EtherCAT Communication Converter

COM-ML [For SRZ] Communication Data List

IMR02E10-E1

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 the manual in a convenient location for easy reference.

This manual describes the communication data of the COM-ML.

For the installation, the detail handling procedures and various function settings, please read if necessary the following separate manuals.

- COM-ML [For SRZ] Installation Manual (IMR02E09-E□):Enclosed with COM-ML
- COM-ML [For SRZ] Instruction Manual (IMR02E11-E□):Separate (Download or sold separately)

These manuals can be downloaded from our website:
URL: http://www.rkcinst.com/english/manual_load.htm

1. EXPLANATION OF DATA MAP ITEMS

Contents of the Communication data map list are compatible parameters between the SRZ and EtherCAT master or Host computer by using COM-ML.

Name: Name of communication data
Symbols
❑: Data for each SRZ unit
♠: Data for each channel
On a Z-TIO module (2-channel type), the communication data of CH3 and CH4 becomes invalid.
♦: Data for each module
★: Parameters which can be used in multi-memory area function
♣: Parameters only used for Heat/Cool control or position proportioning control, therefore data for CH2 and CH4 of Z-TIO module are unused. [Read is possible (0), but the result of Write is disregarded.]

RKC Identifier: Communication identifier of RKC communication

Modbus register address:
A register address of Modbus and EtherCAT data item specification
HEX: Hexadecimal DEC: Decimal

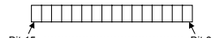
Digits: The number of communication data digits in RKC communication

Attribute: A method of how communication data items are read or written when viewed from the host computer is described
RO: Read only data (Host computer or PLC ← The controller)
R/W: Read and Write data (Host computer or PLC ↔ The controller)

Data range and Number of data:
Read or Write range of communication data
[ ]: Number of data (This is the maximum number per communication data that can be handled by one SRZ unit.)

- ASCII code data (Example: 7 digits)

- 16-bit data



Factory set value: Factory set value of communication data

2. COMMUNICATION DATA MAP

■ Communication data of COM-ML

Name	RKC Identifier	Modbus register address HEX	Modbus register address DEC	Digits	Attribute	Data range and Number of data	Factory set value
Model code ♦ (COM-ML)	ID	—	—	32	RO	Model code (character)	—
Model code ♦ (Function module*)	IE	—	—	32	RO	Model code (character) [100]	—
ROM version ♦ (COM-ML)	VR	—	—	8	RO	ROM version	—
ROM version ♦ (Function module*)	VQ	—	—	8	RO	ROM version [100]	—
Integrated operating time monitor ♦ (COM-ML)	UT	—	—	7	RO	0 to 19999 hours	—
Integrated operating time monitor ♦ (Function module*)	UV	—	—	7	RO	0 to 19999 hours [100]	—
Error code ❑ (COM-ML)	ER	0000	0	7	RO	• RKC communication 1: Adjustment data error 2: Data back-up error [1] 4: A/D conversion error 32: Logic output data error 64: Stack overflow [2] 512: Network module error [2] • Modbus Bit 0: Adjustment data error Bit 1: Data back-up error [1] Bit 2: A/D conversion error Bit 3, Bit 4: Unused Bit 5: Logic output data error Bit 6: Stack overflow [2] Bit 9: Network module error [2] Bit 7, Bit 8 and Bit 10 to 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 615] For the identifier ER, the error condition is shown by the *OR* of each module. When multiple errors occur, the error No. is the sum value. [1] Common item of the COM-ML and function module [2] Item of the COM-ML [COM-ML: 1, Z-TIO and Z-DIO: 100]	—
Error code ♦ (Function module*)	EZ	0001 : 0064	1 : 100	7	RO		—
Backup memory state monitor ♦ (COM-ML)	EM	0065	101	1	RO	0: The content of the backup memory does not coincide with that of the RAM.	—
Backup memory state monitor ♦ (Function module*)	CZ	0066 : 00C9	102 : 201	1	RO	1: The content of the backup memory coincides with that of the RAM. [COM-ML: 1, Z-TIO and Z-DIO: 100]	—
Unused	—	00CA 00CB	202 203	—	—	—	—

