

## Solutions for wind energy



 **BONFIGLIOLI**  
*Power & Control Solutions*





## We design and manufacture solutions for power transmission and control and for energy generation

Bonfiglioli is a leading company that competes at the highest levels of the global power transmission market.

Bonfiglioli designs, manufactures and distributes a complete range of gearmotors, drive systems and planetary gearboxes and boasts the best integrated offering on the market today. Bonfiglioli has enjoyed impressive growth in recent years.

Efficiency and competitiveness have both been improved by the acquisition of established market-leading companies, the expansion of existing plant and the construction of new factories and, above all, by an ambitious programme of production process automation. The Bonfiglioli name embodies the values of experience and advanced technology, supported by constant dedication to the cause of innovation and research and by the financial resources necessary to sustain a process of continuous evolution.

The Bonfiglioli Group offers the power transmission market three distinct brands:



The strength of these brands lies in the high technology content of each product and the careful integration of different technologies to provide an exclusive and synergic solution. Quite uniquely, Bonfiglioli has the core capabilities to develop systems which integrate electronic, hydraulic and mechanical engineering.

These solutions represent choices of excellence for industrial systems and mobile machinery as well as innovative renewable energy applications in the wind turbine, solar panel and bio fuel sectors.

Hi-tech industries and complex applications increasingly call for the ability to provide solutions and not just products. This can only be achieved with the appropriate expertise. And we are convinced that this is our unique selling point which we must foster and invest in our drive to promote innovation.

2 3





## Bonfiglioli Riduttori, Bonfiglioli Trasmital and Bonfiglioli Vectron develop innovative solutions for industry and renewable energy

Bonfiglioli Riduttori today is one of the top brands in the power transmission industry. The company's success is the result of a business strategy that relies on three fundamental factors: know-how, innovation and quality. All the brand's gearmotors offer excellent technical characteristics and guarantee the highest performance. Substantial investment and technical expertise have enabled the company to achieve an annual production output of 1600,000 units, using completely automated processes. Certification of the company's Quality System by DNV and TÜV is proof of the high quality standards achieved.

With the acquisition of the Vectron brand, Bonfiglioli is now established as leader of the industrial automation sector. Bonfiglioli Vectron delivers products and services for completely integrated inverter solutions. These solutions complement Bonfiglioli's power transmission and control offering to the industrial sector.

Since 1976, Bonfiglioli Trasmital's know-how in the power transmission industry has focused on special applications offering 100% reliability and in particular, on the manufacture of gearmotors for mobile machinery translation, slew and wheel drive applications, and gearboxes for wind turbine nacelle and blade rotation. Today Bonfiglioli Trasmital stands at the forefront of the industry as a key partner to top manufacturers worldwide.

### Bonfiglioli Riduttori, Bonfiglioli Trasmital and Bonfiglioli Vectron's offering

- Helical in-line gearboxes
- Bevel gearmotors
- Worm gears
- Shaft mounted gearmotors
- Heavy duty gearboxes
- Mechanical variators
- Three phase asynchronous motors
- Single phase motors
- Open loop inverters
- Closed loop inverters
- Servo motors and drives
- Solar systems
- General purpose gearboxes
- Wheel hub gearboxes
- Track drive gearboxes
- Slew gearboxes
- Winch gearboxes
- Gearboxes for cement mixer trucks
- Yaw and Pitch Drive for Wind Turbines

4

5





## Bonfiglioli Trasmital and Bonfiglioli Vectron supply specific products and solutions for wind energy

Well aware of the need to produce renewable, clean energy alternatives to oil, 30 years ago Bonfiglioli saw the opportunity of exploiting its vast experience in gearboxes for developing ad-hoc solutions for wind energy.

A number of wind turbine gearboxes (700T series) have been designed, engineered and manufactured by Bonfiglioli Trasmital, the Group's Business Unit specialized in planetary gearboxes. The result is a complete package dedicated to the wind energy sector which seamlessly enabled the whole control of energy generation, from rotor blades position (pitch drive) to nacelle orientation (yaw drive).

