

Unidrive Options

The Unidrive SP provides application and system designers with an incredibly flexible drive platform, which is easily modified by an extensive range of sophisticated SM option modules for economical, space saving solutions. SM option modules install easily into any of the three option slots on the SP, with no tools required. The I/O, feedback, motion control, communication and application modules enable the Unidrive SP to provide an optimized solution to meet your specific requirements.



OPTIONS AT-A-GLANCE

Option	Description	Order Code
Base Drive Configuration and Programming	Cloning and Parameter Storage Card	SMARTCARD ¹
	Configuration Software	CTSOFT ¹
	RS232/485 Comms Cable	CT-COMMS-CABLE
	USB Comms Cable	CT-USB-CABLE
Operator Interface	Keypad to Drive Cable	SP-LCD-485-XXX
	No Keypad Option	Standard
	LED Keypad ⁶ (size 1-6)	SM-KEYPAD ²
	LED Keypad ⁶ (size zero only)	KEYPAD-SP0
	Backlit LCD Keypad Plus	SM-KEYPAD PLUS ²
Power Accessories	Programmable HMI Panels	See Options & Accessories
	Zero-Space Brake Resistor	Based on Drive
	E-Stop Duty Braking Resistor	See Options & Accessories
	Cyclic Duty Braking Resistor	See Options & Accessories
	Zero Space EMC Filter	Standard
Feedback Solutions Modules	External EMC Filters	See Options & Accessories
	Universal Encoder Feedback SM-UNIVERSAL ENCODER PLUS	SM-UNI-ENCODER
	Incremental Encoder Input SM-ENCODER PLUS	SM-ENCODER-PLUS
	Incremental Encoder Input & Output SM-ENCODER OUTPUT PLUS	SM-ENCODER-OUT
	Resolver Feedback	SM-RESOLVER
	Screw Terminal Connector	SM-ETC
I/O Solutions Modules	Extended Analog and Digital I/O	SM-I/O-PLUS
	Extra Analog and Digital I/O	SM-I/O-LITE
	Extended I/O	SM-I/O-32
	Extra I/O with RealTime Clock/Calendar	SM-I/O-TIMER
	120/240 Volt AC I/O	SM-I/O-120V
	Double Insulated Extended I/O	SM-I/O-PELV
	Remote Network I/O	See Options & Accessories
	+24 VDC Protected I/O	SM-I/O-24V

A complete range of other accessories are available to simplify system integration and meet system design criteria. See the *Options and Accessories* section for details.

Option	Description	Order Code
Communications Solutions Modules	Modbus RTU Follower	Standard
	Modbus RTU Master SM APPLICATIONS PLUS ³	SM-APPS-PLUS ³
	DeviceNet	SM-DEVICENET
	PROFIBUS DP	SM-PROFIBUS-DP
	Ethernet (Modbus TCP/IP, Ethernet IP)	SM-ETHERNET
	INTERBUS-S	SM-INTERBUS
	CANopen	SM-CANOPEN
	CAN Interface	SM-CAN
	Ethernet (EtherCAT)	SM-ETHERCAT
	SERCOS	SM-SERCOS
	CTNet, CTSync	SM-APPS-PLUS
	Application Solutions Modules	Systems Programming (Distributed Control) SM APPLICATIONS PLUS
Systems Programming (Centralized Control) SM APPLICATIONS LITE V2		SM-APPS-LITE-V2
System Programming and Registration		SM-REGISTER
Dedicated Motion Control		SM-EZMOTION ⁴
Applications Module Programming Software	Ladder and Function Blocks	SYPTLITE ⁵
	IEC 61131-3 (Ladder, FB, and Text Based)	SYPTPRO
Miscellaneous	Motion Made Easy Programming	POWERTOOLSPRO
	Conduit Entry Plates	See Options & Accessories
	IP54 or IP55 Cooling Fans	Based on Drive

¹ Can be ordered separately, but comes standard with Unidrive SP
² These options can be ordered separately, but are normally part of the Unidrive SP Order Code
³ Provides an additional Modbus RTU port (in addition to one on drive)
⁴ Only one of these modules can be used in a Unidrive SP at a time
⁵ Available via free web site download only
⁶ For Keypad details see the Options & Accessories section page 394

Operator Interface

KEYPAD INTERFACE

The Unidrive SP can operate without a keypad, or with either the SM-Keypad and SP-Keypad or SM-Keypad Plus.

