

# Product Range

Wind Solutions



MOBILITY & WIND  
INDUSTRIES





# Wind Solutions



## Over 30 years of expertise in the wind industry

### Standard Solutions

- 700TW Series | Pitch drive
- 700TW Series | Yaw drive
- BN/M Series
- BE/ME Series
- BX/MX Series
- Active Cube Series
- Agile Series
- AEC Series

### Innovative Solutions

- Integrated Load Cell
- 700TW Series
- Yaw & Pitch drives with Torque Limiter
- Integrated Agile
- Next generation mechatronic yaw drives
- 700TW Series
- Yaw drives with motor, brake and inverter integrated

## Innovative solutions for renewable energies

For more than 30 years, Bonfiglioli has provided dedicated integrated solutions to the wind industry. The combined expertise in the designing and manufacturing of gearboxes in association with years of experience in application on wind turbines has enabled Bonfiglioli to become a global top player.

One out of every three wind turbines globally uses a Bonfiglioli gearbox.

The result is a complete package dedicated to the wind energy sector which seamlessly enables the control of energy generation, from rotor blade positioning with a pitch drive to nacelle orientation with a yaw drive.

Bonfiglioli has produced a completely integrated inverter solution for yaw drives and re-generator inverters to direct the electricity created by the wind turbine into the power grid.

Working closely with customers to develop tailor-made applications, Bonfiglioli uses its flexibility to deliver reliable, superior performance products, which comply with all worldwide standards. The largest companies around the world use Bonfiglioli Wind Energy Solutions.

Bonfiglioli also provides solutions for:



