



EMERSON™
Industrial Automation

A Guide to Control Techniques Option Modules

for use with:

- > Unidrive SP
- > Commander SK
- > Affinity
- > Digitax ST
- > Mentor MP

This guide is one of a series covering subjects such as harmonics, safety features, EMC, feedback devices, industrial communications and motion control.

These can be accessed via www.controltechniques.com/guides.

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1 Drive option modules

Control Techniques offer a variety of options and Solutions Modules which enhance the functionality and connectivity of our variable speed drives.

This guide is designed to give a brief overview of our drive option modules, including:

- A brief explanation of their function
- Key specification details
- Terminal descriptions
- Compatibility

Each option section includes a compatibility table highlighting which Control Techniques drives support each module:

Unidrive SP	✓	Commander SK	✗	Affinity	✗	Digitax ST	✓	Mentor MP	✗
-------------	---	--------------	---	----------	---	------------	---	-----------	---

Key:

- ✓ = compatible with named drive
- ✗ = incompatible with named drive

Control Techniques Solutions Modules allow our drives to integrate seamlessly with existing automation systems and other vendor supplied equipment. These include communications, I/O, feedback devices, enhanced safety features and onboard PLCs. Control Techniques use a high speed parallel bus between the drive and Solutions Module which removes delays, improving the drive's reaction time. Communications interfaces are independently certified for conformance with the relevant standards to ensure performance and interoperability.

Solutions Modules can be categorised as follows:

Intelligence & Safety

Programmable automation and motion option modules

Communications

Ethernet and fieldbus communications option modules

Feedback

Encoder and resolver option modules

Inputs and Outputs

Additional analog and digital input and output option modules

Figure 1-1 Typical arrangement of Solutions Modules and Smartcard in a Control Techniques drive



2 Automation (Intelligence and Safety) modules

Control Techniques automation modules contain a high performance microprocessor, leaving the drive's own processor to give you the best possible motor performance.

2.1 SM-Safety

Control Techniques' SM-Safety module is currently under development and will be available by the end of 2010. This will provide an intelligent, programmable solution to meet IEC61800-5-2, the functional safety standard.

2.2 SM-Applications Lite V2

	Colour: White								
	Unidrive SP	✓	Commander SK	✗	Affinity	✓	Digitax ST	*	Mentor MP

* Features provided by this option are integrated within the product range

The SM-Applications Lite V2 module is designed to provide programmable control for standalone drive applications or when the drive is connected to a centralised controller via I/O or fieldbus. SM-Applications Lite may be programmed using ladder logic with SyPTLite or can make use of the full automation and motion capabilities contained within SyPTPro. Features include:

- Easy powerful configuration – SM-Application Lite can be used to tackle automation problems from simple start/stop sequencing with a single drive to more complex machine and motion control applications.
- Real time control – The SM-Applications Lite module gives real-time access to all of the drive's parameters, plus access to data from I/O and other drives. The module uses a high speed multi-tasking operating system with task update times as low as 250µs. Tasks are synchronised to the drive's own control loops to give the best possible performance for drive control and motion.

Terminal descriptions

There are no terminals on the SM-Applications Lite V2.

2.3 SM-Applications Plus



Colour: Moss green

Unidrive SP ✓

Commander SK ✗

Affinity ✓

Digitax ST *

Mentor MP ✓

* Features provided by this option are integrated within the product range

SM-Applications Plus offers all of the features of the SM-Applications Lite V2 module but with additional communications and high speed I/O. This module is programmed using SyPTPro system programming tool. Features include:

- ➔ Inputs/Outputs – The module has two digital inputs and two digital outputs for high-speed I/O operations such as position capture and actuator firing.
- ➔ High speed serial port - The module features a serial communications port supporting standard protocols such as Modbus for connection to external devices such as operator interface panels.
- ➔ Drive-to-drive communications - SM-Applications Plus modules include a high speed drive-to-drive network called CTNet. CTNet is optimised for intelligent drive systems offering flexible peer to peer communications. The bus has the capability to connect to remote I/O, operator panels, Mentor II DC drives and PCs using an OPC server.

Terminal descriptions

1	2	3	4	5
---	---	---	---	---

EIA-485	Function
1	Isolated 0V
2	EIA-485 /Rx
3	EIA-485 Rx
4	EIA-485 /Tx
5	EIA-485 Tx

6	7	8
---	---	---

CTNet	Function
6	CTNet A
7	CTNet shield
8	CTNet B

9	10	11	12	13
---	----	----	----	----

Digital I/O	Function
9	Digital 0V
10	Digital input 0
11	Digital input 1
12	Digital output 0
13	Digital output 1

2.4 SM-Register



Colour: Golden brown

Unidrive SP	✓	Commander SK	✗	Affinity	✓	Digitax ST	✓	Mentor MP	✓
-------------	---	--------------	---	----------	---	------------	---	-----------	---

