

# Terumo® Advanced Perfusion System 1

Proven design, continuously enhanced to increase safety and reduce risk.





pH	7.40	HCT	32 %	SpO2	97 %
PCO2i	44	Hgb	10.5	FiO2	21 %
PCO2e	102	SaO2	72 %	Set P	5.0
Temp	36.0 °C	K+	5.4	Na+	120
HCO3-	27	Cl-	101	Ca2+	1.0
BE	3	U	3.1		

# Continuing to set the standard in perfusion technology and patient care.

Since its introduction in 2002, perfusionists and surgical teams have relied on the Terumo® Advanced Perfusion System 1 to help them deliver the highest quality care and achieve the best possible patient outcomes. To maintain this standard of excellence, the technology and design of the Terumo System 1 have continuously evolved, resulting in an exceptional heart-lung machine for the perfusion team.

## Superior Safety Features



- **Fast, intuitive access to information via Central Control Monitor (CCM) screen:** The CCM graphic interface provides central messaging using intuitive language plus colored icons. Clinicians can navigate through alerts and alarms in one or two screen touches.
- **Redundant controls:** Roller pumps and the Electronic Patient Gas System (EPGS) can be controlled locally or through the CCM, providing system redundancy and allowing options for speed adjustment.
- **“On the fly” occlusion adjustments:** The roller pump’s occlusion mechanism with audible feedback can be adjusted while the pump is running. No need to stop the roller pump to adjust the occlusion setting.
- **Self-adjusting tube clamp mechanism:** Eliminates the need for changing tubing clamp inserts.
- **Extended battery life:** The system provides a minimum of 60 minutes of internal battery backup. Actual minutes remaining are clearly displayed on the battery icon on the CCM, providing essential information to users.
- **Uni-directional handcrank:** Only supports forward flow; it cannot be rotated in the wrong direction.



Performance claims based on product validation test results. Data on file.

# Designed to help clinicians achieve the best possible outcomes.

## Terumo Advanced Perfusion System 1

### Centrifugal and Roller Pumps

- System supports up to eight pumps, including two centrifugal pumps.
- Base- or pole-mounted roller pumps with rotating raceways help reduce circuit length and hemodilution.
- Clinicians may choose 6" or 4" roller pumps to adapt to different protocols.
- Centrifugal and roller pumps can be controlled from the speed control knob or the Central Control Monitor.
- Fast power-on of roller and centrifugal pumps allows users to quickly respond in emergent situations.
- The roller pump's occlusion mechanism with audible feedback can be adjusted while the pump is running.
- The arterial pump displays alert and alarm messages that affect operation. Pump status and safety messages can be viewed on either the pumps' local display or the Central Control Monitor.
- 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.
- Updated roller pump software improves pumping performance.
- Newly designed roller pump lids improve accessibility to the pump raceway. The metal pump lid hinge is strong and durable.
- Colorful new roller pump caps include instructional graphic to make operation more intuitive and help guide users as they change occlusion levels. Integrated magnet secures colored cap to occlusion knob.



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

Performance claims based on product validation test results. Data on file.

## Flexible Design Evolves With User Needs

The Terumo System 1 is configurable and adapts to evolving practices or individual clinician needs.

The basic system configuration is intuitive, with quality and technology features that address today's perfusion practices. As perfusion techniques evolve, the system configures quickly and simply to adapt to new protocols and leading-edge practices.



- Advanced functions can be performed:
  - Pulsatile flow operation on arterial pumps
  - 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

BASIC



ADVANCED



*The advanced system configuration includes base- or pole-mount options for pumps. (Pole-mounting a pump closer to the patient and perfusion circuit components may minimize circuit size, thereby minimizing foreign surface exposure and hemodilution.) The pumps can be controlled locally or remotely using the CCM.*

## Central Control Monitor (CCM)

- Fast processing, high-resolution touch screen serves as both a safety monitor and as the central interface for operating the system components.
- Intuitive graphic interface helps users organize information and view current perfusion parameters on a single screen without having to look at multiple displays.
- Users can create up to 12 customized perfusion screens to accommodate different perfusion setups.
- Priority messaging area displays color-coded alarms, alerts, status, and error messages in order of priority.
- Critical patient and system information can be viewed and responded to with no more than two screen touches.