Drawing on its vast experience in inverter design, Bonfiglioli Vectron has produced a completely integrated inverter solution for yaw drive and it is developing a pitch drive control system, as well as Re-generator Inverters.

Working closely with customers to develop tailored applications, Bonfiglioli uses its flexibility to deliver reliable, superior performance products. Some of the biggest installations in Europe and Overseas already use Bonfiglioli Wind Energy solutions. Nowadays Bonfiglioli has a market share of 30% in the sector.





**Pitch Drive**  
up to max torque of 80.000 Nm

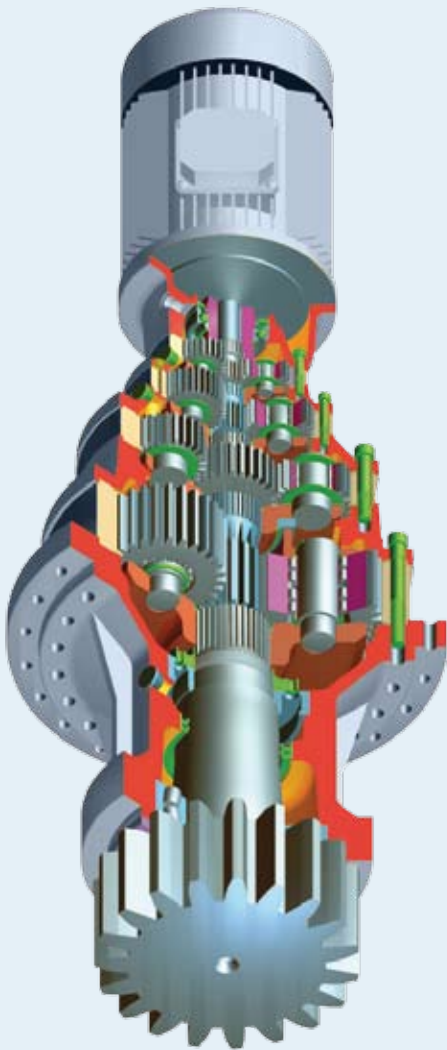
**Yaw Drive**  
up to max torque of 200.000 Nm

**Active / Active Cube**  
Vector control inverter  
from 0.25 to 22 kW





## Always Towards the Best Wind



Bonfiglioli products are used in the latest state-of-the-art wind turbines to control such significant functions like yaw and pitch drives. 700T series planetary speed reducers are appreciated by a number of leading wind turbine manufacturers thanks to their advanced technical features.

### Torque Range

8.000 ... 200.000 Nm

### Gear Ratios

3,4 ... 2000

### Key Features

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

### GENERAL FEATURES

- High transmissible torque
- High radial/thrust load capacity
- High shock resistance and designed for heavy duty
- Wide range of reduction ratios (from 3,4 up to 2.000)
- High efficiency
- Compact dimensions
- Low weight
- Low cost

