



Power Fault Recording Application Example

Customer: **Chemical Industry – fuel production**
 Substation monitoring

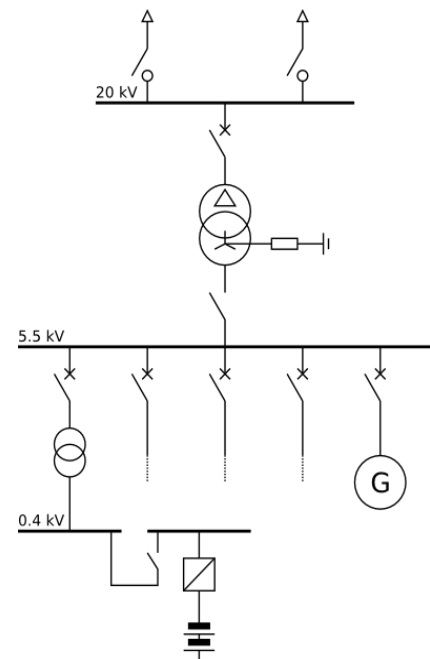
The distribution grid, which the customer is connected to, has problems with the power quality. To verify the power quality and estimate the cause of the impacts from the customer itself, he installed a DEWETRON PFR to monitor the voltage conditions. Furthermore, the customer wanted to measure his power consumption as well as total energy.

Challenge

The customer has a connection to the medium voltage grid with a nominal voltage of 20 kV. There is a 10 MVA transformer located in the substation, with a secondary voltage of 5.5 kV which feeds an isolated industrial grid. The supply of important equipment is guaranteed by an emergency power supply and a separate line. For a clear view of the actual condition of the power flow and switchgear states, the measured data should be visualised in the control room and stored in the background for future evaluation.

The Substation

A 20 kV overhead line is looped-in and feeds a single busbars via load disconnectors. A 10 MVA transformer in delta/star configuration feeds a 5.5 kV busbar with several feeders, each protected with a circuit breaker. The neutral terminal of the transformer is earthed via an ohmic resistor for earth fault protection. There is an emergency supply for safety reasons, which is connected to a battery set. Due to waste substances form the production line, there is also a small power station located at the area which ensures certain degree of self-supply.



Technical Requirements

The measurement of voltages and currents is realized by transformers. The voltage transformers provide a signal scaled to 100V, the current transformers provide either 1 to 5A or 4 to 20mA. Also the condition of the switchgears will be monitored via digital inputs.

Voltage Level	Device	Voltage Points	Current Points
20 kV	Overhead line feeder	3	3
	Transformer		1
5.5 kV	Busbar feeder 1	3	1
	Busbar feeder 2	3	1
	Busbar feeder 3	3	1
	Circuit Breaker line 1		4
	Circuit Breaker line 2	3	4
	Circuit Breaker line 3	3	4
0.4 kV	Emergency Supply	3	3
Digital	Total 32 Digital Inputs		



Voltage Level	Device	Voltage Points	Current Points
0.4 kV	Single Line Cable	3	3
	Parallel Line Cable	3	3

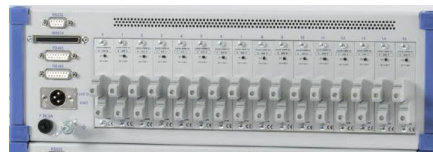
Location

The main monitoring system is located in the substation; a second one is located at a different place to monitor a special cable configuration in the low voltage grid.

The DEWETRON Hardware

Due to the numerous analog inputs, the system is build up as rack system, which consists of two DEWE-820-PFR and one DEWE-30-32 to extend one of the PFR's. The system is arranged in such a way, that the calculation of the power is well separated on each device. The digital inputs are implemented as isolated inputs for safety reasons.

Device	Main Unit	DAQP-HV	DAQP-LA-SC-5A	DAQP-LA-SC-0.6A
1.1	DEWE-820-PFR-16	9	4	3
1.2	DEWE-30-32-PFR	6	6	2
2	DEWE-820-PFR-16	6	6	1
3	DEWE-820-PFR-16	6	6	



The devices are operated in standalone mode and transfer the data to a common database via the local network.

The DEWETRON-Software

The Data is streamed to a DEWESOFT-session which is running in the control room and displays the actual state of the power flow and switchgear position.

