



# ABB

## The Company

We are an established world force in the design and manufacture of instrumentation for industrial process control, flow measurement, gas and liquid analysis and environmental applications.

As a part of ABB, a world leader in process automation technology, we offer customers application expertise, service and support worldwide.

We are committed to teamwork, high quality manufacturing, advanced technology and unrivalled service and support.

The quality, accuracy and performance of the Company's products result from over 100 years experience, combined with a continuous program of innovative design and development to incorporate the latest technology.

The UKAS Calibration Laboratory No. 0255 is just one of the ten flow calibration plants operated by the Company and is indicative of our dedication to quality and accuracy.

EN ISO 9001:2000



Cert. No. Q 05907

EN 29001 (ISO 9001)



Lenno, Italy – Cert. No. 9/90A

Stonehouse, U.K.



0255

## Electrical Safety

This equipment complies with the requirements of CEI/IEC 61010-1:2001-2 'Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use'. If the equipment is used in a manner NOT specified by the Company, the protection provided by the equipment may be impaired.

## Symbols

One or more of the following symbols may appear on the equipment labelling:

|  |   |
|--|---|
|  | <b>Warning</b> – Refer to the manual for instructions |
|  | <b>Caution</b> – Risk of electric shock               |
|  | Protective earth (ground) terminal                    |
|  | Earth (ground) terminal                               |

|  |  |
|--|--|
|  | Direct current supply only                           |
|  | Alternating current supply only                      |
|  | Both direct and alternating current supply           |
|  | The equipment is protected through double insulation |

Information in this manual is intended only to assist our customers in the efficient operation of our equipment. Use of this manual for any other purpose is specifically prohibited and its contents are not to be reproduced in full or part without prior approval of the Technical Publications Department.

### Health and Safety

To ensure that our products are safe and without risk to health, the following points must be noted:

1. The relevant sections of these instructions must be read carefully before proceeding.
2. Warning labels on containers and packages must be observed.
3. Installation, operation, maintenance and servicing must only be carried out by suitably trained personnel and in accordance with the information given.
4. Normal safety precautions must be taken to avoid the possibility of an accident occurring when operating in conditions of high pressure and/or temperature.
5. Chemicals must be stored away from heat, protected from temperature extremes and powders kept dry. Normal safe handling procedures must be used.
6. When disposing of chemicals ensure that no two chemicals are mixed.

Safety advice concerning the use of the equipment described in this manual or any relevant hazard data sheets (where applicable) may be obtained from the Company address on the back cover, together with servicing and spares information.

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# 1 INTRODUCTION

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The Memory Card option on the advanced process recorder allows data logging and instrument configuration storage.

The instrument accepts the following memory cards:

|      |      |
|------|------|
| SRAM | 64K  |
| SRAM | 128K |
| SRAM | 256K |
| SRAM | 512K |
| SRAM | 1M   |
| SRAM | 2M   |
| SRAM | 4M.  |

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## Notes.

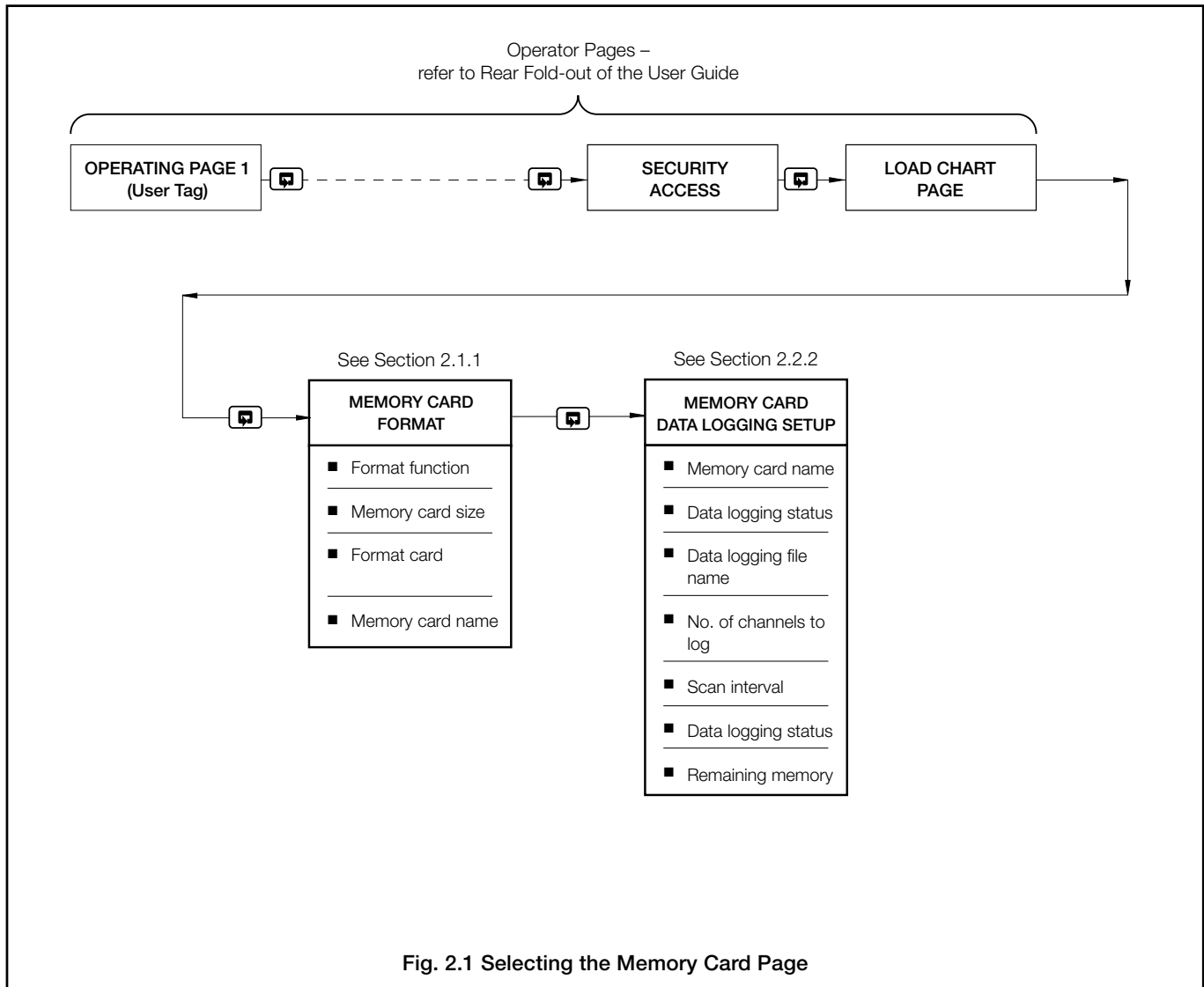
- The advanced process recorder does not work with Flash EPROM, ROM or EPROM cards.
- **DOS format** is used that allows configuration storage and data logging in a form which can be imported directly onto a PC-based spreadsheet.
- The **DOS format** allows data logging and instrument configurations to be stored on the same card. The **DOS format** implemented on the instrument memory card has the following limitations:

Up to 32 files can be stored (including any volume label).

Files can be deleted only by reformatting the card.

- Cards should be formatted on the process recorder to prevent compatibility problems.
-

## 2 OPERATION



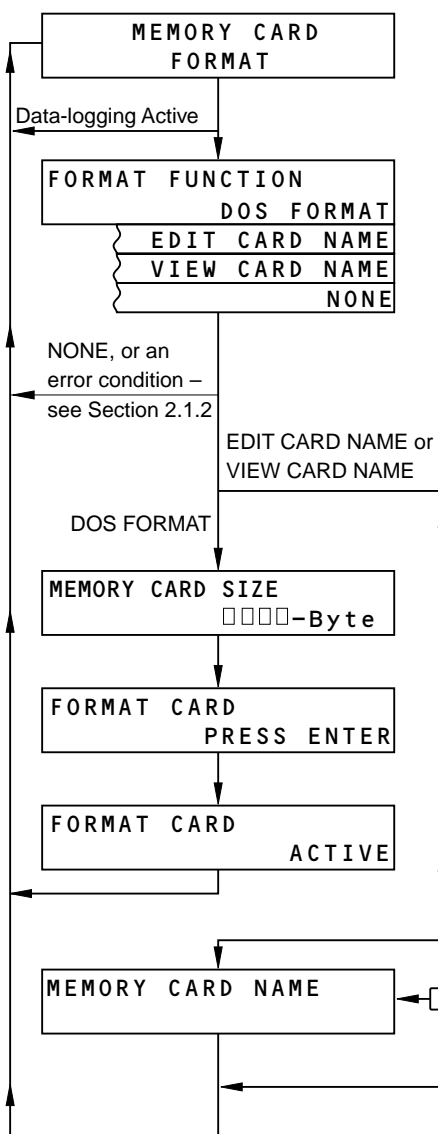
## 2.1 Memory Card Format

### Notes.

- All memory cards must to be formatted on the instrument before they can be used.
- **DOS format** is used that allows configuration storage and data logging in a form which can be imported directly onto a PC-based spreadsheet.
- The memory card's name (volume label in DOS) can be edited.
- The memory card's size is required to successfully format the card. Sizes available are 64kB, 128kB, 256kB, 512kB, 1MB, 2MB and 4MB.
- Formatting can take place only when data logging is not active.

### 2.1.1 Memory Card Format Page

A memory card can be formatted only if data logging is stopped or invalid. Before installing the card, note its memory size.



Page Header – Memory Card Format


#### Format Function

- |                       |  |
|-----------------------|--|
| <b>DOS FORMAT</b>     | – Format card as DOS compatible format for configuration and data logging storage.   |
| <b>EDIT CARD NAME</b> | – View and/or re-write (if write protect tab is in the unlocked position) the memory card name held on the card (known as 'Volume Label' under DOS). |
| <b>VIEW CARD NAME</b> | – View only, when write protect tab is in the locked position.   |


#### Memory Card Size

Select the memory size of the card to be formatted. Available sizes are 64kB, 128kB, 256kB, 512kB, 1MB, 2MB and 4MB.

#### Format Card

Press the  key to format the card using the information set above. While formatting is in progress, **ACTIVE** is displayed. **COMPLETE** is displayed when formatting is completed successfully. If the card is absent, an error is displayed. If the Write Protect tab is in the locked position, an error message is displayed (see Section 2.1.2) and formatting is disabled. Set the Write Protect tab to the unlocked position and perform the procedure again.

#### Memory Card Name



In **EDIT CARD NAME**, a card name of up to 11 characters can be set on the upper display. In **VIEW CARD NAME**, the  key is inoperative.

Return to top of the Memory Card Format Page.

## ...2 OPERATION

### 2.1.2 Error Messages

The following error messages may be displayed during the format procedure:

| Error Message                             | Error Condition   | Action  |
|---|---|---|
| CARD ERROR<br>CARD ABSENT                 | Upper display flashing.<br>The card is absent or may not be inserted properly   | Fit the memory card correctly into the advanced process recorder. |
| CARD ERROR<br>NOT FORMATTED               | The card is not formatted and the <b>EDIT CARD NAME</b> is selected.  | Select <b>DOS FORMAT</b> (Section 2.1.1).                         |
| FORMAT FUNCTION<br>CARD WRITE PROTECTED   | If the card is write protected and <b>DOS FORMAT</b> is selected, the lower display flashes.  | Move the Write Protect tab to the unlocked position.              |
| MEMORY CARD ERROR<br>CARD ABSENT          | Flashes if the card is absent (or not inserted properly) when the  key is pressed. | Fit the memory card correctly into the advanced process recorder. |
| MEMORY CARD ERROR<br>WRITE PROTECTED CARD | Flashes if the card is write protected when the  key is pressed.                   | Move the Write Protect tab to the unlocked position.              |

### 2.1.3 Using a PC to Format Memory Cards

Memory cards can be formatted on PCs that have been fitted with certain types of PCMCIA card reader. This method is faster than using the recorder and does not require data logging to be interrupted for longer than is absolutely necessary.

