



PT Series

AC Variable Speed Drive

0.75kW–250kW / 1HP–350HP

220–480V Single & 3 Phase Input

Powerful Performance

Advanced motor control

PT Series

Powerful Performance

World leading control for the latest generation of permanent magnet and standard induction motors

World Leading Motor Control

The PT Series P2 offers the perfect combination of high performance together with ease of use to allow even the most demanding applications to be tackled easily. Designed for fast installation and commissioning, PT Series P2 provides the most cost effective solution for industry.

All PT Series P2 units provide 150% overload for 60 seconds as standard, ensuring each drive is suitable for Heavy Duty applications, whilst the IP55 enclosed versions ensure the drive is tough enough to survive in industrial environments. Extensive I/O and communications interface capabilities ensure the drive can be integrated quickly and efficiently into a wide variety of control systems with the minimum commissioning time, ensuring rapid start up. Powertran simple parameter structure, and carefully selected factory parameter settings ensure that commissioning time is kept to a minimum.

Advanced Motor Control

PT Series P2 has been uniquely developed to allow a wide range of different motor types to be used, with only parameter changes being required. This technology allows the same drive to be used in a wide range of applications, allowing OEMs and end user alike to take advantage of the energy saving provided by using the latest motor technologies.

AC Induction Motors

The majority of AC motors in use today around the world are standard induction motors. These motors are relatively low cost, readily available and provide good performance with long service life. With the ever increasing focus on energy efficiency, motor

manufacturers have refined and improved their designs in recent years.

PT Series P2 has been developed to provide optimum control and maximum efficiency when operating with older motors designs, or newer high efficiency designs.

Operation can be in simple V/F control mode or in High Performance Third Generation Vector Mode, which provides up to 200% torque from zero speed without requiring an encoder.

Permanent Magnet AC Motors

Permanent magnet AC motors provide improved efficiency compared to standard induction motors. Using permanent magnets in the motor construction eliminates the need for any magnetising current, reducing electrical losses. PM motors have been used for many years in high performance applications, however this has always required the use of a feedback device, such as a resolver or encoder. PT Series P2 has been designed to operate with AC PM motors without requiring any feedback device, allowing them to be used for their energy efficiency benefits without incurring extra cost and complexity in applications which do not require position feedback.



IP20

Up to 250kW

IP55

Up to 160kW

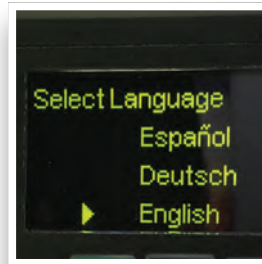
IP66

Up to 11kW

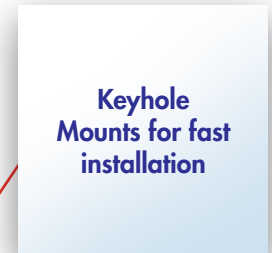
150% overload for 60 seconds

At a Glance...

High performance, excellent usability and flexible to meet the needs of your application



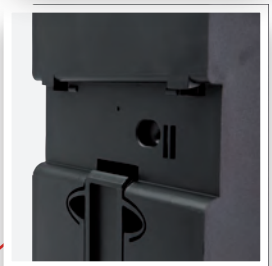
Integrated Keypad & Display
(LED or Multi-language Text Display)



Keyhole Mounts for fast installation



Contactor-style Power Wiring Arrangement



DIN Rail Mount



Modbus RTU and CANopen
on board as standard



Modbus
CANopen

Safe Torque Off (provided as standard)

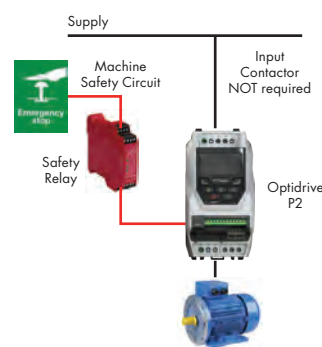
PT Series P2 features a safe torque off function to allow simple integration into machine critical safety circuits.

