DEPARTMENT	EQUIPMENT/SERVICES	QUANTITY
	"Intensive Care Ventilator for premature infants and children"	

BIL	SPECIFICATION		Compliance			Remark
			YES	NO	(Catalogue/User Manual)	
1	**APPLICATION:**					
1.1	To provide various modes of ventilatory support for premature infants, neonates and children in intensive care units.		YES			
1.2	Intensive care ventilator incorporates with high performance pneumatics and dual-microprocessor electronics		YES			
2	**PATIENT SELECTION:**					
2.1	Very small premature infants, neonates and children weighing up to 30kg		YES			
3	**VENTILATION MODES AND RANGES OF VENTILATION PARAMETERS:**					
3A	**Invasive Ventilation IV:**		Yes			
	Modes: IPPV/IMV, S-IPPV (PSV-SIPPV), S-IMV (PSV-SIMV), CPAP, HFO					
3.1	**CPAP**		YES			
3.1.1	Backup (apnoe breaths)	off; 1 .. 5	YES			
3.2	**IPPV/IMV**		YES			
3.2.1	P Insp (cmH_2O)	4 .. 60	YES			
3.2.2	PEEP (cmH_2O)	0 .. 30	YES			
3.2.3	Flow Insp (l/min)	1 .. 32	YES			
3.2.4	Flow Exsp (l/min)	2 .. 10	YES			
3.2.5	Freq/Freq Backup (BPM)	6 .. 200	YES			
3.2.6	T Insp	0.10 .. 2.00	YES			
3.2.7	I:E	9 : 1 .. 1 : 99	YES			
3.2.8	VT Limit (ml)	off; 1 .. 200	YES			
3.2.9	FiO_2 (%)	21 .. 100	YES			
3.2.10	T_{EXP} (sec)	0.2 .. 9,90	YES			
	ASSIST Modes		Yes			
3.3	**SIMV**		YES			
3.3.1	P Insp (cmH_2O)	4 .. 60	YES			
3.3.2	PEEP (cmH_2O)	0 .. 30	YES			
3.3.3	I:E	9 : 1 .. 1 : 299	YES			
3.3.4	T_{EXP} (sec)	0.2 .. 29,90	YES			
3.3.5	(SIMV) P support (cmH2O)	off; 6 .. 60	YES			
3.4	**S-IPPV**		YES			
3.4.1	P Insp (cmH_2O)	4 .. 60	YES			
3.4.2	PEEP (cmH_2O)	0 .. 30	YES			
3.4.3	Trig Vol (% Vti)	5 .. 30	YES			
3.4.4	Trigger (l/min)	0,1 .. 1	YES			
3.4.5	Freq/Freq Backup (BPM)	2 .. 100	YES			
3.4.6	VTG (ml)	off; 0,1 .. 200	YES			
3.4.7	I:E	9 : 1 .. 1 : 299	YES			
3.4.8	T_{EXP} (sec)	0.2 .. 29,90	YES			
3.5	**PSV**		YES			
3.6	**Tidalvolume Guarantee in:** **SIPPV, SIMV, SIPPV PSV, SIMV PSV, SIMV support, SIMV PSV support, HFO**		YES			
3.7	**HFO**		YES			
3.7.1	P Mean (cmH_2O)	0 .. 40	YES			
3.7.2	HF Freq (Hz)	5 .. 20	YES			
3.7.3	HF Ampl (cmH_2O)	5 .. 100	YES			
3.7.4	I:E	25:75 .. 50:50	YES			
3.7.5	Freq Rec (recruitment) (1/std)	off; 1 .. 59	YES			
	Freq Rec (recruitment) (1/min)	continous to 1 .. 60	YES			

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			YES	NO	(Catalogue/User Manual)	
3.7.7	T Rec (recruitment insp.) (s)	0,1 .. 5	YES			
3.7.8	P Rec (recruitment pressure) (cmH_2O)	1 .. 40	YES			
3.7.9	VTG (ml)	off; 0,1 .. 30	YES			
3.7.10	Manual ventilatory drive in HFO (optional)		YES			
3.8	**HFO Combinations:**		YES			
3.8.1	**with VTG (Tidalvolume Guarantee)**		YES			
3.8.2	**HFO according diaphram-principle**		YES			
3.8.3	**HFO with opportunity of spontaneous breathing during operation**		YES			