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#### Notes.

- Memory cards cannot be formatted using a PC unless the format image from a blank card of the same capacity has first been created on the PC.
  - Not all memory card readers and associated driver software have the facility to transfer card format images between memory card and PC.
- 

The following notes apply generally to stand-alone memory card readers. For information on using specific card readers to format memory cards, refer to the manufacturer's instructions.

- 1) Ensure that the memory card reader and associated software is installed and running on a PC.
- 2) Insert a newly-formatted recorder memory card into the card reader – see Section 2.1.1.
- 3) Create an image of the memory card format on the PC.
- 4) To format another memory card on the PC for use in the recorder, first insert the card requiring formatting into the card reader installed on the PC.
- 5) Copy the existing format image file created in step 3 to a newly-formatted card of the same capacity.

## 2.2 Data Logging

### Notes.

- Data formatted for direct viewing on spreadsheet.
- Recording of up to 12 channels (analog inputs or maths results).
- Recording of process alarm states.
- Date and time stamping of data.
- Channel tags and units recorded for each channel.
- Scan times variable from 1 to 240 seconds.
- Card must be formatted for DOS format in the **Memory Card Format Page** – see Section 2.1.1.

### 2.2.1 Filenames

Logged data is saved to a unique filename. The filename comprises eight or less characters.

All files are automatically given the extension '•SRx' where 'x' is initially '1'. The instrument provides a default filename.

Default file format = **SRddmmy.SR1**

Example default file created on 17th May 1999 = **SR170599.SR1**

The default filename may be edited by the user. The instrument searches the card directory to ensure that the filename selected is unique and then opens a new file with this name. An error message is displayed if this name already exists.

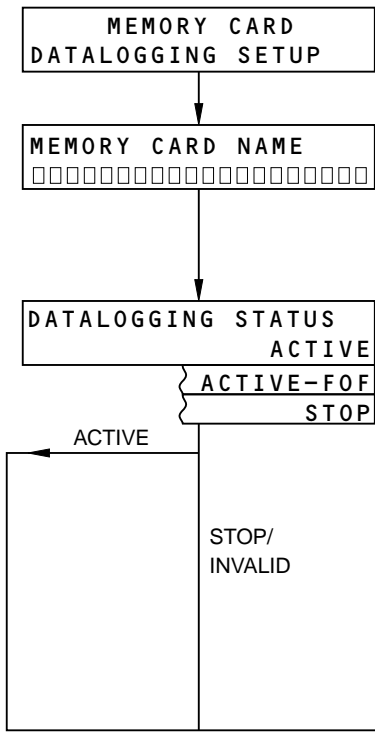
Some spreadsheets are limited to files of 8192 rows. In order to meet this requirement the process recorder automatically starts a new file when 8192 rows of data are exceeded. The new file has the same filename as before but the extension is incremented, e.g. SR1 becomes SR2. If the instrument is powered-down then powered-up again while data logging is active, **ACTIVE-FOF** (follow-on-file) is displayed momentarily. Data logging then automatically resumes but the data is stored onto a new file. This file has the same filename as before but the extension is incremented e.g. SR1 becomes SR2.

If data logging is stopped, the card can be removed to be viewed on a PC, and then returned to the process recorder where data logging can be resumed onto the same file. However, if a new filename is created, data cannot then be appended to any existing files. The number of channels and the channel sources are fixed on creation of the file and cannot be edited later. In order to store different channel data a new file has to be created. The scan interval may be changed at any time without creating a new file.

When a memory card becomes full, recording stops and an error message is generated – see Section 2.2.5. The memory card must be re-formatted to remove existing data before it can be re-used – see Section 2.1.

## ...2 OPERATION

### 2.2.2 Memory Card Data Logging Setup Page



Page Header – **Memory Card Data Logging Setup.**

---

#### Memory Card Name

The memory card name set in the **Memory Card Format Page** is displayed. If the memory card is not formatted, **MEMORY CARD NAME** is substituted with the message: **CARD ERROR**. The lower display describes the error – see Section 2.2.5.

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#### Data Logging Status

Select the data logging status required.

