FAX REF 6047 :4 February 1997 Page 1 of 1
TO :Ed Avila
:Teledyne
FROM :John S. Lamb

Dear Ed,
We have tested almost 100 Nellcor SpO2 cables from repaired Nellcor probes.

The Resistor values are as follows

7.44Kohm	1
7.45	2
7.46	9
7.47	15
7.48	13
7.49	21
7.50	14
4.51	9
7.52	4
7.53	3
7.54	1
7.68	1

This is a typical distribution curve around a resistor value of 7.5Kohm with a +/- 1% tolerance.

It would therefore appear that Nellcor are no longer matching LED's to a resistor value on Finger probes.

We tested 1 Dura Y @ 7.97Kohm

Two Disposable 8.03 Kohm & 8.23 Kohm

These tests are too few in number to be meaningful but it appears that the disposable with a difference of 2% may be using a different or even wider tolerance LED's.

NB

If a 7.5Kohm resistor is added to a BCI probe it will work on a Nellcor instrument

Investigation has shown that on a Nellcor connector Pins 1 & 2 are joined by a 7.5Kohm resistor.

Pin 7 is a screen

On a BCI pins 1, 6 & 7 are shorted out to a screen

We are looking at other DP9 connectors on other models and will keep you informed. However the above information should make life easier for UDT. i.e.

Kind Regards,

VIAMED

Date:	3/11/97
Manufacturer:	Nellcor
Oximeter Model:	N200
Probe Type:	Finger
Probe Resistor:	4K
Notes:	Resistor reduced to 4K using an adaptor cable.
Reading at 100%:	100
Reading at 99%:	100
Reading at 98%:	99
Reading at 97%:	98
Reading at 96%:	97
Reading at 95%:	96
Reading at 94%:	95
Reading at 93%:	94
Reading at 92%:	94
Reading at 91%:	93
Reading at 90%:	92
Reading at 85%:	87
Reading at 80%:	83
Reading at 75%:	78
Reading at 70%:	73
Reading at 65%:	68
Reading at 60%:	63
Notes:	Just within ±3 spec.

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Date:	3/11/97
Manufacturer:	Nellcor
Oximeter Model:	N200
Probe Type:	Finger
Probe Resistor:	5K
Notes:	Resistor altered to 5K using an adaptor cable.
Reading at 100%:	100
Reading at 99%:	100
Reading at 98%:	99
Reading at 97%:	98
Reading at 96%:	97
Reading at 95%:	96
Reading at 94%:	95
Reading at 93%:	94
Reading at 92%:	94
Reading at 91%:	93
Reading at 90%:	92
Reading at 85%:	87
Reading at 80%:	82
Reading at 75%:	78
Reading at 70%:	73
Reading at 65%:	68
Reading at 60%:	63
Notes:	Within ±3 spec.

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Date:	3/11/97
Manufacturer:	Nellcor
Oximeter Model:	N200
Probe Type:	Finger
Probe Resistor:	7K
Notes:	Resistor set to this value using an adaptor cable
Reading at 100%:	100
Reading at 99%:	100
Reading at 98%:	99
Reading at 97%:	98
Reading at 96%:	97
Reading at 95%:	96
Reading at 94%:	95
Reading at 93%:	94
Reading at 92%:	93
Reading at 91%:	92
Reading at 90%:	91
Reading at 85%:	86
Reading at 80%:	81
Reading at 75%:	76
Reading at 70%:	72
Reading at 65%:	67
Reading at 60%:	62
Notes:	Still within spec., appears fairly stable and fast to react.

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Date:	3/11/97
Manufacturer:	Nellcor
Oximeter Model:	N200
Probe Type:	Finger
Probe Resistor:	0
Notes:	Resistor turned down to zero using an adaptor cable
Reading at 100%:	98
Reading at 99%:	97
Reading at 98%:	96
Reading at 97%:	94
Reading at 96%:	93
Reading at 95%:	92
Reading at 94%:	91
Reading at 93%:	90
Reading at 92%:	89
Reading at 91%:	88
Reading at 90%:	88
Reading at 85%:	84
Reading at 80%:	80
Reading at 75%:	77
Reading at 70%:	75
Reading at 65%:	72
Reading at 60%:	70

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Date:	3/11/97
Manufacturer:	Nellcor
Oximeter Model:	N200
Probe Type:	Finger
Probe Resistor:	7.74K
Notes:	Resistor set to this value using an adaptor cable. This is the highest the resistor would go before being more than ±3% inaccurate.
Reading at 100%:	99-100
Reading at 99%:	99
Reading at 98%:	97
Reading at 97%:	96
Reading at 96%:	95
Reading at 95%:	95
Reading at 94%:	93
Reading at 93%:	92
Reading at 92%:	91
Reading at 91%:	90
Reading at 90%:	90
Reading at 85%:	84
Reading at 80%:	79
Reading at 75%:	73
Reading at 70%:	69-70
Reading at 65%:	62-63
Reading at 60%:	57

