ROOTECH
Energy Solution for Human & Nature

ACCURA 3700

High Accuracy Digital Power Quality Meter

Installed at multiple locations within a facility
Actually makes possible power quality measurement

Communication User Guide[English]

Revision 1.50 2018/10/4

Process Control Equipment
E324900

Digital Power Quality Meter	
	
Accura 3700 front	Accura 3700 Rear

Extended Module		
		
Accura 3700 DIO module	Accura 3700 AI module	Accura 3700 RTD module
		
Accura 3700 DI module	Accura 3700 AO module	Accura 3700 ELD module
		
Accura 3700 DO module	Accura 3700 A4D2 module	Accura 3700 DC module
		
	Accura 3700 A2D4 module	

Notice

Symbol

Caution

Indicates the presence of dangerous voltage which can cause severe injury or death to persons if proper precautions are not followed.

Warning

Alerts the user to the presence of hazards which can cause somewhat injury to persons, damage to property or damage to the device itself, if proper precautions are not followed.

Note

Indicates the user's attention to installation, operating and maintenance instructions.

Indicates alternative voltage or current.

Indicates direct voltage or current.

Installation Consideration

Installation and operation of Accura 3700 should be performed only by qualified, competent personnel that have appropriate training and experience with high voltage and current devices.

Caution

Failure to observe the following instructions may result in severe injury or death.

- During normal operation of Accura 3700, hazardous voltages are present on its terminal strips of voltages input and power.
- Standard safety precautions are as followed while performing any installation or service work. [removing PT fuses, shorting CT secondary, etc.]
- Do not access to terminal strips of Accura 3700 after installation.

Warning

Observe the following instructions, or permanent damage to the meter may occur.

- Do not apply Accura 3700 to voltages and currents that exceed Input ratings of PT and CT.
- To use device in the other way than specified by manufacturer can cause severe damage.
- Connect ground terminal to the earth ground to protect device from noise and surge.
- Terminal screw torque is as followed.
  - Barrier-type voltage terminal: 1.35Nm[1.00 ft-lbf] max.
  - Barrier-type digital inputs/digital output terminal: 0.90Nm[0.66 ft.lbf] max.

About Manual

Rootech Inc. reserves the right to make changes in the device specifications shown in this User Guide without notice. Rootech Inc. advises customers to obtain the latest specifications of device before giving orders to confirm that the information being relied on by the customer is up to date.

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The Warranty does not apply to uninterrupted or error-free operation of the Product or cover normal wear and tear of the product or costs caused by the removal, installation, or troubleshooting of the customer's electrical systems.

The warranty claims for defects caused by any of the following factors are not covered.

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- Unauthorized modifications, changes or attempted repairs.
- Failure to comply with applicable safety standards & regulations.
- Damages when transporting or storing.
- Damages by force majeure, examples are(not necessarily limited): fire, flood, earthquakes, storm damage, overvoltage & lightning.
- If the original identify markings(trade-mark, serial number, etc.) have been defaced, altered, or removed.

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It is the original purchaser's responsibility to determine the suitability of any product and associated documentation for its purposes. The original purchaser acknowledges that 100% "up" time is not realizable because of possible hardware or software defects. The original purchaser recognizes that such defects and failures may cause inaccuracies or malfunctions.

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Standard Compliance

Process Control Equipment

E324900

MSIP-REM-RTE-ACCURA 3700

QMS-1347

KAB-QC-09

Revision History

The following versions of Accura 3700 Communication User Guide have been released.

Revision	Date	Description
Revision 1.00	2013. 05. 10	Initial draft.
Revision 1.10	2013. 06. 17	Accura 3500 compatible map updated.
Revision 1.20	2013. 07. 12	Contents updated.
Revision 1.30	2013. 08. 23	Contents updated and appendix included.
Revision 1.31	2015. 05. 21	Standard compliance updated.
Revision 1.40	2016. 10. 24	Bookmark feature added.
Revision 1.50	2018. 10. 04	zero voltage/current --> residual voltage/current word changed

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Chapter 1 Modbus Protocol of Accura 3700

Modbus Protocol Overview

In this section, we will introduce the fundamentals of the Modbus RTU protocol and the Modbus TCP protocol that are used in Accura 3700 For more details on the definition of Modbus protocol, Modbus RTU protocol and Modbus TCP protocol, see www.modbus.org.

Modbus Protocol

The Modbus protocol is the application protocol that defines the rules for organizing and interpreting data that are independent of the data transmission means. Modbus protocol uses port number 502. The Modbus protocol establishes the format for master's request by placing into it a slave device (or broadcast) address, a function code defining the requested action, any data to be sent, and an error-checking field. The slave's response message is also constructed using Modbus protocol. It contains fields confirming the action taken, any data to be returned, and an error-checking field. If an error occurred when receiving a message, or if the slave is unable to perform the requested action, the slave will construct an error message and send it as its response.

Modbus RTU Protocol

The Modbus RTU protocol is a version of Modbus protocol that is designed to work under a serial communication environment such as RS-485, RS-232, etc. This protocol uses the pre-set device address to identify each device and CRC to check the errors. It does not allow multiple accesses through serial communications.

Modbus TCP Protocol

The Modbus TCP (also Modbus TCP/IP) is similar to the Modbus RTU protocol, but enhanced to work more effectively under TCP/IP network layer. The primary function of TCP is to ensure that all packets of data are received correctly, while IP makes sure that messages are correctly addressed and routed.

The TCP/IP combination is merely a transport protocol, and does not define what the data means or how the data is to be interpreted (this is the job of the application protocol, the Modbus protocol in this case). The Modbus TCP/IP combines a physical network (Ethernet), with a networking standard (TCP/IP) to carry the data of the Modbus message structure between compatible devices. The Modbus TCP embeds a standard Modbus data frame into a TCP frame, without the Modbus checksum.
The requests and the responses may not be matching in order. Also, it is not required to maintain the gaps between packets. In addition, since the protocol is based on TCP, multiple accesses are possible. The maximum number of multiple accesses supported may differ depending on the individual devices.

Modbus Packet Structure

Modbus RTU Packet Structure

The request and response packets of Modbus RTU are composed of the following fields.

Device Address	Function Code	Data	CRC
1 bytes	1 byte	n bytes	2 bytes

The meaning of each field is as follows.

Fields	Description
Device Address	Device address field is used to identify each slave device and can have any value within the range of 1 to 247.
Function Code	When a request is sent from master to slave device, this function code field tells the slave device what kind of action to perform. In the case of normal response, the function code of the corresponding request is used without alteration. In the case of error response, 80h is added to the request function code.
Data	The data fields differ depending on the function code.
CRC	This is an error-checking field that is based on a Cyclical Redundancy Check (CRC) method. The CRC field checks the contents of the entire message. It is generated using CRC-16 (Modbus) algorithm. For more details, see Appendix C.

Modbus TCP Packet Structure

The request and response packets of Modbus TCP are composed of the following fields.

Modbus TCP Header				**Function Code**	**Data**
Transaction ID	Protocol ID	Length	Unit ID		
2 bytes	2 bytes	2 bytes	1 byte	1 byte	n bytes

The meaning of each field is as follows.

Fields	**Description**
Transaction ID	This identification field is used for transaction pairing when multiple messages are sent along the same TCP connection by client without waiting for a prior response. The requests and the responses may not be matching in order. Normally, this value is increased by 1 at each request and supposed to circulate within the range of 0000h - FFFFh. At the response, the transaction ID assigned to the corresponding request is copied without alteration.
Protocol ID	This field is always 0 for Modbus services and other values are reserved for future extensions. The same applies to the request and the response.
Length	This field is a byte count of the remaining fields and includes the Unit ID byte, function code byte, and the data fields.
Unit ID [1]	This field is used to identify a remote server located through the serial communication under the device that supports TCP/IP network.
Function Code	When a request is sent from client to slave device, this function code field tells the slave device what kind of action to perform. In normal response, the function code of the corresponding request is used without alteration. In error response, 80h is added to the request function code.
Data	The data fields differ depending on the function code.

1. In Accura 3700, this value should always be fixed to 1. Accura 3700 has all the measurement data of Module.

Accura 3700 Modbus Supports

Unit ID (Modbus TCP only)

In Accura 3700 this filed is fixed at 1. Accura 3700 periodically collects all measurement data of the extension module connected through internal communication. Therefore, Accura 3700 collects all the data of the main unit and extension module.

Function code

Accura 3700 supports the following function codes.

Function code Decimal [Hexadecimal]	Name	Description
3 [03h]	Read Holding Registers [1]	Reads the contents of holding registers 1- 65536 in the slave device. The request message specifies the starting register and the quantity of registers to be read. Registers are addressed starting at zero: registers 1 - 16 are addressed as 0 - 15.
6 [06h]	Write Single Register	Writes a value to a single holding register, one of 1 - 65536 in the slave device. The request message specifies the holding register reference to be written. Registers are addressed starting at zero: register 1 is addressed as 0. The requested preset value is specified in the request data field.
16 [10h]	Write Multiple Registers	Writes values to multiple consecutive holding registers 1 - 65536 in the slave device. The request message specifies the starting holding register to be written. Registers are addressed starting at zero: register 1 is addressed as 0. The requested preset values are specified in the request data field.
101 [65h]	Read Multi-block Registers	This function code is a user-defined function code. It is a single Read Packet that can read one or several holding register blocks. Each holding register block is a group of consecutive registers. This function code has the effect of reducing the communication overhead because it can read data of the registers distributed in wide valid range at once. This function code is provided only in the Modbus TCP protocol. Details are described in the packet structure.

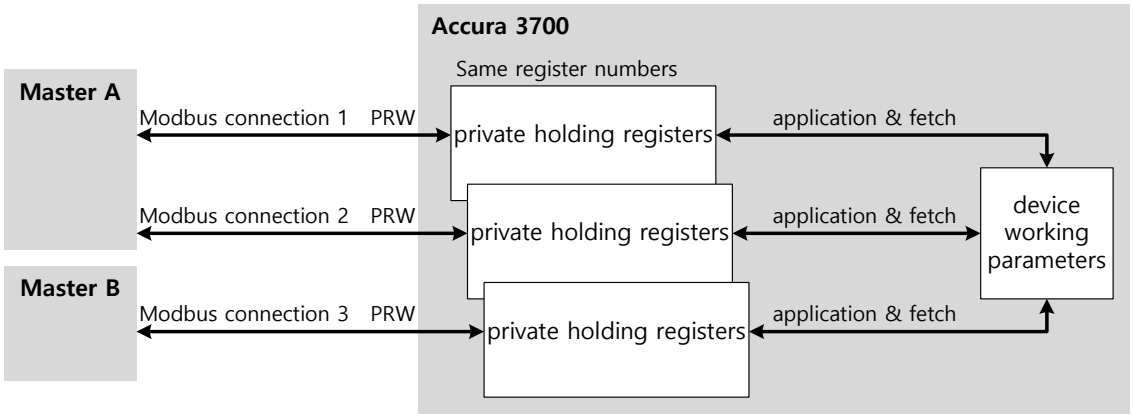
1. Holding register is 16-bit (2-byte) word.

Multiple Access Policy

Accura 3700 supports up to 16 (TCP 15, RTU 1) simultaneous connections.

Each connection is independent from others. Each connection is capable of performing a private task using separate private holding registers for its own. The holding register of which the access attribute is marked as PR (private read) or PRW (private read / write) in the Modbus Map has a separate private holding register allocated for each connection. Therefore, even if a connection changes the value of the private register of itself, the private register values of other connections are not changed.

Fig 1.1 Private holding register for each connection



Connection Termination Policy

Accura 3700 terminates the connection of Modbus TCP protocol in the following cases.

- A request for connection termination or forced termination is received.
- No request was received for 10 minutes
- The received protocol ID value is not zero.
- The received function code is not supported.

Accura 3700 Function Code Packet Structure

The detailed packet structure of each function code provided by Accura 3700 is as follows.

Function 3 [03h]: Read Holding Registers

This function code can read some parts of the holding registers 1 - 65536 in the slave device.

Each holding register is 2-byte word.

Request

Function Code	Starting Address	Quantity of Registers
1 byte	2 bytes	2 bytes

Response

Function Code	Byte Count	Register Values
1 byte	1 byte	2 * (Quantity of Registers) bytes

Error Response

Error Code	Exception Code
1 byte	1 byte

Detailed Structure of Request

Name	Byte Length	Description
Function Code	1	3 [03h]: Read holding registers.
Starting Address	2	Starting address to be read. Registers are addressed starting at zero: Register address is obtained by subtracting by 1 from register number of Modbus Map. Holding registers 1 - 65536 are addressed as 0 - 65535.
Quantity of Registers	2	Number of registers to be read. Standard range: 1 - 125 Allowed range by Accura 3700: 1 - 250 Accura 3700 is designed to be read up to 250 registers. However, when reading 128 or more registers, measures to cope with the errors should be considered, as the "Byte Count" field of the Response packet can experience an overflow.

Detailed Structure of Response

Name	Byte Length	Description
Function Code	1	3 [03h]: Read holding registers.
Byte Count	1	2 * (Quantity of Registers), Since it has 1-byte space, an overflow might occur if the quantity of registers is 128 or more.
Register Values	2 * Quantity of Registers	Contents of holding registers to be read. Contents of holding registers are described in the Modbus Map.

Detailed Structure of Error Response

Name	Byte Length	Description
Error Code	1	131 [83h]: Error response of "Read Holding Registers".
Exception Code	1	2: When the holding register number to be read exceeds the limitation of 65536 3: When the requested "Quantity of Registers" is 0 or above 250.

Function 6 [06h]: Write Single Register

This function code can write content to a holding register in the range of 1 - 65536.

Each holding register is 2-byte word.

Request

Function Code	Register Address	Register Value
1 byte	2 byte	2 byte

Response

Function Code	Register Address	Register Value
1 byte	2 byte	2 byte

Detailed structure of Request

Name	Byte Length	Description
Function Code	1	6 [06h]: Write Single Register.
Register Address	2	Holding register address to be written. Register is addressed starting at zero: Register address is obtained by subtracting by 1 from register number of Modbus Map. Holding registers 1 - 65536 are addressed as 0 - 65535.
Register Value	2	Content of holding register to be written. Contents of holding registers are described in the Modbus Map.

Detailed structure of Response

Name	Byte Length	Description
Function Code	1	6 [06h]: Write Single Register
Register Address	2	The same value as that of Request packet.
Register Value	2	The same value as that of Request packet.

Function 16 [10h]: Write Multiple Registers

This function code can write contents to some parts of the holding registers 1 - 65536.

Each holding register is 2-byte word.

Request

Function Code	Starting Address	Quantity of Registers	Byte Count	Register Values
1 byte	2 byte	2 byte	1 byte	2 * (Quantity of Registers) bytes

Response

Function Code	Starting Address	Quantity of Registers
1 byte	2 byte	2 byte

Error Response

Error Code	Exception Code
1 byte	1 byte

Detailed structure of Request

Name	Byte Length	Description
Function Code	1	16 [10h]: Write Multiple Registers
Starting Address	2	Starting address to be written. Registers are addressed starting at zero: Register address is obtained by subtracting by 1 from register number of Modbus Map. Holding registers 1 - 65536 are addressed as 0 - 65535.
Quantity of Registers	2	Number of registers to be written. Valid range: 1 - 123
Byte Count	1	2 x Quantity of Registers
Register Values	2 * Quantity of Registers	Contents of holding registers to be written. Contents of holding registers are described in the Modbus Map.

Detailed structure of Response

Name	Byte Length	Description
Function Code	1	16 [10h]: Write Multiple Registers
Starting Address	2	The same value as that of Request packet.
Quantity of Registers	2	The same value as that of Request packet.

Detailed structure of Error Response

Name	Byte Length	Description
Error code	1	144 [90h]: Error response of "Write Multiple Registers".
Exception code	1	2: When the holding register number to be read exceeds the limitation of 65536 3: When the requested "Quantity of Registers" is 0 or above 124.

Function 101 [65h]: Read Multi-block Registers

This function code can read the separate multiple block holding registers that are not in one consecutive area with only one packet communication. Each holding register is 2-byte word.

This function code is a user-defined function code that is supported by **only Modbus TCP protocol**.

Request

Function Code	Number Of Blocks	Starting Address 1	Word Length 1	...
1 byte	1 byte	2 byte	2 byte	
		Block #1		

Starting Address N	Word Length N
2 byte	2 byte
Block #N	

Response

Function Code	Number Of Blocks	Starting Address 1	Word Length 1	...
1 byte	1 byte	2 byte	2 byte	
		Block #1		

Starting Address N	Word Length N	Register Values 1	...	Register Values N
2 byte	2 byte	2 * Length 1 byte		2 * Length N byte
Block #N		Block #1		Block #N

Error Response

Error Code	Exception Code
1 byte	1 byte

Detailed structure of Request

Name	Byte Length	Description
Function Code	1	101 [65h]: Read Multi-block Registers
Number of Blocks	1	Number of blocks to be read. There are "Starting Address" and "Word Length" for each block. Valid block number is 1 - 255.
Starting Address 1	2	Starting address to be read for block 1. Registers are addressed starting at zero: holding registers 1 - 65536 are addressed as 0 - 65535.
Word Length 1	2	Number of registers to be read for block 1. Valid word length is 1 - 32764.
.....	2 * (N-2)	"Starting Address" and "Word Length" for 2 - (N-1) blocks.
Starting Address N	2	Starting address to be read for block N. Registers are addressed starting at zero: holding registers 1 - 65536 are addressed as 0 - 65535.
Word Length N	2	Number of registers to be read for block N. Valid word length is 1 - (32767-3*N).

Detailed structure of Response

Name	Byte Length	Description
Function Code	1	101 [65h]: Read Multi-block Registers
Number of Blocks	1	The same value as that of Request packet.
Starting Address 1	2	The same value as that of Request packet.
Word Length 1	2	The same value as that of Request packet.
.....	2 * (N-2)	The same values as those of Request packet.
Starting Address N	2	The same value as that of Request packet.
Word Length N	2	The same value as that of Request packet.
Register Values of Block 1	2 * Word Length 1	Contents of holding registers of the first block to be read.
.....	.....	.....
Register Values of Block N	2 * Word Length N	Contents of holding registers of the Nth block to be read.

Detailed structure of Error Response

Name	Byte Length	Description and Range
Error code	1	229 (E5h): Error response of "Read Multi-block Registers".
Exception code	1	2: When the holding register number to be read for each block exceeds the limitation of 65536 3: There are many cases as follows; ■ When "Number of Blocks" is 0 ■ When "Word Length" for each block is 0 ■ Too many registers have been requested for, resulting in an overflow of the "Length" field in Modbus TCP header. For more details see "Word-Length Limitations on Read Multi-block Registers" as below.

Word-Length Limitations on "Read Multi-block Registers"

The "Length" field in Modbus TCP header is 16-bit space. Therefore, the maximum number of registers available for request is (32766-2N), where N is the number of blocks.

For example, when there are two blocks, the maximum number of registers available for request is 32762

Chapter 2 Modbus Map of Accura 3700

Modbus Map Overview

Accura 3700 Modbus Map is composed of five categories: System information, Setup, Control, Measurement data, Event data. Accura 3700 Module is referred to "module" for abbreviation. The module types of Accura 3700 are shown in the table below.

Module Type of Accura 3700	Description	Channel number
Accura 3700-DIO	Digital Input /Output	DI: 8-channel DO: 2-channel
Accura 3700-DI	Digital Input	DI: 8-channel
Accura 3700-DO	Digital Output	DO: 6-channel
Accura 3700-AI	Analog Input	AI: 6-channel
Accura 3700-AO	Analog Output	AO: 6-channel
Accura 3700-A4D2	Analog Output /Digital Output	AO: 4-channel DO: 2-channel
Accura 3700-A2D4	Analog Output /Digital Output	AO: 2-channel DO: 4-channel
Accura 3700-RTD	RTD temperature	RTD: 3-channel
Accura 3700 ELD	Leakage current detect	ELD: 6-channel
Accura 3700 DC	DC Voltage /Current detect	DC voltage: 1-channel DC current: 2-channel DO: 2-channel

Summary Map

Holding Register is addressed starting at zero. Register address is obtained by subtracting by 1 from register number of Modbus Map. Holding register 1 - 65536 are addressed as 0 - 65535.

Register Number	Description
System Information	
1-33	Accura 3700 System Information
1501-1731	Accura 3700 Module System Information
Setup	
2000	Remote Setup Unlock
2001-2025	General Setup
2041-2049	Network Setup
2151-2156	Network Time Protocol(NTP) Setup
2161-2187	Measurement Setup
2211-2220	User Interface Setup
2251-2266	Dip/Swell Setup
2271-2292	Aggregation Setup
2321-2325	Modbus Serial Communication Setup

2331-2341	Summer Time Setup
2529-2532	Measurement Event Setup
2541-2549	Current Event Setup
2551-2554	Temperature Event Setup
2561-2568	Power Event Setup
3001-3031	PT Backup Data Setup
50001-50007	Module ID Setup
50011-51558	Direct Module Setup
52301-52475	Direct Module Type Setup
52501-52502	Module Setup Data Clear
Control	
2400	Remote Control Unlock
2401-2405	Measurement Control
52001-52288	Module Control
53001-53045	DIO Module Control
53051-53167	DO Module Control
53201-53425	AO Module Control
53501-53689	A4D2 Module Control
53701-53853	A2D4 Module Control
53901-53927	DC Module Control
54001-54027	ELD Module Control
Measurement Data	
11001-16800	Basic Measurement Data - Accura 3700 Voltage, Current - Accura 3700 Module - Accura 3700 Voltage, Current Max/Min - Accura 3700 Module Max/Min
20001-20385	Voltage Harmonics Data: 0 - 63th components from 64-sample/cycle per phase * 3-phase
20386-20769	Current Harmonics Data: 0 - 63th components from 64-sample/cycle per phase * 3-phase
21002-21182	Voltage RMS Data
21201-25965	Voltage/Current Waveform Data 64-sample/cycle * 12-cycle * 3-phase
Measurement Event	
38001-38380	Measurement Event Status
40001-40111	Measurement Event Data
41000	Measurement Event Clear
42000-49899	Measurement Event Saved Data
62301-62404	Fault Record

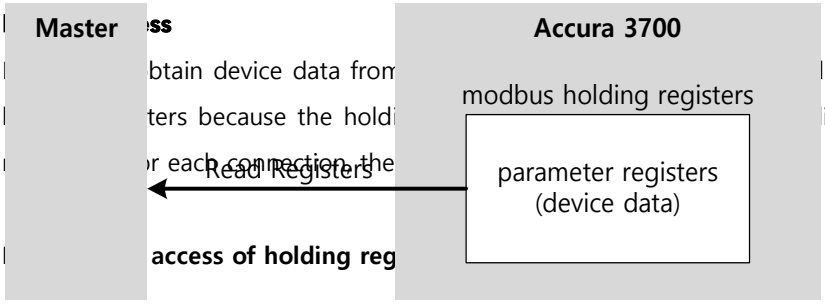
Data Format

Data Format	Description	Word Length	Endian	Range
UInt16	Unsigned 16-bit	1	NA 1	0 to 65,535
Int16	Signed 16-bit	1	NA 1	-32,768 to 32,767
UInt32	Unsigned 32-bit	2	Big-Endian 2	0 to 4,294,967,295
Int32	Signed 32-bit	2	Big-Endian 2	-2,147,483,648 to 2,147,483,647
Float32	Single-precision float (IEEE 754)	2	Big-Endian 2	-3.4x1038 to 3.4x1038

1. NA (Not Available): 1-word data, independent of endian.

2. 2-word data, two register spaces are used. The upper word is located in the lower address register and the lower word is located in the higher address register.

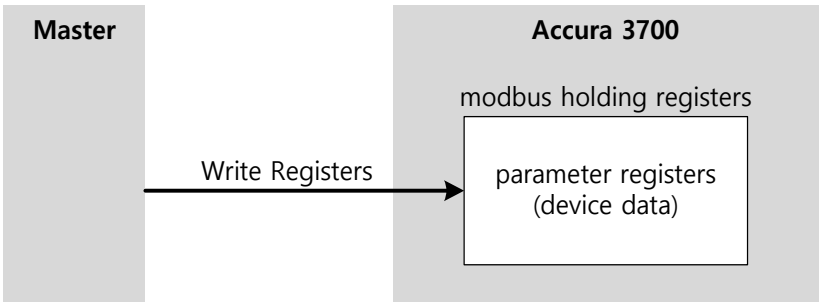
Data Attribute of Register Access



W: Write Access

Master can transfer data to the holding registers that have "write attribute" by just writing them to the holding registers that are applied to Accura 3700 data directly. This holding register is not private for each connection, therefore is the same for all connections.

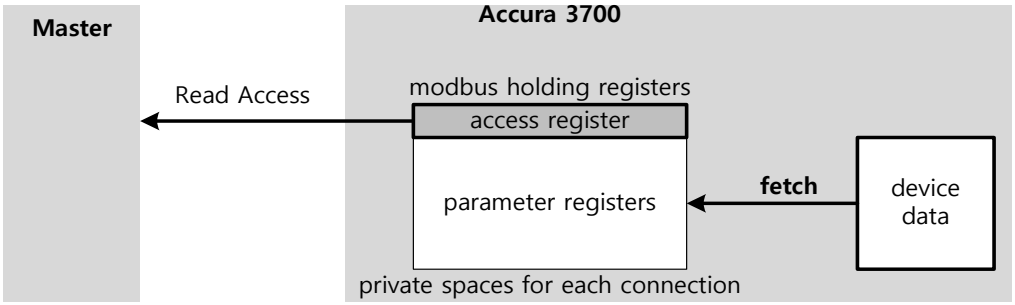
Fig 2.2 Write access of holding register



PR: Private Read Access

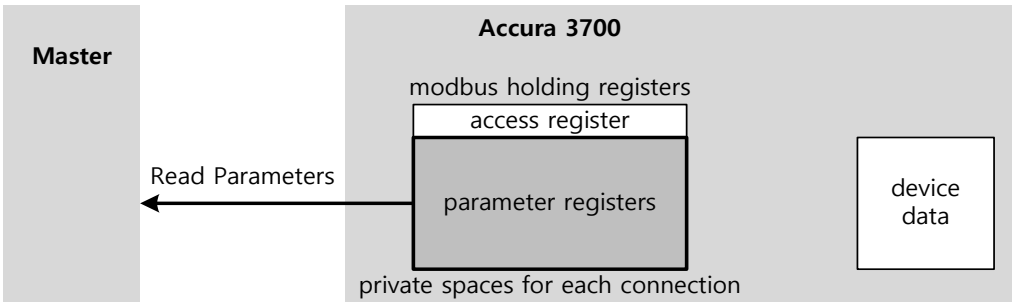
In order to read a group of data from Accura 3700 that has a same time-stamp safely for synchronism, two steps are needed. At first, master must fetch them into the parameter registers before reading them. By reading "access register" of the corresponding parameter registers, Accura 3700 data is fetched into the parameter registers on the private spaces for the connection.

Fig 2.3 Private Read access of holding register: Read Access



After fetching them into the parameter registers (private spaces for the connection), master can read the private spaces safely although Accura 3700 real data changes during the read interval. The synchronism of the device data obtained is guaranteed because the parameter registers on the private spaces do not change during the read interval.

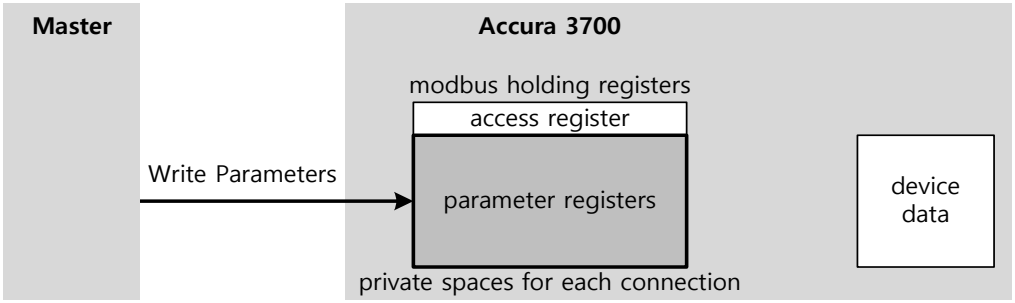
Fig 2.4 Private Read access of holding register: Read Parameter



PW: Private Write Access

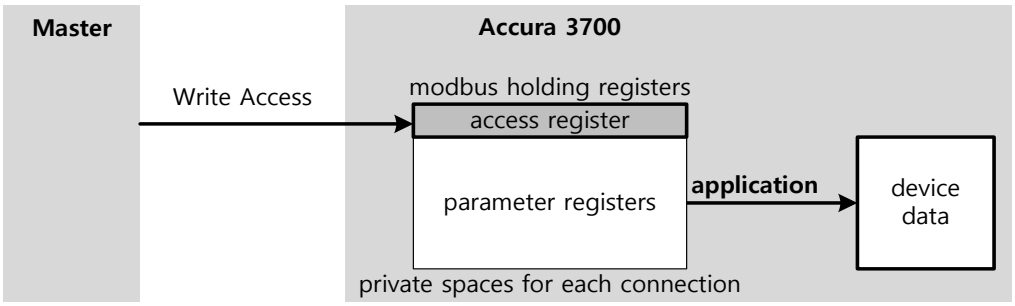
In order to write a group of data to be applied at the same time safely, two steps are needed. At first, a group of data must be written into the parameter registers on the private spaces for the connection.

Fig 2.5 Private Write access of holding register: Write Parameter



And then by writing 1 to "access register" of the corresponding parameter registers, the stored data into the parameter registers is applied to Accura 3700 at the same time for synchronism.

Fig 2.6 Private Write access of holding register: Write Access



RW: Read / Write

RW attribute means "Read" and "Write" as mentioned above.

PRW: Private Read / Private Write

PRW attribute means "Private Read" and "Private Write" as mentioned above.

System Information Category

Accura 3700 System information

Register Number	Name	Format	Attribute	Description
1	Product ID	UInt16	R	Accura 3700 product ID. Default: 3700
2	Serial number	UInt32	R	Accura 3700 Serial Number.
4-13	Vendor name	20*char	R	Manufacturing company. Default: Rootech Inc.
14	Hardware version	UInt16	R	Hardware version.
15	Application version	UInt16	R	Main application version.
16	DSP Firmware version	UInt16	R	DSP Firmware version.
17	Map version	UInt16	R	Modbus Map version.
18-20	Ethernet MAC address	6*UInt8	R	Ethernet MAC address.
21	Bootloader version	UInt16	R	Bootloader version.
22	Kernel version	UInt16	R	Kernel version.
23	Application revision number	UInt16	R	Application revision number.
24	PT bootloader version	UInt16	R	PT bootloader version.
25	Ethernet switch type	UInt16	R	Ethernet switch type.
26	Flash type	UInt16	R	Flash type.
27	PCB revision number	UInt16	R	PCB revision number.

Accura 3700 Module System information

Accura 3700 module ID can be assigned to 1 - 9. Accura 3700 module has its own system information register section for each ID as shown below.

Accura 3700 Module System Information by ID

Register Number	Word Length	Module ID	Description
1501-1516	16	1	System information of ID 1. See "Accura 3700 Module System Information Details".
1517-1532	16	2	System information of ID 2. See "Accura 3700 Module System Information Details".
...	...	...	...
1629-1644	16	9	System information of ID 9. See "Accura 3700 Module System Information Details".

Accura 3700 Module System Information by Position

Register Number	Word Length	Position	Description
1652-1667	16	1	System information of module position 1st. See "Accura 3700 Module System Information Details".
1668-1683	16	2	System information of module position 2nd. See "Accura 3700 Module System Information Details".
...	...	...	...
1716-1731	16	5	System information of module position 5th. See "Accura 3700 Module System Information Details".

Accura 3700 Module System Information Details

The data map in this detailed section is described in "Offset Number", not in "Number". The "Offset Number" is a relative number to the initiation number that is determined by Module ID or position as above.

It is calculated as "1501 + Offset Number" for module ID 0, and "1501 + (8 * 16) + Offset Number" for module ID 9. It is also calculated as "1652 + Offset Number" for the 1st module, and "1652 + (4 * 16) + Offset Number" for the 5th module.

Offset Number	Name	Format	Attribute	Description
0	Module ID	UInt16	R	Module ID.
1	Firmware version	UInt16	R	Firmware version.
2	Module type	UInt16	R	1: DIO 2: DI 3: DO 4: AI 5: AO 6: A4D2 7: A2D4 8: DC 9: RTD 10: ELD
3	Channel Information	UInt16	R	Module channel information. Bit.[15:12]: Number of AO channels Bit.[11:8]: Number of AI channels Bit.[7:4]: Number of DO channels Bit.[3:0]: Number of DI channels
4	Serial number	UInt32	R	Serial number.
6	Hardware version	UInt16	R	Hardware version.
7	Bootloader version	UInt16	R	Bootloader version.

Setup Category

Setup in remote mode is locked by default. At first, it is necessary to unlock the setup at the Modbus connection in which the change is to be made. Also, another setup unlock is necessary when making new Modbus connection.

