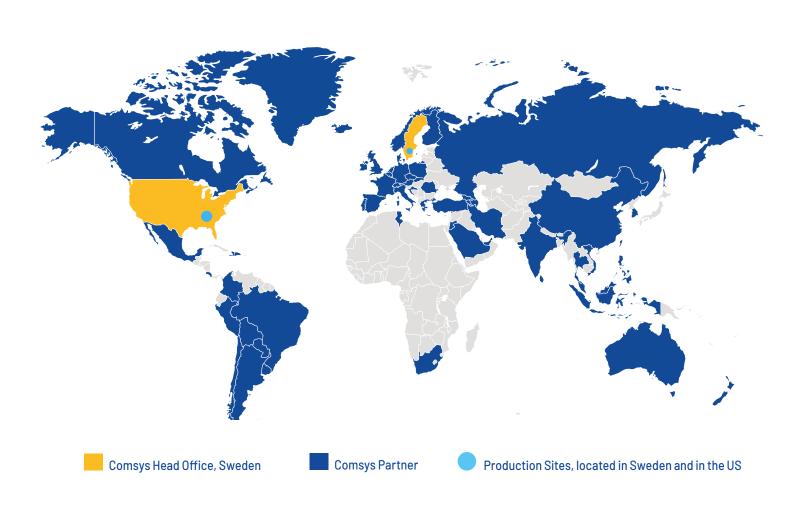


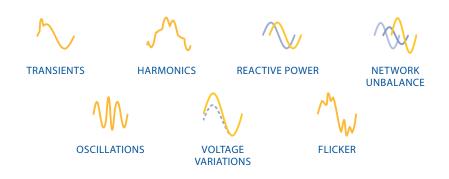
ADF technology makes energy more efficient among our 5 000 installations around the globe and has been established as THE standard within Active filtering because of its many unique features that adds value to customer sites.



# MOST INDUSTRIES HAVE THOUSANDS ELECTRICAL DRIVES IN CRITICAL EQUIPMENT

THEIR SPEED INCREASES & DECREASES CONTINUOUSLY

### THIS CREATES DISTURBANCES



Causing a variety of

### PROBLEMS

OVERHEATING TRANSFORMERS

SHORTER EQUIPMENT LIFE

NUISANCE TRIPPING IN CIRCUIT BREAKERS

PRODUCTION FAILURE/DOWNTIME

NON-COMPLIANCE

EXCEEDING NORM LIMITS

# Low harmonic drive technology

If you have a number of drives
(also referred to as variable-speed
motor drives) on site, you are
generating electrical disturbances.

LHD = standard 6-pulse drive + filter technology

These disturbances include network unbalance, flicker, and especially harmonics—not to mention the risk of regulatory non-compliance. Those working in the marine, offshore, and water treatment industries are especially vulnerable to these problems.

For decades the common filter solution has been passive filter, but there's a modern solution that offers an improved competitive advantage. With active filter technology, you get a more compact solution that enables fewer losses and less total harmonic distortion (THD).

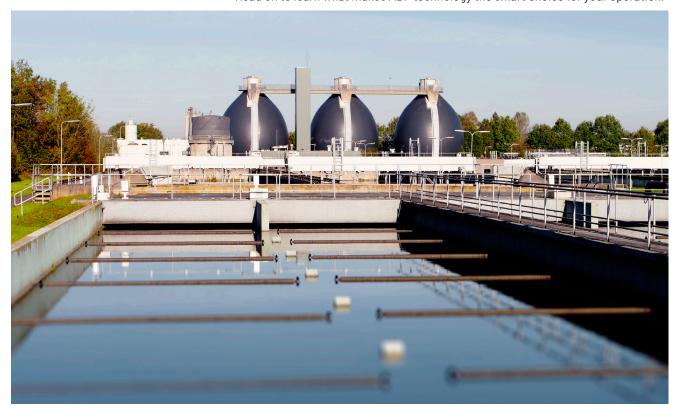
ADF is the most flexible system available to help you achieve an LHD. And there's no comparison when it comes to price: ADF can save you up to 40% in total cost of ownership compared to AFE. It's a versatile yet powerful solution that takes the hassle out of installation and operation.