DISCRETE MANUFACTURING & PROCESS INDUSTRIES



ELECTROMOBILITY



MOTION & ROBOTICS

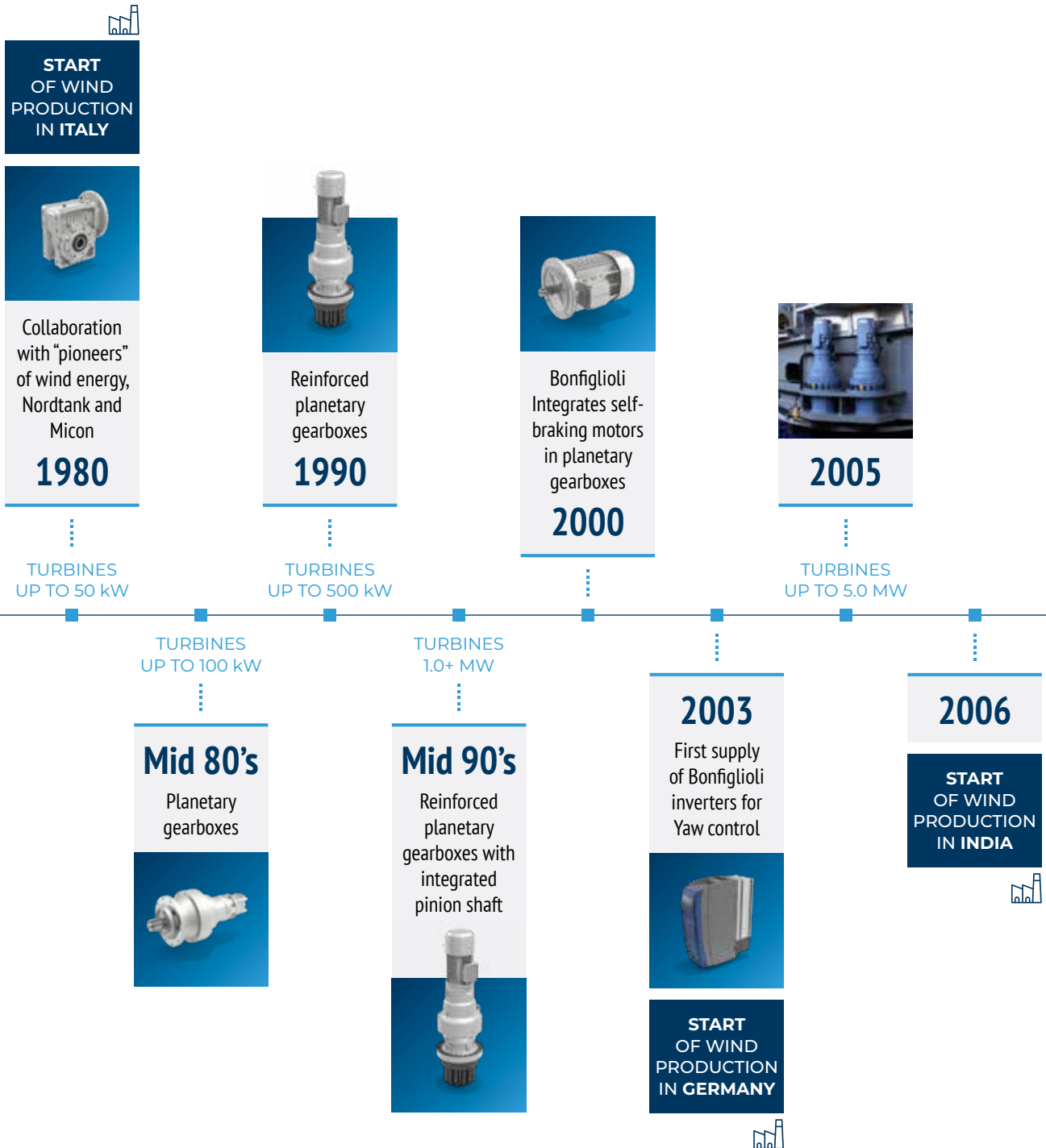


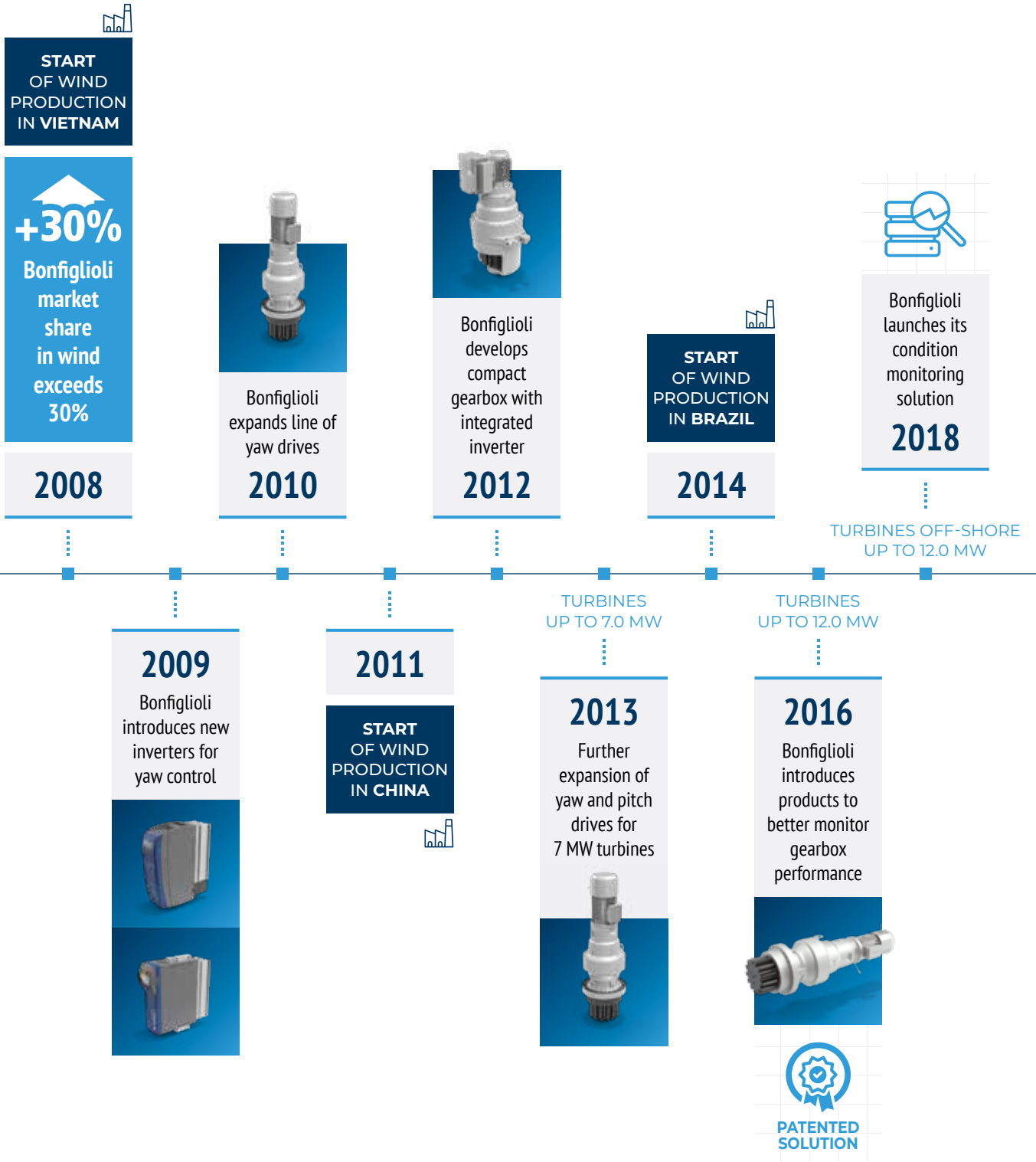
MOBILE

[www.bonfiglioli.com](http://www.bonfiglioli.com)



# Over 30 years of expertise in the wind industry

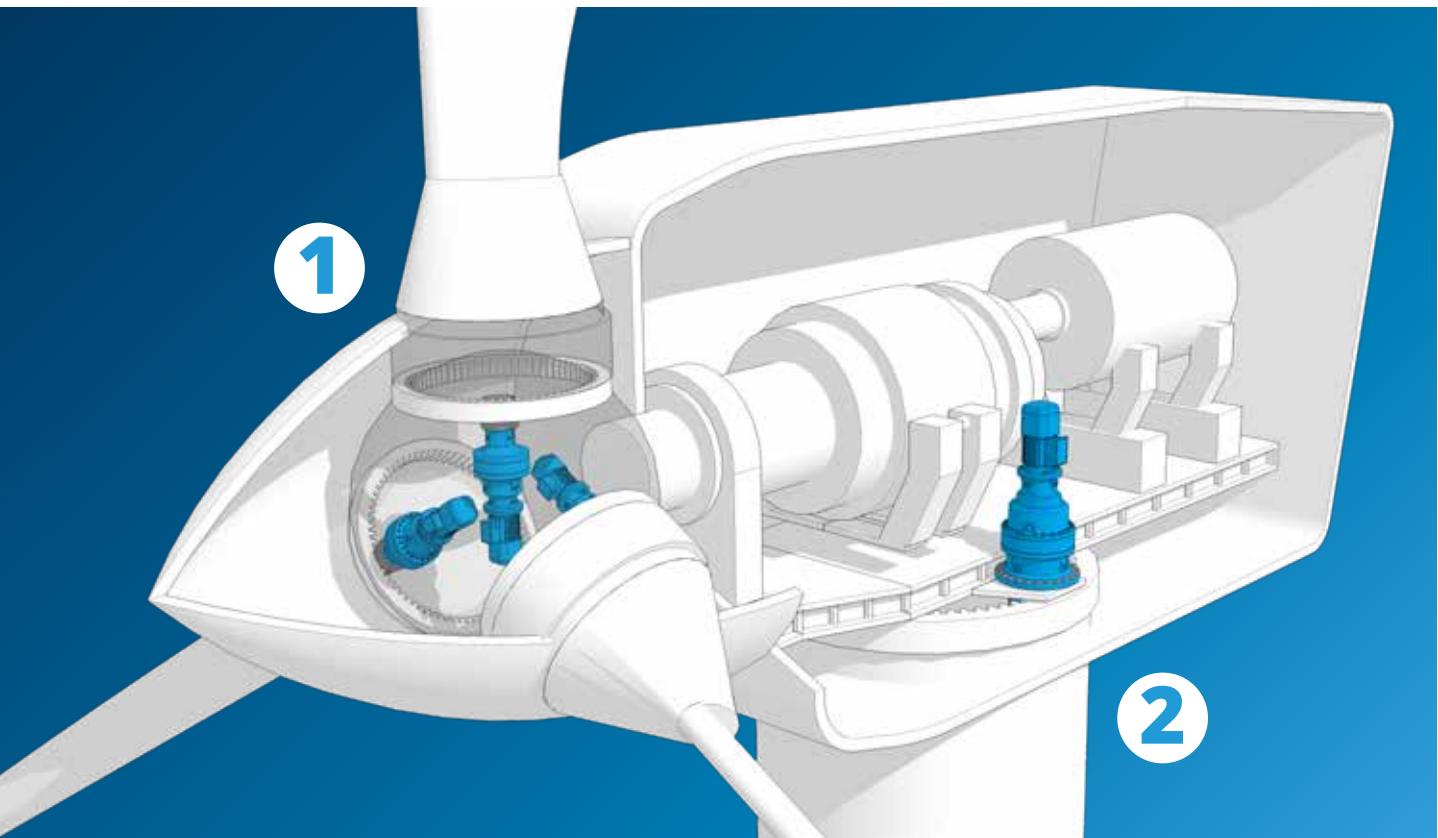




**Standard  
Solutions**



# Integrated solutions with motors and inverters



## Pitch drives with asynchronous induction motors

1

Bonfiglioli pitch drives' wide range of output torques and gearbox sizes expertly meet the OEM requirements of wind turbines. Completely custom made, this product offers a flexible solution to wind turbine manufacturers. Recent new features like the integrated load cell and the torque limiter show that Bonfiglioli always thinks out the box and continuously searches for the most cost-effective solution.

