User Manual

Lucid485 AI4/AI8

4/8 Channel Analog Input Serial Module

Table of Content

1 Introduction

This document describes the functionality of the Lucid485 AI4/AI8 serial module, measuring 4/8 analog voltages or currents controllable by RS-485 bus.

A description of the Lucid485 product family can be found in the general *Lucid485 User Manual*.

2 Setup and Installation

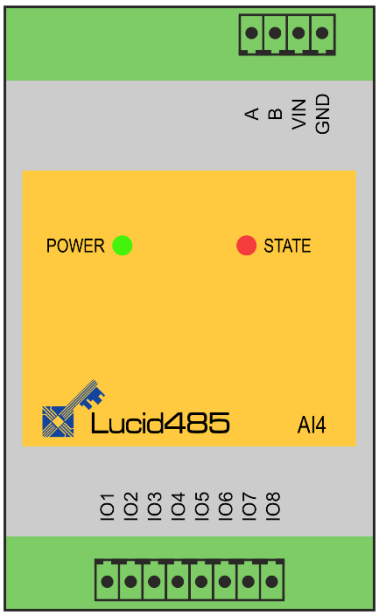

Fig. 1 Lucid485 AI4 Module

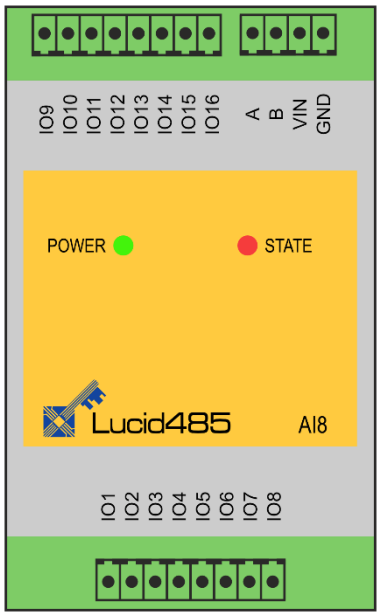

Fig. 2 Lucid485 AI8 Module

Fig. 1 and Fig. 2 show drawings of the AI4 and AI8 analog input module with 4/8 analog voltage or current input channels (AI0 – AI3 and AI4 – AI7).

The IO signals are connected to the lower (IO1 - IO8) and the upper (IO9 - IO16) IO terminals.

The upper IO terminal connector is present at the AI8 module only.

2.1 Safety Information

Lucid485 complies with regulations and industrial standards active in the EU. To keep the device functional, the following safety and maintenance information must be adhered.

The device must only be used for the intended purpose.

The device must not be used under the following conditions:

- It is obviously damaged
- An error was detected
- Outside humidity and temperature limits
- Unauthorized personnel

Never apply voltages higher than 30V (or lower than -30V) to any IO terminal. This would damage the device.

2.2 RS-485 bus and Power Connection

Please see the general *Lucid485 User Manual*.

2.3 LucidIoCtrl Command Line Tool

The LucidIoCtrl command line tool gives full access to all Lucid485 modules operating with Frame Protocol enabled. Executables for different architectures and can be downloaded from our website:

https://www.lucid-control.com/downloads

After downloading the program can be stored in a folder of choice.

Please see the general *Lucid485 User Manual* for more information.

2.3.1 First Steps

When the module is powered, the green power LED is switched on, signaling that the module is ready.

The following examples demonstrate the functionality of the module by using the LucidIoCtrl command line tool.
It is assumed that the module is configured with default address 11, 9600 baud, 8N1.
The serial to RS-485 adapter is connected to COM1 of the host.

Windows Examples:

Reading the voltages of 4 input channels

```
      LucidIoCtrl -drs485:COM4:11 -tV -c0,1,2,3 -r
->    CH00:5.000  CH01:5.000  CH02:5.000  CH03:5.000
```

Linux Examples:

For all examples it is assumed that the module is connected to /dev/ttyACM0.