SM-Register is designed to provide a flexible, high performance solution for programmable motion requiring high speed registration features. It is ideal for applications such as printing, packaging and cutting machinery. Features include:

- Motion programming using PLCopen or Control Techniques' Advanced Position Controller (APC)
- Programmable in user defined units
- Two fully independent registration capture channels
- Storage for 256 events per channel, microseconds apart
- Pattern recognition
- Speeds in excess of 1000m/min can be handled
- Ability to filter unwanted marks (i.e. splashes, dirt, text etc)
 - Minimum and/or maximum pulse width
 - Distance from previous edge
- Compensation for registration sensor throughput delay

Terminal descriptions

1	2	3	4	5
---	---	---	---	---

EIA-485	Function
1	Isolated 0V
2	EIA-485 /Rx
3	EIA-485 Rx
4	EIA-485 /Tx
5	EIA-485 Tx


6	7	8
---	---	---

CTNet	Function
6	CTNet A
7	CTNet shield
8	CTNet B

9	10	11	12	13
---	----	----	----	----

Digital I/O	Function
9	Digital 0V
10	Digital input 0
11	Digital input 1
12	Digital output 0
13	Digital output 1

2.5 SM-EZMotion


Colour: Dark blue

Unidrive SP ✓
Commander SK ✗
Affinity ✗
Digitax ST *
Mentor MP ✓

*Features provided by this option are integrated within the product range

The SM-EZ Motion module and Power Tools Pro software provide a user friendly environment for motion programming. The EZ-Motion approach is ideal for applications that are low volume and low engineering time. Features include:

- Simple drag and drop programming allows the user to create programs “out of the box” without having to write any code
- Programming can be completed in 5 steps, with the software guiding the user through drive configuration, I/O configurations and programming steps
- Familiar Windows™ based environment with simple data entry
 - “Fill-in-the-blank” values
 - ‘Point and click” radio buttons
 - “Scrolling” menu selections
 - “Drag and drop” parameters
- The module has four digital inputs and two digital outputs for high-speed I/O operations

Terminal descriptions

1	2	3	4	5	6	7
---	---	---	---	---	---	---

PL1	Function
1	0V common
2	Digital input 1
3	Digital input 2
4	Digital input 3
5	Digital input 4
6	Digital output 1
7	Digital output 2

2.6 Smartcard



Unidrive SP	✓	Commander SK	✗	Affinity	✓	Digitax ST	✓	Mentor MP	✓
-------------	---	--------------	---	----------	---	------------	---	-----------	---

The Smartcard is a memory device that can be used to back-up parameter sets and PLC programs, and copy them from one drive to another. Features include:

- Parameter and program storage
- Simplified drive maintenance and commissioning
- Quick set-up for sequential build of machines
- Machine upgrades can be stored on a Smartcard and sent to the customer for installation

2.7 LogicStick




Colour: Grey

Unidrive SP	✗	Commander SK	✓	Affinity	✗	Digitax ST	✗	Mentor MP	✗
-------------	---	--------------	---	----------	---	------------	---	-----------	---

Inserting the LogicStick into the front of the drive adds the memory required to allow the Commander SK to execute a ladder logic PLC program. The PLC program is able access the drive parameters, option module I/O and Real Time Clock (RTC).

2.8 Smartstick



Colour: Black

Unidrive SP	✗	Commander SK	✓	Affinity	✗	Digitax ST	✗	Mentor MP	✗
-------------	---	--------------	---	----------	---	------------	---	-----------	---

Upload drive parameters to the SmartStick for storage or for easy set-up of identical drives.


3 Communications modules

Control Techniques drives support almost any industrial Ethernet, Fieldbus or real-time servo network such as Ethernet/IP, Profibus and EtherCAT. Where possible, we obtain independent certification for compliance with the relevant protocol standards to guarantee operation with other vendors' equipment. We continually monitor our customers needs and develop new modules as technologies emerge.


Control Techniques is a member of the following standards organisations:

- PROFIBUS International - responsible for maintaining and developing the specification for PROFIBUS
- ODVA - responsible for maintaining and developing the specification for the CIP family of protocols
- CiA (Can in Automation) - responsible for maintaining and developing the specification for CAN
- LONMark - responsible for maintaining and developing the specification for LonWorks and the LonTalk protocol
- EtherCAT Technology Group (ETG) - responsible for maintaining and developing the specification for EtherCAT

3.1 SM-Ethernet



Colour: Beige

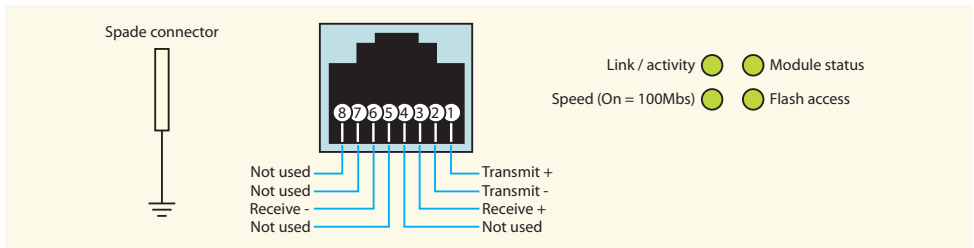


Unidrive SP ✓	Commander SK ✓	Affinity ✓	Digitax ST ✓	Mentor MP ✓
---------------	----------------	------------	--------------	-------------

