

PNC Tech

MODBUS PROTOCOL & MEMORY MAP DOCUMENT

PAC-E100ST(IE)

Rev Date: 2015-09-29

Revision Document: 1.0

Firmware:

Hardware:

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REVISIONS

REV	Date	Description/Reason	Initiated By
1.0	2014-09-29	Initial Map	
	2014-12-12	Control Active Setting Group CMD are added Contact Output Reset input is modified Logic Operand index are modified User Logic Status(BI) are inserted	
	2014-12-23	Addr:2807, Cycle Start Condition are modified F701 Setting Flag is added	
	2014-12-24	Addr:2807, Cycle Start Condition is modified	
	2015-03-03	Addr:1606~1608, CB Mon Alarm Status	
	2015-05-13	<u>F301</u> BPS 7:57600 is inserted	
	2015-05-20	Status(BI) grouped Bit Type are changed 79 setting; addr 2806,2807 Prepare condition, Cycle start condition are changed	
	2016-12-22	, Pickup setting range of 50N_1,50N_2,51N are changed 0.01*In(<-0.1*In).	

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1. Scope

This document describes the Modbus RTU register map for the PAC-E110

2. Applicable Document

Modicon Modbus Protocol Reference Guide

DWG#:PI-MBUS-300 Rev.E

This document describes the Modicon Modbus RTU communication protocol used by the PAC-E110

The device configuration parameters, such as baud rate, is only accessible via debug port on the device.

Because MODBUS is a multidrop network, the operator is responsible to make sure no 2 devices have the same ID on the network, The device ID can range from 1 - 254 only.

3. Register Types

The registers are mapped in order listed below.

Register Type	Category	Function Code	Start Address	Use/Contents	Access
Input Registers	Fixed Value Registers	0x03	0000	Fixed data reported by the device	R/O
Control Registers	Command Registers	0x06	0500	Control Command	W/O
Input Registers	Dynamic Value Registers	0x04	1000	Metering data	R/O
			1500	Status data	R/O
			2000	Counter data	R/O
Input Registers	Fault Registers	0x04	2200	Fault data	R/O
Set-point Registers	Setting Registers	0x06	2500	Device Setting**	R/W
		0x16	2800	Device Configuration	R/W*
Input Registers	File Registers	0x04	60500	Summary of files	R/O

* Debug Port Only

** Master Device Setting Write Operation

1. Write Setting Data to Appropriate Register(2510~...)
2. Set Setting Flag Register(2500)
3. Control Set Update(0506)

4. Functions and message parsing

The PAC-E110 supports a subset of Modbus commands. All the supported commands are listed below.

Function Code		Modbus Definition	P&C Definition	Register Groups
0x03	03	Read Holding Registers	Read Actual Values of Set-points	Set-point & Control registers
0x04	04	Read Input Registers	Read Actual Values of Set-points	Dynamic values, fixed values, faults, events, and reports
0x05	05	Force Single Coil	Execute Operation	Coil registers
0x06	06	Preset Single Register	Program Set-points	Set-point registers
0x10	16	Preset Multiple Register	Program Multiple Set-points	Set-point registers

5. Exception Responses

When a system host command received by PAC-E110 cannot be performed, it replies with an error code.

- 01- illegal function
- 02- illegal register address
- 03- illegal data value
- 04- slave device failure
- 05- acknowledge long duration command
- 06- busy servicing another long duration command
- 07- negative acknowledge
- 08- invalid report index

6. Data Formats

7. Register Map

Device Information									
Addr	Func Code	Description	LCD Test	Range	Step	Default	Format	Unit	Access
0000	0x03	Unit Address	--	0 ~ 254	--	--	<u>INT16U</u>	--	R/O
0001	“	Device Type	--	12 ASCII characters “PAC-E110I1C2” “PAC-E110I1C3” “PAC-E110I5C2” “PAC-E110I5C3” “PAC-E10TI5C0” “PAC-E10TIEC0”	--	5A, IEC/DNP IE, IEC/DNP	<u>CH12</u>	--	R/O
0013	“	Device ID	--	12 ASCII characters	--	--	<u>CH12</u>	--	R/O
0025	“	S/W Version	--	4 characters	--	--	<u>CH4</u>	--	R/O
0029 ~0499	“	Reserved	--	--	--	--	--	--	--

