CASE STORY

ADF helps breathe new life into recycled tissue mill troubled by ageing legacy equipment

» **LOCATION**
Derbyshire, UK

» **INDUSTRY**
Recycled tissue mill

» **INSTALLATION DATE**
2019

BACKGROUND

A recycled tissue mill found itself in a vulnerable position due to an ageing and problematic drive system for its tissue machine. Not only was the system becoming increasingly difficult to maintain, but the manufacturer of the equipment was no longer able to support it.
The customer called on system integrators, Industrial Automation & Control (IAC) in Wales, for help.

CHALLENGE

IAC was tasked to determine how the old drives could be replaced whilst retaining the existing DCS system, all on a tight budget and with minimal disruption in production. During a site survey, they discovered that the old drives relied on built-in mains supply conditioning and that the filters were just as old and problematic as the drive. They called CP Automation, a Comsys partner in the UK, who found that the old power supply conditioning was only performing to 50% of its original capacity. Unless the customer wanted to pay ongoing power factor penalty charges for inefficient power use, a new power quality filter would also be needed.

SOLUTION

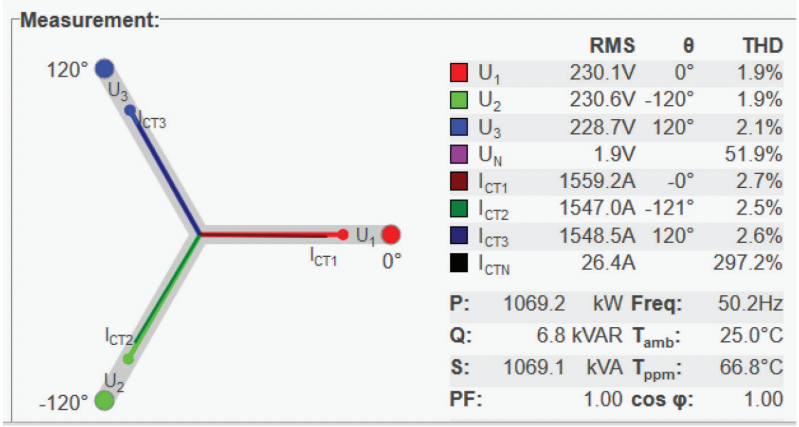
IAC proposed a retrofit approach to keep costs down, which involved extending the existing drive enclosures to make room for new ABB DC drives, as well as introducing a Rockwell PLC to interface with the DCS system. CP Automation proposed 4% AC line chokes, a Sine Tamer for transients and lightning protection, and two Comsys P300-360/480 ADF filters for harmonic mitigation and reactive power compensation for the DC drives. To minimize downtime, all installation and commissioning tasks were carefully planned ahead of the shutdown, which enabled the work to be completed efficiently.

RESULTS

With the upgrade to new DC drives and the installation by CP Automation of 4% AC line chokes, the system THDV was reduced to 6-7%. The Comsys ADF filters then further reduced THDV to 2%. Once the system was restarted, the Voltage distortion was down from 6.5% to 1.9%. This has been achieved by reducing THDI from 30% to 3% and then eliminating 103 kVAr of wasted energy.

The combined efforts of IAC's team of technicians and engineers together with CP Automation to install and commission the new equipment made migration to the new setup a thorough success.

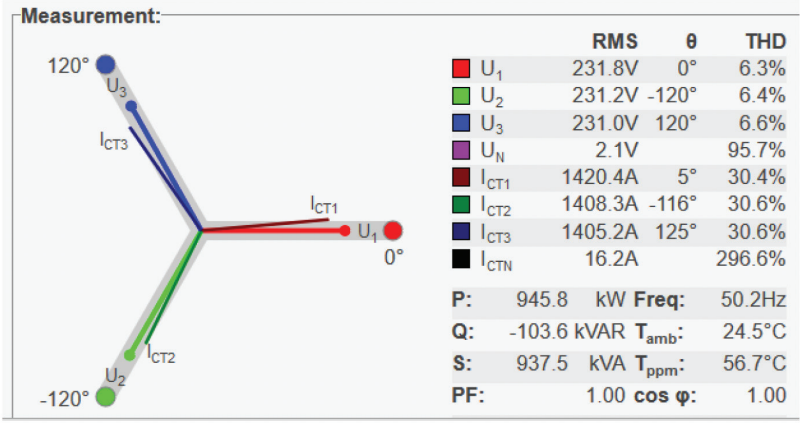
Measurements with **ADF ON**



	RMS	θ	THD
U_1	230.1V	0°	1.9%
U_2	230.6V	-120°	1.9%
U_3	228.7V	120°	2.1%
U_N	1.9V		51.9%
I_{CT1}	1559.2A	-0°	2.7%
I_{CT2}	1547.0A	-121°	2.5%
I_{CT3}	1548.5A	120°	2.6%
I_{CTN}	26.4A		297.2%

P:	1069.2 kW	**Freq:**	50.2Hz
Q:	6.8 kVAR	**T_{amb}:**	25.0°C
S:	1069.1 kVA	**T_{ppm}:**	66.8°C
PF:	1.00	**cos φ:**	1.00

Measurements with **ADF OFF**



	RMS	θ	THD
U_1	231.8V	0°	6.3%
U_2	231.2V	-120°	6.4%
U_3	231.0V	120°	6.6%
U_N	2.1V		95.7%
I_{CT1}	1420.4A	5°	30.4%
I_{CT2}	1408.3A	-116°	30.6%
I_{CT3}	1405.2A	125°	30.6%
I_{CTN}	16.2A		296.6%

P:	945.8 kW	**Freq:**	50.2Hz
Q:	-103.6 kVAR	**T_{amb}:**	24.5°C
S:	937.5 kVA	**T_{ppm}:**	56.7°C
PF:	1.00	**cos φ:**	1.00

"With the help of CP Automation, we were able to deliver a complete solution for our customer," says IAC. "The customer is now in a much more secure position, using commonly used parts that they are familiar with for repairs and maintenance. Additionally, the effective power quality conditioning means an end to inefficient power use and the business will no longer be faced with equipment replacements attributed to harmonic damage.

PRODUCT USED IN THIS CASE

ADF P300

- HARMONIC ELIMINATION
- DYNAMIC VAR COMPENSATION
- LOAD BALANCING
- MODULAR & SCALABLE DESIGN
- FLICKER COMPENSATION
- 208-690V NOMINAL VOLTAGE
- CLOSED LOOP, OPEN LOOP & SENSORLESS CONTROL