attocube
pioneers of precision

Version: 2.0.04
Modified: August 13
Products: ANC350 /NUQ /NUM /RES /SCN /DTH, DAISY Software v1.5.xx

User Manual

attocube systems' Piezo Motion Controller ANC350



attocube systems AG, Königinstr. 11a (Rgb), D – 80539 Munich Germany
Phone: +49 89-2877 8090 Fax: +49 89-2877 80919
E-Mail: info@attocube.com www.attocube.com

For technical queries, contact:
support@attocube.com

attocube systems office Munich:
Phone: +49 89 2877 8090
Fax +49 89 2877 80919

Safety Information

For the continuing safety of the operator of this equipment and the protection of the equipment itself, the operator should take notice of the **Warnings, Cautions,** and **Notes** throughout this handbook and - where applicable - on the device itself.

The following safety symbols may be used throughout this handbook:



Caution. An instruction which draws attention to the risk of injury or death.



Caution. An instruction which draws attention to the risks of damage to the device, process, or surrounding.



Warning. Risk of electric shock. High voltages present.



Warning. Laser radiation. Do not stare into the beam. Class 1M Laser product.



Note. Clarification of an instruction or additional information.



Functional (EMC) earth/ground terminal.

Important Warnings – Read this Section First!

The unit described in this manual must only be connected to a grounded and fused supply of 100, 115, or 230V, respectively.



Warning. The equipment, as described herein, is designed to be used by personnel properly trained in the use and handling of mains powered electrical equipment. Only personnel trained in servicing and maintenance of this equipment should remove its protective covers or attempt any repair or adjustments.
If malfunction is suspected, return the part to attocube systems immediately for repair or replacement. There are no user-serviceable parts inside the electronics. Take special care if connecting products from other manufacturers. Follow the General Accident Prevention Rules.



Note. Modified or opened electronics are no longer covered in terms of attocube's warranty.



Caution. The piezo translators and controllers are high voltage devices which are capable of generating high output currents. Do never touch any part of the piezo translator or the controller which might either be at high voltage or connected to the high voltage output of the controller by any means. Touching electrified parts of the system may cause serious or even lethal injuries. Working with high voltage devices requires adequately educated operating personnel.



Warning. Do not operate the instrument outside its dedicated supply voltage or environmental range. If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. In particular, excessive moisture may impair safety.



Warning. Never connect any cabling to the electronics when the outputs are enabled!
The scan piezo elements at the heart of a positioner unit are high voltage components and can cause serious injuries.



Caution. Avoid short-cuts. Be careful not to create short-cuts between the contacts in the Sub-D-Mix connector or anywhere in the cabling.



Caution. For laboratory use only. This unit is intended for operation in conjunction with a normal, single phase supply, in the temperature range from 5°C to 40°C, 20% to 80% RH.

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.



Firmware update. Before updating the firmware of the ANC350 please contact *attocube systems* technical support. Unauthorized updates could lead to permanent malfunction and will not be covered by attocube's warranty.

Declarations of Conformity



For Customers in Europe:

This equipment has been tested and found to comply with the EC Directives 89/336/EEC 'EMC Directive' and 73/23/EEC 'Low Voltage Directive' as amended by 93/68/EEC.
Compliance was demonstrated by conformance to the following specifications which have been listed in the Official Journal of the European Communities:

Safety EN61010: 2001
EMC EN61326: 1997

For Customers in the USA:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense. Changes or modifications not explicitly approved by attocube systems could void the user's authority to operate the equipment.

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

Waste Electrical and Electronic Equipment (WEEE) Directive



DE16963721

Compliance
As required by the Waste Electrical and Electronic Equipment (WEEE) Directive of the European Community and the corresponding national laws, attocube systems offers all end users within the European Union (EU) the possibility to return "end of life" units without incurring disposal charges.
This offer is valid for attocube systems electrical and electronic equipment:

- sold after August 13th 2005,
- marked correspondingly with the crossed out "wheelie bin" logo (see logo to the left),
- sold to a company or institute within the EU,
- currently owned by a company or institute within the EU,
- still complete, not disassembled, and not contaminated.

As the WEEE directive applies to self contained operational electrical and electronic products, this "end of life" take back service does not refer to other attocube products, such as

- pure OEM products, that means assemblies to be built into a unit by the user (e. g. OEM electronic drivers),
- components,
- mechanics and optics,
- left over parts of units disassembled by the user (PCB's, housings etc.).

If you wish to return an attocube unit for waste recovery, please contact attocube systems or your nearest dealer for further information.

Waste treatment on your own responsibility
If you do not return an "end of life" unit to attocube systems, you must hand it to a company specialized in waste recovery. Do not dispose of the unit in a litter bin or at a public waste disposal site.

Ecological background
It is well known that WEEE pollutes the environment by releasing toxic products during decomposition. The aim of the European RoHS directive is to reduce the content of toxic substances in electronic products in the future.
The intent of the WEEE directive is to enforce the recycling of WEEE. A controlled recycling of end of live products will thereby avoid negative impacts on the environment.

Table of Contents

Safety Information 2
Important Warnings – Read this Section First! 3
Declarations of Conformity 5
Waste Electrical and Electronic Equipment (WEEE) Directive 6
Table of Contents 7
I. System Overview 11
II. Setup Procedure 12
II.1. Mechanical Installation 12
II.2. Electrical Installation 13
II.3. Front Panel Controls and Indicators 13
II.4. Rear Panel Connections 15
III. Pin Assignment 17
III.1. TTL Trigger Connector 17
III.2. Positioner Control Cables 18
IV. Manual Use of Front Panel 25
IV.1. ANC350 Motion Controller (Master Module) 25
IV.2. ANC350 Stepper Driver (Step Module) 26
IV.3. ANC350 Scan Driver (Scan Amplifier and Module) 27
IV.4. ANC350 Scan Driver+ (Dither Module) 28
V. Software 29
V.1. Hardware Requirements 29
V.2. Operating System 29
V.3. Hardware Driver Installation 29
V.4. DAISY Software Installation 32
VI. Starting the System 33
VI.1. Starting the System – Main Window (DAISY) 33
VI.2. Starting the GUI 34
VI.3. Software – Axis Control 36
VI.4. Software – Scanner Control 44
VI.5. Software – Dither Control 45
VI.6. Software – Output Trigger Settings 47
VI.6.1. Trigger 48
VI.6.2. Quadrature 49
VI.6.3. IcHaus 49
VI.7. Software – Input Trigger Settings 50
VI.7.1. Coarse 51
VI.7.2. Quadrature 52
VI.8. Software – ANC350 Global Settings 53
VI.9. Closing the GUI and switching off the ANC350 54
VI.10. Configuring ethernet settings 55
VI.11. Upgrading 55
VII. Firmware Update Procedure 56

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

VIII. DLL 57
VIII.1. LabView Drivers 57
VIII.1.1. ANC350_Check.vi 57
VIII.1.2. ANC350_Connect.vi 57
VIII.1.3. ANC350_Close.vi 58
VIII.1.4. ANC350_Load.vi 58
VIII.1.5. ANC350_GetStatus.vi 58
VIII.1.6. ANC350_SetOutput.vi 59
VIII.1.7. ANC350_Amplitude.vi 59
VIII.1.8. ANC350_GetAmplitude.vi 59
VIII.1.9. ANC350_Frequency.vi 60
VIII.1.10. ANC350_GetFrequency.vi 60
VIII.1.11. ANC350_GetPosition.vi 60
VIII.1.12. ANC350_MoveAbsolute.vi 61
VIII.1.13. ANC350_MoveContinous.vi 61
VIII.1.14. ANC350_MoveRelative.vi 61
VIII.1.15. ANC350_UpdateAbsolute.vi 62
VIII.1.16. ANC350_SetTargetGround.vi 62
VIII.1.17. ANC350_MoveSingleStep.vi 62
VIII.1.18. ANC350_StepCount 63
VIII.1.19. ANC350_MoveReference.vi 63
VIII.1.20. ANC350_StopMoving.vi 63
VIII.1.21. ANC350_StopDetection.vi 64
VIII.1.22. ANC350_StopApproach.vi 64
VIII.1.23. ANC350_CapMeasure.vi 64
VIII.1.24. ANC350_DCLevel.vi 65
VIII.1.25. ANC350_StaticAmplitude.vi 65
VIII.1.26. ANC350_ResetPosition.vi 65
VIII.1.27. ANC350_GetStepWidth.vi 66
VIII.1.28. ANC350_GetSpeed.vi 66
VIII.1.29. ANC350_GetReference.vi 66
VIII.1.30. ANC350_SetIntEnable.vi 67
VIII.1.31. ANC350_GetIntEnable.vi 67
VIII.1.32. ANC350_SetDcInEnable.vi 67
VIII.1.33. ANC350_GetDcInEnable.vi 68
VIII.1.34. ANC350_SetAcInEnable.vi 68
VIII.1.35. ANC350_GetAcInEnable.vi 68
VIII.1.36. ANC350_GetDCLevel 69
VIII.1.37. ANC350_AmplitudeControl.vi 69
VIII.1.38. ANC350_TriggerModeIN.vi 69
VIII.1.39. ANC350_TriggerModeOUT.vi 70
VIII.1.40. ANC350_Trigger.vi 70
VIII.1.41. ANC350_TriggerAxis.vi 70
VIII.1.42. ANC350_TriggerPolarity.vi 71
VIII.1.43. ANC350_TriggerEpsilon.vi 71
VIII.1.44. ANC350_ QuadratureAxis.vi 71
VIII.1.45. ANC350_ QuadratureInputPeriod.vi 72
VIII.1.46. ANC350_QuadratureOutputPeriod.vi 72
VIII.1.47. ANC350_ ExternalStepFwdInput.vi 72
VIII.1.48. ANC350_ ExternalStepBkwInput.vi 73

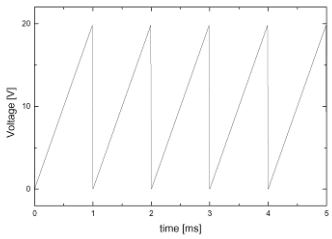
VIII.1.49. ANC350_ ExternalStepInputEdge.vi 73
VIII.1.50. ANC350_SingleCircleMode.vi 73
VIII.1.51. ANC350_SetStopDetectionSticky.vi 74
VIII.1.52. ANC350_ClearStopDetection.vi 74
VIII.1.53. ANC350_BandwidthLimitEnable.vi 74
VIII.1.54. ANC350_GetBandwidthLimitEnable.vi 75
VIII.1.55. ANC350_GetRotCount.vi 75
VIII.1.56. ANC350_ GetReferenceRotCount.vi 75
VIII.1.57. ANC350_SetHardwareID.vi 76
VIII.1.58. ANC350_SetTargetPos.vi 76
VIII.1.59. ANC350_MoveAbsoluteSync.vi 76
VIII.1.60. ANC350_SensorPowerGroupA 77
VIII.1.61. ANC350_SensorPowerGroupB 77

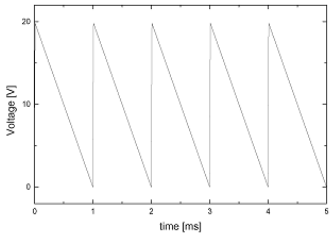
© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

I. System Overview

The ANC350 electronics is a sophisticated open- and closed loop positioning and scanning controller, allowing the simultaneous operation of up to six piezo-driven positioners and/or scanners. The ANC350 can be controlled either directly from the front panel or, alternatively, with the help of the "DAISY" software provided by attocube.

In addition, a *.DLL-file is provided for the integration of ANC350 software control in your own programs. For synchrotron applications specs and EPIC drivers are also available.





With the ANC350 controller, you are able to drive attocube positioners either open-loop or closed-loop (only for encoded positioners). In both cases, two different driving modes are available, namely stepping mode and fine positioning mode.
Closed-loop positioning can be achieved in an either absolute or relative coordinate system. Both modes allow the most accurate operation and control since the position of the piezo stage is controlled and adjusted by the controller in real-time.

Stepping mode:
In this mode a saw-tooth-shaped driving signal as shown in the figure to the left is applied to the positioning stages. The amplitude and frequency of the signal can be adjusted to the positioner and the application.
The motion created by the depicted driving signal corresponds to several subsequent steps, where the step size is mainly dependant on the amplitude of the signal.

Fine positioning mode:
In this mode, a DC-Voltage signal is applied to the positioner which causes an elongation of its built-in piezo ceramic. The travel range of this mode is limited by the maximum extension of the piezo, typically on the order several micrometers.

For attocube scanners, the ANC350 controller can also be used as dedicated high voltage amplifier with a gain factor of 14. The ANC350 has an input range of 0-10 V and a differential high-voltage output of 0-140 V. In addition, a built-in voltage source allows the positioning the scanners without the need for external voltage input.

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

II. Setup Procedure

II.1. Mechanical Installation

Setting up
Please unpack the controller and the delivered positioning stages (if applicable) carefully and inspect them for any damage. Place all components on a flat and clean surface.



Caution. When setting up the ANC350 controller for first use, it should be positioned in such a way that the operation of the power supply plug and switch on the rear panel is not impeded. Ensure that proper airflow is maintained to the unit. Do not obscure the ventilation holes.



Warning. Operation outside the following environmental limits may adversely affect the safety of the operator:

- Indoor use only
- Maximum altitude 2000 m
- Temperature range 5°C to 40°C
- Maximum humidity less than 80% RH (non-condensing) at about 30°C

To ensure reliable operation, the unit should not be exposed to corrosive agents or excessive moisture, heat or dust. If the unit has been stored at a low temperature or in an environment of high humidity, it must be allowed to reach ambient conditions before being powered up.