Remote Setup Unlock

Register Number	Name	Format	Attribute	Description
2000	Remote setup unlock	UInt16	PRW	For setup to be allowed, write these four numbers on this register in the order given below [1]. 2300 → 0 → 700 → 1 [1] For setup to be locked, write any value on this register. Setup lock status can be known by reading this register as shown below. 0: Setup allowed 1: (default) Setup lock

1. If order is wrong, the entire writing process should start from the beginning again.

General Setup

Register Number	Name	Format	Attribute	Description
2001-2020	User area	20* UInt16	RW	Readable/writable space for the user information. The values written in this space is preserved in Accura 3700.
2021	System time in UTC time	UInt32	PRW	UTC time is written to this register. And then by writing the sub-time to register 2023 - 2024, all registers 2021 - 2022 of system time are applied to the system time of Accura 3700 for synchronism. By reading the register 2021, all registers 2021 - 2024 are fetched from the system time of Accura 3700 for synchronism.
2023	System sub-time in microsecond	UInt32	PRW	Sub-time in microsecond is written to this register. By writing to register 2024, all registers 2021 - 2024 of system time are applied to the system time of Accura 3700 for synchronism. By reading the register 2021, sub-time fetched before to this register is read.
2025	Time-zone offset	Int16	RW	The time difference between the local time and the standard time in minute. Unit [min] Valid range: -720 to 800 [min] Default: 540 [min]

Network Setup

Register Number	Name	Format	Attribute	Description
2041	Network setup access	UInt16	PRW	Access register of Register 2042 - 2049. By reading this register, Fetched from Accura 3700 data to register 2042 - 2049. Bit.[15] of this register is read as 1 on success of fetch. By writing 1 to this register, applied from register 2042 - 2049 to Accura 3700.
2042	DHCP enable	UInt16	PRW	DHCP enable setup. 0: (default) Disable 1: Enable
2043	IPv4 address	UInt32	PRW	IPv4 address. DHCP enabled, read only. Default: 10.10.10.100 (0A0A0A64h)
2045	IPv4 subnet mask	UInt16	PRW	IPv4 subnet mask. DHCP enabled, read only. Valid range: 16 - 30 16: 255.255.0.0 17: 255.255.128.0 ..... 24: (default) 255.255.255.0 ..... 29: 255.255.255.248 30: 255.255.255.252
2046	IPv4 gateway	UInt32	PRW	IPv4 gateway. DHCP enabled, read only. Default: 10.10.10.1 (0A0A0A01h)
2048	Modbus timeout	UInt16	PRW	Automatic connection termination time when communication is interrupted. Unit [sec] Valid range: 5 - 600 [sec] Default: 600 [sec]
2049	RSTP disable	UInt16	PRW	Ring network disabled setup. 0: Enable 1: (default) Disable

Network Time Protocol (NTP) Setup

Register Number	Name	Format	Attribute	Description
2151	NTP Setup access	UInt16	PRW	Access register of Register 2152 - 2156. By reading this register, Fetched from Accura 3700 data to register 2152 - 2156. Bit.[15] of this register is read as 1 on success of fetch. By writing 1 to this register, applied from register 2152 - 2156 to Accura 3700.
2152	NTP server	UInt32	PRW	NTP server IP address. Default: 10.10.10.1 (0A0A0A01h)
2154	NTP synchronization mode	UInt16	PRW	Accura 3700 can synchronize to NTP server repeatedly according to the NTP synchronization mode as below. 0: No synchronization mode Accura 3700 operates in stand-alone and Accura 3700 time is managed only by RTC in itself. 1: (default) Auto synchronization mode Optimal synchronization time is determined to a value less than a setting periodic time (register 2155), automatically. 2: Periodic synchronization mode Synchronization period is set through the register 2155.
2155	NTP synchronization period	UInt16	PRW	Synchronization period value. unit [sec] Auto synchronization mode: Maximum limit value of automatically determined synchronization interval. Periodic synchronization mode: Accura 3700 synchronizes this value on a periodic basis. Valid range: 60 - 18000 [sec] Default: 3600 [sec]
2156	NTP synchronization maximum difference	UInt16	PRW	Maximum time difference during NTP synchronization. This is enabled only in auto synchronization mode. In auto synchronization mode, Accura 3700 tries to find the optimal synchronization time to alleviate packet-burden. Accura 3700 can estimate the time difference from the last synchronized time. Accura 3700 determines the optimal next synchronization time in order for the time difference not to over the NTP synchronization maximum difference. Unit [ms] Valid range: 20 - 1000 [ms] Default: 100 [ms]

Measurement Setup

Register Number	Name	Format	Attribute	Description
2161	Measurement setup access	UInt16	PRW	Access register of Register 2162 - 2187. By reading this register, Fetched from Accura 3700 data to register 2162 - 2187. Bit.[15] of this register is read as 1 on success of fetch. By writing 1 to this register, applied from register 2162 - 2187 to Accura 3700.
2162	Wiring mode	UInt16	PRW	Wiring mode. 2: 3P3O, 3-phase open delta voltage connection 3: (default) 3P4W, 3-phase 4-wire voltage connection 4: 3P3W, 3-phase 3-wire voltage connection
2163	Minimum measured voltage	UInt16	PRW	Minimum measured value of Accura 3700 input voltage. A voltage less than this value is considered to be 0 voltage. Unit [V] Valid range: 1 - 10 [V] (When external PT is used, PT secondary voltage reference) Default: 5 [V]
2164	Primary voltage	UInt32	PRW	Primary line-line voltage of external potential transformer. High voltages over line-line 600V can be connected through the external potential transformer. Unit [0.1V] Valid range: 1 - 9,999,999 (0.1 - 999999.9 [V]) Default: 380 [V]
2166	Secondary voltage	UInt16	PRW	Secondary line-line voltage of external potential transformer. High voltages over line-line 600V can be connected through the external potential transformer. [0.1V] Valid range: 1 - 9999 (0.1 - 999.9 [V]) Default: 380 [V]
2167	Primary current	UInt32	PRW	Primary line current of external current transformer. Valid range: 1 - 999,999 (0.1 - 99999.9 [A]) Default: 50 [A]
2169	Secondary current	UInt16	PRW	Secondary line current of external current transformer. Valid range: 1 - 999 (0.1 - 99.9 [A]) Default: 5 [A]
2170	Power source selection for Demand evaluation	UInt16	PRW	Type of power to be used in calculating the demand. 0: Received power 1: (default) Net power (Received power-Delivered power)
2171	Number of sub-demand	UInt16	PRW	The number of sub-demands for total demand interval. Valid range: 1 - 12 Default: 1
2172	Sub-demand interval time	UInt16	PRW	Interval time of sub-demand. Demand value is updated at every sub-demand interval time. Unit [min] Valid range: 1 - 60 [min] Default: 15 [min] Total demand interval time = (# of sub-demand) * (sub-demand interval time)
2173	Reserved			
2174	Demand prediction response index	UInt16	PRW	Demand Prediction Response. The higher the value is, the faster response speed. The smaller the value is, the better attribute to remove peak. Valid range: 0 - 99

2175	Phase power calculation method	UInt16	PRW	Phase power calculation method. 0: (default) Fundamental calculation (Power calculation by considering only fundamental) 1: Harmonic calculation (Power calculation with effective value including harmonics)
2176	Total power calculation method	UInt16	PRW	Total power calculation method from phase power. 0: (default) Vector sum 1: Arithmetic sum
2177	TDD source	UInt16	PRW	Select TDD reference value to calculate current TDD. 0: (default) Use TDD nominal current as TDD reference value. cf) Use Reference current (register 2184) if TDD nominal current is 0. 1: Use measured peak demand as TDD reference value.
2178	Nominal TDD	UInt16	PRW	Set using current TDD as reference value if value of register 2177 is 0. Use Reference current (register 2184) value as current TDD if this register value is 0. Unit [0.1A] Valid range: 0 (followed reference current) Valid range: 1 - 999,999 (0.1 - 99999.9 [A])
2180	Minimum measured current	UInt16	PRW	Measurable minimum current level. Measured current of the device under the minimum measurable current is considered as 0. Unit [mA] Valid range: 1 - 100 [mA] (Apply secondary voltage of potential transformer while use external potential transformer) Default: 20 [mA]
2181	Reserved			
2182	Reference voltage	UInt16	PRW	Primary reference voltage. Display bar graph percentage based on this voltage. Unit [0.1V] Valid range: 1 - 9,999,999 (0.1 - 999999.9 [V]) Default: 3800 (380.0 [V])
2184	Reference current	UInt16	PRW	Primary reference current. Display bar graph percentage based on this current. Unit [0.1A] Valid range: 1 - 999,999 (0.1 - 99999.9 [A]) Default: 500 (50.0 [A])
2186	Power factor property	UInt16	PRW	Power factor display setup. Bit.[0]: Power factor indication value when apparent electric power is 0. 0: (default) PF 1.0 indicate 1: PF 0.0 indicate Bit.[8]: Sign of power factor(positive/negative number indication. 0: Sign does not exist, PF = abs(P)/S. 1: (default) Sign exist, PF = P/S. Positive value means power receiving status, Negative value means power transmission status.
2187	Reactive power sign	UInt16	PRW	Reactive power sign display setup. Bit.[8]: Set sign of reactive power indication. 0: (default) Sign exist. Positive value means Inductive reactive power, Negative value means Capacitive reactive power. 1: Sign does not exist.

User Interface Setup

Register Number	Name	Format	Attribute	Description
2211	LCD Backlight off timeout	UInt16	RW	The time taken to turn off LCD backlight automatically when there is no button input. Unit [sec] Valid range: 10 - 300 [sec] Default: 60 [sec]
2212	Backlight high duty	UInt16	RW	Setting backlight duty ratio for middle brightness. Unit [%] Valid range: low - high [%]
2213	Backlight middle duty	UInt16	RW	Setting backlight duty ratio for middle brightness. Unit [%] Valid range: low - high [%]
2214	Backlight low duty	UInt16	RW	Setting backlight duty ratio for minimum brightness. Unit [%] Valid range: 0 - low [%]
2215	Setup exit timeout	UInt16	RW	The time taken to exit to display mode automatically when there is no button input at setup mode. Unit [sec] Valid range: 60 - 3600 [sec] Default: 600 [sec]
2216	Energy display type	UInt16	RW	Selection of energy type to be displayed in the VIPE page. 0: kWh Received. Energy flows from source to load 1: kWh Delivered. Energy flows from load to source 2: kWh Sum: (kWh Received) + (kWh Delivered) 3: kWh Net: (kWh Received) - (kWh Delivered)
2217	Local setup lock	UInt16	RW	Local setup at Accura 3700. 0: (default) Allowed 1: Not allowed
2218	Event LCD backlight time	Int16	RW	Set LCD backlight on-time when event occurs. Unit [min] Valid range: -1 (LCD backlight not turned on) Valid range: 0 (5 sec) Valid range: 1 - 9999 [min] Valid range: 10000(turned off by user) Default: 0 (5 sec)
2219	Display mode	UInt16	RW	Page settings visible. 0: All pages 1: Network, Module related pages 2: V0 mode, Module related pages 2: A0 mode, Module related pages 2: V0 mode A0 mode, Module related pages
2220	Event LED time	Int16	RW	Set Event LED on-time when event occurs. Unit [min] Valid range: -1 (LED not turned on) Valid range: 0 (5 sec) Valid range: 1 - 9999 [min] Valid range: 10000(turned off by user) Default: 10000(turned off by user))

Dip/Swell Setup

Register Number	Name	Format	Attribute	Description
2251	Dip/swell setup access	UInt16	PRW	Access register of Register 2252 - 2258. By reading this register, Fetched from Accura 3700 data to register 2252 - 2258. Bit.[15] of this register is read as 1 on success of fetch. By writing 1 to this register, applied from register 2252 - 2258 to Accura 3700.
2252	Dip detection enable	UInt16	PRW	Dip detection enable. 0: (default) Disable 1: Enable
2253	Swell detection enable	UInt16	PRW	Swell detection enable. 0: (default) Disable 1: Enable
2254	Dip start voltage ratio	UInt16	PRW	Dip start voltage ratio. Unit [0.1%] Valid range: 10 - 980 (1.0 - 98.0 [%]) Default: 900 (90.0 [%])
2255	Dip end voltage ratio	UInt16	PRW	Dip end voltage ratio. Must be greater than “Dip start voltage ratio”. Unit [0.1%] Valid range: 20 - 990 (- 99.0 [%]) Default: 920 (92.0 [%])
2256	Swell start voltage ratio	UInt16	PRW	Swell start voltage ratio. Unit [0.1%] Valid range: 1020 - 9990 (102.0 - 999.0 [%]) Default: 1100 (110.0 [%])
2257	Swell end voltage ratio	UInt16	PRW	Swell end voltage ratio. Must be less than “Swell start voltage ratio”. Unit [0.1%] Valid range: 1010 - 9980 (101.0 - 998.0[%]) Default: 1080 (108.0 [%])
2258	Reference voltage type	UInt16	PRW	Dip/Swell reference voltage selection. 0: Reference voltage Used Reference voltage of Measurement Setup. 1: Auto “Sliding Voltage Reference” voltage (the first LPF of 1 minute time constant) calculated within Accura 3700 Device.
2259-2260	Reserved			
2261	Reference voltage of phase A	UInt32	RW	A-phase reference voltage for Dip/Swell operation. Unit [0.1V] Used only when the reference voltage type is Auto. Setting the value will update the value being calculated and will be recalculated based on the recorded value in the future. Valid range: 0 - 4,292,967,295 (0 - 429296729.5 [V])
2263	Reference voltage of phase B	UInt32	RW	B-phase reference voltage for Dip/Swell operation. Unit [0.1V] Valid range: 0 - 4,292,967,295 (0 - 429296729.5 [V])
2265	Reference voltage of phase C	UInt32	RW	C-phase reference voltage for Dip/Swell operation. Unit [0.1V] Valid range: 0 - 4,292,967,295 (0 - 429296729.5 [V])

Aggregation Setup

Register Number	Name	Format	Attribute	Description
2271	Aggregation setup access	UInt16	PRW	Access register of Register 2272 - 2292. By reading this register, Fetched from Accura 3700 data to register 2272 - 2292. Bit.[15] of this register is read as 1 on success of fetch. By writing 1 to this register, applied from register 2272 - 2292 to Accura 3700. There are 6 aggregations in Accura 3700 with fixed intervals. In addition there are five Custom-Aggregations that can set interval and offset times. There is no offset setting for aggregations with fixed intervals.
2272	Reserved			
2273	Interval of aggregation 11	UInt32	PRW	Interval of Aggregation 11. Unit [sec] Valid range: 2 - 86400 [sec] (Up to 1 day) Default: 3 [sec]
2275	Reserved			
2276	Interval of aggregation 12	UInt32	PRW	Interval of Aggregation 12. Valid range: 2 - 86400 [sec] (Up to 1 day) Default: 900 [sec] (15 minutes)
2278	Reserved			
2279	Interval of aggregation 13	UInt32	PRW	Interval of Aggregation 13. Valid range: 2 - 86400 [sec] (Up to 1 day) Default: 7200 [sec] (2 hours)
2281	Reserved			
2282	Interval of aggregation 14	UInt32	PRW	Aggregation 14. Valid range: 2 - 86400 [sec] (Up to 1 day) Default: 43200 [sec] (12 hours)
2284	Reserved			
2285	Interval of aggregation 15	UInt32	PRW	Interval of Aggregation 15. Valid range: 2 - 86400 [sec] (Up to 1 day) Default: 86400 [sec] (1 day)
2287	Selection of default aggregation	UInt16	PRW	Default Aggregation. 0: Aggregation 0 (0.5 seconds) 1: (default) Aggregation 1 (1 seconds) 2: Aggregation 2 (5 seconds) 3: Aggregation 3 (1 minute) 4: Aggregation 4 (5 minutes) 5: Aggregation 5 (1 hour) 6: Aggregation 6 (6 hours)
2288	Offset of aggregation 11	UInt16	PRW	Offset time of Aggregation 11. Unit [min] Valid range: 0 - 1439 [min] Default: 0 [min]
2289	Offset of aggregation 12	UInt16	PRW	Offset time of Aggregation 12. Valid range: 0 - 1439 [min] Default: 0 [min]
2290	Offset of aggregation 13	UInt16	PRW	Offset time of Aggregation 13. See "Offset of Aggregation 12".

2291	Offset of aggregation 14	UInt16	PRW	Offset time of Aggregation 14. See "Offset of Aggregation 12".
2292	Offset of aggregation 15	UInt16	PRW	Offset time of Aggregation 15. See "Offset of Aggregation 12".

Modbus Serial Communication Setup

Register Number	Name	Format	Attribute	Description
2321	Modbus serial communication setup access	UInt16	PRW	Access register of Register 2322 - 2325. By reading this register, Fetched from Accura 3700 data to register 2322 - 2325. Bit.[15] of this register is read as 1 on success of fetch. By writing 1 to this register, applied from register 2322 - 2325 to Accura 3700.
2322	Device address	UInt16	PRW	Modbus serial address. Valid range: 0 - 247 Default: 0
2323	Baud rate	UInt16	PRW	Baud rate. 0: 1200 1: 2400 2: 4800 3: (default) 9600 4: 19200 5: 38400 6: 57600 7: 115200
2324	Parity	UInt16	PRW	Parity bit. 0: Parity none 1: Odd parity 2: (default) Even parity
2325	Stop bits	UInt16	PRW	0: (default) 1-stop bit 1: 2-stop bit

Summer Time Setup

Register Number	Name	Format	Attribute	Description
2331	Summer time setup access	UInt16	PRW	Access register of Register 2332 - 2341. By reading this register, Fetched from Accura 3700 data to register 2332 - 2341. Bit.[15] of this register is read as 1 on success of fetch. By writing 1 to this register, applied from register 2332 - 2341 to Accura 3700.
2332	Summer time enable	UInt16	PRW	Summer time enable. 0: (default) Disable 1: Enable
2333	Start month	UInt16	PRW	Summer time start month. Valid range: 1 - 12 [month] Default: 3 [month]
2334	Start n-th day	UInt16	PRW	Set how many days of the week to start the summer time. Valid range: 1 - 5 (If there is no 5th, automatic conversion to 4th) Default: 2 (2nd day)
2335	Start day	UInt16	PRW	Set the day of the week to start the summer time. Summer time Set the start day of the week. Valid range: 0 (Sunday) - 6 (Saturday) Default: 0 (Sunday)
2336	Start minute	UInt16	PRW	Summer time start time. Unit [min] Valid range: 0 - 1439 [min] Default: 120 (02:00 AM)
2337	End month	UInt16	PRW	Summer time end month. Valid range: 1 - 12 [month] Default: 11 [month]
2338	End n-th day	UInt16	PRW	Set how many days of the week to end the summer time. Valid range: 1 - 5 (If there is no 5th, automatic conversion to 4th) Default: 2 (1st day)
2339	End day	UInt16	PRW	Set the day of the week to end the summer time. Valid range: 0 (Sunday) - 6 (Saturday) Default: 0 (Sunday)
2340	End minute	UInt16	PRW	Summer time end time. Unit [min] Valid range: 0 - 1439 [min] Default: 120 (02:00 AM)
2341	Time offset	UInt16	PRW	Adjustment time when applying summer time. Unit [min] Valid range: 0 - 1439 [min] Default: 60 [min]

Measurement Event Setup

Register Number	Name	Format	Attribute	Description
2529	Saved event data buffer mode	UInt16	PRW	Set the number of buffers before and after the event when saving measurement event data. 0: Before 3, After 2 1: Before 2, After 3
2530	Phase open detection mode	UInt16	PRW	Phase open detection. 0: Off 1: On
2531	Fuse fail detection mode	UInt16	PRW	Fuse fail detection event. 0: Off 1: On
2532	Blackout detection mode	UInt16	PRW	Blackout detection event. 0: Off 1: On

Over Current Event Setup

Register Number	Name	Format	Attribute	Description
2541	Current event setup access	UInt16	PRW	Access register of Register 2542 - 2549. By reading this register, Fetched from Accura 3700 data to register 2542 - 2549. Bit.[15] of this register is read as 1 on success of fetch. By writing 1 to this register, applied from register 2542 - 2549 to Accura 3700.
2542	Over current event	UInt16	PRW	Over current event enable. 0: (default) Disable 1: Enable
2543	Start ratio of over current	UInt16	PRW	Over current start level (ratio). Unit [0.1%] Valid range: 50 - 9990 (5.0 - 999.0 [%]) Default: 1000 (100 [%])
2544	End ratio of over current	UInt16	PRW	Over current end level (ratio). Unit [0.1%] Valid range: 0 - 9980 (0 - 998.0 [%]) Set lower than the start level. Default: 980 (98.0 [%])
2545	Delay time of over current	Int16	PRW	Over current event judgment time. If the inverse time concept is set to 0, it is regarded as instantaneous. Valid range: -1 (1 cycle) Valid range: 0 (0.2 seconds instantaneous time) Valid range: 1 - 9 [sec] Inverse time Default: 1 (Inverse time 1 second)
2546	Over current pickup process enable	UInt16	PRW	Set up event determination when the over current starts (pick up). Applicable when the over current delay time is 1 or more. 0: (default) Disable 1: Pick up event saved. Not related to over current event storage. 2: Pick up event conditional storage.

				Over current event save pick up event only when saved. However, after the pick up event and the over current event, If other event is saved, pick up event is saved.
2547	Reserved			
2548	Over demand current event	UInt16	PRW	Over demand current event enable. 0: (default) Disable 1: Enable
2549	Start ratio of over demand current	UInt16	PRW	Over demand current start level (ratio). Unit [0.1%] Valid range: 50 - 9990 (5.0 - 999.0 [%]) Default: 700 (70 [%])

Over Temperature Event Setup

Register Number	Name	Format	Attribute	Description
2551	Temperature event setup access	UInt16	PRW	Access register of Register 2552 - 2554. By reading this register, Fetched from Accura 3700 data to register 2552 - 2554. Bit.[15] of this register is read as 1 on success of fetch. By writing 1 to this register, applied from register 2552 - 2554 to Accura 3700.
2552	Over temperature event	UInt16	PRW	Over temperature event enable. 0: (default) Disable 1: Enable
2553	Start value of over temperature	UInt16	PRW	Over temperature start level. Unit [℃] Valid range: 20 - 9999 [℃] Default: 50 [℃]
2554	End value of over temperature	UInt16	PRW	Over temperature end level. Unit [℃] Valid range: 0 - 9998 [℃] (1 degree below start temperature level) Default: 40 [℃]

Over Power Event Setup

Register Number	Name	Format	Attribute	Description
2561	Over power event setup access	UInt16	PRW	Access register of Register 2562 - 2568. By reading this register, Fetched from Accura 3700 data to register 2562 - 2568. Bit.[15] of this register is read as 1 on success of fetch. By writing 1 to this register, applied from register 2562 - 2568 to Accura 3700.
2562	Over power event	UInt16	PRW	Over power event enable. 0: (default) Disable 1: Phase power enable 2: Total power enable
2563	Start ratio of over power	Float32	PRW	Over power start threshold. Unit [kW] Valid range: 0.1 - 100,000 [kW] Default: 33 [kW]
2565	End ratio of over power	Float32	PRW	Over power end threshold. Unit [kW] Valid range: 0 - (Over power start - rated power / 100) [kW] Default: 32 [kW]
2567	Delay time of over power	Int16	PRW	Over power event judgment time. If the inverse time concept is set to 0, it is regarded as instantaneous. Valid range: -1 (1 cycle) Valid range: 0 (0.2 seconds instantaneous time) Valid range: 1 - 9 [sec] Inverse time Default: 1 (Inverse time 1 second)
2568	Over power pickup process enable	UInt16	PRW	Set up event determination when the over power starts (pick up). Applicable when the over power delay time is 1 or more. 0: (default) Disable 1: Pick up event saved. Not related to over power event storage. 2: Pick up event conditional storage. Over power event save pick up event only when saved. However, after the pick up event and the over power event, If other event is saved, pick up event is saved.

Energy Level Setup

Register Number	Name	Format	Attribute	Description
3001	Energy level setup access	UInt16	PRW	Access register of Register 3002 - 3031. By reading this register, Fetched from Accura 3700 data to register 3002 - 3031. Bit.[15] of this register is read as 1 on success of fetch. By writing 1 to this register, applied from register 3002 - 3031 to Accura 3700.
3002	Received kWh of phase A	UInt32	PRW	Received energy of Phase A, Active power. Unit [kWh] Valid range: 0 - 999,999,999 Default: 0
3004	Received kWh of phase B	UInt32	PRW	Received energy of Phase B, Active power. Unit [kWh] Valid range: 0 - 999,999,999 Default: 0
3006	Received kWh of phase C	UInt32	PRW	Received energy of Phase C, Active power. Unit [kWh] Valid range: 0 - 999,999,999 Default: 0
3008	Delivered kWh of phase A	UInt32	PRW	Delivered energy of Phase A, Active power. Unit [kWh] Valid range: 0 - 999,999,999 Default: 0
3010	Delivered kWh of phase B	UInt32	PRW	Delivered energy of Phase B, Active power. Unit [kWh] Valid range: 0 - 999,999,999 Default: 0
3012	Delivered kWh of phase C	UInt32	PRW	Delivered energy of Phase C, Active power. Unit [kWh] Valid range: 0 - 999,999,999 Default: 0
3014	Received kVARh of phase A	UInt32	PRW	Received energy of Phase A, Reactive power. Unit [kVARh] Valid range: 0 - 999,999,999 Default: 0
3016	Received kVARh of phase B	UInt32	PRW	Received energy of Phase B, Reactive power. Unit [kVARh] Valid range: 0 - 999,999,999 Default: 0
3018	Received kVARh of phase C	UInt32	PRW	Received energy of Phase C, Reactive power. Unit [kVARh] Valid range: 0 - 999,999,999 Default: 0
3020	Delivered kVARh of phase A	UInt32	PRW	Delivered energy of Phase A, Reactive power. Unit [kVARh] Valid range: 0 - 999,999,999 Default: 0
3022	Delivered kVARh of phase B	UInt32	PRW	Delivered energy of Phase B, Reactive power. Unit [kVARh] Valid range: 0 - 999,999,999 Default: 0
3024	Delivered kVARh of phase C	UInt32	PRW	Delivered energy of Phase C, Reactive power. Unit [kVARh] Valid range: 0 - 999,999,999 Default: 0
3026	Received kVAh of phase A	UInt32	PRW	Energy of Phase A, Apparent power. Unit [kVAh] Valid range: 0 - 999,999,999 Default: 0
3028	Received kVAh of phase B	UInt32	PRW	Energy of Phase B, Apparent power. Unit [kVAh] Valid range: 0 - 999,999,999 Default: 0
3030	Received kVAh of phase C	UInt32	PRW	Energy of Phase C, Apparent power. Unit [kVAh] Valid range: 0 - 999,999,999 Default: 0

Module ID Setup

Register Number	Name	Format	Attribute	Description
50001	Module ID setup access	UInt16	PRW	Access register of Register 50002 - 50007. By reading this register, Fetched from Accura 3700 data to register 50002 - 50007. Bit.[15] of this register is read as 1 on success of fetch. By writing 1 to this register, applied from register 50002 - 50007 to Accura 3700.
50002	Module count	UInt16	PRW	Number of modules connected to Accura 3700.
50003	Module ID of 1st position	UInt16	PRW	1st module ID setting. Valid range: 1 - 9
50004	Module ID of 2nd position	UInt16	PRW	2nd module ID setting. Valid range: 1 - 9
50005	Module ID of 3rd position	UInt16	PRW	3rd module ID setting. Valid range: 1 - 9
50006	Module ID of 4th position	UInt16	PRW	4th module ID setting. Valid range: 1 - 9
50007	Module ID of 5th position	UInt16	PRW	5th module ID setting. Valid range: 1 - 9

Module Setup

Module Setup by ID

Register Number	Name	Format	Attribute	Description
50011	Read setup of module ID 1	UInt16	R	When this register is read, the setting information of module ID 1 is updated. Bit.[15:8]: Module setting update result 0: Fail 1: Invalid type 2: Success Bit.[7:0]: Module type 1: DIO 2: DI 3: DO 4: AI 5: AO 6: A4D2 7: A2D4 8: DC 9: RTD 10: ELD
50012-50181	Setup of module ID 1	UInt16	PRW	Settings information for module ID 1. See "Module Setup Details by type".
50182	Write setup of module ID 1	UInt16	RW	Write module type in this register, setting of module ID 1 is applied. Bit.[15:8]: Module setting update result 0: Fail 1: Invalid type 2: Success Bit.[7:0]: Module type 1: DIO 2: DI 3: DO 4: AI 5: AO 6: A4D2 7: A2D4 8: DC 9: RTD 10: ELD
50183	Read setup of module ID 2	UInt16	R	When this register is read, the setting information of module ID 2 is updated. See "Read setup of module ID 1" (register 50011).
50184-50353	Setup of module ID 2	UInt16	PRW	Settings information for module ID 2. See "Module Setup Details by type".
50354	Write setup of module ID 2	UInt16	RW	Write module type in this register, setting of module ID 2 is applied. See "Write setup of module ID 1" (register 50182).
50355	Read setup of module ID 3	UInt16	R	When this register is read, the setting information of module ID 3 is updated. See "Read setup of module ID 1" (register 50011).
50356-50525	Setup of module ID 3	UInt16	PRW	Settings information for module ID 3. See "Module Setup Details by type".
50526	Write setup of module ID 3	UInt16	RW	Write module type in this register, setting of module ID 3 is applied. See "Write setup of module ID 1" (register 50182).
50527	Read setup of module ID 4	UInt16	R	When this register is read, the setting information of module ID 4 is updated. See "Read setup of module ID 1" (register 50011).
50528-50697	Setup of module ID 4	UInt16	PRW	Settings information for module ID 4. See "Module Setup Details by type".
50698	Write setup of module ID 4	UInt16	RW	Write module type in this register, setting of module ID 4 is applied. See "Write setup of module ID 1" (register 50182).
50699	Read setup of module ID 5	UInt16	R	When this register is read, the setting information of module ID 5 is updated. See "Read setup of module ID 1" (register 50011).

50700-50869	Setup of module ID 5	UInt16	PRW	Settings information for module ID 5. See "Module Setup Details by type".
50870	Write setup of module ID 5	UInt16	RW	Write module type in this register, setting of module ID 5 is applied. See "Write setup of module ID 1" (register 50182).
50871	Read setup of module ID 6	UInt16	R	When this register is read, the setting information of module ID 6 is updated. See "Read setup of module ID 1" (register 50011).
50872-51041	Setup of module ID 6	UInt16	PRW	Settings information for module ID 6. See "Module Setup Details by type".
51042	Write setup of module ID 6	UInt16	RW	Write module type in this register, setting of module ID 6 is applied. See "Write setup of module ID 1" (register 50182).
51043	Read setup of module ID 7	UInt16	R	When this register is read, the setting information of module ID 7 is updated. See "Read setup of module ID 1" (register 50011).
51044-51213	Setup of module ID 7	UInt16	PRW	Settings information for module ID 7. See "Module Setup Details by type".
51214	Write setup of module ID 7	UInt16	RW	Write module type in this register, setting of module ID 7 is applied. See "Write setup of module ID 1" (register 50182).
51215	Read setup of module ID 8	UInt16	R	When this register is read, the setting information of module ID 8 is updated. See "Read setup of module ID 1" (register 50011).
51216-51385	Setup of module ID 8	UInt16	PRW	Settings information for module ID 8. See "Module Setup Details by type".
51386	Write setup of module ID 8	UInt16	RW	Write module type in this register, setting of module ID 8 is applied. See "Write setup of module ID 1" (register 50182).
51387	Read setup of module ID 9	UInt16	R	When this register is read, the setting information of module ID 9 is updated. See "Read setup of module ID 1" (register 50011).
51388-51557	Setup of module ID 9	UInt16	PRW	Settings information for module ID 9. See "Module Setup Details by type".
51558	Write setup of module ID 9	UInt16	RW	Write module type in this register, setting of module ID 9 is applied. See "Write setup of module ID 1" (register 50182).

Module Setup by ID and Type

Register Number	Name	Format	Attribute	Description
52301	Module ID and Type	UInt16	PRW	Set ID and Type of module to access. Bit.[15:8]: Module type 1: DIO 2: DI 3: DO 4: AI 5: AO 6: A4D2 7: A2D4 8: DC 9: RTD 10: ELD Bit.[7:0]: ID Valid range: 1 - 9
52302	Read setup	UInt16	PRW	If you write the module type in this register, the module setting is updated. Bit.[15:8]: Module setting update result 0: Fail 1: Invalid type 2: Success Bit.[7:0]: Module type 1: DIO 2: DI 3: DO 4: AI 5: AO 6: A4D2 7: A2D4 8: DC 9: RTD 10: ELD
52303-52474	Detailed module setup	UInt16	RW	Module setting data. See "Module Setup Details by type".
52475	Write setup	UInt16	RW	If you write the module type in this register, the module setting is applied. Bit.[15:8]: Module setting apply result 0: Fail 1: Invalid type 2: Success Bit.[7:0]: Module type 1: DIO 2: DI 3: DO 4: AI 5: AO 6: A4D2 7: A2D4 8: DC 9: RTD 10: ELD

DIO Setup Details

This detailed map describes the setting data for the Accura 3700 DIO module. The "Offset Number" of the detailed map means relative position from "Number" which refers to the detailed map.

Offset Number	Name	Format	Attribute	Description
0	Input polarity of DI channel 1	UInt16	RW	Input polarity of DI channel 1. 0: Normal 1: Reverse
1	Active width of DI channel 1	UInt16	RW	Minimum input length for detection of DI channel 1. Unit [ms] Valid range: 10 - 255 [ms]
2	Event enable of DI channel 1	UInt16	RW	Event type to be detected on DI channel 1 0: Off 1: Closed 2: Open 3: Both
3	Hold time of DI channel 1	UInt16	RW	Time to hold edge detection output after edge detection on DI channel 1. Unit [sec] Valid range: 1 - 16383 [sec]
4-13	Reserved			
14-27	Setup of DI channel 2			DI channel 2 setting. See offset number 0 - 13.
28-41	Setup of DI channel 3			DI channel 3 setting. See offset number 0 - 13.
42-55	Setup of DI channel 4			DI channel 4 setting. See offset number 0 - 13.
56-69	Setup of DI channel 5			DI channel 5 setting. See offset number 0 - 13.
70-83	Setup of DI channel 6			DI channel 6 setting. See offset number 0 - 13.
84-97	Setup of DI channel 7			DI channel 7 setting. See offset number 0 - 13.
98-111	Setup of DI channel 8			DI channel 8 setting. See offset number 0 - 13.
112	Output polarity of DO channel 1	UInt16	RW	Output polarity of DO channel 1. 0: Normal 1: Reverse
113	DO type of DO channel 1	UInt16	RW	DO type of DO channel 1. 0: Latch 1: Periodic pulse 2: Uncountable pulse 3: Countable pulse
114	Period width of DO channel 1	UInt16	RW	Period width of DO channel 1. Unit [ms] Valid range: 20 - 10,000 [ms]
115	On width of DO channel 1	UInt16	RW	On width (On time) of DO channel 1. Unit [ms] Valid range: 20 - 10,000 [ms]
116	DO parameter of DO channel 1	UInt16	RW	If DO type of DO channel 1 is 0 - 2, Output event parameter. 0: No 1: Dip 2: Swell 3: Fuse fail 4: Phase open 5: Leakage over current 6: Blackout 7: Over current 8: Demand over current 9: Over temperature 10: Event LED 11: Over power If DO type of DO channel 1 is 3, Output power parameter. 0: No 1: kWh Received 2: kWh Delivered 3: kVARh Received 4: kVARh Delivered
117	Countable pulse param of DO channel 1	UInt16	RW	If DO type of DO channel 1 is 3 and the DO parameter is 1 - 4, the DO setting for each DO output is set. Valid range: 1 - 999999 (10 - 99990 [Wh]) or (10 - 99990 [VARh])
118	Max pulse command of DO channel 1	UInt16	RW	If DO type of DO channel 1 is 3, the maximum cumulative count of countable pulse. Valid range: 1 - 100

119	Countable pulse limit of DO channel 1	UInt16	RW	If DO type of DO channel 1 is 3, count that can be incremented at one time. Valid range: 1 - 10
120	DO interruption enable of DO channel 1	UInt16	RW	If DO type of DO channel 1 is 1 or 2, about DO off. 0: perform DO off after existing operation is completed. 1: perform DO off even existing operation is not completed.
121-129	Reserved			
130-147	Setup of DO channel 2			DO channel 2 setting. See offset number 112 - 129.

DI Setup Details

This detailed map describes the setting data for the Accura 3700 DI module. The "Offset Number" of the detailed map means relative position from "Number" which refers to the detailed map.

Offset Number	Name	Format	Attribute	Description
0	Input polarity of DI channel 1	UInt16	RW	Input polarity of DI channel 1. 0: Normal 1: Reverse
1	Active width of DI channel 1	UInt16	RW	Minimum input length for detection of DI channel 1. Unit [ms] Valid range: 10 - 255 [ms]
2	Event enable of DI channel 1	UInt16	RW	Event type to be detected on DI channel 1 0: Off 1: Closed 2: Open 3: Both
3	Hold time of DI channel 1	UInt16	RW	Time to hold edge detection output after edge detection on DI channel 1. Unit [sec] Valid range: 1 - 16383 [sec]
4-13	Reserved			
14-27	Setup of DI channel 2			DI channel 2 setting. See offset number 0 - 13.
28-41	Setup of DI channel 3			DI channel 3 setting. See offset number 0 - 13.
42-55	Setup of DI channel 4			DI channel 4 setting. See offset number 0 - 13.
56-69	Setup of DI channel 5			DI channel 5 setting. See offset number 0 - 13.
70-83	Setup of DI channel 6			DI channel 6 setting. See offset number 0 - 13.
84-97	Setup of DI channel 7			DI channel 7 setting. See offset number 0 - 13.
98-111	Setup of DI channel 8			DI channel 8 setting. See offset number 0 - 13.
112-125	Setup of DI channel 9			DI channel 9 setting. See offset number 0 - 13.
126-139	Setup of DI channel 10			DI channel 10 setting. See offset number 0 - 13.
140-153	Setup of DI channel 11			DI channel 11 setting. See offset number 0 - 13.
154-167	Setup of DI channel 12			DI channel 12 setting. See offset number 0 - 13.

DO Setup Details

This detailed map describes the setting data for the Accura 3700 DO module. The "Offset Number" of the detailed map means relative position from "Number" which refers to the detailed map.