> **BN, BE & BX Series** | AC motors

## Yaw drives with asynchronous induction motors and inverters

2

With a wide range of output torques and gearbox sizes, Bonfiglioli yaw drives excellently meet the OEM requirements of wind turbines. Completely custom made, this product offers a flexible solution to wind turbine manufacturers. Recent new features, like the integrated load cell and the torque limiter, show that Bonfiglioli always thinks outside the box, continuously searching for the most cost-effective solution.

> **BN, BE & BX Series** | AC motors

> **Agile Series** | Standard inverters

> **Active Cube Series** | Premium inverters

> **AEC Series** | Regenerative units

> **Also with integrated inverter**

# Standard Yaw & Pitch drives



## 700TW Series

Bonfiglioli products are used in the latest state-of-the-art wind turbines to control the necessary functions of pitch and yaw drive systems. 700TW series planetary speed reducers (wind turbine yaw control gear motors) are used by a number of leading wind turbine manufacturers due to their advanced technical features, ensuring the highest level of performance.

### Gear ratios

- 60 ... 3,000

### Applicable motors

- Electric motors

### Key benefits

- High transmissible torque
- High radial/thrust load capacity
- High shock resistance and designed for heavy duty
- Wide range of reduction ratios (from 60 up to 3000)
- High efficiency
- Compact dimensions
- Low weight
- Low cost

### Key Features

- Flange mounted
- Output shaft: splined or with integral pinion
- Rugged construction
- High torque capacity
- Output shafts supported by heavy duty bearings

### Standards

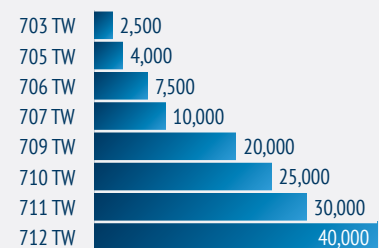
- Gears are designed according to ISO 6336
- Modular design
- In line or right angle design
- Different output versions
- Input for electric motor (IEC, NEMA and compact)

### Construction features

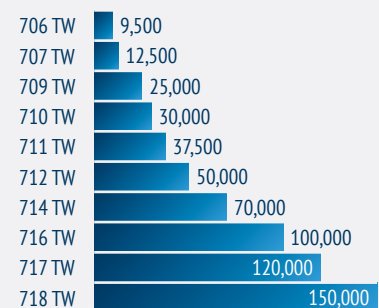
- There can be from 3 up to 5 reduction stages (all of them with a planetary design), depending upon the total required reduction ratio
- Each stage may have from 3 up to 4 planets (to increase the deliverable torque)
- The gears are made of alloyed steel and are heat treated (case hardening for suns & planets, induction hardening or nitriding for internal toothed rings)
- The planets are supported by roller bearings or full rollers track bearings to obtain an high efficiency during the phases of starting and running
- The output housing is made by nodular cast iron and designed to hold the heavy loads generated during the machine's job

### Nominal torque (Nm)

#### Pitch drive



#### Yaw drive

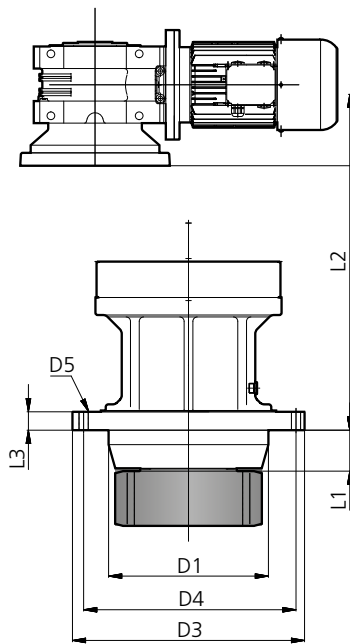


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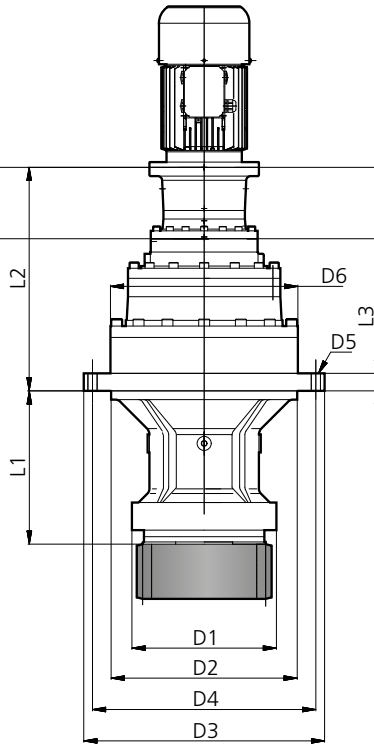
## Overall dimensions

Combined version  
Worm gearbox - Planetary gearbox



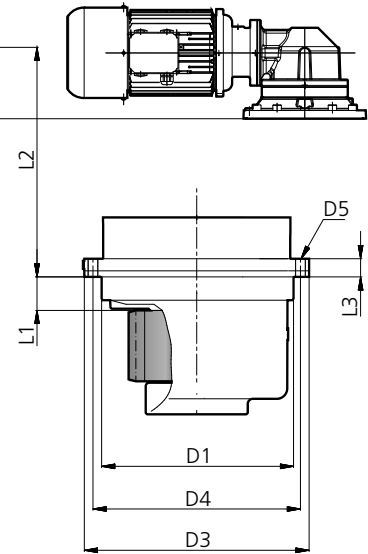
Output version F (short)

Inline version  
Planetary gearbox



Output version N (long)

Right angle version  
Planetary gearbox



Output version U (pinion supported)

Type	Version	D1	D2	D3	D4	D5	D6	L1	L2	L3
703T	F	175	-	275	245	∅ 18 n°10	244	41	370	20
705T	F	175	-	275	245	∅ 18 n°10	244	41	400	20
706T	F	250	-	360	320	∅ 18 n°24	292	130	460	35
706T	N	200	250	360	325	∅ 17 n°10	292	225	350	25
707T	F	310	-	410	360	∅ 22 n°12	348	70	540	30
707T	N	230	280	348	314	∅ 17 n°12	348	300	360	98
709T	F	310	-	410	360	∅ 22 n°12	348	70	540	30
709T	N	230	280	348	314	∅ 17 n°24	348	300	400	125
709T	U	340	-	405	375	∅ 17 n°24	348	90	450	40
710T	F	320	-	410	370	∅ 21 n°21	400	75	600	35
710T	N	300	425	500	450	∅ 22 n°12	400	360	500	40
710T	U	340	-	400	370	∅ 17 n°24	400	36	550	176
711T	F	390	-	520	480	∅ 17 n°30	428	60	700	35
711T	N	300	425	500	460	∅ 22 n°12	428	350	520	40
712T	F	410	-	490	450	∅ 21 n°24	428	125	660	40
712T	N	400	425	520	470	∅ 21 n°24	428	318	580	40
712T	U	415	-	530	480	∅ 26 n°16	428	140	500	45
714T	F	420	-	530	490	∅ 22 n°24	490	160	870	40
714T	U	555	-	645	600	∅ 30 n°32	490	97	760	100
716T	F	555	-	650	600	∅ 30 n°32	542	70	900	50
716T	U	555	-	650	600	∅ 30 n°32	542	70	900	50
717T	F	650	-	740	680	∅ 27 n°32	695	112	1250	50
718T	U	750	-	900	830	∅ 32 n°24	695	60	900	100

The indicated data are for reference only; please contact Bonfiglioli for more detailed information.

