TERUMO

# Advanced Perfusion System 1


*Touch the future...today.*

# Terumo® Advanced Perfusion System 1

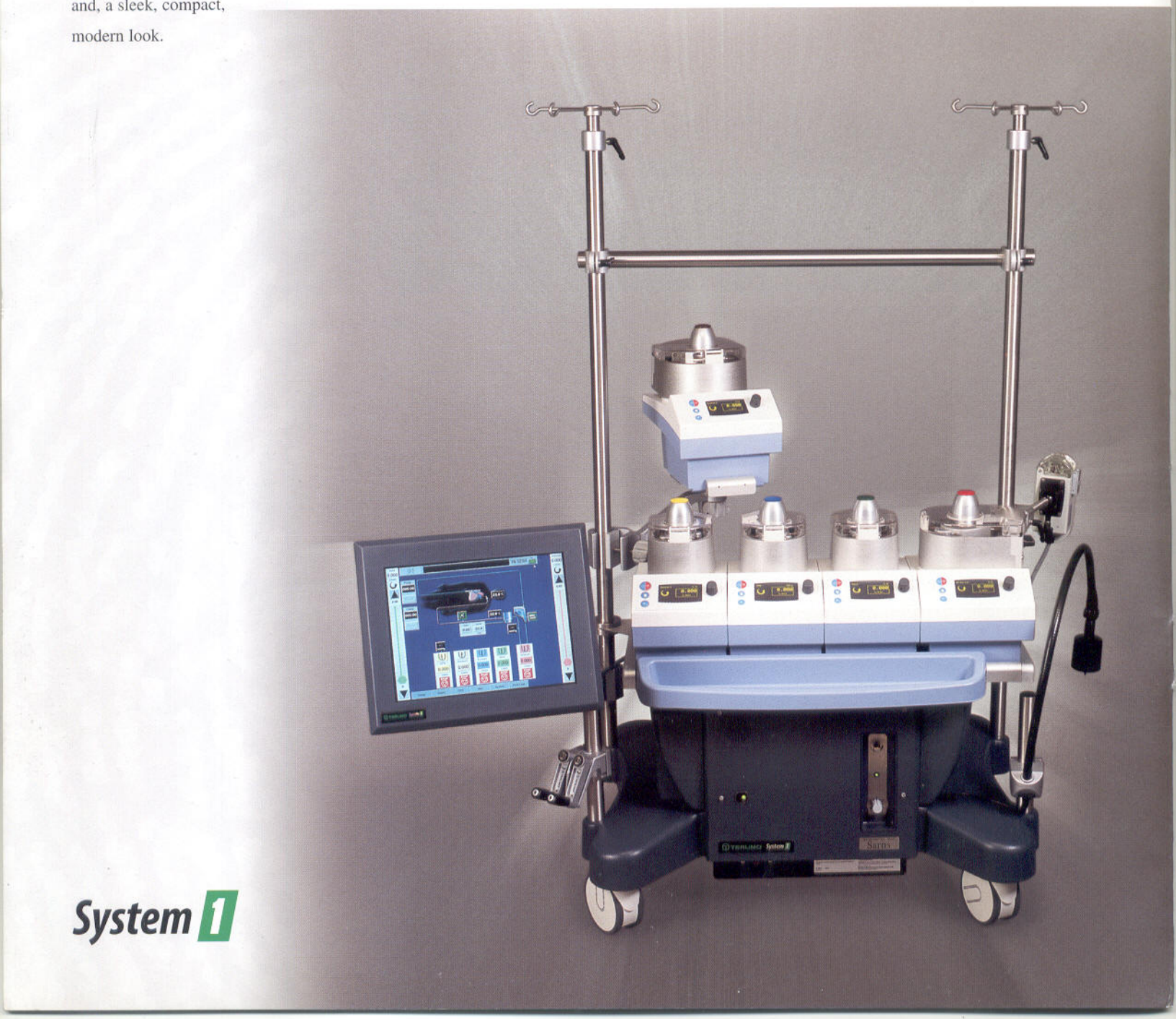
*Touch the future...today.*

The sophisticated design of the Terumo System 1 means many things to today's perfusionist: the ability to customize the system's operation with the touch of a finger; an unprecedented degree of flexibility of the system's physical configuration; the ability to upgrade, adapt, and expand the system to meet future needs; a truly intuitive, easy-to-operate user interface; an innovative service application; and, a sleek, compact, modern look.

