



19120171 A00

Copyright © Shenzhen Inovance Technology Co., Ltd.

Shenzhen Inovance Technology Co., Ltd.  
www.inovance.com

Suzhou Inovance Technology Co., Ltd.  
www.inovance.com

Add.:Inovance Headquarters Tower, High-tech Industrial Park,  
Guanlan Street, Longhua New District, Shenzhen  
Tel: (0755) 2979 9595 Fax: (0755) 2961 9897

Add.:No. 16 Youxiang Road, Yuexi Town, Wuzhong District, Suzhou  
215104, P.R. China  
Tel: (0512) 6637 6666 Fax: (0512) 6285 6720

INOVANCE

FORWARD, ALWAYS PROGRESSING

# Great Achievements with Higher Safety, Reliability, and Intellectuality

## Wind Power Industry Applications and Solutions



Industrial  
Automation



Smart  
Elevators



New-Energy  
Vehicles



Industrial  
Robotics



Rail  
Transit

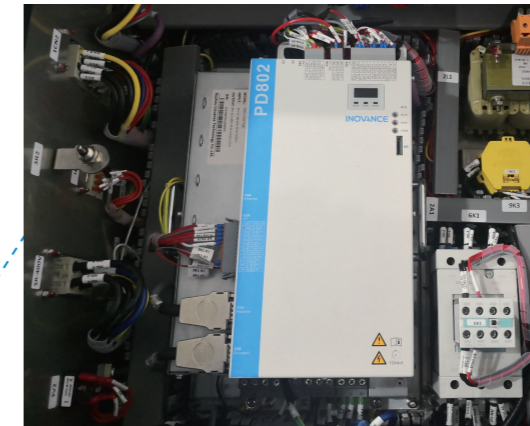
www.inovance.com



# Future development trend of large wind driven generators among the opportunities and challenges of inexpensive grid connection for wind driven generators

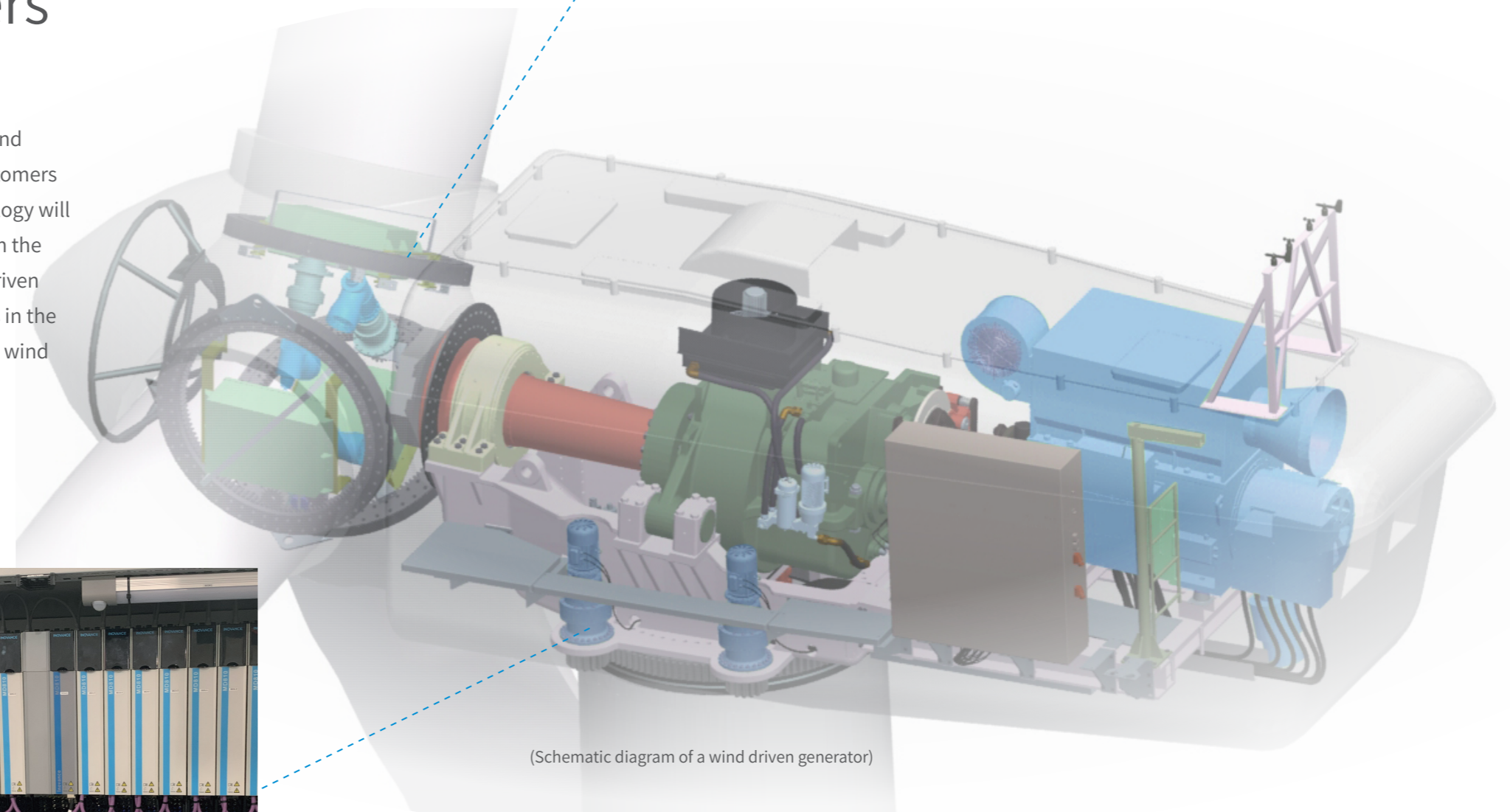
## Ways to improve customers' response capabilities

Shenzhen Inovance Technology Co., Ltd. provides safer, more reliable, and smarter solutions to customers in the wind power industry, helping customers improve quality, reduce costs, and increase efficiency. Inovance Technology will continue to work with customers in the wind power industry to deal with the opportunities and challenges of inexpensive grid connection for wind driven generators and promote the domestic manufacture of core components in the industry, with a view to building an open and win-win ecosystem for the wind power industry chain in the great era of wind power.



### Wind driven pitch system

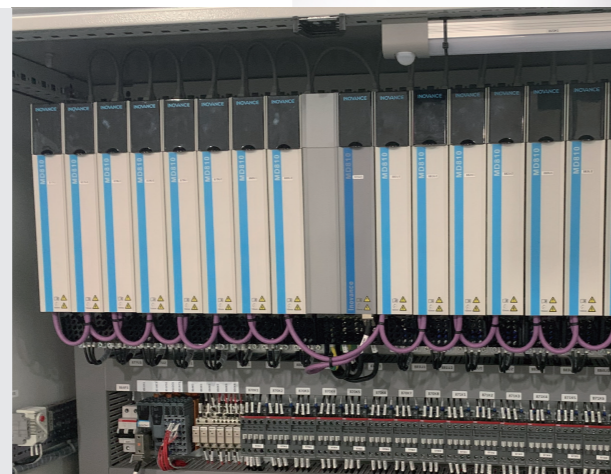
- Installed in a wheel hub, a wind driven pitch system is an important part of the wind driven generator.
- The system controls the wind wheel rotation speed and the fan output power by controlling blade rotation and changing the pitch angle.
- In extreme cases, the system triggers feathering and stops the fan safely by aerodynamic braking.



(Schematic diagram of a wind driven generator)

### Wind driven yaw system

- A wind driven yaw system cooperates with the main control system, allowing the cabin axis to be aligned with the wind direction quickly and smoothly to obtain maximum wind energy.
- The system provides the necessary locking force to ensure the safe positioning and operation of the wind driven generator after wind direction alignment is completed.
- The system controls wire unwinding when the drain wire from the cabin to the tower bottom reaches the set wire twisting angle.





