

Function Tester

TBH-400



Testing system for function tests of clinical thermometer (DIN EN ISO 80601-2-56), cardiac output-, invasive (IEC 60601-2-34) and non-invasive blood pressure devices (IEC 60601-2-30)



- temperature output from 0 – 70 °C
- output of several NIBP signals
- approved for calibration on medical thermometer
- user specific language setting
- accumulator operated device in a suitcase
- dynamic and static IBP signal output
- 4 different cardiac outputs selectable

Technical Data

Mains voltage:	83 – 264 V ac, 50 / 60 Hz or internal accumulator operation max. 25 VA	Invasive blood pressure:	5 or 40 $\mu\text{V/V}$ / mmHg [V(monitor)]
Nominal power:	max. 25 VA	Static signals:	0 - 400 mmHg in 1 mmHg steps
Protection class:	internal power supply	Dynamic signals:	± 1 mmHg
Environmental temperature:	+ 5 - +40 °C	ARP 120 / 80 mmHg	aorta radial pressure
Storage temperature:	-10 - +50 °C	AFP 130 / 70 mmHg	aorta femoral pressure
Timer:	10 – 60 min in 10 min steps, ± 1 sec	ZVP 10 / 0 mmHg	central vein pressure
Interface:	1 x RS-232 for PC connection	PAP 25 / 10 mmHg	pulmonary aorta pressure
Testing device connections:	9 sockets 4 mm	PAWP 10 / 0 mmHg	pulmonary-ast-wedge-position
Digital display:	4 x 16 char display	LVP 10 / 0 mmHg	left ventricle pressure
Keyboard:	8 key foil keyboard	LAP 5 / 0 mmHg	left atrium pressure
Accessories:	1 x RS-232 interface cable, charger or power supply	RVP 25 / 0 mmHg	right ventricle pressure
Mechanical data:	light weight metal case IP20	RAP 5 / 0 mmHg	right atrium pressure
Dimensions:	140 x 220 x 30 mm (W x H x D)	Arrhythmia:	aorta damped 110 / 80 mmHg aorta disturbed 170 / 20 mmHg
Weight:	approx. 6,5 kg (incl. suitcase and accessories)	Puls rates:	30 - 150 bpm in 10 bpm steps ± 2 bpm
Temperature:	0 - 70 °C in 1 °C steps, ± 1 °C 20 - 50 °C in 0,1 °C steps, $\pm 0,1$ °C YSI 400 / 700 compatible	Non invasive blood pressure:	0,1 % fullscale
Temperature [°C]:	20,40 / 21,70 / 23,00 / 24,30 / 25,60 / 26,90 28,20 / 29,50 / 30,80 / 32,10 / 33,40 / 34,70 36,00 / 37,30 / 38,60 / 39,90 / 41,20 / 42,50 43,80 / 45,10 / 46,40 / 47,70 / 49,00 $\pm 0,01$ °C	Manometer function:	0 - 750 mmHg in 0,1 mmHg steps
Cardiac output:	3, 5, 7, 9 l/min, $\pm 0,5$ l/min	Leakage rate measurement:	1 - 15 min in 1 min steps, ± 1 sec
Blood temperature:	37 °C, $\pm 0,1$ °C	Simulation mode:	oscillometric
Injectate temperatur:	4, 12, 20 °C, $\pm 0,2$ °C	Puls rate:	80 bpm, ± 2 bpm
Injectate volume:	10 ml	Reference volume:	100 / 500 ml
		Systole / Diastole:	120/80, 180/120, 90/50 mmHg ± 3 mmHg
		Accessories:	hand calibration pump adapter block with connection set reference pressure volume 100 / 400 ml
		Selectable languages:	german, english, french, polish spanish, italian, portuguese, turkish

temperature – simulator

The simulation of temperature levels is based on precision resistances with fixed output values, that can be adjusted in 1°C steps (0-70°C) and 0,1°C steps (20-50°C). Accurate resistance values, like for the thermistorprobe series YSI 400/ 700, are implemented for simulation.

cardiac output – simulator

By changing the temperature / resistance ratio send to the monitor, the cardiac output can be simulated. You can choose between four different output values and three injectate temperatures. The blood temperature is fixed at 37°C and the injectate volume to 10ml.