<sup>\*</sup> based on internal calculation

### USE OUR COMPONENTS TO YOUR ADVANTAGE

Because ADF components can be combined with a drive to create the ultimate low harmonic solution, it's ideal for system integrators or OEMs (original equipment manufacturers). We can give you the components you need to succeed in any application.

Read on to learn what makes ADF technology the smart choice for your operation.



# Technology that makes energy more efficient

Engineered in Sweden, ADF provides a unique way of reducing energy losses in a vast range of applications such as industrial production

It works by sensing electrical behavior, then reduces energy losses by correcting the electrical behavior. This is achieved by using state-of-the-art signal processing and advanced control structures to manage the power flow to and from the machine with a power processor (power converter). By continuously monitoring the network and injecting exactly the right amount of compensation current—at exactly the right time—the most efficient and accurate solution to any power quality problem can be achieved.





### ADF vs. Competitor

Compared to other power quality technologies, ADF provides a solution that is hard to beat. It is an efficient system that leads to low losses, but more than that, it provides a reliable tool box that can seamlessly address a variety of disturbances, from THD to flicker.

And while most power quality products can help you meet regulations in some sense, we do that with a lighter, more compact solution. The modular structure of ADF also allows for flexibility for the future and adaptability for your specific project.

	ADF	MULTIPULSE	AFE	PASSIVE FILTER
Losses	•	•	•	•
Total harmonic distortion	•	•	•	•
Physical size	•	•	•	•
			• LOW	● MEDIUM ● HIGH
	ADF	MULTIPULSE	AFE	PASSIVE FILTER
Meets regulation *	•		•	0
Specified harmonic selection	•	0	0	0
Resonance elimination	•	0	0	0
Flicker Compensation	•	0	0	0
Configurable	•	0		0

Although other solutions will meet some of your needs, you can rely on ADF to meet all of them.

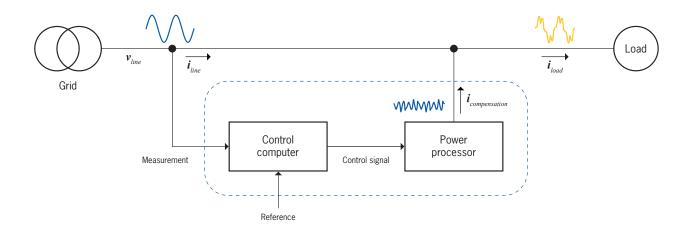
# What to expect with ADF

An ADF unit is basically a very advanced computer-controlled current generator with the ability to instantly produce any shape or form of compensation current.

A simplified diagram of the operating principle is shown in the figure below. Each ADF unit is connected in parallel, in shunt, with the load that requires compensation. The power flows of electrical currents between the load and the network are measured and analyzed [1] to determine if disturbances such as reactive displacement and/or harmonics are present.

If found, the ADF unit injects compensation current [2] that are the exact opposite of, for example, the harmonics and/or reactive displacement. This is done in order to cancel out the load behavior [3].

The result is an ideal load with a minimum of power losses and disturbances. The energy profile then appears ideal to the transformer.



### ADF TECHNOLOGY HELPS YOU SAVE:

**SPACE** 

Since one module supports multiple drives, you can save space and ensure flexibility for the future.

TIME

Avoid unnecessary downtime for maintenance or replacement of equipment affected by power quality issues.

MONFY

Increase energy efficiency while reducing the expense of replacing worn equipment.

HASSLE

ADF-type technology is already being included in regulatory demands and equipment warranties - a trend that will only continue to grow.















When it comes to regulatory compliance, you need a solution you can depend on. But more than that, why not consider a solution that leaves room for growth? With ADF, you can remain care-free in the knowledge that this low harmonic solution will ensure you meet necessary standards.

#### **MAINTAIN YOUR EOUIPMENT WARRANTIES**

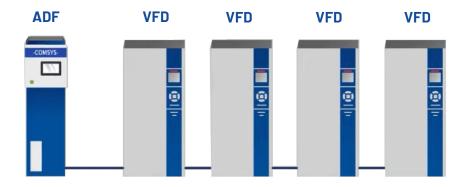
With increasingly sensitive equipment, come stricter technical infrastructure demands and increasing electrical disturbances. Avoid this concern over loss of

#### **EXTEND YOUR EQUIPMENT LIFETIME**

A reliable power quality solution ensures that unstable power is compensated. With ADF, you lower the risk for wear, expensive shutdowns, and replacement.