# Innovative practice of inexpensive grid connection for wind driven generators



## Wind driven generators

Clean electric power will be provided to **40 million** household users every year based on more than **300** wind farms, a total installed capacity exceeding **20 GW**, and more than **100,000** pitch drives, pitch motors, yaw AC drives and other supporting products.

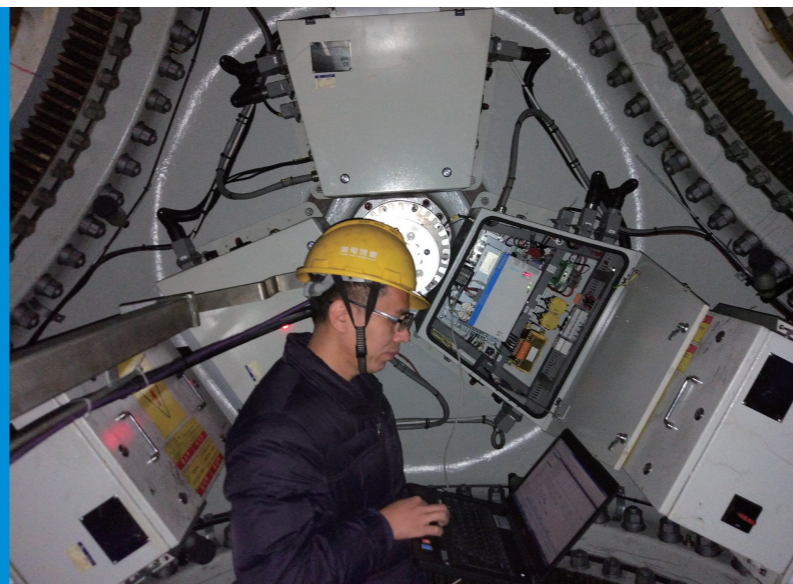
## Wind driven installation ship

Inovance Technology provides a complete AC drive system for the electric propulsion, lifting, and hoisting equipment of the world's largest wind driven installation ship of 2500 tons, with **57** motor drive points and a total power of **17 MW**.

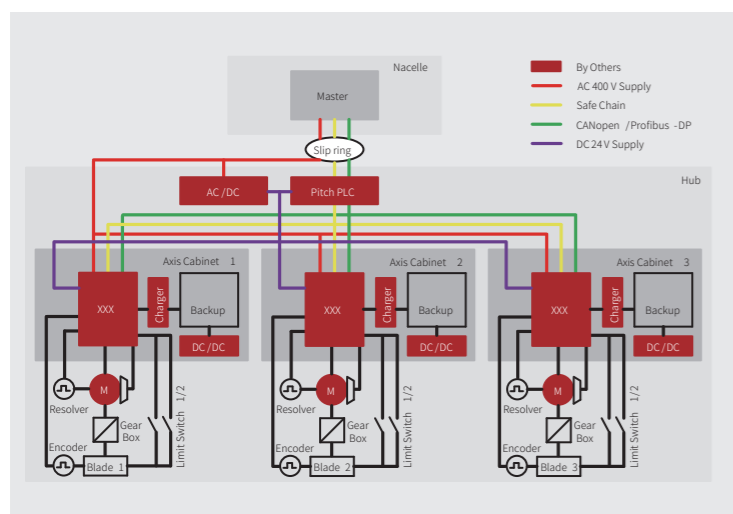


# Wind driven pitch system

## PD800/802 series pitch drive



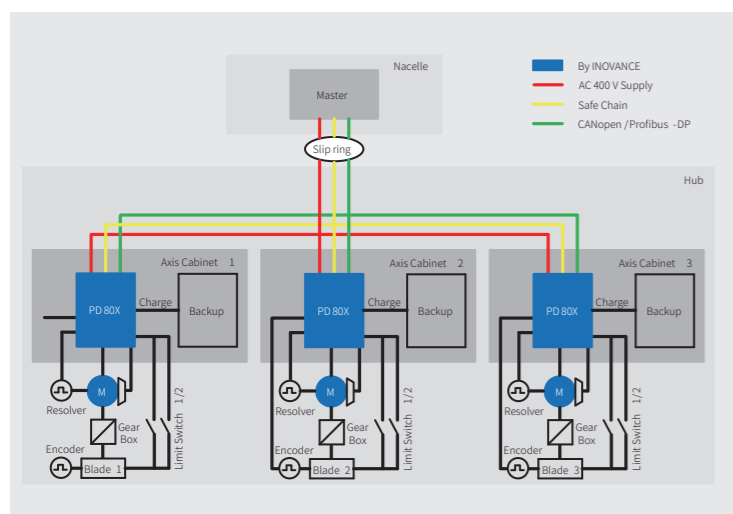
### Solutions



#### Traditional pitch system solutions

##### Disadvantages:

- The system is complex and has many components.
- The total system cost is high.
- High failure rate
- Inconvenient installation, wiring, commissioning, and maintenance



#### Inovance pitch system solution

##### Advantages:

- **High safety and reliability**  
Design failure mode and effects analysis (DFMEA)/Process failure mode and effects analysis (PFMEA)  
Safe feathering strategy based on hardware and software redundancy to ensure the safety of fans
- **High flexibility and openness**  
Integrated programmable logic controller (PLC) based on the CoDeSys open platform (IEC61131)  
Satisfying the secondary development needs of customers and implementing differentiation of the pitch system
- **High environment adaptability**  
Spray-coated and anti-rust chassis with low voltage ride-through (LVRT) and high voltage ride-through (HVRT) capabilities; excellent durability, passed the Highly Accelerated Life Testing (HALT) and Highly Accelerated Stress Testing (HAST)

### Applications

Inovance pitch drive provides abundant built-in interfaces and functions to meet the applications of different customers. The all-metal shell provides good anti-vibration, anti-impact, and EMC performance. The user-friendly HMI software facilitates online simulation and monitoring and control. Installation, wiring, commissioning, and O&M are easy with the help of the ergonomic handle, support for downloading the operating system and applications with a micro SD card, fault recording (with a black box), and intermediate voltage detection and online health check for the backup power supply.

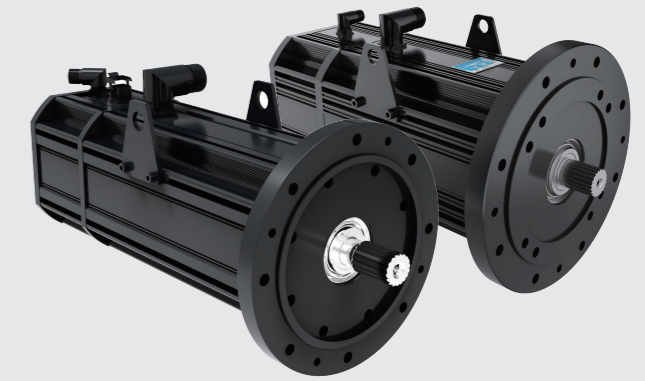
Inovance Technology's pitch drive is suitable for newly installed machines and modified machines. The first batch of prototypes has been continuously and safely running without failure on wind farms for more than four years.



