Module Type Controller SRZ

Temperature Control Module [for Host Communication]

Instruction Manual

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IMS01T01-E2

Thank you for purchasing this RKC product. In order to achieve maximum performance and ensure proper operation of your new instrument, carefully read all the instructions in this manual. Please place this manual in a co nvenient location for easy reference.

This manual describes the mounting, wiri ng and specifications only. For the basic operations, see Z-TIO Host Communicati on Quick Operation Manual (IMS01T02-E

). For the detail handling procedures and various function settings, pl ease refer to separate SRZ Instruction Manual (IMS01T04-E

).

The above manuals can be downloaded from our website: URL: http://www.rkcinst.c om/english/manual_load.htm

■ Product Check

Z-TIO Instruction Manual (this manua	nl)	1
Z-TIO Host Communication Quick Ins	struction Manual (IMS01T02-E	□)1
Joint connector cover (KSRZ-517A)		2
Power terminal cover (KSRZ-518A)		1

■ Safety Precautions

WARNING

- An external protection device must be installed if failure of this instrument could result in damage to the instrument, equipment or injury to personnel.
- All wiring must be completed before power is turned on to prevent electric shock, fire or damage to instrument and equipment
- This instrument must be used in accordance with the specifications to prevent fire or damage to instrument and equipment.
- This instrument is not intended for use in locations subject to flammable or
- Do not touch high-voltage connections such as power supply terminals, etc. to avoid electric shock
- RKC is not responsible if this inst rument is repaired, modified or disassembled by other than factory-approved personnel. Malfunction can occur and warranty is void under these conditions.

CAUTION

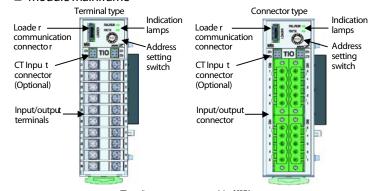
- This product is intended for use with industr ial machines, test and measuring equipment. It is not designed for use with medical equipment and nuclear energy.
- This is a Class A instrument. In a domestic environment, this instrument may cause radio interference, in which case the user may be required to take adequate measures
- This instrument is protect ed from electric shock by reinforced insulation. Provide reinforced insulation between the wire for the input signal and the wires for instrument power supply, source of power and loads.
- Be sure to provide an appropriate surge contro I circuit respectively for the following: If input/output or signal lines within the building are longer than 30 meters.
- If input/output or signal lines leave the building, regardless the length.
- This instrument is designed fo r installation in an enclosed instrumentation panel. All high-voltage connections such as power s upply terminals must be enclosed in the instrumentation panel to avoid elec tric shock by operating personnel.
- All precautions described in this manual should be taken to avoid damage to the
- All wiring must be in accordance with local codes and regulations.
- To prevent instrument damage or failure, prot ect the power line and the input/output lines from high currents with a protection device such as fuse, circuit breaker, etc.
- Prevent metal fragments or lead wire scraps fr om falling inside instrument case to avoid electric shock, fire or malfunction.
- Tighten each terminal screw to the specified torque found in the manual to avoid electric shock, fire or malfunction.
- For proper operation of this instrument, prov ide adequate ventilation for heat dispensation.
- Do not connect wires to unused terminals as the is will interfere with proper operation of the instrument.
- Turn off the power supply before cleaning the instrument.
- Do not use a volatile solvent—such as paint thinner to clean—the instrument. Deformation or discoloration will occur. Use a soft, dry clot h to remove stains from the instrument
- To avoid damage to instrument display, do not rub with an abrasive material or push front panel with a hard object.

- This manual assumes that the reader has a fundamental knowledge of the principles of electricity, process control, co mputer technology and communications.
- The figures, diagrams and numeric values used in this manual are only for purpose of
- RKC is not responsible for any damage or injury that is caused as a re sult of using this instrument, instru ment failure or indirect damage
- RKC is not responsible for any damage and/or in jury resulting from the use of instruments
- Periodic maintenance is required for safe and proper operation of this instrument. Some components have a limited service life, or characteristics that change over time.