Control									
Addr	Func Code	Description	LCD Test	Range	Step	Default	Format	Unit	Access
0500	0x06	Open/Close Breaker1	--	On(H'FF00)/Off(0000)	--	--	--	--	W/O
0501	“	Reserved							
0502	“	Reset Annunciator	--	FF00 only	--	--	--	--	W/O
0503	“	Clear Event Data	--	FF00 only	--	--	--	--	W/O
0504	“	Clear Waveform Data	--	FF00 only	--	--	--	--	W/O
0505	“	Reserved							
0506	“	Setting Update(SG0) Setting Update(SG1) Setting Update(SG2) Setting Update(SG3)	--	FF00 FF01 FF02 FF03	--	--	--	--	W/O
0507	“	Clear Thermal Data							
0508	“	Reserved							
0509	“	Reserved							
0510	“	Activate Setting Group(SG0) Activate Setting Group(SG1) Activate Setting Group(SG2)	--	FF00 FF01 FF02	--	--	--	--	W/O

		Activate Setting Group(SG3)		FF03					
0511	“	Clear CB MON Data	--	FF00 only	--	--	--	--	W/O
0512 ~0599	“	Reserved							
0600	“	Panel Test		FF00 only	--	--	--	--	W/O
0507 ~0599	“	Reserved							

Measurement(Integer)									
Addr	Func Code	Description	LCD Test	Range	Step	Default	Format	Unit	Access
1000 ~1007	0x04	Reserved							
		Current							
1008	“	Phase A Current Magnitude	CURR(IA)	0~65.535	--	--	<u>INT16U</u>	kA	R/O
1009	“	Phase A Current Angle		0~359.9	--	--	<u>INT16U</u>	deg	R/O
1010	“	Phase B Current Magnitude	CURR(IB)	0~65.535	--	--	<u>INT16U</u>	kA	R/O
1011	“	Phase B Current Angle		0~359.9	--	--	<u>INT16U</u>	deg	R/O
1012	“	Phase C Current Magnitude	CURR(IC)	0~65.535	--	--	<u>INT16U</u>	kA	R/O
1013	“	Phase C Current Angle		0~359.9	--	--	<u>INT16U</u>	deg	R/O
1014	“	Phase N Current Magnitude	CURR(IN)	0~65.535	--	--	<u>INT16U</u>	kA	R/O
1015	“	Phase N Current Angle		0~359.9	--	--	<u>INT16U</u>	deg	R/O
1016 ~1039	“	Reserved							
		Sequence Current							
1040	“	Positive Sequence Current Magnitude	SEQ(I1)	0~65.535	--	--	<u>INT16U</u>	kA	R/O
1041	“	Positive Sequence Current Angle		0~359.9	--	--	<u>INT16U</u>	deg	R/O
1042	“	Negative Sequence Current Magnitude	SEQ(I2)	0~65.535	--	--	<u>INT16U</u>	kA	R/O
1043	“	Negative Sequence Current Angle		0~359.9	--	--	<u>INT16U</u>	deg	R/O
1044	“	Zero Sequence Current Magnitude	SEQ(I0)	0~65.535	--	--	<u>INT16U</u>	kA	R/O

