# ΗΙΟΚΙ

# **Instruction Manual**

# **PW Communicator**

- This manual explains the free software (PW Communicator) for the HIOKI Power Meter series only.
- Please refer to the Instruction Manual for your Power Meter for details regarding communication settings.
- All reasonable care has been taken in the production of this manual, but if you find any points which are unclear or in error, please contact your supplier or the International Sales and Marketing Department at HIOKI headquarters.
- In the interest of product development, the contents of this manual may be subject to revision without notice.
- The content of this manual is protected by copyright. No reproduction, duplication or modification of the content is permitted without the authorization of HIOKI E.E. Corporation.
- Be sure to review the Instruction Manual for your Power Meter before using the software.

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# 1. Introduction

"PW Communicator" is application software exclusively used for the HIOKI Power Meter series. This software allows you to view the measurement data and also save them in the CSV format through communication with up to eight Power Meters via a LAN, GP-IB, USB, or RS-232C(COM port).

Davies Mater	Power Meter's Communication interface						
Power Meter	LAN	GP-IB	USB	RS-232C			
PW3335, -02,-03	0	-	-	0			
PW3335-01	0	0	-	-			
PW3335-04	0	0	-	0			
PW3336, -02	0	-	-	0			
PW3336-01, -03	0	0	-	0			
PW3337, -02	0	-	-	0			
PW3337-01, -03	0	0	-	0			
PW3390-01,-02,-03	0	-	0	0			
PW6001	0	0	-	0			

Supported Models and Communication Interfaces

Hereafter in this manual, the Power Meter may also be referred to as the "instrument", and "PW Communicator" as the "software".

	unic	ator (V	er.1.4.8.0)	iin scre	en				
	ID	Status	Information	Meas Value	Instrument Setting		Item Num	Data Save Item	Sync.
Regist/Check	A	READY	PW3390-03 USB488:1 170113266	Select	Display		119	Select	
Regist/Check	в	READY	PW3336_01 GPIB:2 ser130522302	Select	Display		92	Select	
Regist/Check	) c	READY	PW6001-04 LAN:192.168.1.61 141111	Select	Display		23	Select	
Regist/Check	D	READY	PW3335_04 COM:4 ser000000000	Select	Display		20	Select	
Regist/Check	) E	READY	PW3390-02 LAN:192.168.1.139 00000	Select	Display		17	Select	
Regist/Check	F	NONE		Select	Display			Select	
Regist/Check	G	NONE		Select	Display			Select	
Regist/Check	) н	NONE		Select	Display			Select	
Save to	¦⊃:¥[ −Inte	Data¥PW ervalSav	888x_20170221csv e						Calc.Setting
					No header		ManualSav	re	Close
		Measure	Instantaneous	value o	No header	scre	ManualSav een	re	Close
		Measure Auto Upo	Instantaneous	value o	No header	scre	ManualSav en		Close
		Measure Auto Upp Dem CH INS	Instantaneous meret value  Meret value  Meret value  Program V  Pr	200.000V 150.000V 100.000V 50.000V	No header	scre			Close
		Auto Lize Parto Lize CH INS	Instantaneous mer value Mer Lieger © Depley Werford(Bit or more deceved Ins 99.97 V 11 0.3744 A	200.007 150.007 100.007 50.007 50.007 -00.007 -00.007 -00.007 -00.007 -00.007 -00.007 -00.007 -00.007 -0.008	No header		en 2011 2011 2011 2015 20		Close
		Heaturner	Instantaneous meret state Maria Leane © Ducker Wordson (Bible or more decayed Ins 999.97 V 15 15 15 15 15 15 15 15 15 15	value     co     c	No header		en		Close

	Me	asurement value	list			Harr	nonic displa	iy scree	en	
	No. Item	PW3337 LAN:192.168.1.2 ser123454321> <1								
	1 Ums C	H1 - 300.00 V 33.00 V	33.00 V							
	2 Ums 0	H2 - 300.00 V 63.00 V H3 - 1.0000kV 0.3100kV	63.00 V 0.3100kV							
	4 Urms S	JM 🔻 🗌 300.00 V 🔲 123.00 V	123.00 V							
	5 Ims 0	H1 V 50.000 A 5.500 A	5.500 A		HarmList <pw33< td=""><td>337 LAN:192.168</td><td>1.2 ser123454321&gt;</td><td></td><td></td></pw33<>	337 LAN:192.168	1.2 ser123454321>			
	7 Ims C	H3 V 20.000 A 6.200 A	6.200 A		Item	FreatH		PEfod	Level Cont	
	8 Ims S	JM - 50.000 A 20.500 A	20.500 A		HU CH1(INS	T) 3	0.00 100.00	1		
	9 Pms C 10 Pms C	H1 - 15.000kW 1.650kW H2 - 15.000kW 3.150kW	1.650kW		OFF					
	11 Pms C	H3 🔻 🗌 20.000kW 🔲 6.200kW	6.200kW		OFF					
	12 Pms S	JM	6.150kW		Order HU	L CH1(INST)	HUcon CH1(INST)	HUpha CH1(IN	STD	
	14 Sms 0	H2 - 15.000kVA 2.3.600kVA	3.600kVA		FileSave					
	15 Sms 0	H3 - 20.000kVA 6.800kVA	. 6.800kVA		0	300.00 V 300.00 V	500.00 % 500.00 %	- 0.10 de - 1.10 de	g	
	17 Qrms 0	H1 -15.000kvar 2.550kvar	r 2.550kvar		2	300.00 V	500.00 %	- 2.10 de	9	
	18 Qms 0	H2 -15.000kvar 4.050kvar	/ 🔲 4.050kvar		4	300.00 V	500.00 %	- 3.10 de - 4.10 de	g g	
	19 Qrms C 20 Qrms S	H3  -20.000kvar 7.400kvar UM  -15.000kvar 7.050kvar	r 7.400kvar		5	300.00 V 300.00 V	500.00 % 500.00 %	- 5.10 de - 6.10 de	g	
Image: District State       Image: District State         Image: District State       Image: District State <td>21 PFms C</td> <td>H1 - 1.0000 0.5100</td> <td>0.5100</td> <td></td> <td>7</td> <td>300.00 V</td> <td>500.00 %</td> <td>- 7.10 de</td> <td>9</td>	21 PFms C	H1 - 1.0000 0.5100	0.5100		7	300.00 V	500.00 %	- 7.10 de	9	
Image: Decision in control in contr	22 PFms 0	H2 -1.0000 -0.5200	-0.5200		9	300.00 V 300.00 V	500.00 %	- 8.10 de - 9.10 de	g g	
Image of the state of the	24 PFms S	JM - 0.0000 0.5400	-0.5400		10	300.00 V 300.00 V	500.00 % 500.00 %	- 10.10 de - 11.10 de	g g	
Image: Decision in the second in the seco	25 FREQ U 0	H1 - 300.00 Hz 100.00 Hz	100.00 Hz		12	200.001/	E00.00.%	10.10 4-	-	
Image:	27 FREQ U	H3  220.00 Hz  300.00 Hz	300.00 Hz							
Image:	28 FREQ I 0	H1 - 300.00 Hz 50.000 Hz	50.000 Hz							
Important	23 FREQ I 0	H3 V 220.00kHz 00.000 Hz	60.000 Hz							
Instrument Setting           Instrument Setting         Instrument Setting           Instrument Setting         Instrument Setting           Instrument Setting         Instrument Setting           Voltage varie         Instrument Setting           Instrument varie         Instrument Setting           Instrument varie         Instrument Setting <t< td=""><td>31 OFF</td><td></td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	31 OFF		-							
Instrument Setting         Image: Setting	Item Num:30									
Instrument Setting put Sottine Digital Measure Harmonics Interface D/A Wiree LP2W83 C ch1 ch2 ch3 Voltage rarge 156V 158V 158V 0 Voltage rarge 156V 0 Voltage rarge 100 V 0 000 V 000 V 000 V 000 V Voltage 000 V Voltage 000 V 000 V Voltage			Inc	strumor	t Sotting					
Put Settire       Display       Measure       Harmonics       Enterline       0/A         Wire       IP2W83       ch1       ch2       ch3         Voltage outo range       150V       150V       000 Vpl       000 Vpl         Voltage outo range       100       10       10       10       000 Vpl         Voltage outo range       100       000 Vpl       000 Vpl       000 Vpl       000 Vpl         Voltage outo range       000 Vpl       000 Vpl       000 Vpl       000 Vpl       000 Vpl         Voltage outo range       000 Vpl       000 Vpl       000 Vpl       000 Vpl       000 Vpl         Voltage outo range       000 Vpl       000 Vpl       000 Vpl       000 Vpl       000 Vpl         Voltage outo range       000 Vpl       000 Vpl       000 Vpl       000 Vpl       000 Vpl         Voltage outo range       000 Vpl       000 Vpl       000 Vpl       000 Vpl       000 Vpl         Voltage outo range       000 Vpl       000 Vpl       000 Vpl       000 Vpl       000 Vpl         Current range 020 Ppl       250 Ppl       1500 Ppl       000 Ppl       000 Ppl       000 Ppl         Current range 020 Ppl       000 Ppl       000 Ppl       0000 Ppl       <		Instrument Setting	1118	strumer	it Setting			x		
Wire       IP2WB3         ch1       ch2         ch1       ch2         voltage sub ranee       159V         Voltage rane       159V         Voltage sub ranee       159V         Voltage rane       159V         Voltage sub ranee       10         Voltage mode       0.00 V         Current targe       2.04         Ourrent targe       0.00 A         Voltage mode       0.00 A         Ourrent targe       0.00 A         Voltage       0.00 A         Ourrent targe       0.00 A         Voltage       0.00 A         Ourrent targe       0.00 A         Voltage       0.00 A         Ourrent targe       0.00 A         Synchronization Source       11 <td></td> <td>Input Setting Display Meas</td> <td>sure Harmonics</td> <td>Interface D</td> <td>/A</td> <td></td> <td></td> <td></td> <td></td>		Input Setting Display Meas	sure Harmonics	Interface D	/A					
chi ch2 ch3 Voltae ado rane Voltae ado rane String 0.00 V/A 0.00 A 0.00 A 0.		Wiring	1P2\#3	•						
Voltage auto range       I         Voltage range       ISUV			ch1		ch2		ch3			
Vitace rare       50V       10V       10 <td></td> <td>Voltage auto range</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>		Voltage auto range								
Voluee rate       1000       1000         Voltage mayor       0000       000       0000 <t< td=""><td></td><td>Val-</td><td>150) (</td><td></td><td>150) (</td><td></td><td>1501/</td><td></td><td></td></t<>		Val-	150) (		150) (		1501/			
Voltage weekom peak(MAX)       0.00 Vpk       0.00 Vpk         Voltage MAX       0.00 Vpk       0.00 V         Voltage MAX       0.00 V       0.00 V         Current auto range       0.00 V       0.00 V         Current range(External       50A        50A          Current Waveform       2620 Apk       2831 Apk       0.000 A         Current Waveform       2620 Apk       2831 Apk       0.000 A         Current Waveform       2620 Apk       2831 Apk       0.000 A         Current Waveform       2620 Apk       280Hz       \$00Hz       \$00Hz         Current Waveform       2620 Apk       280Hz       \$00Hz       \$00Hz         Statise File       Statise       \$100       \$100       \$100       \$100         Statise File       Statise & St		voitage range	1007		1007		10			
Voltage M(MAX)       0.00 Vpk       0.00 Vpk       0.00 V         Voltage MAX       0.00 V       0.00 V       0.00 V         Voltage 0.00 V       0.00 V       0.00 V       0.00 V         Voltage 0.00 V       0.00 V       0.00 V       0.00 V         Voltage 0.00 V       0.00 V       0.00 V       0.00 V         Current sensor       TYPE2       TYPE2       TYPE2         Current name       20A       20A       20A         Current name       20A       20A       0.00 Pek         Current name       1000       1000       1000         Current name       1000       1000       0.00 Pek         Current name       1000       0.00 Pek       0.00 Pek         Current name       1000       0.00 Pek       0.00 Pek         Current name       1000       0.00 Pek       0.00 Pek         Current name       500Hz       500Hz       500Hz       0.1sec         Synchronization Source       I       D       D       0.00 Pek         Setting File       Send Retire       Recieve Setting       Edulation result       Option         Auto Update       Close       Send Setting       Desk Valae y Cabulation result       Option		VT ratio	1.0	÷	1.0	÷	1.0	-		
Voltage MAX       0.00 V       0.00 V       0.00 V         Voltage       0.00 V       0.00 V       0.00 V         Ch1       ch2       ch3         External current sensor       TYPE2       TYPE2         Current auto range       0.00 V       0.00 V         Current range(External       50A       50A         Ourrent mayor(External)       50A       0.00 A         Current mayor(External)       50A       0.00 A         Ourrent mayor(External)       50B       0.000 A         Ourrent mayor(External)       50B       0.000 A         Voltage       0.1sec       0.1sec         Vortent Timeout       0.1sec       0.1sec         Synchronization Source       II       II       II         Sating       File       Coole       Coole         Current Naver (Maximum and Carrent Sating and		voitage waveform peak(MAX)	0.00 Vpk		0.00 Vpk		0.00 Vpk			
Voltage       0.00 V       0.00 V       0.00 V         ch1       ch2       ch3         External current sensor       TYPE2       TYPE2         Current auto range       20A       20A         Current range(External)       50A       50A         Current range(External)       50A       50A         Current range(External)       50A       50A         Current range(External)       50A       000 Apk         Current range(External)       50A       000 Apk         Current range(External)       500Hz       500Hz       0000 A         Current range(External)       500Hz       500Hz       500Hz       500Hz         Pack(MXV)       2620 Apk       2831 Apk       0.000 A       0000 A         Current range(External)       500Hz       500Hz       500Hz       500Hz       500Hz         Synchronization Source       II       II       II       III       III       III       III       III       IIII       IIII       IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII		VoltageMAX	0.00 V		0.00 V		0.00 V			
ch1       ch2       ch3         External current sensor       TYPE2       TYPE2         Current anne       00A       20A         Current anne       00A       50A         Current waveform       1000       1000         Current waveform       18310A       18343A         Current Waveform       500Hz       500Hz         Current Waveform       500Hz       500Hz         Current Waveform       500Hz       500Hz         Synchronization Source       11       12       13         Auto Update       Close       Close       Close         Colume       Consenting       Close       Close         Stime Childs       Y       Penschilds       Y		Voltage	0.00 V		0.00 V		0.00 V			
External current sensor       TYPE2       TYPE2       TYPE2         Current auto range       0       20A       20A       20A         Current range       20A       20A       000 Apk       000 Apk         Current workform       2520 Apk       2891 Apk       000 Apk       000 Apk         Current workform       2520 Apk       18043 A       0000 A       0000 A         Current workform       2520 Apk       18043 A       0000 A       0000 A         Verrent       18070 A       17810 A       0000 A       0000 A         Synchronization Source       II       II       II       III       IIII       III       III			ch1		ch2		ch3			
Current auto range       20A       20A       20A         Current range       20A       50A       50A       50A         Current range       50A       50A       50A       50A         Current range       50A       50A       50A       50A         Current range       50A       50A       50A       50A         Current vaveform       2620 Apk       2031 Apk       0.000 A       000 A         Current 18078 A       17810 A       0.000 A       0000 A       To pak(MAX)         Gurrent Barre       500Hz       500Hz       500Hz       To 00         Synchronization Source       11       12       13       To 13         Synchronization Source       11       12       13       To 13         Synchronization Source       11       12       13       To 14         Auto Update       Close       Close       Close       Close         Check to take       Send Setting       Receive Setting         Save       Load       Send Setting       Close       Close         Check to take       Close         Check to take       Close         Check to take       Close		External current sensor	TYPE2	•	TYPE2	•	TYPE2	•		
Ourrent range       20A       20A       20A         Ourrent range       50A       50A       50A         Ourrent range       50A       50A       000 A         Ourrent weveform       2620 Apk       2891 Apk       000 A         Ourrent Waveform       2620 Apk       2891 Apk       0000 A         Ourrent 18078 A       17810 A       0000 A       0000 A         Ourrent 18078 A       17810 A       0000 A       0000 A         Frequency Messurement       500Hz       500Hz       500Hz         Setting File       500Hz       0.1sec       0.1sec       0.1sec         Synchronization Source       11       12       13       I         Setting File       Load       Send/Receive       Close       Close         Calculation Setting         Auto Update       Close       Close       Close         Outrent Reside       Send/Hall       PhrmsCHIMAX       Ballenthint       Send Apk       Outrent Apk         Outrent Reside       Send S		Gurrent auto range								
Current range       20A       20A       20A         Current range       50A       50A       50A         Current sensor)       50A       50A       50A         Current sensor)       1000       1000       1000         Ourrent wase       2620 Apk       2831 Apk       0.000 Apk         Current Wasking       2620 Apk       2831 Apk       0.000 A         Current Wasking       18.078 A       17.810 A       0.000 A         Current Wasking       500H2       500H2       500H2         Current Wasking       500H2       500H2       500H2         Current Barge       500H2       0.1sec       0.1sec       0.1sec         Timeout       0.1sec       0.1sec       0.1sec       0.1sec       0.1sec         Synchronization Source       II       IZ       IB       0.0se       0.0se         Setting       File       Send Setting       Recieve Setting       0.0se         Calculation Setting       V       Oneck Value × Value y Calculation result       Option         OALI       Barnechinax       Y       Oneck Value × Value y Calculation result       Option         OALI       Setting       Barnechinax       Barnechinax       Barnechinax		our on auto range								
Current Nerge C.xterner       50A       50A       50A         CT ratio       1.000       1.000       1.000         Current Wax Ore       25.20 Apk       28.91 Apk       0.000 Apk         Current Wax Ore       25.20 Apk       28.91 Apk       0.000 Apk         Current Wax Ore       18.013 A       10.000 A       0.000 A         Frequency Messurement       500Hz       500Hz       500Hz         Synchronization Source       11       12       13         Setting File       Send/Receive       Close         Setting File       Close       Close		Current range	20A		20A	<b>T</b>	20A	<b></b>		
Current waveform peak(MAX) Current MAX 18310 A Current 18.078		Current range(External current sensor)	50A	•	50A	•	50A	<b></b>		
Current waveform pek(MN) 2620 Apk 2891 Apk 0.00 Apk CurrentMAX 18310 A 18043 A 0.000 A Current 18078 A 17810 A 0.000 A Current 18078 A 17810 A 0.000 A Frequency Messurement Source 0.1sec 0.1sec 0.1sec 0.1sec Timeout 0.1sec 0.1sec 0.1sec 0.1sec Synchronization Source II 2 33 Setting File Becieve Setting Recieve Setting Close Close Close Clo		CT ratio	1.000	<b>÷</b>	1.000	÷	1.000	÷		
Current MAX 18310 A 18.043 A 0.000 A Current 18.078 A 17.810 A 0.000 A Frequency Measurement 500Hz 500Hz 500Hz Timeout 0.1sec 0.1sec 0.1sec 0.1sec Synchronization Source 11 2 13 Setting File Load Send/Receive Save Load Send Setting Recieve Setting Auto Update Close C		Current waveform	26.20 Apk		28.91 Apk		0.00 Apk			
Current 18.078 A 17.810 A 0.000 A Frequency Measurement 500Hz 500Hz 500Hz Timeout 0.1sec 0.1sec 0.1sec Synchronization Source II 1 12 13 Setting File Bernsch/Receive Close Close Close Close Close Close Close Close Close Calculation Setting D Label Calculation Setting D Label Calculation Setting D Label Calculation Setting D Label Calculation Setting Calculation Setting D Label Calculation Setting Calculation Setting D Label Calculation Setting D Calculation Settin		CurrentMAX	18.310 A		18.043 A		0.000 A			
Frequency Measurement       500Hz       500Hz       500Hz         Timeout       0.1sec       0.1sec       0.1sec         Synchronization Source       II       IZ       I3         Setting File       Send/Receive       Recieve Setting         Setting File       Close       Close         Setting File       Close       Close         Calculation Setting       Recieve Setting       Close         Close       Close       Close         Calculation Setting         D       Label       Close         D       Label       Close       Sister S		Concert	19.079 0		17.810 4		A 000.0			
Range       bU0Hz       500Hz       500Hz         Timeout       0.1sec       0.1sec       0.1sec         Synchronization Source       II       I2       I3         Setting File       Send/Receive       Close         Save       Load       Send/Receive         Close       Close       Close         Calculation Setting         Peck Value x       Value y       Calculation result         Option       Calculation Setting       Calculation result       Option         CALL Rate of serie       Efficient       BPrmsCHIINST       BVmsCHIIMAX       BitmsCHIIMIN       EVEC       0.3884       0.3884       0.020 A       Option         CAL2       V       V       BitmsCHIIMAX       BitmsCHIIMIN       EVEC       0.1185       5.330 V       Option         CAL3       V       V       BitmsCHIIMAX       BitmsCHIIMIN       EVEC       0.1185       5.330 V       Option         CAL5       off       EVEC       10.55       5.530 V       Option       Option         CAL3       off       EVEC       10.55       5.530 V       Option       Option         CAL5       off       EVEC       10.55       0.555		Frequency Measurement	10.070 M		TY.OTU M		0.000 M			
Timeout       0.1sec       0.1sec       0.1sec         Synchronization Source       II       I2       I3         Setting File       Send/Receive       Send         Save       Load       Send Setting       Recieve Setting         Auto Update       Close       Close         Calculation Setting         V       Check Value × Value y Calculation result       Option         OAL1       Ret of serie.       Efficient + BPrmsCH1INST       BPrmsCH2INST       EXEC 35.18       38.89       0.909       Option         OAL2       Image: High RecH1IMIX       BirmsCH1IMIX       EXEC 0.8384       0.8684       0.020 A       Option         OAL3       Image: High RecH1IMIX       BirmsCH1IMIX       EXEC 101.86       9.853       5.330 V       Option         OAL5       Off       EXEC 101.86       9.853       5.330 V       Option       Option         OAL5       Off       EXEC ID1.86       9.853       5.330 V       Option       Option		Range	500Hz		500Hz	•	500Hz			
Synchronization Source II I I I II II III IIII Setting File Save Load Send Setting Recieve Setting Auto Update Close Clo		Timeout	0.1sec	<b></b>	0.1sec	<b></b> ]	0.1sec	<b></b>		
Setting File         Send/Receive         Send/Receive         Send Setting         Close         Close         Close         Close         Close         Close         Close         Calculation Setting         ID       Load       V       Check Value X       Calculation result       Option         ID       Load       PrimsCH1INST       BPrimsCH2005T       EXEC 35.18       38.88       0.909       Option         ID       Load       PrimsCH1INST       BPrimsCH2005T       EXEC 35.18       38.88       0.909       Option         ID       Label       Calculation result       Option         Calculation Setting       EXEC 35.18       38.88       0.909       Option         Calculation Setting       Calculation result       Option <th colspan<="" td=""><td></td><td>Synchronization Source</td><td>I1</td><td>•</td><td>I2</td><td>•</td><td>13</td><td>-</td><td></td></th>	<td></td> <td>Synchronization Source</td> <td>I1</td> <td>•</td> <td>I2</td> <td>•</td> <td>13</td> <td>-</td> <td></td>		Synchronization Source	I1	•	I2	•	13	-	
Setting File       Send/Receive         Save       Load       Send Setting       Recieve Setting         Close         Close         Close         Calculation Setting         D Label Enable       Calculation Setting         D Label Enable       Calculation X       Y       Check Value X       Value Y       Calculation result       Option         OAL1 Rate of serie.       Efficient * BPrmsCH1INST       BPrmsCH1INST       EXEC 0.3884       0.3009       Option         Option       Calculation setting         Calculation Setting         D Label Enable       Calculation Tesult       Option         Option       Calculation Setting         Calculation Setting       D Setting         Calculation Setting       Calculation Tesult       Option         Option       Calculation Setting         Calculation Setting         Calculation Setting <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>										
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Auto Update       Close         Close         Calculation Setting		Save	Load		Send Settin	e	Recieve Setting			
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Calculation Setting         ID       Label       Calculation       Calculation       Calculation       Colspan="2">Colspan="2"Col				lculatio	n Setting					
ID     Label     Value     Value <th< td=""><td></td><td></td><td><u> </u></td><td>loalatio</td><td></td><td></td><td></td><td></td><td></td></th<>			<u> </u>	loalatio						
CAL1         Participant         PrimsCH1INST         BPrmsCH2INST         EXEC         35.18         38.69         0.909         Option           CAL2         V         X=y         ElimsCH1IMAX         BirmsCH1IMIN         EXEC         0.3884         0.020 A         Option           CAL3         V         X=y         ElimsCH1MAX         BirmsCH1MIN         EXEC         0.3884         0.020 A         Option           CAL4         V         X=y         BlghCH1MAX         BirmsCH1MIN         EXEC         0.185         96.58         5,330 V         Option           CAL4         V         X=y         BlumsCH1MAX         BirmsCH1MIN         EXEC         10185         96.58         5,330 V         Option           CAL5         0ff         EXEC         10185         96.58         5,330 V         Option           CAL5         0ff         EXEC         0ff         EXEC         0ption           CAL5         0ff         EXEC         0ff         Option         0ption           CAL8         0ff         EXEC         0ption         0ption         0ption	Calculation	Setting	Ca							
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CAL8 Off CALS Off CALS Off CALS	Calculation ID Labe CAL1 Rate CAL2 CAL3 CAL3 CAL4 CAL5	Setting I Enable Calc. formula of serie V Efficient V V XYV V V XYV V Of arry V	Ca BPrmsCH1INST BirmsCH1MAX BipkCH1MAX BibrCH1MAX	y B:PrmsCi BirmsCi BirmsCi BirmsCi BirmsCi	Check H2INST EXEC H1MIN EXEC H1MIN EXEC H1MIN EXEC EXEC	Value x 35.18 0.3884 2.6197 101.86	Value y Calculat 38.69 0. 0.3684 0.0 -2.2473 4.86 96.53 53	ion result 909 120 A 37 Apk 330 V	Option Option Option Option Option Option	
	Calculation	Setting I Enable Calc. formula of serie V Efficient V V XYV V V XYV V Of srvv V Of off Off	Ca BPrmsCH1INST BitmsCH1MAX BitkcH1MAX BitkcH1MAX	y BiPrmsCi BiPrmsCi BiPrmsCi BiPrmsCi BiPrmsCi Diatematical and an and an and an	Check H2INST EXEC H1MIN EXEC H1MIN EXEC H1MIN EXEC EXEC EXEC	Value x 35.18 0.3884 2.6197 101.86	Value y         Calculat           38.69         0.           0.3684         0.0           -2.2473         4.86           96.53         5.5	ion result 909 ( )20 A ( 37 Apk ( 330 V	Option Option Option Option Option Option Option	
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# **1.1 Operating Precautions Including Reproduction and Copyright**