# Pitch drive

## Technical data



### 707T3N+BN132 Series

Gearboxes for 1.0 to 2.0 MW wind turbines

### 707T3N Series

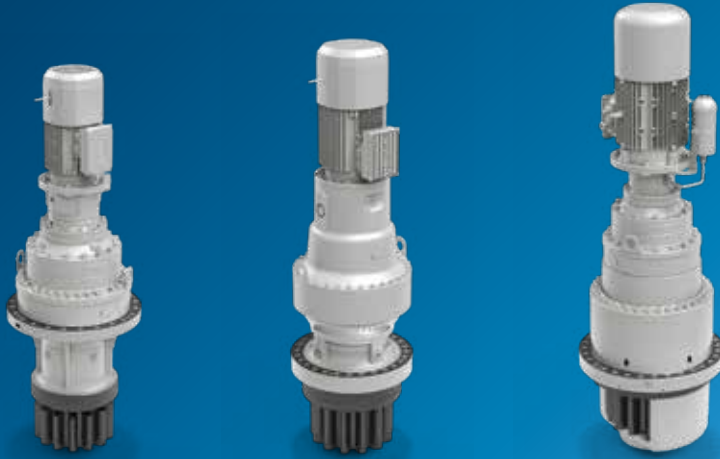
Gearboxes for 1.0 to 2.0 MW wind turbines

Wind turbine size MW	Pitch Drive number	Gearbox type & Max static torque	Electric motor type & power
up to 1.0	3	703 T ÷ 706 T 4.5 ÷ 16 [kNm]	BN 90 ÷ 100 1.1 ÷ 3.0 [kW]
1.0 ÷ 1.5	3	705 T ÷ 707 T 8 ÷ 25 [kNm]	BN 100 ÷ 132 2.2 ÷ 5.5 [kW]
1.5 ÷ 2.0	3	706 T ÷ 709 T 16 ÷ 55 [kNm]	BN 100 ÷ 132 3.0 ÷ 7.5 [kW]
3.0 ÷ 4.0	3	707 T ÷ 711 T 25 ÷ 80 [kNm]	BN 132 ÷ 160 5.5 ÷ 15.0 [kW]
5.0 ÷ 6.0	3	711 T ÷ 712 T 80 ÷ 110 [kNm]	BN 132 ÷ 180 9.2 ÷ 22.0 [kW]
7.0 ÷ 8.0	3 ÷ 6	712 T 110 [kNm]	BN 160 ÷ 200 11.0 ÷ 30.0 [kW]
9.0 ÷ 12.0	3 ÷ 6	712 T 110 [kNm]	BN 160 ÷ 200 11.0 ÷ 30.0 [kW]

Type	Peak static torque Nm	Range of ratios 1:	Available pinion module m	Weight kg
703 T	4.500	100-250	10 ÷ 12	60
705 T	8.000	100-250	10 ÷ 12	90
706 T	16.000	100-250	10 ÷ 14	120
707 T	25.000	100-250	12 ÷ 16	170
709 T	55.000	100-250	12 ÷ 20	300
710 T	60.000	100-250	14 ÷ 20	350
711 T	80.000	100-250	16 ÷ 20	400
712 T	110.000	100-250	18 ÷ 20	500

# Yaw drive

## Technical data



### 711T4N Series

Gearboxes for 1.0 to 2.0 MW wind turbines

### 714T4F+BN132 Series

Gearboxes for 2.0 to 4.0 MW wind turbines

### 716T4U Series

Gearboxes for 5.0 to 8.0 MW wind turbines

Wind turbine size	Yaw Drive number	Gearbox type & Max static torque	Electric motor type & power	Inverter type & power
MW				
up to 1.0	2 ÷ 4	706 T ÷ 709 T 15 ÷ 55 [kNm]	BN 80 ÷ 100 0.75 ÷ 2.2 [kW]	AGL / ACU size 1÷2 0.75 ÷ 2.2 [kW]
1.0 ÷ 1.5	2 ÷ 4	709 T ÷ 712 T 55 ÷ 110 [kNm]	BN 90 ÷ 112 1.1 ÷ 4.0 [kW]	AGL / ACU size 1÷2 1.1 ÷ 4.0 [kW]
1.5 ÷ 2.0	4 ÷ 6	709 T ÷ 714 T 55 ÷ 150 [kNm]	BN 100 ÷ 132 2.2 ÷ 5.5 [kW]	AGL / ACU size 2÷3 2.2 ÷ 5.5 [kW]
3.0 ÷ 4.0	4 ÷ 8	710 T ÷ 714 T 60 ÷ 150 [kNm]	BN 100 ÷ 132 3.0 ÷ 9.2 [kW]	AGL / ACU size 2÷3 3.0 ÷ 9.2 [kW]
5.0 ÷ 6.0	6 ÷ 8	714 T ÷ 716 T 150 ÷ 250 [kNm]	BN 132 ÷ 160 7.5 ÷ 15.0 [kW]	ACU size 3÷4 7.5 ÷ 15.0 [kW]
7.0 ÷ 8.0	6 ÷ 10	716 T ÷ 718 T 250 ÷ 400 [kNm]	BN 132 ÷ 180 9.2 ÷ 22.0 [kW]	ACU size 3÷5 9.2 ÷ 22.0 [kW]
9.0 ÷ 12.0	8 ÷ 16	716 T ÷ 718 T 250 ÷ 400 [kNm]	BN 132 ÷ 180 9.2 ÷ 22.0 [kW]	ACU size 3÷5 9.2 ÷ 22.0 [kW]

Type	Peak static torque	Range of ratios	Available pinion module	Weight
	Nm	1:	m	kg
706 T	16,000	600-3,000	10 ÷ 14	120
707 T	25,000	600-3,000	12 ÷ 16	170
709 T	55,000	600-3,000	12 ÷ 20	300
710 T	60,000	600-3,000	14 ÷ 20	350
711 T	80,000	600-3,000	16 ÷ 20	400
712 T	110,000	600-3,000	16 ÷ 20	550
714 T	150,000	600-3,000	20 ÷ 24	800
716 T	250,000	600-3,000	22 ÷ 26	1,000
717 T	300,000	600-3,000	26 ÷ 30	1,800
718 T	400,000	600-3,000	30 ÷ 36	2,100

The indicated data are for reference only; please contact Bonfiglioli for more detailed information.

