



Anville Instruments

Series 420TC Data Acquisition System

User Manual

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Anville Instruments
Laser House, Doman Road
Camberley, Surrey, GU15 3DF

Tel. 01276 684613/25107
Fax. 01276 29141

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AN OVERVIEW OF THIS USER MANUAL

This manual is divided into six parts. Part I introduces you to an overview of the SERIES 420TC. Starting with Part II, the manual shows you how to install the SERIES 420TC software, configure and operate the equipment. After mastering the system, you can use the manual as a handy reference. When you need help with a specific problem, turn to the appropriate area of the manual that describes that part of the system.

To give you an idea of the manual's layout, here is a description of each part of the manual:

- Part I describes the hardware and software for both the SERIES 420TC and the host computer system.
- Part II tells you how to install the SERIES 420TC software.
- Part III describes system hardware configuration and tells you how to connect the different types of sensors using tables and diagrams.
- Part IV talks about the SERIES 420TC environment; how to start and exit from the logging program; how to configure the system using the dialogue boxes.
- Part V tells you how to operate the data logger in a straight forward way (with reference to Part III).
- Part VI lists and explains error messages that may occur from time to time.
- Part VII provides specification parameters for the Series 420TC.

PART I: INTRODUCTION TO SERIES 420TC

Overview

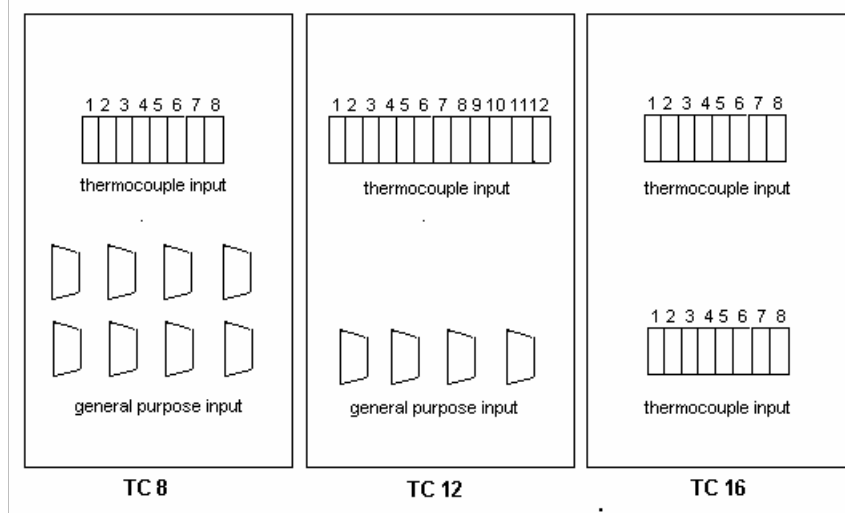
Welcome to the SERIES 420TC group of Data Acquisition Units. Each unit consists of two parts, the hardware and the software. Hardware is all the physical parts of the unit including a computer system. Software is the logging application that interacts with your hardware. The hardware and software work together to automate most of the units' configuration and operation. However, you will be asked to configure some of your system requirements yourself. Instructions are simple to follow. The complete system is easy to set-up and use.

The SERIES 420TC is connected to a compatible computer system which provides the SERIES 420TCs software operating environment working under MS-DOS and Windows 3 or 3.x and Win 95.

Hardware

The compact hardware provides type T thermocouple and general purpose analogue inputs. You configure the general purpose input to meet your requirements along with digital inputs and outputs for simultaneous logging and alarm setting. Connection to a compatible computer, using the supplied cable, is made via an RS422/423 serial link. An additional RS422/423 connector allows you to daisy-chain two or more SERIES 420TCs together if more analogue inputs are needed. The SERIES 420TC's internal microprocessor converts all inputs into their correct engineering units for transmission to the host computer.

Unit Types



TC-8 provides 8 type T thermocouple inputs and 8 general purpose inputs.
 TC-12 provides 12 type T thermocouple inputs and 4 general purpose inputs.
 TC-16 provides 16 type T thermocouple inputs.

Software

The SERIES 420TC software package is supplied on a single 3.5" diskette for installation to your computer's hard disk. See Part II: SOFTWARE for installation and set-up instructions.

An alternative software package sometimes supplied is SCAN1000. For a description and installation details please refer to SCAN1000 handbooks.

The SERIES 420TC software, running under Windows 3 or 3.1 provides all facilities for your system and gives you very easy mouse-operated control.

Incoming data is simultaneously filed on the host computer hard disk and displayed on the monitor screen. Screen display shows you last-read data and trend graphs of the analogue inputs, either singly or together. Readings and trend graph scales are presented in suitable engineering units for the sensor types selected. When logging two different types of sensor, both scales are displayed. Scale ranges can be adjusted to provide your own default settings and you can choose to display either a fifty-reading scrolling window or any fixed, historical window which can be viewed on-screen while logging continues. Data is stored in files which can be exported to your Excel spreadsheet for analysis or reporting. Logged data files can be replayed for display and examination when ever you wish.

Note: Lotus 123 can be used but you must edit Windows win.ini file to accomplish this.

Compatible Computer System

Introduction

Your computer system should comprise a system unit, colour monitor, keyboard and printer. The system unit must be IBM 386 compatible, have at least a 100Mbyte hard disk and 8Mbytes of RAM. A reasonably sized hard disk is necessary for storing data files if you anticipate logging for long periods.

System Unit and Memory

The system unit is the large box component of the computer. The back of the unit supports all ports used for connecting your peripheral equipment including the SERIES 420TC. The SERIES 420TC will plug into either COM1 or COM2 serial port using the supplied cable. On some system units the mouse could be plugged into COM1, which means using COM2 instead. It is also possible that COM2 is a 25-pin connector. In which case you will need a 25-pin (female)to 9-pin (male) adapter. The system unit houses the PC's main microchip and the computer's internal memory as well. The memory has several names. You commonly hear it referred to as RAM (Random Access Memory).

The Monitor

The television-like screen is called the monitor. The monitor is one place where graphical data and spreadsheet data will be sent for viewing. Your monitor plugs into the back of your system unit .

The Printer

Your printer provides a more permanent way of recording your SERIES 420TC's system results. It can be used to provide hard copies of on-screen information and spreadsheet data. The printer can be described as the 'typewriter' of the SERIES 420TC logging system. The printer plugs into the parallel port at the back of the system unit.

The Keyboard

The keyboard plugs into the back of your system unit. Most of the keys are the same as a standard typewriter. The letters and numbers in the large centre of the keyboard produce the characters that you type on-screen. In the main you will use only these keys in conjunction with using your mouse.

The Mouse

Your mouse plugs into your system unit. The mouse moves the mouse cursor (pointer) to any location on-screen. If you have never used a mouse before, you should take time to become reasonably skilful in moving the mouse cursor with it. You can also issue LOG420TC commands and select items on-screen by pointing to them with the mouse and pressing a button on the mouse. Some mouse devices have two buttons whereas others have three. However, the first button is mostly used.

Mouse Techniques

- Pointing
- Clicking
- Double-clicking
- Pressing
- Dragging

Pointing

The mouse moves a pointer or cursor on the screen. The pointer has a number of shapes depending on where you are placing it. It can have an arrow, an I - beam or an hour glass. The hour glass shape will appear only when the system is logging and it will alternate with the arrow shape at a rate equal to the current scan speed.

You move the pointer on the screen by moving the mouse over your desktop pad in the direction you want the pointer to move. The mouse ball must make physical contact with the pad or desk to move the cursor. You can pick up the mouse and move it to a different spot on the desk without moving the pointer.

Clicking and Double-clicking

Clicking means tapping on the mouse button. By pointing at something on the screen then clicking the left mouse button, you either position the pointer or select what is underneath the pointer.

Double clicking means pointing to an object on the screen and quickly clicking the left mouse button twice. This technique is not required when the LOG420TC program is running but is often required to move around Windows screens.

Pressing

Pressing is like clicking, except that you need not immediately release the button. For example, you can hold the button down while a menu unfolds and you can examine the contents.

Dragging

Dragging means holding the left button down and moving the pointer. Dragging lets you, for example select a dialog box and reposition it by dragging it to a new location.

PART II: SOFTWARE

Installation

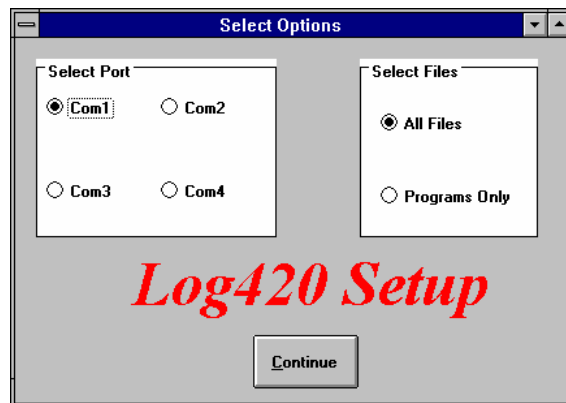
- Start Windows.

- Insert the LOG 420 software disk into the A drive (or B).
- In Windows Program Manager open the Main icon and then click File Manager icon.
- On the menu bar click first on File followed by Run.

In the Command Line text box type A:\Setup and click OK. A Setup box containing the message 'Initializing Setup' will be displayed temporarily until the Log420 Setup dialog box appears. Read instructions contained in the box. Click Continue.



- A Select Options box containing communication ports will appear with COM1 and All Files as default setting.



If you are happy with the port selected, click Continue. If your PC mouse uses COM1 as is sometimes the case, select COM2 and click Continue. Installation will begin and LOG420TC files will be installed in Windows Program Manager under the ISOsystem group icon.

