

MAGTROL

PF-Test

Pass/Fail

Motor Testing Software

v1.3

User's Manual

MAGTROL, INC.

Sales and Technical Assistance

70 Gardenville Parkway
Buffalo, New York 14224 USA

Tel: (716) 668-5555 or 1-800-828-7844
Fax: (716) 668-8705

www.magtrol.com

Manufacturers of:

Motor Test Equipment
◆
Load-Force-Weight Systems
◆
In-Line Torque Transducers
◆
Hysteresis Brakes and Clutches
◆
Displacement Transducers
◆
Rotary Transmitters

While every precaution has been exercised in the compilation of this document, Magtrol, Inc., assumes no responsibility for errors or omissions. Additionally, no liability is assumed for any damages that may result from the use of the information contained within this publication.

PCI-GPIB is a trademark of National Instruments Corporation.

Windows 95®, Windows 98® and Windows NT® is a registered trademark of Microsoft Corporation.

Microsoft® Excel is a registered trademark of Microsoft Corporation.

Table of Contents

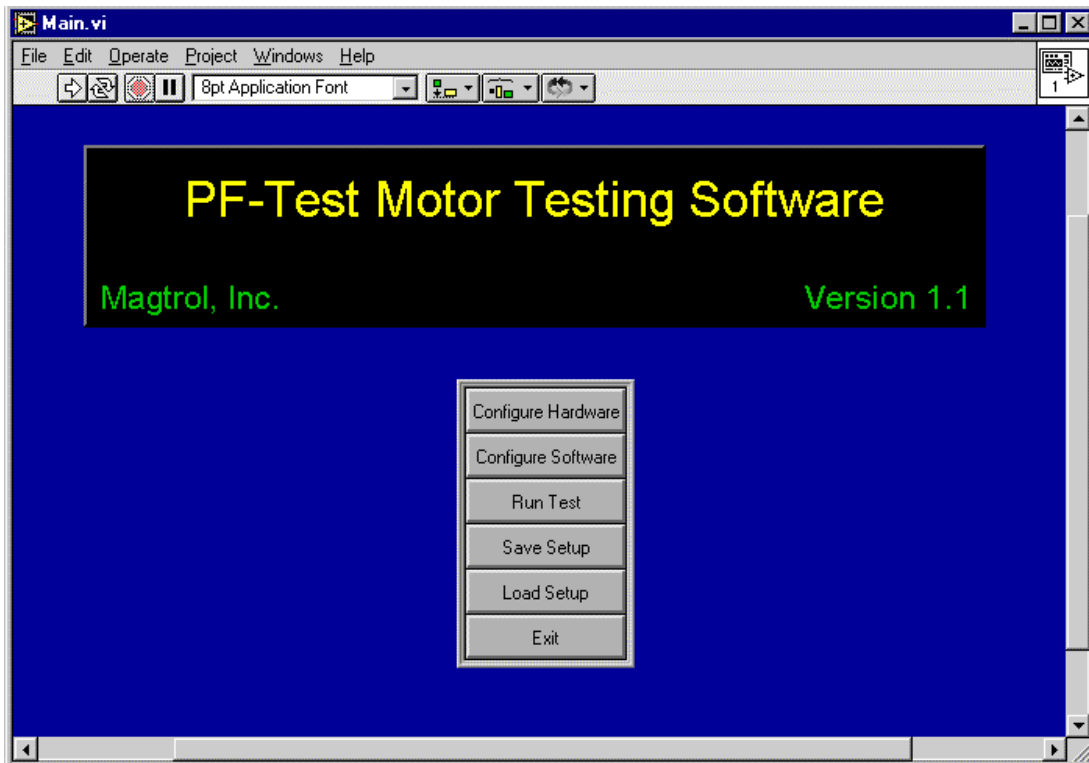
SALES AND TECHNICAL ASSISTANCE	2
REVISIONS TO THIS MANUAL	4
1 - INTRODUCTION	5
DESCRIPTION	5
SETUP	5
2 - HARDWARE CONFIGURATION	6
PASSWORD PROTECTION	6
Password	6
POWER SUPPLY	6
GPIB Address	6
POWER MEASUREMENT	6
Device	6
GPIB Address	6
Units	7
DYNAMOMETER	7
Torque Units	7
Encoder	7
Kinetic Power Rating	7
CONTROLLER	7
Interface Type	7
GPIB Address	7
Serial Port	7
Baud Rate	7
Auxiliary Input	7
TEMPERATURE MEASUREMENT	7
OK	7
3 - SOFTWARE CONFIGURATION	8
PASSWORD PROTECTION	8
Password	8
POWER SUPPLY	8
Power Source	8
Rated Voltage	8
Rated Current	8
Voltage Set	8
Current Set	8
CONTROLLER	9
Display Torque	9
P - Proportional Gain Control	9
I - Integral Control	9
D - Derivative Control	9
DATA STORAGE	9
Serial Number	9
Auto Increment	9
Pass File Name	9
Fail File Name	9
PLOT DURING DISPLAY	9

