

DATA SHEET

**MAQUET**  
GETINGE GROUP

**ANESTHESIA SYSTEM  
FLOW-i**





## FLOW-i

General			
System model	C20	C30	C40
Base system weight (depending on configuration)	Approx. 138 kg/ 304 lbs	Approx. 143 kg/ 315 lbs	Approx. 140 kg/ 309 lbs
Dimensions of base plate	692 x 985 mm (27.2" x 38.8")	692 x 985 mm (27.2" x 38.8")	406 x 897 mm (16.0" x 35.3") Measured over table-top and grips
Height (1 drawer)	N/A	835 - 1025 mm (32.9" - 40.4") Adjustable	632 mm/ 24.9"
Height (2 drawers)	860 mm/ 33.9"	N/A	802 mm/ 31.6"
Height (3 drawers)	1030 mm/ 40.6"	N/A	N/A
Drawers	2-3 (1 lockable)	1 (lockable)	1-2 (1 lockable)
Vertical shafts for optional horizontal rails	4	4	4
Wheels	Four wheels (diameter 150 mm/ 5.9") with separate brakes	Four wheels (diameter 150 mm/ 5.9") with separate brakes	Three wheels (diameter 50 mm/ 2.0")
Working surface/writing table	Approx. 420 x 600 mm (16.5" x 23.6")		
Additional writing table	397 mm x 250 mm (15.6" x 9.8")		
Reading lamp	Adjustable LED light integrated into the display arm		

**FLOW-i**

Display		
Type	LED touch screen, complete with 11 membrane switches and one rotary knob	
Size	432 mm x 295 mm (17.0" x 11.6")	
Placement	Attached to display arm	
Viewing area	15", 1024x768 pixels with a palette of 512 colors	
Waveforms	Up to 6 waveforms, user configurable	
Trends	<ul style="list-style-type: none"> <li>■ Graphic display, 1 to 24 hour resolution</li> <li>■ Numeric display, 1 to 60 minute resolution</li> </ul>	
Environment	Operating conditions	Non-operating conditions
Ambient temperature	+15°C to +35°C (+60°F to +95°F) (Desflurane: +15°C to +30°C, +60°F to +85°F)	-25°C to +60°C (-15°F to +140°F)
Battery	+15°C to +35°C (+60°F to +95°F)	+5°C to 40°C (40°F to 104°F)
Relative humidity (non-condensing)	15% to 95%	< 95%
Atmospheric pressure	700 hPa – 1060 hPa	470 hPa to 1060 hPa

## FLOW-i

Maximum load			
Accessory/Option	C20, MAX LOAD (KG/LBS)	C30, MAX LOAD (KG/LBS)	C40, MAX LOAD (KG/LBS)
Additional writing table	5/11	5/11	5/11
Drawer	5/11	5/11	5/11
Patient monitor mounting position	13.5/30	13.5/30	13.5/30
Auxiliary O <sub>2</sub> & Suction module mounting position	2.5/5.5	2.5/5.5	2.5/5.5
Parameter box support arm	5/11	5/11	5/11
Working surface/writing table	20/44	5/11	5/11
4 vertical shafts	5 kg/ 11 lbs per shaft	5 kg/ 11 lbs per shaft	5 kg/ 11 lbs per shaft
Horizontal rails for hanging accessories	3/6.6	3/6.6	3/6.6
Additional arm	12/26	12/26	12/26
Backup Gas Rack (incl. full gas cylinders)	34/75	34/75	N/A
Extra backup gas holder (incl. full gas cylinder)	13/29	13/29	12/26
Top shelf	20/44	20/44	20/44
Vaporizer holder	4/8.8	4/8.8	4/8.8
Universal bracket	30/66	30/66	N/A
Universal bracket (C20)	30/66	N/A	N/A
Cable support arm	0.5/1.1	0.5/1.1	0.5/1.1