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# **1.2 System Configuration Requirements**

The following systems must be installed on your computer to use PW Communicator.

Computer	PC/AT compatible machine (DOS/V machine)
	Windows 7 SP1 or above (32-/64-bit edition)
	Windows 8 (32-/64-bit edition)
	Windows 10 (32-/64-bit edition)
Operating system	Microsoft .NET Framework4 must be installed in the above operating
	systems in advance.
	(In a non-English environment, language pack according to the
	environment is necessary)
CPU	1.0 GHz or above (2.0 GHz or above is recommended)
Momony	1.0 GB or above (2.0 GB or above is recommended)
Memory	Note: 2.0 GB or above for Windows 64-bit edition
Hard disk	Free space of 128 MB or more (at the time of startup)
Display	Resolution of 1,024×768 dots or above, 65,536 colors or more
Communication inter	ace (one or more of the following)
LAN	Ethernet(TCP/IP)
	Only the products manufactured by National Instruments Corporation
GP-IB	are acceptable (The GP-IB driver manufactured by National
	Instruments (class library compatible with .NET4.0, ni-488.2 3.1.2 later)
	must be installed in advance)
USB	Install the supplied driver (USB488h) to use the USB interface.
PS-232C	9600/38400 bps
1.0-2.020	*PW6001: 9600/19200/38400/57600/115200/230400 bps

For the connection procedure between the instrument and computer, refer to the Instruction Manual for the instrument.

# NOTE

When you use GP-IB communication, the GP-IB driver (class library compatible with .NET4.0) manufactured by National Instruments must be installed in advance. You can check this on "Measurement & Automation Explorer", which is installed when you use a product manufactured by National Instruments.



The supplied USB driver (USB488h) must be installed in order to use the USB interface. The driver can be downloaded from Hioki's website (https://www.hioki.co.jp).

# 2. Installation

Before installing this software, it is required that Microsoft .NET Framework4 be installed in advance. If it is not installed, it can automatically be installed before the installation of this software, as long as your computer is currently linked to the Internet.

If it is not installed and your computer is not linked to the Internet, this software cannot be installed. It can be downloaded from the Microsoft website.



### Note

- Install the software with the Administrator privilege.
- Installation may not be possible if other applications are currently running. Before installation, exit all other applications, if possible. Especially when antivirus software is currently running, installation may be prohibited even if the software is not affected by a virus. In such a case, change the settings of the antivirus software to permit installation.

Example: When installing the software on Windows7

Note: A different message may appear, depending on the operating system.

- 1 Exit all the applications currently running.
- 2 Double-click [setup.exe] (setup file) (the extension may not be displayed depending on the setting of your computer). Double-clicking it starts up the installer.



If Microsoft .NET Framework4 is not installed on your computer

If Microsoft .NET Framework4 is not installed on your computer, the following screen appears. Check your computer is linked to the Internet and then install the software.

nicrosoft .NET Framework 4 Se	tup	
.NET Framework 4 Setup Please accept the license term	ıs to continue.	Microsoft .NET
MICROSOFT S		here
I have read and accept the	e license terms.	
Download size estimate:	0 MB	
Download une esumates.	Broadband: 0 minutes	
		(2)Click here
	1	Install Cancel

When a dialog box requiring you to permit the continued program installation appears, click [Yes] to proceed to the next step.

😯 User Account Control	x			
Do you want to allow the following program to make changes to this computer?				
Program name: dotNetFx40_Full_x86_x64.exe Verified publisher: <b>Microsoft Corporation</b> File origin: Hard drive on this computer	Click here			
Show details	No			
Change when these noti	fications appear			

When a message prompting you to restart the system appears, click [Yes] to restart the system. After the system has restarted, the installation will automatically be continued.

When the "PW Communicator" setup wizard appears, click [Next>] and check the installation destination.

HIOKI PW Communicator	
Welcome to the HIOKI PW Communicator Setup Wizard	
The installer will guide you through the steps required to install HIOKI PW Communicator on your computer.	
WARNING: This computer program is protected by copyright law and international treaties. Unauthorized duplication or distribution of this program, or any portion of it, may result in severe civil or criminal penalties, and will be prosecuted to the maximum extent possible under the law.	
	Click here
Cancel KBack Next >	

Specify the installation destination.

If you wish to change the installation destination, click [Browse...], and then change to the relevant folder. Normally, it is not necessary to change it.

If it is not necessary to change the installation destination, click [Next>].

HIOKI PW Communicator	
Select Installation Folder	<b>_</b>
The installer will install HIDKI PW Communicator to the following folder. To install in this folder, click "Next". To install to a different folder, enter it below or <u>Folder:</u> [C#Program Files (x86)#HIOKI#PW_Communicator# Install HIOKI PW Communicator for yourself, or for anyone who uses this	Click "Browse". Browse Disk Cost computer:
● Everyone Just me	Click here
Cancel < Back	Next >

## Click [Next]

🛃 HIOKI PW Communicator		
Confirm Installation		
The installer is ready to install HIDKI PW/ Communicator on your computer. Click "Next" to start the installation.		
	Clie	ck here
Cancel Cancel	Next >	

### Installation starts.

B HIOKI PW Communicator	
Installing HIOKI PW Communicator	
HIOKI PW Communicator is being installed.	
Please wait	
Cancel < Back	Next >

When a dialog box requiring you to permit the continued program installation appears, click [Yes] to proceed to the next step.

0	User	Account Control	Commencements	22
(		Do you want unknown put	to allow the following pr plisher to make changes	ogram from an to this computer?
		Program name: Publisher: File origin:	C:\Users\4ka\Desktop\PW3336 <b>Unknown</b> Hard drive on this comput	Click here
6	🔊 si	now details		Yes No
		hese notifications appear		

Once the installation is completed, click [Close].

HIOKI PW Communicator		
Installation Complete		
HIOKI PW Communicator has been successfully installed. Click "Close" to exit.		
Please use Windows Update to check for any critical updates to the NET France of	ck her	e
Cancel Casc Cos		

# 3. Basic Usage

# 3.1 Startup Procedure

From the [START] menu, select [Program] - [HIOKI] - [PW Communicator] - [PW Communicator] to start up the application. The main screen will be displayed.