The SM/SP-Keypad are full-function, 7-digit LED data displays. The SM-Keypad Plus is a back-lit LCD display option that can be mounted on the drive or remote mounted. SM-Keypad Plus supports 5 languages, plus custom text database, online help, and HMI features. Keypads are "hot-pluggable," enabling them to be moved from one drive to another without powering down.



**SP-Keypad (LED)
for Unidrive SP size Zero**



**SM-Keypad, No Keypad
size 1-6**



SM-Keypad Plus

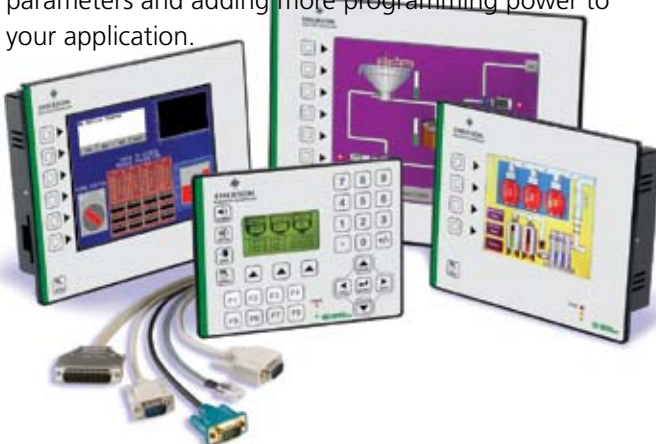
Multi-lingual Keypad

English French
Spanish German
Italian

Keypad to Drive Cable SP-LCD-485-XXX
XXX=005, 010, 015, 025, 050 feet

HUMAN MACHINE INTERFACE (HMI)

These operator interface units complement the product line by offering an impressive way of accessing parameters and adding more programming power to your application.



For more information, refer to the Accessories Section.

Power Accessories

INTERNAL DYNAMIC BRAKING RESISTORS

During deceleration, the mechanical energy stored in the spinning mass of the motor and load is converted to electrical energy, which recharges the drive's DC bus. Dynamic braking resistors provide a means of rapidly dissipating that energy so that the DC bus does not become overcharged. The ohmic value and power rating of the braking resistor is a function of the drive type and size.



**Size 1 Unidrive SP
heatsink shown**

A Zero-space braking resistor is available for heatsink mounting on Unidrive SP frame sizes 0-2. These resistors are designed for low-inertia loads commonly used in servo type applications. For higher-inertia loads, the heatsink mounted resistor may not have enough braking capacity, and a larger external resistor may be required. No thermal protection device is required with these heatsink mounted resistor packages.

Frame Size	DC Resistance	Power Rating	Order Code
0	75 Ω	50W	SM-HEATSINK-DBR0
1	75 Ω	50W	SM-HEATSINK-DBR1
2	37.5 Ω	100W	SM-HEATSINK-DBR2

(Drives Larger than Size 2 do not have this option)

DYNAMIC BRAKING RESISTORS

E-STOP DUTY

E-Stop duty DB resistors are designed for non-cyclic use where energy dissipation from an active drive is required.



CYCLIC DUTY

These heavy-duty kits have been designed to provide dynamic braking for cyclic and continuous braking applications.



See the Options and Accessories section for details

EXTERNAL EMC FILTERS

EMC filters are used to minimize high frequency power supply line disturbances caused by PWM AC drives that may interfere with proper operation of sensitive electronic equipment. These specific filters have been assessed for conformance with the EMC directive by testing with the appropriate Control Techniques drives. The filters used with Unidrive SP have been designed to mount in either Footprint or Bookend dimensions, allowing the user to optimize panel space.



See the Options and Accessories section for details.

IP54 AND IP55 FAN OPTIONS

For those applications using through-panel mounting, and located in demanding environments, Unidrive SP can be fitted with optional fans providing either IP54 or IP55 Ingress Protection Ratings. The chart below lists the available fan options.



Unidrive SP Frame Size	IP54 Fan Option Order Code	IP55 Fan Option Order Code
1	3251-4824	3251-3824
2	3251-4824	3251-3824
3	N/A	3251-1224
4	3251-7824	N/A
5	Standard	N/A
6	Standard	N/A

Drives fitted with fan options require field wiring.