## FLOW-i

### Standards - Safety and Functionality

Safety	IEC 60601-1 (Class 1, Type B), IEC 60601-1-1, IEC 60601-1-2, IEC 60601-1-8, IEC 60601-2-13, IEC 62304, ISO 8835-2, ISO 8835-3, ISO 8835-4, ISO 8835-5, ISO 5360:2006
Electromagnetic compatibility	IEC 60601-1-2
Respiratory gas monitoring	ISO 21647
Usability	IEC 62366, 60601-1-6
Cleaning	IEC 60601-1, IEC 60601-2-13

#### Classification according to IEC 60601-1:

Class I equipment:	according to the type of protection against electrical shock
Type B equipment:	according to the degree of protection against electrical shock
Continuous operation:	according to the mode of operation (not applicable to the lift, 10% duty cycle)

#### Classification according to EU Medical Directive 93/42/EEC:

The anesthesia system is classified as IIb.

#### Classification according to IEC 60529

Ingress Protection Rating (IP)	IPX1
--------------------------------	------

## FLOW-i

### Power supply

#### Mains power

Mains power	100-120V, 220-240V, AC 50-60Hz
Power consumption (C30)	560 VA (auxiliary power outlet not included)
Power consumption (patient monitor and maximum auxiliary configuration)	1250 VA
Mains fuse	2x4A (230V)/2x8A (110V)
Lift fuse	1A (230V)/2A (110V)
Patient monitor	1A (230V)/2A (110V)

#### Battery

Type	Sealed acid-lead rechargeable
Capacity	38 Ah
Operating time	Approx. 90 minutes
Charging time	Approx. 6 hours

#### Auxiliary power outlets (option)

Power outlet	All auxiliary outlets and the patient monitor outlet are connected to an isolation transformer. Voltage depends on mains power supply		
Type of electrical outlet	Max load from each outlet	Max load total	
3 x IEC outlets	2A (230V)/4A (110V)	2A (230V)/4A (110V)	
1 x IEC patient monitor power cable	1A (230V)/2A (110V)	1A (230V)/2A (110V)	
3 x 15A NEMA 5-15R (Option)	2A-1A-1A (110V)	2A-1A-1A (110V)	

## FLOW-i

### Gas supply inlets and gas outlets

#### Central gas

Supply pressure inlet	Air/O <sub>2</sub> /N <sub>2</sub> O	250-650 kPa/2.5-6.5 bar/ 36-94 PSI
-----------------------	--------------------------------------	---------------------------------------

Hospital central gas supply must be able to deliver a flow of at least 60 l/min at a supply pressure of 2.8 bar (280 kPa, 41 PSI)

Connection standards	<ul style="list-style-type: none"> <li>■ AGA</li> <li>■ DISS</li> <li>■ NIST</li> <li>■ French standard</li> </ul>
----------------------	--

Maximum levels:	Air <ul style="list-style-type: none"> <li>■ H<sub>2</sub>O &lt; 7 g/m<sup>3</sup></li> <li>■ Oil &lt; 0.5 mg/m<sup>3</sup></li> <li>■ Chlorine must not be detectable</li> </ul>	O <sub>2</sub> <ul style="list-style-type: none"> <li>■ H<sub>2</sub>O &lt; 20 mg/m<sup>3</sup></li> </ul>
-----------------	---	--

Maximum inlet gas temperature	<35°C (<95°F)
-------------------------------	---------------

#### Gas supply outlets

O <sub>2</sub> outlet	Dependent on central gas supply pressure or cylinder inlet pressure
-----------------------	---

Air outlet	Dependent on central gas supply pressure or cylinder inlet pressure
------------	---

#### Backup gas supply (option)

Pin Index cylinders (5l)	Electronically measured cylinder pressure, Quick-release system for docking and release
--------------------------	---

Weight and size (backup gas rack)	Approx. 20 kg / 44 lbs excluding gas cylinders, 322 mm x 846 mm x 291 mm (12.7" x 33.3" x 11.5") (WxHxD)
-----------------------------------	--

Cylinder configuration (backup gas rack)	Max 2 cylinders: O <sub>2</sub> /N <sub>2</sub> O or O <sub>2</sub> /Air
--	--