Caution. In applications requiring the highest level of accuracy and repeatability, it is recommended that the controller unit is powered up approximately 30 minutes before usage in order to allow the internal temperature to stabilize.



Caution. Do not connect any cabling longer than 5 m. Longer cabling may increase the sensitivity of the device to external influences.



Caution. Only use control cables supplied by attocube systems. Other cabling may affect the sensitivity of the device to external influences or may cause errors.

II.2. Electrical Installation

Connect the controller to the voltage supply:



Warning. The unit must be connected to a grounded and fused supply of 100 V, 115 V, or 230 V. The voltage selector on the rear panel has to be adjusted to match the voltage value of the power supply line.



Warning. Only use power supply cables supplied by attocube systems, other cables may not be rated to the same current. The unit is shipped with appropriate power cables for usage in the UK, Europe, and the USA. When shipped to other territories, the appropriate power plug has to be provided by the user.

Start the controller:



Note. When the unit's main power switch is turned on, the system will boot. This may take several seconds. Flashing of the green LED on the master module will indicate the booting process.

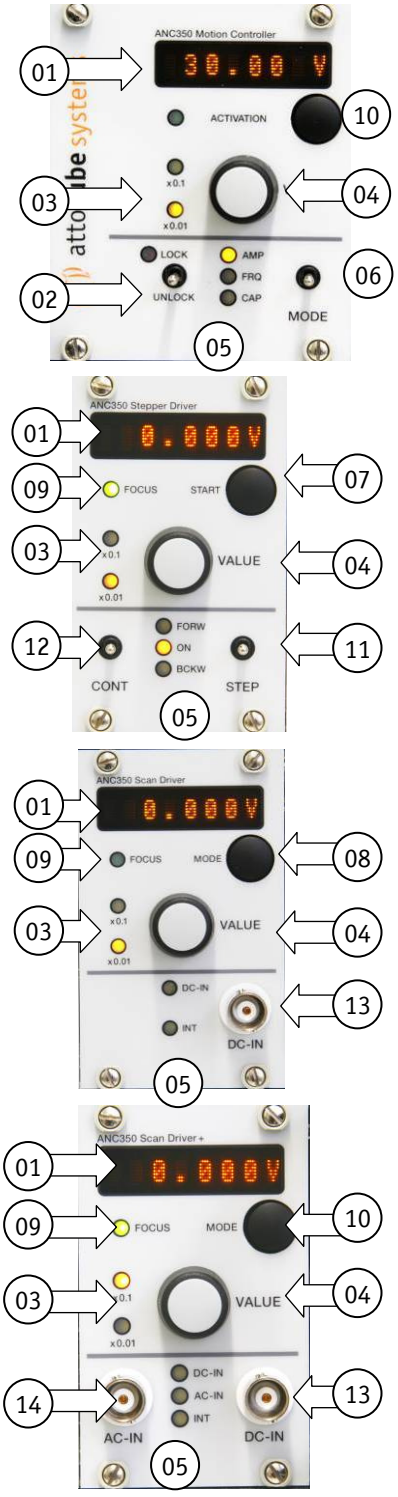
II.3. Front Panel Controls and Indicators



Master	Axis 1 Stepper	Axis 2 Stepper	Axis 3 Stepper	Axis 4 Scanner	Axis 5 Scanner	Axis 6 Scanner	Axis 7 Dither

The front panel of the ANC350 consists of a single panel for the *master module* (ANC350 Motion Controller), and up to seven individual panels, each corresponding to one output axis. On the following page, these panels are described in detail.

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.



1) Display

2) Lock / unlock switch with lock / unlock LED [on / off]
   (only on main module)

3) Resolution indicator LEDs [1 | 0.1 | 0.01]

4) Value dial [change value | toggle resolution by pressing]
   on scan module: confirm mode
   on dither module: confirm mode

5) Mode indicator LEDs
   on main module: amplitude | frequency | capacitance
   on step module: forward | backward | output off
   on scan module: DC-IN | Internal | output off
   on dither module: DC-IN | AC-IN | Internal | output off

6) Mode switch
   on main module: amplitude | frequency | capacitance

7) Mode switch / button
   on step module: reset | output off | offset/distance

8) Mode switch / button
   on scan module: DC-IN | Internal | output off
   on dither module: DC-IN | AC-IN | Internal | output off

9) Focus LED
   on step, scan, and dither module: indicates active module

10) Activation button
    on main module: check capacitance

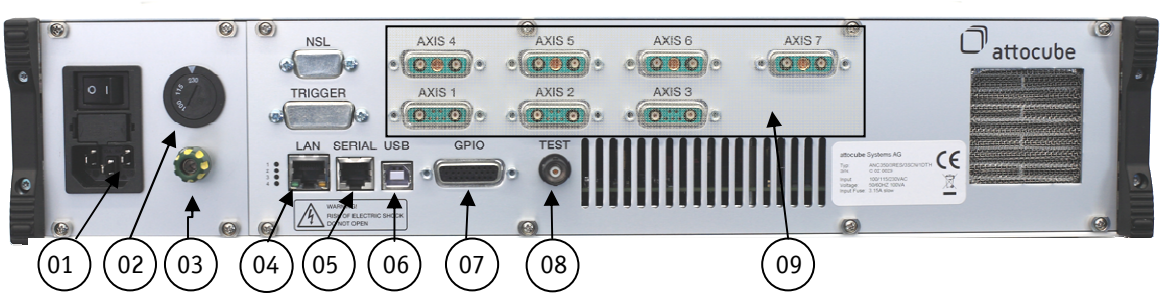
11) Stepping switch
    on step module: single step [up / down]

12) Stepping switch LED
    on step module: continuous [up / down]

13) DC-IN input BNC plug
    only on scan, and dither module

14) AC-IN input BNC plug
    only on dither module

II.4. Rear Panel Connections



On the back panel, there are:

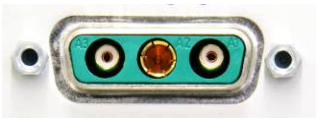
01 main power switch
main fuse
main power supply connector,
(110 V / 115 V / 220 V, 50 Hz – 60 Hz, max. 20 VA)
02 voltage selector (100 V / 115 V / 220 V)
03 GND socket
04 Ethernet port (optional)
05 RJ-12 port (for internal use only)
06 USB port for connection to a computer
07 trigger connector (Sub-D, 15-pin)
08 BNC connector for the Test-Output (for internal use only)
09 positioner connectors: Sub-D mix connectors
(max. 70 V / 140 V, 4.5 A), up to seven axes



Connector for /NUM encoded system



Connector for /RES encoded system
Piezo drive connector for NUQ-system, readout over SubD15



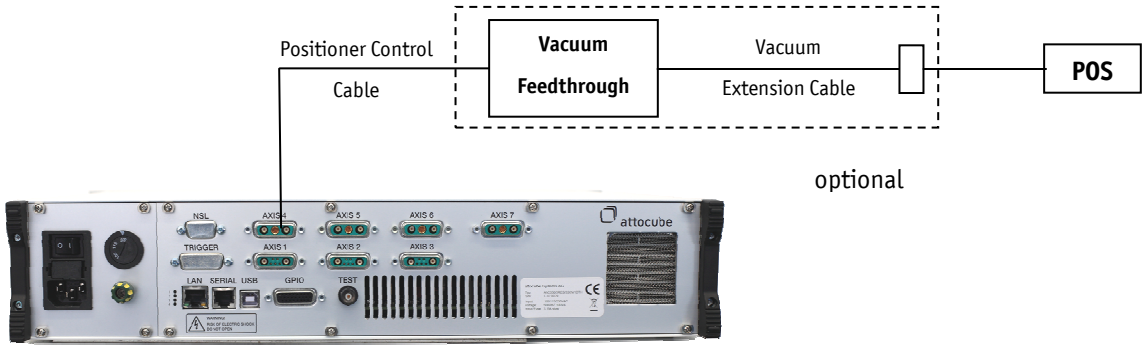
Connector for /SCN system

Axes arrangement on rear panel (“A” designates “axis”):

A4	A5	A6	A7
A1	A2	A3	

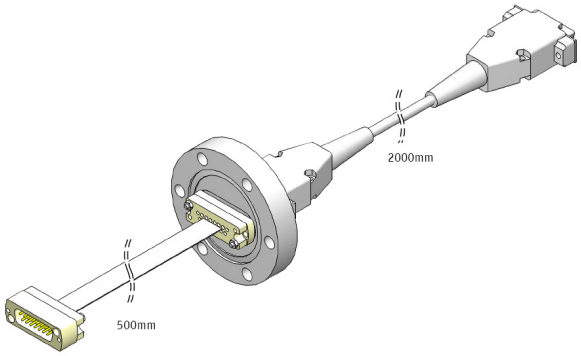
© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

How to connect a positioner:



For more information on the specific types of positioners and connectors please see chapter III.2.

Optional vacuum feedthrough:
In addition to all attocube positioning systems, specific vacuum feedthroughs are available as an option. As an example, the image below depicts a feedthrough for a single /NUM-positioner. Vacuum feedthroughs for multiple axes are also availible. For more information please visit us at http://attocube.com/nanoPOSITIONING/feedthroughs.htm or inquire at sales@attocube.com .
With every feedthrough, an alternative-adapter is delivered allowing the testing the whole system whithout dismantling the original feedthrough.



Vacuum feedthrough /NUM-positioner



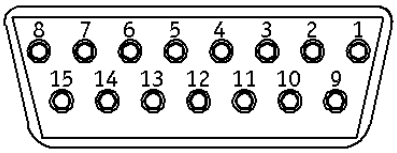
alternative-adapter

III. Pin Assignment

III.1. TTL Trigger Connector

The ANC350 allows *outputting* LVTTL trigger signals depending on the actual position of a connected piezo positioning stage. For further details regarding this feature please refer to chapter VI.6. In addition, modules and stages can be controlled by external trigger *inputs*, such as frequently used for the coarse approach of scanning probe microscopes (see chapter VI.7). The pin assignment of the female 15-pin Sub-D connector at the rear side of the ANC350 for the trigger output and input signals is given in the table below:

PIN #	Pin Assignment	PIN #	Pin Assignment
1	Output trigger 1	9	Input trigger 1
2	Output trigger 2	10	Input trigger 2
3	Output trigger 3	11	Input trigger 3
4	Output trigger 4	12	Input trigger 4
5	Output trigger 5	13	Input trigger 5
6	Output trigger 6	14	Input trigger 6
7	GND	15	GND
8	+3.3V		



The ANC350 uses LVTTL logic operating at a maximum Voltage of 3.3V. In the table below, all threshold values of the LVTTL logic are translated to the 5V-TTL logic.

	Input		Output	
Technology	Low (V_{IL})	High (V_{IH})	Low (V_{OL})	High (V_{OH})
LVTTL 3.3V	≤ 0.8	≥ 2.0	≤ 0.4	≥ 2.4
TTL 5V	≤ 0.8	≥ 2.0	≤ 0.4	≥ 2.4



Warning. Do not under any circumstances attempt to connect the digital I/O to any external equipment that is not galvanically isolated from the mains. In addition to the damage that may occur to the controller there is the risk of serious injuries and fire hazard.

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

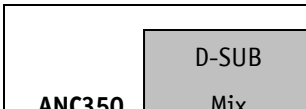
III.2. Positioner Control Cables

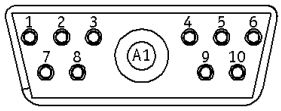
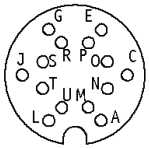
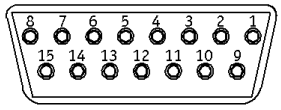
Positioner control cables are used to connect the ANC350 electronics to any of attocube's positioners and scanners. attocube provides these cables along with each delivered axis by default. Nevertheless, for self-construction or customization purposes, cabling specifications as well as pin assignment are listed below.

Caution. Avoid short-circuits. Be careful not to cause short-cuts between the contacts in the Sub-D-Mix connector or anywhere in the cabling.

Cable Layout for /NUM

Connectors and Cabling: (figures illustrates front view of connectors)



	D-SUB MIX connector, male, 11-pin Connector: FM11W1P-K120 High power contact (A1)
	Circular plug-in connector, female Type Binder 678, 14-pin **→ Used for room temperature applications**
	Standard D-SUB connector, female, 15-pin **→ Used for vacuum applications**
	Control Cable Type e.g. LiY-LiY(CB)-Y, 12-pin, 6x2x0.14, twisted in pairs, one pair extra shielded (driving signal)

Pin Assignment:

Control Cable, 12-pin., shielded (/NUM)				
SUB-D MIX, 11-pin	Sensor I/O (1 Vss)	Piezo voltage	RT Circ. plug-in connector 14-pin	HV/UHV SUB-D 15-pin
1	U0+		N	1
2	Pos-Con		G	5
3		- OUT	U	10
4		+ OUT	T	11
5	U1+		L	3
6	U2+		R	13
7	U0-		O	15
8	UB=5V		S	12
9	U1-		J	4
10	U2-		P	14
A1	GND		E	6
			A,C,M not connected	2,7,8,9 not connected

Caution.

