

# Automatic changeover manifold control system

C-SR-2210M-2251M/S-HTM  
**HTM 2022 / 02-01**

## Automatic changeover manifold control system

### C-SR-2210M-2251M/S-HTM HTM 2022 / 02-01

#### Key features

Available in 2 versions:

- 1 **ECO VERSION** C-SR-2210M-2251M-HTM/E: with the same operational function of the **STANDARD VERSION** but without a cover box. This version is mounted on a wall mounting stainless steel support panel
- 2 **STANDARD VERSION** C-SR-2210M-2251M-HTM/S: with external wall mounting white painted cover box
- 3 Integrated Alarm system controlled by microprocessor complying to HTM 02-01 and HTM 2022 Standards
- 4 The manifold is supplied fully equipped with pressure gauges, pressure switch and pressure relief valves
- 5 Two stage regulation system complying to ISO 10524-2 standard

**Pressure regulators are CE marked as medical devices in accordance to 93/42 EEC directive**

**Degreased in accordance with ISO 15001**

**All the components of the system subjected to cylinder pressure or to single fault condition have successfully withstood the adiabatic compression test in accordance with ISO 10524-2 and ISO 15001**



**STANDARD VERSION CLOSED DOOR**



## General Description

The **AUTOMATIC CHANGEOVER MANIFOLD CONTROL SYSTEM C-SR-2210M-2251M-HTM** complies to **HTM 02-01**, **HTM 2022**, **ISO 7396-1** and **ISO 10524-2** standards.

The **AUTOMATIC CHANGEOVER MANIFOLD CONTROL SYSTEM C-SR-2210M-2251M-HTM** manifold control system is able to provide an uninterrupted supply of a specific medical gas from equally sized high pressure cylinder banks. In addition the system is provided with an Emergency Reserve manifold to supply the pipeline in case of a Primary supply failure.

An electronic warning and alarm system provides to monitoring the manifold operational parameters, and it also gives alarm warnings in case of malfunctioning. The manifold is housed in a zinc-plated steel box.

The manifold is supplied fully assembled and tested.

## Working principles

The **AUTOMATIC CHANGEOVER MANIFOLD CONTROL SYSTEM C-SR-2210M-2251M-HTM** is a high capacity manifold designed to ensure a capacity of **120 m³/h**. There are two separated stages of regulation: **First stage** and **Second stage**.

The First stage ensures a regulation from 200 bar to 10-12 bar.

The Second stage ensures a regulation from 10-12 bar to 5 bar.

First stage's regulators are protected from over-pressure by relief valves. There is a pneumatic switch that ensures the changeover from duty bank to stand-by bank.

Two inductive sensors detect the switch's position, and after the detection the changeover occurs. There are two pressure gauges on the frontal panel, indicating the left bank's pressure level and the right bank's pressure level. A third pressure gauge indicates the line's pressure status. An electronic control panel ensures the monitoring of the system and provides to notice alarm conditions by means of visual and audible signals.

The control panel is provided with three-colour LEDs indicating the following conditions of manifold:

**Green:** Normal status

**Yellow:** Warning condition

**Red:** Emergency Alarm

In the event of mains power failure a battery pack ensures the power supply to the "ALARM SYSTEM FAULT" indicator up to 48 hours.