Reading the voltages of 4 input channels

```
      LucidIoCtrl -drs485:/dev/ttyACM0:11 -tV -c0,1,2,3 -r
->    CH00:5.000  CH01:5.000  CH02:5.000  CH03:5.000
```

2.4 IO Configurations

The Lucid485 AI4/AI8 module is available in different configurations:

Function Class	Value	Channels
AI4	0x8100	4
AI8	0x8110	8

Tab. 1 Analog Input Function Classes

Function Class Type	Input Type	Value	Input Signal Range	
			V_{Min} / I_{Min}	V_{Max} / I_{Max}
5	Voltage	0x1000	0 V	5 V
10	Voltage	0x1001	0 V	10 V
24	Voltage	0x1005	0 V	24 V
5S	Voltage	0x1010	-5 V	5 V
10S	Voltage	0x1011	-10 V	10 V
24S	Voltage	0x1015	-24 V	24 V
20M0	Current	0x1100	0 mA	20 mA

Tab. 2 Analog Input Function Class Types

Tab. 1 and Tab. 2 list the Function Classes and Function Class Types.
The input signal range of the Function Class Types is shown in Tab. 2.

2.4.1 Voltage Inputs

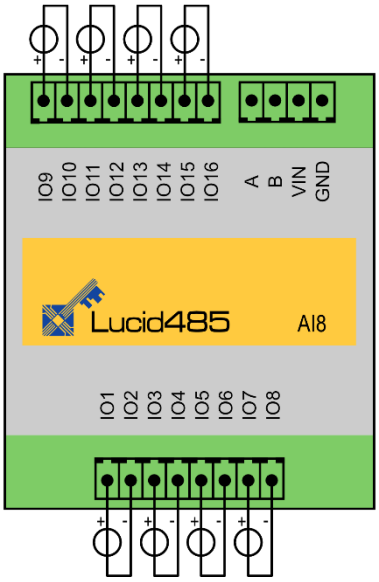

Fig. 3 AI8 IO Connection (Voltage)

Fig. 4 AI Voltage Signal

Fig. 3 shows 8 voltage sources connected to the IO terminals of channels 0 – 7 of the AI8 module.

Fig. 4 shows the signal connected to the IO terminals IO1 and IO2 (input channel 0).

IO Terminal	Signal	IO Channel Number
1	AI0 +	0
2	AI0 -	
3	AI1 +	1
4	AI1 -	
5	AI2 +	2
6	AI2 -	
7	AI3 +	3
8	AI3 -	
9	AI4 +	4
10	AI4 -	
11	AI5 +	5
12	AI5-	
13	AI6 +	6
14	AI6 -	
15	AI7 +	7
16	AI7 -	

Tab. 3 AI4 / AI8 IO Terminal Connector

Tab. 3 lists the IO terminals and the voltage input signals.

2.4.2 Current Inputs

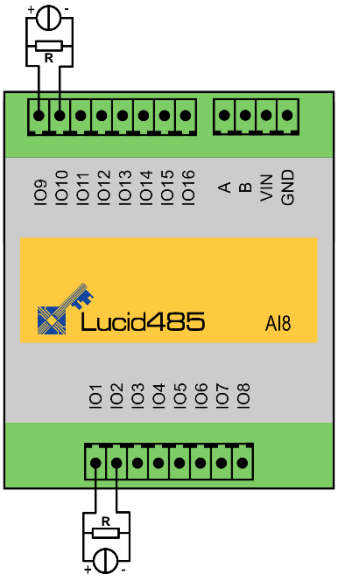

Fig. 5 AI8-I IO Connetion (Current)

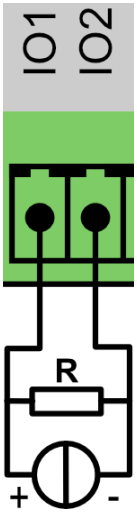

Fig. 6 AI-I Current Signal

Fig. 5 shows 2 current sources connected to the IO terminals of channels 0 and 4 of the AI8 module.

Fig. 6 shows the signal connected to the IO terminals IO1 and IO2 (input channel 0).

Tab. 3 lists the IO terminals and the current input signals.

The AI4/AI8-20M0 module is supplied with 4/8 pcs of 500 Ω precision burden resistors. The resistors are connected to the input terminals in parallel to the input signal.

The AI4/AI8-20M0 is able to measure both, 0-10 V signals as well as 0-20 mA signals. The burden resistor is only placed for 0-20mA current inputs.

