



## Powerdrive F300

**Fan, Pump and Compressor drive**

**Optimum energy efficiency, flexible  
functionality and ease of use**



**CONTROL TECHNIQUES™**

***Nidec***  
All for dreams

# Powerdrive F300

## Optimum energy efficiency, flexible functionality and ease of use



### Powerdrive F300: Cabinet-mount drive solution

End users, OEMs and integrators need to maximize energy efficiency and minimize build costs while providing the necessary programming and functionality. Powerdrive F300 has been designed to solve these needs with several innovative features.

### Optimizing for energy efficiency

As part of a Dyneo® PM solution, Powerdrive F300 achieves the most energy efficient industrial drive and motor combination available, exceeding IE4 and NEMA Premium standards.



### Lowering system costs with flexible intelligent drives

The Powerdrive F300 variable speed drive provides flexibility in mounting options and functionality including I/O and fieldbus communications. For those who want even more flexibility, Powerdrive F300 also provides the most comprehensive on-board drive programming available for fan, pump and compressor applications: an on-board PLC provides extensive IEC 61131-3 compliant programming functionality without the additional cost, footprint and resource required to procure, install and commission an external PLC.

### Reducing design, build and commissioning time

Powerdrive F300 has been designed according to system integrator, OEM and end user needs, based on extensive hands-on customer research. The result is smaller drive dimensions to allow for easier, more economical installation; the programming software enables rapid, clear code development and the drive interface and PC tools also allow fast, simple drive commissioning, diagnostics and maintenance.



### Further benefits of using a Dyneo® solution

- Potential return on investment in less than 12 months - energy meter automatically calculates energy usage
- Significant experience on permanent magnet motor solutions installation demonstrated by the Nidec Industrial Automation installed base - currently the largest industrial permanent magnet motor installed base in the world
- Matched drive and motor ensures optimum performance with minimal set-up

### Eliminate the need for mechanical transmission devices

LSRPM and PLSRPM motors are market leaders in producing high torque at high speeds, and at equivalent torque they have higher rotational speed than competitive motors. This allows their motor speed to be adapted to that of the driven application, eliminating transmission devices such as gearboxes and enhances performance of the driven machine by increasing its speed. A permanent magnet motor demands variable speed drive control and Powerdrive F300 has been developed specifically for this role, with optimum motor control capabilities.



# Specific features for exact control of fans, pumps and compressors

Powerdrive F300 is equipped with wide motor control functionality flexible for ventilation, pumping and compression application needs, which can be rapidly accessed to exacting levels of flow control. A comprehensive I/O offering boosts component connectivity and multiple fieldbus protocols are supported, combined with a wide power range to suit your fan, pump and compressor rating.

## Flexible control capability

Powerdrive F300 has been designed with specific fan, pump and compressor control features including:

- Fan and pump macros embedded within Powerdrive F300's PC Tools provide fast, simple access to flow performance
- Two PID controllers with anti-windup and user scaling provide flow-specific functionality, enhancing application productivity
- Logic functions including 'AND', 'OR', 'invert', 'binary sum' and 'timer' achieved through easy menu setup
- Realtime Clock available on the KI-HOA Keypad RTC enables precision in application productivity according to demand, improving control accuracy and saving energy
- Water hammer control with S-ramp deceleration
- Catch a spinning motor – improved starting sequences for fan and pump control
- On-board Fire Mode allowing run to failure in the event of a fire for the extraction of smoke
- Low load condition monitoring and hysteresis for broken belt and dry pump detection



Motor control options available include:

- Open loop permanent magnet motor control (RFC-S)
  - Control Type - Speed
    - Utilizing closed loop current control, this mode offers good dynamic performance and enables more compact and higher efficiency motor technologies to be used
- Open loop Rotor Flux Control for induction motors (RFC-A)
  - Control Type - Speed
    - Open loop motor control for induction motors utilizing closed loop current control to enhance performance
- Open loop vector or V/Hz induction motor control
  - Control Type - Frequency
    - Open loop motor control for induction motors and easiest configuration. V/Hz can be used in multi-motor systems



# Flexible control of fans, pumps and compressors

## Flexible I/O range

I/O specific to pumping, ventilation and compression application requirements boosts component connectivity and flexibility. I/O connectivity includes:

- 2 x analog input, 2 x analog output, 3 x digital input, 3 x configurable digital output; 2 x form C relay output, 1 x Safe Torque Off input
- SI-I/O option provides additional 4 x Digital I/O, 3 x Analog inputs (default)/Digital inputs, 1 x Analog output (default)/Digital input, 2 x Relays

## Communication connectivity choice

Powerdrive F300 provides flexible communication integration with a wide variety of fieldbus networks. Modbus RTU is supported on-board the drive and additional networks are accessed by Powerdrive F300's option modules.