* Function module: Z-TIO-A/B module or Z-DIO module

Name	RKC Identifier	Modbus register address HEX	Modbus register address DEC	Digits	Attribute	Data range and Number of data	Factory set value
Network error code ❑	ES	00CC	204	7	RO	0: Normal 1: Network operation not possible [1]	—
Unused	—	00CD : 0131	205 : 305	—	—	—	—
Monitor for the number of connected modules ❑	QK	0132	306	7	RO	0 to 31 [1]	—
RUN/STOP transfer (Each SRZ unit) ❑	SR	0133	307	1	R/W	0: STOP (Control stop) 1: RUN (Control start) [1]	0
RUN/STOP transfer (Each module) ♦	SW	0134 : 0197	308 : 407	1	R/W	0: STOP (Control stop) 1: RUN (Control start) [100]	0
Control RUN/STOP holding setting (Each module) ♦	X1	0198 : 01FB	408 : 507	1	R/W	0: Not holding (STOP start) 1: Holding (RUN/STOP hold) [100]	1
The following items are enabled when the power is turned on again or when control is changed from STOP to RUN.							
Unused	—	8000 : 8003	32768 : 32771	—	—	—	—
Communication protocol ❑	VP	8004	32772	1	R/W	0: RKC communication 1: Modbus [1]	0
Communication speed ❑	VU	8005	32773	1	R/W	0: 4800 bps 2: 19200 bps 1: 9600 bps 3: 38400 bps [1]	2
Communication data bit configuration ❑	VW	8006	32774	7	R/W	0 to 5 Refer to table 1. [1]	0
Communication interval time ❑	VX	8007	32775	7	R/W	0 to 250 ms [1]	10
Unused	—	8008 : 8010	32776 : 32784	—	—	—	—
Method for setting the number of connected modules ❑	RY	8011	32785	7	R/W	0: No action. 1: Automatically set the maximum number of connected function modules only when power is turned on. 2: Execute automatic setting of the maximum number of connected function modules. [1]	1
Unused	—	8012	32786	—	—	—	—
Number of connected modules [2] (Z-TIO module) ❑	QY	8013	32787	7	R/W	0 to 16 Maximum number of Z-TIO modules connected to COM-ML. [1]	—
Number of connected modules [2] (Z-DIO module) ❑	QU	8014	32788	7	R/W	0 to 16 Maximum number of Z-DIO modules connected to COM-ML. [1]	—
Unused	—	8015 : 801F	32789 : 32799	—	—	—	—
Communication data items setting ❑	QG	8020 : 8051	32800 : 32849	7	R/W	0 to 65535 [50]	65535
Number of measured data items (IN) ❑	QH	8052 : 8083	32850 : 32899	7	R/W	0 to 128 0: Unused [50]	0
Number of setting data items (OUT) ❑	QI	8084 : 80B5	32900 : 32949	7	R/W	0 to 127 0: Unused [50]	0
Unused	—	80B6	32950	—	—	—	—
Control RUN/STOP holding setting (Each SRZ unit) ❑	X2	80B7	32951	1	R/W	0: Not holding (STOP start) 1: Holding (RUN/STOP hold) [1]	1
EtherCAT address	QJ	80B8	32952	7	RO	0 to 65535 [1]	—
Network status	—	80B9	32953	—	RO	Bit data Bit 0 to Bit 7: Update counter of Read data Bit 8: Toggle counter of Data mapping update Bit 9: Write completion flag Bit 10: Write error flag Bit 11: Error occurring flag Bit 12 to Bit 15: Unused [1]	—

[1] After automatic setting of the number of connected function modules, the value automatically reverts to 0.
[2] When 1 or 2 is set for the communication identifier RY (method of setting the number of connected modules), the maximum number of connected modules is set automatically. When 0 is set, the maximum number of connected modules is set manually.
Maximum number of connected modules: Maximum address of function modules (address setting switch set value + 1)
COM-ML uses this set value to calculate the number of channels of communication data (RKC communication only).

Table 1: Data bit configuration

Set value	Data bit	Parity bit	Stop bit	Settable communication
0	8	Without	1	Modbus RKC communication
1	8	Even	1	
2	8	Odd	1	
3	7	Without	1	RKC communication
4	7	Even	1	
5	7	Odd	1	

