Autonics
Sensors & Controllers

Standard type temperature controller

TK Series

USER MANUAL

For COMMUNICATION

TK Series

Thank you very much for selecting Autonics products.

For your safety, please read the following before using.

Preface

Thank you for purchasing an Autonics product.

Please store this manual in a place where user can find easily, because it contains the guidance for the product and how to correctly use it.

User Manual Guide

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

- 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.
- A user manual is not provided as part of the product package.
  Please visit 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, therefore, the contents of this manual is subject to change without prior notice.

Communication Protocol

TK Series is accepted to Modbus RTU Protocol.

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

Table of Contents

1 Modbus RTU Protocol

1.1 Read Coil Status(Func01–01H)

Read the output of ON/OFF(OX reference, Coil) status in Slave device.

1) Query(Master Side)

Slave Address	Function	Starting Address		No. of Points		Error Check(CRC16)	
		High	Low	High	Low	Low	High
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte

CRC16

2) Response(Slave Side)

Slave Address	Function	Byte Count	Data	Data	Data	Error Check(CRC16)	
						Low	High
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte

CRC16

If read the output status of 10EA within Coil 000001(0000 H)~000010(0009 H) on the Slave side(Address 17) from the Master side.

- Query(Master Side)

Slave Address	Function	Starting Address		No. of Points		Error Check(CRC16)	
		High	Low	High	Low	Low	High
11 H	02 H	00 H	00 H	00 H	0A H	## H	## H

If the values of Coil 000008(0007 H)~000001(0000 H) on Slave side are “ON-ON-OFF-OFF-ON-ON-OFF-ON” and the values of Coil 000010(0009 H)~000009(0008 H) are “OFF-ON”.

- Response(Slave Side)

Slave Address	Function	Byte Count	Data (000008~000001)	Data (000010~000009)	Error Check(CRC16)	
					Low	High
11 H	01 H	02 H	CD H	01 H	## H	## H

1.2 Read Input Status(Func02–02H)

Read the input(1X reference) ON/OFF Status in Slave device.

(1) Query(Master Side)

Slave Address	Function	Starting Address		No. of Points.		Error Check(CRC16)	
		High	Low	High	Low	Low	High
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte

CRC16

(2) Response(Slave Side)

Slave Address	Function	Byte Count	Data	Data	Data	Error Check(CRC16)	
						Low	High
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte

CRC16

If read the input status of 10EA(ON: 1, OFF:0) within 100001(0000 H) ~ 100010(0009 H) on Slave side(Address 17) from the Master side.

- Query(Master Side)

Slave Address	Function	Starting Address		No. of Points		Error Check(CRC16)	
		High	Low	High	Low	Low	High
11 H	02 H	00 H	00 H	00 H	0A H	## H	## H

If the values of 100008(0007 H)~100001(0000 H) on the Slave side are “ON-ON-OFF-OFF-ON-ON-OFF-ON” and the values of 100010(0009 H)~100009(0008 H) are “OFF-ON”.

- Response(Slave Side)

Slave Address	Function	Byte Count	Data (000008~000001)	Data (000010~000009)	Error Check(CRC16)	
					Low	High
11 H	02 H	02 H	CD H	01 H	## H	## H

1.3 Read Holding Registers(Func03–03H)

Read the Binary data of Holding Registers(4X reference) in Slave device.

(1) Query(Master Side)

Slave Address	Function	Starting Address		No. of Points		Error Check(CRC16)	
		High	Low	High	Low	Low	High
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte

CRC16

(2) Response(Slave Side)

Slave Address	Function	Byte Count	Data		Data		Data		Error Check(CRC16)	
			High	Low	High	Low	High	Low	Low	High
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte

CRC16

If read the value of 2EA within Holding Register 400001(0000 H)~400002(0001 H) on Slave side(Address 17) from the Master side.

- Query(Master Side)

Slave Address	Function	Starting Address		No. of Points		Error Check(CRC16)	
		High	Low	High	Low	Low	High
11 H	03 H	00 H	00 H	00 H	02 H	## H	## H

If the values of 40001(0000 H) and 40002(0001 H) on Slave side are respectively “555(22B H)” and “100(64 H)”.

- Response(Slave Side)

Slave Address	Function	Byte Count	Data		Data		Error Check(CRC16)	
			High	Low	High	Low	Low	High
11 H	03 H	04 H	02 H	2B H	00 H	64 H	## H	## H

1.4 Read Input Registers(Func04–04H)

Read the Binary data of Input Registers(3X reference) in Slave device.

