

# Terumo® Advanced Perfusion System 1

*Extracorporeal Perfusion System*



The Terumo® Advanced Perfusion System 1 is the heart-lung machine of choice: designed for today's practice and engineered for tomorrow's challenges. Its built-in features and modular design allow perfusionists to configure the platform to keep pace with their practices' evolving needs.

 **TERUMO**

# Terumo® Advanced Perfusion System 1

## The Heart-lung Machine of Choice for Your Evolving Practice



- Compact, space-saving base with choice of brackets and holders facilitates the right pump configuration without expensive hardware costs.
- System design allows users to define safety responses and pump responses.
- Myocardial protection is paramount with standard and advanced multiple cardioplegia delivery options:
  - Multi-ratio cardioplegia delivery
  - Volume and timed delivery
- Central Control Monitor features fast processing, a high-resolution screen, and updated software.
- Base- or pole-mounted pumps with rotating raceways help reduce circuit length and hemodilution.
- Pump status and safety messages can be viewed on both the pumps' local controls or the Central Control Monitor.
- A unique electronic gas blender integrated into the base can be controlled locally or via the Central Control Monitor.

## The Right Platform for Today... And Tomorrow

The Terumo System 1 can be readily configured to adapt to new protocols and individual patient needs. The system's flexibility allows users to choose exactly how to manage a case including:

- How the safety connections and responses are defined.
- How the Central Control Monitor is used.
- Built-in advanced capabilities that can be implemented at users' discretion.



## Adaptable Safety and Monitoring Modules

With the ability to integrate up to 18 safety and monitoring modules and an internal battery backup that comes standard, the Terumo System 1 is designed with patient safety and user needs in mind. Users can integrate the desired number of safety and monitoring modules, selecting individual responses for each. Users can add or change modules as needed.



*The Terumo System 1 can integrate up to 18 modules. These compact modules are plugged into the base of the system.*

Modules can monitor or update:

- Ultrasonic level detector (alert/alarm) and air bubble detectors
- Flow, pressure, and temperature sensors
- Electronic venous line occluder
- Interface modules for TLink™ Data Management System and CDI™ Monitoring Systems

## Pumps Enhance Flexibility and Performance

- The Terumo System 1 can support up to eight pumps, including two centrifugal pumps.
- Users can choose 6" or 4" roller pumps to adjust to different protocols.
- Both centrifugal and roller pumps can be controlled from the speed control knob or the Central Control Monitor.
- The roller pump's occlusion mechanism with audible feedback can be adjusted while the pump is running.
- Arterial pump displays alert and alarm messages that affect operation.
- Self-adjusting tube clamp mechanism eliminates the need to change tube inserts.
- Remote-mounted centrifugal pump motor helps to reduce tubing lengths.
- Non-invasive flow sensor eliminates the need for a disposable flow probe.
- Uni-directional hand crank ensures correct blood flow direction.



*Roller pumps are available in large and small raceways to adjust to different perfusion protocols.*



### Advanced Features

- **Pulsed Flow** operation on arterial pumps and user-selectable Coast™ response on centrifugal pumps.
- Pump flow setpoint and pressure setpoint (negative or positive) maintained by activating the **Servo-Regulation** feature.
- **Master/Follower** pump operation in which any two roller pumps can be used to deliver multi-ratio cardioplegia to minimize hemodilution and optimize myocardial protection.



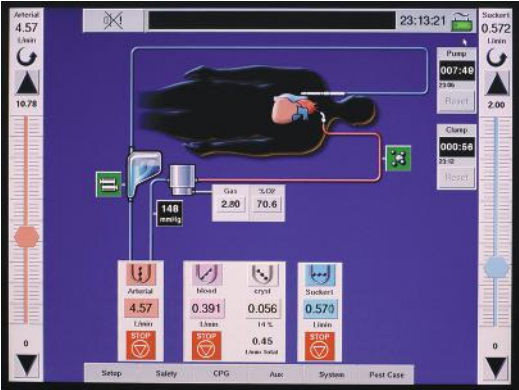
# Terumo® Advanced Perfusion System 1

## Central Control Monitor

The Terumo System 1 Central Control Monitor is a high-resolution touch screen computer that serves as both a safety monitor and as the central interface for operating the system components. The Central Control Monitor's intuitive graphic interface helps users organize information and view current perfusion parameters on a single screen without having to look at multiple displays.



- Customized configurations: Users can create up to 12 customized perfusion screens.
- Priority messaging area: Color-coded alarms, alerts, status, and error messages are displayed in order of priority.