- ❖ Simple machine design reduces component costs, saves panel space and minimises installation time
- ❖ Faster shut down and reset procedures reduce system maintenance time
- ❖ Better safety standard compared to mechanical solution
- ❖ Better motor connection. Single cable with no interruption.

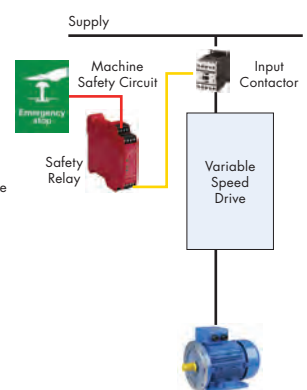
Meets requirements of IEC 61508 SIL 2, IEC 61800-5-2 Type 2, IEC 62061 SIL 2 & ISO 13849 PL "e"



With



Without



PT Series

Applications

High performance, accurate motor control for even the most demanding of applications

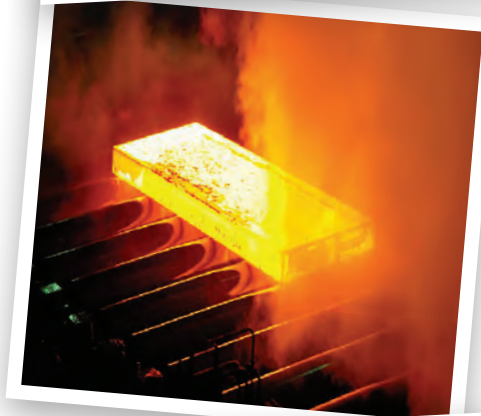
Mining & Quarrying

- ❖ Feed conveyers
- ❖ Crushers
- ❖ Cranes



Metals & Processing

- ❖ Grinding
- ❖ Cutting
- ❖ Polishing
- ❖ Drilling
- ❖ Rolling



Rubber & Plastics

- ❖ Extruders
- ❖ Moulding
- ❖ Mixers
- ❖ Winding



Food & Beverage

- ❖ Conveyers
- ❖ Pumps
- ❖ Mixers
- ❖ Palletisers



Cranes



Requirements :

- ❖ High starting torque
- ❖ Smooth motor operation throughout starting and stopping phases
- ❖ Motor holding brake control
- ❖ Avoidance of load droop and sag
- ❖ Regeneration and braking capability during load lowering

PT Series P2 provides :

- ❖ Dedicated Hoist Mode Operation with motor holding brake control algorithm
- ❖ Up to 200% torque from zero speed in vector operation without encoder feedback
- ❖ Multiple Preset Speed or variable speed operation
- ❖ Built in dynamic braking transistor, requires only an external resistor

Compressors



Requirements :

- ❖ Precise regulation of speed to ensure a consistent end product
- ❖ High starting torque demand in many applications
- ❖ Maximum efficiency under all conditions
- ❖ Safe operation to prevent accidents and injuries

PT Series P2 Provides :

- ❖ PM Motor control mode to allows open loop operation with Permanent Magnet motors for maximum efficiency
- ❖ Maximum starting torque with standard AC motors
- ❖ Better than 0.5% speed holding accuracy in Open Loop Vector Operation
- ❖ Dedicated Safe Torque Off input complies with EN62061 SIL Level 2 for safe operation

Winding

Requirements :

- ❖ Precise control of motor torque over a broad speed range
- ❖ Accurate control of material tension under all conditions
- ❖ Open or closed loop control capability, based on tension feedback or winding diameter
- ❖ Web break protection in case of material breakage

PT Series P2 Provides :

- ❖ PID Closed Loop Tension Control with feedback from a load cell or dancer arm
- ❖ Open Loop Vector control provides optimum control of the output torque level
- ❖ Encoder feedback option allows for a very wide speed range, even down to zero speed
- ❖ Safe Torque Off input immediately disables the drive in Emergency conditions



PT Series

Options & Accessories

Installation options, plug-in modules and commissioning tools



Modbus RTU and CANopen on board as standard

For additional communication interfaces or functionality a range of plug-in modules is available:



