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M.U. IO-CB/AI-08TC-3/11.05
Cod. J30-478-1AAI-08TC E

mod. IO-CB/AI-08TC-00

User manual

Contents

CANopen I/O Module 8 Thermocouple Analogue Inputs mod. IO-CB/AI-08TC

8 analogue inputs configurable for:
- Thermocouple
- mV linear inputs

APPLICABLE STANDARDS

The AI-08TC module is suited for the CiA DS301 protocol [1] and implements the CiA DS 404 standard Device Profile, as far as the Analogue Input Function Block is concerned [2].

WARNING

1) **The product described in this manual should only be installed, operated and maintained by qualified application programmers and software engineers who are familiar with automation safety concepts and applicable national standards.**
2) **This product supports the Parameter defaults indicated by CiA standards, in addition, some parameters have a factory set (value present in the module when comes from the factory). The default values can be loaded with the restore command, but after the restore, factory set values are lost.**

Characteristics

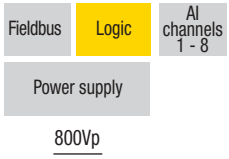
Technical data

Accuracy at 25°C	±0.1% FS
Temperature coefficient	0.005% FS/K
Cold junction compensation accuracy	0.25°C
Input impedance	mV > 100MΩ
Digital resolution	16 bit
Input ranges	0...100 mV
	0...1000 mV
	-100...+100 mV
	-1000...+1000 mV
Type of TC	J, K, L ,N, R, S, T
Conversion time	Better than 60 ms (x 2 or 4 channels)
Overvoltage protection	30 V
CMRR	> 100 dB

General

3 way isolation	800 Vp
Power supply	24 Vdc; –15...+25%
Power consuption	3 W
Dimensions	L: 76; H: 110; W: 65
Weight	220 g
Safety regulations EN61010-1	**Isolation class II** (500 Vrms) Installation cathegory II Pollution degree 2
CE marking	EN61131-2

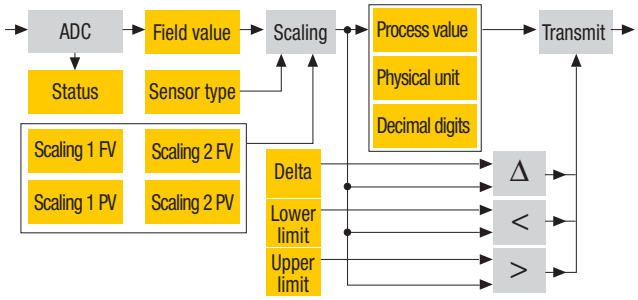
3 way isolation diagram



Environment

	Operating	Storage
Temperature	-10...+65°C	-40...+85°C
Relative Humidity	5...95% non condensing Appropriate measures must be taken against humidity >85%	5...95% non condensing For a short period, slight condensation may appear on the housing
Mounting	Vertical, free air	
Protection	IP20	
Vibrations (3 axes)	10...57Hz 0.0375mm 57...150Hz 0.5g	
Shock (3 axes)	15g, 11ms half sine	

Functional Block Diagram



The analogue input function block describes, for each input channel, how field values are converted to process values. The field values are converted to the real physical dimension of the measured quantity, and the result is called "Process Value". The conversion from Field Value to Process Value is generally described as a linear transformation.

This is defined by two pairs of field values and corresponding process values (Input Scaling 1 FV/Input Scaling 1 PV and Input Scaling 2 FV/Input Scaling 2 PV), called calibration point 1 and 2.

Non-linear transformation (e.g. for thermocouples sensors) is possible, and is defined within the parameter "Sensor Type". In this case the input scaling values are meaningless.

The parameters "Span Start" and "Span End" define the process value validity range. If the process value exceeds these limits it will be marked as "overflowed".