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Date:	3/11/97
Manufacturer:	Nellcor
Oximeter Model:	N200
Probe Type:	Finger
Probe Resistor:	2K
Notes:	Resistor reduced to 2K using an adaptor cable.
Reading at 100%:	98
Reading at 99%:	97
Reading at 98%:	96
Reading at 97%:	95
Reading at 96%:	94
Reading at 95%:	92
Reading at 94%:	91
Reading at 93%:	90
Reading at 92%:	89
Reading at 91%:	88
Reading at 90%:	88
Reading at 85%:	83
Reading at 80%:	80
Reading at 75%:	77
Reading at 70%:	75
Reading at 65%:	72
Reading at 60%:	70
Notes:	More than ±3% inaccurate

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Date:	3/11/97
Manufacturer:	Nellcor
Oximeter Model:	N200
Probe Type:	Finger
Probe Resistor:	3K
Notes:	Resistor reduced to 3K using an adaptor cable.
Reading at 100%:	100
Reading at 99%:	100
Reading at 98%:	99
Reading at 97%:	99
Reading at 96%:	98
Reading at 95%:	97
Reading at 94%:	96
Reading at 93%:	95
Reading at 92%:	94
Reading at 91%:	93
Reading at 90%:	92
Reading at 85%:	88
Reading at 80%:	83
Reading at 75%:	78
Reading at 70%:	74
Reading at 65%:	69
Reading at 60%:	64
Notes:	No longer accurate at this resistor value.

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Date:	3/11/97
Manufacturer:	Nellcor
Oximeter Model:	N200
Probe Type:	Finger
Probe Resistor:	6K
Notes:	The resistor on this probe was reduced to 6K using an adaptor cable.
Reading at 100%:	100
Reading at 99%:	100
Reading at 98%:	99
Reading at 97%:	99
Reading at 96%:	98
Reading at 95%:	97
Reading at 94%:	97
Reading at 93%:	95
Reading at 92%:	94
Reading at 91%:	94
Reading at 90%:	92
Reading at 85%:	88
Reading at 80%:	83
Reading at 75%:	78
Reading at 70%:	73
Reading at 65%:	68
Reading at 60%:	63
Notes:	Still just within ±3%

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Date:	3/11/97
Manufacturer:	Nellcor
Oximeter Model:	N200
Probe Type:	Finger
Probe Resistor:	9.51K
Notes:	This was the maximum value the resistor could be taken to before the oximeter refused to accept the probe.
Reading at 100%:	99
Reading at 99%:	98
Reading at 98%:	97
Reading at 97%:	95
Reading at 96%:	93-94
Reading at 95%:	92
Reading at 94%:	91
Reading at 93%:	89
Reading at 92%:	88
Reading at 91%:	86
Reading at 90%:	85
Reading at 85%:	78
Reading at 80%:	70
Reading at 75%:	63
Reading at 70%:	57
Reading at 65%:	50
Reading at 60%:	44
Notes:	Extremely inaccurate at this resistor value.

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Variation in product specification

P856RA Nellcor compatible

S/N 941568 ME to 941667 ME

Variation from Viamed specification:

During the design of this probe a range of Nellcor probes was tested for resistor value.

Nellcor use this resistor for two purposes.

1) It informs the instrument that a probe exists

2) Disposables probes use 8K23 - 8K03

3) Y use 7k97

It became apparent that a 7K5 ohm resistor was being used by Nellcor finger probes although no actual specification has been actually published. A wide variation around this value did not effect the accuracy of the probes.

However it was decided that Viamed would use 7K5 ohm +/- 1%

Although this increased the expense it was felt that it would be better to be as accurate as possible leaving a larger margin for errors.

This batch appear to be using a +/- 5% tolerance resistor.

Although accuracy should not be compromised the supplier has been advised that in future the correct specification for this resistor must be used.

