

SPRING TESTING MACHINE ANALYZER

SPECIFICATION:

DATA LOGGER	
NO OF CHANNELS	: Data logger of 2 channels can be provided.
Minimum requirement	
DISPLAY	: 16 X 2 line LCD display with backlight.
SCAN RATE	: 0.2 sec per channel.
SAMPLING RATE	: 30 samples per sec.
INPUT	: 2 channels.
ANALOG	: 1 channels.
DIGITAL	: 1 channel for speed.
SERIAL OUTPUT	: RS-232 Serial output provided at 9600 baud rate with USB.
POWER	: 230V 50Hz.
SOFTWARE	: SPRING TESTING ANALYSER (Lab View Software 2009) to Monitoring and controlling the Data Acquisition, Tend Plot, Offline Analysis, Printing.

1. IVDT sensor with 9 pin connector
2. LOAD sensor with 9 pin connector
3. serial cable to pc with 9 pin connector



Sensor Outputs

The sensor outputs are connecting to the microcontroller through 9pin connector.

Connector 1

The first connector is used for IVDT to measure deflection. The IVDT sensor having three wires and the input voltage is 5VDC. The Maximum Displacement is 75mm.

Connector 2

The second connector is used to connect S type load sensors. The load and displacement are monitored by microcontroller and the data are sent to the PC with the help of MAX232 and RS232.

Connector 3

The third connector is used to connect the PC via serial port and the data are sent through serial cable to PC.

SENSORS

The sensors are used to measure the real physical parameters like load, deflection and etc. A sensor is a device that measures a physical quantity and converts it into a signal which can be read by an observer or by an instrument.

POSITION TRANSDUCER SPECIFICATIONS:

Special features

- Long life – 100 x 106 movements
- Outstanding linearity – up to $\pm 0.075\%$
- Choice of plug or cable connection
- DIN standard gauging end
- Double bearing system on shaft
- Insensitive to shock or vibration
- Repeatability to ± 0.002 mm



Nomenclature	Specifications
Displacement	75mm

Operating frequency	Approximately 50hz with output of 5V DC
Nominal resistance	5 Kohms
Housing	Aluminum, Anodized
Actuating shaft	stainless steel with anti-rotation device, inside thread M 2.5 x 6
Fixings	Adjustable clamps
Electrical connections	Type 3 wire plug connector

LOAD MEASUREMENT

Load is measured by a stainless steel S-type load cell which can be used in both, tension or compression.

S TYPE TRANSDUCER

In the load measurement unit we are using strain gauge. A strain gauge is a long length of conductor arranged in a zigzag pattern on a membrane

When it is stretched, its resistance increases. Strain gauges are mounted in the same direction as the strain and often in fours to form a full Wheatstone Bridge. An downward bend stretches the gauges on the top and compresses those on the bottom. A load cell may contain several similar strain gauges elements.

Load measurement is stainless steel round-type load cell which can be used either in tension or compression.

NOMENCLATURE SPECIFICATIONS

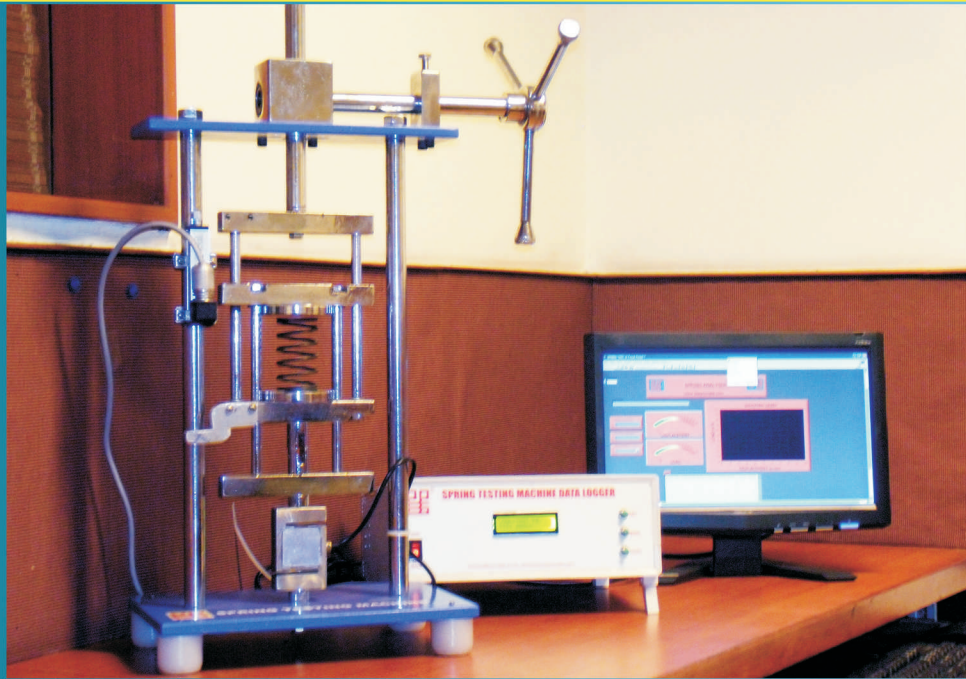
Input voltage 5-30V DC

Electrical connections 4 wires

Load capacity 1 to 10 kg

Metal Stainless steel

Output 0 to 50mv



MICROCONTROLLER SPECIFICATIONS:

