Data sheet DS/SM3000–EN Rev. AA

SM3000
Multipoint videographic recorder

Raising the standards of data storage

Measurement made easy

Large clear display
— 31 cm (12.1 in.) thin film transistor (TFT) color screen

Unsurpassed environmental protection
— hosedown to IP66 and NEMA4X standards

Multiple point recording
— up to 36 universal analog inputs

Robust and convenient archive storage
— solid-state high-reliability
— Compact Flash Memory Card option

Intuitive user interface
— clear and simple Microsoft® Windows-style operation and configuration menus

10BaseT Ethernet communications as standard
— easy integration into PC networks
— remote monitoring/access
— email notification of alarms and status reports.

21 CFR Part 11 compliant data security
— extensive physical and electronics security features

GAMP validation package
— 21 CFR part 11 compliant

Power and productivity
for a better world™

SM3000

The SM3000 Multipoint Videographic Recorder features state-of-the-art data storage and security technologies. Up to 36 universal analog inputs, communicated inputs or math results can be recorded and displayed in a variety of operator views.

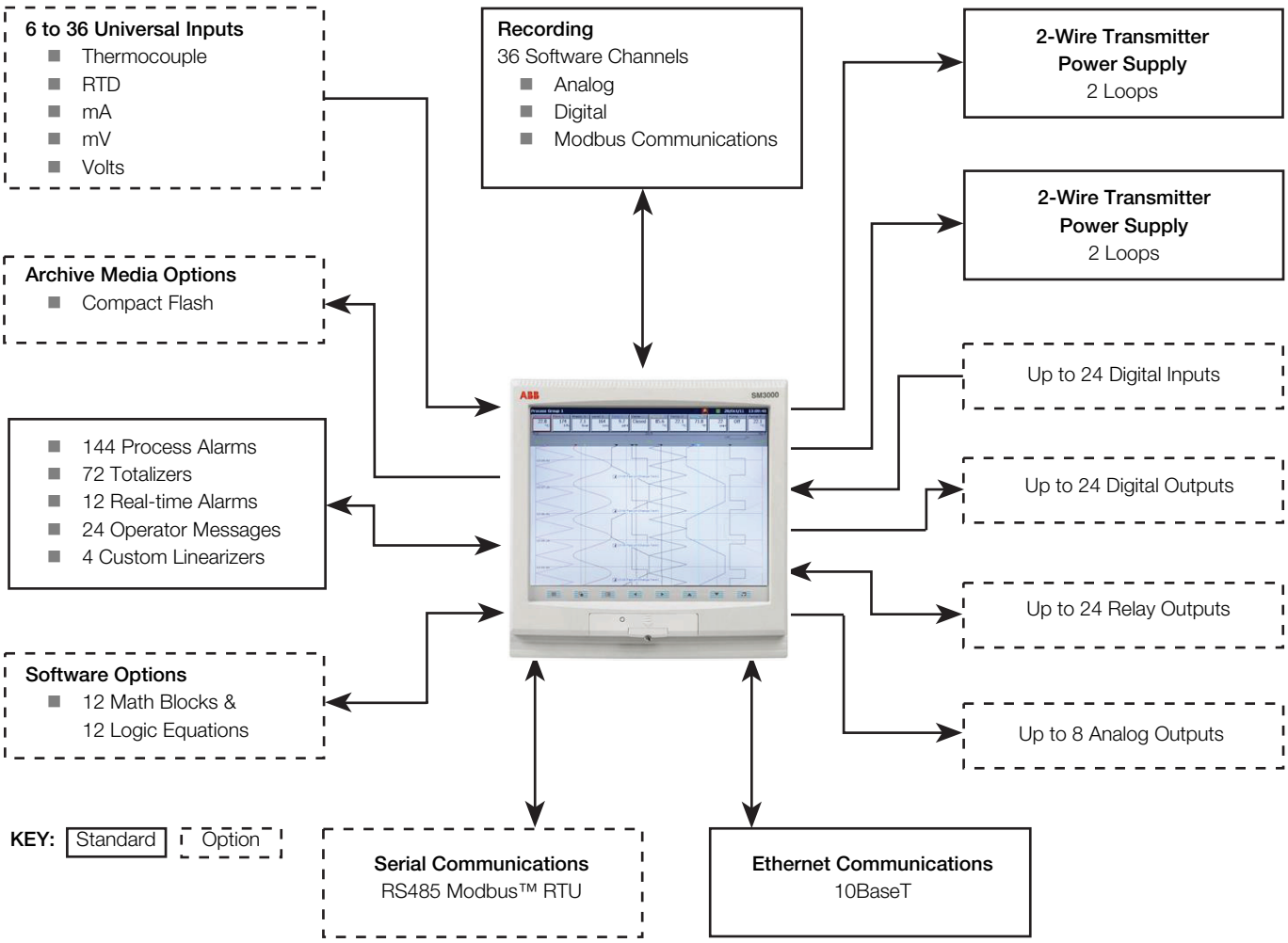
Standard 10KBaseT Ethernet communications ensure full integration into PC networks for remote process monitoring and secure access to archived process data.

8 MB of onboard flash memory, capable of storing 2.8 million samples of data and the option of Compact Flash removable memory cards, provide extensive data storage capability.

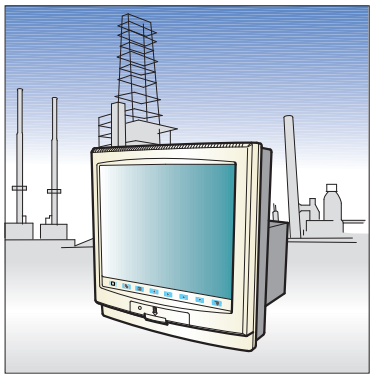
A bright, clear high-contrast 31 cm (12.1 in.) TFT display, Windows-style operation and configuration menus ensure clear and simple operator interface.

Application areas include:

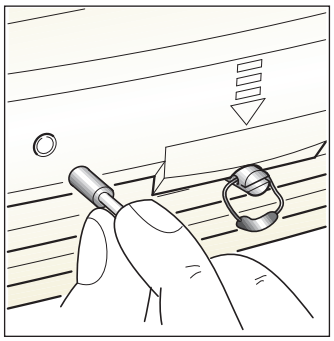
- Environmental monitoring
- Water treatment plants
- Heat treatment
- Autoclaves
- Food, Dairy and Beverage processing
- Power stations
- Cold storage
- Emission monitoring
- Life sciences



Advanced Process Recording



- 36 recording channels are provided as standard which can be used to record any analog, digital or communications (via Modbus) signal.
- Each group can be stored at it's own primary or secondary sample rate. This allows detailed information to be stored under specific process conditions, e.g. critical process states or alarm conditions. Alternatively, for simple applications one sample rate can be applied to all channels.
- Through the use of pre-storage filters it is possible to record the average, max./min. or instantaneous values of any recording channel.
- 8 MB of internal memory is provided for buffering of process data. Once this memory is full it wraps-around automatically and overwrites the oldest data, ensuring that the latest process data is always captured.
- All data recorded by the SM3000 is available to archive to the removable storage media. During periods when a card is not present or is full, data is still recorded into the SM3000's internal memory. When a card is inserted or space becomes available on the card unarchived data can be transferred to the card.