Fieldbus Interfaces



Profibus DP
OPT-2-PROFB-IN



DeviceNet
OPT-2-DEVNT-IN



Ethernet IP
OPT-2-ETHNT-IN



Modbus TCP
OPT-2-MODIP-IN



Profinet
OPT-2-PFNET-IN



EtherCat
OPT-2-ETCAT-IN



Plug-in Options



Encoder Feedback

OPT-2-ENCOD-IN (5 Volt)
OPT-2-ENCHT-IN (15 – 30 Volt)

Closed loop encoder feedback, compatible with a wide range of incremental encoders

Extended I/O
OPT-2-EXTIO-IN

- ❖ Additional 3 Digital Inputs
- ❖ Additional Relay Output

Extended Relay
OPT-2-CASCD-IN

Additional 3 Relay Outputs :

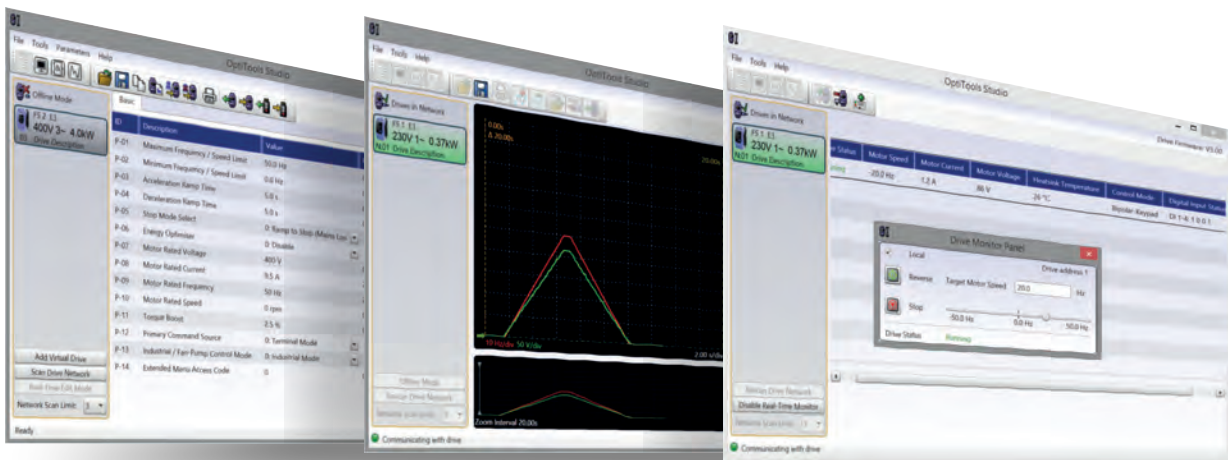
- Relay 3** – Drive Healthy Indication
- Relay 4** – Drive Fault Indication
- Relay 5** – Drive Running Indication

Functions are programmable / adjustable

Installation & Peripheral Options

A range of external EMC Filters, Brake Resistors, Input Chokes and Output Filters are available, to suit all installation requirements

OptiTools Studio



Powerful PC Software

Drive commissioning and parameter backup

- ❖ Real-time parameter editing
- ❖ Drive network communication
- ❖ Parameter upload, download and storage
- ❖ Simple PLC function programming
- ❖ Real-time scope function and data logging
- ❖ Real-time data monitoring

Compatible with :

Windows Vista
Windows 7
Windows 8
Windows 8.1
Windows 10

Optistick Smart



NFC
Bluetooth

Rapid Commissioning Tool

- ❖ Allows copying, backup and restore of drive parameters
- ❖ Provides Bluetooth interface to a PC running OptiTools Studio or the OptiTools Mobile app on a smartphone
- ❖ Onboard NFC (Near Field Communication) for rapid data transfer