40-PIN 8-BIT CMOS FLASH MICROCONTROLLERS
PIC16F877

Microcontroller Core Features:

High performance RISC CPU

- Only 35 single word instructions to learn
- All single cycle instructions except for program Branches which are two cycle
- Operating speed: DC - 20 MHz clock input DC - 200 ns instruction cycle
- Up to 8K x 14 words of FLASH Program Memory, Up to 368 x 8 Bytes of Data Memory (RAM)
- Up to 256 x 8 bytes of EEPROM Data Memory
- Pinout compatible to the PIC16F877A
- Interrupt capability (up to 14 sources)
- Eight level deep hardware stack
- Direct, indirect and relative addressing modes
- Power-on Reset (POR)
- Power-up Timer (PWRT) and Oscillator Start-up Timer (OST)
- Watchdog Timer (WDT) with its own on-chip RC oscillator for reliable operation

- Programmable code protection
- Power saving SLEEP mode
- Selectable oscillator options
- Low power, high speed CMOS FLASH/EEPROM technology
- Fully static design
- In-Circuit Serial Programming (ICSP) via two pins
- Single 5V In-Circuit Serial Programming capability
- In-Circuit Debugging via two pins
- Processor read/write access to program memory
- Wide operating voltage range: 2.0V to 5.5V
- High Sink/Source Current: 25 mA
- Commercial, Industrial and Extended temperature ranges
- Low-power consumption:
 - < 0.6 mA typical @ 3V, 4 MHz
 - 20 μ A typical @ 3V, 32 kHz
 - < 1 μ A typical standby current

Peripheral Features:

- Timer0: 8-bit timer/counter with 8-bit prescaler
- Timer1: 16-bit timer/counter with prescaler, Can be incremented during SLEEP via external Crystal/clock
- Timer2: 8-bit timer/counter with 8-bit period Register, prescaler and postscaler
- Two Capture, Compare, PWM modules
 - Capture is 16-bit, max. resolution is 12.5 ns
 - Compare is 16-bit, max. resolution is 200 ns
 - PWM max. resolution is 10-bit
- 10-bit multi-channel Analog-to-Digital converter
- Synchronous Serial Port (SSP) with SPI (Master mode) and I2C (Master/Slave)
- Universal Synchronous Asynchronous Receiver Transmitter (USART/SCI) with 9-bit address detection
- Parallel Slave Port (PSP) 8-bits wide, with external RD, WR and CS controls (40/44-pin only)
- Brown-out detection circuitry for Brown-out Reset (BOR)

PIN OUT

Pin	Function	Pin	Function
1	NC	18	NC
2	NC	19	NC
3	NC	20	NC
4	NC	21	NC
5	NC	22	NC
6	NC	23	NC
7	NC	24	NC
8	NC	25	NC
9	NC	26	NC
10	NC	27	NC
11	NC	28	NC
12	NC	29	NC
13	NC	30	NC
14	NC	31	NC
15	NC	32	NC
16	NC	33	NC
17	NC	34	NC
35	NC	40	NC
36	NC	41	NC
37	NC	42	NC
38	NC	43	NC
39	NC	44	NC

FUTURES:

Microcontrollers are used in automatically controlled products and devices, such as automobile engine control systems, implantable medical devices, remote controls, office machines, appliances, power tools, and toys. By reducing the size and cost compared to a design that uses a separate microprocessor, memory, and input/output devices, microcontrollers make it economical to digitally control even more devices and processes. Mixed signal microcontrollers are common, integrating analog components needed to control non-digital electronic systems

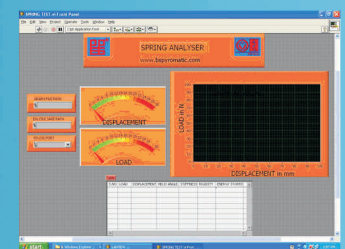
SOFTWARE FOR MICROCONTROLLER

MPLAB IDE is used for developing the program to microcontroller in this HiTech c compiler is used to developing c programs

SOFTWARE SPECIFICATION

Lab view

LabVIEW (Laboratory Virtual Instrument Engineering Workbench) is a platform and development environment for a visual programming language from National Instruments. This software is used to developing of .exe file to our application only. FRONT PANEL



BENEFITS

One benefit of LabVIEW over other development environments is the extensive support for accessing instrumentation hardware. Drivers and abstraction layers for many different types of instruments and buses are included or are available for inclusion. These present themselves as graphical nodes. In our equipment we are developing the exe file to the application of SPRING TESTING MACHINE to monitor the load and deflection to applied on the spring as show in fig.