- When installation is complete a dialog box will be displayed to that effect. Click OK.
- Installation need only be carried out for the first SERIES 420TC unit used, as installations for additional units would overwrite initialised data for existing units.

Changing Port Setting

On installation the software, will by default use the COM1 port for communication (unless you have chosen a different port) with the SERIES 420TC. If you want to change to a different port, you can either re-install the software or make an entry to the WINDOWS win.ini file.

To reload the software follow instructions given in the preceeding section. When you reach the Select Options dialog box select a port and under Select Files click on Programs Only. Clicking Programs Only will not delete any files you may have saved.

To edit the win.ini file proceed as follows:

- Choose the COM port from which you want the SERIES 420TC to run.
- If you choose COM1 no action is necessary other than to set the COM1 port parameters by using the PORTS option from the WINDOWS Control Panel.

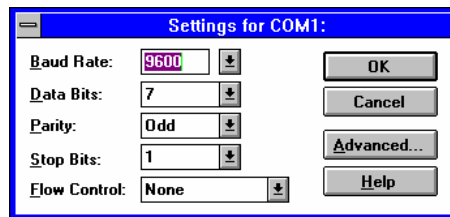
If COM1 is NOT chosen, then the following entry must be made to the win.ini file:

```
[log420]
Port=COMx: (where x is the appropriate port number)
```

Proceed as follows:

- Open Accessories and double click on Notepad.
- Click on File followed by Open.
- In the Open dialog box click on All Files and select win.ini. Click OK to open the file.
- Scroll to the end of the win.ini file and type the afore mentioned stanza. Click on File Save and then Exit.

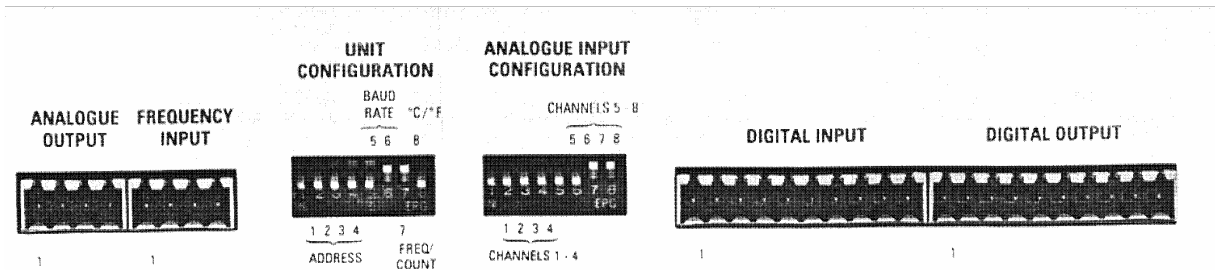
The chosen COM port should be set up as required using the Ports settings option in the Windows Control Panel. The default COM port setting is:



PART III: HARDWARE CONFIGURATION

Unit Address

Your SERIES 420TC is supplied with its address set to zero. An address is set by the positions of switches 1 to 4 of the UNIT CONFIGURATION switch array. See SERIES 420TC side panel layout below.



If more than one SERIES 420TC is to be used on the computer port, it will be necessary to alter switch settings of any additional SERIES 420s thus providing each one with a unique address. For example, box 1 will have address 0, box 2 address 1 and so on. To initialise switch settings, power to the SERIES 420 must be turned off then on.

The table below provides configuration address and switch settings.

Switch setting 1 2 3 4	Unit address
on on on on	0
off on on on	1
on off on on	2
off off on on	3
on on off on	4
off on off on	5
on off off on	6
off off off on	7
on on on off	8
off on on off	9
on off on off	10
off off on off	11
on on off off	12
off on off off	13
on off off off	14
off off off off	15

Unit Configuration Table

Communication Baud Rate

Your SERIES 420TC is supplied with baud rate set to 9600. If you need to change the baud rate, use switches 5 and 6 of the UNIT CONFIGURATION switch array. The following table gives switch settings for specific baud rates. To initialise switch settings, power to the SERIES 420TC must be turned off then on.

Switch settings 5 6	Baud rate
on on	1200
off on	2400
on off	9600
off off	19200

Communication Format

The communication format is fixed and will always consist of 7 data bits, 1 stop bit, odd parity, flow control- none. It is very important that you set the communication format and baud rate for the chosen serial port using the WINDOWS Control Panel before operating the SERIES 420TC. Refer to Part II: SOFTWARE.

Temperature Conversion

The SERIES 420TC can output measurements received from temperature sensors in either degrees Celsius or Fahrenheit. Switch 8 of the UNIT CONFIGURATION switch array controls this function for all outputs. Temperature conversion configuration is given in the table below.

Switch setting 8	Temp. conversion
on	° C
off	° F

As before, to confirm switch settings, power to the SERIES 420TC must be turned off then on.

Analogue input configuration

Analogue inputs may be configured in two groups of four inputs. Refer to the following table for details of the possible input configurations in conjunction with connection diagrams shown at the end of this section. Please note that the settings shown in the table will be overridden by the LOG 420TC software which automatically configures the analogue input to match the sensor type.

Note: When SCAN1000 software is being used, sensor types are not automatically selected so must be manually selected using the switch settings given in the table. Switch the unit off then on to initialise settings.

Switch settings 1 2 3 4 5 6 7 8	Input range	Input function	Resol ution	O/P units	Connection diagram
on on on on	±1V	Voltage	0.1	mV	Fig.1
off on on on	± 0.1V	Voltage	0.01	mV	Fig.1
on off on on	± 0.01V	Voltage	0.01	mV	Fig.1
off off on on	± 1V	4-20mA loop	0.01	%	Fig.2 or 3
on on off on	-200C to +400°C	T thermocouple	0.1	C or F	Fig.4
off on off on	-200C to +1200°C	K thermocouple	0.1	C or F	Fig.4
on off off on	-100C to +1100°C	J thermocouple	0.1	C or F	Fig.4
off off off on	0C to +1300°C	N thermocouple	0.1	C or F	Fig.4
on on on off	-100C to +1000°C	E thermocouple	0.1	C or F	Fig.4
off on on off	0C to +1700°C	R thermocouple	1	C or F	Fig.4
on off on off	0C to +1700°C	S thermocouple	1	C or F	Fig.4

off off on off	-100C to +200°C	T thermocouple	0.01	C or F	Fig.7
on on off off	-100C to +600°C	Pt100	0.1	C or F	Fig.5
off on off off	-100C to +200°C	Pt100	0.01	C or F	Fig.5
on off off off	± 1V	Transducer	0.1	mV	Fig.6
off off off off	± 0.1V	Transducer	0.01	mV	Fig.6

Analogue Outputs

Two analogue outputs may be factory fitted to the SERIES 420TC as an option. These outputs are not supported by the LOG 420TC software. Configuration details are shown below with connections being made via a 4- way plug in terminal block.

Pin no.	Signal name	Pin no.	Signal name
1	anout gnd	2	anout 2
3	anout gnd	4	anout 1

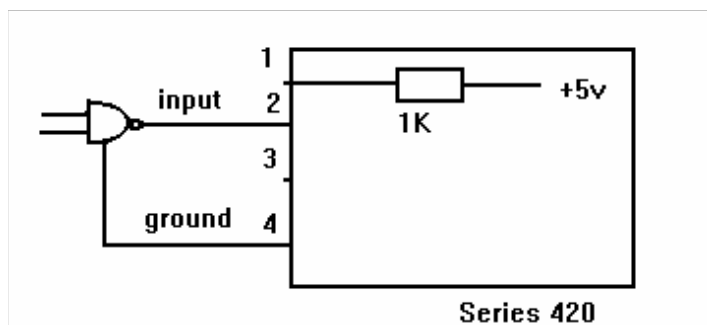
Frequency Input

The SERIES 420TC can output measurements received from frequency (Hz) and pulsed count sources. Switch 7, a 2 position switch, of the UNIT CONFIGURATION switch array is used to select input mode..

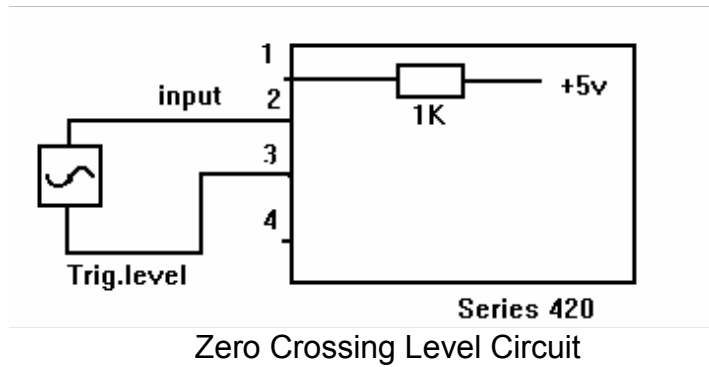
Switch setting 7	Freq/Pulse
on	Pulse
off	Frequency

Switch the SERIES 420TC off then on to confirm selection. Connections are made via a 4-way plug-in terminal block shown in the table depending on the type of measurement you wish to record. For input signals < 100mV but > 2.5V make connections shown in Logic Level diagram. For input signals <2.5V make connections shown in Zero Crossing diagram.