PW Communicator (Ver.1.4.8.0)									
	ID	Status	Information	Meas Value	Instrument Setting	H	Item Num	Data Save Item	Sync.
Regist/Check	A	READY	PW3390-03 USB488:1 170113266	Select	Display		119	Select	
Regist/Check	) в	READY	PW3336_01 GPIB:2 ser130522302	Select	Display		92	Select	
Regist/Check	0	READY	PW6001-04 LAN:192.168.1.61 141111	Select	Display		23	Select	
Regist/Check	D	READY	PW3335_04 COM:4 ser000000000	Select	Display		20	Select	
Regist/Check	) E	READY	PW3390-02 LAN:192.168.1.139 00000	Select	Display		17	Select	
Regist/Check	F	NONE		Select	Display			Select	
Regist/Check	G	NONE		Select	Display			Select	
Regist/Check	) н	NONE		Select	Display			Select	
-Data Save									
Save to	¦⊃:¥E	Data¥PW(	333x_20170221.csv						Calc.Setting
	Inte	ervalSave							
	]	Interval	200ms* 🗸						
	Countdown Timer 📝 🛛 🔄 day 🔍 🖓 hour 1 🗐 min 🔍 🖶 sec								
	File	Division	OFF 🚽 🔲 Start inte	gration at t	he same time	•	START	]	
No header ManualSave Close									

Main screen

## 3.2 Connection Settings with the Instrument

First, connect the communication line between the Instruments and computer.

🕎 PW Communicator (Ver.	Clicking [Regist/Check] Instrument] dialog box.	opens	the	[Registration	of	New
ID Status Regist/Check A READY P						
Regist/Check B READY P						

When connecting using a LAN interface When connecting to a computer using a LAN interface, specify the IP address of the Instrument.

Registration of New Instrument 💻 💷 🗙	
(11) A LAN GP-IB COM USB488 (2) P Address 192.168.1.61 MAC Address 00-01-67-06-45-82 Model HICKI PW6001-14 Serial No. 141111075 FarmVer. V2.00	<ol> <li>Select the [LAN] tab in the [Registration of New Instrument] dialog box.</li> <li>Enter the IP address of the Instrument to be connected in the [IP Address] fields.</li> <li>When you press [Check], communication will be performed with the specified instrument. When communication is performed successfully, the MAC address, model number, serial number, and firmware version are displayed.</li> <li>When you press [Regist], the confirmation dialog box will be closed and the connected instrument will then be registered on the main corner.</li> </ol>
(3) Check	
(4)Regist	Note: For how to check the IP address of the
Clear	for the instrument.
Cancel	

When connecting using a GP-IB interface When connecting to a computer using a GP-IB interface, specify the GP-IB address of the Instrument.

Registration of New Instrument	<ol> <li>Select the [GP-IB] tab in the [Registration of New Instrument] dialog box.</li> <li>Enter the GP-IB address of the Instrument to be connected in the [GP-IB Address] field.</li> <li>When you press [Check], communication will be performed with the specified instrument. When communication is performed successfully, the model number, serial number, and firmware version are displayed.</li> <li>When you press [Regist], the confirmation dialog box will be closed and the connected instrument will then be registered on the</li> </ol>
3 Check 4 Regist Clear Cancel	Note: For how to check the GP-IB address of the instrument, refer to the Instruction Manual for the instrument.

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When connecting using a RS-232C interface (COM port) When connecting to a computer using the RS-232C (COM port) interface, specify the COM port address and baud rate of the Instrument.

Registration of Ne	ew Instrument 🗕 🗉 🗙	(1)
(1) LAN GP-IB	A COM USB488	(2)
(2) BaudRate	t COM4	(3)
Mod Serial N FarmVe	el HIOKI PW3390-03 lo. 170113265 er. V1.00	(4)
(3) (4)	Check Regist	*1
	Clear	*2
		£

- (1) Select the [COM] tab in the [Registration of New Instrument] dialog box.
- (2) Select the COM port number\*1 and baud rate setting\*2 to be connected with the Instrument in the [COM port] and [BaudRate] fields.
- (3) When you press [Check], communication will be performed with the specified instrument. When communication is performed successfully, the model number, serial number, and firmware version are displayed.
- (4) When you press [Regist], the confirmation dialog box will be closed and the connected instrument will then be registered on the main screen.
- \*1: The COM port list displays all the available COM ports when the [Registration of New Instrument] dialog box opens. If the COM port you wish to use is not in the list, close the [Registration of New Instrument] dialog box, and then open it again.
- \*2: Be sure that the baud rate setting conforms to that of the instrument. For how to check the baud rate setting of the instrument, refer to the Instruction Manual for the instrument.

When connecting using a USB

When connecting to a computer using the USB (USB488) interface, specify the instrument from the list.

	Registration of New Instrument 🗕 💷 🗙	(1) Select the [USB488] tab in the [Registration of New Instrument] dialog box
	A LAN GP-IB COM USB488 USB488ID:Model (D: PW3390) (2) Model HIOKI PW3390-03 Serial No. 170113266 FarmVer. V1.00	<ul> <li>(2) Select the instrument to which you wish to connect in the [USB488ID:Model] field.</li> <li>(3) Click the [Check] button to attempt to connect to the specified instrument. If the application is able to communicate with the instrument, the instrument's model number, serial number, and firmware version will be displayed.</li> <li>(4) Click the [Regist] button to close the dialog box and add the instrument to the main screen.</li> </ul>
(3 (4	Check Regist Clear Cancel	*1: The [USB488ID:Model] list displays instruments that are available when the [Registration of New Instrument] dialog box opens. If the instrument you wish to use does not appear in the list, close and then reopen the dialog box.
	Cancer	

### To delete previously registered data

A destination instrument previously registered on the main screen can be deleted according to the following procedure.



# NOTE

If connection fails, refer to the Instruction Manual for the instrument and check the cable connection and address settings.

Do not turn off the power to the instrument or disconnect cables while the screen displaying the measurement values is displayed or file saving is in progress. Otherwise, the application or instrument operation may become unstable.

Do not connect multiple computers to the same instrument. Otherwise, the application or instrument operation may become unstable.

## 3.3 Overview of Measurement Value Display

This software displays the following measurement values, and each screen allows the following display variations.

Meas value	Select the desired measurement items on the 4- to 32-split screen to view the measurement values and calculation values. The size of the display items can be changed to enlarge the display of the measurement values on the computer screen. The measured waveform can be displayed (only if a conditions are met).
DispmeasValueList (PW3335/PW3336/ PW3337 only)	Select the desired measurement items to view the measurement values and calculation values (up to 64 items). The instantaneous, maximum and minimum values are displayed side by side. The file output setting can be specified for each item individually.
Harm.List	0 (DC) or 1 to 50th order can be displayed by selecting the desired harmonic measurement items (PW6001,PW3390: 0th to 100th order). For the harmonic voltage and current, the frequency, THD, and power factor (fundamental wave) are displayed concurrently. The order range to be displayed can be customized (order range, or output of all orders within the range/even order/odd order).

All the above screens can be displayed at the same time.

When multiple Instruments systems are connected, the measurement value screen can be displayed for each instrument individually.

However, if there are many items or screens to be displayed, an operational delay may occur depending on the communication status or the load applied by computer processing. In such a case, reduce the number of items or screens to be displayed.

For the PW6001, software operation may become unstable if waveforms from multiple PW6001 instruments are displayed. If you encounter this issue, turn off the waveform display.

## 3.4 Display of Measurement Values

This section describes how to display the Measurement Value screen.

(*	)	Meas Value Select Select	Instrument Setting Display Display	Item Num 26 92	Data Save Item Select Select		(1) Press [Meas value] on the main screen.
		Meas Value	Instrument Setting	Item Num	Data Save Item	-	(2) When menus are displayed, select the screen to be displayed.
	(	Select Select Select	Measuremen Measusreme	t Value nt Value L	ist	14 L	
		Select	Harm. Data	ſ	Select	_	

# NOTE

• While any of the measurement value display screens above is displayed or file output is in progress, communication is being performed with the relevant instrument.

- Do not turn off the power to the instrument or disconnect cables while the screen displaying the measurement values is displayed or file saving is in progress. Otherwise, the software or instrument operation may become unstable.
- While the file saving item selection screen is displayed, the measurement screen cannot be displayed.
- This software sends the HOLD command to the instrument during acquisition of the measurement data to change the HOLD state of the instrument.(\*1)
- The screen of the measuring instrument which is the communication target becomes the measurement screen.(PW3390)
- As the instrument to be communicated with is set to the remote mode, any operation on the instrument panel is disabled. To use the panel of the instrument, stop the communication with the software (close all the measurement screens and stop the saving operation), and then cancel the remote mode by pressing the [SHIFT] key on the instrument (PW3335/PW3336/PW3337 only).
- \*1: The PW3335/PW3336/PW3337 will change the hold state if the number of items to be communicated on the Main screen is greater than 80, or if harmonic data is targeted for communication. If the hold state is changed, auto-range operation may cease to function.

The PW6001/PW3390 will change the hold state if the number of items to be communicated on the Main screen is greater than 32, if elapsed time data is targeted for communication, if harmonic data is targeted for communication, or if multiple Instruments systems are connected.

# 3.5 Measurement Value Display Screen



The configuration of the measurement value display screen is as follows.

### Selecting the display items

When you press the item selection button located to the right of the relevant item selection display area, menus are displayed.

From the menus, select the measurement item (e.g., channel, rectifier) to be displayed.



The following operations are available from the menus that appear when you right-click the mouse on the measurement value display screen.

AllOff	Turns OFF all the display items.
Reset	Returns the display items to the default statuses in the application.

# NOTE

For details on the measurement items (including the rectifier, etc.), refer to the Instruction Manual of the instrument.

The display menus, such as Channel, may differ depending on the measurement item. (Example: For "TIME" (integration time), channel selection menu is not displayed.)

### Selecting the number of display items

You can select the number of items to be displayed in the measurement value display item area from the selection list for the number of displayed items.

The size of the displayed item is automatically adjusted according to the number of the selected display items and the size of the screen.



Sp	olit into 4	5	Split into 8	Split into 16		Split into 32		
Measurement value Auto Update Ben Nun	Display Waveform(9kHz or more decayed)	Measurement val	Jodate Display Waveform(%kHz or more decayed)	₩ M	feasurement value iuto Update Upd Item Num 🔟	ate Display Waveform(%Hz or more decayed)	Measurement value Auto Update Update Update Dem Num 32	Display Waveform(SkHz or more decayed)
Urms CH1	100.02 \/	Urms CH1 INST	99.90 V 🏼 🎽	Un Irr	ms CH1 INST	99.89 V 0.3746 A	Urms CH1 INST Irms CH1 INST Prms CH1 INST IH CH1 INST	99.85 V 2 0.3747 A 2 35.07 W 2 1.087mAh 2
INST	100.02 V	Irms CH1 INST	0.3747 A	Pn	ms CH1 INST H CH1 INST	35.08 W 1.087mAh	Upk CH1 INST Ipk CH1 INST Ucf CH1 INST Icf CH1 INST	137.36 Vpk 2 -0.9011 Apk 2 1.3756 2.4050 2
Irms CH1	0 3740 A	Prms CH1 INST	35.09 W	Ui	ok CH1 INST	137.59 Vpk −0.8658 Apk	Uthd CH1 INST Ithd CH1 INST FREQ,U CH1 IL FREQ,I CH1 IN_	4.18 % > 20.96 % > 60.017 Hz > 60.018 Hz >
INST		CH1 INST	1.087mAh	Le Le	of CH1 INST	1.3775 2.3112	Urms CH1 MAX Urms CH1 MAX	0000000010 E 101.86 V E 96.53 V E
Prms CH1	25.12 W	Upk CH1 INST	−137.43 Vpk	Ut	hd CH1 INST nd CH1 INST	4.14 % 20.82 %	Irms CH1 MAX Irms CH1 MIN Ufnd CH1 INST Upk CH1 MAX	0.3884 A ≥ 0.3684 A ≥ 99.76 V ≥ 140.75 Vpk ≥
INST	3J.12 W	Ipk CH1 INST	-0.8687 Apk	FR	EQ_U CH1 I EQ_I CH1 IN	60.027 Hz 60.028 Hz	Uef CH1 MAX Urf CH1 MAX Ifnd CH1 INST Ibk CH1 MAX	1.4030 2 0.00 % 2 0.3565 A 2 2.6197 Apk
IH	1.097	Ucf CH1 INST	1.3757	w	H CH1 INST	0.1013 Wh >	Icf CH1 MAX Irf CH1 MAX PFrms CH1 IN PErms CH1 M	6.8959 ≥ 0.00 % ≥ -0.9372 ≥
INST	1.087mAh	Icf CH1 INST	2.3185	Un Ur	ms CH1 MAX ms CH1 MIN	101.86 V 96.53 V	PFrms CH1 MIN EFF1 INST CAL1:Rate:1st DEGac CH1 IN	-0.9283 > 109.99 % > 909.256m > - 20.41 deg >

Screen configuration for each split setting of the measurement value display PW Communicator V1.60 Adjusting the size of each display item The size of the measurement value display area for each item can be changed individually by dragging the border (the line enclosed with red dotted lines in the figure below) with the mouse. It is also possible to enlarge the display of a specific measurement value as below.



Measurement value display (after the size of the measurement value display area has been adjusted)

When you reopen the measured value display screen, then the display goes back to the initial state.

### Display Waveform (only if a connection are met)

When this checkbox is checked, voltage and current waveforms input to the power meter can be displayed.



# NOTE

For the PW3335/PW3336/PW3337, voltage and current waveforms are filtering-processed thinned waveforms. A frequency band of 8 kHz or more is decayed in the waveform. These are also thinned waveforms, and the peak values of the voltage and current in the value display area and peak values of the displayed waveforms may differ.

The number of data on the horizontal axes depends on the width of the window for the harmonics analysis of the PW3335/PW3336/PW3337) (178.57 ms to 222.22 ms). For more details, refer to Harmonic Measurement Specifications in the Instruction Manual for the PW3335/PW3336/PW3337.

For the PW3390, the horizontal axis data count is 500 points. If the waveform recording length is greater than 500, the waveform will be compressed to 500 points using the maximum and minimum values. For example, if the waveform recording length is 10k, the first point on the displayed graph will be displayed by connecting the maximum and minimum values for points 1 to 20.

For the PW6001, the horizontal axis data count is 1k points. If the waveform recording length is greater than 1k, the waveform will be compressed to 1k points using the maximum and minimum values. For example, if the waveform recording length is 10k, the first point on the displayed graph will be displayed by connecting the maximum and minimum values for points 1 to 10.

For the PW6001, the maximum sampling speed for motor analog waveforms is 50 kHz. If the sampling speed is faster than 50 kHz, motor analog waveforms will be displayed by means of interpolation using the same value for multiple points. For example, when displaying a motor analog waveform with a sampling speed of 100 kHz, the graph's first and second points will be displayed using the value recorded for the first point.

Instrument		Communication interface						
Instrument	LAN	GP-IB	USB	RS-232C				
PW3335	0	0	-	×				
PW3336/PW3337	0	0	-	×				
PW3390	0	-	0	×				
PW6001	0	×	-	×				

### OWaveform display possible conditions

### Enlarged display of waveforms

An area can be enlarged and displayed by dragging and specifying the desired area with the mouse.



Waveforms after magnification

Scroll bars appear on the vertical or horizontal axes when magnified waveforms are displayed. Using a scroll bar allows you to scroll in any direction with the expanded magnification.

# NOTE

For the PW6001,PW3390, compressed points cannot be displayed, even when the display is zoomed in.

area.

150.00ms

200.00ms

#### Change of the balance of the waveform area size The balance of each waveform area size for the voltage and current can be changed. 150.00V -100.00V -50.00V --50.00V -100.00V -100.00V -Dragging the 50.00ms column border 0.00ms 100.00ms 150.00ms 200.00ms upward... 0.60A 0.40A 0.20A To enlarge the E 0.60 current waveform

н (1) 111 📝 U2 📝 U3

0.40A

0.20A

0.00A -0.20A

-0.40A

-0.60A

50.00ms

each channel can be set.

100.00ms

Before changing the balance

150.00ms

Change of the waveform colors and display on/off

200.00ms

Waveform display of voltage (CH1) can be turned (1) on/off.

50.00ms

100.00ms

After changing the balance

(2) Display color of voltage (CH1) can be changed.