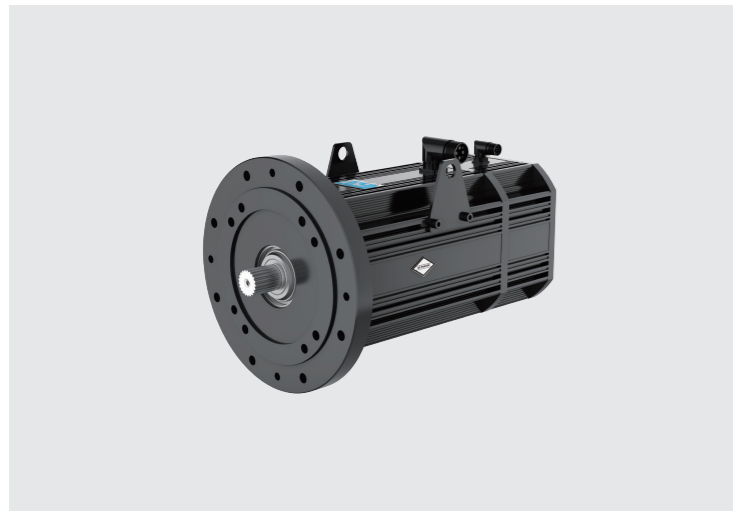


# Wind driven pitch system

## MVP series pitch motor



## Technological advantages



### MVP series pitch motor

- **Low temperature rise**  
Built-in IPM structural design, low loss, and high efficiency  
Temperature rise reduced by 15° C (compared with SPM surface-mounted design), high demagnetization resistance, and longer lifetime
- **Full power**  
Rated power from 4 kW to 30 kW  
Adapted generator power from 1 MW to 11 MW
- **Maintenance free**  
No fan design, free of maintenance  
IP rating: IP65; degree of corrosion resistance: C4



## Applications

Inovance pitch motor is designed by rigorous and detailed simulation in terms of fluidity, heat generation, structural strength, magnetic field vector distribution of electromagnetic rotors, electric vector distribution of electromagnetic winding, and magnetic density distribution of electromagnetic permanent magnets.

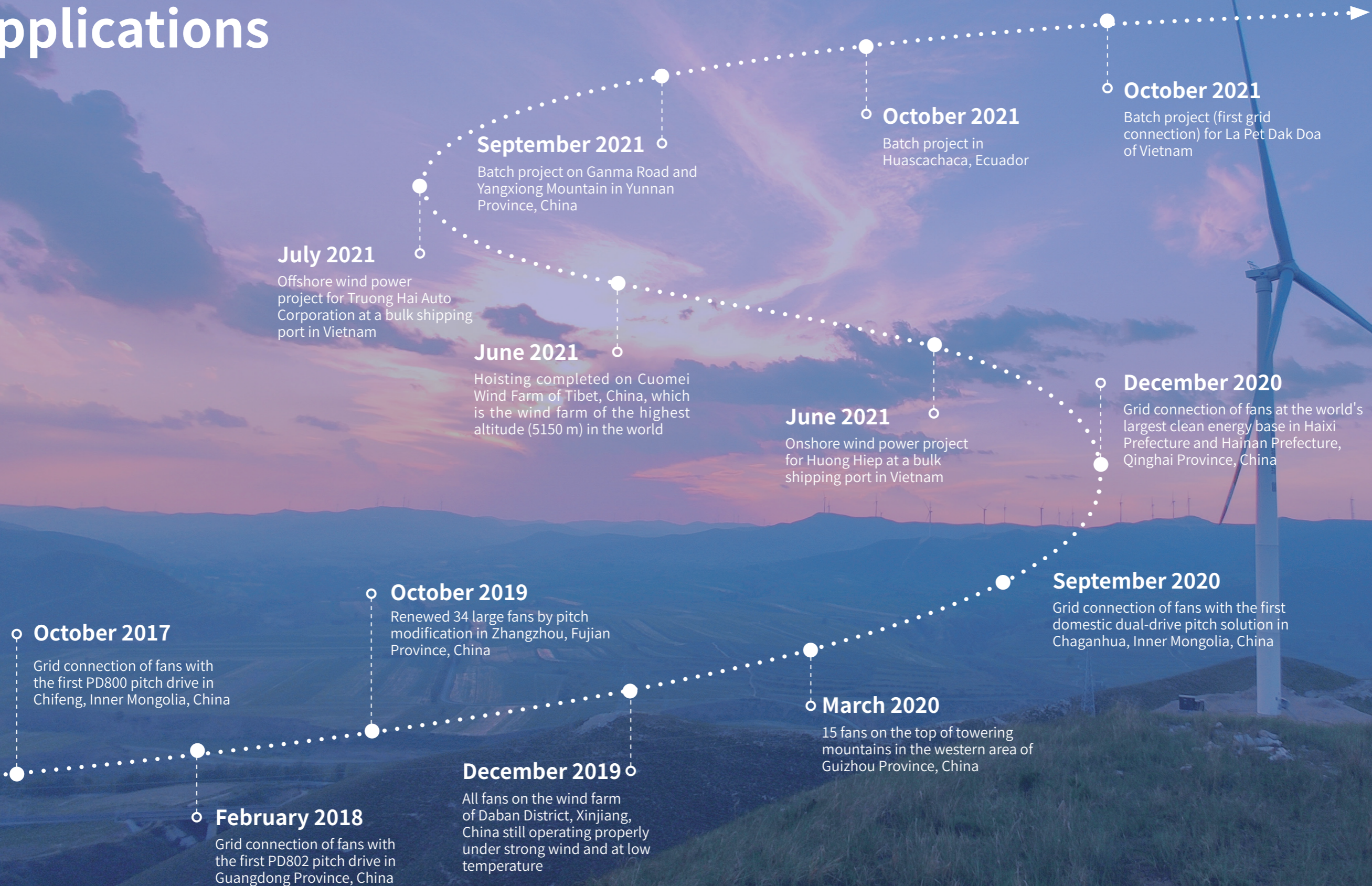
The pitch motor is bare installed in a continuously rotating wheel hub and has been running properly on wind farms in different regions such as the southern and northern regions, mountains, and coastal areas of China. Sixty pitch motors ensured the safety of fans on Putian Wind Farm in Fujian Province, China under the tropical cyclone named Maria on July 11, 2018.

Inovance Technology's pitch motor is suitable for newly installed machines and modified machines. The first batch of prototypes has been continuously and safely running without failure on wind farms for more than six years.