Weight (backup gas holder)	Approx. 13 kg / 29 lbs including gas cylinder
----------------------------	---

Cylinder configuration (backup gas holder)	N <sub>2</sub> O, O <sub>2</sub>
--	----------------------------------

Cylinder pressure, O <sub>2</sub> /Air	Max. 20,000 kPa / 200 bar / 2900 PSI
--	--------------------------------------

Cylinder pressure, N <sub>2</sub> O	Max. 8,000 kPa / 80 bar / 1160 PSI
-------------------------------------	------------------------------------

Cylinder safety valve opening pressure	Air/O <sub>2</sub> and N <sub>2</sub> O	650 kPa/6.5 bar/94 PSI
--	---	------------------------

All gases and anesthetic agents must conform to the European and American Pharmacopeia.



## FLOW-i

### Anesthesia gas scavenging (AGS)

Type	Passive system (including a flow indicator) integrated into the system
Scavenging flow	Minimum 25 l/min, or 10 l/min over the set minute volume, whichever is greater.
Outlet connections	<ul style="list-style-type: none"> <li>■ 30 mm ISO taper</li> <li>■ DISS EVAC</li> <li>■ 12.7 mm / ½" in hose Barb</li> <li>■ 25 mm / 1" Barb</li> <li>■ AGA EVAC</li> <li>■ WAGD-to-Vacuum connector</li> <li>■ 22 mm out. diam. connector and 22 mm int. diam. connection tube</li> </ul>

### Fresh gas flow

Gas mix	Air/O <sub>2</sub>	Electronic Servo controlled
	O <sub>2</sub> /N <sub>2</sub> O	Electronic Servo controlled
Fresh gas flow range	<ul style="list-style-type: none"> <li>■ MAN = 0.3 - 20 l/min</li> <li>■ AUTO = 0.3 - 20 l/min (FGF delivery depending on set MV)</li> <li>■ AFGO = 1.0 - 20 l/min</li> </ul>	
Fresh gas O <sub>2</sub> /air Flow (numerical/bargraph)	Selectable	
Fresh gas O <sub>2</sub> /N <sub>2</sub> O Flow (numerical/bargraph)	Selectable	
Preset O <sub>2</sub> concentration	Air/O <sub>2</sub>	21% - 100% ±5%
	O <sub>2</sub> /N <sub>2</sub> O	28% - 100% ±5%
O <sub>2</sub> Flush	<ul style="list-style-type: none"> <li>■ Approx. 50 l/min</li> <li>■ 2 cmH<sub>2</sub>O expiratory resistance when APL is set to SP</li> </ul>	

## FLOW-i

Breathing system			
Type	Circle system with Volume Reflector		
System volume (incl. absorber, without patient tubings and manual breathing bag)	Approx. 2.9 l		
Maximum volume allowed for patient tubings and optional equipment forming part of the circle system	3000 ml		
Drive gas	O <sub>2</sub>		
CO <sub>2</sub> absorber	<ul style="list-style-type: none"> <li>■ Volume</li> <li>■ Absorbent material</li> </ul>	Approx. 0.7 l Sofnolime™	
Patient tube connections	22/15 mm ISO cone		
Type of material (breathing circuit system)	PPSU (Polyphenylsulphone).		
System compliance (volume of gas lost due to internal compliance - manual mode only)	Approx. 3 ml/cmH <sub>2</sub> O		
Internal resistance	6 cmH <sub>2</sub> O at a flow of 1 l/s		
Manual ventilation			
Electronic APL valve	Spontaneous breathing (SP) and adjustable pressure up to 80 cmH <sub>2</sub> O		
AFGO - Additional Fresh Gas Outlet (option)			
Type	<ul style="list-style-type: none"> <li>■ 22 mm coaxial/15 mm conical outlet connections</li> <li>■ Pneumatic powered SW controlled (from control panel)</li> </ul>		
Emergency backup ventilation			
Emergency APL valve	SP - 80 cmH <sub>2</sub> O		
O <sub>2</sub> emergency flow	0 - 10 l/min		