### 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)

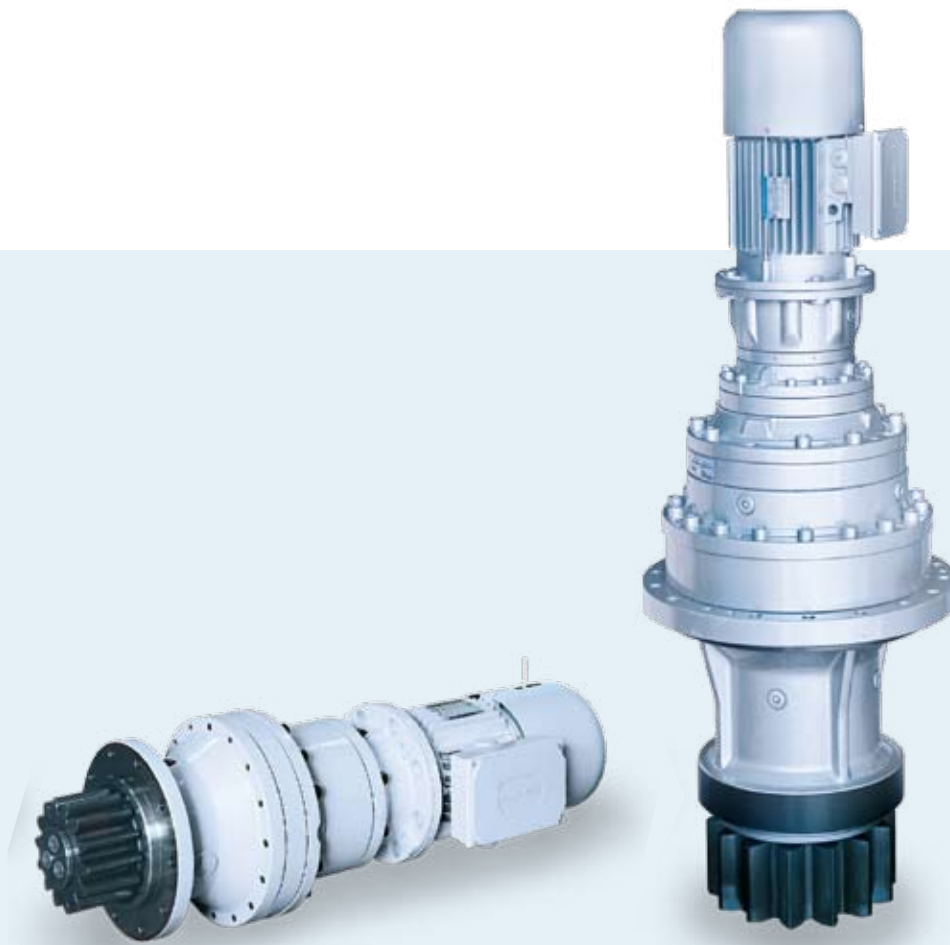
### CONSTRUCTION FEATURES:

- There can be from 1 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 5 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 cast iron and designed to hold the heavy loads generated during the machine's job.