**ACTIVE** – select **STOP** to stop data logging and advance to channel setup parameters.

**ACTIVE-FOF** – **FOF** (follow-on-file) is briefly displayed when a new data logging file is opened automatically.

**STOP** – select **ACTIVE** to start data logging.

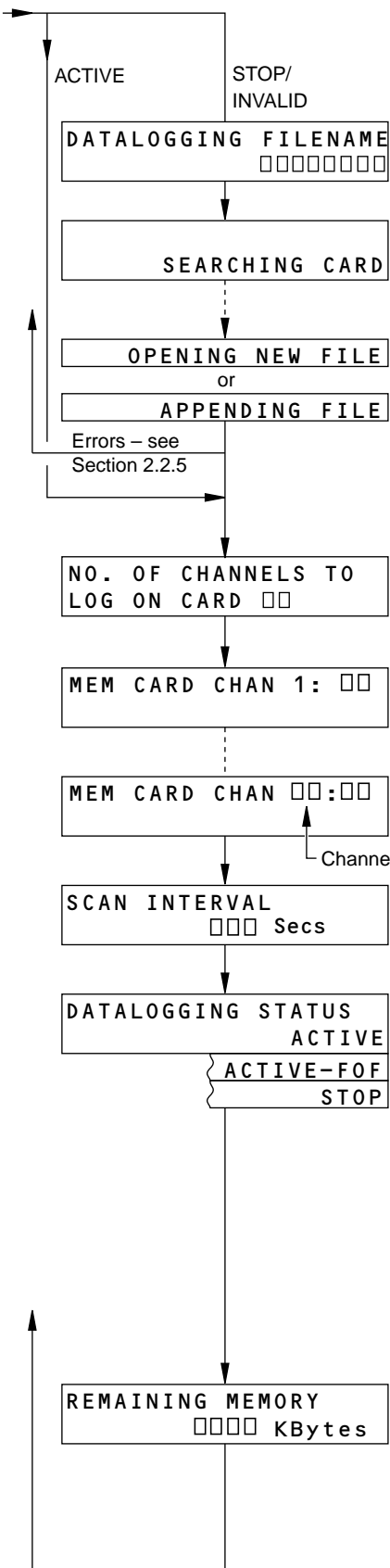
If the lower display is blank (INVALID status), the  key is inoperative until the setup procedure detailed in this section is performed. Use the  key to toggle between **ACTIVE** and **STOP**.

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Continued on next page



...2.2.2 Memory Card Data Logging Setup Page



From previous page.

□□□□□□□□□□□□□□□□  
▼ 6789 : ; < = ? @ A B C D E F G ▲

**Data Logging Filename**  
The last filename used for data logging (or default filename\* if no previous files on card) is displayed.

\*Default filename is 'SRddmmyy' where: dd = date, mm = month, yy = year.

If there is an error when searching the card for the filename an error message is displayed – see Section 2.2.5.

- OPENING NEW FILE** – creates a new file
- APPENDING FILE** – continues after the last entry in the existing file.

If there are any error conditions an error message is displayed – see Section 2.2.5.

**Number of Channels to Log**

Select the number of channels (from 1 to 12) to be logged on the card.

**Memory Card Channels**

Select the source for each channel (inputs A1 to A6, B1 to B6, depending on the options fitted, or maths blocks M1 to M4).

The number of channels available depends on the number set in the previous parameter (12 channels max).

**Scan Interval**

Select the logging interval required. The datalogging interval can be set between 1 and 240s in 1s increments.

**Data Logging Status**

Select the data logging status required.

- ACTIVE** – select **STOP** to stop data logging and advance to channel setup parameters.
- ACTIVE-FOF** – **FOF** (follow-on-file) is briefly displayed when a new data logging file is opened automatically.
- STOP** – select **ACTIVE** to start data logging.

If the lower display is blank (INVALID status), the [F5] key is inoperative until the setup procedure detailed in this section is performed. Use the [F5] key to toggle between **ACTIVE** and **STOP**.

**Memory Available**

Displays the data logging memory remaining, in k bytes.

**Note.** When a memory card becomes full it must be reformatted to remove any existing data before it can be reused – see Section 2.1.

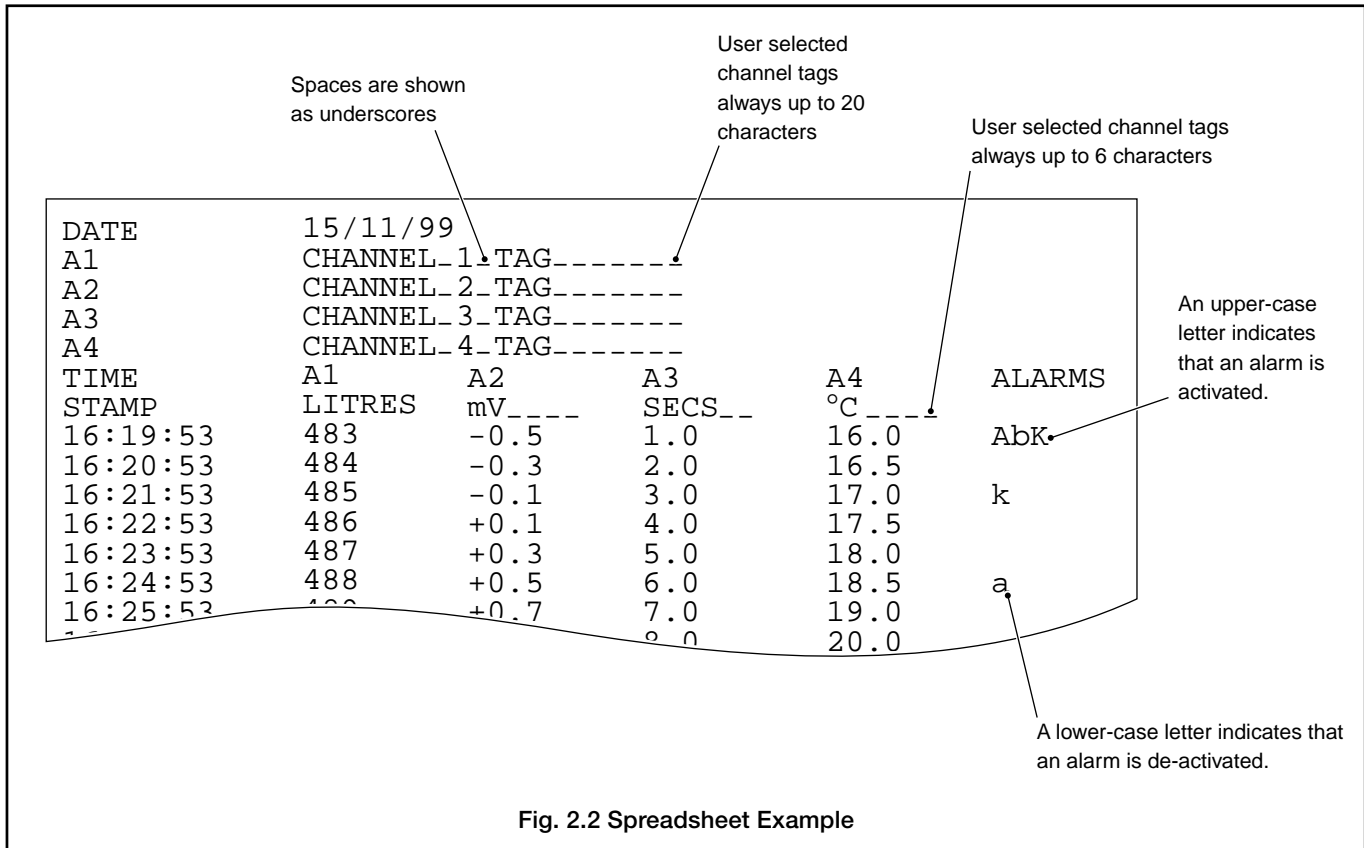
Return to the top of the **Memory Card Data Logging Setup Page**.

