

User Manual for Communication

Power Controllers

SPR Series

MCY-SPRC1-V3.7-EN

Thank you for purchasing an Autonics product.

This user manual contains information about the product and its proper use,
and should be kept in a place where it will be easy to access.

Preface

Thank you for purchasing Autonics product.

Please familiarize yourself with the information contained in the **Safety Considerations** section before using this product.

This user manual contains information about the product and its proper use, and should be kept in a place where it will be easy to access.

User Manual Guide

- Please familiarize yourself with the information in this manual before using the product.
- This manual provides detailed information on the product's features. It does not offer any guarantee concerning matters beyond the scope of this manual.
- This manual may not be edited or reproduced in either part or whole without permission.
- This manual is not provided as part of the product package. Please visit our website (www.autonics.com) to download a copy.
- The manual's content may vary depending on changes to the product's software and other unforeseen developments within Autonics, and is subject to change without prior notice. Upgrade notice is provided through our homepage.
- We contrived to describe this manual more easily and correctly. However, if there are any corrections or questions, please notify us these on our website.

Communication Protocol

SPR Series is accepted to Modbus RTU Protocol.

Users should be aware that it does not support a broadcast command.

User Manual Symbols

Symbol	Description
 Note	Supplementary information for a particular feature.
 Warning	Failure to follow instructions can result in serious injury or death.
 Caution	Failure to follow instructions can lead to a minor injury or product damage.
 Ex.	An example of the concerned feature's use.
※	Annotation mark.

Safety Considerations

- Following these safety considerations will ensure the safe and proper use of the product and help prevent accidents, as well as minimizing possible hazards.
- Safety considerations are categorized as Warnings and Cautions, as defined below:

 Warning	Warning	Failure to follow the instructions may lead to a serious injury or accident.
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 Caution	Caution	Failure to follow the instructions may lead to a minor injury or accident.
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Warning

- Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)
Failure to follow this instruction may result in fire, personal injury, or economic loss.
- Install on the device panel, and ground to the heat sink or bracket separately.
Failure to follow this instruction may result in electric shock or fire.
- Do not connect, repair, or inspect the unit while connected to a power source.
Failure to follow this instruction may result in electric shock or fire.
- Check 'Connections' before wiring.
Failure to follow this instruction may result in fire.
- Do not disassemble or modify the unit.
Failure to follow this instruction may result in electric shock or fire



Caution

- Use the unit within the rated specifications.
Failure to follow this instruction may result in fire or product damage.
- Use dry cloth to clean the unit, and do not use water or organic solvent.
Failure to follow this instruction may result in electric shock or fire.
- Do not use the unit in the place where flammable/explosive/corrosive gas, humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.
Failure to follow this instruction may result in fire or explosion.
- Keep metal chip, dust, and wire residue from flowing into the unit.
Failure to follow this instruction may result in fire or product damage.

- Since leakage current still flows right after turning off the power or in the output OFF status, do not touch the load terminal.
Failure to follow this instruction may result in electric shock.

The specifications are subject to change and some models may be discontinued without notice.
Be sure to follow cautions written in the instruction manual, user manual and the technical descriptions (catalog, website).

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1 Modbus RTU Protocol

Modbus is an industrial protocol developed in 1979 for serial communication between devices. Its functionality has gradually expanded to allow implementation in TCP/IP and UDP environments, and it is now widely used for simple, stable, and efficient communication in various network environments. This protocol has become the standard communication method in industrial automation systems, SCADA (Supervisory Control and Data Acquisition systems), and other industrial networks.

Modbus RTU transmits data in a continuous binary format, making it more efficient and faster than ASCII transmission. The frame structure does not clearly distinguish the start and end, but defines the start and end by leaving a silent interval (3.5 character times) between frames.



For more detailed information about Modbus protocol, refer to the documentation provided by the developer.

1.1 Function Code Frame Structure

1.1.1 01 (0x01) Read Coil Status

Reads the ON/OFF status of output (0X reference, coil) in the slave device.

Request frame (master)

Frame element	Data size	Description
Slave address	1-byte	Address of the slave device
Function code	1-byte	0x01 (Read Coil Status)
Starting address	2-byte	Starting address of the coil to be read
Quantity of coils	2-byte	Number of coils
CRC check	2-byte	Adds a CRC-16 checksum at the end of the frame to verify data integrity.