Offset Number	Name	Format	Attribute	Description
0	Output polarity of DO channel 1	UInt16	RW	Output polarity of DO channel 1. 0: Normal 1: Reverse
1	DO type of DO channel 1	UInt16	RW	DO type of DO channel 1. 0: Latch 1: Periodic pulse 2: Uncountable pulse 3: Countable pulse
2	Period width of DO channel 1	UInt16	RW	Period width of DO channel 1. Unit [ms] Valid range: 20 - 10,000 [ms]
3	On width of DO channel 1	UInt16	RW	On width (On time) of DO channel 1. Unit [ms] Valid range: 20 - 10,000 [ms]
4	DO parameter of DO channel 1	UInt16	RW	If DO type of DO channel 1 is 0 - 2, Output event parameter. 0: No 1: Dip 2: Swell 3: Fuse fail 4: Phase open 5: Leakage over current 6: Blackout 7: Over current 8: Demand over current 9: Over temperature 10: Event LED 11: Over power If DO type of DO channel 1 is 3, Output power parameter. 0: No 1: kWh Received 2: kWh Delivered 3: kVARh Received 4: kVARh Delivered
5	Countable pulse param of DO channel 1	UInt16	RW	If DO type of DO channel 1 is 3 and the DO parameter is 1 - 4, the DO setting for each DO output is set. Valid range: 1 - 999999 (10 - 99990 [Wh]) or (10 - 99990 [VARh])
6	Max pulse command of DO channel 1	UInt16	RW	If DO type of DO channel 1 is 3, the maximum cumulative count of countable pulse. Valid range: 1 - 100
7	Countable pulse limit of DO channel 1	UInt16	RW	If DO type of DO channel 1 is 3, count that can be incremented at one time. Valid range: 1 - 10
8	DO interruption enable of DO channel 1	Uint16	RW	If DO type of DO channel 1 is 1 or 2, about DO off. 0: perform DO off after existing operation is completed. 1: perform DO off even existing operation is not completed.
9-17	Reserved			
18-35	Setup of DO channel 2			DO channel 2 setting. See offset number 0 - 17.
36-53	Setup of DO channel 3			DO channel 3 setting. See offset number 0 - 17.
54-71	Setup of DO channel 4			DO channel 4 setting. See offset number 0 - 17.
72-89	Setup of DO channel 5			DO channel 5 setting. See offset number 0 - 17.
90-107	Setup of DO channel 6			DO channel 6 setting. See offset number 0 - 17.

AI Setup Details

This detailed map describes the setting data for the Accura 3700 AI module. The "Offset Number" of the detailed map means relative position from "Number" which refers to the detailed map.

Offset Number	Name	Format	Attribute	Description
0	Event enable of AI channel 1	UInt16	RW	Event type to be detected on AI channel 1. 0: Off 1: Over 2: Under 3: Both
1	Range type of AI channel 1	UInt16	RW	Current range to be input to AI channel 1. 0: 4 - 20 mA 1: 0 - 20 mA
2	High value of AI channel 1	Float32	RW	Conversion value corresponding to AI channel input current maximum value (20mA).
4	Low value of AI channel 1	Float32	RW	Conversion value corresponding to AI channel input current minimum value (0 or 4mA).
6	Moving average size of AI channel 1	UInt16	RW	Average time of AI channel 1 measurement value. Unit [ms] 0: 1 1: 2 2: 4 3: 8 4: 16 5: 32
7	Minus sign of AI channel 1	UInt16	RW	Measurement sign of AI channel 1 current. 0: Real value 1: Absolute value
8	Threshold of AI channel 1	Float32	RW	Threshold of AI channel 1. Event reference value. (based on conversion value)
10	Hysteresis of AI channel 1	Float32	RW	Hysteresis of AI channel 1. Event release reference value (based on conversion value) is threshold-hysteresis in case of Over, threshold + hysteresis in case of Under.
12-21	Reserved			
22-43	Setup of AI channel 2			AI channel 2 setting. See offset number 0 - 21.
44-65	Setup of AI channel 3			AI channel 3 setting. See offset number 0 - 21.
66-87	Setup of AI channel 4			AI channel 4 setting. See offset number 0 - 21.
88-109	Setup of AI channel 5			AI channel 5 setting. See offset number 0 - 21.
110-131	Setup of AI channel 6			AI channel 6 setting. See offset number 0 - 21.

AO Setup Details

This detailed map describes the setting data for the Accura 3700 AO module. The "Offset Number" of the detailed map means relative position from "Number" which refers to the detailed map.

Offset Number	Name	Format	Attribute	Description
0	AO parameter of AO channel 1	UInt16	RW	Measurement value to be output by AO channel 1. 0: No 1: Voltage A 2: Voltage B 3: Voltage C 4: Voltage LN Avg. 5: Voltage AB 6: Voltage BC 7: Voltage CA 8: Voltage LL Avg. 9: Current A 10: Current B 11: Current C 12: Current Avg. 13: Active Power 14: Power factor 15: Reactive Power 16: Apparent Power 17: Frequency
1	Range type of AO channel 1	UInt16	RW	Current range to be output to AO channel 1. 0: 4 - 20 mA 1: 0 - 20 mA
2	High value of AO channel 1	Float32	RW	Conversion value corresponding to AO channel output current maximum value (20mA).
4	Low value of AO channel 1	Float32	RW	Conversion value corresponding to AO channel output current minimum value (0 or 4mA).
6-15	Reserved			
16-31	Setup of AO channel 2			AO channel 2 setting. See offset number 0 - 15.
32-47	Setup of AO channel 3			AO channel 3 setting. See offset number 0 - 15.
48-63	Setup of AO channel 4			AO channel 4 setting. See offset number 0 - 15.
64-79	Setup of AO channel 5			AO channel 5 setting. See offset number 0 - 15.
80-95	Setup of AO channel 6			AO channel 6 setting. See offset number 0 - 15.

A4D2 Setup Details

This detailed map describes the setting data for the Accura 3700 A4D2 module. The "Offset Number" of the detailed map means relative position from "Number" which refers to the detailed map.

Offset Number	Name	Format	Attribute	Description
0	AO parameter of AO channel 1	UInt16	RW	Measurement value to be output by AO channel 1. 0: No 1: Voltage A 2: Voltage B 3: Voltage C 4: Voltage LN Avg. 5: Voltage AB 6: Voltage BC 7: Voltage CA 8: Voltage LL Avg. 9: Current A 10: Current B 11: Current C 12: Current Avg. 13: Active Power 14: Power factor 15: Reactive Power 16: Apparent Power 17: Frequency
1	Range type of AO channel 1	UInt16	RW	Current range to be output to AO channel 1. 0: 4 - 20 mA 1: 0 - 20 mA
2	High value of AO channel 1	Float32	RW	Conversion value corresponding to AO channel output current maximum value (20mA).
4	Low value of AO channel 1	Float32	RW	Conversion value corresponding to AO channel output current minimum value (0 or 4mA).
6-15	Reserved			
16-31	Setup of AO channel 2			AO channel 2 setting. See offset number 0 - 15.
32-47	Setup of AO channel 3			AO channel 3 setting. See offset number 0 - 15.
48-63	Setup of AO channel 4			AO channel 4 setting. See offset number 0 - 15.
64	Output polarity of DO channel 1	UInt16	RW	Output polarity of DO channel 1. 0: Normal 1: Reverse
65	DO type of DO channel 1	UInt16	RW	DO type of DO channel 1. 0: Latch 1: Periodic pulse 2: Uncountable pulse 3: Countable pulse
66	Period width of DO channel 1	UInt16	RW	Period width of DO channel 1. Unit [ms] Valid range: 20 - 10,000 [ms]
67	On width of DO channel 1	UInt16	RW	On width (On time) of DO channel 1. Unit [ms] Valid range: 20 - 10,000 [ms]
68	DO parameter of DO channel 1	UInt16	RW	If DO type of DO channel 1 is 0 - 2, Output event parameter. 0: No 1: Dip 2: Swell 3: Fuse fail 4: Phase open 5: Leakage over current 6: Blackout 7: Over current 8: Demand over current 9: Over temperature 10: Event LED 11: Over power If DO type of DO channel 1 is 3, Output power parameter. 0: No 1: kWh Received 2: kWh Delivered 3: kVARh Received 4: kVARh Delivered
69	Countable pulse param of DO channel 1	UInt16	RW	If DO type of DO channel 1 is 3 and the DO parameter is 1 - 4, the DO setting for each DO output is set. Valid range: 1 - 999999 (10 - 99990 [Wh]) or (10 - 99990 [VARh])

70	Max pulse command of DO channel 1	UInt16	RW	If DO type of DO channel 1 is 3, the maximum cumulative count of countable pulse. Valid range: 1 - 100
71	Countable pulse limit of DO channel 1	UInt16	RW	If DO type of DO channel 1 is 3, count that can be incremented at one time. Valid range: 1 - 10
72	DO interruption enable of DO channel 1	UInt16	RW	If DO type of DO channel 1 is 1 or 2, about DO off. 0: perform DO off after existing operation is completed. 1: perform DO off even existing operation is not completed.
73-81	Reserved			
82-99	Setup of DO channel 2			DO channel 2 setting. See offset number 0 - 17.

A2D4 Setup Details

This detailed map describes the setting data for the Accura 3700 A2D4 module. The "Offset Number" of the detailed map means relative position from "Number" which refers to the detailed map.

Offset Number	Name	Format	Attribute	Description
0	AO parameter of AO channel 1	UInt16	RW	Measurement value to be output by AO channel 1. 0: No 1: Voltage A 2: Voltage B 3: Voltage C 4: Voltage LN Avg. 5: Voltage AB 6: Voltage BC 7: Voltage CA 8: Voltage LL Avg. 9: Current A 10: Current B 11: Current C 12: Current Avg. 13: Active Power 14: Power factor 15: Reactive Power 16: Apparent Power 17: Frequency
1	Range type of AO channel 1	UInt16	RW	Current range to be output to AO channel 1. 0: 4 - 20 mA 1: 0 - 20 mA
2	High value of AO channel 1	Float32	RW	Conversion value corresponding to AO channel output current maximum value (20mA).
4	Low value of AO channel 1	Float32	RW	Conversion value corresponding to AO channel output current minimum value (0 or 4mA).
6-15	Reserved			
16-31	Setup of AO channel 2			AO channel 2 setting. See offset number 0 - 15.
32	Output polarity of DO channel 1	UInt16	RW	Output polarity of DO channel 1. 0: Normal 1: Reverse
33	DO type of DO channel 1	UInt16	RW	DO type of DO channel 1. 0: Latch 1: Periodic pulse 2: Uncountable pulse 3: Countable pulse
34	Period width of DO channel 1	UInt16	RW	Period width of DO channel 1. Unit [ms] Valid range: 20 - 10,000 [ms]
35	On width of DO channel 1	UInt16	RW	On width (On time) of DO channel 1. Unit [ms] Valid range: 20 - 10,000 [ms]

36	DO parameter of DO channel 1	UInt16	RW	If DO type of DO channel 1 is 0 - 2, Output event parameter. 0: No 1: Dip 2: Swell 3: Fuse fail 4: Phase open 5: Leakage over current 6: Blackout 7: Over current 8: Demand over current 9: Over temperature 10: Event LED 11: Over power If DO type of DO channel 1 is 3, Output power parameter. 0: No 1: kWh Received 2: kWh Delivered 3: kVARh Received 4: kVARh Delivered
37	Countable pulse param of DO channel 1	UInt16	RW	If DO type of DO channel 1 is 3 and the DO parameter is 1 - 4, the DO setting for each DO output is set. Valid range: 1 - 999999 (10 - 99990 [Wh]) or (10 - 99990 [VARh])
38	Max pulse command of DO channel 1	UInt16	RW	If DO type of DO channel 1 is 3, the maximum cumulative count of countable pulse. Valid range: 1 - 100
39	Countable pulse limit of DO channel 1	UInt16	RW	If DO type of DO channel 1 is 3, count that can be incremented at one time. Valid range: 1 - 10
40	DO interruption enable of DO channel 1	UInt16	RW	If DO type of DO channel 1 is 1 or 2, about DO off. 0: perform DO off after existing operation is completed. 1: perform DO off even existing operation is not completed.
41-49	Reserved			
50-67	Setup of DO channel 2			DO channel 2 setting. See offset number 0 - 17.
68-85	Setup of DO channel 3			DO channel 3 setting. See offset number 0 - 17.
86-103	Setup of DO channel 4			DO channel 4 setting. See offset number 0 - 17.

DC Setup Details

This detailed map describes the setting data for the Accura 3700 DC module. The "Offset Number" of the detailed map means relative position from "Number" which refers to the detailed map.

Offset Number	Name	Format	Attribute	Description
0	Input polarity of DI channel 1	UInt16	RW	Input polarity of DI channel 1. 0: Normal 1: Reverse
1	Active width of DI channel 1	UInt16	RW	Minimum input length for detection of DI channel 1. Unit [ms] Valid range: 10 - 255 [ms]
2	Event enable of DI channel 1	UInt16	RW	Event type to be detected on DI channel 1. 0: Off 1: Closed 2: Open 3: Both
3	Hold time of DI channel 1	UInt16	RW	Time to hold edge detection output after edge detection on DI channel 1. Unit [sec] Valid range: 1 - 16383 [sec]
4	Display event of DI channel 1	UInt16	RW	Setting contents to display on DI channel 1 event. 0: No 1: Voltage relay 2: Fuse 3: Discharge 4: Charge
5-13	Reserved			
14-27	Setup of DI channel 2			DI channel 2 setting. See offset number 0 - 13.
28-41	Setup of DI channel 3			DI channel 3 setting. See offset number 0 - 13.
42-55	Setup of DI channel 4			DI channel 4 setting. See offset number 0 - 13.
56	Output polarity of DO channel	UInt16	RW	Output polarity of DO channel. 0: Normal 1: Reverse
57	DO type of DO channel	UInt16	RW	DO type of DO channel. 0: Latch 1: Periodic pulse 2: Uncountable pulse 3: Countable pulse
58	Period width of DO channel	UInt16	RW	Period width of DO channel. Unit [ms] Valid range: 20 - 10,000 [ms]
59	On width of DO channel	UInt16	RW	On width (On time) of DO channel. Unit [ms] Valid range: 20 - 10,000 [ms]
60	DO parameter of DO channel	UInt16	RW	If DO type of DO channel is 0 - 2, Output event parameter. 0: No 1: Dip 2: Swell 3: Fuse fail 4: Phase open 5: Leakage over current 6: Blackout 7: Over current 8: Demand over current 9: Over temperature 10: Event LED 11: Over power If DO type of DO channel is 3, Output power parameter. 0: No 1: kWh Received 2: kWh Delivered 3: kVARh Received 4: kVARh Delivered
61	Countable pulse param of DO channel	UInt16	RW	If DO type of DO channel is 3 and the DO parameter is 1 - 4, the DO setting for each DO output is set. Valid range: 1 - 999999 (10 - 99990 [Wh]) or (10 - 99990 [VARh])
62	Max pulse command of DO channel	UInt16	RW	If DO type of DO channel is 3, the maximum cumulative count of countable pulse. Valid range: 1 - 100
63	Countable pulse limit of	UInt16	RW	If DO type of DO channel is 3, count that can be incremented

	DO channel			at one time. Valid range: 1 - 10
64	DO interruption enable of DO channel	UInt16	RW	If DO type of DO channel is 1 or 2, about DO off. 0: perform DO off after existing operation is completed. 1: perform DO off even existing operation is not completed.
65-73	Reserved			
74	Event enable of DC voltage channel	UInt16	RW	Event type to be detected on DC voltage channel. 0: Off 1: Over 2: Under 3: Both
75	Minus sign of DC voltage channel	UInt16	RW	Minus sign of DC voltage channel. 0: Real value 1: Absolute value
76-79	Reserved			
80	Threshold of DC voltage channel	UInt16	RW	Threshold of DC voltage channel. Start level is threshold. Unit [V] Valid range: 1 - 200 [V] Default: 100 [V]
82	Hysteresis of DC voltage channel	UInt16	RW	Hysteresis of DC voltage channel. Event release reference value is threshold-hysteresis in case of Over, threshold + hysteresis in case of Under. Unit [V] Valid range: 1 - 20 [V] Default: 4 [V]
84-93	Reserved			
94	Event enable of Output current channel	UInt16	RW	Event type of output current channel. 0: Off 1: Over 2: Under 3: Both
95	Minus sign of Output current channel	UInt16	RW	Minus sign of DC voltage channel. 0: Real value 1: Absolute value
96	Shunt rating current of Output current channel	Float32	RW	Shunt rating current of output current channel. Valid range: 1 - 9999 Default: 100 [V]
98	Shunt voltage drop of Output current channel	Float32	RW	Shunt voltage drop of output current channel. Valid range: 0.001 - 0.999 Default: 0.05 [V]
100	Threshold of Output current channel	Float32	RW	Threshold of output current channel. Start level is threshold. Unit [A] Valid range: 1 - 9999 [A] Default: 100 [A]
102	Hysteresis of Output current channel	Float32	RW	Hysteresis of DC voltage channel. Event release reference value is threshold-hysteresis in case of Over, threshold + hysteresis in case of Under. Unit [A] Valid range: 1 - 999 [A] Default: 4 [A]
104-113	Reserved			
114	Setup of Battery current channel	UInt16	RW	Event type to be detected on battery current channel. 0: Off 1: Over 2: Under 3: Both
115	Minus sign of Battery current channel	UInt16	RW	Minus sign of Battery current channel. 0: Real value 1: Absolute value
116	Shunt rating current of Battery current channel	Float32	RW	Shunt rating current of battery current channel. Valid range: 1 - 9999 Default: 100 [V]
118	Shunt voltage drop of Battery current channel	Float32	RW	Shunt voltage drop of battery current channel. Valid range: 0.001 - 0.999 Default: 0.05 [V]
120	Threshold of Battery current channel	Float32	RW	Threshold of battery current channel. Start level is threshold. Unit [A] Valid range: -9999 to 9999 [A] Default: 100 [A]
122	Hysteresis of	Float32	RW	Hysteresis of battery current channel. Event release reference

	Battery current channel			value is threshold-hysteresis in case of Over, threshold + hysteresis in case of Under. Unit [A] Valid range: 1 - 999 [A] Default: 4 [A]

RTD Setup Details

This detailed map describes the setting data for the Accura 3700 RTD module. The "Offset Number" of the detailed map means relative position from "Number" which refers to the detailed map.

Offset Number	Name	Format	Attribute	Description
0	Temperature Sensor type	UInt16	RW	Temperature sensor type. 0: PT100 1: PT1000
1	Open event enable	UInt16	RW	Event enable by channel. Bit.[0]: Event enable of channel 1 0: Off 1: On Bit.[1]: Event enable of channel 2 0: Off 1: On Bit.[2]: Event enable of channel 3 0: Off 1: On
2	Wiring of channel 1	UInt16	RW	Wiring mode of channel 1. 0: 4-wire 1: 3-wire 2: 2-wire
3	Wiring of channel 2	UInt16	RW	Wiring mode of channel 2. 0: 4-wire 1: 3-wire 2: 2-wire
4	Wiring of channel 3	UInt16	RW	Wiring mode of channel 3. 0: 4-wire 1: 3-wire 2: 2-wire
5	Event enable of channel 1	UInt16	RW	Event type to be detected by channel 1. 0: Off 1: Over 2: Under 3: Both
6	Event enable of channel 2	UInt16	RW	Event type to be detected by channel 2. 0: Off 1: Over 2: Under 3: Both
7	Event enable of channel 3	UInt16	RW	Event type to be detected by channel 3. 0: Off 1: Over 2: Under 3: Both
8	Threshold of channel 1	Float32	RW	Event reference value for channel 1. Start value is threshold. Unit [℃] Valid range: -100 to 850 [℃] Default: 100 [℃]
10	Threshold of channel 2	Float32	RW	Event reference value for channel 2. Start value is threshold. Unit [℃] Valid range: -100 to 850 [℃] Default: 100 [℃]
12	Threshold of channel 3	Float32	RW	Event reference value for channel 3. Start value is threshold. Unit [℃] Valid range: -100 to 850 [℃] Default: 100 [℃]
14	Hysteresis of channel 1	Float32	RW	Hysteresis of channel 1. Event release reference value is threshold - hysteresis in case of Over, threshold + hysteresis in case of Under. Unit [℃] Valid range: 5 - 999 [℃] Default: 5 [℃]
16	Hysteresis of channel 2	Float32	RW	Hysteresis of channel 2. Event release reference value is threshold - hysteresis in case of Over, threshold + hysteresis in case of Under. Unit [℃] Valid range: 5 - 999 [℃]

				Default: 5 [℃]
18	Hysteresis of channel 3	Float32	RW	Hysteresis of channel 3. Event release reference value is threshold - hysteresis in case of Over, threshold + hysteresis in case of Under. Unit [℃] Valid range: 5 - 999 [℃] Default: 5 [℃]

ELD Setup Details

This detailed map describes the setting data for the Accura 3700 ELD module. The "Offset Number" of the detailed map means relative position from "Number" which refers to the detailed map.

Offset Number	Name	Format	Attribute	Description
0	Event enable of ELD channel 1	UInt16		Event type to be detected on channel 1. 0: Off 1: Over 2: Under 3: Both
1	ZCT burden resistance of ELD channel 1	Float32		Voltage type ZCT burden resistance value of channel 1. Unit [Ω] Valid range: 1 - 9999 [Ω] Default: 1200 [Ω]
3	ZCT internal resistance of ELD channel 1	Float32		Voltage type ZCT burden inner resistance value of channel 1. Unit [Ω] Valid range: 1 - 9999 [Ω] Default: 1000 [Ω]
5	RMS type of ELD channel 1	UInt16		Measurement method of channel 1. 0: Half-cycle RMS 1: 1-cycle RMS 2: Fundamental 1-cycle RMS
6	Threshold of ELD channel 1	Float32		Event reference value for channel 1. Start value is threshold. Unit [A] Valid range: 0.01 - 2.00 [A] Default: 0.2 [A]
8	Hysteresis of ELD channel 1	Float32		Hysteresis of channel 1. Event release reference value is threshold - hysteresis in case of Over, threshold + hysteresis in case of Under. Unit [℃] Valid range: 0.01 - 2.00 [A] Default: 0.04 [A]
10-19	Reserved			
20-39	Setup of ELD channel 2			ELD channel 2 setting. See offset number 0 - 19.
40-59	Setup of ELD channel 3			ELD channel 3 setting. See offset number 0 - 19.
60-79	Setup of ELD channel 4			ELD channel 4 setting. See offset number 0 - 19.
80-99	Setup of ELD channel 5			ELD channel 5 setting. See offset number 0 - 19.
100-119	Setup of ELD channel 6			ELD channel 6 setting. See offset number 0 - 19.
120	Output polarity of DO channel	UInt16	RW	Output polarity of DO channel. 0: Normal 1: Reverse
121	DO type of DO channel	UInt16	RW	DO type of DO channel. 0: Latch 1: Periodic pulse 2: Uncountable pulse 3: Countable pulse
122	Period width of DO channel	UInt16	RW	Period width of DO channel. Unit [ms] Valid range: 20 - 10,000 [ms]

123	On width of DO channel	UInt16	RW	On width (On time) of DO channel. Unit [ms] Valid range: 20 - 10,000 [ms]
124	DO parameter of DO channel	UInt16	RW	If DO type of DO channel is 0 - 2, Output event parameter. 0: No 1: Dip 2: Swell 3: Fuse fail 4: Phase open 5: Leakage over current 6: Blackout 7: Over current 8: Demand over current 9: Over temperature 10: Event LED 11: Over power If DO type of DO channel is 3, Output power parameter. 0: No 1: kWh Received 2: kWh Delivered 3: kVARh Received 4: kVARh Delivered
125	Countable pulse param of DO channel	UInt16	RW	If DO type of DO channel is 3 and the DO parameter is 1 - 4, the DO setting for each DO output is set. Valid range: 1 - 999999 (10 - 99990 [Wh]) or (10 - 99990 [VARh])
126	Max pulse command of DO channel	UInt16	RW	If DO type of DO channel is 3, the maximum cumulative count of countable pulse. Valid range: 1 - 100
127	Countable pulse limit of DO channel	UInt16	RW	If DO type of DO channel is 3, count that can be incremented at one time. Valid range: 1 - 10
128	DO interruption enable of DO channel	UInt16	RW	If DO type of DO channel is 1 or 2, about DO off. 0: perform DO off after existing operation is completed. 1: perform DO off even existing operation is not completed.

Control Category

Remote Control Unlock

Register Number	Name	Format	Attribute	Description
2400	Remote control unlock	UInt16	PRW	For control to be allowed, write these four numbers on this register in the order given below [1]. 2300 → 0 → 1600 → 1 [1] For control to be locked, write any value on this register. Control-lock status can be known by reading this register as shown below: 0: Control allowed 1: (default) Control locked

1. If order is wrong, the entire writing process should start from the beginning again.

Measurement Control

Register Number	Name	Format	Attribute	Description
2401	Sub-demand synchronization	UInt16	RW	By writing 1 on this register, the start time of sub-demand interval is synchronized with the current time. This register is auto-cleared internally.
2402	Demand reset	UInt16	RW	By writing a 1 to this register, the demand values are initialized (clear). This register is auto-cleared internally. Peak demand is not cleared by "Demand reset".
2403	Max/Min reset	UInt16	RW	By writing 1 on this register, the maximum/minimum values of Accura 3700 are cleared. This register is auto-cleared internally. Peak demand is cleared by "Max/Min reset".
2404	Energy reset	UInt16	RW	By writing 1 on this register, the energy values are cleared. This register is automatically set to zero.
2405	Demo mode	UInt16	RW	Demonstration mode. 0: (default) Not used demonstration mode. Normal operation mode by voltage and current sensing 1: 3-phase balance mode by internal lookup table 2: 3-phase unbalance mode by internal lookup table

Module Control

Module Control by ID

Register Number	Name	Format	Attribute	Description
52001	Read control of module ID 1	UInt16	R	When this register is read, control information of module ID 1 is updated. Bit.[15:8]: Module information update result 0: Fail 1: Invalid type 2: Success Bit.[7:0]: Module type 1: DIO 2: DI 3: DO 4: AI 5: AO 6: A4D2 7: A2D4 8: DC 9: RTD 10: ELD
52002-52031	Control of module ID 1			Control information of module ID 1. See "Module Control Details by type".
52032	Write control of module ID 1	UInt16	RW	In "Module Control Details", it is applied by setting the control and control mask each channel to 1 and inputting the module type in this register. Bit.[15:8]: Module applied result 0: Fail 1: Invalid type 2: Success Bit.[7:0]: Module type 1: DIO 2: DI 3: DO 4: AI 5: AO 6: A4D2 7: A2D4 8: DC 9: RTD 10: ELD
52033	Read control of module ID 2	UInt16	R	When this register is read, control information of module ID 2 is updated. See "Read control of module ID 1". (register 52001)
52034-52063	Control of module ID 2			Control information of Module ID 2. See "Module Control Details by type".
52064	Write control of module ID 2	UInt16	RW	If you enter the module type in this register, the module control is applied. See "Write control of module ID 1". (register 52032)
52065	Read control of module ID 3	UInt16	R	When this register is read, control information of module ID 3 is updated. See "Read control of module ID 1". (register 52001)
52066-52095	Control of module ID 3			Control information of Module ID 3. See "Module Control Details by type".
52096	Write control of module ID 3	UInt16	RW	If you enter the module type in this register, the module control is applied. See "Write control of module ID 1". (register 52032)
52097	Read control of module ID 4	UInt16	R	When this register is read, control information of module ID 4 is updated. See "Read control of module ID 1". (register 52001)
52098-52127	Control of module ID 4			Control information of Module ID 4. See "Module Control Details by type".

52128	Write control of module ID 4	UInt16	RW	If you enter the module type in this register, the module control is applied. See "Write control of module ID 1". (register 52032)
52129	Read control of module ID 5	UInt16	R	When this register is read, control information of module ID 5 is updated. See "Read control of module ID 1". (register 52001)
52130-52159	Control of module ID 5			Control information of Module ID 5. See "Module Control Details by type".
52160	Write control of module ID 5	UInt16	RW	If you enter the module type in this register, the module control is applied. See "Write control of module ID 1". (register 52032)
52161	Read control of module ID 6	UInt16	R	When this register is read, control information of module ID 6 is updated. See "Read control of module ID 1". (register 52001)
52162-52191	Control of module ID 6			Control information of Module ID 6. See "Module Control Details by type".
52192	Write control of module ID 6	UInt16	RW	If you enter the module type in this register, the module control is applied. See "Write control of module ID 1". (register 52032)
52193	Read control of module ID 7	UInt16	R	When this register is read, control information of module ID 7 is updated. See "Read control of module ID 1". (register 52001)
52194-52223	Control of module ID 7			Control information of Module ID 7. See "Module Control Details by type".
52224	Write control of module ID 7	UInt16	RW	If you enter the module type in this register, the module control is applied. See "Write control of module ID 1". (register 52032)
52225	Read control of module ID 8	UInt16	R	When this register is read, control information of module ID 8 is updated. See "Read control of module ID 1". (register 52001)
52226-52255	Control of module ID 8			Control information of Module ID 8. See "Module Control Details by type".
52256	Write control of module ID 8	UInt16	RW	If you enter the module type in this register, the module control is applied. See "Write control of module ID 1". (register 52032)
52257	Read control of module ID 9	UInt16	R	When this register is read, control information of module ID 9 is updated. See "Read control of module ID 1". (register 52001)
52258-52287	Control of module ID 9			Control information of Module ID 9. See "Module Control Details by type".
52288	Write control of module ID 9	UInt16	RW	If you enter the module type in this register, the module control is applied. See "Write control of module ID 1". (register 52032)

DIO Control Details

Offset Number	Name	Format	Attribute	Description
0	Control of	UInt16	RW	Output control of DO channel 1.

	DO channel 1			When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open
1	Control of DO channel 2	UInt16	RW	Output control of DO channel 2. See "Control of DO channel 1".
2-17	Reserved			
18	Control mask of DO channel 1	UInt16	RW	Control mask of DO channel 1. If 1 is written to this register, control is applied.
19	Control mask of DO channel 2	UInt16	RW	Control mask of DO channel 2. If 1 is written to this register, control is applied.

DO Control Details

Offset Number	Name	Format	Attribute	Description
0	Control of channel 1	UInt16	RW	Output control of DO channel 1. When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open
1	Control of channel 2	UInt16	RW	Output control of DO channel 2. See "Control of DO channel 1".
2	Control of channel 3	UInt16	RW	Output control of DO channel 3. See "Control of DO channel 1".
3	Control of channel 4	UInt16	RW	Output control of DO channel 4. See "Control of DO channel 1".
4	Control of channel 5	UInt16	RW	Output control of DO channel 5. See "Control of DO channel 1".
5	Control of channel 6	UInt16	RW	Output control of DO channel 6. See "Control of DO channel 1".
6-17	Reserved			
18	Control mask of channel 1	UInt16	RW	Control mask of DO channel 1. If 1 is written to this register, control is applied.
19	Control mask of channel 2	UInt16	RW	Control mask of DO channel 2. If 1 is written to this register, control is applied.
20	Control mask of channel 3	UInt16	RW	Control mask of DO channel 3. If 1 is written to this register, control is applied.
21	Control mask of channel 4	UInt16	RW	Control mask of DO channel 4. If 1 is written to this register, control is applied.
22	Control mask of channel 5	UInt16	RW	Control mask of DO channel 5. If 1 is written to this register, control is applied.
23	Control mask of channel 6	UInt16	RW	Control mask of DO channel 6. If 1 is written to this register, control is applied.

AO Control Details

Offset Number	Name	Format	Attribute	Description
0	Control of channel 1	Float32	RW	Output value of AO channel 1. (the value corresponding to the output current)
2	Control of channel 2	Float32	RW	Output value of AO channel 2. (the value corresponding to the output current)
4	Control of channel 3	Float32	RW	Output value of AO channel 3. (the value corresponding to the output current)
6	Control of channel 4	Float32	RW	Output value of AO channel 4. (the value corresponding to the output current)
8	Control of channel 5	Float32	RW	Output value of AO channel 5. (the value corresponding to the output current)
10	Control of channel 6	Float32	RW	Output value of AO channel 6. (the value corresponding to the output current)
12-17	Reserved			
18	Control mask of channel 1	UInt16	RW	Control mask of channel 1. If 1 is written to this register, control is applied.
19	Control mask of channel 2	UInt16	RW	Control mask of channel 2. If 1 is written to this register, control is applied.
20	Control mask of channel 3	UInt16	RW	Control mask of channel 3. If 1 is written to this register, control is applied.
21	Control mask of channel 4	UInt16	RW	Control mask of channel 4. If 1 is written to this register, control is applied.
22	Control mask of channel 5	UInt16	RW	Control mask of channel 5. If 1 is written to this register, control is applied.
23	Control mask of channel 6	UInt16	RW	Control mask of channel 6. If 1 is written to this register, control is applied.

A4D2 Control Details

Offset Number	Name	Format	Attribute	Description
0	Control of AO channel 1	Float32	RW	Output value of AO channel 1. (the value corresponding to the output current)
2	Control of AO channel 2	Float32	RW	Output value of AO channel 2. (the value corresponding to the output current)
4	Control of AO channel 3	Float32	RW	Output value of AO channel 3. (the value corresponding to the output current)
6	Control of AO channel 4	Float32	RW	Output value of AO channel 4. (the value corresponding to the output current)
8	Control of DO channel 1	UInt16	RW	Output control of DO channel 1. When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open
9	Control of DO channel 2	UInt16	RW	Output control of DO channel 2. See “Control of DO channel 1”.
10-17	Reserved			
18	Control mask of AO channel 1	UInt16	RW	Control mask of channel 1. If 1 is written to this register, control is applied.
19	Control mask of AO channel 2	UInt16	RW	Control mask of channel 2. If 1 is written to this register, control is applied.
20	Control mask of AO channel 3	UInt16	RW	Control mask of channel 3. If 1 is written to this register, control is applied.
21	Control mask of AO channel 4	UInt16	RW	Control mask of channel 4. If 1 is written to this register, control is applied.
22	Control mask of DO channel 1	UInt16	RW	Control mask of DO channel 1. If 1 is written to this register, control is applied.
23	Control mask of DO channel 2	UInt16	RW	Control mask of DO channel 2. If 1 is written to this register, control is applied.

A2D4 Control Details

Offset Number	Name	Format	Attribute	Description
0	Control of AO channel 1	Float32	RW	Output value of AO channel 1. (the value corresponding to the output current)
2	Control of AO channel 2	Float32	RW	Output value of AO channel 2. (the value corresponding to the output current)
4	Control of DO channel 1	UInt16	RW	Output control of DO channel 1. When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open
5	Control of DO channel 2	UInt16	RW	Output control of DO channel 2. See "Control of DO channel 1".
6	Control of DO channel 3	UInt16	RW	Output control of DO channel 3. See "Control of DO channel 1".
7	Control of DO channel 4	UInt16	RW	Output control of DO channel 4. See "Control of DO channel 1".
8-17	Reserved			
18	Control mask of AO channel 1	UInt16	RW	Control mask of channel 1. If 1 is written to this register, control is applied.
19	Control mask of AO channel 2	UInt16	RW	Control mask of channel 2. If 1 is written to this register, control is applied.
20	Control mask of DO channel 1	UInt16	RW	Control mask of DO channel 1. If 1 is written to this register, control is applied.
21	Control mask of DO channel 2	UInt16	RW	Control mask of DO channel 2. If 1 is written to this register, control is applied.
22	Control mask of DO channel 3	UInt16	RW	Control mask of DO channel 3. If 1 is written to this register, control is applied.
23	Control mask of DO channel 4	UInt16	RW	Control mask of DO channel 4. If 1 is written to this register, control is applied.

DC Control Details

Offset Number	Name	Format	Attribute	Description
0	Control of DO channel	UInt16	RW	Output control of DO channel. When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open
1-17	Reserved			
18	Control mask of DO channel	UInt16	RW	Control mask of DO channel. If 1 is written to this register, control is applied.

ELD Control Details

Offset Number	Name	Format	Attribute	Description
0	Control of	UInt16	RW	Output control of DO channel.

	DO channel			When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open
1-17	Reserved			
18	Control mask of DO channel	UInt16	RW	Control mask of DO channel. If 1 is written to this register, control is applied.