Data range: Modbus: 0 to 2 RKC communication: 0 to 5

■ Communication data of Z-TIO module

Name	RKC Identifier	Modbus register address HEX	Modbus register address DEC	Digits	Attribute	Data range and Number of data	Factory set value
Measured value (PV) ♠	M1	01FC : 023B	508 : 571	7	RO	Input scale low to Input scale high [64]	—
Comprehensive event state ♠	AJ	023C : 027B	572 : 635	7	RO	• RKC communication Least significant digit to 4th digit: Event 1 state to Event 4 state 5th digit: Heater break alarm state 6th digit: Temperature rise completion 7th digit: Burnout Data 0: OFF 1: ON • Modbus Bit 0 to Bit 3: Event 1 state to Event 4 state Bit 4: Heater break alarm state Bit 5: Temperature rise completion Bit 6: Burnout Bit 7 to Bit 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 127] [64]	—
Operation mode state monitor ♠	L0	027C : 02BB	636 : 699	7	RO	• RKC communication Least significant digit: Control STOP 2nd digit: Control RUN 3rd digit: Manual mode 4th digit: Remote mode 5th digit to Most significant digit: Unused Data 0: OFF 1: ON • Modbus Bit 0: Control STOP Bit 1: Control RUN Bit 2: Manual mode Bit 3: Remote mode Bit 4 to Bit 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 15] [64]	—
Unused	—	02BC : 02CB	700 : 715	—	—	—	—
Manipulated output value (MV) monitor [heat-side] ♣ ♠	O1	02CC : 030B	716 : 779	7	RO	PID control or Heat/Cool PID control: −5.0 to +105.0 % Position proportioning control (FBR input): 0.0 to 100.0 % [64]	—
Manipulated output value (MV) monitor [cool-side] ♣ ♠	O2	030C : 034B	780 : 843	7	RO	−5.0 to +105.0 % [64]	—
Current transformer (CT) input value monitor ♠	M3	034C : 038B	844 : 907	7	RO	CTL-6-P-N: 0.0 to 30.0 A CTL-12-S56-10L-N: 0.0 to 100.0 A [64]	—
Set value (SV) monitor ♠	MS	038C : 03CB	908 : 971	7	RO	Setting limiter low to Setting limiter high [64]	—
Remote setting (RS) input value monitor ♠	S2	03CC : 040B	972 : 1035	7	RO	Setting limiter low to Setting limiter high [64]	—
Burnout state monitor ♠	B1	040C : 044B	1036 : 1099	1	RO	0: OFF 1: ON [64]	—
Event 1 state monitor ♠	AA	044C : 048B	1100 : 1163	1	RO	0: OFF 1: ON	—
Event 2 state monitor ♠	AB	048C : 04CB	1164 : 1227	1	RO	If the Event 3 type is temperature rise completion, check the temperature rise completion state in the comprehensive event state.	—
Event 3 state monitor ♠	AC	04CC : 050B	1228 : 1291	1	RO	(The Event 3 state monitor does not turn ON.)	—
Event 4 state monitor ♠	AD	050C : 054B	1292 : 1355	1	RO	[Each 64]	—
Heater break alarm (HBA) state monitor ♠	AE	054C : 058B	1356 : 1419	1	RO	0: OFF 1: ON [64]	—
Output state monitor ♦	Q1	058C : 059B	1420 : 1435	7	RO	• RKC communication Least significant digit to 4th digit: OUT1 to OUT4 5th digit to Most significant digit: Unused Data 0: OFF 1: ON • Modbus Bit 0 to Bit 3: OUT1 to OUT4 Bit 4 to Bit 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 15] [16]	—
Memory area soak time monitor ♠	TR	059C : 05DB	1436 : 1499	7	RO	• 0 minutes 00 seconds to 199 minutes 59 seconds: RKC communication: 0:00 to 199:59 (min:sec) Modbus: 0 to 11999 seconds • 0 hours 00 minutes to 99 hours 59 minutes: RKC communication: 0:00 to 99:59 (hrs:min) Modbus: 0 to 5999 minutes [64]	—
Unused	—	05DC : 05EB	1500 : 1515	—	—	—	—
Holding peak value ambient temperature monitor ♠	Hp	05EC : 062B	1516 : 1579	7	RO	−10.0 to +100.0 °C or 14.0 to 212.0 °F [64]	—
Unused	—	062C : 063B	1580 : 1595	—	—	—	—
Logic output monitor 1 ♦	ED	063C : 064B	1596 : 1611	7	RO	• RKC communication Least significant digit to 4th digit: Logic output 1 to 4 5th digit to Most significant digit: Unused Data 0: OFF 1: ON • Modbus Bit 0 to Bit 7: Logic output 1 to 8 Bit 8 to Bit 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 255] [16]	—
Logic output monitor 2 ♦	EE	—	—	7	RO	RKC communication Least significant digit to 4th digit: Logic output 5 to 8 5th digit to Most significant digit: Unused Data 0: OFF 1: ON	—
Unused	—	064C : 080B	1612 : 2059	—	—	—	—
PID/AT transfer ♠	G1	080C : 084B	2060 : 2123	1	R/W	0: PID control 1: Autotuning (AT) * * Automatically reverts to 0 after auto-tuning ends. [64]	0
Auto/Manual transfer ♠	J1	084C : 088B	2124 : 2187	1	R/W	0: Auto mode 1: Manual mode [64]	0
Remote/Local transfer ♠	C1	088C : 08CB	2188 : 2251	1	R/W	0: Local mode 1: Remote mode [64]	0
Unused	—	08CC : 08DB	2252 : 2067	—	—	—	—
Memory area transfer ♠	ZA	08DC : 091B	2268 : 2331	7	R/W	1 to 8 [64]	1
Interlock release ♠	AR	091C : 095B	2332 : 2395	1	R/W	0: Normal state 1: Interlock release execution [64]	0

