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M-7360-99-1216 20 APR 99
ATA 2422-00 MODEL ALL
BOEING VENDOR LIST
REF /A/ XXXM990330 /C/

AXA POWER A/S HAS BEEN ADDED TO THE BOEING GROUND SUPPORT EQUIPMENT VENDOR DATABASE. AXA POWER WILL THUS BE INCLUDED IN THE GSE VENDOR LIST IN FUTURE REVISIONS OF THE BOEING MAINTENANCE FACILITY AND EQUIPMENT PLANNING DOCUMENTS (MFEPD). PLEASE NOTE, HOWEVER, THAT THE GSE VENDOR LIST IN THE MFEPD IS PROVIDED AS A GUIDE ONLY AND DOES NOT IN ANY WAY REPRESENT A BOEING ENDORSEMENT OR RECOMMENDATION OF THE LISTED VENDORS.

EFFECTIVE IMMEDIATELY, THE AXA POWER 2200 SERIES GROUND POWER UNITS WILL APPEAR IN THE BOEING ON-AIRCRAFT MAINTENANCE EQUIPMENT LIST, WHICH IS GIVEN TO CUSTOMERS DURING THE INTRODUCTORY PHASE OF AIRPLANE DELIVERY AND INITIAL GSE PROVISIONING. THIS LIST IS FOR THE PURPOSE OF ADVISING OUR AIRLINE CUSTOMERS OF THE TYPES OF DIFFERENT EQUIPMENT WHICH WILL BE REQUIRED FOR SUPPORT OF THE AIRPLANE AFTER DELIVERY. VENDOR NAMES APPEAR WITH THE INDIVIDUAL EQUIPMENT ITEMS ON THE LIST. THEREFORE, AXA POWER WILL HAVE IMMEDIATE VISIBILITY AS A SUPPLIER OF GROUND POWER UNITS.

IF YOU HAVE ANY FURTHER QUESTIONS OR CONCERNS REGARDING THIS MATTER, PLEASE DO NOT HESITATE TO CONTACT US AGAIN.

LEE ROCKWOOD
MAINTENANCE AND GROUND OPERATIONS SYSTEMS
CUSTOMER SUPPORT
BOEINGAIR M-7360 2J-52

MRM 20 APR 99 1342



Joined Forces...

AXA is rather proud to be able to say (as one of the only GPU suppliers) that our GPUs have been tested at the Boeing laboratories. After the test Axa has been okayed and included in Boeings list of recommended suppliers.

It all started when one of our mutual customers (i.e. of Boeing and Axa) had the problem that a GPU was from time to time disconnected from the aircraft when they came to be serviced in the hangar – and apparently there was nothing wrong with either aircraft or GPU! What was then the matter? – at any rate, the customer was dissatisfied (as we can all understand).

Boeing and Axa agreed that the best way to solve the problem would be to transport an AXA 2200 GPU to Boeing's power laboratories in Seattle, USA, in order to test it on Boeings test rigs.

Of course Axa's engineers had done some preliminary work and examined in which situations exactly the GPU was tripped, and they had found certain patterns showing that often something went wrong when heavy equipment such as hydraulic pumps was connected in addition to the non-linear load that was already there. As you can see, there was every indication that the tripping problem might be caused by too much harmonic distortion preventing the plane to accept the power supply from the GPU.

Already before the journey to the USA a new software programme had been developed which could not only measure but also completely eliminate the harmonic

distortion caused by a non-linear load. Then: Off to the USA! During the testing at Boeing it was confirmed that the problems did not arise until a heavy load (the equivalent of two or three hydraulic pumps at the same time) was connected to the GPU. The violent starting currents in addition to the non-linear load already existing made the power supply from the GPU exceed the alarm limits of the aircraft Bus Protection Panel (BPP) and as a result the GPU was tripped.

(For the information of those who are not experts on aircraft: The so-called BPP is installed in aircraft in order to protect the sensitive electrical equipment by registering any disturbances in the power supply, and to disconnect the power supply in case of a disturbance. That is what happened).

