

# 3. Specifications

## Energy Measuring Unit

● ... measurable (incl. max/min) ○ ... measurable — ... unmeasurable

Items		Specifications										
Models		EMU2-RD3-F	EMU2-RD3-C	EMU2-RD5-F	EMU2-RD5-C	EMU2-RD7-F	EMU2-RD7-C	EMU2-RD2-F-4W	EMU2-RD2-C-4W	EMU2-RD4-F-4W	EMU2-RD4-C-4W	
Measuring Elements	Active Energy				○					○		
	Reactive Energy				○					○		
	Current/Current Demand				●					●		
	Reactive Power				●					●		
	Power Factor				●					●		
	Frequency				○					○		
	Harmonic Current				●					●		
	Harmonic Voltage				○					○		
Upper/lower limit Monitoring	Demand Current				○					○		
	Voltage				○					○		
	Power Demand				○					○		
	Power Factor				○					○		
Phase wire		3-phase 3-wire Single-phase 2-wire					3-phase 4-wire					
Rating input	Voltage circuit (1P2W)	110/220V (*1)					—					
	Voltage circuit (3P3W)	110/220V (*2)					—					
	Voltage circuit (3P4W)	—					63.5/110V, 110/190V, 120/208V, 220/380V, 240/415V(*4)					
	Current circuit	50A, 100A, 250A, 400A, 600A (*5) 5A (with 5A current sensor) (*6)					—					
	Frequency	50Hz/60Hz (frequency auto-detect)										
Auxiliary power supply rating		100V-220V AC (+10%, -15%) 50Hz/60Hz										
Tolerance (*7)	Current/Voltage/Active Power/ Reactive Power/Frequency	±1.0% (to rating input)										
	Power Factor	±3.0%										
	Active Energy/Reactive Energy	±2.0% (5-100% of rating, power factor)										
	Harmonic current/Harmonic Voltage	±2.5% (to rating input)										
Data updating cycle		500ms Wh value constantly accumulated (following short-cycle load fluctuations)										
Demand time limit setting		0, 10 sec, 20 sec, 30 sec, 40 sec, 50 sec, 1-15 min (per min), 20 min, 25 min, 30 min										
Power failure compensation	Wh/max.min values/Upper&lower limit values/Setting data	Stored in EEPROM (nonvolatile memory)										
	Clock	168 hours continuous operating at 25°C (*8)										
	Clock accuracy	±1 min/month										
Connection to Terminal block	Auxiliary power terminal	Appropriate wire: 1.25 mm										
	Voltage input terminal	Appropriate crimp-type terminal:M3.5 use/up to ø 7.2 mm (eg. R1.25-3.5 bare round type)										
Connection to Current sensor	Sensor cable	Dedicated cable used (optional)										
	Wiring length to Current sensor	Split type sensor : max. 50m Split type 5A sensor: max. 10m										
Consumed VA	Voltage circuit	0.1 VA/phase (110V AC) 0.2VA/phase (220V AC)										
	Current circuit	0.1 VA (on primary side of current sensor)										
	Auxiliary power supply circuit		—									
		100V AC	6.5 (8.0) VA	7.5 (9.0) VA	8.0 (9.5) VA	9.0 (10.5) VA	9.5 (11.0) VA	10.5 (12.0) VA	6.5 (8.0) VA	7.5 (9.0) VA	8.0 (9.5) VA	9.0 (10.5) VA
	220V AC	8.0 (9.5) VA	9.0 (10.5) VA	9.5 (11.0) VA	10.5 (12.0) VA	11.0 (12.5) VA	12.0 (13.5) VA	8.0 (9.5) VA	9.0 (10.5) VA	9.5 (11.0) VA	10.5 (12.0) VA	
CC-Link communication	Number of occupied stations	—	1 station (Remote device)	—	1 station (Remote device)	—	1 station (Remote device)	—	1 station (Remote device)	—	1 station (Remote device)	
	CC-Link version	—	1.10	—	1.10	—	1.10	—	1.10	—	1.10	
Mounting		IEC rail mounting										
Working temperature		-5°C to 55°C										
Working humidity		30%-85% RH (no condensation)										
Storage temperature		-10°C to 60°C										
Withstand voltage		All electric circuits-outside box: 1500V AC/min All current circuits (current sensor primary side)/Voltage circuits - Auxiliary power supply :1500V AC/min All current circuits (current sensor primary side)/Voltage circuits - All output :1500V AC/min All voltage circuits - All voltage circuits :1500V AC/min										
Insulation resistance		10MΩor more(same places shown above)										
Weight		0.6kg		0.8kg		1.0kg		0.5kg		0.7kg		