SM-Ethernet supports Ethernet/IP and Modbus TCP/IP and has an inbuilt web server that can generate emails. The module can be used to provide high speed drive access, global connectivity and integration with IT network technologies, such as wireless networking. Features include:

- Modbus TCP/IP, Ethernet/IP, e-mail, web pages, SNMP
- Addressing is IP based
- Data rates 10Mbps/100Mbps
- Cyclic data sizes of up to 80 words in/out
- Explicit messaging supported
- Non-vendor specific AC drive profile supported


Terminal descriptions



3.2 SM-PROFIBUS-DP



Colour: Purple

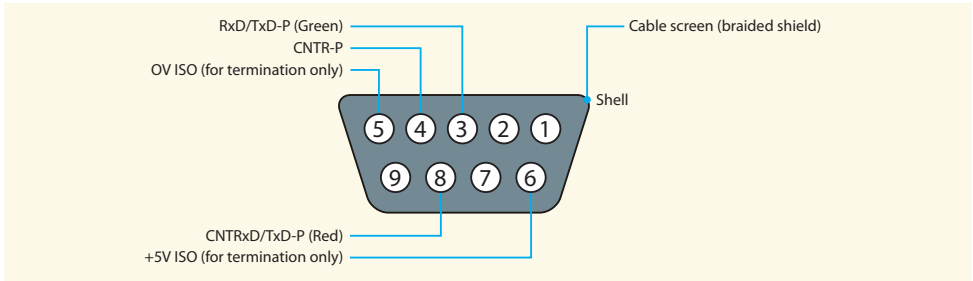


Unidrive SP	✓	Commander SK	✓	Affinity	✓	Digitax ST	✓	Mentor MP	✓
-------------	---	--------------	---	----------	---	------------	---	-----------	---


Control Techniques' PROFIBUS-DP slave/follower option module. Features include:

- Profibus protocol up to specification DP-V0 and DP-V1
- Up to 125 nodes on a network
- Data rates up to 12Mbps, automatically detected by the module
- Cyclic data sizes of up to 32 words in/out
- Non cyclic access available by mapping a non-cyclic channel into the cyclic data
- DP-V1 adds a non-cyclic channel
- Vendor independent profile for variable speed drives, PROFIdrive

Terminal descriptions



3.3 SM-EtherCAT



Colour: Brown red

EtherCAT

Technology Group

Unidrive SP ✓

Commander SK ✓

Affinity ✓

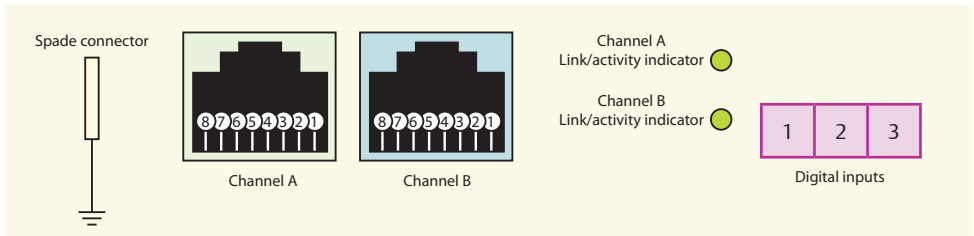
Digitax ST ✓

Mentor MP ✓

Control Techniques' EtherCAT slave/follower option module, for high performance servo applications. Features include:

- Up to 64535 nodes on a segment
- Data rate of 100Mbps (100BASE-TX)
- Update 40 axes in 200µs (assuming 2 words command data and 3 words feedback data per axis, a control word and basic cyclic synchronisation data)
- Jitter of less than 1µs (less than 500ns with Unidrive SP 3, 6 and 12KHz switching frequencies)
- Non-cyclic data using the CoE mailbox
- CANopen DS-402 profile supported (drives and motion control)


Terminal descriptions




Pin	Channel A	Pin	Channel B
1	Transmit +	1	Transmit +
2	Transmit -	2	Transmit -
3	Receive +	3	Receive +
4	Not used	4	Not used
5	Not used	5	Not used
6	Receive -	6	Receive -
7	Not used	7	Not used
8	Not used	8	Not used

