Invertek Drives.com

Member of Sumitomo Drive Technologies

OPTIDRIVE™ coolvert

High Performance Drive
specifically for BLDC Compressors, Heat Pumps & CDUs

7 – 20A 200V Single Phase Input
14 – 58A 400V Three Phase Input

R290
Natural Refrigerant Ready

OPTIDRIVE™ coolvert

High Performance Drive

Invertek's high-performance OPTIDRIVE™ CoolVert; designed specifically for machine builders to optimise the performance of BLDC compressors used in Heat Pumps and Condensing Units (CDUs), improving overall system performance and lowering energy costs.

EASY TO USE

Key Product Features

Application Features

- **PI Control** – Internal PI Controller for simple temperature/ pressure regulation
- **Demagnetisation Protection** – Configurable overcurrent trip threshold for greater protection against demagnetisation of the motor
- **Start-up Profile** – Three stage configurable start-up profile with individual ramp rates to match compressor manufacturer's requirements
- **Start/Stop Blocking Features** – Configurable Minimum On Time, Minimum Off Time and Minimum Re-Start Delay to reduce oil migration and maximise on compressor lifetime
- **Oil-Return Feature** – Configurable oil return feature to ensure that operation at low speeds for extended periods of time do not result in a lack of oil in the compressor itself
- **Slow-Acting Current Limit** – An additional current limit that can be set at just over the rated current of the compressor to slowly reduce the speed to prevent unwanted trips caused by extended overload conditions
- **Separate Stop Ramp** – A separate deceleration ramp rate can be applied when the drive is given a stop command, this can prevent an unwanted pump-down of the system
- **CrankCase Heating** – The drive can inject current into the windings of the motor to heat up/maintain the compressor temperature removing the need for external heater belts to be installed

Open Connectivity & Easy Commissioning

- Seamless connectivity with any application controller
- Built in RS485 Modbus RTU
- Bluetooth connectivity available via Optistick Smart
- External TFT keypad available
- Drive status LEDs

Environmental

- Compact design with through panel mounting
- Wide operating temperature: –20°C to 60°C
- IP20 rated front enclosure, IP55 at the rear
- Coldplate version available
- Coated PCBs meet class 3C2 in accordance with EN60713-303
- Built-in EMC filter class C1 in accordance with EN61800-3-2004
- Low harmonic design compliant with; EN61000-3-2, (1 phase 200-230V input), and EN61000-3-12, (3 phase 380-480V input).

Supply voltages and output current range

- 1 x 200–240V (± 10%):
  7.0A, 12A, 16A, 20A
  All single phase drives with active PFC
- 3 x 380–480V (± 10%):
  14A, 18A, 24A, 30A, 39A, 46A, 58A

Selectable motor types

- AC Induction (IM)
- AC Permanent Magnet (PM)
- Brushless DC (BLDC),
- Synchronous Reluctance (SynRM)
- Line Start Permanent Magnet (LSPM)

Control Terminals

- Pluggable control and communication terminals
- STO SIL3 Safe Torque Off for system protection, TUV approved
- Programmable, predefined input and output functions:
  - Start / Stop (Enable / Disable)
  - PTC motor thermal protection (0-10V, 4-20mA)
  - Relay (drive healthy / trip)

R290
Natural Refrigerant Ready

Sensorless Vector Control for all Motor Types

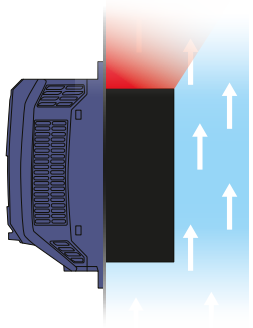
- **IM** — IE2 & IE3 Induction Motors
- **PM** — AC Permanent Magnet Motors
- **BLDC** — Brushless DC Motors
- **SynRM** — Synchronous Reluctance Motors
- **LSPM** — Line Start PM Motors

Precise and reliable control for
IE2, IE3, IE4 & IE5 motors

Practical Thermal Management

Through panel mounting allows the drive power electronics to be cooled by the chilled air.

Allowing OEM's to select the smallest electrical panel size, for the control electronics, while safely removing the heat generated by the drive, and maintaining IP rating.

