

Service Manual

SphygmoCor XCEL System



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SphygmoCor[®] XCEL Service Manual

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Disclaimer

This manual has been validated and reviewed for accuracy. The instructions and descriptions it contains are accurate for the AtCor Medical product models at the time of this manual's production. However, succeeding models and manuals are subject to change without notice. AtCor Medical assumes no liability for damages incurred directly or indirectly from errors, omissions or discrepancies between the product and the manual.

This Manual is produced on the assumption that the operator is an experienced user of Windows 7, 8, or 10 Operating Systems.

If the operator is not familiar with Windows operations, please refer to the Windows User Manual or Windows Online Help.

Trademarks

"SphygmoCor" is a registered trademark of AtCor Medical Pty Ltd.

Millar, IBM, IBM PC, Microsoft, Windows, Excel, and InstallShield, are the registered trademarks of their respective holders.

Caution

Federal (USA) law restricts this device to sale by or on the order of a physician

Operator's Manual Cross Reference

This Service Manual shall be used in conjunction with the SphygmoCor XCEL Operator's Manual.

Refer to the SphygmoCor XCEL Operator's Manual for the following:

- Applicable standards
- Components, accessories, and spare parts
- Contraindications
- Database management
- Details of operation and use
- Displayed errors on the screen
- Electromagnetic Compatibility (EMC)
- Installation, setting up, uninstalling, and repair of XCEL
- Installing SphygmoCor XCEL in a Networked Configuration
- Maintenance and care of equipment
- Product Support
- Safety Warnings
- Specifications (technical, physical, environmental)
- Troubleshooting
- Visual indicators
- Warnings
- Warranty

Calibrating SphygmoCor XCEL

Warning: The SphygmoCor XCEL System requires annual calibration. Failure to do so may result in the device being out of specification. This may result in inaccurate measurements.

When calibration is due, the following message will appear in the SphygmoCor XCEL application:

Scor	X
i	Annual callibration is due, lastannual callibration was done on 10/18/2011 12:00:00 AM. Press Ok to Remind later or Cancel to ignore.
	OK Cancel

Note: The SphygmoCor XCEL device will continue to take measurements even though the calibration period has expired.

2 options are available for completing calibration:

- 1- Contact your distributor or AtCor Medical to arrange for your SphygmoCor XCEL to be returned for calibration.
- 2- Purchase a Calibration Kit. Contact your distributor or AtCor Medical for further information.

SphygmoCor XCEL Calibration Kit Operating Instructions

Intended Use

The SphygmoCor XCEL Calibration Kit calibrates the SphygmoCor XCEL Device by providing a rigid 1/2L volume and a pumping bulb to pressurise the pneumatic system. An external calibrated manometer (electronic manometer, Sphygmomanometer mercury column, or anaerobic Sphygmomanometer) with indication in mmHg and resolution of 1mmHg shall be used with the SphygmoCor XCEL Calibration Kit. The SphygmoCor XCEL Calibration Kit is intended to be used by medical professionals and biomedical service personnel.

Warning: The aneroid Sphygmomanometer or manometer that will be used to calibrate the SphygmoCor XCEL, must be calibrated prior to calibrating the SphygmoCor XCEL device.

Basic Care

As per the relevant areas of the Basic System Care section for the SphygmoCor XCEL.

Note: If the following message appears in SphygmoCor XCEL application indicating incomplete or unsuccessful calibration, then refer to the Restarting the Calibration Procedure Section in the Calibration Troubleshooting section.



WARRANTY: The SphygmoCor[®] XCEL Calibration Kit components are guaranteed for one year from the date of purchase

Calibration Kit Components

The Calibration Kit contains the following components:

1- Calibration Pneumatic kit



2- 1/8 " male to 1/8" male adapter



3- 3/16" male to 3/16" male adapter



4- 3/16" female to 1/8" male adapter



5- Calibration Kit Dongle

Calibration Setup

Connect the open ended tube of the Calibration Pneumatic Kit to a calibrated manometer (electronic or Sphygmomanometer mercury column or anaerobic Sphygmomanometer, with reading in mmHg, and resolution of 1mmHg) using one of the adaptors provided. Connect the other tube of the Calibration Pneumatic Kit to the cuff hose of SphygmoCor XCEL using the lockable connection as illustrated in the following figure.