(1) Query(Master Side)

Slave Address	Function	Starting Address		No. of Points		Error Check(CRC16)	
		High	Low	High	Low	Low	High
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte
← CRC16 →							

(2) Response(Slave Side)

Slave Address	Function	Byte Count	Data	Data	Data	Error Check(CRC16)	
						Low	High
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte
← CRC16 →							

If read the value of 2EA within Input Register 300001(0000 H)~300002(0001 H) on Slave side from the Master side.

- Query(Master Side)

Slave Address	Function	Starting Address		No. of Points		Error Check(CRC16)	
		High	Low	High	Low	Low	High
11 H	04 H	00 H	00 H	00 H	02 H	## H	## H

If the values of 300001(0000 H) and 300002(0001 H) are respectively “10(A H)” and “20(14 H)”.

- Response(Slave Side)

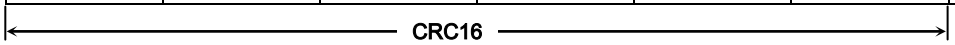
Slave Address	Function	Byte Count	Data		Data		Error Check(CRC16)	
			High	Low	High	Low	Low	High
11 H	04 H	04 H	00 H	0A H	00 H	14 H	## H	## H

1.5 Preset Single Registers(Func06–06H)

Preset the Binary data of single Holding Registers(4X reference) in Slave device.

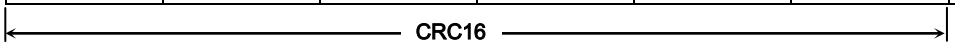
(1) Query(Master Side)

Slave Address	Function	Register Address		Preset Data		Error Check(CRC16)	
		High	Low	High	Low	Low	High
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte



(2) Response(Slave Side)

Slave Address	Function	Register Address		Preset Data		Error Check(CRC16)	
		High	Low	High	Low	Low	High
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte



If write “10(A H)” to Holding Register 400001(0000 H) on Slave side(Address 17) from the Master side.

- Query(Master Side)

Slave Address	Function	Starting Address		Preset Data		Error Check(CRC16)	
		High	Low	High	Low	Low	High
11 H	06 H	00 H	00 H	00 H	0A H	## H	## H

- Response(Slave Side)

Slave Address	Function	Starting Address		Preset Data		Error Check(CRC16)	
		High	Low	High	Low	Low	High
11 H	06 H	00 H	00 H	00 H	0A H	## H	## H

1.6 Preset Multiple Registers(Func16–10H)

Write consecutively the Binary data of Holding Registers(4X reference) in Slave device.

(1) Query(Master Side)

Slave Address	Function	Starting Address		No. of Register		Byte Count	Data		Data		Error Check (CRC16)	
		High	Low	High	Low		High	Low	High	Low	Low	High
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte

CRC16

(2) Response(Slave Side)

Slave Address	Function	Starting Address		No. of Register		Error Check(CRC16)	
		High	Low	High	Low	Low	High
1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte	1Byte

CRC16

If write “10(A H)” to both 400001(0000 H) and 400002(0001 H) of Holding Register on Slave side(Address 17) from the Master side.

- Query(Master Side)

Slave Address	Function	Starting Address		No. of Register		Byte Count	Data		Data		Error Check (CRC16)	
		High	Low	High	Low		High	Low	High	Low	Low	High
11 H	10 H	00 H	00 H	00 H	02 H	04 H	00 H	0A H	00 H	0A H	## H	## H

- Response(Slave Side)

Slave Address	Function	Starting Address		No. of Register		Error Check(CRC16)	
		High	Low	High	Low	Low	High
11 H	10 H	00 H	00 H	00 H	02 H	## H	## H

Please use the Single Register Write function rather than Multi Register Write function if you use the slave(device) connecting with external devices such as PLC, Graphic Panel, except in the case of download that presets minimum/maximum or basic value of the parameter by input type in PC loader program.

1.7 Exception Response-Error Code

If occurs an error, send a response command and transmit each Exception code after set(1) the highest-level bit of received command(function).