Module Direct Control

DIO Direct Control

Register Number	Name	Format	Attribute	Description
53001	Control of DO channel 1 in module ID 1	UInt16	W	Output control of DO channel 1 in module ID 1. When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open
53002	Control of DO channel 2 in module ID 1	UInt16	W	Output control of DO channel 2 in module ID 1. See "Control of DO channel 1 in module ID 1".
53003-53004	Control of module ID 2			Output control of per DO channel in module ID 2. See Control of module ID 1 (register 53001-53002)
53005-53006	Control of module ID 3			Output control of per DO channel in module ID 3. See Control of module ID 1 (register 53001-53002)
53007-53008	Control of module ID 4			Output control of per DO channel in module ID 4. See Control of module ID 1 (register 53001-53002)
53009-53010	Control of module ID 5			Output control of per DO channel in module ID 5. See Control of module ID 1 (register 53001-53002)
53011-53012	Control of module ID 6			Output control of per DO channel in module ID 6. See Control of module ID 1 (register 53001-53002)
53013-53014	Control of module ID 7			Output control of per DO channel in module ID 7. See Control of module ID 1 (register 53001-53002)
53015-53016	Control of module ID 8			Output control of per DO channel in module ID 8. See Control of module ID 1 (register 53001-53002)
53017-53018	Control of module ID 9			Output control of per DO channel in module ID 9. See Control of module ID 1 (register 53001-53002)
53019	Control result in module ID 1	UInt16	R	Control result in module ID 1. Bit.[15:12]: Receiving control request 0: Fail 1: ID, Type input error 2: Success 3: Channel count error Bit.[11:8]: Control result 0: Fail 1: Invalid input

				2: Success Bit.[7:0]: Module type 1: DIO 2: DI 3: DO 4: AI 5: AO 6: A4D2 7: A2D4 8: DC 9: RTD 10: ELD
53020	Status of DO channel 1 in module ID 1	UInt16	R	Output status of DO channel 1 in module ID 1. When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open
53021	Status of DO channel 2 in module ID 1	UInt16	R	Output status of DO channel 2 in module ID 1. See "Status of DO channel 1 in module ID 1".
53022-53024	Control result and status in module ID 2			Control result and status in module ID 2. See Control result and status in module ID 1. (register 53019-53021)
53025-53027	Control result and status in module ID 3			Control result and status in module ID 3. See Control result and status in module ID 1. (register 53019-53021)
53028-53030	Control result and status in module ID 4			Control result and status in module ID 4. See Control result and status in module ID 1. (register 53019-53021)
53031-53033	Control result and status in module ID 5			Control result and status in module ID 5. See Control result and status in module ID 1. (register 53019-53021)
53034-53036	Control result and status in module ID 6			Control result and status in module ID 6. See Control result and status in module ID 1. (register 53019-53021)
53037-53039	Control result and status in module ID 7			Control result and status in module ID 7. See Control result and status in module ID 1. (register 53019-53021)
53040-53042	Control result and status in module ID 8			Control result and status in module ID 8. See Control result and status in module ID 1. (register 53019-53021)
53043-53045	Control result and status in module ID 9			Control result and status in module ID 9. See Control result and status in module ID 1. (register 53019-53021)

DO Direct Control

Register Number	Name	Format	Attribute	Description
53051	Control of channel 1 in module ID 1	UInt16	W	Output control of DO channel 1 in module ID 1. When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open
53052	Control of channel 2 in module ID 1	UInt16	W	Output control of DO channel 2 in module ID 1. See "Control of DO channel 1 in module ID 1".
53053	Control of channel 3 in module ID 1	UInt16	W	Output control of DO channel 3 in module ID 1. See "Control of DO channel 1 in module ID 1".
53054	Control of channel 4 in module ID 1	UInt16	W	Output control of DO channel 4 in module ID 1. See "Control of DO channel 1 in module ID 1".
53055	Control of channel 5 in module ID 1	UInt16	W	Output control of DO channel 5 in module ID 1. See "Control of DO channel 1 in module ID 1".
53056	Control of channel 6 in module ID 1	UInt16	W	Output control of DO channel 6 in module ID 1. See "Control of DO channel 1 in module ID 1".
53057-53062	Control of module ID 2			Output control of per DO channel in module ID 2. See Control of module ID 1 (register 53051-53056)
53063-53068	Control of module ID 3			Output control of per DO channel in module ID 3. See Control of module ID 1 (register 53051-53056)
53069-53074	Control of module ID 4			Output control of per DO channel in module ID 4. See Control of module ID 1 (register 53051-53056)
53075-53080	Control of module ID 5			Output control of per DO channel in module ID 5. See Control of module ID 1 (register 53051-53056)
53081-53086	Control of module ID 6			Output control of per DO channel in module ID 6. See Control of module ID 1 (register 53051-53056)
53087-53092	Control of module ID 7			Output control of per DO channel in module ID 7. See Control of module ID 1 (register 53051-53056)
53093-53098	Control of module ID 8			Output control of per DO channel in module ID 8. See Control of module ID 1 (register 53051-53056)
53099-53104	Control of module ID 9			Output control of per DO channel in module ID 9. See Control of module ID 1 (register 53051-53056)
53105	Control result in module ID 1	UInt16	R	Control result in module ID 1. Bit.[15:12]: Receiving control request 0: Fail 1: ID, Type input error 2: Success 3: Channel count error Bit.[11:8]: Control result 0: Fail 1: Invalid input 2: Success Bit.[7:0]: Module type 1: DIO 2: DI 3: DO 4: AI 5: AO 6: A4D2 7: A2D4 8: DC 9: RTD 10: ELD
53106	Status of channel 1	UInt16	R	Output status of DO channel 1 in module ID 1.

	in module ID 1			When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open
53107	Status of channel 2 in module ID 1	UInt16	R	Output status of DO channel 2 in module ID 1. See "Status of DO channel 1 in module ID 1".
53108	Status of channel 3 in module ID 1	UInt16	R	Output status of DO channel 3 in module ID 1. See "Status of DO channel 1 in module ID 1".
53109	Status of channel 4 in module ID 1	UInt16	R	Output status of DO channel 4 in module ID 1. See "Status of DO channel 1 in module ID 1".
53110	Status of channel 5 in module ID 1	UInt16	R	Output status of DO channel 5 in module ID 1. See "Status of DO channel 1 in module ID 1".
53111	Status of channel 6 in module ID 1	UInt16	R	Output status of DO channel 6 in module ID 1. See "Status of DO channel 1 in module ID 1".
53112-53118	Control result and status in module ID 2			Control result and status in module ID 2. See Control result and status in module ID 1. (register 53105-53111)
53119-53125	Control result and status in module ID 3			Control result and status in module ID 3. See Control result and status in module ID 1. (register 53105-53111)
53126-53132	Control result and status in module ID 4			Control result and status in module ID 4. See Control result and status in module ID 1. (register 53105-53111)
53133-53139	Control result and status in module ID 5			Control result and status in module ID 5. See Control result and status in module ID 1. (register 53105-53111)
53140-53146	Control result and status in module ID 6			Control result and status in module ID 6. See Control result and status in module ID 1. (register 53105-53111)
53147-53153	Control result and status in module ID 7			Control result and status in module ID 7. See Control result and status in module ID 1. (register 53105-53111)
53154-53160	Control result and status in module ID 8			Control result and status in module ID 8. See Control result and status in module ID 1. (register 53105-53111)
53161-53167	Control result and status in module ID 9			Control result and status in module ID 9. See Control result and status in module ID 1. (register 53105-53111)

AO Direct Control

Register Number	Name	Format	Attribute	Description
53201	Control of channel 1 in module ID 1	Float32	W	Output value of AO channel 1 in module ID 1. (the value corresponding to the output current)
53203	Control of channel 2 in module ID 1	Float32	W	Output value of AO channel 2 in module ID 1. (the value corresponding to the output current)
53205	Control of channel 3 in module ID 1	Float32	W	Output value of AO channel 3 in module ID 1. (the value corresponding to the output current)
53207	Control of channel 4 in module ID 1	Float32	W	Output value of AO channel 4 in module ID 1. (the value corresponding to the output current)
53209	Control of channel 5 in module ID 1	Float32	W	Output value of AO channel 5 in module ID 1. (the value corresponding to the output current)
53211	Control of channel 6 in module ID 1	Float32	W	Output value of AO channel 6 in module ID 1. (the value corresponding to the output current)
53213-53224	Control of module ID 2			Output control of per AO channel in module ID 2. See Control of module ID 1 (register 53201-53212)
53225-53236	Control of module ID 3			Output control of per AO channel in module ID 3. See Control of module ID 1 (register 53201-53212)
53237-53248	Control of module ID 4			Output control of per AO channel in module ID 4. See Control of module ID 1 (register 53201-53212)
53249-53260	Control of module ID 5			Output control of per AO channel in module ID 5. See Control of module ID 1 (register 53201-53212)
53261-53272	Control of module ID 6			Output control of per AO channel in module ID 6. See Control of module ID 1 (register 53201-53212)
53273-53284	Control of module ID 7			Output control of per AO channel in module ID 7. See Control of module ID 1 (register 53201-53212)
53285-53296	Control of module ID 8			Output control of per AO channel in module ID 8. See Control of module ID 1 (register 53201-53212)
53297-53308	Control of module ID 9			Output control of per AO channel in module ID 9. See Control of module ID 1 (register 53201-53212)
53309	Control result in module ID 1	UInt16	R	Control result in module ID 1. Bit.[15:12]: Receiving control request 0: Fail 1: ID, Type input error 2: Success 3: Channel count error Bit.[11:8]: Control result 0: Fail 1: Invalid input 2: Success Bit.[7:0]: Module type 1: DIO 2: DI 3: DO 4: AI 5: AO 6: A4D2 7: A2D4 8: DC 9: RTD 10: ELD
53310	Status of channel 1 in module ID 1	Float32	R	Status of AO channel 1 in module ID 1. (Output value)
53312	Status of channel 2 in module ID 1	Float32	R	Status of AO channel 2 in module ID 1. (Output value)

53314	Status of channel 3 in module ID 1	Float32	R	Status of AO channel 3 in module ID 1. (Output value)
53316	Status of channel 4 in module ID 1	Float32	R	Status of AO channel 4 in module ID 1. (Output value)
53318	Status of channel 5 in module ID 1	Float32	R	Status of AO channel 5 in module ID 1. (Output value)
53320	Status of channel 6 in module ID 1	Float32	R	Status of AO channel 6 in module ID 1. (Output value)
53322-53334	Control result and status in module ID 2			Control result and status in module ID 2. See Control result and status in module ID 1. (register 53309-53321)
53335-53347	Control result and status in module ID 3			Control result and status in module ID 3. See Control result and status in module ID 1. (register 53309-53321)
53348-53360	Control result and status in module ID 4			Control result and status in module ID 4. See Control result and status in module ID 1. (register 53309-53321)
53361-53373	Control result and status in module ID 5			Control result and status in module ID 5. See Control result and status in module ID 1. (register 53309-53321)
53374-53386	Control result and status in module ID 6			Control result and status in module ID 6. See Control result and status in module ID 1. (register 53309-53321)
53387-53399	Control result and status in module ID 7			Control result and status in module ID 7. See Control result and status in module ID 1. (register 53309-53321)
53400-53412	Control result and status in module ID 8			Control result and status in module ID 8. See Control result and status in module ID 1. (register 53309-53321)
53413-53425	Control result and status in module ID 9			Control result and status in module ID 9. See Control result and status in module ID 1. (register 53309-53321)

A4D2 Direct Control

Register Number	Name	Format	Attribute	Description
53501	Control of AO channel 1 in module ID 1	Float32	W	Output value of AO channel 1 in module ID 1. (the value corresponding to the output current)
53503	Control of AO channel 2 in module ID 1	Float32	W	Output value of AO channel 2 in module ID 1. (the value corresponding to the output current)
53505	Control of AO channel 3 in module ID 1	Float32	W	Output value of AO channel 3 in module ID 1. (the value corresponding to the output current)
53507	Control of AO channel 4 in module ID 1	Float32	W	Output value of AO channel 4 in module ID 1. (the value corresponding to the output current)
53509	Control of DO channel 1 in module ID 1	UInt16	W	Output control of DO channel 1 in module ID 1. When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open
53510	Control of DO channel 2 in module ID 1	UInt16	W	Output control of DO channel 2 in module ID 1. See "Control of DO channel 1 in module ID 1".
53511-53520	Control of module ID 2			Output control of per channel in module ID 2. See Control of module ID 1 (register 53501-53510)
53521-53530	Control of module ID 3			Output control of per channel in module ID 3. See Control of module ID 1 (register 53501-53510)
53531-53540	Control of module ID 4			Output control of per channel in module ID 4. See Control of module ID 1 (register 53501-53510)
53541-53550	Control of module ID 5			Output control of per channel in module ID 5. See Control of module ID 1 (register 53501-53510)
53551-53560	Control of module ID 6			Output control of per channel in module ID 6. See Control of module ID 1 (register 53501-53510)
53561-53570	Control of module ID 7			Output control of per channel in module ID 7. See Control of module ID 1 (register 53501-53510)
53571-53580	Control of module ID 8			Output control of per channel in module ID 8. See Control of module ID 1 (register 53501-53510)
53581-53590	Control of module ID 9			Output control of per channel in module ID 9. See Control of module ID 1 (register 53501-53510)
53591	Control result in module ID 1	UInt16	R	Control result in module ID 1. Bit.[15:12]: Receiving control request 0: Fail 1: ID, Type input error 2: Success 3: Channel count error Bit.[11:8]: Control result 0: Fail 1: Invalid input 2: Success Bit.[7:0]: Module type

				1: DIO 2: DI 3: DO 4: AI 5: AO 6: A4D2 7: A2D4 8: DC 9: RTD 10: ELD
53592	Status of AO channel 1 in module ID 1	Float32	R	Status of AO channel 1 in module ID 1. (Output value)
53594	Status of AO channel 2 in module ID 1	Float32	R	Status of AO channel 2 in module ID 1. (Output value)
53596	Status of AO channel 3 in module ID 1	Float32	R	Status of AO channel 3 in module ID 1. (Output value)
53598	Status of AO channel 4 in module ID 1	Float32	R	Status of AO channel 4 in module ID 1. (Output value)
53600	Status of DO channel 1 in module ID 1	UInt16	R	Output status of DO channel 1 in module ID 1. When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open
53601	Status of DO channel 2 in module ID 1	UInt16	R	Output status of DO channel 2 in module ID 1. See “Status of DO channel 1 in module ID 1”.
53602-53612	Control result and status in module ID 2			Control result and status in module ID 2. See Control result and status in module ID 1. (register 53591-53601)
53613-53623	Control result and status in module ID 3			Control result and status in module ID 3. See Control result and status in module ID 1. (register 53591-53601)
53624-53634	Control result and status in module ID 4			Control result and status in module ID 4. See Control result and status in module ID 1. (register 53591-53601)
53635-53645	Control result and status in module ID 5			Control result and status in module ID 5. See Control result and status in module ID 1. (register 53591-53601)
53646-53656	Control result and status in module ID 6			Control result and status in module ID 6. See Control result and status in module ID 1. (register 53591-53601)
53657-53667	Control result and status in module ID 7			Control result and status in module ID 7. See Control result and status in module ID 1. (register 53591-53601)
53668-53678	Control result and status in module ID 8			Control result and status in module ID 8. See Control result and status in module ID 1. (register 53591-53601)
53679-53789	Control result and status in module ID 9			Control result and status in module ID 9. See Control result and status in module ID 1. (register 53591-53601)

A2D4 Direct Control

Register Number	Name	Format	Attribute	Description
53701	Control of AO channel 1 in module ID 1	Float32	W	Output value of AO channel 1 in module ID 1. (the value corresponding to the output current)
53703	Control of AO channel 2 in module ID 1	Float32	W	Output value of AO channel 2 in module ID 1. (the value corresponding to the output current)
53705	Control of DO channel 1 in module ID 1	Float32	W	Output control of DO channel 1 in module ID 1. When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open
53706	Control of DO channel 2 in module ID 1	Float32	W	Output control of DO channel 2 in module ID 1. See "Control of DO channel 1 in module ID 1".
53707	Control of DO channel 3 in module ID 1	UInt16	W	Output control of DO channel 3 in module ID 1. See "Control of DO channel 1 in module ID 1".
53708	Control of DO channel 4 in module ID 1	UInt16	W	Output control of DO channel 4 in module ID 1. See "Control of DO channel 1 in module ID 1".
53709-53716	Control of module ID 2			Output control of per channel in module ID 2. See Control of module ID 1 (register 53701-53708)
53717-53724	Control of module ID 3			Output control of per channel in module ID 3. See Control of module ID 1 (register 53701-53708)
53725-53732	Control of module ID 4			Output control of per channel in module ID 4. See Control of module ID 1 (register 53701-53708)
53733-53740	Control of module ID 5			Output control of per channel in module ID 5. See Control of module ID 1 (register 53701-53708)
53741-53748	Control of module ID 6			Output control of per channel in module ID 6. See Control of module ID 1 (register 53701-53708)
53749-53756	Control of module ID 7			Output control of per channel in module ID 7. See Control of module ID 1 (register 53701-53708)
53757-53764	Control of module ID 8			Output control of per channel in module ID 8. See Control of module ID 1 (register 53701-53708)
53765-53772	Control of module ID 9			Output control of per channel in module ID 9. See Control of module ID 1 (register 53701-53708)
53773	Control result in module ID 1	UInt16	R	Control result in module ID 1. Bit.[15:12]: Receiving control request 0: Fail 1: ID, Type input error 2: Success 3: Channel count error Bit.[11:8]: Control result 0: Fail 1: Invalid input 2: Success Bit.[7:0]: Module type

				1: DIO 2: DI 3: DO 4: AI 5: AO 6: A4D2 7: A2D4 8: DC 9: RTD 10: ELD
53774	Status of AO channel 1 in module ID 1	Float32	R	Status of AO channel 1 in module ID 1. (Output value)
53776	Status of AO channel 2 in module ID 1	Float32	R	Status of AO channel 2 in module ID 1. (Output value)
53778	Status of DO channel 1 in module ID 1	Float32	R	Output status of DO channel 1 in module ID 1. When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open
53779	Status of DO channel 2 in module ID 1	Float32	R	Output status of DO channel 2 in module ID 1. See "Status of DO channel 1 in module ID 1".
53780	Status of DO channel 3 in module ID 1	UInt16	R	Output status of DO channel 3 in module ID 1. See "Status of DO channel 1 in module ID 1".
53781	Status of DO channel 4 in module ID 1	UInt16	R	Output status of DO channel 4 in module ID 1. See "Status of DO channel 1 in module ID 1".
53782- 53790	Control result and status in module ID 2			Control result and status in module ID 2. See Control result and status in module ID 1. (register 53773-53781)
53791- 53799	Control result and status in module ID 3			Control result and status in module ID 3. See Control result and status in module ID 1. (register 53773-53781)
53800- 53808	Control result and status in module ID 4			Control result and status in module ID 4. See Control result and status in module ID 1. (register 53773-53781)
53809- 53817	Control result and status in module ID 5			Control result and status in module ID 5. See Control result and status in module ID 1. (register 53773-53781)
53718- 53726	Control result and status in module ID 6			Control result and status in module ID 6. See Control result and status in module ID 1. (register 53773-53781)
53727- 53735	Control result and status in module ID 7			Control result and status in module ID 7. See Control result and status in module ID 1. (register 53773-53781)
53736- 53744	Control result and status in module ID 8			Control result and status in module ID 8. See Control result and status in module ID 1. (register 53773-53781)
53745- 53753	Control result and status in module ID 9			Control result and status in module ID 9. See Control result and status in module ID 1. (register 53773-53781)

DC Direct Control

Register Number	Name	Format	Attribute	Description
53901	Control of DO channel in module ID 1	UInt16	W	Output control of DO channel in module ID 1. When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open
53902	Control of DO channel in module ID 2	UInt16	W	Output control of DO channel in module ID 2. See Control of module ID 1 (register 53901)
53903	Control of DO channel in module ID 3	UInt16	W	Output control of DO channel in module ID 3. See Control of module ID 1 (register 53901)
53904	Control of DO channel in module ID 4	UInt16	W	Output control of DO channel in module ID 4. See Control of module ID 1 (register 53901)
53905	Control of DO channel in module ID 5	UInt16	W	Output control of DO channel in module ID 5. See Control of module ID 1 (register 53901)
53906	Control of DO channel in module ID 6	UInt16	W	Output control of DO channel in module ID 6. See Control of module ID 1 (register 53901)
53907	Control of DO channel in module ID 7	UInt16	W	Output control of DO channel in module ID 7. See Control of module ID 1 (register 53901)
53908	Control of DO channel in module ID 8	UInt16	W	Output control of DO channel in module ID 8. See Control of module ID 1 (register 53901)
53909	Control of DO channel in module ID 9	UInt16	W	Output control of DO channel in module ID 9. See Control of module ID 1 (register 53901)
53910	Control result in module ID 1	UInt16	R	Control result in module ID 1. Bit.[15:12]: Receiving control request 0: Fail 1: ID, Type input error 2: Success 3: Channel count error Bit.[11:8]: Control result 0: Fail 1: Invalid input 2: Success Bit.[7:0]: Module type 1: DIO 2: DI 3: DO 4: AI 5: AO 6: A4D2 7: A2D4 8: DC 9: RTD 10: ELD
53911	Status of DO channel in module ID 1	UInt16	R	Output status of DO channel in module ID 1. When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open

53912-53913	Control result and status in module ID 2			Control result and status in module ID 2. See Control result and status in module ID 1. (register 53910-53911)
53914-53915	Control result and status in module ID 3			Control result and status in module ID 3. See Control result and status in module ID 1. (register 53910-53911)
53916-53917	Control result and status in module ID 4			Control result and status in module ID 4. See Control result and status in module ID 1. (register 53910-53911)
53918-53919	Control result and status in module ID 5			Control result and status in module ID 5. See Control result and status in module ID 1. (register 53910-53911)
53920-53921	Control result and status in module ID 6			Control result and status in module ID 6. See Control result and status in module ID 1. (register 53910-53911)
53922-53923	Control result and status in module ID 7			Control result and status in module ID 7. See Control result and status in module ID 1. (register 53910-53911)
53924-53925	Control result and status in module ID 8			Control result and status in module ID 8. See Control result and status in module ID 1. (register 53910-53911)
53926-53927	Control result and status in module ID 9			Control result and status in module ID 9. See Control result and status in module ID 1. (register 53910-53911)

ELD Direct Control

Register Number	Name	Format	Attribute	Description
54001	Control of DO channel in module ID 1	UInt16	W	Output control of DO channel in module ID 1. When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open
54002	Control of DO channel in module ID 2	UInt16	W	Output control of DO channel in module ID 2. See Control of module ID 1 (register 54001)
54003	Control of DO channel in module ID 3	UInt16	W	Output control of DO channel in module ID 3. See Control of module ID 1 (register 54001)
54004	Control of DO channel in module ID 4	UInt16	W	Output control of DO channel in module ID 4. See Control of module ID 1 (register 54001)
54005	Control of DO channel in module ID 5	UInt16	W	Output control of DO channel in module ID 5. See Control of module ID 1 (register 54001)
54006	Control of DO channel in module ID 6	UInt16	W	Output control of DO channel in module ID 6. See Control of module ID 1 (register 54001)
54007	Control of DO channel in module ID 7	UInt16	W	Output control of DO channel in module ID 7. See Control of module ID 1 (register 54001)
54008	Control of DO channel in module ID 8	UInt16	W	Output control of DO channel in module ID 8. See Control of module ID 1 (register 54001)
54009	Control of DO channel in module ID 9	UInt16	W	Output control of DO channel in module ID 9. See Control of module ID 1 (register 54001)
54010	Control result in module ID 1	UInt16	R	Control result in module ID 1. Bit.[15:12]: Receiving control request 0: Fail 1: ID, Type input error 2: Success 3: Channel count error Bit.[11:8]: Control result 0: Fail 1: Invalid input 2: Success Bit.[7:0]: Module type 1: DIO 2: DI 3: DO 4: AI 5: AO 6: A4D2 7: A2D4 8: DC 9: RTD 10: ELD
54011	Status of DO channel in module ID 1	UInt16	R	Output status of DO channel in module ID 1. When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open

54012-54013	Control result and status in module ID 2			Control result and status in module ID 2. See Control result and status in module ID 1. (register 54010-54011)
54014-54015	Control result and status in module ID 3			Control result and status in module ID 3. See Control result and status in module ID 1. (register 54010-54011)
54016-54017	Control result and status in module ID 4			Control result and status in module ID 4. See Control result and status in module ID 1. (register 54010-54011)
54018-54019	Control result and status in module ID 5			Control result and status in module ID 5. See Control result and status in module ID 1. (register 54010-54011)
54020-54021	Control result and status in module ID 6			Control result and status in module ID 6. See Control result and status in module ID 1. (register 54010-54011)
54022-54023	Control result and status in module ID 7			Control result and status in module ID 7. See Control result and status in module ID 1. (register 54010-54011)
54024-54025	Control result and status in module ID 8			Control result and status in module ID 8. See Control result and status in module ID 1. (register 54010-54011)
54026-54027	Control result and status in module ID 9			Control result and status in module ID 9. See Control result and status in module ID 1. (register 54010-54011)

Measurement Data Category

Measurement Overview

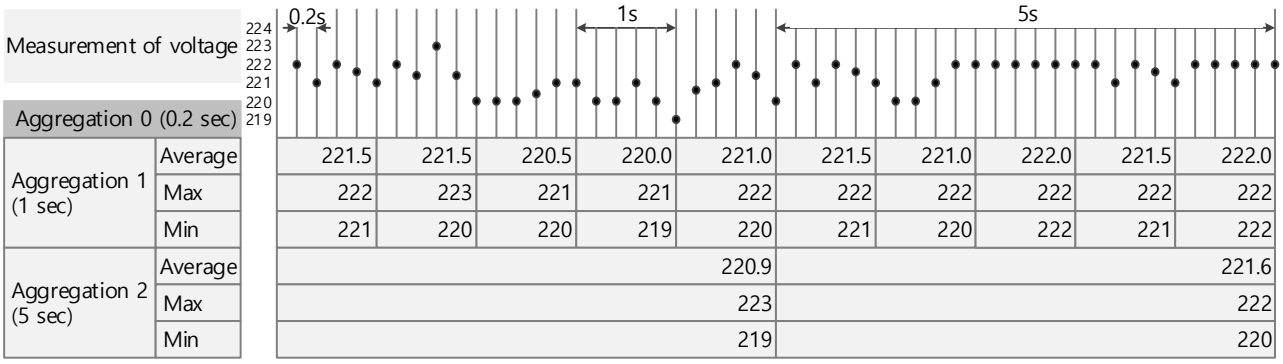
In Accura 3700 device, basic measurement data is obtained by processing of sensed voltage and current for every 0.2 second.

Based on this 0.2 second data array, aggregation values during longer interval than 0.2 second are obtained as shown in figure 2.7. This figure illustrates the case that aggregation interval is 1 second and 5 seconds for each.

The aggregation values are average and max/min with time-stamp. Average and max/min with time-stamp are generated for each aggregation. Average is the mean value of data array during the aggregation interval. Max/Min is the maximum / minimum value of data array of which resolution is 0.2 second during the aggregation interval.

The provided time of max/min means the time difference between the start time of the aggregation interval and the real time of max/min data during the aggregation interval. Therefore the real time can be obtained by summing the start time of the aggregation interval and the real time of max data.

Fig 2.7 Aggregation of measured data



Aggregation 0 (0.2 sec)										
Aggregation 1 (1 sec)	Average	221.5	221.5	220.5	220.0	221.0	221.5	221.0	222.0	221.5	222.0
	Max	222	223	221	221	222	222	222	222	222	222
	Min	221	220	220	219	220	221	220	222	221	222
Aggregation 2 (5 sec)	Average					220.9					221.6
	Max					223					222
	Min					219					220

Fixed Aggregation

Accura 3700 basically provides six fixed Aggregation intervals [1 second, 5 seconds, 1 minute, 5 minutes, 1 hour, 6 hours] fixed aggregation has a fixed offset time of zero for the start of the aggregation interval. If you want to set the offset time to a value other than 0, use the following customed aggregation.

Customed Aggregation

Accura 3700 provides five customed aggregation that allow the user to arbitrarily set the offset interval for the aggregation interval and the interval start.

Event Aggregation

When an active event is detected, 3 frame [Frame at the time of occurrence / 0.2 second before frame / 0.2 second after frame] measurement data is indexed into "Aggregation 200" and kept separately. It is possible to collect the stored event aggregation data [Measurement data / 1-cycle RMS voltage] and analyze the situation before and after the event occurs.

Aggregation Data Collect

When you select an aggregation, the selected aggregation data is collected through the Modbus map.
Since the aggregation processed data is stored in circular buffer of Accura 3700 for a certain period of time, it is possible to collect the aggregation measurement values with more flexibility in time.
The circular buffer size for each aggregation is as follows, and the index can easily be judged by the recent index because it cycles to the valid range 0 - 4294967295 larger than the buffer size.

Aggregation name	Aggregation interval	Buffer length	Buffering time	Circular index
Fixed Aggregation				
Aggregation 0	0.2 second (base)	251	60 seconds	0 - 4,294,967,295
Aggregation 1	1 second	61	32 seconds	0 - 4,294,967,295
Aggregation 2	5 seconds	13	60 seconds	0 - 4,294,967,295
Aggregation 3	1 minute	13	12 minutes	0 - 4,294,967,295
Aggregation 4	5 minutes	13	50 minutes	0 - 4,294,967,295
Aggregation 5	1 hour	13	10 hours	0 - 4,294,967,295
Aggregation 6	6 hours	13	60 hours	0 - 4,294,967,295
Customed Aggregation				
Aggregation 11	default 3 seconds	29	66 seconds	0 - 4,294,967,295
Aggregation 12	default 15 minutes	13	180 minutes	0 - 4,294,967,295
Aggregation 13	default 2 hours	13	20 hours	0 - 4,294,967,295
Aggregation 14	default 12 hours	13	120 hours	0 - 4,294,967,295
Aggregation 15	default 1 day	13	10 days	0 - 4,294,967,295
Event Aggregation				
Aggregation 200	0.6 seconds	507	-	0 - 4,294,967,295

Measurement Map Summary

Register Number	Name	Format	Attribute	Description
11001	Aggregation selection	UInt16	PRW	Selection of measurement data aggregation. 0: Data of measurement interval 0.2 [sec] 1: (default) Aggregation 1 (1 sec), Max/Min included 2: Aggregation 2 (5 sec), Max/Min included 3: Aggregation 3 (1 min), Max/Min included 4: Aggregation 4 (5 min), Max/Min included 5: Aggregation 5 (1 hour), Max/Min included 6: Aggregation 6 (6 hours), Max/Min included 11: Aggregation 11 (default 3 sec), Max/Min included 12: Aggregation 12 (default 15 min), Max/Min included 13: Aggregation 13 (default 2 hours), Max/Min included 14: Aggregation 14(default 12 hours), Max/Min included 15: Aggregation 15 (default 1 day), Max/Min included 200: Event Aggregation, Max/Min included
10002	Buffer size	UInt16	PR	Number of buffers in the selected aggregation.
11003	Index selection	UInt32	PRW	If the selected buffer index is out of the valid buffer index due to buffer length limitation of the corresponding aggregation, the data of the selected buffer index is obsolete and cannot be collected. Valid range: 0 - 4,294,967,295 Default: 0 (Invalid)
11005	Index selection update mode	UInt16	PRW	0: Fixed Fetch data corresponding to index selection when reading fetch data. The value of the index selection does not change after reading the fetch data. 1: Newest When reading the fetch data, change the index selection value to the latest index and fetch the data. 2: Auto increment When reading the fetch data, if the index selection value is within the valid range, increment the index selection value by 1 after fetching the data. If the index selection value is smaller than the valid range, the data is fetched by changing to the minimum value of valid range.
11006	Buffered data count	UInt16	PR	Total number of buffered data.
11007	Oldest index	UInt32	PR	Oldest buffer index among buffered data. Valid range: 0 - 4,294,967,295
11009	Newest index	UInt32	PR	Latest buffer index among buffered data. Valid range: 0 - 4,294,967,295
11011	Fetch data	UInt16	PR	When this register is read, the measurement data is updated according to the buffer index selection and the index selection update mode. 0: Fail (Fetched index maintains the previous value) 1: Success, (Current index displayed in Fetched index)
11012	Remaining data count	UInt16	PR	The number of data indexes remaining in the buffer since the read measurement data.
11013	Fetched index	UInt32	PR	Buffer index of updated measurement data.
11015	Validity of Voltage/Current measurement	UInt16	PR	Measurement data validity of Accura 3700 voltage/current. 0: Invalid 1: Valid

11016	Validity of module ID 1 measurement	UInt16	PR	Measurement data validity of Accura 3700 Module ID 1. 0: Invalid 1: Valid
11017	Validity of module ID 2 measurement	UInt16	PR	Measurement data validity of Accura 3700 Module ID 2. 0: Invalid 1: Valid
…				
11024	Validity of module ID 9 measurement	UInt16	PR	Measurement data validity of Accura 3700 Module ID 9. 0: Invalid 1: Valid
11025	Type of module ID 1	UInt16	PR	Type of Accura 3700 Module ID 1. 1: DIO 2: DI 3: DO 4: AI 5: AO 6: A4D2 7: A2D4 8: DC 9: RTD 10: ELD
11026	Type of module ID 2	UInt16	PR	Type of Accura 3700 Module ID 2. 1: DIO 2: DI 3: DO 4: AI 5: AO 6: A4D2 7: A2D4 8: DC 9: RTD 10: ELD
…				
11033	Type of module ID 9	UInt16	PR	Type of Accura 3700 Module ID 9. 1: DIO 2: DI 3: DO 4: AI 5: AO 6: A4D2 7: A2D4 8: DC 9: RTD 10: ELD
11034-11035	Start time of selected aggregation	UInt32	PR	Aggregation interval start time of selected buffer (UTC).
11036	millisecond part of start time	UInt16	PR	Aggregation interval start time. (millisecond part) Valid range: 0 - 999 [ms]
11037-11038	End time of selected aggregation	UInt32	PR	Aggregation interval end time of selected buffer (UTC).
11039	millisecond part of end time	UInt16	PR	Aggregation interval end time. (millisecond part) Valid range: 0 - 999 [ms]
11040-11100	Reserved			
11101-12100	Voltage/Current measurement data		PR	Voltage/Current measurement data. See "Voltage/Current Measurement Data". Used when Aggregation selection is 0 - 15 or 200.
12101-12200	Module measurement data of ID 1		PR	Measurement data of module ID 1. See "Module Data Details by type". Used when Aggregation selection is 0 - 15 or 200.
12201-12900	Module measurement data of ID 2		PR	Measurement data of module ID 2. See "Module Data Details by type". Used when Aggregation selection is 0 - 15 or 200.
…				
12901-13000	Module measurement data of ID 9		PR	Measurement data of module ID 9. See "Module Data Details by type". Used when Aggregation selection is 0 - 15 or 200.
13001-	Voltage/Current		PR	Voltage/Current measurement max/min data

14000	max/min data			See "Voltage/Current Measurement Max/Min Data". Used when Aggregation selection is 0 - 15 or 200.
14001-15000	Voltage/Current max/min time-stamp		PR	Voltage/Current measurement max/min time-stamp See "Voltage/Current Measurement Max/Min Time-Stamp".
15001-15200	Module max/min data of ID 1		PR	Max/Min data and time-stamp of module ID 1. See "Module Max/Min Data With Time-Stamp Details by type". Used when Aggregation selection is 0 - 15 or 200.
15201-15400	Module max/min data of ID 2		PR	Max/Min data and time-stamp of module ID 2. See "Module Max/Min Data With Time-Stamp Details". Used when Aggregation selection is 0 - 15 or 200.
...				
16601-16800	Module max/min data of ID 9		PR	Max/Min data and time-stamp of module ID 9. See "Module Max/Min Data With Time-Stamp Details by type". Used when Aggregation selection is 0 - 15 or 200.

Voltage/Current Measurement Data

This map provides Accura 3700 voltage/current measurement data for the selected aggregation section.

