MOTOR CONTROL

REGAL

1200 SERIES
VARIABLE FREQUENCY AC DRIVE

UNICO

REGAL

www.regalaustralia.com.au

We convert power into motion to make the world run more efficiently

REGAL

industrial motors & generators | motors starters & control | single phase & dc motors | gearboxes | couplings, brakes & clutches | insulators & conductors | air systems | die casting | rewind, service & repair

Facts about Regal

100 YEARS RUNNING STRONG

Our Heritage

- Established in Wisconsin, USA in 1955. Officially listed on the NY Stock Exchange in 2005.
- Born in 1913, Marathon have gained over 100 years experience in design and manufacture of electric motors and generators.

  Marathon has built their legacy on innovation combining magnetics and motors into a single leading technology. Their use of Magnology™ has led to the motor industry's first axial & radial flux motors used in pumping applications.
- Unico has been providing innovative motion control solutions since 1967. With operations in 10 countries, Unico drives incorporate application specific features & functions not found in general purpose drives.

Product Range

Broad product range covering the complete offering from motors, motor control & drives, gearboxes, brakes and couplings through to winding wire, insulation material, cables and varnishes. A one stop shop for complete electro mechanical, power transmission and speed control solutions.

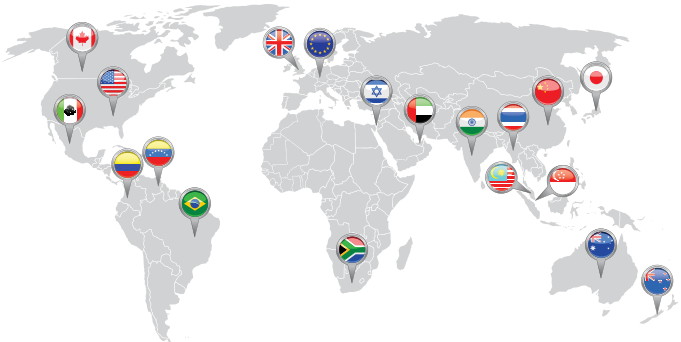
Local Expertise

Our Local Presence

- National company with 8 branches Australia wide
- 5 modifications centres; VIC, NSW, QLD, SA & WA
- Local engineering & R&D support teams
- Providing local expertise, support and product customisation to you and your customers

NATIONAL SALES
☎ 1300 888 853

TECHNICAL SUPPORT
☎ 1800 724 149



Worldwide Presence

The ability to meet our customers' needs around the world.

- 25,000 employees
- 63 manufacturing locations
- 16 design centres
- All accessible to our 'Regal' customers.

Our Regal brands:

marathon™ Motors
marathon™ Generators
marathon™ Drives
HUB CITY
CMG
DURST
GROVE GEAR
FASCO
FOOTE-JONES
MASTERGEAR WORLDWIDE
UNICO

UNICO 1200
Variable Frequency AC Drive

Overview

The 1200 provides reliable, efficient, cost-effective variable-frequency (V/Hz) or flux vector control of a wide variety of motors. It incorporates the latest technologies in insulated gate bipolar transistors (IGBTs), pulse-width modulation (PWM) and digital signal processing (DSP) to deliver optimum motor performance, complete programmability and simplicity of operation.

Performance Flexibility

The 1200 accommodates a broad range of performance requirements. Units maybe configured for constant-torque operation for heavy-duty cyclic loads, variable-torque operation for medium-duty requirements, or extended-torque operation for centrifugal loads such as fans and pumps. The drive operates in a transducer less vector control mode that does not require a feedback device and produces full torque to base speed with full starting torque. For demanding applications, an incremental encoder or resolver interface can be added for precise position, velocity and torque regulation and improved dynamic performance. Dual and triple-encoder interfaces are also available for position-following or dual-transducer applications. Variable-frequency control is alternately available for applications that do not require critical velocity or torque control. Several controller options are available to meet differing application requirements.

Motor-Independent Design

The 1200 can operate any standard or inverter-duty AC induction or synchronous motor, making it ideal for retrofits and new applications alike. A unique, proprietary digital current regulator (DCR) tunes the drive continuously in real time, eliminating the usual current-loop tuning process required by conventional drives. Digital space vector (DSV) control can be selected for reduced motor noise and low current ripple.

