Multi-phase Programmable AC/DC Power Source

ASR-6000 Series

DeviceNet MANUAL

Rev. C

ISO-9001 CERTIFIED MANUFACTURER

GW INSTEK

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Table of Contents

SAFETY INSTRUCTIONS

This chapter contains important safety instructions that you must follow during operation and storage. Read the following before any operation to ensure your safety and to keep the instrument in the best possible condition.

Safety Symbols

These safety symbols may appear in this manual or on the instrument.

 WARNING	Warning: Identifies conditions or practices that could result in injury or loss of life.
 CAUTION	Caution: Identifies conditions or practices that could result in damage to the ASR-6000 or to other properties.
	DANGER High Voltage
	Attention Refer to the Manual
	Protective Conductor Terminal
	Earth (ground) Terminal

Do not dispose electronic equipment as unsorted municipal waste. Please use a separate collection facility or contact the supplier from which this instrument was purchased.

Safety Guidelines

General Guideline

CAUTION

- Do not place any heavy object on the ASR-6000.
- Avoid severe impact or rough handling that leads to damaging the ASR-6000.
- Do not discharge static electricity to the ASR-6000.
- Use only mating connectors, not bare wires, for the terminals.
- Do not block the cooling fan opening.
- Do not disassemble the ASR-6000 unless you are qualified.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Due to the fact that ASR-6000 unit weights greater than 18kg, please resort to the standard kit GRA-451-E for transport or remove the unit by at least two persons in case of danger occurred.

Power Supply

⚠ WARNING

- AC Input voltage range:
  200 Vac to 240 Vac ±10 %
  phase voltage (Delta: L-L, Y: L-N)
- Frequency: 47 ~ 63 Hz
- To avoid electrical shock connect the protective grounding conductor of the AC power cord to an earth ground.
- The power switch that is included in the instrument is not consi dered a disconnecting device.
- The permanently connected power input is used as the disconnecting device and shall remain readily operable.
  a. A switch or circuit-breaker must be included in the installation
  b. It must be suitably located and easily reached
  c. It must be marked as the disconnecting device for the equipment.
  d. It shall be located near the equipment
- Do not position the equipment so that it is difficult to operate the disconnecting device.
- Ask for professional technician for installation.
- It requires 200Vac input condition and the maximum input current [30A (ASR-6450), 40A (ASR-6600)], which conforms to cord diameter by local regulations.
- Breaker, of which the specification is required to larger than 30A (ASR-6450), 40A (ASR-6600) individually, should be in the near proximity of unit.

Cleaning the ASR-6000	• Disconnect the circuit-breaker or permanently connected power input before cleaning. • Use a soft cloth dampened in a solution of mild detergent and water. Do not spray any liquid. • Do not use chemicals containing harsh material such as benzene, toluene, xylene, and acetone.
Operation Environment	• Location: Indoor, no direct sunlight, dust free, almost non-conductive pollution (Note below) • Relative Humidity: 20%~ 80%, no condensation • Altitude: < 2000m • Temperature: 0°C to 40°C (Pollution Degree) EN 61010-1:2010 specifies the pollution degrees and their requirements as follows. The ASR-6000 falls under degree 2. Pollution refers to "addition of foreign matter, solid, liquid, or gaseous (ionized gases), that may produce a reduction of dielectric strength or surface resistivity". • Pollution degree 1: No pollution or only dry, non-conductive pollution occurs. The pollution has no influence. • Pollution degree 2: Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected. • Pollution degree 3: Conductive pollution occurs, or dry, non-conductive pollution occurs which becomes conductive due to condensation which is expected. In such conditions, equipment is normally protected against exposure to direct sunlight, precipitation, and full wind pressure, but neither temperature nor humidity is controlled.
Storage environment	• Location: Indoor • Temperature: -10°C to 70°C • Relative Humidity: ≤90%, no condensation
Disposal 	Do not dispose this instrument as unsorted municipal waste. Please use a separate collection facility or contact the supplier from which this instrument was purchased. Please make sure discarded electrical waste is properly recycled to reduce environmental impact.

GETTING STARTED

This chapter describes the ASR-6000 power supply in a nutshell, including its main features and front / rear panel introduction.

ASR-6000 series

ASR-6000 Series Overview

Series lineup

The ASR-6000 series consists of 2 models, the ASR-6450 and ASR-6600, differing in capacity. Note that throughout the user manual, the term "ASR-6000" refers to any of the models, unless stated otherwise.

1P Output Condition

Model Name	Power Rating	Max. Output Current	Max. Output Voltage
ASR-6450	4500 VA	45 / 22.5 A	350 Vrms / 500 Vdc
ASR-6600	6000 VA	60 / 30 A	350 Vrms / 500 Vdc

1P3W Output Condition

Model Name	Power Rating	Max. Output Current	Max. Output Voltage
ASR-6450	3000 VA	15 / 7.5 A	700 Vrms / 1000 Vdc
ASR-6600	4000 VA	20 / 10 A	700 Vrms / 1000 Vdc

3P Output Condition (Pre phase)

Model Name	Power Rating	Max. Output Current	Max. Output Voltage
ASR-6450	1500 VA	15 / 7.5 A	350 Vrms / 500 Vdc
ASR-6600	2000 VA	20 / 10 A	350 Vrms / 500 Vdc

Main Features

Performance	• Maximum phase voltage is 350 Vrms, line voltage is 700 Vrms • Maximum DC output voltage is 1000 Vdc • Maximum output frequency is 2000 Hz • Adjustable Voltage rising time • DC full capacity output ability • Output voltage total harmonic distortion is less than 0.3% at 50 and 60 Hz • Maximum crest factor reached 4 times
Features	• Include sine, square, triangle, arbitrary and DC output waveforms • Variable voltage, frequency and current limiter • 100 steps Harmonic voltage and current analysis ability • Supported three phase unbalanced output mode • Sequence, simulate and preset memory functions • AC line frequency synchronized output • USB memory save and recall • Remote sense compensator • Supported 1P, 1P3W and 3P output phase • External control I/O and signal input applications • Voltage and current monitor output • Voltage control amplifier output • PC software, web control and data log functions
Interface	• Built-in LAN, USB host, USB device and RS232 interface • Optional GPIB, DeviceNet and CAN BUS interface

Accessories

Before using the ASR-6000 power source unit, check the package contents to make sure all the standard accessories are included.

Standard Accessories	Part number	Description
		Quick Start Guide
	82GW1SAFE0M*1	Safety guide
	62SR-6K0SC401	Input terminal cover
	62SR-6K0SC301	Output terminal cover
	62SR-6K0CP101	Copper plate for delta connection input (Mark 1)
	62SR-6K0CP201	Copper plate for single phase and Y connection input (Mark 2)
	62SR-6K0CP301	Copper plate for delta connection input (Mark 3)
	62SR-6K0CP401	Copper plate for 1P output (Mark 4)
	GRA-451-E	Rack mount adapter (EIA)
	GTL-246	USB cable (USB 2.0 Type A - Type B cable, approx. 1.2M)
Optional Accessories	Part number	Description
	GRA-451-J	Rack mount adapter (JIS)
	GPW-008	Power Cord SJT 10AWG/3C, 3m Max Length, 105oC, RV5-5*3P, RV5-5*3P UL TYPE
	GPW-009	Power Cord H05VV-F 2.5mm2/3C, 3m Max Length, 105oC, RVS3-5*3P, RVS3-5*3P VDE TYPE

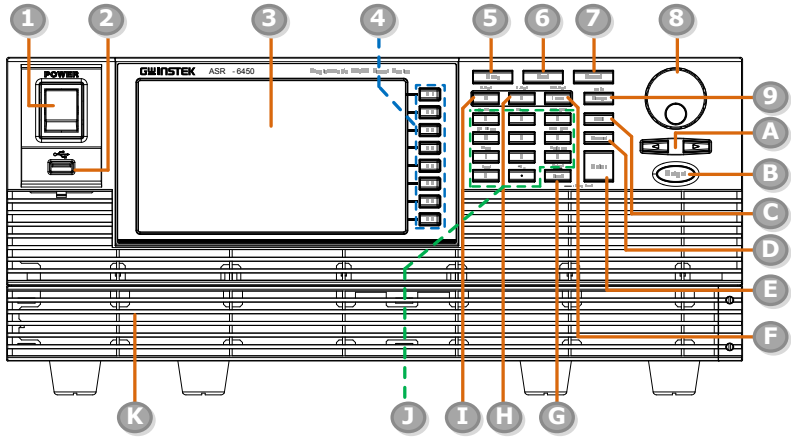
GPW-010	Power Cord VCTF 2.0mm2/3C, 3m Max Length, 105oC, RVS2-5*3P, RVS2-5*3P PSE TYPE
GPW-011	Power Cord SJT 10AWG/5C, 3m Max Length, 105oC, RV5-5*5P, RV5-5*5P UL TYPE
GPW-012	Power Cord H05VV-F 2.5mm2/5C, 3m Max Length, 105oC, RVS3-5*5P, RVS3-5*5P VDE TYPE
GPW-013	Power Cord VCTF 2.0mm2/5C, 3m Max Length, 105oC, , RVS2-5*5P, RVS2-5*5P PSE TYPE
GPW-014	Power Cord SJT 10AWG/4C, 3m Max Length, 105oC, RV5-5*4P, RV5-5*4P UL TYPE
GPW-015	Power Cord H05VV-F 2.5mm2/4C, 3m Max Length, 105oC, RVS3-5*4P, RVS3-5*4P VDE TYPE
GPW-016	Power Cord VCTF 2.0mm2/4C, 3m Max Length, 105oC, , RVS2-5*4P, RVS2-5*4P PSE TYPE
GTL-232	RS232C cable, approx. 2M
GTL-248	GPIB cable, approx. 2M
ASR-003	GPIB interface card
ASR-004	DeviceNet interface card
ASR-005	CAN BUS interface card
ASR-006	External parallel cable

Note

- GPW-008, 009, 010 are for single phase input only.
- GPW-011, 012, 013 are for Y connection input only.
- GPW-014, 015, 016 are for Delta connection input only.

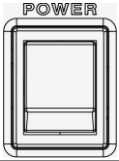
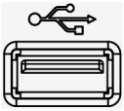
Appearance

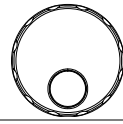
Front Panel

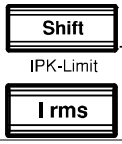
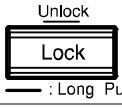
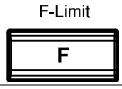
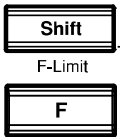
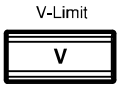
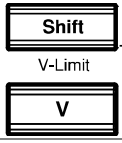


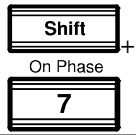
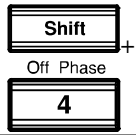
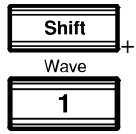
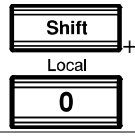
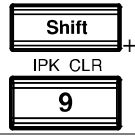
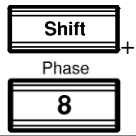
Item Index	Description
1	Power switch button
2	USB interface connector (A Type)
3	LCD screen
4	Function keys (blue zone)
5	Menu key
6	Test key
7	Preset key
8	Scroll wheel
9	Range key/Output mode key
A	Arrow keys
B	Output key
C	Shift key

D	Cancel key
E	Enter key
F	Irms/IPK-Limit button
G	Lock/Unlock button
H	F/F-Limit button
I	V/V-Limit button
J	Numerical Keypad with additional “Shift + key” shortcut functions (green zone)
K	Air inlet

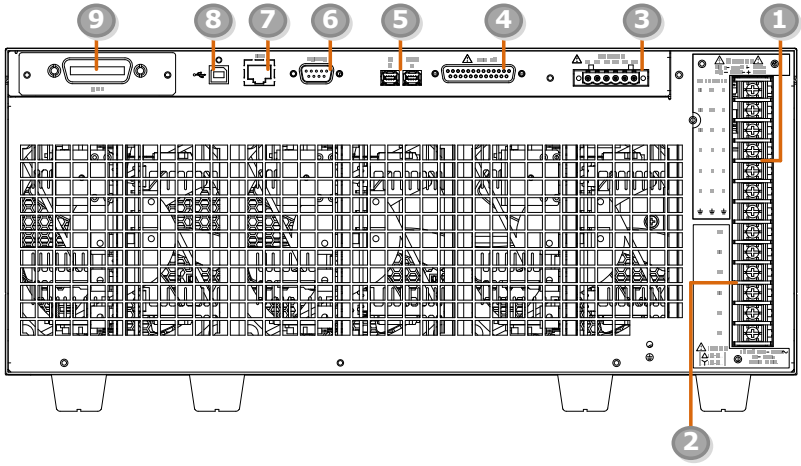
Item	Description
Power Switch	 Turn on the mains power
USB A Port	 The USB port is used for data transfers and upgrading software. Also, it is available for screenshot hardcopy.  It supports FAT32 format with maximum 32G storage.
LCD Screen	Displays the setting and measured values or menu system
Function Keys	 Assigned to the functions displayed on the right side of the screen.

Menu Key	Menu	Enters the Main menu or goes back to one of the display modes.
Test Key	Test	Puts the instrument into the Sequence and Simulation control mode.
Preset Key	Preset	Puts the instrument into Preset mode.
Arrow Keys	◁ ▷	The arrow keys are used to select the digit power of a value that is being edited.
Range Key	Mode Range	Switches between the 100V, 200V and AUTO ranges
Output Mode	Shift + Mode Range	Selects between the AC+DC-INT, AC-INT, DC-INT, AC+DC-EXT, AC-EXT, AC+DC-ADD, AC-ADD, AC+DC-Sync, AC-Sync and AC-VCA modes.
Scroll Wheel		Used to navigate menu items or for increment/decrement values one step at a time.
Output Key	Output	Turns the output on or off.
Shift Key	Shift	Turns on the shift state, which enables shortcut operations with an icon Shift indicated on the top status bar. The shift state, which allows continuous shortcut operations, is kept until another press on shift key again.
	⚠	When performing shortcut operations, press shift key followed by another shortcut function key. Do Not press both shift key and shortcut function key simultaneously.
Cancel Key	Cancel	Used to cancel function setting menus or dialogs.

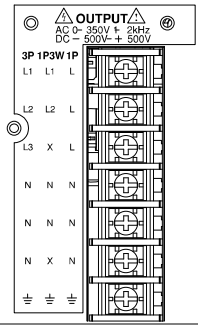
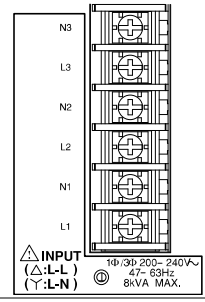
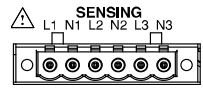
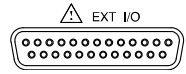
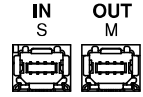
Enter Key		Confirms selections and settings.
Irms		Used for setting the maximum output current.
IPK-Limit		Used to set the peak output current limit value.
Lock/Unlock Key		Used to lock or unlock the front panel keys except output key. Simply press to lock, whilst long press to unlock.
F		Used for setting the output frequency (DC mode N/A).
F-Limit		Used for setting the output frequency limit value (DC mode N/A).
V		Used for setting the output voltage.
V-Limit		Used for setting the output voltage limit value.
Keypad		Used to input power of a value directly. The ±/. key is used to input decimal / plus or minus.

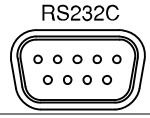
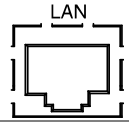
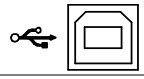
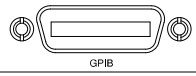
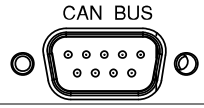
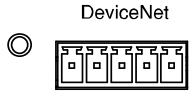
On Phase		Sets the on phase for the output voltage.
Off Phase		Sets the off phase for the output voltage.
Output Waveform		Selects between the Sine, Square, Triangle and ARB 1~253 waveforms (not available for DC-INT, AC+DC-EXT and AC-EXT).
Local Mode		Switches operation back to local mode from remote mode.
IPK CLR		Used to clear peak output current value.
ALM CLR		Clears alarms.
Hardcopy Key		Used to take a screenshot. Make sure an USB flash disk in well inserted before the action.
Output Phase		Used to switch output phase sequentially between 1P2W, 1P3W and 3P4W in a cyclic manner.

Rear Panel



Item Index	Description
1	Output terminal
2	AC power input terminal
3	Remote sensing input terminal
4	External I/O connector
5	External IN/OUT connection in parallel function
6	RS232 connector
7	Ethernet (LAN) connector
8	USB interface connector (B Type)
9	Optional interface Slot ▪ GPIB card (ASR-003) ▪ DeviceNet card (ASR-004) ▪ CAN BUS card (ASR-005)

Item	Description	
Output Terminal		Output terminal (M4 screw type, 8 ~ 18 AWG) (Screw torque value:18kgf-cm)
AC Power Input Terminal		AC inlet (M4 screw type, 8 ~ 18 AWG) (Screw torque value:18kgf-cm)
Remote Sensing Input Terminal		Remote sensing input terminal is for compensation of load wire voltage drop. (M2.5 screw type, 12 ~ 30 AWG) (Screw torque value: 0.5N*m) (Strip length: 7 ~ 8mm)
External Control I/O Connector		Used to control ASR-6000 externally by using the logic signal and monitor Sequence function status.
External IN/OUT Connection in Parallel Function		The IN (Slave) and OUT (Master) ports are used for connection with external unit in parallel function.

RS232C Connector		The RS232C connector for controlling the ASR-6000 remotely.
Ethernet LAN Port		The Ethernet port is used for remote control.
USB B-type Port		USB port for controlling the ASR-6000 remotely.
Optional GPIB Connector		The optional GPIB connector for controlling the ASR-6000 remotely.
Optional CAN BUS Connector		The optional CAN BUS connector for controlling the ASR-6000 remotely.
Optional DeviceNet Connector		The optional DeviceNet connector for controlling the ASR-6000 remotely.

DEVICENET

This chapter describes DeviceNet Communication.

Communication Introduction

DeviceNet is one of the kind of the network protocol base on the CAN bus. It allows direct peer to peer data exchange between nodes in organized and deterministic manner. The network managment function specified in DeviceNet simplifies project design, implementation and dianosis by providing standard mechanism for network start-up and error management.

DeviceNet commnuciation protocol is base on the concept of connection. Must establish a connection with a device in orer to exclude information with device. Each getway implement predefined master or slave connection setting through the DeviceNet network.

Identifier Bits											Hex Range	Identity Usage
10	9	8	7	6	5	4	3	2	1	0		
0	Group 1 Message ID					Source MAC ID					000 - 3FF	Message Group 1
1	0	MAC ID					Group 2 Message ID				400 - 5FF	Message Group 2
1	1	Group 3 Message ID					Source MAC ID				600 - 7BF	Message Group 3
1	1	1	1	1	Group 4 Message ID						7C0 - 7EF	Message Group 4
1	1	1	1	1	1	1	X	X	X	X	7F0 - 7FF	Invalid CAN ID

DeviceNet define four separate groups of 11-bits CAN identifiers. Message Group1, 2 and 3 consist of two fields, 6-bits field for Media Access Code Identifier(MAC ID) and the other for Message ID. Message Group 4 is uesed offline communication. Message ID is respected to connect base on message. Because of the arbitration scheme defined by CAN, group 1 message has a higher priority than group 2 message, group 2 message has a higher priority than group 3 message and so on.

The four Message Groups are used as follows:

Identifier Bits											Identity Usage
10	9	8	7	6	5	4	3	2	1	0	
0	Group 1 Message ID				Source MAC ID						Message Group 1(0x000 - 0x3FF)
0	0	0	0	0							
0	0	0	0	1							
0	0	0	1	0							
0	0	0	1	1							
0	0	1	0	0							
0	0	1	0	1							
0	0	1	1	0							
0	0	1	1	1							
0	1	0	0	0							
0	1	0	0	1							
0	1	0	1	0							
0	1	0	1	1							
0	1	1	0	0							Slave I/O Multicast Poll Response Message
0	1	1	0	1							Slave I/O Change of State / Cycle Message
0	1	1	1	0							Slave I/O Bit-Strobe Response Message
0	1	1	1	1							Slave I/O Poll Response Message / Change of State / Cycle Acknowledge Message

Message Group 1 is assigned 1024 CAN Identifiers (0x000 – 0x3FF) . Up to 16 different Message IDs are available per device within this group. Usually used to I/O message application data communicated.

Identifier Bits											Identity Usage
10	9	8	7	6	5	4	3	2	1	0	
1	0	MAC ID						Group 2 Message ID			Message Group 2(0x400 - 0x5FF)
1	0	Source MAC ID						0	0	0	Master I/O Bit-Strobe Command Message
1	0	Source MAC ID						0	0	1	Master I/O Multicast Poll command Message
1	0	Destination MAC ID						0	1	0	Master I/O Change of State / Cycle Acknowledge Message
1	0	Source MAC ID						0	1	1	Slave Explicit Response Message/ Unconnected Response Message / Device Shutdown Message
1	0	Destination MAC ID						1	0	0	Master Explicit Request Message
1	0	Destination MAC ID						1	0	1	Master I/O Poll Command Message / Change of State / Cycle Message
1	0	Destination MAC ID						1	1	0	Group 2 Only Unconnected Explicit Request Message
1	0	Destination MAC ID						1	1	1	Duplicate MAC ID Check Message

Message Group 2 is assigned 512 CAN identifiers (0x400 – 0x5FF). Up to 8 different Message IDs are available per device within this group. Most of the message IDs in this group are optionally defined for what is commonly referred to as the predefined master/slave connection set. One message ID is reserved for the Duplicate Node ID Check.

Identifier Bits											Identity Usage
10	9	8	7	6	5	4	3	2	1	0	
1	1	Group 3 Message ID			Source MAC ID						Message Group 3(0x600 - 0x7BF)
1	1	0	0	0	Source MAC ID						
1	1	0	0	1							

1	1	0	1	0		
1	1	0	1	1		
1	1	1	0	0		
1	1	1	0	1		UCMM Response Message
1	1	1	1	0		UCMM Request Message
1	1	1	1	1	XXXXXXX	Not Suppported

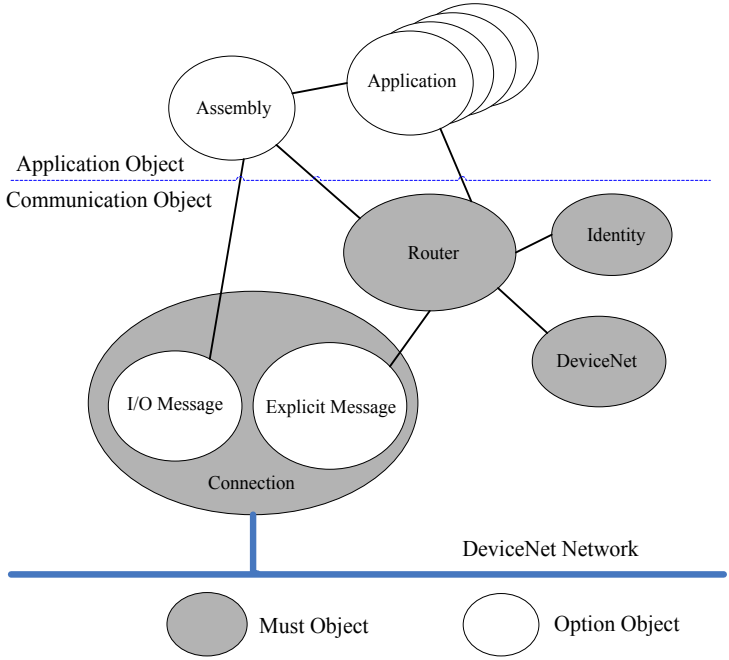
Message Group 3 is assigned 448 CAN identifiers (0x600 - 0x7BF). Up to 7 different Message IDs are available per device within this group. The Main use of this group is setting up dynamic explicit connection. Two message IDs are reserved for the Unconnected Message Manager(UCMM) port.

Identifier Bits											Identity Usage
10	9	8	7	6	5	4	3	2	1	0	
1	1	1	1	1	Group 4 Message ID						Message Group 4(0x7C0 - 0x7EF)
1	1	1	1	1	1	0	1	1	0	0	Communication Faulted Response Message
1	1	1	1	1	1	0	1	1	0	1	Communication Faulted Request Message
1	1	1	1	1	1	0	1	1	1	0	Offline Ownership Response Message
1	1	1	1	1	1	0	1	1	1	1	Offline Ownership Request Message

Message Group 4 is assigned 48 CAN Identifiers (0x07C0 – 0x07EF). It does not include any MAC IDs, only Message IDs. The messages in this group are only used for network management. Four Message IDs are currently assigned for services of the Offline Connection Set.

Object Model

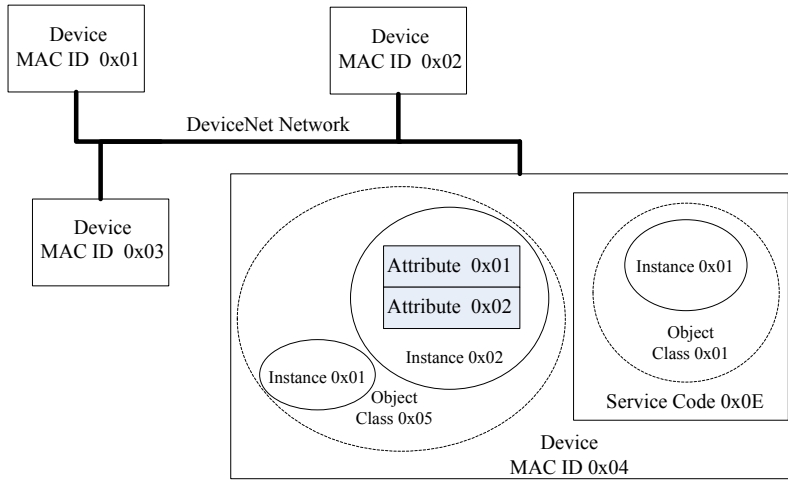
A device within DeviceNet network is represented by the below object model.



DeviceNet is used the object model to describe the network how to establish and manage device commnuication. Each device consists of communication object and application object. A DeviceNet can define the object and all of typical device objects contains Identity, Message Router, DeviceNet, Assembly, Connection and Application object. Device communictaion used Class, Instance, Attribute, Service to describe the structure encoding.

Object Address Code

The object address described Media Access Code Identifier(MAC ID), Class ID, Instance ID, Attribute ID and Service Code from DeviceNet portocol specification for each device.



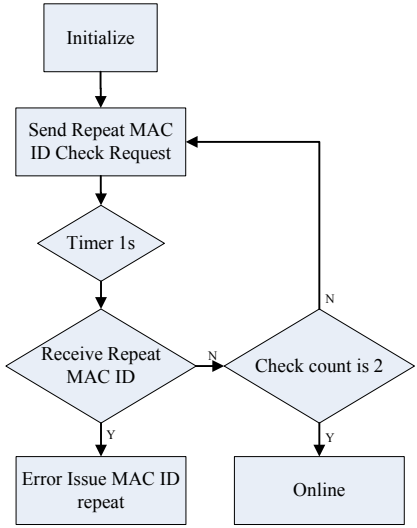
- MAC ID: integer identification value assigned to each node on the DeviceNet network.
- Class ID: integer identification value assigned to each object class accessible from the network.
- Instance ID: integer identification value assigned to object instance than identifies it among all instance of the same class.
- Attribute ID: integer identification value assigned to class or instance attribute value.
- Service Code: integer identification value which particular object instance or object class function.

DeviceNet protocol define the range for address in the specification.

Object	Range	Identity Usage
MAC ID	0X00 - 0x3F	If MAC ID is assigned other value then default value is 0x3F
Class	0x00 - 0x63	Open specification by DeviceNet define
	0x64 - 0xC7	Vendor specification
	0xC8 - 0xFF	Resvered for future use
Service Code	0x00 - 0x31	Open specification by DeviceNet define
	0x32 - 0x4A	Vendor specification
	0x4B - 0x63	Object class specification by DeviceNet define
	0x64 - 0x7F	Resvered for future use
	0x80 - 0xFF	None used

Duplicate MAC ID Check Message Protocol

Each physical attachment to DeviceNet must be assigned a MAC ID. It is inevitable that all of modules on the same link network will be assigned the same MAC ID, therefore all DeviceNet modules are required to paritcipate in a duplicate MAC ID check algorithm.



When each node connects to the network, it need to send the MAC ID request check twice at interval of 1 second and wait for 1 second after send a request message. If the node does not receive a duplicate response message within the period, then going online successful and become normal sending and receiving message.

It is found that the assigned MAC ID has been used on the network, sending duplicate response message and device enter a communications fault state.

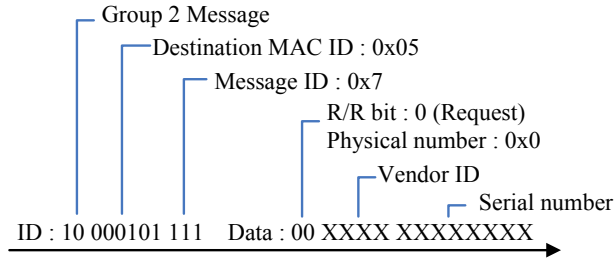
Identifier Bits											Identity Usage
10	9	8	7	6	5	4	3	2	1	0	
1	0	MAC ID						Group 2 Message ID			Message Group 2(0x400 - 0x5FF)
1	0	Destination MAC ID						1	1	1	Duplicate MAC ID Check Message

	Data Bits							
Byte Offset	7	6	5	4	3	2	1	0
0	R/R	Physical Number						
1	Vendor ID(LSB)							
2	Vendor ID(MSB)							
3	Serial Number(Low)							
4	Serial Number(Mid)							
5	Serial Number(High)							
6	Serial Number(Highest)							

Description

- R/R: Request(0)/Response(1) message flag.
- Physical Number: DeviceNet assigned to each physical identification value. Multiple device physical connector mnst assign each attachment a value within the ragne of 0-127 decimal. Implement a single connector should set zero within the field.
- Vendor ID: Assigned to the vendor of the device that is transmitting the message.
- Serial Number: Assigned to the device by the vendor.

CAN bus frame message example



Connection Establishment Protocol

DeviceNet device connection is established. Used to the Group 2 Only Unconnected Explicit Request port which is defined by the predefined master/slave connection set. Every device can set up a connection with every other device, and the source MAC ID of the devices is contained in the connection ID.

The predefined master/slave connection set defines a way to establish connections called the Group 2 Only Unconnected Explicit Request Port. This method allows a device to limit the messages received to only those in Group 2 with its own MAC ID. Devices that operate are referred to as Group 2 Only Servers, they are only required to receive messages in Group 2.

There are two type of messages to predefined connection objects, Explicit Message Connection and I/O Message Connection(not supported the connection establishment). Explicit message is definded in Message Group 2.

Identifier Bits											Identity Usage
10	9	8	7	6	5	4	3	2	1	0	
1	0	MAC ID						Group 2 Message ID			Message Group 2(0x400 - 0x5FF)
1	0	Source MAC ID						0	1	1	Slave Explicit Response Message
1	0	Destination MAC ID						1	1	0	Group 2 Only Unconnected Explicit Request Message

Connection requset data

	Data Bits							
Byte Offset	7	6	5	4	3	2	1	0
0	Frag	XID	Source MAC ID					
1	R/R	Service Code(0x4B)						
2	Class ID(0x03)							
3	Instance ID(0x01)							
4	Allocation Choice							
5	x	x	Source MAC ID					

Description

- Frag: Non-fragmet(0)/Fragment(1) flag. Indicating whether or not this transmission is a fragment piece of an Explicit Message.
- XID: Used an application to match a response with the associated request.
- Source MAC ID: Device MAC ID.
- R/R: Request(0)/Response(1) message flag.
- Service Code: By the DeviceNet protocol define.
- Allocation Choice: Predefined connection is to be allocated.(Only supported Explicit Message connection)

Allocation Choice Data Bits							
7	6	5	4	3	2	1	0
Reserved	Ack Suppression	Cyclic	COS	Multicast Polling	Bit-Strobe	Poll	Explicit Message

Connection response data

	Data Bits							
Byte Offset	7	6	5	4	3	2	1	0
0	Frag	XID	Destination MAC ID					
1	R/R	Service Code(0x4B)						
2	Body Format Message(0x00)							

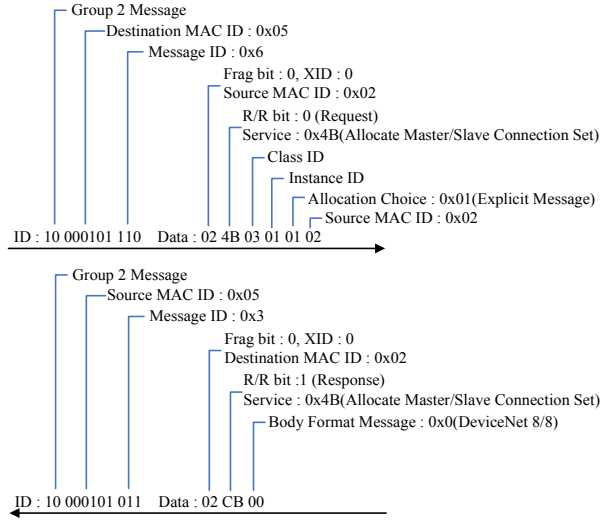
Description

- Frag: Non-fragmet(0)/Fragment(1) flag. Indicating whether or not this transmission is a fragment piece of an Explicit Message.
- XID: Used an application to match a response with the associated request.
- Destination MAC ID: Device MAC ID.
- R/R: Request(0)/Response(1) message flag.
- Service Code: By the DeviceNet protocol define.
- Body Format Message: Request a particular message for subsequnet Explicit Message transmitted.(Only Supported DeviceNet(8 / 8))

Body Fromat Message Data	
Value	Identity
0x00	DeviceNet(8 / 8). Class is 8-bit integer. Instance ID is 8-bit integer.
0x01	DeviceNet(8 / 16). Class is 8-bit integer. Instance ID is 16-bit integer.
0x02	DeviceNet(16 / 16). Class is 16-bit integer. Instance ID is 16-bit integer.
0x03	DeviceNet(16 / 8). Class is 16-bit integer. Instance ID is 8-bit integer.
0x04 - 0x0F	Reserved by DeviceNet

CAN bus frame message example

Master(MAC ID = 0x02), Slave(MAC ID = 0x05)



Explicit Message Protocol

All of explicit messages are done via connection and the associated connection object instance. This can use the predefined master/slave connction set to activate a conncetion object in the device. The explicit message by the Group 2 Only Unconnected Port is connected object.