\*1: Settable primary voltage:110V/220V/440V/3300V/6600V (for over 440V, VT necessary outside)  
 \*2: Settable primary voltage:110V/220V/440V/3300V/6600V/22000V/33000V/66000V/77000V (for over 440V, VT necessary outside)  
 \*3: Set primary voltage to 110V.  
 \*4: Settable primary voltage:63.5/110V, 110/190V, 120/208V, 220/380V, 240/415V, 254/440V (for 254/440V,  $\frac{440}{\sqrt{3}} / \frac{110}{\sqrt{3}}$  V VT necessary)  
 \*5: Current value of current sensor primary side when a split current sensor used. EMU-CT50/100/250/400/600 for low voltage only (circuit voltage under 440 V). **Non usable for high voltage circuits**  
 \*6: 5A sensor used in combination with CT. Primary current settable: 5A/ 6A/ 7.5A/ 8A/ 10A/ 12A/ 15A/ 20A/ 25A/ 30A/ 40A/ 50A/ 60A/ 75A/ 80A/ 100A/ 120A/ 150A/ 200A/ 250A/ 300A/ 400A/ 500A/ 600A/ 750A/ 800A/ 1000A/ 1200A/ 1500A/ 1600A/ 2000A/ 2500A/ 3000A/ 4000A/ 5000A/ 6000A/ 7500A/ 8000A/ 10000A/ 12000A/ 20000A/ 25000A/ 30000A  
 \*7: Current value indicated "0" for below 0.5% of rated current. Electric energy calculated with load more than 0.4% of all load power. Electric energy value indicated "0" for below 0.4% of all load power. Power factor indicated "1.000", when indicated voltage value 0 V or indicated current value 0 A.  
 \*8: 168 hours is the compensation time for continuously energized condition for over 1 hour.

- Occurrence time of max./min value & simple demand value can be checked on a display unit (EMU2-D65/EMU2-D65-M), not retrievable through transmission (communication).
- Total current: For 1P2W circuit, Total current = Phase R current. For 3P3W/1P3W circuit, Total current = (Phase R current + Phase T current) / 2
- Total voltage: For 1P2W circuit, Total voltage = R-S V. For 3P3W/1P3W circuit, Total voltage = (R-S V+S-T V) / 2
- Max.current value: For a 3P3W circuit, largest value of R, S and T. For a 1P3W circuit, larger value of R and T.
- Min.current value: For a 3P3W circuit, largest value of R, S and T. For a 1P3W circuit, larger value of R and T.
- Max voltage value: For a 3P3W circuit, largest value of R-S, S-T and T-R. For a 1P3W circuit, larger value of R-S and S-T.
- Min. voltage value: For 3P3W circuit, largest value of R-S, S-T and T-R. For a 1P3W circuit, larger value of R-S and S-T.
- Harmonic current and harmonic voltage: RMS value and rate of harmonic content of 1st/3rd/5th/7th/9th/11th/13th measurable.
- When measuring mode set to high frequency details, max/min/occurrence time, upper/lower limit/ occurrence time not displayable.

\*9: Please see programming manual about CC-link communication.

Features

Product line-up

Specifications

Double-Logging

Outline dimensions

Terminal arrangement/  
connection diagram

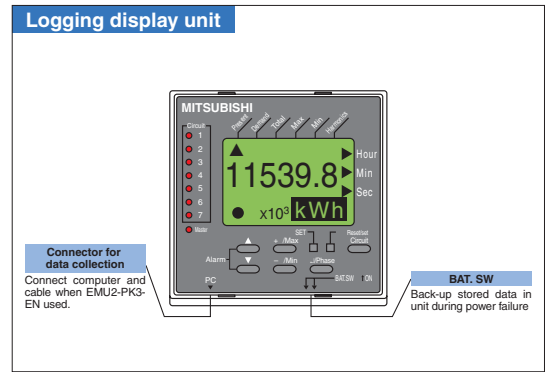
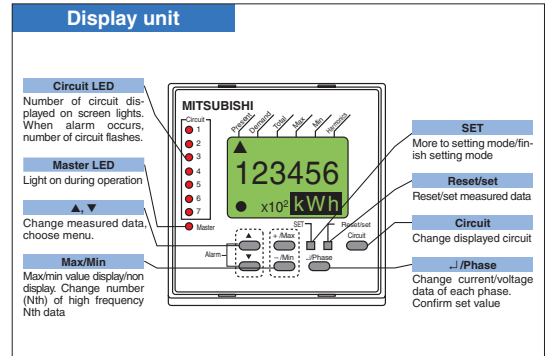
Safety precautions