Name	RKC Identifier	Modbus register address HEX	Modbus register address DEC	Digits	Attribute	Data range and Number of data	Factory set value
Event 1 set value (EV1) ★ ♠	A1	095C : 099B	2396 : 2459	7	R/W	Deviation action, Deviation action between channels, Temperature rise completion range *: −Input span to +Input span Process action, SV action: Input scale low to Input scale high	50
Event 2 set value (EV2) ★ ♠	A2	099C : 09DB	2460 : 2523	7	R/W		50
Event 3 set value (EV3) ★ ♠	A3	09DC : 0A1B	2524 : 2587	7	R/W	MV action: −5.0 to +105.0 % * When temperature rise completion is selected at Event 3 type.	50
Event 4 set value (EV4) ★ ♠	A4	0A1C : 0A5B	2588 : 2651	7	R/W	[Each 64]	50
Control loop break alarm (LBA) time ★ ♠	A5	0A5C : 0A9B	2652 : 2715	7	R/W	0 to 7200 seconds (0: Unused) [64]	480
LBA deadband ★ ♠	N1	0A9C : 0ADB	2716 : 2779	7	R/W	0 (0.0) to Input span [64]	0 (0.0)
Set value (SV) ★ ♠	S1	0ADC : 0B1B	2780 : 2843	7	R/W	Setting limiter low to Setting limiter high [64]	TC/RTD: 0 V/I: 0.0
Proportional band [heat-side] ♣ ★ ♠	P1	0B1C : 0B5B	2844 : 2907	7	R/W	TC/RTD inputs: 0 (0.0) to Input span (Unit: °C [°F]) Voltage (V)/Current (I) inputs: 0.0 to 1000.0 % of input span 0 (0.0): ON/OFF action ON/OFF action for both heat and cool actions in case of a Heat/Cool control type. [64]	TC/RTD: 30 (30.0) V/I: 30.0
Integral time [heat-side] ♣ ★ ♠	I1	0B5C : 0B9B	2908 : 2971	7	R/W	PID control or heat/cool PID control: 0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PD action) Position proportioning control: 1 to 3600 seconds or 0.1 to 1999.9 seconds [64]	240
Derivative time [heat-side] ♣ ★ ♠	D1	0B9C : 0BDB	2972 : 3035	7	R/W	0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PI action) [64]	60
Control response parameter ★ ♠	CA	0BDC : 0C1B	3036 : 3099	1	R/W	0: Slow 1: Medium 2: Fast P or PD action: 2 (Fast) fixed [64]	PID control, Position proportioning control: 0 Heat/Cool PID control: 2
Proportional band [cool-side] ♣ ★ ♠	P2	0C1C : 0C5B	3100 : 3163	7	R/W	TC/RTD inputs: 1 (0.1) to Input span (Unit: °C [°F]) Voltage (V)/Current (I) inputs: 0.1 to 1000.0 % of input span [64]	TC/RTD: 30 (30.0) V/I: 30.0
Integral time [cool-side] ♣ ★ ♠	I2	0C5C : 0C9B	3164 : 3227	7	R/W	0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PD action) [64]	240
Derivative time [cool-side] ♣ ★ ♠	D2	0C9C : 0CDB	3228 : 3291	7	R/W	0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PI action) [64]	60
Overlap/ Deadband ♣ ★ ♠	V1	0CDC : 0D1B	3292 : 3355	7	R/W	TC/RTD inputs: −Input span to +Input span (Unit:°C [°F]) Voltage (V)/Current (I) inputs: −100.0 to +100.0 % of input span [64]	0
Manual reset ★ ♠	MR	0D1C : 0D5B	3356 : 3419	7	R/W	−100.0 to +100.0 % [64]	0.0
Setting change rate limiter (up) ★ ♠	HH	0D5C : 0D9B	3420 : 3483	7	R/W	0 (0.0) to Input span/unit time 0 (0.0): Unused Unit time: 60 seconds (factory set value) [64]	0 (0.0)
Setting change rate limiter (down) ★ ♠	HL	0D9C : 0DDB	3484 : 3547	7	R/W	0 (0.0) to Input span/unit time 0 (0.0): Unused Unit time: 60 seconds (factory set value) [64]	0 (0.0)
Area soak time ★ ♠	TM	0DDC : 0E1B	3548 : 3611	7	R/W	• 0 minutes 00 seconds to 199 minutes 59 seconds: RKC communication: 0:00 to 199:59 (min:sec) Modbus: 0 to 11999 seconds • 0 hours 00 minutes to 99 hours 59 minutes: RKC communication: 0:00 to 99:59 (hrs:min) Modbus: 0 to 5999 minutes [64]	RKC communication: 0:00 Modbus: 0
Link area number ★ ♠	LP	0E1C : 0E5B	3612 : 3675	7	R/W	0 to 8 (0: No link) [64]	0
Heater break alarm (HBA) set value ♠	A7	0E5C : 0E9B	3676 : 3739	7	R/W	When CT is CTL-6-P-N: 0.0 to 30.0 A (0.0: Not used) When CT is CTL-12-S56-10L-N: 0.0 to 100.0 A (0.0: Not used) [64]	0.0
Heater break determination point ♠	NE	0E9C : 0EDB	3740 : 3803	7	R/W	0.0 to 100.0 % of HBA set value (0.0: Heater break determination is invalid) [64]	30.0
Heater melting determination point ♠	NF	0EDC : 0F1B	3804 : 3867	7	R/W	0.0 to 100.0 % of HBA set value (0.0: Heater melting determination is invalid) [64]	30.0
PV bias ♠	PB	0F1C : 0F5B	3868 : 3931	7	R/W	−Input span to +Input span [64]	0
PV digital filter ♠	F1	0F5C : 0F9B	3932 : 3995	7	R/W	0.0 to 100.0 seconds (0.0: Unused) [64]	0.0
PV ratio ♠	PR	0F9C : 0FDB	3996 : 4059	7	R/W	0.500 to 1.500 [64]	1.000
PV low input cut-off ♠	DP	0FDC : 101B	4060 : 4123	7	R/W	0.00 to 25.00 % of input span [64]	0.00
RS bias * ♠	RB	101C : 105B	4124 : 4187	7	R/W	−Input span to +Input span [64]	0
RS digital filter * ♠	F2	105C : 109B	4188 : 4251	7	R/W	0.0 to 100.0 seconds (0.0: Unused) [64]	0.0
RS ratio * ♠	RR	109C : 10DB	4252 : 4315	7	R/W	0.001 to 9.999 [64]	1.000

* Data on RS bias, RS ratio and RS digital filter is that in cascade control or ratio setting.