Register Number	Name	Format	Attribute	Description
11101	Voltage Van	Float32	PR	Line to neutral voltage between phase A and neutral. Unit [V]
11103	Voltage Vbn	Float32	PR	Line to neutral voltage between phase B and neutral. Unit [V]
11105	Voltage Vcn	Float32	PR	Line to neutral voltage between phase C and neutral. Unit [V]
11107	Voltage Vavg_ln	Float32	PR	Average of 3 line to neutral voltages Van, Vbn, Vcn. Unit [V]
11109	Current Ia	Float32	PR	Current of phase A. Unit [A]
11111	Current Ib	Float32	PR	Current of phase B. Unit [A]
11113	Current Ic	Float32	PR	Current of phase C. Unit [A]
11115	Current Iavg	Float32	PR	Average current of 3 phase currents. Unit [A]
11117	Voltage Vab	Float32	PR	Line to line voltage between phase A and B. Unit [V]
11119	Voltage Vbc	Float32	PR	Line to line voltage between phase B and C. Unit [V]
11121	Voltage Vca	Float32	PR	Line to line voltage between phase C and A. Unit [V]
11123	Voltage Vavg_ll	Float32	PR	Average of 3 line to line voltages Vab, Vbc, Vca. Unit [V]
11125	Active power Pa	Float32	PR	Active power of phase A. Unit [kW]
11127	Active power Pb	Float32	PR	Active power of phase B. Unit [kW]
11129	Active power Pc	Float32	PR	Active power of phase C. Unit [kW]
11131	Active power Ptot	Float32	PR	Total active power of all phases. Unit [kW]
11133	Reactive power Qa	Float32	PR	Reactive power of phase A. Unit [kVAR]
11135	Reactive power Qb	Float32	PR	Reactive power of phase B. Unit [kVAR]
11137	Reactive power Qc	Float32	PR	Reactive power of phase C. Unit [kVAR]
11139	Reactive power Qtot	Float32	PR	Total reactive power of all phases. Unit [kVAR]
11141	Apparent power Sa	Float32	PR	Apparent power of phase A. Unit [kVA]
11143	Apparent power Sb	Float32	PR	Apparent power of phase B. Unit [kVA]
11145	Apparent power Sc	Float32	PR	Apparent power of phase C. Unit [kVA]
11147	Apparent power Stot	Float32	PR	Total apparent power of all phases. Unit [kVA]
11149	PF A	Float32	PR	Power factor of phase A.
11151	PF B	Float32	PR	Power factor of phase B.
11153	PF C	Float32	PR	Power factor of phase C.
11155	Total PF	Float32	PR	Total power factor of all phases.
11157	Angle of PFa	UInt16	PR	Angle status of phase-A power factor. 0: None 1: Lead 2: Lag 3: Invalid
11158	Angle of PFb	UInt16	PR	Angle status of phase-B power factor. 0: None 1: Lead 2: Lag 3: Invalid
11159	Angle of PFc	UInt16	PR	Angle status of phase-C power factor. 0: None 1: Lead 2: Lag 3: Invalid
11160	Angle of PFtot	UInt16	PR	Angle status of total power factor. 0: None 1: Lead 2: Lag 3: Invalid
11161	kWh received	Int32	PR	Received KWh energy of total active power. Unit [kWh]
11163	kWh delivered	Int32	PR	Delivered KWh energy of total active power. Unit [kWh]
11165	kWh sum	Int32	PR	Sum KWh energy: Received kWh + Delivered kWh. Unit [kWh]

11167	kWh net	Int32	PR	Net kWh energy: Received kWh - Delivered kWh. Unit [kWh]
11169	kVARh received	Int32	PR	Received kVARh energy of total reactive power. Unit [kVARh]
11171	kVARh delivered	Int32	PR	Delivered kVARh energy of total reactive power. Unit [kVARh]
11173	kVARh sum	Int32	PR	Sum kVARh energy: Received kVARh + Delivered kVARh
11175	kVARh net	Int32	PR	Net kVARh energy: Received kVARh - Delivered kVARh
11177	KVAh	Int32	PR	kVAh energy of total apparent power. Unit [kVAh]
11179	kWh received A	Int32	PR	Received kWh energy of phase A, active power. Unit [kWh]
11181	kWh received B	Int32	PR	Received kWh energy of phase B, active power. Unit [kWh]
11183	kWh received C	Int32	PR	Received kWh energy of phase C, active power. Unit [kWh]
11185	kWh delivered A	Int32	PR	Delivered kWh energy of phase A, active power. Unit [kWh]
11187	kWh delivered B	Int32	PR	Delivered kWh energy of phase B, active power. Unit [kWh]
11189	kWh delivered C	Int32	PR	Delivered kWh energy of phase C, active power. Unit [kWh]
11191	kVARh received A	Int32	PR	Received kVARh energy of phase A, reactive power. Unit [kVARh]
11193	kVARh received B	Int32	PR	Received kVARh energy of phase B, reactive power. Unit [kVARh]
11195	kVARh received C	Int32	PR	Received kVARh energy of phase C, reactive power. Unit [kVARh]
11197	kVARh delivered A	Int32	PR	Delivered kVARh energy of phase A, reactive power. Unit [kVARh]
11199	kVARh delivered B	Int32	PR	Delivered kVARh energy of phase B, reactive power. Unit [kVARh]
11201	kVARh delivered C	Int32	PR	Delivered kVARh energy of phase C, reactive power. Unit [kVARh]
11203	kVAh A	Int32	PR	kVAh energy of phase A, apparent power. Unit [kVAh]
11205	kVAh B	Int32	PR	kVAh energy of phase B, apparent power. Unit [kVAh]
11207	kVAh C	Int32	PR	kVAh energy of phase C, apparent power. Unit [kVAh]
11209	Demand kW A	Float32	PR	Active power demand of phase A. Unit [kW]
11211	Demand kW B	Float32	PR	Active power demand of phase B. Unit [kW]
11213	Demand kW C	Float32	PR	Active power demand of phase C. Unit [kW]
11215	Demand kW total	Float32	PR	Total active power demand of all phases. Unit [kW]
11217	Prediction demand KW total	Float32	PR	Total active power prediction demand of all phases. Unit [kW]
11219	Demand kVAR A	Float32	PR	Reactive power demand of phase A. Unit [kVAR]
11221	Demand kVAR B	Float32	PR	Reactive power demand of phase B. Unit [kVAR]
11223	Demand kVAR C	Float32	PR	Reactive power demand of phase C. Unit [kVAR]
11225	Demand kVAR total	Float32	PR	Total reactive power demand of all phases. Unit [kVAR]
11227	Prediction demand kVAR total	Float32	PR	Total reactive power prediction demand of all phases. Unit [kVAR]
11229	Demand kVA A	Float32	PR	Apparent power demand of phase A. Unit [kVA]
11231	Demand kVA B	Float32	PR	Apparent power demand of phase B. Unit [kVA]
11233	Demand kVA C	Float32	PR	Apparent power demand of phase C. Unit [kVA]
11235	Demand kVA total	Float32	PR	Total apparent power demand of all phases. Unit [kVA]
11237	Prediction demand kVA total	Float32	PR	Total apparent power prediction demand of all phases. Unit [kVA]

11239	Demand current A	Float32	PR	Current demand of phase A. Unit [A]
11241	Demand current B	Float32	PR	Current demand of phase B. Unit [A]
11243	Demand current C	Float32	PR	Current demand of phase C. Unit [A]
11245	Demand current average	Float32	PR	Average current demand of all phases. Unit [A]
11247	Prediction demand current average	Float32	PR	Average current prediction demand of all phases. Unit [A]
11249-11288	Reserved			
11289	Voltage Van1	Float32	PR	Fundamental component of line to neutral Van. Unit [V]
11291	Voltage Vbn1	Float32	PR	Fundamental component of line to neutral Vbn. Unit [V]
11293	Voltage Vcn1	Float32	PR	Fundamental component of line to neutral Vcn. Unit [V]
11295	Voltage Vavg1	Float32	PR	Average of 3 fundamental components Van1, Vbn1, Vcn1. Unit [V]
11297	Current Ia1	Float32	PR	Fundamental component of phase current Ia. Unit [A]
11299	Current Ib1	Float32	PR	Fundamental component of phase current Ib. Unit [A]
11301	Current Ic1	Float32	PR	Fundamental component of phase current Ic. Unit [A]
11303	Current Iavg1	Float32	PR	Average of 3 fundamental components Ia1, Ib1, Ic1. Unit [A]
11305-11340	Reserved			
11341	Voltage THD A	Float32	PR	Total harmonic distortion of line to neutral Van. Unit [%]
11343	Voltage THD B	Float32	PR	Total harmonic distortion of line to neutral Vbn. Unit [%]
11345	Voltage THD C	Float32	PR	Total harmonic distortion of line to neutral Vcn. Unit [%]
11347	Current THD A	Float32	PR	Total harmonic distortion of current Ia. Unit [%]
11349	Current THD B	Float32	PR	Total harmonic distortion of current Ib. Unit [%]
11351	Current THD C	Float32	PR	Total harmonic distortion of current Ic. Unit [%]
11353	Current TDD A	Float32	PR	Total demand distortion of current Ia. Unit [%]
11355	Current TDD B	Float32	PR	Total demand distortion of current Ib. Unit [%]
11357	Current TDD C	Float32	PR	Total demand distortion of current Ic. Unit [%]
11359	Voltage phasor Vax	Float32	PR	X-coordinate of phasor voltage for phase A. Unit [V]
11361	Voltage phasor Vay	Float32	PR	Y-coordinate of phasor voltage for phase A. Unit [V]
11363	Voltage phasor Vbx	Float32	PR	X-coordinate of phasor voltage for phase B. Unit [V]
11365	Voltage phasor Vby	Float32	PR	Y-coordinate of phasor voltage for phase B. Unit [V]
11367	Voltage phasor Vcx	Float32	PR	X-coordinate of phasor voltage for phase C. Unit [V]
11369	Voltage phasor Vcy	Float32	PR	Y-coordinate of phasor voltage for phase C. Unit [V]
11371	Current phasor Iax	Float32	PR	X-coordinate of phasor current for phase A. Unit [A]
11373	Current phasor Iay	Float32	PR	Y-coordinate of phasor current for phase A. Unit [A]
11375	Current phasor Ibx	Float32	PR	X-coordinate of phasor current for phase B. Unit [A]
11377	Current phasor Iby	Float32	PR	Y-coordinate of phasor current for phase B. Unit [A]
11379	Current phasor Icx	Float32	PR	X-coordinate of phasor current for phase C. Unit [A]
11381	Current phasor Icy	Float32	PR	Y-coordinate of phasor current for phase C. Unit [A]
11383	Residual voltage	Float32	PR	Residual voltage by sum of 3-phase voltage. Unit [V]
11385	Residual current	Float32	PR	Residual current by sum of 3-phase current. Unit [A]
11387	Voltage unbalance of Vln	Float32	PR	Unbalance ratio of line to neutral voltages. Unit [%] Max. deviation of (Van,Vbn,Vcn) from Vavg_ln/Vavg_ln*100 [%]

11389	Voltage unbalance of Vll	Float32	PR	Unbalance ratio of line to line voltages. Unit [%] Max. deviation of (Vab,Vbc,Vca) from Vavg_ll / Vavg_ll * 100 [%]
11391	Voltage U0 unbalance	Float32	PR	Voltage zero-sequence unbalance ratio. Unit [%] zero seq. component / positive seq. component *100 [%]
11393	Voltage U2 unbalance	Float32	PR	Voltage negative-sequence unbalance ratio. Unit [%] negative seq. component / positive seq. component *100 [%]
11395	Current unbalance	Float32	PR	Unbalance ratio of 3 phase currents. Unit [%] Max. deviation of (Ia,Ib,Ic) from Iavg / Iavg * 100 [%]
11397	Current U0 unbalance	Float32	PR	Current zero-sequence unbalance ratio. Unit [%] zero seq. component / positive seq. component *100 [%]
11399	Current U2 unbalance	Float32	PR	Current negative-sequence unbalance ratio. Unit [%] negative seq. component / positive seq. component *100 [%]
11401	CFa	Float32	PR	Crest factor of phase A current.
11403	CFb	Float32	PR	Crest factor of phase B current.
11405	CFc	Float32	PR	Crest factor of phase C current.
11407	KFa	Float32	PR	K-factor of phase A current.
11409	KFb	Float32	PR	K-factor of phase B current.
11411	KFc	Float32	PR	K-factor of phase C current.
11413	Frequency	Float32	PR	Frequency of input voltage. Unit [Hz]
11415	Temperature	Float32	PR	Temperature measured from rear side of Accura 3300E. Unit [℃]

Module Measurement Data

DIO Data

This detailed map describes the measurement data of DIO module for the selected aggregation interval. The register number in this detailed section is expressed in "Offset Number", not in "Number". The "Offset Number" is a relative location to the initiation number that is determined by Module ID as mentioned before. The starting number of Module ID 1 is 12101, the starting number of Module ID 2 is 12201, and the interval between starting numbers of Module is 100.

Offset Number	Name	Format	Attribute	Description
0-3	Reserved			
4	Status of DI channel 1	UInt16	R	Status of DI channel 1. When polarity is normal 0: Open 1: Closed When polarity is reverse 0: Closed 1: Open
5	Status of DI channel 2	UInt16	R	Status of DI channel 2. See "Status of DI channel 1".
…				
11	Status of DI channel 8	UInt16	R	Status of DI channel 8. See "Status of DI channel 1".
12-15	Reserved			
16	Status of DO channel 1	UInt16	R	Output status of DO channel 1. When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open
17	Status of DO channel 2	UInt16	R	Output status of DO channel 2. See "Status of DO channel 1".
18	DI duality error	UInt16	R	Duality error status for each DI channel. Bit.[0]: DI channel 1 Bit.[1]: DI channel 2 … Bit.[7]: DI channel 8 0: Normal 1: Error
19	DI rising hold	UInt16	R	Rising hold status for each DI channel. Bit.[0]: DI channel 1 Bit.[1]: DI channel 2 … Bit.[7]: DI channel 8 0: Normal 1: Holding
20	DI falling hold	UInt16	R	Falling hold status for each DI channel. Bit.[0]: DI channel 1 Bit.[1]: DI channel 2 … Bit.[7]: DI channel 8 0: Normal 1: Holding
21	Reserved			
22	Pulse counter of DI channel 1	Float32	R	Increment count when DI channel 1 status is Closed.
24	Pulse counter of DI	Float32	R	Increment count when DI channel 2 status is Closed.

	channel 2			
…				
36	Pulse counter of DI channel 8	Float32	R	Increment count when DI channel 8 status is Closed.
38	Pulse counter of DO channel 1	Float32	R	Increment count when DO channel 1 status is Closed.
40	Pulse counter of DO channel 2	Float32	R	Increment count when DO channel 2 status is Closed.

DI Data

This detailed map describes the measurement data of DI module for the selected aggregation interval. The register number in this detailed section is expressed in "Offset Number", not in "Number". The "Offset Number" is a relative location to the initiation number that is determined by Module ID as mentioned before. The starting number of Module ID 1 is 12101, the starting number of Module ID 2 is 12201, and the interval between starting numbers of Module is 100.

Offset Number	Name	Format	Attribute	Description
0-3	Reserved			
4	Status of DI channel 1	UInt16	R	Status of DI channel 1. When polarity is normal 0: Open 1: Closed When polarity is reverse 0: Closed 1: Open
5	Status of DI channel 2	UInt16	R	Status of DI channel 2. See "Status of DI channel 1".
…				
15	Status of DI channel 12	UInt16	R	Status of DI channel 12. See "Status of DI channel 1".
16	DI duality error	UInt16	R	Duality error status for each DI channel. Bit.[0]: DI channel 1 Bit.[1]: DI channel 2 … Bit.[7]: DI channel 8 0: Normal 1: Error
17	DI rising hold	UInt16	R	Rising hold status for each DI channel. Bit.[0]: DI channel 1 Bit.[1]: DI channel 2 … Bit.[7]: DI channel 8 0: Normal 1: Holding
18	DI falling hold	UInt16	R	Falling hold status for each DI channel. Bit.[0]: DI channel 1 Bit.[1]: DI channel 2 … Bit.[7]: DI channel 8 0: Normal 1: Holding
19	Reserved			
22	Pulse counter of DI channel 1	Float32	R	Increment count when DI channel 1 status is Closed.
24	Pulse counter of DI channel 2	Float32	R	Increment count when DI channel 2 status is Closed.
…				
44	Pulse counter of DI channel 12	Float32	R	Increment count when DI channel 12 status is Closed.

DO Data

This detailed map describes the measurement data of DO module for the selected aggregation interval. The register number in this detailed section is expressed in "Offset Number", not in "Number". The

"Offset Number" is a relative location to the initiation number that is determined by Module ID as mentioned before. The starting number of Module ID 1 is 12101, the starting number of Module ID 2 is 12201, and the interval between starting numbers of Module is 100.

Offset Number	Name	Format	Attribute	Description
0-15	Reserved			
16	Status of DO channel 1	UInt16	R	Output status of DO channel 1. When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open
17	Status of DO channel 2	UInt16	R	Output status of DO channel 2. See "Status of DO channel 1".
…				
21	Status of DO channel 6	UInt16	R	Output status of DO channel 6. See "Status of DO channel 1".
22	Pulse counter of DO channel 1	Float32	R	Increment count when DO channel 1 status is Closed.
24	Pulse counter of DO channel 2	Float32	R	Increment count when DO channel 2 status is Closed.
…				
32	Pulse counter of DO channel 6	Float32	R	Increment count when DO channel 6 status is Closed.

AI Data

This detailed map describes the measurement data of AI module for the selected aggregation interval. The register number in this detailed section is expressed in "Offset Number", not in "Number". The "Offset Number" is a relative location to the initiation number that is determined by Module ID as mentioned before. The starting number of Module ID 1 is 12101, the starting number of Module ID 2 is 12201, and the interval between starting numbers of Module is 100.

Offset Number	Name	Format	Attribute	Description
0-3	Reserved			
4	AI overflag status	UInt16	R	Over flag status for each AI channel. Bit.[0]: AI channel 1 Bit.[1]: AI channel 2 ... Bit.[5]: AI channel 6 0: Not over 1: Over
5-21	Reserved			
22	Conversion value of AI channel 1	Float32	R	Value of AI Channel 1 converted to match the conversion settings.
24	Conversion value of AI channel 2	Float32	R	Value of AI Channel 2 converted to match the conversion settings.
...				
32	Conversion value of AI channel 6	Float32	R	Value of AI Channel 6 converted to match the conversion settings.
34	Current input of AI channel 1	Float32	R	Input current of AI channel 1. Unit [A]. Valid range: -0.020 to 0.020 [A]
36	Current input of AI channel 2	Float32	R	Input current of AI channel 2. Unit [A]. Valid range: -0.020 to 0.020 [A]
...				
44	Current input of AI channel 6	Float32	R	Input current of AI channel 6. Unit [A]. Valid range: -0.020 to 0.020 [A]

AO Data

This detailed map describes the measurement data of AO module for the selected aggregation interval. The register number in this detailed section is expressed in "Offset Number", not in "Number". The "Offset Number" is a relative location to the initiation number that is determined by Module ID as mentioned before. The starting number of Module ID 1 is 12101, the starting number of Module ID 2 is 12201, and the interval between starting numbers of Module is 100.

Offset Number	Name	Format	Attribute	Description
0-21	Reserved			
22	Current output of AO channel 1	Float32	R	Output current of AO channel 1. Valid range determine according to "Range type of AO channel 1". Unit [A] Valid range: 0.000 - 0.020 [A] (When setting 0 - 20 mA) Valid range: 0.004 - 0.020 [A] (When setting 4 - 20 mA)
24	Current output of AO channel 2	Float32	R	Output current of AO channel 2. Valid range determine according to "Range type of AO channel 2". Unit [A] See "Current output of AO channel 1".
…				
32	Current output of AO channel 6	Float32	R	Output current of AO channel 6. Valid range determine according to "Range type of AO channel 6". Unit [A] See "Current output of AO channel".
34	Conversion value of AO channel 1	Float32	R	Value of AO Channel 1 converted to match the conversion settings.
36	Conversion value of AO channel 2	Float32	R	Value of AO Channel 2 converted to match the conversion settings.
…				
34	Conversion value of AO channel 6	Float32	R	Value of AO Channel 6 converted to match the conversion settings.

A4D2 Data

This detailed map describes the measurement data of A4D2 module for the selected aggregation interval. The register number in this detailed section is expressed in "Offset Number", not in "Number". The "Offset Number" is a relative location to the initiation number that is determined by Module ID as mentioned before. The starting number of Module ID 1 is 12101, the starting number of Module ID 2 is 12201, and the interval between starting numbers of Module is 100.

Offset Number	Name	Format	Attribute	Description
0-15	Reserved			
16	Status of DO channel 1	UInt16	R	Output status of DO channel 1. When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open
17	Status of DO channel 2	UInt16	R	Output status of DO channel 2. See "Status of DO channel 1".
18-21	Reserved			
22	Current output of AO channel 1	Float32	R	Output current of AO channel 1. Valid range determine according to "Range type of AO channel 1". Unit [A] Valid range: 0.000 - 0.020 [A] (When setting 0 - 20 mA) Valid range: 0.004 - 0.020 [A] (When setting 4 - 20 mA)
24	Current output of AO channel 2	Float32	R	Output current of AO channel 2. Valid range determine according to "Range type of AO channel 2". Unit [A] See "Current output of AO channel 1".
26	Current output of AO channel 3	Float32	R	Output current of AO channel 3. Valid range determine according to "Range type of AO channel 3". Unit [A] See "Current output of AO channel 1".
28	Current output of AO channel 4	Float32	R	Output current of AO channel 4. Valid range determine according to "Range type of AO channel 4". Unit [A] See "Current output of AO channel 1".
30-33	Reserved			
34	Conversion value of AO channel 1	Float32	R	Value of AO Channel 1 converted to match the conversion settings.
36	Conversion value of AO channel 2	Float32	R	Value of AO Channel 2 converted to match the conversion settings.
38	Conversion value of AO channel 3	Float32	R	Value of AO Channel 3 converted to match the conversion settings.
40	Conversion value of AO channel 4	Float32	R	Value of AO Channel 4 converted to match the conversion settings.
42	Pulse counter of DO channel 1	Float32	R	Increment count when DO channel 1 status is Closed.
44	Pulse counter of DO channel 2	Float32	R	Increment count when DO channel 2 status is Closed.

A2D4 Data

This detailed map describes the measurement data of A2D4 module for the selected aggregation interval. The register number in this detailed section is expressed in "Offset Number", not in "Number".

The "Offset Number" is a relative location to the initiation number that is determined by Module ID as mentioned before. The starting number of Module ID 1 is 12101, the starting number of Module ID 2 is 12201, and the interval between starting numbers of Module is 100.

Offset Number	Name	Format	Attribute	Description
0-15	Reserved			
16	Status of DO channel 1	UInt16	R	Output status of DO channel 1. When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open
17	Status of DO channel 2	UInt16	R	Output status of DO channel 2. See "Status of DO channel 1".
18	Status of DO channel 3	UInt16	R	Output status of DO channel 3. See "Status of DO channel 1".
19	Status of DO channel 4	UInt16	R	Output status of DO channel 4. See "Status of DO channel 1".
20-21	Reserved			
22	Current output of AO channel 1	Float32	R	Output current of AO channel 1. Valid range determine according to "Range type of AO channel 1". Unit [A] Valid range: 0.000 - 0.020 [A] (When setting 0 - 20 mA) Valid range: 0.004 - 0.020 [A] (When setting 4 - 20 mA)
24	Current output of AO channel 2	Float32	R	Output current of AO channel 2. Valid range determine according to "Range type of AO channel 2". Unit [A] See "Current output of AO channel 1".
26-33	Reserved			
34	Conversion value of AO channel 1	Float32	R	Value of AO Channel 1 converted to match the conversion settings.
36	Conversion value of AO channel 2	Float32	R	Value of AO Channel 2 converted to match the conversion settings.
38	Pulse counter of DO channel 1	Float32	R	Increment count when DO channel 1 status is Closed.
40	Pulse counter of DO channel 2	Float32	R	Increment count when DO channel 2 status is Closed.
42	Pulse counter of DO channel 3	Float32	R	Increment count when DO channel 3 status is Closed.
44	Pulse counter of DO channel 4	Float32	R	Increment count when DO channel 4 status is Closed.

DC Data

This detailed map describes the measurement data of DC module for the selected aggregation interval. The register number in this detailed section is expressed in "Offset Number", not in "Number". The "Offset Number" is a relative location to the initiation number that is determined by Module ID as mentioned before. The starting number of Module ID 1 is 12101, the starting number of Module ID 2 is 12201, and the interval between starting numbers of Module is 100.

Offset Number	Name	Format	Attribute	Description
4	Status of DI channel 1	UInt16	R	Status of DI channel 1. When polarity is normal 0: Open 1: Closed When polarity is reverse 0: Closed 1: Open
5	Status of DI channel 2	UInt16	R	Status of DI channel 2. See "Status of DI channel 1".
6	Status of DI channel 3	UInt16	R	Status of DI channel 3. See "Status of DI channel 1".
7	Status of DI channel 4	UInt16	R	Status of DI channel 4. See "Status of DI channel 1".
8	Status of DC overflag	UInt16	R	Over flag status of DC channel Bit.[0]: DC voltage overflag Bit.[1]: Output current overflag Bit.[2]: Battery current overflag 0: Not over 1: Over
9-15	Reserved			
16	Status of DO channel	UInt16	R	Output status of DO channel 1. When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open
17	DI duality error	UInt16	R	Duality error status for each DI channel. Bit.[0]: DI channel 1 Bit.[1]: DI channel 2 Bit.[2]: DI channel 3 Bit.[3]: DI channel 4 0: Normal 1: Error
18	DI rising hold	UInt16	R	Rising hold status for each DI channel. Bit.[0]: DI channel 1 Bit.[1]: DI channel 2 Bit.[2]: DI channel 3 Bit.[3]: DI channel 4 0: Normal 1: Holding
19	DI falling hold	UInt16	R	Falling hold status for each DI channel. Bit.[0]: DI channel 1 Bit.[1]: DI channel 2 Bit.[2]: DI channel 3 Bit.[3]: DI channel 4 0: Normal 1: Holding
20-21	Reserved			
22	Voltage DC	Float32	R	DC voltage. Unit [V]

24	Output current	Float32	R	Output current. Unit [A]
26	Battery current	Float32	R	Battery current. Unit [A]
28	Pulse counter of DI channel 1	Float32	R	Increment count when DI channel 1 status is Closed.
30	Pulse counter of DI channel 2	Float32	R	Increment count when DI channel 1 status is Closed.
32	Pulse counter of DI channel 3	Float32	R	Increment count when DI channel 1 status is Closed.
34	Pulse counter of DI channel 4	Float32	R	Increment count when DI channel 1 status is Closed.
36	Pulse counter of DO channel 1	Float32	R	Increment count when DO channel 1 status is Closed.

RTD Data

This detailed map describes the measurement data of RTD module for the selected aggregation interval. The register number in this detailed section is expressed in "Offset Number", not in "Number". The "Offset Number" is a relative location to the initiation number that is determined by Module ID as mentioned before. The starting number of Module ID 1 is 12101, the starting number of Module ID 2 is 12201, and the interval between starting numbers of Module is 100.

Offset Number	Name	Format	Attribute	Description
0-3	Reserved			
4	Status of RTD temperature overflag	UInt16	R	Over flag for each RTD channel. Bit.[0]: RTD channel 1 Bit.[1]: RTD channel 2 Bit.[2]: RTD channel 3 0: Not over 1: Over
5-21	Reserved			
22	Resistance of channel 1	Float32	R	Measured resistance of channel 1. Unit [Ω]
24	Temperature of channel 1	Float32	R	Measured temperature of channel 1. Unit [℃]
26	Resistance of channel 2	Float32	R	Measured resistance of channel 2. Unit [Ω]
28	Temperature of channel 2	Float32	R	Measured temperature of channel 2. Unit [℃]
30	Resistance of channel 3	Float32	R	Measured resistance of channel 3. Unit [Ω]
32	Temperature of channel 3	Float32	R	Measured temperature of channel 3. Unit [℃]

ELD Data

This detailed map describes the measurement data of ELD module for the selected aggregation interval. The register number in this detailed section is expressed in "Offset Number", not in "Number". The "Offset Number" is a relative location to the initiation number that is determined by Module ID as mentioned before. The starting number of Module ID 1 is 12101, the starting number of Module ID 2 is 12201, and the interval between starting numbers of Module is 100.

Offset Number	Name	Format	Attribute	Description
0-3	Reserved			
4	Status of ELD leakage current overflag	UInt16	R	Over flag status for each ELD channel. Bit.[0]: ELD channel 1 overflag Bit.[1]: ELD channel 2 overflag ... Bit.[5]: ELD channel 6 overflag 0: Not over 1: Over
5-15	Reserved			
16	Status of DO channel 1	UInt16	R	Output status of DO channel 1. When output polarity is normal 0: Open 1: Closed When output polarity is reverse 0: Closed 1: Open
17-21	Reserved			
22	Leakage current of channel 1	Float32	R	Leakage current of channel 1. Unit [A]
24	Leakage current of channel 2	Float32	R	Leakage current of channel 2. Unit [A]
26	Leakage current of channel 3	Float32	R	Leakage current of channel 3. Unit [A]
28	Leakage current of channel 4	Float32	R	Leakage current of channel 4. Unit [A]
30	Leakage current of channel 5	Float32	R	Leakage current of channel 5. Unit [A]
32	Leakage current of channel 6	Float32	R	Leakage current of channel 6. Unit [A]
34	Pulse counter of DO channel 1	Float32	R	Increment count when DO channel 1 status is Closed.

Voltage/Current Max/Min Data with time-stamp

This detailed map describes the maximum / minimum values and their time-stamps for Accura 3700 voltage/current measurement data within the selected aggregation interval.

Register Number	Name	Format	Attribute	Description
Max data during the aggregation interval				
13001	Van max	Float32	PR	Max of Line to neutral voltage between phase A and neutral. Unit [V]
13003	Vbn max	Float32	PR	Max of Line to neutral voltage between phase B and neutral. Unit [V]
13004	Vcn max	Float32	PR	Max of Line to neutral voltage between phase C and neutral. Unit [V]
13007	Vavg_ln max	Float32	PR	Max of Average of 3 line to neutral voltages Van, Vbn, Vcn. Unit [V]
13009	Vab max	Float32	PR	Max of Line to line voltage between phase A and B. Unit [V]
13011	Vbc max	Float32	PR	Max of Line to line voltage between phase B and C. Unit [V]
13013	Vca max	Float32	PR	Max of Line to line voltage between phase C and A. Unit [V]
13015	Vavg_ll max	Float32	PR	Max of Average of 3 line to line voltages Vab, Vbc, Vca. Unit [V]
13017	THDva max	Float32	PR	Max of Total harmonic distortion of line to neutral Van. Unit [%]
13019	THDvb max	Float32	PR	Max of Total harmonic distortion of line to neutral Vbn. Unit [%]
13021	THDvc max	Float32	PR	Max of Total harmonic distortion of line to neutral Vcn. Unit [%]
13023	Unbal_Vln max	Float32	PR	Max of Unbalance ratio of line to neutral voltages. Unit [%]
13025	Unbal_Vll max	Float32	PR	Max of Unbalance ratio of line to line voltages. Unit [%]
13027	Unbal_U0_V max	Float32	PR	Max of voltage zero-sequence unbalance ratio. Unit [%]
13029	Unbal_U2_V max	Float32	PR	Max of voltage negative-sequence unbalance ratio. Unit [%]
13031	Temperature max	Float32	PR	Max of Ambient temperature of Accura 3700 device. Unit [℃]
13033	Residual voltage max	Float32	PR	Max of residual voltage by sum of 3-phase voltages (Van + Vbn + Vcn). Unit [V]
13035	Frequency max	Float32	PR	Max value of frequency. Unit [Hz]
Min data during the aggregation interval				
13037	Van min	Float32	PR	Min of line to neutral voltage between A and neutral. Unit [V]
13039	Vbn min	Float32	PR	Min of line to neutral voltage between B and neutral. Unit [V]
13041	Vcn min	Float32	PR	Min of line to neutral voltage between C and neutral. Unit [V]
13043	Vavg_ln min	Float32	PR	Min of average of 3 line to neutral voltages Van, Vbn, Vcn. Unit [V]
13045	Vab min	Float32	PR	Min of line to line voltage between A and B. Unit [V]
13047	Vbc min	Float32	PR	Min of line to line voltage between B and C. Unit [V]
13049	Vca min	Float32	PR	Min of line to line voltage between C and A. Unit [V]
13051	Vavg_ll min	Float32	PR	Min of average of 3 line to line voltages Vab, Vbc, Vca. Unit [V]
13053	Residual voltage min	Float32	PR	Min of residual voltage by sum of 3-phase voltages (Van + Vbn + Vcn). Unit [V]
13055	Frequency min	Float32	PR	Min value of frequency. Unit [Hz]
Max data during the aggregation interval				
13057	Ia max	Float32	PR	Max of phase A current. Unit [A]

13059	Ib max	Float32	PR	Max of phase B current. Unit [A]
13061	Ic max	Float32	PR	Max of phase C current. Unit [A]
13063	Iavg max	Float32	PR	Max of average current of 3 phase currents. Unit [A]
13065	Residual current max	Float32	PR	Max of residual current by sum of 3-phase currents (Ia+ Ib + Ic). Unit [A]
13067	Pa max	Float32	PR	Max of active power of phase A. Unit [kW]
13069	Pb max	Float32	PR	Max of active power of phase B. Unit [kW]
13071	Pc max	Float32	PR	Max of active power of phase C. Unit [kW]
13073	Ptot max	Float32	PR	Max of total active power of all phases. Unit [kW]
13075	Qa max	Float32	PR	Max of reactive power of phase A. Unit [kVAR]
13077	Qb max	Float32	PR	Max of reactive power of phase B. Unit [kVAR]
13079	Qc max	Float32	PR	Max of reactive power of phase C. Unit [kVAR]
13081	Qtot max	Float32	PR	Max of total reactive power of all phases. Unit [kVAR]
13083	Sa max	Float32	PR	Max of apparent power of phase A. Unit [kVA]
13085	Sb max	Float32	PR	Max of apparent power of phase B. Unit [kVA]
13087	Sc max	Float32	PR	Max of apparent power of phase C. Unit [kVA]
13089	Stot max	Float32	PR	Max of total apparent power of all phases. Unit [kVA]
13091	PFa max	Float32	PR	Max of power factor of phase A.
13093	PFb max	Float32	PR	Max of power factor of phase B.
13095	PFc max	Float32	PR	Max of power factor of phase C.
13097	PFtot max	Float32	PR	Max of total power factor of all phases.
13099	PFa angle max	UInt16	PR	Angle status of PFa when phase A power factor is maximum. 0: Invalid (Apparent power is equal to zero) 1: Lead angle 2: Lag angle
13100	PFb angle max	UInt16	PR	Angle status of PFb when phase B power factor is maximum. See "PFa angle max". (register 13099)
13101	PFc angle max	UInt16	PR	Angle status of PFc when phase C power factor is maximum. See "PFa angle max". (register 13099)
13102	PFtot angle max	UInt16	PR	Angle status of PFtot when total power factor is maximum. See "PFa angle max". (register 13099)
13103-13138	Reserved			
13139	Demand Pa max	Float32	PR	Max of active power demand of phase A. Unit [kW]
13141	Demand Pb max	Float32	PR	Max of active power demand of phase B. Unit [kW]
13143	Demand Pc max	Float32	PR	Max of active power demand of phase C. Unit [kW]
13145	Demand Ptot max	Float32	PR	Max of total active power demand of all phases. Unit [kVAR]
13147	Demand Qa max	Float32	PR	Max of reactive power demand of phase A. Unit [kVAR]
13149	Demand Qb max	Float32	PR	Max of reactive power demand of phase B. Unit [kVAR]
13151	Demand Qc max	Float32	PR	Max of reactive power demand of phase C. Unit [kVAR]
13153	Demand Qtot max	Float32	PR	Max of total reactive power demand of all phases. Unit [kVAR]
13155	Demand Sa max	Float32	PR	Max of apparent power demand of phase A. Unit [kVA]
13157	Demand Sb max	Float32	PR	Max of apparent power demand of phase B. Unit [kVA]
13159	Demand Sc max	Float32	PR	Max of apparent power demand of phase C. Unit [kVA]

13161	Demand Stot max	Float32	PR	Max of apparent power demand of all phases. Unit [kVA]
13163	Demand Ia max	Float32	PR	Max of current demand of phase A. Unit [A]
13165	Demand Ib max	Float32	PR	Max of current demand of phase B. Unit [A]
13167	Demand Ic max	Float32	PR	Max of current demand of phase C. Unit [A]
13169	Demand Iavg max	Float32	PR	Max of average current demand of all phases. Unit [A]
13171-13202	Reserved			
13203	THDia max	Float32	PR	Max of total harmonic distortion of current Ia. Unit [%]
13205	THDib max	Float32	PR	Max of total harmonic distortion of current Ib. Unit [%]
13207	THDic max	Float32	PR	Max of total harmonic distortion of current Ic. Unit [%]
13209	TDDia max	Float32	PR	Max of total demand distortion of current Ia. Unit [%]
13211	TDDib max	Float32	PR	Max of total demand distortion of current Ib. Unit [%]
13213	TDDic max	Float32	PR	Max of total demand distortion of current Ic. Unit [%]
13215	Unbal_I max	Float32	PR	Max of unbalance ratio of 3 phase currents. Unit [%]
13217	Unbal_U0_I max	Float32	PR	Max of current zero-sequence unbalance ratio. Unit [%]
13219	Unbal_U2_I max	Float32	PR	Max of current negative-sequence unbalance ratio. Unit [%]
13221	CFa max	Float32	PR	Crest factor of phase A current.
13223	CFb max	Float32	PR	Crest factor of phase B current.
13225	CFc max	Float32	PR	Crest factor of phase C current.
13227	KFa max	Float32	PR	K-factor of phase A current.
13229	KFb max	Float32	PR	K-factor of phase B current.
13231	KFc max	Float32	PR	K-factor of phase C current.
Min data during the aggregation interval				
13233	Ia min	Float32	PR	Min of phase A current. Unit [A]
13235	Ib min	Float32	PR	Min of phase B current. Unit [A]
13237	Ic min	Float32	PR	Min of phase C current. Unit [A]
13239	Iavg min	Float32	PR	Min of average current of 3 phase currents. Unit [A]
13241	Residual current min	Float32	PR	Min of of residual current by sum of 3-phase currents (Ia+ Ib + Ic). Unit [A]
13243	Pa min	Float32	PR	Min of active power of phase A. Unit [kW]
13245	Pb min	Float32	PR	Min of active power of phase B. Unit [kW]
13247	Pc min	Float32	PR	Min of active power of phase C. Unit [kW]
13249	Ptot min	Float32	PR	Min of total active power of all phases. Unit [kW]
13251	Qa min	Float32	PR	Min of reactive power of phase A. Unit [kVAR]
13253	Qb min	Float32	PR	Min of reactive power of phase B. Unit [kVAR]
13255	Qc min	Float32	PR	Min of reactive power of phase C. Unit [kVAR]
13257	Qtot min	Float32	PR	Min of total reactive power of all phases. Unit [kVAR]
13259	Sa min	Float32	PR	Min of apparent power of phase A. Unit [kVA]
13261	Sb min	Float32	PR	Min of apparent power of phase A. Unit [kVA]
13263	Sc min	Float32	PR	Min of apparent power of phase A. Unit [kVA]
13265	Stot min	Float32	PR	Min of total apparent power of all phases. Unit [kVA]
13267	PFa min	Float32	PR	Min of power factor of phase A.
13269	PFb min	Float32	PR	Min of power factor of phase B.

