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TMC 188/40-TA

Four Axis Linear Motion And Pressure Control Module

The TMC 188/40-TA is a high performance motion control module with both analog and magnetostrictive transducer feedback. Each axis is independently programmed to operate in position or pressure control modes. The analog inputs may be used either for analog position transducers or for pressure signals. Drive outputs can be configured to work with hydraulic valves and servo drives.

Features

- Analog and magnetostrictive (Temposonics™) inputs in a single module
- Four axes of independent or coordinated control
- Isolated inputs and outputs
- Simatic TI 505 series compatible
- Pressure override and control.
- Pressure profiling and plotting
- Direct connection to Magnetostrictive (Temposonics) sensing devices
- Motion and pressure profiles can be changed on the fly
- Full PID loop control for position and pressure
- Two millisecond control loop
- Front panel status indicators

Applications

- Particle board / hard board
- Pinch roller positioning
- Plastics molding
- Investment casting
- End doggers / clamping
- Hydraulic actuators
- Palletizers/Stackers
- Laser positioning
- Robotics
- Tube forging machines

Analog Inputs

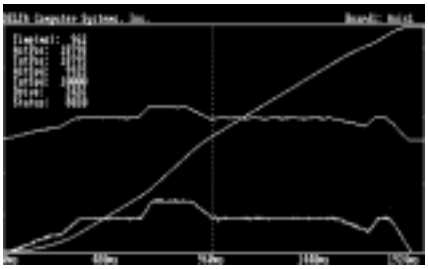
- Input range configurable for: 4-20 mA, 0-5 V, 0-10 V, ±5 V, and ±10 V
- 750 Vdc isolation
- 12 bit resolution
- 2 ms update rate

Magnetostrictive Inputs

- Resolution to 0.001 inches
- Direct connection to magnetostrictive transducers (Temposonics)
- 1,2 or 4 recirculations
- Positive or negative interrogation pulses
- Maximum speeds up to 60 inches per second (240 ips at 0.004" resolution)
- Transducer lengths up to 240 inches (0.004" resolution)

Diagnostic Program (requires PC or compatible)

- Provides graphic display of latest motion profile pressure and position information



- Calculates motion parameters SCALE, OFFSET & DIRECTION
- Provides access to auto tuning function
- Allows user to activate simple motion profiles from a keyboard
- Permits user to change control parameters from a keyboard
- Displays parameter and status information for multiple axes
- Saves and retrieves graphic diagnostic information to and from disk

TMC 188/40-TA

Hardware Information

Analog Inputs	Resolution	12 bits	
	Input Range*	4-20 mA	
		0-5 V	*The range on each channel is
		0-10 V	independently selected. All axes must be
		±5 V	unipolar or bipolar.
		±10 V	
	Input Isolation	750 Vdc	
	Input Impedance	400 kΩ differential	
		200 kΩ common mode	
		2 ms pressure loop	
Magnetostrictive Interface	Interface Type	Start/Stop digital pulse	
	Temposonics I and II	Direct connection	
	Temposonics II & RPM module	One differential driver board per axis (AMP 10)	
	Norstat	Direct connection	
	Balluff	One differential driver board per axis with BTL-2-P	
	T&R Electronics	One recirculation only (Consult Delta before using)	
	Input Isolation	2500 VAC optically isolated	
	Recirculations	Provided by module: 1, 2 or 4 (positive or negative pulse)	
	Counters	27.75 MHz	
	Position update rate	Two milliseconds	
	Sensor protection	4.7 and 15 ohm resistors for sensor power	
Drive Outputs	Output Isolation	2500 VAC optically isolated	
	Current Mode	±25, ±50, ±100 milliamps	
	Voltage Mode	±2.5, ±5, ±10 Volts	
	Resolution	12 bit	
Simatic TI 505 Interface	WY register requirements	8 WY registers	
	V Memory requirements	Up to 148 locations	
	Typical 525 scan times	10 milliseconds per module (plus remote I/O overhead)	
	Typical 535 scan times	1.6 milliseconds per module (plus remote I/O overhead)	
	Typical 545 scan times	0.8 milliseconds per module (plus remote I/O overhead)	
	505 Bus Interface	Special Function Interface Hardware	
Power Requirements	TI bus	+ 5 VDC @ 1.500 Amps maximum	
	External Magnetostrictive sensor	±15 VDC @ 500 mA, +5 VDC @ 500 mA	
	External drive	±15 VDC @ 500 mA	
Mechanical Specifications	Dimensions (WxHxD)	1.6 x 10.5 x 7.5 in (41 x 266 x 191 mm)	
	Weight	1.3 lb. (592g)	
	Connectors:		
	Backplane	Direct connection to TI 505 series backplane	
	Analog	DB-37S	
	Magnetostrictive Sensor	DB-25S	
	Drive	DB-15S	
Environment	Operating Temperature	+32 to +140 F (0 to +60C)	
	Non-Operating Temperature	-40 to +185 F (-40 to +85C)	
	Humidity	0 to 95% non-condensing	