Example of a request frame

Slave address	Function code	Starting address		Quantity of coils		CRC check	
1-byte	1-byte	High	Low	High	Low	Low	High
		1-byte	1-byte	1-byte	1-byte	1-byte	1-byte
CRC-16							

Response frame (slave)

Frame element	Data size	Description
Slave address	1-byte	Address of the slave device
Function code	1-byte	0x01 (Read Coil Status)
Byte count	1-byte	Number of bytes in the returned data
Coil status	N-byte	The status of the requested coils is represented. Each coil's status is represented by 1 bit, and 8 coil statuses are grouped into 1 byte. N = number of coils / 8 If the remainder is not zero when divided by 8: N = N + 1
CRC check	2-byte	Adds a CRC-16 checksum at the end of the frame to verify data integrity.

Example of a response frame

Slave address	Function code	Byte count	Coil status	CRC check	
1-byte	1-byte	1-byte	N × byte	Low	High
				1-byte	1-byte
CRC-16					

1.1.2 02 (0x02) Read Input Status

Reads the ON/OFF status of input (1X reference) in the slave device.

Request frame (master)

Frame element	Data size	Description
Slave address	1-byte	Address of the slave device
Function code	1-byte	0x02 (Read Input Status)
Starting address	2-byte	Starting address of the input to be read
Quantity of inputs	2-byte	Number of inputs
CRC check	2-byte	Adds a CRC-16 checksum at the end of the frame to verify data integrity.

Example of a request frame

Slave address	Function code	Starting address		Quantity of inputs		CRC check	
1-byte	1-byte	High	Low	High	Low	Low	High
		1-byte	1-byte	1-byte	1-byte	1-byte	1-byte
CRC-16							

Response frame (slave)

Frame element	Data size	Description
Slave address	1-byte	Address of the slave device
Function code	1-byte	0x02 (Read Input Status)
Byte count	1-byte	Number of bytes in the returned data
Input status	N-byte	The status of the requested inputs is represented. Each input's status is represented by 1 bit, and 8 input statuses are grouped into 1 byte. N = number of inputs / 8 If the remainder is not zero when divided by 8: N = N + 1
CRC check	2-byte	Adds a CRC-16 checksum at the end of the frame to verify data integrity.

Example of a response frame

Slave address	Function code	Byte count	Input status	CRC check	
1-byte	1-byte	1-byte	N × byte	Low	High
				1-byte	1-byte
CRC-16					

1.1.3 03 (0x03) Read Holding Registers

Reads the binary data of holding registers (4X reference) in the slave device.

Request frame (master)

Frame element	Data size	Description
Slave address	1-byte	Address of the slave device
Function code	1-byte	0x03 (Read Holding Registers)
Starting address	2-byte	Starting address of the first register to be read
Quantity of registers	2-byte	Number of registers
CRC check	2-byte	Adds a CRC-16 checksum at the end of the frame to verify data integrity.

Example of a request frame

Slave address	Function code	Starting address		Quantity of registers		CRC check	
1-byte	1-byte	High	Low	High	Low	Low	High
		1-byte	1-byte	1-byte	1-byte	1-byte	1-byte
CRC-16							

Response frame (slave)

Frame element	Data size	Description
Slave address	1-byte	Address of the slave device
Function code	1-byte	0x03 (Read Holding Registers)
Byte count	1-byte	Number of bytes in the returned data (Number of registers read × 2-byte)
Register value	N × 2-byte	The values of the requested registers are represented. Each register is represented by 2 bytes. N is determined by the number of requested registers.
CRC check	2-byte	Adds a CRC-16 checksum at the end of the frame to verify data integrity.

Example of a response frame

Slave address	Function code	Byte count	Register value		CRC check	
1-byte	1-byte	1-byte	High	Low	Low	High
			1-byte	1-byte	1-byte	1-byte
CRC-16						

1.1.4 04 (0x04) Read Input Registers

Reads the binary data of input registers (3X reference) in the slave device.

Request frame (master)

Frame element	Data size	Description
Slave address	1-byte	Address of the slave device
Function code	1-byte	0x04 (Read Input Registers)
Starting address	2-byte	Starting address of the first input register to be read
Quantity of input registers	2-byte	Number of input registers
CRC check	2-byte	Adds a CRC-16 checksum at the end of the frame to verify data integrity.

Example of a request frame

Slave address	Function code	Starting address		Quantity of input registers		CRC check	
1-byte	1-byte	High	Low	High	Low	Low	High
		1-byte	1-byte	1-byte	1-byte	1-byte	1-byte
CRC-16							

Response frame (slave)

Frame element	Data size	Description
Slave address	1-byte	Address of the slave device
Function code	1-byte	0x04 (Read Input Registers)
Byte count	1-byte	Number of bytes in the returned data (Number of registers read × 2-byte)
Register value	N × 2-byte	The values of the requested input registers are represented. Each register is represented by 2 bytes. N is determined by the number of requested registers.
CRC check	2-byte	Adds a CRC-16 checksum at the end of the frame to verify data integrity.

