



**CONTROL
TECHNIQUES**

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Unidrive 

**THE
BENCHMARK**

AC drive 0.75 kW to 30 kW



Unidrive -

AC Drive 0.75 kW to 30 kW

What is ?

From the simplest to the most complex AC drive application; Unidrive  is a truly scalable Solutions Platform. Your requirements can be matched by Unidrive  and its options to maximise your productivity.

What makes Unidrive The Benchmark?

Unidrive  is so **flexible** it can be **personalised** to your requirements, to **lower** your true total costs whilst improving your productivity - Unidrive  rewrites the standards for all drive users. As a Solutions Platform with **ultimate** flexibility, it is the point from which all drive users should measure themselves -

it is 

Power Range at a Glance

VOLTS	SIZE 1	SIZE 2	SIZE 3	
200-240	3 kW	7.5 kW	15 kW	
380-480	5.5 kW	15 kW	30 kW	
500-575			18.5 kW	
500-690				

Unidrive SP ratings to 1 MW and voltages to 690V to follow

is **The**
Solutions
Platform




For all AC Drives

Easiest integration to your application -

24V dc back up

As standard, to maintain power for control, fieldbus and encoder. Commissioning and monitoring with mains supply disconnected.

User interface versatility

- Supplied without keypad for low cost multidrive solutions
- Optional removable LED keypad
 - 'hot swappable' for maintenance and commissioning engineers
- Optional backlit LCD keypad
 - On line help functions
 - Dual language
 - Customer configurable text database
 - IP54/Nema 12 remote cubicle mountable



48V dc input power supply

Standard back-up power supply input, also for machine set up and lift rescue applications allowing full operation of motor at slow speed.

Online connectivity

"Hot pluggable" Modbus RTU port for programming and interrogation of

- Unidrive 
- SMARTCARD
- LCD keypad set up
- Universal encoder set up
- Applications module (zero-space PLC)

And allows users (via CTNet) to view and access other CT drives on the network.

World class fieldbus flexibility

Modbus RTU (as standard)



Up to three fieldbus options can be installed simultaneously if application requires.



Application flexibility

3 universal option slots capable of accepting any combination of options (e.g. fieldbus, applications, extended I/O). Total flexibility in tailoring the Unidrive  to customer requirements.

Secure Disable function

Meets the requirements of EN954-1 category 3 for machine safety. This standard feature potentially eliminates the need for safety contactors by utilising secure circuitry to prevent the motor shaft from being driven by the drive.



Through hole mounting

- Convenient heat dissipation
- Cubicle size reduction
- Sealed to IP54/Nema 12

Universal encoder

Unidrive SP can be configured for 14 different feedback signals as standard including:-

- Quadrature/Pulse Encoders
- SinCos (single and multum Hiperface & EnDat)
- Synchronous Serial Interface (SSI)
- Frequency and Direction
- CW/CCW



All induction motors

Unidrive operates in open loop and closed loop vector modes and has been matched to the Leroy Somer range of totally enclosed AC squirrel caged motors although any induction motor will operate with Unidrive .



no matter how simple or complex

SMARTCARD

Parameter set up and storage facility as standard

- Hot-pluggable
- Auto backup of parameters
- Fast low cost cloning facility
- 4 full parameter sets or many sub-sets
- Pre-defined application Macros
- SMARTCARD supplied as standard

“Hot-pluggable” commissioning tools

- Safe access - cover remains on - no powerdown to connect
- Drive interface via **Modbus RTU**
- Can read and write to SMARTCARD for simpler, safer commissioning and maintenance
- Programming tool for LCD keypad



On board EMC filter

Optional footprint mounted filter

for demanding applications not met with the standard on board filter



Optional zero-space braking resistor

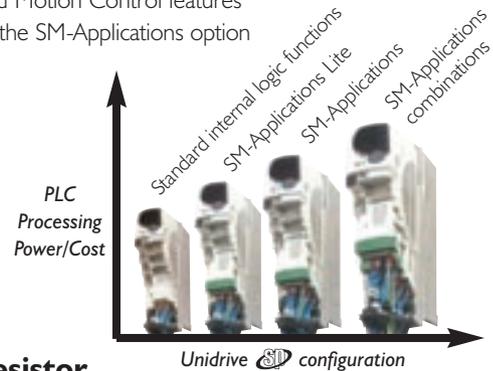
for sizes 1 & 2, within the heatsink envelope.

Practical cable management

- EMC grounding accessories for easy installation to best practice wiring practices

Powerful zero space real-time PLC

Implement complex systems within the drive envelope using the PLC and Motion Control features of the SM-Applications option



Drive to drive synchronisation

is achieved between SM-Applications modules using CTSync, creating a virtual master for distributed multi-axis positioning.