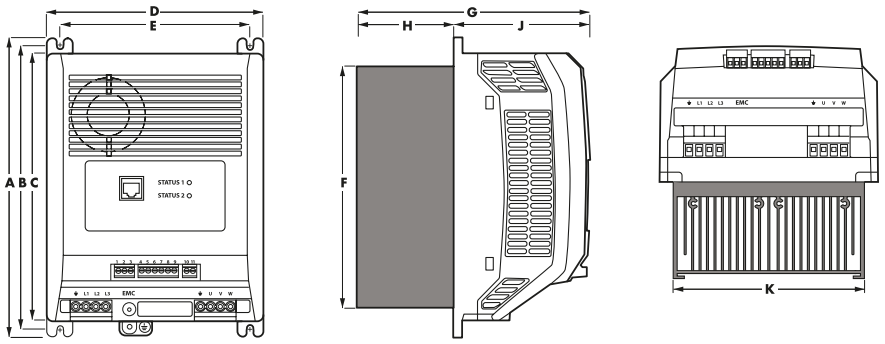


IP20 **Front** **IP55** **Rear**

Coldplate Version

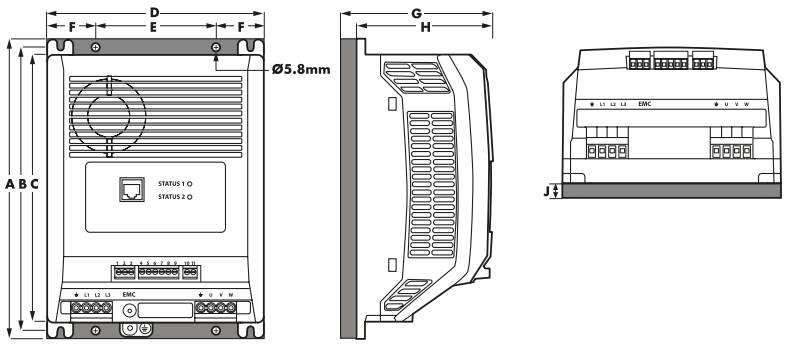
Specifications are identical to the standard Coolvert except the heatsink is replaced with a flat aluminium coldplate. This allows the Coolvert to be fixed to a device containing its own heat exchanger which then dissipates the heat from the drive.

Heatsink Version (dimensions in mm)



	A		B		C		D		E		F		G		H		J		K	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
Size 2	226.3	8.9	215.2	8.5	201.4	7.9	165.3	6.5	144.8	5.7	182	7.2	177	6.96	71.7	2.82	104.4	4.11	104.4	4.11
Size 3	277.5	10.9	262.6	10.3	247.2	9.7	193.6	7.6	168.9	6.6	224	8.8	200.3	7.9	84.3	3.3	116	4.6	116	4.6
Size 4	310	12.2	336	13.3	364	14.3	239.5	9.4	150	5.9	291.5	11.5	230.6	9.1	98	3.9	133	5.2	133	5.2

Coldplate Version (dimensions in mm)



	A		B		C		D		E		F		G		H		J	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
Size 2	226.3	8.9	215.2	8.5	201.4	7.9	165.3	6.5	90	3.5	37.7	1.48	113.9	4.48	104.4	4.11	9.5	0.37

OPTIDRIVE™ coolvert

	kW	HP	Amps	Size	Model Code
200–240V ± 10% 1 Phase Input	1.5	2	7.0	2	CV - 2 2 0070 - 1 F # P
	3	4	12	2	CV - 2 2 0120 - 1 F # P
	4	5.5	16.0	2	CV - 2 2 0160 - 1 F # P
	5.5	7.5	20.0	2	CV - 2 2 0200 - 1 F # P
380–480V ± 10% 3 Phase Input	5.5	7.5	14	2	CV - 2 4 0140 - 3 F # E
	7.5	10	18	2	CV - 2 4 0180 - 3 F # E
	11	15	24	2	CV - 2 4 0240 - 3 F # E
	15	20	30	3	CV - 3 4 0300 - 3 F # E
	18.5	25	39	3	CV - 3 4 0390 - 3 F # E
	22	30	46	4	CV - 4 4 0460 - 3 F # E
	30	40	58	4	CV - 4 4 0580 - 3 F # E

Model Code: Product Family | Frame Size | Voltage Code | Power Rating Code | Number of Inputs Phases | EMC Filter | Heatsink/Coldplate | Power Technology