SphygmoCor XCEL Calibration Software

Minimum computer requirements to install the XCEL Calibration Software

Туре	IBM Compatible PC
Processor	Intel or compatible, 32 or 64 bits
Nominal Speed	2GHz minimum
Memory	2GB RAM minimum
Hard Disk	2GB for Installation
Printer Drivers	User Provided

Communications	USB port
Operating Systems	Windows 7 Professional + SP1, or Windows 8 Pro

Software Download & Installation

Download

- 1- Open the ATCOR Medical website www.atcormedical.com and navigate to the Download Portal.
- 2- Enter the required User information to access the Download Portal.
- 3- Select and download the Calibration Kit Software zip file.
- 4- Right click on the zip file and extract the files.

Installation

1- Once completing the download and unzipping of the file, run setup.exe

2- Click Next

3- Select "I accept the agreement" if you agree with the terms and conditions.

4- Click Next when the Next button is enabled.

5- Click Next when this screen appears.

6- Click Install when this screen appears.

7- Click Finish when the installation is complete

SphygmoCor XCEL Calibration Steps

Note: If during the calibration process a message appears indicating incomplete or unsuccessful calibration, or the calibration did not complete as expected, then refer to the Restarting the Calibration Procedure Section in the Calibration Troubleshooting section.

- 1- Turn the SphygmoCor XCEL device ON, and connect the USB cable to your computer.
- 2- Connect either the tonometer supplied with your SphygmoCor XCEL or the Calibration Kit Dongle to the SphygmoCor XCEL device.

Note: To disconnect the Tonometer/Calibration Kit Dongle, gently push back the connector plug and the connector will automatically release away from the module. DO NOT twist the Tonometer/tonometer dongle connector.

3- Disconnect the cuff hose from the SphygmoCor XCEL device.

4- Run XCEL Calibration Software by selecting this icon.

SphygmoCor XCEL Calibration Software	
Eile	
Setup COM36 Connect	Connected to device SN: Not connected
Please ensure the following steps have been taken prior to calibration: 1. The mercury Sphygmomanometer or manometer that will be used to calibrate the st calibrated. 2. The SphygmoCor XCEL device has been turned ON, and the USB cable has been or 3. The tonometer or tonometer dongle has been connected to the SphygmoCor XCEL 4. The calibration kit pneumatic components have been connected to the cuff hose a manometer. 5. The cuff hose has been disconnected from the SphygmoCor XCEL device. Select the serial port connected to the SphygmoCor XCEL on the button at the top of	SphygmoCor XCEL has been recently onnected to your computer. . device. Ind the mercury Sphygmomanometer or f the page and press Connect.
Date	
Year: Month: Day:	
Pressure: (mmHg)	Continue
version: 1.0.1	ł.

5- Select the Com port number that is connected to the SphygmoCor XCEL device using the drop down menu and click *Connect*

Note: To find the Com port that is connected to the SphygmoCor, please refer to the Finding Com Port Section in the Calibration Troubleshooting section.

Note: The following screen appears if the incorrect Com port has been selected. Please refer to the Finding Com Port Section in the Calibration Troubleshooting section.

File	
_ Setun	
COM1 Connect	Connected to device SN: Not connected
Status	
The SphygmoCor XCEL device is not responding. Ple a USB cable.	ase ensure the device is turned on and connected to your computer with
Date Year: Month:	Day:
Date Year: Month: Pressure: (mmHg)	Day:Continue

SphygmoCor XCEL Calibration	ion Software			
<u>F</u> ile				
Setup COM36 💌 Connect			Connected to de	evice SN: 12-3456-7890
Status				
Connection established betwee	en the SphygmoCor XCEL (Calibration software an	d the SphygmoCor XCE	L device. Press
Date				
Year:	Month:	Day:		
Pressure:	(mmHg)			Continue

6- If successfully connected, click *Continue* in the bottom right hand corner

Note: The following screen appears if the tonometer or Calibration Kit Dongle is not connected, or if the cuff hose is connected to the SphygmoCor XCEL device.

ile				
Setup				
COM12 🔻 C	Connect		Connected to device SN: 12#34	56-789
Status				
Date Year:	Month:	Day:		
Date Year:	Month:	Day:		

If this message is displayed, connect the tonometer or Calibration Kit Dongle and disconnect the cuff hose then click Continue

lle			
Setup			
COM36 🔻 Cor	nnect	Connected to device SN: 12-	3456-78
Status			
Calibrating			
Dete			
Date	Month:	David	
Year:		Day:	
Year:	(mmHg)		ontinue

7- The software will display this message for a few seconds.

