

OPTIDRIVE PLUS 3^{GV}

3rd Generation Vector Control

AC Variable Speed Drive 0.37-160kW

Optidrive Plus 3^{GV} is the natural evolution of the Optidrive family adding ultimate motor control to established Optidrive benchmarks of control and ease of use.

Optidrive Plus 3^{GV} uses 3^{GV} technology, a revolutionary and patented motor control strategy. 3^{GV} technology delivers 100% torque at 0.0Hz allowing this unique open loop product to be used without any feedback device in many traditional closed loop applications.

Only the motor name plate data is required to achieve optimum performance, the drive continuously and automatically determines and tracks the key motor characteristics required for vector control.

Optidrive Plus 3^{GV} can be commissioned using the unique Optiwand CE Plus software designed for use on pocket pc's. Communication takes place without wires using infrared light to quickly and accurately transfer data.

Key Benefits

- True evolution of range, maintaining same footprint and connector arrangement as original
- Fast and accurate parameter configuration using unique Optiwand CE Plus and Optistore Plus
- Small mechanical envelope
- Rugged industrial operation 50°C ambient rating
- Simple mechanical & electrical installation
- Simple operation, powerful features & easy to use
- Fast setup, 14 basic parameters
- Real time motor current, motor speed and kW indication
- Debugging using troubleshooting & P0
- 150% overload for 60 secs (175% for 2 secs)
- Keypad control
- Spin start
- **100% torque at 0.0Hz (no encoder)**
- Built in PID controller for feedback control systems
- Speed regulation <1%
- Torque control
- Dual high speed serial communication interfaces
 - Optical (IrDA) interface for commissioning and low bandwidth control systems (115kbps)
 - RS485/ Modbus RTU interface for high bandwidth control (9k6 to 115kbps)



Key Physical Features

- Pluggable control terminals
- Easy access key slots for simple installation
- Easy access contactor style power terminals for intuitive easy wiring
- Help card for basic parameter description and terminal layout
- Easy to use keypad with bright LED display
- IP20
- Integral rfi filter
- Integral braking transistor (not size 1)
- 3 phase line choke (size 4, 5 & 6)

Key Control I/O Features

- Programmable I/O for flexible control
- 12 bit bipolar analogue input, 8ms sample time
- 2nd analogue input for PID feedback control systems
- Positive logic digital inputs (active high), 8ms sampling
- 24V/ 100mA user supply output
- 0..10V & 4..20mA analog output, 8ms update
- Galvanically isolated and short circuit proof

Key Programming Features

- Silent motor running with 32kHz ultra-quiet switching
- 8 preset speeds
- Mains dip ride through
- Skip frequency
- Last 4 trips stored
- 2kHz output frequency
- Parameter lock
- Hours run & kWh meters
- Speed scaling factor for master- slave arrangements
- 2nd deceleration ramp for rapid stop
- Display scaling to show real values ie "bottles/ hour"

A Revolution Evolution – 21st Century Motor Control

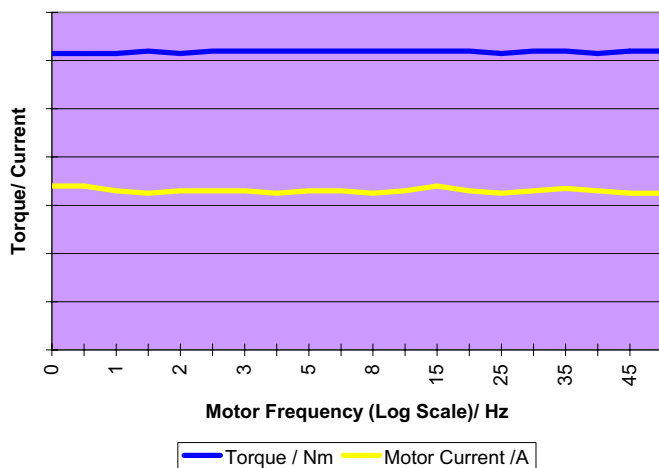
Optidrive Plus 3^{GV}'s revolutionary and patented 3^{GV} (3rd Generation Vector) vector control strategy provides smooth, controlled full torque through zero speed in open loop mode, without the need for motor tachogenerators or encoders.

The 3^{GV} ultrafast torque control ensures it is the ideal drive for applications across the industrial spectrum. **Fast** enough for pulse loads like jogging machines and industrial washers. **Powerful** enough for high starting torque applications like crushers and fully loaded conveyors. **Smooth** enough for hoists and cranes.