This batch have all been tested and released on my authority

J.S.Lamb

Managing Director

19 May 1999

uppler ref	P/N	S/N	Text S/N	Link	Status	Date
9619	P856RA	941568	ME	L	Printing	18/05/9
9619	P856RA	941569	ME	L	Printing	18/05/9
96	P856RA	941570	ME	L	Printing	18/05/9
9619	P856RA	941571	ME	L	Printing	18/05/9
9619	P856RA	941572	ME	L	Printing	18/05/9
9619	P856RA	941573	ME	L	Printing	18/05/9
9619	P856RA	941574	ME	L	Printing	18/05/9
9619	P856RA	941575	ME	L	Printing	18/05/9
9619	P856RA	941576	ME	L	Printing	18/05/9
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9619	P856RA	941585	ME	L	Printing	18/05/9
9619	P856RA	941586	ME	L	Printing	18/05/9
9619	P856RA	941587	ME	L	Printing	18/05/9
96	P856RA	941588	ME	L	Printing	18/05/9
9619	P856RA	941589	ME	L	Printing	18/05/9
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9619	P856RA	941601	ME	L	Printing	18/05/9
9619	P856RA	941602	ME	L	Printing	18/05/9
9619	P856RA	941603	ME	L	Printing	18/05/9
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9619	P856RA	941605	ME	L	Printing	18/05/9
96	P856RA	941606	ME	L	Printing	18/05/9
9619	P856RA	941607	ME	L	Printing	18/05/9
9619	P856RA	941608	ME	L	Printing	18/05/9
9619	P856RA	941609	ME	L	Printing	18/05/9
9619	P856RA	941610	ME	L	Printing	18/05/9
9619	P856RA	941611	ME	L	Printing	18/05/9
9619	P856RA	941612	ME	L	Printing	18/05/9
9619	P856RA	941613	ME	L	Printing	18/05/9
9619	P856RA	941614	ME	L	Printing	18/05/9
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9619	P856RA	941616	ME	L	Printing	18/05/9
9619	P856RA	941617	ME	L	Printing	18/05/9
9619	P856RA	941618	ME	L	Printing	18/05/9
9619	P856RA	941619	ME	L	Printing	18/05/9
9619	P856RA	941620	ME	L	Printing	18/05/9
9619	P856RA	941621	ME	L	Printing	18/05/9
9619	P856RA	941622	ME	L	Printing	18/05/9
961	P856RA	941623	ME	L	Printing	18/05/9
96	P856RA	941624	ME	L	Printing	18/05/9
9619	P856RA	941625	ME	L	Printing	18/05/9
9619	P856RA	941626	ME	L	Printing	18/05/9

upplier ref	P/N	S/N	Text S/N	Link	Status	Date
9619	P856RA	941627	ME	L	Printing	18/05/9
9619	P856RA	941628	ME	L	Printing	18/05/9
96	P856RA	941629	ME	L	Printing	18/05/9
9619	P856RA	941630	ME	L	Printing	18/05/9
9619	P856RA	941631	ME	L	Printing	18/05/9
9619	P856RA	941632	ME	L	Printing	18/05/9
9619	P856RA	941633	ME	L	Printing	18/05/9
9619	P856RA	941634	ME	L	Printing	18/05/9
9619	P856RA	941635	ME	L	Printing	18/05/9
9619	P856RA	941636	ME	L	Printing	18/05/9
9619	P856RA	941637	ME	L	Printing	18/05/9
9619	P856RA	941638	ME	L	Printing	18/05/9
9619	P856RA	941639	ME	L	Printing	18/05/9
9619	P856RA	941640	ME	L	Printing	18/05/9
9619	P856RA	941641	ME	L	Printing	18/05/9
9619	P856RA	941642	ME	L	Printing	18/05/9
9619	P856RA	941643	ME	L	Printing	18/05/9
9619	P856RA	941644	ME	L	Printing	18/05/9
9619	P856RA	941645	ME	L	Printing	18/05/9
9619	P856RA	941646	ME	L	Printing	18/05/9
96	P856RA	941647	ME	L	Printing	18/05/9
9619	P856RA	941648	ME	L	Printing	18/05/9
9619	P856RA	941649	ME	L	Printing	18/05/9
9619	P856RA	941650	ME	L	Printing	18/05/9
9619	P856RA	941651	ME	L	Printing	18/05/9
9619	P856RA	941652	ME	L	Printing	18/05/9
9619	P856RA	941653	ME	L	Printing	18/05/9
9619	P856RA	941654	ME	L	Printing	18/05/9
9619	P856RA	941655	ME	L	Printing	18/05/9
9619	P856RA	941656	ME	L	Printing	18/05/9
9619	P856RA	941657	ME	L	Printing	18/05/9
9619	P856RA	941658	ME	L	Printing	18/05/9
9619	P856RA	941659	ME	L	Printing	18/05/9
9619	P856RA	941660	ME	L	Printing	18/05/9
9619	P856RA	941661	ME	L	Printing	18/05/9
9619	P856RA	941662	ME	L	Printing	18/05/9
9619	P856RA	941663	ME	L	Printing	18/05/9
9619	P856RA	941664	ME	L	Printing	18/05/9
96	P856RA	941665	ME	L	Printing	18/05/9
9619	P856RA	941666	ME	L	Printing	18/05/9
9619	P856RA	941667	ME	L	Printing	18/05/9