Explicit messages on the DeviceNet have a compact structure to make them fit into the 8-byte frame in most cases. The example of request message using the 8/8 Message Body Format.(Connection response DeviceNet Message Body Format is 8/8. Meas 1 byte for Class ID, 1 byte for Instance ID.)

Explicit message requset data

	Data Bits							
Byte Offset	7	6	5	4	3	2	1	0
0	Frag	XID	Source MAC ID					
1	R/R	Service Code						
2	Class ID							
3	Instance ID							
4	Attribute ID							
5	Service Data(Optional)							
6								
7								

Description

- Frag: Non-fragmet(0)/Fragment(1) flag. Indicating whether or not this transmission is a fragment piece of an Explicit Message.
- XID: Used an application to match a response with the associated request.
- Source MAC ID: Device MAC ID.
- R/R: Request(0)/Response(1) message flag.
- Service Code: By the DeviceNet protocol define.
- Class ID: Defines the object class towards which this request is directed.
- Instance ID: Defines the particular instance within the object class towards which this request is directed.
- Attribute ID: Defines the particular attribute whith the object class and instance towards which this request is directed.
- Service Data: Request data by specific object define.

Explicit message response data

	Data Bits							
Byte Offset	7	6	5	4	3	2	1	0
0	Frag	XID	Source MAC ID					
1	R/R	Service Code						
2	Service Data(Optional)							
3								
4								
5								
6								
7								

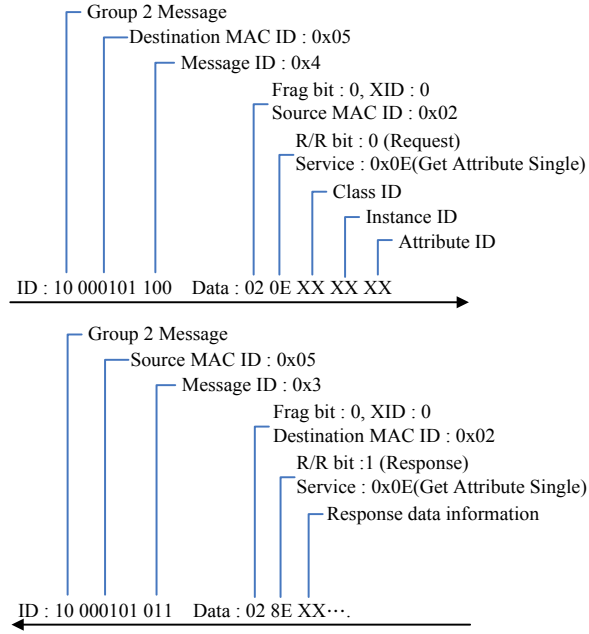
Description

- Frag: Non-fragmet(0)/Fragment(1) flag. Indicating whether or not this transmission is a fragment piece of an Explicit Message.
- XID: Used an application to match a response with the associated request.
- Source MAC ID: Device MAC ID.
- R/R: Request(0)/Response(1) message flag.
- Service Code: By the DeviceNet protocol define.
- Service Data: Response data by specific object define.which this request is directed.
- Service Data: Request data by specific object define.

CAN bus frame message example

Identifier Bits											Identity Usage
10	9	8	7	6	5	4	3	2	1	0	
1	0	MAC ID					Group 2 Message ID				Message Group 2(0x400 - 0x5FF)
1	0	Source MAC ID					0		1	1	Slave Explicit Response Message
1	0	Destination MAC ID					1		0	0	Master Explicit Request Message

Master(MAC ID = 0x02), Slave(MAC ID = 0x05)



Error Response Explicit Message

The Error Response Explicit Message is returned when an error is encountered while attempting to service a previously received Explicit Request Message. The Error Response can be sent as either a Connection Based or Unconnected response message. The Service Code for an Error Response message is 0x14, and two bytes of error code are included in the service data field to convey more information about the nature of the error.

Error response explicit message data

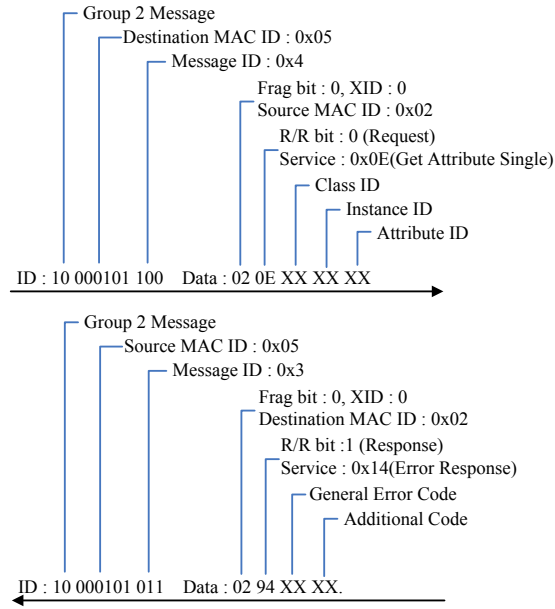
	Data Bits							
Byte Offset	7	6	5	4	3	2	1	0
0	Frag	XID	Source MAC ID					
1	R/R	Service Code (0x14)						
2	General Error Code							
3	Additional Code							

Description

- Frag: Non-fragmet(0)/Fragment(1) flag. Indicating whether or not this transmission is a fragment piece of an Explicit Message.
- XID: Used an application to match a response with the associated request.
- Source MAC ID: Device MAC ID.
- R/R: Request(0)/Response(1) message flag.
- Service Code: By the DeviceNet protocol define.
- General Error Code: Identifies the encoutered error.
- Additional Code: Further describes the error condition. If responsed object has no additional iformation to define, then the value default is 0xFF within this field.define.

CAN bus frame message example

Master(MAC ID = 0x02), Slave(MAC ID = 0x05)



Explicit Fragmentation Message

Fragmentation of an Explicit Message is performed in an Acknowledged fashion. Acknowledged fragmentation consists of the transmission fragmentation from the transmitting module followed by the transmission of an acknowledg by the receiving module. The receiving module acknowledges the reception of each fragment.

Explicit Fragmentation message data

	Data Bits							
Byte Offset	7	6	5	4	3	2	1	0
0	Frag	XID	Source MAC ID					
1	Fragment Type		Fragment Count					
2	Explicit Fragment Message Body							
3								
4								
5								
6								
7								

Description

- Frag: Non-fragmet(0)/Fragment(1) flag. Indicating whether or not this transmission is a fragment piece of an Explicit Message.
- XID: Used an application to match a response with the associated request.
- Source MAC ID: Device MAC ID.
- Fragment Type: Indicate that is the first, middle, or last transmission.
- Fragment Count: Marks each separate fragment. Count is increased by one for each successful fragment in the series.

Acknowledged Fragmentaion data

	Data Bits							
Byte Offset	7	6	5	4	3	2	1	0
0	Frag	XID	Source MAC ID					
1	Fragment Type		Fragment Count					
2	Ack Status							

Description

- Frag: Non-fragmet(0)/Fragment(1) flag. Indicating whether or not this transmission is a fragment piece of an Explicit Message.
- XID: Used an application to match a response with the associated request.
- Source MAC ID: Device MAC ID.
- Fragment Type: Indicate that is the Fragment Acknowledge.
- Fragment Count: Echo the last count value received.
- Ack Status: Indicates whether or not received error the fragment message.

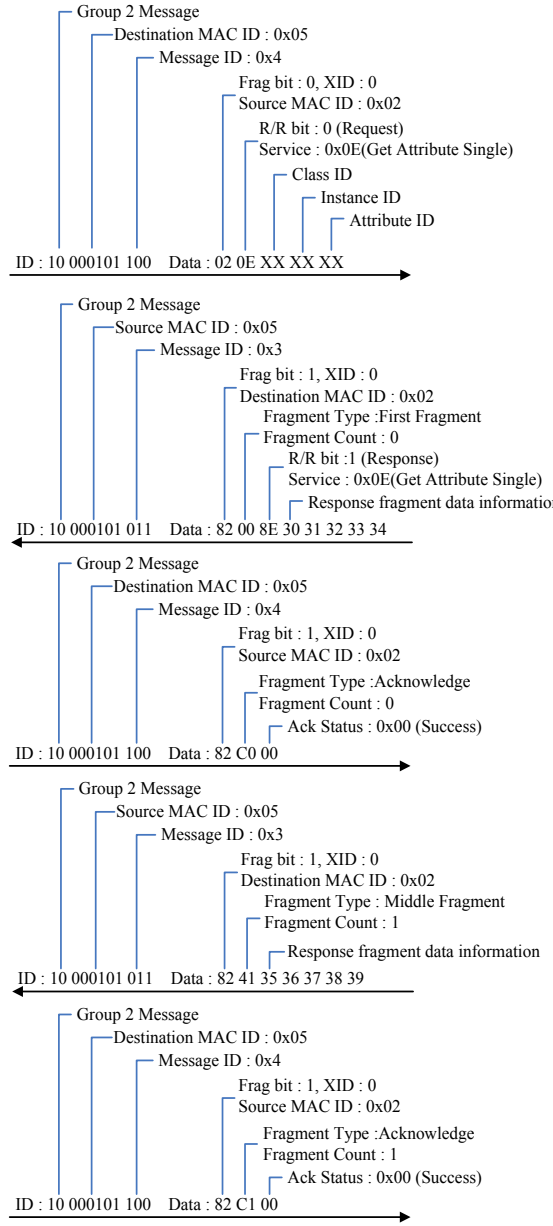
Fragment Type	
Value	Identity
0x0	First Fragment
0x1	Middle Fragment
0x2	Last Fragment
0x3	Fragment Acknowledge

Fragmentation Ack Status	
Value	Identity
0x00	Successful. No error has been detected and fragment transmission should continue.
0x01	Fail. The data is received over the maximun amount.
0x02 - 0xFF	Reserved by DeviceNet

CAN bus frame message example

Master(MAC ID = 0x02), Slave(MAC ID = 0x05)

Get Slave Device Data 0x30, 0x31, 0x32, 0x33, 0x34, 0x35, 0x36, 0x37, 0x38, 0x39



REMOTE CONTROL

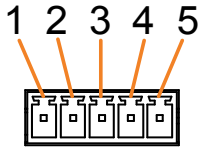
This chapter describes basic configuration of DeviceNet-based remote control. The ASR-6000 can be programmed by a controller over DeviceNet.

DeviceNet Configuration

DeviceNet Interface

DeviceNet Configuration	Connector	Block terminal, 5 pins, male
	Parameters	Baudrate, MAC ID.

Pin Assignment



1: 24V
2: CAN-H
3, 5: GND
4: CAN-L

Steps

1. Connect a DeviceNet cable from the PC to the DeviceNet port on the rear panel.

2. Press the *Menu* key. The Menu setting will appear on the display.

3. Use the scroll wheel to go to item 6, *Option Interface* and press *Enter*.

4. Set the DeviceNet relative settings.

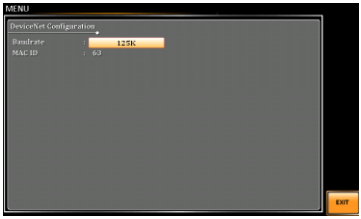
Baudrate	125K(default), 250K, 500K, Auto
MAC ID	0 ~ 63 (63 is default value)

Exit

5. Press *Exit[F8]* to exit from the DeviceNet settings.

Example

DeviceNet Configuration



Setting of the DeviceNet baud rate

Depending on the set bit rate the length of the bus line is restricted. The specified max. bus length is an approximate value and also depends on the other devices on the bus.

Baud rate	Max. bus length
125K	500 m
250K	250 m
500K	100 m

Auto baud rate

The CAN BUS of ASR6000 supports auto baud rate mode. When the Baud rate is switched to "Auto", the system will start to detect the baud rate mode. At this time, the master in the CAN BUS network must send more than 1 Byte of data. When ASR6000 receives after receiving the packet, the baud rate detection is completed and the system will automatically set the same baud rate as the master.

CAN Bus termination resistance

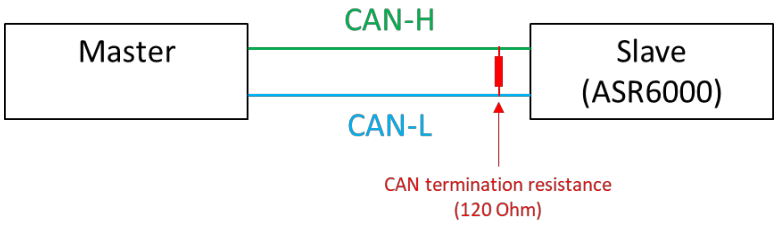
CAN Bus networks require a specific characteristic impedance of typically 120 Ohm to operate correctly. This characteristic impedance is maintained by placing termination resistors at both ends of the network, which effectively terminate the CAN signal and prevent signal reflections that can cause errors and signal corruption.

To add terminal resistance, you need to connect a 120 Ohm resistor between the CAN_H and CAN_L lines at each end of the network. The termination resistors are typically placed at the two ends of the bus network, which could be at the physical ends of the network or at the last two nodes in the network.

If the network has only two nodes, both nodes must have termination resistors. However, if there are more than two nodes, only the two nodes at the physical ends of the network require termination resistors.

To add a termination resistor to a CAN connector on ASR6000, you should connect the CAN connector on the ASR6000 through a CAN cable with the second last device in the network. Then, cover the CAN connector with a CAN terminal connector (with a 120 Ohm resistor between CAN-L and CAN-H) to provide proper termination for the network.

It's important to note that failure to add termination resistors can result in poor network performance and communication issues. So, it's essential to ensure proper termination of the network to maintain its integrity and reliable performance.



Pin assignment

The CAN BUS port have the following pin assignments:

Pin	Signal
1	V+(+24V)
2	CAN-H
3	Not assigned
4	CAN-L
5	V-(CAN GND)

Object Class Specification

The following table shows all objects of the class specification profile which are supported by the device:

Identify Object (Class 0x01)

The object provides identification and general information.

Class Attributes

Attribute ID	Access Rule	Name	Data type
0x01	Get	Revision	UINT8
0x02	Get	Max Instance	UINT8

Instance Attributes

Attribute ID	Access Rule	Name	Data type
0x01	Get	Vendor Number	UINT8
0x02	Get	Device Type	UINT8
0x03	Get	Product Code Number	UINT16
0x04	Get	Product Major Revision Product Minor Revision	UINT16
0x05	Get	Status	UINT16
0x06	Get	Serial Number	UINT32
0x07	Get	Product Name	UINT16

Common Services

Service Code	Implemented for		Name
	Class	Instance	

Service Code	Implemented for		Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single

DeviceNet Object (Class 0x03)

The object provides for the configuration and status of DeviceNet port.

Class Attributes

Attribute ID	Access Rule	Name	Data type
0x01	Get	Revision	UINT8
0x02	Get	Max Instance	UINT8

Instance Attributes

Attribute ID	Access Rule	Name	Data type
0x01	Get	MAC ID	UINT8
0x02	Get	Baud Rate	UINT8
0x05	Get	Allocation Choice Byte Master Node MAC ID	UINT8 UINT8

Common Services

Service Code	Implemented for		Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single

Connection Object (Class 0x05)

The object provides explicit message connection to allocate and manage internal resources.

Class Attributes

Attribute ID	Access Rule	Name	Data type
0x01	Get	Revision	UINT8
0x02	Get	Max Instance	UINT8

Instance Attributes

Instance 0x01: Master / Slave explicit message connection

Attribute ID	Access Rule	Name	Data type
0x01	Get	State	UINT8
0x02	Get	Instance Type	UINT8
0x03	Get	TransportClass Trigger	UINT16
0x04	Get	Produced Connection ID	UINT16
0x05	Get	Consumed Connection ID	UINT16
0x06	Get	Initial Comm Characteristics	UINT8
0x07	Get	Produced Connection Size	UINT16
0x08	Get	Consumed Connection Size	UINT16
0x09	Get/Set	Expected Packed Rate	UINT16
0x0C	Get	Watch Dog Timeout Action	UINT8
0x0D	Get	Produced Connection Path Length	UINT8
0x0E	Get	Produced Connection Path	UINT8
0x0F	Get	Consumed Connection Path Length	UINT8

Attribute ID	Access Rule	Name	Data type
0x10	Get	Consumed Connection Path	UINT8

Common Services

Service Code	Implemented for		Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

Communication Command Object

The object provides application SCPI Command for ASR-6000 serials.

IEEE Command Object (Class 0x64)

Class Attributes

Attribute ID	Access Rule	Name	Data type
0x01	Get	Revision	UINT8

Instance Attributes

Instance 0x01: IEEE Common Commands

Attribute ID	Access Rule	Name	Data type
0x02	Set	*CLS	UINT8
0x05	Get	*IDN?	Char
0x07	Set	*RCL	UINT8
0x08	Set	*RST	UINT8
0x09	Set	*SAV	UINT8
0x0E	Set	*WAI	UINT8

Data Command Object (Class 0x66)

Class Attributes

Attribute ID	Access Rule	Name	Data type
0x01	Get	Revision	UINT8

Instance Attributes

Instance 0x01: DATA:SEQuence Commands

Attribute ID	Access Rule	Name	Data type
0x16	Set	DATA:SEQuence:CLEar	UINT8
0x21	Set	DATA:SEQuence:RECall	UINT8
0x22	Set	DATA:SEQuence:STORe	UINT8

Instance 0x03: DATA:SIMulation Commands

Attribute ID	Access Rule	Name	Data type
0x16	Set	DATA:SIMulation:CLEar	UINT8
0x21	Set	DATA:SEQuence:RECall	UINT8
0x22	Set	DATA:SIMulation:STORe	UINT8

Instance 0x09: DATA:WAVE Commands

Attribute ID	Access Rule	Name	Data type
0x01	Set	DATA:WAVE:CLEar	UINT8

Instance 0x0B: DATA:WAVE ARBX Commands

Attribute ID	Access Rule	Name	Data type
0x01	Set	DATA:WAVE[:DATA]	UINT32
0x02	Set	DATA:WAVE[:DATA]	UINT32
0x03	Set	DATA:WAVE[:DATA]	UINT32
0x04	Set	DATA:WAVE[:DATA]	UINT32
. . .			
0xFA	Set	DATA:WAVE[:DATA]	UINT32
0xFB	Set	DATA:WAVE[:DATA]	UINT32
0xFC	Set	DATA:WAVE[:DATA]	UINT32
0xFD	Set	DATA:WAVE[:DATA]	UINT32

Display Command Object (Class 0x67)

Class Attributes

Attribute ID	Access Rule	Name	Data type
0x01	Get	Revision	UINT8

Instance Attributes

Instance 0x01: DISPlay:DESign Commands

Attribute ID	Access Rule	Name	Data type
0x01	Set	DISPlay[:WINDow]:DESign:MODE	UINT8

Instance 0x02: DISPlay:MEASure Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get / Set	DISPlay[:WINDow]:MEASure:SOURce	UINT8
0x02	Get / Set	DISPlay[:WINDow]:MEASure:SOURce	UINT8
0x03	Get / Set	DISPlay[:WINDow]:MEASure:SOURce	UINT8
0x04	Get / Set	DISPlay[:WINDow]:MEASure:SOURce	UINT8

Instance 0x04: DISPLAY_ADDRESS Commands

Attribute ID	Access Rule	Name	Data type
0x01	Set	DISPLAY_ADDRESS	UINT8

Fetch Command Object (Class 0x69)

Class Attributes

Attribute ID	Access Rule	Name	Data type
0x01	Get	Revision	UINT8

Instance Attributes

Instance 0x01: FETCh:CURRent Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get	FETCh[:SCALar]:CURRent:CFACotr	INT32
0x02	Get	FETCh[:SCALar]:CURRent:HIGH	INT32

Attribute ID	Access Rule	Name	Data type
0x03	Get	FETCh[:SCALar]:CURRent:LOW	INT32
0x04	Get	FETCh[:SCALar]:CURRent:PEAK:HOLD	INT32
0x05	Get	FETCh[:SCALar]:CURRent[:RMS]	INT32
0x06	Get	FETCh[:SCALar]:CURRent[:RMS]:TOTal	INT32
0x07	Get	FETCh[:SCALar]:CURRent:AC	INT32
0x08	Get	FETCh[:SCALar]:CURRent:AVERage	INT32
0x09	Get	FETCh[:SCALar]:CURRent:HARMonic[:RMS]	INT32
0x0A	Get	FETCh[:SCALar]:CURRent:HARMonic[:RMS]	INT32
0x0B	Get	FETCh[:SCALar]:CURRent:HARMonic[:RMS]	INT32
0x0C	Get	FETCh[:SCALar]:CURRent:HARMonic[:RMS]	INT32
0x0D	Get	FETCh[:SCALar]:CURRent:HARMonic[:RMS]	INT32
0x0E	Get	FETCh[:SCALar]:CURRent:HARMonic[:RMS]	INT32
0x0F	Get	FETCh[:SCALar]:CURRent:HARMonic:RATio	INT32
0x10	Get	FETCh[:SCALar]:CURRent:HARMonic:RATio	INT32
0x11	Get	FETCh[:SCALar]:CURRent:HARMonic:RATio	INT32
0x12	Get	FETCh[:SCALar]:CURRent:HARMonic:RATio	INT32
0x13	Get	FETCh[:SCALar]:CURRent:HARMonic:RATio	INT32
0x14	Get	FETCh[:SCALar]:CURRent:HARMonic:RATio	INT32

Instance 0x03: FETCh:FREQuency Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get	FETCh[:SCALar]:FREQuency	INT32

Instance 0x04: FETCh:POWer Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get	FETCh[:SCALar]:POWer[:AC]:APParent	INT32
0x02	Get	FETCh[:SCALar]:POWer[:AC]:APParent:TOTal	INT32
0x03	Get	FETCh[:SCALar]:POWer[:AC]:PFACtor	INT32
0x04	Get	FETCh[:SCALar]:POWer[:AC]:PFACtor:TOTal	INT32
0x05	Get	FETCh[:SCALar]:POWer[:AC]:REACtive	INT32
0x06	Get	FETCh[:SCALar]:POWer[:AC]:REACtive:TOTal	INT32
0x07	Get	FETCh[:SCALar]:POWer[:AC][:REAL]	INT32
0x08	Get	FETCh[:SCALar]:POWer[:AC]:[:REAL]:TOTal	INT32

Instance 0x05: FETCh:VOLTage Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get	FETCh[:SCALar]:VOLTage[:RMS]	INT32
0x02	Get	FETCh[:SCALar]:VOLTage[:RMS]:TOTal	INT32
0x03	Get	FETCh[:SCALar]:VOLTage:AC	INT32
0x04	Get	FETCh[:SCALar]:VOLTage:AVERage	INT32

Attribute ID	Access Rule	Name	Data type
0x05	Get	FETCh[:SCALar]:VOLTage:HIGH	INT32
0x06	Get	FETCh[:SCALar]:VOLTage:LOW	INT32
0x07	Get	FETCh[:SCALar]:VOLTage:HARMonic[:RMS]	INT32
0x08	Get	FETCh[:SCALar]:VOLTage:HARMonic[:RMS]	INT32
0x09	Get	FETCh[:SCALar]:VOLTage:HARMonic[:RMS]	INT32
0x0A	Get	FETCh[:SCALar]:VOLTage:HARMonic[:RMS]	INT32
0x0B	Get	FETCh[:SCALar]:VOLTage:HARMonic[:RMS]	INT32
0x0C	Get	FETCh[:SCALar]:VOLTage:HARMonic[:RMS]	INT32
0x0D	Get	FETCh[:SCALar]:VOLTage:HARMonic:RATio	INT32
0x0E	Get	FETCh[:SCALar]:VOLTage:HARMonic:RATio	INT32
0x0F	Get	FETCh[:SCALar]:VOLTage:HARMonic:RATio	INT32
0x10	Get	FETCh[:SCALar]:VOLTage:HARMonic:RATio	INT32
0x11	Get	FETCh[:SCALar]:VOLTage:HARMonic:RATio	INT32
0x12	Get	FETCh[:SCALar]:VOLTage:HARMonic:RATio	INT32

Instance 0x07: FETCh:LINE Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get	FETCh[:SCALar]:LINE:VOLTage[:RMS]	INT32
0x02	Get	FETCh[:SCALar]:LINE:VOLTage:AVERage	INT32
0x03	Get	FETCh[:SCALar]:LINE:VOLTage:HIGH	INT32

Attribute ID	Access Rule	Name	Data type
0x04	Get	FETCh[:SCALar]:LINE:VOLTage:LOW	INT32

Input Command Object (Class 0x6B)

Class Attributes

Attribute ID	Access Rule	Name	Data type
0x01	Get	Revision	UINT8

Instance Attributes

Instance 0x01: INPut Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get / Set	INPut:GAIIN	UINT16
0x02	Get / Set	INPut:SOURce	UINT8
0x03	Get / Set	INPut:SYNC:SOURce	UINT8

InsTrument Command Object (Class 0x6C)

Class Attributes

Attribute ID	Access Rule	Name	Data type
0x01	Get	Revision	UINT8

Instance 0x01: INSTrument Commands

Attribute ID	Access Rule	Name	Data type

Attribute ID	Access Rule	Name	Data type
0x01	Get / Set	INSTrument:EDIT	UINT8
0x02	Get / Set	INSTrument:SELect	UINT8

Measure Command Object (Class 0x6D)

Class Attributes

Attribute ID	Access Rule	Name	Data type
0x01	Get	Revision	UINT8

Instance Attributes

Instance 0x01: MEASure Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get / Set	MEASure:AVERage:COUNt	UINT8
0x02	Get / Set	MEASure:CONFigure:SENSing	UINT8
0x03	Get / Set	MEASure:UPDate:RATE	UINT8
0x04	Get	MEASure[SCALar]:FREQuency	INT32
0x05	Set	MEASure[SCALar]:PEAK:CLEar	UINT8

Instance 0x02: MEASure:CURRent Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get	MEASure[:SCALar]:CURRent:CFACtor	INT32
0x02	Get	MEASure[:SCALar]:CURRent:HIGH	INT32

Attribute ID	Access Rule	Name	Data type
0x03	Get	MEASure[:SCALar]:CURRent:LOW	INT32
0x04	Get	MEASure[:SCALar]:CURRent:PEAK:HOLD	INT32
0x05	Get	MEASure[:SCALar]:CURRent[:RMS]	INT32
0x06	Get	MEASure[:SCALar]:CURRent[:RMS]:TOTal	INT32
0x07	Get	MEASure[:SCALar]:CURRent:AC	INT32
0x08	Get	MEASure[:SCALar]:CURRent:AVERage	INT32
0x0A	Get	MEASure[:SCALar]:CURRent:HARMonic[:RMS]	INT32
0x0B	Get	MEASure[:SCALar]:CURRent:HARMonic[:RMS]	INT32
0x0C	Get	MEASure[:SCALar]:CURRent:HARMonic[:RMS]	INT32
0x0D	Get	MEASure[:SCALar]:CURRent:HARMonic[:RMS]	INT32
0x0E	Get	MEASure[:SCALar]:CURRent:HARMonic[:RMS]	INT32
0x0F	Get	MEASure[:SCALar]:CURRent:HARMonic[:RMS]	INT32
0x10	Get	MEASure[:SCALar]:CURRent:HARMonic:RATio	INT32
0x11	Get	MEASure[:SCALar]:CURRent:HARMonic:RATio	INT32
0x12	Get	MEASure[:SCALar]:CURRent:HARMonic:RATio	INT32
0x13	Get	MEASure[:SCALar]:CURRent:HARMonic:RATio	INT32
0x14	Get	MEASure[:SCALar]:CURRent:HARMonic:RATio	INT32
0x15	Get	MEASure[:SCALar]:CURRent:HARMonic:RATio	INT32

Instance 0x04: MEASure:POWer Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get	MEASure[:SCALar]:POWer[:AC]:APParent	INT32
0x02	Get	MEASure[:SCALar]:POWer[:AC]:APParent:TOTal	INT32
0x03	Get	MEASure[:SCALar]:POWer[:AC]:PFACtor	INT32
0x04	Get	MEASure[:SCALar]:POWer[:AC]:PFACtor:TOTal	INT32
0x05	Get	MEASure[:SCALar]:POWer[:AC]:REACtive	INT32
0x06	Get	MEASure[:SCALar]:POWer[:AC]:REACtive:TOTal	INT32
0x07	Get	MEASure[:SCALar]:POWer[:AC][:REAL]	INT32
0x08	Get	MEASure[:SCALar]:POWer[:AC]:[:REAL]:TOTal	INT32

Instance 0x05: MEASure:VOLTage Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get	MEASure[:SCALar]:VOLTage[:RMS]	INT32
0x02	Get	MEASure[:SCALar]:VOLTage[:RMS]:TOTal	INT32
0x03	Get	MEASure[:SCALar]:VOLTage:AC	INT32
0x04	Get	MEASure[:SCALar]:VOLTage:AVERage	INT32
0x05	Get	MEASure[:SCALar]:VOLTage:HIGH	INT32
0x06	Get	MEASure[:SCALar]:VOLTage:LOW	INT32
0x07	Get	MEASure[:SCALar]:VOLTage:HARMonic[:RMS]	INT32
0x08	Get	MEASure[:SCALar]:VOLTage:HARMonic[:RMS]	INT32

Attribute ID	Access Rule	Name	Data type
0x09	Get	MEASure[:SCALar]:VOLTage:HARMonic[:RMS]	INT32
0x0A	Get	MEASure[:SCALar]:VOLTage:HARMonic[:RMS]	INT32
0x0B	Get	MEASure[:SCALar]:VOLTage:HARMonic[:RMS]	INT32
0x0C	Get	MEASure[:SCALar]:VOLTage:HARMonic[:RMS]	INT32
0x0D	Get	MEASure[:SCALar]:VOLTage:HARMonic:RATio	INT32
0x0E	Get	MEASure[:SCALar]:VOLTage:HARMonic:RATio	INT32
0x0F	Get	MEASure[:SCALar]:VOLTage:HARMonic:RATio	INT32
0x10	Get	MEASure[:SCALar]:VOLTage:HARMonic:RATio	INT32
0x11	Get	MEASure[:SCALar]:VOLTage:HARMonic:RATio	INT32
0x12	Get	MEASure[:SCALar]:VOLTage:HARMonic:RATio	INT32

Instance 0x07: MEASure:LINE Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get	MEASure[:SCALar]:LINE:VOLTage[:RMS]	INT32
0x02	Get	MEASure[:SCALar]:LINE:VOLTage:AVERage	INT32
0x03	Get	MEASure[:SCALar]:LINE:VOLTage:HIGH	INT32
0x04	Get	MEASure[:SCALar]:LINE:VOLTage:LOW	INT32

Memory Command Object (Class 0x6E)

Class Attributes

Attribute ID	Access Rule	Name	Data type
0x01	Get	Revision	UINT8

Instance Attributes

Instance 0x04: MEMory Commands

Attribute ID	Access Rule	Name	Data type
0x01	Set	MEMory:SAV	UINT8
0x02	Set	MEMory:RCL	UINT8

Output Command Object (Class 0x6F)

Class Attributes

Attribute ID	Access Rule	Name	Data type
0x01	Get	Revision	UINT8

Instance 0x01: OUTPut:IMPendance Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get / Set	OUTPut:IMPendance	UINT8
0x02	Get / Set	OUTPut:IMPendance:INDucatance	UINT16
0x03	Get / Set	OUTPut:IMPendance:INDucatance	UINT16

Attribute ID	Access Rule	Name	Data type
0x04	Get / Set	OUTPut:IMPendance:INDucatance	UINT16
0x05	Get / Set	OUTPut:IMPendance:RESistance	UINT16
0x06	Get / Set	OUTPut:IMPendance:RESistance	UINT16
0x07	Get / Set	OUTPut:IMPendance:RESistance	UINT8

Instance 0x03: OUTPut:MONitor Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get / Set	OUTPut:MONitor:AMPLitude	UINT8
0x02	Get / Set	OUTPut:MONitor:SOURce	UINT8
0x03	Get / Set	OUTPut:MONitor:SOURce	UINT8

Instance 0x05: OUTPut Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get / Set	OUTPut:PON	UINT8
0x02	Set	OUTPut:PROTection:CLEar	UINT8
0x03	Get / Set	OUTPut:RELay	UINT8
0x05	Get / Set	OUTPut[:STATe]	UINT8

System Command Object (Class 0x72)

Class Attributes

Attribute ID	Access Rule	Name	Data type
0x01	Get	Revision	UINT8

Instance Attributes

Instance 0x01: SYSTem Commands

Attribute ID	Access Rule	Name	Data type
0x02	Get / Set	SYSTem:VUNit	UINT8
0x03	Get / Set	SYSTem:BEEPer:SATAe	UINT8
0x06	Get / Set	SYSTem:KLOCk	UINT8
0x08	Get / Set	SYSTem:PKHold:TIME	UINT16
0x09	Set	SYSTem:REBoot	UINT8
0x12	Get / Set	SYSTem:HOLD:STATe	UINT8

Instance 0x02: SYSTem:ARBitrary Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get / Set	SYSTem:ARBitrary:EDIT:BUILtin	UINT8
0x02	Get / Set	SYSTem:ARBitrary:EDIT:CFACtor	UINT16
0x03	Get / Set	SYSTem:ARBitrary:EDIT:CFACtor	UINT8
0x04	Get / Set	SYSTem:ARBitrary:EDIT:CLIP	UINT16
0x05	Get / Set	SYSTem:ARBitrary:EDIT:DIP	UINT32

