

## FCoE Public Data Set 02 – September 2020

### Summary

This data set contains readings from a wide array of instruments and actuators available on the **XCaliber flow Loop** at the **Flow Center of Excellence** in Dordrecht the Netherlands.

The data set contains 5, approximately 5 minute intervals of different operating regimes: 40 m<sup>3</sup>/hr., 60 m<sup>3</sup>/hr., 80 m<sup>3</sup>/hr., 60 m<sup>3</sup>/hr., 40 m<sup>3</sup>/hr., in semi-automatic control of the loop. Note that this data set is rather similar to XCaliber Data Set 01 – September 2020. Now two of the XCaliber centrifugal pumps were used to realize the flow.

### License

This data set is licensed under the Community Data License Agreement – Permissive, Version 1.0 ([CDLA-Permissive-1.0](#))

### More Information

More information on XCaliber and the Flow Center of Excellence is available at <https://www.flowcenter.nl/en/home-en/>

### Required Citations

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### Data Collection & Storage Info

Data was obtained from an OPC factory Server by Schneider Electric using UReason's APM-Studio. Original raw data format, stored by APM-Studio, is available in Microsoft SQL-Server.

### Data Information

Key devices in the data set:

1. ATV\_101 : Frequency Controller (pump drive) for pump 101
2. ATV\_102 : Frequency Controller (pump drive) for pump 101
3. ATV\_PID : PID controller for the ATVs (Altivar Process Variable speed drive)
4. FT\_100 : Magnetic Induction Flow Transmitter (Main line)
5. FT\_102 : Coriolis Flow Transmitter (mass meter , Main Line)
6. FT\_210 : Magnetic Induction Flow Transmitter (MUT section A)
7. FT\_211 : Magnetic Induction Flow Transmitter (MUT section A)
8. FT\_220 : Magnetic Induction Flow Transmitter (MUT section B)
9. FT\_221 : Magnetic Induction Flow Transmitter (MUT section B)
10. P\_101 : Pump 101
11. P\_102 : Pump 102
12. PT\_101 : Pressure Transmitter (right after pump section)
13. PT\_201 : Pressure Transmitter (just before pump section)
14. TT\_201 : Temperature Transmitter (just before pump section)

The P&ID (piping and instrumentation diagram) of XCaliber, is provided as part of the data set.

Key features in the data set:

Device	OPC-item	Description
1. ATV_101	ATV_101_ATV_ST.PresentValue	Drive RPM - process value
2. ATV_101	ATV_101_ATV_ST.SetPoint	Drive RPM – setpoint
3. ATV_102	ATV_102_ATV_ST.PresentValue	Drive RPM - process value
4. ATV_102	ATV_102_ATV_ST.SetPoint	Drive RPM – setpoint
5. ATV_PID	ATV_PID_PIDCTL_ST.OP	Drive frequency setpoint
6. ATV_PID	ATV_PID_PIDCTL_ST.PV	flow (primary value)
7. ATV_PID	ATV_PID_PIDCTL_ST.SP	flow setpoint
8. FT_100	FT_100_Calc_flow	flow (m3/hr; calculated)
9. FT_100	FT_100_KFact_Value	# puls /hr (KFact = 20000)
10. FT_102	FT_102_Calc_flow	flow (m3/hr)
11. FT_210	FT_210_Calc_flow	flow (m3/hr; calculated)
12. FT_211	FT_211_Calc_flow	flow (m3/hr; calculated)
13. FT_220	FT_220_Calc_flow	flow (m3/hr; calculated)
14. FT_221	FT_221_Calc_flow	flow (m3/hr; calculated)
15. P_101	P_101_Freq_OP	frequency (%) as set by drive
16. P_101	P_101_Run_CMD	status indicator (pump command running)
17. P_101	P_101_Running	status indicator (pump running)
18. P_101	P_101_SDDEVCTL_ST.PV	Motor/PUMP speed RPM
19. P_102	P_102_Freq_OP	frequency (%) as set by drive
20. P_102	P_102_Run_CMD	status indicator (pump command running)
21. P_102	P_102_Running	status indicator (pump running)
22. P_102	P_101_SDDEVCTL_ST.PV	Motor/PUMP speed RPM
23. PT_101	PT_101_AINPUT1_ST.PV	process value (barg)
24. PT_201	PT_201_AINPUT1_ST.PV	process value (barg)
25. TT_201	TT_201_AINPUT1_ST.PV	process value (o C)

## Data set type

Raw data – multiple conditions.

## Sequence of Events

The system running with 2 pumps ; flow SP = 40 (m3/hr), base pressure: 0 barg

1. 15:23:10 start logging
2. 15:28:12 flow SP changed to 60 (m3/hr)
3. 15:33:14 flow SP changed to 80 (m3/hr)
4. 15:38:20 flow SP changed to 60 (m3/hr)
5. 15:43:22 flow SP changed to 40 (m3/hr)
6. 15:48:26 stop logging