Rack BMS TCP/IP MODBUS Protocol Definition

◆ Read Definition [Function Code 0X03 : Read Holding Register]

DATA	Unit	Scale when Data read	Description	Request Address(PLC)	RW	Signed/ Unsigned	Type	Remark
AI	V	10	Rack Voltage	0000	R	u	Decimal	R A C K
AI	A	10	Rack Current	0001	R	s	Decimal	
AI	%	10	Battery SOC	0003	R	u	Decimal	
AI	℃	10	Module Max Temperature	0004	R	s	Decimal	
AI	℃	10	Module Min Temperature	0005	R	s	Decimal	
AI	℃	10	Module Avg Temperature	0006	R	s	Decimal	
AI	V	1000	Battery Cell Max Voltage	0007	R	u	Decimal	
AI	V	1000	Battery Cell Min Voltage	0008	R	u	Decimal	
AI	V	1000	Battery Cell Avg Voltage	0009	R	u	Decimal	
AI	%	1	Operating SOC Max	0010	R	u	Decimal	
AI	%	1	Operating SOC Min	0011	R	u	Decimal	
AI	V	1	Operating Voltage Max	0012	R	u	Decimal	
AI	V	1	Operating Voltage Min	0013	R	u	Decimal	
AI	%	10	Rack SOH	0014	R	u	Decimal	
AI	V	100	Modue Voltage	0015	R	u	Decimal	Module0
AI	V	100	Modue Voltage	0016	R	u	Decimal	Module1
DI	-	-	System Lock Rack/Module Status : "1" Error or Fail / "0" None b15 ~ b12 : Reserved b11: EEPROM R/W Fail b10: MODBUS Communication Error [Single Rack : RBMS-PMS] b9: CAN Communication Error [Multi Rack : SBMS-RBMS] b8: PEC Error b7: Vref2 Error b6: AFE Error b5: Reserved b4: Reserved b3: Module BMS ↔ Rack BMS - Loss of Comm, SPI Communication Error b2: Reserved b1: Fuse Fail b0: Relay off Fail	0046	R	u	Bit Mask	
DI	-	-	System Lock Rack/Module Status : "1" Error or Fail / "0" None b15: PRA Fail b14: PRA Fail b13: PRA Fail b12: Current Sensor Fail b11: Current Sensor Fail b10: Current Sensor Fail b9: Cell Temperature Imbalance Error b8: Module/Cell Under Temperature Error b7: Module/Cell Over Temperature Error b6: Cell V Imbalance Error b5: Rack/Module/Cell Under Voltage Error b4: Rack/Module/Cell Over Voltage Error b3: Reserved b2: Reserved b1: Discharge Over Current Error b0: Charge Over Current Error	0047	R	u	Bit Mask	
DI	-	-	System Lock Self Test Status : "1" Error or Fail / "0" None b15 ~ b9: Reserved b8: ST_External_Watchdog Fail, External Watchdog FB Fail b7: ST_Watchdog Test Fail b6: ST_CAN Communication Test Fail b5: ST_SPI Communication Test Fail b4: ST_Clock Test Fail b3: ST_ADC Test Fail b2: ST_Flash Memory Chcecksum Fail b1: ST_GPIO_Output Test Fail b0: ST_GPIO_Input Test Fail	0048	R	u	Bit Mask	
DI	-	-	System Lock Self Test Status : "1" Error or Fail / "0" None b15: ST_Interrupt Test Fail b14: ST_CPU_Timer2_Test Fail b13: ST_CPU_Timer1_Test Fail b12: ST_CPU_Timer0_Test Fail b11: Reserved b10: ST_RAM_L7 Test Fail b9: ST_RAM_L6 Test Fail b8: ST_RAM_L5 Test Fail b7: ST_RAM_L4 Test Fail b6: ST_RAM_L3 Test Fail b5: ST_RAM_L2 Test Fail b4: ST_RAM_L1 Test Fail b3: ST_RAM_L0 Test Fail b2: ST_Program Counter Test Fail b1: ST_FPU Resisters Fail b0: ST_CPU Resisters Fail	0049	R	u	Bit Mask	
DI	-	-	Battery System Alarm (Bit Mask) : "1" ON / "0" None b15~b9: Reserved b8: System Lock b7: HW Alarm b6: Low SOC b5: Cell Delta V b4: Discharge Over Current b3: Charge Over Current b2: Temperature(Over/ Under) b1: Under Voltage b0: Over Voltage	0050	R	u	Bit Mask	