Attribute ID	Access Rule	Name	Data type
0x06	Get / Set	SYSTem:ARBitrary:EDIT:DIP	UINT32
0x07	Get / Set	SYSTem:ARBitrary:EDIT:DIP	UINT32
0x08	Get / Set	SYSTem:ARBitrary:EDIT:LFRing	UINT32
0x09	Get / Set	SYSTem:ARBitrary:EDIT:LFRing	UINT32
0x0A	Get / Set	SYSTem:ARBitrary:EDIT:LFRing	UINT32
0x0B	Get / Set	SYSTem:ARBitrary:EDIT:LFRing	UINT32
0x0C	Get / Set	SYSTem:ARBitrary:EDIT:LFRing	UINT32
0x0D	Get / Set	SYSTem:ARBitrary:EDIT:LFRing	UINT32
0x0E	Get / Set	SYSTem:ARBitrary:EDIT:LFRing	UINT32
0x0F	Get / Set	SYSTem:ARBitrary:EDIT:LFRing	UINT32
0x10	Get / Set	SYSTem:ARBitrary:EDIT:RIPPle	UINT8
0x11	Get / Set	SYSTem:ARBitrary:EDIT:RIPPle	UINT16
0x12	Get / Set	SYSTem:ARBitrary:EDIT:RIPPle	UINT16
0x13	Get / Set	SYSTem:ARBitrary:EDIT:STAir	UINT8
0x14	Set	SYSTem:ARBitrary:EDIT:STORe	UINT8
0x15	Get / Set	SYSTem:ARBitrary:EDIT:STORe:APPLy	UINT8
0x16	Get / Set	SYSTem:ARBitrary:EDIT:STORe:APPLy	UINT8
0x17	Get / Set	SYSTem:ARBitrary:EDIT:STORe:APPLy	UINT8
0x18	Get / Set	SYSTem:ARBitrary:EDIT:STORe:SURGe	UINT8
0x19	Get / Set	SYSTem:ARBitrary:EDIT:STORe:SURGe	UINT16

Attribute ID	Access Rule	Name	Data type
0x1A	Get / Set	SYSTem:ARBitrary:EDIT:STORe:SURGe	UINT16
0x1B	Get / Set	SYSTem:ARBitrary:EDIT:STORe:TRIangle	UINT16

Instance 0x04: SYSTem:COMMunicate Commands

Attribute ID	Access Rule	Name	Data type
0x07	Get / Set	SYSTem:COMMunicate:INTerface:ADDRess	UINT8
0x08	Get / Set	SYSTem:COMMunicate:INTerface:BAUD	UINT8
0x09	Get / Set	SYSTem:COMMunicate:LAN:DHCP	UINT8
0x0A	Get / Set	SYSTem:COMMunicate:LAN:DNS	UINT8
0x0B	Get / Set	SYSTem:COMMunicate:LAN:GATeway	UINT8
0x0D	Get / Set	SYSTem:COMMunicate:LAN:IPADdress	UINT8
0x0E	Get	SYSTem:COMMunicate:LAN:MAC	Char
0x0F	Get / Set	SYSTem:COMMunicate:LAN:SMASk	UINT8
0x12	Get / Set	SYSTem:COMMunicate:RLSTate	UINT8
0x13	Get / Set	SYSTem:COMMunicate:SERIal[:RECeive]:TRANsmit:BAUD	UINT8
0x14	Get / Set	SYSTem:COMMunicate:SERIal[:RECeive]:TRANsmit:BITS	UINT8
0x15	Get / Set	SYSTem:COMMunicate:SERIal[:RECeive]:TRANsmit:PARity	UINT8
0x16	Get / Set	SYSTem:COMMunicate:SERIal[:RECeive]:TRANsmit:SBITs	UINT8

Attribute ID	Access Rule	Name	Data type
0x17	Get	SYSTem:COMMunicate:TCPip:CONTrol	UINT16
0x18	Get	SYSTem:COMMunicate:USB:FRONt:STATe	UINT8
0x1A	Get	SYSTem:COMMunicate:USB:REAR:STATe	UINT8

Instance 0x05: SYSTem:CONFigure Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get / Set	SYSTem:CONFigure:EXTio[:STATe]	UINT8
0x02	Get / Set	SYSTem:CONFigure:PHASe	UINT8
0x03	Get / Set	SYSTem:CONFigure[:MODE]	UINT8
0x04	Get / Set	SYSTem:CONFigure:TRIGger:OUTPut:SOURce	UINT8
0x05	Get / Set	SYSTem:CONFigure:TRIGger:OUTPut:WIDTh	UINT16

Trace Command Object (Class 0x73)

Class Attributes

Attribute ID	Access Rule	Name	Data type
0x01	Get	Revision	UINT8

Instance Attributes

Instance 0x05: TRACe:SEQuence Commands

Attribute ID	Access Rule	Name	Data type
0x01	Set	TRACe:SEQuence:CLEar	UINT8
0x20	Set	TRACe:SEQuence:RECall	UINT8
0x21	Set	TRACe:SEQuence:STORe	UINT8

Instance 0x07: TRACe:SIMulation Commands

Attribute ID	Access Rule	Name	Data type
0x01	Set	TRACe:SIMulation:CLEar	UINT8
0x20	Set	TRACe:SIMulation:RECall	UINT8
0x21	Set	TRACe:SIMulation:STORe	UINT8

Instance 0x0B: TRACe:WAVE Commands

Attribute ID	Access Rule	Name	Data type
0x01	Set	TRACe:WAVE:CLEar	UINT8

Instance 0x0C: TRACe:WAVE ARBX Commands

Attribute ID	Access Rule	Name	Data type
0x01	Set	TRACe:WAVE[:DATA]	UINT32
0x02	Set	TRACe:WAVE[:DATA]	UINT32
0x03	Set	TRACe:WAVE[:DATA]	UINT32
0x04	Set	TRACe:WAVE[:DATA]	UINT32

Attribute ID	Access Rule	Name	Data type
. . .			
0xFA	Set	TRACe:WAVE[:DATA]	UINT32
0xFB	Set	TRACe:WAVE[:DATA]	UINT32
0xFC	Set	TRACe:WAVE[:DATA]	UINT32
0xFD	Set	TRACe:WAVE[:DATA]	UINT32

Trigger Command Object (Class 0x74)

Class Attributes

Attribute ID	Access Rule	Name	Data type
0x01	Get	Revision	UINT8

Instance Attributes

Instance 0x01: TRIGger Commands

Attribute ID	Access Rule	Name	Data type
0x05	Set	TRIGger:SEQuence:SELected:EXECute	UINT8
0x06	Set	TRIGger:SIMulation:SELected:EXECute	UINT8

Source Command Object (Class 0x76)

Class Attributes

Attribute ID	Access Rule	Name	Data type
0x01	Get	Revision	UINT8

Instance Attributes

Instance 0x01: SOURce:CURRent Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get / Set	[:SOURce]:CURRent:LIMit:PEAK:HIGH	UINT32
0x02	Get / Set	[:SOURce]:CURRent:LIMit:PEAK:LOW	INT32
0x03	Get / Set	[:SOURce]:CURRent:LIMit:PEAK:MODE	UINT8
0x04	Get / Set	[:SOURce]:CURRent:LIMit:RMS[:AMPLitude]	UINT32
0x05	Get / Set	[:SOURce]:CURRent:LIMit:RMS:MODE	UINT8

Instance 0x02: SOURce:FREQuency Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get / Set	[:SOURce]:FREQuency:LIMit:HIGH	UINT32
0x02	Get / Set	[:SOURce]:FREQuency:LIMit:LOW	UINT32
0x03	Get / Set	[:SOURce]:FREQuency[:IMMediate]	UINT32

Instance 0x03: SOURce:FUNCtion Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get / Set	[:SOURce]:FUNCtion[:SHAPe][:IMMediate]	UINT8
0x02	Get / Set	[:SOURce]:FUNCtion:THD:FORMat	UINT8

Instance 0x04: SOURce:LINE Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get / Set	[:SOURce]:LINE:VOLTage[:LEVel][:IMMediate][:AMPLitude]	UINT32
0x02	Get / Set	[:SOURce]:LINE:VOLTage[:LEVel][:IMMediate]:OFFSet	INT32

Instance 0x05: SOURce:PHASe Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get / Set	[:SOURce]:PHASe:BALance	UINT8
0x02	Get / Set	[:SOURce]:PHASe:MODE	UINT8
0x03	Get / Set	[:SOURce]:PHASe:PHASe	UINT16
0x04	Get / Set	[:SOURce]:PHASe:PHASe	UINT16
0x05	Get / Set	[:SOURce]:PHASe:RELock	UINT8
0x06	Get / Set	[:SOURce]:PHASe:SETChange:STATe	UINT8
0x07	Get / Set	[:SOURce]:PHASe:STARt[:IMMediate]	UINT16
0x08	Get / Set	[:SOURce]:PHASe:STARt:STATe	UINT8
0x09	Get / Set	[:SOURce]:PHASe:STOP[:IMMediate]	UINT16

Attribute ID	Access Rule	Name	Data type
0x0A	Get / Set	[:SOURce]:PHASe:STOP:STATe	UINT8
0x0B	Get / Set	[:SOURce]:PHASe:SYNC[:IMMediate]	UINT16

Instance 0x07: SOURce:READ Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get	[:SOURce]:READ?	INT32
0x02	Get	[:SOURce]:READ?	INT32
0x03	Get	[:SOURce]:READ?	INT32
0x04	Get	[:SOURce]:READ?	INT32
. . .			
0x30	Get	[:SOURce]:READ?	INT32
0x31	Get	[:SOURce]:READ?	INT32
0x32	Get	[:SOURce]:READ?	INT32
0x33	Get	[:SOURce]:READ?	INT32

Instance 0x09: SOURce:SEQuence Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get	[:SOURce]:SEQuence:CONDition	UINT8
0x02	Get / Set	[:SOURce]:SEQuence:CPARameter	UINT32
0x03	Get / Set	[:SOURce]:SEQuence:CPARameter	UINT16
0x04	Get / Set	[:SOURce]:SEQuence:CPARameter	UINT8
0x05	Get / Set	[:SOURce]:SEQuence:CPARameter	UINT16

Attribute ID	Access Rule	Name	Data type
0x06	Get / Set	[:SOURce]:SEQuence:CPARameter	UINT8
0x07	Get / Set	[:SOURce]:SEQuence:CPARameter	UINT8
0x08	Get / Set	[:SOURce]:SEQuence:CPARameter	UINT16
0x09	Get / Set	[:SOURce]:SEQuence:CPARameter	UINT8
0x0A	Get / Set	[:SOURce]:SEQuence:CPARameter	UINT16
0x0B	Get / Set	[:SOURce]:SEQuence:CPARameter	UINT8
0x0C	Get / Set	[:SOURce]:SEQuence:CPARameter	UINT16
0x0D	Get / Set	[:SOURce]:SEQuence:CPARameter	UINT8
0x0E	Get / Set	[:SOURce]:SEQuence:CPARameter	UINT16
0x0F	Get / Set	[:SOURce]:SEQuence:CPARameter	UINT8
0x10	Get / Set	[:SOURce]:SEQuence:CPARameter	UINT8
0x11	Get	[:SOURce]:SEQuence:CSTep	UINT16
0x12	Get / Set	[:SOURce]:SEQuence:INSTrument:SELect	UINT8
0x13	Get / Set	[:SOURce]:SEQuence:SPARameter	UINT32
0x14	Get / Set	[:SOURce]:SEQuence:SPARameter	UINT8
0x15	Get / Set	[:SOURce]:SEQuence:SPARameter	UINT32
0x16	Get / Set	[:SOURce]:SEQuence:SPARameter	UINT8
0x17	Get / Set	[:SOURce]:SEQuence:SPARameter	UINT32
0x18	Get / Set	[:SOURce]:SEQuence:SPARameter	UINT8
0x19	Get / Set	[:SOURce]:SEQuence:SPARameter	UINT8

Attribute ID	Access Rule	Name	Data type
0x1A	Get / Set	[:SOURce]:SEQuence:SPARameter	UINT16
0x1B	Get / Set	[:SOURce]:SEQuence:STEP	UINT16
0x1C	Get / Set	[:SOURce]:SEQuence:NSParameter	UINT32
0x1D	Get / Set	[:SOURce]:SEQuence:NSParameter	UINT8
0x1E	Get / Set	[:SOURce]:SEQuence:NSParameter	UINT32
0x1F	Get / Set	[:SOURce]:SEQuence:NSParameter	UINT8
0x20	Get / Set	[:SOURce]:SEQuence:NSParameter	UINT32
0x21	Get / Set	[:SOURce]:SEQuence:NSParameter	UINT8
0x22	Get / Set	[:SOURce]:SEQuence:NSParameter	UINT8
0x23	Get / Set	[:SOURce]:SEQuence:NSParameter	UINT16
0x24	Get / Set	[:SOURce]:SEQuence:NSParameter	UINT16
0x25	Get	[:SOURce]:SEQuence:CJUMp:CNT	UINT16
0x26	Get	[:SOURce]:SEQuence:CTIMe	UINT16
0x27	Get	[:SOURce]:SEQuence:CTIMe	UINT8
0x28	Get	[:SOURce]:SEQuence:CTIMe	UINT8
0x29	Get	[:SOURce]:SEQuence:CTIMe	UINT8

Instance 0x0B: SOURce:SIMulatoin Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get	[:SOURce]:SIMulatoin:CONDition	UINT8
0x02	Get / Set	[:SOURce]:SIMulatoin:AB	UINT8

Attribute ID	Access Rule	Name	Data type
		Normal:CODE	
0x03	Get / Set	[:SOURce]:SIMulatoin:ABNormal:FREQuency	UINT32
0x04	Get / Set	[:SOURce]:SIMulatoin:ABNormal:PHASe:STARt:ENABle	UINT8
0x05	Get / Set	[:SOURce]:SIMulatoin:ABNormal:PHASe:STARt[:IMMediate]	UINT16
0x06	Get / Set	[:SOURce]:SIMulatoin:ABNormal:PHASe:STOP:ENABle	UINT8
0x07	Get / Set	[:SOURce]:SIMulatoin:ABNormal:PHASe:STOP[:IMMediate]	UINT16
0x08	Get / Set	[:SOURce]:SIMulatoin:ABNormal:TIME	UINT32
0x09	Get / Set	[:SOURce]:SIMulatoin:ABNormal:VOLTage	UINT32
0x0A	Get	[:SOURce]:SIMulatoin:CSTep	UINT8
0x0B	Get / Set	[:SOURce]:SIMulatoin:INITial:CODE	UINT8
0x0C	Get / Set	[:SOURce]:SIMulatoin:INITial:FREQuency	UINT32
0x0D	Get / Set	[:SOURce]:SIMulatoin:INITial:PHASe:STARt:ENABle	UINT8
0x0E	Get / Set	[:SOURce]:SIMulatoin:INITial:PHASe:STARt[:IMMediate]	UINT16
0x0F	Get / Set	[:SOURce]:SIMulatoin:INITial:PHASe:STOP:ENABle	UINT8
0x10	Get / Set	[:SOURce]:SIMulatoin:INITial:PHASe:STOP[:IMMediate]	UINT16
0x11	Get	[:SOURce]:SIMulatoin:INITial:VOLTage	UINT32

Attribute ID	Access Rule	Name	Data type
0x13	Get / Set	[:SOURce]:SIMulatoin:NORMal:CODE	UINT8
0x14	Get / Set	[:SOURce]:SIMulatoin:NORMal:CODE	UINT8
0x15	Get / Set	[:SOURce]:SIMulatoin:NORMal:FREQuency	UINT32
0x16	Get / Set	[:SOURce]:SIMulatoin:NORMal:FREQuency	UINT32
0x17	Get / Set	[:SOURce]:SIMulatoin:NORMal:PHASe:STARt:ENABle	UINT8
0x18	Get / Set	[:SOURce]:SIMulatoin:NORMal:PHASe:STARt:ENABle	UINT8
0x19	Get / Set	[:SOURce]:SIMulatoin:NORMal:PHASe:STOP[:IMMediate]	UINT16
0x1A	Get / Set	[:SOURce]:SIMulatoin:NORMal:PHASe:STOP[:IMMediate]	UINT16
0x1B	Get / Set	[:SOURce]:SIMulatoin:NORMal:PHASe:STOP:ENABle	UINT8
0x1C	Get / Set	[:SOURce]:SIMulatoin:NORMal:PHASe:STOP:ENABle	UINT8
0x1D	Get / Set	[:SOURce]:SIMulatoin:NORMal:PHASe:STOP[:IMMediate]	UINT16
0x1E	Get / Set	[:SOURce]:SIMulatoin:NORMal:PHASe:STOP[:IMMediate]	UINT16
0x1F	Get / Set	[:SOURce]:SIMulatoin:NORMal:TIME	UINT32
0x20	Get / Set	[:SOURce]:SIMulatoin:NORMal:TIME	UINT32
0x21	Get / Set	[:SOURce]:SIMulatoin:NORMal:VOLTage	UINT32
0x22	Get / Set	[:SOURce]:SIMulatoin:NORMal:VOLTage	UINT32

Attribute ID	Access Rule	Name	Data type
0x23	Get / Set	[:SOURce]:SIMulatoin:REPeat:COUNt	UINT16
0x24	Get / Set	[:SOURce]:SIMulatoin:REPeat:ENABle	UINT8
0x25	Get / Set	[:SOURce]:SIMulatoin:TRANsition:CODE	UINT8
0x26	Get / Set	[:SOURce]:SIMulatoin:TRANsition:CODE	UINT8
0x27	Get / Set	[:SOURce]:SIMulatoin:TRANsition:TIME	UINT32
0x28	Get / Set	[:SOURce]:SIMulatoin:TRANsition:TIME	UINT32
0x29	Get	[:SOURce]:SIMulation:CREPeat:COUNt	UINT32
0x2A	Get	[:SOURce]:SIMulation:CTIMe	UINT16
0x2B	Get	[:SOURce]:SIMulation:CTIMe	UINT8
0x2C	Get	[:SOURce]:SIMulation:CTIMe	UINT8
0x2D	Get	[:SOURce]:SIMulation:CTIMe	UINT8

Instance 0x0D: SOURce Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get / Set	[:SOURce]:SQUare:DCYCle	UINT16
0x02	Get / Set	[:SOURce]:MODE	UINT8

Instance 0x0E: SOURce:VOLTage Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get / Set	[:SOURce]:VOLTage:LIMit:PEAK	UINT32
0x02	Get / Set	[:SOURce]:VOLTage:LIMit:RMS	UINT32

Attribute ID	Access Rule	Name	Data type
0x03	Get / Set	[:SOURce]:VOLTage:LIMit:HIGH	UINT32
0x04	Get / Set	[:SOURce]:VOLTage:LIMit:LOW	INT32
0x05	Get / Set	[:SOURce]:VOLTage:RANGe	UINT8
0x06	Get / Set	[:SOURce]:VOLTage:RESPonse	UINT8
0x07	Get / Set	[:SOURce]:VOLTage[:LEVel][:IMMediate][:AMPLitude]	UINT32
0x08	Get / Set	[:SOURce]:VOLTage[:LEVel][:IMMediate]:OFFSet	INT32

Data Range Command Object (Class 0x77)

Class Attributes

Attribute ID	Access Rule	Name	Data type
0x01	Get	Revision	UINT8

Instance Attributes

Instance 0x01: DATA RANGE MAX Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get	DATA_RANGE_MAX	UINT32
0x02	Get	DATA_RANGE_MAX	INT32
0x03	Get	DATA_RANGE_MAX	UINT32
0x04	Get	DATA_RANGE_MAX	UINT32
0x05	Get	DATA_RANGE_MAX	UINT16
0x06	Get	DATA_RANGE_MAX	UINT16

Attribute ID	Access Rule	Name	Data type
0x07	Get	DATA_RANGE_MAX	UINT16
0x08	Get	DATA_RANGE_MAX	UINT16
0x09	Get	DATA_RANGE_MAX	UINT16
0x0A	Get	DATA_RANGE_MAX	UINT16
0x0B	Get	DATA_RANGE_MAX	UINT32
0x0C	Get	DATA_RANGE_MAX	INT32
0x0D	Get	DATA_RANGE_MAX	UINT32
0x0E	Get	DATA_RANGE_MAX	INT32
0x0F	Get	DATA_RANGE_MAX	UINT32
0x10	Get	DATA_RANGE_MAX	UINT32
0x11	Get	DATA_RANGE_MAX	UINT32
0x12	Get	DATA_RANGE_MAX	UINT32

Instance 0x02: DATA RANGE MIN Commands

Attribute ID	Access Rule	Name	Data type
0x01	Get	DATA_RANGE_MIN	UINT32
0x02	Get	DATA_RANGE_MIN	INT32
0x03	Get	DATA_RANGE_MIN	UINT32
0x04	Get	DATA_RANGE_MIN	UINT32
0x05	Get	DATA_RANGE_MIN	UINT16
0x06	Get	DATA_RANGE_MIN	UINT16
0x07	Get	DATA_RANGE_MIN	UINT16
0x08	Get	DATA_RANGE_MIN	UINT16
0x09	Get	DATA_RANGE_MIN	UINT16

Attribute ID	Access Rule	Name	Data type
0x0A	Get	DATA_RANGE_MIN	UINT16
0x0B	Get	DATA_RANGE_MIN	UINT32
0x0C	Get	DATA_RANGE_MIN	INT32
0x0D	Get	DATA_RANGE_MIN	UINT32
0x0E	Get	DATA_RANGE_MIN	INT32
0x0F	Get	DATA_RANGE_MIN	UINT32
0x10	Get	DATA_RANGE_MIN	UINT32
0x11	Get	DATA_RANGE_MIN	UINT32
0x12	Get	DATA_RANGE_MIN	UINT32

Common Services

Service Code	Implemented for		Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

Manufacturer-specific Command List

Object Class	Instance ID	Name
0x64	0x01	Common Commands
0x66	0x01	DATA:SEQuence Commands
	0x03	DATA:SIMulation Commands
	0x09	DATA:WAVE Commands
	0x0B	DATA:WAVE ARBX Commands
0x67	0x01	DISPlay:DESign Commands
	0x02	DISPlay:MEASure Commands
	0x04	DISPLAY_ADDRESS Commands
0x69	0x01	FETCh:CURRent Commands
	0x03	FETCh:FREQuency Commands
	0x04	FETCh:POWer Commands
	0x05	FETCh:VOLTage Commands
	0x07	FETCh:LINE Commands
0x6B	0x01	INPut Commands
0x6C	0x01	INSTrument Commands
0x6D	0x01	MEASure Commands
	0x02	MEASure:CURRent Commands
	0x04	MEASure:POWer Commands
	0x05	MEASure:VOLTage Commands
	0x07	MEASure:LINE Commands
0x6E	0x04	MEMory Commands
0x6F	0x01	OUTPut:IMPendance Commands
	0x03	OUTPut:MONitor Commands

Object Class	Instance ID	Name
	0x05	OUTPut Commands
0x72	0x01	SYSTem Commands
	0x02	SYSTem:ARBitrary Commands
	0x04	SYSTem:COMMunicate Commands
	0x05	SYSTem:CONFigure Commands
0x73	0x05	TRACe:SEQuence Commands
	0x07	TRACe:SIMulation Commands
	0x0B	TRACe:WAVE Commands
	0x0C	TRACe:WAVE ARBX Commands
0x74	0x01	TRIGger Commands
0x76	0x01	SOURce:CURRent Commands
	0x02	SOURce:FREQuency Commands
	0x03	SOURce:FUNCtion Commands
	0x04	SOURce:LINE Commands
	0x05	SOURce:PHASe Commands
	0x07	SOURce:READ Commands
	0x09	SOURce:SEQuence Commands
	0x0B	SOURce:SIMulatoin Commands
	0x0D	SOURce Commands
	0x0E	SOURce:VOLTage Commands
0x77	0x01	DATA RANGE MAX Commands
	0x02	DATA RANGE MIN Commands

Service Code	Name

Service Code	Name
0x0E	Get_Attribute_Single
0x10	Set_Attribute_Single

Common Commands (Class 0x64)

Instance 0X01

Data / Trace Commands (Class 0x66/73)

Instance 0X01/0x05

Instance 0X03/0x07

Instance 0X09/0x0B

Instance 0X0B/0x0C

Display Commands (Class 0x67)

Instance 0X01

Instance 0X02

Instance 0X03

Fetch Commands (Class 0x69)

Instance 0X01

Instance 0X03

Instance 0X04

Instance 0X05

Instance 0X07

Input Command (Class 0x6B)

Instance 0X01

Instrumnet Commands (Class 0x6C)

Instance 0X01

Measure Commands (Class 0x6D)

Instance 0X01

Instance 0X02

Instance 0X04

Instance 0X05

Instance 0X07

Memory Commands (Class 0x6E)

Instance 0X04

Output Commands (Class 0x6F)

Instance 0X01

Instance 0X03

Instance 0X05

System Function Commands (Class 0x72)

Instance 0X01

Instance 0X02

Instance 0X04

Instance 0X05

Trigger Commands (Class 0x74)

Instance 0X01

Source Commands (Class 0x76)

Instance 0X01

Instance 0X02

Instance 0X03

Instance 0X04

Instance 0X05

Instance 0X07

Instance 0X09

Instance 0X0B

Instance 0X0D

Instance 0X0E

Read Data Range Commands (Class 0x77)

Instance 0X01

Instance 0X02

Common Commands (Class 0x64)

Instance 0X01

Attribute 0x02: *CLS

Description	The *CLS command clears all the event registers, including the status byte, event status and error queue.
Name	*CLS
Value	-
Type	UINT8
Data size	1 Byte
Access	Set
Example (Data)	XX 10 64 01 02 (*CLS) Sets the *CLS command.

Attribute 0x05: *IDN

Description	Queries the manufacturer, model name, serial number, and firmware version of the ASR.
Name	*IDN
Value	Returns the instrument identification as a string in the following format:

	GW-INSTEK,ASR-XXXX,GXXXXXXXX,XX.XX Manufacturer: GW-INSTEK Model number : ASR-XXXX Serial number : GXXXXXXXX Firmware version : XX.XX
Type	Char
Data Size	36 Bytes
Access	Get
Example (Data)	Command : XX 0E 64 01 05 (*IDN?) Fragment Return 1: 8X 00 8E 47 57 2D 49 4E (Char data is “GW-IN”) Fragment Command Ack: 8X C0 00 Fragment Return 2: 8X 41 53 54 45 4B 2C 41 (Char data is “STEK,A”) Fragment Command Ack: 8X C1 00 Fragment Return 3: 8X 42 53 52 5D 36 36 30 (Char data is “SR-660”) Fragment Command Ack: 8X C2 00 Fragment Return 3:

8X 43 30 2C 53 4E 30 30
(Char data is “00,SN00”)

Fragment Command Ack:
8X C3 00
Fragment Return 3:
8X 44 30 30 30 31 2C 31
(Char data is “0001,1”)

Fragment Command Ack:
8X C4 00
Fragment Return 3:
8X 45 2E 32 36 2E 30 30
(Char data is “.26.00”)

Fragment Command Ack:
8X C5 00
Fragment Return 3:
8X 86 30
(Char data is “0”)

Fragment Command Ack:
8X C6 00

Return data is “GW-INSTEK,ASR-6600,SN000001,1.26.000”

Attribute 0x07: *RCL

Description	Recalls the contents stored in memory slot M0 ~ M9. These memory slots are mapped to the preset settings.
Name	*RCL
Value	0 ~ 9 (as memory M0 ~ M9)
Type	UINT8
Data size	1 Byte
Access	Set
Example (Data)	XX 10 64 01 07 (*RCL) Sets the *RCL command.

Attribute 0x08: *RST

Description	Performs a device reset. Configures the unit to a known configuration (default settings). This known configuration is independent of the usage history.
Name	*RST
Value	-
Type	UINT8
Data size	1 Byte
Access	Set
Example (Data)	XX 10 64 01 08 (*RST) Sets the *RST command.

Attribute 0x09: *SAV

Description	Saves the settings into memory slot M0 ~ M9. These memory slots are mapped to the preset settings.
Name	*SAV
Value	0 ~ 9 (as memory M0 ~ M9)
Type	UINT8
Data size	1 Byte
Access	Set

Attribute 0x0E: *WAI

Description	Prevents any other commands or queries from being executed until all outstanding commands have completed.
Name	*WAI
Value	-
Type	UINT8
Data size	1 Byte
Access	Set

Data / Trace Commands(Class 0x66/73)

Note

The TRACE and DATA node for the following commands are functionally equivalent.

Instance 0X01/0x05

Instance 0X03/0x07

Instance 0X09/0x0B

Instance 0X0B/0x0C

Attribute 0x16/0x01: DATA/TRACe:SEQuence:CLEar

Description	Clears the sequence data for the selected save memory (Seq0 ~ Seq9).
Name	DATA|TRACe:SEQuence:CLEar
Value	0 ~ 9 (Seq0 ~ Seq9).
Type	UINT8
Data size	4 Bytes

Access	Set
Example (Data)	XX 10 66 01 16 01(:DATA:SEQ:CLE 1) XX 10 73 05 01 01(:TRACe:SEQ:CLE 1) Clears the sequence data from Seq1.

Attribute 0x21/0x20: DATA/TRACe:SEQuence:RECall

Description	Loads the sequence data. This command is the equivalent to recalling a sequence memory in the Sequence mode.
Name	DATA | TRACe:SEQuence:RECall
Value	0 ~ 9 (Seq0 ~ Seq9).
Type	UINT8
Data size	1 Byte
Access	Set
Example (Data)	XX 10 66 16 21 01(:DATA:SEQ:REC 1) XX 10 73 05 20 01(:TRACe:SEQ:REC 1) Loads the data from Seq1.

Attribute 0x22/0x21: DATA/TRACe:SEQuence:STORe

Description	Saves the sequence data. This command is the equivalent to saving a sequence memory in Sequence mode.
Name	DATA | TRACe:SEQuence:STORe
Value	0 ~ 9 (Seq0 ~ Seq9).
Type	UINT8
Data size	1 Byte
Access	Set

Example	XX 10 66 16 21 01(:DATA:SEQ:STOR 1)
(Data)	XX 10 73 05 21 01(:TRACe:SEQ:STOR 1)
	Saves the data from Seq1.

Attribute 0x16/0x01: DATA/TRACe:SIMulation:CLEar

Description	Clears the simulation data for the selected save memory (SIM0 ~ SIM9).
Name	DATA | TRACe:SIMulation:CLEar
Value	0 ~ 9 (SIM0 ~ SIM9).
Type	UINT8
Data size	1 Byte
Access	Set
Example	XX 10 66 03 16 01(:DATA:SIM:CLE 1)
(Data)	XX 10 73 07 01 01(:TRACe:SIM:CLE 1)
	Clears the simulation data from SIM1.

Attribute 0x21/0x20: DATA/TRACe:SIMulation:RECall

Description	Loads the simulation data. This command is the equivalent to recalling a simulation memory in the Simulation mode (SIM0~SIM9).
Name	DATA | TRACe:SIMulation:RECall
Value	0 ~ 9 (SIM0 ~ SIM9).
Type	UINT8
Data size	1 Byte
Access	Set
Example	XX 10 66 03 21 01(:DATA:SIM:REC 1)

(Data)	XX 10 73 07 20 01(:TRACe:SIM:REC 1) Loads the data from SIM1.

Attribute 0x22/0x21: DATA/TRACe:SIMulation:STORe

Description	Saves the simulation data. This command is the equivalent saving a simulation memory in Simulation mode (SIM0 ~ SIM9).
Name	DATA | TRACe:SIMulation:STORe
Value	0 ~ 9 (SIM0 ~ SIM9).
Type	UINT8
Data size	1 Byte
Access	Set
Example (Data)	XX 10 66 03 22 01(:DATA:SIM:STOR 1) XX 10 73 07 21 01(:TRACe:SIM:STOR 1) Saves the data from SIM1.

Attribute 0x01/0x01: DATA/TRACe:WAVe:CLEar

Description	Clears the ARB 1-253 data for the selected wave group.
Name	DATA | TRACe:WAVe:CLEar
Value	0~252 (ARB1 ~ ARB253).
Type	UINT8
Data size	1 Byte
Access	Set
Example (Data)	XX 10 66 09 01 0D(:DATA:WAV:CLE 13) XX 10 73 0B 01 0D(:TRACe:WAV:CLE 13)

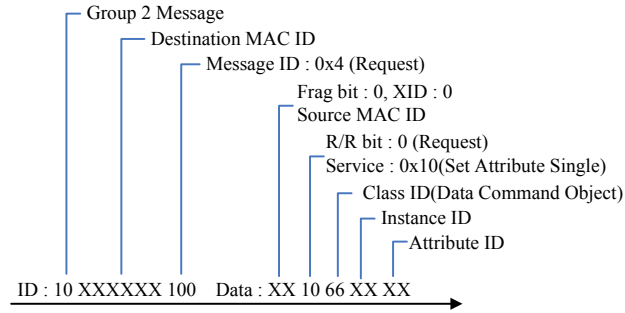
	Clears the wave data from ARB14.

Attribute 0x01 ... 0xFD: DATA/TRACe:WAVe[:DATA]

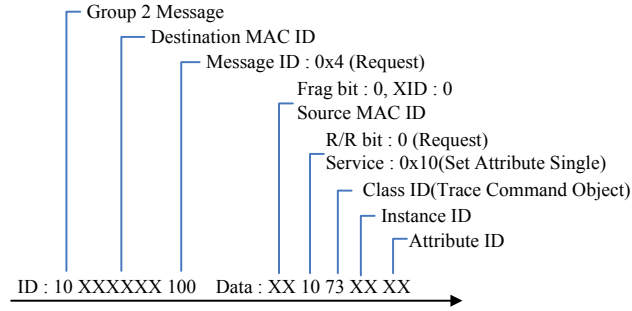
Description	Sets the arbitrary wave.
Name	DATA/TRACe:WAVe[:DATA]
Vange	Indicates 16-bit with 4096 words waveform data. Plus, the data format of wave is the big endian in the form of two's complement.
Type	UINT32
Data size	8192 Bytes
Access	Set

Request Data / Trace Commands Example

Data Request Example



Trace Request Example



Display Commands (Class 0x67)

Instance 0X01

Instance 0X02

Instance 0X03

Attribute 0x01: DISPlay[:WINDow]:DESign:MODE

Description	Sets three display mode.
Name	DISPlay[:WINDow]:DESign:MODE
Value	0 = NORMal Configure setup and Measurement. 1 = TOTal Configure setup and Measurement include total information. 2 = SIMPle All measurement times.
Type	UINT8
Data size	1 Byte
Access	Set
Example (Data)	XX 10 67 01 01 00 (:DISP:DES:MODE NORM) Sets standard normal display.

