The control commands summary of equipment in SinBerBEST BIMG Test-Bedding

2014.08.01

This document presents the sub-sets of control commands summary to help the engineers of the SinBerBEST BIMG Test-Bedding software development facilitating the relevant equipment's operating control programming. To be concise, it is focused on the specific control commands of the equipment that are used for the BIMG Test-Bedding controlling, the command execution order (command sending sequence to equipment) in equipment control as well as the notices in the BIMG Test-Bedding control processes. The detailed commands explanations please refer to the relevant programming manuals (in the attached documents).

There are 4 chapters; each chapter aims at one kind of equipment using in the SinBerBEST BIMG Test-Bedding. As the control commands are still undergoing the integration-test in the BIMG Test-Bedding dry lab, this document is only a draft and may be amended or extended later.

Chapter 1: Electronic-Load control (Part 1: DC Load Operating Mode)

The programmable DC Electronic-Load in the SinBerBEST BIMG Test-Bedding is Chroma 63803, which is deployed on 380 V DC Bus of the BIMG Test-Bedding. The maximum power capacity of a Chroma 63803 is 3600 W and the maximum current is 36 A.

At present, the BIMG server remotely controls the Chroma 63803 by means of Wi-Fi network and the control commands are a sub-set of SCPI standard in ISO 8859-1-encoded string.

1. Initialization commands

When the Chroma 63803 is power on, the BIMG server should first send a series of command to initialize the Chroma 63803 before its operating.

Sequence 1: General initializing command series

COMMAND SERISES	EXPLANATION
"*CLS;*ESE 1;*SRE 32\n*IDN?\n"	This command series is to clear some of key internal Registers and set the Event Status Enable Register & the Service Requester Enable Register of the Chroma 63803 first, and then query manufacture's name, model name, serial number and firmware version. (e.g. the Chroma 63803 returns "Chroma, 63803, 0, 1.00") *Putting this command series in the top of the command execution order is a pre-security measure. The response string "Chroma, 63803, 0, 1.00" can be used to check the Chroma 63803's first operating status.*

Sequence 2: Set up DC load operating mode command series

COMMAND SERISES	EXPLANATION
"SYSTem:SETup:MODE DC\n"	This command series is to set up the Chroma 63803 to DC load mode. *Putting this command series in the top of the command execution order is to make sure the Chroma 63803 in DC load.*

Sequence 3: Limiting parameters setup initializing command series

Before the Chroma 63803 starting operation, it should be set up the relevant operating limit parameters.

COMMAND SERISES	EXPLANATION
"LOAD:CURRent:MAX:LEVel:AMPLitude:DC " + Max current limit string in <NR2> + "\n " e.g. "10.00" (in Ampere) "LOAD:POWer:LEVel:AMPLitude:HIGH " + Max power limit string in <NR2> + "\n " e.g. "3600.00" (in Watt)	This command series is to set up the relevant operating limit parameters. If necessary, it is available to query the limit parameters by replacing the last parameter in command with "?". *Putting this command series in the second top of the command execution order is necessary to prevent the Chroma 63803 from unexpected damage.*

Sequence 4: Sub-operating mode selecting initializing command series

The Chroma 63803 works in DC Load Operating Mode can further set up in following sub-operating mode: power control mode (PC Mode), current control mode (CC Mode) and resistance control mode (RC Mode).

a) Power control mode (PC Mode)

COMMAND SERISES	EXPLANATION
"LOAD:MODE POWer\n"	This command is to select the sub-operating mode to power control.

b) Current control mode (CC Mode)

COMMAND SERISES	EXPLANATION
"LOAD:MODE CURRent\n"	This command is to select the sub-operating mode to current control.

c) Resistance control mode (RC Mode)

COMMAND SERISES	EXPLANATION
"LOAD:MODE RES\n"	This command is to select the sub-operating mode to resistance control.