*Integrated electronic gas blender can be controlled through the Central Control Monitor or locally.*

*The Central Control Monitor features fast processing, a high-resolution screen, and intuitive user interface.*

## Specifications

### Terumo System 1 Base

	801763	801764
Voltage	100/115V 50/60 Hz	220/240V 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<sub>2</sub> Blender/Analyzer

	801188
Operating range:	
Flow	0 – 10 L/min
FiO <sub>2</sub>	0.21 – 1.00
Measured O <sub>2</sub>	21% – 100%

### Central Control Monitor

	816300
Height	13.7 in (34.8 cm)
Width	15.7 in (39.9 cm)
Depth	3.4 in (8.6 cm)
Weight	15 lbs (6.8 kg)

### Roller Pumps

	816570 (small)	816571 (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

	816572
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

## Modules

### 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 Module

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

### Temperature Module

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

### Flow Module

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 Module

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 Module

802110
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 Module

803480
Operating range: 0 – 100% flow on 1/4 in to 1/2 in tubing
Maximum of 1 module

### Interface Module for CDI System 500

803479
One CDI System 500 monitor per module
Maximum of 1 module

### Interface Module for RS-232

802113
One TLink Data Management System per module
Maximum of 1 module



# Terumo® Advanced Perfusion System 1

## Ordering Information

### Terumo System 1 Base\*

CATALOG #	DESCRIPTION	DIAGRAM #
801763	100/115V base	1
801764	220/240V base	1
803739	Programmed PC card system configuration	1
801016	Hand crank (includes 2 hand cranks)	2
802089	Hand crank bracket	3
816300	Central Control Monitor	4
816261	Central Control Monitor Cover	39

### Base Options

Each blender requires a hose kit and adaptor set.

CATALOG #	DESCRIPTION	DIAGRAM #
801188	Electronic O <sub>2</sub> blender/analyzer	5
164235	Pole-mounted blender	6
<b>Hose kits</b>		
814475	U.S. hose kit (3 hoses: green, yellow, black)	
814474	Non-U.S. hose kit (3 hoses: blue, yellow, black)	
<b>Hose adaptor sets</b>		
144207	NCG hose adaptor set	7
144215	D.I.S.S. hose adaptor set	8
144223	Ohio Diamond hose adaptor set	9

### Center Poles and Accessories

CATALOG #	DESCRIPTION	DIAGRAM #
145980	Crossbar fitting (required for each additional pole)	10
16553301	2 ft (0.6 m) pole	11
131115	3 ft (0.9 m) pole	11
16553401	4 ft (1.2 m) pole	11
816489	Shelf	12
816370	Metallic sliding back cover panel kit	40

### Flexible Halogen Lamp

CATALOG #	DESCRIPTION	DIAGRAM #
801238	33 in (83.8 cm) flexible halogen lamp	13
801558	15 in (38.1 cm) flexible halogen lamp	13

### Roller Pumps

CATALOG #	DESCRIPTION	DIAGRAM #
816571	Roller pump, 6 in (15.2 cm) diameter	14
816570	Roller pump, 4 in (10.2 cm) diameter	15
801093	Pole mount pump rest with bracket	16
816477	Dual pumps pole mount bracket	17
816483	Descending pole mount pump bracket	18

### Integrated Centrifugal System

CATALOG #	DESCRIPTION	DIAGRAM #
164267	Drive motor	19
816572	Control unit	20
164268	Manual drive	20
804372	Pole mount centrifugal display bracket	20
816620	Flexible mounting arm	21

### TLink Data Management System

CATALOG #	DESCRIPTION
Call	Data management software

### Flow Sensing

CATALOG #	DESCRIPTION	DIAGRAM #
802018	Flow module	22
6382	Non-invasive flow sensor, 3/8 in (9.5 mm) ID x 3/32 in (2.4 mm) wall, reusable	23
801550	Mounting bracket (holds 2 modules)	24

### Level Detection

(One each included with Terumo System 1)

CATALOG #	DESCRIPTION	DIAGRAM #
802111	Level detect module	25
195215	Yellow transducer (alert)	26
195274	Red transducer (alarm)	26
195240	Level sensor pads (60 per box), gel included	

### Air Bubble Detection

(One each included with Terumo System 1)

One sensor required per air bubble detection system.

CATALOG #	DESCRIPTION	DIAGRAM #
802110	Air bubble detect module	27
822763	Cable assembly	28
149876	Pole clip sensor holder	
<b>Ultrasonic air sensor (choose 1 of 3)</b>		
5773	3/8 in x 3/32 in (9.5 mm x 2.4 mm)	29
5791	1/4 in x 3/32 in (6.4 mm x 2.4 mm)	29
5785	1/4 in x 1/16 in (6.4 mm x 1.6 mm)	29
5793	Air sensor bracket (optional)	30

### Venous Occluder

CATALOG #	DESCRIPTION	DIAGRAM #
803480	Occluder module	31
806455	Occluder head	32
816620	Flexible mounting arm	21

### Pressure Monitoring

CATALOG #	DESCRIPTION	DIAGRAM #
802112	Pressure module (2 pressures per module)	33

### Temperature Monitoring

CATALOG #	DESCRIPTION	DIAGRAM #
802114	Temperature module, YSI® series 400 compatible (2 temperatures per module)	35

YSI® is a registered trademark of Yellow Springs Instruments.