Conformance is standard

- Immunity IEC6100-6-2, IEC61800-3
- Emission EN61800-3 with internal filter
- I/O to IEC 61131-2
- Programming to IEC61131-3
- Machinery directive requirement EN954-1 Cat.3
- Secure Disable certified by BIA
- Electrical safety to EN50178
- Meets UL508C
- Designed to EN81-1 for lifts

Unimotor UM Servo Motor range

The unique finned design of this performance matched range of AC servo motors improves heat dissipation and with its single piece design, optimises torque output and reduces cogging. The compact design, optimised laminations and coils, and high energy magnets make Unimotor UM the truly dynamic servo motor ideally suited to high performance drive solutions. From 0.65Nm to 78Nm. Will also control any other type of AC servo motor.



"This product has been designed to be easily disassembled for ease of recycling - virtually all parts can be recycled."

Unidrive Features

Drive Configuration

High Performance Universal AC drive with five user selectable operating modes:

- Open loop induction motor drive.
- High Performance open loop vector induction motor drive.
- Closed loop vector induction motor drive.
- Servo motor drive.
- Regenerative module, with power factor control.

Power

- Industrial ratings: – Normal Duty or Heavy Duty - see rating table
 - 200% overload current available on a typical 4-pole induction motor or servo motor.
- Global voltage supply
 - 200V to 575V ac 50/60Hz.
 - dc bus connections – for supplying multiple drives to allow power sharing/braking.
- 48V dc power back-up supply input. For example, machine tool set up and lift rescue applications.
- Auxiliary 24V dc back up supply input to maintain power for control, fieldbus and position loop when mains supply is removed.
- Internal brake resistor option for frame sizes 1 and 2.

Control

- Common control interface for entire range.
- Comprehensive autotune features for quick and predictable commissioning.
- Synchronised control loops for deterministic control; ideal for motion applications.
- **Speed loop:**
 - Update time of 250µs; typical bandwidth 150Hz.
 - Gains in real units
 - Increased precision in positioning systems and high performance section control.
 - Selectable gain sets for speed profiling and multi-motor operation.
 - Step-less gain change for on-line tuning.
 - Fully selectable feedback source for flexibility.
- **Torque loop:**
 - Update time of 83µs; typical bandwidth 830Hz.
 - 'In-motion' transfer between open and closed loop control.
 - Torque feed forward for minimal speed error during acceleration.
 - Set point to two decimal places for precision torque applications, such as dynamometer test rigs.
- **(SLM)**
 - Digital servo control, to complement Control Techniques M'Ax servo range.
- **Motor:**
 - Output frequency to 3kHz open loop and 1.2kHz closed loop.
 - Up to 16kHz switching frequency for silent operation.
 - Second motor map for rapid change between motors.
 - Support for embedded motor map in encoders with serial communications.
- **Universal Feedback Interface:**
 - Support for 14 different feedback device configurations as standard, including: Quadrature (up to 400kHz), SinCos (single and multi-turn, Hiperface and Endat), SSI (plus grey code), Frequency and Direction, CW/CCW and Resolver.
 - A second universal feedback interface with identical specification is available as a plug-in option for synchronisation and positioning applications. Can also be used to provide encoder simulation output in any of the formats.
 - More than one encoder feedback device can be accepted simultaneously.

SM-Applications customisation

Powerful SM-Applications module for implementing fully customised PLC solutions, or executing pre-engineered solutions. Features include:

- Programming tool IEC61131-3 compliant.

- Programme in function block, ladder or Drive Programming Language.
- 32 bit RISC processor.
- On board CTNet interface.
- 2 x 24V high speed inputs for position freeze/registration.
- 2 x 24V high speed outputs.
- Motion function blocks.
- Synchronisation with drive control loops.
- 384kbytes of user flash memory.
- 80kbytes of user RAM.
- 400 x 32 bit non-volatile registers.
- Speed reference and feedback resolution to 3 decimal places.
- Torque reference and feedback resolution to 2 decimal places.
- User tasks include: Synchronised Clock; selectable update of 4ms to 100ms, 2 x synchronised Position tasks; selectable update of 250µs to 2ms. 4 x Event tasks; triggered by timer I/O, software, CTSync or fieldbus cyclic.
- Drive to drive synchronisation for multi-axis motion co-ordination, using CTSync.