Parameter	9
LOAD PARAMETERS	9
(1st Menu)	9
Value	9
Dwell	9
(2nd - 6th Menu)	9
Min	9
Max	9
Timebase	10
Load Tolerance %	10
Averaging	10
Number of Cycles	10
LR Current %	10
OK	10
4 - RUN TEST	11
5 - SAVE TEST	12
DATA OUTPUT	12
Print Data	12
Print Graph	12
Return	12
APPENDIX A: COM2 SERIAL SWITCH	13
MOMENTARY SELECTION	13
LATCHED SELECTION	13
DISABLED SELECTION	13

Revisions to This Manual

Date	Change	Page Number(s)
10/24/00	Added Appendix A: COM2 Serial Switc	13

1 - Introduction



DESCRIPTION

The Magtrol Pass/Fail motor Testing Program was developed to provide production line testing of motors at specified load points, compare to test specifications, and provide Pass/Fail indication to the operator. Data from each test is stored in user defined directories.

Hardware for the system consists of a Magtrol DSP6000 dynamometer controller, dynamometer, and optional power analyzer and DC power supply. Interfacing between the computer and instrumentation is by the National Instruments PCI-GPIB card.

SETUP

The Run Arrow on the left side of the tool bar indicates that the program is running. If the Stop Sign is pressed, the program halts and the Run Arrow changes to a static symbol. Restart by pressing the Run Arrow.

Buttons are provided for selecting various functions:

Configure Hardware - This allows certain parameters relating to hardware to be changed.

Configure Software - This allows test parameters to be set up for specific types of tests.

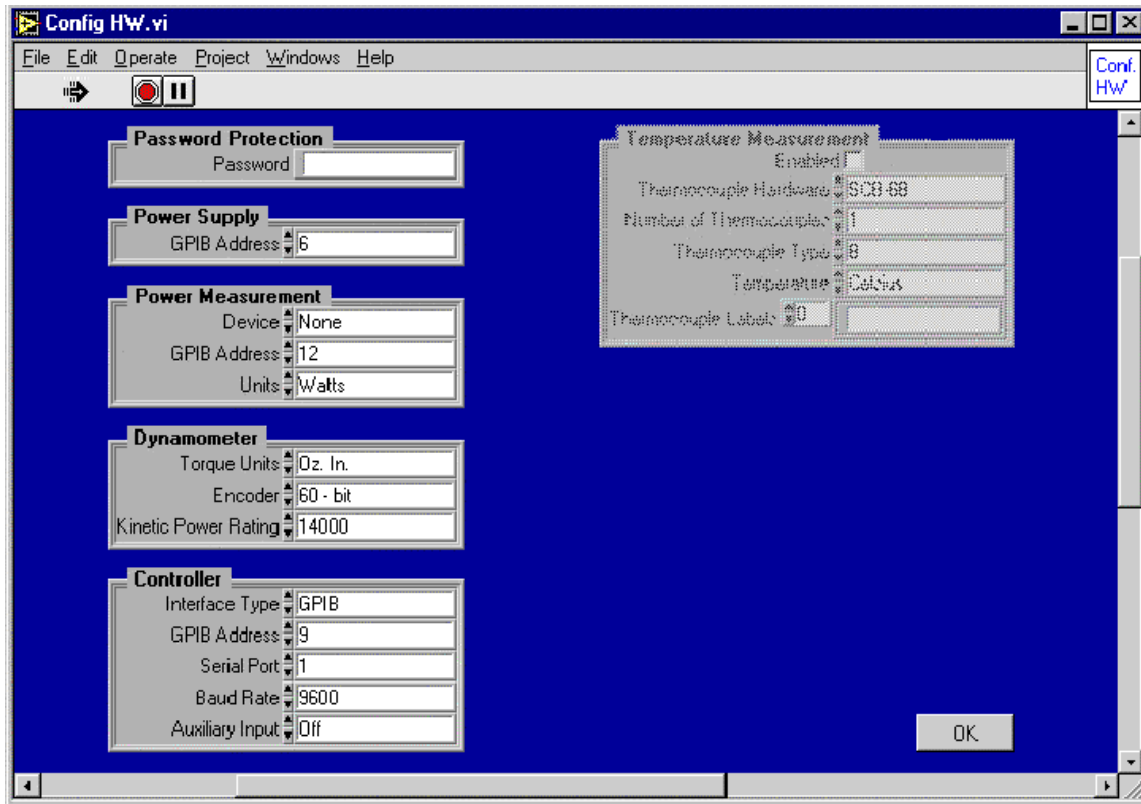
Run Test - Executes the motor test using the previously defined parameters.