Example of a response frame

Slave address	Function code	Byte count	Register value		CRC check	
1-byte	1-byte	1-byte	High	Low	Low	High
			1-byte	1-byte	1-byte	1-byte
CRC-16						

1.1.5 05 (0x05) Force Single Coil

Forces a single coil (0X reference) to either ON (0xFF00) or OFF (0x0000) status in the slave device.

Request frame (master)

Frame element	Data size	Description
Slave address	1-byte	Address of the slave device
Function code	1-byte	0x05 (Force Single Coil)
Coil address	2-byte	Address of the coil to be forced
Force data	2-byte	Sets or resets the coil. (0xFF00 = ON, 0x0000 = OFF)
CRC check	2-byte	Adds a CRC-16 checksum at the end of the frame to verify data integrity.

Example of a request frame

Slave address	Function code	Coil address		Force data		CRC check	
1-byte	1-byte	High	Low	High	Low	Low	High
		1-byte	1-byte	1-byte	1-byte	1-byte	1-byte
CRC-16							

Response frame (slave)

Frame element	Data size	Description
Slave address	1-byte	Address of the slave device
Function code	1-byte	0x05 (Force Single Coil)
Coil address	2-byte	Address of the coil that was forced
Force data	2-byte	The status of the coil is represented. (0xFF00 = ON, 0x0000 = OFF)
CRC check	2-byte	Adds a CRC-16 checksum at the end of the frame to verify data integrity.

Example of a response frame

Slave address	Function code	Coil address		Force data		CRC check	
1-byte	1-byte	High	Low	High	Low	Low	High
		1-byte	1-byte	1-byte	1-byte	1-byte	1-byte
CRC-16							

1.1.6 06 (0x06) Preset Single Register

Writes the binary data to a single holding register (4X reference) in the slave device.

Request frame (master)

Frame element	Data size	Description
Slave address	1-byte	Address of the slave device
Function code	1-byte	0x06 (Preset Single Register)
Register address	2-byte	Address of the register to be preset
Preset data	2-byte	Value to be preset
CRC check	2-byte	Adds a CRC-16 checksum at the end of the frame to verify data integrity.

Example of a request frame

Slave address	Function code	Register address		Preset data		CRC check	
1-byte	1-byte	High	Low	High	Low	Low	High
		1-byte	1-byte	1-byte	1-byte	1-byte	1-byte
CRC-16							

Response frame (slave)

Frame element	Data size	Description
Slave address	1-byte	Address of the slave device
Function code	1-byte	0x06 (Preset Single Register)
Register address	2-byte	Address of the register that was preset
Preset data	2-byte	Value preset to the register
CRC check	2-byte	Adds a CRC-16 checksum at the end of the frame to verify data integrity.

Example of a response frame

Slave address	Function code	Register address		Preset data		CRC check	
1-byte	1-byte	High	Low	High	Low	Low	High
		1-byte	1-byte	1-byte	1-byte	1-byte	1-byte
CRC-16							

1.1.7 16 (0x10) Preset Multiple Registers

Writes the binary data continuously to multiple holding registers (4X reference) in the slave device.

Request frame (master)

Frame element	Data size	Description
Slave address	1-byte	Address of the slave device
Function code	1-byte	0x10 (Preset Multiple Registers)
Starting address	2-byte	Starting address of the first register to be preset
Quantity of registers	2-byte	Number of registers to be preset
Byte count	1-byte	Number of bytes for the register values to be preset (Number of registers to be preset × 2-byte)
Register values	N × 2-byte	The values of the registers to be preset are represented. N is determined by the number of registers to be preset.
CRC check	2-byte	Adds a CRC-16 checksum at the end of the frame to verify data integrity.

Example of a request frame

Slave addr.	Func. code	Starting addr.		Quantity of registers		Byte count	Register values		CRC check	
1-byte	1-byte	High	Low	High	Low	1-byte	High	Low	Low	High
		1-byte	1-byte	1-byte	1-byte		1-byte	1-byte	1-byte	1-byte
CRC-16										

Response frame (slave)

Frame element	Data size	Description
Slave address	1-byte	Address of the slave device
Function code	1-byte	0x10 (Preset Multiple Registers)
Starting address	2-byte	Starting address of the first register that was preset
Quantity of registers	2-byte	Number of registers that were preset
CRC check	2-byte	Adds a CRC-16 checksum at the end of the frame to verify data integrity.