Programming Parameters

Axis Setup Parameters	Pressure Differentiator	Differential gain while in pressure mode
	Pressure Integrator	Integral gain while in pressure mode
	Pressure Gain	Proportional gain for pressure control
	Pressure Scale	Scale for conversion from analog value to pressure
	Pressure Offset	Offset pressure value from zero
	Pressure Ramp	Change in pressure with respect to time
	Pressure Low	Minimum pressure set-point
	Pressure Command	Desired pressure to maintain
	New Null	Preset drive offset value
	Emergency Stop Mask	Disable for quick stop on errors
	Halt Mask	Disable for ramped stop on errors
	Feed Forward Advance	Time shift in milliseconds for Feed Forward term
	Null Update	Null calculation interval in milliseconds
	Dither	Static friction drive in percent of full drive
	Hysteresis	Drive deadband
	Static Gain	Proportional gain at rest
	Extend Gain	Proportional gain when extending
	Retract Gain	Proportional gain when retracting
	Integral Gain	Integral gain while in motion
	Differential Gain	Differential gain while in motion
	Extend Feed Forward	Feed forward drive when extending
	Retract Feed Forward	Feed forward drive when retracting
	Scale	Measured position conversion number
	Offset	Fixed position offset
	Direction	Sign of position units with respect to Transducer Counts
	Maximum Position Error	Set point for position error indication
	At Requested Position	Window around requested position for status bit
	Near Requested Position	Window around requested position for status bit
	Extend Limit	Maximum length allowed
	Retract Limit	Minimum length allowed
Axis Dynamic Control Parameters	Mode	Function selection bits
	Acceleration	Acceleration rate or distance
	Deceleration	Deceleration rate or distance
	Maximum Speed	Maximum speed during a move
	Requested Position	Destination position in position units
	Command	Command to be executed (F, G, H, P, R, S) F Auto adjustment of Feed Forward term G Move axis H Halt axis P Initialize axis setup parameters R Restore previously saved drive null S Save current drive null
Axis Status Information (Read only)	Command Position	Requested Position with limits checked
	Target Position	Calculated position of axis
	Actual Position	Scaled position measurement
	Transducer Counts	Raw transducer counts
	Status Word	Axis error and status
	Drive	Output drive in raw A/D counts (12 bit)
	Target Speed	Calculated speed
	Null drive	Current value for null drive
	Pressure Actual	Scaled pressure value
	Pressure Counts	Digital value from analog-to-digital converter

TMC 188/40-TA

Wiring Information

DB-25P to pigtail cable (6 feet) for magnetostrictive sensor inputs . Cable uses Alpha 1181/25 or equiv.

