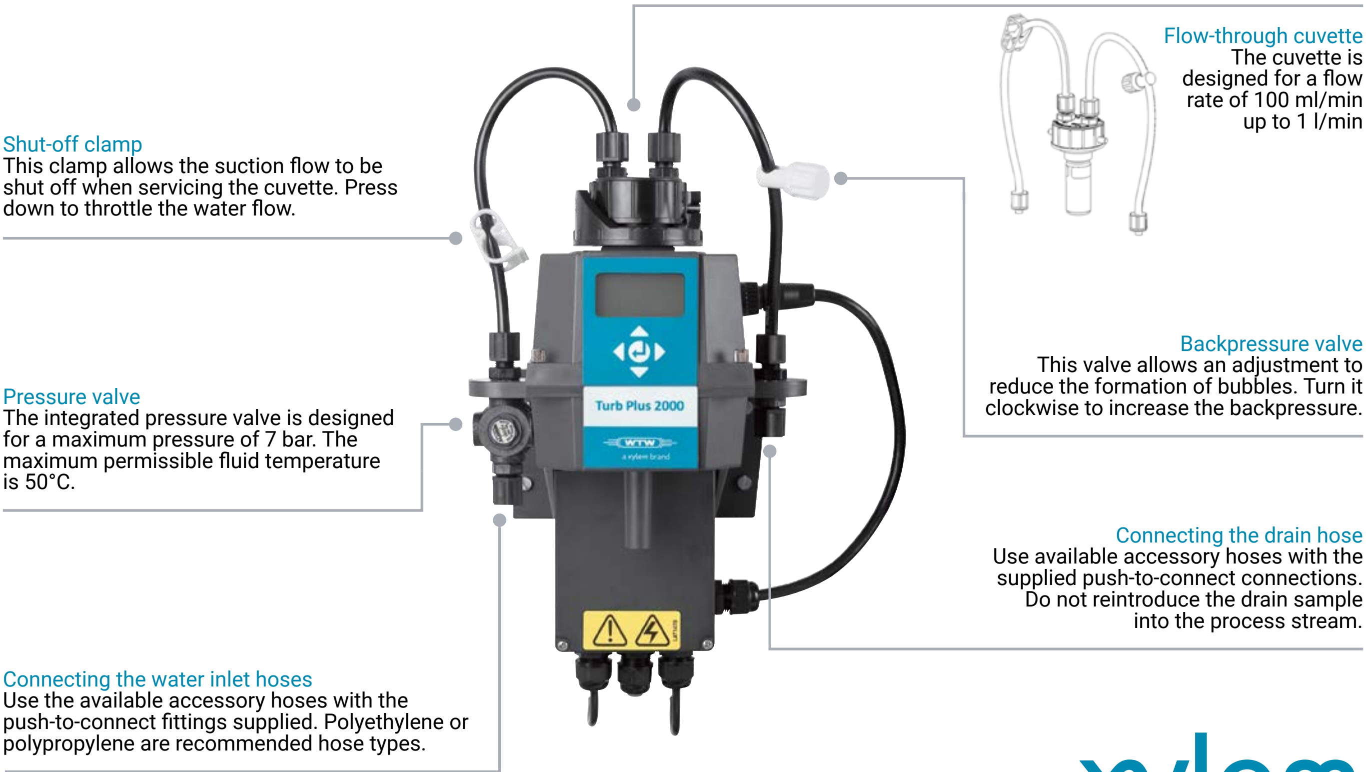

Figure 1: Setup of the WTW Turb PLUS 2000 turbidity analyzer

2. Settings

The **backpressure valve**, the programmable **signal averaging** and the incoming **flow rate** offer setting options.

- The backpressure valve (see figure 2) allows an adjustment to reduce the formation of bubbles in the cuvette. Bubbles in the cuvette distort the measurement signal and lead to jumping measurement values (see figure 5, phase 2). It is essential to adjust the valve in order to obtain good measured values. To do this, the valve must be turned clockwise, which increases the backpressure downstream of the cuvette and prevents air bubbles from outgassing in the cuvette. How far the valve must be closed depends on the application and environment. It is recommended to increase the backpressure gradually and to check the effect on the measured values.
- Signal averaging is programmable on the device (see figure 3) and can be used to smooth the response to peaks or unstable measured values. The reaction is achieved by averaging the measured values. The measuring interval is 1 second and the maximum averaging time is 60 seconds.
- The flow rate should not be set on the turbidity analyzer, but in the inlet (see figure 4). It should be within the design range of the flow-through cuvette, between 6 L/h and 60 L/h. If the turbidity analyzer is installed on the WTW Drinking Water Panel, the adjustable range is reduced to 10 L/h to 40 L/h.