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



## Safety and Monitoring Modules

- Users may integrate up to 18 safety and monitoring modules, selecting individual responses for each, with the option of adding or changing modules as needed.
- Modules plug into any of the slots in the system's base. They are easy to access and provide an uncluttered work environment.
- Modules are available for:
  - Ultrasonic level detector (alert/alarm)
  - Ultrasonic air bubble detectors (4)
  - Flow (4), pressure (8), and temperature (8) sensors
  - Electronic venous line occluder
  - CDI® Blood Parameter Monitoring Systems



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

## Electronic Patient Gas System (EPGS)

- Unique technology allows the gas blender to be integrated into the base and controlled through the CCM or locally.
- An integrated oxygen analyzer measures oxygen content of the blended gas and displays it on the CCM.
- Settable low  $\text{FiO}_2$  alarm displays on the CCM screen in the case of an out-of-range level.
- High and low gas source pressure alarms display on the CCM if the gas supply is outside the recommended pressures.
- A multi-colored LED on the base provides status indications.
- Software updates streamline and improve the EPGS calibration process.
- Increased messaging and changes to the CCM display better inform users of gas blender status.



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

## Internal Battery Backup and Power

- System provides a minimum of 60 minutes of internal battery backup.
- New circuitry and software algorithms enhance battery performance. New battery charge level display increases accuracy.
- Enhanced battery reporting and new A/C visual indicators on CCM splash screen during power up improve battery status communication to users.
- System periodically reminds users to perform a battery health test.
- Sealed power switch adds durability, and new protective plate on switch prevents inadvertent power downs.



*Protective plate on power switch.*



*CCM splash screen.*

# The Heart-lung Machine of Choice

For the hospital



For the clinician



For the patient



Proven technology

Increased safety features

Advanced functionality  
and flexibility

Unrivalled clinical and  
field support

Terumo's commitment  
to perfusion



# Terumo Advanced Perfusion System 1

## Specifications

Terumo System 1 Base		
	801763	801764
Voltage	100/115V, 50/60 Hz	220/240V, 50/60 Hz
Height	22.6" (57.4 cm)	22.6" (57.4 cm)
Width	35.2" (89.4 cm)	35.2" (89.4 cm)
Depth	26.5" (67.3 cm)	26.5" (67.3 cm)
Weight	262 lb (118.8 kg)	262 lb (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" (34.8 cm)	
Width	15.7" (39.9 cm)	
Depth	3.4" (8.6 cm)	
Weight	15 lb (6.8 kg)	
Roller Pumps		
	816570 (Small)	816571 (Large)
Pumphead diameter	4" (10.2 cm)	6" (15.2 cm)
Voltage	24VDC	24VDC
Height	12.5" (31.8 cm)	12.5" (31.8 cm)
Width	7.1" (18.0 cm)	8.5" (21.6 cm)
Depth	11.8" (30.0 cm)	13.1" (33.3 cm)
Weight	21 lb (9.5 kg)	24 lb (10.9 kg)
Operating range	0 – 4 L/min	0 – 10 L/min
Centrifugal Control Unit 816572		
Voltage	24VDC	
Height	3.1" (8.0 cm)	
Width	7.3" (18.4 cm)	
Depth	8.5" (21.6 cm)	
Weight	2.4 lb (1.1 kg)	
Operating range	0 – 3,600 RPM	
Flexible Halogen Lamps		
	801238	801558
Size	33" (83.8 cm)	15" (38.1 cm)
Voltage	24VDC	24VDC

## Modules

Functional Modules		
	Flow Module 802018	Other Modules
Height	6.30" (160.0 mm)	3.54" (90.0 mm)
Width	3.63" (92.2 mm)	1.06" (27.0 mm)
Depth	1.33" (33.8 mm)	3.03" (77.0 mm)
Weight	0.95 lb (0.43 kg)	0.27 lb (0.12 kg)
Pressure Module 802112		
Two pressure transducers per module		
Operating range: (-250) mmHg – 900 mmHg		
Maximum of eight transducers		
Temperature Module 802114		
Temperature module, YSI™ series 400 compatible (2 temperatures per module)		
Operating range: 0 – 50° C		
Maximum of eight sensors		
Flow Module 802018		
Non-invasive flow measurement, one per module		
Operating range: (-9.9) L/min to 9.9 L/min		
Maximum of four 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" – 0.15" (1.8 mm – 3.8 mm)		
Maximum of one module		
Ultrasonic Air Bubble Detector Module 802110		
Operating range:		
3/8" : 0.5 cc or larger up to 6 L/min		
1/4" : 0.3 cc or larger up to 3 L/min		
Maximum of four modules		
Electronic Venous Occluder Module 803480		
Operating range:		
0 – 100% flow on 1/4" to 1/2" tubing		
Maximum of one module		
Interface Module for CDI® System 500 803479		
One CDI System 500 monitor per module		
Maximum of one module		
Interface Module for RS-232 802113		
Data output module		
Maximum of one module		