Input/Output

- Digital I/O to IEC61131-2.
- **Analogue inputs;** 1 high precision (16 bit plus sign) differential and 2 general purpose with update times of 250µs or 4ms.
- **Analogue outputs;** 2 general purpose at 4ms update time.
- **Digital inputs;** 1 Secure Disable at < 1µs update, 6 general purpose at 4ms update with the possibility of 2 having a 250µs update when configured as limit switch inputs.
- **Digital outputs;** 3 general purpose at 4ms update time.
- One relay output; normally open.
- One relay driver output.

Environment

- IP20/Nema 1 rating.
- Ambient temperature -15 to +40°C, 50°C with derating.
- Humidity 95% maximum (non condensing).
- Electromagnetic Immunity complies with EN61800-3 and EN50082-2.
- Electromagnetic Emissions complies with EN61800-3 (second environment) with on board EMC filter. Complies with EN61800-3 (first environment), EN50081-1 and EN50081-2 with optional footprint EMC filter.

Fieldbus Connectivity

- Modbus RTU as standard.
- Options PROFIBUS-DP (12Mbits/s), DeviceNet, CANopen, INTERBUS and CTNet.

System Design

- Three universal option slots, that **each** support applications, fieldbus, universal encoder and expansion I/O modules to maximise flexibility.
- Fieldbus gateway solutions can be implemented by installing two or even three different fieldbus option modules.
- Secure Disable input to meet the requirements of EN954-1 category 3 for machine safety with cost reduction.
- Both distributed and centralised control systems can be implemented.
- **SMART** for simple set up, maintenance and drive cloning.

Keypad Choice

- Optional LED SM-Keypad; 'hot-swappable' with 7 digit data display.
- Optional backlit LCD SM-Keypad Plus; 'hot-swappable' plain text display, remote mountable, on-line help, real engineering units, customisable text database, dual language, field programmable.
- No keypad as standard.
- Any HMI that supports Modbus RTU.

Unidrive SP Selection

Model Reference	Frame Size	Supply Voltage & Motor Power Rated Voltage	Normal Duty				Heavy Duty				
			Typical Motor Power		Max. Continuous Output Current	Max. Output Current	Typical Motor Power		Max. Continuous Output Current	Maximum Output Current	
			(kW)	(hp)	I _N (A)	Open Loop (A)	(kW)	(hp)	I _{HL} (A)	Open Loop (A)	Closed Loop (A)
SP1201	1	200 to 240V ± 10%	1.1	1.5	5.2	5.7	0.75	1.0	4.3	6.5	7.5
SP1202			1.5	2.0	6.8	7.5	1.1	1.5	5.8	8.7	10.2
SP1203			2.2	3.0	9.6	10.6	1.5	2.0	7.5	11.3	13.1
SP1204			3.0	3.0	11.0	12.1	2.2	3.0	10.6	15.9	18.6
SP2201	2	kW at 220V hp at 230V	4.0	5.0	15.6	17.1	3.0	3.0	12.6	18.9	22.1
SP2202			5.5	7.5	22.0	24.2	4.0	5.0	17.0	25.5	29.8
SP2203			7.5	10.0	28.0	30.8	5.5	7.5	25.0	37.5	43.8
SP3201	3		11.0	15.0	42.0	46.2	7.5	10.0	31.0	46.5	54.3
SP3202			15.0	20.0	54.0	59.4	11.0	15.0	42.0	63.0	73.5
SP1401	1	380 to 480V ± 10%	1.1	1.5	2.8	3.1	0.75	1.0	2.1	3.2	3.7
SP1402			1.5	2.0	3.8	4.2	1.1	2.0	3.0	4.5	5.3
SP1403			2.2	3.0	5.0	5.5	1.5	3.0	4.2	6.3	7.4
SP1404			3.0	5.0	6.9	7.6	2.2	3.0	5.8	8.7	10.2
SP1405			4.0	5.0	8.8	9.7	3.0	5.0	7.6	11.4	13.3
SP1406			5.5	7.5	11.0	12.1	4.0	5.0	9.5	14.3	16.6
SP2401	2	kW at 400V hp at 460V	7.5	10.0	15.3	16.8	5.5	10.0	13.0	19.5	22.8
SP2402			11.0	15.0	21.0	23.1	7.5	10.0	16.5	24.8	28.9
SP2403			15.0	20.0	29.0	31.9	11.0	20.0	25.0	37.5	43.8
SP3401	3		18.5	25.0	35.0	38.5	15.0	25.0	32.0	48.0	56.0
SP3402			22.0	30.0	43.0	47.3	18.5	30.0	40.0	60.0	70.0
SP3403			30.0	40.0	56.0	61.6	22.0	30.0	46.0	69.0	80.5
SP3501	3	500 to 575V ± 10%	3.0	3.0	5.4	5.9	2.2	2.0	4.1	6.2	7.2
SP3502			4.0	5.0	6.1	6.7	3.0	3.0	5.4	8.1	9.5
SP3503			5.5	7.5	8.4	9.1	4.0	5.0	6.1	9.2	10.7
SP3504			7.5	10.0	11.0	12.1	5.5	7.5	9.5	14.3	16.6
SP3505			11.0	15.0	16.0	17.6	7.5	10.0	12.0	18.0	21.0
SP3506			15.0	20.0	22.0	24.2	11.0	15.0	18.0	27.0	31.5
SP3507			18.5	25.0	27.0	29.7	15.0	20.0	22.0	33.0	38.5

