

Pharmacy Shelving



Pharmaceutical products

Facts & figures:

In the U.S. increased there drug consumption from \$144 per person in 1960 to almost \$4,400 by 1999. By 2008 it the US citizen spent \$7'500 per person.

The general aging of the population is leading to higher drug consumption. By 2020, 28% of the US population will be older than 65.

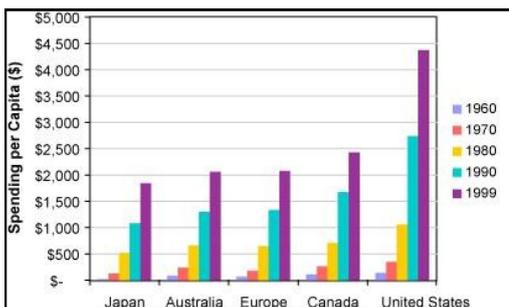
Pharmacy Shelving in general

Pharmacological knowledge was already recorded in the ancient Egyptian (16th century BC) by Edwin Smith Papyrus. The great knowledge about the power of botany was carried over generations. At this time

in the Middle East in botany, chemistry and techniques as sublimation and distillation led medicine in medieval Islam (856-1013 AD) substantially to develop pharmacology.

In the 9th century, the first pharmacies were state-regulated. This was the first step into public regulatory. In the meantime everything became a lot more complex and professional. Nowadays sophisticated substances and costly chemical compounds fill the shelves of pharmacies,

helping people to cure their diseases. Since drug processing is costly and zero error is tolerated, not only the production needs to be controlled also transportation and storage is crucial to ensure the product quality.



Growing World-Wide Healthcare Spending Per Person

Public Regulatory
 Food and Drug Administration (FDA)
 United States Pharmacopeia (USP)
 World Health Organization (WHO)
 Int. Conf. on Harmonization (ICH)

Guide lines:
 Good Distribution Practice (GDP)
 Good Manufacturing Practice (GMP)

Source: www.wikipedia.com

Discussed in this edition:

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Why the need to measure humidity, temperature or light?

A medicament is a special product. If it isn't treated with caution our health is affect by soon. Light, temperature and humidity are affecting the quality and purity of the drug which can lead to no effect or at worst may even harm our health.

Possible negative effects:
Light, Unsaturated fatty acids which are used for salve or oils

are light sensitive substances. If they are exposed to light they can become dull and rank, begin fermenting and or decompose. Warm temperature will even enhance these effects.

Heat: Essential oils (e.g. from Camille) or alcohol-containing substances (e.g. cough drops)

can evaporate if they are exposed to higher temperature.

Humidity: If tees or powders are exposed to the humidity they can be effected by mildew. Tablets can turn gray or begin to decompose.

Cold: The so called substrate of drug as lactose in tables can harden.

How to ensure the right climate distribution?

The best way to check the overall a room parameters is to carry out a mapping. A mapping is done by placing datalogger for (°C, %rh, light) in various strategic places in a

room, that are accurately monitoring the different parameters. Depending on the room topology hot and cold spots will occur. **Mapping** gives a detailed picture of the

overall room homogeneity over a certain period of time for temperature and/or humidity. More details about °C & % rh mapping can be found in our Application Note F005.

What solutions can Rotronic offer?

Rotronic offers a wide range of products either for monitoring a pharmacy shelves or making your mapping successful.

The range starts from small standalone loggers as HL20 to Universal loggers which is capable to measure beside °

C & %rh also light, G-force and analogue input information signals.

The HL-NT series and the wireless logger LOG-HC2-RC are network based products. With their network ability they are able to communicate via various ways as RS485, USB, LAN or Wire-

less which allows to monitor remote places anywhere in the room.

The validated HW4 software makes it easy to analyze the data or export the data into Excel for reporting and further processing as requested by FDA 21 CFR Part 11 regulations.

Rotronic products:

Dataloggers:

- **Universal Logger**

Two interchangeable probes, Display and USB interface, 2million measurement parameters for:
°C / % rh / light / G-Force / pressure / Analog In- / Outputs Display available...

