ZAPI® GROUP

ZAPI ZIVAN ZEP BEST MOTOR

ATECH

ANTRIEBSTECHNIK

Performed with emotion

Built by intelligence

Pitch systems for wind power turbines.

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Trail of strength.

As each country searches for renewable energy sources, and reducing their carbon dioxide emissions, wind energy prevails as one of the most trusted and viable solutions. Wind turbines are in use today all over the world, and continue to provide clean and reliable energy to the end user.

Renewable. Reliable. Unparalleled.

Our pitch systems are based on a low voltage technique. We use maintenance-free, temperature independent capacitors, which apply the appropriate amount of power to the pitch-control in the event of power failure. With more than 100,000 load cycles of the powercaps and the high quality standard of our industrial series components, our pitch systems are maintenance-free for the entire life of the wind-power-plant.

The redundancy of our systems is guaranteed for an optimal and safe working environment. Our product already adheres to standards that will affect the wind turbine market in the future.

Progressive Design.

The multi-redundancy of our systems is guarantor for an optimal and safe working of or plants. Our standard today corresponds already to the requirements form tomorrow. We think into the future.

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Safety by experience

Always close to the wind.

The following facts speak clearly for a ZAPI/ATECH low-voltage-pitch system:

- efficient use of space while maintaining high power density
- high quality industrial components
- the use of high volume production components yields cost savings to the end customer
- parts are readily available
- continual improvement manufacturing process ensures the highest quality
- highest safeguarding against failure achieved through redundancy systems
- high flexibility by modular conception
- compatible with wind turbines from 1 - 6 megawatts or more
- customized solutions possible
- wide product range allows for compatibility to many different turbine sizes
- maintenance-free energy storage and components
- UL registered components
- simple and effective energy storage (powercaps, batteries)
- compatible with all motor technologies
- highly efficient system yields cost savings to the customer
- thousands of our low-voltage pitch systems are working today around the world

Example of pitch system assemblies

Low-voltage Pitch system 1,5 MW

To turbine operating control

Profibus | PC | CAN

All fieldbus possible

Grid-connection
1, 2 or 3-phase, 230V_{AC} or 400V_{AC}
• other voltages on request

Power-supply
from 20V to 100V, from 1kW to 18kW
• more output power on request

Pitchsystem in most compact design, include PLC
• pitchinverter
• DC/DC-converter

Low-voltage dc-link bus
20V_{DC} to 100V_{DC}

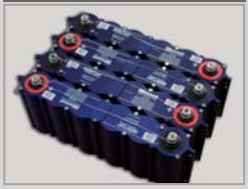
Pitchmotor
• DC, AC or synchronmotor
• integrated thermal sensor
• integrated SSi-multiturn absolute encoder
• electric-fan / brake
• customized options

Additional
limit switch(es)
• encoder as option
possible

Low-voltage
dc-link bus
20V_{DC} to 100V_{DC}

ATECH low-voltage pitchinverter
from 1kW to 12kW

Power capacitors
up to 100V / 150F



Low-voltage Pitch system 2,5 MW

To turbine operating control

Profibus | PC | CAN

All fieldbus possible

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Technical specifications (component examples)