But most importantly, Terumo System 1's advanced design provides today's perfusionist with the confidence that comes with knowing that Terumo System 1 will be one of the smartest professional investments they'll ever make.

## Unprecedented Customization

System 1 redefines the notion of customization with quick, simple configurability to easily adapt for new protocols or individual patient needs. You can choose exactly how you're going to manage a case – which devices you'll use, where you'll locate them, how you'll configure the display on the Central Control Monitor. And System 1's software-based design lets you select advanced functions without specialized hardware.



System 1

# Customization

- Choose the number and types of devices you need.
- Mount pumps on the system base or on a pole close to the surgical field.
- Rotate pump raceways to optimize tubing lengths.
- Control pumps using the front panel knob or from the Central Control Monitor.
- Select from expanded choices for pump responses to alert and alarm conditions.
- View pump information either on the front panel display or on the Central Control Monitor.
- Create up to 12 procedure-specific display screens.
- Add devices and sensors as your needs change.

## System Modules Plug In Anywhere

System 1's safety and monitoring systems are housed in individual compact modules that can be plugged into any of 18 slots conveniently housed in the system's base. This modular system not only enhances the system's configurability, it also provides an uncluttered and less-distracting working environment.

Select as many as 18 modules that monitor or operate up to:

- 8 pumps (up to 2 centrifugal pumps)
- 1 electronic $O_2$ blender/analyzer
- 1 occluder
- 4 air bubble detectors
- 1 level alert and 1 level alarm sensor
- 8 pressure sensors
- 8 temperature sensors
- 4 flow sensors
- 1 serial interface that connects to either the CDI™ System 100 or CDI™ System 500
- 1 serial interface that connects directly to the Sarns™ CCPro Data™ Perfusion Software


## Compact Base

- Optional electronic $O_2$ blender includes a built-in analyzer.
- Integrated battery backup can power the system without interruption for one hour.
- Side and back covers protect cables and modules from spills.
- Large, smooth surfaces are designed to be easily cleaned.

## Confidence and Control At Your Fingertips

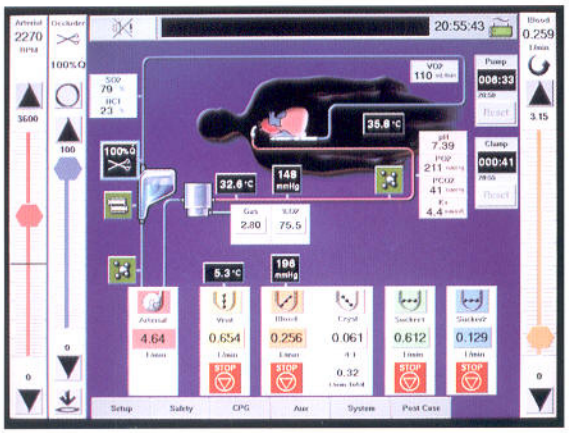
Terumo System 1's Central Control Monitor allows complete control and monitoring of the entire perfusion case from a highly visible, central touch-screen display. Beneath the attractive, easy-to-view graphics lies an intelligently and intuitively designed software program for fast, simple configuration and running of a case.

- Device identification is fast and easy with the simple perfusion circuit graphic.
- Important patient parameters are always visible, even as menu screens are changed and viewed.
- Critical information and operating controls are accessible with one touch.
- All menu screens can be accessed with no more than two touches.
- Alarm, alert, status and error messages are easily viewable.
- Pulse, servo regulation to pressure or flow, master/follower operation for multi-ratio cardioplegia, cardioplegia volume tracking and cardioplegia dose delivery are easy to activate and control from the Central Control Monitor.

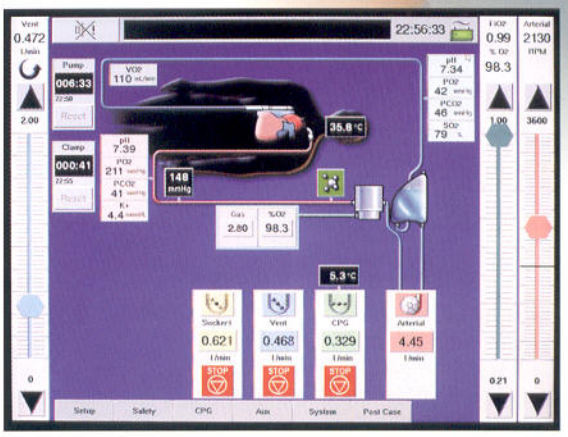
Creating your own perfusion display screen is quick and simple:

- Select a graphical orientation.
- Select and place the pumps on the graphical interface.
- Select and place the safety and monitoring devices on the graphical interface.
- Define responses to alert and alarm conditions.
- Assign displayed devices to physical components.
- Save the configuration.