0.00A

-0.20A

-0.40A

-0.60A

The display colors for each channel voltage and current can be changed, and the display on/off for

0.00ms

Display colors and display on/off for other channels and current can be changed as well.

### Saving waveform images

The waveforms of the voltage and current displayed on the screen can be saved from the menu by right-clicking in any waveform display area. Legends are added to the saved image. Waveform data can also be copied to the clipboard.



0.60A 0.40A 0.20A 0.00A 0.00A 0.00A 0.00A 0.00A 0.40A

Example of a saved waveform (with legends)

100.00ms

150.00ms

50.00ms

### Saving waveform data

You can save waveform data for which the display has been enabled in the CSV format.



# NOTE

• For the PW6001, the maximum and minimum values will be output for each parameter when the storage mode is set to P-P.

# 3.6 Measurement Value List Display Screen (PW3335/PW3336/PW3337)

The configuration of the measurement value list display screen is as follows.

jung Dis	spN(:1V)lueL	· (2)	(	(3)	(4)	(5	) (6)	(7	) (8) <sup>×</sup>		(1)	Display item selection
No.	Item	ch			INST		MAX		MIN	-		button
2	Ums				300.00 V		33.00 V		33.00 V			Allows you to select the
2	Ums				1.0000kV		0.2100kV		0.2100kV			measurement items to be
	Ume	SUM -	- I		300.00.1/		123.00.1/		123.00.V			displayed.
5	Ims	CH1 ·	-		50 000 A		5 500 A		5 500 A		(2)	Channel selection button
6	Ims	CH2	- 1		50.000 A		10.500 A		10.500 A		(-)	Allows you to select the shappels
7	Ims	СНЗ	- 1		20.000 A		6.200 A		6.200 A			Allows you to select the charmers
8	lms	SUM ·	- [		50.000 A		20.500 A		20.500 A	=	(-)	to be displayed.
9	Prms	CH1	•		15.000kW		1.650kW		1.650kW		(3)	File output check
10	Prms	CH2	•		-15.000kW		3.150kW		3.150kW		(5)	The values of the measurement
11	Prms	СНЗ	- [		20.000kW		6.200kW		6.200kW		(7)	items checked in the relevant
12	Prms	SUM ·	- [		15.000kW		6.150kW		6.150kW		. ,	checkboxes are output in a file
13	Sms	CH1	•		15.000kVA		2.100kVA		2.100kVA			(interval coving, manual coving)
14	Sms	CH2	•		15.000kVA		3.600kVA		3.600kVA			(interval saving, manual saving).
15	Sms	СН3	•		20.000kVA		6.800kVA		6.800kVA			
16	Sms	SUM ·	•		15.000kVA		6.600kVA		6.600kVA			
17	Qrms	CH1	•		-15.000kvar		2.550kvar		2.550kvar			
18	Qrms	CH2	•		-15.000kvar		4.050kvar		4.050kvar		(4)	Measurement value display
19	Qrms	CH3	•		-20.000kvar		7.400kvar		7.400kvar		$\dot{6}$	aroa
20	Qrms	SUM ·	•		-15.000kvar		7.050kvar		7.050kvar		(3)	
21	PFms	CH1	•		1.0000		0.5100		0.5100		(0)	Displays the measurement values
22	PFms	CH2	•		-1.0000		-0.5200		-0.5200			(instantaneous, maximum, and
23	PFms	СНЗ	•		1.0000		0.5300		0.5300			minimum values).
24	PFms	SUM	•		-0.0000		-0.5400		-0.5400			
25	FREQ U	CH1	•		300.00 Hz		100.00 Hz		100.00 Hz			For an item that has no
26	FREQ U	CH2	•		30.000kHz		200.00 Hz		200.00 Hz			measurement value, the field
27	FREQ U	СНЗ	•		220.00kHz		300.00 Hz		300.00 Hz			remains blank or is indicated on
28	FREQ I	CH1 ·	•		300.00 Hz		50.000 Hz		50.000 Hz			remains blank or is indicated as
29	FREQ I	CH2	•		30.000kHz		60.000 Hz		60.000 Hz			<b>"</b> <i>"</i> .
30	FREQ I	СНЗ	•		220.00kHz		70.000 Hz		70.000 Hz			
31	OEF		•							-		Only the instantaneous value is
Item I	Num:30									:		displayed for the results of the
	Mea	SUIRO	m	פו	nt val		list s	cre	en			calculation setting.
	mea	Surc			int vai	uc	1151 5				(9)	Number of display items
												Displays the number of
												measurement items displayed in the
												measurement value list
												הפמטויכוווכות למועל ווטו.
												Lice this information as a reference
												when a communication delay
												occurs.

## Selecting the display items

The display items can be selected using the display item selection buttons and channel selection buttons.

No.	Item	ch	INST	MAX	MIN
1	Ums	CH1 🔻	300.00 V	33.00 V	33.00 V
2	Ums	CH2 🔻	300.00 V	63.00 V	63.00 V
2			1 00001 1/	0.010011/	0.010011/

All Item	Disp Off	Turns OFF all the display items.
	Clear Save Check	Turns OFF the file output of all items.
Selected	Disp Off	Turns OFF the display of the selected item(s).
Items	Clear Save Check	Turns OFF the file output of the selected item(s).
Reset		Returns the display items to their default statuses
		in the application.

# NOTE

For details on the measurement items (including the rectifier, etc.), refer to the Instruction Manual of the instrument.

The display menus, such as channel, may differ depending on the measurement item, or the Instrument.

(Example: For "TIME" (integration time), channel selection menu is not displayed.)

The screen display of each measurement item and file output (saving) setting are controlled separately. Even when the display of all items is set to OFF, if the saving setting is set to ON, the relevant measurement items will be included in the output file.

Measured value display area turns red to a communication error occurs.

# 3.7 Harmonic Data Display Screen

HarmList<PW3336 GPIB:6 ser130522302> (1) **Display item selection** Freq[Hz] THD[%] Conter area 2.2  $\checkmark$ HU CH1(INST) (1) Allows you to select the OFF OF harmonic measurement items to be displayed. Ord HU\_CH1(INST) HUcon\_CH1(INST) FileS (2) Harmonic order data 0.06 \ 0.06 % 103.07 V 100.00 % display area 0.04 \ 0.04 % 1.22 V 1.19 % Displays each set of order (2) 0.02 0.02 % 1.42 V 1.38 % data for the harmonic data selected in the display item 1.25 V 1.21 % 0.02\ 0.02 5 selection area. 0.23 % 0.24 V 0.01 V 0.01 % 10 0.42 V 0.41 % 11 0.01 \ 0.01 % The order to be displayed can 13 0.32 V 0.31 % be changed with the [Option] 14 0.01 V 0.01 % button (4). Close AlClear (4) Option (3) [AllClear] button (3) (5) Turns OFF all the display and Harmonic data display screen saving settings of the harmonic data (4) [Option] button Allows you to change the order range to be displayed in the harmonic display area. (5) [Close] button Closes the harmonic display screen.

The configuration of the harmonic data display screen is as follows.

### Selecting the harmonic display items

The display items can be selected using the display item selection buttons (1).

The items checked in the relevant checkboxes in the display item selection area are displayed in the harmonic data display area.

More than one item can be selected at the same time.

	ltem	Freq[Hz]	THD[%]	PFfnd	Level	Conter	Phase.		
(1)	HU CH1(INST)	59.996	2.26	-0.9853	<b>V</b>			1	(2)
`íí				-					
	OFF								

# NOTE

.....

When the harmonic voltage or current is selected, the measurement values of the frequency, THD, and power factor (fundamental wave) are displayed. (PW3390: the frequency,RMS value,and THD)

As the harmonic measurement items require data communication for each order, be aware that a larger amount of data is transferred through the communication.

The measured value display area will turn red in the event of a communications error.

### Harmonic order data display area

Displays each set of order data for the harmonics selected in the display item selection area.

	Order	HU_CH1(INST)	HUcon_CH1(INST)	HUpba_CH1(INST)
1)	<u>FileSave</u>			
ÍI	0	0.07 V	0.06 %	0.00 deg
	1	103.22 V	100.00 %	0.00 deg
	2	0.05 V	0.05 %	133.52 deg
	3	1.24 V	1.20 %	52.82 deg
	4	0.02 V	0.02 %	73.47 deg
	5	1.56 V	1.51 %	-143.33 deg
	6	0.02 V	0.02 %	- 19.39 deg
	7	1.13 V	1.09 %	35.85 deg
	8	0.02 V	0.02 %	-109.45 deg
	9	0.19 V	0.18 %	144.60 deg
	10	0.011/	0.01.9/	147.04 4

# NOTE

The items checked in the relevant file saving checkboxes (1) are saved during file output (interval saving, manual saving). All orders currently displayed are saved.

## Specifying the harmonic display order range

The order range to be displayed can be specified by pressing the [Option] button.

Harmonic Data List Option Order (1) (2) (3) Output Lower Upper Order Num	(1)	Output order setting area Allows you to select from all orders, even order, and odd order.
ALL OK Cancel OK Cancel Harmonic data display option dialog box	(2)	Maximum/minimum order setting area Allows you to specify the maximum/minimum order to be output within the range from 0 to 50. (PW6001,PW3390: 0th to 100th order)
	(3)	<b>Display area for the</b> <b>number of orders</b> Displays the number of orders specified for output in the current settings.

# NOTE

- The specified order range also applies to the file output setting of the harmonic data (interval saving, manual saving).
- For the PW6001, the maximum and minimum values will be output for each parameter when the storage mode is set to P-P.

# 3.8 Calculation Setting

Efficiency calculations and four arithmetic operations can be processed for the measurements of multiple registered instruments in this software. These calculation results can be output to a file or displayed on the screen.

Displaying the calculation setting screen Pressing the [Calc. Setting] button displays the calculation setting screen.

🙄 PW Commi	unic	ator (Ve	er.0.4.8.0)						-   0   ×
	ID	Status	Information	Meas Value	Instrument Setting		Item Num	Data Save Item	Sync.
Regist/Check	A	READY	PW3835_04 LAN:192.168.1.35 ser1407	Select	Display		28	Select	
Regist/Check	в	READY	PW3336_01 LAN:192.168.1.36 ser1305	Select	Display		92	Select	
Regist/Check	С	NONE		Select	Display			Select	
Regist/Check	D	NONE		Select	Display			Select	
Regist/Check	Е	NONE		Select	Display			Select	
Regist/Check	F	NONE		Select	Display			Select	
Regist/Check	G	NONE		Select	Display			Select	
Regist/Check	н	NONE		Select	Display			Selec <mark>t</mark>	
Data Save									
Save to	C:¥t	mp¥PW3:	38×_20141001.csv						Calc.Setting
	Inte	ervalSave							
	1	Interval	Countdown Timer 📄 0 🚖 da	ıy 0÷	hour 0	🗧 min	10 📩	sec	
	File	e Division	OFF   Start inte	gration at t	he same time		START		
						1	ManualSav	e	Close

# NOTE

Other window operations such as measurement value display cannot be performed while the calculation setting screen is displayed.

Description of calculation setting screen

Ca/01	tion Setting	(3)	(4)	)(5)		(6)	(7)	(8)				(10)
ID	Label	Enable	Ы	Caic. formula		×	у	Check	Value x	Value y	Calculation result	Option
CAL	1	<b>v</b>		Efficient	•	B:UrmsCH1INST	B:UrmsCH2INST	EXEC				Option
CAL	2	<b>V</b>		х-у	-	B:UrmsCH1MAX	B:UrmsCH1MIN	EXEC				Option
CAL	3	<b>V</b>		x-y	-	B:IrmsCH1MAX	BilrmsCH1INST	EXEC		(9)		Option
CAL		V		x-y	-	BlipkCH1MAX	B:IpkCH1MIN	EXEC				Option
CAL	5			off				EXEC				Option
CAL	ì			off				EXEC				Option
CAL	7			off				EXEC				Option
CAL	3			off				EXEC	L		I	Option
												Close

### Calculation setting screen

(1)	ID	IDs are identification numbers for the calculation contents.
(2)	Label	Arbitrary character strings can be input for the descriptions of the calculations.
		This is used for displaying the selection menu on the measurement value display screen and outputting files.
(3)	[Enable]checkbox	Calculation is not executed while the checkbox is not checked.
(4)	[File Save]checkbox	Check the checkbox for the file output.
(5)	Calculation formula	Select the calculation formula. For more details, refer to the next section.
(6)(7)	Operand (x, y)	Sets the operand.
(8)	[Check] button	Calculation results can be checked by pressing this button.
		PW Communicator V1.60

(9)	Checked values display field	Pressing the [EXEC] button displays each value of the operand (x, y) and calculation results.
(10)	Options (detail settings)	The number of digits in the calculation results and unit character strings can be specified.

### 

NOTE

Calculation contents settings Set the operation contents according to the following procedure.

(1)	Enable	Enabling the calculation Select the [Enable] checkbox.
(2)	Calc. formula Efficient off x+y x-y x*y x/y Efficient (x*x)/y x/(y*y)	Calculation formula selectionThe following operations can be selectedusing the buttons of the Calc. formula.offNo calculation is executed.x+yAdditionx-ySubtractionx*yMultiplicationx/yDivisionEfficientEfficiency operation ((x/y)*100)(x*x)/yx/(y*y)
(3)	Calculation Settings: CAL1-x         Operand       A:HUCH1         Constant       1.000         Function       SQR_SUM         Harmonics order select       Select         Select       Lower       Upper         O       100       101         You can set the range of orders to display on the Harmonic Measured Value screen.       SQR_SUM(A:HUCH1)         Check Value       Update       Close	<b>Operand setting</b> Set the operand on the Operand Settings screen that is shown when you click the x or y operand button. For more information, see the description of how to set the operand on the following page.
(4)	Check Value x Value y Calculation result	<b>Check the calculation contents</b> Pressing the [EXEC] button displays the value of the operand (x, y) and calculation results in the checked values display field.
(5)	OFF         Voltage         Current         Power         Integration         CAL         CAL         CAL2         CAL3         CAL4         CAL5         CAL6         CAL7         CAL8	Display in the measurement value display screen Calculation results can be selected from the [CAL] menu of the display selection menu. Calculation results can be displayed in the measurement value list screen as well.

Only the instantaneous value is displayed for the calculation results in the measurement value list screen.

An invalid calculation cannot be selected in the measurement value display screen or the measurement value list screen.

There is no updating of calculated values when the calculation is disabled while selecting the measured value list screen and measured value display screen.

This instrument's hold state will be canceled when executing the calculation contents check.

## Setting the operand

Use the following procedure to set the operand.

Calculation Settings: CAL1-x	
Operand Constant Function	① A:HUCH1 ② 1.000 ► ③ SQR_SUM ▼
Harmonics order select Select Lower	Upper Order Num
You can set the range of ord on the Harmonic Measured V	ers to display /alue screen.
SQR_SUM(A:HUCH1)	5 Check Value
6 Update	Close

1	Operand A:HUCH1  A:HUCH1 OFF 1.000 A  SQR_SUM CAL  CONST	Selecting the operand Click the operand button and select an operand from the menu that is displayed. In addition to measurement values, you can select calculation results (CALn) with numbers lower than the current number. Selecting "Equipment calculation - CONST" allows you to set a constant. Setting a constant This field lets you set a constant within the range of ±1000.000. If you select a parameter other than CONST, the value of that parameter (or if the function is set to a value other than OFF, the value after calculating the function) will be multiplied by the constant. Selecting CONST causes the constant's value (or if a function is set, the value after calculating the function) to be used as the value	
2	Constant 1.000		
3	Function OFF <b>•</b>	Setting a functionYou can select from the following functions using the Function button.OFFNoneABSAbsolute value *1EXPExponent *1LOGLogarithm *1LOG10Common logarithm *1NEGNegative *1SQRSquare *1SQR_SUMSum of squares *2SQRTSquare root *1SUMSum *3SINTrigonometric functions *4TANTrigonometric functions *4ASINInverseASINInverseASINInverseASINInverseASINInverse	

			functions *4
			Inverse
		ATAN	trigonometric
			functions *4
		SINH	Hyperbolic
			functions *4
		COSH	Hyperbolic
		00011	functions *4
		TANH	Hyperbolic
			functions *4
4		Setting the	range of
		harmonic o	orders
		This field is va	alid when a harmonic
		measurement	t parameter is
		selected as th	ne target parameter.
	Harmonics order select	You can set the	he range of orders
	Select Lower Upper Order Num	that can be sp	pecified when
		selecting a ha	armonic
		measurement	parameter and then
		specifying SC	R_SUM as the
	You can set the range of orders to display on the Harmonic Measured Value screen	function. The	order range will
		serve as the c	display range on the
		Harmonic Me	asurement value
		Screen. For ex	kample, if you set the
		Management	
		12 you won't	he able to specify
		the 14th or bi	be able to specify
		calculation ite	me
5		Checking	
J	SQR_SUM(A:HUCH1)	Click the "Che	alues ock Value" button to
	Chearle ) (also	display the for	rmula and value
	Offeck Value		
(6)		Updating s	ettinas
Ŭ		Applies the se	ettings on the
	Update	Calculation Se	ettings screen to
		equipment ca	Iculations.
(7)		Closing the	e window
Ŭ		Click the "Clo	se" button to close
		the Calculatio	n Settings screen.
			<b>U</b>
	Ulose	You can canc	el the settings for the
		Calculation S	ettings screen by
		closing the sc	reen before clicking
		the Update bu	utton.