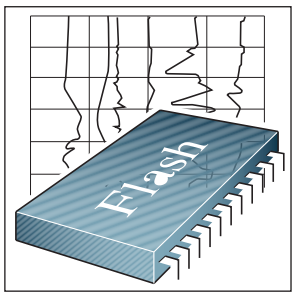


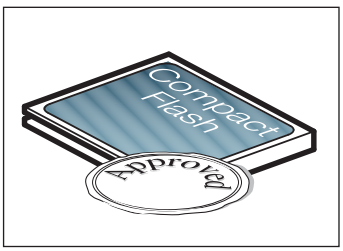
Security

- High specification data security compliant with 21 CFR Part II.
- A media door lock is fitted as standard to prevent unauthorized access to the memory card.
- Multiple users can be configured, each with an individual user name and password. Comprehensive security options, including password expiry and configurable access levels, ensure the exceptional security of the SM3000.
- Operator actions, data archiving events, configuration changes and other system occurrences are all saved to the audit log of the SM3000. Each entry is time, date and, where appropriate, stamped with a user ID, providing a comprehensive audit trail to accompany any data recorded by the SM3000.
- All data files contained within the SM3000's 8 MB of internal buffer memory, or created on memory cards, are encoded in a secure binary format ensuring that recorded data cannot be altered.
- Two security modes are available for protection of the instrument's configuration. Multiple users can be configured, each with individual passwords and access levels or, as an alternative, a tamper-evident seal can be fitted to the front of the recorder. In this mode the configuration of the recorder can only be altered by first changing the position of an internal switch. To accomplish this the recorder must be removed from it's case, breaking the seal.

Guaranteed Data Integrity

- The use of Flash memory technology ensures that the SM3000 is not reliant on batteries to preserve stored data during a power failure.
- Data stored in the internal memory and on removable media is stored in small blocks with each block containing a checksum to ensure the integrity of that data.
- An advanced error detection/correction code is built into the internal Flash memory, ensuring safe storage of your process data.





Industrial Standard, Robust, Archive Storage

- A Compact Flash memory card option can be fitted to the SM3000 for archive purposes. The solid-state nature of these cards ensures that the SM3000 can truly operate in ambient temperatures up to 50 ºC (122 ºF), whereas traditional electromagnetic floppy disk drives can operate only in temperatures up to 40 ºC (104 ºF).
- Every write to the archive storage media is verified to ensure the integrity of the data.

21 CFR part 11 Compliance and GAMP Validation Package

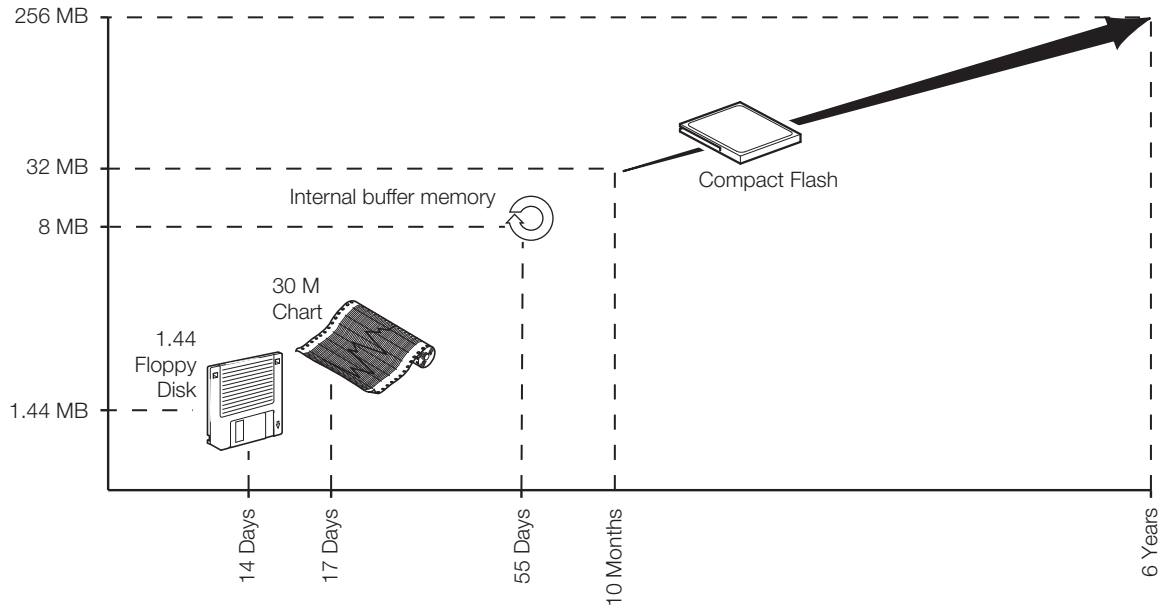
With its comprehensive audit trail, secure archiving format and extensive physical and configuration security features, the SM3000 is ideally suited to applications where compliance to 21CFR part 11 (the FDA's regulations regarding electronic record keeping) is required (for further information refer to INF02/70A).

In keeping with this, a template for validating the SM3000 videographic recorder is available. Following GAMP 5 (a risk-based approach to compliant GxP computerized systems), the template is designed to make the validation process as simple as possible and provides an IQ and OQ that is completed at the customer site, before and after installation. Once completed, the template is then packaged together with other documentation relating to the system as a whole, ready to be presented to the governing regulatory body for inspection.

Low Cost of Ownership

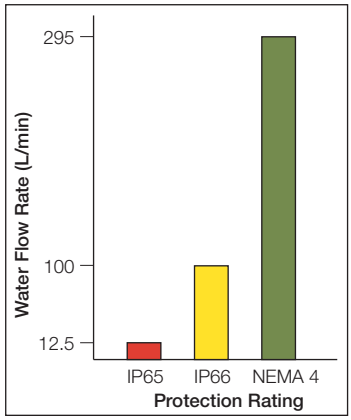
The large capacity of the Compact Flash memory cards used by the SM3000 ensures that the requirement for operator intervention to transfer process data to a PC on a regular basis is greatly reduced. Older floppy disk technology, used by many other manufacturers of graphical recorders, limits storage capability significantly; sometimes to levels below the ability of a traditional paper recorder.

See below for an example of how memory storage times vary depending on the type of media device. The example shows the recording durations for a 6-channel recorder with a sample rate of 10 s. Also included in the example is how these storage times compare with a traditional paper recorder.