# Asynchronous IE1 Three Phase motor



## BN/M Series

The IEC-normalized BN motors comply with all the applicable international standards, including the EMC and LV Directives. They are available in the 0.06 - 30 kW range in the foot and the flange mounting version, the latter in both the IM B5 and the IM B14 configuration with generally two brake options offered, DC and AC supply, Lastly, all motors are inverter duty.

### Degree of protection

- Standard IP55
- Standard for brake motors IP54

### Conformity

- Efficiency - IEC 60034-30
- Low Voltage Directive
- Electromagnetic Compatibility

### Power supply

- @50 Hz: 230/400, 280/480, 400/690
- @60 Hz: 265/460, 280/480, 330/575, 380/660

### Mounting options

- IM B3, IM B5, IM B14

### Brake types

- AC & DC brakes

### Brake-related options

- Manual release lever
- Soft-start flywheel
- Capacitive filter
- Brake separate power supply
- Brake functionality check (micro-switch)

### Motors

- 3 phase asynchronous

### Motor options

- Thermistors and thermostat sensors
- Independent forced cooling
- Incremental, sin/cos absolute single/multi-turn encoders
- Tropicalization
- Anti-condensate heaters
- Up to IP65 protection
- Insulation class H
- Customized connector

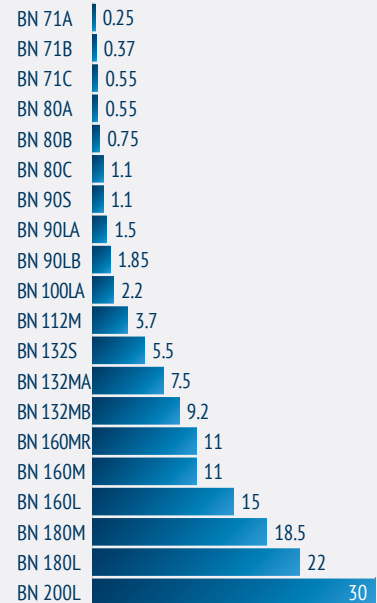
### Key benefits

- Reduced operating cost
- Energy saving
- Complete solution (gearbox and motor)
- Control flexibility
- Flexibility
- Global motor

### Key features

- Compact version
- Inverter duty ready
- Multiple-speed motors
- Certified motor (DOE, NRCAN, CCC, etc.)

### Power (kW)



Other sizes available.

The indicated data are for reference only; please contact Bonfiglioli for more detailed information.

# Asynchronous IE2 Three Phase motor



## BE/ME Series

The IEC-normalized BE motors comply with IEC 60034-30:2008 (efficiency classes) and all the applicable international standards, including the EMC and LV Directives. They are available in the 0.75 - 22 kW range in the foot and the flange mounting version, the latter in both the IM B5 and the IM B14 configuration. Lastly, all motors are inverter duty.

### Degree of protection

- Standard IP55

### Conformity

- Efficiency - IEC 60034-30
- Low Voltage Directive
- Electromagnetic Compatibility

### Power supply

- @50 Hz: 230/400, 280/480, 400/690
- @60 Hz: 265/460, 280/480, 330/575, 380/660

### Mounting options

- IM B3, IM B5, IM B14

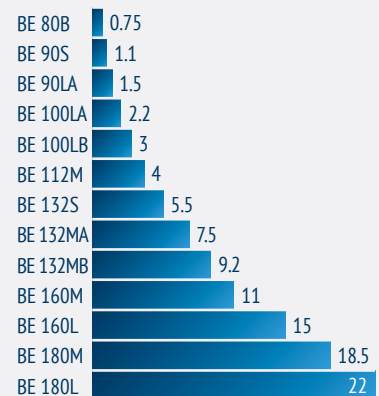
### Motors

- 3 phase asynchronous

### Motor options

- Thermistors and thermostat sensors
- Independent forced cooling
- Incremental, sin/cos absolute single/multi-turn encoders
- Tropicalization
- Anti-condensate heaters
- Up to IP65 protection

### Power (kW)



Other sizes available.

The indicated data are for reference only; please contact Bonfiglioli for more detailed information.

# Asynchronous IE3 Three Phase motor



## BX/MX Series

The release of the new BX/MX motors is a further expression of our regard for the environment.

The BX/MX motors fulfil IE3 efficiency class requirements, according to the international standard IEC 60034-30.

The "X" of the new BX/MX motors stands for "excellence" in efficiency, being IE3 the top efficiency rating currently formalized by global standards.

Lastly, all motors are inverter duty and generally 3 brakes options are offered.

### Degree of protection

- Standard IP55
- Standard for brake motors IP54

### Conformity

- Efficiency - IEC 60034-30
- Low Voltage Directive
- Electromagnetic Compatibility

### Power supply

- @50 Hz: 230/400, 280/480, 400/690
- @60 Hz: 265/460, 280/480, 330/575, 380/660

### Mounting options

- IM B3, IM B5, IM B14

### Brake types

- AC & DC brakes

### Brake-related options

- Manual release lever
- Soft-start flywheel
- Capacitive filter
- Brake separate power supply
- Brake functionality check (micro-switch)

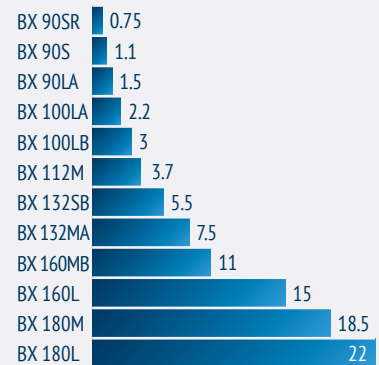
### Motors

- 3 phase asynchronous

### Motor options

- Thermistors and thermostat sensors
- Independent forced cooling
- Incremental, sin/cos absolute single/multi-turn encoders
- Tropicalization
- Anti-condensate heaters
- Up to IP65 protection

### Power (kW)



Other sizes available.

The indicated data are for reference only; please contact Bonfiglioli for more detailed information.

# Premium drive



## Active Cube Series

The Bonfiglioli Active Cube is a frequency inverter offering both compactness and flexibility. This specific solution is adaptable on a wide range of machines, starting from servo to heavy industry applications. The broad support for various field bus systems and the standardized interface for motion control applications make Active Cube an excellent jack of all trades for your application needs.