- \*1: When a harmonic measurement parameter is specified, calculations are performed for the 1st order measurement value (if the 1st order measurement value is outside the order range, the lowest order value in the range).
- \*2: When a harmonic measurement parameter is specified, the sum of squares value for the specified order range is calculated. For example, if the order range has been set to odd orders from 1 to 5, the calculation would be (k1\*K1) + (k3\*k3) + (k5\*k5), where kn indicates the nth order measurement value.

If a non-harmonic measurement parameter is specified, the sum of squares value is used.

\*3: When a harmonic measurement parameter is specified, the sum across the specified order range is calculated. For example, if the order range has been set to odd orders from 1 to 5, the calculation would be k1 + k3 + k5, where kn indicates the nth order measurement value.

If a non-harmonic measurement parameter is specified, the value is used without modification.

\*4: Accuracy is expressed in degrees, not radians. Measurement values for parameters such as phase angle can be entered without modification.

### Calculation and other settings

Set the operation contents according to the following procedure.

(1)	Option	<b>Detailed setting screen display</b> Pressing the [Option] button displays the setting screen of the number of digits and unit character strings.	
(2)	Calculation Detail Setting Display unit 99.971 \$ Close	Number of digits and unit character string settingsThe following can be set in the detailed setting screen.Display unitDisplay units can be selected from the following: m(milli), k(kilo), M(mega), G(giga), N/A(blank)UnitUnit character strings followed immediately by the calculation results can be set.Number of decimal placesThe number of digits of the calculation results can be specified.	
(3)		<b>File output settings</b> Select the [File Save] checkbox when saving the calculation results to a file.	

## 3.9 File Output (Interval Saving)

The selected measurement data can be obtained from the instrument and saved on the computer as a CSV file at the specified interval. With the Countdown Timer function, the saving operation can be completed automatically at the specified timing.

When multiple instruments systems are connected, the measurement data can be obtained from the specified instruments systems concurrently and saved in the same file.

The interval saving can be specified in the Data Save area on the main screen.

Data Save (1) Save to D¥Data¥PW333x_20170221.csv	)
IntervalSave	
(3) Interval 200ms* -	
(4) untdown Timer ⊽ 0 to day 0 to hour 1 to min 0 to sec (5	)
(6) File Division OFF	
(/) 🔲 No header ManualSave	

Data Save area on the main screen

Specifying the save destination and file name Click the button (2), and then specify the save destination and file name. It is also possible to directly edit the field (1).

For interval saving, whenever the [START] (8)button is pressed, a new file is created for saving the measurement values. For this file, an identification number (e.g., "\_001") is added to the specified file name.

Example: When "C:\Data\Pw333x\_20131001.csv" is specified

For the first interval saving, the file is saved in the following file:

C\Data\Pw333x\_20131001.csv

Subsequently, whenever a measurement is started, the save files are created sequentially as follows:

C:\Data\Pw333x\_20131001\_001.csv C:\Data\Pw333x\_20131001\_002.csv

Specifying the interval

The interval for obtaining and saving the measurement values can be specified in the field (3). It can be selected from 50ms,100ms, 200ms, 500ms, 1s, 5s, 10s, 15s, 30s, 1min, 5min, 10min, 15min, and 60min.

# NOTE

- It may not be possible to save the data at the specified interval, depending on the number of measurement items to be transferred through the communication and the communication status. If the saving operation is delayed from the specified interval, reduce the number of measurement items to be displayed or saved.
- When using functionality for synchronizing multiple instruments (described below), shorter interval times make delays in save operation more likely due to the need to perform processing to detect synchronization for each instrument.
- When the interval is set to 50 ms/100 ms, the application will only be able to update the data quickly enough if the following conditions are satisfied:

Only one PW6001 or PW3390 is registered with PWCommunicator. The LAN, GPIB, or USB interface is being used for the connection. The waveform display is disabled.

- Even when no delay occurs, there may be some time lag due to the clock accuracy of the computer. There are some fluctuations in the laptime of the saved measurement data in milliseconds.
- In the following circumstances, the application will not be able update the data at the specified interval. In this case, an asterisk ("\*") will be displayed in the interval setting field. Performing interval saving under these conditions will cause multiple instances of the same value to be saved in the CSV file since data updates will not occur quickly enough to keep pace with the save timing.

Save interval	Delay condition	Data update speed under delay condition
50ma/100ma	Multiple instruments have been registered with PWCommunicator.	200ma
50ms/100ms	One or more instruments other than the PW6001 or PW3390 have been registered.	2001115
200ms	Synchronized measurement using multiple instruments (master/slave measurement), described below, is being used.	500ms
50ms $\sim$ 500ms	One or more instruments are connected via the RS232C (COM) port. A waveform is being displayed.	1sec

This software sends the HOLD command to the instrument during acquisition of the measurement data to change the HOLD status of the instrument.

As the instrument currently in a communication state enters the remote mode, any operation on the instrument panel is disabled (PW3335/PW3336/PW3337 only). To use the panel of the instrument, stop the communication with the software (close all the measurement screens and stop the saving operation), and then cancel the remote mode by pressing the [SHIFT] key on the instrument.

The screen of the measuring instrument which is the communication target becomes the measurement screen(PW3390).

### Countdown timer operation

When the checkbox (4) below is checked, the countdown timer function is enabled. When interval saving is executed, a countdown for the time set in the fields (5) starts. When the counter reaches 0, the interval saving will automatically be stopped.



### Specifying the file division

If the field (6) below is set to an item other than "OFF", the save destination is changed to a new file after data are saved the specified number of times in the current file.



The name of a newly created file is assigned in the same manner as that when interval saving is newly started (an identification number (e.g., "\_002") is attached to the file name specified in (1) above).

Example: When "C:\Data\Pw333x\_20131001.csv" is specified For the first interval saving, the file is saved in the following file: C:\Data\Pw333x\_20131001.csv
Subsequently, for each specified number of times, the save files are created sequentially as follows:

C:\Data\Pw333x\_20131001\_001.csv C:\Data\Pw333x\_20131001\_002.csv

Integration link

When checkbox (7) is selected, the power meter's integrated values will be reset and integration operation started when interval saving starts. When interval saving completes, integration operation on the power meter will also stop. When interval saving is performed, the countdown configured with (5) will start, and interval saving will automatically stop when 0 is reached.



#### Specifying the instrument to be saved

The data of the instruments checked in the relevant checkboxes are saved. Whether or not to save the data of an instrument can be selected individually.

						(10)			
	ID	Status	Information	Meas Value	Instrumen <mark>t</mark> Setting		Item Num	Data Save Item	Sync.
Regist/Check	Α	READY	PW3337 LAN:192.168.1.2 ser1234543	Select	Display		92	Select	
Regist/Check	в	READY	PW3336 LAN:192.168.1.36 ser130522	Select	Display	<b>V</b>	92	Select	

#### Specifying the saving items

The items to be saved can be selected on the measurement value list screen or saving item setting screen.

							(8)	
	ID	Status	Information	Meas Value	Instrument Setting	Item Num	Data Save Item	Sync.
Regist/Check	A	READY	PW3337 LAN:192.168.1.2 ser1234543	Select	Display 📃	92	Select	
Regist/Check	в	READY	PW3336 LAN:192.168.1.36 ser130522	Select	Display 🔽	92	Select	

Pressing one of the buttons indicated as (8) (saving item selection button) displays the saving item setting screen.

However, those buttons cannot be selected during file saving. If you wish to change the saving items, complete the file saving operation.

The save order range for harmonics can be specified with the option dialog box on the Harmonic Data Display screen.

Save Item S	<sup>etting</sup> ive Item Select	(2) Selected Item Num:	3	(1)	Measurement item group selection area Allows you to select the group of the measurement items.
Ums Umean Uac Udc	CH1 CH2 CH1 CH2 VINST VINST MAX MIN VINST MAX MIN VINST MAX MIN VINST MAX MIN VINST MAX MIN VINST MAX MIN VINST MAX MIN VINST	CH3 V INST A I I MAX A I I MIN A I I INST A I I MAX A I I MIN A I I INST A I I MAX I I MIN A I I I I I I I I I I I I I I I I I I	SUM NST A MAX NST A MIN T NST A MIN T NST A MIN T	(2) (3) (4)	Display for the number of selected items Displays the number of items to be saved. Saving item selection area The measurement items checked in the relevant checkboxes are output in a file (interval saving, manual saving). [Clear] button When this button is pressed, all items in the displayed tab are
Ufnd Upk	INST     INST       MAX     MAX       MIN     INST       MAX     MIN	INST A MAX MIN T	NST A MAX MIN T	(5)	excluded from the items to be saved. [OK] (confirmation) button When this button is pressed, any changes made in the saving settings are applied to the next file
Ucf	INST MAX MIN T INST MAX MIN T INST MAX MIN T INST	INST A MAX MIN T INST A MAX MIN T		(6)	output, and then the saving item setting screen is closed. [Cancel] button When this button is pressed, the saving item setting screen is closed without making any changes to the
4)	(5) Saving item se	tting scree	Cancel (6)		saving settings.

For the data in the harmonic tab, when one item is selected as the saving target, all the specified data of each order are saved. When the order output is set to 0 to 50th order, there are 51 more data to be saved per harmonic item. Be aware that a communication or saving delay is more likely to occur.

#### Format of the save file

The CSV file created during interval saving is saved in the following format. In the following file, Urms1, Irms1, and P1 are obtained and saved from each of the two Instrument systems.



The first row contains information such as the instrument ID and serial number for which communication is performed.

The second row contains the date and time the measurement has started.

The third row is the header information.

### NOTE

• The following special values are used for items for which the measured value could not be acquired from the instrument due to a communications error or for which a condition such as over-peak or over-range occurred on the instrument:

Error	Measured value string
(PW3335/PW3336/PW3337)	
Communications error	"789.00E+9"
Over-range on instrument	"999.99E+9"
Scaling error on instrument	"888.88E+9"
No measurement data on	"777.77E+9"
instrument	

Error (PW3390)	Measured value string
Communications error	"789.00E+9"
Over-range on instrument	" +9999.9E+99"
No measurement data on	
instrument	

Error (PW6001)	Measured value string
Communications error	"789.00E+9"
Over-range on instrument	" +99999.9E+99"
No measurement data on	
instrument	

#### 3.10 File Output (Manual Saving)

The measurement data can be obtained at the specified timing and the measurement values can also be saved on the computer as a CSV file.

Data Save		(1)		
Save to	;>:¥Data¥PW3:	3x_20170221.csv		
	-IntervalSave			
	Interval	200ms* 👻		
		Countdown Timer 🔽 🛛 💽 day	y 0 i hour 1 i min 0 i sec	
	File Division	OFF 🚽 📄 Start integ	gration at the same time START	
		(*	10) 🗆 No header 🛛 ManualSave 🗍 (1	1)
		Data Save area	a <b></b> -	

Data Save area

Pressing the button (11) above executes manual saving.

The save destination and saving items are the same as those for interval saving.

However, the data are output to the file specified in (1) above. (No identification number is added.)

### NOTE

When manual saving is executed, if the file to be saved is currently being used for another application, a different file (added with an identification number for its file name) will be created and the measurement values will be saved in the file, in the same manner as for interval saving.

#### Header suppression

When (10) is selected, headers will not be added when appending data to an existing file during manual saving. This option allows files to be created in a format similar to that generated by interval saving when a series of manual saves are performed.



## NOTE

If you continue to save data manually after changing the parameters being saved, the measured values being saved will differ from the information contained in the header.

If you change the parameters being saved, either deselect the [No header] checkbox or save the data to a new file with a different filename.

#### 3.11 Synchronous Settings When Multiple Systems Are Connected

With this software, communication can be performed with a maximum of eight Instruments systems concurrently.

This section describes how to use the software when connecting to multiple instruments that have been connected with synchronization cables to perform synchronized measurement.

#### 3.11.1 Synchronous Settings (for the PW3335/PW3336/PW3337)

You can perform synchronized measurement by connecting instruments (PW3335/PW3336/PW3337) with the 9165 Connection Cable (a BNC cable).

	ID	Status	Information	Meas Value	Instrument Setting		Item Num	Data Save Item	Syr	nc.
Regist/Check	A	READY	PW3337 LAN:192.168.1.2 ser1234543	Select	Display		92	Select	(1	2)
Regist/Check	В	READY	PW3336 LAN:192.168.1.36 ser130522	Select	Display	1	92	Select		<b>~)</b>

During synchronous measurement, the master and slave settings for each instrument are displayed in (12) above.

#### 3.11.2 Synchronous Settings (for the PW3390)

You can perform synchronized measurement by connecting instruments (PW3390) with the 9683 Connection Cable.

To acquire data that has been synchronized across multiple instruments, it is necessary to set the synchronization event for both the master and the slave instrument to HOLD.

Field (12) indicates the master (MASTER\_H) or slave (SLAVE\_H) setting for each instrument when performing synchronized measurement (when there is at least one PW3390 with synchronization set to slave and synchronization events set to HOLD). Only instruments whose synchronization events parameter is set to HOLD are shown.

#### 3.11.3 Synchronous Settings (for the PW6001)

When two PW6001 instruments are connected with a cable such as the L6000 Optical Connection Cable, simultaneous measurement can be performed by the connected instruments.

You can acquire synchronized measurement data by acquiring measured values from the SLAVE (MEAS) instrument via the PW6001 set to MASTER (MEAS) (by choosing a parameter followed by "(slv)" in the master instrument's measurement parameter menu [see screenshot below]). You can acquire synchronized measurement data by acquiring measured values from the SLAVE (MEAS) instrument via the PW6001 set to MASTER (MEAS) (by choosing a parameter followed by "(slv)" in the master instrument's measurement parameter menu [see screenshot below]). Slave instrument measured values cannot be specified from the master instrument's measurement parameter menu [see screenshot below]). Slave instrument measured values cannot be specified from the master instrument's measurement parameter menu (see screenshot below]). Slave instrument measured values cannot be specified from the master instrument's measurement parameter menu (see screenshot below]). Slave instrument measured values cannot be specified from the master instrument's measurement parameter menu [see screenshot below]). Slave instrument measured values cannot be specified from the master instrument's measurement parameter menu (see screenshot below]). Slave instrument measured values cannot be specified from the master instrument's measurement parameter menu (see screenshot below]).

The synchronization setting field for PW6001 instruments will display nothing, regardless of the instrument's setting.

OFF				
Voltage	•			
Current	•			
Power	•			
Integration	•			
Motor	•			
etc.	•			
Voltage(slv)	•	SlvUrms	×	CH1
Current(slv)	►	SlvUmn	►	CH2
Power(slv)	►	SlvUac	•	СНЗ
Integration(slv)	►	SlvUdc	+	CH4
Motor(slv)	•	SlvUfnd	+	CH5
etc.(slv)	•	SlvUpk+	•	CH6
CAL	•	SlvUpk-	•	
		SlvUthd	•	
		SlvUrf	•	
		SlvθU	+	

Specifying a SLAVE (MEAS) measurement parameter from the PW6001 set to MASTER (MEAS)

### NOTE

- For more information about synchronization functionality, see the instrument's user manual.
- When using the synchronous function, be sure to connect the target instrument using the synchronous cable.
- If synchronism is not necessary for the measurement data, you can turn OFF all the synchronous settings for the instrument and obtain the measurement data without using the synchronous function.
- While using the integration function, the synchronous setting of the instrument cannot be changed. When changing the synchronous setting of the instrument, reset the integration of the instrument.
- This software sends the HOLD command to the instrument during acquisition of the measurement data. When the instrument whose synchronous setting is set to "MASTER(\_H)" or "SLAVE(\_H)" is currently registered in the connection list, the HOLD command is only sent to the master unit, while no HOLD command is sent to the slave unit.
- You will not be able to select the measured value display if the synchronization setting field indicates the following:
  - Multiple instruments set as MASTER(\_H)
  - One or more SLAVE (\_H) instruments but no MASTER(\_H) instrument
- The MASTER (\_H) and SLAVE (\_H) instruments must be the same model.( The PW3335, PW3336, and PW3337 are considered to be the same model.)
- When using the PW3335/PW3336/PW3337, it may take time to acquire measured values due to synchronization processing.
- Although this software normally acquires measured values at an interval of 50 ms to 200 ms, measured values are acquired at an interval of 500 ms when synchronizing multiple instruments (when MASTER [\_H] and SLAVE [\_H] instruments are shown in the synchronization setting field). An asterisk ("\*") will appear in the interval time setting field when settings do not allow acquisition of measured values while synchronizing multiple instruments.