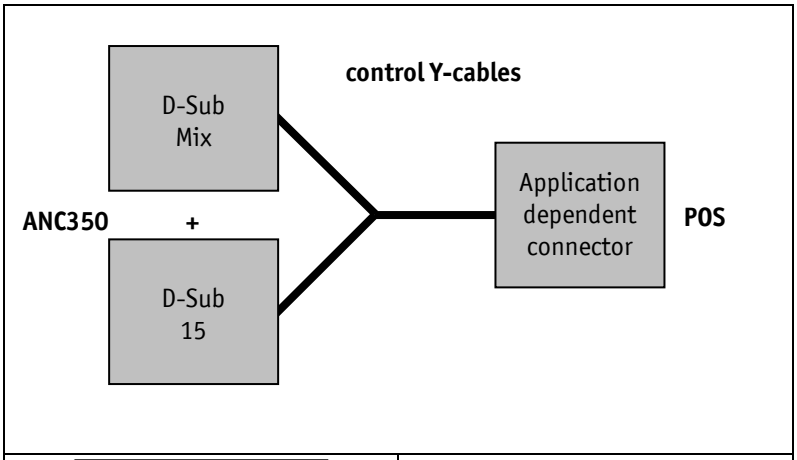


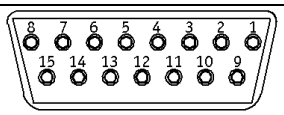
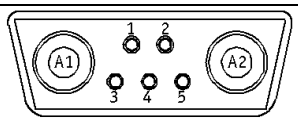
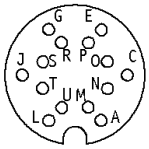
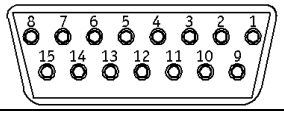
- The pin-numbers of the feed through will be different from the numbers of the vacuum cable [Sub-D 15-pin]. 1⇔8; 2⇔7;3⇔6;4⇔5; 9⇔15; 10⇔14; 11⇔13
- Make sure not to connect cabling with a wire resistance >5Ω.
- Use EMV-housings as enclosure for the SUB-D connectors
- Use the extra shielded twisted pair wires for the piezo voltage supply to avoid interference with the sensor signal.

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

Cable Layout for /NUQ

Connectors and Cabling:



	Standard D-SUB connector, male, 15-pin
	D-SUB MIX connector, male, with 2x coaxial contacts Connector: FM-7W2P-K120 Coaxial contacts (A1, A2)
	Circular plug-in connector, female Type Binder 678, 14-pin **→ Used for room temperature applications**
	Standard D-SUB connector, female, 15-pin **→ Used for vacuum applications**

Pin assignment:

Y - Control Cable, 14-pin., shielded (/NUQ)				
SUB-D MIX, 9-pin			RT	HV/UHV
	Sensor I/O	Piezo voltage	Circular plug-in connector 14-pin	SUB-D 15-pin female
A1		-	U	10
A2		+	T	11
	5V		S	12
	GND		E	6
	DCLK-		M	8
	DCLK+		G	7
	nSS-		C	5
	nSS+		A	4
	CLK-		O	3
	CLK+		N	2
	MOSI-		J	10
	MOSI+		L	9
	MISO-		P	12
	MISO+		R	13



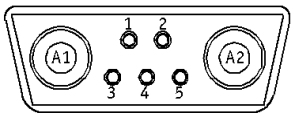
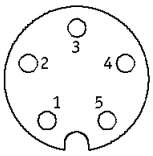
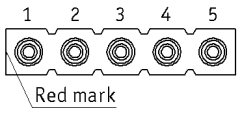
Caution.

- The pin-numbers of the feed through will be different from the numbers of the vacuum cable [Sub-D 15-pin]. 1⇔8; 2⇔7;3⇔6;4⇔5; 9⇔15; 10⇔14; 11⇔13
- Make sure not to connect cabling with a wire resistance >5Ω.
- Use EMV-housings as enclosure for the SUB-D connectors
- Use the extra shielded twisted pair wires for the piezo voltage supply to avoid interference with the sensor signal.

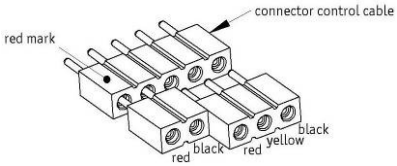
© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

Cable Layout for /RES

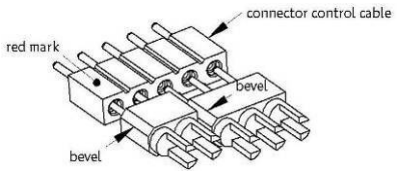
Connectors and Cabling: (figures illustrates front view of connectors)

ANC350 — D-SUB Mix — Control Cable — Application dependent connector — **POS**	
	D-SUB MIX connector, male, with 2x coaxial contacts Connector: FM-7W2P-K120 Coaxial contacts (A1, A2)
	Circular plug-in connector, female Type Binder 678, 5-pin **→ Used for room temperature (RT) applications**
	Socket board connector, 5 pin, female, raster 2.0mm **→ Used for low temperature (LT) and vacuum (HV/UHV) applications**
	Control Cable Type e.g. LiY-LiY(CB)-Y, 6-pin, 3x2x0.14/12, twisted in pairs, one pair extra shielded (driving signal)

Connecting scheme for non-vacuum positioners



Connecting scheme for vacuum positioners



Pin Assignment:

SUB-D MIX, 9-pin	Sensor I/O	Piezo voltage	RT	LT/HV/UHV	HV/ UHV	LT
			Circ. plug-in con. 5-pin	Socket board con. 5-pin	Positioner pin plug	
1	Sens -		5	5	not beveled 3-pin	black 3-pin
2	GND		5	5		
3	Sens +		4	4	middle	yellow
4	RES-CON					
5	U_0		3	3	beveled 3-pin	red 3-pin
I-A1		-OUT	2	2	not beveled 2-pin	black 2-pin
S-A1						
I-A2		+OUT	1	1	beveled 2-pin	red 2-pin
S-A2						
Jumper 4 to 2						
R=1MΩ between 1 and 3						



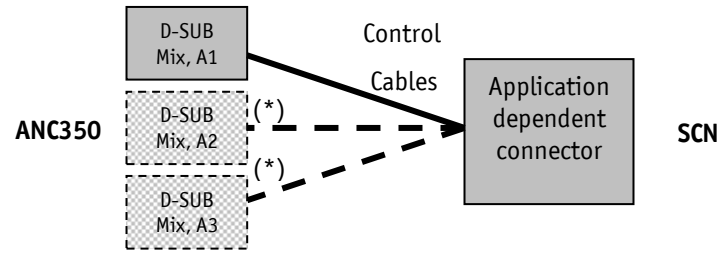
Caution.

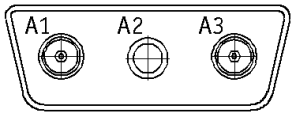
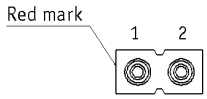
- Make sure not to connect cabling with a wire resistance >5Ω.
- Use EMV-housings as enclosure for the SUB-D connectors
- Use the extra shielded twisted pair wires for the piezo voltage supply to avoid interference with the sensor signal.

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

Cable Layout for /SCN

Connectors and Cabling: (figures illustrates front view of connectors)



	D-SUB MIX connector, with 2x coaxial contacts and 1x high power contact Connector: FM-3W3P-K120 Coaxial contacts (A1, A3) High power contact (A2)
	Socket board connector, 2 pin, female, raster 2.0mm **→ Used for low temperature (LT) and vacuum (HV/UHV) applications**
	Control Cable Type e.g. LIFYCY, 2-pin, 1x2x0.14/14, twisted pair

Pin Assignment:

SUB-D MIX, 5-pin	Piezo voltage	Socket board connector, 2-pin	Positioner pin plug	
			LT	HV/ UHV
I-A1	-OUT	2	black	not beveled
S-A1				
A2				
I-A3	+OUT	1	red	beveled
S-A3				

Caution.

- Make sure not to connect cabling with a wire resistance >5Ω.
- Use EMV-housings as enclosure for the SUB-D connectors.
- The Output of the scan drivers is differential, so output can be up to -70V. Do not use BNC-connectors!

IV. Manual Use of Front Panel

The front panel consists of four different types of modules; one *master module* (ANC350 Motion Controller, see figure below) and three types of individual modules: A *step module,* a *scan module*, and a *dither module*. All three modules can be arbitrarily combined to best match the application of the user.

IV.1. ANC350 Motion Controller (Master Module)



With the *master module*, one can control both amplitude and frequency for each individual module, measure the capacitance of connected piezoelectric elements, and lock the control panel.

LOCK/UNLOCK: After turning on the ANC350, the front panel interface is locked by default. To unlock, simply turn the "LOCK/UNLOCK"-switch to the UNLOCK position. By switching to the "LOCK"-position, the front panel can be locked at any time if so desired. When locked, the red LED is illuminated.

The settings displayed by the *master module* always refer to the *axis module* in "FOCUS". Whether or not an individual module is focused on is indicated by a *green* LED on the corresponding module, labeled "FOCUS". In order to lift a certain *axis module* in the "FOCUS"-state, simply press any knob/switch of this specific module. This action will activate the *axis module*, but not alter its individual setting. Note: It is not possible to modify the settings of modules not in "FOCUS".

MODE: Using the "MODE"-switch, *amplitude* (AMP) and *frequency* (FRQ) values for each *axis module* can be set. The display of the *master module* will automatically show the current parameters for the *axis module* in focus. Simply adjust this value by rotating the turning knob. The adjustment step size can be varied in three steps from "x0.01" to "x1.0" by pressing the knob. A yellow LED indicates a "x0.1" and "x0.01" setting; without any LED illuminated, the step size is "x1.0".
By selecting the "MODE"-function *capacitance* (CAP), the capacitance of the piezo element connected to the axis in "FOCUS" is measured. In order to start or refresh this measurement, press the "ACTIVATION"-button.
By pressing the "ACTIVATION"-button in *amplitude mode,* the "*Automatic Amplitude Control*" is activated (green LED) for the axis in "FOCUS". "*Automatic Amplitude Control*" adjusts the amplitude of the piezo drive voltage in order to achieve a constant step size. This step size corresponds to the amplitude value selected on the master module.

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

IV.2. ANC350 Stepper Driver (Step Module)



With the *step module,* one can control the motion of a positioner by either defining a certain target position (closed-loop) or by manually performing several steps (open-loop).

Prior to operation, make sure that the positioner is connected to the control unit correctly. Afterwards, enable the output of the step module by lifting it into "FOCUS" (press any button) and by pressing and holding the "START" button for approx. two seconds. Once the module is turned on, the yellow "ON"-LED in the lower part of the module is illuminated. Using the same method, the output can also be disabled. In this status ("ON"-LED off), the axis is set to GND level.

The *step module* can be operated in either *positioning* or *fine-positioning mode*. Use the "START"-button to toggle between these two modes.

Note: The module can only be turned on and off in *Fine positioning mode*, i.e. whenever the display shows "x.xxxV".

Positioning mode: The module shows "±xxxx.xx" on its display, corresponding to the positioners's absolute position. By turning the "VALUE" knob, the set-position can be adjusted, causing the positioner to follow the input value instantly (closed loop).

In contrast to the closed-loop functionality of the "VALUE" knob, the switches "STEP" and "CONT" allow open loop positioning. By pressing the "STEP"-switch, the positioner takes a single step, whereas pressing the "CONT"-switch causes the positioner to make continuous steps as long as the switch is being held. If the "CONT" and the "STEP" switches are pressed simultaneously, continuous stepping mode is enabled until one of these switches is operated again. The travel direction of the positioner depends on the direction these switches are pressed and will be indicated by respective yellow LEDs (up→forward (FORW); down→backward (BCKW)).

Note: If "*Automatic Amplitude Control*" of the corresponding axis is turned off, the "VALUE"-knob of the *master module* can be used to select the desired driving voltage for the "STEP" as well as the "CONT"-positioning.

Fine positioning mode: The display shows "x.xxxV", corresponding to the DC voltage applied to the piezo element. By varying this voltage (turning the "Value"-knob), the position of the translation stage can be varied with nanometer resolution. The standard positioning functions of both "STEP" and "CONT" switches are also accessible in this mode.

IV.3. ANC350 Scan Driver (Scan Amplifier and Module)



With the Scan module, a dedicated scanner (providing a linear movement proportional to any applied voltage) can be operated. The scan module has different modes of operation and can be driven by both internal and external voltage sources, working either as voltage supply or as voltage amplifier.

To turn on the scan module, put it in "FOCUS" first by either pressing the "MODE" button or turning the "VALUE" knob. Next, enable the output by pressing and holding the "MODE" button for approx. two seconds. An operational scan module is indicated by yellow illuminated LEDs (**DC-IN** / **INT**), located in the lower section of the front panel. The module can also be disabled by pressing and holding the "MODE" button; in this case, the LEDs are switched off and the output is set to GND.

After turning on the unit, the display shows "x.xxxV" by default, corresponding to the DC voltage applied to the piezo element. Simply adjust this voltage by turning the "VALUE" knob for manual operation. The rate can be varied in three steps from "x0.01" to "x1.0" by pressing the knob. Yellow LEDs indicate "x0.1" or "x0.01" settings; no LED illuminated corresponds to "x1.0".

The ANC350 Scan module has three working modes: "INT", "DC-IN" and "INT & DC-IN". To toggle between these modes, simply press the "MODE" button and **confirm** your selection by pressing the "VALUE" knob.

INT: In this mode, an internally generated DC-voltage of up to 140V is supplied to the respective axis. The voltage magnitude can be adjusted by turning the "VALUE" knob, as described above. The INT mode is indicated by a yellow illuminated "INT" LED.