Auto Tuning

Once routine electrical connections have been made, simple to use auto-tuning features adjust virtually all motor and load-dependent parameters. No motor maps are required. Simply enter basic motor information from the nameplate and the advanced setup routines do the rest. The drive is completely tuned within minutes.

Application Software

A wide variety of software options is available to tailor the 1200 to an application from a fully featured velocity/ torque control for general purposes to a host of powerful programs pre-engineered for specific applications. Customization is possible with many programs using UEdit®,a Windowsbased programming tool that lets users extend an application using IEC 1131 standard ladder diagrams and function blocks.

Digital Setup, Easy Operation

A keypad and liquid crystal display provide a simple interface for setting and viewing operating parameters and diagnostics. All controller settings are made digitally for precision and repeatability. Readouts and fault messages are displayed in readily understandable language. An optional graphic display provides a variety of visual formats for accessing drive information.

Multi axis and Tandem Operation

A built-in high-speed synchronous communication port allows the motion of multiple slave drives to be precisely coordinated. With optional master/slave software, the velocity ratio and position phasing of the drives can also be controlled. Multiple motors can be operated in parallel from a single drive using variable-frequency control. Two drive sections can be operated in tandem for high-power applications.

Power Quality

A unique bus architecture provides near-unity overall power factor and low harmonic line currents at all motor speeds. High-power units also offer a six-phase (12-pulse) configuration for a single drive section and a twelve-phase (24-pulse) configuration for a tandem drive for minimising line harmonics in critical applications.

Protection and Advanced Diagnostics

The 1200 monitors its operating conditions and provides a comprehensive set of overload, short circuit and other electronic protective features to ensure safe, reliable operation. Faults indications are displayed in plain language. A log maintains a history of fault occurrences and externally triggered events.

Communications

A fully isolated RS-422/485 serial interface is provided for connecting the drive to a process controller, communication network, or programmable controller. A variety of popular communication protocols is available through software or optional Any bus modules. Optional Bluetooth and MaxStream modules provide short and long-range wireless communications. An RS-232 connection is also provided for connecting a personal computer. Windows based PCs can set up, monitor and control a network of drives using optional UEdit® software. The Drive Talk™ application provides remote interface capabilities for the iPhone and iPad.

Packaging

Compact and rugged, the 1200 is available either enclosed or as an open chassis for mounting inside an enclosure. Both versions can be foot mounted to a wall or sub plate or flange mounted through a cutout to dissipate heat outside an enclosure.

UNICO 1200
Variable Frequency AC Drive

Features & Benefits

General
- 24-bit digital signal processor (DSP) for fast processing
- 512 kilobytes battery backup memory for application setup data
- 1.5 megabytes scratch pad memory and 6.0 megabytes firmware memory
- Clock/calendar maintains accurate time during power outage
- Sine-coded PWM waveform output for improved torque performance
- High switching frequency IGBT devices for smooth, quiet operation
- Digital current regulator for high speed operation and fast response
- Digital space vector control for reduced motor noise and low current ripple
- Flux vector control for full starting torque and full torque to base speed
- Variable frequency operation for simple control of motor speed
- Internal control loop for maintaining speed with sudden load changes
- Automatic field weakening for speeds up to three times base speed
- Unique architecture for high power factor and low total harmonic distortion
- Integral dynamic braking for fast deceleration or energy absorption
- Power disturbance ride through for reducing nuisance trips
- User programmable analog and digital inputs and outputs
- Through hole heat sink mounting of chassis units for dissipating heat externally
- Optional NEMA 1 (IP20) and NEMA 3R (IP23) or NEMA 4 (IP66) enclosures

Ease of Installation, Setup and Maintenance
- Automated setup features require no chart recorders or meters
- Software calibration and adjustment eliminates tuning components
- Digital parameter adjustment for precise and repeatable settings
- Software input and output scaling eliminates potentiometers
- Complete, self contained package requires minimal option boards
- Identical control boards across full power range reduces spare parts

Ease of Use
- Touch keypad for easy parameter adjustment and access to displays
- Two line descriptive plain language display with numerical and bar graph readouts
- Optional graphics display for charting drive information in real time
- Comprehensive plain languge fault diagnostics with time stamped fault log