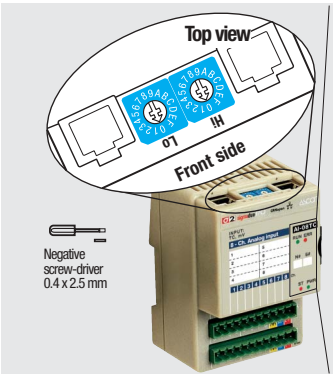
PDOs used by the module

TPDO	Properties	Mapped objects	Index	Sub-index
TPDO 1	COBID: 180h + NodeID	AI Input PV Ch1	9130h	01h
	Transmission Type: 01h *	AI Input PV Ch2	9130h	02h
TPDO 2	COBID: 280h + NodeID	AI Input PV Ch3	9130h	03h
	Transmission Type: 01h *	AI Input PV Ch4	9130h	04h
TPDO 3	COBID: 380h + NodeID	AI Input PV Ch5	9130h	05h
	Transmission Type: 01h *	AI Input PV Ch6	9130h	06h
TPDO 4	COBID: 480h + NodeID	AI Input PV Ch7	9130h	07h
	Transmission Type: 01h *	AI Input PV Ch8	9130h	08h

Note: * The Transmission Type is configurable:
01h is the factory set (value present in the modules when come from the factory);
FFh is the default value

Hardware Set-up

Hexadecimal rotary switches, service and I/O LEDs



LED	Status	Meaning
RUN	ON	Operational
	Blinking	Pre-operational (CANopen)
	Single flash	STOPPED
	OFF	Device in RESET state
ERR	ON	BUS OFF
	Single flash	Warning limit reached
	Double flash	Error Control Event
	Triple flash	Sync Error (CANopen)
	OFF	No error. Device working
ST	ON	DIAG Error
	Blinking	INIT and DIAG running
	Single flash	Baud rate setting
	OFF	Module OK and ready
PWR	ON	Module Power Supply ON
	OFF	Module Power Supply OFF

Bit Rate and Node ID configuration

Bit rate

Lo switch	Baud rate kbps	Bus length m
1	20	2500
2	50	1000
3	100	500
4	125	500
5	250	250
6 *	500	100
7	800	50
8	1000	25

Node ID

Hi switch	Lo switch	Valid ID Node
0	1	01h (address 1)
0	2	02h (address 2)
↓	↓	↓
7	F	7Fh (address 127D) *

Notes: * Default value

Procedure for Node ID and Bit Rate configuration

The HI and LO hexadecimal rotary swithches set the module's Bit Rate and CAN Node ID. During the configuration, the module must be **off line** and the CAN bus must be physically disconnected.

To configure the module, follow the procedure:

1 Turn the Power OFF
2 Set the **HI** switch to "F"
3 Select the desired Bit Rate value by setting the **LO** switch following the table (e.g. "8" for 1 Mbps)
4 Turn the Power ON
5 Shift the **HI** switch to "E" (all the module service LEDs should flash)
6 Turn the Power OFF. Now configure Node ID
7 Set the **HI** and **LO** switches to the desired valid Node ID following the table
8 Turn the Power ON.

Alternatively, at step 7 set the value 00h. Then, at the next Power ON, the last valid stored value will be resumed as Node ID.

Default values: Bit Rate = 500 kbps, Node ID = 127D

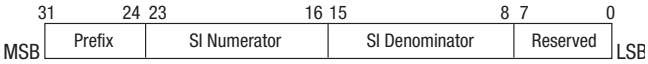
Parameter configuration

Index 6110h - AI Sensor type

Setting (in decimal form) (value to be inserted at address 6110h)	**Thermocouple type**	**Range**	
1h	Type J	-210°C	+1200°C
2h	Type K	-200°C	+1372°C
3h	Type L	-200°C	+600°C
4h	Type N	0°C	+1300°C
5h	Type R	0°C	+1600°C
6h	Type S	0°C	+1760°C
7h	Type T	-200°C	+400°C
2Bh		-1 V	+1 V
2Ch		0 V	1 V
2Dh		-100 mV	+100 mV
2Eh		0 V	100 mV

Index 6131h - AI Physical Unit PV
Index 6132h - AI Decimal Digits PV

The AI Physical Unit PV assigns SI units and prefixes to the process value, with the following structure:



Physical units and prefixes are coded according to CiA standard [3] (DS404 profile).