## FLOW-i

Ventilator	
Type	Pneumatic powered Servo controlled
Patient range	Neonatal to Adult
Ventilation modes	<ul style="list-style-type: none"> <li>■ Manual/Bag</li> <li>■ AFGO (option)</li> <li>■ Volume Control (VC)</li> <li>■ Pressure Control (PC)</li> <li>■ Pressure Support (PS, option)</li> <li>■ Pressure Regulated Volume Control (PRVC, option)</li> <li>■ Synchronized Intermittent Mandatory Ventilation (SIMV, option)</li> </ul>
Tidal volume (VT)	20 - 2000 ml $\pm$ 10% of actual value or 10 ml, whichever is greater
Tidal volume setting range	Infant range: 20 - 350 ml, resolution 1 ml Adult range: 100 - 2000 ml, resolution 10 ml
Inspiratory pressure (Pressure controlled modes)	0 - 120 cmH <sub>2</sub> O <span style="float: right;"><math>\pm</math> 15% or <math>\pm</math> 2 cmH<sub>2</sub>O, whichever is greater</span>
Inspiratory pressure setting range	Infant range: 0 - 80 cmH <sub>2</sub> O, resolution 1 cmH <sub>2</sub> O Adult range: 0 - 120 cmH <sub>2</sub> O, resolution 1 cmH <sub>2</sub> O
Compressible volume compensation	Yes
Inspiratory flow	Maximum 3.3 l/s (200 l/min)
Breathing frequency	4 - 100 $\pm$ 1 breaths/minute
I:E (VC, PC)	1:10 - 4:1
PEEP	0 - 50 cmH <sub>2</sub> O
Trigger	Flow / Pressure
Inspiratory pause (VC)	0 to 30% or 0 - 1.5 s

## FLOW-i

Respiratory monitoring	
Administered breaths	1-100 $\pm$ 1 breath/minute
Loops	<ul style="list-style-type: none"> <li>■ Flow – Volume</li> <li>■ Volume – Pressure</li> </ul> <p>Additional display options include having a reference loop and/or the last two loops shown together with the real-time loop</p>
Inspiratory Minute Volume	0.3 - 60 l/min $\pm$ 15% or $\pm$ 15 ml multiplied by the breathing frequency, whichever is greater
Expiratory Minute Volume	0.3 - 60 l/min $\pm$ 15% or $\pm$ 10 ml multiplied by the breathing frequency, whichever is greater
Inspiratory Tidal Volume	5 - 2000 ml
Accuracy Insp. Tidal Volume	$\pm$ 4 ml (5-20 ml range) $\pm$ 15% or 15 ml, whichever is greater (20-2000 ml range)
Expiratory Tidal Volume	5 - 2000 ml
Accuracy Exp. Tidal Volume	$\pm$ 4 ml (5-20 ml range) $\pm$ 15% or 10 ml, whichever is greater (20-2000 ml range)
Mean Airway Pressure	0 – 100 cmH <sub>2</sub> O
Peak Airway Pressure	0 - 140 cmH <sub>2</sub> O
End Expiratory Airway Pressure	-40 – 100 cmH <sub>2</sub> O
Airway Pressure	-30 to 140 cmH <sub>2</sub> O
Airway pressure accuracy (applicable to all pressure measurements)	$\pm$ 5% of actual value or $\pm$ 2 cmH <sub>2</sub> O, whichever is greater