Example of a response frame

Slave address	Function code	Starting address		Quantity of registers		CRC check	
1-byte	1-byte	High	Low	High	Low	Low	High
		1-byte	1-byte	1-byte	1-byte	1-byte	1-byte
CRC-16							



Except when downloading parameters with predefined minimum, maximum, or default values based on the input specifications in the PC loader program, it is recommended to use Preset Single Register rather than Preset Multiple Registers when connecting to external devices such as PLCs or graphic panels.

1.2 Exception Handling

In case of a communication error, the slave device sets the highest bit of the received function code to 1 in its response. It then sends only the exception code, without including any data related to the original request.

Exception response frame

Slave address	Function code + 0x80	Exception code	CRC check
1-byte	1-byte	1-byte	2-byte
CRC-16			

Exception codes

Exception code	Code name	Description
01	ILLEGAL FUNCTION	If the command is not supported.
02	ILLEGAL DATA ADDRESS	If the requested data address is invalid. (e.g. The data address does not exist or the address range is incorrect.)
03	ILLEGAL DATA VALUE	If the requested data value is invalid. (e.g. The data value is out of the allowable range.)
04	SLAVE DEVICE FAILURE	If the parameter is locked, communication write is prohibited, or the command cannot be processed correctly.
06	SLAVE DEVICE BUSY	If the device is in a state where it cannot execute the requested command.

2 Modbus Mapping Table

2.1 Read coil status(Func 01) / Force single coil(Func 05)

No(Address)	Func	R/W	Parameter	Description	Setting Range	Unit	Factory Default	Note
000001 to 000050	01/05	R/W	Reserved					

2.2 Read input status(Func 02)

No(Address)	Func	R/W	Parameter	Description	Setting Range	Unit	Factory Default	Note
100001 (0000)	02	R	RUN lamp	Operation indicator	0: OFF 1: ON	-	-	
100002 (0001)	02	R	MAN lamp	Manual control indicator	0: OFF 1: ON	-	-	
100003 (0002)	02	R	ALM lamp	Alarm output indicator	0: OFF 1: ON	-	-	
100004 (0003)	02	R	OUT lamp	Control output indicator	0: OFF 1: ON	-	-	
100005 (0004)	02	R	V lamp	Unit indicator	0: OFF 1: ON	-	-	
100006 (0005)	02	R	A lamp	Unit indicator	0: OFF 1: ON	-	-	
100007 (0006)	02	R	DI-1 input	DI-1 input status	0: OFF 1: ON	-	-	
100008 (0007)	02	R	DI-2 input	DI-2 input status	0: OFF 1: ON	-	-	
100009 (0008)	02	R	DI-3 input	DI-3 input status	0: OFF 1: ON	-	-	
100010 to 100050	02	R	Reserved					

2.3 Read input registers(Func 04)

2.3.1 SPR1 Series

No(Address)	Func	R/W	Parameter	Description	Setting Range	Unit	Factory Default	Note
300001 to 300100	04	R	Reserved					
300101 (0064)	04	R	-	Product number H	-	-	0	Dedicated model number
300102 (0065)	04	R	-	Product number L	-	-	0	
300103 (0066)	04	R	-	Hardware version	-	-	0	
300104 (0067)	04	R	-	Software version	-	-	0	
300105 (0068)	04	R	-	Model 1※1	-	-	SP	Item
300106 (0069)	04	R	-	Model 2※1	-	-	R1	Control phase (single-phase)
300107 (006A)	04	R	-	Model 3※1	-1: 110VAC Type -2: 220VAC Type -3: 380VAC Type -4: 440VAC Type	-	-2	Rated load voltage
300108 (006B)	04	R	-	Model 4※1	025N: 25A alarm output	-	02	Rated load current
300109 (006C)	04	R	-	Model 5※1	035N: 35A alarm output 050N: 50A alarm output 070N: 70A alarm output 100N: 100A alarm output 150N: 150A alarm output 025T: 25A alarm output + RS-485 035T: 35A alarm output + RS-485 050T: 50A alarm output + RS-485 070T: 70A alarm output + RS-485 100T: 100A alarm output + RS-485 150T: 150A alarm output + RS-485	-	5N	Option output
300110 (006D)	04	R	-	Model 6※1	NN: General control, no fuse FN: General feedback control, no fuse NF: General control, with fuse FF: General feedback control, with fuse	-	NN	Feedback control, fuse
300111 (006E)	04	R	-	Reserved	-	-	-	
300112 (006F)	04	R	-	Reserved	-	-	-	
300113 (0070)	04	R	-	Reserved	-	-	-	
300114 (0071)	04	R	-	Reserved	-	-	-	
300115 (0072)	04	R	-	Reserved	-	-	-	
300116 (0073)	04	R	-	Reserved	-	-	-	
300117 (0074)	04	R	-	Reserved	-	-	-	
300118 (0075)	04	R	-	Coil Status Start Address	-	-	0000	
300119 (0076)	04	R	-	Coil Status Quantity	-	-	0	