Custom display screens are transferable between systems using a PC card. Access to perfusion display screens can be controlled by using the optional password security feature.




**Intuitive Design**
*The display design uses a simple perfusion circuit graphic with icons for easy identification of system devices and parameters. Quickly access information or activate controls by touching the corresponding icon.*




**Device Controls and Display**
*Adjust pump speeds, the occluder position, $FiO_2$ setting, and gas flow rate using the control bars located on either side of the touch screen. View important patient parameters directly on the device icons.*

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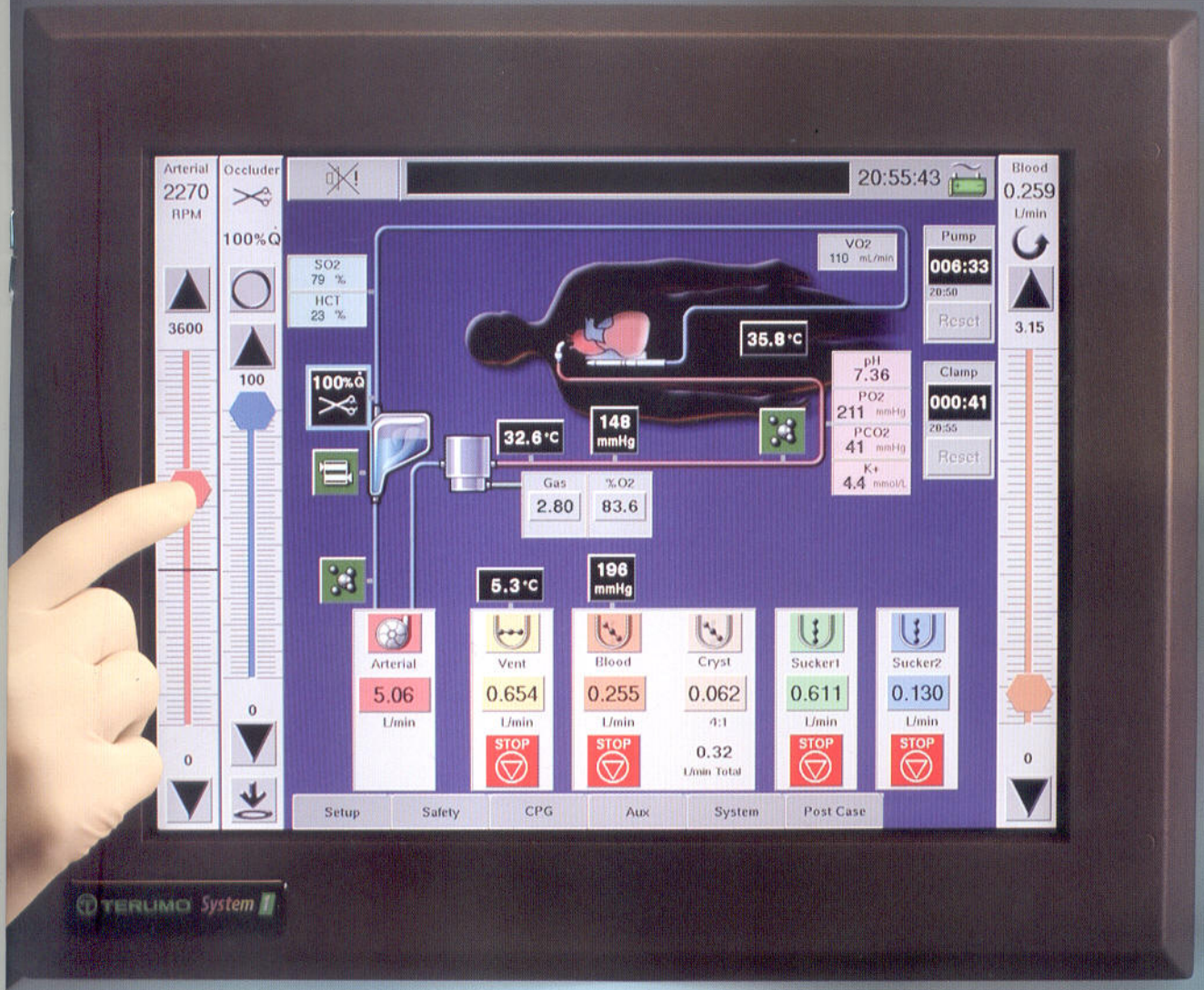
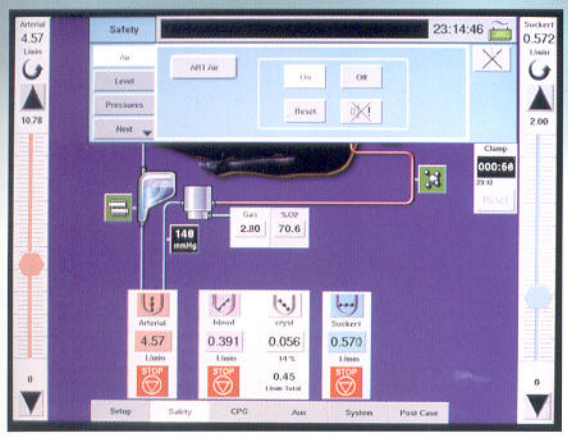
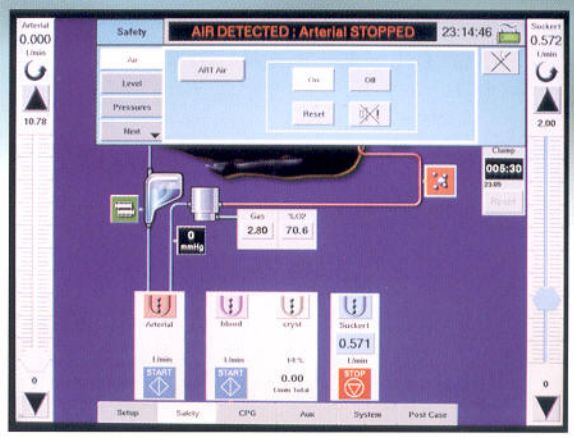