invasiv – blood pressure – simulator

Static and dynamic signals can be simulated by changing the values send from the IBP modules to the transducer. You can choose between various signal styles and arrhythmia. In addition to that, the pulse rate can be adjusted in 10bpm steps from 30 to 150 bpm.

non invasiv – blood pressure – simulator

The blood pressure simulator comes with a precision hand pump, an adapter block, hoses and two reference pressure volumes. Static pressures can be generated via the hand pump and are simultaneously displayed in the simulator. Three different systole / diastole combinations can be simulated via an oscillometric method. The pulse rate is fixed at 80bpm. There is a leakage rate measurement and a manometer function included.

(The specified measuring accuracy refers to the measuring element. Technical modifications and errors reserved. 06/2018)

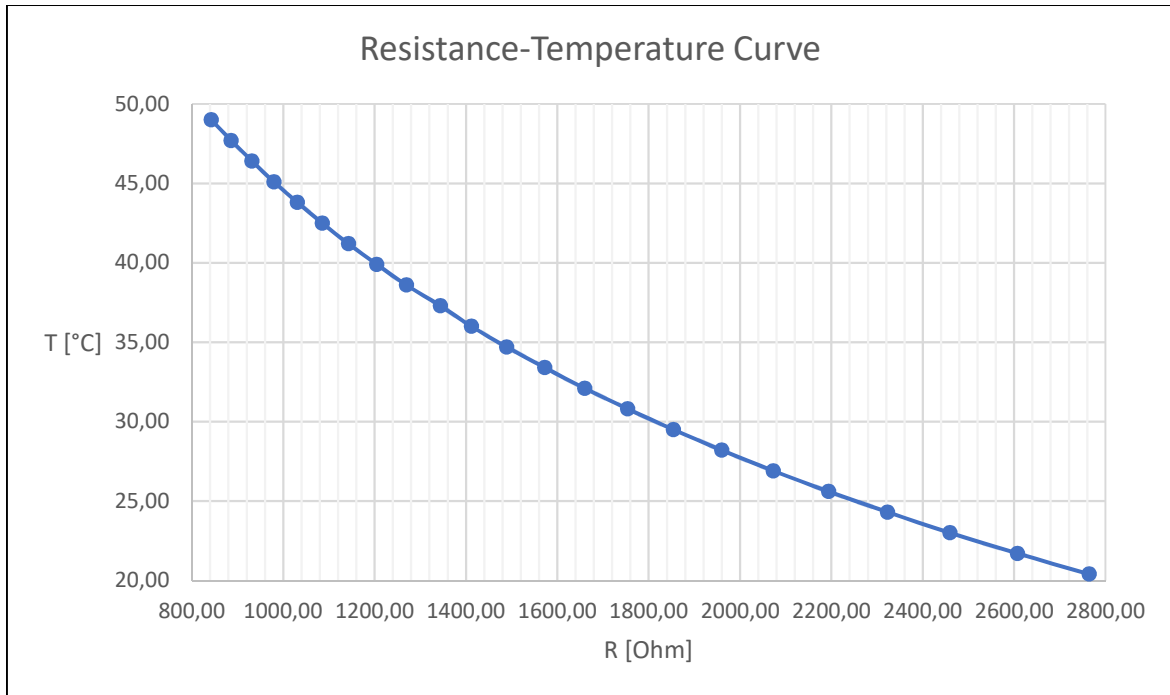


深圳为尔康科技有限公司 联系人：曾祥满 手机：13632925349

QQ：274798107 电话：0755-28896837 地址：深圳市龙岗区沙平北路111号608A

网址：www.medicalQC.com 邮箱：szchina1718@163.com

Technical Data



R [Ohm]	T [°C]
2764,40	20,40
2607,40	21,70
2460,00	23,00
2323,40	24,30
2194,40	25,60
2073,20	26,90
1960,40	28,20
1854,50	29,50

R [Ohm]	T [°C]
1754,20	30,80
1660,20	32,10
1572,60	33,40
1489,60	34,70
1412,00	36,00
1344,20	37,30
1269,80	38,60
1204,90	39,90