Pin No.	Signal	Pin No.	Signal
1	+5V	2	input
3	trig.level	4	ground



Logic Level Input Circuit

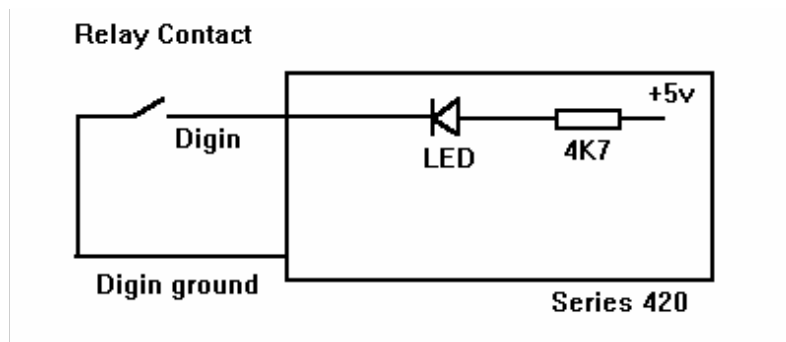


Digital Inputs

The SERIES 420TC provides 8 optically isolated digital inputs. With reference to the table below, digin signals 2-5 are measured with respect to pin 1 and digin signals 5-8 are measured with respect to pin 6.

Pin	Signal name	Pin	Signal name
1	ground	6	ground
2	digin 1	7	digin 5
3	digin 2	8	digin 6
4	digin 3	9	digin 7
5	digin 4	10	digin 8

The input connector provides access to one end of the LED of an optical isolator with a 4K7 series resistor to limit current. Connections are via a 10-way terminal block.

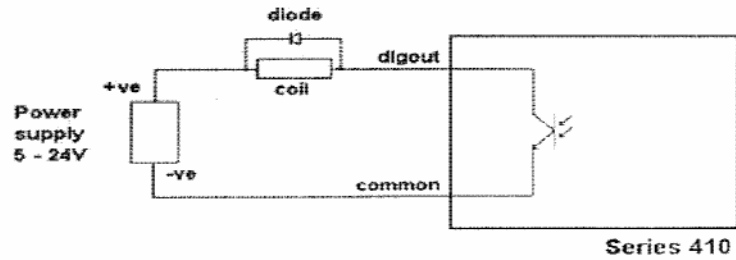


A typical digital input circuit

Digital Outputs

The SERIES 420TC provides 8 digital outputs. These are open collector transistor type outputs capable of directly driving relays. With reference to the table below, digouts 2-5 are with respect to pin 1 and digouts 5-8 are with respect to pin 6. Connections are via a 10-way plug-in terminal block. The LOG420TC software uses these outputs to flag alarms that you may set in the Set Up Logging Parameters dialog box.

Pin no.	Signal name	Pin no.	Signal name
1	ground	6	ground
2	digout 1	7	digout 5
3	digout 2	8	digout 6
4	digout 3	9	digout 7
5	digout 4	10	digout 8



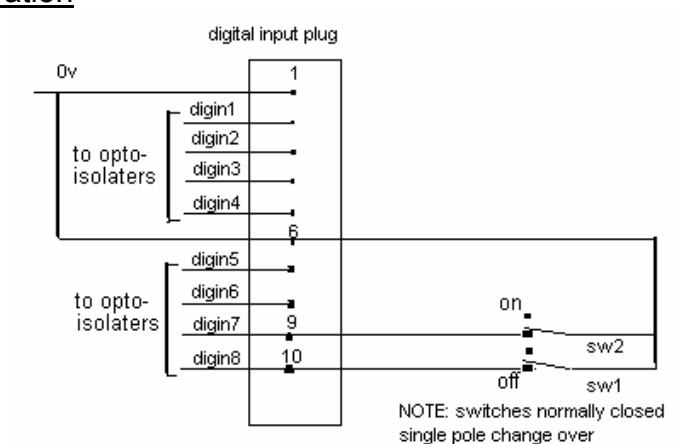
A typical digital output circuit

Remote Log

Introduction

It is envisaged that you would use the Remote Log facility where you have a need to log data for specific periods of time, for example, when a system has stabilised on reaching a set temperature point. By using a voltage level from Digital Output connected to suitable circuitry, logging could begin automatically. Remote Log control signals are sent to the unit's optically isolated digital inputs digin 7 and digin 8. Connections are made via the Digital Input plug using the 10-way mating connector supplied with the unit. Typical wiring diagrams shown below give pin and switch connections for multiple scans and a single-shot scan. Control signals are input using combinations of switch settings.

Multiple Scan Operation

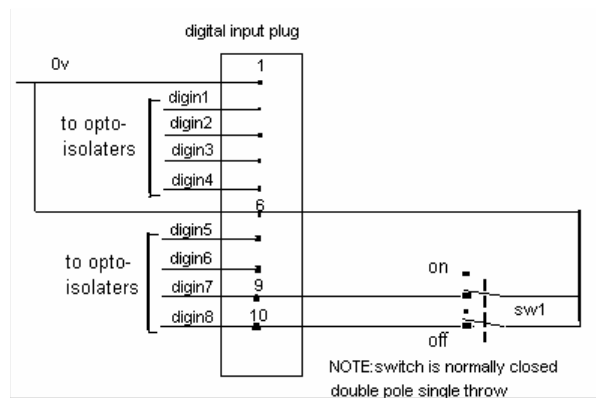


Typical wiring layout for multiple scans

With reference to the wiring diagram you will notice that both switches are set initially in the OFF position. Logging will start when you set switch 1 to the ON position and finish logging when you set switch 2 to the ON position. At the end of a logging sequence you must set both switches to OFF to reset the unit's optical isolaters before you can begin another sequence. Depending at which point of a scan you decide to start logging, a delay may occur until a new scan begins. The Remote Log sequence is given in the table.

Switch	Start Logging	Stop Logging	Reset
1	ON	-	OFF
2	-	ON	OFF

Single-shot Scan Operation



Typical wiring layout for single-shot scan

Starting a single-shot scan is identical to starting a multiple scan, except that switch SW1 is ganged, such that both control signals are input simultaneously. Set the SW1 to the ON position to start logging and the software will execute one scan. Set SW1 to the OFF position to reset the unit's opto-isolaters before starting another scan.

Viewing Remote Log Files

To view a file click View File and call up your file in the normal way. Refer to View section.

CONNECTING THE SERIES 420TC TO YOUR COMPUTER

IMPORTANT NOTE: please refer to PART VII: SPECIFICATIONS if you do not intend using the cable supplied.

The SERIES 420TC is supplied with a 2 metre length cable (which meets the requirements of RS232)fitted with 'D' type plug and socket. The socket end of the cable The system requires transmit (Tx), receive (Rx) and ground connections for most applications, so these are the only signal connections made in the plug and socket. Pins 6 and 8 or pins 7 and 8 are linked depending on the type of serial data transmission..

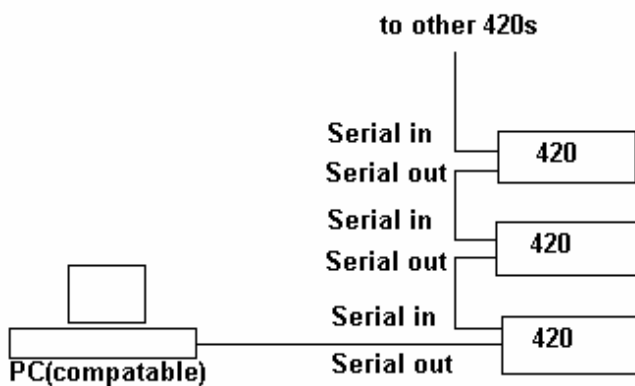
Links are made in the cable plug end which is connected to the logger. Pin 9 is not used. Cable wiring details are given below.

Pin	Signal name	Signal direction	Wire
2	Tx	to computer	white
3	Rx	from computer	red
5	signal ground		screen
6	RS422 link	Linked to pin 8	
7	RS423 link	Linked to pin 8	
8	+5V		

The SERIES 420TC has two serial port connectors, SERIAL IN and SERIAL OUT. As a general rule, SERIAL OUT will be connected to your computer in a single unit installation. Where more than one unit is required, up to a maximum of eight, these are connected into the system by 'daisy chaining' the SERIAL IN of one unit to the SERIAL OUT of the next unit.

Cable connections for 'daisy chaining' a SERIES 420TC are given in the table below.

Pin	Signal name	Signal direction	Wire
2	Tx	to next 420TC	white
3	Rx	from next 420TC	red
5	Signal ground		screen
6	RS422link	Linked to pin 8	
7	RS423 link	Linked to pin 8	
8	+5V		



A Typical System Interconnection

RS422 Transmission

If the overall line length (distance) between your PC and up to 8 daisy-chained loggers exceeds 30 metres (approx. 65 feet) an RS422 serial card must be fitted to your PC to maintain signal integrity. RS422 signal titles and pin connections are given in the table below. In addition the serial cable link between pins 7 and 8 must be removed and pins 6 and 8 linked. See previous table.

Pin	Signal Name	Signal Direction
1	Txb	to computer
2	Txa	to computer
3	Rxa	from computer
4	Rxb	from computer
5	ground	

Power Up

Note: in order to comply with European EMC legislation the Series 420 must be connected to mains earth. This automatically occurs when the mains adapter is used.

The SERIES 420TC is dc powered requiring +5V at 0.5A and +24V at 0.2A. The unit is normally supplied with a 240V AC mains adapter which will provide correct input voltages. Power enters the SERIES 420TC via the 4 pole connector on the rear panel. Where several units are to be mounted within an enclosure it may be beneficial to power them from a common supply. Power connection details are:

Pin	Signal name
1	Earth
2	0V
3	+5V
4	+24V

Front Panel Connection Details

Type T front panel connections are made through type T plugs and general purpose connections (other analogue inputs) are made through 9-pin D type plugs supplied with the Series 420TC. Please note that connections to D type plugs must be soldered.