(Continued on the next page ➔)

Name	RKC Identifier	Modbus register address HEX	Modbus register address DEC	Digits	Attribute	Data range and Number of data	Factory set value
Output distribution selection ♠	DV	10DC ⋮ 111B	4316 ⋮ 4379	1	R/W	0: Control output 1: Distribution output [64]	0
Output distribution bias ♠	DW	111C ⋮ 115B	4380 ⋮ 4443	7	R/W	−100.0 to +100.0 % [64]	0.0
Output distribution ratio ♠	DQ	115C ⋮ 119B	4444 ⋮ 4507	7	R/W	−9.999 to +9.999 [64]	1.000
Proportional cycle time ♠	T0	119C ⋮ 11DB	4508 ⋮ 4571	7	R/W	0.1 to 100.0 seconds M: Relay contact output T: Triac output V: Voltage pulse output D: Open collector output [64]	M output: 20.0 V, T, D output: 2.0
Minimum ON/OFF time of proportioning cycle ♠	VI	11DC ⋮ 121B	4572 ⋮ 4635	7	R/W	0 to 1000 ms [64]	0
Manual manipulated output value ♣ ♠	ON	121C ⋮ 125B	4636 ⋮ 4699	7	R/W	PID control: Output limiter low to Output limiter high Heat/cool PID control: −Cool-side output limiter (high) to +Heat-side output limiter (high) Position proportioning control (with FBR input): Output limiter low to Output limiter high Position proportioning control (without FBR input): 0: Close-side output OFF, Open-side output OFF 1: Close-side output ON, Open-side output OFF 2: Close-side output OFF, Open-side output ON [64]	0.0
Area soak time stop function ♠	RV	125C ⋮ 129B	4700 ⋮ 4763	1	R/W	0: No function 3: Event 3 1: Event 1 4: Event 4 2: Event 2 [64]	0
EDS mode (for disturbance 1) ♠	NG	129C ⋮ 12DB	4764 ⋮ 4827	1	R/W	0: No function 1: EDS function mode 2: Learning mode 3: Tuning mode EDS function: External disturbance suppression function [Each 64]	0
EDS mode (for disturbance 2) ♠	NX	12DC ⋮ 131B	4828 ⋮ 4891	1	R/W		0
EDS value 1 (for disturbance 1) ♠	NI	131C ⋮ 135B	4892 ⋮ 4955	7	R/W	−100.0 to +100.0 %	0.0
EDS value 1 (for disturbance 2) ♠	NJ	135C ⋮ 139B	4956 ⋮ 5019	7	R/W		0.0
EDS value 2 (for disturbance 1) ♠	NK	139C ⋮ 13DB	5020 ⋮ 5083	7	R/W		0.0
EDS value 2 (for disturbance 2) ♠	NM	13DC ⋮ 141B	5084 ⋮ 5147	7	R/W	[Each 64]	0.0
EDS transfer time (for disturbance 1) ♠	NN	141C ⋮ 145B	5148 ⋮ 5211	7	R/W	0 to 3600 seconds or 0.0 to 1999.9 seconds	0
EDS transfer time (for disturbance 2) ♠	NO	145C ⋮ 149B	5212 ⋮ 5275	7	R/W	[Each 64]	0
EDS action time (for disturbance 1) ♠	NQ	149C ⋮ 14DB	5276 ⋮ 5339	7	R/W	1 to 3600 seconds	600
EDS action time (for disturbance 2) ♠	NL	14DC ⋮ 151B	5340 ⋮ 5403	7	R/W	[Each 64]	600
EDS action wait time ♠ (for disturbance 1)	NR	151C ⋮ 155B	5404 ⋮ 5467	7	R/W	0.0 to 600.0 seconds	0.0
EDS action wait time ♠ (for disturbance 2)	NY	155C ⋮ 159B	5468 ⋮ 5531	7	R/W	[Each 64]	0.0
EDS value learning times ♠	NT	159C ⋮ 15DB	5532 ⋮ 5595	7	R/W	0 to 10 times (0: No learning mode) [64]	1
EDS start signal ♠	NU	15DC ⋮ 161B	5596 ⋮ 5659	1	R/W	0: EDS start signal OFF 1: EDS start signal ON (for disturbance 1) 2: EDS start signal ON (for disturbance 2) [64]	0
Operation mode ♠	EI	161C ⋮ 165B	5660 ⋮ 5723	1	R/W	0: Unused 1: Monitor 2: Monitor + Event function 3: Control [64]	3
Startup tuning (ST) ♠	ST	165C ⋮ 169B	5724 ⋮ 5787	1	R/W	0: ST unused 1: Execute once * 2: Execute always * Automatically reverts to 0 after Startup tuning (ST) ends. [64]	0
Automatic temperature rise learning ♠	Y8	169C ⋮ 16DB	5788 ⋮ 5851	1	R/W	0: Unused 1: Learning * * Automatically reverts to 0 after automatic temperature rise learning ends. [64]	0
Communication switch (for logic) ♦	EF	16DC ⋮ 16EB	5852 ⋮ 5867	7	R/W	• RKC communication Least significant digit to 4th digit: Communication switch 1 to 4 5th digit to Most significant digit: Unused Data 0: OFF 1: ON • Modbus Bit 0 to Bit 3: Communication switch 1 to 4 Bit 4 to Bit 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 15] [16]	0
Unused	—	16EC ⋮ 196B	5868 ⋮ 6507	—	—	—	—

For communication data (Engineering setting), refer to the **COM-ML [for SRZ] Instruction Manual (IMR02E11-E□)**.