Save Setup - Saves a specific setup to disk for future use.

Load Setup - Load a previously defined test setup from disk for use with another motor.

Exit - Exits the motor test program and returns to Win95/98/NT desktop.

2 - Hardware Configuration



PASSWORD PROTECTION

PASSWORD

If you wish to protect a setup from unauthorized changes, enter a multi digit password in the text box by clicking the mouse pointer on it and typing your password. This will apply to both hardware and software configurations at the same time. To disable password protection, double click the mouse pointer in the box and press the Delete key.

POWER SUPPLY

GIPIB ADDRESS

Sets the GIPIB address for the optional power supply in use. The default address of the power supply is 6.

POWER MEASUREMENT

DEVICE

If a test requires that motor input parameters be measured, select a device from the list provided. The device may be a power analyzer or DC power supply. Left click the mouse in the box and drag to the appropriate selection.

GIPIB ADDRESS

Enter the GIPIB address for the power measurement device being used. The default address for power measurement devices are:

DEVICE	GIPIB ADDRESS
6510 or 5100 Single Phase Power Analyzer	12
5300 Three Phase Power Analyze	14
6550 Three Phase Power Analyze	1
DC Power Supply	6

UNITS

If a 5100 is being used with an external high current shunt (>50 Amps) certain ranges will cause the analyzer to output kW instead of Watts. If this is the case, select the appropriate unit of power.

DYNAMOMETER

TORQUE UNITS

Every dynamometer is set up to read torque in either English, Metric, or SI units. In order for output power calculations to be performed properly, the software must know these units. Determine the correct setting by observing the value printed on the dynamometer label, and enter it here.

ENCODER

Standard dynamometers come equipped with a 60-bit speed encoder (60 pulses per revolution). For low speed applications, optional 600- and 600-bit encoders are available. Select the proper value for the installed encoder.

KINETIC POWER RATING

The hysteresis dynamometer is a power absorption device and can as such withstand a certain amount of heating. Exceeding the power rating may cause catastrophic failure, and an expensive repair. To help prevent this, the software will abort a test that exceeds a value posted here. The correct value may be determined from the dynamometer label.

CONTROLLER

INTERFACE TYPE

The DSP6000 can be used with either the GPIB or RS232 interface. However, other instruments in the test system use the GPIB, so it is easier to have all on the same bus.

GPIB ADDRESS

Sets the address for the DSP6000 if used with the GPIB. The default address is 9.

SERIAL PORT

Selects the RS232 Com port in use on the computer, if the DSP6000 is used with serial communication.

BAUD RATE

Sets the RS232 baud rate for the DSP6000.

AUXILIARY INPUT

If an external sensor is connected to the Auxiliary Input of the DSP6000 and it is internally enabled, turning this ON will allow the computer to acquire this data at the same time it reads Speed and Torque. For more information on this input refer to the DSP6000 manual.