- Every effort has been made to ensure accura cy of all informati on contained herein. RKC makes no warranty expressed or implied, with re spect to the accuracy of the information. The information in this manual is s ubject to change wit hout prior notice.
- No portion of this document may be reprinted, modified, copied, tr ansmitted, digitized, stored, processed or retrieved through any mec hanical, electronic, optical or other means without prior written approval from RKC.

1. PARTS DESCRIPTION

■ Module Mainframe Terminal type

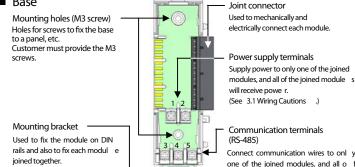


[Indication lamps]

When normal (RUN): A green lamp is on Self-diagnostic error (FAIL): A green lamp flashes Instrument abnormality (FAIL): A red lamp is on

During data send and receive: A green lamp turns on

Base



2. MOUNTING



/!\ | WARNING

the joined modules will communicate.

To prevent electric shock or instrument failure, always turn off the power before mounting or removing the instrument.

2.1 Mounting Cautions

- (1) This instrument is intended to be used under the following envir onmental conditions. (IEC61010-1) [OVERVOLTAGE CATEGORY II, POLLUTION DEGREE 2]
- (2) Use this instrument within t he following environment conditions.
- Allowable ambient temperature: −10 to +50 °C
- Allowable ambient humidity: 5 to 95 % RH
- (Absolute humidity: MAX. W. C 29.3 g/m ³ dry air at 101.3 kPa) • Installation environment conditions: Indoor use

Altitude up to 2000 m

(3) Avoid the following conditions when selecting the mounting location:

- Rapid changes in ambient temperat ure which may c ause condensation.
- Corrosive or inflammable gases.
- Direct vibration or shock to the mainframe.
- Water, oil, chemicals, vapor or steam splashes. Excessive dust, salt or iron particles.
- Excessive induction noise, static elec tricity, magnetic fields or noise.
- Direct air flow from an air conditioner.
- Exposure to direct sunlight.
- Excessive heat accumulation.
- (4) Take the following points into considerati on when mounting this instrument in the panel.
- Ensure at least 50 mm space on top and bo ttom of the instrument for maintenance and
- Do not mount this instrument directly abo ve equipment that gener ates large amount of heat (heaters, transformers, semi-conductor f unctional devices, large-wattage resistors).
- If the ambient temperature rises above 50 °C, cool this instrument with a forced air fan, cooler, or the like. However, do not allow cooled air to blow this instrument directly.

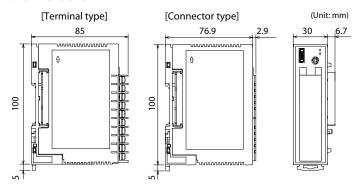
- In order to improve safety and the immunity to withstand noise, mount this instrument as far away as possible from high voltage equipment, power lines, and rotating machinery.
 - High voltage equipment: Do not mount within the same panel. Separate at least 200 mm.
- (5) This instrument is Pe rmanently connected to equipment , please take the following

Separate as far as possible.

- A switch or circuit-breaker shall be included in the building installation.
- It shall be in close proximity to the equipm ent and within easy reach of the operator.
- It shall be marked as the disconnec ting device for the equipment.

2.2 Dimensions

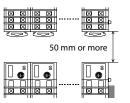
Rotating machinery:



 Space required between each module vertically

When the module is mounted on the panel. allow a minimum of 50 mm at the top and bottom of the module to attach the modul e to the mainframe.

 Depth for connector moun t type module Space for connectors and cables must be considered when installing.

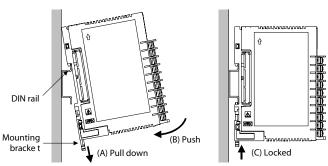


Approx.

2.3 DIN Rail Mounting

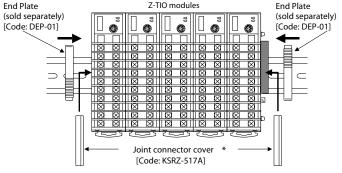
■ Mounting Procedures

- Pull down the mounting bracket at the bottom of the module (A). Attach the hooks on the top of the module to the DIN rail and push the lower section into place on the DIN rail (B).
- Slide the mounting bracket up to secure the module to the DIN rail.