General Purpose Analogue Inputs

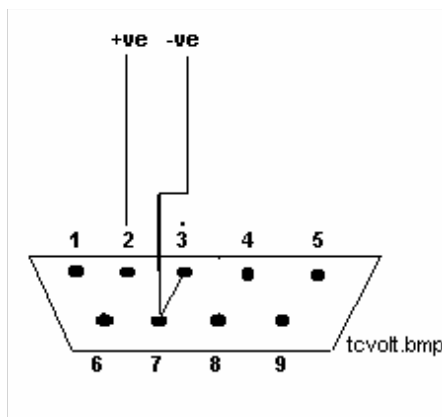


Figure 1 Voltage input

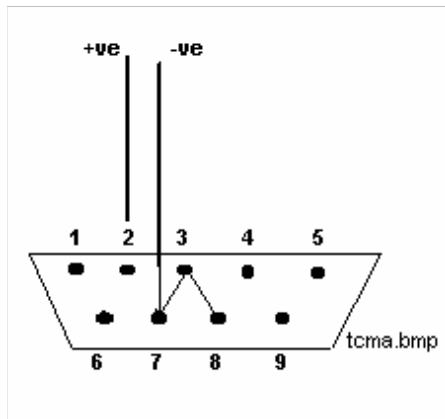


Figure 2. Current loop input: 4 to 20mA (powered by transmitter)

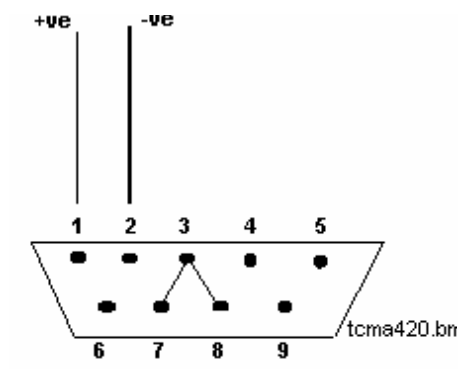


Figure 3. Current loop input: 4 to 20mA (powered by Series 420)

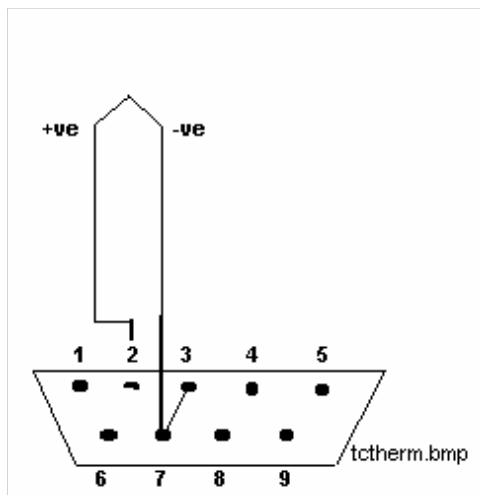


Figure 4. Thermocouple input

Note: do not fit link between pins 3 and 7 if using grounded thermocouples

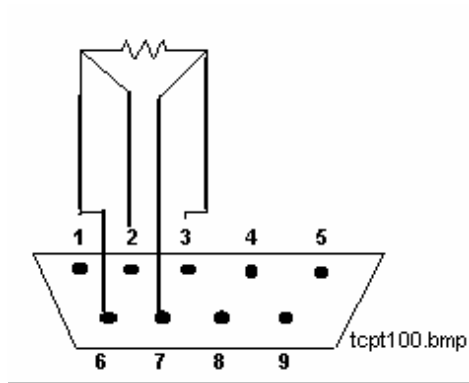


Figure 5. Pt100 or resistive inputs

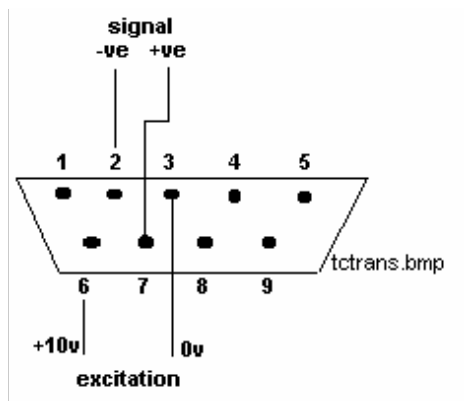


Figure 6. Transducer input

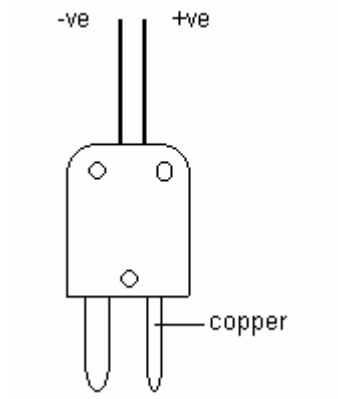


Figure 7. Type T input plug

PART IV: THE SERIES 420TC SOFTWARE ENVIRONMENT

Software used by the SERIES 420TC is referred to as LOG 420TC. LOG 420TC software offers an array of helpful tools, such as a full-screen display, pull-down menus, dialogue boxes and mouse support. For software installation procedure refer to Part II: SOFTWARE.

This chapter introduces the following topics:

- Starting LOG 420TC
- Understanding LOG 420TC dialogue boxes
- Using LOG 420TC menu bars
- Leaving LOG 420TC
- Restarting LOG 420TC Automatically
- Data file size

STARTING SERIES 420TC

To begin using SERIES 420TC, apply power to the unit and switch on your computer.

On some computer systems a DOS prompt appears, similar to the following:

C:\

Note: If your PC displays a menu on start-up and SERIES 420TC is not a menu option, you will not be able to start LOG 420TC program until you choose the menu option that exits the menu and takes you to DOS.

From the prompt type:

```
cd windows <cr>
```

From the next prompt type:

```
win <cr>
```

After some seconds, depending on how your PC has been configured, you will be in to the Windows environment and the Program Manager Main screen. Other computers, which have been preloaded with Windows application, will automatically open to the Windows environment and ISOsystems group.

Starting the LOG 420TC Software

- Using your mouse, move the cursor to the ISOsystem icon and double click the left button or use the Restore facility to open the ISOsystem group.
- Double click the LOG 420TC System icon and the program will open with the LOG 420TC logging program screen, quickly followed by Set Up Logging Parameters dialog box superimposed over the logging screen.

Understanding LOG 420TC Dialog Boxes

- Set Up Logging Parameters
- 420TC Logging Program

Set Up Logging Parameters

Set Up Logging Parameters

Box Set Up

Box: 1 5
 2 6
 3 7
 4 8

Box Address : 1
 Box Title : Box1, addr1
 Scan Rate : 5

S
 Mins

Channel Set Up

Channel: 1 5
 2 6
 3 7
 4 8
 f

Title : Channel 1
 Scale : 1.000000 Offset : 0.000000
 MinAlarm 0.0000 MaxAlarm 10.0000

Log Channel Units 1-4: Deg C Units 5-8: Deg C

Confirm Channel Sensor Type: T Type, 0.01 TC

End, Cancel, Quit, Page

Page 1

Set Up Logging Parameters

Box Set Up

Box: 1 5
 2 6
 3 7
 4 8

Box Address : 1
 Box Title : Box1, addr1
 Scan Rate : 5

S
 Mins

Channel Set Up

Channel: 9 13
 10 14
 11 15
 12 16
 f

Title : Chan 9
 Scale : 1.000000 Offset : 0.000000
 MinAlarm 0.0000 MaxAlarm 75.0000

Log Channel Units 9-12: Deg C Units 13-16: Deg C

Confirm Channel Sensor Type: T Type, 0.01 TC

End, Cancel, Quit, Page

Page 2

Two Set Up Logging Parameters dialog boxes are provided for you to set your initial parameters or to change existing parameters at run start time. The first box, by default represents Page 1 of the logging screen and the second box Page 2. To change pages click on Page. Dialog boxes are divided into two areas, Box Set Up and Channel Set Up. In each area you are provided with radio buttons for mouse selection and text boxes for data input (using mouse and keyboard). The dialog box also contains End, Cancel, Quit, Page buttons.

Box Set Up

<u>Box</u>	<u>Action</u>
Box:	select box 1-8, 9-16

Box Address: switch settings 0-15
 Box Title: you define
 Scan Rate: scan rate
 S: seconds
 Min: minutes

It is most important that the address you type in the Box Address text box is the exact same address setting that you have already configured using the system hardware Unit Address switches 1 to 4. Refer to PART III: HARDWARE CONFIGURATION for further details.

The Box Title name, which you type in the text box, and the chosen Scan rate will be displayed on the LOG 420TC's main screen when monitoring is in progress.

Channel Set Up

<u>Channel</u>	<u>Action</u>
Channel:	select channel 1-8, 9-16
Title:	you define
Scale:	input scale - you define
Offset:	input offset - you define
MinAlarm	low alarm limits - you define
MaxAlarm	high alarm limits - you define
Units 1-4:	engineering units- you define
Units 5-8:	engineering units - you define
Units 9-12:	engineering units - you define
Units 13-16:	engineering units - you define
f	select for frequency/pulse input
Log Channel:	log or skip - you define
Sensor types	you select
TC	selects type T sensor
Confirm Channel	saves channel settings

Click on the radio buttons to choose a channel. If the channel has been in use before, it's current set-up values will be shown. If you wish to keep these values, do nothing. If you require fresh values edit the text boxes.

Title

Click on the text box and at the cursor type the channel title you want. The title you have typed will appear in the channel box on the logging screen. The title will also be attached to the data file for future retrieval.

Scale

Click on the Scale text box to enter a scaling value if required. The default scale setting is 1.0. The figure in the box represents a multiplication value; data read from the SERIES 420TC will be multiplied by this value.

Offset

Click on the Offset text box to enter an offset value if required. The default offset is zero. The figure in the box represents an addition value; data read from the SERIES 420TC will have this value added.

MinAlarm

Click on the MinAlarm text box to enter a low alarm value. Input values lower than this will cause the channel to go into alarm.

MaxAlarm

Click on the MaxAlarm text box to enter a high alarm value. Input values higher than this will cause the channel to go into alarm.

f (frequency)

When this function is selected, in conjunction with switch 7 setting, frequency measurements will be displayed on the main logging screen.