1045	“	Zero Sequence Current Angle		0~359.9	--	--	<u>INT16U</u>	deg	R/O
1046 ~1057	“	Reserved							
		Thermal							
1058	“	Thermal overload	THERMAL	0~250.0	--	--	<u>INT16U</u>	%	R/O
		Frequency							
1059	“	Frequency	FREQUENCY	0~655.35	--	--	<u>INT16U</u>	Hz	R/O
		Current 2nd Harmonics							
1060	“	Phase A Current 2 nd harmonic	2nd(IA)	0~65.535	--	--	<u>INT16U</u>	kA	R/O
1061	“	Phase B Current 2 nd harmonic	2nd(IB)	0~65.535	--	--	<u>INT16U</u>	kA	R/O
1062	“	Phase C Current 2 nd harmonic	2nd(IC)	0~65.535	--	--	<u>INT16U</u>	kA	R/O
		CB Wear Monitor %	CB MON %						
1063 ~1065		Phase A accumulation % Phase B accumulation % Phase C accumulation %	CB_MON%A CB_MON%A CB_MON%A	0~100.0	--	--	<u>INT16U</u>	%	R/O
1066 ~1199	“	Reserved							

Measurement(Float)									
Addr	Func Code	Description	LCD Test	Range	Step	Default	Format	Unit	Access
		Phase current magnitude							
1200	0x04	Phase A Current	CURR(IA)	0.00~999999.999	--	--	<u>FLOAT</u>	A	R/O
1202	“	Phase B Current	CURR(IB)	0.00~999999.999	--	--	<u>FLOAT</u>	A	R/O
1204	“	Phase C Current	CURR(IC)	0.00~999999.999	--	--	<u>FLOAT</u>	A	R/O
1206	“	Phase N Current	CURR(IN)	0.00~999999.999	--	--	<u>FLOAT</u>	A	R/O
		Phase sequence current magnitude							
1208	“	Positive sequence current	SEQ(I1)	0.00~999999.999	--	--	<u>FLOAT</u>	A	R/O
1210	“	Negative sequence current	SEQ(I2)	0.00~999999.999	--	--	<u>FLOAT</u>	A	R/O
1212	“	Zero sequence current	SEQ(I0)	0.00~999999.999	--	--	<u>FLOAT</u>	A	R/O
		Thermal							
1214	“	Thermal Overload	THERMAL	0.0~250.0	--	--	<u>FLOAT</u>	%	R/O
		Frequency							

1216	“	Frequency	FREQUENCY	0.00~80.00	--	--	<u>FLOAT</u>	Hz	R/O
		Phase current angle							
1218	“	Phase A Current	CURR(IA)	0.0~359.9	--	--	<u>FLOAT</u>	deg	R/O
1220	“	Phase B Current	CURR(IB)	0.0~359.9	--	--	<u>FLOAT</u>	deg	R/O
1222	“	Phase C Current	CURR(IC)	0.0~359.9	--	--	<u>FLOAT</u>	deg	R/O
1224	“	Phase N Current	CURR(IN)	0.0~359.9	--	--	<u>FLOAT</u>	deg	R/O
		Phase sequence current angle							
1226	“	Positive sequence current	SEQ(I1)	0.0~359.9	--	--	<u>FLOAT</u>	deg	R/O
1228	“	Negative sequence current	SEQ(I2)	0.0~359.9	--	--	<u>FLOAT</u>	deg	R/O
1230	“	Zero sequence current	SEQ(I0)	0.0~359.9	--	--	<u>FLOAT</u>	deg	R/O
1232		Phase A accumulation %	CB_MON% A	0~100.0	--	--	<u>FLOAT</u>	%	R/O
1234		Phase B accumulation %	CB_MON% A						
1236		Phase C accumulation %	CB_MON% A						
1238 ~1499	“	Reserved							