## Yaw drive

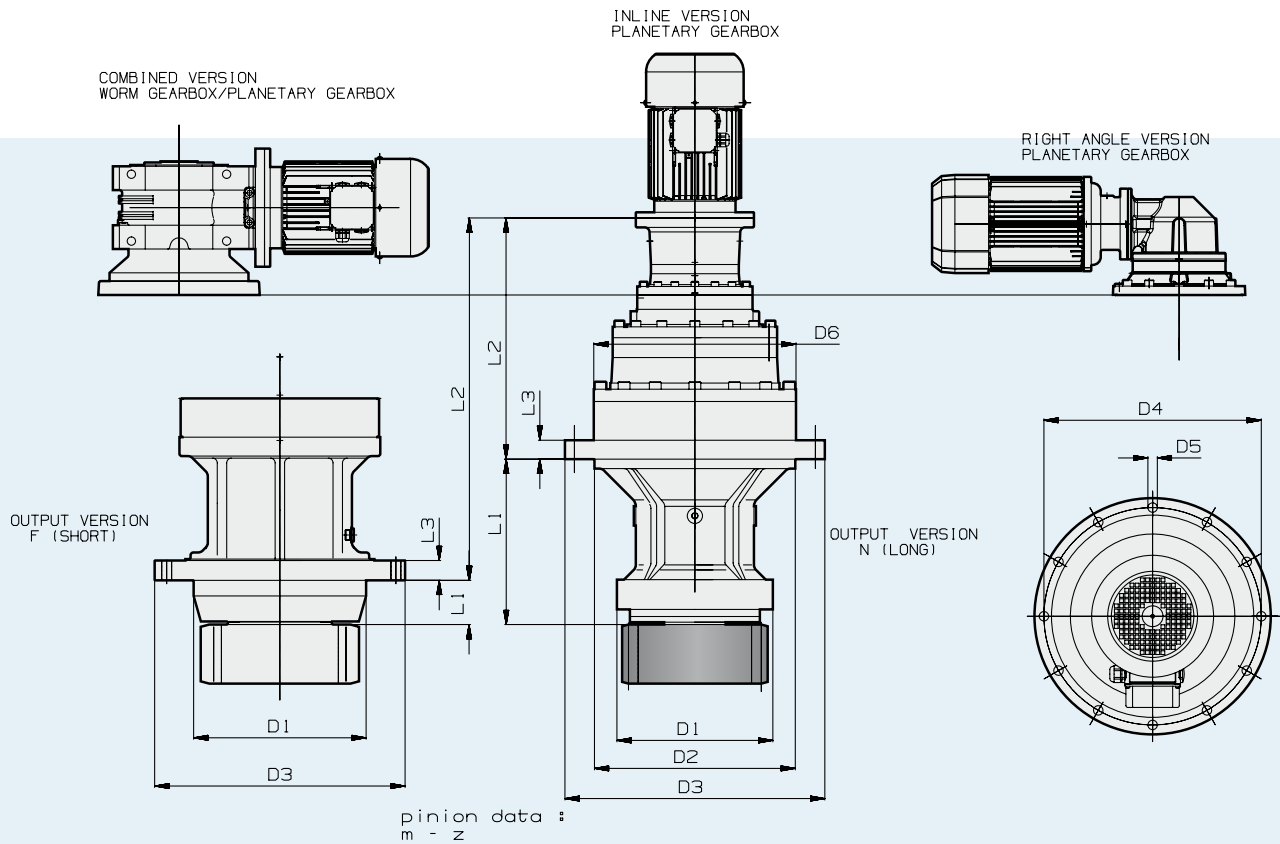
Type	Nominal Torque Nm	Peak static Torque Nm	Range of Ratios 1:	Available Pinion module	Weight Kg
<b>706 T</b>	8.000	15.000	600-2000	From m10 to m14	120
<b>707 T</b>	12.000	25.000	600-2000	From m12 to m16	170
<b>709 T</b>	18.000	45.000	600-2000	From m12 to m20	300
<b>710 T</b>	25.000	60.000	600-2000	From m14 to m20	350
<b>711 T</b>	35.000	80.000	600-2000	From m16 to m20	400
<b>712 T</b>	40.000	100.000	600-2000	From m16 to m20	550
<b>713 T</b>	50.000	130.000	600-2000	From m20 to m24	650
<b>715 T</b>	80.000	150.000	600-2000	From m22 to m24	800
<b>716 T</b>	100.000	160.000	600-2000	From m22 to m26	1000
<b>717 T</b>	130.000	200.000	600-2000	From m26 to m30	1800



## Pitch drive

Type	Nominal Torque Nm	Peak static Torque Nm	Range of Ratios 1:	Available Pinion module	Weight Kg
703 T	2.500	6.000	100-250	From m10 to m12	60
705 T	5.000	10.000	100-250	From m10 to m12	90
<b>706 T</b>	8.000	15.000	100-250	From m10 to m14	120
<b>707 T</b>	12.000	25.000	100-250	From m12 to m16	170
<b>709 T</b>	18.000	45.000	100-250	From m12 to m20	300
<b>710 T</b>	25.000	60.000	100-250	From m14 to m20	350
<b>711 T</b>	35.000	80.000	100-250	From m16 to m20	400