P SphygmoCor XCEL Calibration Software	
<u>F</u> ile	
Setup	
COM12 V Connect	Connected to device SN: 12#3456-7890
Status	
Connect the cuff hose to the SphygmoCor XCEL device and press	Continue.
Date	
Year: Month:	Day:
Pressure: (mmHg)	Continue

8- Connect the cuff hose on the SphygmoCor XCEL and click *Continue*

² SphygmoCor XCE	L Calibration Software			
ile				
Setup				
COM12 V	onnect		Connected to device SN	l: 12#3456-7890
Status				
The SphygmoCor >	(CEL device will pump to approxir	mately 180mmHg.		
Date				
Year:	Month:	۵	Day:	
Pressure:	(mmHg)			Continue

9- The software will display this message

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10- Review the pressure displayed on the manometer or Sphygmomanometer

ile		
Setup COM36 🔻 Connect		Connected to device SN: 12-3456-7890
Status		
Read the pressure on the when enabled.	e mercury Sphygmomanometer or manomet	er, enter it in the Pressure box, then press Continue
Date		
Date Year:	Month:	Day:
Date Year:	Month:	Day:Continue

11- Enter the pressure value in whole numbers (no decimal points) and Click Continue

Note: The pressure value should be entered within 30 seconds; otherwise the following screen will appear:

Setup Connect Connected to device SN: 12#3456-76 Status SphygmoCor XCEL calibration has not been completed. Power off and on the SphygmoCor XCEL device. Close this application and repeat the calibration procedure.	Setup Connect Connected to device SN: 12#3456-7 Status SphygmoCor XCEL calibration has not been completed. Power off and on the SphygmoCor XCEL device. Close this application and repeat the calibration procedure. Close this application and repeat the calibration procedure. Date Year: Month: Day:	<u>r</u> ile				
COM12 Connect Connect Status SphygmoCor XCEL calibration has not been completed. Power off and on the SphygmoCor XCEL device. Close this application and repeat the calibration procedure.	COM12 Connect Connect Status SphygmoCor XCEL calibration has not been completed. Power off and on the SphygmoCor XCEL device. Close this application and repeat the calibration procedure. Close this application and repeat the calibration procedure. Date Year: Month: Day:	Setup				
Status SphygmoCor XCEL calibration has not been completed. Power off and on the SphygmoCor XCEL device. Close this application and repeat the calibration procedure.	Status SphygmoCor XCEL calibration has not been completed. Power off and on the SphygmoCor XCEL device. Close this application and repeat the calibration procedure. Date Year: Month: Day:	COM12 🔻	Connect		Connected to device SN	: 12#3456-7
SphygmoCor XCEL calibration has not been completed. Power off and on the SphygmoCor XCEL device. Close this application and repeat the calibration procedure.	SphygmoCor XCEL calibration has not been completed. Power off and on the SphygmoCor XCEL device. Close this application and repeat the calibration procedure. Date Year: Month: Day:	Status				
	Date Year: Month: Day:	SphygmoCor) Power off and Close this app	CEL calibration has not been complete on the SphygmoCor XCEL device. cation and repeat the calibration proce	d. edure.		

If this message appears, turn OFF and then ON the SphygmoCor XCEL device, close the SphygmoCor XCEL Calibration software, and repeat the calibration procedures from step 1. Please refer to Restarting the Calibration Procedure Section in the Calibration Troubleshooting section.