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## Technical Data

### FULLY AUTOMATIC MANIFOLD CONTROL PANEL

**COMPLYING TO:** HTM02-01, HTM 2022, ISO 7396-1 standards

**SUITABLE FOR FOLLOWING GASES:** O<sub>2</sub>, N<sub>2</sub>O, CO<sub>2</sub>, AIR, N<sub>2</sub>

**MAX FLOW RATE:** 120 Nm<sup>3</sup>/h

**OUTPUT PRESSURE:** 5 bar (adjustable)

**MAX INPUT PRESSURE:** 200 bar

**STORAGE TEMPERATURE:** -20° C ÷ +60° C

**WORKING TEMPERATURE:** +10° C ÷ +40° C

**PRESSURE RELIEF VALVES CONNECTION:** Soldering coupler Ø16 mm pipe

**HIGH PRESSURE INPUT CONNECTION:** See Gas Table

**OUTPUT CONNECTION:** G 1/2" M with welding tang Ø14mm

### DIMENSIONS

**STANDARD VERSION:** Housed in a zinc-plated steel box 1070x680x210 mm

**ECO VERSION:** Mounted on a stainless steel support panel 1030x640 mm

### TWO STAGE REGULATION SYSTEM COMPLYING TO ISO 10524-2 STANDARDS

**AUTOMATIC SWITCH FROM DUTY BANK TO STAND-BY BANK**

**ALARM SYSTEM CONTROLLED BY MICROPROCESSOR COMPLYING TO HTM02-01 STANDARD**

**ALARM'S ELECTRICAL FEATURES:** 115/230 Vac 50-60 Hz

**ALARM'S BATTERY FEATURES:** NiMH, 600 mAh, sealed, exchangeable, automatically rechargeable within 72 hours, up to 48 hours of life

### DEGREASED IN ACCORDANCE WITH ISO 15001

ALL THE COMPONENTS OF THE SYSTEM SUBJECTED TO CYLINDER PRESSURE OR TO SINGLE FAULT CONDITION HAVE SUCCESSFULLY WITHSTOOD THE ADIABATIC COMPRESSION TEST IN ACCORDANCE WITH **ISO 10524-2** AND **ISO 15001**

Gas Table	GAS	GAS SYMBOL	CYLINDER COLOR	HIGH PRESSURE CONNECTION
	Oxygen	O <sub>2</sub>	White	UNI 11144 (W 21,7 M x 1/14")
	Medical Air	AIR	White / Black	UNI 11144 (W 30 M x 1/14")
	Nitrous Oxide	N <sub>2</sub> O	Blue	UNI 11144 (G 3/8" M)
	Carbon Dioxide	CO <sub>2</sub>	Grey	ISO 5145 (W 27 x 2 M)
	Nitrogen	N <sub>2</sub>	Black	UNI 11144 (W 21,7 F x 1/14")

## Product Codes

### C-SR 2210M-2251M/S HTM - ECO VERSION (WITHOUT COVER BOX)

<b>10443H-2002M</b>	AUTOMATIC CHANGEOVER SUPPLY UNIT C-SR-2210M-2251M/E	<b>O<sub>2</sub></b> HTM ECO
<b>10444H-2002M</b>	AUTOMATIC CHANGEOVER SUPPLY UNIT C-SR-2210M-2251M/E	<b>Air</b> HTM ECO
<b>10445H-2002M</b>	AUTOMATIC CHANGEOVER SUPPLY UNIT C-SR-2210M-2251M/E	<b>N<sub>2</sub>O</b> HTM ECO
<b>10446H-2002M</b>	AUTOMATIC CHANGEOVER SUPPLY UNIT C-SR-2210M-2251M/E	<b>CO<sub>2</sub></b> HTM ECO
<b>10447H-2002M</b>	AUTOMATIC CHANGEOVER SUPPLY UNIT C-SR-2210M-2251M/E	<b>N<sub>2</sub></b> HTM ECO

### C-SR 2210M-2251M/S HTM - STANDARD VERSION (WITH COVER BOX)

<b>10366H-2002M</b>	AUTOMATIC CHANGEOVER SUPPLY UNIT C-SR-2210M-2251M/S	<b>O<sub>2</sub></b> HTM STANDARD
<b>10422H-2002M</b>	AUTOMATIC CHANGEOVER SUPPLY UNIT C-SR-2210M-2251M/S	<b>Air</b> HTM STANDARD
<b>10423H-2002M</b>	AUTOMATIC CHANGEOVER SUPPLY UNIT C-SR-2210M-2251M/S	<b>N<sub>2</sub>O</b> HTM STANDARD
<b>10424H-2002M</b>	AUTOMATIC CHANGEOVER SUPPLY UNIT C-SR-2210M-2251M/S	<b>CO<sub>2</sub></b> HTM STANDARD
<b>10425H-2002M</b>	AUTOMATIC CHANGEOVER SUPPLY UNIT C-SR-2210M-2251M/S	<b>N<sub>2</sub></b> HTM STANDARD