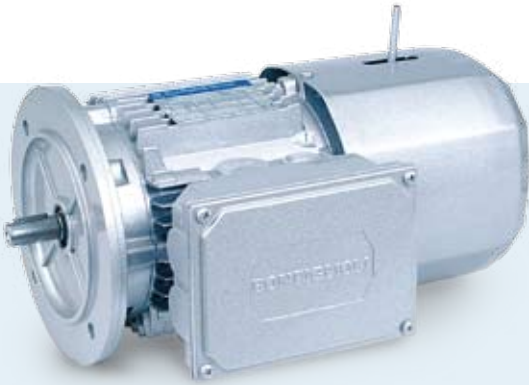
## Overall dimensions



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
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
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
713T	F	550		660	600	∅ 26 n°24	445	145	880	50
713T	N	340	400	560	510	∅ 22 n°24	445	430	630	30
715T	F	540		650	590	∅ 30 n°24	542	125	800	60
715T	N	370	470	640	600	∅ 22 n°24	542	470	670	36
716T	F	555		650	600	∅ 30 n°32	542	70	900	50
717T	F	630		740	680	∅ 27 n°32	695	112	1250	50

module/number of teeth of pinion: on request

## A complete range of AC motors developed for gearmotor duty that will exceed expectations



The IEC-normalized BN motors comply with all the applicable international standards, including the EMC and LV Directives. For wind energy solutions they are widely used in the 0.25 - 15 kW range. They are available in the foot and the flange mounting version, the latter in both the IM B5 and the IM B14 configuration. Single and dual pole version available with generally, three brake options offered, one DC and two AC supply, lending further flexibility to the system. Finally, all motors are inverter duty.

Type	kW
BN 71A	0,25
BN 71B	0,37
BN 71C	0,55
BN 80A	0,55
BN 80B	0,75
BN 80C	1,1
BN 90S	1,1
BN 90LA	1,5
BN 90LB	1,85
BN 100LA	2,2
BN 100LB	3
BN 112M	4
BN 132S	5,5
BN 132MA	7,5
BN 132MB	9,2
BN 160MR	11
BN 160M	15

### kW rating (4 pole)

0,25 kW ... 15kW

### Frame Sizes

From 71A to 200L

### Pole Numbers

4, 6

### Mounting Options

Flange Im B5 and IM B14

### Voltage

230/400 – 400/600 V

### Operation

50 Hz and 60 Hz

### Compliance

CEE 73/23 (LVD) and CEE 89/336 (EMC)

CSA and UL Approved Design

### Inverter Duty

All Frame Sizes

### Housing

Cast Aluminium

### Degree of protection

IP54 – IP55

### Insulation class

CLF - CLH

### Main Brake Features

DC and AC supply

Faster Brake Engage/Disengage through Electronically Controlled AC/DC Rectifier type SB, NBR, SBR (option)

### Main Options

Thermistors and Thermostates sensor

Separate Supply Forced Ventilation

Line Driver and Push-Pull Incremental Encoder

Heaters

AC/DC Rectifier



## Versatility, promptness, accuracy

A full series of solution & servo drives, compact and flexible, is available to control significant functions in wind turbines, in match with Bonfiglioli servomotors

### Power Range (ACU401)

0.25 - 22 kW / three-phase 360 V - 480 V / 50 Hz - 60 Hz ( $\pm 10\%$ )

### Type of Control

Selectable control function: sensor-less scalar control, sensor-less field oriented control (speed, torque and position) with asynchronous motors and synchronous servomotors with or without speed/position sensor

### Overload Capacity

150% for 60s / 200% for 1s

### Switching Frequency

2, 4, 8, 12, 16 kHz

### Enclosure

IP20 (EN 60529)

### EMC Filter

Integrated up to 9.2 kW (EN 61800-3)

### Main Standard Hardware features

Integrated safe torque off function, External 24 Vdc supply for control board and electronics, Integrated dynamic braking module, DC link connection Standard encoders interface, Resolver module for feedback acquisition from Bonfiglioli servomotors, Motor temperature monitoring, Plug-in power terminals (up to 3 kW), Plug-in and programmable control terminals, 6 digital input, 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, repetition frequency output, System bus