Sensor Types-General Purpose

To select a sensor, click on either the forward or reverse arrows until you reach the sensor type you want. The list begins with Volts \pm 10v and ends with Transducer \pm 0.1v. Sensor types available are listed in the table.

Type and Range	Resolution	Type and Range	Resolution
Volts \pm 10v	1mV	E type -100 to +1000°C	0.1°C
Volts \pm 1v	100uV	R type 0 to +1700°C	1°C
Volts \pm .1v	10uv	S type 0 to +1700°C	1°C
4 to 20 mA loop	0.01%	B type 0 to +1800°C	1°C
T type -200 to +400°C	0.1°C	Pt 100 -100 to +600°C	0.1°C
K type -200 to +1200°C	0.1°C	Pt 100 -100 to +200°C	0.01°C
J type -100 to +1100°C	0.1°C	Transducer \pm 1v	100uV
N type 0 to +1300°C	0.1°C	Transducer \pm 0.1v	10uV

Sensor Types-TC

To select a sensor, click on either the forward or reverse arrows until you reach the sensor type you want. The list begins with Volts \pm 1v and ends with Transducer \pm 0.1v. Sensor types available are listed in the table.

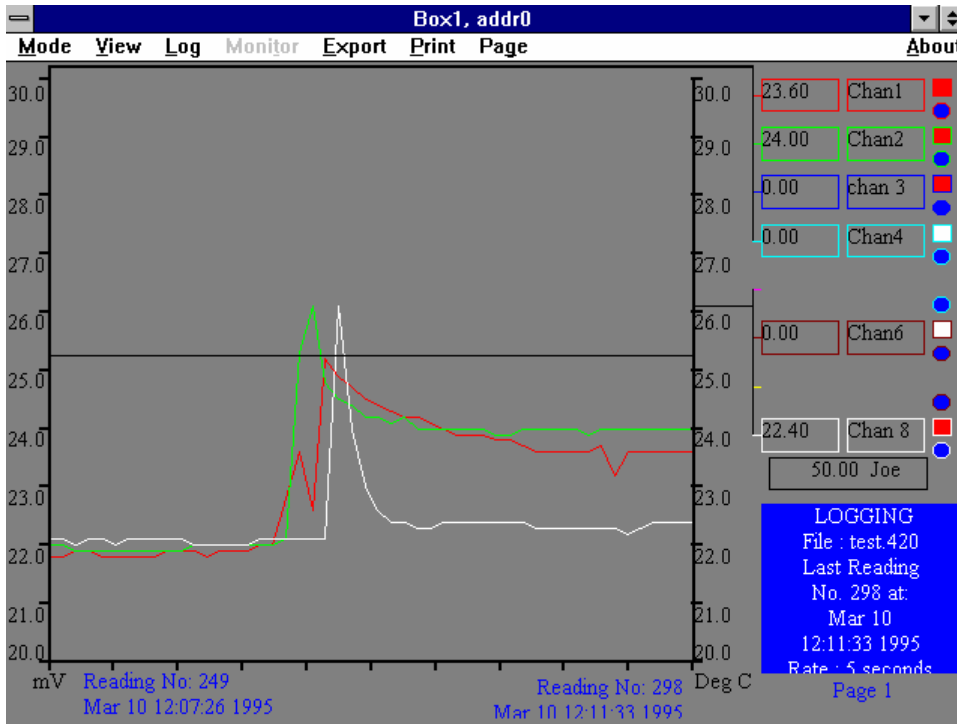
Type and Range	Resolution	Type and Range	Resolution
Volts \pm 1v	100uV	E type -100 to +1000°C	0.1°C
Volts \pm 0.1v	10uV	R type 0 to +1700°C	1°C
Volts \pm 0.01v	1uv	S type 0 to +1700°C	1°C
4 to 20 mA loop	0.01%	T type -100 to +200°C	0.01°C
T type -200 to +400°C	0.1°C	Pt 100 -100 to +600°C	0.1°C
K type -200 to +1200°C	0.1°C	Pt 100 -100 to +200°C	0.01°C
J type -100 to +1100°C	0.1°C	Transducer \pm 1v	100uV

N type 0 to +1300°C	0.1°C	Transducer ± 0.1v	10uV
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Units and Log Channel

Unlike the previous settings, Units 1-8 and Log Channel can be changed while the program is running. Refer to View, Change Details.

420TC LOGGING PROGRAM



The logging program screen is the LOG 420TC's main screen and (having set-up your initial values) is displayed during program run-time.

The screen displays the following information initialised by you at set-up:

- Box Title
- Scale(chan 1-4)
- Scale(chan 5-8)
- Scale(chan 9-12)
- Scale(chan 13-16)
- Channel Title
- Alarm Status
- Input Units (chan 1-4)
- Input Units (chan 5-8)
- Input Units (chan 9-12)
- Input Units (chan 13-16)
- Frequency

Other information displayed is provided by the automated LOG420TC program software, in this example are:

- Logging
- File name
- Last Data Reading
- Mode
- Reading No.

A Menu bar, positioned beneath the Box Title bar at top of the of the screen, enables you to access program functions.

As you enter the logging screen, with page 1 displayed, the program is initially in a monitoring mode with data, although not being permanently recorded, being displayed graphically on the screen and the last data reading being displayed numerically toward the right of the screen. The Y axes scaling, displayed vertically, shows channels 1-4 on the left of the screen and channels 5-8 toward the right with the graphical data moving between them from left to right.

Click on Page in the menu bar to bring up page 2 of the logging screen. Data is displayed in the same manner as page 1 but with channels 9-12 on the left and channels 13-16 to the right of the screen. Click Page to revert to page 1.

The alarm status of each channel is indicated by either a square or circular indicator, adjacent to each channel, at the far right of the screen. The square indicator represents an analogue input and shows red for channel in alarm status, otherwise white. The circular indicator represents a digital input and shows green for a channel in ON or OFF alarm status, otherwise blue. Note that in real-time mode a lost or bad reading causes XXX to be displayed of a channel box.

The Mode box, bottom right of the screen, indicates operating mode together with file name, last reading time and scanning interval.

Using the LOG 420TC Menu Bar

All functions are the drop-down menu type and mouse operated. The current selection state is indicated by a tick. Moving from left to right along the bar:

Mode

Mode menu comprises three functions:

- Recording
- Recording Stopped.
- Remote Log

Recording

Click Recording to log data. Recording will only be turned on if a log file has been selected (see Log File).

Recording Stopped

Click Recording Stopped to halt logging. Note that when Recording is turned off the system no longer recognises that a particular log file is assigned.

Remote Log

Before activating Remote Log ensure the system is in Monitoring mode. Create or open a log file (see Log File) then click Remote Log. The LOG420 software is then primed to receive remote log input signals. To exit, click Remote Log. For further details please refer to Remote Log section in PART III.

View

View menu comprises four functions:

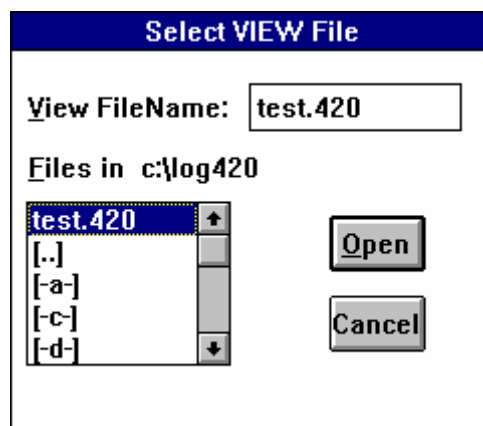
- View File
- View Information
- Change Details
- Alarm Information

View File

In View File, previously (historic) recorded files can be displayed in two ways. In the first way, files can only be viewed if monitoring or recording is not taking place (see Monitoring). The second way allows files to be viewed while logging is in progress.

Viewing a file without logging

Selecting the View File option brings up a Select VIEW File dialog box which lets you select a previously recorded data file.



To open a file, click on the file that you want in the Files box. The file name will appear in the View File Name text box. Alternatively, you can type the file name directly into the text box. Click on Open. If the file you want to read is already in use an error message box will appear warning you as such. The file is now regarded as the current View File.

Viewing a previously (historic) recorded file while logging

To view a previously recorded data file, the number 100 is entered in an empty Box Address text box. This address number is not associated with any other address and will pause the logger while you view your selected file.

This facility is not available if all 8 boxes are in use. However, files can still be viewed in your spreadsheet in the normal way.

To actually view a file, select Windows Program Manager followed by Isosystem Group and the 420TC icon to reopen Set Up Logging Parameters dialog box. Type 100 in an unused address box and click End. In the main logging screen click View, View File and select the file that you want to view.

Recorded data contained in the file can now be displayed according to the parameters defined in the View Information dialog box (see below). Statistical details of the selected file are given in the Mode box of the logging screen under the heading of VIEWING.

Note: When recording is taking place the Log File is also assigned the same View File.