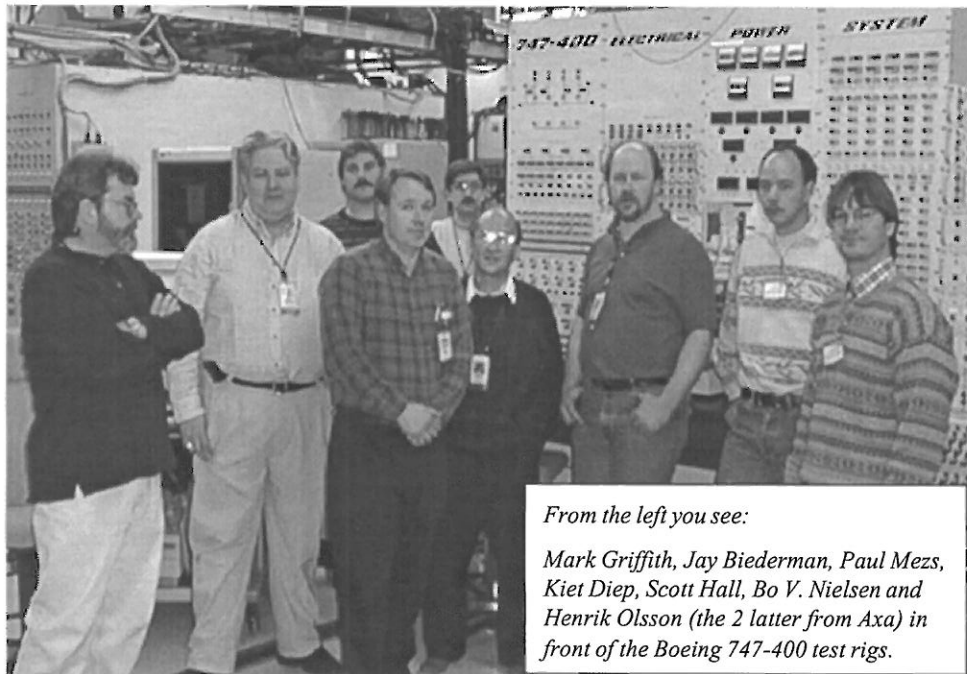
Then came the exciting moment when the new software for the elimination of harmonic distortion was installed. More tests were carried out on Boeing's test rigs, but no matter which load conditions were simulated and no matter how "brutal" starting currents were used, the system continued working without problems. As a matter of fact the measurements showed that with the new software a great improvement in the harmonic distortion had been obtained. The above test (and more tests of a more general kind) were carried through on the 737 classic test rig, but once having come to Boeing we found it desirable if we could have the GPU tested on the other aircraft types as well. Boeing kindly accepted that, and the testing was continued on the 737-600/700/800 test rig (Next Generation), and on the 777 and 747-400 test rigs. Also on these test rigs attempts were made to make the GPU trip by stressing the system through different load conditions; but no matter how heavy an unbalanced

load/non-linear load was connected, aircraft and GPU worked together perfectly.

Thus we can conclude that by joining forces Boeing and Axa had found out what had caused the problem which was the reason why we wanted to carry out the testing in the first place: the tripping problem caused by the fact that the 737-400 aircraft that came to be serviced at our common customer's had so much fancy equipment (non-linear load) giving a greater harmonic distortion than foreseen when the requirements for the GPU power supply were originally specified. In order to prevent similar situations in the future, Boeing and Axa have agreed to keep in close contact. This will help ensure that future specifications of requirements are attuned to maximum load conditions. Among other things, distortion will be stated for both linear and non-linear load in future specifications.

As you can see, the new software solved the problem excellently, ... but there is a small catch in it: the GPU standing at our common customer's was of an older generation that could not be equipped with the new software just like that. Unless they wanted to exchange the GPU with a newer model or to make an extensive upgrading, we had to think again! But on the basis of the additional knowledge as to the nature of the problem that was achieved during the testing at Boeing, our technical department designed an extra harmonic output filter which was also able to solve the problem (even though in a more traditional manner), and this filter has now been installed in the GPU mentioned above. Since then the 737-400 planes and the GPU have worked together without any problems at all.