### Optional Communication Modules

RS232, RS485, Modbus, Profibus-DP, CANopen

### Optional Keypad

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

### PC Software VPlus

Windows-based engineering "workbench" with easy interface, Drive parameters set-up, Terminal monitor, Actual value window, Scope function, Bonfiglioli servomotors quick-configuration window, Motion block parameters management, Teleservice

### Main Software Features

32 Programmable Motion blocks, 36 Homing functions according to CAN open DSP4.02, Unit converter, Jog function, Absolute and relative positioning modes, Touch probe, Teach-In functions, Rotary table control, Programmable reference value channel, Programmable start and stop characteristics, Motor potentiometer, Programmable S curve, 4 data sets, Auto start-up and commissioning, Auto reset after failure, Auto start after power failure, PI controller, Programmable logic and timer functions, Bumpless torque / speed changeover, Master / Slave function with electronic gear, Index and stability control, Intelligent current limits, Power failure regulation, Comprehensive monitoring and protection capabilities, High speed control, Function for lift, crane and winch applications, 3 different brake Management Functions. Advanced application functions: advanced brake release control, spindle control up to 1000Hz, traverse function for winders, Volume flow control, load evaluation.

Type	Power kW*
ACU401 - 01	0,25
ACU401 - 03	0,37
ACU401 - 05	0,55
ACU401 - 07	0,75
ACU401 - 09	1,1
ACU401 - 11	1,5
ACU401 - 12	1,85
ACU401 - 13	2,2
ACU401 - 15	3,0
ACU401 - 18	4,0
ACU401 - 19	5,5
ACU401 - 21	7,5
ACU401 - 22	9,2
ACU401 - 23	11
ACU401 - 25	15
ACU401 - 27	18,5
ACU401 - 29	22

\*200% overload - 1sec  
150% overload - 1min



# Bonfiglioli Worldwide

## AUSTRALIA

BONFIGLIOLI TRANSMISSION (Aust) Pty Ltd.  
2, Cox Place Glendenning NSW 2761 (Australia)  
Locked Bag 1000 Plumpton NSW 2761  
Tel. (+ 61) 2 8811 8000 - Fax (+ 61) 2 9675 6605  
www.bonfiglioli.com.au - sales@bonfiglioli.com.au

## BRASIL

BONFIGLIOLI REDUTORES DO BRASIL INDUSTRIA E COMERCIO LTDA  
Av. Padre Anchieta 365 - 09891-420 - Sao Bernardo do Campo  
Sao Paulo (Brasil) - Tel. (+55) 11 4337 1806 - Fax (+55) 11 4337 5083  
www.bonfigliolidobrasil.com.br - bonfiglioli@bonfigliolidobrasil.com.br

## CANADA

BONFIGLIOLI CANADA INC.  
2-7941 Jane Street - Concord, Ontario L4K 4L6  
Tel. (+1) 905 7384466 - Fax (+1) 905 7389833  
www.bonfigliolicanada.com - sales@bonfigliolicanada.com

## CHINA

BONFIGLIOLI DRIVES (SHANGHAI) CO. LTD.  
19D, No. 360 Pudong Road (S)  
New Shanghai International Tower - 200120 Shanghai (P.R. China)  
Tel. (+86) 21 69225500 - Fax (+86) 21 69225511  
www.bonfiglioli.cn - bds@bonfiglioli.com.cn

## FRANCE

BONFIGLIOLI TRANSMISSIONS S.A.  
14 Rue Eugène Pottier BP 19  
Zone Industrielle de Moimont II - 95670 Marly la Ville  
Tel. (+33) 1 34474510 - Fax (+33) 1 34688800  
www.bonfiglioli.fr - btf@bonfiglioli.fr