Attribute 0x01 ... 0x04:DISPlay[:WINDow]:MEASure:SOURce<1|2|3|4>

Description	Sets standard normal display to measurement items 1 – 4.
Name	Item 1 (Attribute 0x01)
Value	0 = VRMS 1 = VAVG 2 = VMAX 3 = VMIN 4 = VPKH 10 = RPOWer 11 = SPOWer (Not available for DC-INT) 12 = QPOWer (Not available for DC-INT) 16 = THDV (Available for AC-INT only) 18 = LRMS 19 = LAVG 20 = LMAX 21 = LMIN
Type	UINT8
Data size	1 Byte
Access	Get/Set
Name	Item 2 (Attribute 0x02)
Value	5 = IRMS 6 = IAVG 7 = IMAX 8 = IMIN 9 = IPKH 14 = PFACtor (Not available for DC-INT) 15 = CFACtor (Not available for DC-INT) 17 = THDI (Available for AC-I T only)
Type	UINT8
Data size	1 Byte
Access	Get/Set

Name	Item 3 (Attribute 0x03)
Value	9 = IPKH , 10 = RPOWer 11 = SPOWer 12 = QPOWer (Not available for DC-INT) 13 = FREQuency (Available for AC+DC-Sync & AC-Synconly) 14 = PFACtor (Not available for DC-INT) 15 = CFACtor (Not available for DC-INT)
Type	UINT8
Data size	1 Byte
Access	Get/Set
Name	Item 4 (Attribute 0x04)
Value	Available for DC-INT only: 5 = IRMS 6 = IAVG 7 = IMAX 8 = IMIN 9 = IPKH Not available for DC-INT: 11 = SPOWer 12 = QPOWer 14 = PFACtor 15 = CFACtor 18 = LRMS 19 = LAVG 20 = LMAX 21 = LMIN Common: 10 = RPOWer
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example	XX 10 67 02 01 00 (:DISP:MEAS:SOUR1 VRMS)

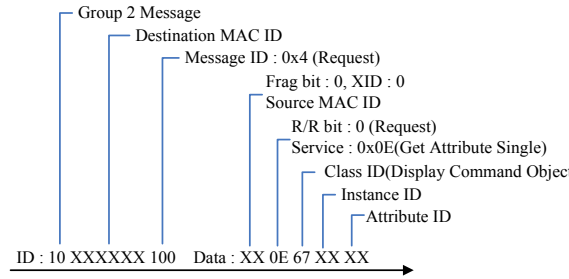
(Data)	Sets measurement source 1 VRMS display.

Attribute 0x01: DISPLAY_ADDRESS

Description	Display the CAN Bus/DeviceNet address on screen.
Name	DISPLAY_ADDRESS
Value	-
Type	UINT8
Data size	1 Byte
Access	Set
Example	XX 10 67 04 01 (DISPLAY_ADDRESS)
(Data)	Display the CAN Bus/DeviceNet address on screen.

Request Dispaly Commands Example

Request Example



Fetch Commands (Class 0x69)

Instance 0X01

Instance 0X03

Instance 0X04

Instance 0X05

Instance 0X07

Attribute 0x01: FETCh[:SCALar]:CURRent:CFACtor

Description	Returns the output fetch current crest factor (CF).
Name	FETCh[:SCALar]:CURRent:CFACtor
Value	Returns the crest factor.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 69 01 01(:FETCh:CURR:CFACtor?) Return data is 1520. XX 8E F0 05 00 00 The crest factor is 1.52, Magnification is

	1000.

Attribute 0x02: FETCh[:SCALar]:CURRent:HIGH

Description	Returns the output fetch current maximum peak value (Imax).
Name	FETCh[:SCALar]:CURRent:HIGH
Value	Returns the Imax value in amps.
Type	INT32
Data size	4 Bytes
Access	Get
Note	Current maximum peak value is defined as the highest peak value in the complete period.
Example (Data)	XX 0E 69 01 02(:FETCh:CURR:HIGH?) Return data is 20050. XX 8E 52 4E 00 00 The current maximum peak value is 20.05 A, Magnification is 1000..

Attribute 0x03: FETCh[:SCALar]:CURRent:LOW

Description	Returns the output fetch current minimum value (Imin).
Name	FETCh[:SCALar]:CURRent:LOW
Value	Returns the Imin value in amps.
Type	INT32
Data size	4 Bytes
Access	Get
Note	Current minimum value is defined as the lowest value in the complete period.

Example (Data)	XX 0E 69 01 03 (:FETCh:CURR:LOW?) Return data is 1050. XX 8E 1A 04 00 00 The current minimum value is 1.05 A, Magnification is 1000.

Attribute 0x04: FETCh[:SCALar]:CURRent:PEAK:HOLD

Description	Returns the fetch current peak hold value in amps (IPK Hold).
Name	FETCh[:SCALar]:CURRent:PEAK:HOLD
Value	Returns the peak hold value in amps.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 69 01 04 (:FETCh:CURR:PEAK:HOLD?) Return data is 20050. XX 8E 52 4E 00 00 The ipeak hold is 20.05 A, Magnification is 1000.

Attribute 0x05: FETCh[:SCALar]:CURRent[:RMS]

Description	Returns the output fetch current (Irms).
Name	FETCh[:SCALar]:CURRent[:RMS]
Value	Returns the current value in Irms.
Type	INT32
Data size	4 Bytes

Access	Get
Example (Data)	XX 0E 69 01 05 (:FETCh:CURR?) Return data is 10050. XX 8E 42 27 00 00 The current is 10.05 A, Magnification is 1000.

Attribute 0x06: FETCh[:SCALar]:CURRent[:RMS]:TOTal

Description	Returns the total of output fetch current (Irms).
Name	FETCh[:SCALar]:CURRent[:RMS]:TOTal
Value	Returns the total of current value in Irms.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 69 01 06 (:FETCh:CURR:TOTal?) Return data is 10050. XX 8E 42 27 00 00 The total of current is 10.05 A, Magnification is 1000.

Attribute 0x07: FETCh[:SCALar]:CURRent:AC

Description	Returns the output fetch AC current (Irms).
Name	FETCh[:SCALar]:CURRent:AC
Value	Returns the AC current value in Irms.
Type	INT32

Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 69 01 07 (:FETCh:CURR:AC?) Return data is 10050. XX 8E 42 27 00 00 The AC current is 10.05 A, Magnification is 1000.

Attribute 0x08: FETCh[:SCALar]:CURRent:AVERage

Description	Returns the fetch current average value (Iavg).
Name	FETCh[:SCALar]:CURRent:AVERage
Value	Returns the current average value in amps.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 69 01 08 (:FETCh:CURR:AVERage?) Return data is 10050. XX 8E 42 27 00 00 The current average value is 10.05 A, Magnification is 1000.

Attribute 0x09 ... 0x0E: FETCh[:SCALar]:CURRent:HARMonic[:RMS]

Description	Returns 101 values covering Total and order 1 to 100 fetch current (Irms) in harmonic. (Only AC-INT and 50/60 Hz Active)

Name	Total Fetch current (Irms) in harmonic. (Attribute 0x09)
Value	Returns the entire 20 values containing Total and order 1 to 20 current (Irms) in harmonic.
Type	INT32
Data size	4 Bytes
Access	Get
Name	Page 1 (Attribute 0x0A)
Value	Returns the entire 20 values containing order 21 to 40 current (Irms) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 2 (Attribute 0x0B)
Value	Returns the entire 20 values containing order 41 to 60 current (Irms) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 3 (Attribute 0x0C)
Value	Returns the entire 20 values containing order 61 to 80 current (Irms) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 4 (Attribute 0x0D)

Value	Returns the entire 20 values containing order 81 to 100 current (Irms) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 5 (Attribute 0x0E)
Value	Returns the entire 20 values containing order 81 to 100 current (Irms) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Example (Data)	Command 1: XX 0E 69 01 0E (:FETCh:CURR:HARMonic? 5) Fragment Return 1: 8X 00 8E 00 00 00 00 00 (Byte 3 ~ Byte 7 is data) Fragment Command Ack: 8X C0 00 Fragment Return 2: 8X 41 00 00 00 00 00 00 (Byte 2 ~ Byte 7 is data) Fragment Command Ack: 8X C1 00 Fragment Return 3:

8X 42 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C2 00
Fragment Return 4:
8X 43 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C3 00
Fragment Return 5:
8X 44 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C4 00
Fragment Return 6:
8X 45 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C5 00
Fragment Return 7:
8X 46 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C6 00
Fragment Return 8:

8X 47 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C7 00
Fragment Return 9:
8X 48 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C8 00
Fragment Return 10:
8X 49 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C9 00
Fragment Return 11:
8X 4A 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X CA 00
Fragment Return 12:
8X 4B 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X CB 00
Fragment Return 13:

	8X 4C 00 00 00 00 00 00 (Byte 2 ~ Byte 7 is data) Fragment Command Ack: 8X CC 00 Fragment Return 14: 8X 8D 00 00 00 (Byte 2 ~ Byte 4 is data) Fragment Command Ack: 8X CD 00 In a total of 80 bytes of data.

Attribute 0x0F ... 0x14: FETCh[:SCALar]:CURRent:HARMonic:RATio

Description	Returns 101 values covering Total and order 1 to 100 fetch current (Ratio) in harmonic. (Only AC-INT and 50/60 Hz Active)
Name	Total Fetch current (Ratio) in harmonic. (Attribute 0x0F)
Value	Returns the Total Fetch current (Ratio) in harmonic.
Type	INT32
Data size	4 Bytes
Access	Get
Name	Page 1 (Attribute 0x10)
Value	Returns the entire 20 values containing

	order 1 to 20 current (Ratio) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 2 (Attribute 0x11)
Value	Returns the entire 20 values containing order 21 to 40 current (Ratio) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 3 (Attribute 0x12)
Value	Returns the entire 20 values containing order 41 to 60 current (Ratio) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 4 (Attribute 0x13)
Value	Returns the entire 20 values containing order 61 to 80 current (Ratio) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 5 (Attribute 0x14)
Value	Returns the entire 20 values containing order 81 to 100 current (Ratio) in harmonic.

Type	INT32
Data size	80 Bytes
Example (Data)	Command 1: XX 0E 69 01 14 (:FETCh:CURR:HARMonic:RATio? 5) Fragment Return 1: 8X 00 8E 00 00 00 00 00 (Byte 3 ~ Byte 7 is data) Fragment Command Ack: 8X C0 00 Fragment Return 2: 8X 41 00 00 00 00 00 00 (Byte 2 ~ Byte 7 is data) Fragment Command Ack: 8X C1 00 Fragment Return 3: 8X 42 00 00 00 00 00 00 (Byte 2 ~ Byte 7 is data) Fragment Command Ack: 8X C2 00 Fragment Return 4: 8X 43 00 00 00 00 00 00 (Byte 2 ~ Byte 7 is data) Fragment Command Ack: 8X C3 00

Fragment Return 5:
8X 44 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C4 00
Fragment Return 6:
8X 45 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C5 00
Fragment Return 7:
8X 46 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C6 00
Fragment Return 8:
8X 47 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C7 00
Fragment Return 9:
8X 48 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C8 00

Fragment Return 10:
8X 49 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C9 00
Fragment Return 11:
8X 4A 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X CA 00
Fragment Return 12:
8X 4B 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X CB 00
Fragment Return 13:
8X 4C 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X CC 00
Fragment Return 14:
8X 8D 00 00 00
(Byte 2 ~ Byte 4 is data)

Fragment Command Ack:
8X CD 00

	In a total of 80 bytes of data.

Attribute 0x01: FETCh[:SCALar]:FREQuency

Description	Returns the fetch SYNC signal source frequency in Hz. The external sync signal frequency measurement range is 10.0 Hz to 2100.0 Hz. (Only AC+DC-sync or AC-sync Active)
Name	FETCh[:SCALar]:FREQuency
Value	Returns the SYNC frequency in Hz
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 69 03 01 (:FETCh:FREQuency?) Return data is 50000. XX 8E 50 C3 00 00 The SYNC frequency is 50 Hz, Magnification is 1000.

Attribute 0x01: FETCh[:SCALar]:POWer[:AC]:APParent

Description	Returns the fetch apparent power (S).
Name	FETCh[:SCALar]:POWer[:AC]:APParent
Value	Returns the apparent power in VA.
Type	INT32
Data size	4 Bytes
Access	Get
Example	XX 0E 69 04 01 (:FETCh:POWer:APParent?)

(Data)	
	Return data is 2500. XX 8E C4 09 00 00 The apparent power is 2.5, Magnification is 1000.

Attribute 0x02: FETCh[:SCALar]:POWer[:AC]:APParent:TOTal

Description	Returns the fetch total of apparent power (S).
Name	FETCh[:SCALar]:POWer[:AC]:APParent:TOTal
Value	Returns the total of apparent power in VA.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 69 04 02 (:FETCh:POWer:APParent:TOTal?) Return data is 2500. XX 8E C4 09 00 00 The total of apparent power is 2.5, Magnification is 1000.

Attribute 0x03: FETCh[:SCALar]:POWer[:AC]:PFACtor

Description	Returns the fetch power factor (PF).
Name	FETCh[:SCALar]:POWer[:AC]:PFACtor
Value	Returns the power factor.
Type	INT32
Data size	4 Bytes
Access	Get

Example (Data)	XX 0E 69 04 03 (:FETCh:POWer:PFACtor?) Return data is 2500. XX 8E C4 09 00 00 The power factor is 2.5, Magnification is 1000.

Attribute 0x04: FETCh[:SCALar]:POWer[:AC]:PFACtor:TOTal

Description	Returns the total of fetch power factor (PF).
Name	FETCh[:SCALar]:POWer[:AC]:PFACtor:TOTal
Value	Returns the total of power factor.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 69 04 04 (:FETCh:POWer:PFACtor:TOTal?) Return data is 2500. XX 8E C4 09 00 00 The total of power factor is 2.5, Magnification is 1000.

Attribute 0x05: FETCh[:SCALar]:POWer[:AC]:REACtive

Description	Returns the fetch reactive power (Q).
Name	FETCh[:SCALar]:POWer[:AC]:REACtive
Value	Returns the reactive power in VAR.
Type	INT32
Data size	4 Bytes
Access	Get

Example (Data)	XX 0E 69 04 05 (:FETCh:POWer:REACtive?) Return data is 2500. XX 8E C4 09 00 00 The reactive power is 2.5, Magnification is 1000.

Attribute 0x06: FETCh[:SCALar]:POWer[:AC]:REACtive:TOTal

Description	Returns the total of fetch reactive power (Q).
Name	FETCh[:SCALar]:POWer[:AC]:REACtive:TOTal
Value	Returns the total of reactive power in VAR
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 69 04 06 (:FETCh:POWer:REACtive:TOTal?) Return data is 2500. XX 8E C4 09 00 00 The reactive power is 2.5, Magnification is 1000.

Attribute 0x07: FETCh[:SCALar]:POWer[:AC][:REAL]

Description	Returns the fetch active power in Watts (P).
Name	FETCh[:SCALar]:POWer[:AC][:REAL]
Value	Returns the power in Watts.
Type	INT32

Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 69 04 07 (:FETCh:POWer?) Return data is 100500. XX 8E 94 88 01 00 The power is 100.5 W, Magnification is 1000.

Attribute 0x08: FETCh[:SCALar]:POWer[:AC][:REAL]:TOTal

Description	Returns the total of fetch active power in Watts (P).
Name	FETCh[:SCALar]:POWer[:AC][:REAL]:TOTal
Value	Returns the total power in Watts.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 69 04 08 (:FETCh:POWer:TOTal?) Return data is 100500. XX 8E 94 88 01 00 The total of power is 100.5 W, Magnification is 1000.

Attribute 0x01: FETCh[:SCALar]:VOLTage[:RMS]

Description	Returns the fetch voltage (Vrms).
Name	FETCh[:SCALar]:VOLTage[:RMS]
Value	Returns the voltage value in Vrms.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 69 05 01 (:FETCh:VOLTage?) Return data is 100500. XX 8E 94 88 01 00 The voltage is 100.5 V, Magnification is 1000.

Attribute 0x02: FETCh[:SCALar]:VOLTage[:RMS]:TOTal

Description	Returns the total of fetch voltage (Vrms).
Name	FETCh[:SCALar]:VOLTage[:RMS]:TOTal
Value	Returns the total of voltage value in Vrms.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 69 05 02 (:FETCh:VOLTage:TOTal?) Return data is 100500. XX 8E 94 88 01 00 The total of voltage is 100.5 V, Magnification is 1000.

Attribute 0x03: FETCh[:SCALar]:VOLTage:AC

Description	Returns the fetch AC voltage (Vrms).
Name	FETCh[:SCALar]:VOLTage:AC
Value	Returns the AC voltage value in Vrms.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 69 05 03 (:FETCh:VOLTage:AC?) Return data is 100500. XX 8E 94 88 01 00 The AC voltage is 100.5 V, Magnification is 1000.

Attribute 0x04: FETCh[:SCALar]:VOLTage:AVERage

Description	Returns the fetch voltage average value (Vavg).
Name	FETCh[:SCALar]:VOLTage:AVERage
Value	Returns the voltage average value in volts.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 69 05 04 (:FETCh:VOLTage:AC?) Return data is -50750. XX 8E C2 39 FF FF The voltage average is -50.75 V, Magnification is 1000.

Attribute 0x05: FETCh[:SCALar]:VOLTage:HIGH

Description	Returns the output fetch voltage maximum peak value (Vmax).
Name	FETCh[:SCALar]:VOLTage:HIGH
Value	Returns the Vmax value in volts.
Type	INT32
Data size	4 Bytes
Access	Get
Note	Voltage maximum peak value is defined as the highest peak value in the complete period.
Example (Data)	XX 0E 69 05 05 (:FETCh:VOLTage:HIGH?) Return data is 100500. XX 8E 94 88 01 00 The voltage maximum peak is 100.5 V, Magnification is 1000.

Attribute 0x06: FETCh[:SCALar]:VOLTage:LOW

Description	Returns the output fetch current minimum value (Vmin).
Name	FETCh[:SCALar]:VOLTage:LOW
Value	Returns the Vmin value in volts
Type	INT32
Data size	4 Bytes
Access	Get
Note	Voltage minimum value is defined as the lowest value in the complete period.

Example (Data)	XX 0E 69 05 06 (:FETCh:VOLTage:LOW?) Return data is -50750. XX 8E C2 39 FF FF The voltage minimum is -50.75 V, Magnification is 1000.

Attribute 0x07 ... 0x0C: FETCh[:SCALar]: VOLTage:HARMonic[:RMS]

Description	Returns 101 values covering Total and order 1 to 100 fetch voltage (Vrms) in harmonic. (Only AC-INT and 50/60 Hz Active)
Name	Total fetch voltage (Vrms) in harmonic. (Attribute 0x07)
Value	Returns the Total fetch voltage (Vrms) in harmonic.
Type	INT32
Data size	4 Bytes
Access	Get
Name	Page 1 (Attribute 0x08)
Value	Returns the entire 20 values containing order 1 to 20 fetch voltage (Vrms) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 2 (Attribute 0x09)
Value	Returns the entire 20 values containing order 21 to 40 fetch voltage (Vrms) in harmonic.

Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 3 (Attribute 0x0A)
Value	Returns the entire 20 values containing order 41 to 60 fetch voltage (Vrms) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 4 (Attribute 0x0B)
Value	Returns the entire 20 values containing order 61 to 80 fetch voltage (Vrms) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 5 (Attribute 0x0C)
Value	Returns the entire 20 values containing order 81 to 100 fetch voltage (Vrms) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Example (Data)	Command 1: XX 0E 69 05 0C (:FETCh: VOLTage:HARMonic? 5) Fragment Return 1: 8X 00 8E 00 00 00 00 00

(Byte 3 ~ Byte 7 is data)

Fragment Command Ack:
8X C0 00
Fragment Return 2:
8X 41 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C1 00
Fragment Return 3:
8X 42 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C2 00
Fragment Return 4:
8X 43 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C3 00
Fragment Return 5:
8X 44 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C4 00
Fragment Return 6:
8X 45 00 00 00 00 00 00

(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C5 00
Fragment Return 7:
8X 46 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C6 00
Fragment Return 8:
8X 47 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C7 00
Fragment Return 9:
8X 48 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C8 00
Fragment Return 10:
8X 49 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C9 00
Fragment Return 11:
8X 4A 00 00 00 00 00 00

(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X CA 00
Fragment Return 12:
8X 4B 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X CB 00
Fragment Return 13:
8X 4C 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X CC 00
Fragment Return 14:
8X 8D 00 00 00
(Byte 2 ~ Byte 4 is data)

Fragment Command Ack:
8X CD 00

In a total of 80 bytes of data.

Attribute 0x0D ... 0x12: FETCh[:SCALar]:VOLTage:HARMonic:RATio

Description	Returns 101 values covering Total and order 1 to 100 fetch Voltage (Ratio) in harmonic. (Only AC-INT and 50/60 Hz Active)
Name	Total fetch Voltage (Ratio) in harmonic. (Attribute 0x0D)
Value	Returns the Total fetch Voltage (Ratio) in harmonic.
Type	INT32
Data size	4 Bytes
Access	Get
Name	Page 1 (Attribute 0x0E)
Value	Returns the entire 20 values containing order 1 to 20 fetch Voltage (Ratio) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 2 (Attribute 0x0F)
Value	Returns the entire 20 values containing order 21 to 40 fetch Voltage (Ratio) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 3 (Attribute 0x10)
Value	Returns the entire 20 values

	containing order 41 to 60 fetch Voltage (Ratio) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 4 (Attribute 0x11)
Value	Returns the entire 20 values containing order 61 to 80 fetch Voltage (Ratio) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 5 (Attribute 0x12)
Value	Returns the entire 20 values containing order 81 to 10 fetch Voltage (Ratio) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Example (Data)	Command 1: XX 0E 69 05 12 (:FETCh: VOLTage:HARMonic:RATio? 5) Fragment Return 1: 8X 00 8E 00 00 00 00 00 (Byte 3 ~ Byte 7 is data) Fragment Command Ack: 8X C0 00

Fragment Return 2:
8X 41 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C1 00
Fragment Return 3:
8X 42 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C2 00
Fragment Return 4:
8X 43 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C3 00
Fragment Return 5:
8X 44 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C4 00
Fragment Return 6:
8X 45 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C5 00

Fragment Return 7:
8X 46 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C6 00
Fragment Return 8:
8X 47 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C7 00
Fragment Return 9:
8X 48 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C8 00
Fragment Return 10:
8X 49 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C9 00
Fragment Return 11:
8X 4A 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X CA 00

Fragment Return 12:
8X 4B 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X CB 00
Fragment Return 13:
8X 4C 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X CC 00
Fragment Return 14:
8X 8D 00 00 00
(Byte 2 ~ Byte 4 is data)

Fragment Command Ack:
8X CD 00

In a total of 80 bytes of data.

Attribute 0x01: FETCh[:SCALar]:LINE:VOLTage[:RMS]

Description	Returns the fetch line voltage (Vrms).
Name	FETCh[:SCALar]:LINE:VOLTage[:RMS]
Value	Returns the fetch line voltage value in Vrms.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 69 07 01 (:FETCh:LINE:VOLTage?) Return data is 100500. XX 8E 94 88 01 00 The line voltage is 100.5 V, Magnification is 1000.

Attribute 0x02: FETCh[:SCALar]:LINE:VOLTage:AVERage

Description	Returns the fetch line voltage average value (Vavg).
Name	FETCh[:SCALar]:LINE:VOLTage:AVERage
Value	Returns the fetch line voltage average value in volts.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 69 07 02 (:FETCh:LINE:VOLTage:AVERage?) Return data is 100500.

	XX 8E 94 88 01 00 The line voltage average is 100.5 V, Magnification is 1000.

Attribute 0x03: FETCh[:SCALar]:LINE:VOLTage:HIGH

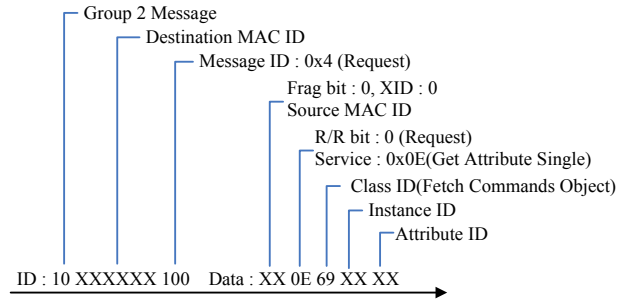
Description	Returns the output fetch voltage maximum peak value (Vmax).
Name	FETCh[:SCALar]:LINE:VOLTage:AVERage
Value	Returns the fetch Vmax value in line volts.
Type	INT32
Data size	4 Bytes
Access	Get
Note	Line voltage maximum peak value is defined as the highest peak value in the complete period.
Example (Data)	XX 0E 69 07 03 (:FETCh:LINE:VOLTage:AVERage:HIGH?) Return data is 100500. XX 8E 94 88 01 00 The line voltage maximum peak is 100.5 V, Magnification is 1000.

Attribute 0x04: FETCh[:SCALar]:LINE:VOLTage:LOW

Description	Returns the output fetch current minimum value (Vmin).
Name	FETCh[:SCALar]:LINE:VOLTage:AVERage
Value	Returns the fetch Vmin value in line volts.
Type	INT32
Data size	4 Bytes
Access	Get
Note	Line voltage minimum value is defined as the lowest value in the complete period.
Example (Data)	XX 0E 69 07 04 (:FETCh:LINE:VOLTage:LOW?) Return data is -50750. XX 8E C2 39 FF FF The line voltage minimum is -50.75 V, Magnification is 1000.

Request Fetch Commands Example

Request Example



Input Command (Class 0x6B)

Instance 0X01

Attribute 0x01: INPut:GAIN

Description	Sets or queries the input gain value. (Only AC+DC-EXT or AC-EXT or AC+DC-ADD or AC-ADD or AC-VCA Active)
Name	INPut:GAIN
Value	Input gain value (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Example (Data)	XX 0E 6B 01 01 (:INP:GAIN?) Return data is 1500 (150.0) XX 8E DC 05 00 00 Returns the input gain value as 150.0.

Attribute 0x02: INPut:SOURce

Description	Sets or queries state of source. (Only AC+DC-EXT or AC-EXT or AC+DC-ADD or AC-ADD or AC-VAC Active)
Name	INPut:SOURce
Value	0 = L1EXT L1 EXT source 1 = L2EXT L2 EXT source 2 = L3EXT L3 EXT source
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 0E 6B 01 02 (:INP:SOUR?) Return data is 0 (L1EXT) XX 8E 00 00 00 00 Returns the input gain value as 150.0.

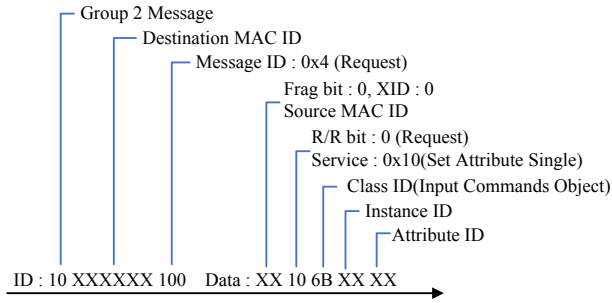
Attribute 0x03: INPut:SYNC:SOURce

Description	Sets or queries state of sync source. (Only AC+DC- sync or AC-sync Active)
Name	INPut:SYNC:SOURce
Value	0 = L1 LINE L1 LINE sync source 1 = L2 LINE L2 LINE sync source 2 = L3 LINE L3 LINE sync source 3 = EXT EXT sync source
Type	UINT8
Data size	1 Byte

Access	Get/Set
Example (Data)	XX 0E 6B 01 03 (:INP:SYNC:SOUR?) Return data is 3 (EXT) XX 8E 03 00 00 00 Returns the state of sync source as EXT.

Request Input Commands Example

Request Input Commands Example



Instrumnet Commands (Class 0x6C)

Instance 0X01

Attribute 0x01: INSTrument:EDIT

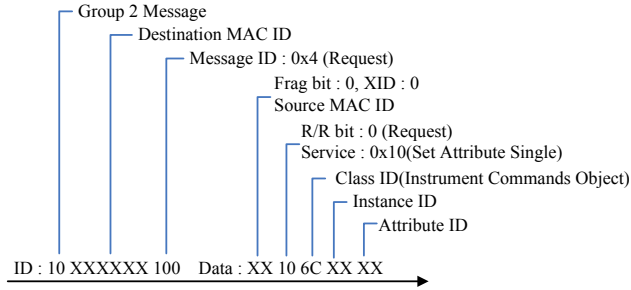
Description	Sets or queries instrument edit. It is convenient to use a programmed command to set all phases at the same time. If INST:EDIT ALL has been programmed, it will sent all phases. (Only three-phase four-wire anf signal-phase three-wire Active)
Name	INSTrument:EDIT
Value	0 = EACH Each phase 1 = ALL All phase
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 10 6C 01 01 01 (:INST:EDIT ALL) Sets instrument edit all phase.

Attribute 0x02: INSTrument:SELect

Description	Sets or queries the phase to set continuous mode. (Only continuous Mode Active. For single-phase, only L1 can be set. For single-phase three-wire, L1and L2 can be set.)
Name	INSTrument:SELect
Value	From 0 ~ 2, which represent different phase to set sequence, respectively. 0 = L1 L1 phase 1 = L2 L2 phase 2 = L3 L3 phase
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 10 6C 01 02 01 (:INST:SEL L2) Sets the L2 phase to set continuous mode.

Request Instrument Commands Example

Request Instrument Commands Example



Measure Commands (Class 0x6D)

Instance 0X01

Instance 0X02

Instance 0X04

Instance 0X05

Instance 0X07

Attribute 0x01: MEASure:AVERage:COUNt

Description	Sets or queries the averaging count for Measure Function.
Name	MEASure:AVERage:COUNt
Value	1 ~ 128
Type	UINT8
Data size	1 Byte
Access	Get/Set
Averaged Parameter	Vrms & Vmax & Vmin & Irms & Imax & Imin & P & S & Q & PF & CF & Vavg & Ivag
Not Averaged Parameter	Vpkh & Ipkh & Freq & THDv & THDi
Example (Data)	XX 0E 6D 01 01 (:MEASure:AVERage:COUNt?) Return data is 1 XX 8E 01 00 00 00 Returns the averaging count for Measure Function.

Attribute 0x02: MEASure:CONFigure:SENSing

Description	Sets or queries the remote sense configuration. (Only AC-INT, DC-INT, AC-SYNC Mode and 100V, 200V Range and SIN Wave Shape and Output Impedance is Truned off)	
Name	MEASure:CONFigure:SENSing	
Value	0 = OFF	Turns the remote sense off.
	1 = ON	Turns the remote sense on.
Type	UINT8	
Data size	1 Byte	
Access	Get/Set	
Example (Data)	XX 10 6D 01 02 00 (:MEAS:CONF:SENS 0) Sets the remote sense off.	

Attribute 0x03: MEASure:UPDate:RATE

Description	Sets or queries the data update interval for Measure Function.
Name	MEASure:UPDate:RATE
Value	0 = FAST 1 = 0.1 Sec 2 = 0.25 Sec 3 = 0.5 Sec 4 = 1 Sec 5 = 2 Sec 6 = 5 Sec

	7 = 10 Sec 8 = 20 Sec
Type	UINT8
Data size	1 Byte
Access	Get/Set
Use Update Rate Parameter	Vrms & Vmax & Vmin & Irms & Imax & Imin & P & S & Q & PF & CF & Vavg & Ivag
Not Use Update Rate Parameter	Vpkh & Ipkh & Freq & THDv & THDi(update as soon as possible)
Example (Data)	XX 0E 6D 01 03 (:MEASure:UPDate:RATE?) Return data is 0 FAST. XX 8E 00 00 00 00 Returns the data update interval for Measure Function.

Attribute 0x04: MEASure[:SCALar]:FREQuency

Description	Returns the SYNC signal source frequency in Hz. (Only AC+DC-sync or AC-sync Active)
Name	MEASure[:SCALar]:FREQuency
Value	Returns the SYNC frequency in Hz
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 6D 01 04 (:MEASure:FREQuency?)

	Return data is 50000. XX 8E 50 C3 00 00 The SYNC frequency is 50 Hz, Magnification is 1000.

Attribute 0x05: MEASure[:SCALar]:PEAK:CLEar

Description	Clears the current peak-hold value.
Name	MEASure[:SCALar]:PEAK:CLEar
Value	0 = ALL Clear the All phase peak hold value. 1 = L1 Clear L1 phase peak hold value. 2 = L2 Clear L2 phase peak hold value. 3 = L3 Clear L3 phase peak hold value.
Type	UINT8
Data size	1 Byte
Access	Set
Example (Data)	XX 10 6D 01 05 00 (:MEASure[:SCALar]:PEAK:CLEar ALL) Clear the three-phase and total peak hold value.

Attribute 0x01: MEASure[:SCALar]:CURRent:CFACtor

Description	Returns the output current crest factor (CF).
Name	MEASure[:SCALar]:CURRent:CFACtor
Value	Returns the crest factor.
Type	INT32
Data size	4 Bytes
Access	Get
Example (SDO)	XX 0E 6D 02 01 (:MEAS:CURR:CFACtor?) Return data is 1520. XX 8E F0 05 00 00 The crest factor is 1.52, Magnification is 1000.

Attribute 0x02: MEASure[:SCALar]:CURRent:HIGH

Description	Returns the output current maximum peak value (Imax).
Name	MEASure[:SCALar]:CURRent:HIGH
Value	Returns the Imax value in amps.
Type	INT32
Data size	4 Bytes
Access	Get
Note	Current maximum peak value is defined as the highest peak value in the complete period.
Example (Data)	XX 0E 6D 02 02 (:MEAS:CURR:HIGH?)

	Return data is 20050. XX 8E 52 4E 00 00 The current maximum peak value is 20.05 A, Magnification is 1000.

Attribute 0x03: MEASure[:SCALar]:CURRent:LOW

Description	Returns the output current minimum value (Imin).
Name	MEASure[:SCALar]:CURRent:LOW
Value	Returns the Imin value in amps.
Type	INT32
Data size	4 Bytes
Access	Get
Note	Current minimum value is defined as the lowest value in the complete period.
Example (Data)	XX 0E 6D 02 03 (:MEAS:CURR:LOW?) Return data is 1050. XX 8E 1A 04 00 00 The current minimum value is 1.05 A, Magnification is 1000.