No(Address)	Func	R/W	Parameter	Description	Setting Range	Unit	Factory Default	Note
300120 (0077)	04	R	-	Input Status Start Address	-	-	0000	
300121 (0078)	04	R	-	Input Status Quantity	-	-	0	
300122 (0079)	04	R	-	Holding Register Start Address	-	-	0000	
300123 (007A)	04	R	-	Holding Register Quantity	-	-	0	
300124 (007B)	04	R	-	Input Register Start Address	-	-	0000	
300125 (007C)	04	R	-	Input Register Quantity	-	-	0	
300126~300200	04	R	Reserved					
301001 (03E8)	04	R	IN	Control input	0 to 100	%	-	
301002 (03E9)	04	R	L-V	Load voltage ^{※3}	0 to rated load voltage	V	-	
301003 (03EA)	04	R	L-A	Load current ^{※3}	0 to rated load current	A	-	
301004 (03EB)	04	R	L-W	Load power ^{※3}	0 to rated load power	kW	-	
301005 (03EC)	04	R	L-R	Load resistance ^{※3}	0 to 100	%	-	
301006 (03ED)	04	R	TEM	Heatsink temperature	0 to 100	°C	-	
301007 (03EE)	04	R	FRQ	Power supply frequency	0.0 to 99.9	Hz	-	
301008 (03EF) ^{※2}	04	R	RUN lamp	Operation indicator	0: OFF 1: ON	-	-	Bit 0
			MAN lamp	Manual control indicator	0: OFF 1: ON	-	-	Bit 1
			ALM lamp	Alarm output indicator	0: OFF 1: ON	-	-	Bit 2
			OUT lamp	Control output indicator	0: OFF 1: ON	-	-	Bit 3
			V lamp	Unit indicator	0: OFF 1: ON	-	-	Bit 4
			A lamp	Unit indicator	0: OFF 1: ON	-	-	Bit 5
			RUN D/I	RUN contact input status	0: OFF 1: ON	-	-	Bit 6
			AUTO D/I	AUTO contact input status	0: OFF 1: ON	-	-	Bit 7
301009 (03F0) ^{※3} (normal control model)	04	R	RESET D/I	RESET contact input status	0: OFF 1: ON	-	-	Bit 8
			Fuse Alarm	Fuse break alarm	0: OFF 1: ON	-	-	Bit 0
			Over Curr Alarm	Overcurrent alarm ^{※5}	0: OFF 1: ON	-	-	Bit 1
			Over Volt Alarm	Overvoltage alarm ^{※5}	0: OFF 1: ON	-	-	Bit 2
			Heat Sink Alarm	Heatsink overheat alarm	0: OFF 1: ON	-	-	Bit 3
			SCR Alarm	SCR error alarm ^{※5}	0: OFF 1: ON	-	-	Bit 4
			Frequency Error Alarm	Frequency error alarm	0: OFF 1: ON	-	-	Bit 5
301009 (03F0) ^{※4} (feedback control model)	04	R	Heater Break Alarm	Heater break alarm ^{※5}	0: OFF 1: ON	-	-	Bit 6
			Fuse Alarm	Fuse break alarm	0: OFF 1: ON	-	-	Bit 0
			Over Curr Alarm	Overcurrent alarm ^{※5}	0: OFF 1: ON	-	-	Bit 1
			Over Volt Alarm	Overvoltage alarm ^{※5}	0: OFF 1: ON	-	-	Bit 2
			Heat Sink Alarm	Heatsink overheat alarm	0: OFF 1: ON	-	-	Bit 3
			SCR Alarm	SCR error alarm ^{※5}	0: OFF 1: ON	-	-	Bit 4
			Frequency Error Alarm	Frequency error alarm	0: OFF 1: ON	-	-	Bit 5
			Heater Break Alarm	Heater break alarm ^{※5}	0: OFF 1: ON	-	-	Bit 6
			Partial Heater Break Alarm	Partial heater break alarm ^{※5}	0: OFF 1: ON	-	-	Bit 7

※1. Parameter setting range is indicated in the hexadecimal value of ASCII codes..