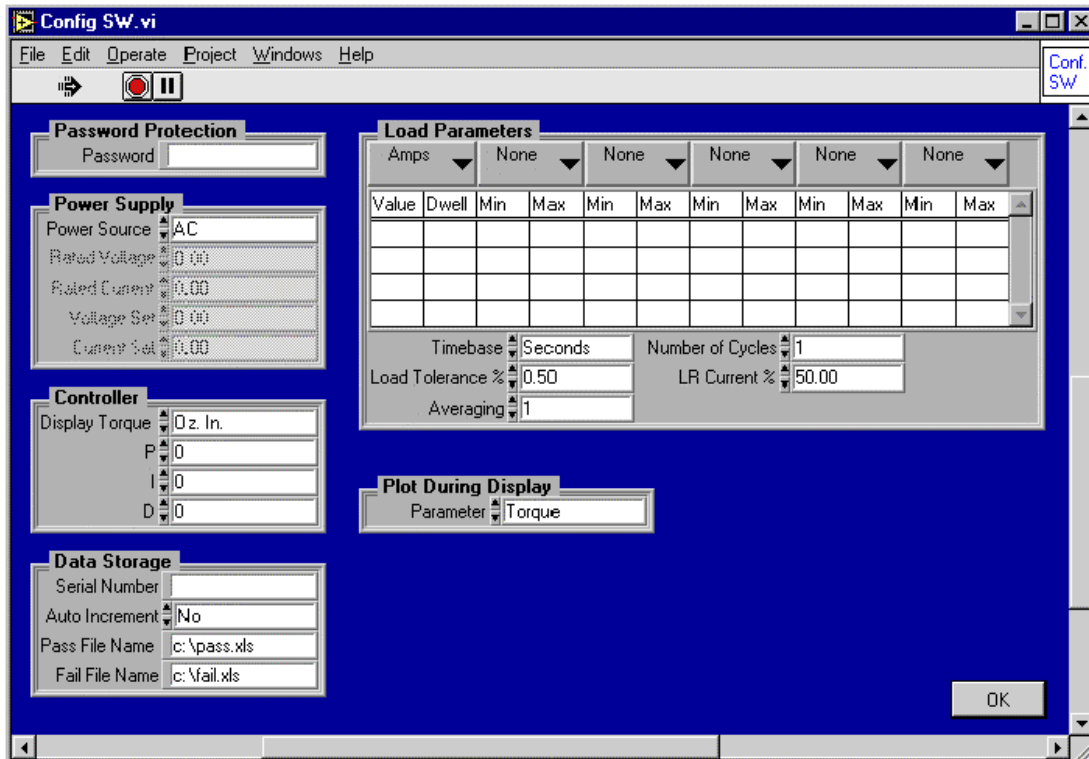
TEMPERATURE MEASUREMENT

This area is grayed out because it is not functional in this package. Additional hardware is required in order to measure temperatures from thermocouples.

OK

When the hardware has been properly configured, press OK to return to the main screen.

3 - Software Configuration



PASSWORD PROTECTION

PASSWORD

If you wish to protect a setup from unauthorized changes, enter a multi digit password in the text box by clicking the mouse pointer on it and typing your password. This will apply to both hardware and software configurations at the same time. To disable password protection, double click the mouse pointer in the box and press the Delete key.

POWER SUPPLY

POWER SOURCE

Select the power source for the motor being tested. If DC is selected, you must use one of the appropriate listed power supplies.

RATED VOLTAGE

For some power supplies, you must enter the rated voltage of the supply in order to get correct voltage readback results. This control will be grayed out if not necessary.

RATED CURRENT

For some power supplies, you must enter the rated current of the supply in order to get correct current readback results. This control will be grayed out if not necessary.

VOLTAGE SET

For DC power sources, set the desired motor voltage with this control.

CURRENT SET

For DC power sources, set the maximum current limit with this control.

CONTROLLER

DISPLAY TORQUE

Select the desired output units of torque. The software will convert the dynamometer units to this value.

P - PROPORTIONAL GAIN CONTROL

For the DSP6000 only. Refer to the DSP6000 manual for details on setting this control.

I - INTEGRAL CONTROL

For the DSP6000 only. Refer to the DSP6000 manual for details on setting this control.

D - DERIVATIVE CONTROL

For the DSP6000 only. Refer to the DSP6000 manual for details on setting this control.

DATA STORAGE

SERIAL NUMBER

If you wish to save a serial number with the test data for a particular motor, enter a numeric value here.

AUTO INCREMENT

Setting this control to 'Yes' will increment the serial number by one after each completed motor test.

PASS FILE NAME

Enter the complete path for data from all good motors to be stored in. Please be sure that the path (directory) actually exists.

FAIL FILE NAME

Enter the complete path for data from all bad motors to be stored in. Please be sure that the path (directory) actually exists.

PLOT DURING DISPLAY

PARAMETER

While the motor test is executing, a graph of this parameter vs. time will appear in real time on the display. Select the parameter to be plotted from the list.