R [Ohm]	T [°C]
1143,00	41,20
1085,50	42,50
1031,20	43,80
979,59	45,10
931,80	46,40
886,12	47,70
842,80	49,00

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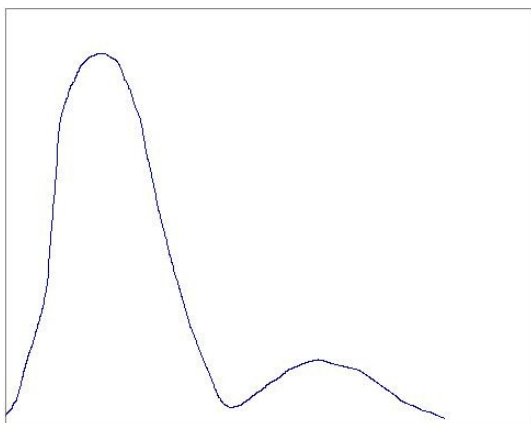


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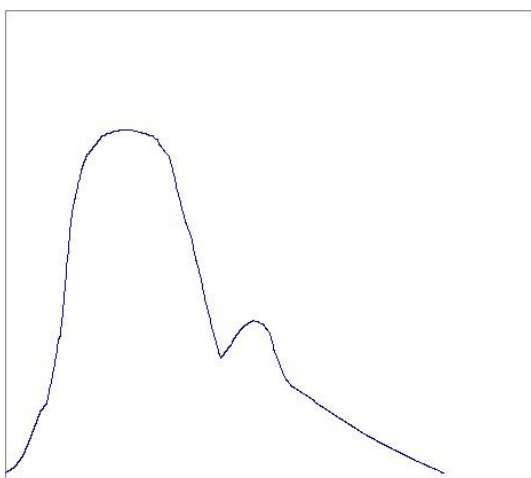
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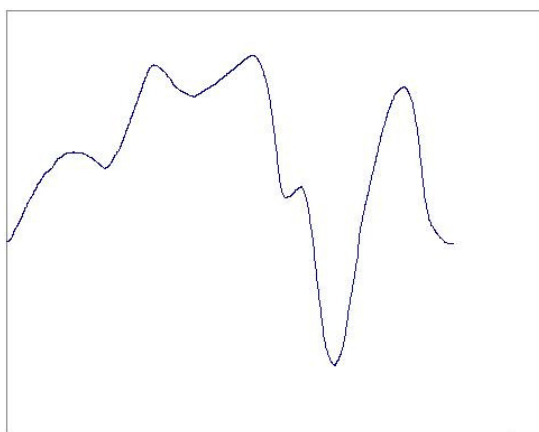
Technical Data



aortafemoral pressure
130 / 70 mmHg (AFP)



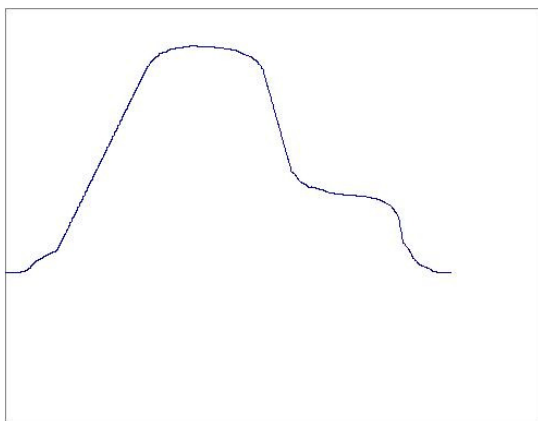
aortaradial pressure
120 / 70 mmHg (ARP)



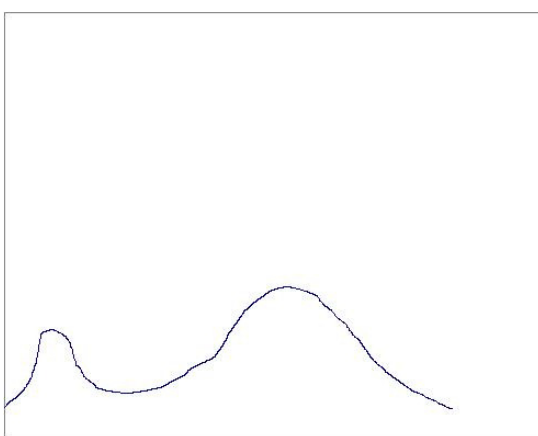
central venous pressure
10 / 0 mmHg (ZVP)