Attribute 0x04: MEASure[:SCALar]:CURRent:PEAK:HOLD

Description	Returns the current peak hold value in amps (IPK Hold).
Name	MEASure[:SCALar]:CURRent:PEAK:HOLD
Value	Returns the peak hold value in amps.
Type	INT32
Data size	4 Bytes

Access	Get
Example (Data)	XX 0E 6D 02 04 (:MEAS:CURR:PEAK:HOLD?) Return data is 20050. XX 8E 52 4E 00 00 The ipeak hold is 20.05 A, Magnification is 1000.

Attribute 0x05: MEASure[:SCALar]:CURRent[:RMS]

Description	Returns the output current (Irms).
Name	MEASure[:SCALar]:CURRent[:RMS]
Value	Returns the current value in Irms.
Type	INT32
Data size	4 Bytes
Access	Get
Example (SDO)	XX 0E 6D 02 05 (:MEAS:CURR?) Return data is 10050. XX 8E 42 27 00 00 The current is 10.05 A, Magnification is 1000.

Attribute 0x06: MEASure[:SCALar]:CURRent[:RMS]:TOTal

Description	Returns the total of output current (Irms).
Name	MEASure[:SCALar]:CURRent[:RMS]:TOTal
Value	Returns the total of current value in Irms.
Type	INT32
Data size	4 Bytes

Access	Get
Example (Data)	XX 0E 6D 02 06 (:MEAS:CURR:TOTal?) Return data is 10050. XX 8E 42 27 00 00 The total of current is 10.05 A, Magnification is 1000.

Attribute 0x07: MEASure[:SCALar]:CURRent:AC

Description	Returns the output AC current (Irms).
Name	MEASure[:SCALar]:CURRent:AC
Value	Returns the AC current value in Irms.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 6D 02 07 (:MEAS:CURR:AC?) Return data is 10050. XX 8E 42 27 00 00 The AC current is 10.05 A, Magnification is 1000.

Attribute 0x08: MEASure[:SCALar]:CURRent:AVERage

Description	Returns the current average value (Iavg).
Name	MEASure[:SCALar]:CURRent:AVERage
Value	Returns the current average value in amps.
Type	INT32
Data size	4 Bytes

Access	Get
Example (Data)	XX 0E 6D 02 08 (:MEAS:CURR:AVERage?) Return data is 10050. XX 8E 42 27 00 00 The current average value is 10.05 A, Magnification is 1000.

Attribute 0x0A ... 0x0F: MEASure[:SCALar]:CURRent:HARMonic[:RMS]

Description	Returns 101 values covering Total and order 1 to 100 current (Irms) in harmonic. (Only AC-INT and 50/60 Hz Active)
Name	Total current (Irms) in harmonic. (Attribute 0x0A)
Value	Returns the Total current (Irms) in harmonic.
Type	INT32
Data size	4 Bytes
Access	Get
Name	Page 1 (Attribute 0x0B)
Value	Returns the entire 20 values containing order 1 to 20 current (Irms) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 2 (Attribute 0x0C)
Value	Returns the entire 20 values containing order 21 to 40 current

	(Irms) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 3 (Attribute 0x0D)
Value	Returns the entire 20 values containing order 41 to 60 current (Irms) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 4 (Attribute 0x0E)
Value	Returns the entire 20 values containing order 61 to 80 current (Irms) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 5 (Attribute 0x0F)
Value	Returns the entire 20 values containing order 81 to 100 current (Irms) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Example (Data)	Command 1: XX 0E 6D 02 0F (:MEAS:CURR:HARMonic? 5) Fragment Return 1:

8X 00 8E 00 00 00 00 00
(Byte 3 ~ Byte 7 is data)

Fragment Command Ack:
8X C0 00
Fragment Return 2:
8X 41 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C1 00
Fragment Return 3:
8X 42 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C2 00
Fragment Return 4:
8X 43 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C3 00
Fragment Return 5:
8X 44 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C4 00
Fragment Return 6:

8X 45 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C5 00
Fragment Return 7:
8X 46 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C6 00
Fragment Return 8:
8X 47 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C7 00
Fragment Return 9:
8X 48 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C8 00
Fragment Return 10:
8X 49 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C9 00
Fragment Return 11:

8X 4A 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X CA 00
Fragment Return 12:
8X 4B 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X CB 00
Fragment Return 13:
8X 4C 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X CC 00
Fragment Return 14:
8X 8D 00 00 00
(Byte 2 ~ Byte 4 is data)

Fragment Command Ack:
8X CD 00

In a total of 80 bytes of data.

Attribute 0x10 ... 0x15: MEASure[:SCALar]:CURRent:HARMonic:RATio

Description	Returns 101 values covering Total and order 1 to 100 current (Ratio) in harmonic. (Only AC-INT and 50/60 Hz Active)
Name	Total current (Ratio) in harmonic. (Attribute 0x10)
Value	Returns the Total current (Ratio) in harmonic.
Type	INT32
Data size	4 Bytes
Access	Get
Name	Page 1 (Attribute 0x11)
Value	Returns the entire 20 values containing order 1 to 20 current (Ratio) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 2 (Attribute 0x12)
Value	Returns the entire 20 values containing order 21 to 40 current (Ratio) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 3 (Attribute 0x13)
Value	Returns the entire 20 values containing order 41 to 60 current (Ratio) in harmonic.
Type	INT32
Data size	80 Bytes

Access	Get
Name	Page 4 (Attribute 0x14)
Value	Returns the entire 20 values containing order 61 to 80 current (Ratio) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 5 (Attribute 0x15)
Value	Returns the entire 20 values containing order 81 to 100 current (Ratio) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Example (Data)	Command 1: XX 0E 6D 02 15 (:MEAS:CURR:HARMonic:RATio? 5) Fragment Return 1: 8X 00 8E 00 00 00 00 00 (Byte 3 ~ Byte 7 is data) Fragment Command Ack: 8X C0 00 Fragment Return 2: 8X 41 00 00 00 00 00 00 (Byte 2 ~ Byte 7 is data) Fragment Command Ack: 8X C1 00

Fragment Return 3:
8X 42 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C2 00
Fragment Return 4:
8X 43 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C3 00
Fragment Return 5:
8X 44 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C4 00
Fragment Return 6:
8X 45 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C5 00
Fragment Return 7:
8X 46 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C6 00

Fragment Return 8:
8X 47 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C7 00
Fragment Return 9:
8X 48 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C8 00
Fragment Return 10:
8X 49 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C9 00
Fragment Return 11:
8X 4A 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X CA 00
Fragment Return 12:
8X 4B 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X CB 00

	Fragment Return 13: 8X 4C 00 00 00 00 00 (Byte 2 ~ Byte 7 is data) Fragment Command Ack: 8X CC 00 Fragment Return 14: 8X 8D 00 00 00 (Byte 2 ~ Byte 4 is data) Fragment Command Ack: 8X CD 00 In a total of 80 bytes of data.

Attribute 0x01: MEASure[:SCALar]:POWer[:AC]:APParent

Description	Returns the apparent power (S).
Name	MEASure[:SCALar]:POWer[:AC]:APParent
Value	Returns the apparent power in VA.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 6D 04 01 (:MEASure:POWer:APParent?) Return data is 2500. XX 8E C4 09 00 00 The apparent power is 2.5, Magnification is

	1000.

Attribute 0x02: MEASure[:SCALar]:POWer[:AC]:APParent:TOTal

Description	Returns the total of apparent power (S).
Name	MEASure[:SCALar]:POWer[:AC]:APParent:TOTal
Value	Returns the total of apparent power in VA.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 6D 04 02 (:MEASure:POWer:APParent:TOTal?) Return data is 2500. XX 8E C4 09 00 00 The total of apparent power is 2.5, Magnification is 1000.

Attribute 0x03: MEASure[:SCALar]:POWer[:AC]:PFACtor

Description	Returns the power factor (PF).
Name	MEASure[:SCALar]:POWer[:AC]:PFACtor
Value	Returns the power factor.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 6D 04 03 (:MEASure:POWer:PFACtor?)

	Return data is 2500. XX 8E C4 09 00 00 The power factor is 2.5, Magnification is 1000.

Attribute 0x04:MEASure[:SCALar]:POWer[:AC]:PFACtor:TOTal

Description	Returns the total of power factor (PF).
Name	MEASure[:SCALar]:POWer[:AC]:PFACtor:TOTal
Value	Returns the total of power factor.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 6D 04 04 (:MEASure:POWer:PFACtor:TOTal?) Return data is 2500. XX 8E C4 09 00 00 The total of power factor is 2.5, Magnification is 1000.

Attribute 0x05: MEASure[:SCALar]:POWer[:AC]:REACtive

Description	Returns the reactive power (Q).
Name	MEASure[:SCALar]:POWer[:AC]:APParent:TOTal
Value	Returns the reactive power in VAR.
Type	INT32
Data size	4 Bytes

Access	Get
Example (Data)	XX 0E 6D 04 05 (:MEASure:POWer:REACtive?) Return data is 2500. XX 8E C4 09 00 00 The reactive power is 2.5, Magnification is 1000.

Attribute 0x06: MEASure[:SCALar]:POWer[:AC]:REACtive:TOTal

Description	Returns the total of reactive power (Q).
Name	MEASure[:SCALar]:POWer[:AC]:REACtive:TOTal
Value	Returns the total of reactive power in VAR.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 6D 04 06 (:MEASure:POWer:REACtive:TOTal?) Return data is 2500. XX 8E C4 09 00 00 The reactive power is 2.5, Magnification is 1000.

Attribute 0x07: MEASure[:SCALar]:POWer[:AC][:REAL]

Description	Returns the active power in Watts (P).
Name	MEASure[:SCALar]:POWer[:AC][:REAL]
Value	Returns the power in Watts.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 6D 04 07 (:MEASure:POWer?) Return data is 100500. XX 8E 94 88 01 00 The power is 100.5 W, Magnification is 1000.

Attribute 0x08: MEASure[:SCALar]:POWer[:AC][:REAL]:TOTal

Description	Returns the total of active power in Watts (P).
Name	MEASure[:SCALar]:POWer[:AC][:REAL]:TOTal
Value	Returns the total of power in Watts.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 6D 04 08 (:MEASure:POWer:TOTal?) Return data is 100500. XX 8E 94 88 01 00 The total of power is 100.5 W, Magnification is 1000.

Attribute 0x01: MEASure[:SCALar]:VOLTage[:RMS]

Description	Returns the voltage (Vrms).
Name	MEASure[:SCALar]:VOLTage[:RMS]
Value	Returns the voltage value in Vrms.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 6D 05 01 (:MEASure:VOLTage?) Return data is 100500. XX 8E 94 88 01 00 The voltage is 100.5 V, Magnification is 1000.

Attribute 0x02: MEASure[:SCALar]:VOLTage[:RMS]:TOTal

Description	Returns the total of voltage (Vrms).
Name	MEASure[:SCALar]:VOLTage[:RMS]:TOTal
Value	Returns the total of voltage value in Vrms.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 6D 05 02 (:MEASure:VOLTage:TOTal?) Return data is 100500. XX 8E 94 88 01 00 The total of voltage is 100.5 V, Magnification is 1000.

Attribute 0x03: MEASure[:SCALar]:VOLTage:AC

Description	Returns the AC voltage (Vrms).
Name	MEASure[:SCALar]:VOLTage:AC
Value	Returns the AC voltage value in Vrms.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 6D 05 03 (:MEASure:VOLTage:AC?) Return data is 100500. XX 8E 94 88 01 00 The AC voltage is 100.5 V, Magnification is 1000.

Attribute 0x04: MEASure[:SCALar]:VOLTage:AVERage

Description	Returns the voltage average value (Vavg).
Name	MEASure[:SCALar]:VOLTage:AVERage
Value	Returns the voltage average value in volts.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 6D 05 04 (:MEASure:VOLTage: AVERage?) Return data is -50750. XX 8E C2 39 FF FF The voltage average is -50.75 V, Magnification is 1000.

Attribute 0x05: MEASure[:SCALar]:VOLTage:HIGH

Description	Returns the output voltage maximum peak value (Vmax).
Name	MEASure[:SCALar]:VOLTage:HIGH
Value	Returns the Vmax value in volts.
Type	INT32
Data size	4 Bytes
Access	Get
Note	Voltage maximum peak value is defined as the highest peak value in the complete period.
Example (Data)	XX 0E 6D 05 05 (:MEASure:VOLTage:HIGH?) Return data is 100500. XX 8E 94 88 01 00 The voltage maximum peak is 100.5 V, Magnification is 1000.

Attribute 0x06: MEASure[:SCALar]:VOLTage:LOW

Description	Returns the output current minimum value (Vmin).
Name	MEASure[:SCALar]:VOLTage:LOW
Value	Returns the Vmin value in volts
Type	INT32
Data size	4 Bytes
Access	Get
Note	Voltage minimum value is defined as the lowest value in the complete period.

Example (Data)	XX 0E 6D 05 06 (:MEASure:VOLTage:LOW?) Return data is -50750. XX 8E C2 39 FF FF The voltage minimum is -50.75 V, Magnification is 1000.

Attribute 0x07 ... 0x0C: MEASure[:SCALar]:VOLTage:HARMonic[:RMS]

Description	Returns 101 values covering Total and order 1 to 100 voltage (Vrms) in harmonic. (Only AC-INT and 50/60 Hz Active)
Name	Total voltage (Vrms) in harmonic. (Attribute 0x07)
Value	Returns the Total voltage (Vrms) in harmonic.
Type	INT32
Data size	4 Bytes
Access	Get
Name	Page 1 (Attribute 0x08)
Value	Returns the entire 20 values containing order 1 to 20 voltage (Vrms) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 2 (Attribute 0x09)
Value	Returns the entire 20 values containing order 21 to 40 voltage (Vrms) in harmonic.

Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 3 (Attribute 0x0A)
Value	Returns the entire 20 values containing order 41 to 60 voltage (Vrms) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 4 (Attribute 0x0B)
Value	Returns the entire 20 values containing order 61 to 80 voltage (Vrms) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 5 (Attribute 0x0C)
Value	Returns the entire 20 values containing order 81 to 100 voltage (Vrms) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Example (Data)	Command 1: XX 0E 6D 05 0C (:MEAS:VOLTage:HARMonic? 5) Fragment Return 1: 8X 00 8E 00 00 00 00 00 (Byte 3 ~ Byte 7 is data)

Fragment Command Ack:
8X C0 00
Fragment Return 2:
8X 41 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C1 00
Fragment Return 3:
8X 42 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C2 00
Fragment Return 4:
8X 43 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C3 00
Fragment Return 5:
8X 44 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C4 00
Fragment Return 6:
8X 45 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C5 00
Fragment Return 7:
8X 46 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C6 00
Fragment Return 8:
8X 47 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C7 00
Fragment Return 9:
8X 48 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C8 00
Fragment Return 10:
8X 49 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C9 00
Fragment Return 11:
8X 4A 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X CA 00
Fragment Return 12:
8X 4B 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X CB 00
Fragment Return 13:
8X 4C 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X CC 00
Fragment Return 14:
8X 8D 00 00 00
(Byte 2 ~ Byte 4 is data)

Fragment Command Ack:
8X CD 00

In a total of 80 bytes of data.

Attribute 0x0D ... 0x12: MEASure[:SCALar]:VOLTage:HARMonic:RATio

Description	Returns 101 values covering Total and order 1 to 100 Voltage (Ratio) in harmonic. (Only AC-INT and 50/60 Hz Active)
Name	Total Voltage (Ratio) in harmonic. (Attribute 0x0D)
Value	Returns the Total Voltage (Ratio) in harmonic.
Type	INT32
Data size	4 Bytes
Access	Get
Name	Page 1 (Attribute 0x0E)
Value	Returns the entire 20 values containing order 1 to 20 Voltage (Ratio) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 2 (Attribute 0x0F)
Value	Returns the entire 20 values containing order 21 to 40 Voltage (Ratio) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 3 (Attribute 0x10)
Value	Returns the entire 20 values containing order 41 to 60 Voltage (Ratio) in harmonic.

Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 4 (Attribute 0x11)
Value	Returns the entire 20 values containing order 61 to 80 Voltage (Ratio) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Name	Page 5 (Attribute 0x12)
Value	Returns the entire 20 values containing order 81 to 100 Voltage (Ratio) in harmonic.
Type	INT32
Data size	80 Bytes
Access	Get
Example (Data)	Command 1: XX 0E 6D 05 12 (:MEAS:VOLTage:HARMonic:RATio? 5) Fragment Return 1: 8X 00 8E 00 00 00 00 00 (Byte 3 ~ Byte 7 is data) Fragment Command Ack: 8X C0 00 Fragment Return 2: 8X 41 00 00 00 00 00 (Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C1 00
Fragment Return 3:
8X 42 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C2 00
Fragment Return 4:
8X 43 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C3 00
Fragment Return 5:
8X 44 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C4 00
Fragment Return 6:
8X 45 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C5 00
Fragment Return 7:
8X 46 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C6 00
Fragment Return 8:
8X 47 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C7 00
Fragment Return 9:
8X 48 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C8 00
Fragment Return 10:
8X 49 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X C9 00
Fragment Return 11:
8X 4A 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X CA 00
Fragment Return 12:
8X 4B 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X CB 00
Fragment Return 13:
8X 4C 00 00 00 00 00 00
(Byte 2 ~ Byte 7 is data)

Fragment Command Ack:
8X CC 00
Fragment Return 14:
8X 8D 00 00 00
(Byte 2 ~ Byte 4 is data)

Fragment Command Ack:
8X CD 00

In a total of 80 bytes of data.

Attribute 0x01: MEASure[:SCALar]:LINE:VOLTage[:RMS]

Description	Returns the line voltage (Vrms).
Name	MEASure[:SCALar]:LINE:VOLTage[:RMS]
Value	Returns the line voltage value in Vrms.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 6D 07 01 (:MEASure:LINE:VOLTage?)

	Return data is 100500. XX 8E 94 88 01 00 The line voltage is 100.5 V, Magnification is 1000.

Attribute 0x02: MEASure[:SCALar]:LINE:VOLTage:AVERage

Description	Returns the line voltage average value (Vavg).
Name	MEASure[:SCALar]:LINE:VOLTage:AVERage
Value	Returns the line voltage average value in volts.
Type	INT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 6D 07 02 (:MEASure:LINE:VOLTage:AVERage?) Return data is 100500. XX 8E 94 88 01 00 The line voltage average is 100.5 V, Magnification is 1000.

Attribute 0x03: MEASure[:SCALar]:LINE:VOLTage:HIGH

Description	Returns the output line voltage maximum peak value (Vmax).
Name	MEASure[:SCALar]:LINE:VOLTage:HIGH
Value	Returns the line Vmax value in line volts.
Type	INT32
Data size	4 Bytes
Access	Get
Note	Line voltage maximum peak value is defined as the highest peak value in the complete period.
Example (Data)	XX 0E 6D 07 03 (:MEASure:LINE:VOLTage:AVERage:HIGH?) Return data is 100500. XX 8E 94 88 01 00 The line voltage maximum peak is 100.5 V, Magnification is 1000.

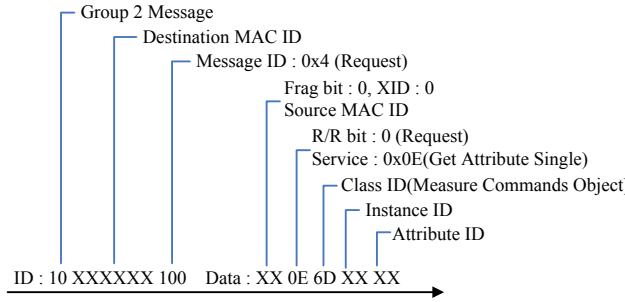
Attribute 0x04: MEASure[:SCALar]:LINE:VOLTage:LOW

Description	Returns the output line current minimum value (Vmin).
Name	MEASure[:SCALar]:LINE:VOLTage:AVERage
Value	Returns the line Vmin value in line volts.
Type	INT32
Data size	4 Bytes
Access	Get
Note	Line voltage minimum value is defined as the lowest value in the complete period.

Example (Data)	XX 0E 6D 07 04 (:MEASure:LINE:VOLTage:LOW?)
	Return data is -50750.
	XX 8E C2 39 FF FF
	The line voltage minimum is -50.75 V, Magnification is 1000.

Request Measure Commands Example

Request Example



Memory Commands (Class 0x6E)

Instance 0X04

Attribute 0x01: MEMory:SAV

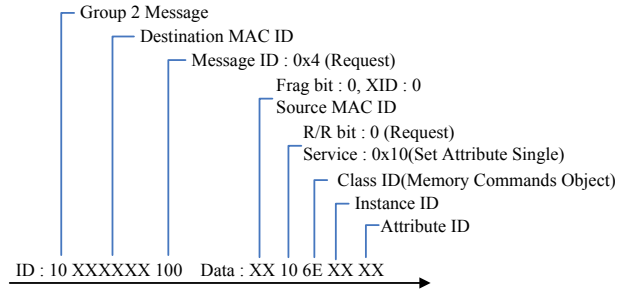
Description	Saves the settings into memory slot M0 ~ M9. These memory slots are mapped to the preset settings. Equivalent to the *SAV command.
Name	MEMory:SAV
Value	0 ~ 9
Type	UINT8
Data size	1 Byte
Access	Set
Example (Data)	XX 10 6E 04 01 01 (:MEMory:SAV 1) Save the settings to M1.

Attribute 0x02: MEMory:RCL

Description	Recalls the settings from memory slot M0~M9. These memory slots are mapped to the preset settings. Equivalent to the *RCL command.
Name	MEMory:RCL
Value	0 ~ 9
Type	UINT8
Data size	1 Byte
Access	Set
Example (Data)	XX 10 6E 04 02 01 (:MEMory:RCL 1) Recall the settings from M1.

Request Memory Commands Example

Request Memory Commands Example



Output Commands (Class 0x6F)

Instance 0X01

Instance 0X03

Instance 0X05

Attribute 0x01: OUTPut:IMPedance

Description	Sets or queries the output impedance state of power source.
Name	OUTPut:IMPedance
Value	0 = OFF Turns the output impedance off. 1 = ON Turns the output impedance on.
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 10 6F 01 01 00 (:OUTP:IMP 0) Sets power output impedance off.

Attribute 0x02 ... 0x04: OUTPut:IMPedance:INDuctance

Description	Sets or queries the phase and inductance value parameter for output impedance inductance.
Name	OUTPut:IMPedance:INDuctance (Attribute 0x02 -> L1 phase) (Attribute 0x03 -> L2 phase) (Attribute 0x04 -> L3 phase)
Value	inductance : 0.0 ~ 2000μH (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Example (Data)	XX 0E 6F 01 02 (OUTP:IMP:IND? L1)

	Return data is 1 (0.1 μH) XX 8E 01 00 00 00 Returns the L1 phase and inductance value parameter for output impedance inductance.

Attribute 0x05 ... 0x07: OUTPut:IMPedance:RESistance

Description	Sets or queries the phase and inductance value parameter for output impedance resistance.
Name	OUTPut:IMPedance:RESistance (Attribute 0x05 -> L1 phase) (Attribute 0x06 -> L2 phase) (Attribute 0x07 -> L3 phase)
Value	resistance : 0.0 ~ 1 Ω (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Example (Data)	XX 0E 6F 01 05 (:OUTP:IMP:RES? L1) Return data is 1 (0.1 μH) XX 8E 01 00 00 00 Returns the L1 phase and resistance value parameter for output impedance resistance.

Attribute 0x01: OUTPut:MONitor:AMPLitude

Description	Sets or queries the range for output monitor amplitude.
Name	OUTPut:MONitor:AMPLitude
Value	0 = ±2.5 LOW 1 = ±10 HIGH
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 10 6F 03 01 01 (:OUTP:MON:AMPL HIGH) Sets the amplitude range to high.

Attribute 0x02 ... 0x03: OUTPut:MONitor:SOURce<1|2>

Description	Sets or queries the source for monitor output1 or monitor output2.(For single-phase, only L1 can be set. For single-phase three-wire, L1 and L2,can be set.)
Name	OUTPut:MONitor:SOURce<1|2> (Attribute 0x02 -> Output 1) (Attribute 0x03 -> Output 2)
Value	0 = L1Voltage L1 phase voltage 1 = L2Voltage L2 phase voltage 2 = L3Voltage L3phase voltage 3 = L1Current L1 phase current 4 = L2Current L2 phase current 5 = L3Current L3 phase current
Type	UINT8

Data size	1 Byte
Access	Get/Set
Example (Data)	XX 10 6F 03 02 01 (:OUTP:MON:SOUR1 L2Voltage) Sets the monitor source1 L2 phase voltage.

Attribute 0x01: OUTPut:PON

Description	Sets the output state at power-on.	
Name	OUTPut:PON	
Value	0 = OFF	Disabled
	1 = ON	Enabled
	2 = SEQ	Sequence function
	3 = SIM	Simulate function
Type	UINT8	
Data size	1 Byte	
Access	Get/Set	
Example	XX 10 6F 05 01 02 (:OUTPut:PON 2) Sets sequence function on at power-on.	

Attribute 0x02: OUTPut:PROTection:CLEar

Description	The Command will clear alarms like Over Current,Over Peak Current, Output Over-Power, Output Short, Output Overvoltage, Sensing Voltage Error.
Name	OUTPut:PROTection:CLEar
Value	-
Type	UINT8

Data size	1 Byte
Access	Set

Attribute 0x03: OUTPut:RELay

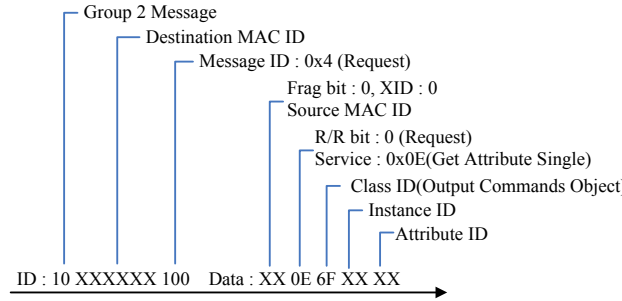
Description	Sets or queries the output relay of power source.
Name	OUTPut:RELay
Value	0 = OFF Turns the output relay Disable. 1 = ON Turns the output relay Enable.
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example	XX 10 6F 05 03 01 (:OUTP:REL 1) Sets output relay Enable.

Attribute 0x05: OUTPut[:STATe]

Description	Sets or queries the output state of power source.	
Name	OUTPut[:STATe]	
Value	0 = OFF	Turns the output off.
	1 = ON	Turns the output on.
Type	UINT8	
Data size	1 Byte	
Access	Get/Set	
Example	XX 10 6F 05 05 00 (:OUTP 0) Sets power output off.	

Request Output Commands Example

Request Example



System Function Commands (Class 0x72)

Instance 0X01

Instance 0X02

Instance 0X04

Instance 0X05

Attribute 0x02: SYSTem:VUNit

Description	Sets or Queries the Unit of Voltage Setting in Specific Wave Shape(TRI or ARB)
Name	SYSTem:VUNit
Value	0 = RMS Sets V Unit (TRI, ARB) as rms 1 = P-P Sets V Unit (TRI, ARB) as p-p
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 0E 72 01 02 (:SYSTem:VUNit?) Return data is 0 (RMS) XX 8E 00 00 00 00

	Returns the V Unit(TRI, ARB) setting.

Attribute 0x03: SYSTem:BEEPer:STATe

Description	Sets or queries the buzzer state on/off.
Name	SYSTem:BEEPer:STATe
Value	0 = OFF Turns the buzzer off. 1 = ON Turns the buzzer on.
Type	UINT8
Data size	1 Byte
Access	Get/Set

Attribute 0x06: SYSTem:KLOCk

Description	Enables or disables the front panel key lock.
Name	SYSTem:KLOCk
Value	0 = OFF Panel keys unlocked 1 = ON Panel keys locked
Type	UINT8
Data size	1 Byte
Access	Get/Set

Attribute 0x08: SYSTem:PKHold:TIME

Description	Sets or queries the Ipeak hold time for peak current measurement when output on.
Name	SYSTem:PKHold:TIME
Value	1 ~ 60,000
Type	UINT16
Data size	2 Bytes

Access	Get/Set
Example (Data)	XX 10 72 01 08 0A 00 (:SYST:PKH:TIME 10) Sets the Ipeak hold time 10ms to measure when output on.

Attribute 0x09: SYSTem:REBoot

Description	Reboots the ASR system.
Name	SYSTem:REBoot
Value	-
Type	UINT8
Data size	1 Byte
Access	Set

Attribute 0x12: SYSTem:HOLD:STATe

Description	Sets or queries the freeze hold state on/off.	
Name	SYSTem:HOLD:STATe	
Value	0 = OFF	Turns the freeze hold off.
	1 = ON	Turns the freeze hold on.
Type	UINT8	
Data size	1 Byte	
Access	Get/Set	

Attribute 0x01: SYSTem:ARBitrary:EDIT:BUILtin

Description	Sets or queries the built in function of arbitrary edit.
Name	SYSTem:ARBitrary:EDIT:BUILtin
Value	0 = TRIangle Built In Triangle Wave Function 1 = STAir Built In Stair Wave Function 2 = CLIP Built In Clip Wave Function 3 = CFACtor1 Built In CF-1 Wave Function 4 = CFACtor2 Built In CF-2 Wave Function 5 = SURGe Built In Surge Wave Function 6~27 = DST01 ~ DST22 Built In DST01 ~ DST22 Wave 28 = RIPPle Built In DC Ripple Wave Function 29 = DIP Built In DIP Wave Function. 30 = LFRing Built In LFRing Wave Function.
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example	XX 0E 72 02 01 (:SYST:ARB:EDIT:BUIL?)

(Data)	
	Return data is 0 (TRI) XX 8E 00 00 00 00 Returns the built in function of arbitrary edit.

Attribute 0x02 ... 0x03: SYSTem:ARBitrary:EDIT:CFACtor<1\|2>

Description	Sets or queries the crest factor parameter for built in CF-1, CF-2 wave function.
Name	CF-1 (Attribute 0x02)
Value	crest factor : 1.1 ~ 10.0 (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Example (Data)	XX 0E 72 02 02 (:SYST:ARB:EDIT:CFAC1?) Return data is 20 (CF: 2.0) XX 8E 02 00 00 00 Returns the crest factor parameter for built in CF-1 wave function
Name	CF-2 (Attribute 0x03)
Value	crest factor : 1.5 ~ 2.0 (Set Value = Value * 10)
Type	UINT8

Data size	1 Byte
Access	Get/Set
Example (Data)	XX 0E 72 02 03 (:SYST:ARB:EDIT:CFAC2?) Return data is 15 (CF: 1.5) XX 8E 14 00 00 00 Returns the crest factor parameter for built in CF-2 wave function

Attribute 0x04: SYSTem:ARBitrary:EDIT:CLIP

Description	Sets or queries the ratio parameter for built in clip wave function.
Name	SYSTem:ARBitrary:EDIT:CLIP
Value	clip ratio : 0.00 ~ 1.00 (Set Value = Value * 100)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Example (Data)	XX 0E 72 02 04 (:SYST:ARB:EDIT:CLIP?) Return data is 50 (CF: 0.50) XX 8E 32 00 00 00 Returns the ratio parameter for built in clip wave function.

Attribute 0x05 ... 0x07: SYSTem:ARBitrary:EDIT:DIP

Description	Sets or queries the ST Phs and SP Phs and End Phs parameter for built in DIP wave function.
Name	STPhs (Attribute 0x05)
Value	0.1 ~ (SP Phs - 0.1) (Set Value = Value * 10)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Name	SPPhs (Attribute 0x06)
Value	(ST Phs+ 0.1) ~ (End Phs - 0.1) (Set Value = Value * 10)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Name	EndPhs (Attribute 0x07)
Value	(SP Phs+ 0.1) ~ 359.9 (Set Value = Value * 10)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Example (Data)	XX 0E 72 02 05 XX 0E 72 02 06 XX 0E 72 02 07 (:SYSTem:ARBitrary:EDIT:DIP?)

	Sub-Index 0 return data is 450 (ST Phs: 45.0) XX 8E C2 01 00 00 Sub-Index 1 return data is 540 (SP Phs: 54.0) XX 8E 1C 02 00 00 Sub-Index 2 return data is 1720 (End Phs: 172.0) XX 8E B8 06 00 00 Returns the ST Phs and SP Phs and End Phs parameter for built in DIP wave function.

Attribute 0x08 ... 0x0F: SYSTem:ARBitrary:EDIT:LFRing

Description	Sets or queries the ACV and Amp and Base_F and Ring_F and Decay and ST Phs and End Phs and Ring Phs parameter for built in LFRing wave function.
Name	ACV (Attribute 0x08)
Value	4.1 ~ 400.0 (Set Value = Value * 100)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Name	Amp (Attribute 0x09)
Value	140 ~ 200
Type	UINT32

Data size	4 Bytes
Access	Get/Set
Name	Base_F (Attribute 0x0A)
Value	50.0 ~ 200.0 (Set Value = Value * 10)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Name	Ring_F (Attribute 0x0B)
Value	200.0 ~ 5000.0 (Set Value = Value * 10)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Name	Decay (Attribute 0x0C)
Value	-0.100 ~ 0.100 (Set Value = Value * 1000)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Name	STPhs (Attribute 0x0D)
Value	4.1 ~ (End Phs – 0.1) (Set Value = Value * 10)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Name	EndPhs (Attribute 0x0E)

Value	(ST Phs+ 0.1) ~ 359.9 (Set Value = Value * 10)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Name	Ring Phs (Attribute 0x0F)
Value	4.1 ~ 359.9 (Set Value = Value * 10)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Example (Data)	XX 0E 72 02 08 XX 0E 72 02 09 XX 0E 72 02 0A XX 0E 72 02 0B XX 0E 72 02 0C XX 0E 72 02 0D XX 0E 72 02 0E XX 0E 72 02 0F (:SYSTem:ARBitrary:EDIT:LFRing?) Sub-Index 0 return data is 0 (ACV: 45.0) XX 8E 00 00 00 00 Sub-Index 1 return data is 140 (Amp: 140%) XX 8E 8C 00 00 00 Sub-Index 2 return data is 500 (Base_F:

	50.0) XX 8E F4 01 00 00 Sub-Index 3 return data is 2000 (Ring_F: 200.0) XX 8E D0 07 00 00 Sub-Index 4 return data is 5 (Decay: 0.005) XX 8E 05 00 00 00 Sub-Index 5 return data is 600 (ST Phs: 60) XX 8E 58 02 00 00 Sub-Index 6 return data is 1200 (End Phs: 120.0) XX 8E B0 04 00 00 Sub-Index 7 return data is 300 (Ring Phs: 30.0) XX 8E 2C 01 00 00 Returns the ACV and Amp and Base_F and Ring_F and Decay and ST Phs and End Phs and Ring Phs parameter for built in LFRing wave function.

