

windEXT

Advanced maintenance, lifetime extension and repowering of wind farms supported by advanced digital tools

Project nº 612424-EPP-1-2019-1-ES-EPPKA2-KA

WP4 - MODULE B: General description and critical components

WP4

Written by

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Project consortium



8.2 | The Experts in
Renewable Energy



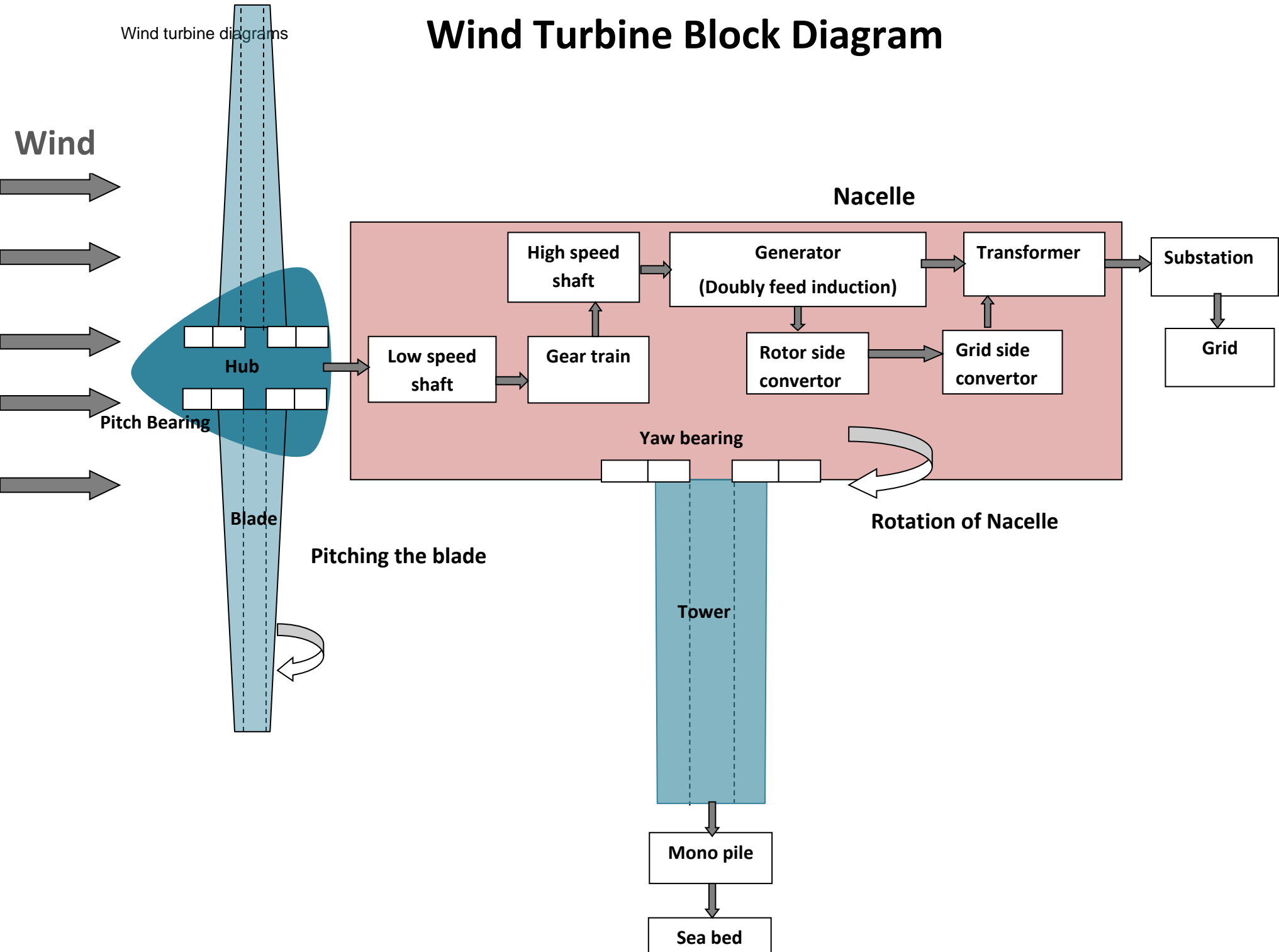
Wind Turbine Diagrams

Two main diagrams “wind turbine block diagram” and “wind turbine process flow diagram” have been used here to illustrate the operation principles of a wind turbine. The block diagram in a quite basic manner shows the major parts of a wind turbine and their interaction to extract the power from the wind.