DC-IN: Here, an external DC-voltage of 0...10V is amplified by a factor 14 and supplied to the scanner. If this mode is activated, the yellow "DC-IN" LED is lit. The external DC-voltage needs to be connected to the "DC-IN" BNC connector on the Scan Driver's front panel.

INT & DC-IN: In the third mode, an internal offset is added to the externally supplied and amplified voltage. This mode is activated when both LEDs are illuminated. The magnitude of the internal offset can be adjusted by turning the "VALUE" knob.



Note: Unless a mode selection is confirmed by pressing the "VALUE" knob, the scan module is still in its mode previously confirmed. This safety feature is implemented to avoid unintentional mode changes.



Caution: The output of the Scan Driver is differential, i.e. for maximum output voltage, the negative output is set to -70V. Be careful with using BNC connectors in your setup.

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

IV.4. ANC350 Scan Driver+ (Dither Module)



The ANC350 Scan Driver+ differs from the standard scan module by having four additional working modes. To toggle between these modes, simply press the "MODE" button and **confirm** your selection by pressing the "VALUE" knob.

AC-IN: In this mode, an external AC-voltage with 0...10V amplitude is added to the output signal of the Scan Driver+ module with no amplification. A yellow "AC-IN" LED indicates operation of this mode. (Currently, the "AC-IN" mode is operational at all times, independent of the LED status). The external AC-voltage needs to be connected to the "AC-IN" BNC connector on the front panel of the module (located in the lower left corner).

AC-IN & DC-IN: In this mode, an external DC-voltage with 0...10V amplitude is amplified by a factor 14. Any external AC voltage supplied to the AC-IN connector is directly added to the amplified DC signal with gain 1, i.e. no amplification. The "AC-IN" LED together with the "DC-IN" LED indicate this mode.

AC-IN & INT: The external AC-voltage is added to the (amplified) internal DC-voltage with gain 1. The "AC-IN" LED together with the "INT" LED indicate this mode.

AC-IN & DC-IN & INT: In this mode, the external DC-Voltage, and the internal voltage are added and amplified by a factor of 14. The external AC voltage is subsequently added to the amplified signal with gain 1. The "AC-IN" LED in combination with the "DC-IN" LED and the "INT" LED indicate this mode.

The additional "AC-IN" option makes the Scan Driver + the module of choice for atomic force microscopy.

Note. Unless a mode selection is confirmed by pressing the "VALUE" knob, the dither module is still in its previously confirmed mode. This safety feature is meant to avoid unintentional mode changes.

Note. In contrast to the step and scan module, only one dither module can be integrated into the ANC350 controller.

V. Software

V.1. Hardware Requirements

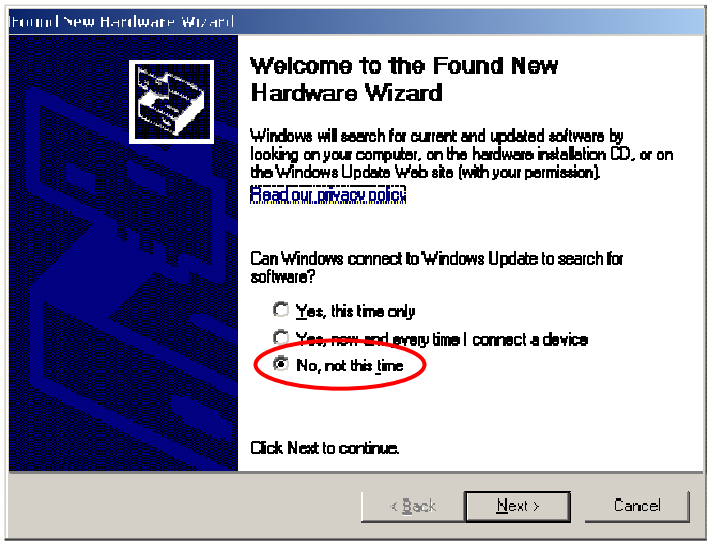
A standard x86- or x64-PC with a USB2.0 port is required to operate the software for the ANC350 Motion Controller.

V.2. Operating System

The current version of the ANC350 software is compatible with Microsoft Windows 2000 ®[TM*], Microsoft Windows XP ®[TM*], Microsoft Windows Vista ®[TM*] and Microsoft Windows 7 ®[TM*]. Corresponding drivers are included on the installation CD.

Note. In order to computer control the ANC350 Motion Controller, both hardware driver and DAISY software need to be installed. Driver and software are installed separately, see sections V.3 and V.4.

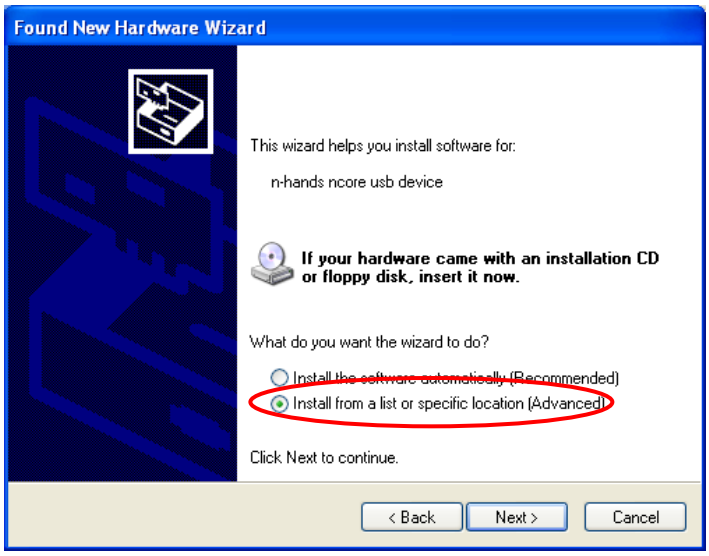
V.3. Hardware Driver Installation



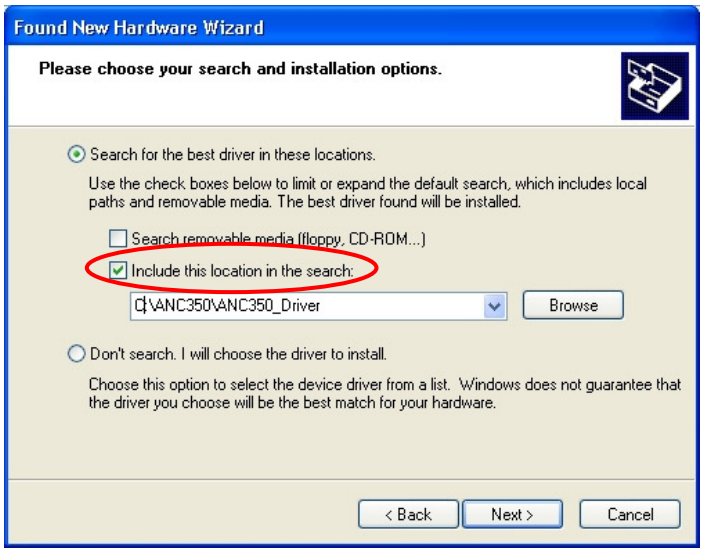
Connect the USB cable to both computer and ANC350 Motion Controller. Once connected, the new hardware wizards (shown to the left) will pop up. Do not let the wizard search for drivers automatically; instead choose: 'No, not this time' as indicated in the screenshot to the left. Choose "Next" to get to the next window.

[*)]Windows, MS, Windows Logo, Microsoft, Windows XP are registered trademarks or trademarks of Microsoft Corporation in the US and or in other countries.

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.



In the subsequent window, choose "Install from a list or specific location (Advanced)". Click "Next".



In the next window, cause the wizard to search for the driver at a defined location. Check: "Include this location in the search" and choose either the CD-Rom path if the driver is installed from CD or the path where you copied the folder ANC350 Driver to.

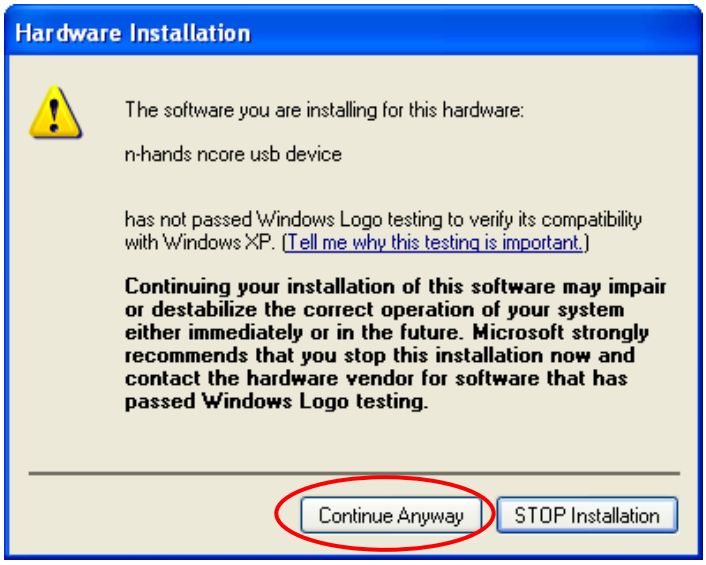
If installing from CD, choose the following path:

\Software\ANC350_Software\
ANC350_USB_Driver\

or

\Software\ANC350_Software\
ANC350_USB_Driver\

Click "Next".



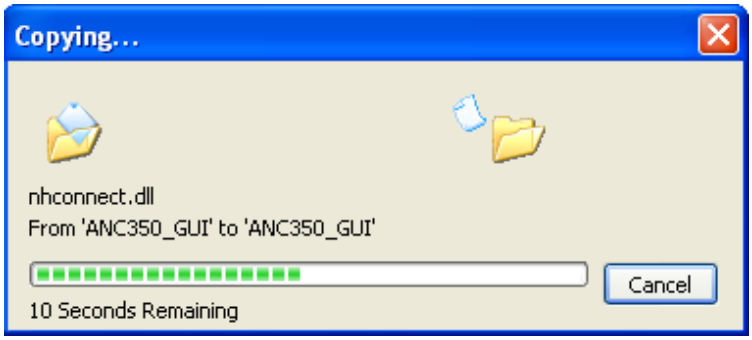
In some cases, another window may pop up claiming that the driver didn't pass the Windows®*) Logo testing. Select 'Continue Anyway'.



Finish the installation by pressing the 'Finish' button.

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

V.4. DAISY Software Installation



For the installation of the DAISY software, please copy the folder *\Software\ANC350_Software\ANC350_v1440\ANC350_GUI* on the enclosed CD and all of its contents to a new folder on your hard drive. In order to launch the software, simply execute the file *daisy.exe* within the new folder (an installation of the software is not required). If desired, a shortcut to the program can be created on the desktop.





When initially executing the file "daisy.exe", a warning message may appear in case the Microsoft Windows XP®*) firewall is activated. Choose "Do not block again" to go ahead.

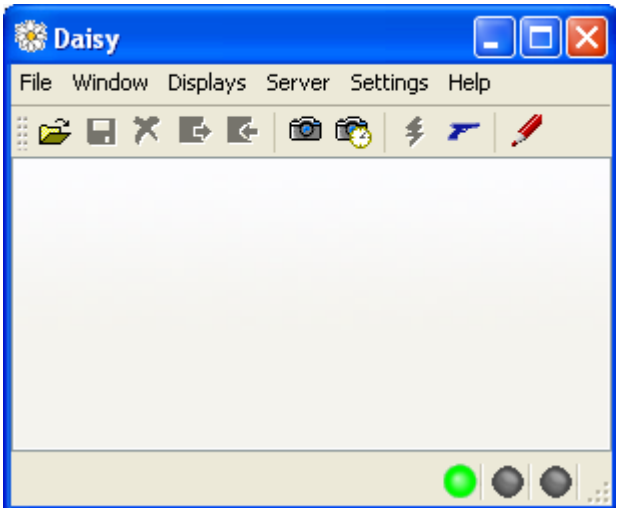
Other firewalls may show slightly different warnings.

VI. Starting the System

The ANC350 positioning system can be fully controlled with the DAISY software. In the following, a detailed description on how to operate this software is given.

VI.1. Starting the System – Main Window (DAISY)

After launching the software [Daisy.exe], the ANC350 hardware is automatically booted, causing the following window to appear.



First of all, check if the (left) status LED in the lower right is illuminated, verifying a proper connection between ANC350 and the host PC. There are three LEDs in this software window, possessing the following functionalities:

left LED: "*Connection to Server*" → ***green*** if connection to the ANC350 is established, otherwise *red*.

middle LED: "Receiving Data" → always ***grey*** when using an ANC350

right LED: "Data Overflow" → always ***grey*** when using an ANC350

If the left LED is illuminated ***red***, check all connections and driver installation.

The ANC350 can be connected to the host PC via USB or Ethernet. By starting up the system, the software will look for connected ANC350s. Any motion controller connected via USB will be linked first. Note: Only **one** ANC350 can be connected at any one time with the DAISY.

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

The following symbols, located below the menu bar, allow fast access to several important functions as described below. The same commands are, however, also accessible from the menu bar itself.



open a user interface



save current data (settings, etc.) into a user interface (.ngp data). Choose "ANC350.ngp" when using the ANC350 or create your own file.



close an user interface



detach the user interface window from the DAISY environment



move detached user interface back to the DAISY environment



immediate **snapshot** of all displays



snapshot of all displays when completed next time



start application server, only active (*yellow*) when there is no connection, otherwise *grey*



shut down application server, only active (*blue*) when there is a connection, otherwise *grey*



open the settings dialog of the DAISY software

VI.2. Starting the GUI

To open up the ANC350 user interface window, select "File/Load File" from the menu or press the open button , respectively. Now, select an ANC350 profile (*.ngp-file). This can either be the attocube preset "ANC350_x.ngp" (where "x" represents the number and types of modules integrated in the controller) or an individually created file. Press "Enter" after selecting a profile. The ANC350 graphical user interface (GUI) will appear (see figure on the next page).