Networks supported include:

- Ethernet (including Modbus TCP/IP, Ethernet/IP and PROFINET)
- Modbus RTU, DeviceNet and PROFIBUS

## Wide power range - 1.1 kW to 2.8 MW (1.5 hp to 4,200 hp)

Powerdrive F300 extends from a rating of 1.1 kW through to 2.8 MW, making it suited to a wide variety of applications. The high power drives from Powerdrive F300's power range are also highly robust and high availability of STO product enables rapid replacement when required.

- Easier, faster installation as a result of modular approach to building high power drives
- Proven drive reliability through high volume production
- Rapid replacement thanks to high stock availability of standard production drive modules



### Safe Torque Off

When used as part of a correctly designed safety control system, Powerdrive F300's Safe Torque Off functionality can remove the need for a contactor and can avoid a complete power-down for safe access to machinery.

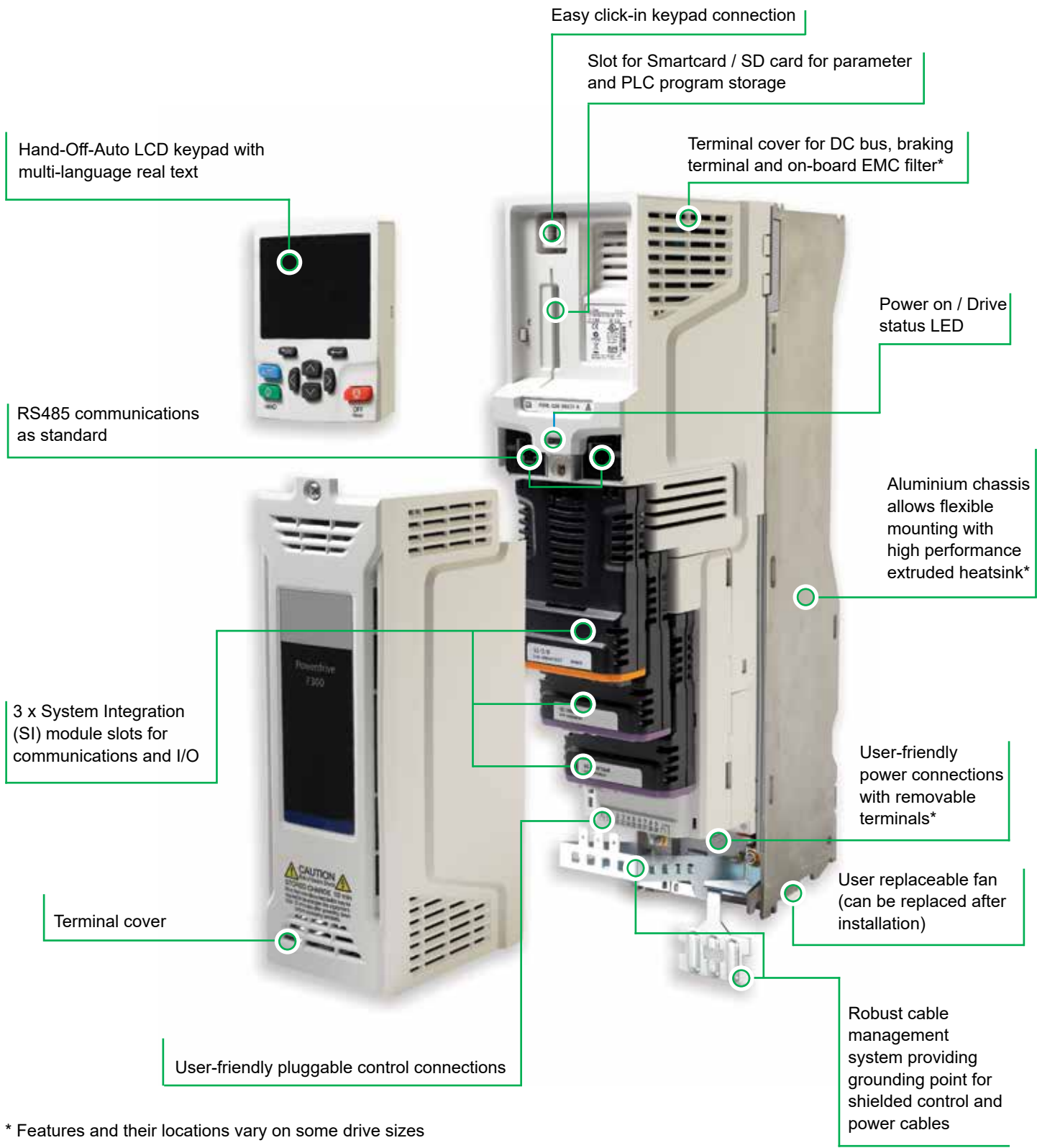
### Harmonics and drive conformance

Sensitive to its environment, Powerdrive F300 has been designed for low harmonic emissions and achieves high conformance levels.