Status									
Addr	Func Code	Description	LCD Test	Range	Step	Default	Format	Unit	Access
1500	0x04	Contact Input	CONT IN1~7	On(1)/Off(0)	--	--	F010	--	R/O
1501		Contact Output	CONT OUT1~5	Energized(1)/ DeEnergized(0)	--	--	F011	--	R/O
1502		User Logic	USER LOGIC1~4	On(1)/Off(0)	--	--	F010	--	R/O
1503		User LED	USER LED1~6	On(1)/Off(0)			F010	--	R/O
1504		Self-Diagnosis	SELF_DIAGNOSIS	Fail(1)/OK(0)			F013	--	R/O
1505		Front LED	FRONT LED	On(1)/Off(0)			F012	--	R/O
1506		Control Local/Remote	CB LOC/REM	Remote(0)/Local(1)			INT16U	--	R/O
1507		CB Status	CB STATUS	Open(0)/Close(1)			INT16U	--	R/O
1508		CB Monitor	CB MON	Alarm(1) /OK (0)			F017	--	R/O
1509		Active Setting Group	ACTIVE SG	P1(0)~P4(3)			INT16U		R/O
		Protection							R/O
1510		50_1		(0: NOP/1:PKP,OP)	--	--	F015	--	R/O
1511		50_2		(0: NOP/1:PKP,OP)	--	--	F015	--	R/O

1512		51		(0: NOP/1:PKP,OP)			F015	--	R/O
1513		50N_1		(0: NOP/1:PKP,OP)			F014	--	R/O
1514		50N_2		(0: NOP/1:PKP,OP)			F014	--	R/O
1515		51N		(0: NOP/1:PKP,OP)			F014	--	R/O
1516		37		(0: NOP/1:PKP,OP)			F015	--	R/O
1517		49		(0: NOP/1:ALARM,OP)			F016	--	R/O
1518		46		(0: NOP/1:PKP,OP)			F014	--	R/O
1519		79		(0: NOP/1:PKP,OP)			F018	--	R/O
1520		50BF		(0: NOP/1:PKP,OP)			F014	--	R/O
1521		Cold Load		(0: NOP/1:PKP,OP)	--	--	F014	--	R/O
1522		Inrush Detection		(0: NOP/1:PKP,OP)			F014	--	R/O

Counter									
Addr	Func Code	Description	LCD Test	Range	Step	Default	Format	Unit	Access
2000	0x04	Event Counter	EVENT CLEAR	1~128	--	--	<u>INT16U</u>	--	R/O
2001	“	Waveform Counter	WAVE CLEAR	0~20	--	--	<u>INT16U</u>	--	R/O
2002	“	Trip Counter	TRIP COUNT	0~65535	--	--	<u>INT16U</u>	--	R/O
2003	“	Auto Reclosing Counter	79_COUNTER	0~4	--	--	<u>INT16U</u>	--	R/O
2004 ~2199	“	Reserved							

Setting									
Addr	Func Code	Description	LCD Test	Range	Step	Default	Format	Unit	Access
2500 ~2501	0x06	Setting Flag	--	--	--	--	<u>F701</u>	--	W/O
2502 ~2509	“	Reserved							
		System	SYSTEM						
		Password	PASSWORD						
2510 ~2511	“	Setting Password	PASSWORD	4 numeric character “0000”~”9999”	1	0000	<u>F601</u>	--	R/O
		RTC	--						
2512	“	Year	--	2000~2100	1	2000	<u>INT16U</u>	--	R/W
2513	“	Month	--	1~12	1	1	<u>INT16U</u>	--	R/W
2514	“	Day	--	1~31	1	1	<u>INT16U</u>	--	R/W
2515	“	Hour	--	0~23	1	0	<u>INT16U</u>	--	R/W
2516	“	Minute	--	0~59	1	0	<u>INT16U</u>	--	R/W
2517	“	Second	--	0~59	1	0	<u>INT16U</u>	--	R/W
2518	“	Millisecond	--	0~999	1	0	<u>INT16U</u>	--	R/W
		Waveform Recording	WAVEFORM						
2519	“	Type	TYPE	0~1	1	[10*12]	<u>F202</u>	Block*Cycles	R/W
2520	“	Trigger Position	TRIG.POS	0~99	1	50	<u>INT16U</u>	%	R/W
2521	“	Trigger Source	TRIG.SRC	0~2	1	[L_OFF]	<u>F109</u>	--	R/W
		COM1	COM1						
2522	“	Function	FUNCTION	0~1	1	[Disable]	<u>F100</u>	--	R/W
2523	“	Slave Address	SLAVE ADDR	DNP3.0 : 1~65534 IEC103 : 0~255	1	1	<u>INT16U</u>	--	R/W
2524	“	BPS	BPS	0~6	1	[9600]	<u>F301</u>	--	R/W
2525	“	Protocol	PROTOCOL	DNP3.0 : 0~1 IEC103 : 1~2 0~2	1	[Modbus]	<u>F300</u>	--	R/W
		COM2	COM2						
2526	“	Function	FUNCTION	0~1	1	[Disable]	<u>F100</u>	--	R/W
2527	“	Slave Address	SLAVE ADDR	DNP3.0 : 1~65534 IEC103 : 0~255	1	1	<u>INT16U</u>	--	R/W
2528	“	BPS	BPS	0~6	1	[9600]	<u>F301</u>	--	R/W
2529	“	Protocol	PROTOCOL	1(fixed)	1	[Modbus]	<u>F300</u>	--	R/W