LOAD PARAMETERS

(1ST MENU)

The first pull down menu selects the control parameter. You may load the motor by Amps, Input Watts, Speed, Torque, or Output Watts.

VALUE

After selecting a control parameter, the value of each load point must be entered here. Click the mouse pointer in the first cell, enter the value, and press <Tab> to advance to the next horizontal cell, or click the mouse pointer in the next desired cell. To obtain free run or locked rotor data use the following values:

Parameter	Free Run	Locked Rotor
Amps	0	9999
Input Watts	0	9999
Speed	9999	0
Torque	0	9999
Output Watts	0	9999

DWELL

Enter the time (in seconds or minutes) to hold at that particular load point.

(2ND - 6TH MENU)

These menus select the desired parameter(s) to perform pass/fail checking on. The choices are None, Amps, Input Watts, Speed, Torque, Output Watts, or Auxiliary Input. Selecting 'None' for all menus disables the pass/fail checking and just executes the motor test. You may select between one and five parameters to perform pass/fail checking on.

MIN

Enter the minimum value for the selected parameter at that particular load point.

MAX

Enter the maximum value for the selected parameter at that particular load point.

TIMEBASE

Select the timebase (seconds or minutes) for the dwell parameter.

LOAD TOLERANCE %

Sets the error band around a particular load point. The tighter the tolerance, the better the PID settings must be to stabilize at each point.

AVERAGING

Once the motor has been loaded to a point within the error band, the dwell timer begins. At the end of the dwell period the data is taken and stored into memory. If small fluctuations are present at the load point, you may set this control to a higher number to take an average number of readings. This will tend to smooth out the data.

NUMBER OF CYCLES

If a load profile is of a cyclic nature, you may enter one cycle into the table and then select the number of times to repeat with this control.