COMMUNICATION CABLES

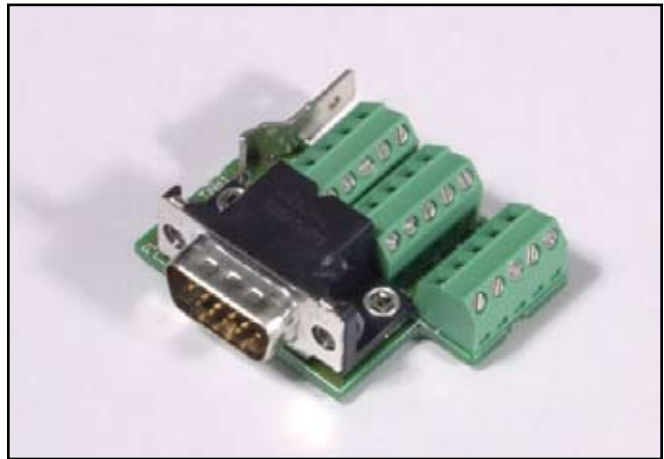
Communication cables are available to allow drive configuration and online monitoring from a PC. The CT Comms Cable connects the 9 pin RS232 serial port of a PC to the RJ45 port of the drive. You may also connect the RJ45 port on the drive directly to the USB port of your PC using the CT USB Cable.



Description	Order Code
PC-to-drive Comms Cable	CT-COMMS-CABLE
PC-to-drive Comms Cable	CT-USB-CABLE

ENCODER TERMINAL CONNECTOR

The 15 way D-Type Converter is used to simplify motor feedback wiring by “Breaking out” the 15-pin D-connector signals to screw terminals.



Description	Order Code
Encoder Screw Terminal connector	SM-ETC

CONDUIT BOXES*

Conduit entry boxes for Commander SK, Commander GP20 and Unidrive SP panel-mount drives. Currently, conduit mounting plates are available for Commander SK, Commander GP20 and Unidrive SP sizes A through 6.

**For overall dimensions and order codes see the AC Options & Accessories section - page 83.*

Unidrive SP Solution Modules Feedback Modules

SM-UNIVERSAL ENCODER PLUS

The SM-Universal Encoder Plus module provides the Unidrive SP with an additional feedback port that supports all of the same feedback types as the base drive, plus has a simulated encoder output that can be programmed to operate in the following modes:

- Quadrature Incremental
- Pulse and Direction
- SSI Gray or Binary Code



The module also incorporates freeze inputs for applications requiring position capture.

Order Code: SM-UNI-ENCODER

SM-ENCODER OUTPUT PLUS

Incremental encoder input and output option module to enable connection with external motion controllers.

Order Code: SM-ENCODER-OUT



SM-ENCODER PLUS

The SM-Encoder Plus module provides an additional quadrature incremental encoder input.

Order Code: SM-ENCODER-PLUS

Note: More than one SM-Encoder module may be installed in a single drive.



SM-RESOLVER

This module enables the Unidrive SP to control the speed and position of motors fitted with resolvers. Because of their ruggedness, resolvers are often used in hot, demanding environments.



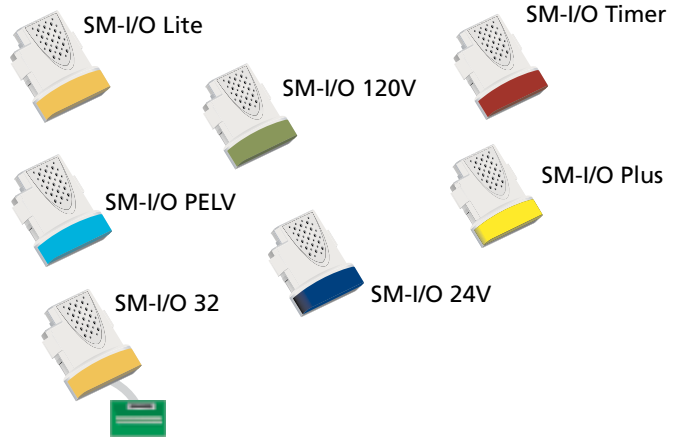
- Input Impedance:** >85 Ohms
Transformation Ratio: 3:1 or 2:1
Excitation Frequency: 6 kHz

Maximum Motor Speed	Feedback Resolution	Quadrature Format
0-3,300 rpm	14 bit	4096
3,301-13,200 rpm	12 bit	1024
13,201-40,000 rpm	10 bit	256

This module also incorporates a simulated encoder output that can be sourced either from the resolver or the main drive encoder port.

Additional Input / Output Modules*

To customize your Unidrive SP with more or specialized I/O, or to install a fieldbus option there are slots beneath the cover for three Solution Modules.