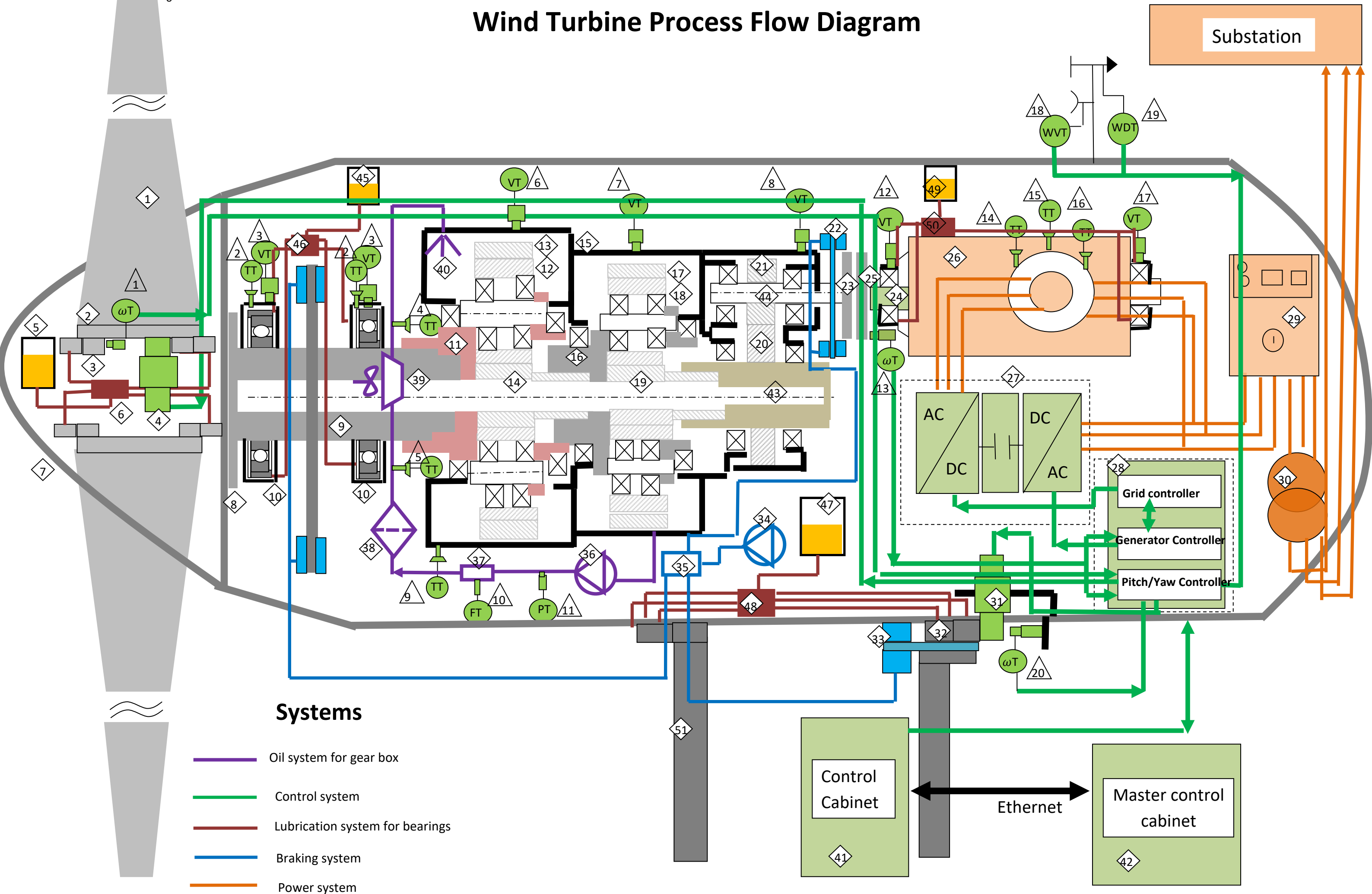
In a more comprehensive manner the process flow diagram presents different systems including all the equipment and sensory devices in a wind turbine. How different items of equipment are related to each other and which kind of instruments are needed to control and monitor the wind turbine are included in this diagram.