## Additional Functionality

*Tabs along the bottom of the touch screen provide access to additional information and functionality without covering critical controls. Menu screens displayed at the top of the screen allow you to efficiently enter patient information, modify system settings, activate safety systems, monitor cardioplegia delivery, and view additional system status information.*



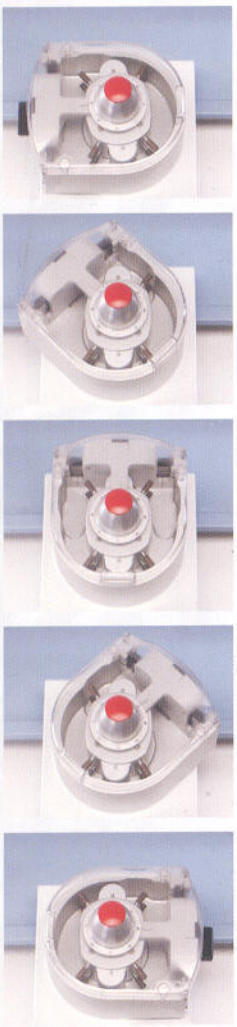

## Alert and Alarm Handling

*Color-coded alert and alarm messages are displayed indicating the condition and status of the system. The device icon for the alert or alarm source flashes and the corresponding safety screen is automatically displayed so you can respond quickly.*

System 1

## Advanced Functionality with Reliability You Trust

Terumo System 1's pumps are smaller and offer more advanced features than the Sarns brand models that preceded them and continue to provide the same precision engineering and solid design that have made Sarns brand pumps legendary for reliability and dependability.

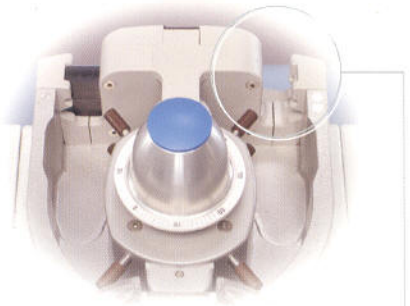


*The roller pump raceway rotates in 15° increments, allowing you to minimize tubing lengths in your circuit.*

### Centrifugal Pumps

- Pumps can be controlled from the front panel knob or the Central Control Monitor.
- Remote-mounted pump motor helps optimize tube lengths.
- Non-invasive flow sensor eliminates need for a disposable flow probe.
- Integrates with system alerts and alarms.
- Advanced functions include:
  - **Pulsatile flow operation (arterial pump only).**
  - **Servo regulation to maintain a constant flow or a constant positive or negative pressure.**
  - **User selectable "coast" response reduces the pump speed to 1500 RPM in response to an alert or alarm.**