OPT-3-STICK-IN

PT Series

Replace # in model code with enclosure/display option

	Frame Size			kW	HP	Amps	kW Model Code							HP Model Code							IP20 TFT Display	IP55 OLED Display	IP66 OLED Display	IP66 Switched OLED Display			
	IP 20	IP 55	IP 66				Probular Family	Generation	Frame Size	Voltage Code	Power Rating Code	Supply Phases	Power Type	EMC Filter	Brake Transistor	Probular Family	Generation	Frame Size	Voltage Code	Power Rating Code					Supply Phases	Power Type	EMC Filter
200–240V ±10% 1 Phase Input	2	2		0.75	1	4.3	PTP - 2 - 2 2 075 - 1 K F 4 #							PTP - 2 - 22 010 - 1 H F 4 #												X-TN	Y-TN
	2		2	1.5	2	7	PTP - 2 - 2 2 150 - 1 K F 4 #							PTP - 2 - 22 020 - 1 H F 4 #												X-TN	Y-TN
	2		2	2.2	3	10.5	PTP - 2 - 2 2 220 - 1 K F 4 #							PTP - 2 - 22 030 - 1 H F 4 #												X-TN	Y-TN
380–480V ±10% 3 Phase Input	2	2		0.75	1	2.2	PTP - 2 - 2 4 075 - 3 K F 4 #							PTP - 2 - 24 010 - 3 H F 4 #												X-TN	Y-TN
	2		2	1.5	2	4.1	PTP - 2 - 2 4 150 - 3 K F 4 #							PTP - 2 - 24 020 - 3 H F 4 #												X-TN	Y-TN
	2	2		2.2	3	5.8	PTP - 2 - 2 4 220 - 3 K F 4 #							PTP - 2 - 24 030 - 3 H F 4 #												X-TN	Y-TN
	2		2	4	5	9.5	PTP - 2 - 2 4 400 - 3 K F 4 #							PTP - 2 - 24 050 - 3 H F 4 #												X-TN	Y-TN
	3	3		5.5	7.5	14	PTP - 2 - 3 4 055 - 3 K F 4 #							PTP - 2 - 34 075 - 3 H F 4 #												X-TN	Y-TN
	3		3	7.5	10	18	PTP - 2 - 3 4 075 - 3 K F 4 #							PTP - 2 - 34 100 - 3 H F 4 #												X-TN	Y-TN
	3			11	15	24	PTP - 2 - 3 4 110 - 3 K F 4 #							PTP - 2 - 34 150 - 3 H F 4 #													
		4		11	15	24	PTP - 2 - 4 4 110 - 3 K F 4 #							PTP - 2 - 44 150 - 3 H F 4 #										N-TN			
	4	4		15	20	30	PTP - 2 - 4 4 150 - 3 K F 4 #							PTP - 2 - 44 200 - 3 H F 4 #									2-MN	N-TN			
	4	4		18.5	25	39	PTP - 2 - 4 4 185 - 3 K F 4 #							PTP - 2 - 44 250 - 3 H F 4 #									2-MN	N-TN			
	4	4		22	30	46	PTP - 2 - 4 4 220 - 3 K F 4 #							PTP - 2 - 44 300 - 3 H F 4 #									2-MN	N-TN			
	5	5		30	40	61	PTP - 2 - 5 4 300 - 3 K F 4 #							PTP - 2 - 54 040 - 3 H F 4 #									2-MN	N-TN			
	5	5		37	50	72	PTP - 2 - 5 4 370 - 3 K F 4 #							PTP - 2 - 54 050 - 3 H F 4 #									2-MN	N-TN			
	6A	6		45	60	90	PTP - 2 - 6 4 045 - 3 K F 4 #							PTP - 2 - 64 060 - 3 H F 4 #									2-MN	N-TN			
	6A	6		55	75	110	PTP - 2 - 6 4 055 - 3 K F 4 #							PTP - 2 - 64 075 - 3 H F 4 #									2-MN	N-TN			
	6B	6		75	100	150	PTP - 2 - 6 4 075 - 3 K F 4 #							PTP - 2 - 64 100 - 3 H F 4 #									2-MN	N-TN			
	6B	6		90	150	180	PTP - 2 - 6 4 090 - 3 K F 4 #							PTP - 2 - 64 150 - 3 H F 4 #									2-MN	N-TN			
		7		110	175	202	PTP - 2 - 7 4 110 - 3 K F 4 #							PTP - 2 - 74 175 - 3 H F 4 #										N-TN			
		7		132	200	240	PTP - 2 - 7 4 132 - 3 K F 4 #							PTP - 2 - 74 200 - 3 H F 4 #										N-TN			
		7		160	250	302	PTP - 2 - 7 4 160 - 3 K F 4 #							PTP - 2 - 74 250 - 3 H F 4 #										N-TN			
8			200	300	370	PTP - 2 - 8 4 200 - 3 K F 4 #							PTP - 2 - 84 300 - 3 H F 4 #									2-MN					
8			250	350	450	PTP - 2 - 8 4 250 - 3 K F 4 #							PTP - 2 - 84 350 - 3 H F 4 #									2-MN					