Pin	Function	Wire Color
1	+15 input	RED
2	Power supply common	BLACK
3	-15 input	WHITE
4	+5 input	GREEN
5	+12 output	ORANGE
6	Common	GRAY
7	Interrogation pulse 1	BROWN
8	+15v axis 1	PINK
9	Return pulse 1	YELLOW
10	-15v axis 1	VIOLET
11	Common	TAN
12	Interrogation pulse 2	BLUE
13	+15v axis 2	RED/BLACK
14	Return pulse 2	RED/YELLOW
15	-15v axis 2	RED/GREEN
16	Common	WHITE/BLACK
17	Interrogation pulse 3	WHITE/BLUE
18	+15v axis 3	WHITE/RED
19	Return pulse 3	WHITE/YELLOW
20	-15v axis 3	WHITE/GREEN
21	Common	WHITE/GRAY
22	Interrogation pulse 4	WHITE/BROWN
23	+15v axis 4	WHITE/ORANGE
24	Return pulse 4	WHITE/BLACK/RED
25	-15v axis 4	WHITE/VIOLET

DB37P-A pigtail cable (10 feet) for analog inputs . Cable uses Alpha 6014 or equiv.

Pin #	Function	Wire Color
1	Axis 1 + input	BLACK pair 1
20	Axis 1 - input	RED pair 1
2	Axis 2 + input	BLACK pair 2
21	Axis 2 - input	WHITE pair 2
3	Axis 3 + input	BLACK pair 3
22	Axis 3 - input	GREEN pair 3
4	Axis 4 + input	BLACK pair 4
23	Axis 4 - input	BLUE pair 4
5	Analog common	BLACK pair 5
24	N.C.	YELLOW pair 5
6	N.C.	BLACK pair 6
25	Digital common*	BROWN pair 6
7	B1*	BLACK pair 7
26	B2*	ORANGE pair 7
8	B3*	RED pair 8
27	B4*	WHITE pair 8
9-19	N.C.	
28-37	N.C.	

*Digital I/O circuitry normally not used. Contact Delta for configuration options and implementation.

DB-15P to pigtail cable (6 feet) for drive outputs. Cable uses Alpha 1181/15 or equiv.

Pin	Function	Wire Color
1	+15 input	RED
2	Power Supply Common	BLACK
3	-15 input	WHITE
4	Common	GREEN
5	Drive Out 1	ORANGE
6	Common	BLUE
7	Common	BROWN
8	Drive Out 2	YELLOW
9	Common	RED/BLACK
10	Drive Out 4	RED/YELLOW
11	Common	RED/GREEN
12	Common	TAN
13	Drive Out 3	PINK
14	Common	GRAY
15	Common	VIOLET

Ordering Information

Part Number: TMC 188/40-TA - Provided with each TMC 188/40-TA: Reference manual, DB15P and DB25P 6' pigtail cable, DB37P-A 10' pigtail cable, DCSMON software and manual, and example ladder program.

Contact: Herb Johanson at 206-254-8688

Options and Accessories

Part Number	Description
TMC 188/40	Motion controller using magnetostrictive sensors
TMC 188/40-Q	Motion controller using quadrature sensors
TMC 188/40-TQ	Motion controller with both magnetostrictive transducer inputs and quadrature inputs
TMC 188/40-QA	Motion controller coordinated with analog sensors (i.e., pressure control applications using quadrature encoders)
SSS/10	1 axis Servo System Simulator
AMP/10	1 axis RS422 converter(for Tempo II RPM option)
MCCBS	6 ft cable set (DB15P and DB25P with pigtails)
MCCBS-01	6 ft DB15P cable with pigtails
MCCBS-02	6 ft DB25P cable with pigtails
MCCBS-03	10 ft DB37P-Q cable with pigtails
MCCBS-04	10 ft DB37P-A cable with pigtails

Company Profile

Delta Computer Systems, Inc. manufactures motion controllers and other industrial controls providing high performance automation solutions to a wide range of industries.

Temposonics is a trademark of MTS Systems, Inc.

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