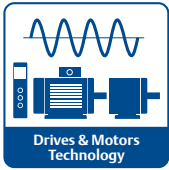
- Total Harmonic Distortion reduced as a result of:
  - DC bus inductor power from 5.5 kW to 55 kW (7.5 hp to 75 hp)
  - AC line reactor power from 75 kW (100 hp) and higher
  - Solutions for 12, 18 and 24 pulse rectifier
  - Active Front End (optional)
- Electromagnetic immunity complies with EN 61800-3 and EN 61000-6-2
- Electromagnetic emission complies with EN 61800-3:
  - With on-board EMC filter, category C3
  - With optional external EMC filter, category C1 or C2 depending on power rating
  - Also complies with EN 61000-3-12 with optional line reactor



# Powerdrive F300 features



\* Features and their locations vary on some drive sizes



# Drives and motors technology

## Drives and Controllers

### AC drives for Process Control

#### Powerdrive F300

Flexible drive, easily adaptable to your particular application requirements

1.1 kW to 2.8 MW (1.5 – 4,200 hp)

6, 12 and 18 pulse and AFE



#### Powerdrive MD2

Ready to use wall mount or free-standing drive

45 kW to 2.8 MW (60 – 4,200 hp)

6, 12 and 18 pulse and AFE



## Motors

#### General purpose permanent magnet motors

##### Dyneo® range

Premium efficiency PM synchronous motors with drive

IP55 & IP23. IE3 & IE4

0.75 - 550 kW (1 - 750 hp)

375 - 5,500 rpm



#### General purpose asynchronous motors

##### IMfinity® and LS motor range

High and premium efficiency motors for fixed and variable speed

0.06 - 1,800 kW  
(0.8 - 2,500 hp)

Non IE, IE2, IE3 derivative ranges (Atex, Nuclear, High temp, liquid cooled and customized versions)



#### Asynchronous motor with integrated drive

##### Varmeca

For variable speed applications

Fit to standard gears

0.25 - 11 kW (0.33 - 15 hp)

IP65



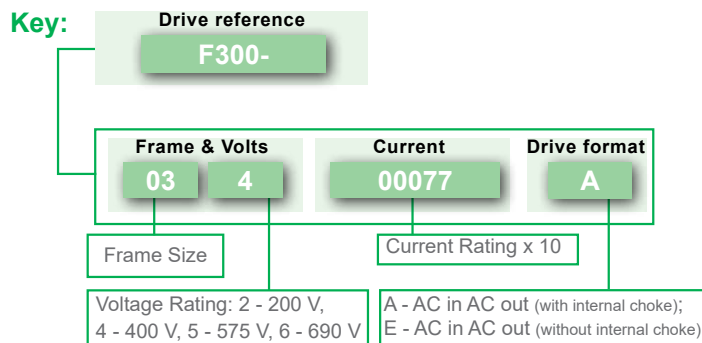
# Powerdrive F300 ratings and specifications

200/240 Vac ±10%			
Drive	Normal Duty		
	Max Continuous Current (A)	Motor Shaft Power (kW)	Motor Shaft Power (hp)
F300-03200066A10	6.6	1.1	1.5
F300-03200080A10	8	1.5	2
F300-03200110A10	11	2.2	3
F300-03200127A10	12.7	3	3
F300-04200180A10	18	4	5
F300-04200250A10	25	5.5	7.5
F300-05200300A10	30	7.5	10
F300-06200500A10	50	11	15
F300-06200580A10	58	15	20
F300-07200750A10	75	18.5	25
F300-07200940A10	94	22	30
F300-07201170A10	117	30	40
F300-08201490A10	149	37	50
F300-08201800A10	180	45	60
F300-09202160A10	216	55	75
F300-09202660A10	266	75	100
F300-09202160E10	216	55	75
F300-09202660E10	266	75	100
F300-10203250E10	325	90	125
F300-10203600E10	360	110	150