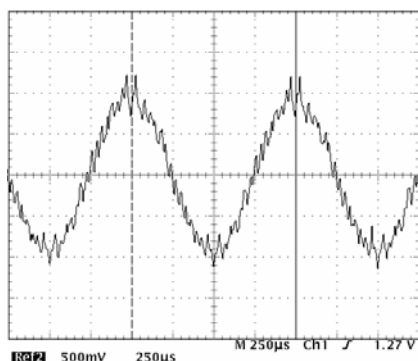
Only motor nameplate details are required to achieve optimum performance. Optidrive Plus 3^{GV} automatically performs an automatic tuning routine measuring vital motor inductances, resistances, currents and power factor with the motor at standstill. After the initial tuning, these values are constantly adapted in real time to ensure that performance is maintained irrespective of changes arising out of motor heating.

Non linearities are further corrected using highly sophisticated measurement and compensation techniques to give a very high quality sine wave output. This results in smooth operation from zero up to **2kHz** output frequency, without discontinuity and making this range of products ideal for high speed applications such as machine tool spindles.

**Torque vs Motor Frequency (Log Scale)
Showing Full Torque Across The Speed Range**



Ultra-smooth high frequency current waveform, ideal for machine tool spindle applications



4 easy steps to *Incredible Performance*

Step 1

Connect motor to drive (check star/ delta connection) & apply power to drive

Step 2

Input motor data from motor name plate:

P1-07 motor rated voltage

P1-08 motor rated current

P1-09 motor rated frequency

Step 3

Change mode to 3GV,
P4-01 = 0

Step 4

Autotune, *P4-02 = 1*

.....drive performs a static automatic tuning routine, after which motor performance is optimised for dynamic response, energy saving and maximum torque

ELECTRICAL DATA

OPTIDRIVE P SIZE 1

Model	ODP -xxxx-IN	12037	12075	12150
Motor output rating	kW	0.37	0.75	1.5
Model	ODP -xxxx-USA	12005	12010	12020
Motor output rating	HP	0.5	1.0	2.0
Supply voltage/ phases	V +/- 10%	220-240/ 1Ø		
Supply fuse or MCB rating	A	6-10	10	20
Output voltage/ phases	V	0-240V/ 3Ø		
Output current	A	2.3	4.3	7.0
Max motor cable length	m	25		

OPTIDRIVE P SIZE 2

Model	ODP -xxxx-IN	22150	22220	24075	24150	24220	24400
Motor output rating	kW	1.5	2.2	0.75	1.5	2.2	4
Model	ODP -xxxx-USA	22020	22030	24010	24020	24030	24050
Motor output rating	HP	2.0	3.0	1.0	2.0	3.0	5.0
Supply voltage/ phases	V +/- 10%	220-240/ 1Ø			380-480/ 3Ø		
Supply fuse or MCB rating	A	20	30	6-10	10	10	20
Output voltage/ phases	V	0-240/ 3Ø			0-480/ 3Ø		
Output current	A	7	10.5	2.2	4.1	5.8	9.5
Max motor cable length	m	100	100	50	100	100	100
Min brake resistor	Ω	33	22	47	47	47	33

OPTIDRIVE P SIZE 3

Model	ODP -xxxx-IN	32030	32040	32055	34055	34075	34110	34150
Motor output rating - industrial 150% o/l	kW	3.0	4.0	5.5	5.5	7.5	11.0	15.0
Model	ODP -xxxx-USA	32040	32050	32075	34075	34100	34150	34200
Motor output rating - industrial 150% o/l	HP	4	5	7.5	7.5	10.0	15.0	20.0
Supply voltage/ phases	V +/- 10%	220-240/ 1 (50% derating) or 3Ø			380-480/ 3Ø			
Supply fuse or MCB rating	A	32	32	50	32	32	50	50
Output voltage/ phases	V	0-240/ 3Ø			0-480/ 3Ø			
Output Amps - industrial 150% overload	A	14	18	25	14	18	25	30
Max motor cable length	m				100			
Min brake resistor	Ω	15			22			

OPTIDRIVE P SIZE 4

Model	ODP -xxxx-IN	42075	42110	42150	42185	44185	44220	44300	44370
Motor output rating - industrial 150% o/l	kW	7.5	11	15	18.5	18.5	22	30	37
Model	ODP -xxxx-USA	42100	42150	42200	42250	44250	44300	44400	44500
Motor output rating - industrial 150% o/l	HP	10	15	20	25	25	30	40	50
Supply voltage/ phases	V +/- 10%	220-240/ 1 (50% derating) or 3Ø				380-480/ 3Ø			
Supply fuse or MCB rating	A	80	80-100	100	100-125	80	80-100	100	100-125
Output voltage/ phases	V	0-240/ 3Ø				0-480/ 3Ø			
Output Amps - industrial 150% overload	A	39	46	61	72	39	46	61	72
Max motor cable length	m					100			
Min brake resistor	Ω	6				12			