Module specific parameters

Index 2010h – Filter config

Settting this parameter is possible to configure the characteritics of the converter:

Value	Time Setting (ms)	Attenuation at 50Hz (dB)	Attenuation at 60Hz (dB)
0	9.52	1.1	1.57
1	19.77	4.83	7.08
2	30.03	11.78	17.84
3	39.55	>20	>35
4	49.8	>40	>80
5	54.61	>60	>60
6	60.06	>80	>40

Index 3000h – Node Address

Current Module Node ID - Read only access

Index 3001h – Baudrate

Current Module Bit rate - Read only access

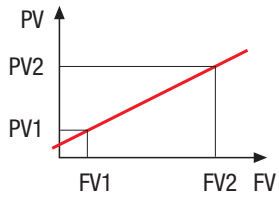
Index 5100h - Cold Junction Measure

Temperature of the cold junction, measured on the module's terminal block.

Scaling input variables

Index 9120h – AI Input Scaling 1FV
Index 9121h – AI Input Scaling 1PV
Index 9122h – AI Input Scaling 2FV
Index 9123h – AI Input Scaling 2PV

For thermocouple inputs all settings are made using the Sensor Type parameter, for analog inputs (±1V, 0...1V, ±100mV and 0...100mV), is possible to scale the values read setting two points of the scaling line.

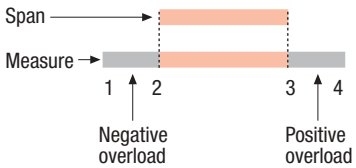


Index 9148h – AI Span start
Index 9149h – AI Span end

These two variables take into account the validity of the span values, indicating possible overloads and limiting the measure in correspondence of the extreme points of the span.

Span programmed values (°C)

Input	Span Start	Span End
TCJ	-210°C	1200°C
TCK	-200°C	1372°C
TCL	-200°C	600°C
TCN	0°C	1300°C
TCR	0°C	1600°C
TCS	0°C	1760°C
TCT	-200°C	400°C



Index 6150h – AI Status (read only parameter)

bit 7 – 3	2	1	0
Reserved	Negative overload	Positive overload	Not valid (e.g. sensor break)

Index 6F20h – Life counter

A counter that increments at each new generated sample.

Index 9133h – AI Interrupt Delta Input PV

Index 9134h – AI Interrupt Lower Limit Input PV

Index 9134h –AI Interrupt Upper Limit Input PV

The last the variables relate to the asynchronous mode of transmission of a PDO (transmission type 255). A comparison is made with the mapped Input PV value and a transmission is initiated asynchronously when any of the limits is reached.

Commands

Index 6112h – AI Operating Mode

Defines the status of a specific channel of the module. In the table that follows is described each status and related to the value of the object or the value to be inserted in the object.

Value	Meaning
0X00	Channel OFF (READY)
0X01	RUN status
0X0A	Insert linearisation status
0XA0	Calibration status
0XFF	Error status

Index 6114h – AI ADC sample rate

ADC acquisition time.

Emergency messages

The module automatically sends emergency messages including error codes. The communication errors are descrided in CiA DS301 [1].
The error codes are expressed as a DEVICE SPECIFIC ERROR type of code, one for each channel: 0xFF0n for channel n. The codes indicating a specific condition are also inserted, following the table below:

Error code	Error
0000000000	**No error** –This code is generated when exiting an error contidion, to notify the end of one of the error states
0000000006	**Error No Command** – Invalid command received
0000000007	**Error Wrong Command** – An attempt to execute a command from an illegal state
0000000008	**Error Wrong Assignment** – An attempt to assign a parameter from an illegal state
0000000009	**Error Wavegeneration** – The parameters calculated for the ramp generation are not valid

	0	1	2	3	4	5	6	7
Emergency message	0nh	FFh	21h	00h	00h	00h	00h	0yh
	COB – ID = [entry 1014h] + NodeID							
				Error code				

Parameter Store/Restore

This module allows parameters to be saved in a non volatile memory. In order to avoid storing parameters by mistake, storage is only executed when a specific signature is written to the appropriate subindex. The signature is “save“.