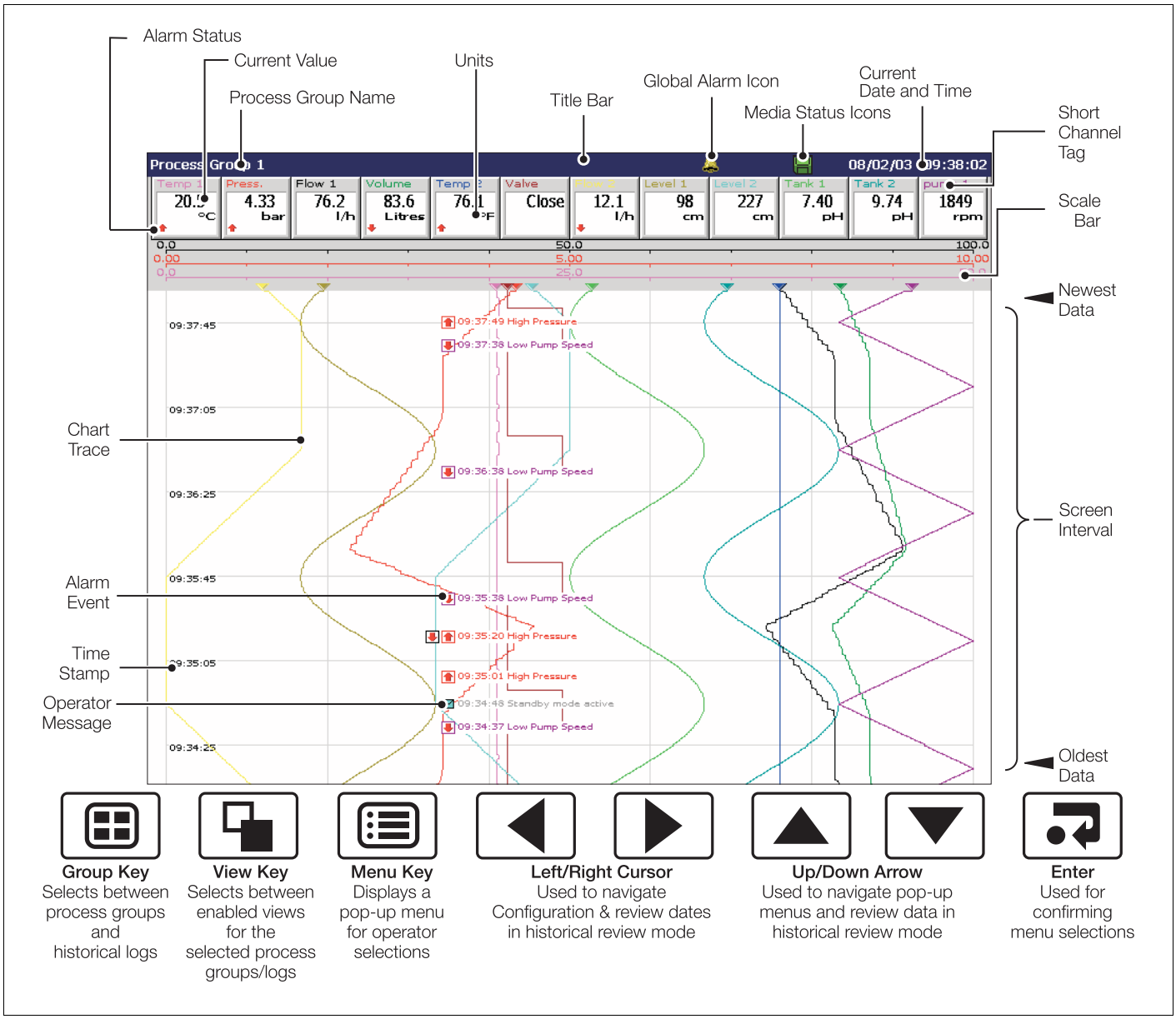


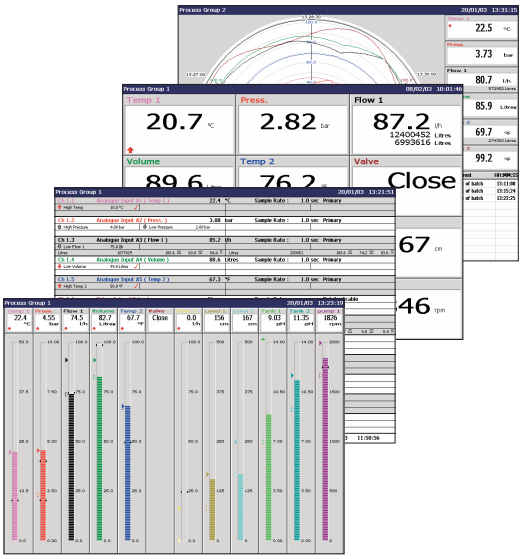
Unsurpassed Environmental Protection

Unique to this type of product, the SM3000 has unrivalled protection ratings of IP66 and NEMA4X and includes a fully-sealed, lockable media door. This enables the SM3000 to be installed, without additional protection, in applications that require frequent hosedown. With industrial standard noise emission and immunity protection, the SM3000 also operates effectively in high electrical-noise environments.



Intuitive User Interface





Operator Views

The 36 recording channels of the SM3000 can be freely distributed between 6 process groups and displayed using a number of different operator views. In addition to the standard strip chart views, the following views are available:

- **Circular Chart View**

  Up to six trends can be plotted on a circular chart. In addition to digital indicators, including alarm status and totalizer values, a log is constantly in view showing a list of recent alarm activity.

- **Digital Indicator View**

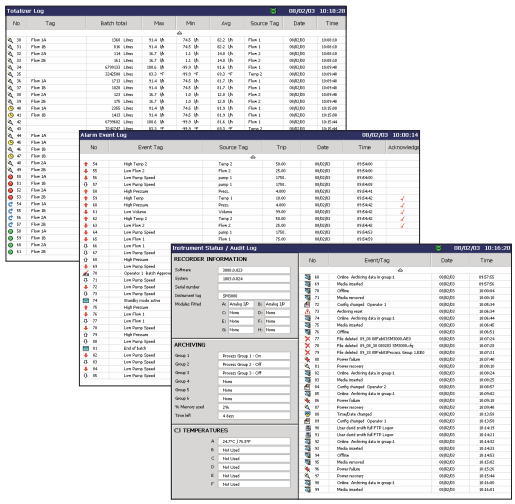
  Process value, engineering units, channel tag, totalizers and alarm status are all displayed clearly. An overview screen provides an at-a-glance view of all 36 recording channels.

- **Process View**

  Provides an at-a-glance summary of each channel, including detailed alarm, totalizer and statistical (min., max. & average) information.

- **Bargraph View**

  Horizontal or vertical formats, including min./max. and alarm trip point markers.



Historical Logs

Providing functions unavailable in paper-based recorders, three full-time and date-stamped historical logs ensure complete validity of the recorder and it's data. Any or all of these logs can be archived to the removable memory card.

- **Totalizer Log**

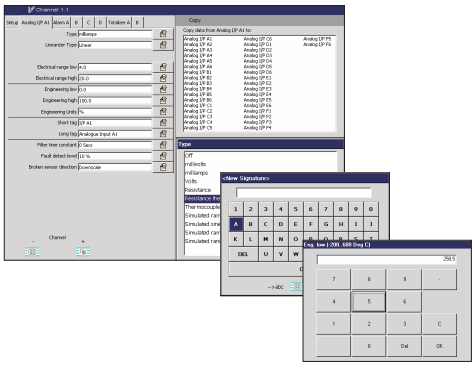
  All totalizer activity, e.g. starts, stops and resets, are recorded by the totalizer log. In addition individual log intervals can be configured for each totalizer, allowing total values to be logged regularly.