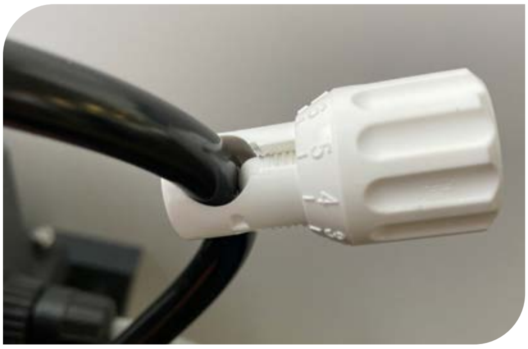

Figure 2: Backpressure valve of the turbidity analyzer

Figure 3: Setting the signal averaging on the turbidity analyzer

Figure 4: Flow rate indicator on the WTW Drinking Water Panel (DW/P)

3. Evaluation of measurement results

Figure 5 and figure 6 show measurement results of the turbidity analyzer from laboratory tests using tap water. In both figures, the measured turbidity in FNU is plotted over time. Figure 5 shows measurement results at a flow rate of 10 L/h, figure 6 at 40 L/h. Both measurements are divided into 3 phases, which differ due to different combinations of backpressure and signal averaging settings.

Flow rate: 10 L/h

Phase	Backpressure valve	Signal averaging
1	set	1 sec
2	open	1 sec
3	set	10 sec

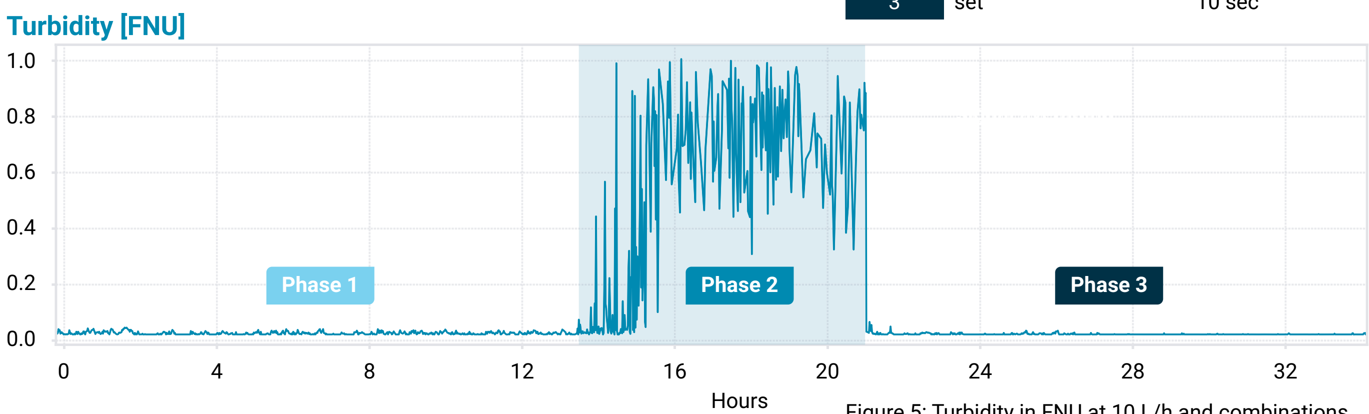

Figure 5: Turbidity in FNU at 10 L/h and combinations of backpressure and signal averaging

Figure 5 illustrates the effect of jumping measurement values in phase 2 when the backpressure valve is opened. Measured values jump up to 1 FNU and behave very unsteadily. Phases 1 and 3 show a high measured value quality, whereby a higher signal averaging is set in phase 3. The effect of signal averaging is shown in more detail in figure 7.

Flow rate: 40 L/h

Phase	Backpressure valve	Signal averaging
1	set	10 sec
2	open	10 sec
3	open	1 sec