※2. 301008 (03EF) address data organization

Bit F	Bit E	Bit D	Bit C	Bit B	Bit A	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
-	-	-	-	-	-	-	RESET input	AUTO input	RUN input	A indicator	V indicator	OUT indicator	ALM indicator	MAN indicator	RUN indicator
0	0	0	0	0	0	0	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1
1Byte								1Byte							

※3. 301009 (03F0), normal control model address data organization

Bit F	Bit E	Bit D	Bit C	Bit B	Bit A	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
-	-	-	-	-	-	-	-	-	Heater break	Frequ ncy error	SCR error	Heatsink overheat	Over-vo ltage	Over-cu rrent	Fuse break
0	0	0	0	0	0	0	0	0	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1
1Byte								1Byte							

※4. 301009 (03F0), feedback control model address data organization

Bit F	Bit E	Bit D	Bit C	Bit B	Bit A	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
-	-	-	-	-	-	-	-	Partial Heater break	Heater break	Frequ ncy error	SCR error	Heatsink overheat	Over-vo ltage	Over-cu rrent	Fuse break
0	0	0	0	0	0	0	0	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1
1Byte								1Byte							

※5. It can be measured only in the feedback control model.

2.3.2 SPR3 Series

No(Address)	Func	R/W	Parameter	Description	Setting Range	Unit	Factory Default	Note
300001 to 300100	04	R	Reserved					
300101 (0064)	04	R	-	Product number H	-	-	0	Dedicated model number
300102 (0065)	04	R	-	Product number L	-	-	0	
300103 (0066)	04	R	-	Hardware version	-	-	0	
300104 (0067)	04	R	-	Software version	-	-	0	
300105 (0068)	04	R	-	Model 1※1	-	-	SP	Item
300106 (0069)	04	R	-	Model 2※1	-	-	R3	Control phase (3-phase)
300107 (006A)	04	R	-	Model 3※1	-1: 110VAC Type -2: 220VAC Type -3: 380VAC Type -4: 440VAC Type	-	-2	Rated load voltage
300108 (006B)	04	R	-	Model 4※1	025N: 25A alarm output	-	02	Rated load current
300109 (006C)	04	R	-	Model 5※1	035N: 35A alarm output 050N: 50A alarm output 070N: 70A alarm output 100N: 100A alarm output 150N: 150A alarm output 025T: 25A alarm output + RS-485 035T: 35A alarm output + RS-485 050T: 50A alarm output + RS-485 070T: 70A alarm output + RS-485 100T: 100A alarm output + RS-485 150T: 150A alarm output + RS-485	-	5N	Option output
300110 (006D)	04	R	-	Model 6※1	NN: General control, no fuse FN: General feedback control, no fuse NF: General control, with fuse FF: General feedback control, with fuse	-	NN	Feedback control, fuse
300111 (006E)	04	R	-	Reserved	-	-	-	
300112 (006F)	04	R	-	Reserved	-	-	-	
300113 (0070)	04	R	-	Reserved	-	-	-	
300114 (0071)	04	R	-	Reserved	-	-	-	
300115 (0072)	04	R	-	Reserved	-	-	-	
300116 (0073)	04	R	-	Reserved	-	-	-	
300117 (0074)	04	R	-	Reserved	-	-	-	
300118 (0075)	04	R	-	Coil Status Start Address	-	-	0000	
300119 (0076)	04	R	-	Coil Status Quantity	-	-	0	
300120 (0077)	04	R	-	Input Status Start Address	-	-	0000	
300121 (0078)	04	R	-	Input Status Quantity	-	-	0	