DATA	Unit	Scale when Data read	Description	Request Address(PLC)	RW	Signed/Unsigned	Type	Remark
DI	-	-	Battery System operation Mode : "1" ON / "0" None b15 ~ b4 : Reserved b3: Idle - RELAY ON b2: Discharging b1: Charging b0: Standby (1: Complete Initialize, 0: Initializing)	0051	R	u	Bit Mask	R A C K
DI	-	-	Battery System Warning Status : "1" ON / "0" None b15 ~ b10 : Reserved b9: Cell Under Voltage Warning b8: Cell Over Voltage Warning b7: Over SOC Warning (OSOCW) b6: Under SOC Warning (USOCW) b5: Over Voltage Warning (OVW) b4: Under Voltage Warning (UVW) b3: Under Temperature Warning (UTW) b2: Over Temperature Warning (OTW) b1: Over Discharge Current Warning (ODCW) b0: Over Charge Current Warning (OCCW)	0052	R	u	Bit Mask	
DI	-	-	Battery System Error Status : "1" ON / "0" None b15 ~ b14 : Reserved b13: System Lock b12: CAN Communication Error [SBMS-RBMS] b11: IEC60730 Self Diagnostic Error b10: Rack Under Voltage Error b9: Rack Over Voltage Error b8: Relay off Fail b7: Fuse Fail b6: PRA Fail b5: CT Sensor Fail b4: HV Sensor Fail b3: EEPROM R/W Fail b2: External Watchdog FB Fail b1: Over Discharge Current Fault (ODCF) b0: Over Charge Current Fault (OCCF)	0053	R	u	Bit Mask	
DI	-	-	Battery Module Error Status : "1" ON / "0" None b15 ~ b11: Reserved b10 : AFE Error b9: Cell V Imbalance Warning b8: Module BMS ↔ Rack BMS - Loss of Comm (MRLOC) b7: Vref2 Error b6: PEC Error b5: Cell V Imbalance Error b4: Cell Temperature Imbalance b3: Cell Under Temperature Error b2: Cell Over Temperature Error b1: Cell Under Voltage Error b0: Cell Over Voltage Error	0054	R	u	Bit Mask	
DI	-	-	Error Code 1 b15 : Cell Imbalance [V&T] b14: Relay off Fail B13: Main Fuse Fail b12: PRA Fail b11: Rack Under Voltage Error b10: Rack Over Voltage Error b9: Rack Discharge Over Current Error b8: Rack Charge Over Current Error b7: Current Sensor Fail b6: Invalid Pack Voltage Fail b5: EEPROM R/W Fail b4: External Watchdog FB Fail b3: Module Under Temperature Error b2: Module Over Temperature Error b1: Module Under Voltage Error b0: Module Over Voltage Error	0055	R	u	Bit Mask	R A C K
DI	-	-	Error Code 2 b15 ~ b8 : Reserved b7: System Lock b6 : AFE Error b5 : Vref2 Error b4 : CAN Communication Error [Multi Rack : SBMS-RBMS] b3 : MODBUS Communication Error [Single Rack : RBMS-PMS] b2: SPI Communication Error b1: PEC Error b0: IEC60730 Self Test Fail	0056	R	u	Bit Mask	
DI	-	1	Fire Alarm b15 : Fire Alarm [0: Normal / 1: Alarm] b14 ~ b1 : Reserved b0 : Smoke Sensor Status [0: Normal / 1: Fault]	0057	R	u	Bitmask	