2. Control variable value-setting commands and load on/off commands

Option 1: Control variable value-setting in Sub-operating mode

When the Chroma 63803 is set up to a sub-operating mode, i.e. power control mode (PC Mode), current control mode (CC Mode) or resistance control mode (RC Mode), the control variable value-setting command is only effective on this sub-operating mode.

a) Value-setting command in PC Mode

COMMAND SERISES	EXPLANATION
"LOAD:POWer:LEVel:AMPLitude:DC " + Power value setting string in <NR2> + "\n " e.g. "1000.00" (in Watt)	This command is to set up control variable value-setting of power. The power value is ranged of 0~3600.00 W and is effective immediately if the Chroma 63803 is set to Load ON. *The real power input of the Chroma 63803 is limited by limiting parameter settings and working state. For example, the max current limit and max power limit will clamp the real power input to the limits; the real power input will be 0.00 when the Chroma 63803 is in Load OFF state.*

b) Value-setting command in CC Mode

COMMAND SERISES	EXPLANATION
"LOAD:CURRent:LEVel:AMPLitude:DC " + Current value setting string in <NR2> + "\n " e.g. "10.00" (in Ampere)	This command is to set up control variable value-setting of current. The current value is ranged of 0~36.00A and is effective immediately if the Chroma 63803 is set to Load ON. *The real current input of the Chroma 63803 is limited by limiting parameter settings and working state. For example, the max current limit and max power limit will clamp the real current input to the limits; the real current input will be 0.00 when the Chroma 63803 is in Load OFF state.*

c) Value-setting command in RC Mode

COMMAND SERISES	EXPLANATION
"LOAD:RES:LEVel:AMPLitude:DC " + Resistance value setting string in <NR2> + "\n " e.g. "100.00" (in Ohm)	This command is to set up control variable value-setting of resistance. The resistance value is ranged of 1.39~2500 Ohm and is effective immediately if the Chroma 63803 is set to Load ON. *The real resistance value of the Chroma 63803 is limited by limiting parameter settings and working state. For example, the max current limit and max power limit will clamp the real resistance value to the limits; the real resistance value will be ∞ when the Chroma 63803 is in Load OFF state.*

Option 2: DC Load ON/OFF command

COMMAND SERISES	EXPLANATION
2. "LOAD ON\n"	This command is to switch on the Chroma 63803 internally.
2. "LOAD OFF\n"	This command is to switch off the Chroma 63803 internally.

Note 1: A friendly switching-on manner of the Chroma 63803 is setting the control variable to a small value (resistance to a large value) first; and then switch on the Chroma 63803.

Note 2: The switching-on/switching-off command is required only when the Chroma 63803's operating state needs to change.

3. Retrieve measure data commands and working state commands

This control command series is to retrieve the measure data from the Chroma 63803. There are many kinds of control commands. However, we currently only retrieve the RMS values of power, current and voltage of the Chroma 63803. Other kinds of control commands will be extent later.

COMMAND SERISES	EXPLANATION
"MEASure:CURRent?\n"	This command is to retrieve the current RMS value of the Chroma 63803. The response string is a digit with a decimal point and its default unit is Ampere. (e.g. "10.23")
"MEASure:VOLTage?\n"	This command is to retrieve the voltage RMS value of the Chroma 63803. The response string is a digit with a decimal point and its default unit is Volt. (e.g. "380.4")
"MEASure:POWer?\n"	This command is to retrieve the power average value of the Chroma 63803. The response string is a digit with a decimal point and its default unit is Watt. (e.g. "2000.0")
"LOAD STATus?\n"	This command is to retrieve the operation on/off status of the Chroma 63803. If it is in internal switching-on status the response is "1", otherwise, the response is "0".
"LOAD:MODE? \n"	This command is to retrieve the operating mode of the Chroma 63803. The response is "CURR", "POW", "RES", which represent CC mode, PC mode and RC mode respectively.

4. The database required data for the Chroma 63803 (in DC Load Mode)

The following table lists the required data that the Chroma 63803 (in DC load mode) may be used in its control process for database. The list may extend in future.

Name	Unit	Access Mode	Data Type	Range	Example	Description
ON_OFF	-	W/R	NR1or String	-	1 or 0	The operation on/off status of the Chroma 63803. 1-on, 0-off
Mod*operating*	-	W/R	NR1or String	-	0,1,3 or CURR, POW, RES	The operating AC/DC mode of the Chroma 63803. "CURR", "POW", "RES"
POW*setting*	W	W/R	NR2	0~3600.0	500.0	The power setting value of the Chroma 63803 in PC mode.
CURR*setting*	A	W/R	NR2	0~36.0	10.0	The current setting value of the Chroma 63803 in CC mode.
RES*setting*	Ohm	W/R	NR2	1.39~2500.0	150.0	The resistance setting value

						of the Chroma 63803 in RC mode.
POW*measure*	W	W/R	NR2	0~3600.0	1000.0	The power average value of the Chroma 63803.
CURR*measure*	A	W/R	NR2	0~36.0	10.0	The current RMS value of the Chroma 63803.
VOLT*measure*	V	W/R	NR2	0~500.0	380.0	The voltage RMS value of the Chroma 63803.