Safe, Reliable Operation
- Extensive electronic protection circuits
- Tolerant of AC line voltage and frequency fluctuations
- S-curve acceleration reduces shock and extends equipment life
- Multilevel security code prevents unauthorised parameter changes
- Lockout of local operator controls for safe remote operation

Specifications

Electrical

Input Supply			
Voltage	230, 460, or 1150V AC nominal (200 to 240, 380 to 480, or 950 to 1200V AC), three-phase (6-pulse); six-phase (12-pulse) available 50 hp CT and above; twelve-phase (24-pulse) available on tandem drives phase sequence insensitive		
Voltage Tolerance	-50% of nominal, +15% of nominal (11/2 to 100 hp CT) -15% of nominal, +15% of nominal (above 100 hp CT)		
Frequency	47 to 63 Hz		
Power factor	Displacement: 1.00 at all loads and speeds Overall: 0.94 at rated load		
Output Rating			
Voltage	Zero to input supply voltage, three-phase		
Frequency	Zero to 120 Hz for transducer less vector control Zero to 180 Hz for transducer based vector control Zero to 300 Hz for variable frequency control		
Switching Frequency	1 to 12 kHz, programmable		
Service Conditions			
Efficiency	97% nominal at rated switching frequency		
Overload Current	Torque	Overload (1 min)	Maximum
	Constant	150% to 200% of rated	200% of rated
	Variable	120% to 150% of rated	140% to 160% of rated
	Extended	110% to 120% of rated	120% to 140% of rated

Environmental

Operating Temperature
Control section: -4° to 131°F (-20° to 55°C) Heat sink (standard): -40° to 104°F (-40° to 40°C) Heat sink (derated): -40° to 131°F (-40° to 55°C)
Storage Temperature
-40° to 158°F (-40° to 70°C)
Operating Humidity
95% maximum, non condensing
Altitude
To 3,300 ft (1,000 m) without derating

UNICO 1200
Variable Frequency AC Drive

Specifications

Performance

Frequency Control	
Range	Zero to base speed at full torque Base speed to 300 Hz at constant power
Resolution	0.024% with analogue input (12-bit) 0.1 Hz with digital input
Velocity Control	
Range	Zero to base speed at full torque Base speed to 180 Hz at constant power with transducer Base speed to 120 Hz at constant power without transducer
Regulation	±0.001% of base speed, down to zero, with transducer ±0.5% of base speed, 2 Hz and above, without transducer
Torque Control	
Starting Torque	Constant torque: zero to 150% of rated Variable torque: zero to 120% of rated
Regulation	±3.0% of maximum with transducer ±10% of maximum without transducer

Inputs and Outputs

Analogue Inputs
Three (3) 12-bit analogue inputs (±10 V DC or 0 to 20 mA)
Analogue Outputs
Two (2) 12-bit analogue outputs (±10 V DC and 0 to 20 mA)
Digital Inputs
Twelve (12) digital inputs (require sink of 1 mA to common) Converter Interface Module: Provision for input converters rated 2.5 to 28V DC @ 30 mA, 90 to 140V AC @ 11 mA, and 180 to 280V AC @ 5 mA
Digital Outputs
Six (6) digital outputs (open-collector drivers rated 24V DC @ 500 mA) Converter Interface Module: Provision for output converters rated 5 to 60V DC @ 3 A, 12 to 140V AC @ 3 A, or 24 to 280V AC @ 3 A; or for normally open or normally closed relay converters rated 250V AC @ 8 A

Serial Communications

Asynchronous	
Port(s)	One RS-232/422/485, isolated, and two auxiliary RS-422/485
Protocols	ANSI-x3.28-2.5-A4 or Modicon RTU, standard
Synchronous	
Port	RS-485 for high-speed master/slave networking
Communication Modules	
Anybus	One module provision Options: CANopen, CC-Link, ControlNet, DeviceNet, Ethernet, Interbus, LonWorks, Modbus Plus, ProfibusDPV1, Profibus Master
Bluetooth or MaxStream	100MHz control: one module provision 270MHz control: two module provisions MaxStream options: 900MHz and 2.4GHz

Protection

The following hardware conditions are detected. Additional protective features are provided by the application software.

