# **ABB Advanced Power Electronics**

### **STATCOM** for arc furnace compensation, Indonesia

**Arc Furnace** 



PCS 6000 STATCOM: +/- 10 MVAr unit



## Introduction and Main Technical Features

Arc furnaces used in smelters cause large disturbances on electrical grids. The frequent interruption of the arc leads to voltage unbalances and voltage flicker on the electrical grid. The STATCOM has the duty to correct these disturbances and dynamically stabilize the voltage, improve the power factor, compensate reactive power, resolve current unbalances and reduce harmonics on the grid. By improving the quality of the electrical grid with the STATCOM, the process of melting iron becomes faster and cheaper, and outages can be significantly reduced.

#### **Problem description**

Arc furnaces are used to melt iron for further processing. Such furnaces operate by heating the iron via the radiant energy of the arc and also by the current passing through the iron. Threephase arc furnaces are famous for their highly unsymmetrical (negative sequence) currents, reducing the quality of the surrounding electrical grid. A poor grid often means longer melting times, and potential for frequent outages.

#### Solution

A +/-10MVAr STATCOM was required to be installed on the local industrial 20kV grid. Taking advantage of the STATCOM's extended list of features, the reactive power of the grid could be regulated as well as compensating the negative sequence current of the arc furnace simultaneously. This negative sequence compensation results in a symmetrical grid. To demonstrate how this is done on the plant, the function of the converter using current-phasor diagrams in Figure 1.





#### **Customer benefits**

- ✓ Improved production process
- ✓ Stabilized electrical grid
- ✓ Negative sequence control
- ✓ Improved power factor resulting in lower energy costs

#### Reliability runs in the family

The MV STATCOM design is part of ABB's family of PCS 6000 products which are used for a wide range of applications. It uses the same power technology as the ACS 6000 range of MV Drives. The standardization of these power electronic modules delivers substantial advantages in terms of cost and quality. With many PCS 6000 sold worldwide this converter has a proven track record and high reliability.

#### MV converter

ACS and PCS 6000 converter units are based on three-level IGCT phase modules. The IGCT (Integrated Gate Commutated Thyristor) is the state-of-the-art semiconductor element for this power range. The converter units are connected by a medium voltage DC link (intermediate circuit). The converter modules are water cooled with a virtually maintenance free closed loop water system equipped with redundant circulating pumps.

### Technical Data

Plant:	Arc Furnace, Indonesia
Application:	STATCOM
Туре:	PCS 6000 STATCOM single
Installation:	Indoor
Nominal reactive power:	+/- 10 MVAr
Nominal voltage:	20 kV
Nominal frequency:	50Hz
STATCOM Controller:	ABB AC 800PEC
Ambient conditions:	+10°C to +35°C



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