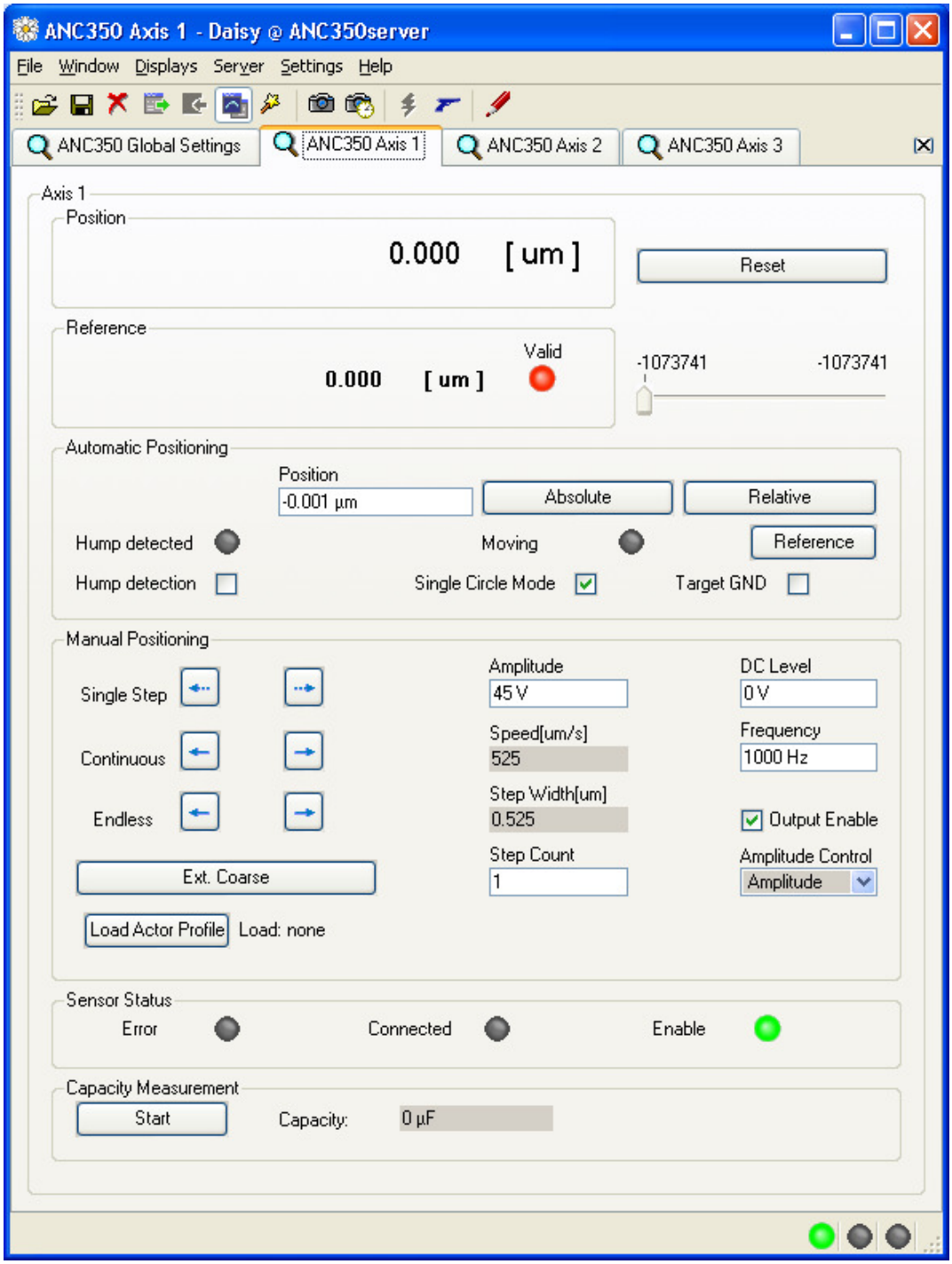


Note: Generally, an ANC350 GUI profile (*.ngp-file) consists of individual panels (*.ngc-files). In simple words, these panels designate input arrays for axis controls, trigger settings, global settings, and update procedures. In addition, these panels include all parameters necessary for the positioning or scanning process.
The user has the possibility to open, close, or alter panels and save the created individual profile with the command “File/Save as …”.
The main window of the attocube profile “ANC350_x.ngp”, for example, combines the axis control panels for x individual axes and the global settings panel. To switch between the individual panels, simply choose the corresponding flag on top of the window. It is also possible to place several axis control windows next to each other by detaching them from the DAISY environment by either double clicking on control window or pressing the  button.

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

VI.3. Software – Axis Control

The following figure shows the features available for each axis:



The software allows entering values for some parameters such as position, amplitude and frequency of a positioning stage into specific input fields.

Note: All values typed into respective input fields need to lie within a certain range allowed by the software. Typed values need to be confirmed by hitting the "Enter"-button. Unless a value is confirmed, the ANC350 uses the last confirmed value.

With respect to input confirmation, three different display modes may appear:

A ***green box*** indicates an allowed value which needs to be confirmed.

A ***red box*** indicates a value outside the allowed range.

A ***white box*** indicates an allowed and subsequently confirmed value.

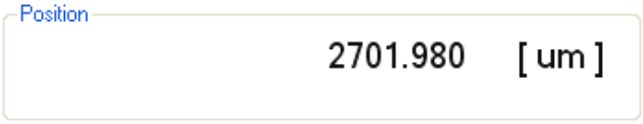
Note: Before operating any axis the "Actor Profile" of the respective positioner needs to be loaded into the software. The specific command to perform this action is located in the "Manual Positioning" array and will be described in detail later. This procedure will import positioner-characteristic parameters into the GUI and guarantees an accurate positioning.

In the following, the different features available for each axis will be explained in detail:

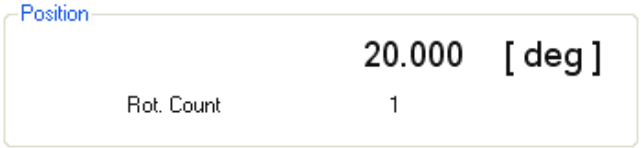
Position

This indicator displays the current position of the positioner connected to the respective axis. The unit corresponding to the indicated number is given in the brackets after the number. If a rotary positioner (ANR) is used, an additional counter indicates the number of revolutions.

Linear positioner:



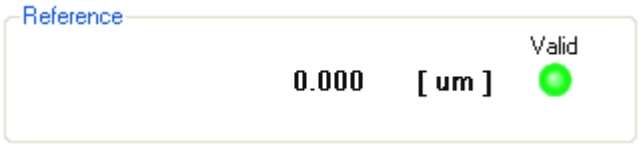
Rotary positioner:



© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

Reference

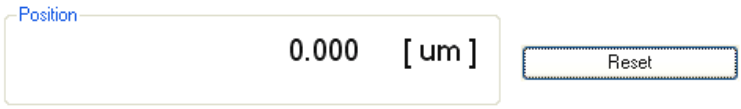
This display refers to the /NUM system only. In contrast to the /RES system, which is reading out an absolute position, the /NUM system uses an incremental encoding method.
Each /NUM positioner has its individual reference position, given by a physical marker on an optical grating mounted in the inside of the positioning stage. Due to the physical nature of this marker, the reference position does exist even after closing the DAISY software or shutting down the ANC350.
The value indicated in the 'Reference'-field corresponds to the distance between the position of the reference mark and the current zero-position.
If the computer read-out is restarted, the positioner needs to be moved across the mark once in order to initialize its reference position.



Only after this process, the read-out provided by the software is accurate, indicated by a green LED "VALID". If no referencing has been performed, the LED is lit red.

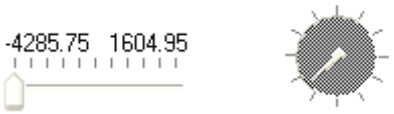
Reset

Pressing this button resets the current position to "0". The reference value is updated automatically. This feature is only valid for the /NUM system.



Graphical Position Indicator

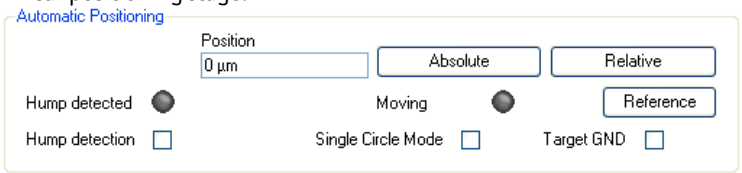
As an additional useful feature, the current position of a /RES or / NUM positioning stage is displayed by means of a graphical indicator. Depending on the positioner type (determined by the uploaded actor profile), either a *linear* or a *rotary progress bar* is displayed. The marginal values are updated automatically as soon the positioner detects a mechanical end stop.



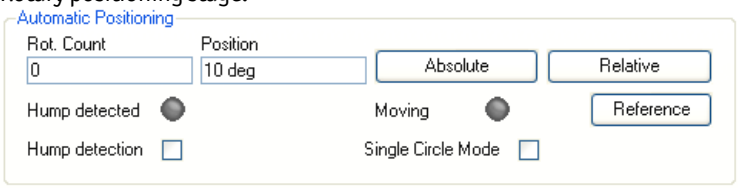
Automatic Positioning

The following controls determine the closed loop functionalities of the ANC350.

Linear positioning stage:



Rotary positioning stage:



Position: In this (input) box, the desired target position needs to be entered. This position may either be an *absolute value* or a *relative distance* which the positioner is supposed to travel. No movement of the positioner is caused unless either "Absolute" or "Relative" button are pressed.

Note. You can enter the position in "µm" or "mm" simply by appending the respective unit after the input value. (In case of µm, "um" has to be entered into the input field).

Rot. Count: This box is used only in case of a rotator. In addition to the target position in degrees, an arbitrary number of additional full revolutions can be defined. (Single Circle Mode must be disabled).

Absolute/Relative: If an absolute positioning is selected by pressing the "Absolute"-button, the positioner travels from its current position to the target position entered in the "Position" field. If relative positioning is selected, the positioner travels a distance according to the entered value. In this case, the entered value is *added* to the current position.

Note. During controlled positioning, no other functionality of the software is available. However, the controlled positioning can be stopped at any time by re-pressing either the "Absolute" or "Relative"-button.

Reference: By pressing this button, the positioner travels to the *absolute reference position,* presuming a referencing motion has already been executed (*green* "Valid"-LED is illuminated).

In case of the /RES system, there is no reference position. Therefore, the "Reference" button is available only when using a /NUM positioner.

Target GND: The positioner will be grounded, if the target position is hit. There will be no correction of the actual position by applying a constant voltage to the positioner.

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

Hump Detected: This LED is illuminated *red* if the positioner reaches a mechanical end stop or if its movement is stopped by any other influence. Once a hump is detected, the system either stops the positioning operation or continues running depending on whether the "Hump detection" is activated or not.

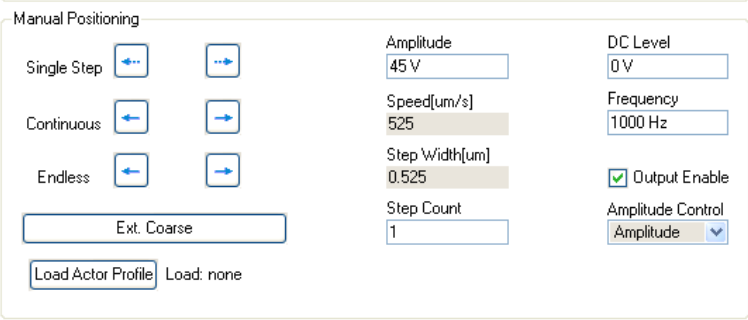
Hump Detection: By checking this box, the positioner will automatically stop as soon as a mechanical stop of the positioning stage is reached.

Moving: Whenever the axis is operative, i.e. the positioning stage moving, this LED is illuminated *green* until the positioner stops its motion.

Single Circle Mode: This setting is only relevant in case of a rotary positioner (ANR-series). If the "Single Circle Mode" is activated, the numbers of revolutions are not counted and absolute or relative positioning is only allowed up to a full circle. In absolute positioning mode, the rotator takes the shortest way to reach the defined destination. Deactivating this box allows a positioning of targets more than 360degs away from the current position.

Manual Positioning

By operating the controls within the "Manual Positioning" window, a positioner connected to the ANC350 can be driven manually via the software interface.



Single Step: The positioner travels one step [alternatively the number of steps entered in *Step Count* box] in the selected direction with each actuation. The step size is determined by the "Amplitude" value.

Continuous: The positioner travels in the selected direction as long as the button remains actuated or a stop is detected [if hump detection is enabled]. The step repetition frequency is given by the field "Frequency".

Endless: This button latches when pressed, causing the positioner to move until the button is unlatched (pressed again) or a stop is detected [if hump detection is enabled].

Step Count: Configures the number of successive steps caused by external trigger, or manual step request.

Amplitude: Value for the drive voltage of the piezo drive. By changing this value, the step size of the positioner can be varied. The allowed voltage values range from 0V to 70V.

DC Level: The "DC Level" box is both indicator and input for the applied DC-voltage to the piezo.

Frequency: Here, the desired frequency of the voltage signal applied to the piezo translation stage can be entered. The frequency is proportional to the travel speed of the positioned and vice versa. The allowed frequency values range from 1Hz to 2kHz.