Communication Modules*

SM NETWORK COMMUNICATION MODULES



** Modbus RTU is standard on Unidrive SP. An additional Modbus RTU port can be provided with an SM-Applications/Plus module.

See the OPTIONS-AT-A-GLANCE chart for order codes. For more information on individual modules see the Options and Accessories section.

* For more details and order codes see the AC Drive Options section at the end of the AC Drives section. For complete product descriptions please refer to the Options and Accessories section.

Application / Programming Modules

SM-APPLICATIONS PLUS

SM-Applications Plus meets your most demanding high speed motion application needs.



The SM-Applications Plus module transforms your Unidrive SP drive into a powerful automation controller that adds PLC functionality and can connect to devices via our drive-to-drive network CTNet. This gives you all of the benefits of a fully distributed control system including better performance, reduced cost and smaller electrical panel sizes.

Performance – The SM-Applications Plus module contains its own high performance microprocessor, leaving the drive's own processor to give you the best possible motor performance. It contains 384K of user program memory, meaning that you are never likely to be limited by the program size or processing power of the module.

Easy Powerful Configuration – The PLC functionality is programmed using SyPTPro (System Programming Tool) allowing you to tackle automation problems from simple start and stop sequencing to more complex machine and motion control applications. The device is programmed within an IEC61131-3 environment with your choice of 3 languages; Ladder Logic, Function Blocks, and text based programming. SyPTPro provides a suite of diagnostic and debugging features for maintenance and to help you to get your solution into service faster.

Real Time Control – SM-Applications Plus module gives you real-time access to all of the drives parameters plus access to data from I/O or other drives. The module uses a high-speed multi-tasking operating system with task update times as low as 250 μ s. Tasks are fully synchronized to the drives own control loop to give you the best possible performance for drive control and motion.

Inputs/Outputs – The module has two digital inputs and two digital outputs for high-speed I/O operations such as position capture or actuator firing. The module also features an optically isolated RS485 port supporting standard protocols such as Modbus for connection to external devices like Operator Interface panels, or CTSync which is a protocol used for synchronous communication between drives. **Order Code: SM-APPS-PLUS**

See the Software section of this catalog for more details on PowerTools Pro Software, which features "Motion Made Easy"™ programming with Drag and Drop, Point and Click, and Fill in the Blank.

SM-REGISTER

SM-Register provides additional capability for position capture and registration and is designed to be used with the SM-Applications Plus module. It is your best solution for critical high speed motion applications.

- 2 Independent Capture Channels
- Automated Pattern Recognition
- Registration Windowing
- Positive & Negative Edge Capture
- Edge Filtering
- Pulse Capture



SM-APPLICATIONS LITE V2

SM-Applications Lite V2 module is your solution for single drive, time critical applications when multiple networked drives are not required. The SM-Applications Lite V2 module is designed to solve your automation requirements where intelligence is needed on a standalone drive or a drive connected to a centralized controller via I/O or Fieldbus.

The module provides many of the same functions of SM-Applications Plus but may be programmed using either SyPTLite or SyPTPro. SM-Applications Lite V2 with SyPTLite gives you an intermediate level automation solution that is suitable for a wide variety of applications, while SyPTPro and SM-Applications Lite V2 allow you to exploit the full power and performance of the option module in 'stand-alone' applications.

Order Code: SM-APPS-LITE-V2

Note: CTNET and CTSync are not supported.



SM-EZMOTION

The SM-EZMotion is ideal for all of your motion control applications whether simple or highly complex. Windows™-based PowerTools Pro configuration software helps to simplify applications while maintaining flexibility and functionality.

The module is equipped with four high speed digital inputs and two digital outputs for external control. Simplify all of your motion applications by using the built-in High-Speed Capture, Queuing, Profile Summation, and Program Multi-tasking capabilities. Ease of use defines this multipurpose motion controller. Take advantage of all its features to quickly solve these applications:

- Indexing
- Random Infeed Control
- Rotary Knife
- Phase Synchronization
- Flying Shear
- High Speed Labeling



Drive Configuration & Programming

SMARTCARD

This standard feature ships with every Unidrive SP enables simple configuration of parameters in a variety of ways.



The SmartCard can:

- ‘Clone’ a complete set of parameters for serial production
- Save multiple complete sets of parameters
- Set up an application as parameter differences from default
- Automatically save all user parameter changes for maintenance purposes
- Load complete motor map parameters
- Read/write SmartCard information from within SM-Applications and SM-Applications Lite programs.

