

Heart-Lung Machine

HL 20

MAQUET
GETINGE GROUP





Well-proven perfusion technology

For many years now, Maquet has been one of the world's leading manufacturers of heart-lung machines and components. With almost 20 years of experience, Maquet provides solutions for cardiac surgery, EVH, and extra-corporeal circulation.

A proven complete perfusion system: The Maquet HL20 combines superior technology needed for cardiopulmonary surgery with clear and concise handling necessary for safe and effective patient management. The HL 20 is offered in a range of configurations that meet the demanding needs of clinicians.

Maquet | The Gold Standard



The Maquet HL 20

Consistency and user-friendliness

The HL 20 heart-lung machine meets and exceeds the necessary requirements for perfusion technology:

The Maquet HL 20 is reliable, flexible and adaptable. The roller pumps run quietly and smoothly on low-voltage power supplied by the console. All controls and monitors are managed from a central panel for the ultimate in user-friendly operation.

Simple operation:

- The system control panel provides supervisory functions and warning status information at a glance.
- A single system knob permits adjustment of all supervisory settings.
- Each pump has user defined names displayed on the front panel.
- A remote control for the heater-cooler unit permits patient temperature control and monitoring without diverting the perfusionist's attention.

Safe and reliable:

- In the event of a power failure an automatic battery back-up system is engaged to run the entire system for 90 minutes*.
- All pumps and modules operate on 24 Volt power for increased patient and operator safety.
- All electrical cables are integrated into the console base.
- The system performs an extensive self-test at power-up and continuously monitors all vital functions during operation.
- All alarms and errors are acoustically and visually represented.
- A single button is used to silence all alarms.



The Maquet HL 20 - tried and tested technology for cardiopulmonary surgery.

Technical Data HL 20

Console	Automatic function test Periodic sampling Emergency power
Pump Modules	Speed range 0 ... 250rpm $\pm$ 10 rpm [clockwise / counterclockwise] Flow rate 0 ... 10lpm
Pressures	Measuring range: -998 ... +998 mmHg Resolution 1 mmHg Optical & acoustic alarm release Digital readout
Temperature	4 channels with sensors, Measuring range: 0 ... 50°C, Optical & acoustic alarm release, Digital readout
Bubble detector	Bubble diameter $\geq$ 5 mm

*As defined in section 13.2 of the Instructions for Use (MCV-GA-10000701-EN-10 as of 2014-08).

Maquet HL 20 perfusion system overview

Reliable, flexible and adaptable



A wide range of configurations to match every need.

The **Maquet HL 20** is constructed of durable stainless steel. The console is easily maneuvered by means of a side guard. The rear wheels lock and the front wheels permit steering lock.

The HL 20 is provided in three basic variants, the HL 20 Vario Flex, HL 20 Vario Single and HL 20 Vario Twin. Each variant is available in a 4 or 5 pump platform.



Maquet HL 20 Vario Flex



Maquet HL 20 Vario Single



Maquet HL 20 Vario Twin

Flexible basic unit: The Vario Flex console is available as a basic unit to which optional components can be added.

- The basic unit includes:
 - four masts (two height adjustable)
 - fixed top shelf
 - flexible mountable system controlpanel
 - mast attachment for control panel
- Optional cardioplegia monitor unit
- Pumps and accessories are ordered individually
- 4 and 5-pump console available

Basic unit plus four single roller pumps: The Vario Single console is a complete system at a competitive price.

- In addition to the four single roller pump modules and all components from the Vario Flex, the Vario Single includes:
 - the cardioplegia monitor unit mounted below the SCP
 - dual pressure module
 - temperature module
 - air emboli protection module
- All other accessories can be ordered individually
- 4 and 5-pump versions are available

Basic unit plus three single roller pumps and one twin pump: The Vario Twin console is a complete system at a competitive price.

- In addition to the three single roller pumps, one twin pump, and all components from the Vario Flex, the Vario Twin console includes:
 - the cardioplegia monitor unit mounted below the SCP
 - dual pressure module
 - temperature module
 - air emboli protection module
- All other accessories can be ordered individually
- 4 and 5-pump versions are available

The pumps

safe and versatile pump system.

Compact roller pump modules: All pumps of the Maquet HL20 run quietly and smoothly on a safe low-voltage power supplied by the console. The roller pumps can be easily removed and re-installed onto the system console simply by lifting and placing the module onto the guided pin position.