		DNP3.0	DNP3.0						
2530	“	Tx Delay	TX DELAY	0~65000	1	0	<u>INT16U</u>	msec	R/W
2531	“	Link Confirm	LINK CONFIRM	0~1	1	[Never]	<u>F302</u>	--	R/W
	“	Link Retry	LINK RETRY	0~5	1	0	<u>INT16U</u>	--	R/W
	“	Link Timeout	LINK TIMEOUT	1~65000	1	1	<u>INT16U</u>	msec	R/W
	“	SBO Timeout	SBO TIMEOUT	1~65000	1	1	<u>INT16U</u>	msec	R/W
	“	Write Time Interval	WR TIME INT	0~65000	1	0	<u>INT16U</u>	min	R/W
2536	“	Cold Restart	COLD RESTART	0~1	1	[Disable]	<u>F100</u>	--	R/W
		Trip Circuit Supervision	TCS						
2537		Function	FUNCTION	0~1	1	[Disable]	<u>F100</u>	--	R/W
2538		Alarm Delay	DELAY	0.00~300.00	0.01	300.00	<u>INT16U</u>	sec	R/W
		CB Wear Monitor	CB MONITOR						
2539		Function	FUNCTION	0~1	1	[Disable]	<u>F100</u>	--	R/W
		Low Current	LOW kA	0.00~650.00	0.01	.10	<u>INT16U</u>	kA	R/W
		Low Counter	LOW CNT	0~65000	1	65000	<u>INT16U</u>	-	R/W
		Middle Current	MID kA	0.00~650.00	0.01	1.00	<u>INT16U</u>	kA	R/W
		Middle Counter	MID CNT	0~65000	1	65000	<u>INT16U</u>	-	R/W
		High Current	HIG kA	0.00~650.00	0.01	100.00	<u>INT16U</u>	kA	R/W
		High Counter	HIG CNT	0~65000	1	65000	<u>INT16U</u>	-	R/W
2546		Alarm Level	ALARM	0~100.0	0.1	100.0	<u>INT16U</u>	%	R/W
2547 ~2669		Reserved							

		Power System	POWER SYSTEM						
2668	“	Frequency	FREQUENCY	0~1	1	[60]	<u>F102</u>	Hz	R/W
2669 ~2676	“	Reserved							
2677	“	Phase CT Ratio	PHS CT RATIO	1A : 1~6000 : 1 5A : 1~6000 : 5	1	1 5	<u>INT16U</u>	A	R/W
2678	“	Ground CT Ratio	GND CT RATIO	1A : 1~6000 : 1 5A : 1~6000 : 5	1	1 5	<u>INT16U</u>	A	R/W
2679	“	Trip Relay	TRIP RELAY	0~3	1	[CONT OUT#1]	<u>F113</u>	--	R/W
		Circuit Breaker Control	CB CONTROL						
2680	0x06	Trip Pulse Time	TRIP PULSE	0.1~5.0	0.1	5.0	<u>INT16U</u>	sec	R/W
2681	“	Close Pulse Time	CLOSE PULSE	0.1~5.0	0.1	5.0	<u>INT16U</u>	sec	R/W
2682 ~2699	“	Reserved							