380/480 Vac ±10%			
Drive	Normal Duty		
	Max Continuous Current (A)	Motor Shaft Power (kW)	Motor Shaft Power (hp)
F300-03400034A10	3.4	1.1	1.5
F300-03400045A10	4.5	1.5	2
F300-03400062A10	6.2	2.2	3
F300-03400077A10	7.7	3	5
F300-03400104A10	10.4	4	5
F300-03400123A10	12.3	5.5	7.5
F300-04400185A10	18.5	7.5	10
F300-04400240A10	24	11	15
F300-05400300A10	30	15	20
F300-06400380A10	38	18.5	25
F300-06400480A10	48	22	30
F300-06400630A10	63	30	40
F300-07400790A10	79	37	50
F300-07400940A10	94	45	60
F300-07401120A10	112	55	75
F300-08401550A10	155	75	100
F300-08401840A10	184	90	125
F300-09402210A10	221	110	150
F300-09402660A10	266	132	200
F300-09402210E10	221	110	150
F300-09402660E10	266	132	200
F300-10403200E10	320	160	250
F300-10403610E10	361	200	300
F300-11404370E10	437	225	350
F300-11404870E10	487	250	400
F300-11405070E10	507	280	450

500/575 Vac ±10%			
Drive	Normal Duty		
	Max Continuous Current (A)	Motor Shaft Power (kW)	Motor Shaft Power (hp)
F300-05500039A10	3.9	2.2	3
F300-05500061A10	6.1	4	5
F300-05500100A10	10	5.5	7.5
F300-06500120A10	12	7.5	10
F300-06500170A10	17	11	15
F300-06500220A10	22	15	20
F300-06500270A10	27	18.5	25
F300-06500340A10	34	22	30
F300-06500430A10	43	30	40
F300-07500530A10	53	37	50
F300-07500730A10	73	45	60
F300-08500860A10	86	55	75
F300-08501080A10	108	75	100
F300-09501250A10	125	90	125
F300-09501550A10	155	110	150
F300-09501250E10	125	90	125
F300-09501500E10	150	110	150
F300-10502000E10	200	130	200
F300-11502480E10	248	175	250
F300-11502880E10	288	225	300
F300-11503150E10	315	250	350

500/690 Vac ±10%			
Drive	Normal Duty		
	Max Continuous Current (A)	Motor Shaft Power (kW)	Motor Shaft Power (hp)
F300-07600230A10	23	18.5	25
F300-07600300A10	30	22	30
F300-07600360A10	36	30	40
F300-07600460A10	46	37	50
F300-07600520A10	52	45	60
F300-07600730A10	73	55	75
F300-08600860A10	86	75	100
F300-08601080A10	108	90	125
F300-09601250A10	125	110	150
F300-09601500A10	150	132	175
F300-09601250E10	125	110	150
F300-09601550E10	155	132	175
F300-10601720E10	172	160	200
F300-10601970E10	197	185	250
F300-11602250E10	225	200	250
F300-11602750E10	275	250	300
F300-11603050E10	305	280	400



Information on higher powers will appear in subsequent issues of this brochure.

# Powerdrive F300 ratings and specifications

## Normal Duty operation only

Suitable for fan, pump and compressor applications, with a current overload requirement of 110 % for 60 s\*.

## Conformance

- IP20 / NEMA1 / UL TYPE 1  
\*UL open class as standard, additional kit needed to achieve Type 1
- IP65 / NEMA4 / UL TYPE 12 rating is achieved on the rear of the drive when through panel mounted
- \* Frame size 9D, 9E, 10D and 10E achieve IP55 / NEMA 4 / UL Type 12
- Ambient temperature -20 °C to 40 °C as standard. Up to 55 °C with derating
- Humidity 95 % maximum (non-condensing) at 40 °C
- Altitude: 0 to 3000m, derate 1 % per 100 m between 1000 m and 3000 m
- Random Vibration Tested in accordance with IEC 60068-2-64
- Bump Tested in accordance with IEC 60068-2-29
- Sinusoidal Vibration Tested in accordance with IEC 600068-2-6
- Mechanical Shock Tested in accordance with IEC 60068-2-29
- Storage temperature -40 °C to 55 °C or up to 70 °C for short-term storage
- Electromagnetic Immunity complies with EN 61800-3 and EN 61000-6-2
- With onboard EMC filter, emissions comply with EN 61800-3 (category C3)
- EN 61000-6-3 and EN 61000-6-4 with optional footprint EMC filter
- IEC 60146-1-1 Supply conditions (category C1 or C2 depending on rating)
- IEC 61800-5-1 (Electrical Safety)
- IEC 61131-2 I/O
- EN 61000-3-12 with optional line reactor
- UL 508C (Electrical Safety)

## Dimensions and Weight



Frame Size		3	4	5	6	7	8
Dimensions (H x W x D)	mm	382 x 83 x 200	391 x 124 x 200	391 x 143 x 200	391 x 210 x 227	557 x 270 x 280	803 x 310 x 290
	in	15.0 x 3.3 x 7.9	15.4 x 4.9 x 7.9	15.4 x 5.6 x 7.6	15.4 x 8.3 x 8.9	21.9 x 10.6 x 11.0	31.6 x 12.2 x 11.4
Weight	kg (lb)	4.5 (9.9)	6.5 (14.3)	7.4 (16.3)	14 (30.9)	28 (61.7)	50 (110.2)

\*For more detailed information please see technical documents.