SphygmoCor XCEL Calibratio	Software		- 0 X
<u>F</u> ile			
Setup COM36 🔻 Connect		Connected to device SN:	12-3456-7890
Status			
Deflating			
Date			
Year:	Month:	Day:	
·			
Pressure:	(mmHg)		Continue

12- The software will display this message.

ile					
Setup					
COM12 🔻 C	onnect		Co	nnected to device SN:	: 12#3456-78
Status					
Press Continue to	pump to approximately 30mm	Hg.			
Date					
Date Year:	Month:		Dav:		
Date Year:	Month:		Day:		
Date Year:	Month:) Day:		

13- Click Continue

14- View the pressure displayed on the manometer or Sphygmomanometer

SphygmoCor XCEL	Calibration Software			
<u>F</u> ile				
Setup				
COM12 🔻 Conr	nect	Conn	ected to device SN: 12	#3456-7890
Status				
	and repeat calloration in the manomete	^a value is outside this range.		
Date				
Year:	Month:	Day:		
Pressure:	(mmHg)			Continue

15- If the manometer readings is between 25-35 mmHg click *Continue*.

Note: If the manometer reading is not between 25-30 mmHg, close the SphygmoCor XCEL Calibration software and start the calibration procedures from Step 1. Please refer to Restarting the Calibration Procedure Section in the Calibration Troubleshooting section.

SphygmoCor XCEL Calibration Software	
<u>F</u> ile	
Setup COM12 V Connect	Connected to device SN: 12#3456-7890
Status	
Press Continue to pump to approximately 185mmH	э.
Date	
Year: Month:	Day:
Pressure: (mmHg)	Continue

16- Click Continue

17- View the pressure displayed on the manometer or Sphygmomanometer

ile					
Setup					
COM12 🔻 Co	onnect		Co	onnected to device SN	: 12#3456-7890
Status					
Press Continue if t	he manometer value is within on and restart calibration if th	180-190mmHg.	s outside this range	5	
ciose uns applicau		ie manometer value i	s outside this range		
Date					
Date Year:	Month:		Day:		
Date Year:	Month:		Day:		

18- If the manometer reading is between 180-190 mmHg click *Continue*.

Note: If the manometer reading is not between 180-190 mmHg, close the SphygmoCor XCEL Calibration software and start the calibration procedures from Step 1. Please refer to Restarting the Calibration Procedure Section in the Calibration Troubleshooting section.

' SphygmoCor XCEL C	alibration Software			
ile				
Setup				
COM12 V Conne	ect		Connected to device SN: 12	#3456-7890
Status				
Disconnect the cuff ho	se from the SphygmoCor XCEL (device and press Continu	Je.	
Date				
Date	Month:	Dav:		
Date Year:	Month:	Day:		
Date	Month:	Day:		
Date Year:	Month:	Day:		Continue

19- Disconnect the cuff hose on the SphygmoCor XCEL and click *Continue*

COM12 - C	onnect		Connected to device SN	: 12#3456-78
Status				
NIBP calibrating				
Date				
Date Year:	Month:	Day:		
Date Year:	Month:	Day:		Continue

20- The software will show a message.

ile Cabus			
COM12 V Co	nnect	Connected	to device SN: 12#3456-7890
Status			
Connect the cuff ho	ose to the SphygmoCor XCEL device and p	press Continue.	
Date			
Date Year:	Month:	Day:	
Date Year:	Month:	Day:	
Date Year:	Month:	Day:	Continue

21- Connect the cuff hose on the SphygmoCor XCEL and click Continue

22- Using the bulb, pump until the pressure on the manometer is slightly above 250 mmHg.

SphygmoCor XCEL Calibration Sc	ftware	
<u>F</u> ile		
Setup COM36 👻 Connect		Connected to device SN: 12-3456-7890
Status		
Using the external bulb, pump to ab exactly 250mmHg, press continue. U	ove 250mmHg. The pressure in the tubir Jse the release knob to speed up the de	ng will be released slowly and when pressure is flation rate if required.
Date		
Year: M	onth: Day	:
Pressure:	(mmHg)	Continue
Date Year: M Pressure: version: 1.0.1	onth: Day.	: Continue

23- Release the pressure slightly using the release knob on the bulb. When the pressure drops to 250 mmHg click *Continue*.