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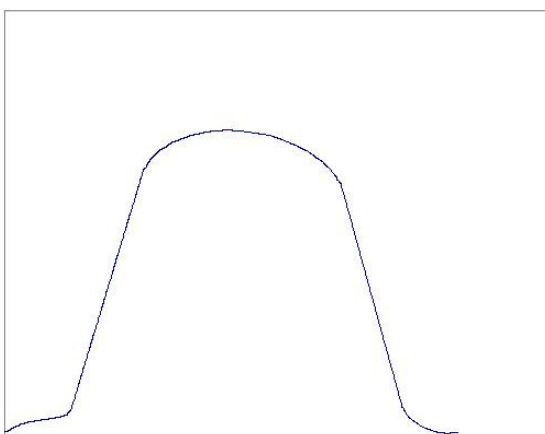
Technical Data



pulmonary pressure
25 / 10 mmHg (PAP)



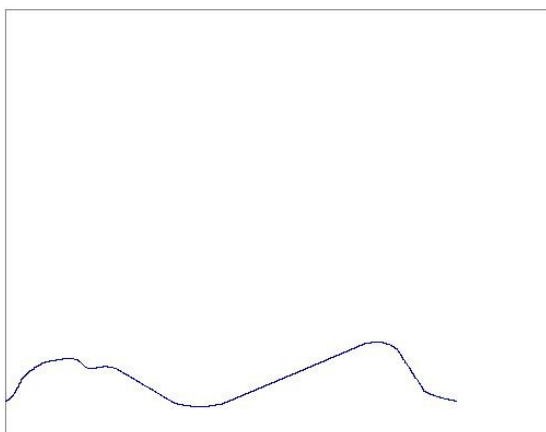
pulmonalis branch, wedge-position
10 / 0 mmHg (PAWP)



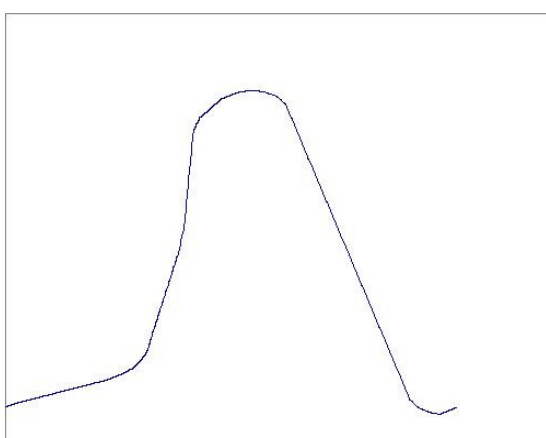
left ventricle pressure
10 / 0 mmHg (LVP)

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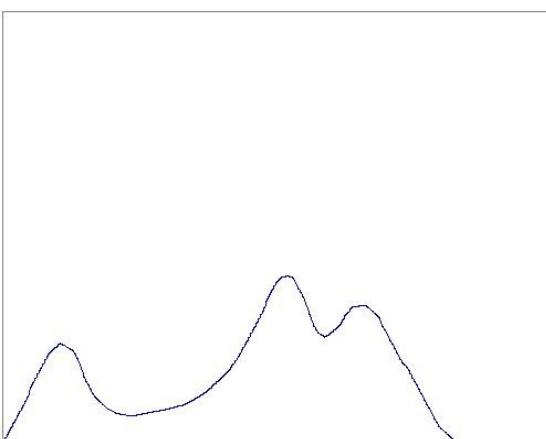
Technical Data



left intraarterial pressure
5 / 0 mmHg (LAP)



right intraventricular pressure
25 / 0 mmHg (RVP)



right intraarterial pressure
5 / 0 mmHg (RAP)

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Example of use



	Version			
	NE	NT	E	N
T	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
NIBP	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
IBP	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
CO	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	

T: Temperature
 NIBP: Non invasive blood pressure
 IBP: Invasive blood pressure
 CO: Cardiac Output

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