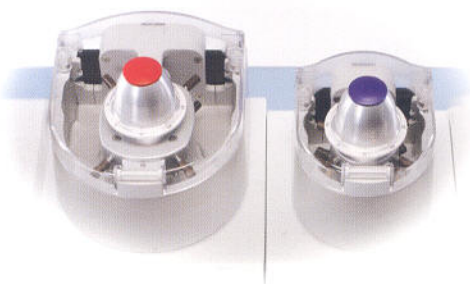
*The centrifugal pump's compact size enables easy pole mounting of the entire system.*



*Self-adjusting tube clamps eliminate the need to replace tube inserts.*

### Roller Pumps

- Occlusion mechanism with audible feedback can be adjusted while the pump is running.
- Easy-to-use mounting hardware allows choice of base or pole mounting.
- Pumps can be controlled from the front panel knob or the Central Control Monitor.
- Front panel display shows pump operating status and any alerts or alarm messages affecting its operation.
- Preferred system direction for forward flow is user selectable.
- Advanced functions can be performed using any roller pump:
  - **Pulsatile flow operation (arterial pump only).**
  - **Servo regulation to maintain a constant flow or a constant positive or negative pressure.**
  - **Master/follower operation of two pumps for delivering multi-ratio cardioplegia.**
  - **Cardioplegia volume or time doses can be set on the Central Control Monitor to stop the cardioplegia pump when delivery is complete.**



*The System 1 roller pumps are available in two sizes: 6" and 4" diameter.*

System 1

# Specifications

## System 1 Base

| | 801763 | 801764 |
|---|---|---|
| Voltage | 100/115V | 220/240V |
| | 50/60 Hz | 50/60 Hz |
| Height | 22.6 in (57.4 cm) | 22.6 in (57.4 cm) |
| Width | 35.2 in (89.4 cm) | 35.2 in (89.4 cm) |
| Depth | 26.5 in (67.3 cm) | 26.5 in (67.3 cm) |
| Weight | 262 lbs (118.8 kg) | 262 lbs (118.8 kg) |

## Electronic $O_2$ Blender/Analyzer

| Operating range: | 801188 |
|---|---|
| Flow | 0 – 10 L/min |
| $FiO_2$ | 0.21 – 1.00 |
| Measured $O_2$ | 21% – 100% |

## Central Control Monitor

| | 802100 |
|---|---|
| Height | 13 in (33 cm) |
| Width | 15.7 in (39.9 cm) |
| Depth | 3.0 in (7.6 cm) |
| Weight | 15 lbs (6.8 kg) |

## Roller Pumps

| | 801040 (small) | 801041 (large) |
|---|---|---|
| Pumphead diameter | 4 in (10.2 cm) | 6 in (15.2 cm) |
| Voltage | 24VDC | 24VDC |
| Height | 12.5 in (31.8 cm) | 12.5 in (31.8 cm) |
| Width | 7.1 in (18.0 cm) | 8.5 in (21.6 cm) |
| Depth | 11.8 in (30.0 cm) | 13.1 in (33.3 cm) |
| Weight | 21 lbs (9.5 kg) | 24 lbs (10.9 kg) |
| Operating range | 0 – 4 L/min | 0 – 10 L/min |

## Centrifugal Control Unit

| | 801046 |
|---|---|
| Voltage | 24VDC |
| Height | 3.1 in (8.0 cm) |
| Width | 7.3 in (18.4 cm) |
| Depth | 8.5 in (21.6 cm) |
| Weight | 2.4 lbs (1.1 kg) |
| Operating range | 0 – 7 L/min |

## Flexible Halogen Lamps

| | 801238 | 801558 |
|---|---|---|
| Size | 33 in (83.8 cm) | 15 in (38.1 cm) |
| Voltage | 24VDC | 24VDC |

## Functional Modules

| | Flow module 802018 | Other modules |
|---|---|---|
| Height | 6.30 in (160.0 mm) | 3.54 in (90.0 mm) |
| Width | 3.63 in (92.2 mm) | 1.06 in (27.0 mm) |
| Depth | 1.33 in (33.8 mm) | 3.03 in (77.0 mm) |
| Weight | 0.95 lbs (0.43 kg) | 0.27 lbs (0.12 kg) |

