



## **INDUPERM A/S - Selected References Constant Current Regulators.**

### **1. In general**

Right from the establishment of the company INDUPERM A/S in 1969, the basis were development and production of special transformers.

### **2. CCR type 739**

In 1978 the first INDUPERM constant current regulator, type 739, were introduced.

Among the most important references are:

- Chileka Airport in Malawi.
- 7 airports in Mozambique, including Maputo and Beira.
- Jacobshavn Airport in Greenland.
- Yanbu Airport in Saudi Arabia.

### **3. CCR type 759**

This type based on updated electronics was introduced in 1987.

All electronics built in plug-in modules for fast and easy service. In the development phase by INDUPERM care were taken to construct electronics with a minimum of power losses for longer lifetime.

This type of CCR have been developed continuously with new facilities, such as:

- Lamp and Earth Failure Supervision.
- Built-in circuit selector.
- Remote control via serial communication, f.i. Bitbus or RS485.

Among the most important references are:

- Copenhagen International Airport  
Here is since 1988 delivered, installed and commissioned app.200 CCR's.
- Halmstad Airport, Sweden  
In 1994 a turn-key airfield package were installed, including a fibre optic based remote control system, CCR's, isolating transformers and light fixtures.  
Contract value app. DKK 3 mill.
- Airports in Kenya  
In the period 1985-87 complete lighting systems were supplied for Wilson, Malindi and Kisumu Airports, incl. training and education of the maintenance staff.  
In 1993/94 20 nos. CCR's were delivered for Jomo Kenyatta Airport in Nairobi.  
Contract value app. DKK 2,5 mill.



- Greenland  
In the period 1992 to 1995 CCR's and other types of equipment were supplied for Nuuk, Sdr. Strømfjord and Kulusuk Airports.  
Annual contract value app. DKK 1 mill.
- Sturup Airport, Sweden  
9 nos. CCR's were delivered in 1992 and adapted to work with an existing remote control system.
- Other Airports  
Deliveries for the Maldives and China (through Erni, Switzerland).  
These project were commissioned in our factory, and installed by the customer without our help.

#### **4. CCR type 951.**

Our range of CCR's, type CCR 951, were introduced in 1995.

Based on the use of  $\mu$ -processors for communication, supervision and data logging.

Among the most important references are:

- Greenland  
In the period from 1997 to 2003 we have supplied complete equipment packages including computer based remote control system, CCR's, isolating transformers and light fixtures for 6 new regional airports.  
Contract value for each airport app. DKK 0,8 mill.
- Gardermoen, Norway  
In an open international tender we won the contract for the supply of 109 nos. CCR's in the period 1997-98.  
Later we have supplied additional 8 nos. CCR's.  
Contract value app. DKK 7 mill.
- Nordholz Marine Flughafen, Germany  
Our biggest single contract for delivery late 1997, included:
  - Complete PLC-based remote control system 38 nos. CCR's
  - Elevated light fixtures for approach, runway and taxiways, totally app. 1800 nos.
  - Inset lights for approach, threshold, runway end and centreline.
  - PAPI for two runways
  - Military distance marker fixtures
  - Isolating transformers for all fixturesContract value app. DKK 16 mill.



- Paderborn Flughafen, Germany  
The contract for supply of equipment included a new developed remote control system and 35 nos. CCR's, delivered and commissioned primo 1998.  
Later runway centre line fixtures and elevated approach fixtures have been supplied.  
Contract value app. DKK 5 mill.
- Other airports in Germany  
Over the past 5 years we, and our German representative, have supplied and commissioned CCR's and other equipment for more than 15 airports, with contract values between DKK 0,25 – 2,5 mill.  
In January 2002, we have supplied and commissioned two CCR's in Schönefeld Airport, Berlin for test together with the existing remote control system.
- Sofia Airport  
In the end of year 1998, we supplied through Erni 15 nos. CCR's and isolating transformers.  
Contract value app. DKK 2,5 mill.
- Arlanda Airport, Sweden  
In 1997 we have supplied 15 nos. CCR's and have developed a special fail safe remote control interface for future CCR installations.  
Contract value app. DKK 2 mill.
- Zürich Airport.  
In the period 2000-2001 did we supply, install and commission 55 nos. CCR's in our latest Multithyristor technique, as well as PAPI system.  
Contract value app. DKK 5 mill.
- Lugano Airport.  
In 2001 we have supplied, installed and commissioned a system with 12 nos. CCR's, extension of existing control system and isolating transformers.  
Contract value app. DKK 1,5 mill.
- Vietnam.  
In the period 1999-2001 we have supplied CCR's, isolating transformers, taxiway edge light fixtures and signs for 3 airports in Vietnam.



## **5. CCR type 961.**

Our latest range of CCR's, type CCR 961, were introduced in 2004.

It's with the latest electronic technology, based on the use of several  $\mu$ -processors in each CCR for regulation, current – lamp – and isolation supervision, data-logging and for serial communication with the remote control system.

In May 2004 we have been awarded the contract for app. 400 nos. CCR's for Frankfurt International Airport. The specifications and requirements from Frankfurt International Airport, together with the latest standards for CCR's were the background for the development of the CCR 961.

Deliveries:

- In the years 2004 – 2008 a total of 380 nos. CCR 961 have been supplied and taken into operation in Frankfurt International Airport.  
The total contract value for Frankfurt International Airport is app. €4 mill.
- In October 2005 we have supplied Remote Control system, Light Fixtures and Isolating Transformers for a new regional airport in Germany, Allendorf, incl. 15 nos. regulators CCR 961. The system has been in operation since October 2005.  
Total contract value app. €0,5 mill.
- In Mai 2006 we supplied and commissioned a complete control system for Esbjerg Airport in Denmark. The supply included 23 nos. CCR type 961 and a AMRES Remote Control System.  
Total contract value app. €0,6 mill.
- In Mai 2006 we supplied 25 nos. CCR type 961 for Stavanger Airport in Norway. Commissioning is expected in October 2006.  
Total contract value app. €0,7 mill.
- In the beginning of 2007 we have supplied Remote Control system, Light Fixtures and Isolating Transformers for Wilhelmhafen Airport in Germany, incl. 25 nos. regulators CCR 961. The system has been in operation since Marts 2007.  
Total contract value app. €0,8 mill.
- In January 2008 we have supplied a complete set of Control Equipment for Maputo Airport in Mozambique. The supplied system included a complete Amres Remote control system and new CCR's type CCR961
- In 2007 – 2008 we have supplied between 40 and 50 nos. CCR961 for extentions or replacement in smaller airports in Norway and Greenland.



- In end 2008 we have supplied four sets of Control Equipment for the Beira, Tete, Quelimane and Nampula Airports in Mozambique. Each set included complete Amres Remote control system and new CCR's type CCR961
- In the first half of 2009 we are going to supply and install a total of 15 nos. CCR 961 for Rønne Airport in Denmark.
- End of 2008 we have won the contract for the supply of app. 100 nos. CCR961 for Geneva International Airport. The CCR's have to be installed during 2008/2009

### **5. Additional information**

We manufacture ourselves more than 90% of the parts in the CCR's, and this gives us experience and influence on how to improve quality.

We have test facilities for system-test of more CCR's, and full load test facilities for up to 25 KVA with almost all values for mains voltages.