MAX-410

AND

MAX-420

SINGLE AND DUAL AXIS MICROSTEP POSITIONING SYSTEMS

INTEGRAL CONTROLLER, DRIVER, POWER SUPPLY
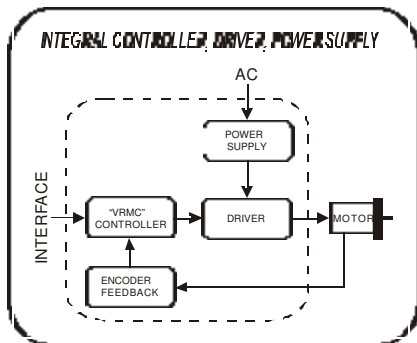
OVERVIEW

The MAX-410 (single axis) and MAX-420 (dual axis) are full function microstep positioning systems with integral driver (4 amps) and power supply (40Vdc). Standard features include 2k bytes of non-volatile memory for program storage, extended user I/O facilities, programmable motor current and independent acceleration/deceleration ramping.

Programming is through high-speed RS-422 serial interface with simple mnemonic commands for plug-and-play operation. Optional encoder circuitry provides stall detection and position feedback for closed-loop operation.

The MAX systems incorporate AMS' proprietary "Variable Resolution Microstep Control" (VRMC®) indexing technology for accurate and repeatable positioning at any shaft speed. Step resolution ranges from 400 to over 50,000 steps per revolution.

Short circuit, over temperature and under voltage protection, combined with special "Watchdog" software, ensure trouble-free operation in any environment. For export, CE certified models are also available.

FEATURES

- **Integral controller/driver/power supply**
- **Rugged, compact design**
- **Low cost**
- **Short circuit/over temp. protected**
- **Output current of 4 amps @ 40Vdc**
- **1/256 motor step resolution**
- **Fixed or variable step resolution**
- **Programmable run/hold current**
- **RS-422 "Party Line" operation**
- **Programmable accel/decel ramps**
- **Six buffered user I.O. ports**
- **2k bytes of non-volatile memory**
- **Optically isolated home/limits**
- **Self-contained home routine**
- **Dual speed jog inputs**
- **Go and soft stop inputs**
- **Programmable trip point**
- **Encoder feedback option**
- **Watchdog S/W for extra reliability**

SERIAL INTERFACE

The MAX systems feature full duplex serial communications. A "Party Line" interface implements a differential transmission and receiver pair that provides reliable communication in industrial environments. This protocol permits simultaneous communication (up to 32 axis) with minimum command processing latency.

PROGRAMMABLE CURRENT

The MAX has a programmable current feature that controls motor winding current to within 1% resolution. Independent settings for "RUN" and "HOLD" currents permit full motor torque when stepping. Automatic power down to the hold current value minimizes motor power dissipation when the system is in an idle mode of operation.

PROGRAMMING

Programs can be stored in non-volatile memory by using a host computer or dumb terminal. For stand-alone use there is a "GO" switch input. Additional input ports can test and branch to multiple motion subroutines. Two programmable outputs are available to drive solid state relays and other devices. A separate "TRIP" function provides automatic program branching when a specified motion is passed. Additional control inputs include soft stop, dual speed jog and step by step monitoring of travel limits.

ENCODER FEEDBACK

All MAX systems are easily upgraded to include encoder feedback for "closed loop" applications that require positional feedback data and stall detection. A built-in "line count" multiplier extends normal encoder resolution by a factor of four, providing greater accuracy at less cost.

COMMANDS

ESC	Abort/Terminate
@	Soft Stop
^C	Reset
A	Port Read/Write
B	Set Jog Speeds
C	Clear and Restore
c	Reset Driver
D	Divide Step Rates
E	Enable Auto Power Down
F	Find Home (SPS)
G	Go
H	Step Resolution
I	Initial Velocity (SPS)
J	Jump to Address N + 1(X)
K	Ramp Slope
k	Special Trip
L	Loop on Port
l	Invert Limit Polarity
M	Move at Constant Speed
O	Set Origin
P	Program Mode
Q	Query (List) Program
R	Index to Target Position
S	Store Parameters
T	Trip Point Set
V	Slew Velocity (SPS)
W	Wait N Milliseconds
w	Read Error Status
X	Examine Parameters
Y	Hold/Run Currents
y	Control Line Feed
Z	Display Position
+	Index in + Direction
-	Index in - Direction
[	Read NV Memory
\	Write to NV Memory
]	Read Limits/Hardware
^	Read Moving Status
|	Selective Termination

ENCODER COMMANDS

a	Read Stall Count
d	Deadband Enable
e	Encoder Resolution
f	Find Encoder Mark
g	Hunt On/Off
h	Hunt Resolution
m	Index Move
n	Force Encoder Position
o	Set Origin to Zero
r	Set Stall Retry Count
s	Stall Factor
t	Stall Test Data
v	Hunt Velocity
z	Read Encoder Position

AUXILIARY I.O. SIGNALS

Signal (J5)	Type	Signal (J5)	Type	Signal (J3)	Type
Gnd	Power	Jog Speed	Input	Opto+	Input
Port 1	Input	Jog 1	Input	Limit A	Input*
Port 2	Input	Jog 2	Input	Limit B	Input*
Port 3	Input	Go	Input	Home	Input*
Port 4	Input	Soft Stop	Input	Go	Input
Port 4	Output	VIO	Input	Gnd	Power
Port 5	Output	Gnd	Power		
Port 6	Output	12Vdc	Output	*Optically Isolated	

ELECTRICAL

Power Supply.....................…40Vdc @90VA
Output Current (Peak)….......4 Amps
Chopping Frequency.........…28kHz
Input Voltage..................…....100 to 125 VAC, 60 Hz or 200 to 250 VAC, 50Hz

I.O. Board (J5)	Min	Typ	Max	Units
I.O. Supply (VIO)	5		28	Vdc
Inputs (Ports 1,2,3,4):				
Input Voltage	-0.7		VIO	Vdc
Input Current			4	mA
Outputs (Ports 4,5,6):				
Output Voltage			36	Vdc
Output Current			0.5	Amp (cont.)

Control Board (J3)	Min	Typ	Max	Units
I.O. Supply (OPTO+)	5		12	Vdc
OPTO+ Inputs	-0.7		OPTO+	Vdc
Encoder Supply Voltage		5		Vdc
Encoder Supply Current			50	mA
Encoder Inputs	-0.7		5.7	Vdc
Encoder Input Currents		5	10	mA
RS-485 Inputs	-10		+15	Vdc
RS-485 Outputs		5		Vdc

MECHANICAL

MAX-410
4.0 x 5.9 x 4.0 (inches)
101.6 x 149.9 x 101.6 (mm)
4.37 lbs. (1.98 kg)

MAX-420
4.0 x 11.6 x 5.0 (inches)
101.6 x 295.2 x 127.0 (mm)
9.37 lbs. (4.25 kg)