### Power range

- ACU210: 0.25 - 9.2 kW  
single or three-phase 200 - 240V  
50 - 60 Hz (± 10%)
- ACU410: 0.25 - 400 kW  
three-phase 360 - 480V  
50 - 60 Hz (± 10%)  
Parallel connection up to 1,200 kW
- ACU510: 160 - 400 kW  
three-phase 525V  
50 - 60 Hz (± 10%)  
Parallel connection up to 1,200 kW
- ACU610: 160 - 400 kW  
three-phase 690V  
50 - 60 Hz (± 10%)  
Parallel connection up to 1,200 kW

### Type of control

- Vector sensor less and closed loop control for Permanent Magnets, Induction and Synchronous Reluctance machines

### Overload capacity

- 150% for 60 seconds and 200% for 1 second

### Switching frequency

- 2, 4, 8, 12, 16 kHz

### Enclosure

- IP20 (EN 60529)

### EMC filter

- Integrated up to 9.2 kW (EN 61800-3)

### Hardware features

- Integrated safe torque off (ACU410: STO Sil 3 / PL e) function
- External 24Vdc supply
- Integrated dynamic braking module
- DC link connection
- Standard HTL encoder interface
- Motor temperature monitoring
- Plug-in power terminals (up to 3kW)
- Plug-in and programmable control terminals
- 6 digital inputs, 1 multifunction input
- 1 digital output, 1 multifunction output
- 1 relay output (changeover contact)

### Optional expansion modules

- Expansion of analog, digital inputs and outputs, additional encoder or resolver input and sincos encoder, repetition frequency output, System bus

### Optional communication modules

- PROFIBUS-DPV1, CANopen, RS232, RS485, DeviceNet, EtherCAT®, PROFINET, VABus/TCP, Modbus TCP, EtherNet I/P

### Optional keypad

- Removable keypad KP500 with copy function, Cabinet mounting kit and handheld for keypad

### Optional PC software

- VPlus for Windows with motor setup, terminal monitor
- Actual value window
- Scope function
- Parameter Storage

### Software features

- Positioning function
- Rotary table control
- Master / Slave function with electronic gear
- Power failure regulation
- Function for lift, crane and winch applications
- Spindle control up to 1000Hz
- Traverse function for winders
- Volume flow control

## Standard drive



### Agile Series

The Agile Series of inverters by Bonfiglioli sets new standards in technology for a broad range of users. Agile inverters are particularly suited for the food & beverage, textile, wood, packaging and ceramic industries, where they can be used in a variety of medium complexity automation processes.

#### Power range

- AGL402: 0.25 - 11 kW  
3-ph 320 V... 530 V  
50 - 60 Hz ( $\pm 10\%$ )
- AGL202: 0.12 - 3 kW  
1-ph 200 V... 240 V  
50 - 60 Hz ( $\pm 10\%$ )  
0.25 - 7.5 kW  
3-ph 200 V ... 240 V  
50 - 60 Hz ( $\pm 10\%$ )

#### Motor compatibility

- Vector sensor less for Permanent Magnets, Induction and Synchronous Reluctance machines

#### Overload capacity

- Asynchronous AC motors
- Permanent magnet synchronous (brushless) motors

#### Type of control

Selectable control function:

- V/f control for asynchronous motors
- Sensor-less vector control for asynchronous motors
- Sensor-less vector control for brushless motors

#### Degree of protection

- IP20 (EN 60529)

#### Hardware features

- Power supply from common DC bus
- Integrated braking module
- Short circuit / ground fault protection
- Integrated Safe Torque Off safety system
- Plug-in and programmable control terminals
- 6 digital inputs, 2 multifunctional A/D inputs
- 1 multifunctional I/O, 1 digital output
- 1 multifunctional A/D/pulse output, 1 relay output (alarm)
- Available power outputs: +24 V DC, +10 V DC
- Optional separate 24 V DC electronic power supply
- Standard serial interfaces: RS-232, RS485, system bus
- Integrated Modbus

#### Optional expansion modules

- Resource Pack memory card

#### Optional communication modules

- PROFIBUS-DPV1, CANopen, RS232, RS485, DeviceNet, EtherCAT®, PROFINET, VABus/TCP, Modbus TCP, EtherNet I/P

#### PC software

- VPlus suite

#### Software features

- Permanent motor tuning
- Selective Multi-Motor Control (SMMC)
- Energy saving function
- Ready-to-use application masks
- Integrated maintenance wizard
- Alarm history
- Motor and inverter state memory
- Autodiagnosics
- Integrated PLC function with graphic development environment
- Integrated oscilloscope function
- Customizable units of measurement



# Regenerative drive



## AEC Series

Decades of experience in electronic industrial drives and renewable energy have enabled Bonfiglioli to offer an effective solution for recovering braking energy. This solution comes as the new Active Regenerative System inverters (AEC). In a large number of electrically controlled industrial applications, inertia in moving mechanisms can drive electric motors as they act as brakes. They convert kinetic energy into electrical energy. In a regenerative process, this energy is returned to the grid.

### Power range

- 9.7 ... 173.2 kVA  
3-phase 320V ... 440V  
45Hz ... 66Hz

### Overload capacity

- 150% for 1min

### Operating mode

Control mode selection:

- Input and regenerative power with sinusoidal current
- Regenerative power with square-wave current

### Enclosure

- IP20 (EN 60529)

### Main hardware features

- DC link connection
- Adjustable input and regenerative power control
- Short-circuit and earth-fault resistance
- Configurable control terminals

### Bus communication

- RS232, RS485, Profibus-DP, CANopen

### Operating panel

- Removable KP500 keypad

### PC software

- VPlus for Windows operating systems

### Software features

- Adjustable displacement factor (sinusoidal)
- Harmonic distortion factor <3% (sinusoidal)
- Adjustable DC link voltage (sinusoidal)
- Power factor ~0.9 (square wave)
- Automatic network synchronization
- Operation independent of phase sequence
- Performance and load characteristics curve

### Hardware features

- Integrated dynamic braking module
- DC link connection
- Plug-in and programmable control terminals
- 6 digital inputs, 1 multifunction input
- 1 digital output, 1 multifunction output, 1 relay output (changeover contact)

### Key features

- Feed energy
- Input and regenerative power with sinusoidal current
- Regenerative power with square-wave current

# Innovative Solutions



# Bonfiglioli Condition Monitoring System



Our technology is an innovative solution for constantly monitoring the health of a gearbox, particularly relevant for offshore wind applications where early fault detection is critical in increasing reliability as well as lowering operational costs, maintenance costs and reducing downtime.



**STANDARD DRIVE INVERTERS**



**INTEGRATED OR CABLE SENSORS**



**REAL TIME DATA ACQUISITION:**  
 PRESSURE  
 TORQUE  
 POWER  
 SPEED  
 VIBRATION  
 TEMPERATURE



**EDGE COMPUTER**  
 AI BASED ALGORITHMS



## Tailor-made IIoT platform

**SMART MONITORING & MAINTENANCE FOR YOUR FULL MOTION CONTROL CHAIN WITH BONFIGLIOLI INVERTERS, MOTORS AND GEARBOXES**

- Device sensorization & monitoring
- Edge & cloud computing
- Bonfiglioli dashboards & customized information

**BONFIGLIOLI DASHBOARD**  
 DYNAMIC LIFECYCLE MONITORING  
 PREDICTIVE MAINTENANCE  
 HEALTH DEVICE ASSESSMENT

# Integrated Load Cell



## Precise real-time load peak monitoring.

This solution integrates the load cell into the gearbox. The output signal from the transmitter can:

- Shut down the e-motor if necessary
- Reduce the input power (e.g. by frequency converter)
- Elaborate the information by customer PLC (e.g. creating working group graphic in real time)