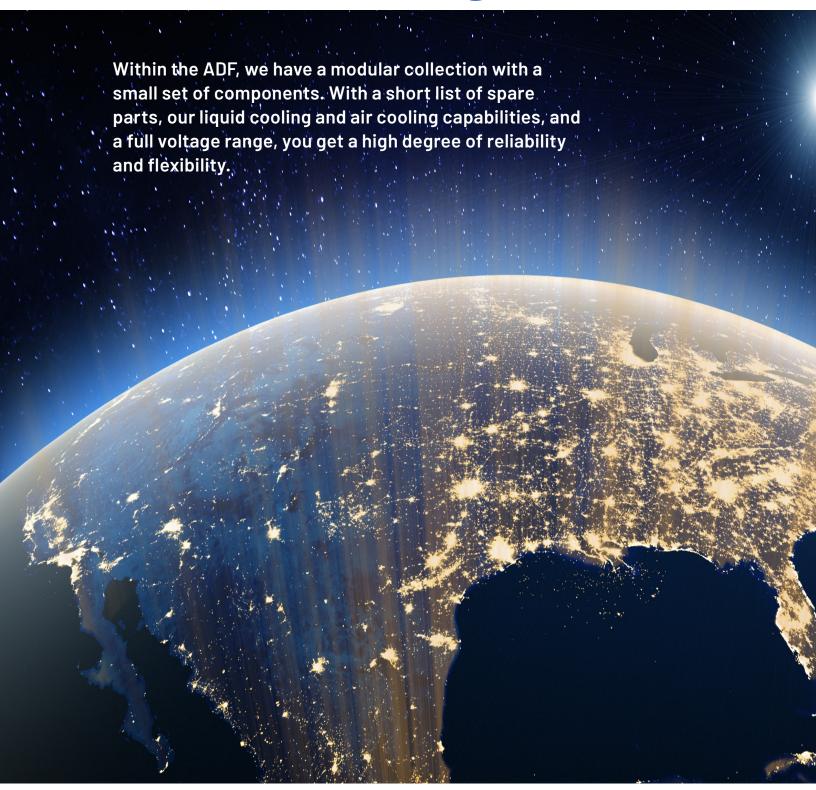
# Ensure smooth operations with ADF

Discover the advantages of our compact ADF installations and the peace of mind that comes with uninterrupted operations.



ADFs offer a high degree of redundancy, ensuring your operations remain unaffected even in the face of equipment failures. By installing our ADFs in parallel with your load, you create a compact and efficient setup that guarantees continuous operation.

## The ADF range



### **ADF P300**

The ADF P300 is the ideal active filter for small and medium size commercial and industrial loads. It is a versatile solution and the best choice for most applications because it is such a flexible active filter.

[50-330 A]

With the ADF P300, the state-of-the-art performance of our active filter technology comes encased in a compact cabinet, although larger than the ADF P100. Each ADF P300 system is delivered with 50-330 A optimization power and the modular design makes it easy and convenient to add future upgrades. The modularity also ensures superior scalability—up to 15 units can be used in parallel.

The ADF P300 is compatible with all three-phase low voltage applications. Beyond harmonics and reactive compensation, the ADF P300 can also be used for flicker control, harmonics with Sensorless operation, and load balancing. The ADF P300 can also be tailored to unique applications requiring special optimization.

#### SOME TYPICAL APPLICATIONS INCLUDE

- Small and medium sized manufacturing companies
- Fluorescent lamps
- Medical equipment
- Industrial loads
- Offices and commercial buildings

- UPS systems
- Fans
- Drive systems
- Maritime vessels
- Offshore oil rigs
- HVAC







ADF P300 meets the most stringent earthquake requirements according to GR63 Core

### **CONTROL FEATURES**

- Fully customizable harmonic compensation
- Several ADF P300s can be combined for higher power
- · Insensitive to network conditions
- Idle mode during low load (Standby)
- Cannot be overloaded
- Fast response time
- ADF Dashboard WUI (Web User Interface)







### **PPM300**

The ADF PPM300 inverter module is one of the key components of the ADF System Integration Program. Designed for easy integration into electrical cabinets and motor control centers, this component enables you to build your own active harmonic filter or low harmonic solution.