13271	PFc min	Float32	PR	Min of power factor of phase C.
13273	PFtot min	Float32	PR	Min of total power factor of all phases.
13275	PFa angle min	UInt16	PR	Angle status of PFa min. 0: Invalid (Active power is equal to zero) 1: Lead angle 2: Lag angle
13276	PFb angle min	UInt16	PR	Angle status of PFb min. See "PFa angle min". (register 13275)
13277	PFc angle min	UInt16	PR	Angle status of PFc min. See "PFa angle min". (register 13275)
13278	PFtot angle min	UInt16	PR	Angle status of PFtot min. See "PFa angle min". (register 13275)
Max time-stamp during the aggregation interval				
14001	Van max time	UInt32	PR	Occurrence time of Van max. Unit [ms] Time difference between aggregation start time and maximum value occurrence time. The actual time of occurrence is calculated by adding the start time of aggregation and the offset of this register.
14003	Vbn max time	UInt32	PR	Occurrence time of Vbn max. Unit [ms]
14005	Vcn max time	UInt32	PR	Occurrence time of Vcn max. Unit [ms]
14007	Vavg_ln max time	UInt32	PR	Occurrence time of Vavg ln max. Unit [ms]
14009	Vab max time	UInt32	PR	Occurrence time of Vab max. Unit [ms]
14011	Vbc max time	UInt32	PR	Occurrence time of Vbc max. Unit [ms]
14013	Vca max time	UInt32	PR	Occurrence time of Vca max. Unit [ms]
14015	Vavg_ll max time	UInt32	PR	Occurrence time of Vavg_ll max. Unit [ms]
14017	THDva max time	UInt32	PR	Occurrence time of THDva max. Unit [ms]
14019	THDvb max time	UInt32	PR	Occurrence time of THDvb max. Unit [ms]
14021	THDvc max time	UInt32	PR	Occurrence time of THDvc max. Unit [ms]
14023	Unbal_Vln max time	UInt32	PR	Occurrence time of Unbal_Vln max. Unit [ms]
14025	Unbal_Vll max time	UInt32	PR	Occurrence time of Unbal_Vll max. Unit [ms]
14027	Unbal_U0_V max time	UInt32	PR	Occurrence time of Unbal_U0 V max. Unit [ms]
14029	Unbal_U2_V max time	UInt32	PR	Occurrence time of Unbal_U2_V max. Unit [ms]
14031	Temperature max time	UInt32	PR	Occurrence time of Temperature max. Unit [ms]
14033	Residual voltage max time	UInt32	PR	Occurrence time of Residual voltage max. Unit [ms]
14035	Frequency max time	UInt32	PR	Occurrence time of Frequency max. Unit [ms]
Min time-stamp during the aggregation interval				
14037	Van min time	UInt32	PR	Occurrence time of Van min. Unit [ms] Time difference between aggregation start time and minimum value occurrence time. The actual time of occurrence is calculated by adding the start time of aggregation and the offset of this register.
14039	Vbn min time	UInt32	PR	Occurrence time of Vbn min. Unit [ms]
14041	Vcn min time	UInt32	PR	Occurrence time of Vcn min Unit [ms]
14043	Vavg_ln min time	UInt32	PR	Occurrence time of Vavg_ln min. Unit [ms]
14045	Vab min time	UInt32	PR	Occurrence time of Vab min. Unit [ms]

14047	Vbc min time	UInt32	PR	Occurrence time of Vbc min. Unit [ms]
14049	Vca min time	UInt32	PR	Occurrence time of Vca min. Unit [ms]
14051	Vavg_ll min time	UInt32	PR	Occurrence time of Vavg_ll min. Unit [ms]
14053	Residual voltage min time	UInt32	PR	Occurrence time of Residual voltage min. Unit [ms]
14055	Frequency min time	UInt32	PR	Occurrence time of Frequency min. Unit [ms]
Max time-stamp during the aggregation interval				
14057	Ia max time	UInt32	PR	Occurrence time of Ia max. Unit [ms] Time difference between aggregation start time and maximum value occurrence time. The actual time of occurrence is calculated by adding the start time of aggregation and the offset of this register.
14059	Ib max time	UInt32	PR	Occurrence time of Ib max. Unit [ms]
14061	Ic max time	UInt32	PR	Occurrence time of Ic max. Unit [ms]
14063	Iavg max time	UInt32	PR	Occurrence time of Iavg max. Unit [ms]
14065	Residual current max time	UInt32	PR	Occurrence time of Residual current max. Unit [ms]
14067	Pa max time	UInt32	PR	Occurrence time of Pa max. Unit [ms]
14069	Pb max time	UInt32	PR	Occurrence time of Pb max. Unit [ms]
14071	Pc max time	UInt32	PR	Occurrence time of Pc max. Unit [ms]
14073	Ptot max time	UInt32	PR	Occurrence time of Ptot max. Unit [ms]
14075	Qa max time	UInt32	PR	Occurrence time of Qa max. Unit [ms]
14077	Qb max time	UInt32	PR	Occurrence time of Qb max. Unit [ms]
14079	Qc max time	UInt32	PR	Occurrence time of Qc max. Unit [ms]
14081	Qtot max time	UInt32	PR	Occurrence time of Qtot max. Unit [ms]
14083	Sa max time	UInt32	PR	Occurrence time of Sa max. Unit [ms]
14085	Sb max time	UInt32	PR	Occurrence time of Sb max. Unit [ms]
14087	Sc max time	UInt32	PR	Occurrence time of Sc max. Unit [ms]
14089	Stot max time	UInt32	PR	Occurrence time of Stot max. Unit [ms]
14091	PFa max time	UInt32	PR	Occurrence time of PFa max. Unit [ms]
14093	PFb max time	UInt32	PR	Occurrence time of PFb max. Unit [ms]
14095	PFc max time	UInt32	PR	Occurrence time of PFc max. Unit [ms]
14097	PFtot max time	UInt32	PR	Occurrence time of PFtot max. Unit [ms]
14099-14130	Reserved			
14131	Demand Pa max time	UInt32	PR	Occurrence time of Demand Pa max. Unit [ms]
14133	Demand Pb max time	UInt32	PR	Occurrence time of Demand Pb max. Unit [ms]
14135	Demand Pc max time	UInt32	PR	Occurrence time of Demand Pc max. Unit [ms]
14137	Demand Ptot max time	UInt32	PR	Occurrence time of Demand Ptot max. Unit [ms]
14139	Demand Qa max time	UInt32	PR	Occurrence time of Demand Qa max. Unit [ms]
14141	Demand Qb max time	UInt32	PR	Occurrence time of Demand Qb max. Unit [ms]
14143	Demand Qc max time	UInt32	PR	Occurrence time of Demand Qc max. Unit [ms]
14145	Demand Qtot max time	UInt32	PR	Occurrence time of Demand Qtot max. Unit [ms]
14147	Demand Sa max time	UInt32	PR	Occurrence time of Demand Sa max. Unit [ms]

14149	Demand Sb max time	UInt32	PR	Occurrence time of Demand Sb max. Unit [ms]
14151	Demand Sc max time	UInt32	PR	Occurrence time of Demand Sc max. Unit [ms]
14153	Demand Stot max time	UInt32	PR	Occurrence time of Demand Stot max. Unit [ms]
14155	Demand Ia max time	UInt32	PR	Occurrence time of Demand Ia max. Unit [ms]
14157	Demand Ib max time	UInt32	PR	Occurrence time of Demand Ib max. Unit [ms]
14159	Demand Ic max time	UInt32	PR	Occurrence time of Demand Ic max. Unit [ms]
14161	Demand Iavg max time	UInt32	PR	Occurrence time of Demand Iavg max. Unit [ms]
14163-14194	Reserved			
14195	THDia max time	UInt32	PR	Occurrence time of THDia max. Unit [ms]
14197	THDib max time	UInt32	PR	Occurrence time of THDib max. Unit [ms]
14199	THDic max time	UInt32	PR	Occurrence time of THDic max. Unit [ms]
14201	TDDia max time	UInt32	PR	Occurrence time of TDDia max. Unit [ms]
14203	TDDib max time	UInt32	PR	Occurrence time of TDDib max. Unit [ms]
14205	TDDic max time	UInt32	PR	Occurrence time of TDDic max. Unit [ms]
14207	Unbal_I max time	UInt32	PR	Occurrence time of Unbal_I max. Unit [ms]
14209	Unbal_U0_I max time	UInt32	PR	Occurrence time of Unbal_U0_I max. Unit [ms]
14211	Unbal_U2_I max time	UInt32	PR	Occurrence time of Unbal_U2_I max. Unit [ms]
14213	CFa max time	UInt32	PR	Occurrence time of CFa max. Unit [ms]
14215	CFb max time	UInt32	PR	Occurrence time of CFb max. Unit [ms]
14217	CFc max time	UInt32	PR	Occurrence time of CFc max. Unit [ms]
14219	KFa max time	UInt32	PR	Occurrence time of KFa max. Unit [ms]
14221	KFb max time	UInt32	PR	Occurrence time of KFb max. Unit [ms]
14223	KFc max time	UInt32	PR	Occurrence time of KFc max. Unit [ms]
Min time-stamp during the aggregation interval				
14225	Ia min time	UInt32	PR	Occurrence time of Ia min. Unit [ms] Time difference between aggregation start time and minimum value occurrence time. The actual time of occurrence is calculated by adding the start time of aggregation and the offset of this register.
14227	Ib min time	UInt32	PR	Occurrence time of Ib min. Unit [ms]
14229	Ic min time	UInt32	PR	Occurrence time of Ic min. Unit [ms]
14231	Iavg min time	UInt32	PR	Occurrence time of Iavg min. Unit [ms]
14233	Residual current min time	UInt32	PR	Occurrence time of Residual current min. Unit [ms]
14235	Pa min time	UInt32	PR	Occurrence time of Pa min. Unit [ms]
14237	Pb min time	UInt32	PR	Occurrence time of Pb min. Unit [ms]
14239	Pc min time	UInt32	PR	Occurrence time of Pc min. Unit [ms]
14241	Ptot min time	UInt32	PR	Occurrence time of Ptot min. Unit [ms]
14243	Qa min time	UInt32	PR	Occurrence time of Qa min. Unit [ms]
14245	Qb min time	UInt32	PR	Occurrence time of Qb min. Unit [ms]
14247	Qc min time	UInt32	PR	Occurrence time of Qc min. Unit [ms]
14249	Qtot min time	UInt32	PR	Occurrence time of Qtot min. Unit [ms]
14251	Sa min time	UInt32	PR	Occurrence time of Sa min. Unit [ms]

14253	Sb min time	UInt32	PR	Occurrence time of Sb min. Unit [ms]
14255	Sc min time	UInt32	PR	Occurrence time of Sc min. Unit [ms]
14257	Stot min time	UInt32	PR	Occurrence time of Stot min. Unit [ms]
14259	PFa min time	UInt32	PR	Occurrence time of PFa min. Unit [ms]
14261	PFb min time	UInt32	PR	Occurrence time of PFb min. Unit [ms]
14263	PFc min time	UInt32	PR	Occurrence time of PFc min. Unit [ms]
14265	PFtot min time	UInt32	PR	Occurrence time of PFtot min. Unit [ms]

Module Max/Min Data with time-stamp Details

AI Max/Min Data with time-stamp

This detailed map describes the maximum / minimum values and their time-stamps for AI module instrumentation data within the selected aggregation interval. The "Offset Number" of the detailed map is not a "Number" of the normal map. This means relative position from "Number" determined by Module ID. The starting number of Module ID 1 is 15001, the starting number of Module ID 2 is 15201, and the interval between starting numbers of Module is 200.

Offset Number	Name	Format	Attribute	Description
Max/Min data during the aggregation interval				
0-1	Reserved			
2	Max of channel 1	Float32	PR	Maximum current input to channel 1. Unit [A]
4	Max of channel 2	Float32	PR	Maximum current input to channel 2. Unit [A]
6	Max of channel 3	Float32	PR	Maximum current input to channel 3. Unit [A]
8	Max of channel 4	Float32	PR	Maximum current input to channel 4. Unit [A]
10	Max of channel 5	Float32	PR	Maximum current input to channel 5. Unit [A]
12	Max of channel 6	Float32	PR	Maximum current input to channel 6. Unit [A]
14-25	Reserved			
26	Min of channel 1	Float32	PR	Minimum current input to channel 1. Unit [A]
28	Min of channel 2	Float32	PR	Minimum current input to channel 2. Unit [A]
30	Min of channel 3	Float32	PR	Minimum current input to channel 3. Unit [A]
32	Min of channel 4	Float32	PR	Minimum current input to channel 4. Unit [A]
34	Min of channel 5	Float32	PR	Minimum current input to channel 5. Unit [A]
36	Min of channel 6	Float32	PR	Minimum current input to channel 6. Unit [A]
Max/Min time-stamp during the aggregation interval				
50	Max time of channel 1	UInt32	PR	Max value occurrence time on channel 1. Unit [ms] Time difference between aggregation start time and maximum value occurrence time. The actual time of occurrence is calculated by adding the start time of aggregation and the offset of this register.
52	Max time of channel 2	UInt32	PR	Max value occurrence time on channel 2. Unit [ms]
54	Max time of channel 3	UInt32	PR	Max value occurrence time on channel 3. Unit [ms]
56	Max time of channel 4	UInt32	PR	Max value occurrence time on channel 4. Unit [ms]
58	Max time of channel 5	UInt32	PR	Max value occurrence time on channel 5. Unit [ms]
60	Max time of channel 6	UInt32	PR	Max value occurrence time on channel 6. Unit [ms]
62-73	Reserved			
74	Min time of channel 1	UInt32	PR	Min value occurrence time on channel 1. Unit [ms] Time difference between aggregation start time and minimum value occurrence time. The actual time of occurrence is calculated by adding the start time of aggregation and the offset of this register.
76	Min time of channel 2	UInt32	PR	Min value occurrence time on channel 2. Unit [ms]
78	Min time of channel 3	UInt32	PR	Min value occurrence time on channel 3. Unit [ms]

80	Min time of channel 4	UInt32	PR	Min value occurrence time on channel 4. Unit [ms]
82	Min time of channel 5	UInt32	PR	Min value occurrence time on channel 5. Unit [ms]
84	Min time of channel 6	UInt32	PR	Min value occurrence time on channel 6. Unit [ms]

AO Max/Min Data with time-stamp

This detailed map describes the maximum / minimum values and their time-stamps for AO module instrumentation data within the selected aggregation interval. The "Offset Number" of the detailed map is not a "Number" of the normal map. This means relative position from "Number" determined by Module ID. The starting number of Module ID 1 is 15001, the starting number of Module ID 2 is 15201, and the interval between starting numbers of Module is 200.

Offset Number	Name	Format	Attribute	Description
Max/Min data during the aggregation interval				
0-13	Reserved			
14	Max of channel 1	Float32	PR	Maximum value of current output from channel 1. Unit [A]
16	Max of channel 2	Float32	PR	Maximum value of current output from channel 2. Unit [A]
18	Max of channel 3	Float32	PR	Maximum value of current output from channel 3. Unit [A]
20	Max of channel 4	Float32	PR	Maximum value of current output from channel 4. Unit [A]
22	Max of channel 5	Float32	PR	Maximum value of current output from channel 5. Unit [A]
24	Max of channel 6	Float32	PR	Maximum value of current output from channel 6. Unit [A]
26-37	Reserved			
38	Min of channel 1	Float32	PR	Minimum value of current output from channel 1. Unit [A]
40	Min of channel 2	Float32	PR	Minimum value of current output from channel 2. Unit [A]
42	Min of channel 3	Float32	PR	Minimum value of current output from channel 3. Unit [A]
44	Min of channel 4	Float32	PR	Minimum value of current output from channel 4. Unit [A]
46	Min of channel 5	Float32	PR	Minimum value of current output from channel 5. Unit [A]
48	Min of channel 6	Float32	PR	Minimum value of current output from channel 6. Unit [A]
Max/Min time-stamp during the aggregation interval				
50-61	Reserved			
62	Max time of channel 1	UInt32	PR	Max value occurrence time on channel 1. Unit [ms] Time difference between aggregation start time and maximum value occurrence time. The actual time of occurrence is calculated by adding the start time of aggregation and the offset of this register.
64	Max time of channel 2	UInt32	PR	Max value occurrence time on channel 2. Unit [ms]
66	Max time of channel 3	UInt32	PR	Max value occurrence time on channel 3. Unit [ms]
68	Max time of channel 4	UInt32	PR	Max value occurrence time on channel 4. Unit [ms]
70	Max time of channel 5	UInt32	PR	Max value occurrence time on channel 5. Unit [ms]
72	Max time of channel 6	UInt32	PR	Max value occurrence time on channel 6. Unit [ms]
74-85	Reserved			
86	Min time of channel 1	UInt32	PR	Min value occurrence time on channel 1. Unit [ms] Time difference between aggregation start time and minimum value occurrence time. The actual time of occurrence is calculated by adding the start time of aggregation and the offset of this register.
88	Min time of channel 2	UInt32	PR	Min value occurrence time on channel 2. Unit [ms]
90	Min time of channel 3	UInt32	PR	Min value occurrence time on channel 3. Unit [ms]

92	Min time of channel 4	UInt32	PR	Min value occurrence time on channel 4. Unit [ms]
94	Min time of channel 5	UInt32	PR	Min value occurrence time on channel 5. Unit [ms]
96	Min time of channel 6	UInt32	PR	Min value occurrence time on channel 6. Unit [ms]

A4D2 Max/Min Data with time-stamp

This detailed map describes the maximum / minimum values and their time-stamps for A4D2 module instrumentation data within the selected aggregation interval. The "Offset Number" of the detailed map is not a "Number" of the normal map. This means relative position from "Number" determined by Module ID. The starting number of Module ID 1 is 15001, the starting number of Module ID 2 is 15201, and the interval between starting numbers of Module is 200.

Offset Number	Name	Format	Attribute	Description
Max/Min data during the aggregation interval				
0-13	Reserved			
14	Max of channel 1	Float32	PR	Maximum value of current output from channel 1. Unit [A]
16	Max of channel 2	Float32	PR	Maximum value of current output from channel 2. Unit [A]
18	Max of channel 3	Float32	PR	Maximum value of current output from channel 3. Unit [A]
20	Max of channel 4	Float32	PR	Maximum value of current output from channel 4. Unit [A]
22-37	Reserved			
38	Min of channel 1	Float32	PR	Minimum value of current output from channel 1. Unit [A]
40	Min of channel 2	Float32	PR	Minimum value of current output from channel 2. Unit [A]
42	Min of channel 3	Float32	PR	Minimum value of current output from channel 3. Unit [A]
44	Min of channel 4	Float32	PR	Minimum value of current output from channel 4. Unit [A]
Max/Min time-stamp during the aggregation interval				
46-61	Reserved			
62	Max time of channel 1	UInt32	PR	Max value occurrence time on channel 1. Unit [ms] Time difference between aggregation start time and maximum value occurrence time. The actual time of occurrence is calculated by adding the start time of aggregation and the offset of this register.
64	Max time of channel 2	UInt32	PR	Max value occurrence time on channel 2. Unit [ms]
66	Max time of channel 3	UInt32	PR	Max value occurrence time on channel 3. Unit [ms]
68	Max time of channel 4	UInt32	PR	Max value occurrence time on channel 4. Unit [ms]
70-85	Reserved			
86	Min time of channel 1	UInt32	PR	Min value occurrence time on channel 1. Unit [ms] Time difference between aggregation start time and minimum value occurrence time. The actual time of occurrence is calculated by adding the start time of aggregation and the offset of this register.
88	Min time of channel 2	UInt32	PR	Min value occurrence time on channel 2. Unit [ms]
90	Min time of channel 3	UInt32	PR	Min value occurrence time on channel 3. Unit [ms]
92	Min time of channel 4	UInt32	PR	Min value occurrence time on channel 4. Unit [ms]

A2D4 Max/Min Data with time-stamp

This detailed map describes the maximum / minimum values and their time-stamps for A2D4 module instrumentation data within the selected aggregation interval. The "Offset Number" of the detailed map is not a "Number" of the normal map. This means relative position from "Number" determined by Module ID. The starting number of Module ID 1 is 15001, the starting number of Module ID 2 is 15201, and the interval between starting numbers of Module is 200.

Offset Number	Name	Format	Attribute	Description
Max/Min data during the aggregation interval				
0-13	Reserved			
14	Max of channel 1	Float32	PR	Maximum value of current output from channel 1. Unit [A]
16	Max of channel 2	Float32	PR	Maximum value of current output from channel 2. Unit [A]
18-37	Reserved			
38	Min of channel 1	Float32	PR	Minimum value of current output from channel 1. Unit [A]
40	Min of channel 2	Float32	PR	Minimum value of current output from channel 2. Unit [A]
Max/Min time-stamp during the aggregation interval				
42-61	Reserved			
62	Max time of channel 1	UInt32	PR	Max value occurrence time on channel 1. Unit [ms] Time difference between aggregation start time and maximum value occurrence time. The actual time of occurrence is calculated by adding the start time of aggregation and the offset of this register.
64	Max time of channel 2	UInt32	PR	Max value occurrence time on channel 2. Unit [ms]
66-85	Reserved			
86	Min time of channel 1	UInt32	PR	Min value occurrence time on channel 1. Unit [ms] Time difference between aggregation start time and minimum value occurrence time. The actual time of occurrence is calculated by adding the start time of aggregation and the offset of this register.
88	Min time of channel 2	UInt32	PR	Min value occurrence time on channel 2. Unit [ms]

DC Max/Min Data with time-stamp

This detailed map describes the maximum / minimum values and their time-stamps for DC module instrumentation data within the selected aggregation interval. The "Offset Number" of the detailed map is not a "Number" of the normal map. This means relative position from "Number" determined by Module ID. The starting number of Module ID 1 is 15001, the starting number of Module ID 2 is 15201, and the interval between starting numbers of Module is 200.

Offset Number	Name	Format	Attribute	Description
Max/Min data during the aggregation interval				
0-1	Reserved			
2	DC voltage max	Float32	PR	Maximum value of DC voltage. Unit [V]
4	Output current max	Float32	PR	Maximum value of output current. Unit [A]
6	Battery current max	Float32	PR	Maximum value of battery current. Unit [A]
8-25	Reserved			
26	DC voltage min	Float32	PR	Minimum value of DC voltage. Unit [V]
28	Output current min	Float32	PR	Minimum value of output current. Unit [A]
30	Battery current min	Float32	PR	Minimum value of battery current. Unit [A]
Max/Min time-stamp during the aggregation interval				
50	DC voltage max time	UInt32	PR	Maximum value occurrence time of DC voltage. Unit [ms] Time difference between aggregation start time and maximum value occurrence time. The actual time of occurrence is calculated by adding the start time of aggregation and the offset of this register.
52	Output current max time	UInt32	PR	Maximum value occurrence time of Output current. Unit [ms]
54	Battery current max time	UInt32	PR	Maximum value occurrence time of Battery current. Unit [ms]
56-73	Reserved			
74	DC voltage min time	UInt32	PR	Minimum value occurrence time of DC voltage. Unit [ms] Time difference between aggregation start time and minimum value occurrence time. The actual time of occurrence is calculated by adding the start time of aggregation and the offset of this register.
76	Output current min time	UInt32	PR	Minimum value occurrence time of Output current. Unit [ms]
78	Battery current min time	UInt32	PR	Minimum value occurrence time of Battery current. Unit [ms]

RTD Max/Min Data with time-stamp

This detailed map describes the maximum / minimum values and their time-stamps for RTD module instrumentation data within the selected aggregation interval. The "Offset Number" of the detailed map is not a "Number" of the normal map. This means relative position from "Number" determined by Module ID. The starting number of Module ID 1 is 15001, the starting number of Module ID 2 is 15201, and the interval between starting numbers of Module is 200.

Offset Number	Name	Format	Attribute	Description
Max/Min data during the aggregation interval				
2	Resistance max of channel 1	Float32	PR	Maximum resistance of channel 1. Unit [Ω]
4	Temperature max of channel 1	Float32	PR	Maximum temperature of channel 1. Unit [℃]
6	Resistance max of channel 2	Float32	PR	Maximum resistance of channel 2. Unit [Ω]
8	Temperature max of channel 2	Float32	PR	Maximum temperature of channel 2. Unit [℃]
10	Resistance max of channel 3	Float32	PR	Maximum resistance of channel 3. Unit [Ω]
12	Temperature max of channel 3	Float32	PR	Maximum temperature of channel 3. Unit [℃]
14-25	Reserved			
26	Resistance min of channel 1	Float32	PR	Minimum resistance of channel 1. Unit [Ω]
28	Temperature min of channel 1	Float32	PR	Minimum temperature of channel 1. Unit [℃]
30	Resistance min of channel 2	Float32	PR	Minimum resistance of channel 2. Unit [Ω]
32	Temperature min of channel 2	Float32	PR	Minimum temperature of channel 2. Unit [℃]
34	Resistance min of channel 3	Float32	PR	Minimum resistance of channel 3. Unit [Ω]
36	Temperature min of channel 3	Float32	PR	Minimum temperature of channel 3. Unit [℃]
38-50	Reserved			
Max/Min time-stamp during the aggregation interval				
50	Resistance max time of channel 1	UInt32	PR	Maximum resistance occurrence time of channel 1. Unit [ms] Time difference between aggregation start time and maximum value occurrence time. The actual time of occurrence is calculated by adding the start time of aggregation and the offset of this register.
52	Temperature max time of channel 1	UInt32	PR	Maximum temperature occurrence time of channel 1. Unit [ms]
54	Resistance max time	UInt32	PR	Maximum resistance occurrence time of channel 2. Unit [ms]

	of channel 2			
56	Temperature max time of channel 2	UInt32	PR	Maximum temperature occurrence time of channel 2. Unit [ms]
58	Resistance max time of channel 3	UInt32	PR	Maximum resistance occurrence time of channel 2. Unit [ms]
60	Temperature max time of channel 3	UInt32	PR	Maximum temperature occurrence time of channel 2. Unit [ms]
60-73	Reserved			
74	Resistance min time of channel 1	UInt32	PR	Minimum resistance occurrence time of channel 1. Unit [ms] Time difference between aggregation start time and minimum value occurrence time. The actual time of occurrence is calculated by adding the start time of aggregation and the offset of this register.
76	Temperature min time of channel 1	UInt32	PR	Minimum temperature occurrence time of channel 1. Unit [ms]
78	Resistance min time of channel 2	UInt32	PR	Minimum resistance occurrence time of channel 2. Unit [ms]
80	Temperature min time of channel 2	UInt32	PR	Minimum temperature occurrence time of channel 2. Unit [ms]
82	Resistance min time of channel 3	UInt32	PR	Minimum resistance occurrence time of channel 2. Unit [ms]
84	Temperature min time of channel 3	UInt32	PR	Minimum temperature occurrence time of channel 2. Unit [ms]

ELD Max/Min Data with time-stamp

This detailed map describes the maximum / minimum values and their time-stamps for ELD module instrumentation data within the selected aggregation interval. The "Offset Number" of the detailed map is not a "Number" of the normal map. This means relative position from "Number" determined by Module ID. The starting number of Module ID 1 is 15001, the starting number of Module ID 2 is 15201, and the interval between starting numbers of Module is 200.

Offset Number	Name	Format	Attribute	Description
Max/Min data during the aggregation interval				
0-1	Reserved			
2	Leakage current max of channel 1	Float32	PR	Maximum leakage current of channel 1. Unit [A]
4	Leakage current max of channel 2	Float32	PR	Maximum leakage current of channel 2. Unit [A]
6	Leakage current max of channel 3	Float32	PR	Maximum leakage current of channel 3. Unit [A]
8	Leakage current max of channel 4	Float32	PR	Maximum leakage current of channel 4. Unit [A]
10	Leakage current max of channel 5	Float32	PR	Maximum leakage current of channel 5. Unit [A]
12	Leakage current max of channel 6	Float32	PR	Maximum leakage current of channel 6. Unit [A]
14-25	Reserved			
26	Leakage current min of channel 1	Float32	PR	Minimum leakage current of channel 1. Unit [A]
28	Leakage current min of channel 2	Float32	PR	Minimum leakage current of channel 2. Unit [A]
30	Leakage current min of channel 3	Float32	PR	Minimum leakage current of channel 3. Unit [A]
32	Leakage current min of channel 4	Float32	PR	Minimum leakage current of channel 4. Unit [A]
34	Leakage current min of channel 5	Float32	PR	Minimum leakage current of channel 5. Unit [A]
36	Leakage current min of channel 6	Float32	PR	Minimum leakage current of channel 6. Unit [A]
Max/Min time-stamp during the aggregation interval				
50	Leakage current max time of channel 1	UInt32	PR	Maximum leakage current occurrence time of channel 1. Unit [ms] Time difference between aggregation start time and maximum value occurrence time. The actual time of occurrence is calculated by adding the start time of aggregation and the offset of this register.
52	Leakage current max time of channel 2	UInt32	PR	Maximum leakage current occurrence time of channel 2. Unit [ms]
54	Leakage current max time of channel 3	UInt32	PR	Maximum leakage current occurrence time of channel 3. Unit [ms]

56	Leakage current max time of channel 4	UInt32	PR	Maximum leakage current occurrence time of channel 4. Unit [ms]
58	Leakage current max time of channel 5	UInt32	PR	Maximum leakage current occurrence time of channel 5. Unit [ms]
60	Leakage current max time of channel 6	UInt32	PR	Maximum leakage current occurrence time of channel 6. Unit [ms]
56-73	Reserved			
74	Leakage current min time of channel 1	UInt32	PR	Minimum leakage current occurrence time of channel 1. Unit [ms] Time difference between aggregation start time and minimum value occurrence time. The actual time of occurrence is calculated by adding the start time of aggregation and the offset of this register.
76	Leakage current min time of channel 2	UInt32	PR	Minimum leakage current occurrence time of channel 2. Unit [ms]
78	Leakage current min time of channel 3	UInt32	PR	Minimum leakage current occurrence time of channel 3. Unit [ms]
80	Leakage current min time of channel 4	UInt32	PR	Minimum leakage current occurrence time of channel 4. Unit [ms]
82	Leakage current min time of channel 5	UInt32	PR	Minimum leakage current occurrence time of channel 5. Unit [ms]
84	Leakage current min time of channel 6	UInt32	PR	Minimum leakage current occurrence time of channel 6. Unit [ms]

Harmonics Data

Register Number	Name	Format	Attribute	Description
20001	Validity of harmonics	UInt16	PR	Harmonics validity. 0: Invalid 1: Valid
20002	Voltage DC of phase A	Float32	PR	DC component of phase A voltage. Unit [V]
20004	Voltage 1st of phase A	Float32	PR	1st component of phase A voltage. Unit [V]
20006-20129	Voltage 2nd - 63th of phase A	62* Float32	PR	2nd - 63th components of phase A voltage. Unit [V]
20130	Voltage DC of phase B	Float32	PR	DC component of phase B voltage. Unit [V]
20132	Voltage 1st of phase B	Float32	PR	1st component of phase B voltage. Unit [V]
20134-20257	Voltage 2nd - 63th of phase B	62* Float32	PR	2nd - 63th components of phase B voltage. Unit [V]
20258	Voltage DC of phase C	Float32	PR	DC component of phase B voltage. Unit [V]
20260	Voltage 1st of phase C	Float32	PR	1st component of phase B voltage. Unit [V]
20262-20385	Voltage 2nd - 63th of phase C	62* Float32	PR	2nd - 63th components of phase B voltage. Unit [V]
20386	Current DC of phase A	Float32	PR	DC component of phase A current. Unit [A]
20388	Current 1st of phase A	Float32	PR	1st component of phase A current. Unit [A]
20390-20513	Current 2nd - 63th of phase A	62* Float32	PR	2nd - 63th components of phase A current. Unit [A]
20514	Current DC of phase B	Float32	PR	DC component of phase B current. Unit [A]
20516	Current 1st of phase B	Float32	PR	1st component of phase B current. Unit [A]
20518-20641	Current 2nd - 63th of phase B	62* Float32	PR	2nd - 63th components of phase B current. Unit [A]
20642	Current DC of phase C	Float32	PR	DC component of phase C current. Unit [A]
20644	Current 1st of phase C	Float32	PR	1st component of phase C current. Unit [A]
20646-20769	Current 2nd - 63th of phase C	62* Float32	PR	2nd - 63th components of phase C current. Unit [A]

Voltage RMS Data [1-cycle]

Register Number	Name	Format	Attribute	Description
21001	Valid points of 1-cycle RMS voltage	UInt16	PR	Valid point count of 1-cycle voltage RMS in the current 0.2 second frame. This number is valid in the RMS area for each phase. Aggregation 0 and Aggregation 200 only. 50: 50Hz (half-cycle refreshed 1-cycle RMS) 60: 60Hz (half-cycle refreshed 1-cycle RMS)
21002-21061	1-cycle RMS voltage of phase A	30* Float32	PR	A phase voltage RMS (half-cycle refreshed 1-cycle RMS). Aggregation 0 and Aggregation 200 only.
21062-21121	1-cycle RMS voltage of phase B	30* Float32	PR	B phase voltage RMS (half-cycle refreshed 1-cycle RMS). Aggregation 0 and Aggregation 200 only.
21122-21181	1-cycle RMS voltage of phase C	30* Float32	PR	C phase voltage RMS (half-cycle refreshed 1-cycle RMS). Aggregation 0 and Aggregation 200 only.