- We thank Boeing for their kind assistance and co-operation!



*From the left you see:
Mark Griffith, Jay Biederman, Paul Mezs,
Kiet Diep, Scott Hall, Bo V. Nielsen and
Henrik Olsson (the 2 latter from Axa) in
front of the Boeing 747-400 test rigs.*

Exel anticipates future ICAO ruling

With Oslo's new airport at Gardermoen due to open in October, and a healthy interest shown in Scandinavian products at inter airport Frankfurt, 1998 could prove to be a high-profile year for the region

Finland's Exel, which manufactures airport approach lighting systems, has been working with ICAO's Frangible Aids Study Group (FASG) to help develop guidelines for the future design of approach lighting support structures.

The company has also developed its product range in anticipation of future ICAO demands for frangibility throughout the entire length of airport lighting systems.



Exel doubled its sales of Frangible Safety Masts in 1997 (photo: Exel).

The deadline for compliance, as stipulated in ICAO's Annex 14, is 1 January 2005.

"Exel is one of the only manufacturers whose masts meet the latest ICAO safety requirements for the approach lighting systems," claims Sales Manager, Jaakko Martikainen.

The company enters the new year on a high, having doubled its sales in 1997 and delivered products to airports such as Hong Kong's Chek Lap Kok, Sydney, Oslo Gardermoen plus airports in Uzbekistan, Poland and the Czech Republic.

"Inter Airport in Frankfurt was also very successful for us," Martikainen told *Airports International*. "We met most of our current customers and gained plenty of new prospects. In the past our strength has been in Western Europe and Scandinavia, but in the near future I think we will gain more and more projects from Eastern Europe and the Far East."

The primary role of approach masts is to ensure that approach lights remain steady in their correct positions and that the beams of light remain at the correct angle. Exel masts are built of fibre glass with a special lattice structure that the company says ensures rigidity in high winds.

AXA 2200 receives Boeing approval

Danish ground power unit (GPU) manufacturer, AXA Power, has received official approval from Boeing for its new AXA 2200 400Hz solid state GPU following tests at the aircraft manufacturer's electrical test rigs in December.

The tests were carried out for the new generation of Boeing 737 (-600/700/800), the 737 classics, 777 and the 747-400.

The purpose of the test was to confirm that the AXA 2200 was in line with Boeing's requirements and that it showed full compliance with Boeing's electrical design in a worst case aircraft load situation

(for example, a high content of unbalanced and non-linear load).

Final testing saw the AXA 2200 unit rigged up to undergo a worst case aircraft load situation that was felt to be far more extreme than the conditions experienced during the normal operation of an aircraft.

According to AXA Power, no anomalies were found and the 2200 GPU fully complied with the electrical design of Boeing aircraft and will be listed in the Boeing Facility and Equipment Planning Manual.

The AXA 2200 unit is flexible and can be reconfigured to suit a

variety of applications, says the company. In addition to the high flexibility of the unit, the company stresses two other key features: the unit has individual phase regulation at output, and has no mains pollution thanks to its 12-pulse rectification.

The AXA 2200 unit debuted at *inter airport* Frankfurt and received considerable interest, says the company. Indeed the show proved the climax of a successful year for AXA Power which saw deliveries to major European airports such as Helsinki Vantaa, Frankfurt, Copenhagen, Rome Fiumicino and the new Oslo Gardermoen Airport.

"In 1998, we foresee a further strengthening of our position as the leading European manufacturer of solid-state GPUs, especially as our latest development has been tested and approved by the Boeing Laboratories," predicts the company's Vibeke Bo Hansen "Among others, we foresee growth in the French market where a co-operation with MGE UPS systems, former Merlin Gerin, has been set up."

The company is already involved in ongoing projects at Manchester, Shanghai Pudong, Antalya and Senai Airport in Malaysia.