## Keypad

Description	Order code
KI-HOA RTC Keypad	82400000018500
Remote LCD Keypad	825000000000001
Remote HOA Keypad RTC	82400000019700

## Optional media and accessories

Description	Order code
SD-Smartcard Adaptor	3470-0047
Smartcard (64 KB)	2214-0010
CT Comms Cable	4500-0096*

\*The USB Comms Cable provides PC connectivity to the drive, enabling drive configuration with the Connect PC Tool. Use of the Connect PC Tool is recommended for setup of LSRPM motors.

## Through hole IP65 kit    UL type 1 conduit kit

Frame size	Order code
3	3470-0053
4	3470-0056
5	3470-0067
6	3470-0055
7	3470-0079
8	3470-0083

Frame size	Order code
3 & 4	6521-0071
5	3470-0069
6	3470-0059
7	3470-0080
8 & 9A	6500-0106
9E & 10E	3470-0115
11	3470-0136

## Through hole IP55 kit

Frame size	Order code
9A	3470-0119
9E/10E	3470-0105
10 Inverter	3470-0108
10 Rectifier	3470-0106
11E & 11T	3470-0126
11D Inverter	3470-0130
11 Rectifier	3470-0123

## Retrofit brackets

To allow Powerdrive F300 to be fitted in existing Unidrive SP and Affinity surface mount installations.

Frame size	Order code
4	3470-0062
5	3470-0066
6	3470-0074
7	3470-0078
8	3470-0087
9A, 9E & 10	3470-0118

## DC bus paralleling kit

Frame size	Order code
3	3470-0048
4	3470-0061
5	3470-0068
6	3470-0063
6 (connect to frame 3,4 & 5)	3470-0111

## Option Modules

Option Module	Order code
SI-PROFIBUS	82400000017500
SI- Ethernet	82400000017900
SI-DeviceNet	82400000017700
SI-CANopen	82400000017600
SI-PROFINET RT	82400000018200
SI-I/O	82400000017800

## Tile mount kits

Frame size	Order code
3	3470-0049
4	3470-0060
5	3470-0073



	9A	9E/10E	9D/10D	11E
	1108 x 310 x 290	1069 x 310 x 290	Rectifier 355 x 310 x 290 Inverter 773 x 310 x 290	1242 x 310 x 312
	43.6 x 12.2 x 11.4	42.1 x 12.2 x 11.4	Rectifier 15.8 x 12.2 x 11.4 Inverter 30.4 x 12.2 x 11.4	48.9 x 12.2 x 12.3
	66.5 (146.6)	46 (101.4)		63 (138.9)

## Line reactors

Frame size	Order code
9E 200 V/400 V	4401-0181
9E 575 V/690 V	4401-0183
10E 200 V/400 V	4401-0182
10E 575 V/690 V	4401-0184

## General kit items

Item	Order code
Keypad blanking cover (10 pieces in pack)	3470-0058
Frame size 3 & 4 power connector split kit	3470-0064

## Optional external EMC filters

Powerdrive F300 built-in EMC filter complies with EN 61800-3. External EMC filters are required for compliance with EN 61000-6-4.

Frame size	Voltage	Order code
3	200 V	4200-3230
	400 V	4200-3480
4	200 V	4200-0272
	400 V	4200-0252
5	200 V	4200-0312
	400 V	4200-0402
	575 V	4200-0122
6	200 V	4200-2300
	400 V	4200-4800
	575 V	4200-3690
7	200 V	4200-1132
	400 V	4200-1132
	575 V	4200-0672
	690 V	4200-0672
8	200 V	4200-1972
	400 V	4200-1972
	575 V	4200-1662
	690 V	4200-1662
9A	200 V	4200-3021
	400 V	4200-3021
	575 V	4200-1660
	690 V	4200-1660
9E & 10E	200 V	4200-4460
	400 V	4200-4460
	575 V	4200-2210
	690 V	4200-2210
11	400 V	4200-0400
	575 V & 690 V	4200-0690

For a full list of patents and patent applications, visit [www.controltechniques.com/patents](http://www.controltechniques.com/patents).

Dimensions include mounting brackets.

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