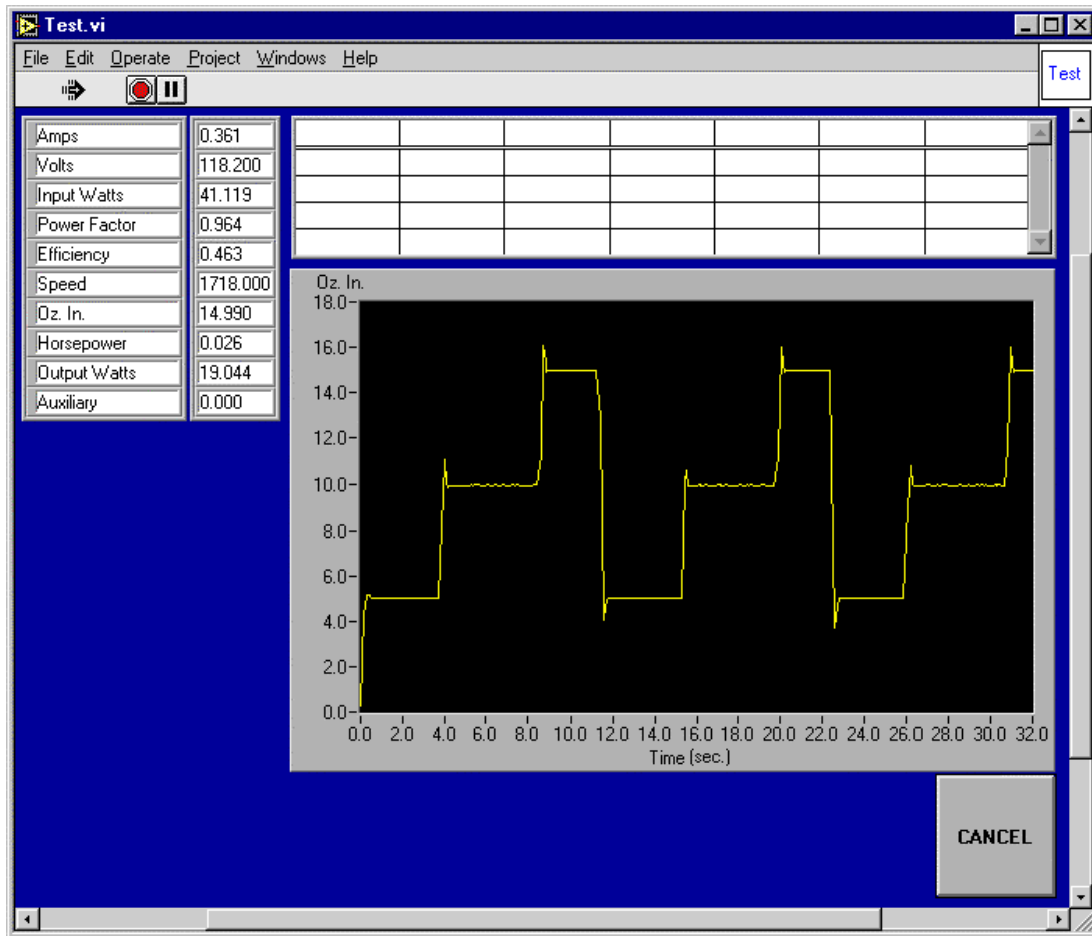
LR CURRENT %

When performing locked rotor testing, the DSP6000 normally outputs full current to the dynamometer brake (≈ 1 Amp). Depending on the size of the dynamometer, and the size of the motor under test, this may be far more current than is required to stall the motor. When current is applied to the brake, and there is no shaft rotation, salient poles (cogs) are introduced into the rotor. After removing current, these poles remain and can produce a significant amount of residual torque. The motor may not have enough starting torque to overcome these cogs and begin rotating. In order to lessen this effect, the LR Current % control was added. It is highly probable that a current much less than 1 Amp is required to lock the rotor. Set this control to the minimum value that consistently achieves locked rotor during the test. This will ensure that the resulting cogs are of a much smaller value that the motor will more than likely overcome.

OK

When the software has been properly configured, press OK to return to the main screen.