It is suggested that these diagrams be used to link the primary components to, for example, VR representations for training. Each item could have a detailed description provided.

Wind Turbine Block Diagram



Wind Turbine Process Flow Diagram
































Equipment list

- | | | | | | |
|----|--|----|---|----|--------------------------------|
| 1 | Blade | 20 | Intermediate shaft gear | 37 | Flow meter |
| 2 | Blade flange | 21 | High speed shaft gear | 38 | Oil filter |
| 3 | Pitch bearing | 22 | High speed shaft brake | 39 | Oil cooler |
| 4 | Pitch motor assembly | 23 | Gear box-Generator coupling | 40 | Oil nozzle |
| 5 | Pitch bearing grease pump | 24 | Generator shaft | 41 | Intermediate control cabinet |
| 6 | Grease distributor | 25 | Generator shaft bearing | 42 | Master control cabinet |
| 7 | Hub | 26 | Doubly feed induction generator | 43 | Intermediate gear box shaft |
| 8 | Main shaft flange | 27 | Power electronic cabinet (AC-DC convertor, DC link and DC-AC convertor) | 44 | High speed gear box shaft |
| 9 | Main shaft | 28 | Control cabinet | 45 | Main shaft bearing grease pump |
| 10 | Main shaft bearing | 29 | Switch gear | 46 | Grease distributor |
| 11 | 1 st planetary gear carrier | 30 | Transformer | 47 | Yaw bearing grease pump |
| 12 | Planetary gear | 31 | Yaw motor assembly | 48 | Grease distributor |
| 13 | Ring gear | 32 | Yaw bearing | 49 | Generator shaft grease pump |
| 14 | Sun gear | 33 | Yaw brake | 50 | Grease distributor |
| 15 | Gear box casing | 34 | Hydraulic brake pump assembly | 51 | Tower |
| 16 | 2 nd planetary gear carrier | 35 | Oil distributor | | |
| 17 | Ring gear | 36 | Gear box hydraulic oil pump | | |
| 18 | Planetary gear | | | | |
| 19 | Sun gear | | | | |

Win **Abbreviations**

- 
Vibration transmitter
- 
Rotation transmitter (Tachometer)
- 
Pressure transmitter
- 
Temperature transmitter
- 
Flow transmitter
- 
Wind velocity transmitter
- 
Wind direction transmitter

Instrument list

- 
Tachometer for rotational measurement of pitch system
- 
Temperature transducer main bearing shaft
- 
Vibration transducer main bearing shaft
- 
Temperature transducer high temperature oil
- 
Temperature transducer low temperature oil
- 
Vibration transducer 1st planetary gear assembly
- 
Vibration transducer 2nd planetary gear assembly
- 
Vibration transducer high speed shaft
- 
Oil casing temperature transducer
- 
Oil flow transducer
- 
Oil pressure transducer
- 
Vibration transducer front bearing generator shaft
- 
Tachometer for rotational measurement of high speed shaft system
- 
Temperature transducer 1st phase stator winding
- 
Temperature transducer 2nd phase stator winding
- 
Temperature transducer 3rd phase stator winding
- 
Vibration transducer back bearing generator shaft
- 
Wind velocity transducer
- 
Wind direction transducer
- 
Tachometer for rotational measurement of Yaw system