#### 3.12 Functionality for Downloading Files

You can use this application to download files from the power meter's media (CF card or USB flash drive) to a computer. (Supported models: PW3390 [LAN, USB], PW6001 [LAN])



### NOTE

- The following limits apply to the display of files stored on instrument media.
  - A single folder can contain up to 90 files and up to 215 folders. Files and folders in excess of those numbers will not be displayed.
  - Filenames containing double-byte characters cannot be displayed.
  - When connected to the PW3390, it is not possible to access files below the folder level (i.e. files stored two levels or further down in the file hierarchy).

#### 3.13 Instrument Setting Function

The setting states of the connected instrument can be obtained and displayed. Setting contents changed in this software can be sent to the Instrument, and the setting files can be saved to the computer.

#### Setting screen

Pressing the instrument setting button of a setting object on the main screen displays the following screen:

Input Setting Display	Measure	Harmonics	Interface	D/A	
Wir	ring 👘	1P2W*	*3 👻	(1)	
		ch1		ch2	ch3
Voltage auto rar	nge				
Voltage rar	nge	15V	•	15V •	· 15V
VT ra	atio	1.0	*	1.0	1.0
Voltage wavefo peak(M/	orm AX)	0.000 V	/pk	0.000 Vpk	0.000 Vpk
VoltageM	1AX	0.000	v	0.000 V	0.000 V
Volta	age	0.000	v	0.000 V	0.000 V
		ch1		ch2	ch3
External current sen	isor	TYPE2	2 🗸	TYPE2 🗣	· TYPE2
Current auto ra	nge				
Current rai	nge	200mA	A -	200mA -	200mA
Current range(Exter current sens	mal	50A	•	50A -	• 50A
OT ra	atio	1.000	*	1.000	1.000
Current wavefo peak(M/	orm AX0	28.54 A	1pk	26.67 Apk	0.00 Apk
CurrentM	1AX	18.116	A	18.384 A	0.000 A
Curr	rent	18.016	A	18.282 A	0.000 A
Frequency Measurem Rai	ient	100Hz	-	100Hz -	100Hz
Time	out	0.1sec	· •	0.1sec -	0.1sec
Synchronization Sou	arce	I1	•	I2 -	· I1

(1)	Setting display area	Setting contents are displayed. The display contents may differ depending on the Instrument. Display contents can be switched by switching the tabs at the top of the instrument setting screen. Invalid setting items are grayed-out and no changes can be made to any settings in the setting display area, i.e., when the wire connections are other than 1P2W (1-phase, 2-wire) and the range setting is shared with CH1.
(2)	Setting files Saving and Loading	Pressing the [Save] button saves the setting contents in a file in text format that is displayed on the software screen. The saved file can be loaded by pressing the [Load] button. Settings are not transmitted or applied to the instrument at the time the saved file is loaded. Click the [Send Setting] button in order to reflect the settings to the instrument.
(3)	Transmission and reception of settings	Pressing the [Send Setting] button transmits and applies the displayed settings to the instrument. Invalid settings such as grayed-out settings are not transmitted. Pressing the [Receive Setting] button receives the settings from the instrument and displays them on the software screen.
(4)	Automatic updating	Checking the checkbox automatically updates the peak and maximum values of the voltage and current on the [Input Setting] tab.

## NOTE

- When selecting a range, use the peak and maximum values of the voltage and current on the [Input Setting] tab as a reference.
- The contents of the hardware settings screen are not updated automatically. To update the information shown on the screen, press the [Receive Setting] button.
- No setting changes such as input settings are available during the instrument integration (for the PW3335/PW3336/PW3337, when the instrument's RUN lamp is lit up or flashing; for the PW6001,PW3390, when the instrument's START lamp is lit up)
- Reset the integration by resetting the instrument or the hardware settings screen.

#### 3.14 Main Screen

With this software, communication can be performed with a maximum of eight instruments systems concurrently.

On the main screen, the connection list for the instrument that is the connection destination is displayed. The file output can also be executed from the main screen.

🕎 PW Comm	unic	ator (Ve	er.1.4.8.0)	(5)	$(\mathbf{c})$	<u> </u>				
(1)	Z) ID	(3) Status	(4) Information	Meas Value	Instrument Setting		Item Num	Data Save Item	<b>(10)</b> Sync.	
Regist/Check	A	READY	PW3390-03 USB488:1 170113266	Select	Display		119	Select		
Regist/Check	) в	READY	PW3336_01 GPIB:2 ser130522302	Select	Display		92	Select		
Regist/Check	C	READY	PW6001-04 LAN:192.168.1.61 141111	Select	Display		23	Select		
Regist/Check	D	READY	PW3335_04 COM:4 ser000000000	Select	Display		20	Select		
Regist/Check	) E	READY	PW3390-02 LAN:192.168.1.139 00000	Select	Display		17	Select		
Regist/Check	F	NONE		Select	Display			Select		
Regist/Check	G	NONE		Select	Display			Select		
Regist/Check	н	NONE		Select	Display			Select		
Data Save (11) <sub>Save to</sub>	)¥C	)ata¥PW;	333x_20170221.csv						Calc Setting	
(1:	(19) (12) Interval 200ms* → (13) Countdown Timer ♥ 0 ↔ day 0 ↔ hour 1 ↔ min 0 ↔ sec									
(1	<b>4)</b> File	Division	OFF Start inte	egration at t	he same tim	•	START	(16)	(20)	
			(13)	(17)	No header		ManualSav	· <b>(18)</b>	Close	

### Main screen

	Name	Description			
(1)	[Regist/Check] button	Allows you to select the instrument to be connected or check the connection status. This is the button that is used first.			
(2)	ID	ID for identifying the instrument registered in the connection list.			
(3)	Status	Displays the communication status of the instrument registered in the connection list.READYCommunication can be performed.BUSYCommunication is currently being performed.ERRORA communication error is currently activated.			
(4)	Information	Displays the model name, serial number, and other information of the instrument to be connected when it is registered in the connection list. This information is also output to a CSV file. When this field is clicked for an already registered instrument, the data can be edited as desired.			
(5)	[Meas Value] button	Allows you to display the measurement values. Select one from the following menus.			

	Name	Description
		Measurement Value Measurement Value List (PW3335/PW3336/PW3337) Harm. Data For more details, refer to the description of each screen.
(6)	[Instrument Setting] button	Allows you to change the settings of the instrument to be connected.
(7)	Checkbox for saved data output	The data of the instrument checked with the relevant checkbox is output to a CSV file. Even when the saving settings are specified for each measurement item on the measurement value list screen or saving item selection screen, unless these checkboxes are checked, the data will not be output to the CSV file. This can be used for switching the ON/OFF setting of the overall measurement items of the specified instrument.
(8)	Item Num	Displays the number of measurement items to be obtained from the instrument through the communication. The larger this number is, the longer it takes to communicate with the instrument. Due to this, a delay is more likely to occur during measurement value display or file output. In order to resolve the delay problem, reduce the number of selected items in each screen so that a smaller value is set in this field.
(9)	Saving item selection	Allows you to select the measurement items to be output in a file. For more details, refer to 3.9 File Output (Interval Saving).
(10)	Sync	Allows you to display the synchronous settings of the instrument.(For the PW3335/PW3336/PW3337/PW3390) For more details, refer to "13. Synchronous Settings When Multiple Systems Are Connected.
(11)	Save to	Allows you to specify the file for outputting the measurement values.
(12)	Interval	Allows you to specify the interval for interval saving.
(13)	Countdown Timer	Allows you to specify the timer operation during interval saving.
(14)	File division	Allows you to specify the file division method during interval saving.
(15)	Start integration at the same time	Allows you to link the instrument's integration operation to interval saving start/stop operation.
(16)	Interval saving start button	Pressing this button starts interval saving. While interval saving is in progress, this button changes to the [Abort] button.
(17)	No Header	Selecting this checkbox will suppress the header when appending data to an existing file during manual saving.
(18)	[ManualSave] button	Pressing this button executes manual saving.
(19)	[Calc. Setting] button	Allows you to obtain the calculated values for the destination instrument.
(20)	[Close] button	Closes the main screen after closing the screen displaying measurement values or stopping the file output.

#### 3.15 Other

#### Startup option

The following option can be specified when launching the application from the command line, for example at startup:

Example: By specifying

"C:\Program Files\HIOKI\PW\_Communicator\PW\_Communicator.exe" -AUTO\_START , you can automatically start interval saving immediately after the application is launched.

Option	Description				
-AUTO_START	Starts interval saving immediately after the application is launched.				
	Specifying an invalid instrument or an invalid location in which to save files will result in an error.				

# 4. Uninstallation

#### 4.1 Uninstalling PW Communicator

If this software is no longer necessary, uninstall it according to the following procedure.

- For Windows 7
  - 1 From the [Start] menu of Windows, click [Control Panel].



2 Click [Uninstall a program].



3 Select [PW Communicator] from the list of the currently installed programs, and then click [Uninstall].

			_ <b>D</b> X
📀 🕞 🗕 🔣 Kontrol Panel 🛛	Programs	🗸 👍 Search Programs and I	Features 🔎
Control Panel Home View installed updates	Uninstall or (2) Click here To uninstall a program celect it from the list a	nd then click Uninstall, Change, or Repa	ir.
off	Organize 🕶 Uninstall Change Repair	(1) Click here	:= 🗸 🔞
	Name	Publisher	Installed On 🔺
	🕎 HIOKI PW Communicator	HIOKI E.E. CORPORATION	10/2/2014 =
	Microsoft .NET Framework 4 Client Profile	Microsoft Corporation	10/2/2014
	Microsoft .NET Framework 4 Extended	Microsoft Corporation	10/2/2014 👻
	<[		•
	HIOKI E.E. CORPORATION Product	version: 0.4.8 Size: 11.8 MB	

When a dialog box that requires you to permit the continued program uninstallation appears, click [Yes] to proceed to the next step.



Uninstalling Microsoft .NET Framework4

In the same manner as "Uninstalling PW Communicator ", select [Microsoft .NET Framework4] and uninstall it.

		· · ··································	NUCL A COURSE	18. 1			3	x
🕞 🗸 🔂 🕨 Control Panel 🕨	Programs +	Programs and Features		👻 🍫 Sear	rch Programs ai	nd Features		٩
Control Panel Home       Uninstall or change a program         View installed updates       To uninstall a program, select it from the list and then click Uninstall, Change, or Repair.         Image: Turn Windows features on or       To uninstall a program, select it from the list and then click Uninstall, Change, or Repair.								
off	Organize 🔻	Uninstall/Change					•	0
	Name	*	Publisher	Installed On	Size	Version		-
	Microsoft	NET Framework 4 Client Profile	Microsoft Corporation	10/1/2013	38.8 MB	4.0.30319		-
	Microsoft Corporation Product version: 4.0.30319 Help link: http://go.microsoft.com/fwlink/?LinkId=164165							

.NET Framework is also used by other application software. Please uninstall only if it is no longer needed completely.

# 5. Specifications

### 5.1 General Specifications

Applicable model	PW3335/PW3336/PW3337 Power Meter PW3390 Power Analyzer PW6001 Power Analyzer				
Operation environment	Personal compute	er compatible with the following conditions			
	Computer	PC/AT compatible machine (DOS/V machine)			
		Windows 7 SP1 or above (32-/64-bit edition)			
	Operating	Windows 8 (32-/64-bit edition)			
	system	Windows 10 (32-/64-bit edition)			
		Microsoft .NET Framework4 must be installed in the above operating systems in advance.			
	CPU	1.0 GHz or higher (2.0 GHz or above is recommended)			
	Momon	1.0 GB or higher (2.0 GB or above is recommended)			
	Wernory	Note: 2.0 GB or higher for Windows 64-bit edition			
	Hard disk	Free space of 128 MB or more (at the time of startup)			
	Display	Resolution of 1,024×768 dots or above, 65,536 colors or more			
	Communication interface	Any one or more of the following must be available: Ethernet (TPC/IP), GP-IB, USB(488),and RS-232C(COM Port). Only the GP-IB interface manufactured by National Instruments Corporation is acceptable. The GP-IB driver of .NET4.0 or above must be installed in advance.(NI-488.2 3.1.2 or later) The supplied driver must be installed in order to use the USB interface.			
Number of systems that ca concurrently	an be connected	8			

### 5.2 Functional Specifications

Display function	By connecting with the Instrument, the measurement values are displayed on the monitor
Value	Selected measurement value is displayed
Number of display items	Selectable from 4, 8, 16, and 32
Waveform display	Waveforms of the voltage and current in each channel can be displayed.
	(For the PW3335/PW3336/PW3337, the waveform has been attenuated in a frequency range of 8 kHz or more. Details depend on the width of the window for the harmonics analysis of the instrument.)
	(For the PW6001, waveforms are displayed after being compressed to 1k points. When the sampling speed is faster than 50 kHz, motor analog waveforms are displayed using interpolation.)
	(For the PW3390, waveforms are displayed after being compressed to 500 points.)
	Any part of the waveform can be enlarged.
Value list (For the PW3335/ PW3336/PW3337)	Instantaneous, maximum and minimum values are displayed at the same time
Number of display items	Maximum of 64 items
Harmonic	Harmonic data are displayed
Available data	Instantaneous, maximum, and minimum values for harmonic voltage, current, and power
	Data from 0 (DC) to 50th order for the selected harmonic data (PW6001,PW3390: 0th to 100th order)
Measurement value saving function	
Overview	By connecting with the instrument, the specified measurement values are saved in
Operation	Manual saving at the specified timing     Interval saving that allows automatic saving at the specified interval
Output format	CSV
Selectable interval time	Selectable from 50ms, 100ms, 200ms, 500ms, 1s, 5s, 10s, 15s, 30s, 1min, 5min, 10min, 15min, and 60min Actual saving interval may differ depending on the communication status and the number of items to be communicated
	The items to be saved are selectable from all the measurement values
Calculation (Inter-device arithmetic) function	
Overview	Measurement values of multiple connected instruments can be calculated.
	Calculation results can be displayed on the value display and value list screen, and the results can be output to a file.
Binary expression	32
Binary expression type	Addition, Subtraction, Multiplication, Division, Efficiency operation, $(x^*x)/y$ , $x/(y^*y)$
Unary calculation	Constant multiplication and unary calculations can be used in expressions.
Unary calculations	Absolute value, exponent, natural logarithm, common logarithm, negative, square, sum of squares (harmonic), square root, sum (harmonic), trigonometric functions, inverse trigonometric functions, hyperbolic function
Instrument setting function	
Overview	Allows you to retrieve and change the settings of the instrument through interface communication.

Other

Startup option Allows you to specify application operation using command line options.