Setting(SG0)									
Addr	Func Code	Description	LCD Test	Range	Step	Default	Format	Unit	Access
		Protection	PROTECTION						
		Instantaneous Phase Overcurrent1 (50_1)	IOC1(50_1)						
2700	0x06	Function	FUNCTION	0~1	1	[Disable]	F100	--	R/W
2701	“	Pickup	PICKUP	1A : 0.10~20.00 5A : 0.50~100.00	0.01 0.05	20.00 100.00	INT16U	A	R/W
2702	“	Delay	DELAY	0.00~60.00 0.00~300.00	0.01	60.00	INT16U	sec	R/W
2703	“	Block	BLOCK	0~59	1	[L_OFF]	F109	--	R/W
		Instantaneous Phase Overcurrent2 (50_2)	IOC2(50_2)						
2704	“	Function	FUNCTION	0~1	1	[Disable]	F100	--	R/W
2705	“	Pickup	PICKUP	1A : 0.10~20.00 5A : 0.50~100.00	0.01 0.05	20.00 100.00	INT16U	A	R/W
2706	“	Delay	DELAY	0.00~60.00 0.00~300.00	0.01	60.00	INT16U	sec	R/W
2707	“	Block	BLOCK	0~59	1	[L_OFF]	F109	--	R/W
		Inverse Time Phase Overcurrent (51)	TOC(51)						
2708	“	Function	FUNCTION	0~1	1	[Disable]	F100	--	R/W
2709	“	Curve	CURVE	0~12	1	[IEC_NI]	F500 F490	--	R/W
2710	“	Pickup	PICKUP	1A : 0.10~20.00 5A : 0.50~100.00	0.01 0.05	20.00 100.00	INT16U	A	R/W
2711	“	Multiplier	MULTIPLIER	0.01~10.00	0.01	10.00	INT16U	--	R/W
2712	“	Delay	DELAY	0.00~300.00	0.01	60.00	INT16U	sec	R/W
2713	“	Block	BLOCK	0~59	1	[L_OFF]	F109	--	R/W
		Instantaneous Ground Overcurrent1 (50N_1)	IOCG1(50N_1)						
2714	“	Function	FUNCTION	0~1	1	[Disable]	F100	--	R/W
2715	“	Pickup	PICKUP	1A : 0.01~20.00 5A : 0.05~100.00	0.01 0.05	20.00 100.00	INT16U	A	R/W
2716	“	Delay	DELAY	0.00~60.00	0.01	60.00	INT16U	sec	R/W

				0.00~300.00					
2717	“	Block	BLOCK	0~59	1	[L_OFF]	F109	--	R/W
		Instantaneous Ground Overcurrent2 (50N_2)	IOCG2(50N_2)						
2718	“	Function	FUNCTION	0~1	1	[Disable]	F100	--	R/W
2719	“	Pickup	PICKUP	1A : 0.01~20.00 5A : 0.05~100.00	0.01 0.05	20.00 100.00	INT16U	A	R/W
2720	“	Delay	DELAY	0.00~60.00 0.00~300.00	0.01	60.00	INT16U	sec	R/W
2721	0x06	Block	BLOCK	0~59	1	[L_OFF]	F109	--	R/W
		Inverse Time Ground Overcurrent (51N)	TOCG(51N)						
2722	“	Function	FUNCTION	0~1	1	[Disable]	F100	--	R/W
2723	“	Curve	CURVE	0~12	1	[IEC_NI]	F500 F490	--	R/W
2724	“	Pickup	PICKUP	1A : 0.01~20.00 5A : 0.05~100.00	0.01 0.05	20.00 100.00	INT16U	A	R/W
2725	“	Multiplier	MULTIPLIER	0.01~10.00	0.01	10.00	INT16U	--	R/W
2726	“	Delay	DELAY	0.00~300.00	0.01	60.00	INT16U	sec	R/W
2727	“	Block	BLOCK	0~59	1	[L_OFF]	F109	--	R/W
2728 ~2734	“	Reserved							