### [50-110 A]

Join our System Integration program when you need to develop a custom solution – either as a System Integrator or OEM. The flexible building blocks allow you to integrate the ADF technology into your application in the most flexible way.

Building on a history of successful installations, the ADF PPM300 tolerates high levels of frequency disturbances and continues to compensate reliably in applications where passive filters are likely to break down. ADF PPM300 is available with air or liquid-cooling.

The ADF "building blocks" can be used to build harmonic compensation solutions, from small to large. From a single PPM system with a single control unit, up to a 90-unit PPM system with 15 control units.

#### SOME TYPICAL APPLICATIONS INCLUDE

- Custom low harmonic drive systems
- Custom cabinets
- Liquid cooling applications
- Marine Applications
- Machine builders
- Utilities

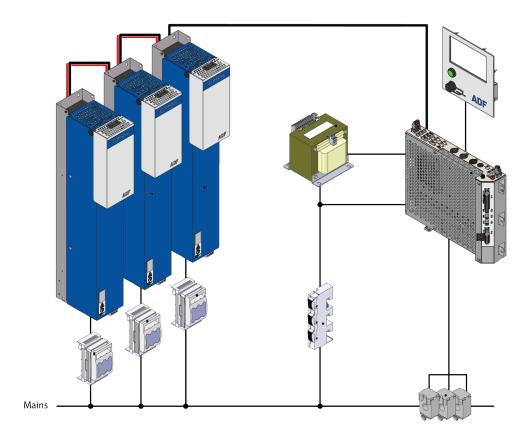
- STATCOM
- 0EM





# System integration

The ADF system integration program is a unique concept to customize and integrate ADF components, or what we can refer to as building blocks, in your projects and products.



Our "building blocks" include the PPM 300 inverter module, the control unit CM-CAB, and other internal components that enable you to get a complex, functioning, and integrated system quickly. For those who want to utilize existing manufacturing resources, system integration is the smart choice for you.

### LHD

= standard 6-pulse drive + filter technology

With system integration, your up-front cost is reduced by utilizing our small set of standardized building blocks-making it the most cost-efficient way of integrating ADF into your operation. Additionally, the modularity and flexibility of these building blocks offer unprecedented flexibility and adaptability to any application, from renewable energy production to data centers. This in turn allows you to solve a wide range of problems with a minimal tool set.

With system integration, you can leverage the capabilities built into our standard products by using our building blocks (components).







### WITH SYSTEM INTEGRATION, YOU GET:

- A more compact solution than standalone products.
- Fast and simple commissioning with the ADF WUI Dashboard

- Leading ADF Technology integrated into your existing products.
- Access to the ADF System Integration Program training with ADF Academy

#### **HOW CUSTOMIZABLE IS IT?**

- Compensation power ranges from about 30 A to in excess of 10,000 A
- Can be controlled via regular HMI-4 devices, via web user interface (WUI), or remote controlled via field bus
- Availability in both voltage ranges (< 480 V and 480 690 V)
- Available as air-cooled or liquid-cooled

With system integration, you get a power quality solution perfectly adapted to you. Add reduced maintenance costs due to small set of components, and you get a highly efficient, highly flexible solution.

# STATCOM systems in electricity networks



ADF STATCOM installation at the Fortum wind farm in Kville, Sweden.

The ADF P700 STATCOM is a high power, utility grade, medium voltage STATCOM for heavy industrial loads. It is ideal for dynamic reactive compensation, flicker mitigation, and harmonic suppression in applications such as electric arc furnaces (EAFs), cranes, hoists and wind farms. In industries with such a high power demand, there is a concurrent need for a powerful power quality solution. That's when you need the STATCOM. ADF P700 STATCOMs can be integrated into existing



## ADF product comparison

Our products solve a variety of problems and are suitable for a range of industries. Explore this comparison chart and see which product might be right for your operation.