OPTIDRIVE P SIZE 5

Model	ODP -xxxx-IN	52220	52300	52370	52450	54450	54550	54750	54900
Motor output rating - industrial 150% o/l	kW	22	30	37	45	45	55	75	90
Model	ODP -xxxx-USA	52300	52400	52500	52600	54600	54750	54100	54120
Motor output rating - industrial 150% o/l	HP	30	40	50	60	60	75	100	120
Supply voltage/ phases	V +/- 10%	220-240/ 1 (50% derating) or 3Ø				380-480/ 3Ø			
Supply fuse or MCB rating	A	160	200	250-300	250-300	160	200	250-300	250-300
Output voltage/ phases	V	0-240/ 3Ø				0-480/ 3Ø			
Output Amps - industrial 150% overload	A	90	110	150	180	90	110	150	180
Max motor cable length	m					100			
Min brake resistor	Ω	3				6			

OPTIDRIVE P SIZE 6

Model	ODP -xxxx-IN	62055	62075	62090	64110	64132	64160
Motor output rating - industrial 150% o/l	kW	55	75	90	110	132	160
Model	ODP -xxxx-USA	62750	62100	62120	64150	64175	64210
Motor output rating - industrial 150% o/l	HP	75	100	120	150	175	250
Supply voltage/ phases	V +/- 10%	220-240/ 1 (50% derating) or 3Ø				380-480/ 3Ø	
Supply fuse or MCB rating	A	315-350	400	450-500	315-350	400	450-500
Output voltage/ phases	V	0-240/ 3Ø				0-480/ 3Ø	
Output Amps - industrial 150% overload	A	202	240	300	202	240	300
Max motor cable length	m					100	
Min brake resistor	Ω	3				6	

SPECIFICATION

- Supply frequency 48 to 62 Hz
- Max. permissible 3-phase supply imbalance 3%
- Max. ambient temperature 50 °C
- Max. altitude 2000 m
- Derate above 1000 m, 1% / 100 m
- For higher switching frequencies, derate output current 5%/°C above max. ambient up to 50°C
- I x t protection above 100% output current
- 150% overload protection for 60 sec
- 175% overload allowable for 2 sec
- Storage temperature -40 to +60 °C
- Options:
 - Optiwand CE Plus & Optistore Plus
 - Optiport Plus
 - RS485 data cables and accessories
 - Optilink
 - Gateway options
 - 3ROUT (3 Relay Output)
 - Isolated USB to RS485 adaptor
 - Optifilter
 - Optibrake
 - Input Chokes
 - Output Filters

OPTIDRIVE DIMENSIONS

	Size 1	Size 2	Size 3	Size 4	Size 5 *	Size 5 **	Size 6
Length / mm	155	260	260	520	1045	1100	1100
Width / mm	80	100	171	340	340	340	340
Depth / mm	130	175	175	220	220	330	330
Weight/ kg	1.1	2.6	5.3	28	67	68	55 ***
Fixings	2 * M4		4 * M4	4 * M8			
Power Terminal torque settings	1 Nm			4 Nm	8 Nm		

* Size 5 – 90A and 110A ratings

** Size 5 – 150A and 180A ratings

*** Size 6 has external line choke weighing 27kg

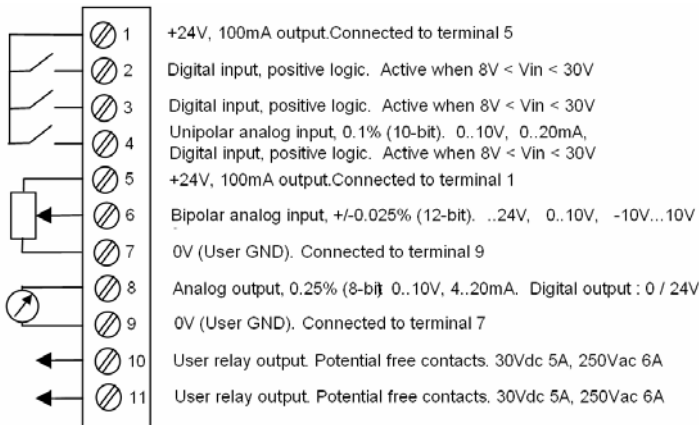
ENCLOSURE - NON VENTED DIMENSIONS (mm)