Similarly, the default values of parameters, according to the communication or device profile, are restored. On receipt of the correct signature in the appropriate subindex, the device restores the default parameters and then confirms the SDO transmission. The signature is “load”.

The new configuration becomes active after a reset, i.e. after a “Power Down” or an NMT “Reset Node” message.

Byte	0	1	2	3	4	5	6	7
Store Parameter	22h	10h	10h	01h	73h	61h	76h	65h
					s	a	v	e
	COB – ID = 600h + NodeID							
Restore Parameter	22h	11h	10h	01h	6Ch	6Fh	61h	64h
					l	o	a	d
	COB – ID = 600h + NodeID							

SDO Messages

The entries of a device Object Dictionary are accessed trough SDO (Service Data Object) messages. The basic SDO messages are as follows, as based on the Client – Server request and response model:

Byte	0	1	2	3	4	5	6	7
Read request	40h	Index		Sub-Index	Reserved			
	COB – ID = 600h + NodeID							
Read response	4Fh *	Index		Sub-Index	Data			
	COB – ID = 580h + NodeID							
Write request	22h	Index		Sub-Index	Data			
	COB – ID = 600h + NodeID							
Write response	60h	Index		Sub-Index	Reserved			
	COB – ID = 580h + NodeID							

* This code is type dependant.
Please refer to the CIA DS301 Profile for more details.

Reference documents

List of CiA documents to which the user should refer:
[1] CiA DS301 - CANopen Application Layer and Communication Profile
[2] CiA DS401 - CANopen Device Profile: Generic I/O Modules

Accessories, Spare Parts and Warranty

Power Supply 45W 24Vdc 2A	AP-S2/AL-DR45-24
Power Supply 120W 24Vdc 5A	AP-S2/AL-DR120-24
Additional Terminal Block 2x11	AP-S2/TB-211-1
Female Plug 11 Screw clamp	AP-S2/SPINA-V11
Female Plug 11 Spring clamp	AP-S2/SPINA-M11
RJ45 terminated cable 14cm	AP-S2/LOCAL-BUS76
RJ45 terminated cable 22cm	AP-S2/LOCAL-BUS152
CAN termination Adapter	AP-S2/TERM-CAN

Warranty: 3 years excluding defects due to improper use

Object Dictionary structure (with default values)

⚠ In order to configure the module, it is necessary to connect it to a PC with the CAN interface and the superivisory software installed. The configuration can be obtained by writing the desired values to the module's variables listed in the Object Dictionary.