Chapter 2: Electronic-Load control (Part 2: AC Load in three-phase parallel Operating Mode)

The programmable AC Electronic-Load in the SinBerBEST BIMG Test-Bedding is three of Chroma 63803s working in parallel, which is deployed on three-phase 380 V AC Bus of the BIMG Test-Bedding. The maximum power capacity is 3*3600 W and the maximum current is 36 A.

At present, the BIMG server remotely controls one of the Chroma 63803s in three-phase parallel operating mode, which is working as the master, by means of Wi-Fi network and the control commands are a sub-set of SCPI standard in ISO 8859-1-encoded string.

1. Initialization commands

When the Three-phase Chroma 63803s is power on, the BIMG server should first send a series of command to initialize the Three-phase Chroma 63803s before their operating.

Sequence 1: General initializing command series

COMMAND SERISES	EXPLANATION
"PHASe:SEL ALL\n" + "*CLS;*ESE 1;*SRE 32\n*IDN?\n"	This command series is to clear some of key internal Registers and set the Event Status Enable Register & the Service Requester Enable Register of the Chroma 63803 first, and then query manufacture's name, model name, serial number and firmware version. (e.g. the Chroma 63803 returns "Chroma, 63803, 0, 1.00") *Putting this command series in the top of the command execution order is a pre-security measure. The response string "Chroma, 63803, 0, 1.00" can be used to check the Chroma 63803's first operating status.*

Sequence 2: Set up DC load operating mode command series

COMMAND SERISES	EXPLANATION
"PHASe:SEL ALL\n" + "SYSTem:SETup:MODE AC\n"	This command series is to set up the Three-phase Chroma 63803s to AC load mode. *Putting this command series in the top of the command execution order is to make sure the Three-phase Chroma 63803s in AC load.*

Sequence 3: Check parallel state

COMMAND SERISES	EXPLANATION
“PHASe:SEL A; PAR:STAT?\n” “PHASe:SEL B; PAR:STAT?\n” “PHASe:SEL C; PAR:STAT?\n”	These command series are to check the Three-phase Chroma 63803s whether in three-phase parallel mode. *If the response is not “2”, the BIMG server should stop initialization and report system error.*

Sequence 4: Limiting parameters setup initializing command series

Before the Three-phase Chroma 63803s starting operation, they should be set up the relevant operating limit parameters.

COMMAND SERISES	EXPLANATION
“PHASe:SEL ALL\n” + “LOAD:CURRent:MAX:LEVel:AMPLitude:DC ” + Max current limit string in <NR2> + “\n ” e.g. “10.00” (in Ampere) “LOAD:POWer:LEVel:AMPLitude:HIGH ” + Max power limit string in <NR2> + “\n ” e.g. “3600.00” (in Watt)	This command series is to set up the relevant operating limit parameters. If necessary, it is available to query the limit parameters by replacing the last parameter in command with “?”. *Putting this command series in the second top of the command execution order is necessary to prevent the Three-phase Chroma 63803s from unexpected damage.*

Sequence 5: Sub-operating mode selecting initializing command series

The Three-phase Chroma 63803s works in DC Load Operating Mode can further set up in following sub-operating mode: power control mode (PC Mode) , current control mode (CC Mode) , voltage control mode (VC Mode) and resistance control mode (RC Mode).

a) Power control mode (PC Mode)

COMMAND SERISES	EXPLANATION
“PHASe:SEL ALL\n” + “LOAD:MODE POWer\n”	This command is to select the sub-operating mode to power control.

b) Current control mode (CC Mode)

COMMAND SERISES	EXPLANATION
“PHASe:SEL ALL\n” + “LOAD:MODE CURRent\n”	This command is to select the sub-operating mode to current control.

c) Voltage control mode (VC Mode)

COMMAND SERISES	EXPLANATION
“PHASe:SEL ALL\n” + “LOAD:MODE VOLTage\n”	This command is to select the sub-operating mode to voltage control.

d) Resistance control mode (RC Mode)

COMMAND SERISES	EXPLANATION
“PHASe:SEL ALL\n” +	This command is to select the sub-operating mode to resistance control.