DRIVE POWER RATING	SEALED UNIT		
	W	H	D
Size 1 0.75kW 200V	250	300	200
Size 1 1.5kW 200V	300	400	250
Size 2 1.5kW 200V/ 2.2kW 400V	300	400	300
Size 2 2.2kW 200V / 4kW 400V	450	600	300

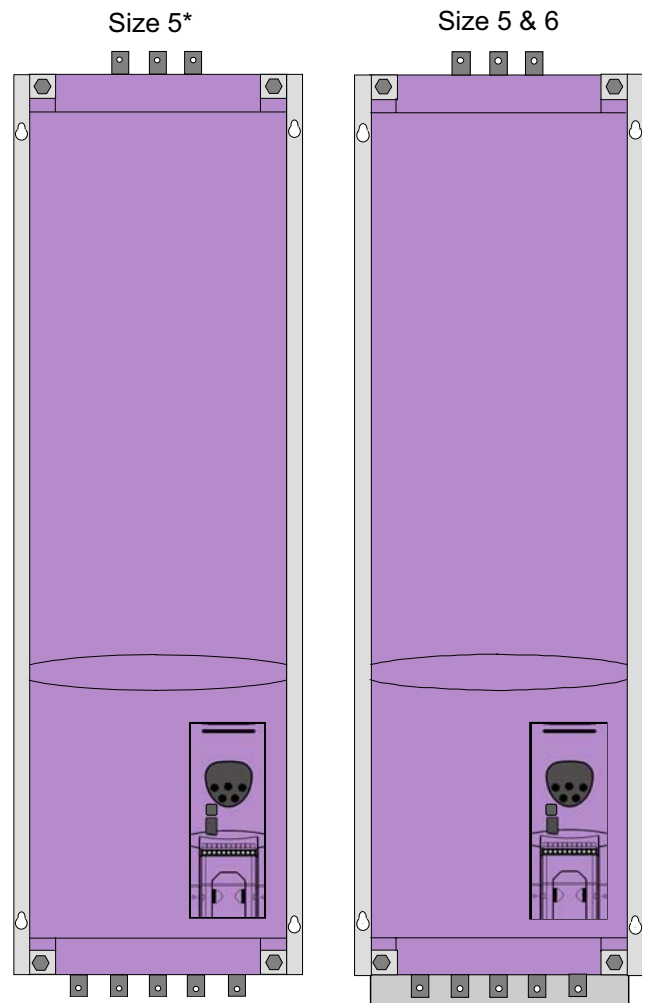
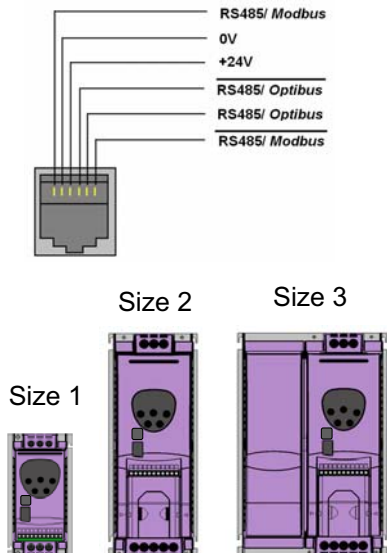
ENCLOSURE – VENTED DIMENSIONS (mm)

DRIVE POWER RATING	VENTED UNIT			FORCE VENTED (WITH FAN)			
	W	H	D	W	H	D	Air Flow
Size 1 (1.5kW)	300	400	150	200	300	150	> 15m ³ / h
Size 2 (4kW)	400	600	250	300	400	250	> 45m ³ / h
Size 3 (15kW)	600	800	300	400	600	250	> 80m ³ / h
Size 4 (22kW)	600	1000	300	600	800	300	> 300m ³ / h
Size 4 (37kW)	N/A	N/A	N/A	600	800	300	> 300m ³ / h
Size 5 (90kW)	N/A	N/A	N/A	800	1600	300	> 900m ³ / h
Size 6 (160kW)	N/A	N/A	N/A	800	2000	300	> 1000m ³ / h