Voltage/Current Waveform Data

Register Number	Name	Format	Attribute	Description
21201-21597	1st cycle Waveform		PR	1st cycle Waveform data. See "Voltage/Current Waveform Data Details".
21598-21994	2nd cycle Waveform		PR	2nd cycle Waveform data. See "Voltage/Current Waveform Data Details".
21995-22391	3rd cycle Waveform		PR	3rd cycle Waveform data. See "Voltage/Current Waveform Data Details".
22392-22788	4th cycle Waveform		PR	4th cycle Waveform data. See "Voltage/Current Waveform Data Details".
22789-23185	5th cycle Waveform		PR	5th cycle Waveform data. See "Voltage/Current Waveform Data Details".
23186-23582	6th cycle Waveform		PR	6th cycle Waveform data. See "Voltage/Current Waveform Data Details".
23583-23979	7th cycle Waveform		PR	7th cycle Waveform data. See "Voltage/Current Waveform Data Details".
23980-24376	8th cycle Waveform		PR	8th cycle Waveform data. See "Voltage/Current Waveform Data Details".
24377-24773	9th cycle Waveform		PR	9th cycle Waveform data. See "Voltage/Current Waveform Data Details".
24774-25170	10th cycle Waveform		PR	10th cycle Waveform data. See "Voltage/Current Waveform Data Details".
25171-25567	11st cycle Waveform		PR	11th cycle Waveform data. See "Voltage/Current Waveform Data Details".
25568-25964	12nd cycle Waveform		PR	12th cycle Waveform data. See "Voltage/Current Waveform Data Details".

Voltage/Current Waveform Data Details

This detailed map describes Accura 3700 voltage / current waveform data.

The "Offset Number" of this map is not a "Number" of the normal map but a relative position from the "Register Number" at which the waveform data starts.

Offset Number	Name	Format	Attribute	Description
0	Validity of cycle waveform	UInt16	PR	Validity of cycle waveform data. 0: Invalid 1: Valid
1	Scale factor of voltage phase A in waveform	Float32	PR	Scale factor value of phase A voltage. Multiply this scale factor by the waveform to get the true-size waveform.
3	Scale factor of voltage phase B in waveform	Float32	PR	Scale factor value of phase B voltage.
4	Scale factor of voltage phase C in waveform	Float32	PR	Scale factor value of phase C voltage.
7	Scale factor of current phase A in waveform	Float32	PR	Scale factor value of phase A current. Multiply this scale factor by the waveform to get the true-size waveform.
9	Scale factor of current phase B in waveform	Float32	PR	Scale factor value of phase B current.
11	Scale factor of current phase C in waveform	Float32	PR	Scale factor value of phase C current.
13-76	Voltage waveform of phase A	64* Int16	PR	A phase voltage waveform. 64-sample / cycle * 1-cycle
77-140	Voltage waveform of phase B	64* Int16	PR	B phase voltage waveform. 64-sample / cycle * 1-cycle
141-204	Voltage waveform of phase C	64* Int16	PR	C phase voltage waveform. 64-sample / cycle * 1-cycle
205-268	Current waveform of phase A	64* Int16	PR	A phase current waveform. 64-sample / cycle * 1-cycle
269-332	Current waveform of phase B	64* Int16	PR	B phase current waveform. 64-sample / cycle * 1-cycle
333-396	Current waveform of phase C	64* Int16	PR	C phase current waveform. 64-sample / cycle * 1-cycle

Measurement Event Data Category

Measurement event data category provides various measurement event data that can occur during measurement process such as Dip, Swell and Voltage Loss. Event data is stored in nonvolatile memory of Accura 3700 and is supported for the most recent 500 event data. The last 500 events are managed by index which is circulated from 0 to 4,294,967,295 so the user can easily recognize the most recent event. The user can delete the accumulated event data and initialize it.

Measurement Event Status and Data

Offset Number	Name	Format	Attribute	Description
38001	Dip start event status of phase A	UInt16	R	Dip start event status of phase A. 0: No event 1: Dip start This register value changes to 1 when an event occurs. The value is changed to 0 after 5 seconds.
38002	Dip start event status of phase B	UInt16	R	Dip start event status of phase B. See "Dip start event status of phase A".
38003	Dip start event status of phase C	UInt16	R	Dip start event status of phase C. See "Dip start event status of phase A".
38004	Dip end event status of phase A	UInt16	R	Dip end event status of phase A. 0: No event 1: Dip end This register value changes to 1 when an event occurs. The value is changed to 0 after 5 seconds.
38005	Dip end event status of phase B	UInt16	R	Dip end event status of phase B. See "Dip end event status of phase A".
38006	Dip end event status of phase C	UInt16	R	Dip end event status of phase C. See "Dip end event status of phase A".
38007	Swell start event status of phase A	UInt16	R	Swell start event status of phase A. 0: No event 1: Swell start This register value changes to 1 when an event occurs. The value is changed to 0 after 5 seconds.
38008	Swell start event status of phase B	UInt16	R	Swell start event status of phase B. See "Swell start event status of phase A".
38009	Swell start event status of phase C	UInt16	R	Swell start event status of phase C. See "Swell start event status of phase A".
38010	Swell end event status of phase A	UInt16	R	Swell end event status of phase A. 0: No event 1: Swell end This register value changes to 1 when an event occurs. The value is changed to 0 after 5 seconds.
38011	Swell end event status of phase B	UInt16	R	Swell end event status of phase B. See "Swell end event status of phase A".
38012	Swell end event status of phase C	UInt16	R	Swell end event status of phase C. See "Swell end event status of phase A".
38013	Over current start event status of phase A	UInt16	R	Over current start event status of phase A. 0: No event 1: Over current start This register value changes to 1 when an event occurs. The value is changed to 0 after 5 seconds.

38014	Over current start event status of phase B	UInt16	R	Over current start event status of phase B. See "Over current start event status of phase A".
38015	Over current start event status of phase C	UInt16	R	Over current start event status of phase C. See "Over current start event status of phase A".
38016	Over current end event status of phase A	UInt16	R	Over current end event status of phase A. 0: No event 1: Over current end This register value changes to 1 when an event occurs. The value is changed to 0 after 5 seconds.
38017	Over current end event status of phase B	UInt16	R	Over current end event status of phase B. See "Over current start event status of phase A".
38018	Over current end event status of phase C	UInt16	R	Over current end event status of phase C. See "Over current start event status of phase A".
38019-38020	Reserved			
38021	Dip start event UTC time of phase A	UInt32	R	Dip start event occurrence time of phase A. (UTC)
38023	Dip start event millisecond time of phase A	UInt16	R	Dip start event occurrence time of phase A. (millisecond part) Unit [ms]
38024	Dip start event index of phase A	UInt32	R	Dip start event index of phase A.
38026-38040	Dip start event contents of phase A		R	Dip start event contents of phase A. See "Measurement Event Data Details, Dip/Swell Start Event".
38041-38060	Dip start event data of phase B		R	Dip start event data of phase B. See Dip start event data of phase A. (register 38021- 38040)
38061-38080	Dip start event data of phase C		R	Dip start event data of phase C. See Dip start event data of phase A. (register 38021- 38040)
38081	Dip end event UTC time of phase A	UInt32	R	Dip end event occurrence time of phase A. (UTC)
38083	Dip end event millisecond time of phase A	UInt16	R	Dip end event occurrence time of phase A (millisecond part) Unit [ms]
38084	Dip end event index of phase A		R	Dip end event index of phase A.
38086-38110	Dip end event contents of phase A		R	Dip end event contents of phase A. See "Measurement Event Data Details, Dip/Swell End Event".
38111-38140	Dip end event data of phase B		R	Dip end event data of phase B. See Dip end event data of phase A. (register 38081- 38110)
38141-38170	Dip end event data of phase C		R	Dip end event data of phase C. See Dip end event data of phase A. (register 38081- 38110)
38171	Swell start event UTC time of phase A		R	Swell start event occurrence time of phase A. (UTC)
38173	Swell start event millisecond time of phase A		R	Swell start event occurrence time of phase A (millisecond part) Unit [ms]
38174	Swell start event index of phase A		R	Swell start event index of phase A.
38176-	Swell start event		R	Swell start event contents of phase A. See "Measurement

38190	contents of phase A			Event Data Details, Dip/Swell Start Event".
38191-38210	Swell start event data of phase B		R	Swell start event data of phase B. See Swell start event data of phase A. (register 38171 - 38190)
38211-38230	Swell start event data of phase C		R	Swell start event data of phase C. See Swell start event data of phase A. (register 38171 - 38190)
38231	Swell end event UTC time status of phase A		R	Swell end event occurrence time of phase A. (UTC)
38233	Swell end event millisecond time status of phase A		R	Swell end event occurrence time of phase A. (millisecond part) Unit [ms]
38234	Swell end event index status of phase A		R	Swell end event index of phase A.
38236-38260	Swell end event contents status of phase A		R	Swell end event contents of phase A. See "Measurement Event Data Details, Dip/Swell End Event".
38261-38290	Swell end event data of phase B		R	Swell end event data of phase B. See Swell end event data of phase A. (register 38231 - 38260)
38291-38320	Swell end event data of phase C		R	Swell end event data of phase C. See Swell end event data of phase A. (register 38231 - 38260)
38321	Over current start event UTC time of phase A		R	Over current start event occurrence time of phase A. (UTC)
38323	Over current start event millisecond time of phase A		R	Over current start event occurrence time of phase A. (millisecond part) Unit [ms]
38324	Over current start event index of phase A		R	Over current start event index of phase A.
38326-38330	Over current start event contents of phase A		R	Over current start event contents of phase A. See "Measurement Event Data Details, Over Current Start Event".
38331-38340	Over current start event data of phase B		R	Over current start event data of phase B. See Over current start event data of phase A. (register 38321 - 38330)
38341-38350	Over current start event data of phase C		R	Over current start event data of phase C. See Over current start event data of phase A. (register 38321 - 38330)
38351	Over current end event UTC time of phase A		R	Over current end event occurrence time of phase A. (UTC)
38353	Over current end event millisecond time of phase A		R	Over current end event occurrence time of phase A (millisecond part) Unit [ms]
38354	Over current end event index of phase A		R	Over current end event index of phase A.
38356-38360	Over current end event contents of phase A		R	Over current end event contents of phase A. See "Measurement Event Data Details, Over Current End Event".
38361-38370	Over current end event data of phase B		R	Over current end event data of phase B. See Over current end event data of phase A. (register 38351 - 38360)
38371-38380	Over current end event data of phase C		R	Over current end event data of phase C. See Over current end event data of phase A. (register 38351 - 38360)

Indexed Measurement Event Data

Register Number	Name	Format	Attribute	Description
40001	Buffer size	UInt16	PR	Number of events stored on Accura 3700.
40002	Index selection	UInt32	PRW	Select the event index to collect data. Valid range: 0 - 4,294,967,295 Default: 0 (Invalid)
40004	Index selection update mode	UInt16	PRW	0: Fixed Fetch data corresponding to index selection when reading fetch data. The value of the index selection does not change after reading the fetch data. 1: Newest When reading the fetch data, change the index selection value to the latest index and fetch the data. 2: Auto increment When reading the fetch data, if the index selection value is within the valid range, increment the index selection value by 1 after fetching the data. If the index selection value is smaller than the valid range, the data is fetched by changing to the minimum value of valid range.
40005	Buffered data count	UInt16	PR	Total number of buffered data.
40006	Oldest index	UInt32	PR	Oldest buffer index among buffered data. Valid range: 0 - 4,294,967,295
40008	Newest index	UInt32	PR	Latest buffer index among buffered data. Valid range: 0 - 4,294,967,295
40010	Fetch data	UInt16	PR	When this register is read, the measurement data is updated according to the buffer index selection and the index selection update mode. 0: Fail (Fetched index maintains the previous value) 1: Success, (Current index displayed in Fetched index)
40011	Remaining data count	UInt16	PR	The number of data indexes remaining in the buffer since the read measurement data.
40012	Fetched index	UInt32	PR	Buffer index of updated measurement data.
40014-40020	Reserved			
40021	Type of measurement event	UInt16	PR	Type of measurement event. 0: Dip start 1: Dip end 2: Swell start 3: Swell end 4: Phase open start 5: Phase open end 6: Fuse fail start 7: Fuse fail end 8: Blackout start 9: Blackout end 10: DI open (Module event) 11: DI closed (Module event) 12: DI dual error (Module event) 13: AI over (Module event) 14: AI under (Module event)

				15: AI open (Module event) 16: Over temperature event start 17: Over temperature event end 18: Over current event start 19: Over current event end 20: Over demand current start 21: Over demand current end 22: Over power start 23: Over power end 24: Current pickup 25: Power pickup 26: External trigger
40022	Event UTC time	UInt32	PR	Event occurrence time. (UTC)
40024	Event millisecond time	UInt16	PR	Event occurrence time. (millisecond part) Valid range: 0 - 999 [ms]
40025	On-event index of measured data	UInt32	PR	Measurement data index at the time of event occurrence.
40027	Pre-event index of measured data	UInt32	PR	Measurement data of a predetermined section is stored when an event occurs. The starting measurement index for this interval.
40029	Post-event index of measured data	UInt32	PR	Measurement data of a predetermined section is stored when an event occurs. The ending measurement index for this interval.
40031	Validity of event index	UInt16	PR	Validity of event index. 0: Invalid 1: Valid
40032-40044	Reserved			
40045	Event contents		PR	See “Measurement Event Data Details by event type”.
40077-40100	Reserved			
40101	Saved on-event index of measured data	UInt16	PR	Measurement index at the time the event occurred.
40102	Count of saved measured data	UInt16	PR	Number of measurement data frames used to store when an event occurs.
40103	Index of saved measured data	UInt16	PR	Index in the measurement data section that is saved when the event occurs. Valid range: 0 - 5
40104	Fetch data	UInt16	PR	Saved measured data is fetched when this register is read.
40105	Validity of measured data	Int16	PR	Measured data validity read. -1: When the measurement data of the event is cleared 0: Invalid 1: Valid
40106	Start UTC time of saved measured data	UInt32	PR	Loaded measurement data start time. (UTC)
40108	Start millisecond time of saved measured data	UInt16	PR	Loaded measurement data start time. (millisecond part) Unit [ms]
40109	End UTC time of saved measured data	UInt32	PR	Loaded measurement data end time. (UTC)

40111	End millisecond time of saved measured data	UInt16	PR	Loaded measurement data end time. (millisecond part) Unit [ms]

Saved Measurement Event Data

Register Number	Name	Format	Attribute	Description
42000	Validity of waveform 1	UInt16	PR	Validity of waveform 1 data. 0: Invalid 1: Valid
42001	Scale factor of voltage phase A in waveform 1	Float32	PR	Scale factor value of phase A voltage in waveform 1. Multiply this scale factor by the waveform to get the true-size waveform.
42003	Scale factor of voltage phase B in waveform 1	Float32	PR	Scale factor value of phase B voltage in waveform 1.
42005	Scale factor of voltage phase C in waveform 1	Float32	PR	Scale factor value of phase C voltage in waveform 1.
42007	Scale factor of current phase A in waveform 1	Float32	PR	Scale factor value of phase A current in waveform 1. Multiply this scale factor by the waveform to get the true-size waveform.
42009	Scale factor of current phase B in waveform 1	Float32	PR	Scale factor value of phase B current in waveform 1.
42011	Scale factor of current phase C in waveform 1	Float32	PR	Scale factor value of phase C current in waveform 1.
42013-42076	Voltage waveform 1 of phase A	64* Int16	PR	Phase A voltage of Waveform 1.
42077-42140	Voltage waveform 1 of phase B	64* Int16	PR	Phase B voltage of Waveform 1.
42141-42204	Voltage waveform 1 of phase C	64* Int16	PR	Phase C voltage of Waveform 1.
42205-42268	Current waveform 1 of phase A	64* Int16	PR	Phase A current of Waveform 1.
42269-42332	Current waveform 1 of phase B	64* Int16	PR	Phase B current of Waveform 1.
42333-42396	Current waveform 1 of phase C	64* Int16	PR	Phase C current of Waveform 1.
42397-42399	Reserved			
42400-42799	Waveform 2		PR	Waveform 2 data. See waveform 1 data. (register 42000 - 42399)
42800-46399	Waveform 3 - 11		PR	Waveform 3 - 11 data. See waveform 1 data. (register 42000 - 42399)
46400-46799	Waveform 12		PR	Waveform 12 data. See waveform 1 data. (register 42000 - 42399)
46800	Valid points of 1-cycle RMS voltage	UInt16	PR	Valid point count of 1-cycle voltage RMS in the current 0.2 second frame. This number is valid in the RMS area for each phase. Aggregation 0 and Aggregation 200 only. 50: 50Hz (half-cycle refreshed 1-cycle RMS)

				60: 60Hz (half-cycle refreshed 1-cycle RMS)
46801	1-cycle RMS voltage of phase A	30* Float32	PR	A phase voltage RMS (half-cycle refreshed 1-cycle RMS). Aggregation 0 and Aggregation 200 only.
46861	1-cycle RMS voltage of phase B	30* Float32	PR	B phase voltage RMS (half-cycle refreshed 1-cycle RMS). Aggregation 0 and Aggregation 200 only.
46921	1-cycle RMS voltage of phase C	30* Float32	PR	C phase voltage RMS (half-cycle refreshed 1-cycle RMS). Aggregation 0 and Aggregation 200 only.
46981-46999	Reserved			
47000	Validity of harmonics	UInt16	PR	Validity of harmonics. 0: Invalid 1: Valid
47001	DC voltage of phase A	Float32	PR	DC component of phase A voltage. Unit [V]
47003	1st voltage of phase A	Float32	PR	1st component of phase A voltage. Unit [V]
47005-47128	2nd - 63th voltage of phase A	62* Float32	PR	2nd - 63th components of phase A voltage. Unit [V]
47129	DC voltage of phase B	Float32	PR	DC component of phase B voltage. Unit [V]
47131	1st voltage of phase B	Float32	PR	1st component of phase B voltage. Unit [V]
47133-47256	2nd - 63th voltage of phase B	62* Float32	PR	2nd - 63th components of phase B voltage. Unit [V]
47257	DC voltage of phase C	Float32	PR	DC component of phase C voltage. Unit [V]
47259	1st voltage of phase C	Float32	PR	1st component of phase C voltage. Unit [V]
47261-47384	2nd - 63th voltage of phase C	62* Float32	PR	2nd - 63th components of phase C voltage. Unit [V]
47385	DC current of phase A	Float32	PR	DC component of phase A current. Unit [A]
47387	1st current of phase A	Float32	PR	1st component of phase A current. Unit [A]
47389-47512	2nd - 63th current of phase A	62* Float32	PR	2nd - 63th components of phase A current. Unit [A]
47513	DC current of phase B	Float32	PR	DC component of phase B current. Unit [A]
47515	1st current of phase B	Float32	PR	1st component of phase B current. Unit [A]
47517-47640	2nd - 63th current of phase B	62* Float32	PR	2nd - 63th components of phase B current. Unit [A]
47641	DC current of phase C	Float32	PR	DC component of phase C current. Unit [A]
47643	1st current of phase C	Float32	PR	1st component of phase C current. Unit [A]
47645-47768	2nd - 63th current of phase C	62* Float32	PR	2nd - 63th components of phase C current. Unit [A]
47769-47899	Reserved			
47900	Validity of Voltage/Current measurement	UInt16	PR	Validity of voltage/current measurement. 0: Invalid 1: Valid
47901	Validity of module ID 1 measurement	UInt16	PR	Validity of module ID 1 measurement. 0: Invalid 1: Valid
47902	Validity of module ID 2 measurement	UInt16	PR	Validity of module ID 2 measurement. 0: Invalid 1: Valid
47903-	Validity of module ID 3 measurement	UInt16	PR	Validity of module ID 3 measurement. 0: Invalid 1: Valid
47904	Validity of module ID 4	UInt16	PR	Validity of module ID 4 measurement.

	measurement			0: Invalid 1: Valid
47905	Validity of module ID 5 measurement	UInt16	PR	Validity of module ID 5 measurement. 0: Invalid 1: Valid
47906	Validity of module ID 6 measurement	UInt16	PR	Validity of module ID 6 measurement. 0: Invalid 1: Valid
47907	Validity of module ID 7 measurement	UInt16	PR	Validity of module ID 7 measurement. 0: Invalid 1: Valid
47908	Validity of module ID 8 measurement	UInt16	PR	Validity of module ID 8 measurement. 0: Invalid 1: Valid
47909	Validity of module ID 9 measurement	UInt16	PR	Validity of module ID 9 measurement. 0: Invalid 1: Valid
47910	Type of module ID 1	UInt16	PR	Type of module ID 1. 1: DIO 2: DI 3: DO 4: AI 5: AO 6: A4D2 7: A2D4 8: DC 9: RTD 10: ELD
47911	Type of module ID 2	UInt16	PR	Type of module ID 2. See “Type of module ID 1”.
47912	Type of module ID 3	UInt16	PR	Type of module ID 3. See “Type of module ID 1”.
47913	Type of module ID 4	UInt16	PR	Type of module ID 4. See “Type of module ID 1”.
47914	Type of module ID 5	UInt16	PR	Type of module ID 5. See “Type of module ID 1”.
47915	Type of module ID 6	UInt16	PR	Type of module ID 6. See “Type of module ID 1”.
47916	Type of module ID 7	UInt16	PR	Type of module ID 7. See “Type of module ID 1”.
47917	Type of module ID 8	UInt16	PR	Type of module ID 8. See “Type of module ID 1”.
47918	Type of module ID 9	UInt16	PR	Type of module ID 9. See “Type of module ID 1”.
47919-47999	Reserved			
48000-48999	Voltage/Current measurement data		PR	Accura 3700 measurement data. See “Voltage/Current Measurement Data”.
49000-49099	Measured data of module ID 1		PR	Measured data of module ID 1. See “Module Data Details by type”.
49100-49199	Measured data of module ID 2		PR	Measured data of module ID 2. See “Module Data Details by type”.
49200-49299	Measured data of module ID 3		PR	Measured data of module ID 3. See “Module Data Details by type”.
49300-49399	Measured data of module ID 4		PR	Measured data of module ID 4. See “Module Data Details by type”.
49400-49499	Measured data of module ID 5		PR	Measured data of module ID 5. See “Module Data Details by type”.
49500-49599	Measured data of module ID 6		PR	Measured data of module ID 6. See “Module Data Details by type”.
49600-49699	Measured data of module ID 7		PR	Measured data of module ID 7. See “Module Data Details by type”.
49700-49799	Measured data of module ID 8		PR	Measured data of module ID 8. See “Module Data Details by type”.
49800-49899	Measured data of module ID 9		PR	Measured data of module ID 9. See “Module Data Details by type”.

Measurement Event Data Details

This detailed map describes Accura 3700 event data. The "Offset Number" of this map is not the "Register Number" of the normal map but the relative position from the "Register Number" where the event content starts.

Dip/Swell Start Event

Offset Number	Name	Format	Attribute	Description
0	Start voltage	Float32	R	Start voltage. Unit [V]
2	Phase	UInt16	R	Phase where the event occurred. 0: Phase AN 1: Phase BN 2: Phase CN 3: Phase AB 4: Phase BC 5: Phase CA
3	Start ratio	UInt16	R	Start ratio level. Ratio value to rated voltage * 10. Unit [%]
4	Reference voltage	Float32	R	Reference voltage. Unit [V]
6	Start voltage AN or AB	Float32	R	Following the wiring mode. Unit [V] 3P4W: Start voltage of phase voltage AN 3P3W: Start voltage of line voltage AB
8	Start voltage BN or BC	Float32	R	Following the wiring mode. Unit [V] 3P4W: Start voltage of phase voltage BN 3P3W: Start voltage of line voltage BC
10	Start voltage CN or CA	Float32	R	Following the wiring mode. Unit [V] 3P4W: Start voltage of phase voltage CN 3P3W: Start voltage of line voltage CA

Dip/Swell End Event

Offset Number	Name	Format	Attribute	Description
0	End voltage	Float32	R	End voltage. Unit [V]
2	Peak voltage	Float32	R	Dip lowest voltage, Swell highest voltage. Unit [V]
4	Duration	UInt32	R	Time from start to end. Unit [ms]
6	Phase	UInt16	R	Phase where the event occurred. 0: Phase AN 1: Phase BN 2: Phase CN 3: Phase AB 4: Phase BC 5: Phase CA
7	End ratio	UInt16	R	End ratio level. Ratio value to rated voltage * 10. Unit [%]
8	Reference voltage	Float32	R	Reference voltage. Unit [V]
10	End voltage AN or AB	Float32	R	Following the wiring mode. Unit [V] 3P4W: End voltage of phase voltage AN 3P3W: End voltage of line voltage AB
12	End voltage BN or BC	Float32	R	Following the wiring mode. Unit [V] 3P4W: End voltage of phase voltage BN 3P3W: End voltage of line voltage BC
14	End voltage CN or CA	Float32	R	Following the wiring mode. Unit [V] 3P4W: End voltage of phase voltage CN 3P3W: End voltage of line voltage CA

16	Peak voltage AN or AB	Float32	R	Following the wiring mode. Unit [V] 3P4W: Peak voltage of phase voltage AN 3P3W: Peak voltage of line voltage AB
18	Peak Voltage BN or BC	Float32	R	Following the wiring mode. Unit [V] 3P4W: Peak voltage of phase voltage BN 3P3W: Peak voltage of line voltage BC
20	Peak Voltage CN or CA	Float32	R	Following the wiring mode. Unit [V] 3P4W: Peak voltage of phase voltage CN 3P3W: Peak voltage of line voltage CA

Phase Open/Fuse Fail Start Event

Offset Number	Name	Format	Attribute	Description
0	Phase	UInt16	R	Phase where the event occurred. 0: Phase A 1: Phase B 2: Phase C
1	Voltage state	UInt16	R	Voltage input state of each phase. Bit.[0]: Phase A Bit.[1]: Phase B Bit.[2]: Phase C 0: On 1: Off
3	Current state	UInt16	R	Current input state of each phase. Bit.[0]: Phase A Bit.[1]: Phase B Bit.[2]: Phase C 0: On 1: Off

Phase Open/Fuse Fail End Event

Offset Number	Name	Format	Attribute	Description
0	Phase	UInt16	R	Phase where the event occurred. 0: Phase A 1: Phase B 2: Phase C
1	Voltage state	UInt16	R	Voltage input state of each phase. Bit.[0]: Phase A Bit.[1]: Phase B Bit.[2]: Phase C 0: On 1: Off
2	Current state	UInt16	R	Current input state of each phase. Bit.[0]: Phase A Bit.[1]: Phase B Bit.[2]: Phase C 0: On 1: Off
3	Duration	Uint32	R	Event duration time. Unit [ms]

Module Event

Offset Number	Name	Format	Attribute	Description
0	Module ID	UInt16	R	ID of module where the event occurred.
1	Module type	UInt16	R	Type of module where the event occurred. 1: DIO 2: DI 3: DO 4: AI 5: AO 6: A4D2 7: A2D4 8: DC 9: RTD 10: ELD
3	Event channel	UInt16	R	Channel of module where the event occurred.

Over Temperature Start Event

Offset Number	Name	Format	Attribute	Description
0	Start temperature	Float32	R	Event detection temperature. Unit [℃]

Over Temperature End Event

Offset Number	Name	Format	Attribute	Description
0	Max temperature	Float32	R	Max temperature. Unit [℃]
2	Duration	Float32	R	Event duration time. Unit [ms]

Over Current Start Event

Offset Number	Name	Format	Attribute	Description
0	Phase	UInt16	R	Phase where the event occurred. 0: Phase A 1: Phase B 2: Phase C
1	Start current	Float32	R	Start current. Unit [A]
3	Delay time	Int16	R	Delay time of definite time for event detection. Valid range: -1 (1-cycle) Valid range: 0 (0.2 [sec]) Valid range: 1 - 9 [sec]

Over Current End Event

Offset Number	Name	Format	Attribute	Description
0	Phase	UInt16	R	Phase where the event occurred. 0: Phase A 1: Phase B 2: Phase C
1	Max current	Float32	R	Max current. Unit [A]
3	Duration	Float32	R	Event duration time. Unit [ms]

Over Demand Current Start Event

Offset Number	Name	Format	Attribute	Description
0	Phase	UInt16	R	Phase where the event occurred. 0: Phase A 1: Phase B 2: Phase C
1	Start demand current	Float32	R	Start demand current. Unit [A]

Over Demand Current End Event

Offset Number	Name	Format	Attribute	Description
0	Phase	UInt16	R	Phase where the event occurred. 0: Phase A 1: Phase B 2: Phase C
1	Max demand current	Float32	R	Max demand current. Unit [A]
3	Duration	Int32	R	Over demand current duration time. Unit [ms]

Over Power Start/Pickup Event

Offset Number	Name	Format	Attribute	Description
0	Phase	UInt16	R	Phase where the event occurred. 0: Phase A 1: Phase B 2: Phase C
1	Start current	Float32	R	Start current. Unit [A]
3	Duration	INT32	R	Delay time of definite time for event detection. Valid range: -1 (1-cycle) Valid range: 0 (0.2 [sec]) Valid range: 1 - 9 [sec]

Over Power End Event

Offset Number	Name	Format	Attribute	Description
0	Phase	UInt16	R	Phase where the event occurred. 0: Phase A 1: Phase B 2: Phase C
1	Max power	Float32	R	Max power. Unit [kW]
3	Duration	Float32	R	Event duration time. Unit [ms]

External Trigger Event

Offset Number	Name	Format	Attribute	Description
0	RMS voltage of Phase A	Float32	R	RMS voltage of Phase A. Unit [V]
2	RMS voltage of Phase B	Float32	R	RMS voltage of Phase B. Unit [V]
4	RMS voltage of Phase C	Float32	R	RMS voltage of Phase C. Unit [V]
6	RMS current of Phase A	Float32	R	RMS current of Phase A. Unit [A]
8	RMS current of Phase B	Float32	R	RMS current of Phase B. Unit [A]
10	RMS current of Phase C	Float32	R	RMS current of Phase C. Unit [A]

Event Data Clear

Register Number	Name	Format	Attribute	Description
2421	Measurement event list clear	UInt16	W	Write 1 to this register to clear the measurement event list.
41000	Measurement event displayed clear	UInt16	RW	Write 1 to this register to release the displayed measurement event alarm on Accura 3700. Remote control unlock is required.

Chapter 3 Modbus Map Application

Register Addressing

Holding registers are addressed starting at zero: Register address is obtained by subtracting by 1 from register number of Modbus Map. Holding registers 1 - 65536 are addressed as 0 - 65535.

For example, the request packet for reading "Voltage Vab" (register number 11117 - 11118) is follows. (11117-1 → 2B6Ch).

Request packet		
03h	2B6Ch	0002h
Function Code (1 byte)	Starting Address (2 bytes)	Quantity of Registers (2 bytes)

Data Format

Measurement data types used in Accura 3700 are as follows.

Data format	Description	Word Length	Endian	Range
UInt16	Unsigned 16-bit	1	NA [1]	0 to 65,535
Int16	Signed 16-bit	1	NA [1]	-32,768 to 32,767
UInt32	Unsigned 32-bit	2	Big-Endian [2]	0 to 4,294,967,295
Int32	Signed 32-bit	2	Big-Endian [2]	-2,147,483,648 to 2,147,483,647
Float32	Single-precision Float (IEEE 754)	2	Big-Endian [2]	-3.4×10^{38} to 3.4×10^{38}

1. NA (Not Available): 1-word data, independent of endian.
2. 2-word data, two register spaces are used. The upper word is located in the lower address register and the lower word is located in the higher address register.

Endian

A measured parameter that has 2 word-length attribute such as "UInt32", "Int32" or "Float32" needs 2 register spaces in Modbus map. Accura 3700 supports "Big-Endian". The high-order word is in the lower register and the low-order word is in the higher addressed register.

For example, suppose that the measured line to line "Voltage Vab" that has float32 attribute (register number 11117 - 11118) is 380.2 Volts.

(Decimal) 380.2 → (Float32) 43BE1999h

Register Number	Name	Value	Remarks
11117	Voltage Vab	43BEh	High-order word of Vab
11118		1999h	Low-order word of Vab

Data Collection Check: Address Error and Endian Error

Data collection In order to analyze / resolve address error and endian error at a short time in development, we stored the following constant value in 4-word space (register number 65533 - 65536) at the end.

Register Number	Value	Format	Attribute	Description
65533	41 42h	Hex16	R	4142h 4344h 4546h 4748h saved in order.
65534	43 44h	Hex16	R	
65535	45 46h	Hex16	R	
65536	47 48h	Hex16	R	

The following is a description of 2-word read from register 65534.

If the data is collected in 43 44 45 46 h in any order, address access is normal.

If 45 46 47 48h is collected, address access is increased by +1, and if 41 42 43 44 h is collected, address access is increased by -1.

If you collect data while correcting the address access error, it becomes one of the types shown in the table below. These are the variations according to the endian, so you can correct the endian order.

The following table describes the possible types for reading 2-words from register 65534.

Case	Data collection status					Solution
	Form of number			Address Offset	Endian	
	Hex	UInt32	Float			
If the register address is normally accessed						
1	43_44_45_46	1,128,547,654	196.271	0	AB CD	Normal.
2	45_46_43_44	1,162,232,644	3172.2	0	CD AB	Endian adjust to ABCD.
3	44_43_46_45	1,145,259,589	781.098	0	BA DC	
4	46_45_44_43	1,178,944,579	12625.1	0	DC BA	
If the register address is accessed incorrectly by +1						
5	45_46_47_48	1,162,233,672	3172.46	+1	AB CD	Subtract 1 from the address.
6	47_48_45_46	1,195,918,662	51269.3	+1	CD AB	Subtract 1 from the address and Endian adjust to ABCD.
7	46_45_48_47	1,178,945,607	12626.1	+1	BA DC	
8	48_47_46_45	1,212,630,597	204057	+1	DC BA	
If the register address is accessed incorrectly by -1						
9	41_42_43_44	1,094,861,636	12.1414	-1	AB CD	Add 1 from the address.
10	43_44_41_42	1,128,546,626	196.255	-1	CD AB	Add 1 from the address and Endian adjust to ABCD.
11	42_41_44_43	1,111,573,571	48.3167	-1	BA DC	
12	44_43_42_41	1,145,258,561	781.035	-1	DC BA	

Setup of device

Setup in remote setup mode is locked by default. At first, it is necessary to unlock the setup at the Modbus connection in which the change is to be made. Also, another setup-unlock is necessary when making a new Modbus connection because this register is private register for each connection.

Remote Setup Unlocking

For setup to be allowed, write these four numbers on the register 2000 in the order given below.

Write 2300 → Write 0 → Write 700 → Write 1

If the order is wrong, the entire writing process should start from the beginning again.

1999(2000-1)→ 07CFh, 700→02BCh, 2300→08FCh

Write 2300		
06h	07CFh	08FCh

→

Write 0		
06h	07CFh	0000h

→

Write 700		
06h	07CFh	02BCh

→

Write 1		
06h	07CFh	0001h

Remote Setup Locking

For setup to be locked, write any value on the register 2000.

Write 0		
06h	07CFh	0000h

Setup-lock status can be known by reading this register as shown below:

1: (default) Setup locked

0: Setup Allowed

Control of device

Remote control is locked by default. At first, it is necessary to unlock the control at the Modbus connection in which the change is to be made. Also, another control-unlock is necessary when making a new Modbus connection because this register is private register for each connection.

Remote Control Unlocking

For control to be allowed, write these four numbers on the register 2400 in the order given below.

Write 2300 → Write 0 → Write 1600 → Write 1

If the order is wrong, the entire writing process should start from the beginning again.

2399(2400-1)→095Fh, 1600→0640h, 2300→08FCh

Write 2300		
06h	095Fh	08FCh

→

Write 0		
06h	095Fh	0000h

→

Write 1600		
06h	095Fh	0640h

→

Write 1		
06h	095Fh	0001h

Remote Control Locking

For control to be locked, write any value on the register 2400.