“LOAD:MODE RES\n”	

2. Control variable value-setting commands and load on/off commands

Option 1: Control variable value-setting in Sub-operating mode

When the Three-phase Chroma 63803s are set up to a sub-operating mode, i.e. power control mode (PC Mode), current control mode (CC Mode) or resistance control mode (RC Mode), the control variable value-setting commands are only effective on this sub-operating mode.

In this summary, three-phase balanced control variable value-setting is assumed. If the assumption is not true, each of the Three-phase Chroma 63803s should be set up individually.

a) Value-setting command in PC Mode

COMMAND SERISES	EXPLANATION
“PHASe:SEL ALL\n” + “LOAD:POWer:LEVel:AMPLitude:AC ” + Power value setting string in <NR2> + “\n ” e.g. “1000.00” (in Watt)	This command is to set up control variable value-setting of power. The power value is ranged of 0~3600.00 W and is effective immediately if the Three-phase Chroma 63803s is set to Load ON. *The real power input of the Three-phase Chroma 63803s is limited by limiting parameter settings and working state. For example, the max current limit and max power limit will clamp the real power input to the limits; the real power input will be 0.00 when the Three-phase Chroma 63803s is in Load OFF state.*

b) Value-setting command in CC Mode

COMMAND SERISES	EXPLANATION
“PHASe:SEL ALL\n” + “LOAD:CURRent:LEVel:AMPLitude:AC ” + Current value setting string in <NR2> + “\n ” e.g. “10.00” (in Ampere)	This command is to set up control variable value-setting of current. The current value is ranged of 0~36.00A and is effective immediately if the Three-phase Chroma 63803s is set to Load ON. *The real current input of the Three-phase Chroma 63803s is limited by limiting parameter settings and working state. For example, the max current limit and max power limit will clamp the real current input to the limits; the real current input will be 0.00 when the Three-phase Chroma 63803s is in Load OFF state.*

c) Value-setting command in VC Mode

COMMAND SERISES	EXPLANATION
“PHASe:SEL ALL\n” + “LOAD:VOLTage:LEVel:AMPLitude:AC ” + Voltage value setting string in <NR2> + “\n ” e.g. “220.00” (in Volt)	This command is to set up control variable value-setting of voltage. The current value is ranged of 40~350.0V and is effective immediately if the Three-phase Chroma 63803s is set to Load ON. *The real voltage input of the Three-phase Chroma*

	63803s is limited by limiting parameter settings and working state. For example, the max current limit and max power limit will clamp the real current input to the limits; the real voltage input will be high-impedance when the Three-phase Chroma 63803s is in Load OFF state.

d) Value-setting command in RC Mode

COMMAND SERISES	EXPLANATION
"PHASe:SEL ALL\n" + "LOAD:RES:LEVel:AMPLitude:AC " + Resistance value setting string in <NR2> + "\n " e.g. "100.00" (in Ohm)	This command is to set up control variable value-setting of resistance. The resistance value is ranged of 1.39~2500 Ohm and is effective immediately if the Three-phase Chroma 63803s is set to Load ON. *The real resistance value of the Three-phase Chroma 63803s is limited by limiting parameter settings and working state. For example, the max current limit and max power limit will clamp the real resistance value to the limits; the real resistance value will be ∞ when the Three-phase Chroma 63803s is in Load OFF state.*

Option 2: AC Load power-factor value-setting command

COMMAND SERISES	EXPLANATION
"PHASe:SEL ALL\n" + "LOAD:PFAC " + + Power-factor value setting string in <NR2> + "\n " e.g. "0.7"	This command is to set up control variable value-setting of power-factor. The power-factor value is ranged of 0~1.0 and is effective immediately if the Three-phase Chroma 63803s is set to Load ON.

Option 3: AC Load crest-factor value-setting command

COMMAND SERISES	EXPLANATION
"PHASe:SEL ALL\n" + "LOAD:CFAC " + + Crest-factor value setting string in <NR2> + "\n " e.g. "2.0"	This command is to set up control variable value-setting of crest-factor. The crest-factor value is ranged of 1.414~5.0 and is effective immediately if the Three-phase Chroma 63803s is set to Load ON.

Option 4: AC Load ON/OFF command

COMMAND SERISES	EXPLANATION
"PHASe:SEL ALL\n" + "LOAD ON\n"	This command is to switch on the Three-phase Chroma 63803s internally.
"PHASe:SEL ALL\n" + "LOAD OFF\n"	This command is to switch off the Three-phase Chroma 63803s internally.