# 6. Appendix

#### 6.1 List of Measurement Items

### 6.1.1 List of Measurement Items (PW3336/PW3337)

Measurement items	Rectifier	Notation on instrument		Notation in software
	RMS value		AC DC	Urms
	Voltage average value rectifier	v	AC DC Umn	Umean
Voltage (U)	DC measurement		DC	Udc
	AC measurement		AC	Uac
	Harmonic (fundamental wave)		FND	Ufnd
	RMS value		AC DC	Irms
	Voltage average value rectifier	A	AC DC Umn	Imean
Current (I)	DC measurement		DC	ldc
	AC measurement		AC	lac
	Harmonic (fundamental wave)		FND	lfnd
	RMS value		AC DC	Prms
	Voltage average value rectifier		AC DC Umn	Pmean
Active power (P)	DC measurement	w	DC	Pdc
	AC measurement		AC	Pac
	Harmonic (fundamental wave)		FND	Pfnd
	RMS value		AC DC	Srms
Apparent power (S)	Voltage average value rectifier	VA	AC DC Umn	Smean
	AC measurement		AC	Sac

Measurement items	Rectifier	Notation on i	nstrument	Notation in software
	Harmonic (fundamental wave)		FND	Sfnd
	RMS value		AC DC	Qrms
	Voltage average value rectifier	var	AC DC Umn	Qmean
Reactive power (Q)	AC measurement		AC	Qac
	Harmonic (fundamental wave)		FND	Qfnd
	RMS value		AC DC	PFrms
	Voltage average value rectifier		AC DC Umn	PFmean
Power factor (λ)	AC measurement	PF	AC	PFac
	Harmonic (fundamental wave)		FND	PFfnd
	AC measurement		AC	DEGac
Phase angle $(\phi)$	Harmonic <sup>°</sup> (fundamental wave)		FND	DEGfnd
Voltage frequency (f)		V Hz		FREQ_U
Current frequency (f)		A Hz		FREQ_I
Positive current integration		Ah +	DC	IH+dc
Negative current integration	1	Ah -	DC	ID-dc
	RMS value	-	AC DC	IH
Current integration sum	Voltage average value rectifier	Ah	AC DC Umn	IH mean
	DC measurement		DC	IH dc
	RMS value		AC DC	WH+
Positive active power integration	Voltage average value rectifier	Wh +	AC DC Umn	WH+mean
	DC measurement		DC	WH+dc
	RMS value		AC DC	WH-
Negative active power integration	Voltage average value rectifier	Wh -	AC DC Umn	WH-mean
	DC measurement		DC	WH-dc
	RMS value		AC DC	WH
Active power integration sum	Voltage average value rectifier	Wh	AC DC Umn	WH mean
	DC measurement		DC	WH dc
Integration time		ТІМЕ		TIME
Voltage waveform peak value (Upk)		V pk		Upk

Measurement items Rectifier		Notation on instrument		Notation in software
Current waveform peak value (lpk)	A pk		lpk	
Efficiency (η)	<b>η1 %</b>	<b>η1 %</b>		
Efficiency (η)		<b>η2 %</b>		EFF2
Voltage crest factor (Ucf)		CF V		Ucf
Current crest factor (lcf)		CF A		Icf
	RMS value		AC DC	I.TAV
Time average current (T.AV I)	Voltage average value rectifier	T.AV A	AC DC Umn	I.TAVmn
	DC measurement		DC	I.TAVdc
	RMS value		AC DC	P.TAV
Time average active power (T.AV P)	Voltage average value rectifier	T.AV W	AC DC Umn	P.TAVmn
	DC measurement		DC	P.TAVdc
Voltage ripple factor (Urf)		RFV%		Urf
Current ripple factor (Irf)		RF A %		Irf
Total harmonic voltage distortion rate (U	thd)	THD V %		Uthd
Total harmonic current distortion rate (Itl	nd)	THD A %		lthd
Inter-channel voltage fundamental wave (0U2-1)	phase difference	θ V ° CH1 CH2		Uchdeg (CH2)
Inter-channel voltage fundamental wave (003-1)	phase difference	θ V ° CH1 CH3		Uchdeg (CH3)
Inter-channel current fundamental wave (θ2-1)	phase difference	θ A ° CH1 CH2		Ichdeg (CH2)
Inter-channel current fundamental wave (θ3-1)	phase difference	θ A ° CH1 CH3		Ichdeg (CH3)
Harmonic voltage RMS value (Uk)		HRM V LEVEL		HU
Harmonic current RMS value (lk)		HRM A LEVEL		HI
Harmonic active power (Pk)	HRM W LEVEL		HP	
Harmonic voltage content percentage (UHDk)		HRM V % HD%		HUcon
Harmonic current content percentage (II	HRM A % HD%		HIcon	
Harmonic active power content percenta	HRM W % HD%		HPcon	
Harmonic voltage phase angle (OUk)		No display		HUpha
Harmonic current phase angle (Olk)		No display		Hlpha
Harmonic voltage/current phase differen	ce (Θk)	No display		HPpha

### 6.1.2 List of Measurement Items (PW3335)

Measurement items	Rectifier	Notation on in	strument	Notation in software
	RMS value		AC DC	Urms
	Voltage average value rectifier		AC DC Umn	Umean
Voltage (U)	DC measurement	v	DC	Udc
	AC measurement		AC	Uac
	Harmonic (fundamental wave)		FND	Ufnd
	RMS value		AC DC	Irms
	Voltage average value rectifier		AC DC Umn	Imean
Current (I)	DC measurement	Α	DC	ldc
	AC measurement	-	AC	lac
	Harmonic (fundamental wave)		FND	lfnd
	RMS value	value value wement w w w w ment c ental	AC DC	Prms
	Voltage average value rectifier		AC DC Umn	Pmean
Active power (P)	DC measurement		DC	Pdc
	AC measurement		AC	Pac
	Harmonic (fundamental wave)		FND	Pfnd
	RMS value		AC DC	Srms
	Voltage average value rectifier		AC DC Umn	Smean
Apparent power (S)	AC measurement	VA	AC	Sac
	Harmonic (fundamental wave)		FND	Sfnd
	RMS value		AC DC	Qrms
	Voltage average value rectifier	var	AC DC Umn	Qmean
Reactive power (Q)	AC measurement		AC	Qac
	Harmonic (fundamental wave)		FND	Qfnd
Power factor (λ)	RMS value	PF	AC DC	PFrms

Measurement items		Rectifier	Notation on instrument			Notation in software
		Voltage average value rectifier			AC DC Umn	PFmean
		AC measurement			AC	PFac
		Harmonic (fundamental wave)			FND	PFfnd
		AC measurement			AC	DEGac
Phase angle $(\phi)$		Harmonic (fundamental wave)		)	FND	DEGfnd
Voltage frequency (f)				V Hz		FREQ_U
Current frequency (f)				A Hz		FREQ_I
	TOTAL (All range)			TOTAL		IH+dc TOTAL
	200mA range			200mA		IH+dc 200mA
	500mA range	-		500mA		IH+dc 500mA
Positive current	1A range	DC		1A	DC	IH+dc 1A
integration	2A range	measurement	Ah +	2A		IH+dc 2A
	5A range	-		5A		IH+dc 5A
	10A range			10A		IH+dc 10A
	20A range			20A		IH+dc 20A
	B(Backup)			В		IH+dc Backup
	TOTAL (All range)			TOTAL	DC	IH-dc TOTAL
	200mA range			200mA		IH-dc 200mA
	500mA range			500mA		IH-dc 500mA
Negative current	1A range			1A		IH-dc 1A
integration	2A range	measurement	Ah -	2A		IH-dc 2A
	5A range			5A		IH-dc 5A
	10A range			10A		IH-dc 10A
	20A range			20A		IH-dc 20A
	B(Backup)			В		IH-dc Backup
		RMS value			AC DC	IH TOTAL
	TOTAL (All range)	Voltage average value rectifier		TOTAL	AC DC Umn	IH mean TOTAL
		DC measurement			DC	IH dc TOTAL
Current integration	200mA range	DC measurement	Ab	200mA	DC	IH dc 200mA
sum	500mA range	DC measurement	An	500mA	DC	IH dc 500mA
	1A range	DC measurement		1 <b>A</b>	DC	IH dc 1A
	2A range	DC measurement		2A	DC	IH dc 2A
	5A range	DC measurement		5A	DC	IH dc 5A

Measurement items		Rectifier	Notation on instrument		Notation in software	
	10A range	DC measurement		10A	DC	IH dc 10A
	20A range DC measurement			20A	DC	IH dc 20A
	B(Backup)	DC measurement		В	DC	IH dc Backup
		RMS value			AC DC	WH+ TOTAL
	TOTAL (All range)	Voltage average value rectifier		TOTAL	AC DC Umn	WH+mean TOTAL
		DC measurement			DC	WH+dc TOTAL
		RMS value			AC DC	WH+ 200mA
	200mA range	Voltage average value rectifier		200mA	AC DC Umn	WH+mean 200mA
		DC measurement			DC	WH+dc 200mA
		RMS value			AC DC	WH+ 500mA
	500mA range	Voltage average value rectifier		500mA	AC DC Umn	WH+mean 500mA
		DC measurement	Wh +		DC	WH+dc 500mA
	1A range	RMS value		1A	AC DC	WH+ 1A
		Voltage average value rectifier			AC DC Umn	WH+mean 1A
		DC measurement			DC	WH+dc 1A
Positive active power	2A range	RMS value		2A	AC DC	WH+ 2A
integration		Voltage average value rectifier			AC DC Umn	WH+mean 2A
		DC measurement			DC	WH+dc 2A
		RMS value			AC DC	WH+ 5A
	5A range	Voltage average value rectifier		5A	AC DC Umn	WH+mean 5A
		DC measurement			DC	WH+dc 5A
		RMS value			AC DC	WH+ 10A
	10A range	Voltage average value rectifier		10A	AC DC Umn	WH+mean 10A
		DC measurement			DC	WH+dc 10A
		RMS value			AC DC	WH+ 20A
	20A range	Voltage average value rectifier		20A	AC DC Umn	WH+mean 20A
		DC measurement			DC	WH+dc 20A
	B(Backup)	RMS value		В	AC DC	WH+ Backup

Measurement items		Rectifier	Notation on instrument		Notation in software	
		Voltage average value rectifier			AC DC Umn	WH+mean Backup
		DC measurement			DC	WH+dc Backup
		RMS value			AC DC	WH- TOTAL
	TOTAL (All range)	Voltage average value rectifier		TOTAL	AC DC Umn	WH-mean TOTAL
		DC measurement			DC	WH-dc TOTAL
		RMS value			AC DC	WH- 200mA
	200mA range	Voltage average value rectifier		200mA	AC DC Umn	WH-mean 200mA
		DC measurement			DC	WH-dc 200mA
		RMS value		-	AC DC	WH- 500mA
	500mA range	Voltage average value rectifier		500mA	AC DC Umn	WH-mean 500mA
Negative active power integration		DC measurement			DC	WH-dc 500mA
	1A range	RMS value			AC DC	WH- 1A
		Voltage average value rectifier		1A	AC DC Umn	WH-mean 1A
		DC measurement			DC	WH-dc 1A
	2A range	RMS value	Wh -	2A	AC DC	WH- 2A
		Voltage average value rectifier			AC DC Umn	WH-mean 2A
		DC measurement			DC	WH-dc 2A
	5A range	RMS value		5A	AC DC	WH- 5A
		Voltage average value rectifier			AC DC Umn	WH-mean 5A
		DC measurement			DC	WH-dc 5A
		RMS value			AC DC	WH- 10A
	10A range	Voltage average value rectifier		10A	AC DC Umn	WH-mean 10A
		DC measurement			DC	WH-dc 10A
		RMS value	]		AC DC	WH- 20A
	20A range	Voltage average value rectifier		20A	AC DC Umn	WH-mean 20A
		DC measurement			DC	WH-dc 20A
		RMS value	1		AC DC	WH- Backup
	B(Backup)	Voltage average value rectifier		В	AC DC Umn	WH-mean Backup

Measurement items		Rectifier	Notat	Notation on instrument		Notation in software
		DC measurement			DC	WH-dc Backup
		RMS value		TOTAL	AC DC	WH TOTAL
	TOTAL (All range)	Voltage average value rectifier			AC DC Umn	WH mean TOTAL
		DC measurement			DC	WH dc TOTAL
		RMS value			AC DC	WH 200mA
	200mA range	Voltage average value rectifier		200mA	AC DC Umn	WH mean 200mA
		DC measurement			DC	WH dc 200mA
		RMS value	-		AC DC	WH 500mA
	500mA range	Voltage average value rectifier		500mA	AC DC Umn	WH mean 500mA
		DC measurement			DC	WH dc 500mA
		RMS value	-		AC DC	WH 1A
Active power integration sum	1A range	Voltage average value rectifier	Wh 2	1A	AC DC Umn	WH mean 1A
		DC measurement			DC	WH dc 1A
	2A range	RMS value		2A	AC DC	WH 2A
		Voltage average value rectifier			AC DC Umn	WH mean 2A
		DC measurement			DC	WH dc 2A
	5A range	RMS value		5A	AC DC	WH 5A
		Voltage average value rectifier			AC DC Umn	WH mean 5A
		DC measurement			DC	WH dc 5A
		RMS value			AC DC	WH 10A
	10A range	Voltage average value rectifier	-	10A	AC DC Umn	WH mean 10A
		DC measurement			DC	WH dc 10A
		RMS value			AC DC	WH 20A
	20A range	Voltage average value rectifier		20A	AC DC Umn	WH mean 20A
		DC measurement			DC	WH dc 20A
		RMS value			AC DC	WH Backup
	B(Backup)	Voltage average value rectifier		В	AC DC Umn	WH mean Backup
		DC measurement			DC	WH dc Backup

Measurement items		Rectifier	Notation on instrument		Notation in software	
	TOTAL (All range)			TOTAL		TIME TOTAL
	200mA range			200mA		TIME 200mA
	500mA range			500mA		TIME 500mA
	1A range	DC		1A		TIME 1A
Integration time	2A range	measurement	TIME	<b>2A</b>	DC	TIME 2A
	5A range			5A		TIME 5A
	10A range			10A		TIME 10A
	20A range			20A		TIME 20A
	B(Backup)			В		TIME Backup
Voltage waveform pea	k value (Upk)		V pk		1	Upk
Current waveform pea	k value (lpk)		Apk			lpk
Maximum Current Rat	io(MCR)		MCR			MCR
Voltage crest factor (U	lcf)		CF V			Ucf
Current crest factor (Ic	;f)		CF A			lcf
		RMS value	_		AC DC	I.TAV TOTAL
	TOTAL (All range)	Voltage average value	-	TOTAL	AC DC Umn	I.TAVmn TOTAL
		DC measurement	T.AV A		DC	I.TAVdc TOTAL
	200mA range	DC measurement		200mA	DC	I.TAVdc 200mA
	500mA range	DC measurement		500mA	DC	I.TAVdc 500mA
Time average current (T.AV I)	1A range	DC measurement		1A	DC	I.TAVdc 1A
	2A range	DC measurement		2A	DC	I.TAVdc 2A
	5A range	DC measurement		5A	DC	I.TAVdc 5A
	10A range	DC measurement		10A	DC	I.TAVdc 10A
	20A range	DC measurement		20A	DC	I.TAVdc 20A
	B(Backup)	DC measurement		В	DC	I.TAVdc Backup
		RMS value	-		AC DC	P.TAV TOTAL
	TOTAL (All range)	Voltage average value rectifier		TOTAL	AC DC Umn	P.TAVmn TOTAL
		DC measurement			DC	P.TAVdc TOTAL
		RMS value			AC DC	P.TAV 200mA
Time average active power (T.AV P)	200mA range	Voltage average value rectifier	T.AV W	200mA	AC DC Umn	P.TAVmn 200mA
		DC measurement			DC	P.TAVdc 200mA
		RMS value			AC DC	P.TAV 500mA
	500mA range	Voltage average value rectifier		500mA	AC DC Umn	P.TAVmn 500mA

Measurement items		Rectifier	Notat	ion on in	strument	Notation in software
		DC measurement			DC	P.TAVdc 500mA
		RMS value			AC DC	P.TAV 1A
	1A range	Voltage average value rectifier		1 <b>A</b>	AC DC Umn	P.TAVmn 1A
		DC measurement			DC	P.TAVdc 1A
		RMS value			AC DC	P.TAV 2A
	2A range	Voltage average value rectifier		2A	AC DC Umn	P.TAVmn 2A
		DC measurement			DC	P.TAVdc 2A
		RMS value			AC DC	P.TAV 5A
	5A range	Voltage average value rectifier		5A	AC DC Umn	P.TAVmn 5A
		DC measurement			DC	P.TAVdc 5A
		RMS value	-		AC DC	P.TAV 10A
	10A range	Voltage average value rectifier		10A	AC DC Umn	P.TAVmn 10A
		DC measurement			DC	P.TAVdc 10A
		RMS value			AC DC	P.TAV 20A
	20A range	Voltage average value rectifier	-	20A B	AC DC Umn	P.TAVmn 20A
		DC measurement			DC	P.TAVdc 20A
		RMS value			AC DC	P.TAV Backup
	B(Backup)	Voltage average value rectifier			AC DC Umn	P.TAVmn Backup
		DC measurement			DC	P.TAVdc Backup
Voltage ripple factor (I	Jrf)		RFV%			Urf
Current ripple factor (I	rf)		RFA%	RF A %		Irf
Total harmonic voltage	e distortion rate (U	thd)	THD V %			Uthd
Total harmonic current distortion rate (Ithd)		nd)	THD A %	)		Ithd
Harmonic voltage RMS value (LIk)			HRMVI	EVEL		HU
Harmonic current RMS value (Ik)			HRM A LEVEL			HI
Harmonic active power (Pk)			HRM W I	EVEL		HP
Harmonic voltage content percentage (UHDk)			HRM V % HD%			HUcon
Harmonic current content percentage (IHDk)			HRM A %	% HD%		HIcon
Harmonic active power content percentage (PHDk)			HRM W % HD%			HPcon
Harmonic voltage pha	se angle (ΘUk)		No displ	ay		HUpha
Harmonic current phas	se angle (Θlk)		No displa	ay		Hlpha
Harmonic voltage/curr	ent phase differen	ce (Θk)	No displa	ау		HPpha