The burden resistor transforms the 0-20mA current into a voltage:

$$U_{In} = R \,||R_{In} * I$$

In this formula I is the measured current. R is the 500 Ω burden resistor. Most of the current I flows through R but a small part flows through the input resistance R_{In} of the analog input circuit. This causes that the maximum measured voltage is lower than

$$U_{In} = 500\Omega * 20\text{mA} = 10\text{V}$$

The maximum voltage at a current of 20mA is 9,985V caused by the input resistance of approx. 300kΩ.

For the Modbus registers and the current value types (e.g. CUS4) this calculation is done by the module.

3 Module Operation

The Lucid485 AI4/AI8 Analog Input Module measures voltages or currents and converts them to a digital representation.

3.1 Operation Modes

3.1.1 Inactive

In inactive mode the input channel returns a value of 0.

Inactive channels are skipped from processing, increasing the conversion speed of the remaining active input channels.

3.1.2 Standard

Input channel is active and signals are converted in a round robin sequence.

3.2 Offset Compensation

The value of the IO Configuration Parameter *inAnOffset* (→ 3.5.4) is added to the measured result. This allows offset correction of ± 3 V or ± 3 mA.

A detailed description can be found in section 3.5.4.

3.3 Oversampling

The AI4/AI8 modules use a precision 12 bit hardware ADC.

The hardware ADC oversamples the measured input signal at minimum by a factor of 256 (hardware oversampling) before the result is returned.

The AI4/AI8 does additional firmware oversampling. The number of firmware oversampling cycles can be configured by the IO Configuration Parameter *inAnNrSamples* (→ 3.5.3).

The default firmware oversampling is 16 (*inAnNrSamples* = 16). This gives a total factor of 4096 (hardware oversampling x firmware oversampling = 256 x 16). This is a good compromise between accuracy and speed.

3.4 Commands

Lucid485 IO Modules can be accessed by the Network Frame Protocol, which is documented in the general *Lucid485 User Manual*.

This section describes in detail the commands which are supported by the AI4/AI8 modules.

3.4.1 GetIo

This command reads a value of an analog input channel.

<table>
<tr><td>Command</td><td>GetIo</td><td>Access</td><td>Read</td></tr>
<tr><td>Opcode</td><td>0x46</td><td></td><td></td></tr>
<tr><td colspan="4">LucidIoCtrl Command Line Tool</td></tr>
<tr><td>Call (-tV)</td><td colspan="3"><code>LucidIoCtrl -drs485:[COMx:addr] -c[Channel] -tV -r</code></td></tr>
<tr><td>Return</td><td colspan="3"><code>CHn:VV</code><table><tr><td>n</td><td>Input Channel</td></tr><tr><td>VV</td><td>Input Voltage</td></tr></table></td></tr>
<tr><td>Call (-tC)</td><td colspan="3"><code>LucidIoCtrl -drs485:[COMx:addr] -c[Channel] -tC -r</code></td></tr>
<tr><td>Return</td><td colspan="3"><code>CHn:VV</code><table><tr><td>n</td><td>Input Channel</td></tr><tr><td>VV</td><td>Input Current</td></tr></table></td></tr>
</table>

Tab. 4 GetIo Command

LucidIoCtrl Command Line Tool Example

Read voltage from input channel 0 (value is 5V):

```
      LucidIoCtrl -drs485:COM4:11 -c0 -tV -r
->    CH0:5.000
```

Read current from input channel 0 (value is 15mA):

```
      LucidIoCtrl -drs485:COM4:11 -c0 -tC -r
->    CH0:15.000
```

Request Frame

DST	SRC	OPC	P1	P2	LEN	CRC
DST	SRC	0x46	Channel	Value Type	0	CRC-16

Tab. 5 GetIo Network Request Frame

<table>
<tr><th>Value</th><th>Description</th></tr>
<tr><td>Channel</td><td>Number of input or output channel (Range: 0 to 7)</td></tr>
<tr><td>Value Type</td><td>Supported Value Types
<table>
<tr><th>Value Type</th><th>Value Range</th><th>Size</th></tr>
<tr><td>Signed Voltage
Resolution 1 µV
(0x1D)</td><td>-100,000,000 µV ~
100,000,000 µV
(-100 V ~ 100 V)</td><td>4 Bytes</td></tr>
<tr><td>Signed Voltage
Resolution 1 mV
(0x1C)</td><td>-30,000 mV ~
30,000 mV
(-30 V ~ 30 V)</td><td>2 Bytes</td></tr>
<tr><td>Signed Current
Resolution 1nA
(0x23)</td><td>-100,000,000 nA ~
100,000,000 nA
(-100 mA ~ 100mA)</td><td>4 Bytes</td></tr>
<tr><td>ADC Value
(0x10)</td><td>0 ~ 65,535</td><td>2 Bytes</td></tr>
</table></td></tr>
</table>