## FLOW-i

Alarms	
Airway pressure: High	16 - 120 cmH <sub>2</sub> O
Expiratory Minute Volume: High	0.5 - 60 l/min
Expiratory Minute Volume: Low	0.01 - 40 l/min
Excessive leakage (automatic mode only)	The difference between the maximum and minimum pressures during inspiration is too low
Continuous APL pressure (manual mode only)	Activated when the measured airway pressure exceeds predefined values for more than 15 seconds. Predefined values depend on current APL setting.
High continuous pressure	The measured airway pressure is above set PEEP + 15 cmH <sub>2</sub> O for more than 15 seconds.
Regulated Pressure Limited (PRVC mode only)	Permissible pressure limits pre-set tidal volume
PEEP: High	0 - 55 cmH <sub>2</sub> O
PEEP: Low	0 - 47 cmH <sub>2</sub> O
Respiratory Rate: High	1 - 140 B/min and OFF
Respiratory rate: Low	1 - 140 B/min and OFF
Apnea (manual mode only)	5 - 45 s. and OFF
Long apnea (manual mode only)	No breath detection for up to 120 s
Backup ventilation	Pressure controlled administered breath detected in pressure support backup mode due to time out of the backup respiratory rate parameter.
Check breathing circuit	Activated when inspiratory and expiratory pressures fail to meet preset requirements
Battery operation - battery capacity unknown	Connection error; unable to estimate battery time.
Limited battery capacity	Less than 18 minutes left of battery operation.
No battery capacity	Less than 3 minutes left of battery operation.
Water trap missing/Replace water trap	The gas analyzer has detected that a water trap replacement is needed

## FLOW-i

Gas alarms	Lower limit setting range	Upper limit setting range
Inspiratory O <sub>2</sub> concentration alarm	18 - 99%	23 - 99% and OFF
Expiratory O <sub>2</sub> concentration alarm	10 - 99% and OFF	13 - 99% and OFF
Inspiratory CO <sub>2</sub> concentration alarm	---	0.1 - 10% and OFF
Expiratory CO <sub>2</sub> concentration alarm	0.1 - 9.9% and OFF	0.1 - 10% and OFF
Inspiratory AA concentration alarm	0.1 - 5.0% and OFF (ISO) 0.1 - 8.0% and OFF (SEV) 0.1 - 18% and OFF (DES)	0.1 - 5.0% (ISO) 0.1 - 8.0% (SEV) 0.1 - 18% (DES)
Expiratory AA concentration alarm	0.1 - 4.0% and OFF (ISO) 0.1 - 6.0% and OFF (SEV) 0.1 - 12% and OFF (DES)	0.1 - 5.0% and OFF (ISO) 0.1 - 8.0% and OFF (SEV) 0.1 - 18% and OFF (DES)
Agent mixture: MAC > 3	The MAC of the secondary agent is $\geq 0.6$ and the total MAC value is $\geq 3$	
High continuous MAC	Measured MAC exceeds time limit: MAC > 2.2; from starting a New Case, until 15 minutes after the first vaporizer activation. MAC > 1.8 otherwise <sup>1</sup>	
Agent mixture	The second agent is MAC $\geq 0.6$ and the total MAC value is <3	
Insp N <sub>2</sub> O: High	Inspiratory N <sub>2</sub> O gas supply >80%	

1. In order to reflect time lag owing to pharmacokinetics between alveolar concentration and the target organ brain concentration, the high continuous MAC alarm activation and deactivation are delayed.

## FLOW-i

Vaporizer		
Agents	Isoflurane, Sevoflurane and Desflurane	
Type	Electronic Injector	
Weight (full)	Approx. 3.2 kg / 7.1 lbs	
Dimensions (mm / inch.)	70 x 215 x 178 (2.8" x 8.5" x 7.0")	
Capacity	300 ml	
Residual capacity	30 ml (triggering the low level alarm)	
Setting range	Isoflurane	0, 0.3-5%, OFF
	Sevoflurane	0, 0.3-8%, OFF
	Desflurane	0, 1.0-18%, OFF
Accuracy	±15% of set value or ±5% of maximum possible user setting (whichever is greater)	
Filling system	Isoflurane	Maquet filling adapter
	Sevoflurane	Quik Fil <sup>®</sup> and Maquet filling adapter
	Desflurane	SAFE-FIL <sup>™</sup>
Vaporizer filling speed	Approx. 4 ml/s	
Overfill protection	Overfilling prevention systems built into the vaporizer	
Tank liquid level	Optical and electronic	
Agent usage tracking	<ul style="list-style-type: none"> <li>■ Individual agent usage for each of the last 20 patient cases</li> <li>■ Total agent usage since last user reset</li> </ul>	