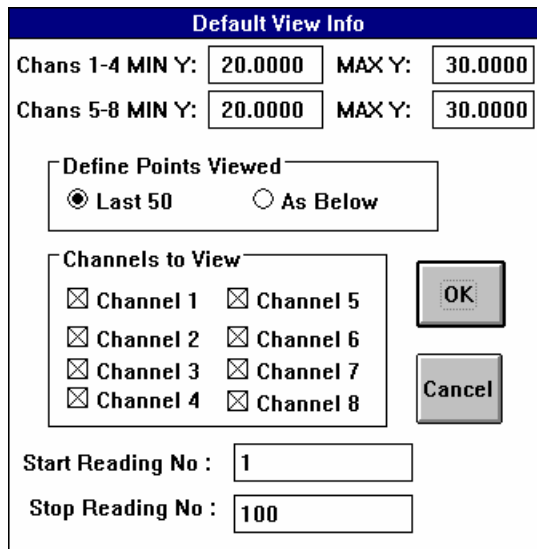
View Information

View Information					
ViewFile is : test.420		Scan	5 seconds	Start no: 399	
View Statistics					
View Started:		Fri Mar 10 12:20:14 1995			
Last View at:		Fri Mar 10 12:25:04 1995			
Chn	Alarm1	Alarm2	Minimum	Maximum	Mean
1	0.0000	10.0000	23.1000	23.4000	23.2760
2	10.0000	20.0000	23.4000	24.1000	23.6320
3	30.0000	38.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000
8	10.0000	-10.0000	21.8000	22.0000	21.8980
OK					

This dialog box shows information similar to that provided by the Log Information option (see Log Information), but the good thing is, this information comes only from what can

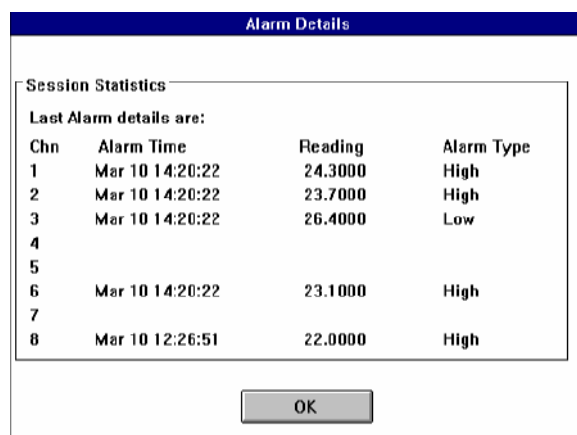
be seen on the screen, which means that you can choose exactly what information you want.

Changing Details



This dialog box (Default View Info) allows you to change the view of the recorded data that is displayed on the screen. The left and right Y axes default settings can be changed, channels can be added to or removed from the display or a new set of recorded points can be displayed. Points from the Log File can be displayed while the data is actually being recorded (remember the Log File is the same as View File). But what if, for example, you request points 1 to 100 to be displayed but the last point logged was number 90. What will happen? Data recording will continue, but the new points, 91 to 100, will not be displayed until the view details are changed again.

Alarm Information



Chn	Alarm Time	Reading	Alarm Type
1	Mar 10 14:20:22	24.3000	High
2	Mar 10 14:20:22	23.7000	High
3	Mar 10 14:20:22	26.4000	Low
4			
5			
6	Mar 10 14:20:22	23.1000	High
7			
8	Mar 10 12:26:51	22.0000	High

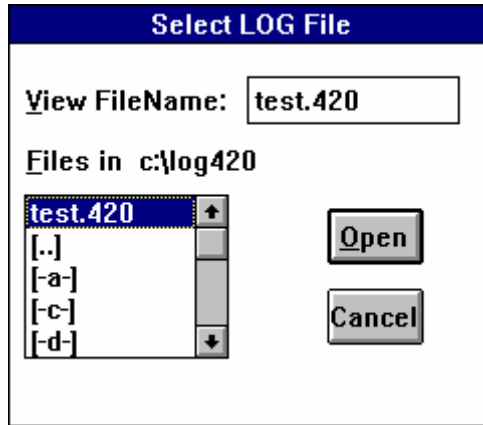
Clicking on the Alarm Information option brings up an Alarm Details dialogue box which provides alarm statistics for a current recording session. This example shows that of 5 channels being logged 4 went into high alarm and 1 into low alarm. Click on OK to exit.

Log

The Log Menu has two options:

- Log File
- Logging Information

Log File

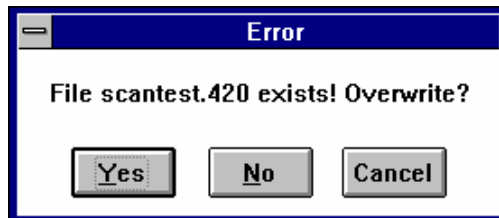


Selecting Log File brings up the Select LOG File dialog box which allows you to choose or create a file for storing recorded data. To start a file type its name plus the .420 extension in the View File Name text box and click Open.

NOTE: Data File Size

The maximum number of scans that any data file can hold, whilst recording is 2000. But recording does not stop when this limit is reached. Instead a new file is automatically opened. The first recording file will have the extension .420, for example, test.420. When this file becomes full (2000 scans), the next file will retain its title but have the extension test.42a, the next test.42b and so on. When .42z is reached the next file opened will have the extension .4aa and so on.

If you select a file that already exists or another box address that is using that file or the system has been incorrectly closed, for example, through loss of power, then an error message box will be displayed indicating that the file already exists:



CAUTION:

Care should be taken when opening an existing file! Since the LOG420 software automatically opens a new file each time a 2000th scan is reached a lot of files will be generated (relative to total logging period). For example say that you have been logging at a 5 sec. scan rate for 24 hrs, LOG420 software will have opened at least 7 files with file extensions .420 to .42f. If you want to re-open file .420

and overwrite it's contents and **provided you have deleted the other files** you can do this quite safely. But if you have not deleted these files, the software, which prohibits writing data to 'full up' files will produce error message 'Failure 4 on recording data'. If this occurs click OK and close down the system. Bear in mind also that having overwritten a file it will be some considerable time before you notice a problem. Alternatively if you have opened the .420 file and chosen No to overwrite, the error message 'Failure 4 on recording data'. will appear within the time it takes to scan 5 times.

Bearing the aforementioned in mind when you need to overwrite a file please note however that data can only be added if the initial parameters (scan rate, scaling, offset etc) remain the same as when data was previously logged. When saving a Log File it should have the extension .420. At this point, although a Log File has been assigned, recording does not take place until selected under the Mode function: Recording.

Log Information

Log File is: test.420 Log Rate: 5 seconds Log No: 1					
Session Statistics					
Log Started:		Fri Mar 10 14:50:35 1995			
Last Log at:		Fri Mar 10 14:50:37 1995			
Chn	Alarm1	Alarm2	Minimum	Maximum	Mean
1	0.0000	10.0000	25.2000	25.2000	25.2000
2	10.0000	20.0000	24.1000	24.1000	24.1000
3	30.0000	38.0000	26.9000	26.9000	26.9000
4	0.0000	0.0000	9999999848	-9999999848	0.0
6	0.0000	0.0000	23.6000	23.6000	23.6000
8	10.0000	-10.0000	9999999848	-9999999848	0.0

If data is being recorded, this data is available for use. The information contained in the dialogue box is for this recording session only. Click Print for a hard copy. Printer should be set to print in landscape mode.

Monitor

This enables monitoring of data to be turned on or off. Not available when Recording (see Mode) recognisable by the Monitor legend being greyed-out.

Export

The Export function contains File Select which allows you to down-load data from any LOG420file in a format readable by spreadsheet programs. To export current display data ensure that Log File is opened and Recording selected.

LOG420TC software has been written to down-load files into Excel by default. To export to Lotus 1-2-3 you must make the following entry in Windows win.ini file.

Exporting to Lotus 1-2-3

First you must open the win.ini file. To do this call up either File Manager or Program Manager. Select File and Run. In the Run text box type win.ini and click OK. The win.ini file will be displayed in Notepad. Scroll down until you reach the LOG420entry.

Set the option 'LOTUS' in the win.ini file as follows:

```
[log420TC]
.....other commands.....
Export=LOTUS
.....other commands.....
```

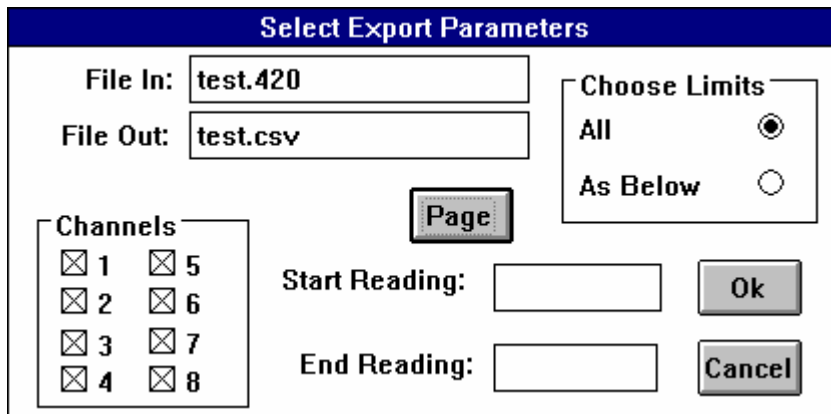
Save the new entry and restart Windows to initialise the win.ini file.

When using the export command in the LOG420TC software, export to a '.txt' file. Remember, if you have a Log or a View file assigned this done by default for you.

Select the file to open in Lotus as a .txt format file. Click on Combine and choose the Formatted Text option. Click OK.

The first 2 columns of recorded data are the data and time, as Lotus date and time numbers. These columns should be formatted to provide the required format.

File Select



Click on Export followed by File Select and a Select Export Parameters dialog box will be displayed. The dialogue box contains radio buttons, text boxes, Page ,OK and Cancel buttons:

- File In: Contains the name of the current view or log file.
- File Out: Contains the same file name but with the file extension .CSV. Both of these text boxes may be edited to operate on other files.

Choose Limits

- Radio buttons All and As Below are used to select either all data in the file or to limit the data to the contents of the Start Reading and End Reading boxes.

Channels 1-8 and 1-16

- The channel check boxes allow you to choose which channel or channels to download. Click the mouse on a box. Click Page to switch between channels displayed and those hidden.

Start Reading and End Reading boxes.

- The number where you want to begin exporting from you enter in the Start Reading box and similarly the number that you want to finish exporting enter in the End Reading box.