## Ordering Information

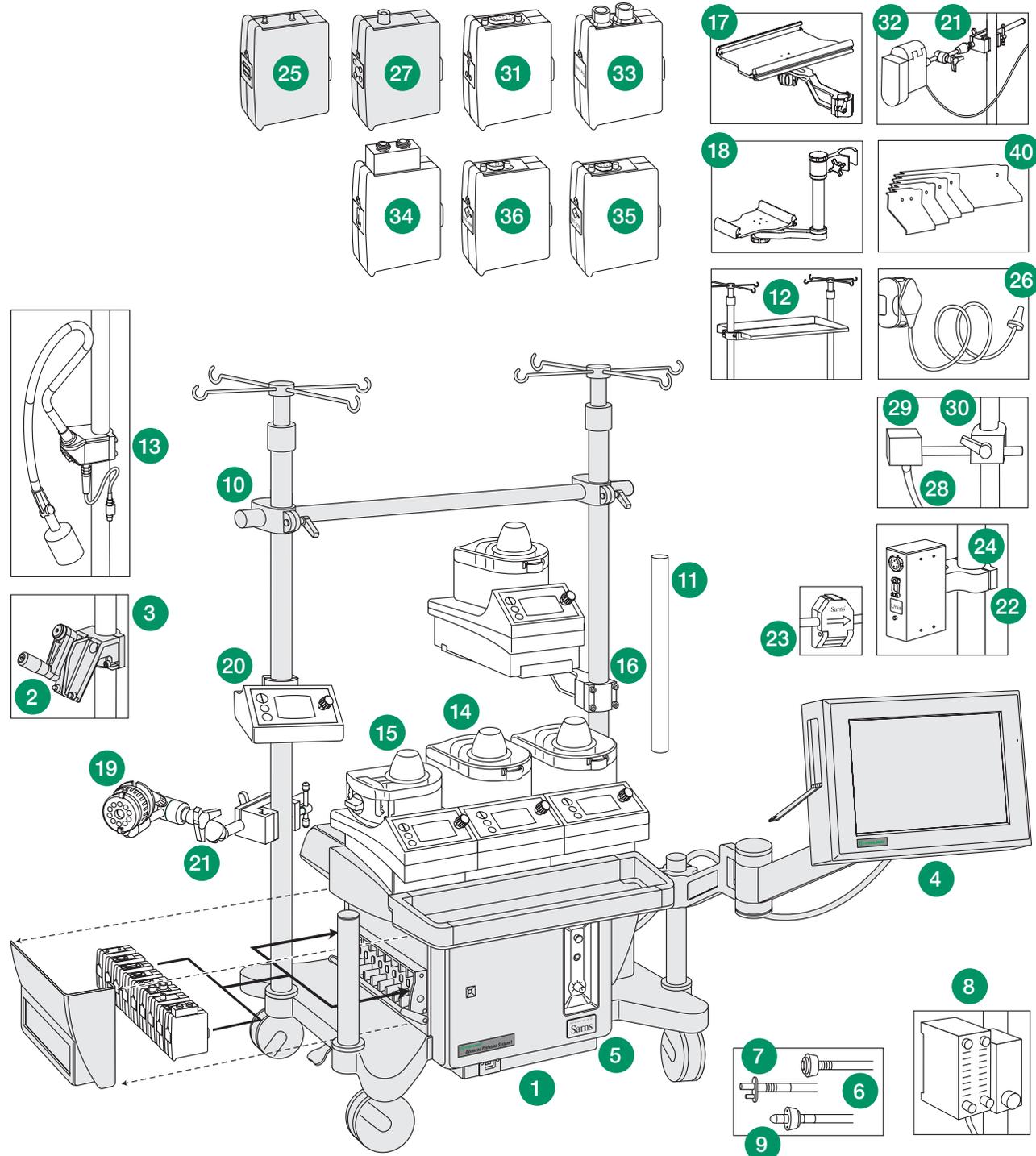
Catalog #	Description	Diagram #
<b>Terumo System 1 Base*</b>		
801763	100/115V base	1
801764	220/240V base	1
803739	Programmed PC card system configuration	4
801016	Hand crank (includes two hand cranks)	2
802089	Hand crank bracket	3
816300	Central Control Monitor	4
<b>Base Options (Each blender requires a hose kit and adaptor set.)</b>		
801188	Electronic O <sub>2</sub> blender/analyzer	5
3500CP-G21	Pole-mounted blender	8
<b>Hose kits</b>		
814475	U.S. hose kit (three hoses: green, yellow, grey)	
814474	Non-U.S. hose kit (three hoses: white, white/black, grey)	
<b>U.S. Hose adaptor sets</b>		
144207	NCG hose adaptor set	7
144215	D.I.S.S. hose adaptor set	6
144223	Ohio Diamond hose adaptor set	9
<b>Non-U.S. Hose adaptor sets</b>		
815459	NCG hose adaptor set	7
815457	D.I.S.S. hose adaptor set	6
815461	Ohio Diamond hose adaptor set	9
<b>Center Poles and Accessories</b>		
145980	Crossbar fitting (required for each additional pole)	10
16553301	2' (0.6 m) pole	11
131115	3' (0.9 m) pole	11
16553401	4' (1.2 m) pole	11
816489	Shelf	12
816370	Metallic sliding back cover panel kit	40
<b>Flexible Halogen Lamp</b>		
801238	33" (83.8 cm) flexible halogen lamp	13
801558	15" (38.1 cm) flexible halogen lamp	13
<b>Roller Pumps</b>		
816571	Roller pump, 6" (15.2 cm) diameter	14
816570	Roller pump, 4" (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