Slave Address	Function(Command)+80 H	Exception Code	Error Check(CRC16)	
			Low	High
1Byte	1Byte	1Byte	1Byte	1Byte

CRC16

- ILLEGAL FUNCTION(Exception Code: 01 H): A command(Function order) that is not supported
- ILLEGAL DATA ADDRESS(Exception Code: 02 H): Starting Address of the queried data is inconsistent with transmittable address from the device
- ILLRGAL DATA VALUE(Exception Code: 03 H): Numbers of queried data are inconsistent with the numbers of transferable data from device
- SLAVE DEVICE FAILURE(Exception Code: 04 H): Not properly complete the queried orders

If read the output status of non-existing coil 001001(03E8 H) [ON: 1, OFF: 0)] on Slave side(Address 17) from the Master side.

- Query (Master Side)

Slave Address	Function	Starting Address		No. of Points		Error Check(CRC16)	
		High	Low	High	Low	Low	High
11 H	01 H	03 H	E8 H	00 H	01 H	## H	## H

- Response (Slave Side)

Slave Address	Function(Command)+80 H	Exception Code	Error Check(CRC16)	
			Low	High
11 H	81 H	02 H	## H	## H

2 Modbus Mapping Table

2.1 Read Coils(Func01) / Write Single Coil (Func05)

No(Address)	Classification	Description	Setting Range	Unit	Factory Default
000001(0000)	RUN/STOP	Control Output Run/Stop	0: rUn 1: StoP	-	rUn
000002(0001)	Auto-Tuning Run	Auto-Tuning Run/Stop	0: oFF 0: on	-	oFF
000003~000050	Reserved				

2.2 Read Discrete Inputs(Func02)

No(Address)	Classification	Description	Setting Range	Unit	Factory Default
100001(0000)	℃ Indicator	Unit Indicator	0: OFF 1: ON	-	-
100002(0001)	℉ Indicator	Unit Indicator	0: OFF 1: ON	-	-
100003(0002)	% Indicator	Unit Indicator	0: OFF 1: ON	-	-
100004(0003)	OUT1 Indicator	Control Output1 Indicator	0: OFF 1: ON	-	-
100005(0004)	OUT2 Indicator	Control Output2 Indicator	0: OFF 1: ON	-	-
100006(0005)	AT Indicator	Auto Tune Running Indicator	0: OFF 1: ON	-	-
100007(0006)	SV1 Indicator	Multi SV1 Selecting Indicator	0: OFF 1: ON	-	-
100008(0007)	SV2 Indicator	Multi SV2 Selecting Indicator	0: OFF 1: ON	-	-
100009(0008)	SV3 Indicator	Multi SV3 Selecting Indicator	0: OFF 1: ON	-	-
100010(0009)	AL1 Indicator	Alarm Output1 Indicator	0: OFF 1: ON	-	-
100011(000A)	AL2 Indicator	Alarm Output2 Indicator	0: OFF 1: ON	-	-
100012(000B)	MAN Indicator	Manual Control Indicator	0: OFF 1: ON	-	-
100013(000C)	DI-1 input	DI-1 Input Status	0: OFF 1: ON	-	-
100014(000D)	DI-2 input	DI-2 Input Status	0: OFF 1: ON	-	-
100015~100050	Reserved				

2.3 Read Input Registers(Func04)

No(Address)	Classification		Setting Range	Unit	Factory Default	Note
300001~300100	Reserved					
300101(0064)	-	Product Serial No. H	-	-		
300102(0065)	-	Product Serial No. L	-	-		
300103(0066)	-	Hardware Version	-	-		
300104(0067)	-	Software Version	-	-		
300105(0068)	-	Model Name 1	-	-	“TK”	“Product Name”
300106(0069)	-	Model Name 2	-	-	“4”	“4-row indicator”
300107(006A)	-	Model Name 3	-	-	“14”	“Option Output” “Power Type”
300108(006B)	-	Model Name 4	-	-	“RR”	“OUT1 Output” “OUT2 Output”
300109(006C)	-	Model Name 5	-	-	“ “	
300110(006D)	-	Model Name 6	-	-	“ “	
300111(006E)	-	Model Name 7	-	-	“ “	
300112(006F)	-	Model Name 8	-	-	“ “	
300113(0070)	-	Model Name 9	-	-	“ “	
300114(0071)	-	Model Name 10	-	-	“ “	
300115(0072)	-	Reseved	-	-	-	
300116(0073)	-	Reseved	-	-	-	
300117(0074)	-	Reseved	-	-	-	
300118(0075)	-	Coil status Start Address	-	-	0000	
300119(0076)	-	Coil status Quantity	-	-	0	
300120(0077)	-	Input status Start Address	-	-	0000	
300121(0078)	-	Input status Quantity	-	-	0	
300122(0079)	-	Holding Register Start Address	-	-	0000	
300123(007A)	-	Holding Register Quantity	-	-	0	
300124(007B)	-	Input Register Start Address	-	-	0000	
300125(007C)	-	Input Register Quantity	-	-	0	
300127~300200	-	Reserved				
301001(03E8)	PV	Present Value	-1999 ~ 9999	℃/℉/-	-	
301002(03E9)	-	Decimal point location	0: 0 1: 0.0 2: 0.0.0 3: 0.0.0.0	-	-	