The range of the roller pumps consist of a single roller pump module or a twin pump module. The twin pump module is suitable for applications where lower flow rates are required, such as pediatric perfusion, cardioplegia delivery, suction or venting.

The pumps offer:

- Clockwise and counterclockwise direction
- Precise and lockable central occlusion knob
- Large four-digit alpha-numeric display for flow and speed
- Eight-digit alpha-numeric display for mode of operation, tube size and status messages
- Eight programmable modes of operation including slave and cardioplegia modes
- Continuous and pulsatile operation
- Calibration memory for up to four tubing sizes
- Full control by supervising units
- A full range of protection including runaway, beltsip, overload, pump direction and temperature monitoring

The ROTAFLOW centrifugal pump system:

The ROTAFLOW centrifugal pump system can be fully integrated into the HL 20 console. Its compact design includes display of all vital information at a glance.

The ROTAFLOW system consists of:

- ROTAFLOW Console, and a control module with triple modality power supply including mains, HL 20 console power, and internal battery
- ROTAFLOW Drive Unit with incorporated flow and bubble measurement
- ROTAFLOW Emergency Drive, a manual drive (hand crank) with speed indicator
- ROTAFLOW Centrifugal Cump, a disposable pump head and an integrated flow probe



Single roller pump module



Twin pump module



The ROTAFLOW centrifugal pump system can also be used as a fully independent stand-alone unit.

Supervisory units

Comprehensive and safe control



System control panel



Cardioplegia monitor unit

Pressure monitoring system: The HL20 allows accurate measurement of up to four pressures. Standard medical grade pressure transducers serve as system sensors. The range and accuracy of measurements are stipulated in the technical data of the transducer itself.

Temperature monitoring system: The HL20 provides accurate measurement of up to four temperatures. The system works with insulated temperature probes, which are fully compatible with the MEAS 400 series (formerly Yellow Springs Instruments YSI 400 series).

Air emboli protection system: The air emboli protection system offers two safety protection systems to prevent air entering the extracorporeal circuit:

- Capacitive level sensor
- Ultrasonic bubble detector

Cardioplegia monitor unit (CMU): The CMU displays all of the important cardioplegia data including volumes, ratio, timers, temperature and pressure.

The CMU is a standard component on the HL20 Vario Single and Vario Twin and is mounted under the system control panel. The CMU is an option on the HL 20 Vario Flex 4-pump and 5-pump consoles.

Developed for Maquet HL 20 a complete range of accessories.

Some of the most commonly used accessories for the Maquet HL20 are:

Flexible LED lamp: The LED lamp is specifically designed for the OR environment with a water resistant housing, easy to clean surface and a shatter proof lense. The 6 watt power supply results in very low heat generation reducing the risk of thermal damage to the extracorporeal circuit components and the blood. The LED light can be mounted anywhere on the HL 20 and is available in two different goose neck arm lengths.

Cross mast: The cross masts for 4-pump and 5-pump consoles consist of a round 25 mm bar with end mast holders. The cross masts are height adjustable without the use of tools.

Vertical mast: The vertical mast is a round 25 mm bar with a length of 500 mm.



Flexible LED lamp

Venous clamp standard: The hard anodized aluminum venous clamp standard is designed to allow precise regulation of the venous return flow by variable occlusion of the venous line. There is no need for inserts, and the clamp is able to accommodate tubing up to 5/8" x 3/32" in size.

Venous clamp quick: The clamp quick offers precise venous return adjustment by means of two separate knobs. The extension arm and ball and socket joint facilitate optimal positioning of the clamp. The clamp accommodates tubing up to 1/2" x 3/32" in size.

Drawer: The optional drawer can be fixed under the console rack. It can be used for hand cranks and other accessories. The drawer can be opened from the rear or front of the 4 and 5-pump consoles.

Side guard: The flexible side guard is used to maneuver the console. The height adjustable side guard can be fixed on the right or left side of the console. The side guard can be separately ordered for each console type.

Technical Data LED lamp

Power consumption	6W
Operating voltage range	22 ... 28 V / 19 V~
Operating temperature	-20°C up to +40°C
Dimensions	Length arm: 200 or 400 mm Head diameter: 59 mm Length head: 73 mm
Dimmer levels	3
Light color	Natural white
Operating mode	Qualified for continuous operation
Housing material	Aluminum (anodized) borosilicate glass

This brochure contains information about products which may be pending regulatory approval to be marketed in your country.

Contact your local Maquet representative for more information.

See instructions for use for full prescribing information, including indications, contraindications, warnings, precautions and adverse events.

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