- **Alarm Event Log**

  A detailed history of all alarm occurrences, including active and inactive transitions plus acknowledgement details.

- **Audit Log**

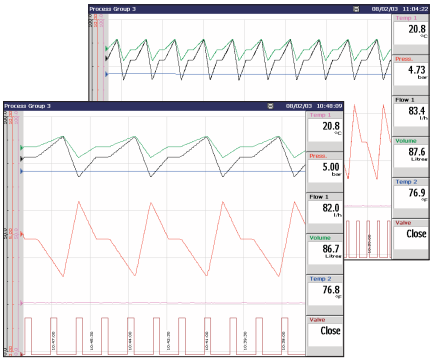
  The highly-detailed secure log of all system events gathered by the Audit Log provides comprehensive evidence of the integrity, validity and traceability of data recorded by the SM3000. Included in the log are configuration changes, data archiving events, calibration adjustments, details of remote accesses and many more key events, all marked with operator IDs where applicable.



Configuration

A simple Windows-style structure provides an exceptionally easy approach to the setup of the SM3000. Text and numerical information is entered very quickly via an on-screen keyboard. Navigation of configuration menus is performed via the cursor keys and the pop-up menu.

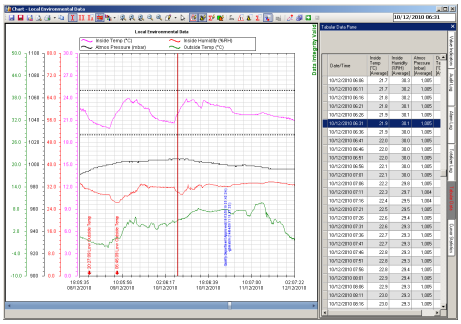
It is also possible to configure the SM3000 via a Windows-based PC configuration package.



On-line Data Review

The SM3000 provides a number of unique features to provide a clear view of your process

- The screen interval can be altered to display between 48 s and 14 days of information, without it affecting the sample rate. This gives you the ability to 'zoom in' to a close-up view of the most current data or 'zoom out' to get the big picture.
- Individual traces can be temporarily removed from the screen to enable clear comparison of two or more trends.
- The SM3000 can easily review all historical data in the 8 MB internal buffer memory at the touch of a button. During this time, recording of the process data to the internal memory remains unaffected.



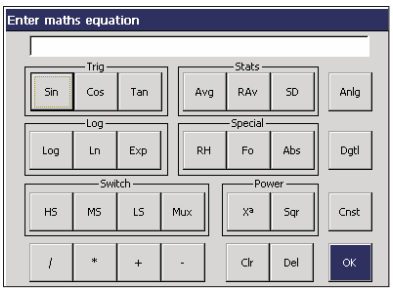
Off-Line Review and Analysis

Using ABB's DataManager Pro software, archived process data and historical logs recorded to a removable media card can be reviewed easily.

- Database management of data files provided by DataManager Pro ensures simple, secure long-term storage and retrieval of historical data.
- The graphing capabilities provided by DataManager Pro ensure easy interrogation of process data.
- The validity of all data files is always checked by DataManager Pro during the storage and retrieval process, ensuring maximum data integrity.

For further information on the capabilities of DataManager, Pro refer to data sheet DS/RDM500–EN.

Math and Logic

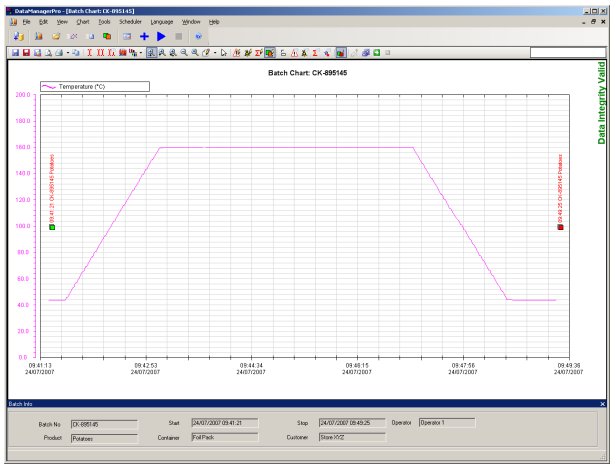


Available as an option are advanced math and logic capabilities. 12 multi-element math and 12 multi-element logic equations can be configured. Equations can be nested into each other to provide extensive capabilities.

- Mean, standard deviation and rolling averaging functions are provided.
- Standard addition, subtraction, multiplication and division are complemented with Log, Ln, Square root, power, Sin, Cos, Tan and absolute functions.
- Switching of process signals can be achieved via the high/low/mid signal selection and multiplexing functions.
- Predefined equations are provided for relative humidity and F_0 measurements.
- AND, NAND, OR, NOR, XOR and NOT operators are available within the logic equations.

All math and logic equation results can be recorded on the display of the SM3000 and archived to the removable media. Detailed diagnostic functions are provided for both the math and logic equations.

Batch Recording



A batch recording option enables simple recording and reviewing of batch processes. When a batch is started it is tagged with a unique batch number, operator identification and three user-definable description fields. All information is entered on-screen with a history function allowing quick entry of commonly repeated descriptions.

Using DataManager Pro software batches can be simply and quickly traced for review using the unique batch number and description information entered at the time of recording. Additional functionality provides the ability to search and sort batch records for an entire production facility in many ways, including by product type, operator and time and date of processing.

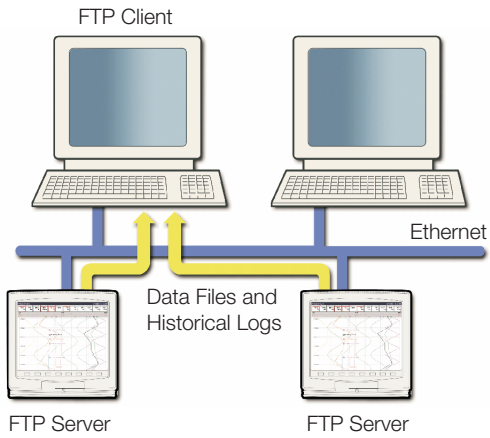
Ethernet Communications

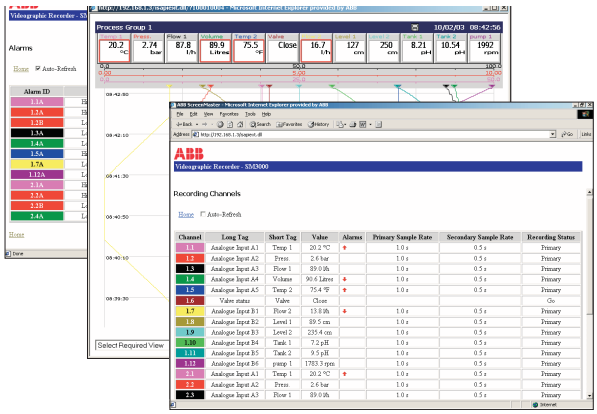
The SM3000 provides 10BaseT Ethernet communications as standard via a standard RJ45 connector. The SM3000 uses industry-standard protocols TCP/IP, FTP and HTTP enabling easy integration into existing PC networks.