No(Address)	Classification		Setting Range	Unit	Factory Default	Note
301003(03EA)	-	Indicator Unit	0: °C 1: °F 2: °Ro 3: oFF	-	-	
301004(03EB)	SV	SV Setting Value	Range from L-SV ~ H-SV	°C/°F/-	0000	
301005(03EC)	H-MV	Heating Side MV	0~1000: H 0.0~H 100	%	-	
301006(03ED)	C-MV	Cooling Side MV	0~1000: C 0.0 ~ C 100	%	-	
301007(03EE)	°C Indicator	Unit Indicator	0: OFF 1: ON	-	-	Bit 0
	°F Indicator	Unit Indicator	0: OFF 1: ON	-	-	Bit 1
	% Indicator	Unit Indicator	0: OFF 1: ON	-	-	Bit 2
	OUT1 Indicator	Control Output 1 Indicator	0: OFF 1: ON	-	-	Bit 3
	OUT2 Indicator	Control Output 2 Indicator	0: OFF 1: ON	-	-	Bit 4
	AT Indicator	Auto-tuning Running Indicator	0: OFF 1: ON	-	-	Bit 5
	SV1 Indicator	Multi SV1 Selecting Indicator	0: OFF 1: ON	-	-	Bit 6
	SV2 Indicator	Multi SV2 Selecting Indicator	0: OFF 1: ON	-	-	Bit 7
	SV3 Indicator	Multi SV3 Selecting Indicator	0: OFF 1: ON	-	-	Bit 8
	AL1 Indicator	Alarm Output 1 Indicator	0: OFF 1: ON	-	-	Bit 9
	AL2 Indicator	Alarm Output 2 Indicator	0: OFF 1: ON	-	-	Bit A
	MAN Indicator	Manual Control Indicator	0: OFF 1: ON	-	-	Bit B
	DI-I Input	DI-1 Input Status	0: OFF 1: ON	-	-	Bit C
	DI-2 Input	DI-2 Input Status	0: OFF 1: ON	-	-	Bit D
301008(03EF)	-	Heater Current Value Monitoring	0.0 ~ 50.0	-	-	

- Consists of the 31007(03EE) Address bit data.

Bit F	Bit E	Bit D	Bit C	Bit B	Bit A	Bit 9	Bit 8
-	-	DI-2 Input	DI-1 Input	MAN Ind.	AL2 Ind.	AL1 Ind.	SV4 Ind.
0	0	0 or 1	0 or 1	0 or 1	0 or 1	0 or 1	0 or 1
1 Byte							

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
SV3 Ind.	SV2 Ind.	AT Ind.	OUT2 Ind.	OUT1 Ind.	% Ind.	°F Ind.	°C Ind.
0 or 1	0 or 1	0 or 1	0 or 1	0 or 1	0 or 1	0 or 1	0 or 1
1 Byte							

2.4 Read Holding Register(Func03) / Write Single Register(Func06) / Write Multiple Registers(Func16).

2.4.1 Parameter 0 Setting Group[Func: 03/06/16, RW: R/W]

- MV Monitoring/Manual Control Setting Group

No(Address)	Parameter	Description	Setting Range	Unit	Factory Default
400001(0000)	SV	SV Set Value	Range: L-SV~H-SV	℃/℉/-	0
400002(0001)	H-oV	Heating MV	0~1000 : H 0.0~H 100	%	-
400003(0002)	C-oV	Cooling MV	0~1000 : C 0.0~C 100	%	-
400004(0003)	-	Auto/Manual Control	0: AUto 1: oAn	-	AUto
400005~400050	Reserved				