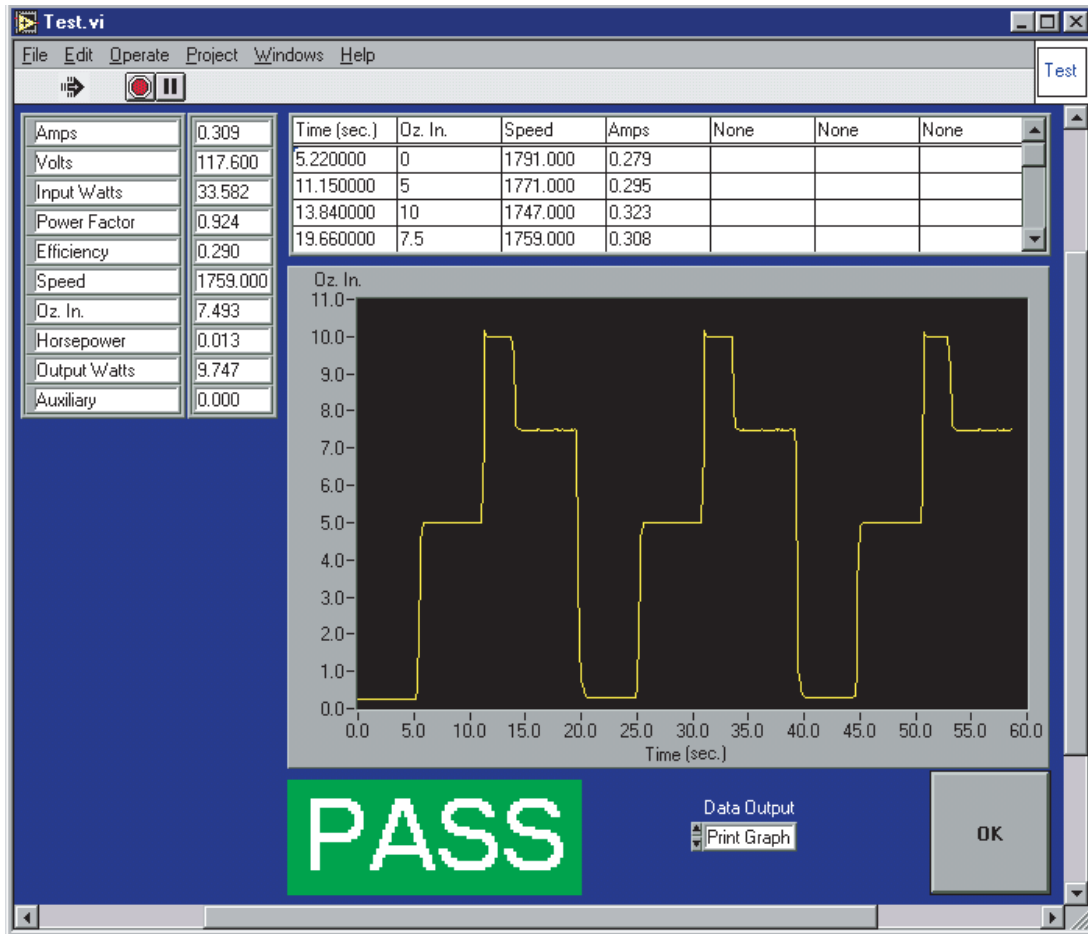
4 - Run Test



The main test display screen appears during the actual motor test. The parameters on the left side of the screen are the actual acquired data. The graph displays the selected parameter vs. time while the test is running.

Pressing the 'Cancel' button will terminate the test at any time and give a pass/fail indication on data taken up until the time of cancellation.

5 - Save Test



After the motor test completes, the pass/fail table displays the acquired data. Any failures will be indicated with asterisks surrounding the failed parameter. In this example, the motor passed our test criteria as indicated by the large green 'PASS' message.

DATA OUTPUT

A Data Output menu also pops up to select the next procedure.

PRINT DATA

Select this option to obtain a hard copy print of the data from the test. The printed data will be the same as what appears in the pass/fail table on this screen.

PRINT GRAPH

Select this option to obtain a hard copy print of the graph (selected parameter vs. time). The graph will be the same as what appears on this screen.

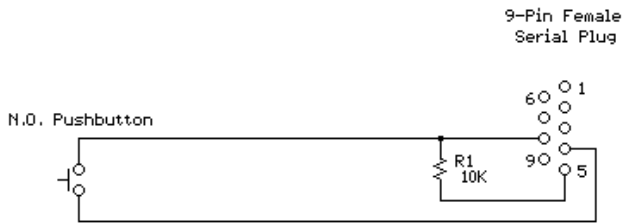
RETURN

Select this option to return to the opening screen. If Auto Increment is selected, the serial number will increment at this time.

Press the 'OK' button after making your selection.

Data will automatically be saved to the appropriate pass or fail file. These files are in a Microsoft Excel spreadsheet format and may be loaded directly into Excel. The Excel file contains the date and time of the test, serial number, and all of the acquired data during the test.

Appendix A: COM2 Serial Switch



Use this diagram to construct a remote start switch for the Magtrol PF-TEST program. The N.O. switch may be either a momentary pushbutton to trigger a test, or a latching switch. A latching switch may be used along with a safety cover over the motor to control the test. You must specify the type of switch used in the Hardware Configuration of PF-TEST. The switch will function only in the COM2 port of the computer.

MOMENTARY SELECTION

The Momentary N.O. selection functions in this manner: At the opening screen, a momentary closure of the switch will start the test. The instruments will be initiated, and the test program sequence will begin. After the test completes, the Data Output menu will appear. You may select one of the options from the menu or you may chose to run another test. To run another test, either press the momentary switch or click on the Next Test button on the screen. Another test will run using the setup parameters defined for the previous test. Initialization of the instruments will be skipped, therefore saving cycle time. To return to the opening menu, select Return from the Data Output menu, and click on the OK button.

LATCHED SELECTION

The Latched N.O. selection functions in this manner: At the opening screen, the switch must be closed, and remain closed. The instruments are initiated and the test begins. If at any time during the test the switch opens, the test is aborted. Upon completion of a test, the Data Output menu appears and you may select one of the options from the menu or you may chose to run another test. To run another test you must open the switch, and then close it, or click on the Next Test button on the screen. To return to the opening menu, select Return

from the Data Output menu, and click on the OK button. The program will wait until you open the switch before proceeding.

DISABLED SELECTION

The Disabled selection operates only with screen buttons and does no checking of external switches.



Products for Measurement and Control of Torque-Speed-Power • Load-Force-Weight • Tension • Displacement

www.magtrol.com

MAGTROL INC

70 Gardenville Parkway
Buffalo, New York 14224 USA
Phone: +1 716 668 5555
Fax: +1 716 668 8705
E-mail: magtrol@magtrol.com

MAGTROL SA

Route de Moncor 4B
1701 Fribourg, Switzerland
Phone: +41 (0)26 407 3000
Fax: +41 (0)26 407 3001
E-mail: magtrol@magtrol.ch

Subsidiaries in:

- Germany
- France
- Great Britain

Worldwide Network
of Sales Agents