Tab. 6 GetIo Request

Response Frame:

DST	SRC	Status	LEN	Data Field	CRC
DST	SRC	Status	Length	Value	CRC-16

Tab. 7 GetIo Network Response Frame

Returns Execution Status Code, documented in the general *Lucid485 User Manual*.

In case of successful execution, the command returns the value of the specified channel number.

3.4.2 GetIoGroup

This command reads the values of a group of input channels of the same Value Type.

<table>
<tr><td>Command</td><td>GetIoGroup</td><td>Access</td><td>Read</td></tr>
<tr><td>Opcode</td><td>0x48</td><td></td><td></td></tr>
<tr><td colspan="4">LucidIoCtrl Command Line Tool</td></tr>
<tr><td>Call (-tV)</td><td colspan="3"><code>LucidIoCtrl -drs485:[COMx:addr] -c[Channels] -tV -r</code>
<u>Channels:</u>
Comma separated list of channels e.g. -c0,1,3</td></tr>
<tr><td>Return</td><td colspan="3">List of values sorted from lower to higher channels
<code>CHn:vv</code><table><tr><td>n</td><td>Input Channel</td></tr><tr><td>vv</td><td>Input Voltage</td></tr></table></td></tr>
<tr><td>Call (-tC)</td><td colspan="3"><code>LucidIoCtrl - -drs485:[COMx:addr] -c[Channels] -tC -r</code>
<u>Channels:</u>
Comma separated list of channels e.g. -c0,1,3</td></tr>
<tr><td>Return</td><td colspan="3">List of values sorted from lower to higher channels
<code>CHn:vv</code><table><tr><td>n</td><td>Input Channel</td></tr><tr><td>vv</td><td>Input Current</td></tr></table></td></tr>
</table>

Tab. 8 GetIoGroup Command

<u>LucidIoCtrl Command Line Tool Example</u>

Read voltages from all input channels:

```
      LucidIoCtrl -drs485:COM4:11 -c0,1,2,3 -tV -r
->    CH0:6.000  CH1:2.500  CH2:0.000  CH3:-2.500
```

<u>Request Frame</u>

DST	SRC	OPC	P1	P2	LEN	CRC
DST	SRC	0x48	Channel Mask	Value Type	0	CRC-16

Tab. 9 GetIoGroup Network Request Frame

<table>
<tr><th>Value</th><th>Description</th></tr>
<tr><td>Channel Mask</td><td>
Channel Mask
Specifies the output channels to access
<table>
<tr><th>Channel</th><th>Bit Position</th><th>Value</th></tr>
<tr><td>0</td><td>0</td><td>0x01</td></tr>
<tr><td>1</td><td>1</td><td>0x02</td></tr>
<tr><td>2</td><td>2</td><td>0x04</td></tr>
<tr><td>3</td><td>3</td><td>0x08</td></tr>
<tr><td>4</td><td>4</td><td>0x10</td></tr>
<tr><td>5</td><td>5</td><td>0x20</td></tr>
<tr><td>6</td><td>6</td><td>0x40</td></tr>
<tr><td>7</td><td>P1A 0</td><td>P1=0x80
P1A = 0x01</td></tr>
</table>
Values are bitwise OR combined
Size of P1 is 1 or 2 bytes. If Bit 7 of P1 is set, a subsequent P1A is expected.