# Typical wind driven pitch applications





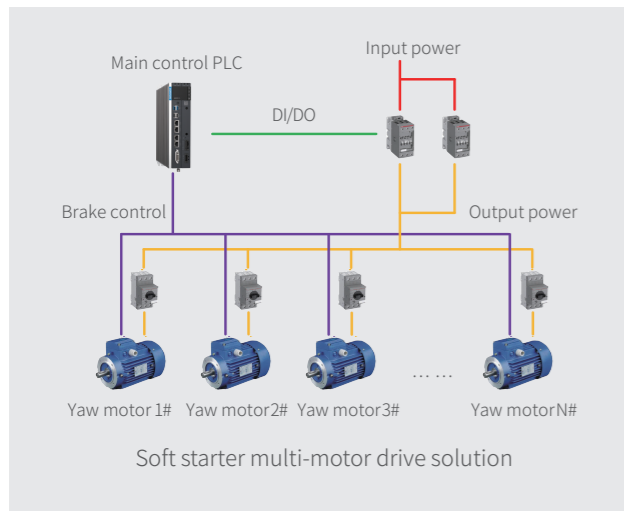
# Wind driven yaw system

## MD810 series yaw AC drive



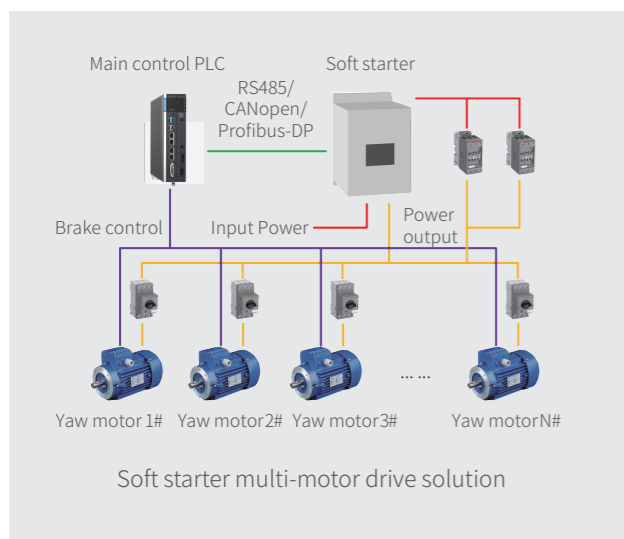
### Solutions – Traditional solutions

### Solutions – Inovance solutions



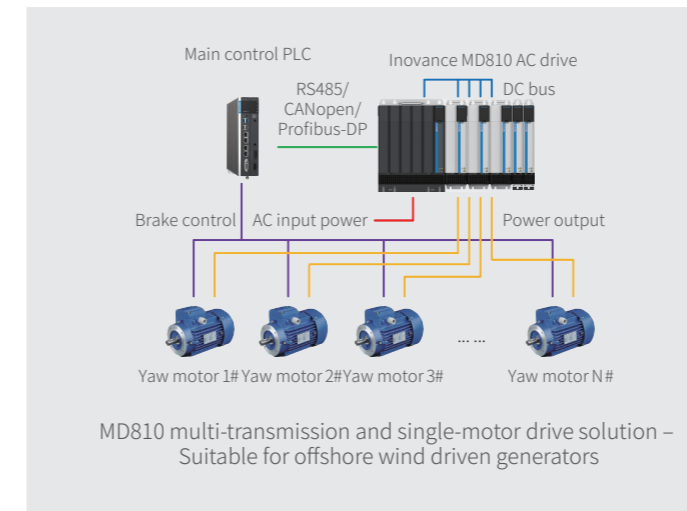
#### Disadvantages of the direct contactor start solution:

- The startup current surge is high, which is 4-5 times the motor current.
- The synchronization effect is poor and loads cannot be evenly distributed.
- The motor startup protector is easy to trip, reducing the power rate.
- Large mechanical wear may cause yaw bearing cracks and tooth breakage.
- Tooth gaps in machinery cannot be adjusted and the torque distribution effect cannot be achieved.
- Potential reliability problem: If one motor is damaged, especially if it is short-circuited, all the other motors cannot work and the yaw system stops.



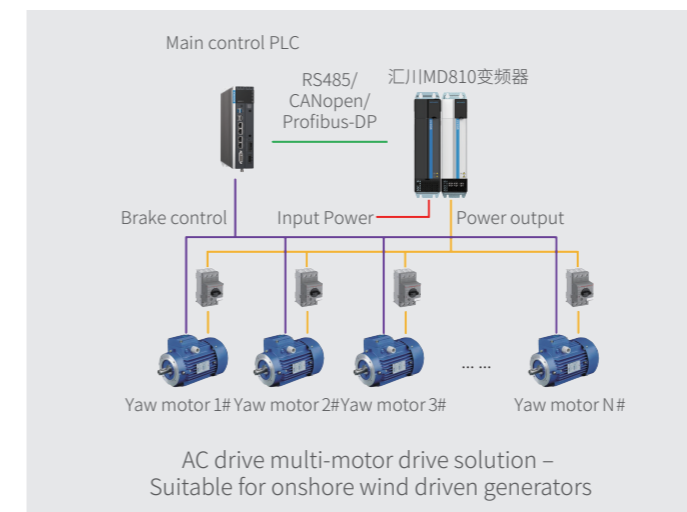
#### Disadvantages of the soft starter multi-motor drive solution:

- Speed governing is not supported and the low frequency torque characteristics are poor.
- The startup current surge is high, which is 3-4 times the motor current.
- The motor startup protector is easy to trip, reducing the power rate.
- Large mechanical wear may cause yaw bearing cracks and tooth breakage.
- Absolute motor synchronization cannot be guaranteed.
- Tooth gaps in machinery cannot be adjusted and the torque distribution effect cannot be achieved.
- Low reliability: If one motor is short-circuited, all the other motors cannot work and yaw stops. Similarly, if the drive is damaged, all motors cannot work.



#### Advantages of the MD810 single-motor drive solution:

- Loss reduction: electromagnetic damping, zero pressure yaw, reducing mechanical wear and noises
- Smoothness: synchronous bus control, load balancing, smooth yaw
- Reliability: low startup inrush current, no tripping or stoppage
- Intellectuality: current and status monitoring and control for each motor, accurate yaw
- Redundancy: fault-tolerant design, no stoppage of generators under some faults, preventing power rate loss
- High efficiency: reducing the whole life cycle cost and LCOE electricity cost



#### Advantages of the MD810 multi-motor drive solution:

- Modular design
- Easy to install and service
- High cost performance
- Low startup inrush current
- CAN/DP/PN/RS485 communication



# Wind driven yaw system

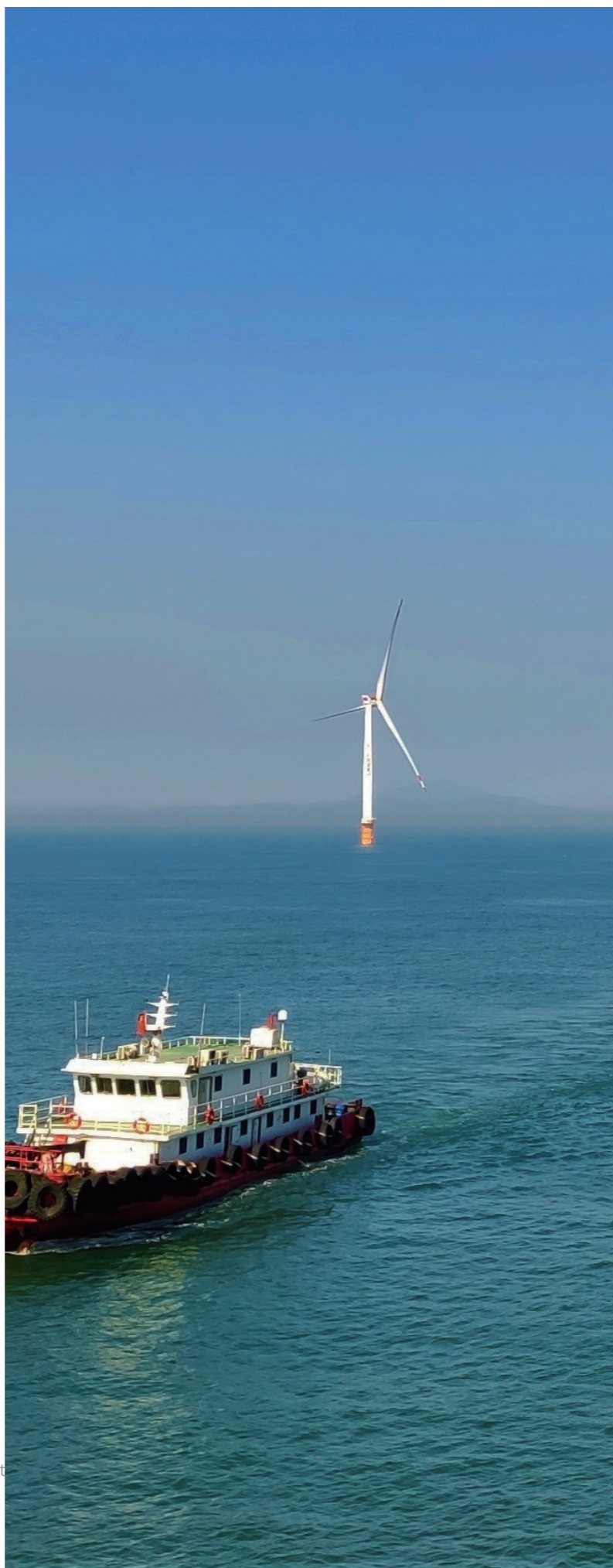
## Applications

In October 2017, the 3.2 MW generators configured with Inovance MD810 multi-transmission yaw solution were connected to the grid on Keqi Wind Farm, Inner Mongolia, China.