Digital input	Function
1	0V common
2	Digital input 1
3	Digital input 2

3.4 SM-DeviceNet



Colour: Medium grey



Unidrive SP ✓

Commander SK ✓

Affinity ✓

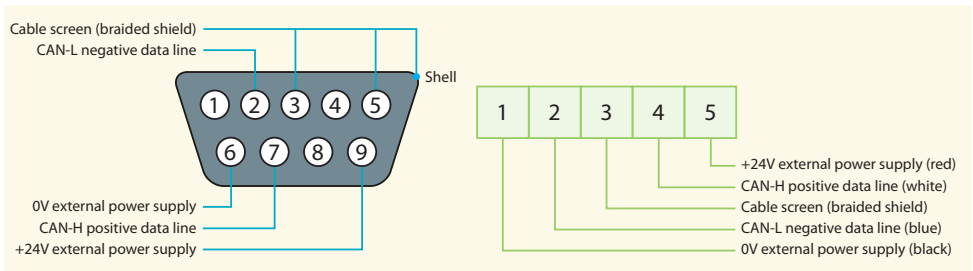
Digitax ST ✓

Mentor MP ✓


Control Techniques' DeviceNET option module. Features include:

- ➔ Up to 62 nodes on a network
- ➔ Data rates up to 500Kbps, automatically detected by the module
- ➔ Cyclic data sizes of up to 28 words in/out
- ➔ Non-cyclic access supported using the explicit data channel
- ➔ Vendor independent assembly objects for basic, extended speed and torque control

Terminal descriptions



3.5 SM-CANopen



Colour: Light grey

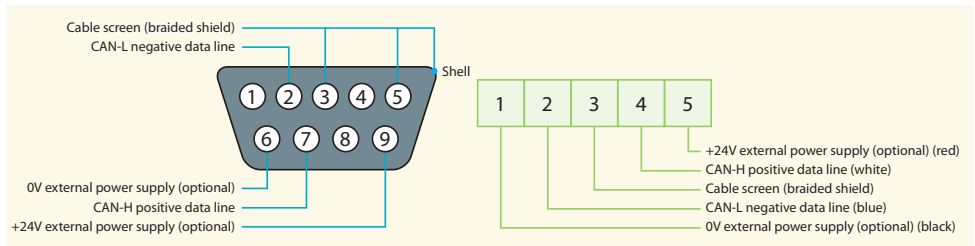
CANopen

Unidrive SP ✓	Commander SK ✓	Affinity ✓	Digitax ST ✓	Mentor MP ✓
---------------	----------------	------------	--------------	-------------


Control Techniques' CANopen interface supporting various profiles including several drive profiles. Features include:

- Up to 127 nodes can be on a network
- Data rates up to 1Mbps, automatically detected by the module
- Up to 4 cyclic data channels, each containing up to 4 words in/out
- Non-cyclic data available: SDO non-cyclic protocol or mapping non-cyclic channel into the cyclic data
- Vendor independent profile supported: DS-402 profile supported (drives and motion control)
- A Control Techniques specific drive synchronisation mechanism implemented for synchronisation of position loops between drives on CANopen network
- Object dictionary extendible with an SM-Applications module

Terminal descriptions



3.6 SM-INTERBUS



Colour: Dark grey

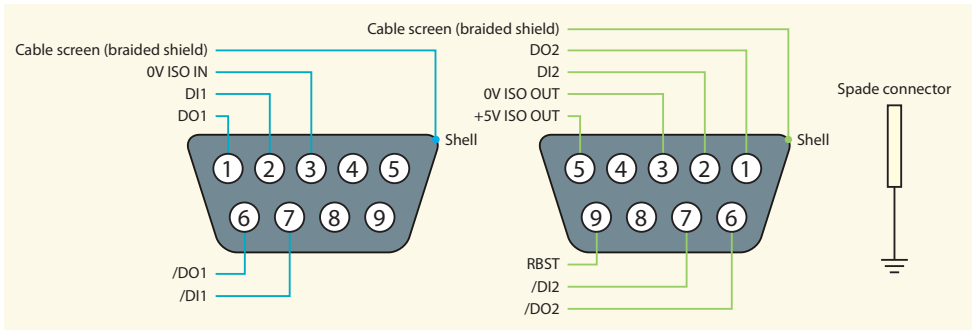


Unidrive SP ✓
Commander SK ✓
Affinity ✓
Digitax ST ✓
Mentor MP ✓

Control Techniques' Interbus interface option module. Features include:

- ➔ Up to 63 nodes on a network
- ➔ Fixed data rate of 500Kbps
- ➔ Cyclic data sizes of up to 10 words in/out
- ➔ Non-cyclic access supported using standard PCP protocol


Terminal descriptions



3.7 SM-CAN



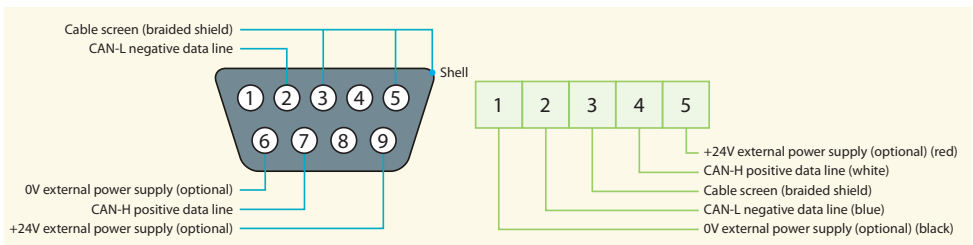
Colour: Pink




Unidrive SP ✓
Commander SK ✗
Affinity ✓
Digitax ST ✓
Mentor MP ✗

Control Techniques' user programmable CAN option module that allows the user to develop their own CAN protocols.