2.4.2 Parameter 1 Setting Group [Func: 03/06/16, RW: R/W]

No(Address)	Parameter	Description	Setting Range	Unit	Factory Default
400051(0032)	r-S	Control Output Run/Stop	0: rUn 1: StoP	-	rUn
400052(0033)	SV-n	Multi SV No. Selection	0: SV-0 1: SV-1 2: SV-2 3 : SV-3	-	SV-0
400053(0034)	Ct-A	Heater Current Value Monitoring	0~500: 00.0~50.0 (Indicator Range)	A	-
400054(0035)	AL 1L	Alarm Output1 Low -limit Set Value	Deviation Alarm : -F.S ~ F.S Absolute Value Alarm: Within the indicator range	℃/℉/-	1550
400055(0036)	AL 1H	Alarm Output 1 High-limit Set Value			1550
400056(0037)	AL2L	Alarm Output2 Low -limit Setting Value			1550
400057(0038)	AL2H	Alarm Output 2 High-limit Set Value			1550
400058(0039)	SV-0	SV-0 Set Value	Range from L-SV~H- SV	℃/℉/-	0000
400059(003A)	SV- 1	SV-1 Set Value	Range from L-SV~H- SV	℃/℉/-	0000
400060(003B)	SV-2	SV-2 Set Value	Range from L-SV~H- SV	℃/℉/-	0000
400061(003C)	SV-3	SV-3 Set Value	Range from L-SV~H-SV	℃/℉/-	0000
400062~400100	Reserved				

2.4.3 Parameter 2 Setting Group [Func: 03/06/16, RW: R/W]

No(Address)	Parameter	Description	Setting Range	Unit	Factory Default
400101(0064)	AT	Auto Tune Run/Stop	0: OFF 1: ON	-	OFF
400102(0065)	H-P	Heating Proportional Band	1~9999: 000.1~999.9	°C/°F/%	010.0
400103(0066)	C-P	Cooling Proportional Band			
400104(0067)	H-I	Heating Integral Time	0~9999: 0000~9999	Sec.	0000
400105(0068)	C-I	Cooling Integral Time			
400106(0069)	H-D	Heating Derivative Time	0~9999: 0000~9999	Sec.	0000
400107(006A)	C-D	Cooling Derivative Time			
400108(006B)	db	Dysfunction Band : It may occur in the course of processing Heating-Cooling Control	- Proportional Band ~ 0.0 ~ +Proportional Band (Based on smaller proportional band value) <ON/OFF – ON/OFF Control> -999~0999 (H) -199.9 ~ 999.9 (L)	Digit	0000
			-99.9~099.9 (Analog)	%F.S	000.0
400109(006C)	rEST	Manual Reset, in the Proportional Control Mode	0~1000: 000.0 ~ 100.0	%	050.0
400110(006D)	H.HYS	Heating Hysteresis	1~100: 001~100 (Temperature H, Analog) 1~1000: 000.1~100.0 (Temperature L)	Digit	002
400111(006E)	H.oSt	Heating OFF offset	0~100: 000~100 (Temperature H, Analog) 0~1000: 000.0~100.0 (Temperature L)	Digit	000
400112(006F)	C.HYS	Cooling Hysteresis	1~100: 001~100 (Temperature H, Analog) 1~1000: 000.1~100.0 (Temperature L)	Digit	002
400113(0070)	C.oSt	Cooling OFF offset	0~100: 000~100 (Temperature H, Analog) 0~1000: 000.0~100.0 (Temperature L)	Digit	000
400114(0071)	L-ou	MV Low-limit Set Value	000.0~H-ou -0.1 (Heating or Cooling Control) -100.0 ~ 000.0 (Heating & Cooling Control)	%	000.0 -100.0
400115(0072)	H-ou	MV High-limit Set Value	L-ou+0.1~100.0 (Heating or Cooling Control) 000.0~100.0 (Heating & Cooling Control)	%	100.0 100.0
400116(0073)	rAnU	Ramp Up-Change Rate	0~999: 000~999 (Temperature H, Analog) 0~9999: 000.0~999.9 (Temperature L)	Digit	000
400117(0074)	rAnd	Ramp Down-Change Rate	0~999: 000~999 (Temperature H, Analog) 0~9999: 000.0~999.9 (Temperature L)	Digit	0000
400118(0075)	r.Unt	Ramp Time Unit	0: SEC 1: Min 2: HOUr	-	Min
400119~400150	Reserved				