Attribute 0x10 ... 0x12: SYSTem:ARBitrary:EDIT:RIPPle

Description	Sets or queries the Times and VDC and Level parameter for built in DC Ripple wave function.
Name	Times (Attribute 0x10)
Value	Times : 1 | 2 | 3 | 6
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Name	VDC (Attribute 0x11)
Value	VDC Value : 1 ~ 100
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Name	Level (Attribute 0x12)
Value	Level Ratio : 1 ~ 30(1 ~ 30%)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Example (Data)	XX 0E 72 02 10 XX 0E 72 02 11 XX 0E 72 02 12 (:SYST:ARB:EDIT:RIPP?) Sub-Index 0 return data is 1 (Times: 1) XX 8E 01 00 00 00 Sub-Index 1 return data is 48 (VDC: 48)

	XX 8E 30 00 00 00 Sub-Index 2 return data is 15 (Level: 15%) XX 8E 0F 00 00 00 Returns the Times and VDC and Level parameter for built in DC Ripple wave function.

Attribute 0x13: SYSTem:ARBitrary:EDIT:STAir

Description	Sets or queries the stair parameter for built in stair wave function.
Name	SYSTem:ARBitrary:EDIT:STAir
Value	stair : 1 ~ 100
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 0E 72 02 13 (:SYST:ARB:EDIT:STA?) Return data is 5 (Stairs: 5) XX 8E 05 00 00 00 Returns the stair parameter for built in stair wave Function.

Attribute 0x14: SYSTem:ARBitrary:EDIT:STORe

Description	Saves the waveform data of built in into ARB1 ~ ARB253.
Name	SYSTem:ARBitrary:EDIT:STORe
Value	0 ~ 252 (ARB1 ~ ARB253)

Type	UINT8
Data size	1 Byte
Access	Set
Example (Data)	XX 10 72 02 14 00 (:SYST:ARB:EDIT:STOR ARB1) Saves the waveform data of built in into ARB1

Attribute 0x15 ... 0x17: SYSTem:ARBitrary:EDIT:STORe:APPLy<1|3>

Description	Saves the waveform to L1 or L2 or L3 phase(into ARB1 ~ ARB253)/Output Mode/ACV/DCV/VPK+ Limit/VPK- Limit/V Unit(TRI, ARB) data(for Built in is RIPPle) Saves the waveform to L1 or L2 or L3 phase(into ARB1 ~ ARB253)/Output Mode/ACV/DCV/VPK+ Limit/VPK- Limit/V Unit(TRI, ARB)/Freq/Freq Hi Limit/Freq Lo Limit data(for Built in is LFRing) For single-phase, only L1 can be set. For single-phase three-wire, L1 and L2,can be set. If instrument edit setting all,apply all phase.
Name	SYSTem:ARBitrary:EDIT:STORe:APPLy<1|3> (Attribute 0x15 -> SAVE & APPLY L1) (Attribute 0x16 -> SAVE & APPLY L2) (Attribute 0x17 -> SAVE & APPLY L3)

Value	0 ~ 252 (ARB1 ~ ARB253)
Type	UINT8
Data size	1 Byte
Access	Set
Example (Data)	XX 10 72 02 15 01 (:SYST:ARB:EDIT:STOR:APPL1 ARB2) Saves the waveform(into ARB2) and Output Mode(AC+DC-INT) / ACV / DCV / VPK+ Limit(max) / VPK- Limit(min) / /V Unit(TRI, ARB)(p-p) data(for Built in is RIPPle) Saves the waveform(into ARB2) and Output Mode(AC+DC-INT) / ACV / DCV / VPK+ Limit(max) / VPK- Limit(min) / /V Unit(TRI, ARB)(p-p)/Freq/Freq Hi Limit(max)/Freq Lo Limit(min) data(for Built in is LFRing).

Attribute 0x18 ... 0x1A: SYSTem:ARBitrary:EDIT:SURGe

Description	Sets or queries the type and ACV and site parameter for built in Surge wave function.	
Name	Type (Attribute 0x18)	
Value	0 = SQU	Square waveform type
	1 = SIN	Sine waveform type
Type	UINT8	
Data size	1 Byte	
Access	Get/Set	
Name	ACV (Attribute 0x19)	
Value	ACV Ratio : 0 ~100(0 ~ 100%)	
Type	UINT16	

Data size	2 Bytes
Access	Get/Set
Name	Site (Attribute 0x1A)
Value	Site Ratio : 0 ~100(0 ~ 100%)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Example (Data)	XX 0E 72 02 18 XX 0E 72 02 19 XX 0E 72 02 1A (:SYST:ARB:EDIT:SURG?) Sub-Index 0 return data is 0 (SIN) XX 8E 00 00 00 00 Sub-Index 1 return data is 50 (ACV: 50%) XX 8E 32 00 00 00 Sub-Index 2 return data is 25 (Site: 25%) XX 8E 19 00 00 00 Returns the type and ACV and site parameter for built in Surge wave function.

Attribute 0x1B: SYSTem:ARBitrary:EDIT:TRIangle

Description	Sets or queries the symmetry parameter for built in triangle wave function.
Name	SYSTem:ARBitrary:EDIT:TRIangle
Value	Symmetry : 0 ~ 100 (0 ~ 100%)
Type	UINT2
Data size	2 Bytes
Access	Get/Set
Example (Data)	XX 0E 72 02 1B (:SYST:ARB:EDIT:TRI?) Return data is 50 (Sym: 0.50) XX 8E 32 00 00 00 Returns the symmetry parameter for built in triangle wave function.

Attribute 0x07: SYSTem:COMMunicate:INTerface:ADDRess

Description	Sets or queries the GPIB address or CAN Node ID or DeviceNet MAC ID.
Name	SYSTem:COMMunicate:INTerface:ADDRes
Value	0~30 (GPIB address) 1~127 (CAN Bus Node ID) 0~63 (DeviceNet MAC ID)
Type	UINT8
Data size	1 Byte
Access	Get/Set
Note	Depends on Option interface device.The setting will only be valid after the power has been cycled.

Example (Data)	XX 10 72 04 07 0F(SYST:COMM:INT:ADDR 15) Sets the GPIB address or CAN Node ID or DeviceNet MAC ID to 15.

Attribute 0x08: SYSTem:COMMunicate:INTerface:BAUD

Description	Description Sets or queries the CAN Baudrate or DeviceNet Baudrate.
Name	SYSTem:COMMunicate:INTerface:BAUD
Value	0 = 125000 1 = 250000 2 = 500000 3 = 1000000 4 = Auto (CAN Bus Baudrate) 0 = 125000 1 = 250000 2 = 500000 3 = Auto (DeviceNet Baudrate)
Type	UINT8
Data size	1 Byte
Access	Get/Set
Note	Depends on Option interface device.The setting will only be valid after the power has been cycled.
Example	XX 0E 72 04 08

(Data)	(:SYSTem:COMMunicate:INTerface:BAUD?) Return data is 1 (250000) XX 8E 01 00 00 00 Returns the baud rate settings.

Attribute 0x09: SYSTem:COMMunicate:LAN:DHCP

Description	Turns DHCP on/off. Queries the DHCP status.	
Name	SYSTem:COMMunicate:LAN:DHCP	
Value	0 = OFF	DHCP off
	1 = ON	DHCP on
Type	UINT8	
Data size	1 Byte	
Access	Get/Set	
Note	The setting will only be valid after the power has been cycled.	

Attribute 0x0A: SYSTem:COMMunicate:LAN:DNS

Description	Sets or queries the DNS address.
Note	The setting will only be valid after the power has been cycled.
Name	SYSTem:COMMunicate:LAN:DNS
Value	0 ~ 255
Type	UINT8
Data size	4 Bytes
Access	Get/Set
Example	Command 1:

(Data)	8X 00 10 72 04 0A FC 01 (Byte 6 ~ Byte 7 is data) Return Fragment Command Ack: 8X C0 00 Command 2: 8X 81 10 AC (Byte 2 ~ Byte 3 is data) Return Fragment Command Ack: 8X C1 00 (SYST:COMM:LAN:DNS "172.16.1.252") Sets the DNS to 172.16.1.252.

Attribute 0x0B: SYSTem:COMMunicate:LAN:GATeway

Description	Sets or queries the Gateway address.
Note	The setting will only be valid after the power has been cycled.
Name	SYSTem:COMMunicate:LAN:GATeway
Value	0 ~ 255
Type	UINT8
Data size	4 Bytes
Access	Get/Set
Example (Data)	Command 1: 8X 00 10 72 04 0B FE 00 (Byte 6 ~ Byte 7 is data) Return Fragment Command Ack: 8X C0 00

	Command 2: 8X 81 10 AC (Byte 2 ~ Byte 3 is data) Return Fragment Command Ack: 8X C1 00 (SYST:COMM:LAN:GAT "172.16.0.254") Sets the LAN gateway to 172.16.0.254.

Attribute 0x0D: SYSTem:COMMunicate:LAN:IPADdress

Description	Sets or queries LAN IP address.
Note	The setting will only be valid after the power has been cycled.
Name	SYSTem:COMMunicate:LAN:IPADdress
Value	0 ~ 255
Type	UINT8
Data size	4 Bytes
Access	Get/Set
Example (Data)	Command 1: 8X 00 10 72 04 0D 6F 05 (Byte 6 ~ Byte 7 is data) Return Fragment Command Ack: 8X C0 00 Command 2: 8X 81 10 AC (Byte 2 ~ Byte 3 is data) Return Fragment Command Ack: 8X C1 00

	(SYST:COMM:LAN:IPAD "172.16.5.111")
	Sets the IP address to 172.16.5.111.

Attribute 0x0E: SYSTem:COMMunicate:LAN:MAC

Description	Returns the unit MAC address as a string. The MAC address cannot be changed.
Name	SYSTem:COMMunicate:LAN:MAC
Value	Returns the MAC address in the following format "FF-FF-FF-FF-FF-FF"
Type	char
Data size	17 Bytes
Access	Get
Example (Data)	Send XX 0E 72 04 0E (SYST:COMM:LAN:MAC?) Fragment Return 1: 8X 00 8E 30 32 3A 38 30 (Char data is "02:80") Fragment Command Ack: 8X C0 00 Fragment Return 2: 8X 41 3A 41 44 3A 32 30 (Char data is ":AD:20") Fragment Command Ack: 8X C1 00

	Fragment Return 3: 8X 82 3A 33 31 3A 42 31 (Char data is ":31:B1") Fragment Command Ack: 8X C2 00 Return (MAC: 02:80:AD:20:31:B1) Returns the MAC address.

Attribute 0x0F: SYSTem:COMMunicate:LAN:SMASk

Description	Sets or queries the LAN subnet mask.
Note	The setting will only be valid after the power has been cycled.
Name	SYSTem:COMMunicate:LAN:SMASk
Value	0 ~ 255
Type	UINT8
Data size	4 Bytes
Access	Get/Set
Example (Data)	Command 1: 8X 00 10 72 04 0F 00 00 (Byte 6 ~ Byte 7 is data) Return Fragment Command Ack: 8X C0 00 Command 2: 8X 81 FF FF (Byte 2 ~ Byte 3 is data) Return Fragment Command Ack:

	8X C1 00 (SYST:COMM:LAN:SMASk "255.255.0.0") Sets the LAN mask to 255.255.0.0.

Attribute 0x12: SYSTem:COMMunicate:RLSTate

Description	Enables or disables local/remote state of the instrument.
Name	SYSTem:COMMunicate:RLSTate
Value	0 = LOCal All keys are valid. This instrument is controlled by the front panel controls. 1 = REMote All keys are invalid, except for the [local] key and the ability to turn the output off. 2 = GET/SETLock All keys are invalid. The instrument can only be controlled remotely. 3 = LREMote All keys are valid. This instrument is controlled by the front panel controls and remotely.
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 10 72 04 12 00 (:SYST:COMM:RLST LOCAL) Sets the operating mode to local.

Attribute 0x13: SYSTem:COMMunicate:SERial[:RECeive]:TRANsmit:BAUD

Description	Sets or queries the UART baud rate.
Name	SYSTem:COMMunicate:SERial[:RECeive]:TRANsmit:BAUD
Value	0 = 1200 1 = 2400 2 = 4800 3 = 9600 4 = 19200 5 = 38400 6 = 57600 7 = 115200
Type	UINT8
Data size	1 Byte
Access	Get/Set
Note	The setting will only be valid after the power has been cycled.
Example (Data)	XX 0E 72 04 13 (SYST:COMM:SER:TRAN:BAUD?) Return data is 3 (Baud rate: 9600) XX 8E 03 00 00 00 Returns the baud rate settings.

Attribute 0x14: SYSTem:COMMunicate:SERial[:RECeive]:TRANsmit:BITS

Description	Sets or queries the UART number of data bits.
Name	SYSTem:COMMunicate:SERial[:RECeive]:TRANsmit:BITS
Value	0 = 7 bits 1 = 8 bits
Type	UINT8
Data size	1 Byte
Access	Get/Set
Note	The setting will only be valid after the power hasbeen cycled.
Example (Data)	XX 0E 72 04 14 (SYST:COMM:SER:TRAN:BITS?) Return data is 1 XX 8E 01 00 00 00 Indicates that 8 data bits are used for the UART connection.

Attribute 0x15: SYSTem:COMMunicate:SERial[:RECeive]:TRANsmit:PARity

Description	Sets or queries the parity of the UART connection.	
Name	SYSTem:COMMunicate:SERial[:RECeive]:TRANsmit:PARity	
Value	0 = NONE	No parity
	1 = ODD	Odd parity

	2 = EVEN Even parity
Type	UINT8
Data size	1 Byte
Access	Get/Set
Note	The setting will only be valid after the power has been cycled.
Example (Data)	XX 0E 72 04 15 (SYST:COMM:SER:TRAN:PARity?) Return data is 0 XX 8E 00 00 00 00 Indicates that no parity is used for the UART connection.

Attribute 0x16: SYSTem:COMMunicate:SERial[:RECeive]:TRANsmit:SBITs

Description	Sets or queries the number of stop bits used for the UART connection.
Name	SYSTem:COMMunicate:SERial[:RECeive]:TRANsmit:SBITs
Value	0 = 1 stop bit 1 = 2 stop bits
Type	UINT8
Data size	1 Byte
Access	Get/Set
Note	The setting will only be valid after the power has been cycled.
Example (Data)	XX 0E 72 04 16 (SYST:COMM:SER:TRAN:SBITs?)

	Return data is 1 XX 8E 01 00 00 00 Indicates that one stop bit is used for the UART connection.

Attribute 0x17: SYSTem:COMMunicate:TCPip:CONTrol

Description	Queries the socket port number.
Name	SYSTem:COMMunicate:TCPip:CONTrol
Value	0000 ~ 9999
Type	UINT16
Data size	2 Bytes
Access	Get
Example (Data)	XX 0E 72 04 17 (SYST:COMM:TCP:CONT?) Return data is 2268 XX 8E DC 08 00 00 Returns the socket port number.

Attribute 0x18: SYSTem:COMMunicate:USB:FRONt:STATe

Description	Queries the front panel USB-A port state.
Name	SYSTem:COMMunicate:USB:FRONt:STATe
Value	0 = Absent 1 = Mass Storage
Type	UINT8
Data size	1 Byte
Access	Get

Attribute 0x1A: SYSTem:COMMunicate:USB:REAR:STATe

Description	Queries the rear panel USB-B port state.
Name	SYSTem:COMMunicate:USB:REAR:STATe
Value	0 = Absent 1 = Connected to the PC
Type	UINT8
Data size	1 Byte
Access	Get

Attribute 0x01: SYSTem:CONFigure:EXTio[:STATe]

Description	Sets or queries the external control state on/off.
Name	SYSTem:CONFigure:EXTio[:STATe]
Value	0 = OFF Turns the external control off. 1 = ON Turns the external control on.
Type	UINT8
Data size	1 Byte
Access	Get/Set

Attribute 0x02: SYSTem:CONFigure:PHASe

Description	Sets or queries the phase configuration . (Only Continuous Mode Active)
Name	SYSTem:CONFigure:PHASe
Value	From 0 – 2 which represent different configure phase, respectively. 0 = 3P4W 1 = 1P2W 2 = 1P3W

Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 0E 72 05 02 (:SYST:CONF:PHAS?) Return data is 0 (3P4W) XX 8E 00 00 00 00 Returns the system configure phase as 3P4W.

Attribute 0x03: SYSTem:CONFigure[:MODE]

Description	Sets or queries the test mode for the power supply.
Name	SYSTem:CONFigure[:MODE]
Value	0 = CONTinuous Continuous mode (normal operating mode) 1 = SEQuence Sequence mode 2 = SIMulation Simulation mode
Type	UINT8
Data size	1 Byte
Access	Get/Set

Attribute 0x04: SYSTem:CONFigure:TRIGger:OUTPut:SOURce

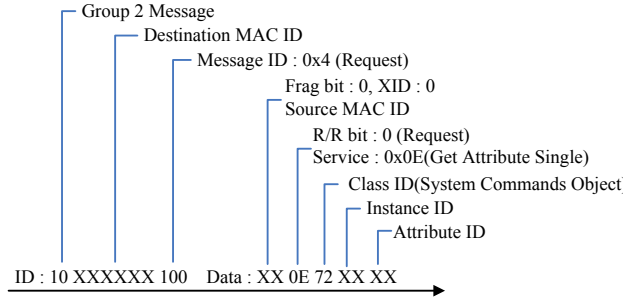
Description	Sets or queries the trigger output source. (For single-phase, only L1 can be set. For single-phase three-wire, L1 and L2 can be set.)
Name	SYSTem:CONFigure:TRIGger:OUTPut:SOURce
Value	From 0 ~ 2, which represent different phase select, respectively. 0 = L1 L1 phase 1 = L2 L2 phase 2 = L3 L3 phase
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 10 72 05 04 01 (SYST:CONF:TRIG:OUTP:SOUR L2) Sets the trigger output source to L2.

Attribute 0x05: SYSTem:CONFigure:TRIGger:OUTPut:WIDTh

Description	Sets or queries the type of trigger output. The trigger output can be set as a user-defined pulse width or as a trigger output level.
Name	SYSTem:CONFigure:TRIGger:OUTPut:WIDTh
Value	0.1 ~ 60 mSec (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Example (Data)	XX 10 72 05 05 32 (:SYST:CONF:TRIG:OUTP:WIDT 0.5) Sets the trigger output width to 5ms.

Request System Function Commands Example

Request Example



Trigger Commands (Class 0x74)

Instance 0X01

Attribute 0x05: TRIGger:SEQuence:SELected:EXECute

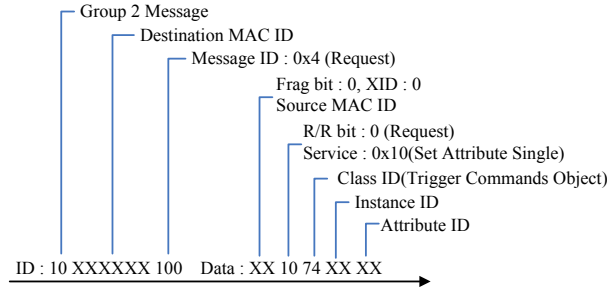
Description	Sets to execute actions for sequence mode. (Only Sequence Mode Active)	
Name	TRIGger:SEQuence:SELected:EXECute	
Value	0 = STOP	Stops sequence execution
	1 = STARt	Starts sequence execution
	2 = HOLD	Holds sequence execution
	3 = BRAN1 execution	Jumps to Branch 1
	4 = BRAN2 execution	Jumps to Branch 2
Type	UINT8	
Data size	1 Byte	
Access	Get/Set	
Example (Data)	XX 10 74 01 05 01 (TRIG:SEQ:SEL:EXEC STAR) Starts sequence execution.	

Attribute 0x06: TRIGger:SIMulation:SELected:EXECute

Description	Sets to execute actions for simulate mode. (Only Simulation Mode Active)	
Name	TRIGger:SIMulation:SELected:EXECute	
Value	0 = STOP	Stops simulate execution
	1 = STARt	Starts simulate execution
	2 = HOLD	Holds simulate execution
Type	UINT8	
Data size	1 Byte	
Access	Get/Set	
Example (Data)	XX 10 74 01 06 01 (:TRIG:SIM:SEL:EXEC STAR) Starts simulate execution.	

Request Trigger Commands Example

Request Trigger Commands Example



Source Commands (Class 0x76)

Instance 0X01

Instance 0X02

Instance 0X03

Instance 0X04

Instance 0X05

Instance 0X07

Instance 0X09

Instance 0X0B

Instance 0X0D

Instance 0X0E

Attribute 0x01: [:SOURce]:CURRent:LIMit:PEAK:HIGH

Description	Sets or queries the Ipk-High Limit parameter for the continuous operation mode.
Name	[:SOURce]:CURRent:LIMit:PEAK:HIGH
Value	Ipk-High Limit in Arms. (Set Value = Value * 100)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Example (Data)	XX 0E 76 01 01 (CURR:LIM:PEAK:HIGH?) Return data is 4200 (42.00) XX 8E 68 10 00 00 Returns the peak current high limit as +42.0 A.

Attribute 0x02: [:SOURce]:CURRent:LIMit:PEAK:LOW

Description	Sets or queries the Ipk-Low Limit parameter for the continuous operation mode.
Name	[:SOURce]:CURRent:LIMit:PEAK:LOW
Value	Ipk-Low Limit in Arms. (Set Value = Value * 100)
Type	INT32
Data size	4 Bytes
Access	Get/Set

Example (Data)	XX 0E 76 01 02 (:CURR:LIM:PEAK:LOW?) Return data is -4200 (-42.00) XX 8E 98 EF FF FF Returns the peak current low limit as -42.0 A.

Attribute 0x03: [:SOURce]:CURRent:LIMit:PEAK:MODE

Description	Sets or queries Ipk limit enabled or disabled.
Name	[:SOURce]:CURRent:LIMit:PEAK:MODE
Value	0 = OFF Ipk limit off 1 = ON Ipk limit on
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 10 76 01 03 01 (:CURR:LIM:PEAK:MODE ON) Sets Ipk limit enabled.

Attribute 0x04: [:SOURce]:CURRent:LIMit:RMS[:AMPLitude]

Description	Sets or queries the Irms parameter for the continuous operation mode.
Name	[:SOURce]:CURRent:LIMit:RMS[:AMPLitude]
Value	Irms in A. (Set Value = Value * 100)
Type	UINT32

Data size	4 Bytes
Access	Get/Set
Example (Data)	XX 0E 76 01 04 (:CURR:LIM:RMS?) Return data is 1050 (10.50) XX 8E 1A 04 00 00 Returns the Irms setting.

Attribute 0x05: [:SOURce]:CURRent:LIMit:RMS:MODE

Description	Sets or queries IRMS limit status.
Name	[:SOURce]:CURRent:LIMit:RMS:MODE
Value	0 = OFF IRMS limit off 1 = ON IRMS limit on
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 10 76 01 05 01 (:CURR:LIM:RMS:MODE ON) Sets IRMS limit enabled.

Attribute 0x01: [:SOURce]:FREQuency:LIMit:HIGH

Description	Sets or queries the frequency upper limit range. (Only AC+DC-INT or AC-INT or AC+DC-ADD or AC-ADD or AC-VCA Active)
Name	[:SOURce]:FREQuency:LIMit:HIGH
Value	Frequency in Hz.

	(Set Value = Value * 100)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Example (Data)	XX 0E 76 02 01 (FREQ:LIM:HIGH?) Return data is 99990 (999.90) XX 8E 96 86 01 00 Returns the frequency upper limit.

Attribute 0x02: [:SOURce]:FREQuency:LIMit:LOW

Description	Sets or queries the frequency lower limit range. (Only AC+DC-INT or AC-INT or AC+DC-ADD or AC-ADD or AC-VCA Active)
Name	[:SOURce]:FREQuency:LIMit:LOW
Value	Frequency in Hz. (Set Value = Value * 100)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Example (Data)	XX 0E 76 02 02 (FREQ:LIM:LOW?) Return data is 100 (1.00) XX 8E 64 00 00 00 Returns the frequency lower limit.

Attribute 0x03: [:SOURce]:FREQuency[:IMMediate]

Description	Sets or queries the frequency for the immediate trigger. (Only AC+DC-INT or AC-INT or AC+DC- ADD or AC-ADD or AC-VCA Active)
Name	[:SOURce]:FREQuency[:IMMediate]
Value	Frequency setting in Hz. (Set Value = Value * 100)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Example (Data)	XX 10 76 02 03 70 17 (:FREQ 60) Sets the frequency of 60Hz.

Attribute 0x01: [:SOURce]:FUNCtion[:SHAPe][:IMMediate]

Description	Sets or queries the waveforms of power supply. (Not available for DC-INT, AC+DC-EXT and AC- EXT)	
Name	[:SOURce]:FUNCtion[:SHAPe][:IMMediate]	
Value	0 = ARB1	Arbitrary wave 1
	1 = ARB2	Arbitrary wave 2
	2 = ARB3	Arbitrary wave 3
	3 = ARB4	Arbitrary wave 4
		.
		.
		.
	12 = ARB13	Arbitrary wave 13
	13 = ARB14	Arbitrary wave 14

	14 = ARB15	Arbitrary wave 15
	15 = ARB16	Arbitrary wave 16
	16 = SIN	Sin wave
	17 = SQU	Square wave
	18 = TRI	Triangle wave
	19 = ARB17	Arbitrary wave 17
	20 = ARB18	Arbitrary wave 18
	21 = ARB19	Arbitrary wave 19
	22 = ARB20	Arbitrary wave 20
		.
		.
		.
	252 = ARB250	Arbitrary wave 250
	253 = ARB251	Arbitrary wave 251
	254 = ARB252	Arbitrary wave 252
	255 = ARB253	Arbitrary wave 253
Type	UINT8	
Data size	1 Byte	
Access	Get/Set	
Example (Data)	XX 0E 76 03 01 (:SOUR:FUNC:SHAP:IMM?) Return data is 18 (TRI) XX 8E 12 00 00 00 Returns the waveform as Triangle wave.	

Attribute 0x02: [:SOURce]:FUNCtion:THD:FORMat

Description	Sets or queries the THD format.
Name	[:SOURce]:FUNCtion:THD:FORMat
Value	0 = IEC IEC THD format 1 = CSA CSA THD format
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 0E 76 03 02 (:SOUR:FUNC:THD:FORM?) Return data is 0 (IEC) XX 8E 00 00 00 00 Returns the THD format as IEC.

Attribute 0x01: [:SOURce]:LINE:VOLTage[:LEVel][:IMMediate][:AMPLitude]

Description	Sets or queries the RMS line voltage for the continuousÐperation mode. (Not available in phase mode independ and DC-INT, AC+DC-EXT, AC-EXT , AC+DC-ADD, AC-ADD and AC-VCA)
Name	[:SOURce]:LINE:VOLTage[:LEVel][:IMMediate][:AMPLitude]
Value	Vrms. (Set Value = Value * 100)
Type	UINT32
Data size	4 Bytes

Access	Get/Set
Example (Data)	XX 10 76 04 01 98 3A (:LINE:VOLT 150.0) Sets the line voltage to 150.0 ACV.

Attribute 0x02: [:SOURce]:LINE:VOLTage[:LEVel][:IMMediate]:OFFSet

Description	Sets or queries the line voltage offset value. (Not available in phase mode independ and only AC+DC-INT or AC+DC-Sync Active)
Name	[:SOURce]:LINE:VOLTage[:LEVel][:IMMediate]:OFFSet
Value	Voltage offset value (Set Value = Value * 100)
Type	INT32
Data size	4 Bytes
Access	Get/Set
Example (Data)	XX 10 76 04 02 98 3A (:LINE:VOLT:OFFS 150.0) Sets the line voltage offset value to 150.0 DCV.

Attribute 0x01: [:SOURce]:PHASe:BALance

Description	Sets or queries the balance setting phase or line. (Only phase mode is balance Active)
Name	[:SOURce]:PHASe:BALance
Value	0 = PHASe Phase setting 1 = LINE Line setting
Type	UINT8

Data size	1 Byte
Access	Get/Set
Example (Data)	XX 0E 76 05 01 (:PHAS:BAL?) Return data is 1 (LINE) XX 8E 01 00 00 00 Returns the balance setting as LINE.

Attribute 0x02: [:SOURce]:PHASe:MODE

Description	Sets or queries the balance mode. (Only three-phase four-wire or single-phase three-wire Active)
Name	[:SOURce]:PHASe:MODE
Value	0 = Independ 1 = Balance
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 0E 76 05 02 (:PHAS:MODE?) Return data is 1 (Balance) XX 8E 01 00 00 00 Returns the phase mode as Balance.

Attribute 0x03 ... 0x04: [:SOURce]:PHASe:PHASe

Description	Sets or queries the target and phase angle parameter. (For three-phase four-wire, L12 and L13 can be set. For single-phase three-wire, L12 can be set.)
Name	Phase angle between L1-L2 (Attribute 0x03)
Value	0° ~ 359.9° (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Name	Phase angle between L1-L3 (Attribute 0x04)
Value	0° ~ 359.9° (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Example (Data)	XX 0E 76 05 03 (:PHAS:PHAS? L12) Return data is 1200 (120.0) XX 8E B0 04 00 00 Returns the Phase angle 120.0 between L1-L2.

Attribute 0x05: [:SOURce]:PHASe:RELock

Description	Sets or queries the relock function in three-phase mode.
Name	[:SOURce]:PHASe:RELock
Value	0 = OFF Phase relock off 1 = ON Phase relock on
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 10 76 05 05 01 (:PHAS:REL ON) Sets Phase relock enabled.

Attribute 0x06: [:SOURce]:PHASe:SETChange:STATe

Description	Sets or queries the set change phase state.
Name	[:SOURce]:PHASe:SETChange:STATe
Value	0 = OFF Set change phase off 1 = ON Set change phase on
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 10 76 05 06 01 (:PHAS:SETC:STAT ON) Sets change phase enabled.

Attribute 0x07: [:SOURce]:PHASe:STARt[:IMMediate]

Description	Sets or queries the start phase. (Not available for DC-INT, AC+DC-EXT and AC-EXT)
Name	[:SOURce]:PHASe:STARt[:IMMediate]
Value	Start phase value 0 º ~ 359.9 º (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Example (Data)	XX 10 76 05 07 00 00 (:PHAS:STAR 0) Sets the starting phase to 0.

Attribute 0x08: [:SOURce]:PHASe:STARt:STATe

Description	Sets or queries state of start phase. (Not available for DC-INT, AC+DC-EXT and AC-EXT)	
Sub-Index	-	
Name	[:SOURce]:PHASe:STARt:STATe	
Value	0 = FREE	Start phase Free
	1 = FIXED	Start phase Fixed
Type	UINT8	
Data size	1 Byte	
Access	Get/Set	
Example (Data)	XX 0E 76 05 08 (:PHAS:STAR:STAT?) Return data is 0 (FREE) XX 8E 00 00 00 00	

	Returns the state of start phase as Free.

Attribute 0x09: [:SOURce]:PHASe:STOP[:IMMediate]

Description	Sets or queries the off phase of the waveform. (Not available for DC-INT, AC+DC-EXT and AC-EXT)
Name	[:SOURce]:PHASe:STOP[:IMMediate]
Value	Stop phase value 0 º ~ 359.9 º (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Note	Sets the off phase of the waveform after the outputhas been turned off.
Example (Data)	XX 10 76 05 09 58 02 (:PHAS:STOP 60) Sets the stop phase to 60.

Attribute 0x0A: [:SOURce]:PHASe:STOP:STATe

Description	Sets or queries state of stop phase. (Not available for DC-INT, AC+DC-EXT and AC-EXT)	
Name	[:SOURce]:PHASe:STOP:STATe	
Value	0 = FREE	Stop phase Free
	1 = FIXED	Stop phase Fixed
Type	UINT8	
Data size	1 Byte	
Access	Get/Set	

Example (Data)	XX 0E 76 05 0A (:PHAS:STOP:STAT?) Return data is 0 (FIXED) XX 8E 01 00 00 00 Returns the state of stop phase as Fixed.

Attribute 0x0B: [:SOURce]:PHASe:SYNC[:IMMediate]

Description	Sets or queries the sync delay phase. (Only AC+DC-sync or AC-sync Active)
Name	[:SOURce]:PHASe:SYNC[:IMMediate]
Value	Sync delay phase value 0° ~ 359.9 ° (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Example (Data)	XX 10 76 05 0B 00 00 (:PHAS:SYNC 0) Sets the sync delay phase to 0.

Attribute 0x01 ... 0x33: [:SOURce]:READ

Description	Returns the measurement readouts.
Name	Attribute 0x01 -> L1 Vrms Attribute 0x02 -> L1 Vavg Attribute 0x03 -> L1 Vmax Attribute 0x04 -> L1 Vmin Attribute 0x05 -> L1 Vpkh Attribute 0x06 -> L1 Irms Attribute 0x07 -> L1 Iavg Attribute 0x08 -> L1 Imax Attribute 0x09 -> L1 Imin Attribute 0x0A -> L1 Ipkh Attribute 0x0B -> L1 P Attribute 0x0C -> L1 S (Invalid in DC-INT mode.) Attribute 0x0D -> L1 Q (Invalid in DC-INT mode.) Attribute 0x0E -> L1 PF (Invalid in DC-INT mode.) Attribute 0x0F -> L1 CF (Invalid in DC-INT mode.) Attribute 0x10 -> L1 THDv (AC-INT mode only) / L1 Freq (AC+DC-Sync and AC-Sync modes only) Attribute 0x11 -> L1 THDi (AC-INT mode only) Attribute 0x12 -> L2 Vrms Attribute 0x13 -> L2 Vavg Attribute 0x14 -> L2 Vmax Attribute 0x15 -> L2 Vmin

Attribute 0x16 -> L2 Vpkh

Attribute 0x17 -> L2 Irms

Attribute 0x18 -> L2 Iavg

Attribute 0x19 -> L2 Imax

Attribute 0x1A -> L2 Imin

Attribute 0x1B -> L2 Ipkh

Attribute 0x1C -> L2 P

Attribute 0x1D -> L2 S (Invalid in DC-INT mode.)