Note 1: A friendly switching-on manner of the Three-phase Chroma 63803s is setting the control variable to a small value (resistance to a large value) first; and then switch on the Three-phase Chroma 63803s.

Note 2: The switching-on/switching-off command is required only when the Three-phase Chroma 63803s's operating state needs to change.

3. Retrieve measure data commands and working state commands

This control command series is to retrieve the measure data from the Three-phase Chroma 63803s. There are many kinds of control commands. However, we currently only retrieve the RMS values of current & voltage, the average value of power, power-factor, crest-factor and frequency of the Three-phase Chroma 63803s . Other kinds of control commands will be extent later.

COMMAND SERISES	EXPLANATION
"PHASe:SEL A;MEASure:CURRent?\n" "PHASe:SEL B;MEASure:CURRent?\n" "PHASe:SEL C;MEASure:CURRent?\n"	These commands are to retrieve the current RMS values of the Three-phase Chroma 63803s. The response string of the command is a digit with a decimal point and its default unit is Ampere. (e.g. "10.23")
"PHASe:SEL A;MEASure:VOLTage?\n" "PHASe:SEL B;MEASure:VOLTage?\n" "PHASe:SEL C;MEASure:VOLTage?\n"	These commands are to retrieve the voltage RMS values of the Three-phase Chroma 63803s. The response string of the command is a digit with a decimal point and its default unit is Volt. (e.g. "380.4")
"PHASe:SEL A;MEASure:POWer?\n" "PHASe:SEL B;MEASure:POWer?\n" "PHASe:SEL C;MEASure:POWer?\n"	These commands are to retrieve the power average values of the Three-phase Chroma 63803s. The response string of the command is a digit with a decimal point and its default unit is Watt. (e.g. "2000.0")
"PHASe:SEL A;MEASure:POWer:APParent?\n" "PHASe:SEL B;MEASure:POWer:APParent?\n" "PHASe:SEL C;MEASure:POWer:APParent?\n"	These commands are to retrieve the apparent power values of the Three-phase Chroma 63803s. The response string of the command of the command is a digit with a decimal point and its default unit is VA. (e.g. "2000.0")
"PHASe:SEL A;MEASure:POWer:PFACtor?\n" "PHASe:SEL B;MEASure:POWer:PFACtor?\n" "PHASe:SEL C;MEASure:POWer:PFACtor?\n"	These commands are to retrieve the power factors of the Three-phase Chroma 63803s. The response string of the command is a digit with a decimal point. (e.g. "0.8")
"PHASe:SEL A;MEASure:POWer:REACtive?\n" "PHASe:SEL B;MEASure:POWer:REACtive?\n" "PHASe:SEL C;MEASure:POWer:REACtive?\n"	These commands are to retrieve the reactive power average values of the Three-phase Chroma 63803s. The response string of the command is a digit with a decimal point and its default unit is Var. (e.g. "2000.0")
"PHASe:SEL A;MEASure:FREQ?\n" "PHASe:SEL B;MEASure:FREQ?\n" "PHASe:SEL C;MEASure:FREQ?\n"	These commands are to retrieve the frequency average value of the Three-phase Chroma 63803s. The response string of the command is a digit with a decimal point and its default unit is Hz. (e.g. "50.00")

“PHASe:SEL A;LOAD STATus?\n” “PHASe:SEL B;LOAD STATus?\n” “PHASe:SEL C;LOAD STATus?\n”	These commands are to retrieve the operating statuses of the Three-phase Chroma 63803s. If it is in internal switching-on status the response is “1”, otherwise, the response is “0”.
“PHASe:SEL A;LOAD:MODE? \n” “PHASe:SEL B;LOAD:MODE? \n” “PHASe:SEL C;LOAD:MODE? \n”	These commands are to retrieve the operating mode of the Three-phase Chroma 63803s. The response string is “CURR”, “POW”, “VOLT”, “RES”, which represent CC mode, PC mode, VC mode and RC mode respectively.

4. The database required data for the Three-phase Chroma 63803s (in AC Load three-phase parallel Mode)

The following table lists the required data that the Three-phase Chroma 63803s (in AC load three-phase parallel mode) may be used in its control process for database. The list may extend in future.