Index (hex)	Sub Index	Object	Name	Default [hex]	Type	Acc. Attr.	MO
1000		VAR	Device Type	80191	UNSIGNED32	RO	M
1001		VAR	Error Register	0	UNSIGNED8	RO	M
1003		ARRAY	Predefined error field	0	UNSIGNED32	RO	O
1005		VAR	COB-ID SYNC	80	UNSIGNED32	RW	O
1006		VAR	Communication cycle period	0	UNSIGNED32	RW	O
1007		VAR	Synchrounous window length	0	UNSIGNED32	RW	O
1008		VAR	Manufacturer Device Name	"08TC"	Vis-String	const	O
1009		VAR	Manufacturer Hardware Version	"1.00"	Vis-String	const	O
100A		VAR	Manufacturer Software Version	"1.00"	Vis-String	const	O
100C		VAR	Guard Time	0	UNSIGNED16	RW	O
100D		VAR	Life Time Factor	0	UNSIGNED8	RW	O
1010		ARRAY	Store Parameters		UNSIGNED32		O
	00h	VAR	Largest subindex supported	1	UNSIGNED8	RO	
	01h	VAR	Save all parameters	3	UNSIGNED32	RW	
1011		ARRAY	Restore Default Parameters		UNSIGNED32	RW	O
	00h	VAR	Largest subindex supported	1	UNSIGNED8	RO	
	01h	VAR	Restore all default parameters	1	UNSIGNED32	RW	
1014		VAR	COB-ID EMCY	80 + NodeID	UNSIGNED32	RW	O
1015		VAR	Inhibit Time EMCY	0	UNSIGNED16	RW	O
1017		VAR	Producer heartbeat time	07D0	UNSIGNED16	RW	O
1018		RECORD	Identity Object		Identity (23h)		O
	00h	VAR	Number of entries	4	UNSIGNED8	RO	
	01h	VAR	Vendor ID	0,00E+00	UNSIGNED32	RO	
	02h	VAR	Product code	1	UNSIGNED32	RO	
	03h	VAR	Revision number	0	UNSIGNED32	RO	
	04h	VAR	Serial Number	1	UNSIGNED32	RO	
1200		ARRAY	Server SDO Parameters				
1800		RECORD	1st Transmit PDOComm Param.		PDO CommPar (20h)		M
	00h	VAR	Largest subindex supported	5	UNSIGNED8	RO	
	01h	VAR	COB-ID used	180 + NodeID	UNSIGNED32	RW	
	02h	VAR	Transmission type	FF *	UNSIGNED8	RW	
	03h	VAR	Inhibit time	0	UNSIGNED16	RW	
	04h	VAR	Reseved		UNSIGNED8	RW	
	05h	VAR	Event timer	0	UNSIGNED16	RW	
1801		RECORD	2nd Transmit PDOComm Param.		PDO CommPar (20h)		M
	00h	VAR	Largest subindex supported	5	UNSIGNED8	RO	
	01h	VAR	COB-ID used	280 + NodeID	UNSIGNED32	RW	
	02h	VAR	Transmission type	FF *	UNSIGNED8	RW	
	03h	VAR	Inhibit time	0	UNSIGNED16	RW	
	04h	VAR	Reseved		UNSIGNED8	RW	
	05h	VAR	Event timer	0	UNSIGNED16	RW	
1802		RECORD	3rd Transmit PDOComm Param.		PDO CommPar (20h)		M
	00h	VAR	Largest subindex supported	5	UNSIGNED8	RO	
	01h	VAR	COB-ID used	380 + NodeID	UNSIGNED32	RW	
	02h	VAR	Transmission type	FF *	UNSIGNED8	RW	
	03h	VAR	Inhibit time	0	UNSIGNED16	RW	
	04h	VAR	Reseved		UNSIGNED8	RW	