Attribute 0x1E -> L2 Q (Invalid in DC-INT mode.)

Attribute 0x1F -> L2 PF (Invalid in DC-INT mode.)

Attribute 0x20 -> L2 CF (Invalid in DC-INT mode.)

Attribute 0x21 -> L2 THDv (AC-INT mode only) / L2 Freq (AC+DC-Sync and AC-Sync modes only)

Attribute 0x22 -> L2 THDi (AC-INT mode only)

Attribute 0x23 -> L3 Vrms

Attribute 0x24 -> L3 Vavg

Attribute 0x25 -> L3 Vmax

Attribute 0x26 -> L3 Vmin

Attribute 0x27 -> L3 Vpkh

Attribute 0x28 -> L3 Irms

Attribute 0x29 -> L3 Iavg

Attribute 0x2A -> L3 Imax

Attribute 0x2B -> L3 Imin

Attribute 0x2C -> L3 Ipkh

Attribute 0x2D -> L3 P

Attribute 0x2E -> L3 S (Invalid in DC-INT

	mode.) Attribute 0x2F -> L3 Q (Invalid in DC-INT mode.) Attribute 0x30 -> L3 PF (Invalid in DC-INT mode.) Attribute 0x31 -> L3 CF (Invalid in DC-INT mode.) Attribute 0x32 -> L3 THDv (AC-INT mode only) / L3 Freq (AC+DC-Sync and AC-Sync modes only) Attribute 0x33 -> L3 THDi (AC-INT mode only)
Type	INT32
Data size	4 Bytes
Access	Get

Attribute 0x01: [:SOURce]:SEQuence:CONDition

Description	Returns the sequence status.(Only Sequence Mode Active)
Name	[:SOURce]:SEQuence:CONDition
Value	Current sequence status 0 = Idle mode 1 = Run mode 2 = Hold mode
Type	UINT8
Data size	1 Byte
Access	Get
Example (Data)	XX 0E 76 09 01 (:SEQ:COND?)

	Return data is 1 (Run mode) XX 8E 01 00 00 00 Returns the Current sequence status as 1.

Attribute 0x02 ... 0x10: [:SOURce]:SEQuence:CPARameter

Description	Sets the common parameters for the Sequence mode. Please see the user manual for a full description of each parameter. (Only Sequence Mode Active)
Name	Step Time (Attribute 0x02)
Value	0.0001 ~ 999.9999 (Set Value = Value * 10000)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Name	On phase (Attribute 0x03)
Value	0.0 ~ 359.9 (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Name	On Phase fixed/ free (Attribute 0x04)
Value	1 = on (fixed) 0 = off (free)
Type	UINT8
Data size	1 Byte
Access	Get/Set
Name	Off phase (Attribute 0x05)

Value	0.0 ~ 359.9 (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Name	Off Phase fixed/ free (Attribute 0x06)
Value	1 = on (fixed) 0 = off (free)
Type	UINT8
Data size	1 Byte
Access	Get/Set
Name	Term (Attribute 0x07)
Value	0 = Continue 1 = End 2 = Hold
Type	UINT8
Data size	1 Byte
Access	Get/Set
Name	Jump step number (Attribute 0x08)
Value	0 ~ 999
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Name	Jump To (Attribute 0x09)
Value	1 = on 0 = off
Type	UINT8
Data size	1 Byte

Access	Get/Set
Name	Jump Cnt (Attribute 0x0A)
Value	0~ 9999
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Name	Sync Code (Attribute 0x0B)
Value	0 = LL 1 = LH 2 = HL 3 = HH
Type	UINT8
Data size	1 Byte
Access	Get/Set
Name	Branch1 (Attribute 0x0C)
Value	0 ~ 999
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Name	Branch1 on/off (Attribute 0x0D)
Value	1 = on 0 = off
Type	UINT8
Data size	1 Byte
Access	Get/Set
Name	Branch2 (Attribute 0x0E)
Value	0 ~ 999
Type	UINT16

Data size	2 Bytes
Access	Get/Set
Name	Branch2 on/off (Attribute 0x0F)
Value	1 = on 0 = off
Type	UINT8
Data size	1 Byte
Access	Get/Set
Name	Reserved (Attribute 0x10)
Value	-
Type	UINT8
Data size	1 Byte
Access	Get/Set

Attribute 0x11: [:SOURce]:SEQuence:CSTep

Description	Returns the currently running step number. (Only Sequence Mode Active)
Name	[:SOURce]:SEQuence:CSTep
Value	Current step number
Type	UINT16
Data size	2 Bytes
Access	Get
Example (Data)	XX 0E 76 09 11 (:SEQ:CSTep?) Return data is 1 XX 8E 01 00 00 00 Returns the Current step number as 1.

Attribute 0x12: [:SOURce]:SEQuence:INSTrument:SELect

Description	Sets or queries the phase to set sequence. (Only Sequence Mode Active. For single-phase, only L1 can be set. For single-phase three-wire, L1 and L2 can be set.)
Sub-Index	-
Name	[:SOURce]:SEQuence:INSTrument:SELect
Value	FGetm 0 ~ 2, which represent different phase to set sequence, respectively. 0 = L1 L1 phase 1 = L2 L2 phase 2 = L3 L3 phase
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 10 76 09 12 01 (:SEQ:INST:SEL L2) Sets the L2 phase to set sequence.

Attribute 0x13 ... 0x1A: [:SOURce]:SEQuence:SPARameter

Description	Sets or queries the parameters for a specified step. (Only Sequence Mode Active)
Name	ACV setting (Attribute 0x13)
Value	ACV (Set Value = Value * 100)
Type	UINT32
Data size	4 Bytes

Access	Get/Set
Name	ACV mode (Attribute 0x14)
Value	0 = Constant 1 = Keep 2 = Sweep
Type	UINT8
Data size	1 Byte
Access	Get/Set
Name	DCV. Not applicable. This parameter will be ignored. (Attribute 0x15)
Value	DCV (Set Value = Value * 100)
Type	INT32
Data size	4 Bytes
Access	Get/Set
Name	DCV mode (Attribute 0x16)
Value	0 = Constant 1 = Keep 2 = Sweep
Type	UINT8
Data size	1 Byte
Access	Get/Set
Name	Frequency (Attribute 0x17)
Value	1.00 ~ 2000.0 (Set Value = Value * 100)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Name	Frequency mode (Attribute 0x18)
Value	0 = Constant

	1 = Keep	
	2 = Sweep	
Type	UINT8	
Data size	1 Byte	
Access	Get/Set	
Name	Waveform (Attribute 0x19)	
Value	0 = ARB1	Arbitrary wave 1
	1 = ARB2	Arbitrary wave 2
	2 = ARB3	Arbitrary wave 3
	3 = ARB4	Arbitrary wave 4
		.
		.
		.
	12 = ARB13	Arbitrary wave 13
	13 = ARB14	Arbitrary wave 14
	14 = ARB15	Arbitrary wave 15
	15 = ARB16	Arbitrary wave 16
	16 = SIN	Sin wave
	17 = SQU	Square wave
	18 = TRI	Triangle wave
	19 = ARB17	Arbitrary wave 17
	20 = ARB18	Arbitrary wave 18
	21 = ARB19	Arbitrary wave 19
	22 = ARB20	Arbitrary wave 20
		.
		.
		.
	252 = ARB250	Arbitrary wave 250
	253 = ARB251	Arbitrary wave 251
	254 = ARB252	Arbitrary wave 252

	255 = ARB253 Arbitrary wave 253
Type	UINT8
Data size	1 Byte
Access	Get/Set
Name	Phase angle (Attribute 0x1A)
Value	Phase angle. (L1 phase Fixed to 0.) 0 ~ 359.9 (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set

Attribute 0x1B: [:SOURce]:SEQuence:STEP

Description	Sets or queries the current step number. (Only Sequence Mode Active)
Name	[:SOURce]:SEQuence:STEP
Value	Step number
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Example (Data)	XX 10 76 09 1B 01 00 (:SEQ:STEP 1) Sets the step number to 1.

Attribute 0x1C ... 0x24: [:SOURce]:SEQuence:NSParameter

Description	Sets or queries the parameters for a specified step.(Only Sequence Mode Active)
Name	Attribute 0x1C -> ACV setting
Value	ACV

	(Set Value = Value * 100)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Name	Attribute 0x1D -> ACV mode
Value	0 = Constant 1 = Keep 2 = Sweep
Type	UINT8
Data size	1 Byte
Access	Get/Set
Name	Attribute 0x1E -> DCV. Not applicable. This parameter will be ignored.
Value	DCV (Set Value = Value * 100)
Type	INT32
Data size	4 Bytes
Access	Get/Set
Name	Attribute 0x1F -> DCV mode
Value	0 = Constant 1 = Keep 2 = Sweep
Type	UINT8
Data size	1 Byte
Access	Get/Set
Name	Attribute 0x20 -> Frequency
Value	1.00 ~ 2000.0 (Set Value = Value * 100)

Type	UINT32	
Data size	4 Bytes	
Access	Get/Set	
Name	Attribute 0x21 -> Frequency mode	
Value	0 = Constant	
	1 = Keep	
	2 = Sweep	
Type	UINT8	
Data size	1 Byte	
Access	Get/Set	
Name	Attribute 0x22 -> Waveform	
Value	0 = ARB1	Arbitrary wave 1
	1 = ARB2	Arbitrary wave 2
	2 = ARB3	Arbitrary wave 3
	3 = ARB4	Arbitrary wave 4
		.
		.
		.
	12 = ARB13	Arbitrary wave 13
	13 = ARB14	Arbitrary wave 14
	14 = ARB15	Arbitrary wave 15
	15 = ARB16	Arbitrary wave 16
	16 = SIN	Sin wave
	17 = SQU	Square wave
	18 = TRI	Triangle wave
	19 = ARB17	Arbitrary wave 17
	20 = ARB18	Arbitrary wave 18
	21 = ARB19	Arbitrary wave 19
	22 = ARB20	Arbitrary wave 20

	. . . 252 = ARB250 Arbitrary wave 250 253 = ARB251 Arbitrary wave 251 254 = ARB252 Arbitrary wave 252 255 = ARB253 Arbitrary wave 253
Type	UINT8
Data size	1 Byte
Access	Get/Set
Name	Attribute 0x23 -> Duty
Value	Square wave signal duty cycle. (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Name	Attribute 0x24 -> Phase angle
Value	Phase angle. (L1 phase Fixed to 0.) 0 ~ 359.9 (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set

Attribute 0x25: [:SOURce]:SEQuence:CJUMp:CNT

Description	Returns the currently running step number and jump count.If the jump to function is turned off, the returned information is "-1". If jump count is set to infinity, the returned information is "10000".(Only Sequence Mode Active)
Name	[:SOURce]:SIMulation:CONDition
Value	Byte 0-1 : Index Byte 2-3 : Jump Count
Type	UINT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 76 09 25 (:SEQ:CJUMp:CNT?) Returns the Index as 1 and Jump Count as 1.

Attribute 0x26 ... 0x29: [:SOURce]:SEQuence:CTIMe

Description	Returns the currently running step number and elapsed time.(Only Sequence Mode Active)
Name	Attribute 0x26 -> Current step number
Type	UINT16
Data size	2 Bytes
Access	Get
Name	Attribute 0x27 -> Hour
Type	UINT8
Data size	1 Byte

Access	Get
Name	Attribute 0x28 -> Minute
Type	UINT8
Data size	1 Byte
Access	Get
Name	Attribute 0x29 -> Second
Type	UINT8
Data size	1 Byte
Access	Get
Example (Data)	XX 0E 76 09 26 Returns the current step number as 100. XX 0E 76 09 27 Returns the Hour as 1. XX 0E 76 09 28 Returns the Minute as 8. XX 0E 76 09 29 Returns the Second as 40. (:SEQ:CTIM?)

Attribute 0x01: [:SOURce]:SIMulation:CONDition

Description	Returns the simulation status. (Only Simulation Mode Active)
Name	[:SOURce]:SIMulation:CONDition
Value	Current simulation status 0 = Idle mode

	1 = Run mode 2 = Hold mode
Type	UINT8
Data size	1 Byte
Access	Get
Example (Data)	XX 0E 76 0B 01 (:SIM:COND?) Return data is 1 (Run mode) XX 8E 01 00 00 00 Returns the Current simulation status as 1.

Attribute 0x02: [:SOURce]:SIMulation:ABNormal:CODE

Description	Sets the external trigger output for the abnormal step parameter. This option is only applicable when in the Simulation mode. (Only Simulation Mode Active)
Name	[:SOURce]:SIMulation:ABNormal:CODE
Value	External trigger output 0 = LL 1 = LH 2 = HL 3 = HH
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 10 76 0B 02 01 (SIM:ABN:CODE 1) Set the external trigger output to LH

Attribute 0x03: [:SOURce]:SIMulation:ABNormal:FREQuency

Description	Sets or queries the frequency of the abnormal step of the simulation mode. (Only Simulation Mode Active)
Name	[:SOURce]:SIMulation:ABNormal:CODE
Value	Frequency of abnormal step 1.00 ~ 2000.0 (Set Value = Value * 100)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Example (Data)	XX 10 76 0B 03 7C 15 (:SIM:ABN:FREQ 55) Sets the frequency to 55Hz.

Attribute 0x04: [:SOURce]:SIMulation:ABNormal:PHASe:STARt:ENABle

Description	Enables/Disables (Fixed/Free) the ON Phs parameter of the abnormal step for the Simulation mode. (Only Simulation Mode Active)
Name	[:SOURce]:SIMulation:ABNormal:PHASe:STARt:ENABle
Value	0 = Disabled 1 = Enabled
Type	UINT8
Data size	1Byte
Access	Get/Set
Example	XX 10 76 0B 04 01

(Data)	(:SIM:ABN:PHAS:STAR:ENAB 1) Enable the ON Phs.

Attribute 0x05: [:SOURce]:SIMulation:ABNormal:PHASe:STARt[:IMMediate]

Description	Sets or queries the ON Phs parameter of the abnormal step for the Simulation mode. (Only Simulation Mode Active)
Name	[:SOURce]:SIMulation:ABNormal:PHASe:STARt[:IMMediate]
Value	ON Phs (start phase) 0° ~ 359.9° (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Example (Data)	XX 10 76 0B 05 00 00 (:SIM:ABN:PHAS:STAR 0) Sets ON Phs to 0.

Attribute 0x06
[:SOURce]:SIMulation:ABNormal:PHASe:STOP:ENABle

Description	Enables/Disables (Fixed/Free) the OFF Phs parameter of the abnormal step for the Simulation mode. (Only Simulation Mode Active)
Name	[:SOURce]:SIMulation:ABNormal:PHASe:STOP:ENABle
Value	0 = Disabled 1 = Enabled
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 10 76 0B 06 01 (:SIM:ABN:PHAS:STOP:ENAB 1) Enable the OFF Phs.

Attribute 0x07: [:SOURce]:SIMulation:ABNormal:PHASe:STOP[:IMMediate]

Description	Sets or queries the OFF Phs parameter of the abnormal step for the Simulation mode. (Only Simulation Mode Active)
Name	[:SOURce]:SIMulation:ABNormal:PHASe:START[:IMMediate]
Value	ON Phs (Stop phase) 0° ~ 359.9° (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Note	Sets the off phase of the waveform after the output has been turned off.
Example (Data)	XX 10 76 0B 07 00 00 (:SIM:ABN:PHAS:STOP 0) Sets OFF Phs to 0.

Attribute 0x08: [:SOURce]:SIMulation:ABNormal:TIME

Description	Sets or queries the Time parameter of the abnormal step for the Simulation mode. (Only Simulation Mode Active)
Name	[:SOURce]:SIMulation:ABNormal:TIME
Value	Time of the abnormal step in seconds 0.0001 ~ 999.9999 s (Set Value = Value * 10000)
Type	UINT32

Data size	4 Bytes
Access	Get/Set
Example (Data)	XX 10 76 0B 08 10 27 (:SIM:ABN:TIME 1) Sets the abnormal step time to 1 second.

Attribute 0x09: [:SOURce]:SIMulation:ABNormal:VOLTage

Description	Sets or queries the Vset parameter of the abnormal step for the Simulation mode. (Only Simulation Mode Active)
Name	[:SOURce]:SIMulation:ABNormal:VOLTage
Value	Voltage of the abnormal step. (Set Value = Value * 100)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Example (Data)	XX 10 76 0B 09 10 27 (:SIM:ABN:VOLT 100) Sets the abnormal step voltage to the 100.

Attribute 0x0A: [:SOURce]:SIMulation:CSTep

Description	Returns the currently running step. (Only Simulation Mode Active)
Name	[:SOURce]:SIMulation:CSTep
Value	Current step 0 = Initial step 1 = Normal1 step 2 = Transition1 step

	3 = Abnormal step 4 = Transition2 step 5 = Normal2 step
Type	UINT8
Data size	1 Byte
Access	Get
Example (Data)	XX 0E 76 0B 0A (:SIM:CSTep?) Return data is 1 (Normal1 step) XX 8E 01 00 00 00 Returns the Current step as Normal1.

Attribute 0x0B: [:SOURce]:SIMulation:INITial:CODE

Description	Sets the external trigger output for the initial step parameter. This option is only applicable when in the Simulation mode. (Only Simulation Mode Active)
Name	[:SOURce]:SIMulation:INITial:CODE
Value	0 = LL 1 = LH 2 = HL 3 = HH
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 10 76 0B 0B 01 (:SIM:INIT:CODE 1) Sets the initial step code to the LH.

Attribute 0x0C: [:SOURce]:SIMulation:INITial:FREQuency

Description	Sets the external trigger output for the initial step parameter. This option is only applicable when in the Simulation mode. (Only Simulation Mode Active)
Name	[:SOURce]:SIMulation:INITial:FREQuency
Value	Frequency of initial step 1.00 ~ 2000.0 (Set Value = Value * 100)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Example (Data)	XX 10 76 0B 0C 70 10 (:SIM:INIT:FREQ 60) Sets the frequency of the initial step to 60Hz.

Attribute 0x0D: [:SOURce]:SIMulation:INITial:PHASe:STARt:ENABle

Description	Enables/Disables (Fixed/Free) the ON Phs parameter of the initial step for the Simulation mode. (Only Simulation Mode Active)
Name	[:SOURce]:SIMulation:INITial:PHASe:STARt :ENABle
Value	0 = Disabled 1 = Enabled
Type	UINT8
Data size	1 Byte
Access	Get/Set

Example (Data)	XX 10 76 0B 0D 01 (:SIM:INIT:PHAS:STAR:ENAB 1) Enable the ON Phs.

Attribute 0x0E: [:SOURce]:SIMulation:INITial:PHASe:STARt[:IMMediate]

Description	Sets or queries the ON Phs parameter of the initial step for the Simulation mode. (Only Simulation Mode Active)
Name	[:SOURce]:SIMulation:INITial:PHASe:STARt [:IMMediate]
Value	ON Phs (start phase) 0˚ ~ 359.9˚ (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Note	Sets the off phase of the waveform after the outputhas been turned off.
Example (Data)	XX 10 76 0B 0E 00 00 (:SIM:INIT:PHAS:STAR 0) Sets ON Phs to 0.

Attribute 0x0F: [:SOURce]:SIMulation:INITial:PHASe:STOP:ENABle

Description	Enables/Disables (Fixed/Free) the OFF Phs parameter of the initial step for the Simulation mode. (Only Simulation Mode Active)
Name	[:SOURce]:SIMulation:INITial:PHASe:STOP:ENABle
Value	0 = Disabled 1 = Enabled
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 10 76 0B 0F 01 (:SIM:INIT:PHAS:STOP:ENAB 1) Enable the OFF Phs.

Attribute 0x10: [:SOURce]:SIMulation:INITial:PHASe:STOP[:IMMediate]

Description	Sets or queries the OFF Phs parameter of the initial step for the Simulation mode. (Only Simulation Mode Active)
Name	[:SOURce]:SIMulation:INITial:PHASe:STARt [:IMMediate]
Value	OFF Phs (Stop phase) 0° ~ 359.9° (Set Value = Value * 10)
Type	UINT16

Data size	2 Bytes
Access	Get/Set
Note	Sets the off phase of the waveform after the output has been turned off.
Example (Data)	XX 10 76 0B 10 00 00 (:SIM:INIT:PHAS:STOP 0) Sets OFF Phs to 0.

Attribute 0x11: [:SOURce]:SIMulation:INITial:VOLTage

Description	Sets or queries the Vset parameter of the initial step for the Simulation mode. (Only Simulation Mode Active)
Name	[:SOURce]:SIMulation:INITial:VOLTage
Value	Voltage of the initial step. (Set Value = Value * 100)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Example (Data)	XX 10 76 0B 11 10 27 (:SIM:INIT:VOLT 100) Sets the initial step voltage to the 100.

Attribute 0x13 ... 0x14: [:SOURce]:SIMulation:NORMal<1|2>:CODE

Description	Sets the external trigger output for the normal 1 or normal 2 step parameter. This option is only applicable when in the Simulation mode. (Only Simulation Mode Active)
Name	Normal 1 Code (Attribute 0x13)
Value	0 = LL 1 = LH 2 = HL 3 = HH
Type	UINT8
Data size	1 Byte
Access	Get/Set
Name	Normal 2 Code (Attribute 0x14)
Value	0 = LL 1 = LH 2 = HL 3 = HH
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 10 76 0B 13 01 (:SIM:NORM1:CODE 1) Sets the Normal 1 Code to the LH.

Attribute 0x15 ... 0x16: [:SOURce]:SIMulation:NORMal 1:FREQuency

Description	Sets or queries the frequency of the normal1 step of the simulation mode. (Only Simulation Mode Active)
Name	Normal 1 Frequency (Attribute 0x15)
Value	Frequency of abnormal step 1.00 ~ 2000.0 (Set Value = Value * 100)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Name	Normal 2 Frequency (Attribute 0x16)
Value	Frequency of abnormal step 1.00 ~ 2000.0 (Set Value = Value * 100)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Example (Data)	XX 10 76 0B 15 70 17 (:SIM:NORM1:FREQ 60) Sets the Normal 1 Frequency to 60Hz.

Attribute 0x17 ... 0x18: [:SOURce]:SIMulation:NORMal<1|2>:PHASe:STARt:ENABle

Description	Enables/Disables (Fixed/Free) the ON Phs parameter of the normal1 or normal2 step for the Simulation mode. (Only Simulation Mode Active)
Name	Normal 1 (Attribute 0x17)
Value	0 = Disabled 1 = Enabled
Type	UINT8
Data size	1 Byte
Access	Get/Set
Name	Normal 2 (Attribute 0x18)
Value	0 = Disabled 1 = Enabled
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 10 76 0B 17 01 (:SIM:NORM1:PHAS:STAR:ENAB 1) Enable the ON Phs.

Attribute 0x19 ... 0x1A:
[:SOURce]:SIMulation:NORMal<1|2>:PHASe:STARt[:IMMediate]

Description	Sets or queries the ON Phs parameter of the normal1 or normal2 step for the Simulation mode. (Only Simulation Mode Active)
Name	Normal 1 ON Phs (start phase) (Attribute 0x19)
Value	0° ~ 359.9° (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Name	Normal 2 ON Phs (start phase) (Attribute 0x1A)
Value	0° ~ 359.9° (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Example (Data)	XX 10 76 0B 19 00 00 (:SIM:NORM1:PHAS:STAR 0) Sets ON Phs to 0.

Attribute 0x1B ... 0x1C: [:SOURce]:SIMulation:NORMal<1|2>:PHASe:STOP:ENABle

Description	Enables/Disables (Fixed/Free) the OFF Phs parameter of the normal1 or normal2 step for the Simulation mode. (Only Simulation Mode Active)
Name	Normal 1 (Attribute 0x1B)
Value	0 = Disabled 1 = Enabled
Type	UINT8
Data size	1 Byte
Access	Get/Set
Name	Normal 2 (Attribute 0x1C)
Value	0 = Disabled 1 = Enabled
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 10 76 0B 1B 01 (:SIM:NORM1:PHAS:STOP:ENAB 1) Enable the OFF Phs.

Attribute 0x1D ... 0x1E:
[:SOURce]:SIMulation:NORMal<1|2>:PHASe:STOP[:IMMediate]

Description	Sets or queries the OFF Phs parameter of the normal1 or normal2 step for the Simulation mode. (Only Simulation Mode Active)
Note	Sets the off phase of the waveform after the output has been turned off.
Name	Normal 1 OFF Phs (Stop phase) (Attribute 0x1D)
Value	0° ~ 359.9° (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Name	Normal 2 OFF Phs (Stop phase) (Attribute 0x1E)
Value	0° ~ 359.9° (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Example (Data)	XX 10 76 0B 1D 00 00 (:SIM:NORM1:PHAS:STOP 0) Sets OFF Phs to 0.

Attribute 0x1F ... 0x20:
[:SOURce]:SIMulation:NORMal<1|2>:TIME

Description	Sets or queries the Time parameter of the normal1 or normal2 step for the Simulation mode. (Only Simulation Mode Active)
Name	Normal 1 Time of the step in seconds (Attribute 0x1F)
Value	0.0001 ~ 999.9999 s (Set Value = Value * 10000)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Name	Normal 2 Time of the step in seconds (Attribute 0x20)
Value	0.0001 ~ 999.9999 s (Set Value = Value * 10000)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Example (Data)	XX 10 76 0B 1F 10 27 (:SIM:NORM1:TIME 1) Sets the step time to 1 second.

Attribute 0x21 ... 0x22:
[:SOURce]:SIMulatoin:NORMal<1|2>:VOLTage

Description	Sets or queries the Vset parameter of the normal1 step for the Simulation mode. (Only Simulation Mode Active)
Name	Normal 1 (Attribute 0x21)
Value	Voltage of the abnormal step. (Set Value = Value * 100)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Name	Normal 2 (Attribute 0x22)
Value	Voltage of the abnormal step. (Set Value = Value * 100)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Example (Data)	XX 10 76 0B 21 10 27 (:SIM:NORM1:VOLT 100) Sets the normal1step voltage to the 100.

Attribute 0x23: [:SOURce]:SIMulation:REPeat:COUNt

Description	Sets or queries the repeat count for the Simulation mode. (Only Simulation Mode Active)
Name	[:SOURce]:SIMulation:REPeat:COUNt
Value	0 ~ 9999 (0 = infinite loop)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Example (Data)	XX 10 76 0B 23 01 (:SIM:REP:COUN 1) Sets the repeat count to 1.

Attribute 0x24: [:SOURce]:SIMulation:REPeat:ENABle

Description	Turns the repeat function on or off for the Simulation mode. (Only Simulation Mode Active)
Name	[:SOURce]:SIMulation:REPeat:ENABle
Value	0 = Disabled 1 = Enabled
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 10 76 0B 24 01 (:SIM:REP:ENAB 1) Enables the repeat function.

Attribute 0x25 ... 0x26: [:SOURce]:SIMulation:TRANsition<1|2>:CODE

Description	Sets the external trigger output for the transition step parameter. This option is only applicable when in the Simulation mode. (Only Simulation Mode Active)
Name	Transition 1 Code (Attribute 0x25)
Value	0 = LL 1 = LH 2 = HL 3 = HH
Type	UINT8
Data size	1 Byte
Access	Get/Set
Name	Transition 2 Code (Attribute 0x26)
Value	0 = LL 1 = LH 2 = HL 3 = HH
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 10 76 0B 25 01 (:SIM:TRAN1:CODE 1) Set the transition 1 code to LH.

Attribute 0x27 ... 0x28: [:SOURce]:SIMulation:TRANsition<1|2>:TIME

Description	Sets or queries the Time parameter of the transition step for the Simulation mode. (Only Simulation Mode Active)
Name	Transition 1 Time of the step in seconds (Attribute 0x27)
Value	0.0001 ~ 999.9999 s (Set Value = Value * 10000)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Name	Transition 2 Time of the step in seconds (Attribute 0x28)
Value	0.0001 ~ 999.9999 s (Set Value = Value * 10000)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Example (Data)	XX 10 76 0B 27 10 27 (:SIM:TRAN1:TIME 1) Sets the step time to 1 second.

Attribute 0x29: [:SOURce]:SIMulation:CREPeat:COUNt

Description	Returns the currently running step and jump count. If the jump to function is turned off, the returned information is "-1". If jump count is set to infinity, the returned information is "10000".(Only Simulation Mode Active)
Name	[:SOURce]:SIMulation:CREPeat:COUNt
Value	Byte 0-1 : Index 0 = Initial step 1 = Normal1 step 2 = Transition1 step 3 = Abnormal step 4 = Transition2 step 5 = Normal2 step Byte 2-3 : Repeat Count
Type	UINT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 76 0B 29 (:SIM:CREP:COUNT?) Returns the Index as 1 and Repeat Count as 1.

Attribute 0x2A ... 0x2D: [:SOURce]:SIMulation:CTIMe

Description	Returns the currently running step number and elapsed time.(Only Simulation Mode Active)
Name	Current step number (Attribute 0x2A)
Type	UINT16

Data size	2 Byte
Access	Get
Name	Hour (Attribute 0x2B)
Type	UINT8
Data size	1 Byte
Access	Get
Name	Minute (Attribute 0x2C)
Type	UINT8
Data size	1 Byte
Access	Get
Name	Second (Attribute 0x2D)
Type	UINT8
Data size	1 Byte
Access	Get
Example (Data)	XX 0E 76 0B 2A Returns the current step number as 100. XX 0E 76 0B 2B Returns the Hour as 1. XX 0E 76 0B 2C Returns the Minute as 8. XX 0E 76 0B 2D Returns the Second as 40. (:SIM:CTIM?)

Attribute 0x01: [:SOURce]:SQUare:DCYCle

Description	Sets or queries the square wave signal duty cycle. The settable range depends on the frequency. Not available for DC-INT, AC+DC-EXT and ACEXT)
Name	[:SOURce]:SQUare:DCYCle
Value	Square wave signal duty cycle. (Set Value = Value * 10)
Type	UINT16
Data size	2 Bytes
Access	Get/Set
Example (Data)	XX 0E 76 0D 01 (:SQU:DCYC?) Return data is 500 (50.0) XX 8E F4 01 00 00 Returns the square wave signal duty cycle as 50.0%.

Attribute 0x02: [:SOURce]:MODE

Description	Sets or queries the output mode of power supply.
Name	[:SOURce]:MODE
Value	From 0 – 9, which represent different output modes, respectively. 0 = AC+DC-INT 1 = AC-INT 2 = DC-INT

	3 = AC+DC-EXT 4 = AC-EXT 5 = AC+DC-ADD 6 = AC-ADD 7 = AC+DC-SYNC 8 = AC-SYNC 9 = AC-VCA
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 0E 76 0D 02 (MODE?) Return data is 0 (ACDC-INT) XX 8E 00 Returns the output mode as AC+DC-INT.

Attribute 0x01: [:SOURce]:VOLTage:LIMit:PEAK

Description	Sets or Queries the Value of Vpp in Specific Mode(AC-INT or AC-ADD or AC-Sync) and Specific Wave Shape(TRI or ARB) and Specific V Unit(p-p)
Name	[:SOURce]:VOLTage:LIMit:PEAK
Value	Vpp (Set Value = Value * 100)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Example	XX 0E 76 0E 01 (VOLT:LIM:PEAK?)

(Data)	
	Return data is 50000 (500.00) XX 8E 50 C3 00 00 Returns the Vpp limit.

Attribute 0x02: [:SOURce]:VOLTage:LIMit:RMS

Description	Sets or queries the voltage limit for the continuous operation mode. (Only AC-INT or AC-ADD or AC-Sync Active)
Name	[:SOURce]:VOLTage:LIMit:RMS
Value	Vrms. (Set Value = Value * 100)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Example (Data)	XX 0E 76 0E 02 (VOLT:LIM:RMS?) Return data is 35000 (350.00) XX 8E B8 88 00 00 Returns the Vrms limit.

Attribute 0x03: [:SOURce]:VOLTage:LIMit:HIGH

Description	Sets or queries the voltage high limit. (Only AC+DC-INT or DC-INT or AC+DC-ADD or AC+DC-Sync Active)
Name	[:SOURce]:VOLTage:LIMit:HIGH
Value	Voltage high limit (Set Value = Value * 100)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Example (Data)	XX 0E 76 0E 03 (VOLT:LIM:HIGH?) Return data is 50000 (500.00) XX 8E 50 C3 00 00 Returns the voltage high limit.

Attribute 0x04: [:SOURce]:VOLTage:LIMit:LOW

Description	Sets or queries the voltage low limit. (Only AC+DC-INT or DC-INT or AC+DC-ADD or AC+DC-Sync Active)
Name	[:SOURce]:VOLTage:LIMit:LOW
Value	Voltage low limit (Set Value = Value * 100)
Type	INT32
Data size	4 Bytes
Access	Get/Set
Example	XX 0E 76 0E 04 (VOLT:LIM:LOW?)

(Data)	
	Return data is -50000 (-500.00) XX 8E B0 3C FF FF Returns the voltage low limit.

Attribute 0x05: [:SOURce]:VOLTage:RANGe

Description	Sets or queries the voltage range.
Name	[:SOURce]:VOLTage:RANGe
Value	From 0 – 2, which represent different voltage ranges, respectively. 0 = 100V 1 = 200V 2 = AUTO (Only AC+DC-INT or AC-INT or DC-INT or AC+DC-sync or AC-sync Active)
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 0E 76 0E 05 (:SOUR:VOLT:RANG?) Return data is 1 (200V) XX 8E 01 Returns the voltage range as 200V.

Attribute 0x06: [:SOURce]:VOLTage:RESPonse

Description	Sets or queries the voltage response. (Fast not available for single-phase or output impedance set to on.)
Name	[:SOURce]:VOLTage:RESPonse
Value	From 0 – 2, which represent different voltage response ,respectively. 0 = SLOW Voltage response slow. 1 = MEDium Voltage response medium. 2 = FAST Voltage response fast.
Type	UINT8
Data size	1 Byte
Access	Get/Set
Example (Data)	XX 0E 76 0E 06 (:VOLT:RESP?) Return data is 1 (Medium) XX 8E 01 Returns the voltage response as medium.