All Unidrive SP modules have optional footprint filters for applications not met with standard on board filters



Normal Duty (open loop)	Suitable for most applications, current overload is set at 110% for 60s. Where motor rated current is less than the drive rated continuous current, higher overloads are achieved
Heavy Duty (open loop)	Suitable for more demanding applications, current overload is set at 150% for 60s. Where motor rated current is less than the drive rated continuous current, higher overloads (200% or greater) are achieved
Heavy Duty (closed loop, servo)	Suitable for demanding applications where high dynamic shaft performance is necessary, current overload is set at 175% for 20s. Where motor rated current is less than the drive rated continuous current, higher overloads (200% or greater) are achieved

Options

Option Order Code	Description
SM-Keypad	LED keypad
SM-Keypad Plus	LCD keypad
SM-Applications Lite	PLC without CTNet - future
SM-Applications	PLC with CTNet
SM-PROFIBUS-DP	Profibus fieldbus
SM-DeviceNet	DeviceNet fieldbus
SM-CANopen	CANopen fieldbus
SM-INTERBUS	Interbus fieldbus
SM-SLM	SLM interface - future
SM-Encoder Plus	Additional incremental encoder feedback
SM-Universal Encoder Plus	2nd universal encoder feedback
SM-Resolver	Resolver feedback
SM-I/O Plus	Extended I/O
CTSoft	PC windows based set up software
CT Comms Cable	For CTSoft between PC & Drive
Footprint EMC Filter	Matched to the Unidrive SP ordered
Braking Resistor (Sizes 1 & 2)	Matched to the Unidrive SP ordered
SyPT	Programming Tool (IEC61131-3) for SM-Applications - Full version
SyPT Lite	Programming Tool (IEC61131-3) for SM-Applications Lite and on-board ladder logic
Software	For Winders, flying shears, pump sequencing

Dimensions (mm)

Frame Size	A	B	C	C1	C2
1	368	100	139	219	264
2	368	155	139	219	274
3	368	250	140	260	320



From 0.75 to 30 kW the **New Unidrive SP** is the **ultimate** in flexible AC drives. The only truly universal drive: - Open loop, Closed loop, Servo, Regeneration - with a **flexible approach** to system design.

More....

Flexibility

- Open loop, Closed loop, Servo and Regeneration modes of operation all selectable as standard by the user.
- Widest possible fieldbus option range with PROFIBUS, DeviceNet, CANopen, Modbus RTU, INTERBUS, CTNet.
- Unique fieldbus to fieldbus gateway approach eliminates costly interfaces when more than one fieldbus type is required.
- True scalability of the PLC processing power with internal SM-Applications technology.
- System status can be accessed whilst drives are running using the "hot-pluggable" RJ45 port and CTSOft PC tool.
- User interface requirements can be scaled to budget and application with a choice of LED or dual language LCD keypads.
- Universal encoder feedback accepts 14 different types of signal.
- Global voltage supply, 200V to 575V ac.

Performance

- Powerful SM-Applications module option for implementing fully customised solutions, or executing pre-engineered solutions. Conforms to IEC61131-3.
- Ultra fast speed and torque updates maximise dynamic response in demanding applications.
- Drive to drive synchronisation for multiaxis motion co-ordination.
- Distributed control via CTNet fieldbus.
- Rapid response to motion profile demands with dynamic 250µs update rate.
- True system drive performance scalable to your solution.



....For Less

- Integrated EMC filter meets EN61800-3.
- Secure Disable feature as standard reduces cost by lowering system component count while meeting EN954-1 category 3.
- **Modbus RTU** as standard.
- Auto parameter back-up by using the **SMARTCARD** for security and fast commissioning.
- Only one learning curve for mastering all types of drives.
- Zero space PLC (IEC61131-3) option.
- Prepackaged applications  software for Winders, Flying Shears, etc, etc.
- Truly scalable PLC power with up to 3 zero-space SM-Applications modules.



XX PLC and/or safety contactor may be eliminated.

**THE
BENCHMARK**
For all AC Drives



Driving the world...



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