In June 2018, Inovance helped Mingyang Smart Energy complete grid connection for 5.5 MW generators (configured with Inovance MD810 multi-transmission yaw solution) on the offshore wind farm of Xinghua Bay, Fujian Province, China (as part of the Three Gorges Project) within 58 minutes. This sets a record of the fastest grid connection speed on the wind farm.

On July 11, 2018, the tropical cyclone named Maria landed on the coast of Huangqi Peninsula in Lianjiang, Fujian Province, China. The offshore wind farm in Xinghua Bay was within the 10-level wind circle of Maria. The 5.5 MW generators were the only wind driven generators on the wind farm to keep full capacity during the cyclone.

Inovance Technology's yaw AC drive is suitable for newly installed machines and modified machines. The first batch of prototypes has been continuously and safely running without failure on wind farms for more than three years.



# Certified safety and reliable quality

The PD802 Plus pitch drive independently developed and manufactured by Inovance Technology meets the DNV-GL functional safety certification and is certified by China General Certification Center, CE, and UL. Inovance Technology is China's first pitch drive brand that meets the DNV-GL functional safety certification.

The PD802 Plus pitch drive helps customers in China cope with the cost and safety challenges of offshore wind driven generators and also help these customers export their wind driven generators to global markets such as Europe and America.





# Typical wind driven yaw applications

## November 2017

Application of the world's first AC drive multi-transmission yaw solution in Keqi, Inner Mongolia, China (the solution was independently developed in China)

## November 2018

Successfully withstanding the temperature difference between day and night on the Loess Plateau with an average altitude of 2200 m on Wulian Mountain, Shanxi Province, China

## December 2019

Grid connection on the first mega-watt offshore wind farm of Guangdong Province, with a total capacity of 200 MW (location: Wailuo, Zhanjiang, Guangdong Province, China)

## July 2020

Grid connection of offshore wind driven generators with the largest capacity of 10 MW in Asia during the second phase construction on Xinghua Bay, Fujian Province, China

## December 2020

Grid connection of all wind driven generators on the offshore wind farm on Nanpeng Island, Yangjiang, China, which has the largest unit capacity of 400 MW in China

## May 2021

Decommissioned China's first floating offshore wind driven generator during the Floating Offshore Project in Yangjiang, Guangdong Province, China

## July 2020

Offshore batch project in Taranto, Italy

## September 2019

Promoted the ancient Qinshan culture by technology in Qinshan, Anhui Province, China

## May 2018

Grid connection on the world's first high-power offshore experimental wind farm during the first phase construction on Xinghua Bay, Fujian Province, China

## March 2020

Promoted the energy structure upgrade in mountainous areas and protected the green mountains and waters in Lingshan, Guangxi Province, China

## November 2020

A total capacity of 300 MW on the offshore wind farm in Jinwan, Zhuhai, Guangdong Province, China, providing a green engine for economic development in Guangdong-Hong Kong-Macao Greater Bay Area

## March 2021

Offshore wind farm with the farthest distance (65 km) from shore under construction in H8, Rudong, Jiangsu Province, China

## June 2020

10MW offshore batch project in Changle, Fujian Province, China



# Our products



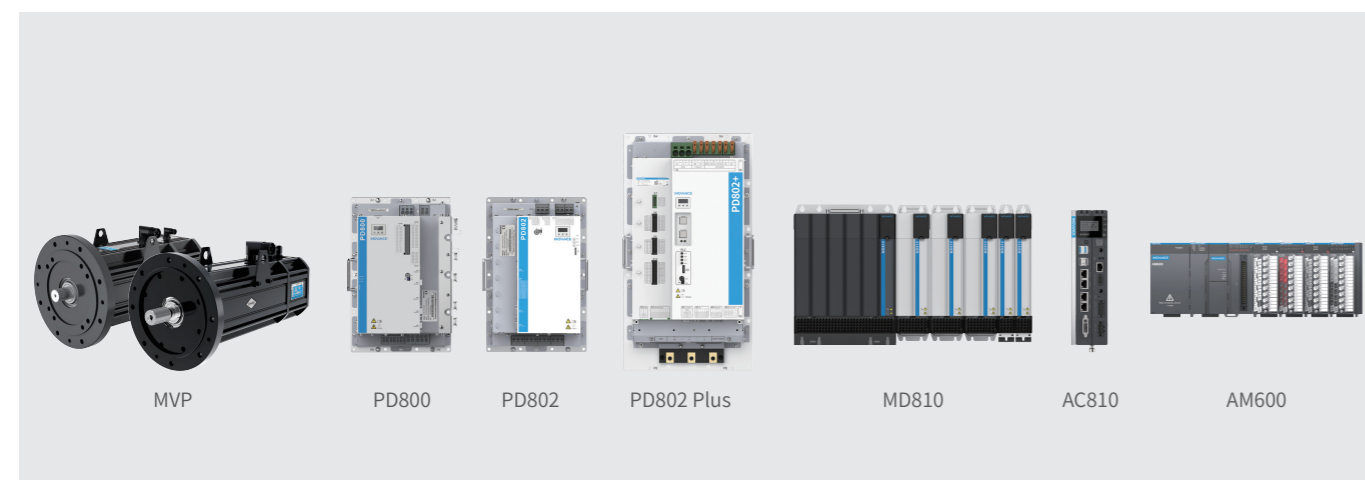
## High-power pitch drive system solution based on PD802 Plus:

**Great achievements:** 80 A rated current, 280 A/3s overload current, suitable for 8–20 MW single-drive and dual-drive pitch applications

**Safety:** PLd functional safety certification, meeting the requirements of PLe system safety certification and export to Europe and America

**Higher reliability:** support for up to 4000 m altitude, IP55 heatsink, C5M corrosion resistance, applicable in scenarios at high altitude onshore and offshore

**Higher intellectuality:** EtherNet interface to support remote connection and maintenance



## PD800/802 series pitch drive Model numbers

**PD800** - **4T** **45** **F** **Y** **0** **0** **0** **0**

①                    ②                    ③                    ④                    ⑤                    ⑥                    ⑦                    ⑧                    ⑨

① Special pitch drive PD for wind driven generators: pitch drive 800/802	④ Heat dissipation mode F: air cooling L: cooling plate cooling	⑦ Motor encoder configuration 0: resolver
② Voltage class 4T: three-phase 380–480 V	⑤ Installation mode X: fan: x-axis installation; Y: fan: y-axis installation; Z: fan: z-axis installation	⑧ Communication interface 0: CANopen 1: PROFIBUS-DP
③ Rated output current 35: 35A                    60: 60A 45: 45A                    80: 80A 52: 52A	⑥ Extension encoder configuration 0: 1 SSI/TTL	⑨ Brake resistor configuration 0: built-in braking resistor 1: External braking resistor

## "One-click" acceleration for the production line by intellectuality

Based on powerful platform functions and mature system solution capabilities, Inovance Technology has built a customized production line that meets the product quality requirements of the wind power industry. The production line is equipped with PLCs, servos, and motors independently developed and manufactured by Inovance Technology, helping customers find innovative solutions to cope with complex challenges in future market expansion of the wind power industry. Inovance Technology implements smart acceleration to realize the annual production capacity of 30,000 pitch drives and satisfy about 75% of the annual demand of the wind power market in China.