DATA	Unit	Scale when Data read	Description	Request Address(PLC)	RW	Signed/ Unsigned	Type	Remark
DI	-	1	Communication Count [Reset Count : 10,000] Increased by Function Code 0x03 Command	0059	R	u	Decimal	
DI	-	-	Module Staus : "1" ON / "0" None b15~b9 Reserved b8 : AFE Error b7: UT Error b6: UT Warning b5: OT Error b4: OT Warning b3: OV Error b2: OV Warning b1: UV Error b0: UV Warning	0060	R	u	Bit Mask	Module 0
DI	-	-	Module Staus : "1" ON / "0" None b15~b9 Reserved b8 : AFE Error b7: UT Error b6: UT Warning b5: OT Error b4: OT Warning b3: OV Error b2: OV Warning b1: UV Error b0: UV Warning	0061	R	u	Bit Mask	Module 1
DI	-	-	Module Staus : "1" ON / "0" None b15~b9 Reserved b8 : AFE Error b7: UT Error b6: UT Warning b5: OT Error b4: OT Warning b3: OV Error b2: OV Warning b1: UV Error b0: UV Warning	0062	R	u	Bit Mask	Module 2
DI	-	-	Module Staus : "1" ON / "0" None b15~b9 Reserved b8 : AFE Error b7: UT Error b6: UT Warning b5: OT Error b4: OT Warning b3: OV Error b2: OV Warning b1: UV Error b0: UV Warning	0063	R	u	Bit Mask	Module 3
DI	-	-	Module Staus : "1" ON / "0" None b15~b9 Reserved b8 : AFE Error b7: UT Error b6: UT Warning b5: OT Error b4: OT Warning b3: OV Error b2: OV Warning b1: UV Error b0: UV Warning	0064	R	u	Bit Mask	Module 4
DI	-	-	Module Staus : "1" ON / "0" None b15~b9 Reserved b8 : AFE Error b7: UT Error b6: UT Warning b5: OT Error b4: OT Warning b3: OV Error b2: OV Warning b1: UV Error b0: UV Warning	0065	R	u	Bit Mask	Module 5
DI	-	-	Module Staus : "1" ON / "0" None b15~b9 Reserved b8 : AFE Error b7: UT Error b6: UT Warning b5: OT Error b4: OT Warning b3: OV Error b2: OV Warning b1: UV Error b0: UV Warning	0066	R	u	Bit Mask	Module 6

DATA	Unit	Scale when Data read	Description	Request Address(PLC)	RW	Signed/ Unsigned	Type	Remark
DI	-	-	Module Staus : "1" ON / "0" None b15~b9 Reserved b8 : AFE Error b7: UT Error b6: UT Warning b5: OT Error b4: OT Warning b3: OV Error b2: OV Warning b1: UV Error b0: UV Warning	0067	R	u	Bit Mask	Module 7
DI	-	-	Module Staus : "1" ON / "0" None b15~b9 Reserved b8 : AFE Error b7: UT Error b6: UT Warning b5: OT Error b4: OT Warning b3: OV Error b2: OV Warning b1: UV Error b0: UV Warning	0068	R	u	Bit Mask	Module 8
DI	-	-	Module Staus : "1" ON / "0" None b15~b9 Reserved b8 : AFE Error b7: UT Error b6: UT Warning b5: OT Error b4: OT Warning b3: OV Error b2: OV Warning b1: UV Error b0: UV Warning	0069	R	u	Bit Mask	Module 9
DI	-	-	Module Staus : "1" ON / "0" None b15~b9 Reserved b8 : AFE Error b7: UT Error b6: UT Warning b5: OT Error b4: OT Warning b3: OV Error b2: OV Warning b1: UV Error b0: UV Warning	0070	R	u	Bit Mask	Module 10
DI	-	-	Module Staus : "1" ON / "0" None b15~b9 Reserved b8 : AFE Error b7: UT Error b6: UT Warning b5: OT Error b4: OT Warning b3: OV Error b2: OV Warning b1: UV Error b0: UV Warning	0071	R	u	Bit Mask	Module 11
DI	-	-	Module Staus : "1" ON / "0" None b15~b9 Reserved b8 : AFE Error b7: UT Error b6: UT Warning b5: OT Error b4: OT Warning b3: OV Error b2: OV Warning b1: UV Error b0: UV Warning	0072	R	u	Bit Mask	Module 12
DI	-	-	Module Staus : "1" ON / "0" None b15~b9 Reserved b8 : AFE Error b7: UT Error b6: UT Warning b5: OT Error b4: OT Warning b3: OV Error b2: OV Warning b1: UV Error b0: UV Warning	0073	R	u	Bit Mask	Module 13
DI	-	-	Module Staus : "1" ON / "0" None b15~b9 Reserved b8 : AFE Error b7: UT Error b6: UT Warning b5: OT Error b4: OT Warning b3: OV Error b2: OV Warning b1: UV Error b0: UV Warning	0074	R	u	Bit Mask	Module 14