Data File Access via FTP (File Transfer Protocol)

The SM3000 features FTP server functionality that provides high-speed access via Ethernet to data archived by the recorder.

- Using a standard web-browser or other similar FTP client, data files contained within the recorder's internal memory and removable memory card can be accessed remotely and transferred to a PC or network drive.
- 8 individual FTP users can be programmed into the SM3000. Access rights can be configured for each user specifying their access level.
- All FTP log-on activity is recorded in the audit log of the SM3000.
- Using the SM series complementary FTS (File Transfer Scheduler) software, data files from multiple recorders can be backed-up automatically to a PC or network drive for long term storage, ensuring the security of valuable process data and minimizing operator intervention.





Embedded Web Server

Contained within the SM3000 is an embedded web-server, enabling access to web pages created within the recorder. The use of HTTP (Hyper Text Transfer Protocol) enables standard web browsers to view these pages.

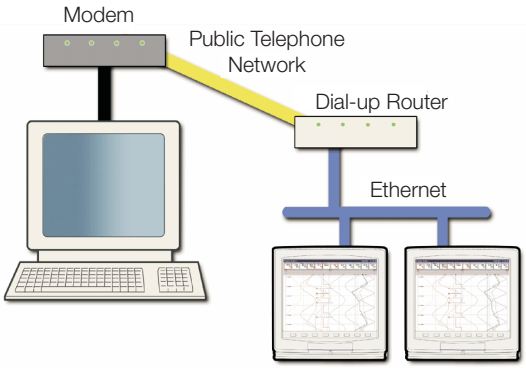
- The web pages show the current display of the recorder, detailed information on process signals, alarm conditions, totalizer values, an overview screen showing the status of all 36 recording channels and other key process information.
- The historical logs stored in the SM3000's internal buffer memory can be displayed in full from within the web pages.
- Operator messages can be entered via the web server enabling comments to be logged to the recorder.
- All of the information displayed on the web pages is regularly refreshed enabling them to be used as a process supervision tool.

On-line Demonstration

A demonstration of these features is available from an on-line recorder accessible via the internet. In the address bar of your web browser enter 'http://217.46.239.73'.

Remote Access/Monitoring

Ethernet communications can provide a link to recorders installed in remote locations. By using a dial-up router, multiple SM3000 recorders can be installed in remote locations and accessed via a public telephone network when required.



Email Notification

Using its inbuilt SMTP client the SM3000 is able to email notification of important events. Emails triggered from process alarms or other critical process events can be sent to multiple recipients. The recorder can also be programmed to email reports of the current status at specific times during the day. Status report content can be tailored to suit your specific process needs.

Specification

Operation and Configuration

Configuration

Via tactile membrane keys on front panel or
PC Configuration using removable media card

Multiple configuration files can be stored in internal (up to 5 files) or external memory (with removable media option fitted)

Display

Thin film transistor (TFT), active-matrix, color, liquid crystal display (LCD) with built-in backlight

Low-reflective, 31 cm (12.1 in.) diagonal display area,
480,000 pixel display*

Viewing angle — Horizontal 55 ° typ. (left side, right side)
Vertical 50 ° from below, 40 ° from above

***Note.** A small percentage of the display pixels may be either constantly active or inactive. Max. percentage of inoperative pixels < 0.01 %.

Screensaver

Can be programmed to dim the backlight if operator keys are not pressed for a selected period of time

Languages

English, German, French, Italian and Spanish

Dedicated operator keys

- Group select
- View select
- Menu key
- Left cursor
- Right cursor
- Up/Increment key
- Down/Decrement key
- Enter key

Vertical chart screen intervals

Selectable from 48 s to 14 days

Horizontal chart screen intervals

Selectable from 70 s to 20 days

Circular chart duration

Selectable from 9 minutes to 32 days

Chart scales

Independent primary and secondary ranges for each channel

Vertical/horizontal chart divisions

Programmable for up to 10 major and 10 minor divisions

Circular chart divisions

Programmable up to 10 divisions

Chart annotation

Alarm and operator messages may be annotated on the chart

Icons to identify the type of event, time of occurrence and tag are displayed

Operator Views

	Views Available			
Contents	**Chart**	**Bargraph**	**Digital Indicator**	**Process**
Instantaneous values/states	✔	✔	✔	✔
Units of measure	✔	✔	✔	✔
Short tags	✔	✔	✔	✔
Long tags	—	—	—	✔
Alarm status	✔	✔	✔	✔
Alarm trip markers	—	✔	—	—
Alarm trip values	—	—	—	✔
Max./Min. markers	—	✔	—	—
Analog bargraphs	—	✔	—	—
Totalizer values & units of measure	—	—	✔	✔
Totalizer tags	—	—	—	✔
Max., min. and average batch values	—	—	—	✔
Graphical view of historical data	✔	—	—	—

Security

Configuration security

Password protection	Access to configuration is allowed only after the user has entered a password
Internal switch protection	Access to configuration is allowed only after a hardware switch has been set. This switch is situated behind a tamper evident seal

Setup security

Configuration	Can be configured for password protection or free access to setup levels

Users

Number of users	Up to 15
Usernames	Up to 20 characters, Usernames are unique, i.e. names cannot be repeated
Access privileges	Setup access — Yes/No Electronic signature access — Yes/No Configuration access — None/load file only/limited/full
Passwords	Up to 20 characters A minimum required password length of 4 to 20 characters can be configured and a password expiry time can be applied to eliminate password ageing
Password failure limit	Configurable for 1 to 10 consecutive occasions or 'infinite' A user is deactivated if a wrong password is entered repeatedly
Deactivation of inactive users	Can be disabled or configured for 7, 14, 30, 60, 90, 180 or 360 days of inactivity Users are deactivated (by removal of access privileges) after a period of inactivity

Electronic signature

Protection	Only accessible to users with electronic signature access privileges Access requires a valid username and password
Function	Provides an electronic equivalent to the signing of a conventional paper chart Enables operator to securely approve recorded data
Content	Date/Time, operator ID and operator defined 20-character message are stored in the alarm/event log and can be displayed on the chart

Standard Functionality

Operator Messages

Number

24 configurable messages of up to 20 characters each

1 operator defined message of up to 20 characters

Trigger

Via front panel or digital signals

Recording in alarm/event log

Can be enabled or disabled on configuration

Process Alarms

Number

144 (4 per recording channel)

Update rate

Up to 12 alarms processed every 100 ms, e.g. with 36 alarms enabled each alarm is updated once every 300 ms.

Types

High/low: process, latch & annunciator, delayed process

Rate: fast/slow

Tag

20-characters tag for each alarm

Hysteresis

Programmable value and time hysteresis 1 to 9999 s

Alarm enable

Allows alarm to be enabled/disabled via a digital input

Alarm log enable

Recording of alarm state changes in the alarm/event log can be enabled/disabled for each alarm

Acknowledgement

Via front panel or digital signals

Real-time Alarms

Number

12

Programmable

Day of the week, 1st of month, start and duration times

Totalizer

Number

72 (2 per recording channel) 10-digit totals

Type

Analog or digital, batch and secure totals

Statistical calculations

Average, maximum, minimum (for analog signals)

Date and time of max. and min, values

Update rate

Up to 4 totalizers processed every 100 ms, e.g. with 12 totalizers enabled each total is updated once every 300 ms.