Write 0		
06h	095Fh	0000h

Control-lock status can be known by reading this register as shown below:

1: (default) Control locked

0: Control Allowed

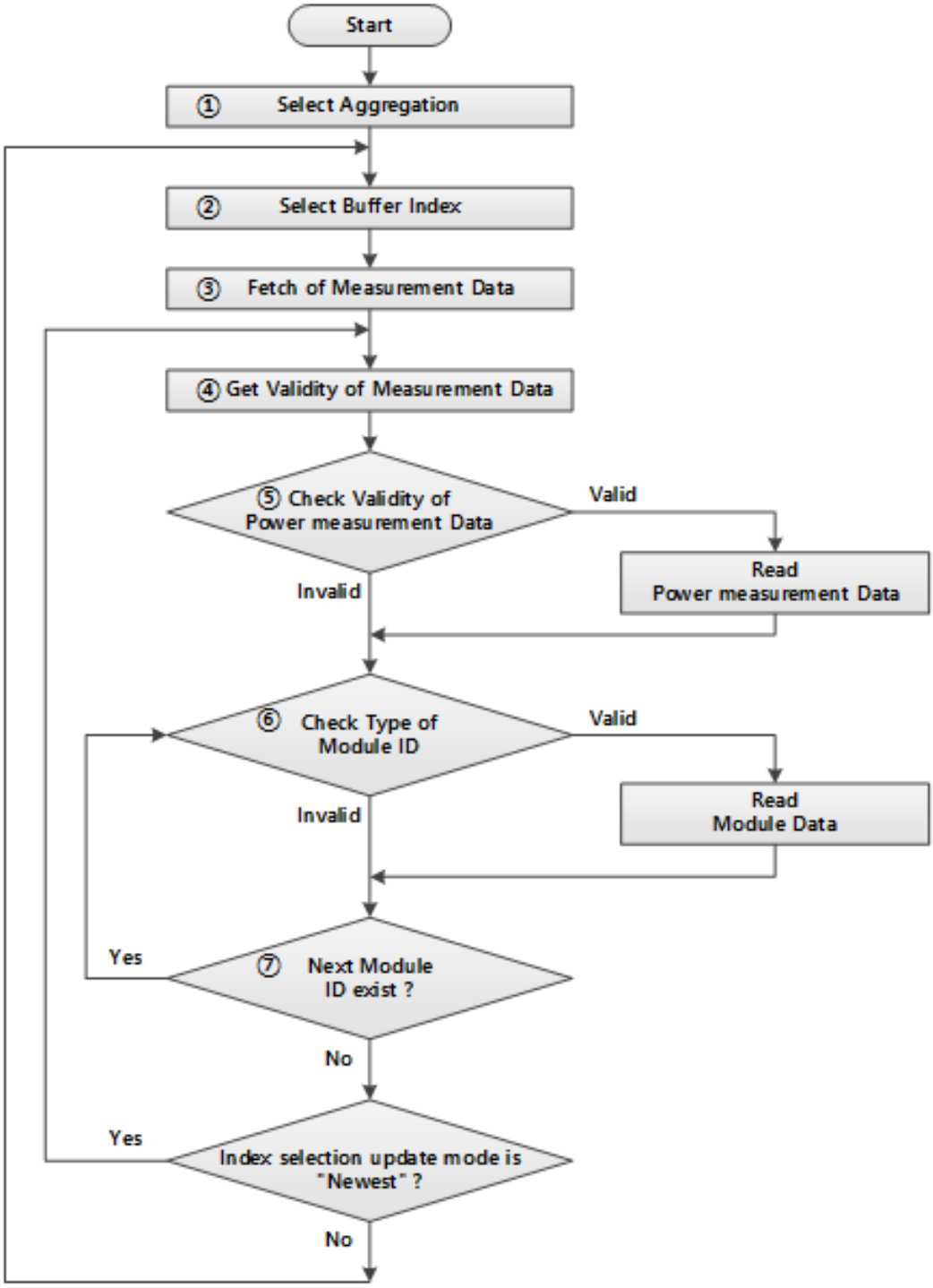
Collection of Measurement Data

Flowchart

In order to collect the measurement data of Accura 3700 properly, some steps must be needed as follows:

① Selection of aggregation: Default aggregation is 1 second.
② Selection of buffer index: Default is auto-indexing of the newest buffer.
③ Data Fetch of measurement data of Accura 3700 to the Modbus registers.
(Can be omitted in the newest index mode)
④ Read the validity of measurement data of Accura 3700 and the type and validity of each ID of module.
⑤ Check the validity of voltage data of Accura 3700. If valid, read measurement data.
⑥ Check the type and validity of A3700 module. When the data is valid, the data is read according to the type.
⑦ If multiple Accura 3700 modules are present, repeat step ⑥.
If all Accura 3700 modules have been collected, wait for the polling period and repeat from step ④.
However, if you did not select the latest index auto indexing in step ②, repeat from step ②.

Fig 3.1 Flowchart of measurement data collection



Selection of Aggregation

Set the aggregation for the interval that you want to collect data. The default setting is aggregation 1 (1 second aggregation).

Aggregation name	Aggregation interval	Buffer length	Buffering time	Circular index
Aggregation 0	0.5 second (base)	120	60 seconds	0 - 4,294,967,295
Aggregation 1	1 second	32	32 seconds	0 - 4,294,967,295
Aggregation 2	5 seconds	12	60 seconds	0 - 4,294,967,295
Aggregation 3	1 minute	12	12 minutes	0 - 4,294,967,295
Aggregation 4	5 minutes	10	50 minutes	0 - 4,294,967,295
Aggregation 5	1 hour	10	10 hours	0 - 4,294,967,295
Aggregation 6	6 hours	10	60 hours	0 - 4,294,967,295
Aggregation 11	Default 3 seconds	22	66 seconds	0 - 4,294,967,295
Aggregation 12	Default 15 minutes	12	180 minutes	0 - 4,294,967,295
Aggregation 13	Default 2 hours	10	20 hours	0 - 4,294,967,295
Aggregation 14	Default 12 hours	10	120 hours	0 - 4,294,967,295
Aggregation 15	Default 1 day	10	10 days	0 - 4,294,967,295
Aggregation 200	0.6 seconds [1]	100	-	0 - 4,294,967,295

1. When the activated event is detected, measurement data of 3-frame [frame at the time of occurrence / frame before 0.2 seconds / frame after 0.2 seconds] is stored in the circular buffer

Register Number	Name	Format	Attribute	Description
11001	Aggregation selection	UInt16	PRW	Selection of measurement data aggregation. 0: Data of measurement interval 0.2 [sec] 1: (default) Aggregation 1 (1 sec), Max/Min included 2: Aggregation 2 (5 sec), Max/Min included 3: Aggregation 3 (1 min), Max/Min included 4: Aggregation 4 (5 min), Max/Min included 5: Aggregation 5 (1 hour), Max/Min included 6: Aggregation 6 (6 hours), Max/Min included 11: Aggregation 11 (default 3 sec), Max/Min included 12: Aggregation 12 (default 15 min), Max/Min included 13: Aggregation 13 (default 2 hour), Max/Min included 14: Aggregation 14(default 12 hour), Max/Min included 15: Aggregation 15 (default 1 day), Max/Min included 200: Event Aggregation, Max/Min included

Selection of Buffer Index

Select a buffer index to collect data. The default setting is to automatically index the newest buffer index.

Register Number	Name	Format	Attribute	Description
11003	Index selection	UInt32	PRW	If the selected buffer index is out of the valid buffer index due to buffer length limitation of the corresponding aggregation, the data of the selected buffer index is obsolete and cannot be collected. Valid range: 0 - 4,294,967,295 Default: 0 (Invalid)

Fetch of Measurement Data

Two steps are required to safely collect data with the same time-stamp of Accura 3700. First, you must fetch these data into the Modbus register before reading the data. When Register 11011 is read, the measurement data of Accura 3700 and module are fetched into the individual space of the Modbus register of the corresponding connection. Second, it reads data fetched into individual space safely regardless of the reading speed.

Register Number	Name	Format	Attribute	Description
11011	Measurement access	UInt16	PR	Register 11012 - 25965 access register. When this register is read when the buffer index (register 11003) is valid, the data of the selected buffer index is fetched to register 11012 - 25965. The value read is the selected buffer index where the data is fetched. If the selected buffer index (register 11003) is not valid, Accura 3700 data will not be fetched even if this register is read. The value read is 0h, which means that the selected buffer index is invalid.

Validity Check and Collection of Voltage/Current Measurement Data

Check the validity of the voltage/current data. If it is valid, it reads data from register 11101 - 12100.

Register Number	Name	Format	Attribute	Description
11015	Validity of Voltage/Current measurement	UInt16	PR	Validity of voltage/current measurement. 0: Invalid 1: Valid.

Register Number	Name	Format	Attribute	Description
11101-12100	Voltage/Current measurement data		PR	Accura 3700 Voltage/Current measurement data. See. "Voltage/Current Measurement Data, Measurement Data Category".

Validity Type Check and Collection of Module Measurement Data

Validate each module data according to Accura 3700 module ID. If the module data type is valid, the register is read according to Accura 3700 module type.

Register Number	Name	Format	Attribute	Description
11016	Validity of module ID 1	UInt16	PR	Measurement data validity of Accura 3700 Module ID 1. 0: Invalid 1: Valid
11017	Validity of module ID 2	UInt16	PR	Measurement data validity of Accura 3700 Module ID 2. 0: Invalid 1: Valid
…				
11024	Validity of module ID 9	UInt16	PR	Measurement data validity of Accura 3700 Module ID 9. 0: Invalid 1: Valid

Register Number	Name	Format	Attribute	Description
12101-12200	Data of module ID 1		PR	Measurement data of Module ID 1. See "Module Data". Used when Aggregation selection is 0 - 15 or 200.
12201-12900	Data of module ID 2		PR	Measurement data of Module ID 1. See "Module Data". Used when Aggregation selection is 0 - 15 or 200.
…				
12901-13000	Data of module ID 9		PR	Measurement data of Module ID 1. See "Module Data". Used when Aggregation selection is 0 - 15 or 200.

APPENDIX A Sample of Modbus RTU Packet

The following is a Modbus RTU packet sample in which Modbus registers 1 - 3 are read using Function code 03h "Read holding registers". Modbus registers 1 - 3 are addressed 0 - 2 by subtracting by 1. It is assumed that the "Device Address" of Accura 3700 is 1.

Request Packet

Device Address	Function Code	Data		CRC
		Starting Address	Quantity of Registers	
1 byte	1 byte	2 bytes	2 bytes	2 bytes
01h	03h	0000h	0003h	05CBh

CRC: See Appendix C for how to get the CRC. (CRC high-order byte is the last byte to be sent)

Response Packet

Device Address	Function Code	Data				CRC
		Byte Count	Quantity of Registers			
1 byte	1 byte	1 byte	6 bytes			2 bytes
01h	03h	06h	0E74h	DC89h	863Fh	585Ah

CRC: See Appendix C for how to get the CRC. (CRC high-order byte is the last byte to be sent)

APPENDIX B Sample of Modbus TCP Packet

The following is a Modbus TCP packet sample in which Modbus registers 1 - 3 are read using Function code 03h "Read holding registers". Modbus registers 1 - 3 are addressed 0 - 2 by subtracting by 1.

Request Packet

Modbus TCP Header				Function Code	Data	
Transaction ID	Protocol ID	Length	Unit ID		Starting Address	Quantity of Registers
2 bytes	2 bytes	2 bytes	1 byte	1 byte	2 bytes	2 bytes
0001h	0000h	0006h	01	03h	0000h	0003h

Response Packet

Modbus TCP Header				Function Code	Data			
Transaction ID	Protocol ID	Length	Unit ID		Byte Count	Quantity of Registers		
2 bytes	2 bytes	2 bytes	1 byte	1 byte	1 byte	6 bytes		
0001h	0000h	0009h	01	03h	06h	0E74h	DC89h	863Fh

APPENDIX C CRC-16[Modbus] Algorithm

CRC Table

```
unsigned int CrcTable[256];
unsigned int GenCrc(unsigned int Data, unsigned int Polynomial, unsigned int crc) {
unsigned int i;
        for(i = 0; i < 8; i++) {
                if((Data ^ crc) & 1){
                        crc = (crc >> 1) ^ Polynomial;
                } else {
                        crc >>= 1;
        }
        Data >>= 1;
    }
        return (crc & 0xFFFF);
}
void MakeCrcTable() {
unsigned int Polynomial = 0xA001;
        unsigned int i;
        for(i = 0; i < 256; i++)
                CrcTable[i] = GenCrc(i, Polynomial, 0);
}
```

CRC Function

```
unsigned int CRC16(unsigned char *puchMsg, unsigned short usDataLen) {
        unsigned char uchCRCHi = 0xFF;
        unsigned char uchCRCLo = 0xFF;
        unsigned uIndex;
        while(usDataLen--) {
                uIndex = uchCRCHi ^ *puchMsg++;
                uchCRCHi = uchCRCLo ^ (CrcTable[uIndex] & 0xFF);
                uchCRCLo = (CrcTable[uIndex] >> 8) & 0xFF;
        }
        return ((uchCRCHi << 8) | uchCRCLo);
}
```


APPENDIX D Accura 3500 Modbus Map Support

Accura 3700 provides convenience of accessibility to Accura 3500 users by having compatibility field on Modbus Map. However, does not provide compatibility for some field.

Accura 3700 and Accura 3500 Compatible Table

Data Area	Compatibility	Note
System Information	x	No compliant provisioning policy.
Configuration	x	No compliant provisioning policy.
Voltage/Current Measurement Data	△	Read / Write area changed to read only area.
THD, K-Factor	○	
Extra Energy	○	
Demand, Maximum, Minimum	x	Will be updated later.
Harmonics	x	Will be updated later.
Vector Diagram	○	
Waveform	x	Will be updated later.
Demand Trend	x	Will be updated later.
Reset	△	Some fields are merged into one.
DIO module	○	
DC module	△	Exclude some fields. No update scheduled.
DI module	○	
DO module	○	
AI module	○	
AO module	○	
Short-formed data block	△	Short-form for DC module is not provided.

Voltage/Current Measurement Data

The measurement area (register number 101 - 147) has data that can be obtained by multiplying the measured value by scale. Voltage, current, power, and power factor.

Register Number	Name	Format	Attribute	Description
101	Voltage Van	UInt16	R	Voltage Van raw value. Unit [V] Voltage Van = Voltage Van raw * Voltage scale * 0.1
102	Voltage Vbn	UInt16	R	Voltage Vbn raw value. Unit [V] Voltage Vbn = Voltage Vbn raw * Voltage scale * 0.1
103	Voltage Vcn	UInt16	R	Voltage Vcn raw value. Unit [V] Voltage Vcn = Voltage Vcn raw * Voltage scale * 0.1
104	Voltage Vavg_ln	UInt16	R	Voltage Vavg_ln raw value. Unit [V] Voltage Vavg_ln = Voltage Vavg_ln raw * Voltage scale * 0.1
105	Voltage Vab	UInt16	R	Voltage Vab raw value. Unit [V] Voltage Vab = Voltage Vab raw * Voltage scale * 0.1
106	Voltage Vbc	UInt16	R	Voltage Vbc raw value. Unit [V] Voltage Vbc = Voltage Vbc raw * Voltage scale * 0.1
107	Voltage Vca	UInt16	R	Voltage Vca raw value. Unit [V] Voltage Vca = Voltage Vca raw * Voltage scale * 0.1
108	Voltage Vavg_ll	UInt16	R	Voltage Vavg_ll raw value. Unit [V] Voltage Vavg_ll = Voltage Vavg_ll raw * Voltage scale * 0.1
109	Voltage scale	UInt16	R	Used in registers 101 - 108.
110	Current Ia	UInt16	R	Current Ia raw value. Unit [A] Current Ia = Current Ia raw * Current scale * 0.001
111	Current Ib	UInt16	R	Current Ib raw value. Unit [A] Current Ib = Current Ib raw * Current scale * 0.001
112	Current Ic	UInt16	R	Current Ic raw value. Unit [A] Current Ic = Current Ic raw * Current scale * 0.001
113	Current Iavg	UInt16	R	Current Ia raw value. Unit [A] Current Iavg = Current Iavg raw * Current scale * 0.001
114	Fund. current Ia	UInt16	R	Fund. current Ia raw value. Unit [A] Fund. current Ia = Fund. current Ia raw * Current scale * 0.001
115	Fund. current Ib	UInt16	R	Fund. current Ib raw value. Unit [A] Fund. current Ib = Fund. current Ib raw * Current scale * 0.001
116	Fund. current Ic	UInt16	R	Fund. current Ic raw value. Unit [A] Fund. current Ic = Fund. current Ic raw * Current scale * 0.001
117	Fund. current Iavg	UInt16	R	Fund. current Iavg raw value. Unit [A] Fund. current Iavg = Fund. current Iavg raw * Current scale * 0.001
118	Current scale	UInt16	R	Used in registers 110 - 117.
119	Active power Pa	UInt16	R	Active power Pa raw value. Unit [kW] Active power Pa = Active power Pa raw * Active power scale * 0.001
120	Active power Pb	UInt16	R	Active power Pb raw value. Unit [kW] Active power Pb = Active power Pb raw * Active power scale * 0.001

121	Active power Pc	UInt16	R	Active power Pc raw value. Unit [kW] Active power Pc = Active power Pc raw * Active power scale * 0.001
122	Active power scale	UInt16	R	Used in registers 119 - 121.
123	Active power Ptot	UInt16	R	Active power Ptot raw value. Unit [kW] Active power Ptot = Active power Ptot raw * Active power scale * 0.001
124	Active power Ptot scale	UInt16	R	Used in register 123.
125	Reactive power Qa	UInt16	R	Reactive power Qa raw value. Unit [kVAR] Reactive power Qa = Reactive power Qa raw * Reactive power scale * 0.001
126	Reactive power Qb	UInt16	R	Reactive power Qb raw value. Unit [kVAR] Reactive power Qb = Reactive power Qb raw * Reactive power scale * 0.001
127	Reactive power Qc	UInt16	R	Reactive power Qc raw value. Unit [kVAR] Reactive power Qc = Reactive power Qc raw * Reactive power scale * 0.001
128	Reactive power scale	UInt16	R	Used in registers 125 - 127.
129	Reactive power Qtot	UInt16	R	Reactive power Qtot raw value. Unit [kVAR] Reactive power Qtot = Reactive power Qtot raw * Reactive power scale * 0.001
130	Reactive power Qtot scale	UInt16	R	Used in register 130.
131	Apparent power Sa	UInt16	R	Apparent power Sa raw value. Unit [kVA] Apparent power Sa = Apparent power Sa raw * Apparent power scale * 0.001
132	Apparent power Sb	UInt16	R	Apparent power Sb raw value. Unit [kVA] Apparent power Sb = Apparent power Sb raw * Apparent power scale * 0.001
133	Apparent power Sc	UInt16	R	Apparent power Sc raw value. Unit [kVA] Apparent power Sc = Apparent power Sc raw * Apparent power scale * 0.001
134	Apparent power scale	UInt16	R	Used in registers 131 - 133.
135	Apparent power Stot	UInt16	R	Apparent power Stot raw value. Unit [kVA] Apparent power Stot = Apparent power Stot raw * Apparent power scale * 0.001
136	Apparent power Stot scale	UInt16	R	Used in register 135.
137	PF A	UInt16	R	PF A raw value. PF A = PF A raw * 0.001
138	PF B	UInt16	R	PF B raw value. PF B = PF B raw * 0.001
139	PF C	UInt16	R	PF C raw value. PF C = PF C raw * 0.001
140	Total PF	UInt16	R	Total PF raw value. Total PF = Total PF raw * 0.001
141	Frequency	UInt16	R	Frequency raw. Unit [Hz] Frequency = Frequency raw * 0.01
142	kWh net	Int32	R	KWh received - KWh delivered. Unit [kWh]

144	kVARh net	Int32	R	kVARh received - kVARh delivered. Unit [kVARh]
146	KVAh	Int32	R	Apparent power of three phases. Unit [kVAh]

THD, K-factor

THD, k Factor area (register 148 - 157) provides the total harmonic distortion (THD) and k Factor.

Register Number	Name	Format	Attribute	Description
148	Voltage THD A	UInt16	R	Voltage THD A raw. Unit [%] Voltage THD A = Voltage THD A raw * 0.1
149	Voltage THD B	UInt16	R	Voltage THD B raw. Unit [%] Voltage THD B = Voltage THD B raw * 0.1
150	Voltage THD C	UInt16	R	Voltage THD C raw. Unit [%] Voltage THD C = Voltage THD C raw * 0.1
151	Current THD A	UInt16	R	Current THD A raw. Unit [%] Current THD A = Current THD A raw * 0.1
152	Current THD B	UInt16	R	Current THD B raw. Unit [%] Current THD B = Current THD B raw * 0.1
153	Current THD C	UInt16	R	Current THD C raw. Unit [%] Current THD C = Current THD C raw * 0.1
154	KFa	UInt16	R	K-factor of current A raw. K-factor of current A = K-factor of current A raw * 0.01
155	KFb	UInt16	R	K-factor of current B raw. K-factor of current B = K-factor of current B raw * 0.01
156	KFc	UInt16	R	K-factor of current C raw. K-factor of current C = K-factor of current C raw * 0.01

Extra Energy

Register Number	Name	Format	Attribute	Description
157	kWh received	UInt32	R	Received active power. Unit [kWh]
159	kWh delivered	UInt32	R	Delivered active power. Unit [kWh]
161	kWh sum	UInt32	R	kWh received + KWh delivered. Unit [kWh]
163	kVARh received	UInt32	R	Received reactive power. Unit [kVARh]
165	KVARh delivered	UInt32	R	Delivered reactive power. Unit [kVARh]
167	kVARh sum	UInt32	R	kVARh received + kVARh delivered. Unit [kVARh]

Vector Diagram

Register Number	Name	Format	Attribute	Description
593	Voltage phasor Vax	Int16	R	X-coordinate of phasor voltage for phase A. Unit [V]
594	Voltage phasor Vay	Int16	R	Y-coordinate of phasor voltage for phase A. Unit [V]
595	Voltage phasor Vbx	Int16	R	X-coordinate of phasor voltage for phase B. Unit [V]
596	Voltage phasor Vby	Int16	R	Y-coordinate of phasor voltage for phase B. Unit [V]
597	Voltage phasor Vcx	Int16	R	X-coordinate of phasor voltage for phase C. Unit [V]
598	Voltage phasor Vcy	Int16	R	Y-coordinate of phasor voltage for phase C. Unit [V]
599	Reserved			
600	Current phasor Iax	Int16	R	X-coordinate of phasor current for phase A. Unit [A]
601	Current phasor Iay	Int16	R	Y-coordinate of phasor current for phase A. Unit [A]
602	Current phasor Ibx	Int16	R	X-coordinate of phasor current for phase B. Unit [A]
603	Current phasor Iby	Int16	R	Y-coordinate of phasor current for phase B. Unit [A]
604	Current phasor Icx	Int16	R	X-coordinate of phasor current for phase C. Unit [A]
605	Current phasor Icy	Int16	R	Y-coordinate of phasor current for phase C. Unit [A]

Reset

Reset area (register 1101 - 1106) provides reset function of active power, reactive power, apparent power, all demand, maximum / minimum value. All peak demand reset of Accura 3500 is integrated with Max / Min Reset.

Register Number	Name	Format	Attribute	Description
1101	kWh reset	UInt16	W	kWh Clear. Initializes when 0x00ff is written to this register.
1102	kVARh reset	UInt16	W	kVARh Clear. Initializes when 0x00ff is written to this register.
1103	kVAh reset	UInt16	W	kVAh Clear. Initializes when 0x00ff is written to this register.
1104	All demand reset	UInt16	W	All demand Clear. Initializes when 0x00ff is written to this register.
1105	Reserved			
1106	Max/Min reset	UInt16	W	Max/Min Clear. Initializes when 0x00ff is written to this register.

DIO module

Register Number	Name	Format	Attribute	Description
1201	Status of DI channel 1	UInt16	R	0: Open 255: Closed
1202	Status of DI channel 2	UInt16	R	0: Open 255: Closed
1203	Status of DI channel 3	UInt16	R	0: Open 255: Closed
1204	Status of DI channel 4	UInt16	R	0: Open 255: Closed
1205	Status of DI channel 5	UInt16	R	0: Open 255: Closed
1206	Status of DI channel 6	UInt16	R	0: Open 255: Closed
1207	Status of DI channel 7	UInt16	R	0: Open 255: Closed
1208	Status of DI channel 8	UInt16	R	0: Open 255: Closed
1209	Control of DO channel 1	UInt16	RW	0: Open 255: Closed
1210	Type of DO channel 1	UInt16	RW	0: Latch 1: Pulse
1211	Pulse width time of DO channel 1	UInt16	RW	Unit [0.1sec] Valid range: 1 - 100 (0.1 - 10 [sec])
1212	Control of DO channel 2	UInt16	RW	0: Open 255: Closed
1213	Type of DO channel 2	UInt16	RW	0: Latch 1: Pulse
1214	Pulse width time of DO channel 2	UInt16	RW	Unit [0.1sec] Valid range: 1 - 100 (0.1 - 10 [sec])

DC Module

Register Number	Name	Format	Attribute	Description
1201	Status of DI channel 1	UInt16	R	0: Open 255: Closed
1202	Status of DI channel 2	UInt16	R	0: Open 255: Closed
1203	Status of DI channel 3	UInt16	R	0: Open 255: Closed
1204	Status of DI channel 4	UInt16	R	0: Open 255: Closed
1205	Voltage DC	UInt16	R	Voltage DC raw value. Unit [V] Voltage DC = Voltage DC value raw * 0.1
1206	Output current	UInt16	R	Output current raw value. Unit [A] Output current = Output current raw value * 0.1
1207	Battery current	UInt16	R	Battery current raw value. Unit [A] Battery current = Battery current raw value * 0.1
1208	Reserved			
1209	Control of DO channel 1	UInt16	RW	0: Open 255: Closed
1210	Type of DO channel 1	UInt16	RW	0: Latch 1: Pulse
1211	Pulse width time of DO channel 1	UInt16	RW	Unit [0.1sec] Valid range: 1 - 100 (0.1 - 10 [sec])

DI Module

Register Number	Name	Format	Attribute	Description
1215	Status of DI channel 1	UInt16	R	0: Open 255: Closed
1216	Status of DI channel 2	UInt16	R	0: Open 255: Closed
1217	Status of DI channel 3	UInt16	R	0: Open 255: Closed
1218	Status of DI channel 4	UInt16	R	0: Open 255: Closed
1219	Status of DI channel 5	UInt16	R	0: Open 255: Closed
1220	Status of DI channel 6	UInt16	R	0: Open 255: Closed
1221	Status of DI channel 7	UInt16	R	0: Open 255: Closed
1222	Status of DI channel 8	UInt16	R	0: Open 255: Closed
1223	Status of DI channel 9	UInt16	R	0: Open 255: Closed
1224	Status of DI channel 10	UInt16	R	0: Open 255: Closed
1225	Status of DI channel 11	UInt16	R	0: Open 255: Closed
1226	Status of DI channel 12	UInt16	R	0: Open 255: Closed

DO Module

Register Number	Name	Format	Attribute	Description
1227	Control of DO channel 1	UInt16	RW	0: Open 255: Closed
1228	Type of DO channel 1	UInt16	RW	0: Latch 1: Pulse
1229	Pulse width time of DO channel 1	UInt16	RW	Unit [0.1sec] Valid range: 1 - 100 (0.1 - 10 [sec])
1230	Control of DO channel 2	UInt16	RW	0: Open 255: Closed
1231	Type of DO channel 2	UInt16	RW	0: Latch 1: Pulse
1232	Pulse width time of DO channel 2	UInt16	RW	Unit [0.1sec] Valid range: 1 - 100 (0.1 - 10 [sec])
1233	Control of DO channel 3	UInt16	RW	0: Open 255: Closed
1234	Type of DO channel 3	UInt16	RW	0: Latch 1: Pulse
1235	Pulse width time of DO channel 3	UInt16	RW	Unit [0.1sec] Valid range: 1 - 100 (0.1 - 10 [sec])
1236	Control of DO channel 4	UInt16	RW	0: Open 255: Closed
1237	Type of DO channel 4	UInt16	RW	0: Latch 1: Pulse
1238	Pulse width time of DO channel 4	UInt16	RW	Unit [0.1sec] Valid range: 1 - 100 (0.1 - 10 [sec])

AI Module

Register Number	Name	Format	Attribute	Description
1239	AI channel 1	UInt16	R	Input value of AI channel 1. Valid range: 0 - 4095 Input current [mA] = (Input value of AI channel 1) * 20 / 4095
1240	AI channel 2	UInt16	R	Input value of AI channel 2. See "AI channel 1".
1241	AI channel 3	UInt16	R	Input value of AI channel 3. See "AI channel 1".
1242	AI channel 4	UInt16	R	Input value of AI channel 4. See "AI channel 1".
1243	AI channel 5	UInt16	R	Input value of AI channel 5. See "AI channel 1".

AO Module

Register Number	Name	Format	Attribute	Description
1239	AO channel 1	UInt16	RW	Output value of AO channel 1. Valid range: 0 - 4095 Output current [mA] = (Output value of AO channel 1) * 16 / 4095 + 4
1240	AO channel 2	UInt16	RW	Output current of AO channel 2. See "AO channel 1".
1241	AO channel 3	UInt16	RW	Output current of AO channel 3. See "AO channel 1".
1242	AO channel 4	UInt16	RW	Output current of AO channel 4. See "AO channel 1".
1243	AO channel 5	UInt16	RW	Output current of AO channel 5. See "AO channel 1".

DIO 2nd Module

Provides information on the second DIO module.

Register Number	Name	Format	Attribute	Description
1251	Status of DI channel 1	UInt16	R	0: Open 255: Closed
1252	Status of DI channel 2	UInt16	R	0: Open 255: Closed
1253	Status of DI channel 3	UInt16	R	0: Open 255: Closed
1254	Status of DI channel 4	UInt16	R	0: Open 255: Closed
1255	Status of DI channel 5	UInt16	R	0: Open 255: Closed
1256	Status of DI channel 6	UInt16	R	0: Open 255: Closed
1257	Status of DI channel 7	UInt16	R	0: Open 255: Closed
1258	Status of DI channel 8	UInt16	R	0: Open 255: Closed
1259	Control of DO channel 1	UInt16	RW	0: Open 255: Closed
1260	Type of DO channel 1	UInt16	RW	0: Latch 1: Pulse
1261	Pulse width time of DO channel 1	UInt16	RW	Unit [0.1sec] Valid range: 1 - 100 (0.1 - 10 [sec])
1262	Control of DO channel 2	UInt16	RW	0: Open 255: Closed
1263	Type of DO channel 2	UInt16	RW	0: Latch 1: Pulse
1264	Pulse width time of DO channel 2	UInt16	RW	Unit [0.1sec] Valid range: 1 - 100 (0.1 - 10 [sec])

Short-formed Map

Register Number	Name	Format	Attribute	Description
9001	Voltage Van	Float32	R	Line to neutral voltage between phase A and neutral. Unit [V]
9003	Voltage Vbn	Float32	R	Line to neutral voltage between phase B and neutral. Unit [V]
9005	Voltage Vcn	Float32	R	Line to neutral voltage between phase C and neutral. Unit [V]
9007	Voltage Vab	Float32	R	Line to line voltage between phase A and B. Unit [V]
9009	Voltage Vbc	Float32	R	Line to line voltage between phase B and C. Unit [V]
9011	Voltage Vca	Float32	R	Line to line voltage between phase C and A. Unit [V]
9013	Current Ia	Float32	R	Current of phase A. Unit [A]
9015	Current Ib	Float32	R	Current of phase B. Unit [A]
9017	Current Ic	Float32	R	Current of phase C. Unit [A]
9019-9020	Reserved			
9021	Active power Pa	Float32	R	Active power of phase A. Unit [kW]
9023	Active power Pb	Float32	R	Active power of phase B. Unit [kW]
9025	Active power Pc	Float32	R	Active power of phase C. Unit [kW]
9027	Active power Ptot	Float32	R	Total active power of all phases. Unit [kW]
9029	Reactive power Qa	Float32	R	Reactive power of phase A. Unit [kVAR]
9031	Reactive power Qb	Float32	R	Reactive power of phase B. Unit [kVAR]
9033	Reactive power Qc	Float32	R	Reactive power of phase C. Unit [kVAR]
9035	Reactive power Qtot	UInt16	R	Total reactive power of all phases. Unit [kVAR]
9037	Apparent power Sa	Float32	R	Apparent power of phase A. Unit [kVA]
9039	Apparent power Sb	Float32	R	Apparent power of phase B. Unit [kVA]
9041	Apparent power Sc	Float32	R	Apparent power of phase C. Unit [kVA]
9043	Apparent power Stot	Float32	R	Total apparent power of all phases. Unit [kVA]
9045	PF A	Int16	R	PF A raw value. PF A = PF A raw * 0.001
9046	PF B	Int16	R	PF B raw value. PF B = PF B raw * 0.001
9047	PF C	Int16	R	PF C raw value. PF C = PF C raw * 0.001
9048	Total PF	Int16	R	Total PF raw value. Total PF = Total PF raw * 0.001
9049	Frequency	UInt16	R	Frequency raw value. Unit [Hz] Frequency = Frequency raw * 0.01
9050	kWh net	Int32	R	KWh received - KWh delivered. Unit [kWh]
9052	kVARh net	Int32	R	kVARh received - kVARh delivered. Unit [kVARh]
9054	Voltage THD A	UInt16	R	Voltage THD A raw. Unit [%] Voltage THD A = Voltage THD A raw * 0.1

9055	Voltage THD B	UInt16	R	Voltage THD B raw. Unit [%] Voltage THD B = Voltage THD B raw * 0.1
9056	Voltage THD C	UInt16	R	Voltage THD C raw. Unit [%] Voltage THD C = Voltage THD C raw * 0.1
9057	Current THD A	UInt16	R	Current THD A raw. Unit [%] Current THD A = Current THD A raw * 0.1
9058	Current THD B	UInt16	R	Current THD B raw. Unit [%] Current THD B = Current THD B raw * 0.1
9059	Current THD C	UInt16	R	Current THD C raw. Unit [%] Current THD C = Current THD C raw * 0.1
9060	DI channels status in DIO/DC module	UInt16	R	Bit.[0]: DI channel 1 Bit.[1]: DI channel 2 ... Bit.[11]: DI channel 12 0: Closed 1: Open
9061	DO channels status in DIO/DC module	UInt16	R	Bit.[0]: DO channel 1 Bit.[1]: DO channel 2 0: Open 1: Closed
9062	DO channel 1 control in DIO/DC module	UInt16	W	0: On 1: Off
9063	DO channel 2 control in DIO/DC module	UInt16	W	0: On 1: Off
9064- 9073	Reserved			
9074	kWh/kVARh reset	UInt16	W	When 1 is written to this register, kWh and kVARh are initialized.
9075- 9080	Reserved			
9081	DI channels status in DI module	UInt16	R	Bit.[0]: DI channel 1 Bit.[1]: DI channel 2 ... Bit.[11]: DI channel 12 0: Closed 1: Open
9082	DO channels status in DO module	UInt16	R	Bit.[0]: DO channel 1 Bit.[1]: DO channel 2 Bit.[2]: DO channel 3 Bit.[3]: DO channel 4 0: Off 1: On
9083	DO channel 1 control in DO module	UInt16	RW	0: Open 1: Closed
9084	DO channel 2 control in DO module	UInt16	RW	0: Open 1: Closed
9085	DO channel 3 control in DO module	UInt16	RW	0: Open 1: Closed
9086	DO channel 4 control in DO module	UInt16	RW	0: Open 1: Closed
9087	AI channel 1	UInt16	R	Input current of AI channel 1 raw value. Input current [mA] = (Input current of AI channel 1) * 20 / 4095
9088	AI channel 2	UInt16	R	Input current of AI channel 2. See “AI channel 1”.

9089	AI channel 3	UInt16	R	Input current of AI channel 3. See "AI channel 1".
9090	AI channel 4	UInt16	R	Input current of AI channel 4. See "AI channel 1".
9091	AI channel 5	UInt16	R	Input current of AI channel 5. See "AI channel 1".
9092	AI channel 6	UInt16	R	Input current of AI channel 6. See "AI channel 1".
9093	AO channel 1	UInt16	RW	Output current of AO channel 1 raw value. Output current [mA] = (Output current of AO channel 1) * 16 / 4095 + 4
9094	AO channel 2	UInt16	RW	Output current of AO channel 2 raw value. See "AO channel 1".
9095	AO channel 3	UInt16	RW	Output current of AO channel 3 raw value. See "AO channel 1".
9096	AO channel 4	UInt16	RW	Output current of AO channel 4 raw value. See "AO channel 1".
9097	AO channel 5	UInt16	RW	Output current of AO channel 5 raw value. See "AO channel 1".
9098	AO channel 6	UInt16	RW	Output current of AO channel 6 raw value. See "AO channel 1".

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