Name	Unit	Access Mode	Data Type	Range	Example	Description
ON_OFF	-	W/R	NR1or String	-	1 or 0	The operation on/off status of the Three-phase Chroma 63803s. 1-on, 0-off
Mod*operating*	-	W/R	NR1or String	-	0,1,2,3 or CURR, POW, VOLT, RES	The operating AC/DC mode of the Three-phase Chroma 63803s. “CURR”, “POW”, “VOLT”, “RES”
PFAC*etting*	-	W/R	NR2	0~1.0	0.85	The power-factor setting value of each phase of the Three-phase Chroma 63803s.
CFAC*etting*	-	W/R	NR2	1.414~5.0	2.0	The crest-factor setting value of each phase of the Three-phase Chroma 63803s.
POW*setting*	W	W/R	NR2	0~3600.0	500.0	The power setting value of each phase of the Three-phase Chroma 63803s in PC mode.
CURR*setting*	A	W/R	NR2	0~36.0	10.0	The current setting value of each phase of the Three-phase Chroma 63803s in CC mode.
VOLT*setting*	V	W/R	NR2	40~350.0	220.0	The voltage setting value of each phase of the Three-phase Chroma 63803s in VC mode.
RES*setting*	Ohm	W/R	NR2	1.39~2500.0	150.0	The resistance setting value of each phase of the Three-phase Chroma 63803s in RC mode.
POW*measure_A*	W	R	NR2	0~3600.0	1000.0	The power average value of phase A of the Three-phase

						Chroma 63803s.
POW*measure_B*	W	R	NR2	0~3600.0	1000.0	The power average value of phase B of the Three-phase Chroma 63803s.
POW*measure_C*	W	R	NR2	0~3600.0	1000.0	The power average value of phase C of the Three-phase Chroma 63803s.
APPA*measure_A*	VA	R	NR2	0~3600.0	1000.0	The apparent power average value of phase A of the Three-phase Chroma 63803s.
APPA*measure_B*	VA	R	NR2	0~3600.0	1000.0	The apparent power average value of phase B of the Three-phase Chroma 63803s.
APPA*measure_C*	VA	R	NR2	0~3600.0	1000.0	The apparent power average value of phase C of the Three-phase Chroma 63803s.
PFAC*measure_A*	-	R	NR2	0~1.0	0.8	The power factor value of phase A of the Three-phase Chroma 63803s.
PFAC*measure_B*	-	R	NR2	0~1.0	0.8	The power factor value of phase B of the Three-phase Chroma 63803s.
PFAC*measure_C*	-	R	NR2	0~1.0	0.8	The power factor value of phase C of the Three-phase Chroma 63803s.
REAC*measure_A*	Var	R	NR2	0~3600.0	1000.0	The reactive power average value of phase A of the Three-phase Chroma 63803s.
REAC*measure_B*	Var	R	NR2	0~3600.0	1000.0	The reactive power average value of phase B of the Three-phase Chroma 63803s.
REAC*measure_C*	Var	R	NR2	0~3600.0	1000.0	The reactive power average value of phase C of the Three-phase Chroma 63803s.
CURR*measure_A*	A	R	NR2	0~36.0	10.0	The current RMS value of phase A of the Three-phase Chroma 63803s.
CURR*measure_B*	A	R	NR2	0~36.0	10.0	The current RMS value of phase B of the Three-phase Chroma 63803s.
CURR*measure_C*	A	R	NR2	0~36.0	10.0	The current RMS value of phase A of the Three-phase Chroma 63803s.
VOLT*measure_A*	V	R	NR2	0~500.0	380.0	The voltage RMS value of phase A of the Three-phase Chroma 63803s.
VOLT*measure_B*	V	R	NR2	0~500.0	380.0	The voltage RMS value of phase C of the Three-phase

						Chroma 63803s.
VOLT*measure_C*	V	R	NR2	0~500.0	380.0	The voltage RMS value of phase C of the Three-phase Chroma 63803s.
FRQ*measure_A*	Hz	R	NR2	45~440.0	50.00	The frequency value of phase A of the Three-phase Chroma 63803s.
FRQ*measure_B*	Hz	R	NR2	45~440.0	50.00	The frequency value of phase B of the Three-phase Chroma 63803s.
FRQ*measure_C*	Hz	R	NR2	45~440.0	50.00	The frequency value of phase B of the Three-phase Chroma 63803s.

Chapter 3: Electronic DC-Source (PV emulator) control

To be edited

Chapter 4: Electronic AC-Source control

To be edited