<u>Examples:</u>
Accessing channel numbers:
0 and 3 Value = 0x01 OR 0x08 = 0x09
1 and 2 Value = 0x02 OR 0x04 = 0x06
1, 2 and 7 Value P1 = 0x02 OR 0x04 = 0x86
Value P1A = 0x01 (for channel 7)
</td></tr>
<tr><td>Value Type</td><td>
Supported Value Types
<table>
<tr><th>Value Type</th><th>Value Range</th><th>Size</th></tr>
<tr><td>Signed Voltage
Resolution 1 µV
(0x1D)</td><td>-100,000,000 µV ~
100,000,000 µV
(-100 V ~ 100 V)</td><td>4 Bytes</td></tr>
<tr><td>Signed Voltage
Resolution 1 mV
(0x1C)</td><td>-30,000 mV ~
30,000 mV
(-30 V ~ 30 V)</td><td>2 Bytes</td></tr>
<tr><td>Signed Current
Resolution 1nA
(0x23)</td><td>-100,000,000 nA ~
100,000,000 nA
(-100 mA ~ 100mA)</td><td>4 Bytes</td></tr>
<tr><td>ADC Value
(0x10)</td><td>0 ~ 65,535</td><td>2 Bytes</td></tr>
</table>
</td></tr>
</table>

Tab. 10 GetIoGroup Request

<u>Response Frame:</u>

DST	SRC	Status	LEN	Data Field	CRC
DST	SRC	Status	Length	Value(s)	CRC-16

Returns Execution Status Code, documented in the general *Lucid485 User Manual*.

In case of successful execution, the command returns the read values of the channels specified in the Channel Mask in channel number ascending order.

Example of GetIoGroup Request:
Read voltage input channels 0 and 1.

DST	SRC	OPC	P1	P2	LEN	CRC
0x11	0x10	0x48	0x03	0x1D	0x00	CRC

Tab. 11 GetIoGroup Network Request Example

Channel Mask (P1): 0x01 OR 0x02 = 0x03

Response Frame:
For input 0 = 5.000 V, input 2 = 2.500V
Values in Data Field are in ascending order Channel 0, Channel 1.

DST	SRC	Status	LEN	Data Field		CRC
0x10	0x11	0x00	0x08	CH 0	CH 1	CRC
				...	...	

Tab. 12 GetIoGroup Network Response Example

CH 0				CH1			
0	1	2	3	4	5	6	7
0x40	0x4B	0x4B	0x00	0xA0	0x25	0x26	0x00

Tab. 13 GetIoGroup Example Channel Values

3.5 IO Configuration Parameters

Lucid485 modules are configured by a set of System Configuration Parameters and IO Configuration Parameters.

The parameters are accessible by the SetParam and GetParam commands, which are described in the general *Lucid485 User Manual*.

Parameter values can be made persistent in the non-volatile memory of the microcontroller e.g., by adding the -p argument to LucidIoCtrl or by setting the persistent parameter in the API function to true. Values of persistent parameters are restored when Lucid485 is powered on.

The number of write cycles to the non-volatile memory is limited. Write operations wear out the non-volatile memory and periodical updates of persistent parameters should be avoided in order not to destroy the device over time.

3.5.1 inAnValue

This IO Configuration Parameter contains the ADC value of the input.

Parameter	*inAnValue*	**Access**	Read
Address	0x1000		
Values	ADC Input Value		
Default Value	0x00	**Parameter Type**	2 Bytes unsigned
LucidIoCtrl Command Line Tool			
Parameter Name	*inAnValue*	**Parameter Values**	0 … 65,535
Call (Get)	`LucidIoCtrl -drs485:[COMx:addr] -c[Channel] -ginAnValue`		

Tab. 14 IO Configuration Parameter inAnValue

LucidIoCtrl Command Line Tool Example

Read value of input channel 0:

```
      LucidIoCtrl -drs485:COM4:11 -c0 -ginAnValue
->    inAnValue=0
```

3.5.2 inAnMode

This IO Configuration Parameter configures the operation mode of the input.