Enclosure Types

- A** **IP66 Outdoor Use**
Non-switched
- B** **IP66 Outdoor Use**
Switched
- N** **IP55**
- 2** **IP20**

kW Models: Factory Settings

Motor Rated Frequency : 50Hz
Motor Rated Voltage : 230/400

HP Models: Factory Settings

Motor Rated Frequency : 60Hz
Motor Rated Voltage : 230/460

Drive Specification

Input Ratings	Supply Voltage	200 – 240V ± 10% 380 – 480V ± 10%	
	Supply Frequency	48 – 62Hz	
	Displacement Power Factor	> 0.98	
	Phase Imbalance	3% Maximum allowed	
	Inrush Current	< rated current	
	Power Cycles	120 per hour maximum, evenly spaced	
Output Ratings	Output Power	230V 1Ph. Input: 0.75–2.2kW (1–3HP) 400V 3Ph. Input: 0.75–250kW	
	Overload Capacity	150% for 60 seconds	
	Output Frequency	0 – 500Hz, 0.1Hz resolution	
	Acceleration Time	0.01 – 600 seconds	
	Deceleration Time	0.01 – 600 seconds	
	Typical Efficiency	> 98%	
Ambient Conditions	Temperature	Storage: –40 to 60°C Operating: –10 to 50°C	
	Altitude	Up to 1000m ASL without derating Up to 2000m maximum UL Approved Up to 4000m maximum (non UL)	
	Humidity	95% Max, non condensing	
	Vibration	Conforms to IEC 60068-2-6 Sinusoidal Vibration 10 - 57Hz @ 0.075mm Pk 57 - 150Hz @ 1g Pk	
Enclosure	Ingress Protection	IP20, IP55, IP66	
Programming	Keypad	Built-in keypad as standard Optional remote mountable keypad	
	Display	Built-in multi language text display (IP55 & IP66) 7 Segment LED (IP20)	
	PC	OptiTools Studio	
Control Specification	Control Method	V/F Voltage Vector Energy Optimised V/F 3GV Sensorless Vector Speed Control 3GV Sensorless Vector Torque Control Closed Loop (Encoder) Speed Control Closed Loop (Encoder) Torque Control PM Vector Control BLDC Control Synchronous Reluctance	
	PWM Frequency	4–32kHz Effective	
	Stopping Mode	Ramp to Stop: User Adjustable 0.01–600 secs Coast to Stop	
	Braking	Motor Flux Braking Built-in Braking Transistor	
	Skip Frequency	Single point, user adjustable	
	Setpoint Control	Analog Signal	0 to 10 Volts 10 to 0 Volts –10 to +10 Volts 0 to 20mA 20 to 0mA 4 to 20mA 20 to 4mA
		Digital	Motorised Potentiometer (Keypad) Modbus RTU CANopen