■ Mounting End Plates

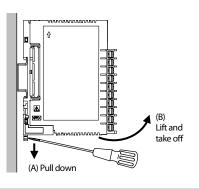
To firmly fix the modules, use end plat es on both sides of the mounted modules.



the connector on both sides of the mounted * It is recommended to use a plastic cover on modules for protection of connectors.

■ Removing Procedures

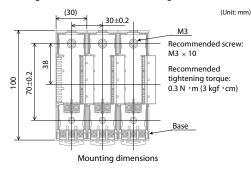
Pull down a mounting bracket with a blade screwdriver (A). Lift the module from bottom, and take it



2.4 Panel Mounting

■ Mounting Procedures

Refer to the mounting dimensions below when selecting the location.



- Remove the base from the module (B) wh ile the lock is pressed (A). (Fig.1)
- Join bases . Then, lock them by pushing in the mounting brackets.

See the 2.5 Joining Each Module

- Fix the base to its mounting position usi ng M3 screws. Customer must provide the
- Mount the module on the base. (Fig.2)

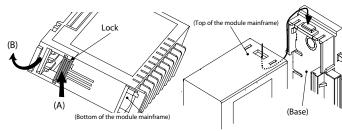


Fig. 1: Removing the base

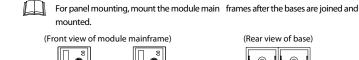
Fig. 2: Mounting the module mainframe

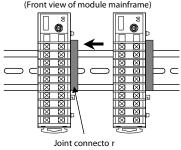
2.5 Joining Each Module

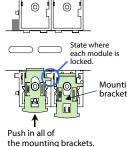
Up to 16 Z-TIO-A/B modules (for host communication) can be joined together. Join these modules according to the following procedure.



- Mount the modules on the DIN rail.
- Slide the modules until the modules are clos ely joined together and the joint connectors
- Push in the mounting brackets to lock the modules together and fix to the DIN rail.

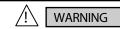






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3. WIRING



To prevent electric shock or instrument failure, do not turn on the power until all the wiring is completed.

3.1 Wiring Cautions

- To avoid noise induction, keep input/output signal wires away from instrument power line, load lines and power lines of other electric equipment.
- If there is electrical noise in the vicinity of the instrument that could affect operation, use a noise filter.
- Shorten the distance between the twisted power supply wire pitches to achieve the most effective noise reduction.
- Always install the noise filter on a grounded panel. Minimize the wiring distance between the noise filter output and the instrument power supply terminals to achieve the most effective noise reduction.
- Do not connect fuses or switches to the noi se filter output wiring as this will reduce the effectiveness of the noise filter.
- About eight seconds are requir ed as preparation time for contact output every time the instrument is turned on. Use a delay relay when the output line is used for an external interlock circuit.
- Power supply wiring must be twisted and have a low voltage drop.
- For an instrument with 24 V power supply, supply power from a SELV circuit.
 A suitable power supply shoul d be considered in the end-use equipment. The power supply must be in compliance with a limited-e nergy circuits (maximum available current
- Supply the power to only one of the joined modules. When power is supplied to any one of the joined modules, all of the joined modules will receive power.
- Select the power capacity which is appropria te for the total power consumption of all joined modules and the initial current surge when the power is turned on. Power consumption (at maximum load): 140 mA max. (at 24 V DC) [4-channel type]

80 mA max. (at 24 V DC) [2-channel type] Rush current 10 A or less

• For the terminal type module, the powe r supply terminals and the communication terminals, use the specified so Iderless terminals. Only these specified solderless terminals can be used due to the insulation between the terminals.

Screw size: M3 \times 7 (with 5.8 \times 5.8 square washer) Recommended tightening torque: $0.4 \, \text{N}$ ·m $(4 \, \text{kgf} \cdot \text{cm})$ Applicable wire: Solid/twist ed wire of 0.25 to 1.65 mm Specified solderless terminals: Manufactured by J.S.T MFG CO., LTD.