**PATENTED SOLUTION**



**MONITORING PERFORMANCE**

Integrated inside the gearbox, the load cell provides a precise monitoring



**MEASURING TORQUE**

Precisely and quickly measure torque



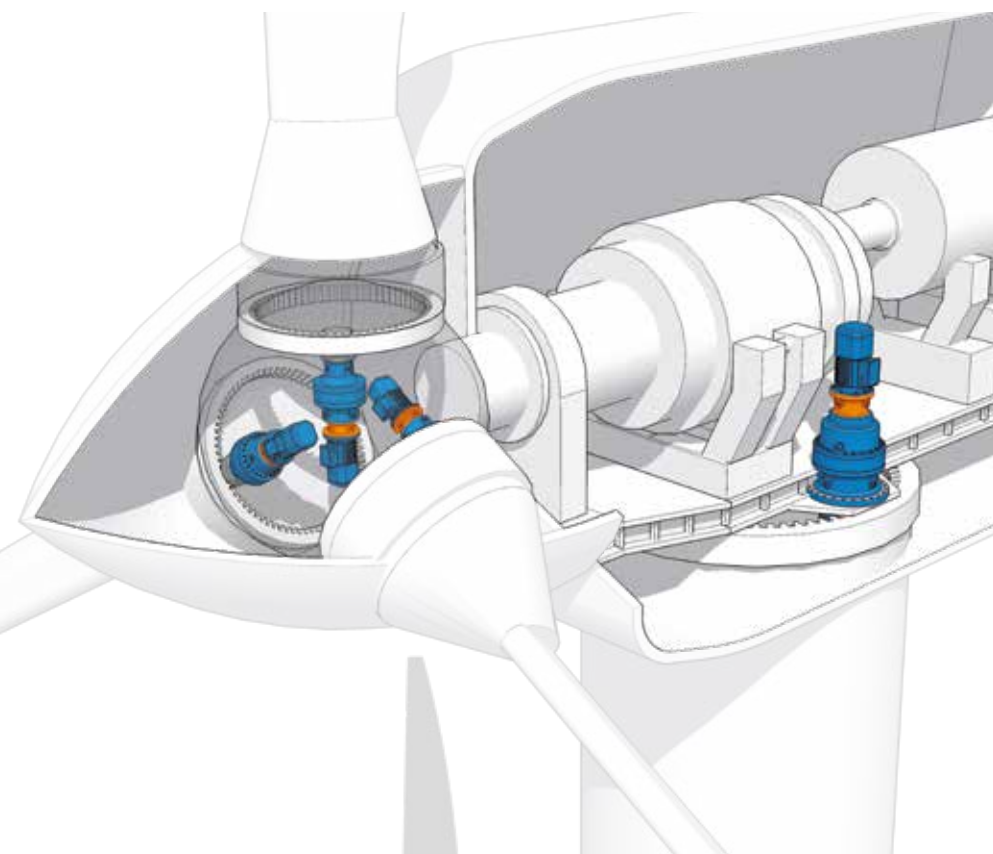
**REAL-TIME MONITORING**



**AUTOMATIC MOTOR SWITCHING**



**ANTI-SEIZE FUNCTION**



### Technical information

- The Load Cell is located between the e-motor and first stage of transmission
- It can be fixed with all IEC and gear stages just by changing the interface component

### Applications

Used in all applications with an e-motor where it is necessary to control and manage the input power, including:

- Yaw Drives
- Pitch Drives

# Yaw & Pitch drives with Integrated Load Cell



## 700TW Series

For all applications of yaw and pitch drives for the monitoring of load peaks, Bonfiglioli offers its customers a solution that is protectively integrated into the gearmotor. The integrated load cell quickly and precisely measures torque and enables torque monitoring in real time. The system provides an automatic engine shut-down to protect the drive or reduce the capacity of the frequency converter and provides information to the PLC. The system also has an anti-seize function which prevents blockages.

### Rated torque range

- 2,500 ... 150,000 Nm

### Peak torque range

- 4,500 ... 400,000 Nm

### Reduction ratios

- 1:60 ... 3,000

### Key features

- Located inside the gearbox to measure gearbox performance in real time
- Can be monitored remotely to immediately detect problems or potential failures
- Gives wind farm operators the ability to measure performance of individual components within the nacelle

### Gearbox configuration

- Flange mounted
- Output shaft: with integral pinion (type: F, N, U)
- Rugged design
- High torque capacity
- Output shafts supported by high load capacity bearings

### Applicable AC motors

- Compact motors and brake motors M/ME series
- IEC motors and brake motors BN/BE series

### Main brake motor features

- DC and AC brake

### Main brake features

- AC/DC rectifier
- Double disc brake
- Microswitch
- Thermal sensors

# Yaw & Pitch drives with Torque Limiter.



## 700TW Series

For both Yaw and Pitch drive applications, Bonfiglioli has created a torque limiter which significantly reduces downtime in the case of stopping the transmission of wind turbines when peak torque has been reached and also reduces maintenance costs.

### Rated torque range

- 2,500 ... 150,000 Nm

### Peak torque range

- 4,500 ... 400,000 Nm

### Reduction ratios

- 1:60 ... 3,000

### Gearbox configuration

- Flange mounted
- Output shaft: with integral pinion (type: F, N, U)
- Rugged design
- High torque capacity
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### Applicable AC motors

- Compact motors and brake motors M/ME series
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### Main brake motor features

- DC and AC brake

### Main brake features

- AC/DC rectifier
- Double disc brake
- Microswitch
- Thermal sensors

### Key features of torque limiter

- External to gearbox\* for fast and easy replacement - no longer necessary to replace the entire gearbox
- Limits peak of torque to avoid failure
- Shuts down gearbox if torque limit is reached
- Fully interchangeable with older gearboxes - can be included in replacement drives for greater long term reliability and reduced costs

(\*) The torque limiter is located inside an easily removable and replaceable cartridge, which is integrated into a worm gear. It is only possible in a right angle solution.

The indicated data are for reference only; please contact Bonfiglioli for more detailed information.

# Next generation mechatronic yaw drives.



## Integrated Agile

Integrated Agile inverters can be mounted directly to the motor and represent a very compact alternative to the traditional yaw system without inverter or with the motor supplied by a standard frequency converter installed in a cabinet.

Using integrated Agile inverters, the performance of turbine yaw systems is enhanced, and additional benefits in terms of reliability, availability and system cost optimization can be achieved.