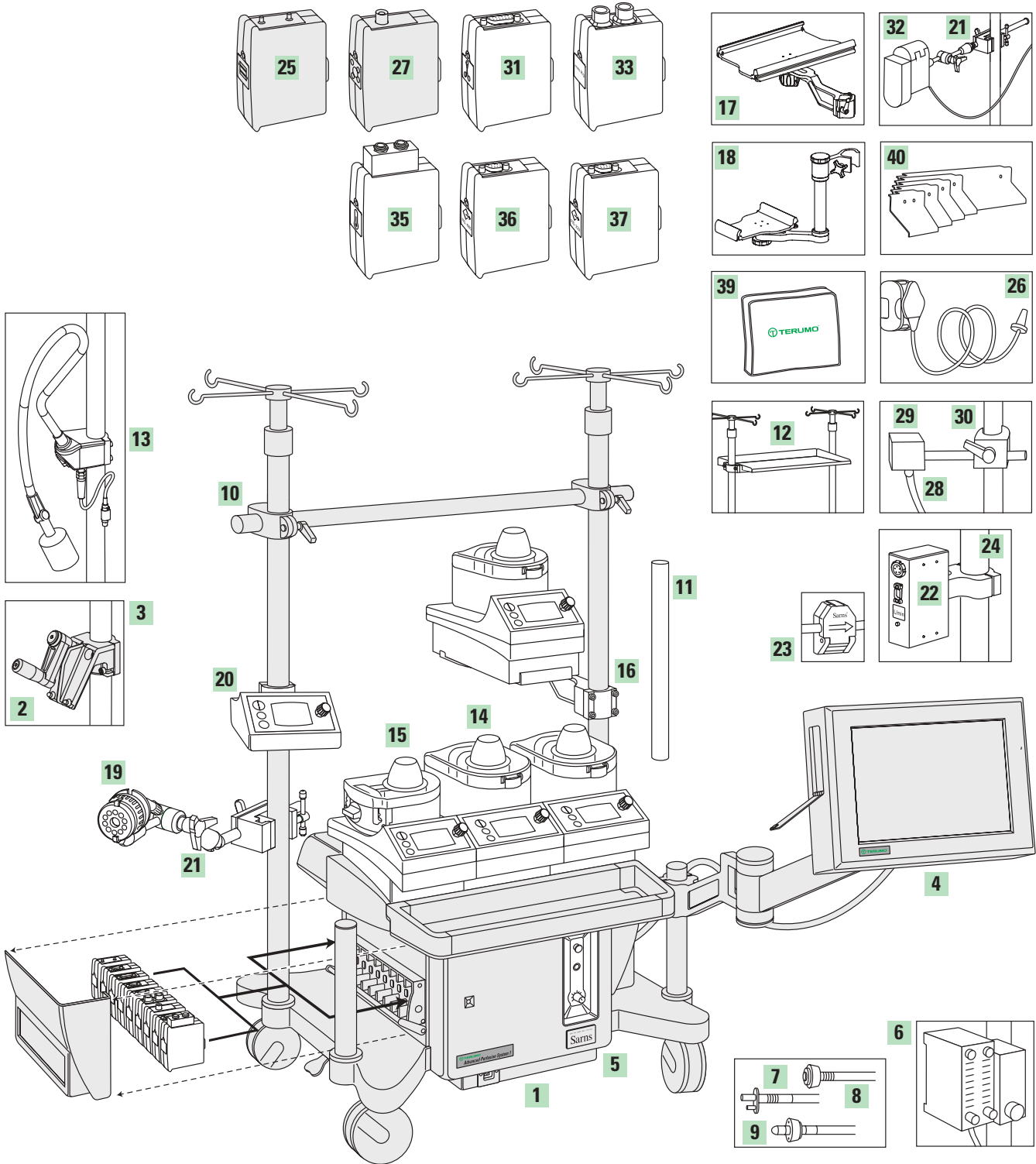
### Data Interface Modules

CATALOG #	DESCRIPTION	DIAGRAM #
802113	Serial interface module RS-232	37
803479	Interface module for CDI™ System 500	36

\* Shaded gray items in diagram are included with the Terumo System 1.

## Terumo System 1 Ordering Information Diagram

Shaded gray items in diagram are included with the Terumo System 1.



## Terumo® Advanced Perfusion System 1



### **Flexible**

From basic to complex configurations, the system can evolve as user needs change.

### **Modular**

Components function and can be controlled individually.

### **Centralized Control**

Intuitive, centralized user control is facilitated through Central Control Monitor.

### **Advanced Functions**

Added safety connections and pump response features can be activated at any time.



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