 ϕ 3.2 MIN ϕ 3.2 Circular terminal with isolation V1.25 –MS3

(M3 screw, width 5.5 mm, hole diameter 3.2 mm) For the connector type module, use the following our connector (plug) [sold s Connector type: SRZP-01 (Front-screw type) SRZP-02 (Side-screw type)

M2.5 Screw size:

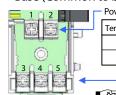
Recommended tightening torque: 0.43 to 0.5 N ·m (4.3 to 5.0 kgf ·cm)

Used cable spec ifications: Lead wire type

Solid (AWG 28 [cross-section: 0.081 mm ²] to 12 [cross-section: 3.309 mm ²]) or Twisted wire (AWG 30 [cross-section: 0.051 mm ²] to 12 [cross-section: 3.309 mm ²]) Stripping length: 9 to 10 mm (SRZP-01), 7 to 8 mm (SRZP-02)

3.2 Terminal Configuration

■ Base (Common to both terminal and connector type)

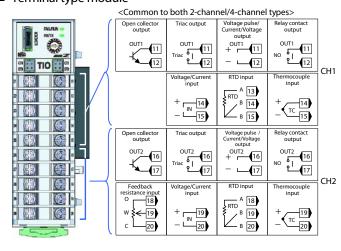


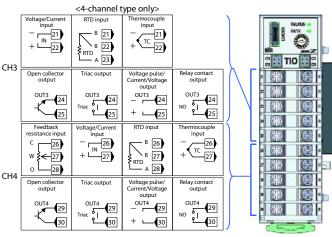
Power supply terminals			
Terminal No.	Description		
1	24 V DC (+)		
2	24 V DC (-)		

— Communication terminals				
Terminal No.	Description			
3	T/R (A)			
4	T/R (B)			
5	SG			

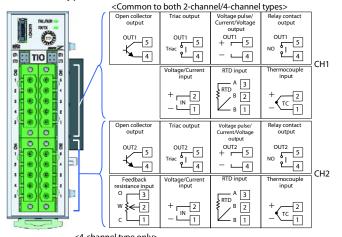


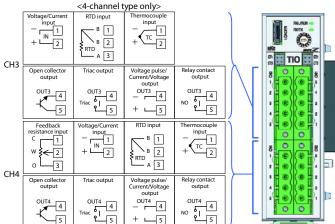
■ Terminal type module





■ Connecter type module





	Triac Triac	4 - 4	NO P 5		
Th	ne output allocation t	able			
	Control type	OUT1	OUT2	OUT3	OUT4
2-channel	PID control	Control output 1 (CH1)	Control output 2 (CH2)	_	_
type	Heat/Cool control	Heat-side output 1 (CH1)	Cool-side output 1 (CH1)		
module	Position proportioning control	Open-side output 1 (CH1)	Close-side output 1 (CH1)	_	_
4-channel	PID control	Control output 1 (CH1)	Control output 2 (CH2)	Control output 3 (CH3)	Control output 4 (CH4)
type	Heat/Cool control	Heat-side output 1 (CH1)	Cool-side output 1 (CH1)	Heat-side output 2 (CH3)	Cool-side output 2 (CH3)
module*	Position proportioning control	Open-side output 1 (CH1)	Close-side output 1 (CH1)	Open-side output 2 (CH3)	Close-side output 2 (CH3)

control

3.3 CT Input Connector (Optional)

Pin No.	Descrip- tion	Sleeve color	FAILPUN —	Pin No.	Descrip- tion	Sleeve color *
1	CT4	T4 Yellow 5 RX/IX	1	CT2	Yellow	
2	(CH4)	Tellow	2 1 3 4	2	(CH2)	Tellow
3	CT3	T3 Blue		CT1	Blue	
4	(CH3)	blue	4 3	4	(CH1)	H1)
			cn in 110 in the			

For the CT input, use the following our CT cable (with socket) and current transformer (CT)

W-BW-03- $\square\square\square\square$ ($\square\square\square\square$: Standard cable length [unit: mm]) -1000: 1m, 2000: 2 m, 3000: 3 m

Current transformer (CT): CTL-6-P-N (0.0 to 30.0 A) or CTL-12-S56-10L-N (0.0 to 100.0 A)

4. SPECIFICATIONS

Measured input

4 points or 2 points (Isolated between each input)

Input type: TC input K, J, T, S, R, E, B, N (JIS-C1602-1995)

PLII (NBS), W5ReW26Re (ASTM-E988-96)

• RTD input Pt100 (JIS-C1604-1997)