KEY FEATURE	ADF P300	PPM300	ADF P700 STATCOM
Compact, wall mounted	•	•	•
Harmonics Compensation	•	•	•
Reactive power compensation	•	•	•
Eliminates resonances			•
Interharmonics compensation			•
Flicker compensation	•	•	
Load balancing	•	•	
Medium voltage applications			
Available with liquid cooling			
Four-wire version		•	
Voltage range	208-690 V	208-690 V	Up to 136 kV
Industrial	•	•	•
Commercial	•	•	•
Utility			•
Marine, offshore	•	•	
Sensorless control	•	•	•

# Added features to boost your performance



## Global service network and support

With the ADF Partner Network, you get access to our global service network. Regionally, ADF partners manage commissioning, service, and local support, but these local teams are backed by our centralized support team for more advanced cases.

### MAINTENANCE AROUND THE WORLD

In addition to our commissioning service, we also provide service contracts and product maintenance around the world. But we can also use the remote operation capabilities as part of our WUI to conduct quick initial assessments off-site.

Whether you are a customer or a partner within our network, to help you get the most out of ADF products, we also provide hands-on training as part of a program called ADF Academy. No matter where you are in the world, which application you are working with, or where you are in your implementation, we offer these courses to enable you and your team to gain confidence and expertise.



### The only solution with Sensorless Control

When you need a retrofit solution or you have a complicated set-up, it can be very difficult to add the CTs (current transformers). But with Sensorless Control, we can compensate without it—so you can eliminate the CTs altogether. This gives you more flexibility when it comes to where and how to install the ADF unit and reduces the overall hassle of installation and compensation. In addition to this, you are also able to isolate sub-grids and compensate background distortion, which further improves the flexibility and adaptability of the ADF platform.

Sensorless Control is now available on all ADF products.

### Remote operation works for you

The WUI is a web application requiring no additional software installation. It offers a convenient, easy-to-use service to enable you to monitor your ADF modules from any device-anywhere, anytime. Additionally, the WUI can be integrated into a larger system (i.e. with multiple generators, many loads, etc.), which you can then choose to run on a certain schedule or operation mode. And if your operation uses a PLC, the PLC can read out critical data from the ADF module automatically.

The WUI also allows us to make commissioning faster and easier for you by allowing our team to support you via remote operation. And further down the line, if your system needs fine tuning or a support issue occurs, we have a simple way of being able to access the system and evaluate the situation.



# **Customer cases from North America**

ADF have been integrated into diverse applications around the world. From data center in Dallas to a packaging manufacturer in Canada, see how ADF enhances our customers operations.



### Data Center, Dallas



Retrofitting into 74 AHU's placed on the roof of a co-location data center that had issues with EC-fans and especially when running on generator. Comsys as only supplier successfully solved the issues and got the data center through IST.





Volvo Cars' production plant in South Carolina faced a critical challenge when power quality issues caused by VFDs and welding robots began to impact equipment performance. In need of a solid and effective solution, Volvo Cars turned to Comsys for complete site compensation.



INDUCTOV

### Packaging Manufacturer



The manufacturer faced frequent transformer failures and production interruptions caused by power quality problems at one of their facilities. To address this issue, ADM Engineering, a trusted partner of Comsys, installed ADFs. The results have been remarkable, with cost savings of approximately **CAD 30,000** per month by eliminating harmonics and improving power factor correction.

"The feedback from the customer has been great. In fact, ADM has received an order to supply three additional ADF packages – 18 PPM300 modules for this site – and has also been involved in identifying and solving power quality issues at other of their sites." – Ali Sarrafian, ADM Engineering Ltd.



### water&wastewatertreatment

### Roxborough Water & Sanitation District



Roxborough Lift Station, owned by the Roxborough Water and Sanitation District, required an upgrade to increase its capacity for future expansion. Comsys's commitment to providing a reliable solution with ADF has transformed the Roxborough Lift Station, enabling it to handle increased sewage flow efficiently while maintaining optimal power quality standards.

## For the full stories and more customer cases, visit **COMSYS.SE**

ADF Technology is developed by Comsys AB in Lund, Sweden. Working with our global network of partners, the ADF Partner Network provides active filter solutions for a wide range of applications, enabling businesses to increase productivity, and simultaneously save money while reducing their carbon footprint.

Due to the flexibility and adaptability of this low harmonic solution, ADF products are ideal for a wide variety of industries.

www.comsys.se

-COMSYS-