## ...2 OPERATION

### 2.2.3 Viewing data on a Personal Computer (PC)

To view data on a PC:

- 1) Stop data logging in the **Memory Card Data Logging Setup Page** – see Section 2.2.2.
- 2) Remove card from advanced process recorder.
- 3) Insert card into PCMCIA port. Internal (e.g. in lap-top PCs) or external PCMCIA ports can be used providing they are recognized as DOS drives by the PC.
- 4) Load spreadsheet.
- 5) Import the required file (created by the instrument) as ASCII values, delimited by space characters (refer to individual spreadsheet manuals for details of the procedure).



### 2.2.4 Memory Card Capacity

The data storage capacity is dependent on the memory card size and the scan time. Use the following formula to calculate the running time of a memory card for a given scan time.

$$\text{Card Running Time (hrs)} = \frac{\text{scan time (secs)} \times \text{useable bytes}}{(13 + [\text{No. of channels} \times 7]) \times 3600} \text{ hrs}$$

Where:

Scan time = 1 to 240 seconds

Usable bytes = number of bytes usable for data logging – see Table 2.1.

No. of channels = 1 to 12.

| Card Size | Usable Bytes |
|-----------|--------------|
| 64k       | 63,488       |
| 128k      | 129,024      |
| 256k      | 260,096      |
| 512k      | 521,216      |
| 1M        | 1,045,504    |
| 2M        | 2,092,032    |
| 4M        | 4,186,112    |

**Table 2.1**

**Note.** The above calculations are applicable only if alarms are set to OFF – see Section 6.2.8 of the User Guide (IM/SR100A).

## 2.2.5 Error Messages

| Error Message                      | Error Condition  | Action  |
|------------------------------------|--|---|
| CARD ERROR<br>NOT FORMATTED        | Upper display flashing.<br>The card is not formatted.  | Select DOS FORMAT (Section 2.1.1)   |
| CARD ERROR<br>CARD WRITE PROTECTED | Upper display flashing.<br>The card is write protected.  | Move the Write Protect tab to the unlocked position.  |
| CARD ERROR<br>CARD ABSENT          | Upper display flashing.<br>The card is absent or is not inserted properly  | Fit the memory card correctly into the instrument.  |
| CARD ERROR<br>CARD ACCESS FAILURE  | Upper display flashing.<br>Hardware communication problem.<br>Failure to read the card filename or,<br>failure to read the memory card file directory. | See Note 1  |
| CARD ERROR<br>FILE EXISTS          | The file already exists in the directory.  | Use a new filename.   |
| CARD ERROR<br>CARD FULL            | There is no vacant area in the directory.  | Use a memory card with available space, return to the top of the <b>Memory Card Data Logging Setup Page</b> and complete the whole procedure. See Note 2. |

**Note 1.** Check that the memory driver board PL1 is seated firmly on the digital processor board SK4, then repeat the procedure. If the procedure fails again, return the instrument to the Company for repair.