JPt100 (JIS-C1604-1989, JIS-C1604-1981 of Pt100)

0 to 10 mV, 0 to 100 mV, 0 to 1 V Voltage (low) input: 0 to 5 V. 0 to 10 V. 1 to 5 V · Voltage (high) input: 0 to 20 mA, 4 to 20 mA • Current input:

100 Ω to 6 k Ω (standard 135 Ω) Feedback resistance input 250 ms Sampling cycle:

Influence of external resistance: Approx. 0.125 $\mu V/\Omega$ (Converted depending on TC types)

Influence of input lead: Approx. 0.02 %/ Ω of PV (RTD input) 10 Ω or less per wire PV bias: -Input span to +Input span

Current transformer (CT) input [optional]

Number of inputs: 4 points or 2 points CTL-6-P-N or CTL-12-S 56-10-N (Sold separately) CT type:

Input range: 0.0 to 30.0 A (CTL-6-P-N)

0.0 to 100.0 A (CTL-12-S 56-10L-N)

Sampling cycle:

Output

Number of outputs: 4 points or 2 points

Output type: • Relay contact output:

Contact type: 1a contact

250 V AC 3 A, 30 V DC 1 A Contact rating (Resistive load)

Flectrical life: 300,000 time s or more (Rated load)

50 million times or more (Switching: 180 times/min) Mechanical life: Voltage pulse output (Not isolat ed between output and power supply):

0/ 12 V DC (Rating) Output voltage:

ON voltage: 11.0 V to 13.0 V OFF voltage: 0.2 V or less

600 Ω or more

Allowable load resistance: Current output (Not isolated between output and power supply) Output current (Rating): 4 to 20 mA DC, 0 to 20 mA DC

Allowable load resistance: 600 Ω or less

 Voltage output (Not isolated etween output and power supply) 0 to 1 V DC, 0 to 5 V DC, 1 to 5 V DC, 0 to 10 V DC Output voltage (Rating):

Allowable load resistance: 1 k Ω or more • Triac output

Output method: AC output (Zero-cross method) Allowable load current 0.5 A (Ambient temperature 40 °C or less) Ambient temperature 50 °C: 0.3 A 75 to 250 V AC

Minimum load current: 30 mA Open collector output Sink type Output method:

Allowable load current 100 mA 30 V DC or less Load voltage: Minimum load current: 0.5 mA

Control

Load voltage:

Brilliant II PID control (Reverse/Direct action) Control type: Brilliant II Heat/Cool PID control (water cooling/air cooling/cooling gain linear)

Position proportioning PID control

Additional function: Au totuning, Startup tuning

Communication

Based on RS-485 EIA standard Interface:

Protocol: RKC communication

(ANSI X3.28-1976 subcategory 2.5, B1) Modbus-RTU

General specifications

Allowable ambient temperature:

24 V DC (Rating) Power supply voltage:

21.6 to 26.4 V DC [Including power supply voltage variation] Power consumption (at maximum load):

140 mA max. (at 24 V DC) [4-channel type] 80 mA max. (at 24 V DC) [2-channel type]

Rush current 10 A or less −10 to +50 °C

Allowable ambient humidity: 5 to 95 % RH

(Absolute humidity: MAX.W.C 29.3 g/m³ dry air at 101.3 kPa) Installation environment conditions: Indoor use

Altitude up to 2000 m

Weight: Terminal type module: Approx. 160 g Connector type module: Approx. 140 g

Standard UL: UL61010-1 Safety standards:

cUL:CAN/CSA-C22.2 No.61010-1 CE marking:

LVD:

OVERVOLTAGE CATEGORYII, POLLUTION DEGREE 2,

Class II (Reinforced insulation

• EMC: C-Tick: AS/NZS CISPR 11 (equivalent to EN55011)

5. MODEL CODE

2-channel type: Z-TIO-B

0-000/00 -0000 /Y 4-channel type: Z-TIO-A

: Code 8 and 9 are for quick start codes to specify software configurable settings. If not specified, these codes will not be printed on labels and all settings will be factory default.