Note: Once pumping starts ensure to click Continue within 3 minutes. If not, a message will appear informing that the calibration was unsuccessful. Then close the SphygmoCor XCEL Calibration Software, turn off/on the module and repeat the calibration procedures from Step 1. Please refer to Restarting the Calibration Procedure Section in the Calibration Troubleshooting section.

	Calibration Software		
<u>F</u> ile			
Setup			
COM36 🔻 Con	inect	Co	nnected to device SN: 12-3456-7890
Status			
30mmHg, press cont	inue. Use the release knob to sp	eed up the deflation rate if required.	
Date			
Year:	Month:	Day:	

24- Using the bulb, pump until the pressure on the manometer is slightly above 30 mmHg. Release the pressure slightly using the release knob on the bulb. When the pressure drops back to 30 mmHg, click *Continue*.

Note: Once pumping starts ensure to click Continue within 3 minutes. If not, a message will appear informing that the calibration was unsuccessful. Then close the SphygmoCor XCEL Calibration Software, turn off/on the module and repeat the calibration procedures from Step 1. Please refer to Restarting the Calibration Procedure Section in the Calibration Troubleshooting section.

⁷ SphygmoCor XCEL Calibration Software	
<u>F</u> ile	
Setup	
Connect	Connected to device SN: 12-3456-7890
Status	
measured pressure ok	
Date	
Year: Month: D	av:
Pressure: (mmHg)	Continue

25- The software will display this message.

SphygmoCor XCEL Calibration Software	
Eile	
Setup	
COM36 🔻 Connect	Connected to device SN: 12-3456-7890
Status	
Using the external bulb, pump to above 250mmHg. The pressure in the tu exactly 250mmHg, press continue. Use the release knob to speed up the	bing will be released slowly and when pressure is deflation rate if required.
Date	
Year: Month: D	ay:
Pressure: (mmHg)	Continue
version: 1.0.1	iii.

26- Using the bulb, pump until the pressure on the manometer is slightly above 250 mmHg. Release the pressure slightly using the release knob on the bulb. When the pressure drops back to 250 mmHg, click *Continue*.

Note: Once pumping starts ensure to click Continue within 3 minutes. If not, a message will appear informing that the calibration was unsuccessful. Then close the SphygmoCor XCEL Calibration Software, turn off/on the module and repeat the calibration procedures from Step 1. Please refer to Restarting the Calibration Procedure Section in the Calibration Troubleshooting section.

SphygmoCor XCEL Calib	ration Software		
ile			
Setup			
COM36 🔻 Connect		Connect	ed to device SN: 12-3456-7890
Status			
measured pressure ok			
Date			
	Month	Dav:	
Year:	Hondia	/-	
Year:	Portu		
Year:	(mmHg)		Continue

27- The software will display this message.

Note: If this message appears (calibration was unsuccessful), then turn OFF and ON the device and close the SphygmoCor[®] XCEL Calibration Software and repeat the calibration procedures from step 1. Please refer to Restarting the Calibration Procedure Section in the Calibration Troubleshooting section.

SphygmoCor XCEL Calibration Software Eile	
Setup COM12 Connect	Connected to device SN: 12#3456-7890
Status SphygmoCor XCEL calibration has not been completed. Power off and on the SphygmoCor XCEL device. Close this application and repeat the calibration procedure.	
Date Year: Month:	Day:
Pressure: (mmHg)	Continue

SphygmoCor XCEL	Calibration Software	and a second	
File			
Setup			
COM36 V Con	nect	Con	nected to device SN: 12-3456-7890
Status			
Enter the calibration Example: year=201	date then press Continue. 2, month=12, day=1		
	-,		
Date			
Year:	Month:	Day:	
Pressure:	(mmHg)		Continue

28- Upon successful calibration, enter the calibration date (year, month & date) then click Continue

If the Continue button is pressed without entering a date, close the SphygmoCor XCEL Calibration software, turn OFF and then ON the SphygmoCor XCEL device, and repeat the calibration procedures from step 1. Please refer to Restarting the Calibration Procedure Section in the Calibration Troubleshooting section.