**Note 2.** Memory cards must be reformatted on the recorder to remove existing data – see Section 2.1.

### 3 CONFIGURATION LEVEL – ADVANCED

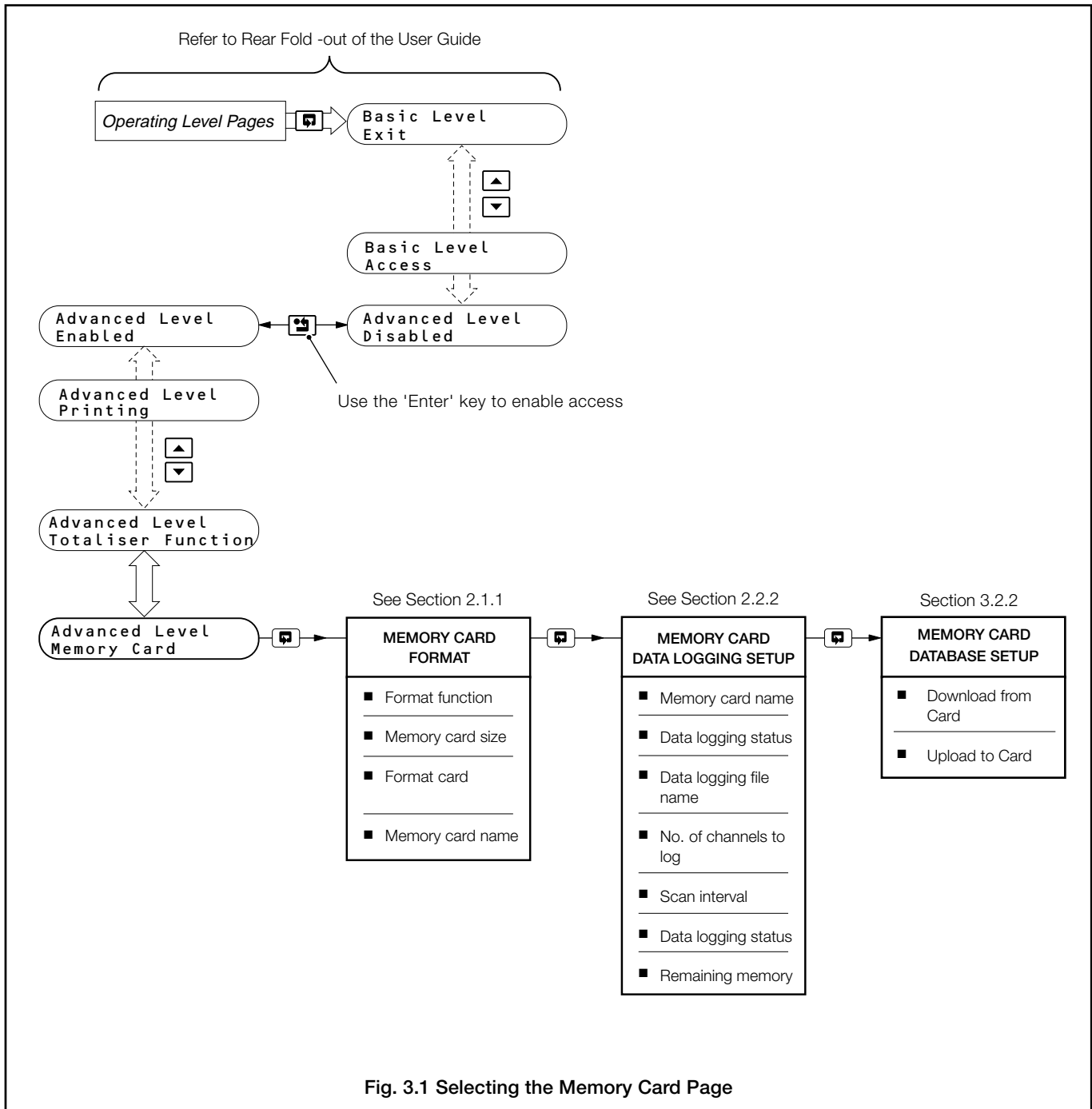


Fig. 3.1 Selecting the Memory Card Page

### 3.1 Memory Card Format

This page is identical to the **Memory Card Format Page** in the Operating Level – see Section 2.2.1.

### 3.2 Memory Card Data Logging Setup

This page is identical to the **Memory Card Data Logging Setup Page** in the Operating Level – see Section 2.2.2.

### 3.3 Memory Card Database Setup

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#### Notes.

- Allows storage of the instrument's configuration onto a memory card.
  - Configuration stored as a DOS-compatible file.
  - Allows data to be downloaded to another advanced process recorder of the same type fitted with the memory card option.
  - Configuration files on the memory card can also be backed-up onto hard or floppy disk using a PC.
  - Up to 32 files can be stored on a card.
  - Configuration files and DOS format data logging files can be stored on the same drive.
  - Allows configurations to be viewed and edited using the Configurator Editor PC software.
  - Allows configurations created offline using the Configurator Editor PC software to be downloaded to the instrument.
- 

#### 3.3.1 Filename Restrictions

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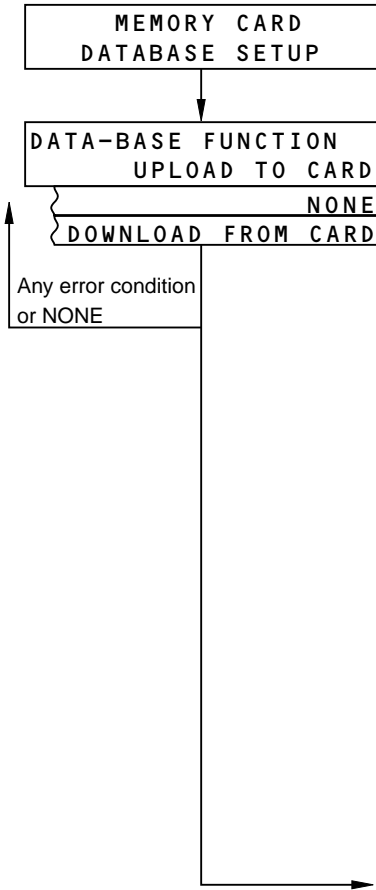
#### Notes.

- Any DOS compatible filename of up to eight characters can be entered by the user.
  - Each file is automatically given the extension '.CFG' (Configuration).
  - Existing filenames cannot be re-used or deleted (unless card is re-formatted).
-

## ...3 CONFIGURATION LEVEL – ADVANCED

### 3.3.2 Memory Card Database Setup Page

Data logging must be stopped in the **Memory Card Data Logging Page** before entry to this Page is enabled – see Section 2.2.2.



Page header – **Memory Card Database Setup.**

---

#### Database Function

Select the database function required:

**DOWNLOAD FROM CARD** – Download previously stored configuration data from the card.

#### Note.

Only configurations previously stored on the instrument should be downloaded.

**UPLOAD TO CARD** – Upload the current configuration data to the card.

**NONE** – No selection.

On entry to this frame, the default is **NONE**. If the card has not been formatted, the only option is **NONE**.