■ Communication data for multi-memory area data (only for Modbus)

Use the register addresses of 386CH to 3DABH to confirm or change set values of parameters in multi-memory areas which are not selected.

☞ For the multi-memory area data, refer to the **COM-ML [for SRZ] Instruction Manual (IMR02E11-E□)**.

■ Communication data of Z-DIO module

Name	RKC Identifier	Modbus register address HEX	Modbus register address DEC	Digits	Attribute	Data range and Number of data	Factory set value
Digital input (DI) state 1 ♦	L1	3E6C ⋮ 3E7B	15980 ⋮ 15995	7	RO	• RKC communication Least significant digit to 4th digit: DI1 to DI4 5th digit to Most significant digit: Unused Data 0: Contact open 1: Contact closed • Modbus Bit 0 to Bit 7: DI1 to DI8 Bit 8 to Bit 15: Unused Data 0: Contact open 1: Contact closed [Decimal number: 0 to 255] [16]	—
Digital input (DI) state 2 ♦	L6	—	—	7	RO	Least significant digit to 4th digit: DI5 to DI8 5th digit to Most significant digit: Unused Data 0: Contact open 1: Contact closed	—
Digital output (DO) state 1 ♦	Q2	3E7C ⋮ 3E8B	15996 ⋮ 16011	7	RO	• RKC communication Least significant digit to 4th digit: DO1 to DO4 5th digit to Most significant digit: Unused Data 0: OFF 1: ON • Modbus Bit 0 to Bit 7: DO1 to DO8 Bit 8 to Bit 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 255] [16]	—
Digital output (DO) state 2 ♦	Q3	—	—	7	RO	Least significant digit to 4th digit: DO5 to DO8 5th digit to Most significant digit: Unused Data 0: OFF 1: ON	—
Unused	—	3E8C ⋮ 3FDB	16012 ⋮ 16347	—	—	—	—
DO manual output 1 ♦	Q4	3FDC ⋮ 3EFB	16348 ⋮ 16353	7	R/W	• RKC communication Least significant digit to 4th digit: DO1 manual output to DO4 manual output 5th digit to Most significant digit: Unused Data 0: OFF 1: ON • Modbus Bit 0 to Bit 7: DO1 manual output to DO8 manual output Bit 8 to Bit 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 255] [16]	0
DO manual output 2 ♦	Q5	—	—	7	R/W	Least significant digit to 4th digit: DO5 manual output to DO8 manual output 5th digit to Most significant digit: Unused Data 0: OFF 1: ON	0
DO output distribution selection ♠	DO	3FEC ⋮ 406B	16364 ⋮ 16491	1	R/W	0: DO output 1: Distribution output [128]	0
DO output distribution bias ♠	O8	406C ⋮ 40EB	16492 ⋮ 16619	7	R/W	−100.0 to +100.0 % [128]	0.0
DO output distribution ratio ♠	O9	40EC ⋮ 416B	16620 ⋮ 16747	7	R/W	−9.999 to +9.999 [128]	1.000
DO proportioning cycle time ♠	V0	416C ⋮ 41EB	16748 ⋮ 16875	7	R/W	0.1 to 100.0 seconds M: Relay contact output D: Open collector output [128]	M output: 20.0 D output: 2.0
DO minimum ON/OFF time of proportioning cycle ♠	VJ	41EC ⋮ 426B	16876 ⋮ 17003	7	R/W	0 to 1000 ms [128]	0
Unused	—	426C ⋮ 432C	17004 ⋮ 17196	—	—	—	—

For communication data (Engineering setting), refer to the **COM-ML [for SRZ] Instruction Manual (IMR02E11-E□)**.

3. OBJECT DICTIONARY

● EtherCAT specifications

Device type: No profile
Correspondence protocol: CANopen over EtherCAT
Communication object: Service data object (SDO), Process data object (PDO)
PDO data length: Up to 256 byte for both input and output
Input: 0, 8, 16, 32, 64, 128, 192, or 256 byte (Selectable)
Output: 0, 10, 18, 34, 66, 130, 194, or 256 byte (Selectable)