## FLOW-i

Patient gas analyzer		
Measuring technology	O <sub>2</sub> Agents, CO <sub>2</sub> , N <sub>2</sub> O	Paramagnetic sensor IR sensor
Warm-up time	ISO standard accuracy	Within 60 s
	Full accuracy	Within 10 minutes
Sampling flow	200 ml/min (Return to circuit)	
Measured parameters		
Resp. rate	2 - 100 breaths/minute	
Respiration rate measurement accuracy	<60 breaths/minute	± 1 breath/minute
	>60 breaths/minute	Unspecified
Gas measuring range	O <sub>2</sub>	0 - 100%
	N <sub>2</sub> O	0 - 80%
	CO <sub>2</sub>	0 - 10%
	Isoflurane	0 - 5%
	Sevoflurane	0 - 8%
	Desflurane	0 - 18%
Inspiratory and End-Tidal O <sub>2</sub> Concentration	Yes	
Inspiratory and End-Tidal CO <sub>2</sub> Concentration	Yes	
Inspiratory and End-Tidal N <sub>2</sub> O Concentration	Yes	
Inspiratory and End-Tidal Agent Concentration	Yes	
Automatic AA identification	Yes. Agent mixtures are displayed containing a Primary and Secondary agent (classification depending on relative agent concentration)	



## FLOW-i

### Patient suction and auxiliary O<sub>2</sub> module (option)

Weight	Approx. 2.2 kg / 4.9 lbs
Patient suction supply pressure (Air)	300-650 kPa/3-6.5 bar/44-94 PSI
Auxiliary O <sub>2</sub> supply pressure	300-650 kPa/3-6.5 bar/44-94 PSI
Auxiliary O <sub>2</sub> flow range	0 - 10 l/min
Max. vacuum (suction)	-90 kPa when gas supply is 6.5 bar
Max. suction flow	90 l/min when gas supply is between 5.0 and 6.5 bar

### Misc. optional equipment

#### Vaporizer holder

Weight	Approx. 0.8 kg / 1.8 lbs
Weight including full vaporizer	Approx. 4.0 kg 8.8 lbs
Dimensions	90 x 220 x 215 mm / 3.5" x 8.7" x 8.5" (W x H x L)

#### Universal bracket for C20

Weight	Approx. 1.5 kg / 3.3 lbs
Maximum load	30 kg / 66 lbs

#### EVAC Restrictor

Weight	Approx. 60 g / 2 oz
Dimensions	32 x 48 x 48 mm / 1.3" x 1.9" x 1.9" (W x H x L)