#### Note.

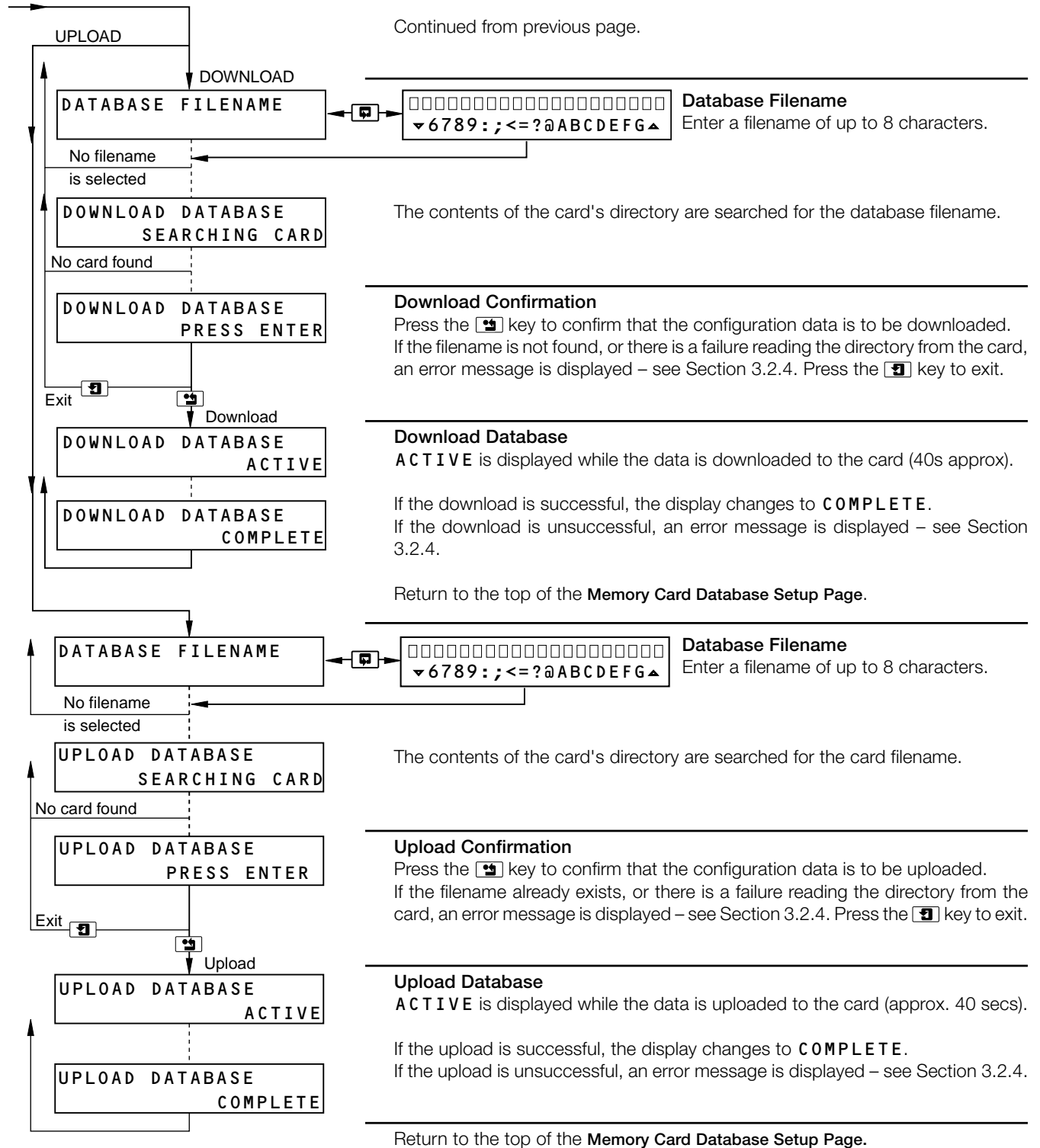
When uploading or downloading memory card data, all relays are de-energized and any analog outputs are set to 0mA. On completion of the operation, any relays energized previously are re-energized and analog outputs, if fitted, revert to their previous output value.

Consequently, it is recommended that the uploading or downloading of memory card data is performed 'Off Line'. Alternatively, ensure any system affected by an analog or relay output is in a stable state before uploading or downloading memory card data.

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Continued on next page.

...3.3.2 Memory Card Database Setup Page



3.3.3 Error Checking

When downloading, the database identified by filename is downloaded to the instrument memory and a further checksum is performed. This checksum is compared with that stored with the database. If the checksums are different, then the operation has failed. An error message is displayed depending on the result of the downloaded operation – see Section 3.2.4.

When a configuration database is uploaded to the memory card, the database is stored in a unique location defined by its filename. A checksum is performed and stored with the database. An error message is displayed depending on the result of the uploaded operation – see Section 3.2.4.