	05h	VAR	Event timer	0	UNSIGNED16	RW	
1803		RECORD	4th Transmit PDOComm Param.		PDO CommPar (20h)		M
	00h	VAR	Largest subindex supported	5	UNSIGNED8	RO	
	01h	VAR	COB-ID used	480 + NodeID	UNSIGNED32	RW	
	02h	VAR	Transmission type	FF *	UNSIGNED8	RW	
	03h	VAR	Inhibit time	0	UNSIGNED16	RW	
	04h	VAR	Reseved		UNSIGNED8	RW	
	05h	VAR	Event timer	0	UNSIGNED16	RW	
1A00		RECORD	1st Transmit PDO Mapping		PDO Mapping (21h)		M
	00h	VAR	No. of mapped application obj.	4	UNSIGNED8	RO	
	01h	VAR	Analogue Input PV ch1	91300120	UNSIGNED32	RO	
	02h	VAR	Analogue Input PV ch2	91300220	UNSIGNED32	RO	
1A01		RECORD	2nd Transmit PDO Mapping		PDO Mapping (21h)		M
	00h	VAR	No. of mapped application obj.	4	UNSIGNED8	RO	
	01h	VAR	Analogue Input PV ch3	91300320	UNSIGNED32	RO	
	02h	VAR	Analogue Input PV ch4	91300420	UNSIGNED32	RO	
1A02		RECORD	3rd Transmit PDO Mapping		PDO Mapping (21h)		M
	00h	VAR	No. of mapped application obj.	4	UNSIGNED8	RO	
	01h	VAR	Analogue Input PV ch5	91300520	UNSIGNED32	RO	
	02h	VAR	Analogue Input PV ch6	91300620	UNSIGNED32	RO	
1A03		RECORD	4th Transmit PDO Mapping		PDO Mapping (21h)		M
	00h	VAR	No. of mapped application obj.	4	UNSIGNED8	RO	
	01h	VAR	Analogue Input PV ch7	91300720	UNSIGNED32	RO	
	02h	VAR	Analogue Input PV ch8	91300820	UNSIGNED32	RO	
2010		VAR	Filter Config	5	UNSIGNED8	RW	
3000		VAR	Node Address	7F	UNSIGNED8	RO	O
3001		VAR	Node Baurate	06	UNSIGNED8	RO	O
3500		ARRAY	Out of Range mode		UNSIGNED8		C
	00h	VAR	Number of entries	8	UNSIGNED8	RO	
	01h	VAR	Ch1 Out of Range mode	0	UNSIGNED8	RW	
	02h	VAR	Ch2 Out of Range mode	0	UNSIGNED8	RW	
	03h	VAR	Ch3 Out of Range mode	0	UNSIGNED8	RW	
	04h	VAR	Ch4 Out of Range mode	0	UNSIGNED8	RW	
	05h	VAR	Ch5 Out of Range mode	0	UNSIGNED8	RW	
	06h	VAR	Ch6 Out of Range mode	0	UNSIGNED8	RW	
	07h	VAR	Ch7 Out of Range mode	0	UNSIGNED8	RW	
	08h	VAR	Ch8 Out of Range mode	0	UNSIGNED8	RW	
5100		ARRAY	Junction Temperature		INTEGER16	RO	O
6110		ARRAY	AI Sensor Type		UNSIGNED16		O
	00h	VAR	Number of entries	8	UNSIGNED8	RO	
	01h	VAR	AI Sensor Type Ch1	1	UNSIGNED16	RW	
	...	...	...	...	...	...	...
	08h	VAR	AI Sensor Type Ch8	1	UNSIGNED16	RW	
6112		ARRAY	AI Operating Mode		UNSIGNED8		O
	00h	VAR	Number of entries	8	UNSIGNED8	RO	
	01h	VAR	AI Operating Mode Ch1	0	UNSIGNED8	RW	
	...	...	...	...	...	...	...
	08h	VAR	AI Operating Mode Ch8	0	UNSIGNED8	RW	