2.4.4 Parameter 3 Setting Group [Func: 03/06/16, RW: R/W]

No(Address)	Parameter	Description	Setting Range		Unit	Factory Default
400151(0096)	In-t	Input Type	See the turn of input specifications		-	tC.1
400152(0097)	Unit	Sensor Temperature Unit	0: °C 1: °F		-	°C
400153(0098)	L-rG	Analog Low-limit Input Value	Minimum Range~H-rG - F.S10%		Digit	000.0
400154(0099)	H-rG	Analog High-limit Input Value	L-rG+F.S10%~Maximum Range		Digit	100.0
400155(009A)	dot	Scale Value Decimal Point	0: 0 1: 0.0 2: 0.00 3: 0.000		-	0.0
400156(009B)	L-SC	Low Scaling	F.S		-	000.0
400157(009C)	H-SC	High Scaling	F.S		-	100.0
400158(009D)	dUnt	Display Unit	0: °C 1: °F 2: °Fo 3: oFF		-	°C
400159(009E)	In-b	Input Bias	-999~999: -999~0999 -1999~9999: -199.9~999.9		Digit	0000
400160(009F)	AvG.F	Moving Average Filter	1~1200: 000.1~120.0		Sec.	000.1
400161(00A0)	L-Su	SV Low-limit Set Value	Input Low-limit Value(L-SC)~H-Su-1Digit		°C/°F %F.S	-200 000.0
400162(00A1)	H-Su	SV High-limit Set Value	L-Su+1Digit ~ Input High-limit Value(H-SC)		°C/°F %F.S	1350 100.0
400163(00A2)	o-Ft	Control Output Operation Mode	Standard Type	0: HEAt 1: CooL	-	HEAt
			Heating & Cooling Type	0: HEAt 1: CooL 2: H-C	-	H-C
400164(00A3)	C-Ad	Temperature Control Type	Standard Control Mode	0: PId 1: onoF	-	PId
			Heating &Cooling Control Mode	0: P.P 1: Pon. 2: onP 3: onon	-	P.P
400165(00A4)	AtE	Auto-tuning Mode	0: tUn1 1: tUn2		-	tUn1
400166(00A5)	oUt1	OUT1 Control Output Type	0: SSr 1: CUrr		-	SSr
400167(00A6)	o1Sr	OUT1 SSR Output Type	0: Stnd 1: CYCL 2: PHAS		-	Stnd
400168(00A7)	o1.AA	OUT1 Current Output Range	0: 4-20 1: 0-20		-	4-20
400169(00A8)	oUt2	OUT2 Control Output Type	0: SSr 1: CUrr		-	SSr
400170(00A9)	o2.AA	OUT2 Current Output Range	0: 4-20 1: 0-20		-	4-20
400171(00AA)	H-t	Heating Control Time	1~1200: 000.1~20.0		Sec.	020.0
400172(00AB)	C-t	Cooling Control Time	1~1200: 000.1~120.0		Sec.	020.0
400173~400200	Reserved					