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

Catalog #	Description	Diagram #
<b>Integrated Centrifugal System</b>		
164267	Drive motor	19
816572	Control unit	20
164268	Manual drive	Included with 20
804372	Pole mount centrifugal display bracket	Included with 20
816620	Flexible mounting arm	21
<b>Flow Sensing</b>		
802018	Flow module	22
6382	Non-invasive flow sensor, 3/8" (9.5 mm) ID x 3/32" (2.4 mm) wall, reusable	23
801550	Mounting bracket (holds two modules)	24
<b>Level Detection (One each included with Terumo System 1)</b>		
802111	Level detect module	25
195215	Yellow transducer (alert)	26
195274	Red transducer (alarm)	26
195240	Level sensor pads (60 per box), gel included	
<b>Air Bubble Detection (One each included with Terumo System 1) One sensor required per air bubble detection system.</b>		
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" x 3/32" (9.5 mm x 2.4 mm)	29
5791	1/4" x 3/32" (6.4 mm x 2.4 mm)	29
5785	1/4" x 1/16" (6.4 mm x 1.6 mm)	29
5793	Air sensor bracket (optional)	30
<b>Venous Occluder</b>		
803480	Occluder module	31
806455	Occluder head	32
816620	Flexible mounting arm	21
<b>Pressure Monitoring</b>		
802112	Pressure module (two pressures per module)	33
<b>Temperature Monitoring</b>		
802114	Temperature module, YSI™ series 400 compatible (two temperatures per module)	34
<b>Data Interface Modules</b>		
802113	Serial interface module RS-232	35
803479	Interface module for CDI® System 500	36

# Terumo System 1 Ordering Information Diagram

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





# Keeping our promise so you can keep yours.

Our promise to continuously improve safety, continuously reduce risk, and relentlessly support your practice – makes your promise for exceptional patient care possible.

## Terumo® Advanced Perfusion System 1

[terumo-cvgroup.com/system1](http://terumo-cvgroup.com/system1)



#### Terumo Cardiovascular Group

6200 Jackson Road, Ann Arbor, MI 48103-9300 USA  
Tel: +1.734.663.4145 Fax: +1.734.663.7981

#### Terumo Corporation

44-1, 2-chome, Hatagaya, Shibuya-Ku, Tokyo 151-0072 Japan  
Tel: +81.3.3374.8111 Fax: +81.3.3374.8399

#### Terumo Asia Holdings Pte. Ltd.

300 Beach Road, #33-03 The Concourse 199555 Singapore  
Tel: +65.6.295.1792 Fax: +65.6.294.2329

#### Terumo Europe N.V., Authorized EC Representative

Interleuvenlaan 40, 3001 Leuven, Belgium  
Tel: +32.16.38.12.11 Fax: +32.16.40.02.49

#### Terumo Latin America Corporation

8750 NW 36th Street, Suite 600, Miami, FL 33178 USA  
Tel: +1.305.477.4822 Fax: +1.305.477.4872

#### Terumo Corporation Dubai Branch

Al Masraf Tower, 22nd Floor, P.O. Box 20291, Dubai UAE  
Tel: +971.4.2212220 Fax: +971.4.2213330

#### Terumo India Pvt. Ltd.

Unit No. 1601 & 1602 Tower B, 16th Floor, Unitech Cyber Park,  
Sector-39, Gurgaon, Haryana 122001 India  
Tel: +91.124.4718700 Fax: +91.124.4718718