DATA	Unit	Scale when Data read	Description	Request Address(PLC)	RW	Signed/ Unsigned	Type	Remark
DI	-	-	Module Staus : "1" ON / "0" None b15~b9 Reserved b8 : AFE Error b7: UT Error b6: UT Warning b5: OT Error b4: OT Warning b3: OV Error b2: OV Warning b1: UV Error b0: UV Warning	0075	R	u	Bit Mask	Module 15
DI	-	-	Module Staus : "1" ON / "0" None b15~b9 Reserved b8 : AFE Error b7: UT Error b6: UT Warning b5: OT Error b4: OT Warning b3: OV Error b2: OV Warning b1: UV Error b0: UV Warning	0076	R	u	Bit Mask	Module 16
AI	℃	10	Module Max Temperature	0101	R	s	Decimal	Module0
AI	℃	10	Module Max Temperature	0102	R	s	Decimal	Module1
AI	℃	10	Module Max Temperature	0103	R	s	Decimal	Module2
AI	℃	10	Module Max Temperature	0104	R	s	Decimal	Module3
AI	℃	10	Module Max Temperature	0105	R	s	Decimal	Module4
AI	V	1000	Cell V #20	0449	R	u	Decimal	Module 1

◆ Write Definition [Function Code 0x06 : Write Single Register]

DATA	Unit	Scale when Data read	Description	Request Address(PLC)	RW	Signed/ Unsigned	Type	Remark
AI	-	-	DC Contactor Control Command b0 : "1" RBMS DC1 ON / "0" RBMS DC1 OFF b1 ~ b15 Reserved	0200	W	u	Bit Mask	Rack
AI	-		Error Reset Command 0x0050 : RBMS Error Reset [Error Code Read : Address 0055] Function Code 04	0201	W	u	HEX	Rack
DI	-	-	System Lock Reset Command 0x0050 : Erase the System Lock Error in EEPROM	0202	W	u	HEX	Rack
AI	-		RBMS IP Write [A.B] of IP Address [A.B.C.D] Example if IP Address 192.168.1.60	0203	W	u	HEX	Rack
AI	-		RBMS IP Write [C.D] of IP Address [A.B.C.D] Example if IP Address 192.168.1.60	0204	W	u	HEX	Rack
AI	-	-	RBMS Reset After Setting IP Address 0xAA55	0205	W	u	HEX	Rack

◆ DC 1 [Relay] Control Warning Status

Warning	Description	Request Address	Position	Type	Remark
Cell UV	b9 : Cell Under Voltage Warning	0052	Module	Bit Mask	
Cell OV	b8 : Cell Over Voltage Warning		Module		
OV Warning	b5 : Over Voltage Warning		Rack		
UV Warning	b4 : Under Voltage Warning		Rack		
UT Warning	b3 : Under Temperature Warning		Module		
OT Warning	b2 : Over Temperature Warning		Module		
ODCW	b1 : Over Discharge Current Warning		Rack		
OCCW	b0 : Over Charge Current Warning		Rack		
Example	0000 0001 0000 0000 - Cell Over Voltage Warning	0052	Module Warning		