The drive only communicates with the SmartCard when commanded to read or write, meaning the card may be “hot swapped”.

Description	Order Code
Plug-In drive configuration card. Save/Copy complete drive parameter mapping.	SMARTCARD



REMOTE NETWORK I/O

The high-quality Beckhoff I/O system is available for systems using the CTNet communications network. A CTNet port is standard on SM-Applications Plus modules. Beckhoff systems for CTNet include an I/O bus coupler and a large variety of snap-on terminal blocks allowing up to 256 digital inputs or outputs and up to 100 analog inputs and outputs per bus coupler. Up to 64 Beckhoff I/O systems can be attached to a CTNet network. I/O points can be easily read or written. Contact Control Techniques for details on the wide range of available Beckhoff Remote I/O options.



See page 381 for complete CTNet integration details.

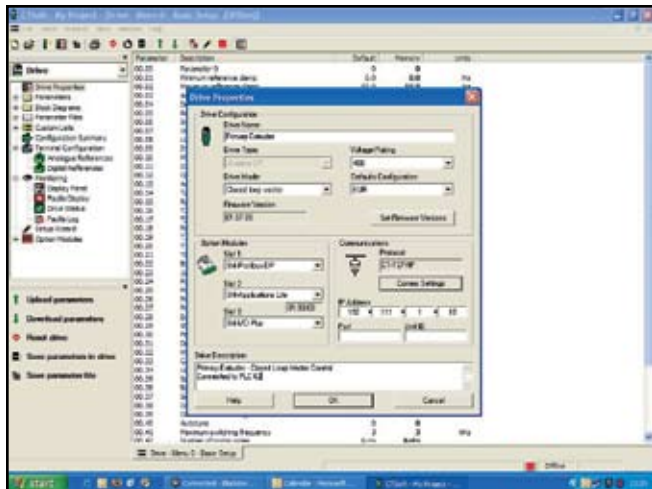
Unidrive SP Software Overview

DRIVE CONFIGURATION TOOLS (CTSOFT)

CTSoft is a free Windows™-based drive configuration tool designed to enable the complete control and display of all parameters within a Unidrive SP. Functions within CTSoft allow data to be uploaded, viewed and saved, or retrieved from disk, modified and printed. It can be used offline in the office or online in the factory. CTSoft communicates with the Unidrive SP via the computer's serial port to the drive's RS485 port using a communications cable (CT Comms cable) or via SM-Ethernet module. For more information, refer to the Software Section.

Some of CTSoft's capabilities include:

- Remote Upload/Download
- Parameter Saving
- Drive Set Up Wizard
- Monitor Screens
- Multiple Window Display
- Block Diagram Animation
- Drive and SM-Application Reset



FREE Software CTSoft IS SUPPLIED WITH THE DRIVE OR YOU CAN DOWNLOAD FROM www.emersonct.com --go to downloads

Application Programming Software

SYPTLITE AND SYPTPRO

Control Techniques has developed a programming tool named SyPT (or System Programming Tool) for OEM's and End Users that allows engineers and machine designers to maximize the functionality of the Unidrive SP and other Control Techniques drives. Whether programming a simple single-drive application that requires Run and Stop controls, or fully networked multi-drive control systems for machine and process control applications, SyPT helps the user to solve the application.

To cover the wide range of application complexity, SyPT is available in two versions called SyPTLite and SyPTPro. SyPTLite is used to create simple or complex Ladder Logic programs that can be used to control the drive, and even to replace small PLC's that control machine I/O. SyPTPro is for the advanced machine programmer, and gives the user IEC-61131-3 style programming with Ladder Logic, Function Block, and DPL (text-based) editors. SyPTPro is used for complete machine control and/or motion control by configuring all drives and control modules, as well as replacing costly PLC's.

Scalable PLC capability is accomplished using Solution Modules, which provide added memory, I/O, and connectivity options, i.e., the SM-Applications Lite and SM-Applications module. (See Software section.)

FREE Software YOU CAN DOWNLOAD SyPTLite FROM www.syptlite.com

POWERTOOLS PRO

PowerTools Pro is a Windows™-based software program used to develop "Motion Made Easy"™ motion control applications, and is employed when an SM-EZMotion module is used with the Unidrive SP. PowerTools Pro is used to develop sophisticated motion programs in minutes instead of hours, and is ideal for solving a full range of axis and axis-and-a-half applications. (See the Motion Control section for details.)

FREE Software YOU CAN DOWNLOAD PowerTools Pro FROM www.emersonct.com