### ...3 CONFIGURATION LEVEL – ADVANCED

#### 3.3.4 Error Messages

| Error Message                             | Error Condition  | Action   |
|---|--|--|
| CARD ERROR<br>CARD ABSENT                 | The upper display flashes.<br>The card is absent or is not inserted properly.  | Fit the memory card correctly into the instrument.   |
| CARD ERROR<br>NOT FORMATTED               | Upper display flashing.<br>The card is not DOS formatted.  | Select DOS FORMAT (Section 2.1.1).<br>Format the memory card.  |
| CARD ERROR<br>CARD ACCESS FAILURE         | Upper display flashing.<br>Hardware communication problem.<br>Failure to read the card status.   | See Note 1.  |
| DATABASE FUNCTION<br>CARD WRITE PROTECTED | The lower display flashes if the card is write protected and UPLOAD TO CARD is selected.   | Move the Write Protect tab to the unlocked position.   |
| DOWNLOAD DATABASE<br>FILE NOT FOUND       | The selected filename cannot be found on the card.   | Use an existing file on the card.  |
| DOWNLOAD DATABASE<br>CARD ACCESS FAILURE  | Hardware communication problem<br>Fails to read directory from the card.   | See Note 1.  |
| DOWNLOAD DATABASE<br>FAILED               | Hardware communication problem<br>Fails to write/read data to/from card.   | See Note 1.  |
| UPLOAD DATABASE<br>CARD ACCESS FAILURE    | Hardware communication problem<br>Fails to read directory from the card.   | See Note 1.  |
| UPLOAD DATABASE<br>FAILED                 | Hardware communication problem<br>Fails to write/read data to/from card.   | See Note 1.  |
| DOWNLOAD DATABASE<br>CONFIG FAULTY        | Data read from the card has been corrupted, causing a checksum calculation error.  | Repeat the download procedure. If an error occurs again, check the instrument configuration.   |
| UPLOAD DATABASE<br>FILE EXISTS            | A file with the same name already exists on the card.  | Use a new filename.  |
| UPLOAD DATABASE<br>CARD FULL              | The file directory of the card already contains 32 files, or there is insufficient available space on the card for the complete configuration. | Use a memory card with available space, return to the top of the <b>Memory Card Database Setup Page</b> and complete the whole procedure.<br>See Note 2. |

**Note 1.** Check that the memory driver board PL1 is seated firmly on the digital processor board SK4, then repeat the procedure. If the procedure fails again, return the instrument to the Company for repair.

**Note 2.** Memory cards must be reformatted to remove existing data – see Section 2.1.



# SIMPLE FAULT FINDING

If problems are encountered using the memory card facility, check for the following:

- 1) Card absent error due to incorrect insertion.
- 2) Card write protect is in the unlocked position.
- 3) Wrong type of card. It must be a 68-pin PCMCIA type 1 S-RAM card.
- 4) Formatting must be carried out on the instrument, not on a PC.

## Memory Card Data Logging Setup Page – see Section 2.2.5.

CARD ERROR  
NOT FORMATTED

CARD ERROR  
CARD ABSENT

CARD ERROR  
FILE EXISTS

CARD ERROR  
CARD WRITE PROTECTED

CARD ERROR  
CARD ACCESS FAILURE

CARD ERROR  
CARD FULL

## Memory Card Format Page – see Section 2.1.2.

CARD ERROR  
CARD ABSENT

CARD ERROR  
NOT FORMATTED

FORMAT FUNCTION  
CARD WRITE PROTECTED

MEMORY CARD ERROR  
CARD ABSENT

MEMORY CARD ERROR  
WRITE PROTECTED CARD

## Memory Card Database Setup Page – see Section 3.2.2.

CARD ERROR  
CARD ABSENT

DOWNLOAD DATABASE  
FILE NOT FOUND

UPLOAD DATABASE  
CARD ACCESS FAILURE

CARD ERROR  
NOT FORMATTED

DOWNLOAD DATABASE  
CARD ACCESS FAILURE

UPLOAD DATABASE  
FAILED

CARD ERROR  
CARD ACCESS FAILURE

DOWNLOAD DATABASE  
FAILED

UPLOAD DATABASE  
FILE EXISTS

DATABASE FUNCTION  
CARD WRITE PROTECTED

DOWNLOAD DATABASE  
CONFIG FAULTY

UPLOAD DATABASE  
CARD FULL

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## NOTES

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# PRODUCTS & CUSTOMER SUPPORT

## Products

### Automation Systems

- *for the following industries:*
  - Chemical & Pharmaceutical
  - Food & Beverage
  - Manufacturing
  - Metals and Minerals
  - Oil, Gas & Petrochemical
  - Pulp and Paper

### Drives and Motors

- *AC and DC Drives, AC and DC Machines, AC Motors to 1kV*
- *Drive Systems*
- *Force Measurement*
- *Servo Drives*

### Controllers & Recorders

- *Single and Multi-loop Controllers*
- *Circular Chart and Strip Chart Recorders*
- *Paperless Recorders*
- *Process Indicators*

### Flexible Automation

- *Industrial Robots and Robot Systems*

### Flow Measurement

- *Electromagnetic Flowmeters*
- *Mass Flow Meters*
- *Turbine Flowmeters*
- *Flow Elements*

### Marine Systems & Turbochargers

- *Electrical Systems*
- *Marine Equipment*
- *Offshore Retrofit and Refurbishment*

### Process Analytics

- *Process Gas Analysis*
- *Systems Integration*

### Transmitters

- *Pressure*
- *Temperature*
- *Level*
- *Interface Modules*

### Valves, Actuators and Positioners

- *Control Valves*
- *Actuators*
- *Positioners*

### Water, Gas & Industrial Analytics Instrumentation

- *pH, Conductivity and Dissolved Oxygen Transmitters and Sensors*
- *Ammonia, Nitrate, Phosphate, Silica, Sodium, Chloride, Fluoride, Dissolved Oxygen and Hydrazine Analyzers*
- *Zirconia Oxygen Analyzers, Katharometers, Hydrogen Purity and Purge-gas Monitors, Thermal Conductivity*

## Customer Support

We provide a comprehensive after sales service via a Worldwide Service Organization. Contact one of the following offices for details on your nearest Service and Repair Centre.

### United Kingdom

ABB Limited  
Tel: +44 (0)1480 475321  
Fax: +44 (0)1480 217948

### United States of America

ABB Inc.  
Tel: +1 215 674 6000  
Fax: +1 215 674 7183

#### Client Warranty

Prior to installation, the equipment referred to in this manual must be stored in a clean, dry environment, in accordance with the Company's published specification.

Periodic checks must be made on the equipment's condition. In the event of a failure under warranty, the following documentation must be provided as substantiation:

1. A listing evidencing process operation and alarm logs at time of failure.
2. Copies of all storage, installation, operating and maintenance records relating to the alleged faulty unit.

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Printed in UK (09.05)

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