**Pressure** 802112
Two pressure transducers per module
Operating range; (-250) mmHg – 900 mmHg
Maximum of 8 transducers

**Temperature** 802114
YSI 400, two temperature sensors per module
Operating range; 0 – 50° C
Maximum of 8 sensors

**Flow** 802018
Non-invasive flow measurement, one per module
Operating range; (-9.9) L/min to 9.9 L/min
Maximum of 4 modules

**Ultrasonic Level Detection** 802111
One alarm sensor, one alert sensor per module
Reservoir: Functions with hardshell reservoirs that have a wall thickness of 0.07 in – 0.15 in (1.8 mm – 3.8 mm)
Maximum of 1 module

**Ultrasonic Air Bubble Detector** 802110
One per module
Operating range;
3/8 in – 0.5 cc or larger up to 6 L/min
1/4 in – 0.3 cc or larger up to 3 L/min
Maximum of 4 modules

**Electronic Venous Occluder** 803480
One per module
Operating range; 0 – 100% flow on 1/4 in to 1/2 in tubing
Maximum of 1 module

**Interface Module for CDI System 100** 802558
One CDI System 100 monitor per module
Maximum of 1 module (either CDI System 100 or CDI System 500)

**Interface Module for CDI System 500** 803479
One CDI System 500 monitor per module
Maximum of 1 module (either CDI System 100 or CDI System 500)

**Interface Module for RS-232** 802113
One CCPro Data system per module
Maximum of 1 module (either RS-232 or RS-485)

**Interface Module for RS-485** 803518
One data management system per module
Maximum of 1 module (either RS-232 or RS-485)

# Ordering Information

## System 1 Base

| | | |
|---|---|---|
| 1* | 100/120V System 1 | 801763 |
| | or 220/240V System 1 | 801764 |

** Shaded items are included with System 1*

| | | |
|---|---|---|
| | Programmed PC card system configuration | 803739 |
| 2 | Hand crank (includes 2 hand cranks) | 801016 |
| 3 | Hand crank bracket | 802089 |
| 4 | Central Control Monitor | 802100 |

## Base Options

| | | |
|---|---|---|
| 5 | Electronic $O_2$ blender/analyzer* | 801188 |
| 6 | Pole-mounted blender* | 164235 |

** Each blender requires a hose kit and adaptor set*

Hose kits

| | | |
|---|---|---|
| | U.S. hose kit (3 hoses: green, yellow, black) | 144194 |
| | Non-U.S. hose kit (3 hoses: blue, yellow, black) | 144186 |

Hose adaptor sets

| | | |
|---|---|---|
| 7 | NCG hose adaptor set | 144207 |
| 8 | D.I.S.S. hose adaptor set | 144215 |
| 9 | Ohio Diamond hose adaptor set | 144223 |

## Center Poles

| | | |
|---|---|---|
| 10 | Crossbar fitting (required for each additional pole) | 145980 |
| 11 | 2 ft (0.6 m) pole | 16553301 |
| | 3 ft (0.9 m) pole | 131115 |
| | 4 ft (1.2 m) pole | 16553401 |

## Flexible Halogen Lamp

| | | |
|---|---|---|
| 12 | 33 in (83.8 cm) flexible halogen lamp | 801238 |
| | 15 in (38.1 cm) flexible halogen lamp | 801558 |

## Roller Pumps

| | | |
|---|---|---|
| 13 | Roller pump 6 in (15.2 cm) diameter | 801041 |
| 14 | Roller pump 4 in (10.2 cm) diameter | 801040 |
| 15 | Pole mount pump rest with bracket | 801093 |

## Integrated Centrifugal System

| | | |
|---|---|---|
| 16 | Drive motor | 164267 |
| 17 | Control unit | 801046 |
| | Manual drive | 164268 |
| | Pole mount centrifugal display bracket | 804372 |
| | Centrifugal motor holder | 7088 |

## Sarns CCPro Data Perfusion Software

| | | |
|---|---|---|
| | Data management software | 194765 |

## Flow Sensing

| | | |
|---|---|---|
| 18 | Flow module | 802018 |
| 19 | Non-invasive flow sensor 3/8 in (9.5 mm) ID x 3/32 in (2.4 mm) wall, reusable | 6382 |
| 20 | Mounting bracket (holds 2 modules) | 801550 |

## Level Detection

*(One each included with System 1)*

| | | |
|---|---|---|
| 21 | Level detect module | 802111 |
| 22 | Yellow transducer | 195215 |
| 22 | Red transducer | 195274 |
| | Level sensor pads, gel included (60 per box) | 195240 |