### Power range

- 1.1 kW up to 11 kW

### Power supply

- 3-Phase 320V ... 528V / 45Hz ... 66Hz

### Type of control

Innovative control dedicated to open loop drives:

- Sensor-less vector speed and torque control for induction motor
- Sensor-less vector speed and torque control for brushless motor
- Sensor-less V/f scalar control

### Enclosure

- Protection rating: IP65 (EN60529)
- Material: robust aluminum

### Main standard features

- Built-in EMC filter for straightforward EMC compliance
- Integrated CANopen / RS485 Modbus / Systembus interfaces
- Integrated brake chopper transistor
- MMC memory cards for easy and fast start up / parameter copying
- Optional communication Modules: Profibus-DP, Ethernet-based field buses
- 6 digital inputs, 2 configurable A/D multi-function inputs, +24VDC input, 1 configurable I/O port
- 1 digital output, 1 configurable A/D/pulse multi-function output, 1 relay, +24VDC output, +10VDC output

### Main software features

- Integrated Safe-Torque-Off function
- Four data sets
- Drive and motor status backup
- Static and dynamic energy saving functions
- Maintenance integrated assistant
- Integrated PLC functions with graphical editor
- Integrated scope function

### Dedicated features for wind turbine yaw drives

- Fanless
- Long life: use of film capacitors
- Operation temperature range: from -10 up to 50°C (special version on request for colder climates)
- Resistance to harsh ambient conditions (corrosion, high humidity)

## Yaw drives with motor, brake and inverter integrated.



### 700TW Series

#### The solution specifically designed for yaw drive applications.

More compact than existing solutions, this innovative system for nacelle orientation control is now equipped with integrated motor and brake and is inverter ready.

The new design incorporates a special feature for quick installation and setting and grants simpler maintenance over the product lifetime.

The yaw control multistage planetary gearmotor is perfect for wind turbines from 1.5 MW to 3.5 MW, both for onshore and offshore applications.

#### An innovative design system:

- Smaller dimensions with the same performance - 20% height reduction compared to traditional solution
- Lighter weight - 8% less than traditional solution
- Design complexity reduction - 11% less components than traditional solution
- Easier installation
- Simplified maintenance also with longer service intervals - 10 years
- Efficiency improved thanks to the design focused on the Wind application profile.

#### Integrated inverters for maximum efficiency:

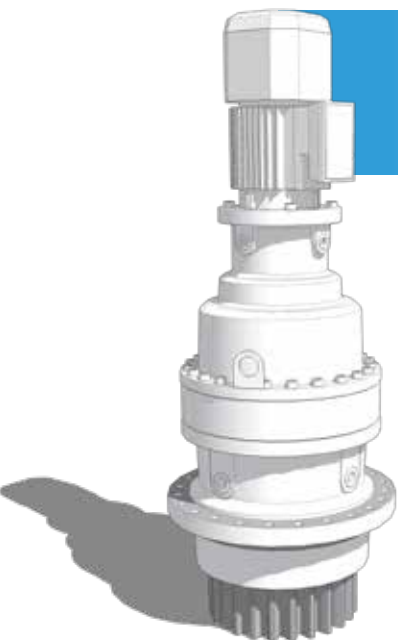
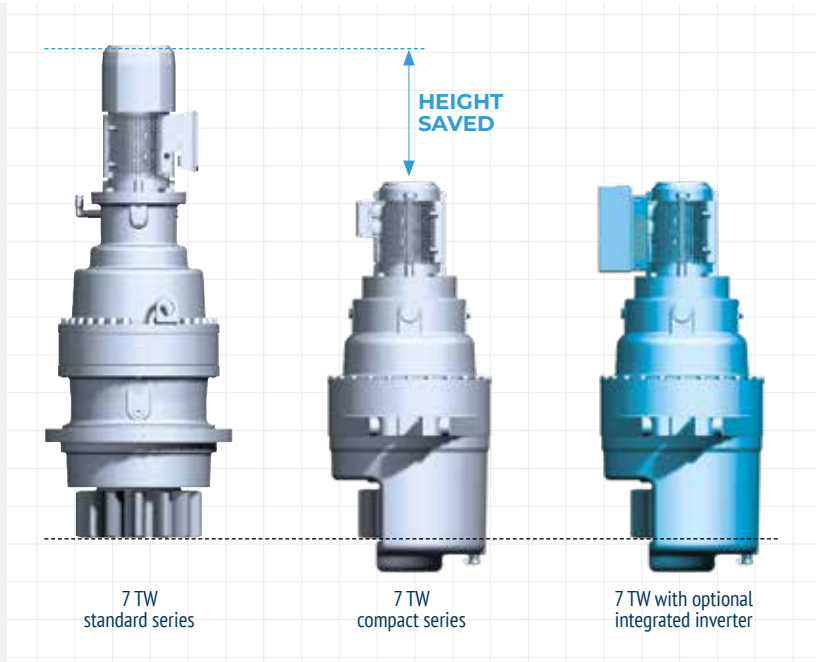
- Higher reliability and increased life of mechanics guaranteed by electronic control of torques
- Maintenance prediction, through diagnostics via inverter field bus
- Easier installation and less components at nacelle because no cabinet required
- Energy efficiency improved thanks to vector control of active and reactive power.



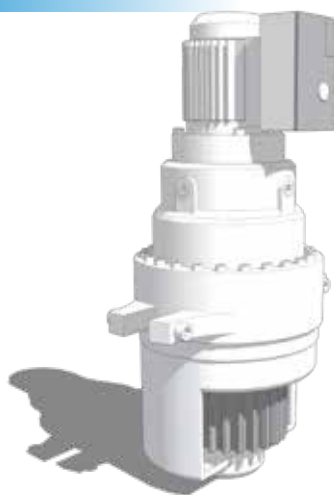


### Technical key characteristics:

- Size: 712 TW
- Rated dynamic torque: 50 kNm
- Peak static torque: 110 kNm
- Reduction ratio: from 600 to 3000
- Pinion module: from 16 to 20
- Motor size: IEC100 integrated
- Parking brake: integrated
- Inverter: optionally integrated



**Standard Yaw Drive**  
3 sections, separate brake;  
requires separate inverter



**New generation Yaw Drive**  
2 sections, integrated brake;  
integrated inverter

**20%  
HEIGHT  
REDUCTION\***

← **INTEGRATED  
INVERTER**

### SMALLER

Integrated AC motor flange and brake decreases height by 20%\*

### SIMPLER

Less bolted connections and only 2-piece housing 11%\* less components

### LIGHTER

Total unit weight reduced by 8%\*

### COMPLETE “PLUG AND PLAY” SOLUTION

\* Measures vary depending on gearbox size

## Global Presence



Bonfiglioli is a market force with a presence spanning 22 countries on 5 continents. Our organization makes the most of geographic proximity to offer complete solutions combining efficiency and competence.



4000  
EMPLOYEES



20  
BRANCHES



15  
PLANTS



550  
DISTRIBUTORS



80  
COUNTRIES

## We Are a Global Company

Thanks to an international network of sales branches and closely interconnecting production plants, we can guarantee the same high standards of Bonfiglioli quality anywhere at any given time. Aware that our direct presence in local markets is the key to long-lasting success, our family includes 20 sales branches, 15 production plants and more than 500 distributors around the world.

**Our organization is always close by, offering complete and efficient solutions and supporting our customers with dedicated services, such as co-engineering or after-sales assistance.**



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 PRODUCTION

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 SERVICE



We have a relentless commitment to excellence, innovation & sustainability. Our team creates, distributes and services world-class power transmission & drive solutions to keep the world in motion.

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