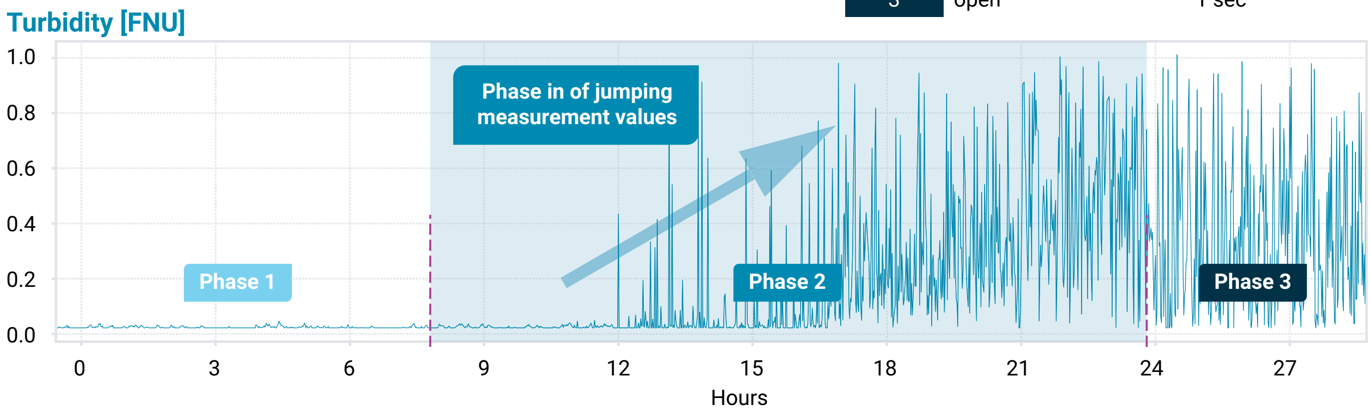

Figure 6: Turbidity in FNU at 40 L/h and different combinations of backpressure and signal averaging

Figure 6 shows a high measurement value quality in phase 1 with the backpressure set properly. Accordingly, no influence of the flow rate on the measurement value quality could be determined in the design range of the WTW Drinking Water Panel (between 10 and 40 L/h).

Phase 2 shows a delayed onset of jumping measurement values after opening the backpressure valve. This effect can be explained by the rigidity of the hose, which is compressed by the backpressure valve. After opening the valve, the hose can retain its compressed state and only open completely again slowly, with a time delay.

Phase 3 illustrates that increasing the signal averaging while the backpressure valve remains open cannot prevent the measured values from jumping. **Setting the backpressure is therefore a priority in order to obtain good measured values.**

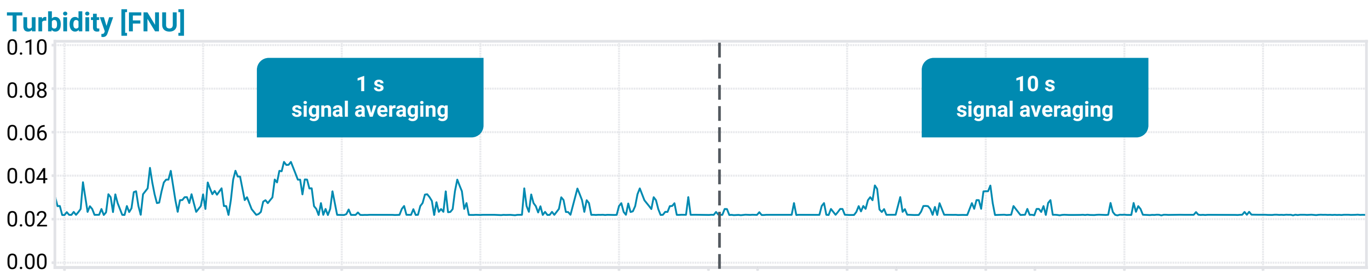

Figure 7: Comparison of the measurement value quality at 10 L/h, set backpressure and 1 s or 10 s signal averaging

Figure 7 focuses on the influence of signal averaging and compares sections from phases 1 and 3 of figure 5 in detail with a scaling of 0 to 0.1 FNU. It can be seen that a signal averaging of 10 seconds does not bring any noticeable advantage (in terms of the measurement value quality) compared to a signal averaging of 1 second if the backpressure is well adjusted. Since the setting of a lower signal averaging enables the monitoring of rapid changes, this is recommended. However, very short peaks can occur due to air bubbles or similar. To prevent the operator from being alerted as a result, signal averaging can cut these peaks.

4. Conclusion

- **The correct setting of the backpressure valve is crucial for a high measurement quality.**
- **The flow rate does not influence the measured value quality, but does determine the water consumption.**
- **Signal averaging can cap short signal peaks and avoids unnecessary alarms, but does not help against jumping measurement values.**
- **Observe the operating instructions and the Blog „How-to turbidity" for general commissioning.**

Figure 8: Calibration standard set for online turbidity meters of the series Turb PLUS 2000

Handy – calibration kits for Turb PLUS 2000:

Kal Kit Turb PLUS 2000:
Calibration standard set for online turbidity meters Turb PLUS 2000; standards 0.02, 10 and 100 NTU; cleaning tissues and designation rings. Acc. to DIN EN ISO 7027 (secondary) and US EPA180.1 (Primary standard)

WTW Turb PLUS 2000 im Web:

Do you have further questions?
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