Terminal descriptions



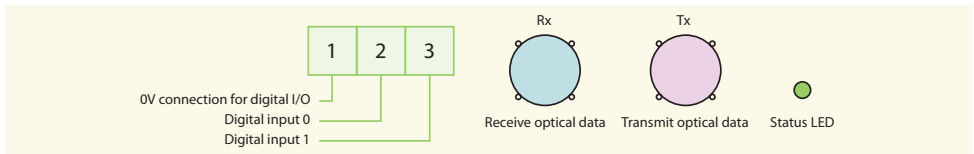
3.8 SM-SERCOS

	Colour: Red								
	Unidrive SP	✓	Commander SK	✗	Affinity		✓	Digitax ST	✓



Control Techniques' SERCOS interface. Features include:

- Up to 254 nodes on a network
- Data rates up to 16Mbps
- Cyclic data sizes of up to 5 words in/out
- Non-cyclic data available: SERCOS service channel
- Vendor independent profile supported: torque, velocity and position

Terminal descriptions



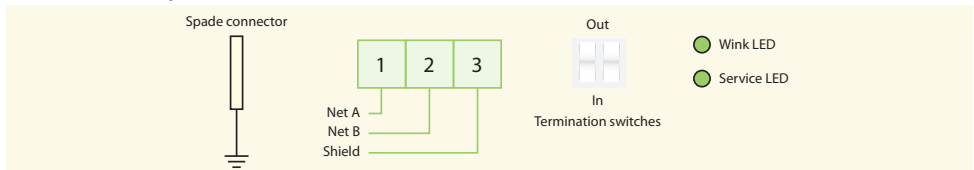
3.9 SM-LON

	Colour: Pale green								
	Unidrive SP	✓	Commander SK	✓	Affinity		✓	Digitax ST	✓

Control Techniques' LonWorks interface for building automation applications. Features include:

- Up to 32385 nodes on a network
- TP/FT-10 cabling 78kbps twisted pair
- Non-cyclic peer-to-peer messaging
- Vendor independent profiles supported: Variable Speed Motor Drive and Node Object function blocks

Terminal descriptions



3.10 SM-PROFINET

This Solutions Module is currently under development at Control Techniques and will be available in 2011.

4 Feedback

Control Techniques products have the hardware required to connect to virtually any feedback encoder type, allowing the system designer to select the most appropriate technology for the application. Encoder types include:

- Incremental - Offers a good balance of cost and performance
- SinCos - Provides increased position resolution for precision and low speed applications
- SSI - Provides absolute position feedback
- EnDat & HIPERFACE - These encoders transfer position data using a high speed communications network, often combined with SinCos technology

These feedback option modules extend the drive's standard functionality.

4.1 SM-Universal Encoder Plus



Colour: Light green

Unidrive SP	✓	Commander SK	✗	Affinity	✗	Digitax ST	✓	Mentor MP	✓
-------------	---	--------------	---	----------	---	------------	---	-----------	---

Control Techniques' additional combined encoder input and output interface supporting Incremental, SinCos, HIPERFACE, EnDAT and SSI encoders.

The SM-Universal Encoder Plus module provides the drive with an additional feedback port with the same functionality as the base drive, supporting:

- SinCos with commutation
- Quadrature incremental
- Pulse and direction
- SSI

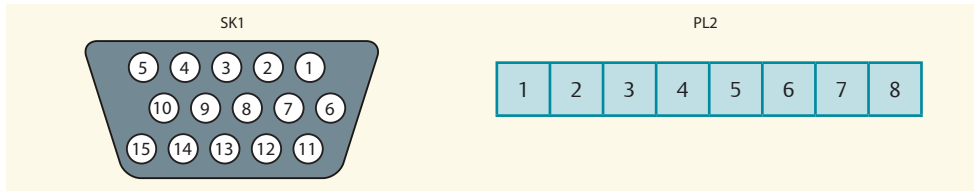
The module also provides a simulated encoder output that can be programmed to operate in the following modes:

- Quadrature incremental
- Pulse and direction
- SSI

The module also incorporates high speed inputs for position capture.