Attribute 0x07: [:SOURce]:VOLTage[:LEVel][:IMMediate][:AMPLitude]

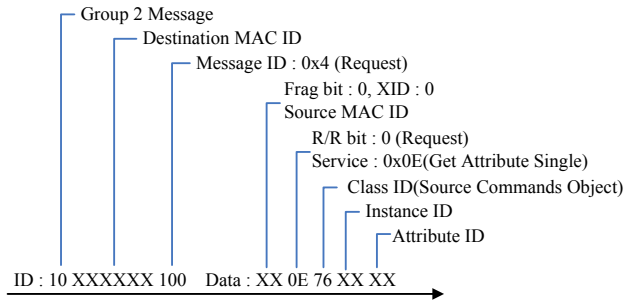
Description	Sets or queries the RMS voltage for the continuous operation mode. (Not available for DC-INT,AC+DC-EXT, AC-EXT and AC-VCA)
Name	[:SOURce]:VOLTage[:LEVel][:IMMediate][:AMPLitude]
Value	Vrms. (Set Value = Value * 100)
Type	UINT32
Data size	4 Bytes
Access	Get/Set
Example (Data)	XX 10 76 0E 07 98 3A (:VOLT 150.0) Sets the voltage to 150.0 ACV.

Attribute 0x08: [:SOURce]:VOLTage[:LEVel][:IMMediate]:OFFSet

Description	Sets or queries the voltage offset value. (Only AC+DC-INT or DC-INT or AC+DC-ADD or AC+DC-Sync Active)
Name	[:SOURce]:VOLTage[:LEVel][:IMMediate]:OFFSet
Value	Voltage offset value (Set Value = Value * 100)
Type	INT32
Data size	4 Bytes
Access	Get/Set
Example (Data)	XX 0E 76 0E 08 (:VOLT:OFFS?) Return data is 15000 (150.00) XX 8E 98 3A 00 00 Returns the voltage offset value as 150.0.

Request Source Commands Example

Request Example



Read Data Range Commands (Class 0x77)

Instance 0X01

Instance 0X02

Attribute 0x01 ... 0x12: DATA_RANGE_MAX

Description	Read the maximum settable value in normal mode.
Name	Attribute:0x01 -> ACV
Value	Set Value = Value * 100
Type	UINT32
Data size	4 Bytes
Access	Get
Name	Attribute:0x02 -> DCV
Value	Set Value = Value * 100
Type	INT32
Data size	4 Bytes
Access	Get
Name	Attribute:0x03 -> Freq
Value	Set Value = Value * 100
Type	UINT32
Data size	4 Bytes
Access	Get

Name	Attribute:0x04 -> Irms
Value	Set Value = Value * 100
Type	UINT32
Data size	4 Bytes
Access	Get
Name	Attribute:0x05 -> On phase
Value	Set Value = Value * 10
Type	UINT16
Data size	2 Bytes
Access	Get
Name	Attribute:0x06 -> Off phase
Value	Set Value = Value * 10
Type	UINT16
Data size	2 Bytes
Access	Get
Name	Attribute:0x07 -> Balance L12
Value	Set Value = Value * 10
Type	UINT16
Data size	2 Bytes
Access	Get
Name	Attribute:0x08 -> Balance L13
Value	Set Value = Value * 10
Type	UINT16
Data size	2 Bytes
Access	Get
Name	Attribute:0x09 -> GAIN
Value	Set Value = Value * 10

Type	UINT16
Data size	2 Bytes
Access	Get
Name	Attribute:0x0A -> Sync Phase
Value	Set Value = Value * 10
Type	UINT16
Data size	2 Bytes
Access	Get
Name	Attribute:0x0B -> Vpk limit High
Value	Set Value = Value * 100
Type	UINT32
Data size	4 Bytes
Access	Get
Name	Attribute:0x0C -> Vpk limit Low
Value	Set Value = Value * 100
Type	INT32
Data size	4 Bytes
Access	Get
Name	Attribute:0x0D -> Ipk limit High
Value	Set Value = Value * 100
Type	UINT32
Data size	4 Bytes
Access	Get
Name	Attribute:0x0E -> Ipk limit Low
Value	Set Value = Value * 100
Type	INT32
Data size	4 Bytes

Access	Get
Name	Attribute:0x0F -> Frequency limit High
Value	Set Value = Value * 100
Type	UINT32
Data size	4 Bytes
Access	Get
Name	Attribute:0x10 -> Frequency limit Low
Value	Set Value = Value * 100
Type	UINT32
Data size	4 Bytes
Access	Get
Name	Attribute:0x11 -> Voltage Limit Peak
Value	Set Value = Value * 100
Type	UINT32
Data size	4 Bytes
Access	Get
Name	Attribute:0x12 -> Voltage Limit RMS
Value	Set Value = Value * 100
Type	UINT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 77 01 01 Return data is 17500 (175.00) XX 8E 5C 44 00 00 Returns the ACV maximum settable value as 175.00.

Attribute 0x01 ... 0x12: DATA_RANGE_MIN

Description	Read the minimum settable value in normal mode.
Name	Attribute:0x01 -> ACV
Value	Set Value = Value * 100
Type	UINT32
Data size	4 Bytes
Access	Get
Name	Attribute:0x02 -> DCV
Value	Set Value = Value * 100
Type	INT32
Data size	4 Bytes
Access	Get
Name	Attribute:0x03 -> Freq
Value	Set Value = Value * 100
Type	UINT32
Data size	4 Bytes
Access	Get
Name	Attribute:0x04 -> Irms
Value	Set Value = Value * 100
Type	UINT32
Data size	4 Bytes
Access	Get
Name	Attribute:0x05 -> On phase
Value	Set Value = Value * 10
Type	UINT16

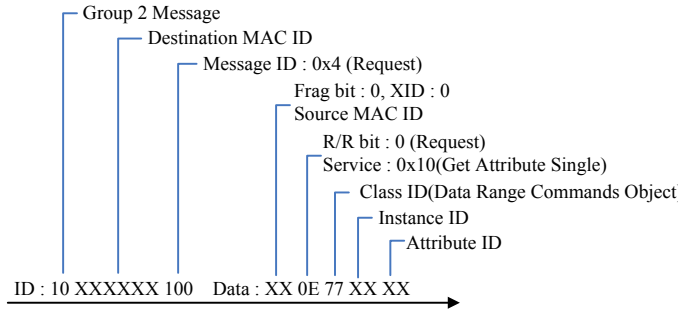
Data size	2 Bytes
Access	Get
Name	Attribute:0x06 -> Off phase
Value	Set Value = Value * 10
Type	UINT16
Data size	2 Bytes
Access	Get
Name	Attribute:0x07 -> Balance L12
Value	Set Value = Value * 10
Type	UINT16
Data size	2 Bytes
Access	Get
Name	Attribute:0x08 -> Balance L13
Value	Set Value = Value * 10
Type	UINT16
Data size	2 Bytes
Access	Get
Name	Attribute:0x09 -> GAIN
Value	Set Value = Value * 10
Type	UINT16
Data size	2 Bytes
Access	Get
Name	Attribute:0x0A -> Sync Phase
Value	Set Value = Value * 10
Type	UINT16
Data size	2 Bytes
Access	Get

Name	Attribute:0x0B -> Vpk limit High
Value	Set Value = Value * 100
Type	UINT32
Data size	4 Bytes
Access	Get
Name	Attribute:0x0C -> Vpk limit Low
Value	Set Value = Value * 100
Type	INT32
Data size	4 Bytes
Access	Get
Name	Attribute:0x0D -> Ipk limit High
Value	Set Value = Value * 100
Type	UINT32
Data size	4 Bytes
Access	Get
Name	Attribute:0x0E -> Ipk limit Low
Value	Set Value = Value * 100
Type	INT32
Data size	4 Bytes
Access	Get
Name	Attribute:0x0F -> Frequency limit High
Value	Set Value = Value * 100
Type	UINT32
Data size	4 Bytes
Access	Get
Name	Attribute:0x10 -> Frequency limit Low
Value	Set Value = Value * 100

Type	UINT32
Data size	4 Bytes
Access	Get
Name	Attribute:0x11 -> Voltage Limit Peak
Value	Set Value = Value * 100
Type	UINT32
Data size	4 Bytes
Access	Get
Name	Attribute:0x12 -> Voltage Limit RMS
Value	Set Value = Value * 100
Type	UINT32
Data size	4 Bytes
Access	Get
Example (Data)	XX 0E 77 02 01 Return data is 0 (0) XX 8E 00 00 00 00 Returns the ACV minimum settable value as 0.

Request Read Data Range Commands Example

Request Read Data Range Commands Example

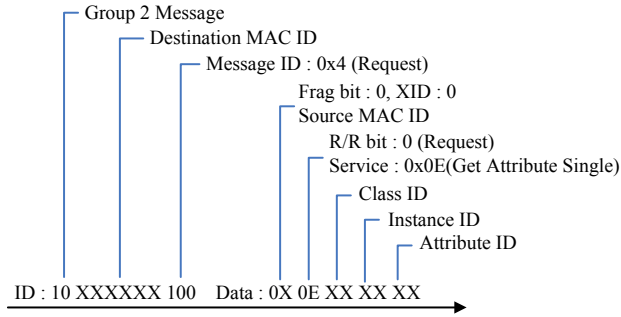


Manufacturer-specific Command Example

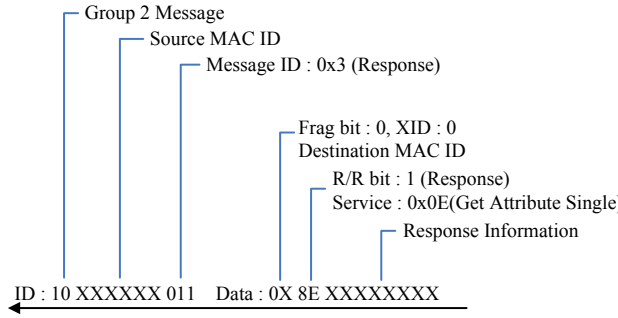
CAN Bus command example for SCPI application object request and response.

For Get information

Request



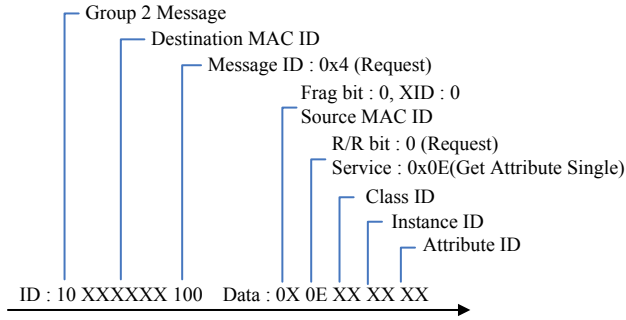
Response



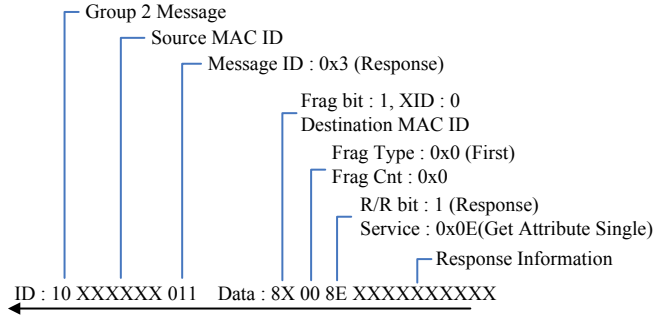
For Get information and response information data more than 6-Bytes (For Example : Response 16-Bytes)

First Fragment response 5-Bytes

Request

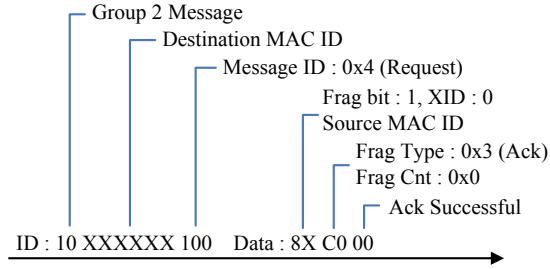


Response

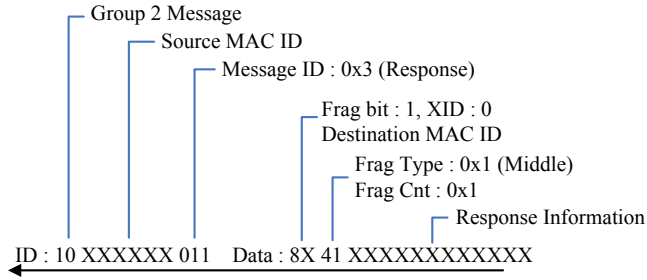


Middle Fragment response 6-Bytes

Request

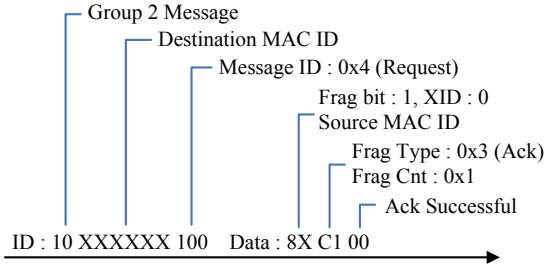


Response

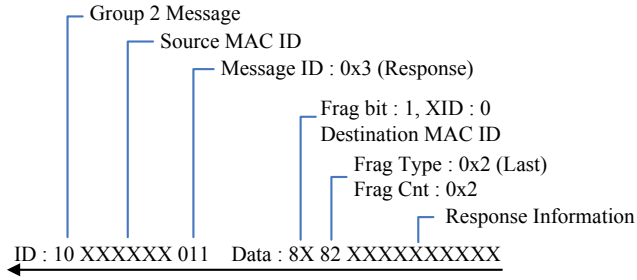


Last Fragment response 5-Bytes and successful acknowledgement

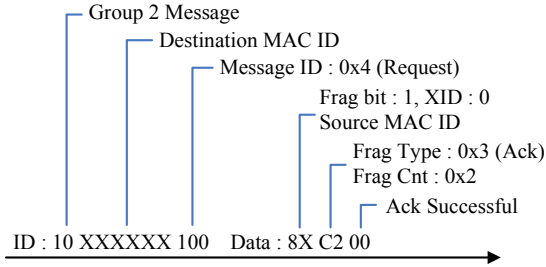
Request



Response



Request
*1

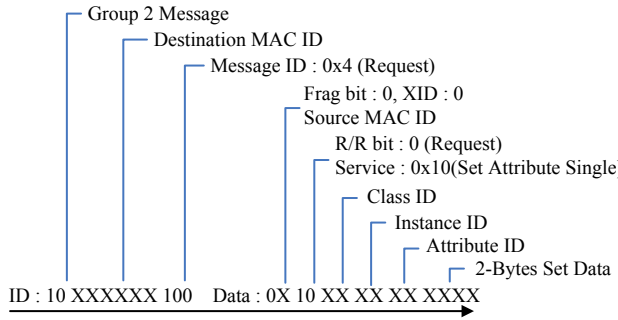


Note

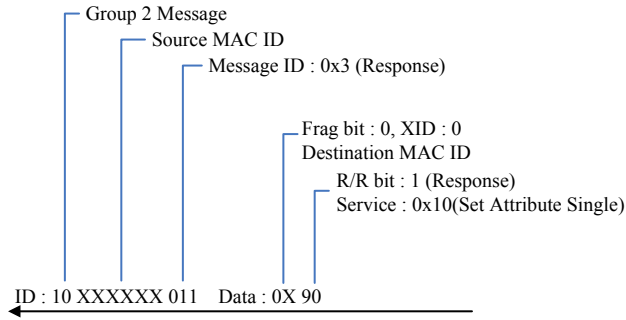
*1 When master got response last fragmentation data then sent ack successful to slave.

For Set information
(For Example : Request 2-Bytes)

Request



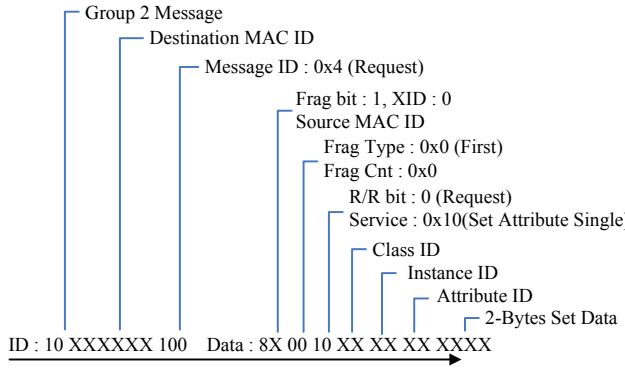
Response



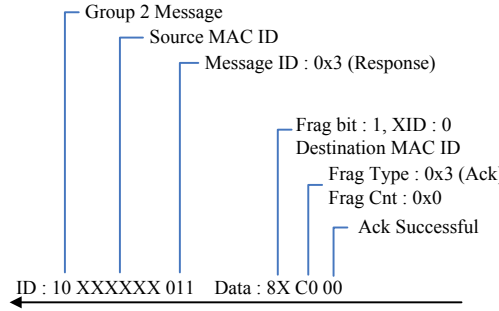
For Set information more than 2-Bytes (For Example : Set 4-Bytes data)

First Fragment request 2-Bytes

Request

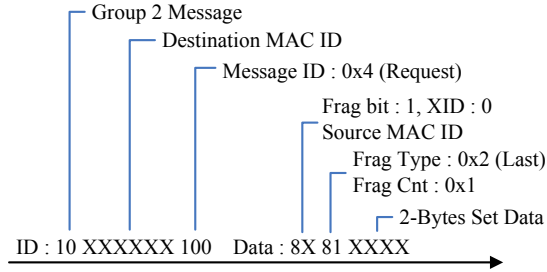


Response

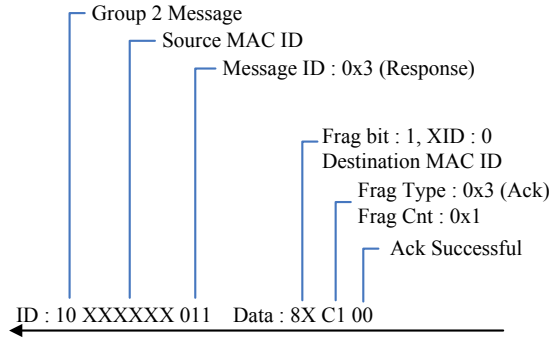


Last Fragment request 2-Bytes and successful acknowledgement

Request



Response *1



Note

*1 When slave got request last fragmentation form master then response ack successful to master

DeviceNet Errors Code

Define the DeviceNet response error code standard setting.

Error Condition	General Error Code (Hex)	Additional Error Condition	Additional Error Code (Hex)
Resource Unavailable	0x02	Not Support Mode	0x01
		Data Out of Range	0x02
		Data Transmit Fail	0x03
		Subindex no Find	0x04
Service Code not Support	0x08	None	0Xff or Null
Attribute Invalid	0x09	None	0Xff or Null
Already in Requested mode/state	0x0B	Invalid Allocation Choice	0x02
		None	0Xff or Null
Object State Confict	0x0C	Class Specific Error	0x01
		None	0Xff or Null
Attribute not Setting	0x0E	None	0Xff or Null
Attribute not Support	0x14	None	0Xff or Null
Object does not exist	0x16	None	0Xff or Null

APPENDIX

Factory Default Settings

The following default settings are the factory configuration settings for the ASR-6000 series. For details on how to return to the factory default settings, see the User's Manual.

Continuous Mode	ASR-6450		ASR-6600	
	3P4W	1P2W	3P4W	1P2W
MODE	AC+DC-INT		AC+DC-INT	
Range	100V		100V	
ACV	0.00 Vrms		0.00 Vrms	
DCV	+0.00 Vdc		+0.00 Vdc	
FREQ	50.00Hz		50.00 Hz	
IRMS	15.75 A	47.25 A	21 A	63 A
ON Phs	Fixed 0.0°		Fixed 0.0°	
OFF Phs	Fixed 0.0°		Fixed 0.0°	
GAIN	100		100	
SIG	L1 LINE		L1 LINE	
Syc Phs	0.0		0.0	
SRC	L1 EXT		L1 EXT	
Wave	SIN		SIN	
Freq Limit	2000		2000	
Vrms Limit	175.0 Vrms		175.0 Vrms	
VPK+ Limit	+250 V		+250 V	
VPK- Limit	-250 V		-250 V	
IPK+ Limit	+63.00 A	+189.00 A	+84.00 A	+252.00 A
IPK- Limit	-63.00 A	-189.00 A	-84.00 A	-252.00 A

MISC Configuration	ASR-6450	ASR-6600
T peak , hold(msec)	1	1
Phase Mode	Unbalance	Unbalance
Peak CLR	ALL	ALL
Power ON	OFF	OFF
Buzzer	ON	ON
Remote Sense	OFF	OFF
V Response	Medium	Medium
Output Relay	Enable	Enable
THD Format	IEC	IEC
External Control	OFF	OFF
V Unit(TRI,ARB)	rms	rms
Set Change Phase	OFF	OFF
Monitor Output1	L1 Voltage	L1 Voltage
Monitor Output2	L1 Current	L1 Current
Monitor Output Amp	±2.5	±2.5
TrgOut Width(ms)	0.1	0.1
TrgOut Source	L1	L1
Re-Lock	ON	ON
Data Average Count	8	8
Data Update Rate	Fast	Fast

LAN	ASR-6450	ASR-6600
DHCP	ON	ON

USB Device	ASR-6450	ASR-6600
Speed	Full	Full
Mode	TMC	TMC

RS232C	ASR-6450	ASR-6600
Baudrate	9600	9600
Databits	8bits	8bits
Parity	None	None
Stopbits	1bit	1bit

GPIB	ASR-6450	ASR-6600
Address	10	10

CAN BUS	ASR-6450	ASR-6600
Baudrate	125K	125K
Node ID	127	127

DeviceNet	ASR-6450	ASR-6600
Baudrate	125K	125K
MAC ID	63	63

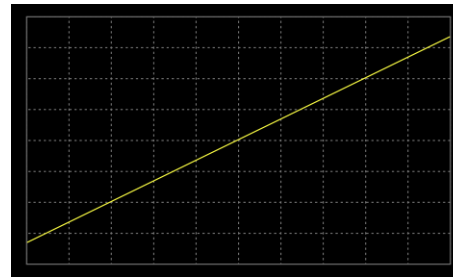
Output Impedance	ASR-6450	ASR-6600
Output Impedance	OFF	OFF
L1 Output Inductance	0.1 µH	0.1 µH
L2 Output Inductance	0.1 µH	0.1 µH
L3 Output Inductance	0.1 µH	0.1 µH
L1 Output Resistance	0.1 Ω	0.1 Ω
L2 Output Inductance	0.1 Ω	0.1 Ω
L3 Output Inductance	0.1 Ω	0.1 Ω

Sequence Mode	ASR-6450			ASR-6600		
Step	0			0		
Time	0.1000 s			0.1000 s		
Jump To	OFF			OFF		
Jump Cnt	1			1		
Branch 1	OFF			OFF		
Branch 2	OFF			OFF		
Term	CONTI			CONTI		
Sync Code	LL			LL		
Item	L1	L2	L3	L1	L2	L3
ACV	0.00, CT	0.00, CT	0.00, CT	0.00, CT	0.00, CT	0.00, CT
DCV	0.00, CT	0.00, CT	0.00, CT	0.00, CT	0.00, CT	0.00, CT
Fset	50.0 , CT	50.0 , CT	50.0 , CT	50.0 , CT	50.0 , CT	50.0 , CT
Wave	SIN	SIN	SIN	SIN	SIN	SIN
ON Phs	Free	Free	Free	Free	Free	Free
OFF Phs	Free	Free	Free	Free	Free	Free
Phase	Fixed (0)	120	240	Fixed (0)	120	240

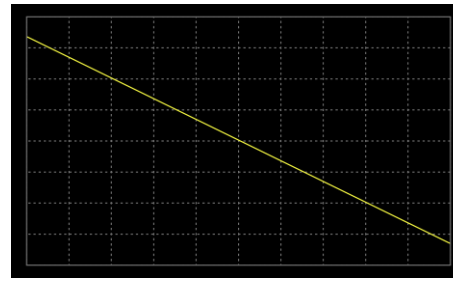
Simulate Mode	ASR-6450			ASR-6600		
Step	Initial			Initial		
Repeat	OFF			OFF		
Time	0.1000 s			0.1000 s		
Term	Free			Free		
Code	LL			LL		
Item	L1	L2	L3	L1	L2	L3
ACV	0.00	0.00	0.00	0.00	0.00	0.00
Fset	50.00	50.00	50.00	50.00	50.00	50.00
Wave	SIN	SIN	SIN	SIN	SIN	SIN
ON Phs	Free	Free	Free	Free	Free	Free
OFF Phs	Free	Free	Free	Free	Free	Free

Default Waveform Setting

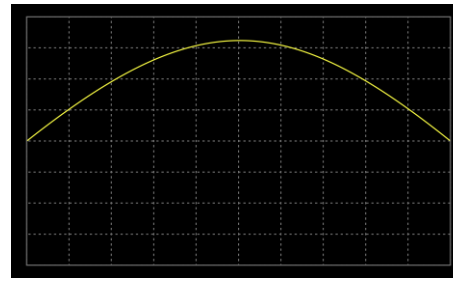
ARB 1 Ramp (rising)



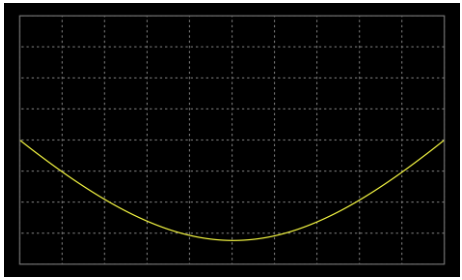
ARB 2 Ramp (falling)



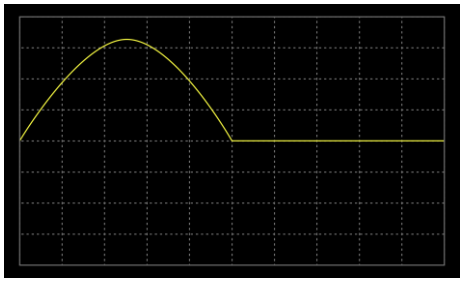
ARB 3 Sine wave, half-cycle(positive pole)



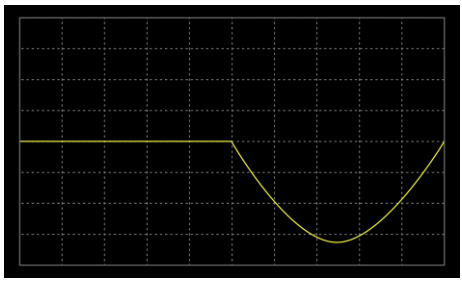
ARB 4 Sine wave, half-cycle(negative pole)



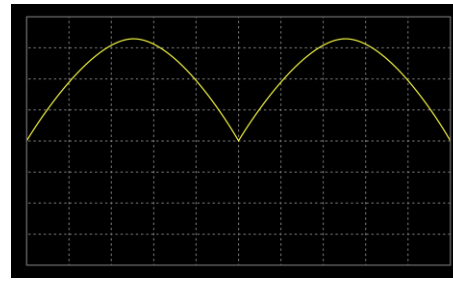
ARB 5 Sine wave, half-wave rectification (positive polarity)



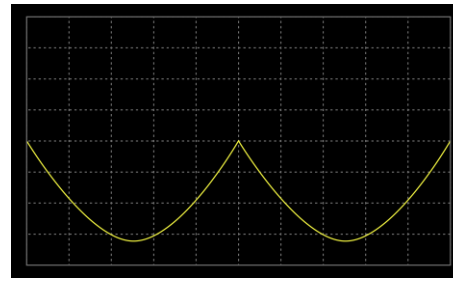
ARB 6 Sine wave, half-wave rectification(negative polarity)



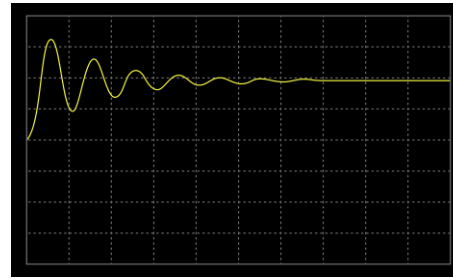
ARB 7 Sine wave, full-wave rectification(positive polarity)



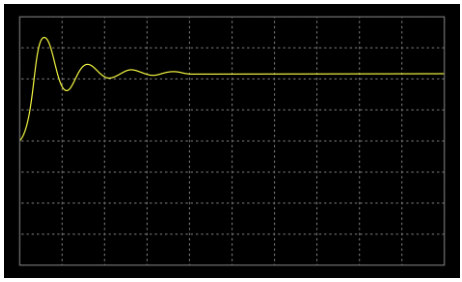
ARB 8 Sine wave, full-wave rectification(negative polarity)



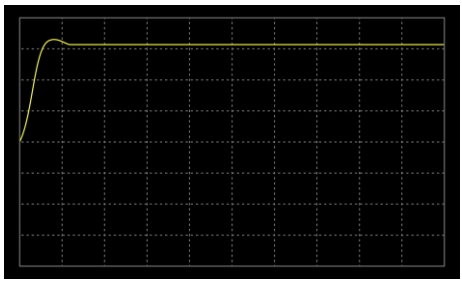
ARB 9 Second order step response(damping coefficient 0.1)



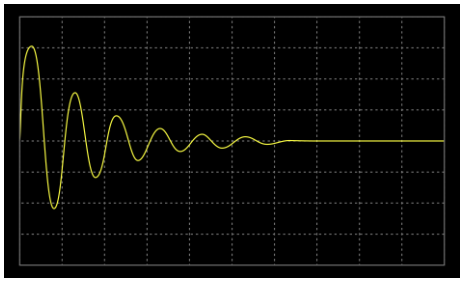
ARB 10 Second order step response(damping coefficient 0.2)



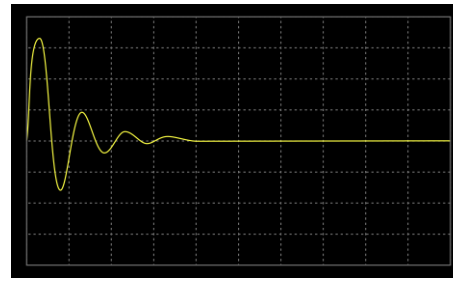
ARB 11 Second order step response(damping coefficient 0.7)



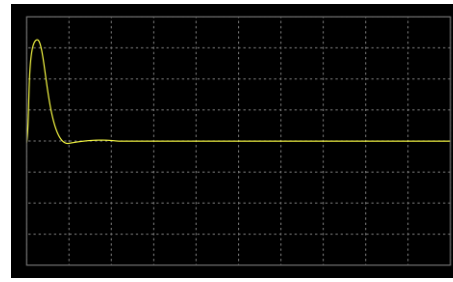
ARB 12 Second order impulse response(damping coefficient 0.1)



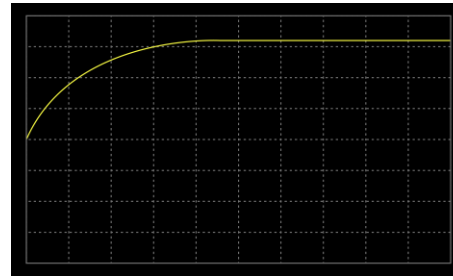
ARB 13 Second order impulse response(damping coefficient 0.2)



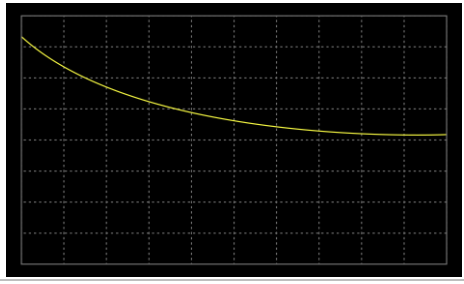
ARB 14 Second order impulse response(damping coefficient 0.7)



ARB 15 Exponential (rising)

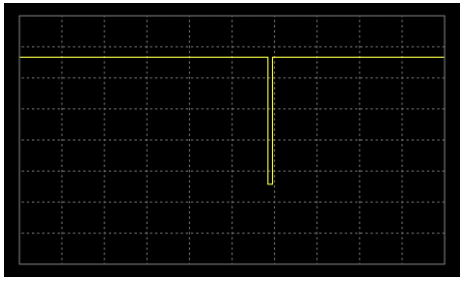


ARB 16 Exponential (falling)

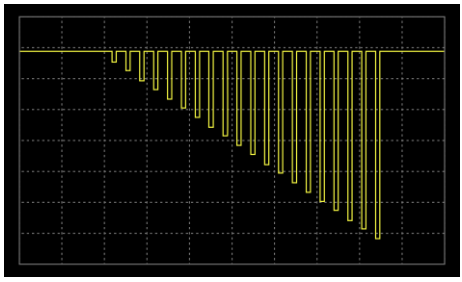


Default Sequence Setting

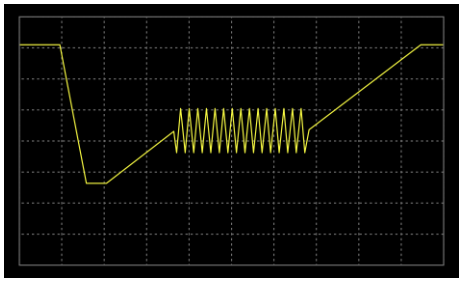
SEQ6 Momentary drop in supply voltage



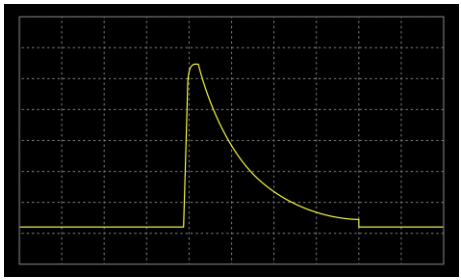
SEQ7 Reset test for Level1 systems with 12V



SEQ8 Starting Profile



SEQ9 Test2 Tr: 10ms, Td: 40ms



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