Model 6100 Closed Loop Speed Control

1.0 INTRODUCTION

The unit is field wired to a back panel terminal strip. Seven terminals are of interest:
- 2 "AC" terminals. Connect 115 VAC.
- 2 "BRAKE" terminals. Connect to brake.
- "5V" terminal. Connected to speed pickup +5VDC
- "5VRTN" terminal. Connected to speed pickup return.
- "FREQ" terminal. Connected to speed pickup output.

☞ | Note: | There are three "EARTH" terminals. These can be used as protective grounds if shield wire is used. The chassis of the unit is **not** connected to any of these terminals.

Both AC inputs and the brake output is fused internally. See back panel for size. The 5V output is **not** fused.

The control algorithm is a simple PI (Proportional, Integral) routine where the current to the brake is governed by:

Current to brake = Coef P * x(n) + Coef I Σ x(n)

Coef P = user selected P value^2

Coef I = user selected I value^2 divided by 10

x(n) = (rpm - set speed) / set speed

The equation is calculated every 10 milliseconds and the value is sent to a 16-bit D–A Converter.

2.0 CONTROLS

2.1 Front Panel

SPEED - To adjust the speed set point, press the "SPEED" button on the front panel and adjust to required set point by turning the Increase/Decrease Dial. The set point is in increments of 10 rpm. The default value is 7000 rpm.

P - The stability of the loop can be adjusted. To adjust the "P" Parameter, press the "P" button on the front panel and adjust to required set point by turning the Increase/Decrease Dial. The default value of "P" is 200.

I - To adjust the "I" parameter, press the "I" button on the front panel and adjust to required set point by turning the Increase/Decrease Dial. The default value for "I" is 70.

All changes to setting are saved and will be retrieved on next power up.

To re-initialize the unit to default values press the "P" and "SPEED" buttons simultaneously during power up.

2.2   Rear Panel

RS-232 Interface - The serial interface can be used to download program updates and send operational commands to the unit.

3.0   INSTALLATION/CONFIGURATION

3.1   Hardware

Connect your computer to the unit using the three RS-232 terminals located on the back of the 6100 (232COM, 232RX and 232TX). A null modem will have to be purchased or fabricated. See below for recommended cable wiring.

Computer 9 pin   6100

1 ——— 1 TO 4 TO 6

2 ——————————————— 232TX

3 ——————————————— 232RX

4 ———○

5 ——————————————— 232COM

6 ———

7 ——— 7 TO 8

8 ———

9 ——— NC
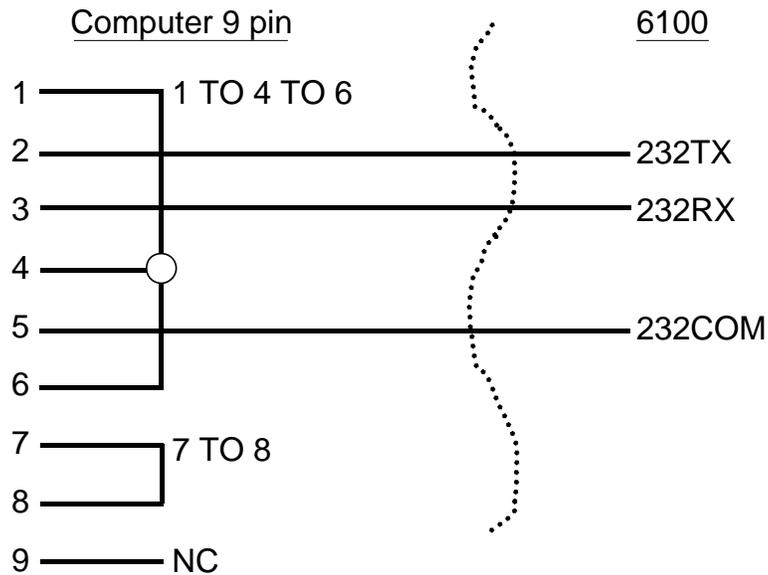
Figure 1 Cable Wiring

The unit communicates at 9600,N,8,1.

3.2   Software

1. Insert the CD-Rom that shipped with your unit and run the setup.exe program. The update program will install under "C:\Magtol\6001update\" by default.
2. Restart the computer when asked.
3. With the 6100 turned off and the RS-232 connected, run the update program in the Magtrol directory…

   "C:\ Magtrol\6001update\6001update.exe"

   …and follow the directions on the screen.
4. After the hex file has loaded, a popup menu will ask "What do you want to do?"

   Select **Burn Code**. The status window will then appear.
5. When "Reboot" appears in the window, turn the power off to the 6100.
6. Press and hold the "P" and "SPEED" buttons simultaneously and turn the power back on.

The software installation is complete.

4.0 OPERATION

4.1 Software Commands

Format = COMMAND<cr>

<cr> = carriage return

<lf> = line feed

XXXX = indicates a number

Command Code	Function	Value Range
OD	Returns speed data. Output data unit returns a string: OD <cr>SXXXX<cr><lf>	---
NP	Sets proportional term "P".	0 to 999
NI	Sets integral term "I".	0 to 999
NXXXX	Sets speed.	0 to 19990
UEØ	Sets 60-bit encoder.	---
UE3	Sets 2-bit encoder.	---

☞ Note: Any command sent to the 6100 requires reading the same number of bytes to clear the buffer.

Date	Edition	Change	Section(s)
01/13/05	1st Edition, Rev. A	Software command update.	4.1