## Automatic changeover manifold control system **HTM 2022 / 02-01**

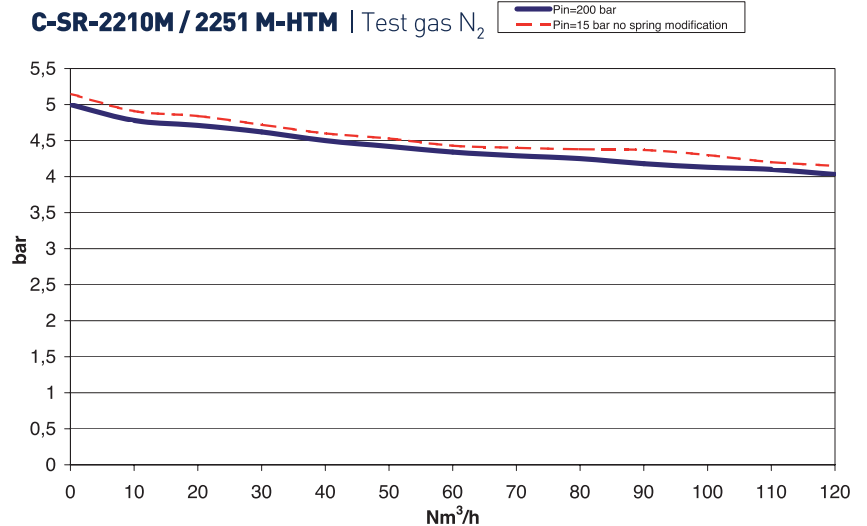
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### Flow rate diagram

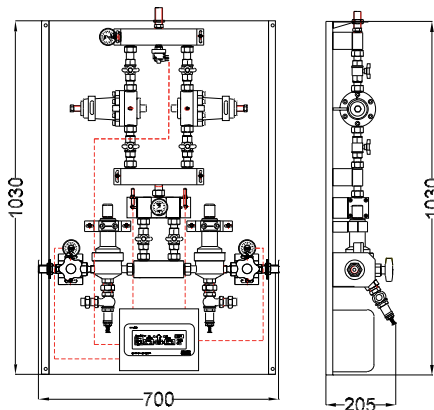
**Test gas** Nitrogen  
**Inlet pressure** see diagram (Pin)  
**Test temperature** 21 °C  
**Conversion factors** To find the flow of a different gas from the test gas, multiply the value read on the curve for the coefficient shown in the following table:

Air	0.98
Oxygen	0.93
Carbon dioxide	0.79
Nitrous oxide	0.79

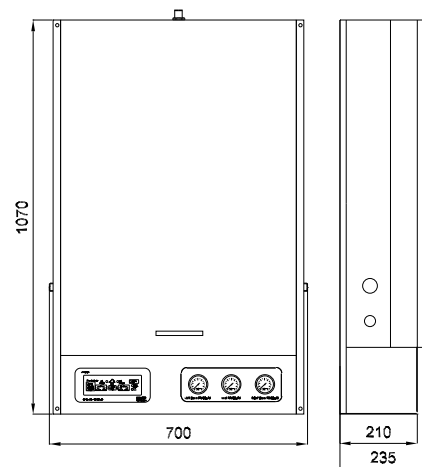
### C-SR-2210M / 2251 M-HTM | Test gas N<sub>2</sub>



### C-SR-2210M-2251M HTM ECO (WITHOUT COVER BOX)



### C-SR-2210M-2251M/S HTM STANDARD (WITH COVER BOX)



### C-SR-2210M-2251M HTM ECO - Typical scheme of installation