● Object dictionary

Index	Index Name	Sub-Index	Description	Type	Access	Notes
1000H	Device Type	00H	Device Type	U32	RO	0000 0000h (No profile)
1001H	Error register	00H	Error register	U8	RO	----
1003H	Pre-defined error field	00H	Number of errors	U8	RW	----
		01H ⋮ 05H	Error field	U32	RO	----
1008H	Manufacturer device name	00H	Manufacturer device name	Visible string	RO	COM-ML-3
1009H	Manufacturer hardware version	00H	Manufacturer hardware version	Visible string	RO	1
1011H	Restore parameters	00H	Largest sub index supported	U8	RO	01h
		01H	Restore all default parameters	U32	RW	----
1018H	Identity object	00H	Number of entries	U8	RO	Number of entries
		01H	Vendor ID	U32	RO	0000 0563h
		02H	Product Code	U32	RO	1
		03H	Revision Number	U32	RO	1
		04H	Serial Number	U32	RO	Unique number
1600H	Receive PDO mapping	00H	Number of mapped application objects in PDO	U8	RO	No. of mapped objects (0 to 128)
		01H	Mapped object 1	U32	RO	----
		02H	Mapped object 2	U32	RO	----
		⋮	⋮	⋮	⋮	⋮
		NNH	Mapped object NN	U32	RO	----
1A00H	Transmit PDO mapping	00H	Number of mapped application objects in PDO	U8	RO	No. of mapped objects (0 to 128)
		01H	Mapped object 1	U32	RO	----
		02H	Mapped object 2	U32	RO	----
		⋮	⋮	⋮	⋮	⋮
		NNH	Mapped object NN	U32	RO	----
1C00H	Sync Manager Communication Type	00H	Number of entries	U8	RO	4
		01H	Mailbox wr	U8	RO	1
		02H	Mailbox rd	U8	RO	2
		03H	Process Data out	U8	RO	3
		04H	Process Data in	U8	RO	4
1C12H	Sync Manager Rx PDO Assign	00H	Number of assigned PDOs	U8	RO	1
		01H	Assigned PDO	U16	RO	1600h
1C13H	Sync Manager Tx PDO Assign	00H	Number of assigned PDOs	U8	RO	1
		01H	Assigned PDO	U16	RO	1A00h
1C32H	SM output parameter	00H	Number of entries	U8	RO	1
		01H	Sync mode	U16	RO	0 (FREE_RUN)
1C33H	SM input parameter	00H	Number of entries	U8	RO	1
		01H	Sync mode	U16	RO	0 (FREE_RUN)
2064H	Controller Data	00H	Number of entries	U8	RO	50
		01H	Data 1	U16	RW	The Modbus register address data specified in the index 20C5H. (Only data used for SDO communication are validated.) When an RO item is written to, the value reverts to the original value several seconds later. Items that are not used are RO, and the data is 0.
		02H	Data 2			
		⋮	⋮			
		32H	Data 50			
20C5H	Communication Item Setting	00H	Number of entries	U8	RO	50
		01H	Item setting of Data 1	U16	RW	Set Modbus resister address of communication item. If not used, set 0xFFFF.
		02H	Item setting of Data 2			
		⋮	⋮			
		32H	Item setting of Data 50			
20C6H	Communication IN Setting	00H	Number of entries	U8	RO	50
		01H	Number of times to use Data 1 as measured data items (IN)	U16	RW	0: Unused, 1 to 128 [a]
		02H	Number of times to use Data 2 as measured data items (IN)			
		⋮	⋮			
		32H	Number of times to use Data 50 as measured data items (IN)			
20C7H	Communication OUT Setting	00H	Number of entries	U8	RO	50
		01H	Number of times to use Data 1 as setting data items (OUT)	U16	RW	0: Unused, 1 to 127 [b]
		02H	Number of times to use Data 2 as setting data items (OUT)			
		⋮	⋮			
		32H	Number of times to use Data 50 as setting data items (OUT)			

[a] A cumulative number of data items of up to 128 from Sub-Index 01H is valid. A setting above this will be disregarded.
[b] A cumulative number of data items of up to 127 from Sub-Index 01H is valid. A setting above this will be disregarded.

📖 Regardless of the setting of Index 20C7H (Communication OUT Setting), "setting state selection" is assigned to the first-word of the setting data item (OUT).

	Description	Type	Access	Notes
First-word of setting data item (OUT)	Setting state selection	U16	RW	Bit data Bit 0: Data setting disabled/enabled 0: Setting disabled 1: Setting enabled Bit 1 to Bit 15: Unused

4. INITIAL COMMUNICATION DATA SETTINGS

4.1 EtherCAT Communication Settings

Configure settings necessary for EtherCAT communication.
Set Communication data items setting, Number of measured data items (IN) and number of setting data items (OUT) by using SDO communication of EtherCAT communication or loader communication.

TwinCAT (software used as PLC master of EtherCAT communication) is available when using the SDO communication of EtherCAT communication.
Use RKC identifier or MODBUS register address of the communication data map below when setting by Host communication or loader communication.

Name	RKC identifier	Modbus register address HEX	Modbus register address DEC	Data range (data size indicated in brackets [ ])	Factory set value
Communication data items setting	QG	8020 ⋮ 8051	32800 ⋮ 32849	RKC communication: 0 to 65535 Modbus: 0000H to FFFFH [50]	65535 (FFFFH)
Number of measured data items (IN)	QH	8052 ⋮ 8083	32850 ⋮ 32899	0 to 128 0: Not used [50]	0
Number of setting data items (OUT)	QI	8084 ⋮ 80B5	32900 ⋮ 32949	0 to 127 0: Not used [50]	0

📖 EtherCAT communication methods supported by the COM-ML are "PDO communication" and "SDO communication."