Speed: Indicates the positioner's current speed of travel, either in "µm/s" in case of a linear positioner or in "deg/s" in case of a rotary positioner/goniometer.

Step Width: Indicates the positioner's current step size, either in "µm" in case of a linear positioner or in "deg" in case of a rotary positioner/goniometer.



Note: In general, piezo elements change their properties due to different environmental conditions such as heavy loads or low temperatures, etc. However, it is possible to maintain constant travel

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

speed or step width by activating the Amplitude Control mode.

Amplitude Control: There are three different kinds of controlling the motion of a piezo drive:

Amplitude: The properties of individual steps of the piezo translation stage are defined by the amplitude entered in the "Manual Positioning" dialog above. The positioner is driven in an open-loop mode with the indicated amplitude. Travel speed and step width may vary in this mode.

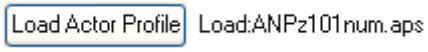
Speed: This feedback control enables a constant travel speed by a closed-loop control of the amplitude and frequency values applied to the piezo. The designated speed (displayed in the speed indicator) is set by adjusting the amplitude and/or the frequency value.

Step Width: In this case, the step size is controlled to a constant value. Here, only the amplitude is closed-loop controlled and the travel speed may vary depending on the frequency value. The designated step width (displayed in the step width indicator) is set by adjusting the amplitude value.

Output Enable: By checking the "Output Enable" box, the respective axis output is enabled. Deactivating this box sets the axis to GND.

Load Actor Profile: Pressing this button opens up the browser window and allows loading a calibration/parameter file (*.aps-files). For each attocube positioner, an individual parameter file exists (e.g. "ANPx101num.aps").

By opening a parameter file, all parameters necessary for the operation of a positioner will be imported into the GUI. For convenience, an identification tag of the currently loaded parameter file is displayed next to the "Load Actor Profile" button. For stand-alone usage of the ANC350, these parameter files can also be uploaded to the controller (see VI.8).



Ext. Coarse: This will open a separate window which allows assigning the input trigger to the corresponding axis.

See Chapter **VI.7**

Sensor Status

This area gives information on the sensor status. After dis- and reconnecting a positioner, any button must be pressed to activate / update the values indicated in the senor status environment.

Error [*only for NUM and RES*]: Indicates a malfunction of the sensor. If a fully operative positioner is connected to the ANC350, this LED is in switched-off state (*grey*). If this LED indicates an error (*red*), please check the connection between positioner, ANC350, and the computer. If the error signal persists, the sensor may be contaminated or even damaged. In this case, please contact our attocube support team.

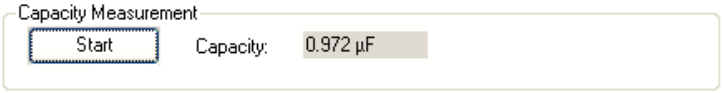
Connected: Indicates if a positioner is connected to the respective axis. A properly connected positioner will cause the LED to be illuminated green.

Enable: A *green* LED displays an activated axis.



Capacitance Measurement

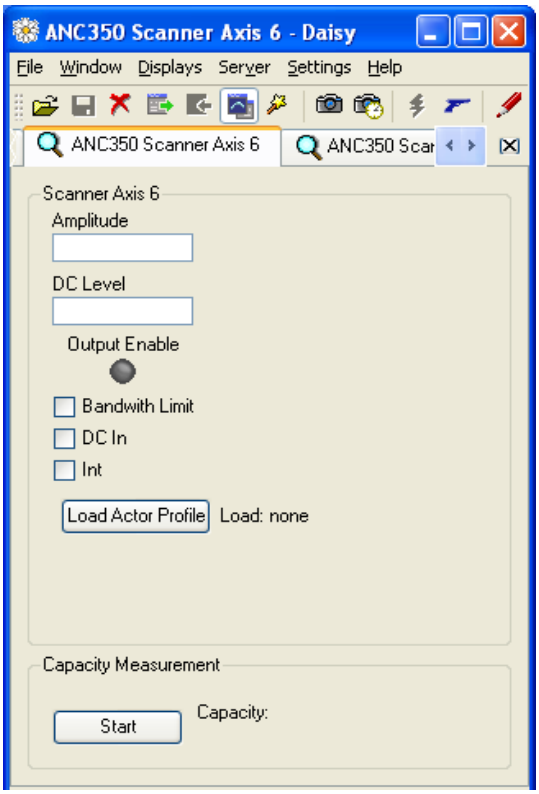
Pressing the **Start** button measures the actual capacitance of a connected positioner.



© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

VI.4. Software – Scanner Control

If the ANC350 is equipped with a scanner module, there is a Scanner Control interface available. This panel is either already loaded into your profile or needs to be opened manually. If already loaded, it can be found among the panel flags on top of the main window. If it needs to be opened manually, please select the menu "File/Open" or press the open button to load the panel file (*.ngc) named "ANC350_scanner_axisx.ngc".



Amplitude In this box, the maximum drive amplitude allowed for the respective axis needs to be entered. This value represents the voltage limit of the DC Level defined in the subsequent input box. The maximum voltage generated by the ANC350 is 140V.

DC Level Defines the DC voltage generated for scanner operation. The voltage is limited by the value entered into the "Amplitude" input box.

Output Enable Indicates whether or not the output is enabled. An enabled output is indicated by an illuminated LED. To enable the output, either DC-In or INT (or both) have to be checked.

Bandwidth Limit Determines the status of the bandwidth limiter of the corresponding axis. Only applicable for scanner axes.

DC In By checking the "DC In" box, the DC-In BNC receptacle on the front panel is activated. Deactivating this box sets the input BNC to GND.

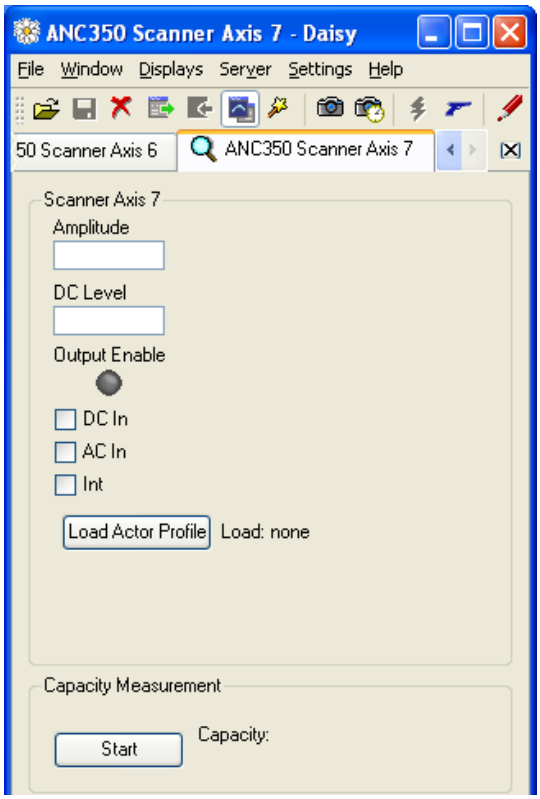
Int By checking the "Int" box, the internal voltage source is switched on.

Load Actor Profile With the help of this functionality, a scanner profile can be loaded into the GUI. This profile sets the maximum specified voltage applicable to the scanning device.

Pressing the "LoadActorProfile"-button opens the browser window in which the calibration/parameter files (*.aps-files) to be loaded can be specified. Open the corresponding file for the scanner in use.

VI.5. Software – Dither Control

If the ANC350 is equipped with a Dither module, there is a Dither Control interface available. This panel is either already loaded into your profile or needs to be opened manually. If already loaded, it can be found among the panel flags on top of the main window. If it needs to be opened, please select the menu "File/Open" or press the open button to open the panel file (*.ngc) named "ANC350_dither_axis7.ngc".



© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

Amplitude In this box, the maximum drive amplitude allowed for operation of the respective axis needs to be entered. This value represents the voltage limit of the DC Level defined in the subsequent input box. The maximum voltage generated by the ANC350 is 140V.

DC Level Defines the DC voltage generated for scanner operation. The voltage is limited by the value entered into the "Amplitude" input box.

Output Enable Indicates whether or not the output is enabled. An enabled output is indicated by an illuminated LED. To enable an output, either DC-In, AC-In, or INT (or any combination thereof) have to be checked.

DC In By checking the "DC In" box, the DC-In BNC receptacle on the front panel is activated. Deactivating this box sets the input BNC to GND.

AC In By checking the "AC In" box, the AC-In BNC receptacle on the front panel is activated. Deactivating this box sets the input BNC to GND.

Int By checking the "Int" box, the internal voltage source is switched on.

Load Actor Profile With the help of this functionality, a scanner profile can be loaded into the GUI. This profile sets the maximum specified voltage applicable to the scanning device.

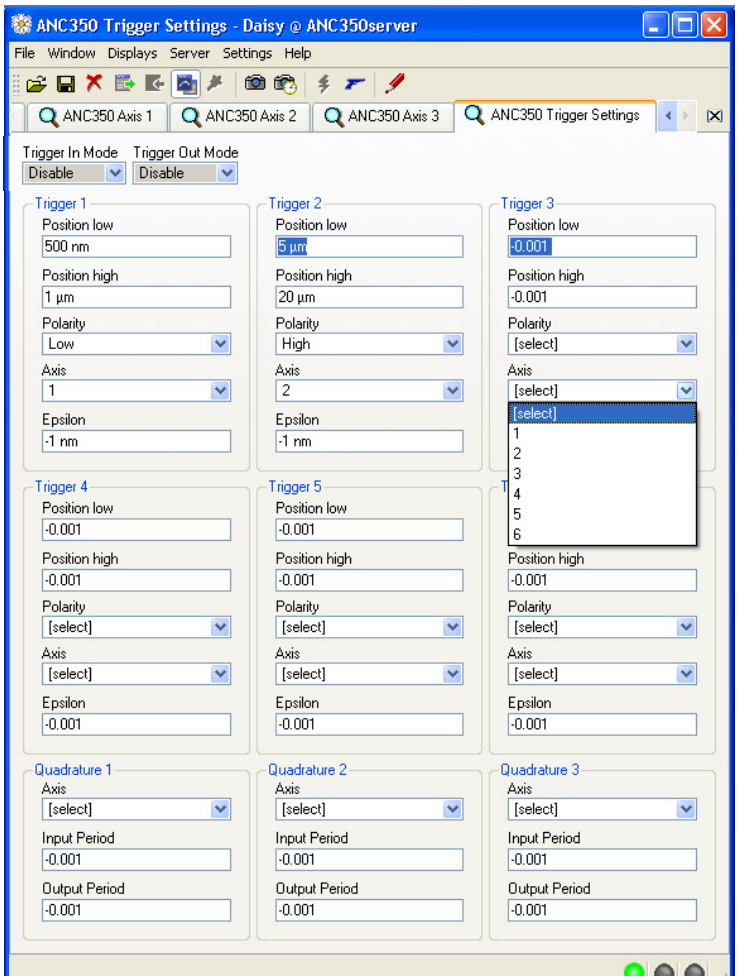
Pressing the "LoadActorProfile"-button opens the browser window in which the calibration/parameter files (*.aps-files) to be loaded can be specified. Open the corresponding file for the scanner in use.

VI.6. Software – Output Trigger Settings

The trigger settings module creates the possibility to generate position-dependent output/trigger signals which can be accessed on the 15-pin sub-D trigger connector of the ANC350 [*see chapter **V.1***].

All Trigger signals are LVTTL compatible, i.e. the high-signal value is 3.3V and the low-signal value 0V [*see chapter **III.1***].

To access the trigger settings module, select the menu "File/Open" or press the open button , respectively, and open the panel file (*.ngc) named "ANC350_trigger.ngc".



All together, there are six output trigger arrays available (see figure above), allowing to generate six position-dependent TTL signals.

A table with the pin configuration of the 15-pin Sub-D trigger output, located at the backside of the ANC350, is shown in chapter III.1.

The trigger input parameters are as follows:

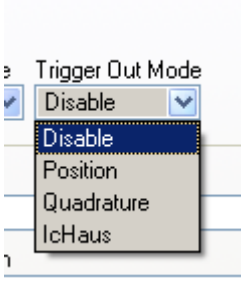
© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

Ourtput Trigger Mode

Trigger

Quadrature

IcHaus



Trigger: The trigger outputs react within the defined limits with the selected polarity

Quadrature: Three pairs of triggers for three axes are used to signal relative movement as AB-signals.
Three pairs of triggers for three axes are used to accept relative movement as AB-signals.

IcHaus : [Only ANC350/NUM]
The trigger out signals are used to output the internal position signal of the NUM-sensor

VI.6.1. Trigger

Every trigger pulse given to the D-sub 15 at the back of the ANC350 is an equivalent to activating the step button in the specified direction.

Position low Position value at which a trigger signal is initiated.

Position high Position value at which the trigger signal is aborted.

Note. The trigger low position needs to be smaller than its corresponding high value.

Polarity The polarity indicates whether the signal is high or low in between the two trigger positions “low” and “high”.

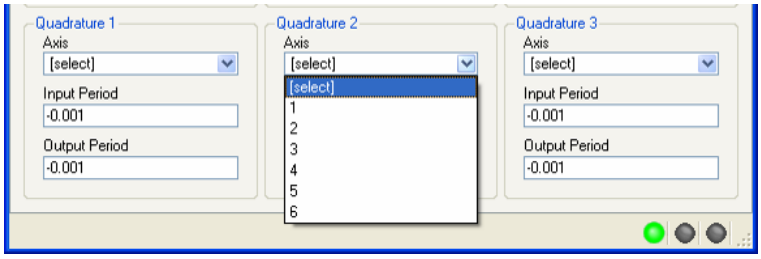
Axis Number of the Axis controlling the trigger signal.