When you have decided which file you would like to export, click on OK or click on Cancel if you wish to abort at this stage. The exported .CSV file will be found in your Log420 directory unless a different path is entered into the File Out: text box and will be presented on a spreadsheet similar to the examples shown here. Example 1 is file Mike.CSV and shows box address, date and analogue data recorded channels 5,6 and 8. Example 2 is the same file but shows how digital input and output data would be presented.

	A	B	C	D	E	F	G	H	I
1	Box 3, addr 0								
2	CHANNELS:					Channel 5	Channel 6		Channel 8
3	04/11/94 15:25					13.8	13.8		14.
4	04/11/94 15:25					13.8	13.8		14.
5	04/11/94 15:25					13.8	13.8		14.
6	04/11/94 15:25					13.8	13.8		14.
7	04/11/94 15:25					13.8	13.8		14.
8	04/11/94 15:25					13.9	13.8		14.
9	04/11/94 15:25					13.8	13.8		14.

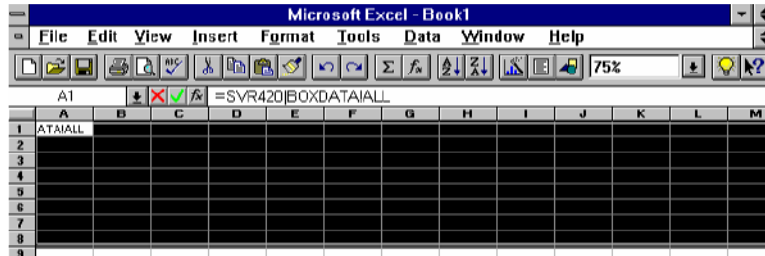
Example 1

	I	J	K	L	M	N	O	P	Q
1									
2	Channel 8								
3	14.6	0	0	1	0	1	0	1	0
4	14.7	0	0	1	0	1	0	1	0
5	14.7	0	0	1	0	1	0	1	0
6	14.7	0	0	1	0	1	0	1	0
7	14.7	0	0	1	0	1	0	1	0
8	14.7	0	0	1	0	1	0	1	0
9	14.7	0	0	1	0	1	0	1	0

Example 2

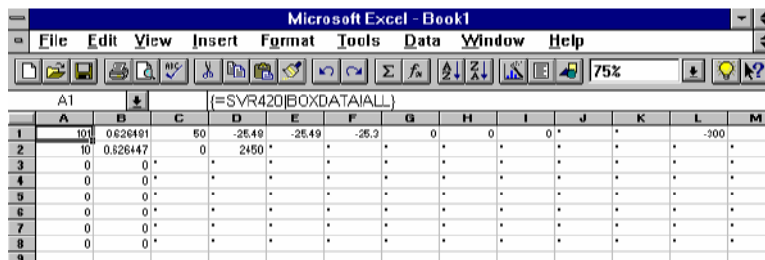
DDE link to Excel

Open Excel. Choose 75% in the Zoom Control. Select lines 1-8 and columns A-V. Select the Formula Bar and type in this instruction (no spaces between characters) =svr420|boxdata!all. See example 1. If you make a mistake with the instruction you will be told with an error message.



Example 1

To enter the instruction, press and hold down Ctrl and Shift keys and then press Enter key. Data being logged will entered into the spreadsheet. Click to remove highlighted cells.



Example 2

Description

Column A represents box status where:

- 0 = not in use
- (1)01 = analog in and digital out
- (1)03 = digital in
- 10 = idle

The number in brackets is a Series 420TC box number; in this example box 1. All other numbers will change with the type of input and be synchronous with the LOG420TC scan rate..

- Column B represents time.
- Column C represents frequency input.
- Columns D - S represent the 16 channels.
- Column T represents digout levels
- Column U represents digin levels

The 8 lines used represent 8 boxes of the LOG420TC software.

Print

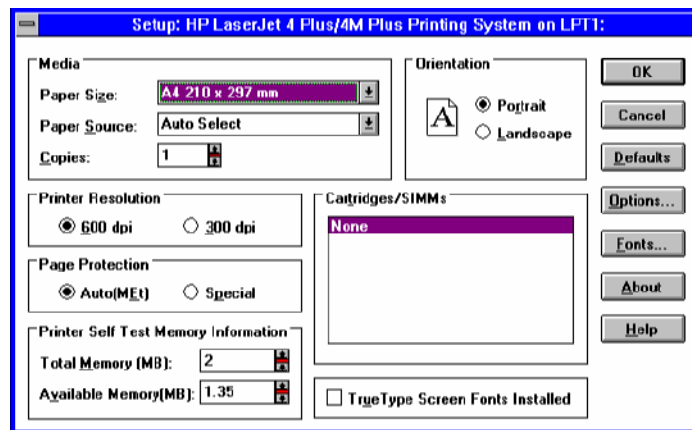
Print comprises two options:

- Print
- Page Set-up

Print

When you choose the Print command a Printing message box is displayed, asking if you really want to print: Yes or No! If you choose No you are taken back to the menu bar. If you decide on Yes, the current screen's contents will be printed. During printing the program will be halted.

Page Set-up



Selecting Page Set-up displays a printer dialog box, headed with the name of the default printer, in which you can make changes to the page you want to print. If you want to change Resolution, Paper Size or Paper Source fields, click on the down arrow. You will be shown a pull-down list of alternatives. Click on the one you want, which will then be shown in the field box to confirm your choice. In the Orientation section you can opt for either Portrait or Landscape. When you are satisfied with all your choices, click on the OK button or if you are not sure click on the Cancel button. For further information on set-up click on the Help button.

The changes you make in the Page Set-up dialog box only apply to the current session. If you exit the LOG420TC program and then launch the program again you will find that the settings have reverted to the default settings.

Please note that the default printer is one that Windows has been told about. If you want to change printers you must switch to the Windows Control Panel. Please have your Windows disks to hand. To change or add printers proceed as follows:

- Click on the Control Menu Box
- Click on Switch to..
- Click on Program Manager (Main)
- Double click on Control Panel
- Double click on Printers

As you double click on Printers a dialog box appears. Click on Add. A list of different printers will be presented to you. Scroll down the list to the printer that you want and click on it. Click Install and insert the required Windows disk and follow instructions.

Leaving LOG 420TC

You will only be allowed to leave the logging program if you shut down all functions that are currently being used. To leave, click on the Windows control box and choose Close from the drop-down menu. If you have not shut down all functions Close will be 'greyed out' and unavailable. You must also close down the File Server

Restarting LOG 420TC Automatically

If the system is shut down due a power failure or the computer is accidentally switched off, the LOG 420TC will be automatically re-launched and continue logging when power is re-connected.

Other Files

The LOG 420TC automatically generates two files that save ALARM and digital data. ALARM data is stored in files with the extension.a42 and digital data is stored in files with extension.d42. Both files can be viewed in Windows Notepad or a spreadsheet.

PART V: OPERATING INSTRUCTIONS

Starting the program

Before starting the LOG 420TC program you should have read the hardware and software installation instructions in Parts III and IV and configured the system to your exact requirements.

Switch on your PC and enter Windows. Run the program LOG420.exe from the Program Manager menu, File Manager or double click on the icon as described in PART II: THE SERIES 420 ENVIRONMENT.

Note: If the program has been previously run, and providing the initial parameters are not to be changed, click on the END button in the Set Up Logging Parameters dialog box. If the program is being run for the first time or that box parameters are being changed proceed as follows:

Box Set Up

- Choose a box by pointing the mouse and clicking on a box number, generally 1.
- In the Box Address box type the address number configured on the SERIES 420TC unit.. Note: if you wish to view previously recorded data, type in an address of 100. This address is not associated with a specific address box.
- Give the program a title by editing the Box Title text box.
- Set the scan rate by entering a value in the Scan Rate text box and selecting either the S or Mins radio button to indicate whether the rate is seconds or minutes.

Channel Set Up Parameters

- Select TC if you are using type T thermocouple inputs.
- Select the channel by clicking on its associated radio button. The current channel set up values will be displayed.
- A channel title may be entered into the Title text box. This will appear in the channel title box towards the right hand side of the graphical display and is also tagged to the data file.
- If scaling is required edit the Scale box. The data read from the SERIES 420TC will be multiplied by this value.
- If an offset is required edit the Offset box. This value is added to the data read from the SERIES 420TC.

- Define the low alarm value by editing the MinAlarm box. Input values lower than this will cause the channel to go into alarm.
- Define the high alarm value by editing the MaxAlarm box. Input values lower than this will cause the channel to go into alarm.
- Define the Y axis engineering units for the input groups by editing the Units 1-4 and 5-8 text boxes on page 1 and Units 9-12 and 13-16 on page 2. These units will appear on the left and right Y axes of the display respectively. Note that these boxes are situated in the channel section of the menu.
- To enable the channel for logging check the Log Channel check box.
- **IMPORTANT:** When all values for a particular channel have been input, click on the Confirm Channel button. This will accept the channel data and indicate that the data has been accepted by clearing the displayed data values. **If the Confirm Channel button is not used, data in the channel will not be altered.**

PART VI: ERROR MESSAGES

Whenever you receive an error message of any type, you must correct it.

Error messages could be related to software problems, hardware problems or to system problems. The chart in this chapter gives LOG 420TC error messages.