- **Wireless Logger**

Based on 433/915MHz 500'000 measured values for (SN, Hour/Date, Temp. % rh) 6 years battery lifetime, up to 100m communication range.

Additional Options:

LOG-DS-EX: Receiver with USB interface
LOG-PT1000: Logger for temperature only

- **HL-NT logger**

For interchangeable probes (up to 7 probes with docking station) 32MB flash card, Display, Conform to FDA21 CFR Part 11 and GAMP4...

- **HL-21D logger**

±0.2 °C accuracy FDA 21 CFR Part 11 / GAMP 4 Adjustable log interval Memory: 20000 data records

- **HL-20D logger**

0..100%rh, ±0.8 %rh / ±0.2 °C FDA 21 CFR Part 11 / GAMP 4 Adjustable log interval Memory: 20000 data records

Probes:

- **HC2-S**

Standard humidity sensor -50...100°C, 0...100%rh, ±0.8%rh and ±0.1K...

- **HC2-x**

Basically any type of rotronic probe can be used with the UART interface to match almost every possible application.

Hygroclip interface for all HC2-xx probes



LOG-HC2-R01 Universal logger



LOG-HC2-RC Wireless LAN-Interface

Customer benefits:

Rotronic loggers:

The accurate long term recording of mainly humidity and temperature is very important for distribution, storage or mapping applications.

The HL-21D & HL-20D Data loggers: The battery powered data logger is designed to be replaced at any location where cabling or external power supply is not a option.

The HL-NT logger: Offers the widest range of possibili-

ties. All loggers can directly be connected with the rotronic HW4 software over LAN, WLAN, USB or RS485. Each logger is capable to handle up to seven probes.

The LOG-HC2-xx Universal logger: Is not only a simple logger, it offers more! This independent battery powered device measures parallel 6 parameters such as Light(Lux), G-force in 3-axes, analogue input, air pressure, temperature and

humidity. The large memory of 2'000'000 measurement values and the USB interface does make it a perfect tool for monitoring and or mapping for a pharmacy environment.

The LOG-HC2-RC Wireless Logger: The outstanding energy-saving technology enables a battery lifetime of up to 6 years. Which makes it optimal tool for sites without infrastructure where precision and high storage is requested.