#### Manual breathing bag support arm

Weight	Approx. 1.0kg / 2.2 lbs
Maximum load	1.0 kg / 2.2 lbs

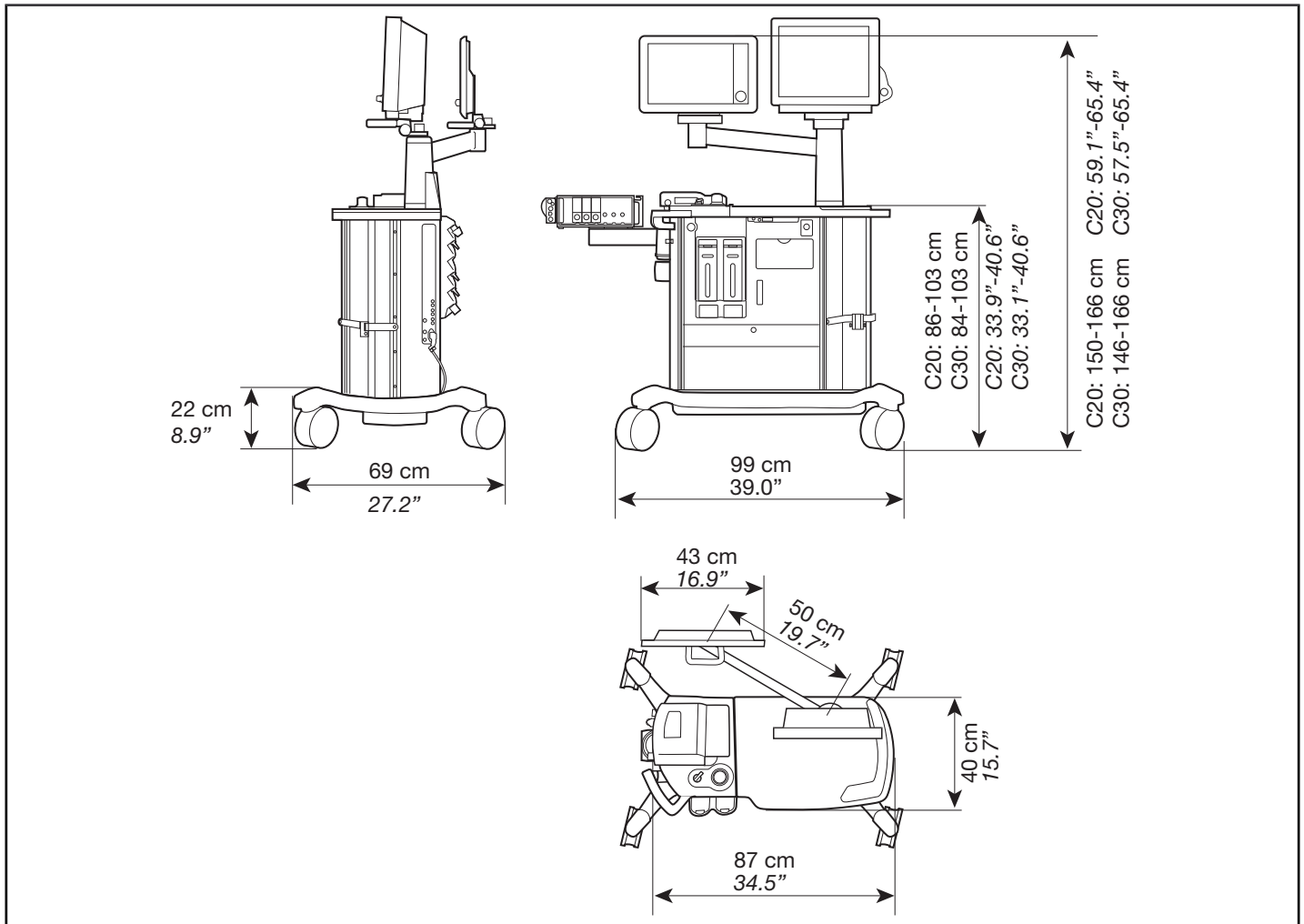
### External communication

Serial ports	2 x RS232	FCI protocol
USB	1	
Video out	1 VGA	
Ethernet	1 Network connection for service use	

The products may be pending regulatory approvals to be marketed in your country. Contact your MAQUET representative for more information.