Epsilon Threshold at which the trigger signal is initiated and aborted, respectively, relative to its actual boundaries. Recommended values are:

ANR rotary positioners: Epsilon = 5mdeg

ANP linear positioners: Epsilon = 1µm

VI.6.2. Quadrature



Axis Number of the Axis controlling the trigger signal.

Input period Distance of a high-low-period in the dimension unit of the chosen axis for direction inwards.

Output period Distance of an high-low-period in the dimension unit of the chosen axis for direction outwards.

VI.6.3. IcHaus

The chosen trigger outputs the signals of the NUM-sensor as AB-signals with fixed resolution [20µm at linear positioners; 10m° at rotators].

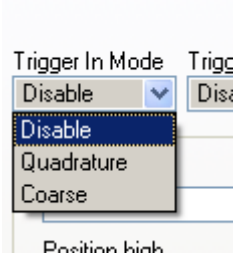
© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

VI.7. Software – Input Trigger Settings

Input Trigger Mode

Quadrature

Coarse



Coarse: The trigger outputs react within the defined limits with the selected polarity

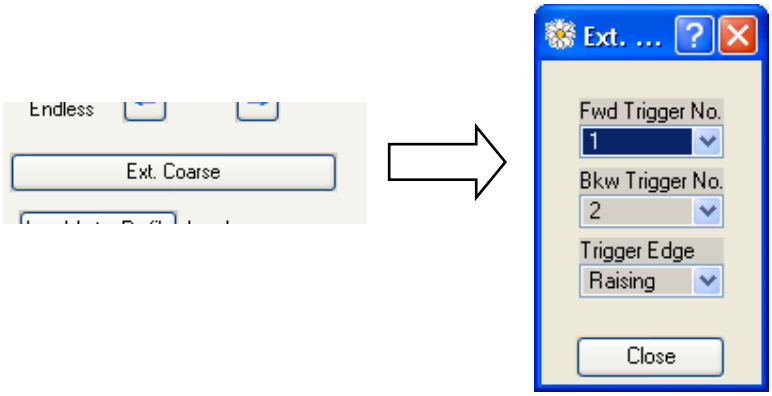
Quadrature: Three pairs of triggers for three axes are used to signal relative movement as AB-signals.
Three pairs of triggers for three axes are used to accept relative movement as AB-signals.

The external coarse settings module creates the possibility to respond to input trigger signals which can be accessed at the 15-pin sub-D trigger connector of the ANC350 [*see chapter* ***V.1***].

All Trigger signals have to be LVTTL compatible, i.e. the high-signal value is 3.8V and the low-signal value 0V [*see chapter* ***III.1***].

VI.7.1. Coarse

Ext. Coarse: This will open a separate window allowing to assigning input triggers to the corresponding axis:



Forward Trigger No.: There are 7 options for the trigger in forward direction available:

- Set no input trigger
- Set input trigger number 1
- Set input trigger number 2
- Set input trigger number 3
- Set input trigger number 4
- Set input trigger number 5
- Set input trigger number 6

Backward Trigger No.: There are 7 options available:

- Set no input trigger
- Set input trigger number 1
- ...
- Set input trigger number 6

Trigger Edge: The trigger edge can be switched between raising edge and falling edge



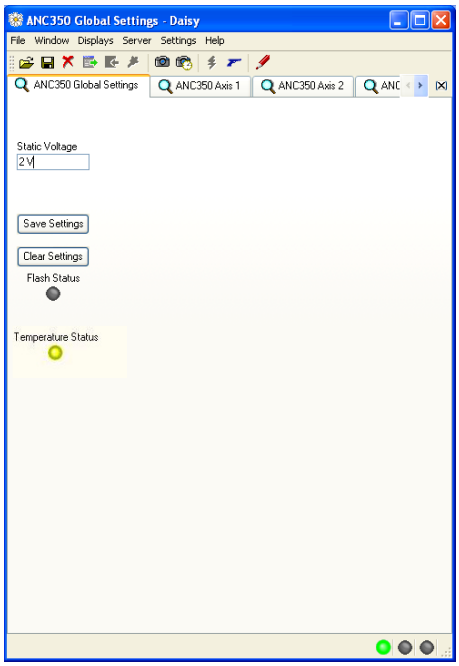
© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

VI.7.2. Quadrature

The settings for the output trigger correspond to the settings for the output trigger [*see chapter* ***III.1***].

VI.8. Software – ANC350 Global Settings

Select the menu “File/Open” or press the open button , respectively, and open the panel file (*.ngc) named “ANC350_Global.ngc”.



© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

Static Voltage This control sets the voltage applied to the resistive readout system. The voltage can be set from 0.001 to 2.000V. Typically, a very small voltage (marginal heat generation) is used for low temperature applications, whereas higher voltages are used at elevated temperature (increased resolution).



Note. Adjusting the reference voltage of the resistive readout system gives the user the opportunity to optimize the system according to the specific application.

Higher voltages enhance the sensitivity of the positioning and provide a better signal to noise ratio. Low voltages, however, minimize the heat dissipation, making the system advantageous for low temperature applications where little heat input is required.

Save Settings Press this button to save all axis parameters (i.e. .aps-file) and global settings to your ANC350. This avoids reentering the parameters for subsequent usage and allows stand-alone operation of the ANC350.

Clear Settings Sets all parameters in your ANC350 to "0".

Flash Status This LED displays whether or not the saving or clearing process has been executed and properly finished. A yellow LED illustrates a working process still in operation.

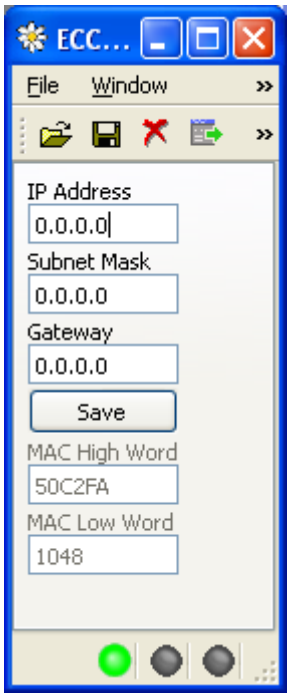
Temperature Status This LED indicates the internal temperature status of the controller. When the internal temperature gets too high, the LED will be illuminated and all outputs will be disabled.

VI.9. Closing the GUI and switching off the ANC350

To avoid malfunctions, always shut down the software connection between ANC350 and PC and exit the DAISY software before switching off the ANC350.

In order to shut down the user interface, select the "Close"-button . Now, the connection between the DAISY software and the ANC350 can be closed by selecting the  button. Afterwards, please terminate DAISY by pressing the cross in the upper right corner of the DAISY window.

VI.10. Configuring ethernet settings



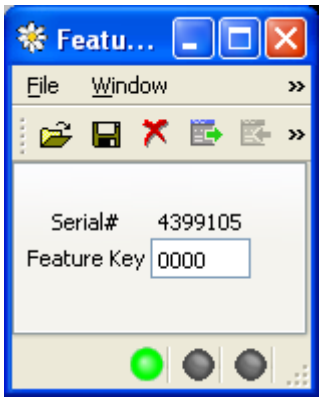
The Ethernet settings can only be set in the Daisy-GUI.

For this purpose one can open *ethernet.ngc* with *Daisy.exe* or just place this tab on *Daisy* via drag and drop.

Specific Ethernet settings for communication with ANC350 via network can be set for different requirements.

For further information please contact your system/network administrator.

VI.11. Upgrading



To obtain more functions on the ANC350 such as Ethernet the ANC350-software can be upgraded.

These features can be unlocked by a code provided by attocube.

The required “feature.ngc” can be found in the same folder as Daisy.exe.

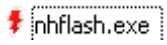
For further information please contact your sales representative or send an email to sales@attocube.com

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

VII. Firmware Update Procedure

requirements

The controller is connected to the computer via **USB**. The software and the drivers are already copied onto your computer and the hardware driver is correctly installed as described in chapter V.3 .



First execute the separate program "nhflash.exe" (to be found in same folder as Daisy.exe).
The updater will automatically check for all connected ANC350 and obtain their IDs.



While updating make sure not to disconnect the USB or power cable or disrupt the connection in any way.



The firmware must be stored in:
..\Software\ANC350_Software\ANC350_GUI\firmware\

Choose the specific ANC350 you want to update and press the "Flash"-button.

After a successful update process it may be necessary to reboot the controller.

VIII. DLL

To control the ANC350 without the atto**cube** DAISY software, a *.DLL library including a detailed documentation is available. The library can be found on the installation CD.

The anc350v2.dll may require other libraries such as libusb0.dll or nhconnect.dll for successful operation.

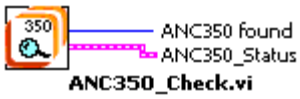
Windows ® (64 Bit) may require Microsoft ® Visual C++ 2010 Redistributable Package (x64) .

VIII.1. LabView Drivers

In addition to the DLL library, the installation CD also includes LabView™*) drivers for all DLL-commands generated with LabView 7™*). Detailed information on these commands can be found in the DLL-documentation on the CD.

*)LabVIEW is a trademark of the National Instruments Corporation.

VIII.1.1. ANC350_Check.vi



The ANC350_Check.vi determines the number of positioners connected to the ANC350 and their respective hardware IDs.

Return value	[out]	Number of available positioners
PositionerInfo	[out]	Array of structure PositionerInfo, containing the hardware ID for unlocked devices Connected devices are marked as locked.

VIII.1.2. ANC350_Connect.vi



Establishes a connection to the selected device.

Return value	[out]	Handle for subsequent access to the device
deviceNo	[in]	Number of the device to connect to

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

VIII.1.3. ANC350_Close.vi



This vi closes the communication channel.

deviceHandle	[in]	Handle of addressed device

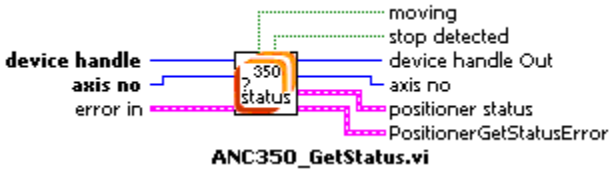
VIII.1.4. ANC350_Load.vi



Loads a parameter file for actor configuration.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
file	[in]	File name

VIII.1.5. ANC350_GetStatus.vi



Determines the status of the selected axis
(available only for stepper axes).

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Number of addressed Axis (0.. Number of axes - 1)
status	[out]	actual status

Bit 0: (moving) Axis is moving
Bit 1: (stop detected) Hump detected
Bit 2: (sensor error) Error of sensor
Bit 3: (sensor disconnected) Sensor not connected

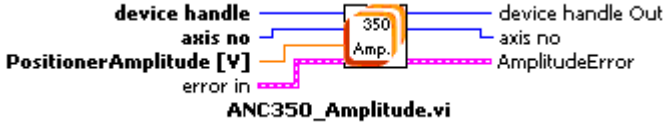
VIII.1.6. ANC350_SetOutput.vi



Activates / Deactivates the output relais of the addressed axis.

deviceHandle	[in]	Handle of addressed device
enable	[in]	Status of relais

VIII.1.7. ANC350_Amplitude.vi



Sets the amplitude setpoint.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
amplitude	[in]	Amplitude [mV]

VIII.1.8. ANC350_GetAmplitude.vi

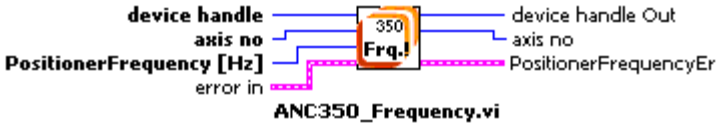


Determines the actual amplitude. In case the positioning device is currently not in operation, the amplitude setpoint is zero. In case of movement, the amplitude as set by the amplitude control is determined.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
amplitude	[out]	Amplitude [V]

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

VIII.1.9. ANC350_Frequency.vi



Sets the frequency.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
Frequency	[in]	Frequency [Hz].