CONTROL TERMINAL ARRANGEMENT



COMMUNICATION INTERFACE



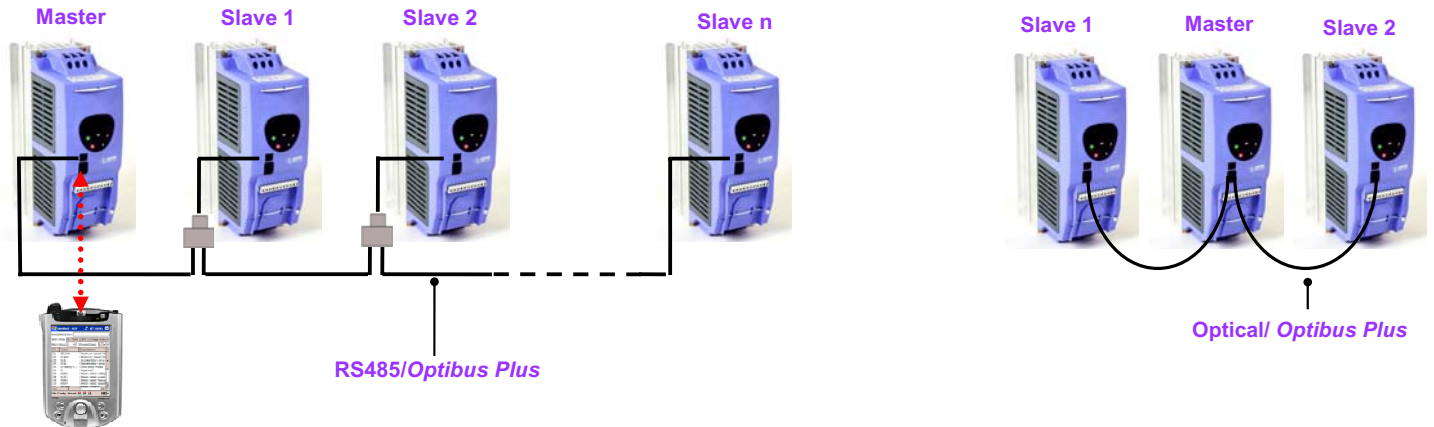
Communication Interfaces



Interface	Protocol	Baud (bps)	Purpose	Connections
RS485	Modbus RTU	9k6 – 115k	High bandwidth control systems	<ul style="list-style-type: none"> • Drive to plc • Drive to fieldbus gateway
	Optibus Plus	115k	Low bandwidth control systems	<ul style="list-style-type: none"> • Drive to pc (Optistore) • Drive to drive (unlimited slaves)
Optical	IrdA	115k	Small, low bandwidth control systems	Drive to drive (max. 2 slaves)
			Commissioning	Commissioning

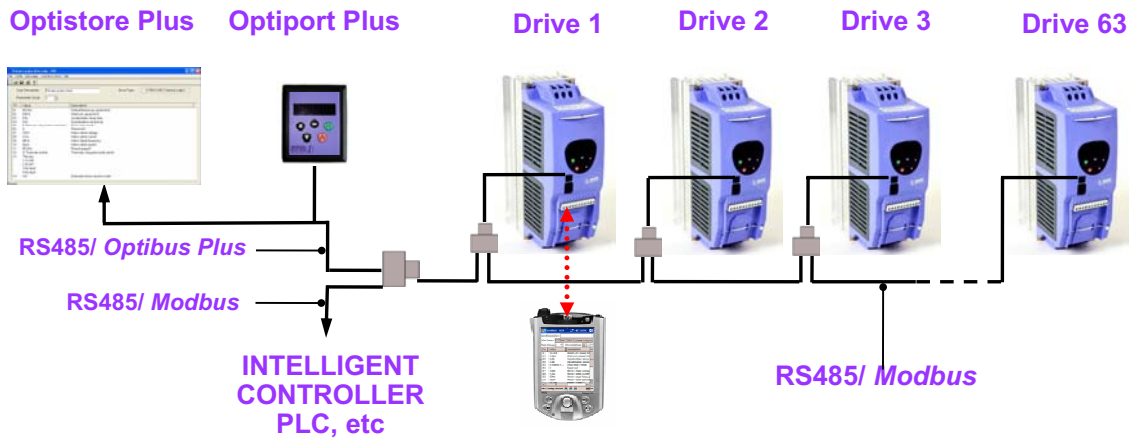
Master – Slave/ Drive to Drive Communication

Master – slave networks can be easily created by connecting the communication ports. Optiwand CE Plus can be used for commissioning individual drives through the optical port even when the drives are connected in an RS485 network.



Drive Networks to Intelligent Controllers

High bandwidth control systems can be created for up to 63 drives connected to an intelligent network with RS485/ Modbus RTU. Optiport Plus and/ or Optistore Plus can run on the same network using an RS485/ Optibus Plus connection for monitoring purposes, but not for control.



Fieldbus Communication

Optidrive Plus 3^{GV} connects to high speed communication networks via a gateway.

1 DeviceNet gateway can connect with up to 4 Optidrive Plus.

1 Profibus gateway can connect with up to 8 Optidrive Plus.