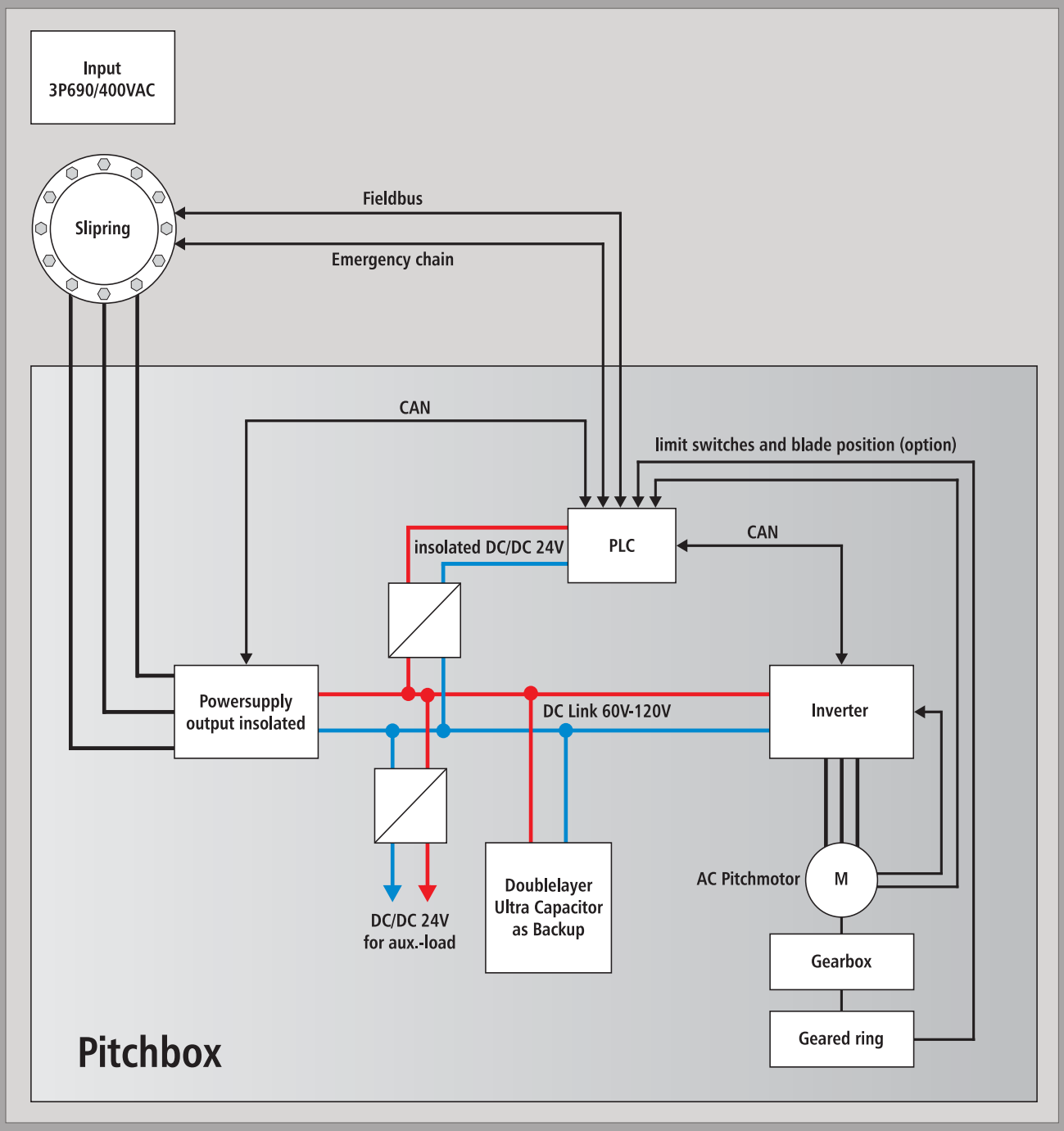
Controller	Pitch system 45V	Pitch system 60V	Pitch system 75V	Pitch system 90-100V	Pitch system 90-120V	Pitch system 100-144V
ACE2						
AC2						
AC3						
ACE5						
	1,0MW Turbine	1,5MW Turbine	2,0 + 2,5MW Turbine	3,0MW Turbine	3,5MW Turbine	>3,5MW Turbine

Power supply	Pitch system 45V	Pitch system 60V	Pitch system 75V	Pitch system 90-100V	Pitch system 90-120V	Pitch system 100-144V
NG3 or SG6						
NG3 or 2 x SG6						
NG7 or 3 x SG6						
NG9 or 2 x NG9						
	1,0MW Turbine	1,5MW Turbine	2,0 + 2,5MW Turbine	3,0MW Turbine	3,5MW Turbine	>3,5MW Turbine

Pitchmotor	Pitch system 45V	Pitch system 60V	Pitch system 75V	Pitch system 90-100V	Pitch system 90-120V	Pitch system 100-144V
4kW						
4,5kW						
6kW						
9kW or more						
	1,0MW Turbine	1,5MW Turbine	2,0 + 2,5MW Turbine	3,0MW Turbine	3,5MW Turbine	>3,5MW Turbine

Example of pitch system structure

only one pitchbox in schematic



Together close to the wind

ATECH Antriebstechnik

We are one of the leading companys in development and finishing of battery-electric powered industrial vehicles, of airport tarmac and many other fields. Since over 22 years we are well-established in the growing market and international approved as a qualified business partner. Our know-how assures the success in business of our clients.

ZAPI Group

ZAPI group presently employs over 350 direct people in its own 13.000 square meter production facility located on a 70.000 square meter lot in Poviglio, Reggio Emilia.

ZAPI was founded in 1975 by the president Giannino Zanichelli and it has always focused its activity on development, innovation and design/manufacturing of electronic controllers of high quality.

Today, ZAPI is known for its advanced and sophisticated controller technology that places ZAPI between the world-wide leaders in high frequency motor controllers for battery powered machines.

ZIVAN, opened in 1985 as a branch of the ZAPI Group, have become experts in every kind of battery/supercap charging, monitoring and care. Since 1980, when the Patent “Righi-Zanichelli” of the first high frequency controlled battery charger was registered, ZIVAN has reached high levels of quality and reliability recognized and rewarded with a worldwide success which is constantly rising.

BEST MOTOR s.r.l. was established in 1990 by technicians of consolidated experience in the electrical and mechanical fields. The factory has quickly increased its production capacity, thus achieving a range of more than 1.000 different models, also thanks to constant research and development through advanced technologies and technical assistance for special motors conceived according to customers’ specifications.

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