■ Communication data items setting

Set the idex 20C5H (0x20C5) "Communication Item Setting" (hereafter called "0x20C5").

- 0x20C5 sub-Index 0x01 to 0x32 (50 items) correspond to CH1 to CH50 of identifier QG of RKC communication, and to Modbus register addresses 8020H to 8051H.
- In each item, set the Modbus register address (PDO communication: only start address, SDO communication: all addresses of channels) of all communication items used in EtherCAT communication.
- Set items used in PDO communication in sub-Index 0x01 and following without any intervals, and then set items (all addresses of channels) that are only used in SDO communication.
- The data order in PDO communication is the same as the 0x20C5 sub-Index order. Set the number of data used in each item in 0x20C6 and 0x20C7.
- Set 65535 (FFFFH) in unused items. Communication items following sub-Index set to 65535 (FFFFH) are not used in PDO communication.

■ Number of measured data items (IN)

Set the index 20C6H (0x20C6) "Communication IN Setting" (hereafter called "0x20C6").

- In the sub-Index numbers of 0x20C6 that are the same as the sub-Index numbers of the communication items used in the measured data items (IN) of PDO communication (in the communication items set in 0x20C5), set the data size used.
- 0x20C6 sub-Index (50 items) corresponds to CH1 to CH50 of identifier QH of RKC communication and to Modbus register addresses 8052H to 8083H.
- Data up to a total of the set values in the sub-Index of 0x20C6 (cumulative total from sub-Index 0x01) of 128 (0080H) are valid.

■ Number of setting data items (OUT)

Set the Index 20C7H (0x20C7) "Communication OUT Setting" (hereafter called "0x20C7").

- In the sub-Index numbers of 0x20C7 that are the same as the sub-Index numbers of the communication items used in the setting data items (OUT) of PDO communication (in the communication items set in 0x20C5), set the data size used.
- 0xC7 sub-Index (50 items) correspond to CH1 to CH50 of identifier QI of RKC communication and to Modbus register addresses 8084H to 80B5H.
- Data up to a total of the set values in the sub-Index of 0x20C7 (cumulative total from sub-Index 0x01) of 127 (007FH) are valid.

[Setting example]

Using CH1 to CH4 of the Measured value (PV) and Set value (SV) of the Z-TIO module in PDO communication
Setting condition: Measured data items (IN): Measured value (PV), Set value (SV)
Setting data items (OUT): Set value (SV)
Assigned destination of communication item:
Measured value (PV): Sub-Index 0x01
Set value (SV): Sub-Index 0x02

RKC communication

- Communication item assignment (0x20C5 setting)
  Measured value (PV): Setting position: CH1 of identifier QG (Sub-Index 01H)
  Set value: 508 [Start Modbus register address (DEC)]
  Set value (SV): Setting position: CH2 of identifier QG (Sub-Index 02H)
  Set value: 2780 [Start Modbus register address (DEC)]
- Number of measured data items (IN) (0x20C6 setting)
  Measured value (PV): Setting position: CH1 of identifier QH (Sub-Index 01H)
  Set value: 4 [For 4 channels]
  Set value (SV): Setting position: CH2 of identifier QH (Sub-Index 02H)
  Set value: 4 [For 4 channels]
- Number of setting data items (OUT) (0x20C7 setting)
  Measured value (PV): Setting position: CH1 of identifier QI (Sub-Index 01H)
  Set value: 0 [Not used]
  Set value (SV): Setting position: CH2 of identifier QI (Sub-Index 02H)
  Set value: 4 [For 4 channels]

Modbus

- Communication item assignment (0x20C5 setting)
  Measured value (PV): Setting position: 8020H (Sub-Index 01H)
  Set value: 01FCH [Start Modbus register address (HEX)]
  Set value (SV): Setting position: 8021H (Sub-Index 02H)
  Set value: 0ADCH [Start Modbus register address (HEX)]
- Number of measured data items (IN) (0x20C6 setting)
  Measured value (PV): Setting position: 8052H (Sub-Index 01H)
  Set value: 0004H [For 4 channels]
  Set value (SV): Setting position: 8053H (Sub-Index 02H)
  Set value: 0004H [For 4 channels]
- Number of setting data items (OUT) (0x20C7 setting)
  Measured value (PV): Setting position: 8084H (Sub-Index 01H)
  Set value: 0000H [Not used]
  Set value (SV): Setting position: 8085H (Sub-Index 02H)
  Set value: 0004H [For 4 channels]

📖 Set the data of CH1 to CH4 of the Set value (SV) in the registers of each (RKC communication: CH1 to CH4 of identifier S1; Modbus: 0ADCH to 0ACFH).

4.2 Other Communication Data Settings

Set communication data other than the items set in Section **4.1** (PID constants of the Z-TIO and Z-DIO modules, event set values, etc.) using host communication, loader communication, or SDO communication of EtherCAT communication.

☞ For each of the communication setting items, refer to **2. COMMUNICATION DATA MAP** and **COM-ML [For SRZ] Instruction Manual (IMR02E11-E□)**.

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FEB. 2010