VIII.1.10. ANC350_GetFrequency.vi



Determines the frequency.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
frequency	[out]	Frequency [Hz]

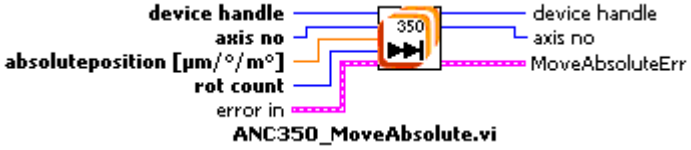
VIII.1.11. ANC350_GetPosition.vi



Determines the actual position of the addressed axis.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
position	[out]	Position in unit of actor multiplied by 1000

VIII.1.12. ANC350_MoveAbsolute.vi



Starts approach to absolute target position. Previous movement will be stopped

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
position	[in]	Target position in unit of actor
rotCount	[in]	Number of rotations in case of rotary actor and deactivated

VIII.1.13. ANC350_MoveContinous.vi



Starts continuous positioning with set parameters for amplitude and speed and amplitude control, respectively.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
dir	[in]	Direction for positioning (0: forward, 1: backward)

VIII.1.14. ANC350_MoveRelative.vi



Starts approach to relative target position. Any previous movement will be stopped.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
distance	[in]	Relative position in unit of actor
rotCount	[in]	Number of rotations in case of rotary actor and deactivated single circle mode

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

VIII.1.15. ANC350_UpdateAbsolute.vi



Updates absolute target position while moving without stopping movement.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
position	[in]	Target position in unit of actor

VIII.1.16. ANC350_SetTargetGround.vi



When enabled, the actor voltage is set to zero after closed loop positioning finished.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
enable	[in]	Switch (true=on, false=off)

VIII.1.17. ANC350_MoveSingleStep.vi



Starts a one step positioning, Previous movement will be stopped.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
dir	[in]	Direction for positioning (0: forward, 1: backward)

VIII.1.18. ANC350_StepCount



Configures the number of successive steps caused by external trigger, or manual step request.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
stepCount	[in]	Number of steps (1..65535)

VIII.1.19. ANC350_MoveReference.vi



Starts approach to reference position. Previous movement will be stopped.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)

VIII.1.20. ANC350_StopMoving.vi



Stops any positioning.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

VIII.1.21. ANC350_StopDetection.vi



Switches Stop Detection

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
enable	[in]	Switch (true=on, false=off)

VIII.1.22. ANC350_StopApproach.vi



Stops approaching target, relative or reference position of selected axis. DC level of affected axis after stopping depends on setting by *SetTargetGround*.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)

VIII.1.23. ANC350_CapMeasure.vi



Determines the capacitance of the piezo of the addressed axis by measurement.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
capacitance	[out]	Measured capacity in [pF] A value of -1 indicates an error

VIII.1.24. ANC350_DCLevel.vi



Sets the DC Level.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
level	[in]	DC Level [V]

VIII.1.25. ANC350_StaticAmplitude.vi



Sets the output voltage for resistive sensors.

deviceHandle	[in]	Handle of addressed device
amplitude	[in]	Amplitude [mV]

VIII.1.26. ANC350_ResetPosition.vi



Sets the origin to the actual position.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

VIII.1.27. ANC350_GetStepWidth.vi



Determines the step width. In case of standstill of the motor this is the calculated step width resulting from amplitude setpoint, frequency and motor parameters.
In case of movement this is the measured step width.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
stepwidth	[out]	Step width in unit of actor * 1000

VIII.1.28. ANC350_GetSpeed.vi



Determines the actual speed. In case of standstill of the actor this is the calculated speed resulting from amplitude setpoint, frequency and motor parameters.
In case of movement this is the measured speed.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
speed	[out]	Speed in unit of actor / s * 1000

VIII.1.29. ANC350_GetReference.vi



Determines the distance of reference mark to the origin.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
position	[out]	Reference position in unit of actor
valid	[out]	Indicator for a valid reference position

VIII.1.30. ANC350_SetIntEnable.vi



Activates / Deactivates the internal signal generation of the addressed axis.
Only applicable for scanner and dither axes.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
enable	[out]	Status of internal signal

VIII.1.31. ANC350_GetIntEnable.vi



Determines the status of internal signal generation of the addressed axis.
Only applicable for scanner and dither axes.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
enable	[out]	Status of internal signal

VIII.1.32. ANC350_SetDcInEnable.vi



Activates / Deactivates the dc input of the addressed axis.
Only applicable for scanner and dither axes.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
enable	[in]	Status of input

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

VIII.1.33. ANC350_GetDcInEnable.vi



Determines the status of dc input of the addressed axis. Only applicable for scanner and dither axes.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
enable	[out]	Status of input

VIII.1.34. ANC350_SetAcInEnable.vi



Activates / Deactivates the ac input of the addressed axis. Only applicable for dither axis.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
enable	[in]	Status of input

VIII.1.35. ANC350_GetAcInEnable.vi



Determines the status of ac input of the addressed axis. Only applicable for dither axis.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
enable	[out]	Status of input

VIII.1.36. ANC350_GetDCLevel



Determines the status actual DC Level.

deviceHandle	[in]	Handle of addressed device.
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
level	[out]	DC Level [V].

VIII.1.37. ANC350_AmplitudeControl.vi



Selects type of amplitude control. The amplitude is controlled by the positioner to hold the value constant determined by the selected type of amplitude control.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
mode	[in]	type of amplitude control: 0: Speed, 1: Amplitude, 2: Step Size

VIII.1.38. ANC350_TriggerModeIN.vi



Selects the mode of the input trigger signals.

0: Disable. The inputs don't trigger anything.
1: Quadrature. Three pairs of trigger in signals are used to accept AB-Signals for relative positioning.
2: Coarse. The trigger in signals are used to generate coarse steps

deviceHandle	[in]	Handle of addressed device
axis	[in]	Axis (0..Number of axes – 1)
modeIN	[in]	Mode of trigger pins

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

VIII.1.39. ANC350_TriggerModeOUT.vi



Selects the mode of the input trigger signals.

0: Disable. The inputs don't trigger anything.
1: Position. The Trigger Outputs reacts to the defined position ranges with the selected polarity
2: Quadrature. Three pairs of trigger out signals are used to signal relative movement as AB-signals.
3: IcHaus. The trigger out signals are used to output the internal position signal of num-sensors

deviceHandle	[in]	Handle of addressed device
axis	[in]	Axis (0..Number of axes – 1)
modeOUT	[in]	Mode of trigger pins

VIII.1.40. ANC350_Trigger.vi



Sets the trigger thresholds for the external trigger.

deviceHandle	[in]	Handle of addressed device
triggerNo	[in]	Number of addressed Trigger (0.. 5)
lowLevel	[in]	Lower trigger threshold in unit of actor * 1000
highLevel	[in]	Upper trigger threshold in unit of actor * 1000

VIII.1.41. ANC350_TriggerAxis.vi



Selects the corresponding axis for the addressed trigger.

deviceHandle	[in]	Handle of addressed device
triggerNo	[in]	Number of addressed Trigger (0.. 5)
axis	[in]	Axis (0..Number of axes – 1)

VIII.1.42. ANC350_TriggerPolarity.vi



Sets the polarity of the external trigger.

deviceHandle	[in]	Handle of addressed device
triggerNo	[in]	Number of addressed Trigger (0.. 5)
polarity	[in]	polarity, 0: low active, 1: high active

VIII.1.43. ANC350_TriggerEpsilon.vi



Sets the hysteresis of the external trigger.

deviceHandle	[in]	Handle of addressed device
triggerNo	[in]	Number of addressed Trigger (0.. 5)
epsilon	[in]	Hysteresis in unit of actor * 1000

VIII.1.44. ANC350_ QuadratureAxis.vi



Selects the axis for use with this trigger in/out pair.

deviceHandle	[in]	Handle of addressed device
quadratureNo	[in]	Number of addressed quadrature unit (0.. 2)
axis	[in]	Axis (0..Number of axes – 1)

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

VIII.1.45. ANC350_ QuadratureInputPeriod.vi



Selects the stepsize the controller executes when detecting a step on it's input AB-signal.

deviceHandle	[in]	Handle of addressed device
quadratureNo	[in]	Number of addressed quadrature unit (0.. 2)
period	[in]	stepsize in unit of actor * 1000

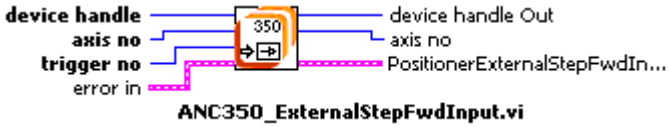
VIII.1.46. ANC350_QuadratureOutputPeriod.vi



Selects the position difference which causes a step on the output AB-signal.

deviceHandle	[in]	Handle of addressed device
quadratureNo	[in]	Number of addressed quadrature unit (0.. 2)
period	[in]	period in unit of actor * 1000

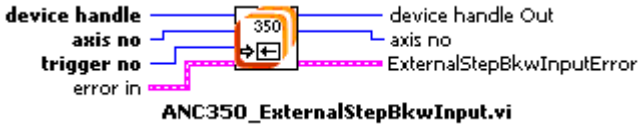
VIII.1.47. ANC350_ ExternalStepFwdInput.vi



Configures external step trigger input for selected axis. A trigger on this input results in a forward single step.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
input	[in]	Trigger input (0: disabled, 1..6 input trigger)

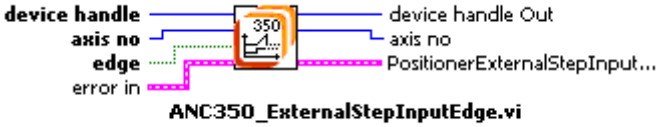
VIII.1.48. ANC350_ ExternalStepBkwInput.vi



Configures external step trigger input for selected axis. A trigger on this input results in a backward single step.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
input	[in]	Trigger input (0: disabled, 1..6 input trigger)

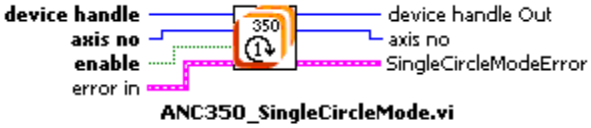
VIII.1.49. ANC350_ ExternalStepInputEdge.vi



Configures edge sensitivity of external step trigger input for selected axis.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
edge	[in]	(0: raising, 1: falling)

VIII.1.50. ANC350_SingleCircleMode.vi



Switches single circle mode. In case of activated single circle mode the number of rotations are ignored and the shortest way to target position is used. Only relevant for rotary actors.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
enable	[in]	Switch (true=on, false=off)

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

VIII.1.51. ANC350_SetStopDetectionSticky.vi



When enabled, an active stop detection status remains active until cleared manually by PositionerClearStopDetection.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
enable	[in]	Switch (true=on, false=off)

VIII.1.52. ANC350_ClearStopDetection.vi



When PositionerSetStopDetectionSticky is enabled, this clears the stop detection status.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)

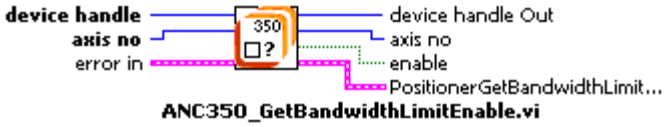
VIII.1.53. ANC350_BandwidthLimitEnable.vi



Activates / Deactivates the band width limiter of the addressed axis. Only applicable for scanner axes.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
enable	[in]	Status of bandwidth limiter

VIII.1.54. ANC350_GetBandwidthLimitEnable.vi



Determines the status of internal signal generation of the addressed axis. Only applicable for scanner and dither axes.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
enable	[out]	Status of internal signal

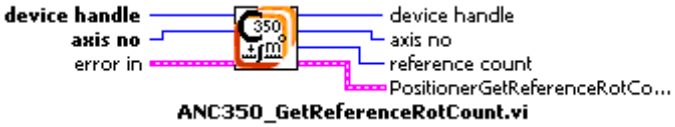
VIII.1.55. ANC350_GetRotCount.vi



Determines the actual number of rotations in case of a rotary actor.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
count	[out]	Number of rotations

VIII.1.56. ANC350_ GetReferenceRotCount.vi



Determines the actual number of rotations for the reference position in case of a rotary actor.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
count	[out]	Number of rotations

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

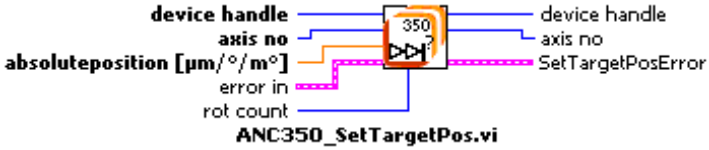
VIII.1.57. ANC350_SetHardwareID.vi



Sets the hardware id for the device. The hardware id serves as a differentiator in case of multiple simultaneous connected devices.

deviceHandle	[in]	Handle of addressed device
ID	[in]	Hardware Id

VIII.1.58. ANC350_SetTargetPos.vi



Sets the target position for the selected axis for use with *PositionerMoveAbsoluteSync*.

deviceHandle	[in]	Handle of addressed device
axisNo	[in]	Handle of addressed axis (0..Number of axes - 1)
position	[in]	Target position in unit of actor multiplied by 1000
rotCount	[in]	Number of rotations in case of rotary actor and deactivated single circle mode

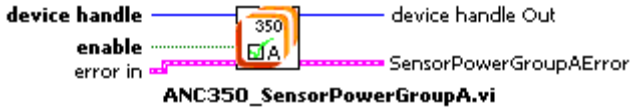
VIII.1.59. ANC350_MoveAbsoluteSync.vi



Starts the synchronous approach to absolute target positions for selected axes. Previous movement will be stopped. The target positions for each axis is defined by PositionerSetTargetPos.

deviceHandle	[in]	Handle of addressed device
axes	[in]	Cluster of axes to start
delay time	[in]	time wait before command is sent

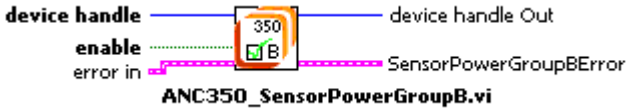
VIII.1.60. ANC350_SensorPowerGroupA



Switches power of sensor group A. Sensor group A contains either the sensors of axis 1..3 or 1..2 dependent on hardware of controller.

deviceHandle	[in]	Handle of addressed device.
enable	[in]	on/off

VIII.1.61. ANC350_SensorPowerGroupB



Switches power of sensor group A. Sensor group A contains either the sensors of axis 4..6 or 3 dependent on hardware of controller.

deviceHandle	[in]	Handle of addressed device.
enable	[in]	on/off

© 2001-2013 attocube systems AG. Product and company names listed are trademarks or trade names of their respective companies. Any rights not expressly granted herein are reserved. ATTENTION: Specifications and technical data are subject to change without notice.

attocube systems AG
Königinstrasse 11a (Rgb)
D-80539 Munich
Germany

Phone +49 89 2877 8090
Fax +49 89 2877 80919