(1) Wiring type T: Terminal type

C: Connector type

(2) Output 1 (OUT1), (3) Output 2 (OUT2), (4) Output 3 (OUT3), (5) Output 4 (OUT4)

M: Relay contact output 6: Voltage output (1 to 5 V DC)

V: Voltage pulse output 7: Curr ent output (0 to 20 mA DC) 3: Voltage output (0 to 1 V DC) 8: Current output (4 to 20 mA DC)

4: Voltage output (0 to 5 V DC) T: Triac output

5: Voltage output (0 to 10 V DC) D: Open collector output

(6) Current transformer (CT) input

N: None

A: CT (4 points) [4-channel type], CT (2 points) [2-channel type]

(7) Ouick start code

N: No quick start code (Conf igured as factory default)

1: Specify quick start code 1

2: Specify quick start code 1 and 2

*For quick start code 2, see SRZ Instruction Manual (IMS01T04-E).

(8) Control Method (all channel common) [Quick start code 1]

No code: No specify quick start code

F: PID action with AT (Reverse action)

D: PID action with AT (Direct action)

G: Heat/cool PID action with AT A: Heat/cool PID action with AT (for Extruder [air cooling])

W: Heat/cool PID action with AT (for Extruder [water cooling])

Z: Position proportioning PID action without FBR

 1 Z-TIO-A type: CH2 and CH4 only accept measured value (PV) monitor and event action. Z-TIO-B type: CH2 only accepts measured value (PV) monitor and event action.

² Z-TIO-A type: Inputs of CH2 and CH4 can be used as FBR input. Z-TIO-B type: Input of CH2 can be used as FBR input.

(9) Measured input and Range (all channel common) [Quick start code 1]

No code: No specify quick start code □□□: See range code table.

(10) Instrument specification

/Y: Version symbol

Range code table

nocouple (TC) input, RTD input)

Type	Code	Range (Input span)	Code	Range (Input span)
	K02	0 to 400 °C	KA1	0 to 800 °F
	K04	0 to 800 °C	KA2	0 to 1600 °F
	K41	−200 to +1372 °C	KA4	0.0 to 800.0 °F
K	K09	0.0 to 400.0 °C	KC7	−328 to +2501 °F
	K10	0.0 to 800.0 °C		
	K35	−200.0 to +400.0 °C		
	K40	−200.0 to +800.0 °C		
	K42	−200.0 to +1372.0 °C		
	J02	0 to 400 °C	JA1	0 to 800 °F
	J04	0 to 800 °C	JA2	0 to 1600 °F
	J15	−200 to +1200 °C	JB6	0.0 to 800.0 °F
J	J08	0.0 to 400.0 °C	JB9	−328 to +2192 °F
	J09	0.0 to 800.0 °C		
	J27	−200.0 to +400.0 °C		
	J32	−200.0 to +800.0 °C		
	J29	−200.0 to +1200.0 °C		
T	T19	−200.0 to +400.0 °C	TC5	−328 to +752 °F
			TC6	0.0 to 752.0 °F
E	E20	−200.0 to +1000.0 °C	EB1	−328 to +1832 °F
			EB2	0.0 to 800.0 °F
S	S06	−50 to +1768 °C	SA7	−58 to +3214 °F
R	R07	-50 to +1768 °C	RA7	−58 to +3214 °F
В	B03	0 to 1800 °C	BB1	32 to 3272 °F
N	N02	0 to 1300 °C	NA6	32 to 2372 °F
PLII	A02	0 to 1390 °C	AA2	0 to 2534 °F
W5Re/W26Re	W03	0 to 2300 °C	WB1	32 to 4208 °F
Pt100	D21	−200.0 to +200.0 °C	DC6	−328.0 to +752.0 °F
	D35	−200.0 to +850.0 °C	DD2	−328 to +1562 °F
JPt100	P30	−200.0 to +640.0 °C	PC6	−328.0 to +752.0 °F
	1		PD2	-328 to +1184 °F

[Voltage input, Current input]

Range (Input s	C ode	Type
	101	0 to 10 mV DC
	201	0 to 100 mV DC
P rogrammable i	301	0 to 1 V DC
-19999 to +19	401	0 to 5 V DC
(Factory set value: 0.0	501	0 to 10 V DC
	601	1 to 5 V DC
	701	0 to 20 mA DC
	801	4 to 20 mA DC

to 100.0)

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