Custom Linearization

Number

4

Number of breakpoints

20 per linearizer

Number of Channels v. Number of Groups

Groups	Channels per Group
1, 2, 3	Up to 12
4	Up to 9
5	Up to 7
6	Up to 6

Recording — to Internal Memory

Data Channels

Internal buffer memory

8 MB Flash memory provides storage for 2.9 million samples

Oldest data is automatically overwritten by new data when memory is full

Data integrity checks

Checksum for each block of data samples

48-bit code for error detection/correction built-in

Independent process groups

6

No. of recording channels

36

Sources

Analog inputs, Modbus input, any digital signal

Filters

Programmable for each channel to allow recording of instantaneous values, average, max., min. and max. & min. value over sample time

Primary/secondary sample rates

Programmable from 0.1 s to 12 hours for each process group

Primary/secondary sample rate selection

Via any digital signal or from password protected menu

Recording start/stop control

Via any digital signal or from password protected menu

Recording Duration

Approximate duration calculated for continuous recording of 12 channels of analog data (for 24 channels divide by 2, for 6 channels multiply by 2 etc.)

Sample Rate	1 s	10 s	40 s	60 s	120 s	480 s
Internal Flash buffer memory	1½ days	27½ days	3½ months	5½ months	11 months	3½ years

Sample Rate	1 s	10 s	40 s	60 s	120 s	480 s
512 MB Compact Flash	8 months	6 years	26 years	40 years	79 years	319 years
1 GB Compact Flash	1 year	13 years	52 years	77 years	155 years	623 years

Historical Logs

Types

Alarm/Event, Totalizer and Audit logs

No. of records in each historical log

Up to 200 in internal memory

Oldest data is automatically overwritten by new data when log is full

Historical Logs

Log Type	Alarm/Event Log		Totalizer Log		Audit Log	
Log Entry Events Information Recorded in Logs	• Alarm state changes • Operator messages • Electronic signatures		• User defined logging intervals • Totalizer stop/start, reset, wrap • Power up/down		• Configuration/calibration changes • System events • Errors, operator actions	
	In Log	On Screen	In Log	On Screen	In Log	On Screen
Date & time of event	✔	✔	✔	✔	✔	✔
Type of event	✔	✔	✔	✔	✔	✔
Tag	✔	✔	✔	✔	–	–
Source tag	✔	–	✔	–	–	–
Alarm trip value & units of measure	✔	–	–	–	–	–
Alarm trip	✔	✔	–	–	–	–
Alarm acknowledgement state	✔	✔	–	–	–	–
Operator ID	✔	–	–	–	✔	✔
Description	–	–	–	–	✔	✔
Batch total and units of measurement	–	–	✔	✔	–	–
Max., Min. and average values plus units	–	–	✔	✔	–	–
Secure total	–	–	✔	–	–	–
Time & date of min./max. values	–	–	✔	✔	–	–

Archiving — To Memory Card

File types that can be saved to removable media

Recorded data for each channel

Alarm event log for each group

Totalizer log for each group

Audit log

Configuration

File Structure

Binary encoded with built-in data integrity checks

Automatic updating of archive files

At regular time intervals according to the sample rate

When a media card is inserted

Data verification

Carried out automatically on all writes to removable-media files

Card compatibility

ABB recorders comply with approved industry standards for memory cards and ABB has fully tested and recommend the use of SanDisk Standard Grade or Ultra II memory cards. Other brands may not be fully compatible with this device and therefore may not function correctly

Card size

Cards up to 4 GB capacity may be used

Analog Input Modules

General

Number of inputs

6 per board, max. of 36 inputs

Input types

Milliamps, millivolts, voltage, resistance, THC, RTD, digital input*

* Digital input is not available on high specification analog input modules

Digital input types

Type	Volt-free contact
Minimum pulse duration	1 s

Thermocouple types

B, E, J, K, L, N, R, S, T

Resistance thermometer

PT100

Other linearizations

$\sqrt{x}$, $x^{3/2}$, $x^{5/2}$, custom linearization

Digital filter

Programmable 0 to 60 s

Display range

—999 to 9999

Common mode noise rejection

> 120 dB at 50/60 Hz with 300 Ω imbalance resistance

Normal (series) mode noise rejection

> 60 dB at 50/60 Hz

CJC rejection ratio

0.05 ºC/ºC

Sensor break protection

Programmable as upscale or downscale

Temperature stability

0.02 %/ºC or 2 µV/ºC

Long term drift

< 0.2 % of reading or 20 µV annually

Input impedance

> 10 MΩ (millivolts inputs)

500 kΩ (voltage inputs) externally mounted divider

10 Ω (mA inputs) externally mounted on terminals*

* Hart transmitters require a minimum 250 Ω loop impedance. A 250 Ω shunt resistor can be used together with the voltage divider board (GR2000/0375) to meet this requirement. In such cases the input should be programmed for 1 to 5 V.

Analog to digital converter resolution

16 bit

Standard/High Specification Analog Input Modules

Linear Inputs	Standard Analog Input	High Specification Analog Input	Accuracy (% of reading)
Millivolts	0 to 2000 mV	—1000 to +1000 mV	0.1 % or ± 10 µV
Milliamps	0 to 50 mA	—100 to +100 mA	0.2 % or ± 2 µA
Volts	0 to +20 V*	—50 to +50 V*	0.2 % or ± 10 mV
Resistance W	0 to 5000 Ω	0 to 2000 Ω	0.2 % or ± 0.08 Ω
Sample Interval	100 ms per sample (2 modules are processed in parallel) gives worst case update times as follows: 600 ms for 6 or 12 channels — mV, mA, voltage 800 ms for 6 or 12 channels — THC 1100 ms for 6 or 12 channels — resistance, RTD	100 ms per sample (2 modules are processed in parallel) gives worst case update times as follows: 100 ms for 6 or 12 channels — all input types	
Input Isolation	35 V DC channel-to-channel	500 V DC channel-to-channel	
Isolation from Rest of Instrument	Galvanically isolated to 500 V DC	Galvanically isolated to 500 V DC	

*Requires external voltage divider board Part No. GR2000/0375

Analog Input Types

Thermocouple	Maximum Range °C	Maximum Range °F	Accuracy (% of reading)
B	—18 to 1800	0 to 3270	0.1 % or ± 2 °C (3.6 °F) (above 200 °C [392 °F])
E	—100 to 900	—140 to 1650	0.1 % or ± 0.5 °C (0.9 °F)
J	—100 to 900	—140 to 1650	0.1 % or ± 0.5 °C (0.9 °F)
K	—100 to 1300	—140 to 2350	0.1 % or ± 0.5 °C (0.9 °F)
L	—100 to 900	—140 to 1650	0.1 % or ± 1.5 °C (2.7 °F)
N	—200 to 1300	—325 to 2350	0.1 % or ± 0.5 °C (0.9 °F)
R	—18 to 1700	0 to 3000	0.1 % or ± 1 °C (1.8 °F) (above 300 °C [540 °F])
S	—18 to 1700	0 to 3000	0.1 % or ± 1 °C (1.8 °F) (above 200 °C [392 °F])
T	—250 to 300	—400 to 550	0.1 % or ± 0.5 °C (0.9 °F)