Terminal descriptions


15 way female D-type



SK1 pin	Encoder												
	Ab	Fb	Fr	Ab.SErVO	Fd.SErVO	Fr.SErVO	SC	SC.HiPEr	EndAt	SC.EndAt	SSI	SC.SSI	SC.UVW
1	A	F	F	A	F	F		Cos		Cos			Cos
2	A\	F\	F\	A\	F\	F\		Cosref		Cosref			Cosref
3	B	D	R	B	D	R		Sin		Sin			Sin
4	B\	D\	R\	B\	D\	R\		Sinref		Sinref			Sinref
5	Z							Encoder input – Data (input/output)					Z
6	Z\							Encoder input – Data (input/output)					Z\
7	Sim. enc, Aout, Fout, Data SSI (output)			U			Simulated encoder Aout, Fout, Data SSI (output)						U
8	Sim. enc, Aout\, Fout\, Data\ SSI (output)			U\			Simulated encoder Aout\, Fout\, Data\ SSI (output)						U\
9	Sim enc. Bout, Dout, Clock\ SSI (input)			V			Simulated encoder Bout, Dout, Clock\ SSI (input)						V
10	Sim enc. Bout\, Dout\, Clock SSI (input)			V\			Simulated encoder Bout\, Dout\, Clock SSI (input)						V\
11				W					Enc. input - Clock (output)			W	
12				W\					Enc. input - Clock\ (output)			W\	
13	+V												
14	0V common												
15	th												

PL2 terminal	Input / Encoder outputs					
	Freeze RS485 input	Freeze +24V input	Ab output	Fd output	SSI output	Marker output
1		Freeze				
2	0V common					
3			A	F	Data	
4			A\	F\	Data\	
5			B	D	Clock\ (input)	
6			B\	D\	Clock (input)	
7	0V common					
8	Freeze					Z
9	Freeze\					Z\

4.2 SM-Encoder Output Plus



Colour: Dark brown

Unidrive SP	✓	Commander SK	✗	Affinity	✗	Digitax ST	✓	Mentor MP	✓
-------------	---	--------------	---	----------	---	------------	---	-----------	---

Control Techniques' incremental encoder input and output option module to enable connection with external motion controllers

Terminal descriptions

PL1

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

PL1 (Input)			
Terminal	Ab	Fd	Fr
1	A	F	F
2	A\	F\	F\
3	B	D	R
4	B\	D\	R\
5	Z		
6	Z\		
7	0V		
8	+V		

PL2

1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---

PL2 (Output)					
Terminal	Ab	Fd	Fr	Ab.L	Fd.L
1	0V				
2	0V				
3	A	F	F	A	F
4	A\	F\	F\	A\	F\
5	B	D	R	B	D
6	B\	D\	R\	B\	D\
7	0V				
8	Z				
9	Z\				

4.3 SM-Encoder Plus



Colour: Brown

Unidrive SP	✓	Commander SK	✗	Affinity	✗	Digitax ST	✓	Mentor MP	✓
-------------	---	--------------	---	----------	---	------------	---	-----------	---


Control Techniques' incremental encoder input option module.

Terminal descriptions

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

Encoder			
Terminal	Ab	Fd	Fr
1	A	F	F
2	A\	F\	F\
3	B	D	R
4	B\	D\	R\
5	Z		
6	Z\		
7	0V		
8	External power supply coupling		

4.4 SM-Resolver



Colour: Light blue

Unidrive SP	✓	Commander SK	✗	Affinity	✗	Digitax ST	✓	Mentor MP	✗
-------------	---	--------------	---	----------	---	------------	---	-----------	---

Control Techniques' Resolver module is designed for robust feedback in demanding environments.

SM-Resolver enables the drive to measure the speed and position of motors and machines fitted with resolvers. Due to their ruggedness, resolvers are often used in hot, demanding environments. The option module also offers a simulated incremental encoder output.


Terminal descriptions

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----

Terminal	Simulated encoder output connections
1	A
2	A\
3	0V common
4	B
5	B\
6	0V common
7	Z
8	Z\

Terminal	Resolver connections
9	SIN LOW
10	SIN HIGH
11	COS LOW
12	COS HIGH
13	REF HIGH (excitation)
14	REF LOW (excitation)
15	0V common
16	
17	

4.5 SM-SLM



Colour: Orange

Unidrive SP

Commander SK

Affinity

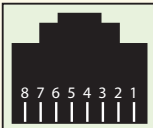
Digitax ST

Mentor MP

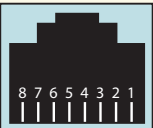
Control Techniques' SLM module is designed for integration with SLM enabled motion controllers.