3.8.4	**Active HFO up to 12 kg bodyweight (double membrane system)**		YES			
3.9	**CLAC (Closed Loop Automatic Oxygen Control) with**		YES			
	SIPPV, SIMV, SIPPV PSV, SIMV PSV, SIMV support, SIMV PSV support, HFO		YES			
3B	**Non Invasive Ventilation NIV: via Neojet H+L/ HiFlow H+L/ Closed systems**		Yes			
	Modes: nCPAP/ snCPAP / snIPPV / nIPPV/ nHFO / HiFlow H+L					
3.12	**nCPAP/snCPAP**		YES			
3.12.1	BaseFlow (L/min)	6 .. 20	YES			
3.12.2	BaseFlow (L/min)	automatic flow regulation	YES			
3.12.3	Abdominal Trigger	off, 1 - 30	YES			
3.13	**nIPPV / snIPPV**		YES			
3.13.1	Tinsp (sec)	0.1 - 15	YES			
3.13.2	BaseFlow (L/min)	6 .. 20	YES			
3.13.3	BaseFlow (L/min)	automatic flow regulation	YES			
3.13.4	I:E	74 : 1 - 1 : 299	YES			
3.13.5	PEEP (cmH_2O)	0 .. 15	YES			
3.13.6	P Insp (cmH_2O)	5 .. 30	YES			
3.13.7	T_{EXP} (sec)	0.2 .. 29.90	YES			
3.13.8	Abdominal Trigger	off, 1 - 30	YES			
3.14	**nHFO (Pressure controlled Oscillation)**		YES			
3.14.1	P Mean (cmH_2O)	0 .. 20	YES			
3.14.2	HF Freq (Hz)	5 .. 20	YES			
3.14.3	HF Ampl (cmH_2O)	2 .. 50	YES			
3.14.4	I:E	25:75 .. 50:50	YES			
3.14.9	Manual ventilatory drive in HFO		YES			
3.15	**HiFlow H+L**		YES			
3.15.1	Pmax (cmH2O)	10 .. 35	YES			
3.15.2	Flow (L/min)	2 .. 30	YES			
3.16	**CLAC (Closed Loop Automatic Oxygen Control) with**		YES			
	nCPAP/ nIPPV/ nHFO / HiFlow H+L		YES			
4	**PRESSURE LIMITATION:**					
4.1	Mechanical excess pressure valve	P_{limMax} = 100 cmH_2O	YES			
4.2	Software pressure limitation	> 10cmH_2O above adjusted Pinsp, emergency air valve opens	YES			
5	**CONTROL SYSTEM:**					
5.1	Continuouse flow		YES			
5.2	Time controlled		YES			
5.3	Pressure limited		YES			
5.4	Trigger principle	Volume Adapted Flow Trigger	YES			
5.5	Trigger delay	45 msec	YES			
5.6	Flowsensor	Hot Wire Anemometry	YES			
5.7	Inspirational O2-concentration	21 – 100 %	YES			
5.8	Oxygen shower	23 – 100 % for max. 2 min.	YES			
5.9	Oxygen shower related on FiO2 adjustement (FiO2 + Δflush)		YES			
6	**PARAMETERS:**					
6.1	Inspiratory peak pressure	4 to 60 cm H2O	YES			
6.2	PEEP/CPAP	0 to 30 cm H_2O	YES			
6.3	Frequency	2 – 200 1/min	YES			
6.4	HFO-frequency	From 5 Hz to 20 Hz	YES			
6.5	Inspiration time	From 0,1 sec to 2,00 sec	YES			
6.6	Inspiration flow	From 1 l/min to 32 l/min	YES			
6.7	Base flow	From 2 l/min to 32 l/min	YES			
6.8	Recruitment in HFO		YES			
6.9	Amplitude HFO 100 cm H2O		YES			

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			YES	NO	(Catalogue/User Manual)	
7	**MONITORING:**					
7.1	Graphic display, size 12" inch TFT		YES			
7.2	Removable touch screen		YES			
7.3	Type of displayed waveforms					
7.3.1	Pressure		YES			
7.3.2	Flow		YES			
7.3.3	Volume		YES			
7.3.4	Plethysmogramm					
7.4	Type of loops displayed :					
7.4.1	Flow/pressure		YES			