No(Address)	Func	R/W	Parameter	Description	Setting Range	Unit	Factory Default	Note
300122 (0079)	04	R	-	Holding Register Start Address	-	-	0000	
300123 (007A)	04	R	-	Holding Register Quantity	-	-	0	
300124 (007B)	04	R	-	Input Register Start Address	-	-	0000	
300125 (007C)	04	R	-	Input Register Quantity	-	-	0	
300126~300200	04	R	Reserved					
301001 (03E8)	04	R	IN	Control input	0 to 100	%	-	
301002 (03E9)	04	R	U-V	Load voltage between U-V line ^{※3}	0 to rated load voltage	V	-	
301003 (03EA)	04	R	V-W	Load voltage between V-W line ^{※3}	0 to rated load voltage	V	-	
301004 (03EB)	04	R	W-U	Load voltage between W-V line ^{※3}	0 to rated load voltage	V	-	
301005 (03EC)	04	R	U-A	U-phase load current ^{※3}	0 to rated load current	A	-	
301006 (03ED)	04	R	V-A	V-phase load current ^{※3}	0 to rated load current	A	-	
301007 (03EE)	04	R	W-A	W-phase load current ^{※3}	0 to rated load current	A	-	
301008 (03FF)	04	R	L-W	Load power ^{※3}	0 to rated load power	kW	-	
301009 (03F0)	04	R	L-R	Load resistance ^{※3}	0 to 100	%	-	
301010 (03F1)	04	R	TEM	Heatsink temperature	0 to 100	°C	-	
301011 (03F2)	04	R	FRQ	Power supply frequency	0.0 to 99.9	Hz	-	
301012 (03F3) ^{※2}	04	R	RUN LAMP	Operation indicator	0: OFF 1: ON	-	-	Bit 0
			MAN LAMP	Manual control indicator	0: OFF 1: ON	-	-	Bit 1
			ALM LAMP	Alarm output indicator	0: OFF 1: ON	-	-	Bit 2
			OUT LAMP	Control output indicator	0: OFF 1: ON	-	-	Bit 3
			V LAMP	Unit indicator	0: OFF 1: ON	-	-	Bit 4
			A LAMP	Unit indicator	0: OFF 1: ON	-	-	Bit 5
			RUN D/I	RUN contact input status	0: OFF 1: ON	-	-	Bit 6
			AUTO D/I	AUTO contact input status	0: OFF 1: ON	-	-	Bit 7
301013 (03F4) ^{※3}	04	R	RESET D/I	RESET contact input status	0: OFF 1: ON	-	-	Bit 8
			Fuse Alarm	Fuse break alarm	0: OFF 1: ON	-	-	Bit 0
			Over Curr Alarm	Overcurrent alarm ^{※4}	0: OFF 1: ON	-	-	Bit 1
			Over Volt Alarm	Overvoltage alarm ^{※4}	0: OFF 1: ON	-	-	Bit 2
			Heat Sink Alarm	Heatsink overheat alarm	0: OFF 1: ON	-	-	Bit 3
			SCR Alarm	SCR error alarm ^{※4}	0: OFF 1: ON	-	-	Bit 4
			Heater Break Alarm	Heater break alarm ^{※4}	0: OFF 1: ON	-	-	Bit 5
			Load Unbalance Alarm	Load unbalance alarm ^{※4}	0: OFF 1: ON	-	-	Bit 6
			Frequency Error Alarm	Frequency error alarm	0: OFF 1: ON	-	-	Bit 7

※1. Parameter setting range is indicated in the hexadecimal value of ASCII codes..

※2. 301012 (03F3) address data organization

Bit F	Bit E	Bit D	Bit C	Bit B	Bit A	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
-	-	-	-	-	-	-	RESET input	AUTO input	RUN input	A indicator	V indicator	OUT indicator	ALM indicator	MAN indicator	RUN indicator
0	0	0	0	0	0	0	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1
1Byte								1Byte							

※3. 301013 (03F4) address data organization

Bit F	Bit E	Bit D	Bit C	Bit B	Bit A	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
-	-	-	-	-	-	-	-	Frequ ency error	Partial heater break	Heater break	SCR error	Heatsink overheat	Over-vo ltage	Over-cu rrent	Fuse break
0	0	0	0	0	0	0	0	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1	0 / 1
1Byte								1Byte							

※4. It can be measured only in the feedback control model.

2.4 Read holding registers(Func 03) / Preset single register(Func 06) / Preset multiple registers(Func 16)

2.4.1 Parameter 1 group

No(Address)	Func	R/W	Parameter	Description	Setting Range	Unit	Factory Default	Note
400001 (0000)	03/06/16	R/W	S-T	SOFT START time	0 to 100: 0 to 100	sec	3	
400002 (0001)	03/06/16	R/W	U-T	SOFT UP time	0 to 100: 0 to 100	sec	3	
400003 (0002)	03/06/16	R/W	D-T	SOFT DOWN time	0 to 100: 0 to 100	sec	3	
400004 (0003)	03/06/16	R/W	L-L	Output low-limit value	0 to 100: 0 to 100	%	0	
400005 (0004)	03/06/16	R/W	H-L	Output high-limit value	0 to 100: 0 to 100	%	100	
400006 (0005)	03/06/16	R/W	SLP	Output slope	0 to 100: 0 to 100	%	100	
400007 to 400050	03/06/16	R/W	Reserved					