SphygmoCor XCEL Ca	libration Software	-	
Setup			
COM36 V Conne	t	Conn	ected to device SN: 12-3456-7890
Status			
Enter the calibration da Example: year=2012, r	te then press Continue. ionth=12, day=1		
Date Year:	Month:	Day:	
Pressure:	(mmHg)		Continue

29- For verification purposes, the date is required to be entered for a second time. Enter the calibration date (year, month & date) then click *Continue*

If the *Continue* button is pressed without entering a date, close the SphygmoCor XCEL Calibration software, turn OFF and then ON the SphygmoCor XCEL device, and repeat the calibration procedures from step 1. Please refer to Restarting the Calibration Procedure Section in the Calibration Troubleshooting section.

SphygmoCor XCEL Calibration So File	oftware	
Setup COM40 V Connect		Connected to device SN: 21#3456-7890
Status An invalid date was entered. Enter the calibration date then pres Example: year=2012, month=12, d	is Continue. Jay=1	
Date Year: M	Nonth: Day:	
Pressure:	(mmHg)	Continue
version: 1.0.2		

Note: If this message appears (incorrect date entered), enter the correct date and press *Continue*.

SphygmoCor XCEL Calibration Software	
<u>F</u> ile	
Setup	
COM12 V Connect	Connected to device SN: 12#3456-7890
Status	
SphygmoCor XCEL calibration has been completed success Please close this application	fully.
Date	
Year: 2013 Month: 4	Day: 16
Pressure: (mmHa)	Continue
	h.

30- The SphygmoCor XCEL calibration has been completed successfully, close the XCEL Calibration Software

Note: Once the calibration has been completed successfully, a calibration summary report will be generated and saved as *"XCEL_CAL_REPORT_SN_DATE.txt"* in the same directory where the application was installed (default installation directory is *"C:\AtCor\XCEL calibration\"*, but this can be changed by the installer during the installation process).

Calibration Troubleshooting

Finding Com Port

To find the com port that is connected to the SphygmoCor XCEL device, follow these steps:

- 1- Connect the SphygmoCor XCEL device to the computer via the USB cable. Ensure your SphygmoCor Software is closed.
- 2- Navigate to Control Panel -> System and Security -> select System.

🚱 🔾 🗢 🖳 🕨 Control Panel 🕨	System and Security + System		- 4- Search Control Panel
Control Panel Home Device Manager Remote settings System protection Advanced system settings	View basic information Windows edition Windows 7 Professional Copyright © 2009 Microso Service Pack 1 Get more features with a n	about your computer ft Corporation. All rights reserved. ew edition of Windows 7	
	System		
	Rating:	5.5 Windows Experience Index	
	Processor:	Intel(R) Core(TM) i5-2410M CPU @ 2.30GHz 2.30 GHz	
	Installed memory (RAM):	4.00 GB	
	System type:	64-bit Operating System	
	Pen and Touch:	No Pen or Touch Input is available for this Display	
	Computer name, domain, and workgroup settings		
See also	Computer name:	ClinicalPCAQ	😵 Change settings
Action Center	Full computer name:	ClinicalPCAQ.atcorau.local	
Windows Update	Computer description:		
Performance Information and Tools	Domain:	atcorau.local	
			-

3- Select the Device Manager link on the left menu.

4- Expand the PORTS (COM & LPT) section.

- 5- The SphygmoCor XCEL will appear as 'USB Serial Port' and the COM Port number will be displayed next to 'USB Serial Port (COM##)'.
- 6- In the Calibration Kit software you will need to select the Com Port number (COM##) from the drop down list.

Restarting the Calibration Procedure

If calibration is not completed successfully, before restarting the calibration procedure, ensure the following:

- 1. That the Aneroid Sphygmomanometer or manometer that will be used to calibrate the SphygmoCor XCEL has been recently calibrated.
- 2. That the SphygmoCor XCEL Calibration software has been closed.
- 3. That the SphygmoCor XCEL device has been turned OFF/ON, and the USB cable has been connected to your computer.
- 4. That the tonometer or Calibration Kit dongle has been connected to the SphygmoCor XCEL device.
- 5. That the calibration kit pneumatic components have been connected to the cuff hose and the Sphygmomanometer or manometer.
- 6. That the cuff hose has been disconnected from the SphygmoCor XCEL device.

Note: If the restart calibration is not successful, please contact AtCor Medical for technical support.