Terminal descriptions

SLM



MC





SLM RJ45	
Term	Function
1	RS485 Drive-link COM
2	RS485 Drive-link COM/
3	Drive status (not used)
4	Enable (used as a monitor)
5	24Vdc (SLM)
6	Isolated 0V (SLM)
7	Not connected
8	Not connected
Screen	Screen


MC RJ45	
Term	Function
1	RS485 Drive-link COM
2	RS485 Drive-link COM/
3	Drive status (not used)
4	Enable (used as a monitor)
5	Not connected
6	Isolated 0V (SLM)
7	24Vdc (SLM)
8	Not connected
Screen	Screen

Terminal	
Term	Function
1	Not used (dedicated for future product enhancements)
2	Not used (dedicated for future product enhancements)
3	Isolated 0V (screen) SLM
4	Battery 24V input
5	Isolated 0V (screen) SLM

5 Inputs and outputs (I/O)

Control Techniques I/O modules and remote I/O units extend the drive's standard analog and digital I/O to allow the onboard drive automation and motion controllers to be at the heart of the end user's system.

5.1 SM-I/O 32



Colour: Yellow

Unidrive SP ✓

Commander SK ✓

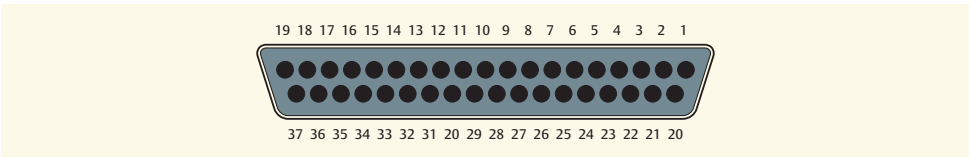
Affinity ✓

Digitax ST ✓

Mentor MP ✓

Control Techniques' extended digital I/O, adding 32 digital high speed bi-directional I/O points to the drive.

Terminal descriptions



PL3 terminal	Function
1 to 32	Digital input/output 1 to 32 (DI01 to 32)
33	+24V output
34 to 37	0V

5.2 SM-I/O Plus



Colour: Yellow

Unidrive SP	✓	Commander SK	✗	Affinity	✓	Digitax ST	✓	Mentor MP	✓
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Control Techniques' extended I/O interface to increase the number of I/O points on a drive. Features include:

- 2 x Analog inputs (10-bit plus sign, +/- 10V)
- 1 x Analog output (10-bit plus sign, +/- 10V)
- 3 x Digital inputs/outputs
- 3 x Digital inputs
- 2 x Relay contacts (2A @ 240V, 4A @ 30Vdc)

Terminal descriptions


1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

22	23	24
----	----	----

PL1 terminal	Function	PL1 terminal	Function
1	0V common	7	Digital input 5
2	Digital input/output 1	8	Digital input 6
3	Digital input/output 2	9	Analog input 1
4	Digital input/output 3	10	Analog input 2
5	0V common	11	0V common
6	Digital input 4	12	Analog output 1

PL1 terminal	Function
21	Relay 1
22	Relay common
23	Relay 2

5.3 SM-I/O Lite



Colour: Dark yellow

Unidrive SP ✓

Commander SK ✓

Affinity ✓

Digitax ST ✓

Mentor MP ✓

Control Techniques' extended I/O interface with reduced functionality. Features include:

- 1 x Analog input (+/- 10V bi-polar or 4-20mA)
- 1 x Analog output (0-10V or 4-20mA)
- 3 x Digital inputs
- 1 x Relay contacts (2A @ 240V, 4A @ 30Vdc)
- Quadrature reference encoder Input

Terminal descriptions


1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

22	23	24
----	----	----

PL1 terminal	Function	PL1 terminal	Function
1	0V common	7	Digital input 3 / Encoder B
2	Analog input	8	Encoder B\
3	Analog output	9	Encoder A
4	+24V	10	Encoder A\
5	Digital input 1	11	0V
6	Digital input 2	12	Encoder +5V

PL1 terminal	Function
21	Relay 1
22	Not connected
23	Relay 2

5.4 SM-I/O Timer



Colour: Dark red

Unidrive SP	✓	Commander SK	✓	Affinity	✗	Digitax ST	✓	Mentor MP	✓
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Control Techniques' extended I/O option module with real time clock. Features include:

- Access to year, month, day, hour, minute, second, and daylight savings mode.
- 1 x Analog input (+/- 10V bi-polar or 4-20mA)
- 1 x Analog output (0-10V or 4-20mA)
- 3 x Digital inputs
- 1 x Relay contacts (2A @ 240V, 4A @ 30Vdc)
- Quadrature reference encoder Input

Terminal descriptions

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----

22	23	24
----	----	----

PL1 terminal	Function	PL1 terminal	Function
1	0V common	7	Digital input 3 / Encoder B
2	Analog input	8	Encoder B\
3	Analog output	9	Encoder A
4	+24V	10	Encoder A\
5	Digital input 1	11	0V
6	Digital input 2	12	Encoder +5V

PL1 terminal	Function
21	Relay 1
22	Not connected
23	Relay 2

5.5 SM-I/O PELV



Control Techniques' NAMUR standard I/O interface with high speed I/O.