# FLOW-i

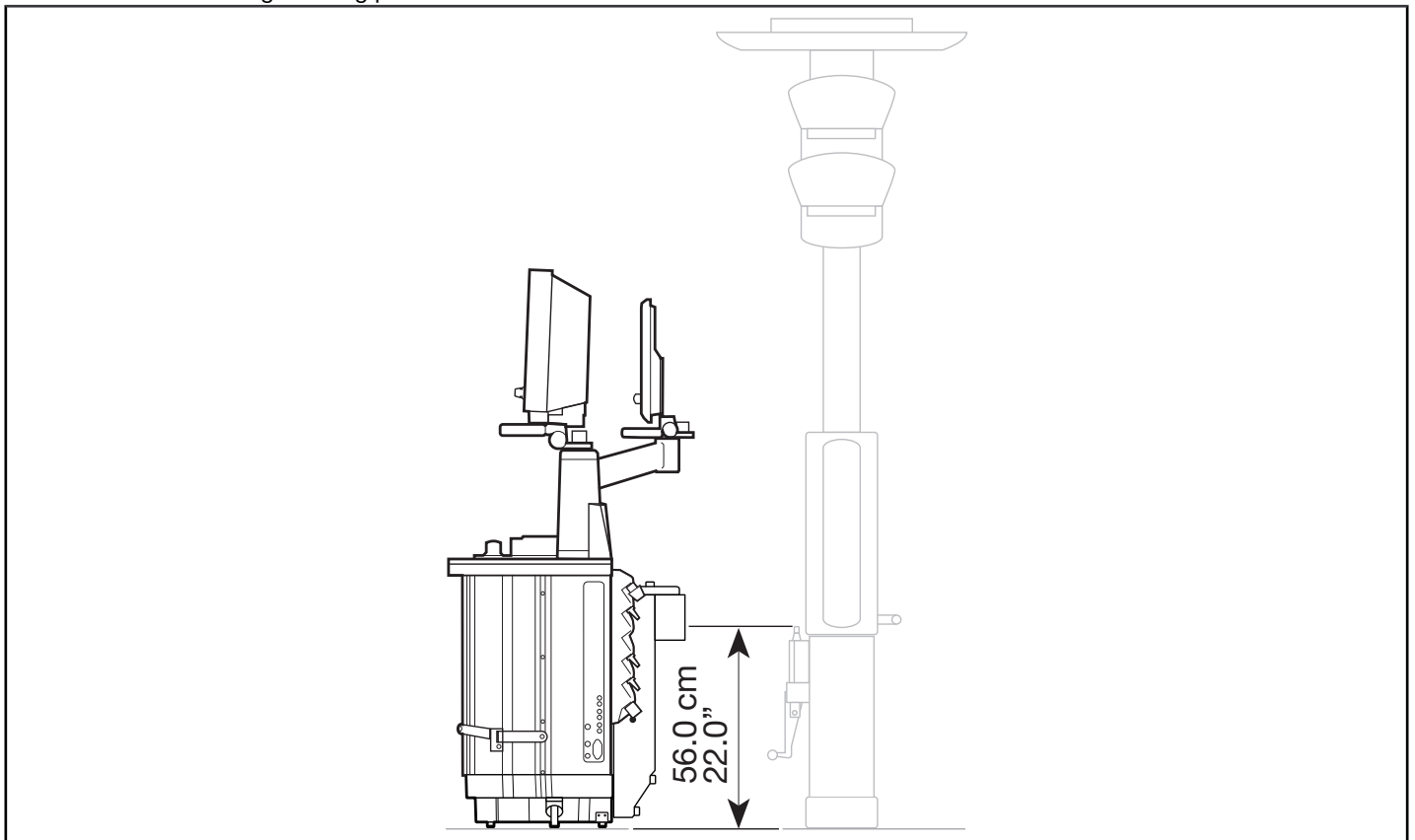
## DIMENSIONAL DRAWINGS (SHOWING C20 MODEL)



## FLOW-i

### DIMENSIONAL DRAWING (SHOWING C40 MODEL).

Several ceiling pendant solutions are available. The minimum height requirement of the pendant interface is 56.0 cm / 22.0" relative to the floor level when using a ceiling pendant.



# MAQUET

## GETINGE GROUP

Maquet Critical Care AB  
Röntgenvägen 2  
SE-171 54 Solna, Sweden  
Phone: +46 (0) 8 730 73 00  
[www.maquet.com](http://www.maquet.com)

**For local contact:**  
Please visit our website  
[www.maquet.com](http://www.maquet.com)

GETINGE GROUP is a leading global provider of products and systems that contribute to quality enhancement and cost efficiency within healthcare and life sciences. We operate under the three brands of ArjoHuntleigh, GETINGE and MAQUET. ArjoHuntleigh focuses on patient mobility and wound management solutions. GETINGE provides solutions for infection control within healthcare and contamination prevention within life sciences. MAQUET specializes in solutions, therapies and products for surgical interventions, interventional cardiology and intensive care.