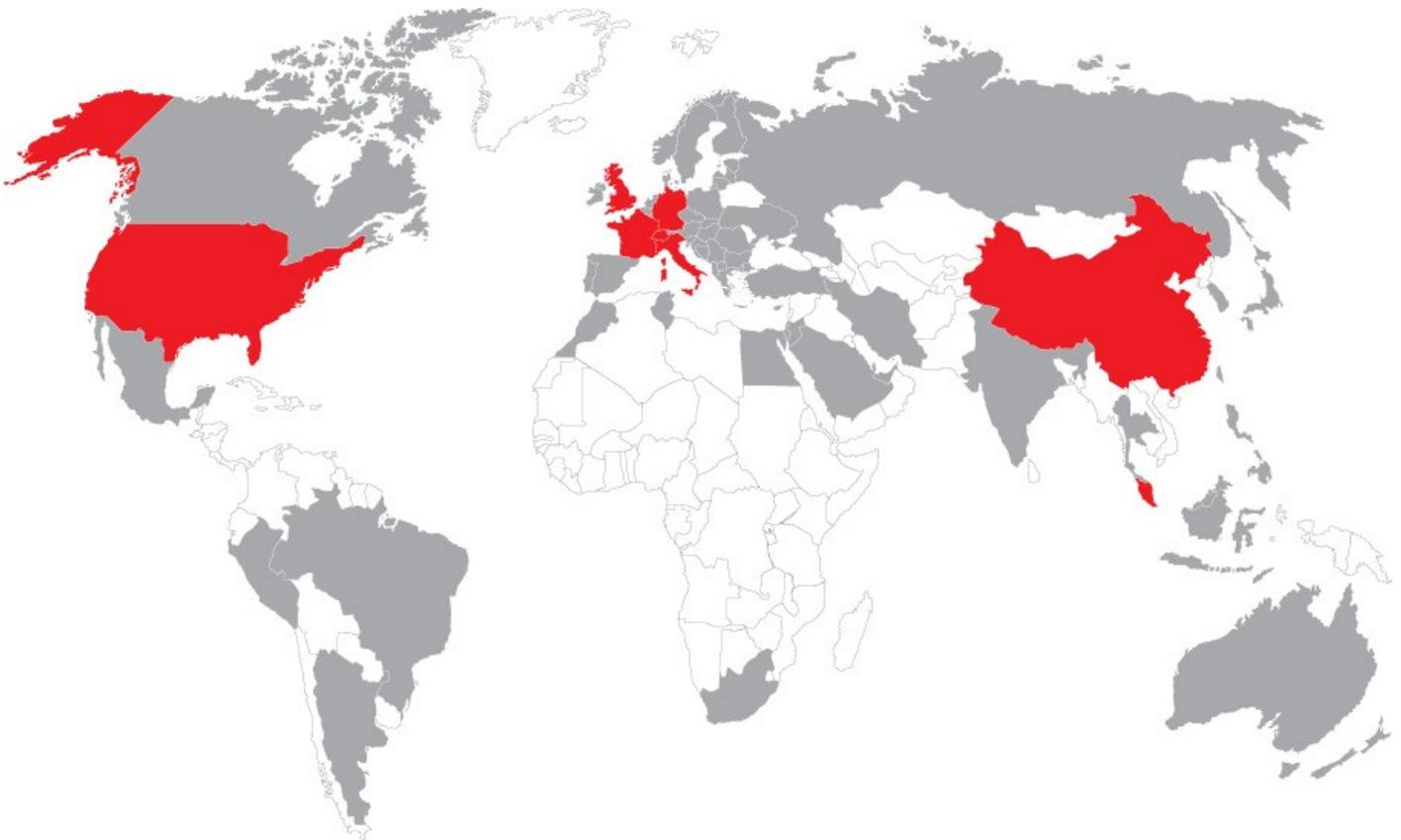
HL20 datalogger



HL-NT datalogger

Contact us:

Rotronic is represented in more than 40 countries around the world. An up to date list of all our partners is available at www.rotronic-humidity.com/international



SWITZERLAND

ROTRONIC AG

Grindelstrasse 6,
CH-8303 Bassersdorf
Phone: +41 44 838 11 44
Fax: +41 44 837 00 73
www.rotronic-humidity.com

FRANCE

ROTRONIC Sarl

56, Bld. De Courcerin,
F-77183 Croissy-Beaubourg.
Phone: +33 1 60 95 07 10
Fax: +33 1 60 17 12 56
www.rotronic.fr

SINGAPORE

ROTRONIC South East Asia Pte Ltd

16 Kallang Place #07-04
Singapore 339156
Phone: +65 6294 6065
Fax: +65 6294 6096
www.rotronic.com.sg

GERMANY

ROTRONIC Messgeräte GmbH

Einsteinstrasse 17-23
DE-76275 Ettlingen
Phone: +49 7243 383 250
Fax: +49 7243 383 260
www.rotronic.de

UK

ROTRONIC Instruments UK Ltd.

Crompton Fields, Crompton Way
Crawley, West Sussex, RH10 9EE
Phone: +44 1293 57 10 00
Fax: +44 1293 57 10 08
www.rotronic.co.uk

ITALY

ROTRONIC Italia srl

Via Repubblica di San Marino, 1
I-20157 Milano (MI)
Phone: +39 02 39 00 71 90
Fax: +39 02 33 27 62 99
www.rotronic.it

USA

ROTRONIC Instrument Corp.

Suite 150, 135 Engineers Road, Haupt-
pauge, NY 11788
Phone: +1 631 427 38 98
Fax: +1 631 427 39 02
www.rotronic-usa.com

CHINA

ROTRONIC Shanghai Rep. Office

2B, Zao Fong Universe Building, No. 1800
Zhing
Shan West Road, Shanghai 200233
China
Phone: +86 21 644 03 55
Fax: +86 21 644 03 77
www.rotronic-humidity.cn

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