See model code guide opposite

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
Output Ratings	Output Power	200V: 7.0A to 20A 400V: 14A to 58A
	Overload Capacity	130% rated current for 10s
	Output Frequency	0 – 500Hz
	Acceleration Time	0.01 – 600 seconds
	Deceleration Time	0.01 – 600 seconds
	Typical Efficiency	> 98%
Ambient Conditions	Temperature	Storage: –40 to 70°C Operating: –20 to 60°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 EN61800-5-1
Enclosure	Ingress Protection (IP)	Front IP20 Rear (Through Panel Mounting) IP55
	Coated PCBs	Designed for operation in 3S2/3C2 environments according to IEC 60721-3-3
Programming	Modbus RTU (RS485)	Modbus RTU on Pluggable terminals and through RJ45 port
	PC Tools	PC Tools software for Diagnostics and parameter configuration (RJ45 port only)
	Keypad	Optional Remote Keypad with TFT display for diagnostic and programming
	Smartphone app	Optitools Mobile
Control Specification	PWM Frequency	4–32kHz
	Control Modes	Modbus RTU (RS485) Terminal Control Digital / Analogue Terminal Control PI mode Master / Slave Mode
Safe Torque Off (STO)	IEC 61800-5-2:2016	SIL 3
	UL 61800-5-2 : 2022	SIL 3
	Independent Approval	TUV Rheinland / UL

Maintenance & Diagnostics	Fault Memory	Last 3 trips stored with time stamp
	Data Logging	Logging of data prior to trip for diagnostic purposes
	Monitoring	Hours Run Meter kWH
Conformance	The Coolvert product range conforms to the relevant safety provisions of the following council directives: 2014/30/EU (EMC), 2014/35/EU (LVD), 2006/42/EC (Machinery Directive), 2011/65/EU (RoHS 2) and 2009/125/EC (Eco-design)	
	Design and manufacture is in accordance with the following harmonised European standards:	
	BSEN 61800-5-1: 2007 & A1: 2017	Adjustable speed electrical power drive systems. Safety requirements. Electrical, thermal and energy.
	BSEN 61800-3:2018	Adjustable speed electrical power drive systems. Part 3: EMC requirements and specific test methods (IEC 61800-3:2017).
	BSEN 61800-9-2:2017	Adjustable speed electrical power drive systems. Part 9-2: Ecodesign for power drive systems, motor starters, power electronics and their driven applications – Energy efficiency indicators for power drive systems and motor starters (IEC 61800-9-2:2017).
	BSEN 60529: 1992 & A2: 2013	Specifications for degrees of protection provided by enclosures
	BSEN 61800-5-2:2017	Adjustable speed electrical power drive systems.[as relevant] Part 5-2: Safety requirements – Functional (IEC 61800-5-2:2016).
	UL 61800-5-1	cUL Listed cUR Recognised for the coldplate variants
	BSEN 61000-3-12: 2011	Electromagnetic compatibility (EMC) - Part 3-12: Limits - Limits for harmonic currents produced by equipment connected to public low voltage systems with input current >16 A and ≤ 75 A per phase
	BSEN 61000-3-2:2019 (single phase input variants only)	Electromagnetic compatibility (EMC).Limits - Limits for harmonic current emissions (equipment input current ≤16 A per phase)

Options for commissioning & diagnostics

Optistick Smart

OPT-3-STICK-IN

Rapid Commissioning Tool

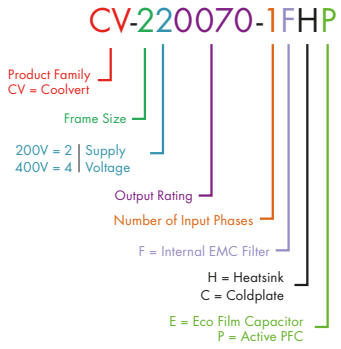
- Copying, backup and restore of drive parameters
- Bluetooth interface to a PC running OptiTools Studio or the OptiTools Mobile app on a smartphone
- Onboard NFC (Near Field Communication) for rapid data transfer

Optipad

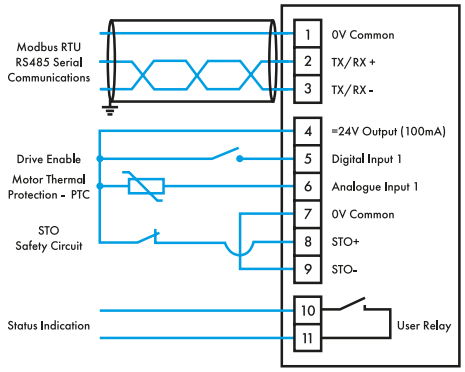
Remote Keypad with TFT Display

OPT-3-OPPAD-IN

Model Code Guide



Connection Diagram



www.invertekdrives.com

INVERTEK DRIVES LIMITED UK Headquarters

Offa's Dyke Business Park
Welshpool, Powys, UK
SY21 8JF

Tel: +44 (0)1938 556868
Fax: +44 (0)1938 556869
Email: sales@invertekdrives.com