This module provides PELV (Protective Extra Low Voltage) double insulated digital and analog I/O to meet IEC61131-2, Clause 3.3.1 Type, as well as NAMUR NE37 specifications for chemical industry applications. Features include:


- 1 x Analog input (current/voltage mode)
- 2 x Analog outputs (0-20mA, 20-0mA, 4-20mA and 20-4mA)
- 1 x Digital input
- 4 x Digital inputs/outputs
- 2 x Relay contacts (2A @ 240Vac, 4A @ 30Vdc)

Terminal descriptions

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
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PL1 terminal	Function	PL1 terminal	Function
1	0V common	10	Analog output 1
2	+24V input	11	0V common
3	Digital I/O 1	12	Analog output 2
4	Digital I/O 2	13	0V common
5	Digital I/O 3	14	Relay 1 contact 1
6	Digital I/O 4	15	Relay 1 contact 2
7	Digital input 5 / Freeze input	16	Relay 2 contact 1
8	Analog input 1 non-inverting input	17	Relay 2 contact 2
9	Analog input 1 inverting input		

5.6 SM-I/O 120V



Colour: Olive

Unidrive SP ✓

Commander SK ✓

Affinity ✓

Digitax ST ✓

Mentor MP ✓

Control Techniques' module that provides digital I/O rated to 120Vac. Features include:


- Conforms to IEC 61131-2 120Vac standard
- 6 x Digital inputs (120Vac or 3 x digital inputs @ 240Vac)
- 2 x relay contacts (2A @ 240Vac, 4A @ 30Vdc)

Terminal descriptions

1	2	3	4	5	6	7	8	9	10	11	12
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PL1 terminal	Function	PL1 terminal	Function
1	Digital input 1	7	Digital input 5
2	Digital input 2	8	Digital input 6
3	Neutral for digital inputs 1 & 2	9	Neutral for digital inputs 5 & 6
4	Digital input 3	10	Relay 1
5	Digital input 4	11	0V common
6	Neutral for digital inputs 3 & 4	12	Relay 2

5.7 SM-I/O 24V Protected



Colour: Cobalt blue

Unidrive SP	✓	Commander SK	✓	Affinity	✓	Digitax ST	✓	Mentor MP	✓
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Control Techniques' overvoltage protected I/O module. Features include:

- 2 x Analog outputs (0-20mA, 20-0mA, 4-20mA and 20-4mA)
- 4 x Digital inputs/outputs
- 3 x Digital inputs
- 2 x Relay contacts (30Vdc)

Terminal descriptions

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----

PL1 terminal	Function	PL1 terminal	Function
1	0V common	10	Analog output 1
2	0V common	11	0V common
3	Digital I/O 1	12	Analog output 2
4	Digital I/O 2	13	0V common
5	Digital I/O 3	14	Relay 1 contact 1
6	Digital I/O 4	15	Relay 1 contact 2
7	Digital input 5	16	Relay 2 contact 1
8	Digital input 6	17	Relay 2 contact 2
9	Digital input 7		

5.8 Beckhoff I/O












Unidrive SP	✓	Commander SK	✗	Affinity	✗	Digitax ST	✓	Mentor MP	✓
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Flexible I/O system for remote connectivity using Control Techniques' CNet drive-to-drive network.

Our simple, flexible product lines make choosing the right drive and options very easy. For more demanding solutions our engineers, located within our Drive Centre and Reseller network, are available to discuss your needs and provide advice. For further details, please refer to the brochures below, which are downloadable from www.controltechniques.com.

For printed versions, please see the back cover for the contact details of your nearest supplier.

	Control Techniques Company Profile	Company overview		
	AC & DC Drives, Servos and Drive Systems	Product Overview	100V / 200V / 400V / 575V/ 690V	0.25kW to 1.9MW
	Commander SK	General purpose AC drive	100V / 200V / 400V / 575V/ 690V	0.25kW to 132kW
	Unidrive SP panel mounting	High performance AC and servo drive	200V / 400V / 575V / 690V	0.37kW to 132kW
	Unidrive SP Free Standing	Higher power performance AC drive	400V / 575V / 690V	90kW to 675kW
	Unidrive SP Modular	High power modular AC drive	200V / 400V / 575V / 690V	45kW to 1.9MW
	Mentor MP	High performance DC drive	400V / 575V / 690V	25A to 7400A
	Digitax ST	Intelligent, compact and dynamic servo drive	200V / 400V	0.72Nm to 19.3Nm (57.7Nm Peak)
	Affinity	Dedicated HVAC/R drive for building automation and refrigeration	200V / 400V / 575V / 690V	0.75kW to 132kW



Unimotor fm

Performance AC brushless
servo motor

0.72Nm to
136Nm
(408Nm Peak)



Unimotor hd

High dynamic AC brushless
servo motor for Control
Techniques drives

0.72 Nm to
18.8 Nm
(56.4 Nm peak)

Control Techniques Drive & Application Centres

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