Suzhou Inovance Technology  
Smart production hall





# PD800/802 series pitch drive

## Technical specifications

Specifications	Technical specifications						
	PD800-45A	PD800-52A	PD802-35A	PD802-45A	PD802-52A	PD802-60A	PD802-80A
Rated output current (A AC)	45	52	35	45	52	60	80
Peak output current (A AC)	90(3s)	120(3s)	85(3s)	90(3s)	120(3s)	200A(3S)	280A(3S)
Input voltage (V AC)	380 to 480						
Input voltage fluctuation (V AC)	323 to 528						
Charging output voltage (V DC)	0 to 450						
Charging output current (A DC)	0 to 5						
Output voltage of built-in power (V DC)	24						
Output current of built-in power (A DC) (Note 1)	0~5						
Weight (kg)	14 (air cooling)/10.4 (cooling plate cooling)					20	30
Dimensions (mm)	240x370x277 (Air cooling)	240x370x277 (Air cooling)	240x405x277 (Air cooling)	240x370x277 (Air cooling) 240x370x173 (Cooling plate cooling)	240x370x277 (Air cooling)	250*405*318 (Air cooling)	300*555*304.9 (Air cooling)
Storage temperature (° C)	-40~+70						
Operating temperature (° C)	-40 to +60	-40 to +60	-40 to +70	-40 to +70	-40 to +60	-40 to +60	-40 to +60
Vibration standard	GB/T 11287-2000 class 2						
DI/DO/AI/RelayO/PT100	24/9/2/1/4		20/9/2/1/4			28/16/2/1/6	
Communication bus interface	CANopen/PROFIBUS-DP						
Motor temperature sensor	KTY/PTC						
Encoder	1 (resolver)/1(SSl/TTL)						
PLC commissioning and HMI monitoring and control interface	EtherNet						

Note 1: The 24 VDC braking power supply is not applied.

# PD800/802 series pitch drive

## Installation dimensions

Dimensions of PD800-45A/52A															
Product model	Dimensions (mm)				Installation dimensions (mm)				Heatsink dimensions (mm)			Mounting hole diameter d (mm)	Weight (kg)		
	H	H3	W	D	D1	D2	H1	H2	W1	W2	A			B	W3
PD800-4T45FY0001	370	280	240	296	275	166.8	355	177.5	225	75	103.2	313.7	171	Ø7	14.0
PD800-4T52FY0001															

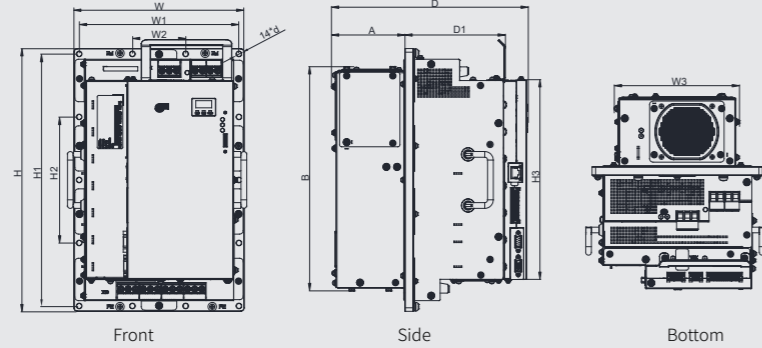
Dimensions of PD802-35A														
Product model	Dimensions (mm)				Installation dimensions (mm)				Heatsink dimensions (mm)			Mounting hole diameter d (mm)	Weight (kg)	
	H	H3	W	D	D1	H1	H2	W1	W2	A	B			W3
PD802-4T35FY0001	405	280	250	276.6	139.3	391	195.5	236	78	103.7	317	177	Ø7.5	14.3



# PD800/802 series pitch drive

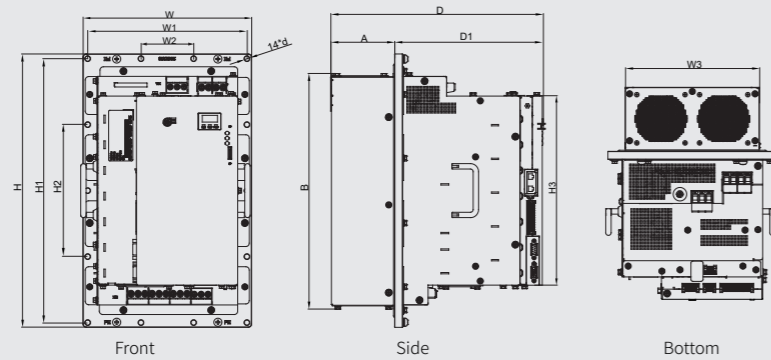
## Installation dimensions

Dimensions of PD802-45A/52A



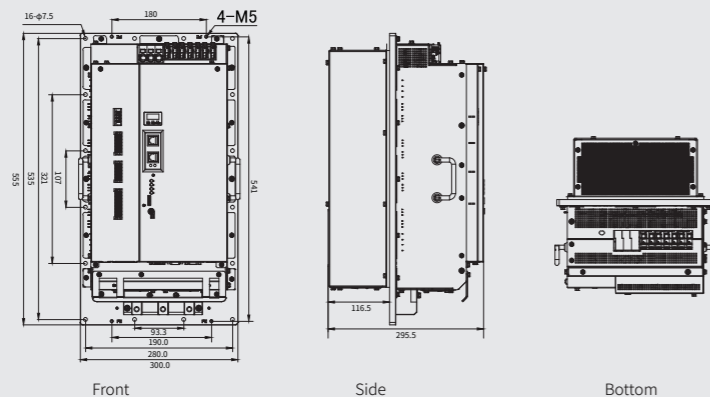
Product model	Dimensions (mm)					Installation dimensions (mm)				Heatsink dimensions (mm)			Mounting hole diameter d (mm)	Weight (kg)
	H	H3	W	D	D1	H1	H2	W1	W2	A	B	W3		
PD802-4T45FY0001	370	280	240	276.6	139.3	355	177.5	225	75	103.7	317	177	Ø7	13.8
PD802-4T45FY0000														
PD802-4T52FY0001														

Dimensions of PD802-60A



Product model	Dimensions (mm)					Installation dimensions (mm)				Heatsink dimensions (mm)			Mounting hole diameter d (mm)	Weight (kg)
	H	H3	W	D	D1	H1	H2	W1	W2	A	B	W3		
PD802-4T60FY0001	405	280	250	313.6	218.6	391	195.5	236	78	95	349	199.8	Ø7.5	20