7.4.2	Volume/pressure		YES			
7.4.3	Flow/Volume		YES			
7.4.4	Freezing function of the loops		YES			
7.5	Lung function					
7.5.1	Compliance		YES			
7.5.2	C_{20}/C		YES			
7.5.3	Resistance		YES			
7.5.4	Trending		YES			
7.5.4.1	Trending of the graphs up to 72 h		YES			
7.5.4.2	Trendings of the numerics up to 72 h		YES			
8	**MEASUREMENT RANGE:**					
8.1	Inspiration Oxygen content FiO2	From 18 % to 100 %	YES			
8.2	Pressure, Pmax	- 60 to 100 cm H_2O	YES			
8.3	Peep, Pmean	- 60 to 100 cm H_2O	YES			
9	**RESISTANCE VALUES:**					
9.1	System resistance at 30l/min	< 20 mbar/l/s	YES			
9.2	Inspiratory resistance	< 12 mbar/l/s	YES			
9.3	Expiratory resistance	< 8 mbar/l/s	YES			
10	**ACCURACY OF VALUE DISPLAY:**					
10.1	**Peak pressure (Ppeak)**					
10.1.1	Measurement range	-60 - 100 cmH_2O	YES			
10.1.2	Resolution	0.1 cmH_2O	YES			
10.1.3	Accuracy	± 4%	YES			
10.2	**Mean pressure (Pmean)**					
10.2.1	Measurement range	-60 - 100 cmH_2O	YES			
10.2.2	Resolution	0.1 cmH_2O	YES			
10.2.3	Accuracy	± 4%	YES			
10.3	**Positive endexpiratory pressure (PEEP)**					
10.3.1	Measurement range	-60 - 100 cmH_2O	YES			
10.3.2	Resolution	0.1 cmH_2O	YES			
10.3.3	Accuracy	± 4%	YES			
10.4	**Minute volume (MV)**					
10.4.1	Measurement range	0 - 99.9 l	YES			
10.4.2	Resolution	10 ml	YES			
10.4.3.	Accuracy	± 8%	YES			
10.5	**Tidal volume (Vti, Vte)**					
10.5.1	Measurement range	0 - 999 ml	YES			
10.5.2	Resolution	0.1 ml	YES			
10.5.3	Accuracy	± 8%	YES			
10.6	**Tube leakage (Leak)**					
10.6.1	Measurement range	10 - 100 %	YES			
10.6.2	Resolution	1%	YES			
10.6.3	Accuracy	± 10%	YES			
10.7	**Dynamic compliance (Cdyn)**					
10.7.1	Measurement range	0 - 500 ml/cmH_2O	YES			
10.7.2	Resolution	0.1 ml/cmH_2O	YES			
10.7.3	Accuracy	± 8%	YES			

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			YES	NO	(Catalogue/User Manual)	
10.8	**Airway resistance**					
10.8.1	Measurement range	0 - 5000 cmH2O/l/s	YES			
10.8.2	Resolution	1 $cmH_2O/l/s$	YES			
10.8.3	Accuracy	± 8%	YES			
10.9	**Oxygen concentration (FiO_2)**					
10.9.1	Measurement range	18 - 100 %	YES			
10.9.2	Resolution	1%	YES			
10.9.3	Accuracy	± 3% (Vol.)	YES			
11	**OPERATING DATA**					
11.1	**Power supply**					
11.1.1	100 V_{AC} + 10% / -15%, 50/60 Hz		YES			
11.1.2	240 V_{AC} + 10% / -15%, 50/60 Hz		YES			
11.2	**Current consumption**					
11.2.1	for 240 V - 0.85 A		YES			
11.2.2	for 100 V - 2.0 A		YES			
11.3	**Power input**	max. 160 VA	YES			
11.4	**Fuse**					
11.4.1	at 230 V - T2.5A DIN 41571 (2x)		YES			
11.4.2	at 100 V - T2.5A DIN 41571 (2x)		YES			
11.5	**Protect against electric shock**	class I, type B Type B = "Body" applied part for use on body but not on opened heart according to DIN EN 60601-1	YES			
12	**GAS CONNECTIONS:**					