- Ground fault
- Heat sink over temperature
- Phase-to-phase short circuit
- Ambient over temperature
- DC bus over voltage
- Power transistor fault
- DCbus under voltage
- Logic power under voltage
- Instantaneous over current
- Memory malfunction
- Motor overload
- Processor not running fault

Options

Transducers

A motor mounted incremental encoder or resolver and corresponding interface may be used for highest performance. The resolver interface provides an encoder emulation for paralleling feedback to other devices. Dual and triple encoder options are also available for position following or dual transducer applications.

Expanded Analog I/O

An analog interface module may be used instead of a feedback interface to expand the analog I/O capabilities of the drive. The module provides eight additional inputs and four additional outputs.

Dynamic Braking

Dynamic braking is included on small units and is optionally available on higher power units. Appropriately sized external braking resistors are required.

Packaged Drives

Drives may be ordered as part of a packaged system including a circuit breaker, operator devices and additional system components mounted inside a NEMA 4 (IP66) enclosure.

Power Range

Input Voltage	Constant Torque Applications	Variable Torque Applications	Extended Torque Applications
230V AC	1 $^{1}/_{2}$-20 hp (1.1-15 kW)	2-25 hp (1.5-18 kW)	10-30 hp (7.5-22 kW)
380V AC	1$^{1}/_{2}$-1600 hp (1.1-1200 kW)	2-2000 hp (1.5-1500 kW)	--
460V AC	1$^{1}/_{2}$-1600 hp (1.1-1200 kW)	2-2000 hp (1.5-1500 kW)	10-2400 hp (7.5-1800 kW)
1150V AC	10-500 hp (7.5-375 kW)	15-600 hp (11-450 kW)	20-800 hp (15-600 kW)

Consult factory for other powers. Other voltages require appropriate derating or adjustment of the switching frequency.

Regal Beloit Australia Pty Ltd ABN 61 122 303 084
19 Corporate Ave (PO Box 2340), Rowville VIC 3178, AUSTRALIA
T: +61 3 9237 4000 F: +61 3 9237 4010

Sales Support ☎ **1300 888 853** Technical Support ☎ **1800 724 149**
www.regalaustralia.com.au • www.regalbeloit.com

VICTORIA / HEAD OFFICE
19 Corporate Avenue
Rowville VIC 3178
T: +61 3 9237 4040
F: +61 3 9237 4050

NEW SOUTH WALES
6-7 Bushells Place
Wetherill Park NSW 2164
T: +61 2 8781 3100
F: +61 2 8781 3131

QUEENSLAND
7 Mahogany Court
Willawong QLD 4110
T: +61 7 3246 3246
F: +61 7 3246 3210

CAIRNS (Service • Repairs • Sales)
2/159-161 Newell Street
Bungalow QLD 4870
T: +61 7 4033 1109
F: +61 7 4033 5553

MACKAY
Paget QLD 4740
T: +61 7 4952 6244
F: +61 7 4952 6277

SOUTH AUSTRALIA
47 Research Road
Pooraka SA 5095
T: +61 8 8359 1321
F: +61 8 8359 5675

WESTERN AUSTRALIA
21 Colin Jamieson Drive
Welshpool WA 6106
T: +61 8 6253 3700
F: +61 8 6253 3710

NEW ZEALAND
AUCKLAND
CMG Electric Motors (NZ) Ltd
18 Jomac Place
Avondale
T: +64 9820 3550
F: +64 9820 8504

CHRISTCHURCH
Cnr Lunns and Annex Roads
Middleton
T: +64 3348 3740
F: +64 3348 3760

ROTORUA
51 Purura Street
Rotorua
T: +64 7347 8624
F: +64 7347 8629

MALAYSIA
Torin Industries SND BHD (MALAYSIA)
No. 6536A Jalan Bukit Kemuning
Batu 6 Seksyen 34
40470 Shah Alam Selangor
T: +60 3 5124 6157
F: +60 3 5121 1467

SINGAPORE
CMG Electric Motors (Asia Pacific) Pte Ltd
12 Tuas Loop 637346
SINGAPORE
T: +65 6863 3473
F: +65 6863 3476

THAILAND
FASCO Motors (Thailand) Limited
29/7-8 Bangkruay-Sainoi Road
Bangkrang
Muang Nonthaburi District Nonthaburi 11000
THAILAND
T: +66 2447 3300
F: +66 2447 3500

UNICO_1200_FLYER_0815WEB supersedes UNICO 1200 Variable Frequency AC Drive 1114 (edition 1.2.0)