## Air Bubble Detection

*(One each included with System 1)*

| | | |
|---|---|---|
| 23 | Air bubble detect module | 802110 |
| 24 | Cable assembly | 149892 |
| | Pole clip sensor holder | 149876 |

*One sensor required per air bubble detection system*

Ultrasonic air sensor (choose 1 of 3)

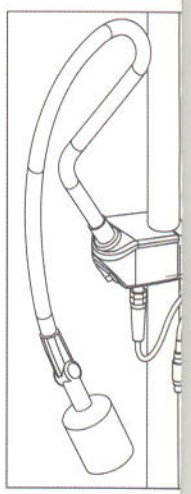
| | | |
|---|---|---|
| 25 | 3/8 in x 3/32 in (9.5 mm x 2.4 mm) | 5773 |
| 25 | 1/4 in x 3/32 in (6.4 mm x 2.4 mm) | 5791 |
| 25 | 1/4 in x 1/16 in (6.4 mm x 1.6 mm) | 5785 |
| 26 | Air sensor bracket (optional) | 5793 |

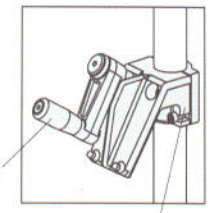
## Venous Occluder

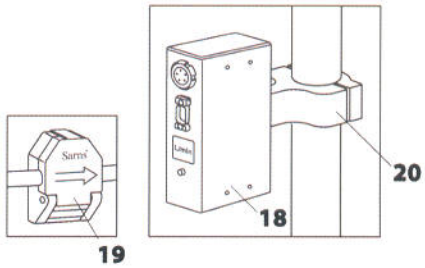
| | | |
|---|---|---|
| 27 | Occluder module | 803480 |
| 28 | Occluder head | 806455 |

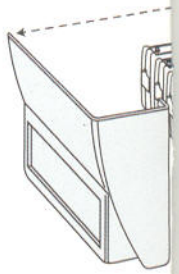
## Pressure Monitoring

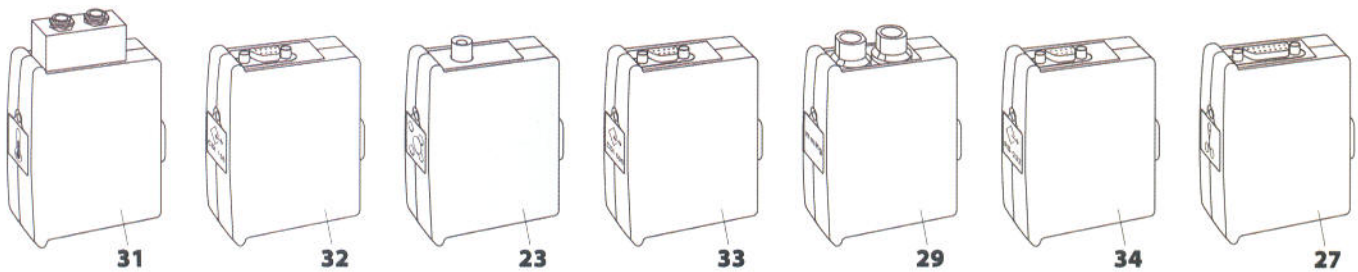
| | | |
|---|---|---|
| 29 | Pressure module | 802112 |
| 30 | Reusable pressure transducer | 16433301 |
| | Pressure monitoring kit (10 per case) | 16066100 |
| | Pressure transducer holder | 22300030 |