Dimensions of PD802-80A



# MD810 series yaw AC drive

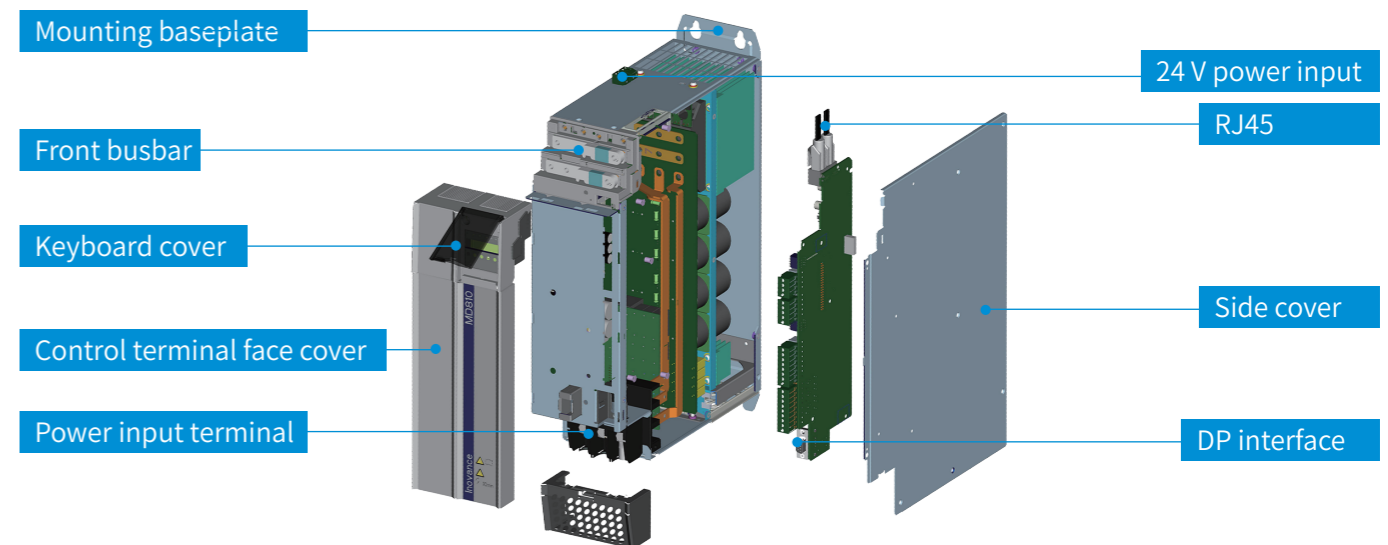
## Model numbers

**MD810** - **20M** **4T** **45** **G** **1** **0** **0** **H** - **FD**

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

① Product category AC drive	⑤ Model G: general model	⑧ Optional function extension components: Power supply unit: Default bit 0 Drive unit: 0: no options 1: built-in STO security torque
② Unit type: 20M: power supply unit 50M: drive unit	⑥ Optional function components Power supply unit: 0: no optional built-in braking unit 1: built-in braking unit (this item is only applicable to 22 kW and 45 kW rectifiers) Drive unit: 2: built-in differential PG card 3: built-in 23-bit absolute value PG card 4: rotary encoder+frequency division card	⑨ None: 1.5–160 kW booksize structure of the same height and depth H: 90–160 kW vertical modular structure W: water cooling
③ Voltage class 4T: 380–480 V	④ Power supply unit (power supply units of the same power can be connected in parallel for power extension) Basic power supply 22: 22kW 45: 45kW 110: 110kW 160: 160kW 355: 355kW Drive unit applicable motor power: Single-axis identifier: 7.5: 7.5kW 37: 37kW Dual-axis identifier: D1.5: 1.5kW( 双轴 ) D5.5: 5.5kW( 双轴 )	⑩ For fan use
	Optional communication components Power supply unit 0: built-in RS485, CANOpen, and CANlink cards for standard configuration 1: Built-in PROFIBUS-DP network bridge, CANOpen for standard configuration, CANlink card 2: built-in PROFINET card Drive unit 0: built-in RS485, CANOpen, and CANlink cards for standard configuration 1: built-in PROFIBUS-DP, CANOpen, and CANlink cards	

## Product form – Power supply unit module structure





# MD810 series yaw AC drive

## Model selection specifications

### Power supply unit specifications

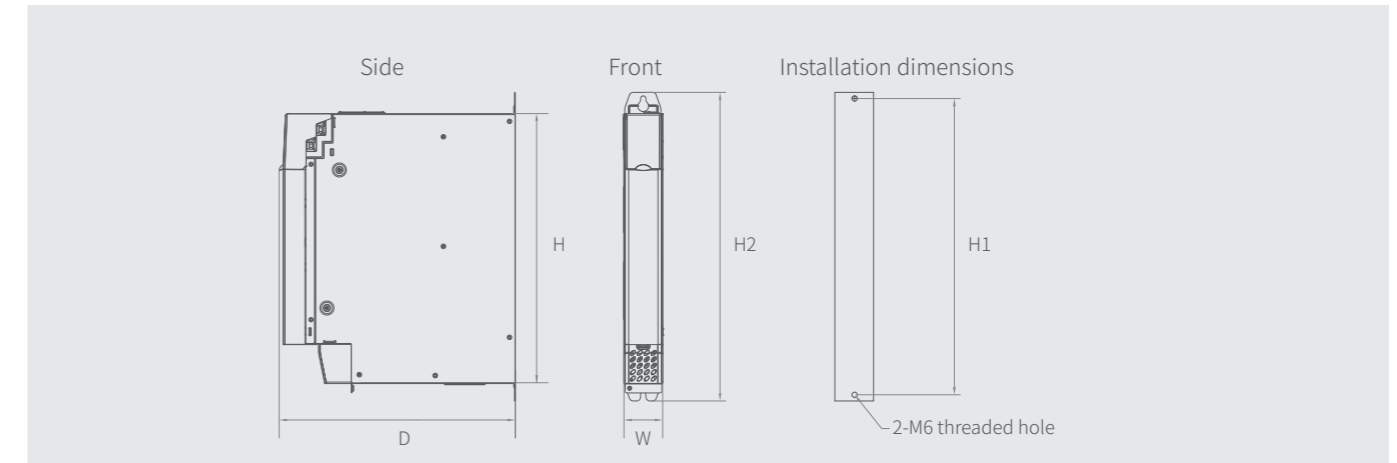
Power supply unit model	Rated power (kW)	Power capacity (kVA)	Input current AC (A)	Output current DC (A)	Braking resistor			Braking unit usage
					Initial braking voltage V (DC)	Recommended power (kW)	Recommended resistance ( $\Omega$ )	
380–480 V AC (operating range: 323–528 V AC) Output voltage 537–679 V DC								
MD810-20M4T22GXXX	22	54	49	56	780	4kW	$\geq 32$	Built-in type
MD810-20M4T45GXXX	45	81	89	107	780	9kW	$\geq 13$	Built-in type

### DC-AC converter specifications

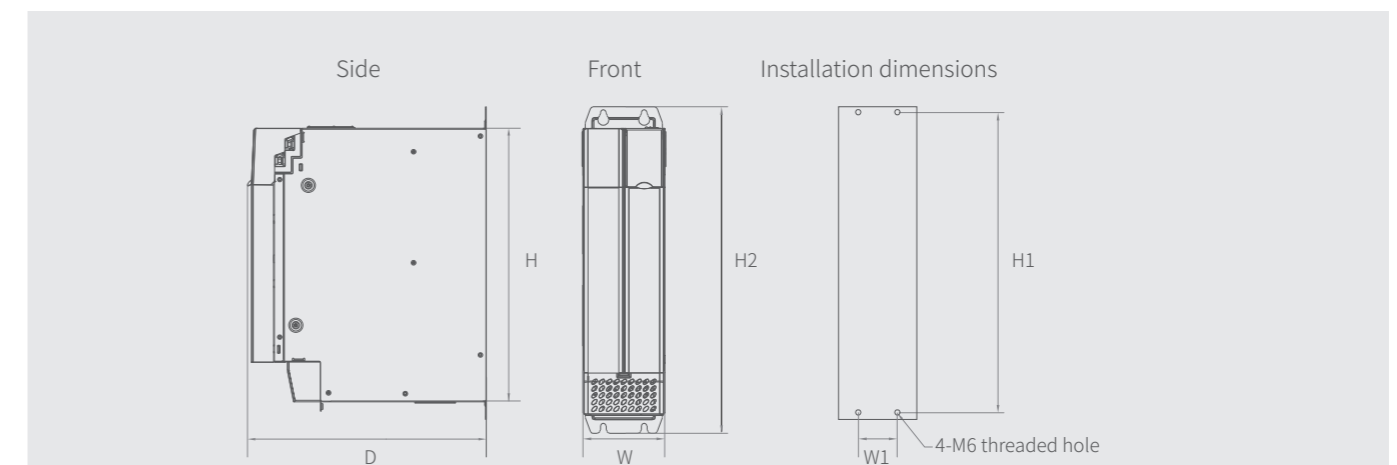
Power supply unit model	Rated power (kW)	Input current DC (A)	Output current AC (A)	Applicable motor		Built-in copper busbar current carrying capacity (A)
				(kW)	(PH)	
537–679 V DC (working scope: 350–800 V DC) Output voltage: 0–480 V AC						
MD810-50M4T3.7GXXX-FD	3.7	12	9	3.7	5	100
MD810-50M4T5.5GXXX-FD	5.5	17	13	5.5	7.5	100
MD810-50M4T7.5GXXX-FD	7.5	22	17	7.5	10	100
MD810-50M4T11GXXX-FD	11	31	25	11	15	200
MD810-50M4T15GXXX-FD	15	40	32	15	20	200
MD810-50M4T22GXXX-FD	22	55	45	22	30	200
MD810-50M4T30GXXX-FD	30	73	60	30	40	200
MD810-50M4T37GXXX-FD	37	90	75	37	50	200
MD810-50M4T45GXXX-FD	45	105	91	45	60	200
MD810-50M4T75GXXX-FD	75	172	150	75	100	200