2.4.2 Parameter 2 group

No(Address)	Func	R/W	Parameter	Description	Setting Range	Unit	Factory Default	Note
400051 (0032)	03/06/16	R/W	INT	Control input channel setting	0: 420 (4~20mA in use) 1: 1-5 (1~5V in use) 2: 512 (5~12V use) 3: ONF (contact in use) 4: COM (Comm. In use)	-	0	
400052 (0033)	03/06/16	R/W	C-M	Control method setting	0: PA (phase control) 1: V-F (voltage feedback control) 2: C-F (control feedback control) 3: W-F (power feedback control) 4: F-C (fixed cycle control) 5: V-C (variable cycle control) 6: ONF (ON/OFF control)	-	0	SPR1 (single-phase)
400053 (0034)	03/06/16	R/W	MAN	Output limit adjuster (inside/outside)	0: I_R (external volume 10 k Ω) 1: E_R (output control volume OUT ADJ) 2: E_I (external volume 10 k Ω +output control volume OUT ADJ)	-	0	
400054 (0035)	03/06/16	R/W	INB	Input correction	-99 to 99: -99 to 99	%	0.0	
400055 (0036)	03/06/16	R/W	SPN	Input slope correction	-99 to 99: -99 to 99	%	0.0	
400056 (0037)	03/06/16	R/W	DIS	Front display	0: IN (Control input value display / 0 to 100)	-	0	SPR1 (single-phase)

No(Address)	Func	R/W	Parameter	Description	Setting Range	Unit	Factory Default	Note
					1: L-V (Load voltage value / 0 to rated voltage range) 2: L-A (Load current value / 0 to rated current range) 3: L-W (Load power value / 0 to rated power range)			
					0: IN (Control input value display / 0 to 100) 1: U-V (U-V line load voltage value / 0 to rated voltage range) 2: V-W (V-W line load voltage value / 0 to rated voltage range) 3: W-U (W-U line load voltage value / 0 to rated voltage range) 4: U-A (U-phase load current value / 0 to rated current range) 5: V-A (V-phase load current value / 0 to rated current range) 6: W-A (W-phase load current value / 0 to rated current range) 7: L-W (Load power value / 0 to rated power range)	-	0	SPR3 (3-phase)
400057 (0038)	03/06/16	R/W	OCV	Overcurrent alarm value	0 to 120: 0 to 120	%	120	
400058 (0039)	03/06/16	R/W	OCT	Overcurrent alarm delay time	0 to 100: 0 to 100	sec	5	
400059 (003A)	03/06/16	R/W	OVV	Overvoltage alarm value	0 to 120: 0 to 120	%	120	
400060 (003B)	03/06/16	R/W	OVT	Overvoltage alarm delay time	0 to 100: 0 to 100	sec	5	
400061 (003C)	03/06/16	R/W	F-L	Full load auto recognition	0: OFF 1: ON	-	0	
400062 (003D)	03/06/16	R/W	HBV	Heater break alarm value	OFF, 10 to 100 : OFF, 10 to 100	%	10	
400063 (003E)	03/06/16	R/W	ADR	Communication address	1 to 99 : 01 to 99	-	01	
400064 (003F)	03/06/16	R/W	BPS	Communication speed	0: 24 (2400bps) 1: 48 (4800bps) 2: 96 (9600bps) 3: 192 (19200bps) 4: 384 (38400bps)	-	2	
400065 (0040)	03/06/16	R/W	PRT	Communication parity bit	0: NON (NONE) 1: EVE (EVEN) 2: ODD (ODD)	-	0	
400066 (0041)	03/06/16	R/W	STP	Communication stop bit	1 / 2	-	2	
400067 (0042)	03/06/16	R/W	RW.T	Communication response waiting time	5 to 99: 5 to 99	ms	20	
400068 (0043)	03/06/16	R/W	CMW	Communication write	0: EN.A (ENABLE) 1: DS.A (DISABLE)	-	0	
400069 (0044)	03/06/16	R/W	LOC	Lock	0: OFF (No parameter lock) 1: LC1 (Parameter group 1 locked) 2: LC2 (Parameter group 2 locked)	-	0	
400070 (0045)	03/06/16	R/W	INI	Parameter reset	0: OFF 1: ON	-	1	

No(Address)	Func	R/W	Parameter	Description	Setting Range	Unit	Factory Default	Note
400071 (0046)	03/06/16	R/W	DFS	[SPR1] Partial heater break scan	0: OFF 1: ON	-	0	
			UL	[SPR3] Load unbalance alarm value	0 to 50: 0 to 50	A	0	
400072 (0047)	03/06/16	R/W	DFN	[SPR1] Number of partial heater break loads	0 to 4: 0 to 4	-	0	
			ULO	[SPR3] Output when load unbalance alarm occurs	0: OFF 1: ON	-	1	
400073 (0048)	03/06/16	R/W	FRQ	Frequency error alarm disable / enable	0: OFF 1: ON	-	1	
400074 to 400100	03/06/16	R/W	Reserved					

2.4.3 Communication control input

No(Address)	Func	R/W	Parameter	Description	Setting Range	Unit	Factory Default	Note
400101 (0064)	03/06/16	R/W	Communication Input	Communication control input	0 to 100	%	0	Initialized when resupplying power

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