## Temperature Monitoring

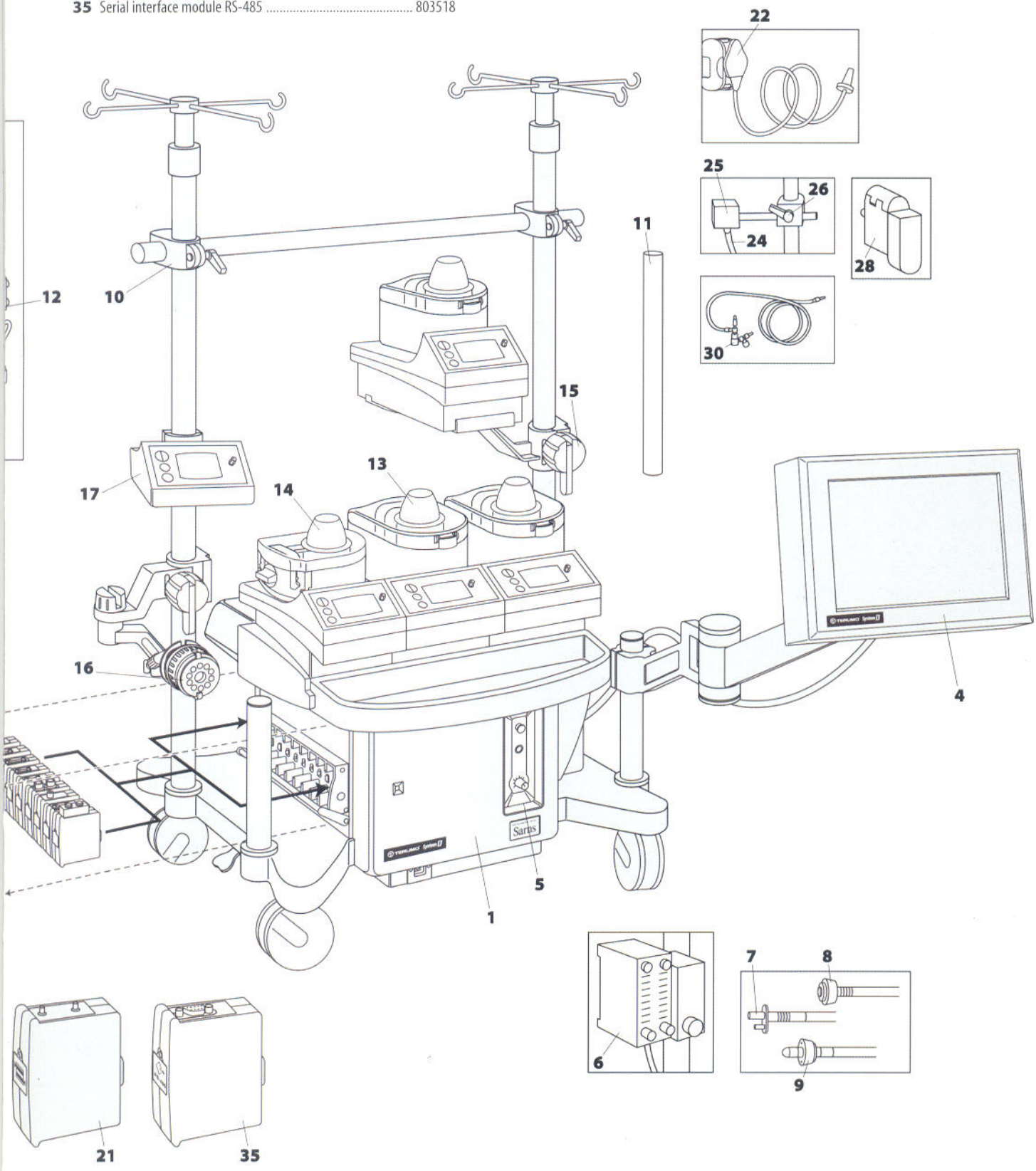
*Shaded items included with System 1*

**31** Temperature module, YSI® series 400 compatible
(2 temperatures per module) ..... 802114

*YSI is a registered trademark of Yellow Springs Instruments*

## Data Interface Modules

**32** Interface module for CDI System 100 ..... 802558
**33** Interface module for CDI System 500 ..... 803479
**34** Serial interface module RS-232 ..... 802113
**35** Serial interface module RS-485 ..... 803518



# Terumo® Advanced Perfusion System 1

| Sarns™ Module 5000 Console | Sarns™ 7000 MDX System | Sarns™ Modular Perfusion System 8000 | Sarns™ Perfusion System 9000 |
|---|---|---|---|




System 1

*Terumo® Advanced Perfusion System 1*

## Heir to the Sarns Legacy

Terumo System 1 may employ 21st century technologies, but it has inherited the best features from its Sarns ancestors, the longest commercially available line of heart-lung machines in the world. Since 1961, Sarns heart-lung machines have been legendary for their high-quality engineering, longevity, and customer satisfaction. Like those ancestors, Terumo System 1 is "built for life."

## Evolved Serviceability

System 1 is designed with a minimum of moving components, simplifying maintenance and repair. It has enhanced self-diagnostics. And its system modules can be replaced during use to minimize downtime if a problem should occur. A special software-based service tool was developed to speed diagnosis and reporting. All these features, supported by experienced technical and field service teams, help make System 1 the most confident choice in perfusion systems today.

Ask your Terumo Cardiovascular Systems representative for additional information about special service features and programs for System 1.

TERUMO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