### 6.1.3 List of Measurement Items (PW3390)

Measurement items		Notation on instrument	Notation in software(CSV)	
Statu	s(logical sum of each CH)		Status	
	Frequency	f	FREQ	
	RMS value	Urms	Urms	
	Mean value rectification RMS equivalent	Umn	Umn	
	AC component	Uac	Uac	
	Simple average	Udc	Udc	
Voltage	Fundamental wave component	Ufnd	Ufnd	
	Waveform peak +	Upk+	PUpk	
	Waveform peak -	Upk-	MUpk	
	Total harmonic distortion	Uthd	Uthd	
	Ripple factor	Urf	Urf	
	Unbalance rate	Uunb	Uunb	
	RMS value	Irms	Irms	
	Mean value rectification RMS equivalent	Imn	lmn	
	AC component	lac	lac	
	Simple average	ldc	ldc	
Current	Fundamental wave component	lfnd	lfnd	
	Waveform peak +	lpk+	Plpk	
	Waveform peak -	lpk-	Mlpk	
	Total harmonic distortion	Ithd	lthd	
	Ripple factor	lrf	Irf	
	Unbalance rate	lunb	lunb	
	Active power	Р	Р	
	Apparent power	S	S	
	Reactive power	Q	Q	
	Power factor	λ	PF	
	Voltage phase angle	θU	θU	
Phase angle	Current phase angle	θΙ	θΙ	
	Power phase angle	φ	DEG	
	Positive-direction current magnitude	lh+	Plh	
	Negative-direction current magnitude	lh-	Mlh	
	Sum of positive- and negative- direction current magnitude	lh	lh	
megration	Positive-direction power magnitude	WP+	PWP	
	Negative-direction power magnitude	WP-	MWP	
	Sum of positive- and negative- direction power magnitude	WP	WP	

Ν	leasurement items	Notation on instrument	Notation in software(CSV)	
	Efficiency	η	Eff	
	Loss	Loss	Loss	
	CH A	CH A	CH A	
Motor	CH B	СН В	СН В	
WOIDI	Motor power	Pm	Pm	
	Slip	Slip	Slip	
Inte	egration time(hr:min:sec)	Elapsed Time	E time	
Integration time(msec)			Eume	
Harmonic voltag	ge RMS value CHn (n=1~4)	Uk	HUnL000~HUnL100	
Harmonic voltag	ge phase angle CHn (n=1~4)	θUk	HUnP000~HUnP100	
Harmonic curre	nt RMS value CHn (n=1~4)	lk	HInL000~HInL100	
Harmonic curre	nt phase angle CHn (n=1~4)	θlk	HInP000~HInP100	
Harmonic active	e power CHn (n=1~4)	Pk	HPnL000~HPnL100	
Harmonic voltage/current phase angle $CHn(n=1 \sim 4)$		θk	HPnP000~HPnP100	
Harmonic voltag	ge content percentage CHn (n=1~4)	HDUk	HUnD000~HUnD100	
Harmonic curre	nt content percentage CHn (n=1~4)	HDIk	HInD000~HInD100	
Harmonic powe	r content percentage CHn (n=1~4)	HDPk	HPnD000~HPnD100	

# NOTE

• The order used when the software outputs parameters to files differs from the order used when the instrument saves parameters as a CSV file.

Measurement items		Notation on	Notation in software(CSV)
Status	s(logical sum of each CH)		Status
	RMS value	Urms	Urms
	Mean value rectification RMS equivalent	Umn	Umn
	AC component	Uac	Uac
	Simple average	Udc	Udc
Voltage	Fundamental wave component	Ufnd	Ufnd
	Waveform peak +	Upk+	PUpk
	Waveform peak -	Upk-	MUpk
	Total harmonic distortion	Uthd	Uthd
	Ripple factor	Urf	Urf
	Unbalance rate	Uunb	Uunb
Phase angle	Voltage phase angle	θU	Udeg
	RMS value	Irms	Irms
	Mean value rectification RMS equivalent	Imn	lmn
	AC component	lac	lac
	Simple average	ldc	ldc
Current	Fundamental wave component	lfnd	lfnd
	Waveform peak +	lpk+	Pipk
	Waveform peak -	lpk-	Mipk
	Total harmonic distortion	Ithd	Ithd
	Ripple factor	Irf	Irf
	Unbalance rate	lunb	lunb
Phase angle	Current phase angle	θΙ	Ideg
	Active power	Р	Р
Funda	mental wave active power	Pfnd	Pfnd
	Apparent power	S	S
Fundam	ental wave apparent power	Sfnd	Sfnd
	Reactive power	Q	Q
Fundan	nental wave reactive power	Qfnd	Qfnd
	Power factor	λ	PF
Fundamental wave power factor		λfnd	PFfnd
Phase angle	Power phase angle	φ	DEG
	Positive-direction current magnitude	lh+	РІН
	Negative-direction current magnitude	lh-	МІН
Integration	Sum of positive- and negative- direction current magnitude	lh	ІН
	Positive-direction power magnitude	WP+	PWP

М	easurement items	Notation on instrument	Notation in software(CSV)	
	Negative-direction power magnitude	WP-	MWP	
	Sum of positive- and negative- direction power magnitude	WP	WP	
	Torque	Τq	Tq	
	RPM	Spd	Spd	
Motor	Motor power	Pm	Pm	
	Slip	Slip	Slip	
	Free input during independent input mode operation	СН	СН	
	Frequency	f	FREQ	
	Efficiency	η	Eff	
	Loss	Loss	Loss	
Integ	gration time(hr:min:sec)	Elapsed Time	Etime	
In	tegration time(msec)		Etime(ms)	
Harmonic voltag	ge RMS value CH1		HU1L000~HU1L100	
Harmonic voltag	ge RMS value CHn	Uk	HUnL000~HUnL100	
Harmonic voltag	ge RMS value CH6		HU6L000~HU6L100	
Harmonic voltag	ge content percentage CH1		HU1D000~HU1D100	
Harmonic voltag	ge content percentage CHn	HDUk	HUnD000~HUnD100	
Harmonic voltag	ge content percentage CH6		HU6D000~HU6D100	
Harmonic voltag	ge phase angle CH1		HU1P000~HU1P100	
Harmonic voltag	ge phase angle CHn	θUk	HUnP000~HUnP100	
Harmonic voltag	ge phase angle CH6		HU6P000~HU6P100	
Harmonic curre	nt RMS value CH1		HI1L000~HI1L100	
Harmonic curre	nt RMS value CHn	lk	HInL000~HInL100	
Harmonic curre	nt RMS value CH6		HI6L000~HI6L100	
Harmonic curre	nt content percentage CH1		HI1D000~HI1D100	
Harmonic curre	nt content percentage CHn	HDIk	HInD000~HInD100	
Harmonic curre	nt content percentage CH6		HI6D000~HI6D100	
Harmonic curre	nt phase angle CH1		HI1P000~HI1P100	
Harmonic curre	nt phase angle CHn	θlk	HInP000~HInP100	
Harmonic current phase angle CH6			HI6P000~HI6P100	
Harmonic active	e power CH1		HP1L000~HP1L100	
Harmonic active	e power CHn	Pk	HPnL000~HPnL100	
Harmonic active power CH6			HP456L000~HP456L100	
Harmonic power content percentage CH1			HP1D000~HP1D100	
Harmonic power content percentage CHn		HDPk	HPnD000~HPnD100	
Harmonic power content percentage CH6			HP456D000~HP456D100	
Harmonic voltag	ge/current phase angle CH1		HP1P000~HP1P100	
Harmonic voltag	ge/current phase angle CHn	θk	HPnP000~HPnP100	
Harmonic voltag	ge/current phase angle CH6		HP456P000~HP456P100	

### NOTE

• The order used when the software outputs parameters to files differs from the order used when the instrument saves parameters as a CSV file.

#### 6.2 Description of Measurement Status Data

The measurement status information output to CSV files indicates occurrence of errors during measurement, for example when the range is exceeded. The status field consists of a string of eight 32-bit values expressed in hexadecimal notation (for example, "00000007"). By checking the status of each bit, you can check the measurement status. The meaning of each bit varies with instrument model. In addition, the first 0 may be omitted for some models of instrument.

• If the status information is "00000007" for a PW3336 or PW3337, the status information contains 4 bits of information for each character.

1st	2nd	3rd	4th	5th	6th	7th	7th
character							
"0"	"0"	"0"	"0"	"0"	"0"	"0"	"7"
Bit31-28	Bit27-24	Bit23-20	Bit19-16	Bit15-12	Bit11-8	Bit7-4	Bit3-0

In addition, bits and characters are related as follows:

addition, bito an	a onlaraotoro aro	1010100 00 101101		
	Bit31	Bit30	Bit29	Bit28
	Bit27	Bit26	Bit25	Bit24
	Bit23	Bit22	Bit21	Bit20
	Bit19	Bit18	Bit17	Bit16
	Bit15	Bit14	Bit13	Bit12
	Bit11	Bit10	Bit9	Bit8
	Bit7	Bit6	Bit5	Bit4
	Bit3	Bit2	Bit1	Bit0
"F"	1	1	1	1
"E"	1	1	1	0
"D"	1	1	0	1
"C"	1	1	0	0
"B"	1	0	1	1
"A"	1	0	1	0
"9"	1	0	0	1
"8"	1	0	0	0
"7"	0	1	1	1
"6"	0	1	1	0
"5"	0	1	0	1
"4"	0	1	0	0
"3"	0	0	1	1
"2"	0	0	1	0
"1"	0	0	0	1
"0"	0	0	0	0

In this example, characters 1 through 7 are all "0," while the 8th character is "7." Consequently, bits 2, 1, and 0 have the value 1, while all other bits have the value 0.

The status table for the PW3336 and PW3337 on the following page indicates the following errors:

Bit2	PU3	CH3 voltage peak exceeded
Bit1	PU2	CH2 voltage peak exceeded
Bit0	PU1	CH1 voltage peak exceeded

Based on this information, a measurement status of "0000007" for a PW3336 or PW3337 indicates that the voltage peak was exceeded by the voltage on channels 1 through 3.

### 6.2.1 Description of Measurement Status Data (PW3336/PW3337)

Bit31	Bit30	Bit29	Bit28	Bit27	Bit26	Bit25	Bit24
-	HM3	HM2	HM1	-	-	-	-
Bit23	Bit22	Bit21	Bit20	Bit19	Bit18	Bit17	Bit16
-	-	-	-	-	SY3	SY2	SY1
Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
-	-	-	-	-	-	-	-
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
-	PI3	Pl2	PI1	-	PU3	PU2	PU1

Bit	Abbreviation	Detail
Bit30~28	HMx	Harmonic wave measurement synchronization error
Bit18~16	SYx	Respective channels synchronization error
Bit6~4	Plx	Respective channels peak exceeded
Bit2~0	PUx	Respective channels voltage peak exceeded

(x is the channel number)

### 6.2.2 Description of Measurement Status Data (PW3335)

Bit31	Bit30	Bit29	Bit28	Bit27	Bit26	Bit25	Bit24
-	-	-	HM	-	-	-	RP
Bit23	Bit22	Bit21	Bit20	Bit19	Bit18	Bit17	Bit16
-	-	-	CP	-	-	-	SY
Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
-	-	-	RI	-	-	-	RU
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
-	-	-	PI	-	-	-	PU

Bit	Abbreviation	Detail
Bit28	HM	Harmonic wave measurement synchronization error
Bit24	RP	Active power exceeded
Bit20	CP	Instrument protection mode activated
Bit16	SY	Synchronization error
Bit12	RI	Current range exceeded
Bit8	RU	Voltage range exceeded
Bit4	PI	Current peak exceeded
Bit0	PU	Voltage peak exceeded

### 6.2.3 Description of Measurement Status Data (PW3390)

Bit 31	Bit 30	Bit 29	Bit 28	Bit 27	Bit 26	Bit 25	Bit 24
HM4	HM3	HM2	HM1	MRB	MRA	MPB	MPA
Bit 23	Bit 22	Bit 21	Bit 20	Bit 19	Bit 18	Bit 17	Bit 16
ULM	UDP	UCU	HUL	UL4	UL3	UL2	UL1
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
RI4	RI3	RI2	RI1	RU4	RU3	RU2	RU1
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
PI4	PI3	PI2	PI1	PU4	PU3	PU2	PU1

Bit	Abbreviation	Detail	
Bit31~28	HMx Harmonic parameter invalid (when the Harmonic synchronization is off, etc.)		
Bit27~26	MRx	Motor analysis function A, B range over	
Bit25~24	MPx	Motor analysis function A, B peak over	
Bit23	ULM	Motor analysis function A, B synchronization unlock	
Bit22	UDP	Uncalculable (when the measuremnt data becomes significantly invalid immediately after a range change, etc.)	
Bit21	UCU	Uncalculable (when the measuremnt data becomes invalid immediately after a range change, etc.)	
Bit20	HUL	Harmonic synchronization unlock	
Bit19~16	ULx	Respective channels synchronization unlock	
Bit15~12	Rlx	Respective channels current range over	
Bit11~8	RUx	Respective channels voltage range over	
Bit7~4	Plx	Respective channels current peak over	
Bit3~0	PUx	Respective channels voltage peak over	

(x is the channel number)
# 6.2.4 Description of Measurement Status Data (PW6001)

Bit31	Bit30	Bit29	Bit28	Bit27	Bit26	Bit25	Bit24
	UCU	ZD	ZC	ZB	ZA	RB	RA
Bit23	Bit22	Bit21	Bit20	Bit19	Bit18	Bit17	Bit16
					UCU	ZM	RM
Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
	UCU	ZP	ZI	ZU	DP	DI	DU
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
				RI	RU	PI	PU

Bit	Abbreviation	Detail	
Bit30	UCU	Calculation unavailable (measured data is immediately after change resulting in invalid)	
Bit29	ZD	CHD with forced zero-cross	
Bit28	ZC	CHC with forced zero-cross	
Bit27	ZB	CHB with forced zero-cross	
Bit26	ZA	CHA with forced zero-cross	
Bit25	RB	CHB range exceeded	
Bit24	RA	CHA range exceeded	
Bit21	UCUB	CHB calculation unavailable (measured data is immediately after change resulting in invalid)	
Bit20	ZMB	CHB motor synchronization source with forced zero-cross	
Bit19	RMB	CHB range exceeded when input is set to analog	
Bit18	UCUA	CHA calculation unavailable (measured data is immediately after change resulting in invalid)	
Bit17	ZMA	CHA motor synchronization source with forced zero-cross	
Bit16	RMA	CHA range exceeded when input is set to analog	
Bit14	UCU	CH1 through CH6 Calculation unavailable (measured data is immediately after change resulting in invalid) on one channel	
Bit13	ZP	CH1 through CH6 forced zero-cross occurred in power calculation (synchronization source) for one channel	
Bit12	ZI	CH1 through CH6 Current frequency with forced zero-cross on one channel	
Bit11	ZU	CH1 through CH6 Voltage frequency with forced zero-cross on one channel	
Bit10	DP	CH1 through CH6 data not updated for power calculation (synchronization source) for one channel	
Bit9	DI	CH1 through CH6 current frequency data not updated for one channel	
Bit8	DU	CH1 through CH6 Voltage frequency data not updated for one channel	
Bit3	RI	CH1 through CH6 Current range exceeded on one channel	
Bit2	RU	CH1 through CH6 Voltage range exceeded on one channel	
Bit1	PI	CH1 through CH6 Current peak exceeded on one channel	
Bit0	PU	CH1 through CH6 Voltage peak exceeded on one channel	



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