2.4.5 Parameter 4 Setting Group [Func: 03/06/16, RW: R/W]

No(Address)	Parameter	Description	Setting Range	Unit	Factory Default
400201(00C8)	AL-1	Alarm Output1 Operation Mode	0: oFF 1: duCC 2:]]du 3:]duC 4: [du] 5: PuCC 6:]]Pu 7: LbA 8: SbA 9: HbA	-	duCC
400202(00C9)	AL 1t	Alarm Output1 Option/Type	0: AL-A 1: AL-b 2: AL-C 3: AL-d 4: AL-E 5: AL-F	-	AL-A
400203(00CA)	A 1HY	Alarm Output1 Hysteresis	1~100: 001~100 (Tem. H, Analog) 1~1000: 000.1~100.0 (Tem. L)	Digit	001
400204(00CB)	A 1n	Alarm Output1 NO/NC	0: no 1: nC	-	no
400205(00CC)	A 1on	Alarm Output1 ON Delay Time	0~3600: 0000 ~ 3600	Sec.	0000
400206(00CD)	A 1oF	Alarm Output1 OFF Delay Time	0~3600: 0000 ~ 3600	Sec.	0000
400207(00CE)	AL-2	Alarm Output2 Operation Mode	0: oFF 1: duCC 2:]]du 3:]duC 4: [du] 5: PuCC 6:]]Pu 7: LbA 8: SbA 9: HbA	-	]]du
400208(00CF)	AL2t	Alarm Output 2 Option/Type	0: AL-A 1: AL-b 2: AL-C 3: AL-d 4: AL-E 5: AL-F	-	AL-A
400209(00D0)	A2HY	Alarm Output2 Hysteresis	1~100: 001~100 (Tem. H, Analog) 1~1000: 000.1~100.0 (Tem. L)	Digit	001
400210(00D1)	A2n	Alarm Output 2 NO/NC	0: no 1: nC	-	no
400211(00D2)	A2on	Alarm Output 2 ON Delay Time	0~3600: 0000~3600	Sec.	0000
400212(00D3)	A2oF	Alarm Output 2 OFF Delay Time	0~3600: 0000~3600	Sec.	0000
400213(00D4)	LbAt	LBA Time	0~9999: 0000~9999	Sec.	0000
400214(00D5)	Reserved				
400215(00D6)	LbAb	LBA Band	1~9999: 001~999 (Tem. H) 1~9999: 000.1~999.9 (Tem. L) 1~9999: 0001~9999 (Analog)	°C/°F %F.S	003 003.0 00.20
400216(00D7)	Ao-n	Analog Output Mode	0: Pu 1: Su 2: H-nu 3: C-nu	-	Pu
400217(00D8)	FS-L	PV Transmission OUT low scale	F.S	°C/°F/-	-200
400218(00D9)	FS-H	PV Transmission OUT high scale	F.S	°C/°F/-	1350
400219(00DA)	Adrs	Unit Address	1~99: 01~99	-	01
400220(00DB)	bPS	Bit Per Second	0: 24 1: 48 2: 96 3: 192 4: 384	X100 bps	96
400221(00DC)	PrtY	Parity Bit	0: nonE 1: EuEn 2: odd	-	nonE
400222(00DD)	StP	Stop Bit	0: 1 1: 2	Bit	2
400223(00DE)	rSY.t	Response Waiting Time	5~99: 5~99	Ms	20
400224(00DF)	ConY	Communication Write	0: EnA 1: diSA	-	EnA
400225~400250	Reserved				

2.4.6 Parameter 5 Setting Group [Func: 03/06/16, RW: R/W]

No(Address)	Parameter	Description	Setting Range	Unit	Factory Default
400251(00FA)	nt.Su	Multi SV	0: 1 1: 2 2: 4	EA	1
400252(00FB)	dI -E	Digital Input Key Function	0: StoP 1: AL.rE	-	StoP
400253(00FC)	dI - 1	DI-1 Digital Input	0: oFF 1: StoP 2: AL.rE 3: nAn 4: nt.Su	-	StoP
400254(00FD)	dI -2	DI-2 Digital Input		-	AL.rE
400255(00FE)	I t.nu	Initial Manual MV	0: AUto 1: Pr.nu	-	AUto
400256(00FF)	Pr.nu	Preset Manual MV	000.0 ~ 100.0 (Standard Control) -100.0 ~ 100.0 (Heating & Cooling Control)	%	000.0
400257(0100)	Er.nu	Error MV	000.0 ~ 100.0 (Standard Control) -100.0 ~ 100.0 (Heating & Cooling Control)	%	000.0
400258(0101)	St.nu	Stop MV	000.0 ~ 100.0 (Standard Control) -100.0 ~ 100.0 (Heating & Cooling Control)	%	000.0
400259(0102)	St.AL	Stop Alarm Output	0: Cont 1: oFF	-	Cont
400260(0103)	USEr	User Level	0: Stnd 1: HI GH	-	Stnd
400261(0104)	I nI t	Parameter Initialization	0: no 1: YES	-	no
400262(0105)	LC.Su	SV Setting Group Lock	0: oFF 1: on	-	oFF
400263(0106)	LC.P 1	Parameter 1 Group Lock	0: oFF 1: on	-	oFF
400264(0107)	LC.P2	Parameter 2 Group Lock	0: oFF 1: on	-	oFF
400265(0108)	LC.P3	Parameter 3 Group Lock	0: oFF 1: on	-	oFF
400266(0109)	LC.P4	Parameter 4 Group Lock	0: oFF 1: on	-	oFF
400267(010A)	LC.P5	Parameter 5 Group Lock	0: oFF 1: on	-	oFF
400268(010B)	PYd	Password Setting	0000: OFF 0002~9999: Password Setting Range (※0001:read-only password)	-	0000
400269~400300	Reserved				

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