# MD810 series yaw AC drive

## Power supply unit dimensions



Power supply unit model	Dimensions(mm)				Mounting hole position (mm)			Mounting hole diameter (mm)	Weight (kg)
	(H2)	(H)	(W)	(D)	(W1)	(W2)	(H1)		
MD810-20M4T22GXXX	400	350	50	305	-	-	384	$\Phi 7$	3.8

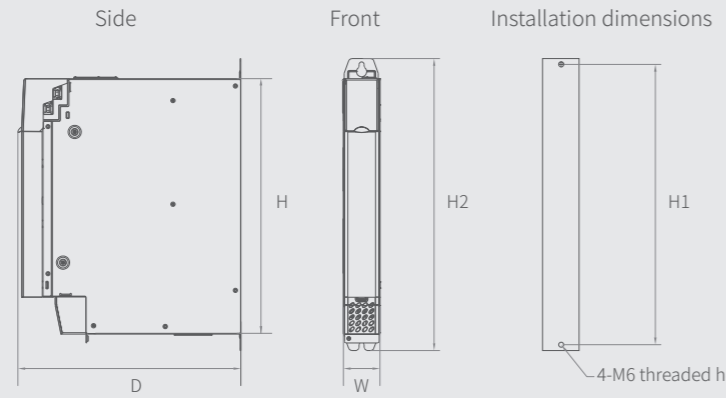


Power supply unit model	Dimensions(mm)				Mounting hole position (mm)			Mounting hole diameter (mm)	Weight (kg)
	(H2)	(H)	(W)	(D)	(W1)	(W2)	(H1)		
MD810-20M4T45GXXX	400	350	100	305	50	-	384	$\Phi 7$	8

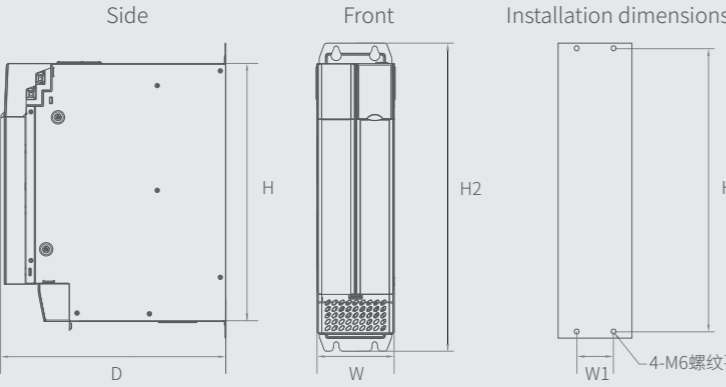


# MD810 series yaw AC drive

## DC-AC converter dimensions



Power supply unit model (SIZE-S1)	Dimensions(mm)				Mounting hole position (mm)			Mounting hole diameter (mm)	Weigh (kg)
	(H2)	(H)	(W)	(D)	(W1)	(W2)	(H1)		
MD810-50M4T3.7GXXX-FD	400	350	50	305	-	-	384	Φ7	3.8
MD810-50M4T5.5GXXX-FD	400	350	50	305	-	-	384	Φ7	4
MD810-50M4T7.5GXXX-FD	400	350	50	305	-	-	384	Φ7	4



Power supply unit model (SIZE-S2)	Dimensions(mm)				Mounting hole position (mm)			Mounting hole diameter (mm)	Weigh (kg)
	(H2)	(H)	(W)	(D)	(W1)	(W2)	(H1)		
MD810-50M4T11GXXX-FD	400	350	100	305	50	-	384	Φ7	7.5
MD810-50M4T15GXXX-FD	400	350	100	305	50	-	384	Φ7	7.5
MD810-50M4T22GXXX-FD	400	350	100	305	50	-	384	Φ7	8.5
MD810-50M4T30GXXX-FD	400	350	100	305	50	-	384	Φ7	9.4
MD810-50M4T37GXXX-FD	400	350	100	305	50	-	384	Φ7	9.4
MD810-50M4T45GXXX-FD	400	350	200	305	150	-	384	Φ7	18.4
MD810-50M4T75GXXX-FD	400	350	200	305	150	-	384	Φ7	19.5

# About INOVANCE



Shenzhen Inovance Technology Co., Ltd. focuses on automation, digitalization, and intelligence in industrial fields and core technologies in the information layer, control layer, drive layer, execution layer, and perception layer.

Over 18 years of development, Inovance has grown into an industry giant covering business sectors including general automation, elevator electrical accessory, electric drive and power supply systems for new energy vehicles, industrial robot, and rail transit, with products and solutions covering AC drives, servo systems, control systems, integrated machines, high-performance motors, encoders, industrial robots, precision machineries, electric drive and power supply assembly systems, and traction systems, which are widely applied in various industries.

Through making generous investment in R&D and providing innovative industry-tailored products and comprehensive solutions integrated with industrial control and process, Inovance is leading the edge not only in core technologies of motor drive and control, power electronics, and industrial network communication, but also in industries including elevator, air compressor, textile, crane, 3C manufacturing, lithium battery, photovoltaic, and new energy vehicle, as demonstrated by the benchmarking products in the industry including integrated elevator controllers, integrated motor controllers for new energy vehicles, integrated controllers for air compressors, and dedicated machines for vehicle air conditioners. Inovance has become the leading supplier for industrial automation products and electric control products for new energy vehicles through mastering core technologies of vector control, servo systems, PLCs, encoders, and permanent magnet synchronous motors and application technologies in industries including new energy vehicle, elevator, crane, injection molding machine, textile, metal products, printing and packaging, and air compressor. Inovance has obtained 2111 patents and software copyrights (excluding those pending) as of December 31, 2020, including 338 patents of invention, 1207 patents of utility models, 353 patents of design, and 213 software copyrights, in which 31 patents of invention, 189 patents of utility models, 75 patents of design, and 16 software copyrights are obtained in 2020. Inovance is listed on Shenzhen Stock Exchange in September 2010 with stock code 300124.

Inovance has over 10 subsidiaries with 12,867 employees (including 2,513 R&D staff that account for 19.53% of the total employees) located in major cities such as Suzhou, Hangzhou, Nanjing, Shanghai, Ningbo, Changchun, and Hongkong as of December 31, 2020.

**67** nationwide offices      **300** authorized distributors      **800+** sales and service staff  
**900** service centers      **6** inventory centers

An extensive service network to offer timely response to customer requests.