RTD	Maximum Range °C	Maximum Range °F	Accuracy (% of reading)
PT100	—200 to 600	—325 to 1100	0.1 % or ± 0.5 °C (0.9 °F)

2-wire Transmitter Power Supply

Number

1 fitted as standard

Voltage

24 V DC

Drive

Up to 45 mA, i.e. can drive 2 loops

Ethernet

Physical medium

10BaseT

Protocols

TCP/IP, ARP, ICMP, FTP (server), HTTP, MODBUS TCP (client + server)

FTP server functions

Directory selection and listing

File upload/download

12 configurable users with full or read-only access

Web server functions

Operator screen monitoring/selection. Remote monitoring of recording channels, analog/digital signals, alarms, totalizers and archiving

SMTP client compatibility

Compatible with MS Exchange versions up to and including MS Exchange 2003

Advanced Math

Math Blocks

Type

12 equations provide ability to perform general arithmetic calculations including F_0, mass flow (of ideal gases), relative humidity and emissions calculations

Size

40-character equation

Functions

+, —, /, log, Ln., Exp, X^n, √, Sin, Cos, Tan, mean, rolling average, standard deviation, high/median/low select, multiplexer, absolute, relative humidity

Tags

8- and 20-character tags for each block

Update rate

1 enabled block every 100 ms

Logic Equations

Number

12

Size

11 elements each

Functions

AND, OR, NAND, NOR, XOR, NOT

Tags

20-character tag for each equation

Update rate

300 ms

Modules

3- or 6-Relay Output Modules (max. of 4 Modules)

Number of relays

3 or 6 per module, max. of 4 modules (24 relays)

Type and rating

Relay type single-pole changeover

Voltage	250 V AC	30V DC
Current	5 A AC	5 A DC
Loading (non-inductive)	1250VA	150 Ω

Note. The total load for all relays within the instrument must not exceed 36 A.

Hybrid Module (max. of 4 Modules)

Digital I/O

Number	6 inputs and 6 outputs per card
Type	Volt-free switching inputs
Polarity	Negative, i.e. closed switch contact or 0 V = active signal
Digital input min. pulse	125 ms
Digital output voltage	5 V
Isolation	500 V from any other I/O

Analog output

Number	2 isolated
Configurable current range	0 to 20 mA
Max. load	750 Ω
Isolation	500 V DC from any other I/O
Accuracy	0.25 %

2-Wire Transmitter Power Supply Module (max. of 2 Modules)

Number

2 isolated supplies per module

Voltage

24 V DC nominal

Drive

45 mA per supply, i.e. each module can drive 2 x 2 = 4 loops

RS485 Serial Communications Module (Max. of 1 Module)

Number of ports

1

Connections

RS485, 2- or 4-wire

Protocol

Modbus RTU slave + master

EMC

Emissions & Immunity

Meets requirements of:
EN50081-2
EN50082-2
EN61326 for an industrial environment

Electrical

Power supply

100 to 240 V AC ±10 % (90 min. to 264 V max.) 50/60 Hz

24 V DC ± 2.4 V (optional)

Power consumption

35 VA max.

Power interruption protection

No effect for interruptions of up to 20 ms

Maximum accepted cable size

Instrument terminal block	14 AWG (1.63 mm OD)
GR2000/0375, GR2000/0377	15 AWG (1.45 mm OD)

Safety

General safety

EN61010-1

cULus

cCSAus

Overvoltage Class III on mains, Class II on inputs and outputs

Pollution category 2

Isolation

500 V DC to earth (ground)

Environmental

Operating temperature range

0 to 50 ºC (32 to 122 ºF) with SmartMedia/Compact Flash

Operating humidity range

5 to 95 % RH (non-condensing)

Storage temperature range

—20 to 60 ºC (—4 to 140 ºF)

Front panel sealing

IP66 and NEMA4X

Rear panel sealing

(with rear cover) IP40

(without rear cover) IP20

Physical

Size

288 mm (11.34 in.) x 288 mm (11.34 in.) x 195 mm (7.68 in.) (depth behind panel)

Weight

8 kg (17.4 lb) approx. (unpacked)

Panel cutout

281 mm (11.06 in.) x 281 mm (11.06 in.)

Case material

20 % glass-filled polyester/stainless steel (grade 304)