Accessories

Display unit/Logging display unit

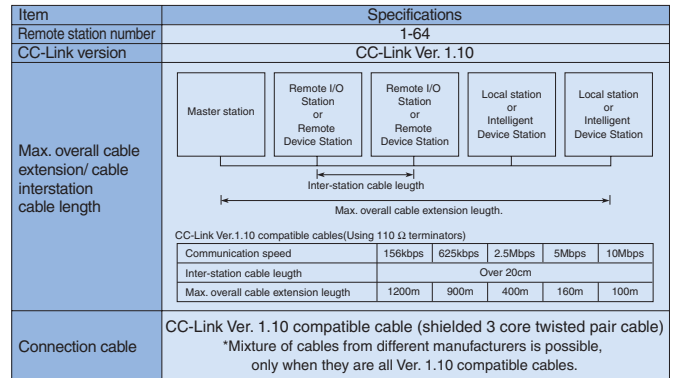
Specifications

Item	Specifications	
	Display unit EMU2-D65	Logging display unit EMU2-D65-M
Model	Display unit EMU2-D65	Logging display unit EMU2-D65-M
Rating	9V DC	
Auxiliary power supply	—	
Consumed VA	—	
Display	LCD with backlight	
Renewal cycle of display	500ms	
Measuring value display	Wh + A + 4 items	
	High frequency details	electrical energy, current, 4 selected items
Alarm display	all measured data	
	Alarm status	upper/lower limit alarm, voltage sag alarm status, relay output status
Settings	Alarm value	upper/lower limit alarm value/time upon occurrence, voltage sag alarm voltage value, time upon occurrence, length
	EMU setting	phase wire, primary vitage, primary current, sensor, demand time limit, pulse unit, measuring mode
Data reset	Logging setting	logging items/logging operation
	clock setting	set built-in clock
Data preset	alarm setting	upper/lower limit alarm value, voltage sag level, voltage sag length
	display setting	LCD contrast, backlight lighting
Logging	Max, min value/ upper,lower limit alarm value/voltage sag alarm value/ electrical energy, reactive energy, logging data	
Logging cycle	electrical energy/reactive energy	
	logging period	1 sec data
Logging data	1 min data	1sec/ 1min/ 1hour
	1 hour data	1 circuit 48 hours 2 circuits/3 circuits 12 hours 4 circuits/5 circuits 4 hours 7 circuits 2 hours
Connection to energy measuring unit	with dedicated cable (included). max cable length: 10m	
Installation	IEC rail mounting/Panel mounting	
Working temperature	-5°C to 55°C	
Working humidity	30 to 80% RH (no condensation allowed)	
Storage temparture	-10°C to 60°C	
Weight	0.1kg	



CC-Link Communication

Item	Specifications
Transmission speed	10M/ 5M/ 2.5M/ 625k/ 156kbps
Communication system	Broadcast polling system
Synchronization system	Frame synchronization system
Transmission format	HDLC conformity
Number of occupied stations	1 (remote device station)
Number of units connected	Max 64 stations when constructed only with energy measuring units; the following conditions must be met 1: (1Xa) + (2Xb) + (3Xc) + (4Xd) ≤ 64 a: Number of units that occupy one station, b: Number of units that occupies two stations, c: Number of units that occupy three stations, d: Number of units that occupy four stations 2: (16XA) + (54XB) + (88XC) ≤ 2304 A: Number of Remote I/O station units ... Max. 64 units A: Number of Remote device station units ... Max. 42 units A: Number of Remote local stations, stand by master stations, intelligent device station units ... Max 26 units



Current sensor

(1) Split-type current sensor

Item	Specifications				
	EMU-CT50	EMU-CT100	EMU-CT250	EMU-CT400	EMU-CT600
Rated primary current	50A	100A	250A	400A	600A
Rate secondary current	16.66mA	33.33mA	66.66mA	66.66mA	66.66mA
Rated load	0.1VA				
Error ratio	±1% (5-100% of rating)				
Max. voltage	460V				
Rated overcurrent intensity	X40 of rated primary current (1sec)				
Weight	0.1kg			0.7kg	

(2) 5A current sensor

Item	Specifications	
	EMU2-CT5	EMU2-CT5-4W
Model	EMU2-CT5	EMU2-CT5-4W
Appropriate circuit	1P2W/1P3W/3P3W	3P4W
Rated primary current	100A	250A
Rate secondary current	33.33mA	66.66mA
Rated load	0.1VA	
Error ratio	±3% (5-100% of rating)	
Max. voltage	460V	
Rated overcurrent intensity	X40 of rated primary current (1 sec)	
Weight	0.3 kg	

Features

Product line-up

Specifications

Double-Logging

Outline dimensions

Terminal arrangement/ connection diagram

Safety precautions