<table>
<tr><td>Parameter</td><td>inAnMode</td><td>Access</td><td>Read / Write</td></tr>
<tr><td>Address</td><td>0x1100</td><td colspan="2"></td></tr>
<tr><td>Values</td><td colspan="3">Input Mode<table><tr><th>Byte</th><th>Mode</th></tr><tr><td>0x00</td><td>inactive</td></tr><tr><td>0x01</td><td>standard</td></tr></table></td></tr>
<tr><td>Default Value</td><td>Standard</td><td>Parameter Type</td><td>1 Byte unsigned</td></tr>
<tr><td colspan="4">LucidIoControl Command Line Tool</td></tr>
<tr><td>Parameter Name</td><td>inAnMode</td><td>Parameter Values</td><td>inactive / standard</td></tr>
<tr><td>Call (Set)</td><td colspan="3"><code>LucidIoCtrl -drs485:[COMx:addr] -c[Channel]
-sinAnMode=[Mode] {-p} {--default}</code></td></tr>
<tr><td>Call (Get)</td><td colspan="3"><code>LucidIoCtrl -drs485:[COMx:addr] -c[Channel] -ginAnMode</code></td></tr>
</table>

Tab. 15 IO Configuration Parameter inAnMode

LucidIoCtrl Command Line Tool Example

Set operation mode of input channel 0 to Standard Mode and make the setting persistent.

```
      LucidIoCtrl -drs485:COM4:11 -c0 -sinAnMode=standard -p
```

Read the operation mode of input channel 0

```
      LucidIoCtrl -drs485:COM4:11 -c0 -ginAnMode
->    inAnMode=standard
```

3.5.3 inAnNrSamples

This IO Configuration Parameter specifies the number of firmware oversampling cycles for an input channel.

Oversampling increases the converted result. The algorithm calculates an average signal and adds additional precision bits if possible.

Valid oversampling cycles are 2, 4, 8, 16, 128 or 256.

Parameter	*inAnNrSamples*	**Access**	Read / Write
Address	0x1112		
Values	2, 4, 8, 16, 128 or 256 oversampling cycles		
Default Value	16	**Parameter Type**	2 Bytes unsigned
LucidIoControl Command Line Tool			
Parameter Name	*inAnNrSamples*	**Parameter Values**	Cycles
Call (Set)	`LucidIoCtrl -drs485:[COMx:addr] -c[Channel] -sinAnNrSamples=[cylces] {-p} {--default}`		
Call (Get)	`LucidIoCtrl -drs485:[COMx:addr] -c[Channel] -ginAnNrSamples`		

Tab. 16 IO Configuration Parameter inAnNrSamples

LucidIoCtrl Command Line Tool Example

Set number of oversampling cycles to 128 and make the setting persistent.

```
LucidIoCtrl -drs485:COM4:11 -c0 -sinAnNrSamples=128 -p
```

Read number of oversampling cycles of input channel 0

```
LucidIoCtrl -drs485:COM4:11 -c0 -ginAnNrSamples
->  inAnNrSamples=128
```

3.5.4 inAnOffset

This IO Configuration Parameter configures the Input Offset Compensation Value.

Parameter	*inAnOffset*	**Access**	Read / Write
Address	0x1120		
Values	Offset Compensation in 100 µV steps (-3 V … 3 V) Offset Compensation in 100 nA steps (-3 mA … 3 mA) -30,000 ~ 30000		
Default Value	0	**Parameter Type**	2 Bytes signed
LucidIoCtrl Command Line Tool			
Parameter Name	*inAnOffset*	**Parameter Values**	Voltage [100 µV] Current [100 nA]
Call (Set)	`LucidIoCtrl -drs485:[COMx:addr] -c[Channel] -sinAnOffset=[Value] {-p} {--default}`		
Call (Get)	`LucidIoCtrl -drs485:[COMx:addr] -c[Channel] -ginAnOffset`		

Tab. 17 IO Configuration Parameter inAnOffset

LucidIoCtrl Command Line Tool Example

Set Input Offset Compensation value of input channel 0 to -500µV and make the setting persistent.

```
LucidIoCtrl -drs485:COM4:11 -c0 -sinAnOffset=-5 -p
```

Read Offset Compensation value

```
LucidIoCtrl -drs485:COM4:11 -c0 -ginAnOffset
->  inAnOffset=-5
```

4 Modbus RTU Protocol

The IO values can be accessed by Modbus holding registers listed in Tab. 18.

IO Channel Values contain the Voltage in mV (singed).

Alternative IO Channel Values contain the Current in µA (signed).