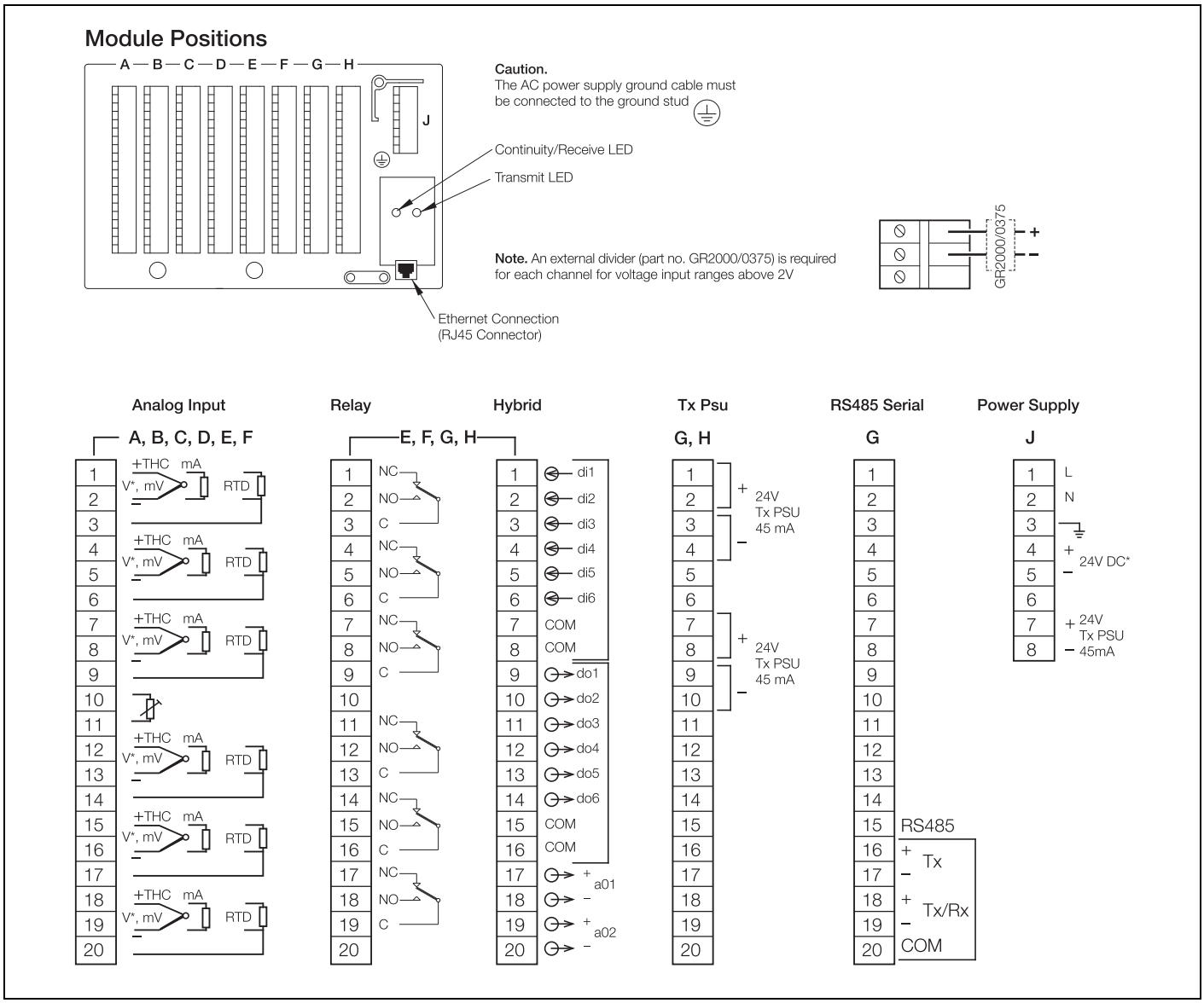
Display housing material

25 % glass-filled polyester

Screen

Double layer polyester coated toughened glass

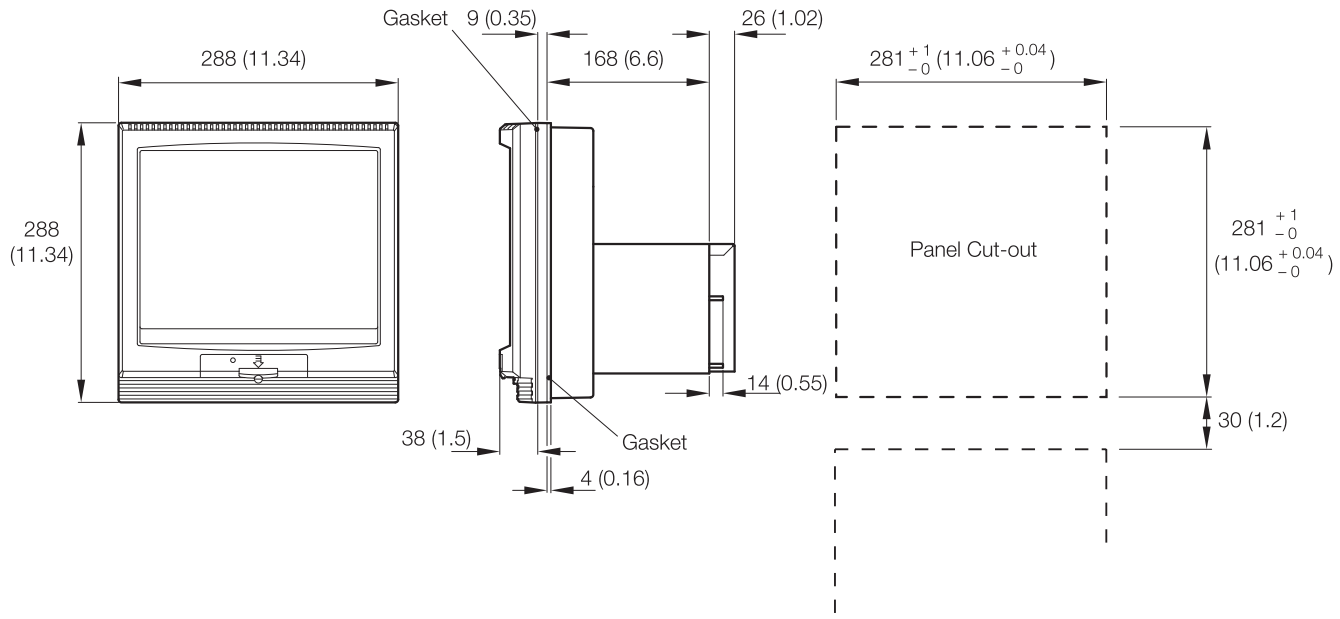
Electrical Connections



***Note.** 24 V DC instrument power supply must be specified when ordering.

Overall Dimensions

Dimensions in mm (in.)



Standard Accessories

Included with each recorder:

Panel-mounting Clamps
Media-door Lock keys
Shunt Resistors (1 per analog input)
Compact Flash Card (only with Compact Flash Memory Card option)

Optional Accessories

Compact Flash Cards

B12568	Compact Flash Card (2 GB)

Card Reader

B12028	Compact Flash Reader (USB Interface)

Other

GR2000/0375	Voltage divider board (2 to 20 V) – per voltage input channel
GR2000/0375	Voltage divider board fitted with a 250 Ω shunt resistor
RDM500–CD	DataManager Pro software
RDM500L	DataManager Pro single user license
RDM500ML	DataManager Pro multi-user license
CD/VALSM3000	SM3000 validation package template
ENG/REC	After-sales engineered configuration service

Acknowledgements and Trademarks

Ordering Information

Multipoint Videographic Recorder	SM30	XX	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	XXX
Analog Inputs																		
None		00																
6 inputs		06																
12 inputs		12																
18 inputs		18																
24 inputs		24																
30 inputs		30																
36 inputs		36																
Universal Inputs																		
Standard			S															
High Specification			H															
Build Option																		
Standard				B														
cCSAus*				C														
UL*				U														
Archive Media																		
None — (8 MB internal flash memory only)					0													
Compact flash drive					2													
Software Option																		
None						0												
Advanced Math & Logic						1												
Batch Recording						4												
Advanced Math & Logic & Batch Recording						5												
Option Modules																		
Position A	Reserved for analog inputs						0											
Position B	Reserved for analog inputs							0										
Position C	Reserved for analog inputs								0									
Position D	Reserved for analog inputs									0								
Position E	None (only option available if 30 or more analog inputs or a 24 V DC powered instrument is specified)										0							
	3 relays										3							
	6 relays										6							
	Hybrid										H							
Position F	None (only option available if 36 analog inputs or a 24 V DC powered instrument is specified)											0						
	3 relays											3						
	6 relays											6						
	Hybrid											H						
Position G	None												0					
	3 relays												3					
	6 relays												6					
	Hybrid												H					
	2-wire transmitter power supply												T					
	RS485 serial communications												S					
Position H	None													0				
	3 relays													3				
	6 relays													6				
	Hybrid													H				
	2-wire transmitter power supply													T				
Mechanical Build																		
Without rear terminal cover															1			
With rear terminal cover															2			
Power Supply																		
100 to 240 V AC ±10 % (90 min. to 264 V max.) 50/60 Hz																2		
24 V DC																3		
Language																		
English																	E	
French																	F	
German																	D	
Italian																	I	
Spanish																	S	
Special Features																		
Standard																		STD
Custom configuration (customer to complete and supply SM3000 custom configuration sheet – INF08/035)																		CUS
GAMP validation compatible instrument**																		VAL
Engineered configuration (customer to supply configuration details required)																		ENG

* Not available in conjunction with 24 V DC power supply

** Instrument supplied preconfigured to customer's requirements, together with calibration and conformity certificates. Configuration must be supplied using custom configuration sheet – INF08/035

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