Index (hex)	Sub Index	Object	Name	Default [hex]	Type	Acc. Attr.	MO
6114		ARRAY	AI ADC Sample Rate		UNSIGNED8		O
	00h	VAR	Number of entries	8	UNSIGNED8	RO	
	01h	VAR	AI ADC Sample Rate Ch1	0	UNSIGNED32	RO	
	...	...	...	...	...	...	...
	08h	VAR	AI ADC Sample Rate Ch8	0	UNSIGNED8	RO	
6131		ARRAY	AI Physical Unit PV		UNSIGNED32		C
	00h	VAR	Number of entries	8	UNSIGNED8	RO	
	01h	VAR	AI Physical Unit Ch1		UNSIGNED32	RW	
	...	...	...	...	...	...	...
	08h	VAR	AI Physical Unit Ch8		UNSIGNED32	RW	
6132		ARRAY	AI Decimal Digit PV		UNSIGNED8		C
	00h	VAR	Number of entries	8	UNSIGNED8	RO	
	01h	VAR	AI Decimal Digit PV Ch1	2	UNSIGNED8	RW	
	...	...	...	...	...	...	...
	08h	VAR	AI Decimal Digit PV Ch8	2	UNSIGNED8	RW	
6150		ARRAY	AI Status		UNSIGNED8		O
	00h	VAR	Number of entries	8	UNSIGNED8	RO	
	01h	VAR	AI Status Ch1	0	UNSIGNED8	RO	
	...	...	...	...	...	...	...
	08h	VAR	AI Status Ch8	0	UNSIGNED8	RO	
6F20		ARRAY	Life Counter		UNSIGNED8		O
	00h	VAR	Number of entries	8	UNSIGNED8	RO	
	01h	VAR	Life Counter Ch1	0	UNSIGNED8	RW	
	...	...	...	...	...	...	...
	08h	VAR	Life Counter Ch8	0	UNSIGNED8	RW	
9100	ARRAY		AI input Field Value		INTEGER32		O
	00h	VAR	Number of entries	8	UNSIGNED8	RO	
	01h	VAR	AI input Field Value Ch1		INTEGER32	RW	
	...	...	...	...	...	...	...
	08h	VAR	AI input Field Value Ch8		INTEGER32	RW	
9120	ARRAY		AI Input Scaling 1FV		INTEGER32		O
	00h	VAR	Number of entries	8	UNSIGNED8	RO	
	01h	VAR	AI Input Scaling 1FV Ch1		INTEGER32	RW	
	...	...	...	...	...	...	...
	08h	VAR	AI Input Scaling 1FV Ch8		INTEGER32	RW	
9121	ARRAY		AI Input Scaling 1PV		INTEGER32		O
	00h	VAR	Number of entries	8	UNSIGNED8	RO	
	01h	VAR	AI Input Scaling 1PV Ch1		INTEGER32	RW	
	...	...	...	...	...	...	...
	08h	VAR	AI Input Scaling 1PV Ch8		INTEGER32	RW	
9122	ARRAY		AI Input Scaling 2FV		INTEGER32		O
	00h	VAR	Number of entries	8	UNSIGNED8	RO	
	01h	VAR	AI Input Scaling 2FV Ch1		INTEGER32	RW	
	...	...	...	...	...	...	...
	08h	VAR	AI Input Scaling 2FV Ch8		INTEGER32	RW	
9123	ARRAY		AI Input Scaling 2PV		INTEGER32		O
	00h	VAR	Number of entries	8	UNSIGNED8	RO	
	01h	VAR	AI Input Scaling 2PV Ch1		INTEGER32	RW	
	...	...	...	...	...	...	...
	08h	VAR	AI Input Scaling 2PV Ch8		INTEGER32	RW	
9130	ARRAY		AI Input PV		INTEGER32		C
	00h	VAR	Number of entries	8	UNSIGNED8	RO	
	01h	VAR	AI Input PV Ch1		INTEGER32	RW	
	...	...	...	...	...	...	...
	08h	VAR	AI Input PV Ch8		INTEGER32	RW	
9133	ARRAY		AI Interrupt Delta Input PV		INTEGER32		O
	00h	VAR	Number of entries	8	UNSIGNED8	RO	
	01h	VAR	AI Interrupt Delta Input PV Ch1		INTEGER32	RW	
	...	...	...	...	...	...	...
	08h	VAR	AI Interrupt Delta Input PV Ch8		INTEGER32	RW	
9134	ARRAY		AI Interrupt Lower Limit Input PV		INTEGER32		O
	00h	VAR	Number of entries	8	UNSIGNED8	RO	
	01h	VAR	AI Interrupt Lower Limit Input PV Ch1		INTEGER32	RW	
	...	...	...	...	...	...	...
	08h	VAR	AI Interrupt Lower Limit Input PV Ch8		INTEGER32	RW	
9135	ARRAY		AI Interrupt Upper Limit Input PV		INTEGER32		O
	00h	VAR	Number of entries	8	UNSIGNED8	RO	
	01h	VAR	AI Interrupt Upper Limit Input PV Ch1		INTEGER32	RW	
	...	...	...	...	...	...	...
	08h	VAR	AI Interrupt Upper Limit Input PV Ch8		INTEGER32	RW	
9148	ARRAY		AI Span Start PV		INTEGER32		O
	00h	VAR	Number of entries	8	UNSIGNED8	RO	
	01h	VAR	AI Span Start PV Ch1		INTEGER32	RW	
	...	...	...	...	...	...	...
	08h	VAR	AI Span Start PV Ch8		INTEGER32	RW	
9149	ARRAY		AI Span Stop PV		INTEGER32		O
	00h	VAR	Number of entries	8	UNSIGNED8	RO	
	01h	VAR	AI Span Stop PV Ch1		INTEGER32	RW	
	...	...	...	...	...	...	...
	08h	VAR	AI Span Stop PV Ch8		INTEGER32	RW	

* The factory set (value present in the modules when new) for the transmission type is: **01h**.