12.1	Compressed air supply	2.0 - 6.5 hPa x 1000 (bar)	YES			
12.2	Oxygen supply	2.0 - 6.5 hPa x 1000 (bar)	YES			
13	**SENSORS:**					
13.1	**Flow sensor**					
13.1.1	Measurement method	hot-wire anemometry	YES			
13.1.2	Additional Dead space	0.6 ml	YES			
13.1.3	Measurement range	up to 32 l/min	YES			
13.1.4	Opportunity for calibration during operation		YES			
13.2	**Oxygen sensor**					
13.2.1	Type	fuel cell	YES			
13.3	**SpO2 Sensor**		YES			
13.3.1	Type	Masimo SET Technologie	YES			
14	**INTERFACES:**					
14.1	Serial connection COM 1 (RS232)	HULBUS	YES			
14.2	Serial connection COM 2 (RS232)	VueLink	YES			
14.3	Ethernet interface	Only for service tasks	YES			
14.4	USB Connection	Datalogging of Monitoring Values, Service	YES			
14.5	Masimo Interface uSet	Masimo SpO2 Intercface	YES			
15	**ENVIRONMENTAL CONDITIONS:**					
15.1	**During operation**					
15.1.1	Temperature	15 - 35° C	YES			
15.1.2	Air pressure	700 - 1060 hPa	YES			
15.1.3	Relative humidity	30 - 90 %, non-condensing	YES			
15.2	**During storage and transport**					
15.2.1	Temperature	-20 - 60° C	YES			
15.2.2	Air pressure	500 - 1060 hPa	YES			
15.2.3	Relative humidity	10 - 90 %, non-condensing	YES			
16	**ALARMS:**					
16.1	Automatic alarm adjustment relative to the settings		YES			
16.2	Alarmlog, displaying up to 3000 Alarms during operation		YES			
16.3	Eventlog, displaying all informations about ventilation and Alarms, up to 3000		YES			
16.4	Adjustable Alarmdelay					
16.5	Adjustable Alarmsounds					
16.6	Adjustable Alarmloudness					
17	**AUTOMATIC CALIBRATION**					
17.1	Automatic O2 Calibration during ventilation, without interruption of the ventilation		YES			

BIL	SPECIFICATION	Compliance			Remark
		YES	NO	(Catalogue/User Manual)	
18	**AUTOMATIC Systemtest**				
18.1	Automatic Systemtest, to verify right assembling and proper function	YES			
19	**POWER REQUIREMENTS :**				
19.1	Power supply: 100-240 VAC 50/60 Hz.	YES			
19.2	Shall have back-up power supply. There should be a built in battery back-up possibility for at least 180 minutes (in conventional modes), 60 minutes in HFOV	YES			
20	**Dimensions and weight:**				
20.1	W x H x D 30.5 cm x 38.5 cm x 39 cm	YES			
20.2	Weight 22 kg	YES			
21	**WARRANTY SERVICE AND MAINTENANCE SUPPORT :**				
21.1	1 year warranty inclusive spare part and labour against manufacturer defects.				
21.2	One year free preventive maintenance service (minimum 2 services).				
22	**TRAINING AND OPERATION MANUAL :**				
22.1	Training should be provided at site for application operation and user maintenance of the equipment.				
22.2	On site training to be provided up on installation and commissioning of				
22.5	1 set of service manual	YES			
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