Address	Type	Width	Description
0x2000	Holding	16	IO Channel Number 0 Value (AI0)
0x2001	Holding	16	IO Channel Number 1 Value (AI1)
0x2002	Holding	16	IO Channel Number 2 Value (AI2)
0x2003	Holding	16	IO Channel Number 3 Value (AI3)
0x2004	Holding	16	IO Channel Number 4 Value (AI4)
0x2005	Holding	16	IO Channel Number 5 Value (AI5)
0x2006	Holding	16	IO Channel Number 6 Value (AI6)
0x2007	Holding	16	IO Channel Number 7 Value (AI7)
0x2000	Holding	16	Alternative IO Channel Number 0 Value (AI0)
0x2001	Holding	16	Alternative IO Channel Number 1 Value (AI1)
0x2002	Holding	16	Alternative IO Channel Number 2 Value (AI2)
0x2003	Holding	16	Alternative IO Channel Number 3 Value (AI3)
0x2004	Holding	16	Alternative IO Channel Number 4 Value (AI4)
0x2005	Holding	16	Alternative IO Channel Number 5 Value (AI5)
0x2006	Holding	16	Alternative IO Channel Number 6 Value (AI6)
0x2007	Holding	16	Alternative IO Channel Number 7 Value (AI7)

Tab. 18 Modbus RTU Registers

5 Specification

Parameter		Condition	Value	
Inputs				
	No of Input Channels		4/8	
Module - Electrical Characteristics				
	Supply Voltage		7-24 V	
	Max. Supply Current		100 mA	
Input - Electrical Characteristics				
	Measurement Method		Analog to Digital Conversion	
	Resolution		12 bit hardware	
	Accuracy		typ. ±0,25 % of full scale range	
	Max. Measuring Error		± 5 LSB	
	Input Resistance		R_{In}	> 100 kΩ
Input - Timing Characteristic				
	Acquisition Interval / Channel		T_{Scan}	5 ms
Module - Communication				
	Baudrate		1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps	
	Parity		NONE, EVEN, ODD	
	Stopbits		1 or 2	
	Databits		8	
	Bus Termination (If enabled)		120 Ω	
Module - Environment				
	Temperature	Storage	-20 °C … +70 °C	
		Operation	0 °C … +55 °C	
	Humidity		< 85 % RH, non-condensing	
Module - Housing				
	Dimensions L x W x H		90 x 54 x 62 mm	
	Weight (in total)		120 g	
	Assembly		Rail-Mount (EN 50022, TS35)	
	Protection Class (DIN 40050)		IP20	

Tab. 19 AI4/AI8 Specification

Module is specified at environmental temperature of 25°C.

6 Order Information

Order Code	Product
L485-AI4-5	Lucid485 Analog Input Serial Module with 4 channels 0 ~ 5 V.
L485-AI4-10	Lucid485 Analog Input Serial Module with 4 channels 0 ~ 10 V.
L485-AI4-24	Lucid485 Analog Input Serial Module with 4 channels 0 ~ 24 V.
L485-AI4-5S	Lucid485 Analog Input Serial Module with 4 channels -5 ~ 5 V.
L485-AI4-10S	Lucid485 Analog Input Serial Module with 4 channels -10 ~ 10 V.
L485-AI4-24S	Lucid485 Analog Input Serial Module with 4 channels -24 ~ 24 V.
L485-AI4-20M0	Lucid485 Analog Input Serial Module with 4 channels 0 ~ 20 mA.
L485-AI8-5	Lucid485 Analog Input Serial Module with 8 channels 0 ~ 5 V.
L485-AI8-10	Lucid485 Analog Input Serial Module with 8 channels 0 ~ 10 V.
L485-AI8-24	Lucid485 Analog Input Serial Module with 8 channels 0 ~ 24 V.
L485-AI8-5S	Lucid485 Analog Input Serial Module with 8 channels -5 ~ 5 V.
L485-AI8-10S	Lucid485 Analog Input Serial Module with 8 channels -10 ~ 10 V.
L485-AI8-24S	Lucid485 Analog Input Serial Module with 8 channels -24 ~ 24 V.
L485-AI8-20M0	Lucid485 Analog Input Serial Module with 8 channels 0 ~ 20 mA.

Tab. 20 Order Information

7 Document Revision

Date	Rev.	
2024/10/08	1.0	Initial documentation

Tab. 21 Document Revision

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