## GERMANY

BONFIGLIOLI DEUTSCHLAND GmbH  
Sperberweg 12 - 41468 Neuss  
Tel. (+49) 02131 2988-0 - Fax (+49) 02131 2988-100  
www.bonfiglioli.de - info@bonfiglioli.de

## GREAT BRITAIN

BONFIGLIOLI UK Ltd  
Industrial Equipment - Unit 3 Colemeadow Road  
North Moons Moat - Redditch. Worcestershire B98 9PB  
Tel. (+44) 1527 65022 - Fax (+44) 1527 61995  
www.bonfiglioli.com - uksales@bonfiglioli-uk.com

Mobile Equipment  
5 Grosvenor Grange, Woolston, Warrington - Cheshire WA1 4SF  
Tel. (+44) 1925 852667 - Fax (+44) 1925 852668  
www.bonfiglioli-uk.com - salesmobile@bonfiglioli-uk.com

## INDIA

BONFIGLIOLI TRANSMISSIONS PVT Ltd.  
PLOT AC7-AC11 Sidco Industrial Estate - Thirumudivakkam - Chennai 600 044  
Tel. +91(0) 44 24781035 / 24781036 / 24781037  
Fax +91(0) 44 24780091 / 24781904  
www.bonfiglioli.co.in - bonfig@vsnl.com

## ITALY

BONFIGLIOLI ITALIA S.p.A.  
Via Sandro Pertini lotto 7b - 20080 Carpiano (Milano)  
Tel. (+39) 02 985081 - Fax (+39) 02 985085817  
www.bonfiglioli.it - customerservice.italia@bonfiglioli.it

## SPAIN

TECNOTRANS BONFIGLIOLI S.A.  
Pol. Ind. Zona Franca sector C, calle F, n°6 08040 Barcelona  
Tel. (+34) 93 4478400 - Fax (+34) 93 3360402  
www.tecnotrans.com - tecnotrans@tecnotrans.com

## SOUTH AFRICA

BONFIGLIOLI POWER TRANSMISSION Pty Ltd.  
55 Galaxy Avenue, Linbro Business Park - Sandton  
Tel. (+27) 11 608 2030 OR - Fax (+27) 11 608 2631  
www.bonfiglioli.co.za - bonfigsales@bonfiglioli.co.za

## SWEDEN

BONFIGLIOLI SKANDINAVIEN AB  
Koppargatan 8 - 234 35 Lomma (Sweden)  
Tel. (+46) 40418230 - Fax (+46) 40414508  
www.bonfiglioli.se - info@bonfiglioli.se

## TURKEY

BONFIGLIOLI TURKIYE  
Atatürk Organize Sanayi Bölgesi, 10015 Sk. No: 17, Çiğli - Izmir  
Tel. +90 (0) 232 328 22 77 (pbx) - Fax +90 (0) 232 328 04 14  
www.bonfiglioli.com.tr - info@bonfiglioli.com.tr

## USA

BONFIGLIOLI USA, INC.  
3541 Hargrave Drive Hebron, Kentucky 41048  
Tel. (+1) 859 334 3333 - Fax (+1) 859 334 8888  
www.bonfiglioliusa.com  
industrialsales@bonfiglioliusa.com - mobilesales@bonfiglioliusa.com

COD. 1180 RO



## HEADQUARTERS

BONFIGLIOLI RIDUTTORI S.p.A.  
Via Giovanni XXIII, 7/A  
40012 Lippo di Calderara di Reno - Bologna (ITALY)  
Tel. (+39) 051 6473111 - Fax (+39) 051 6473126  
www.bonfiglioli.com - bonfiglioli@bonfiglioli.com

## SPARE PARTS BONFIGLIOLI

B.R.T.  
Via Castagnini, 2-4 - Z.I. Bargellino  
40012 Calderara di Reno - Bologna (ITALY)  
Tel. (+39) 051 727844 - Fax (+39) 051 727066  
www.brtonfigliolicambi.it - brt@bonfiglioli.com