ERROR MESSAGES	DESCRIPTION/ACTION
Box in use	Box already selected
Box input error	Anything can cause this type of error
Box still in use	Box already selected
Cannot allocate space for dialogue with Server	Insufficient memory available. Check hard disk capacity. Delete or down load files as necessary
Cannot set up printer	Printer driver not selected or not loaded. See Print section page 19 or Windows documentation on how to load a printer
Could not load device driver	Printer driver not selected or not loaded. See Print section page 19 or Windows documentation on how to load a printer
Cannot connect with 420 File Server	File Server missing. Close system down. Check LOG420TC directory for Server 420.exe. Reload LOG420TC software.
Cannot open set box file	File details in error
Error accessing alarm file	Disk full. Physical damage to disk. Run SCANDISK under MS-DOS.
Error accessing digin file	Disk full. Physical damage to disk. Run SCANDISK under MS-DOS.
Error reading file	Cannot read file. Check file name. Physical disk problem: run SCANDISK.
Error retrieving all readings	Any sort of reading when trying to access a view file. Physical damage to disk. Run SCANDISK under MS DOS.
Error on COM port using 'x'	File Server related. Problem with COMs port number shown. Refer to PART V : Port Selection or re-install LOG 420 software.
Error on SetView file	File Server related. File Server will check against Set box data.. Physical disk problem. Run SCANDISK.
Export error numbers:	
-1	Start reading less than 1
-2	Start reading greater than the last reading
-3 on file export	Cannot open source file. Incorrect file name
-4 on file export	Cannot open destination file. File name

	missing. Trying to export to the same file. File still open.
-10	Cannot allocate memory
-11	Cannot free memory
-12	HRD (header)read error
-13	Seek error
-14 on file export	Read error
-15 on file export	Write error
Failure 1 on recording data	30 second timer goes. Related to Failure 4. If this occurs it will cause Windows to hang-up. Cannot open Log, Alarm, Digin files. Hardware problems.
Failure 2 on recording data	Stopped logging but cannot write files to disk
Failure 3 on recording data	During logging cannot write files to disk
Failure 4 on recording data	Trying to write 5 readings to a 'full' file. A'full' file holds 2000 readings.
Failure on logging end	File with extension .42a being used without a file .420 being opened first. There must always be a .420 file present.
Failure reading View File	Problem reading files from disk. Check file names. Physical disk problem: run SCANDISK.
Insufficient readings in logged file	Not enough data for a graph to be drawn
No file name specified	Select Viewfile related: file name not entered.
No timer for logging	Timers being used by other Windows applications must be shut down e.g. clock
Reading error 'x'	Start reading number is larger than or equal to finish reading number.
Scale error	Default View Info dialog box related. Incompatible values entered into min and max Y axis boxes.
Set-up error	Set-up Logging related. Incorrect values entered.
Status Information Incompatible	Scan rate. for example has been changed and then the file has tried to be opened again
Too many timers and clocks	Shut down Windows applications using timers or clocks.
WARNING. Cannot open DefView file	Default View file related. Set-up file missing. Close system down. Reload 420 software.

PART VII: SPECIFICATIONS

Data Logger

CONSTRUCTION

The SERIES 420TC data logger is constructed as a metal box formed by 2 U-shaped sections. A bottom box section forms the mount for printed circuit boards (PCB). All connectors and switches are mounted on the PCBs. A top box section locates over the bottom section, allowing access to connectors and switches and is secured into position using 4 M3x6mm screws. Four rubber feet are screwed to the bottom.

Dimensions: 269mm long, 150mm wide, 75mm deep (including feet).

Connectors

- 16 analogue inputs
- 2 RS423 ports
- 1 digital input
- 1 digital output
- 1 analogue output
- 1 power input
- 1 frequency input

Switches

- 4 unit configuration
- 2 baud rate
- 2 temperature scale selection
- 8 analogue input configuration

Mounting and Ventilation

To mount a logger, remove rubber feet and use the same screw locations. Maximum screw length penetration is M3x4mm. It is dangerous to exceed the recommended penetration length as damage to internal components could occur. The logger requires no special ventilation requirements.

Cleaning

Loggers are easy to clean. Use a non-abrasive or foam cleaner.

ANALOGUE INPUTS

Direct Voltage and Current

Range	Resolution
±100 mV	10 µV
± 1V	100 µV

± 10v	1 mV
4-20mA	0.01%

Thermocouples

Input range	Input function	Resolution	Accuracy*
-200 to +400°C	T thermocouple	0.1	±0.5 °C
-200 to +1200°C	K thermocouple	0.1	±0.5 °C
-100 to +1100°C	J thermocouple	0.1	±0.5 °C
0 to +1300°C	N thermocouple	0.1	±0.5 °C
-10C to +1000°C	E thermocouple	0.1	±0.5 °C
0 to +1700°C	R thermocouple	1	±4 °C
0 to +1700°C	S thermocouple	1	±4 °C
0 to +1800°C	B thermocouple	1	±4 °C
-100 to +200°C	T thermocouple	0.01	± 0.25°C

* Note: accuracy includes cold junction error when using thermocouple sockets and not when using general purpose sockets.

PT100 - 100 ohms @ °C, 4 wire connection

Range	Resolution	Accuracy
-100 to +600 °C	0.1 °C	±0.5 °C
-100 to +200 °C	0.01 °C	±0.2 °C

Pressure transducer/load cell

Range	Resolution
0 to 100 mV	10 uV

Signal conditioning

For thermocouple, PT100 and pressure transducers.

Transducer energisation

- For PT100: switched constant current of 1mA.
- For pressure transducer/load cell: switched constant voltage of 10V.
- For 4-20mA current loop: switched constant voltage of 24V.

Input switching

Reed relay - 3 pole switching

Engineering units

As appropriate or selectable:
mV, V, mA, C, %

Scan speed

All inputs in 2 seconds

Scan interval per box

Variable from 5 seconds to 999 minutes (per logger).

Serial link

RS232 or RS422. Choice dependant on cable length.

Cable length

Maximum cable length for RS232 operation is approximately 30 metres.

Maximum cable length for RS422 operation is approximately 1.5 kilometres.

To avoid electrical interference the serial cable should be installed away from other cables particularly mains voltage cables. Ideally the serial link should be installed in it's own trunking

Cable Type

For runs of up to 30 metres: two pair, overall foil shielded, 24 AWG, polyethylene insulated, PVC screened.

Type: 0S2P24, UL style 2464 obtainable from Farnell Electronic Services (FES)

For runs of up to 1.5 kilometres: two pair, overall foil shielded, 24 AWG, polyethylene insulated, PVC screened.

Type: FB0S2P24, UL style 2919 obtainable from FES.

Type 2, UL style 2493 obtainable from RS Components, part no. 368-738.

Baud rate

Four baud rates are available: 1200, 2400, 9600,19200.

Daisy-chained linked loggers

Maximum number of loggers that can be daisy-chained is:

8 using integrated software.

16 using SCAN1000.

Environmental Operating Range

-10°C to +60°C.

Power supply

+5V @ 0.5 Amps and +24V @ 0.2 Amps.

OTHER INPUTS/OUTPUTS

Frequency input

- optically isolated frequency and pulse count
- frequency range 0 to 65KHz
- pulse count range 0 to 65KHz

Digital inputs

Optically isolated.

Digital outputs

Optically isolated.

Analogue outputs

Isolated 0 to 10V; accuracy $\pm 0.1\%$.

COMPUTER

Minimum configuration.

For Series 420 integrated software:

- Processor type: 386SX
- Processor speed: 25MHz
- Machine memory (RAM): 4Mb
- Display type: VGA
- Hard-disc size: 100Mb
- Pointer device: Mouse, tracker ball (some laptops).
- Serial ports: 2.
- Printer: colour preferably and one with full range of colours.
- Networks: view historic data only. Must be Windows compatible.

For Series 420 SCAN1000 software:

- Processor type: 486SX/DX
- Processor speed: 33MHz
- Machine memory (RAM): 8Mb
- Display type: VGA
- Hard-disc size: 100Mb
- Pointer device: Mouse, tracker ball (some laptops).
- Serial ports: 2.
- Printer/parallel ports: one per device. Note: the Software Key (dongle) requires one port, printers will work through software keys, but it is not advised in data logging applications.
- Networks: view historic data only. Must be Windows compatible.

Power Supply PUP30-25

The power supply is an AC/DC switching power supply providing 30 watts of continuous output power. The supply is enclosed in polycarbonate case with IEC320 inlet connector to mate with interchangeable mains cord for world-wide use. This model meets VDE

class B and FCC class B emission limits and is designed to comply with UL, CSA VDE and IEC requirements.

Input

Voltage: 85 to 264 VAC
 Frequency: 47 to 440Hz
 Current: 0.50A (rms) @ 230VAC
 Safety ground leakage current: 0.75 mA @ 240VAC, 50Hz

Output

Voltage: +5V DC @ 3.0A max
 Voltage: +24 DC @ 1.0A max
 Power range: 0 to 30 watts
 Ripple: 1% peak to peak max
 Overvoltage protection: +5V output only. 112-132% of nominal output voltage
 Overcurrent protection: both outputs protected for short circuit conditions
 Temp coefficient: both outputs $\pm 0.04\%/^{\circ}\text{C}$ max

DC pin chart

Wire	Pin	Voltage
Screen	1	earth
Black	2	0V
Brown	3	+5V
Green	4	+24V

Environmental

Operating temp: 0 to 70°C
 Relative Humidity: 5% to 95% non-condensing
 Derating: Derated from 100% at +50°C linearly to 50% at +70°C

General

Efficiency: 65% min at 30W output
 Hold-up time: 10 msec min
 Line regulation: $\pm 0.5\%$ max at full load
 Inrush current: 15 A @ 115VAC or 30 A @ 230 VAC @ 25°C cold start
 Withstand voltage: 3000 VAC from input to output
 1500 VAC from input to ground
 500 VAC from output to ground
 Insulation resistance: 10M ohm min from output to ground
 EMI requirements: Meets conduction limits of:
 FCC 20780 Level B
 VDE 0878 Level B
 Safety requirements: Meets or exceeds:
 UL 1950
 CSA C22.2 NO.234

IEC 950

Notes