Fieldbus Connectivity	Built-in	CANopen	125 – 1000kbps	
		Modbus RTU	9.6 - 115.2 kbps selectable 8N1, 8N2, 8E1, 8O1	
Fieldbus Connectivity	Optional	Other	PROFIBUS DP (DPV1) PROFINET IO DeviceNet EtherNet/IP EtherCAT Modbus TCP	
I/O Specification	Power Supply	24 Volt DC, 100mA, Short Circuit Protected 10 Volt DC, 10mA for Potentiometer		
	Programmable Inputs	5 Total as standard (Optional additional 3) 3 Digital (Optional additional 3) 2 Analog / Digital Selectable		
	Digital Inputs	Opto - Isolated 8 – 30 Volt DC, internal or external supply Response time < 4ms		
	Analog Inputs	Resolution: 12 bits Response time: < 4ms Accuracy: < 1% full scale Parameter adjustable scaling and offset		
	PTC Input	Motor PTC / Thermistor Input Trip Level : 3kΩ		
	Programmable Outputs	4 Total (Optional additional 3) 2 Analog / Digital 2 Relays (Optional additional 3)		
	Relay Outputs	Maximum Voltage: 250 VAC, 30 VDC Switching Current Capacity: 5A AC , 5A DC		
	Analog Outputs	0 to 10 Volt 0 to 20mA 4 to 20mA		
	Application Features	PID Control	Internal PID Controller Multi Setpoint Select Standby / Sleep Mode Boost Function	
		Hoist Mode	Dedicated Hoist Mode Motor Holding Brake Pre-Torque & Control Over Limit Protection	
Maintenance & Diagnostics	Fault Memory	Last 4 Trips stored with time stamp		
	Data Logging	Logging of data prior to trip for diagnostic purposes: Output Current Drive Temperature DC Bus Voltage		
	Maintenance Indicator	Maintenance Indicator with user adjustable maintenance interval Onboard service life monitoring		
	Monitoring	Hours Run Meter Resettable & Non Resettable kWh meters Cooling Fan Run Time		
Standards Compliance	Low Voltage Directive	2014/35/EU		
	EMC Directive	2014/30/EU		
	Additional Conformance	UL, cUL, EAC, RCM		
	Marine Certification	DNV Type Approval		
	Environmental Conditions	Designed to meet IEC 60721-3-3, in operation: IP20 Drives: 3S2/3C2 IP55 & 66 Drives: 3S3/3C3		

Model Code Guide

PTP-2-22075-1KF4#-#N

Product Family | **Generation** | **Frame Size** | **Supply Voltage** | **Power Rating Code** | **Power Type** | **EMC Filter** | **Brake Transistor** | **Enclosure** | **Display** | **PCB Coating**

200–240V = 2 | 380–480V = 4 | Supply Voltage

Single Phase = 1 | 3 Phase = 3 | Supply Phases

kW = K | HP = H | Power Type

No Internal EMC Filter = 0 | Internal EMC Filter = F | EMC Filter

Internal Brake Transistor = 4 | Brake Transistor

IP20 = 2 | IP55 = N | IP66 Non-switched = X | IP66 Switched = Y | Enclosure

7 Segment LED = S | OLED = T | TFT = M | Display

Standard Coating = N | PCB Coating

Connection Diagram

Pin	Function	Default Setting
1	+24V	24 Volt DC Output, 100mA max / 24 Volt DC Input
2	DI 1	Drive Enable
3	DI 2	Forward/Reverse Select
4	DI 3	Preset Speed 1 Select
5	+10V	+10 Volt Power Supply 5mA
6	DI 4/AI 1	Speed Reference 0–10 Volt
7	0V	
8	AO1	Motor Speed
9	0V	
10	DI 5/AI 2	
11	AO2	Motor Current
12	STO +	
13	STO -	
14	RL1-C	Output Relay 1 Drive Healthy / Fault
15	RL1-NO	
16	RL1-NC	
17	RL2-A	Output Relay 2 Drive Running
18	RL2-B	

NOT TO SCALE

		IP20						
Size		2	3	4	5	6A	6B	8
mm	Height	221	261	418	486	614	726	995
mm	Width	110	131	160	222	286	330	482
mm	Depth	185	205	240	260	320	320	480
kg	Weight	1.8	3.5	9.2	18.2	32	43	128

		IP66		IP55				
Size		2	3	4	5	6	7	
mm	Height	257	310	450	540	865	1280	
mm	Width	188	211	171	235	330	330	
mm	Depth	239	266	252	270	330	360	
kg	Weight	4.8	7.7	11.5	23	55	89	

AUTOMATION APPLICATIONS



POWERTRAN[®]

Industrial Automation



JK Fenner

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Cat.No.2516700

Ver 1.0

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