Addr	Func Code	Description	LCD Test	Range	Step	Default	Format	Unit	Access
		Undercurrent (37)	UC(37)						
2735	“	Function	FUNCTION	0~1	1	[Disable]	F100	--	R/W
2736	“	Pickup	PICKUP	1A : 0.02~1.00 5A : 0.10~5.00	0.01 0.05	0.02 0.10	INT16U	A	R/W
2737	“	Delay	DELAY	0.00~180.00	0.01	180.00	INT16U	sec	R/W
2738	“	Block	BLOCK	0~59	1	[L_OFF]	F109	--	R/W
		Thermal Overload (49)	THERMAL(49)						
2739	“	Function	FUNCTION	0~1	1	[Disable]	F100	--	R/W
2740	“	K-Factor	K-FACTOR	0.10~4.00	0.01	4.00	INT16U	--	R/W
2741	“	Time Constant	TIME CONST	1.0~999.9	0.1	1.0	INT16U	min	R/W
2742	“	Thermal Alarm	ALARM	50~100	1	100	INT16U	%	R/W
2743	“	Block	BLOCK	0~59	1	[L_OFF]	F109	--	R/W

		Negative Phase Sequence Overcurrent (46)	NSOC(46)						
2744	“	Function	FUNCTION	0~1	1	[Disable]	F100	--	R/W
2745	“	Pickup	PICKUP	1A : 0.10~20.00 5A : 0.50~100.00	0.01 0.05	20.00 100.00	INT16U	A	R/W
2746	“	Delay	DELAY	0.00~180.00	0.01	180.00	INT16U	sec	R/W
2747	“	Block	BLOCK	0~59	1	[L_OFF]	F109	--	R/W
2748 ~2803	“	Reserved							
		Auto Reclosing(79)	AREL(79)						
2804	“	Function	FUNCTION	0~1	1	[Disable]	F100	--	R/W
2805	“	Shot Number	SHOT NUM	1~5	1	4	INT16U	--	R/W
2806	0x06	Prepare Condition	PRE CON	~	1	[L_ON]	F109	--	R/W
2807	“	Cycle Start Condition	START CON	~	0	[L_OFF]	F109	--	R/W
2808	“	Prepare Time	PRE TIME	0.05~200.00	0.01	200.00	INT16U	sec	R/W
2809	“	Discriminating Time	DISC TIME	0.01~5.00	0.01	5.00	INT16U	sec	R/W
2810	“	Reclaim Time	RECL TIME	0.01~350.00	0.01	350.00	INT16U	sec	R/W
2811	“	1st Delay	1ST DELAY	0.01~300.00	0.01	300.00	INT16U	sec	R/W
2812	“	2nd Delay	2ND DELAY	0.01~300.00	0.01	300.00	INT16U	sec	R/W
2813	“	3rd Delay	3RD DELAY	0.01~300.00	0.01	300.00	INT16U	sec	R/W
2814	“	4th Delay	4TH DELAY	0.01~300.00	0.01	300.00	INT16U	sec	R/W
2815	“	5th Delay	5TH DELAY	0.01~300.00	0.01	300.00	INT16U	sec	R/W
2816	“	Block	BLOCK	~	1	[L_OFF]	F109	--	R/W
		Circuit Breaker Failure(50BF)	CBF(50BF)						
2817	“	Function	FUNCTION	0~1	1	[Disable]	F100	--	R/W
2818	“	Pickup Current(CB Closed)	PICKUP	1A : 0.10~1.00 5A : 0.50~5.00	0.01 0.05	1.00 5.00	INT16U	A	R/W
2819	“	Operating Delay(Trip Timer)	DELAY	0.00~60.00	0.01	60.00	INT16U	sec	R/W
2820	“	Block	BLOCK	0~59	1	[L_OFF]	F109	--	R/W
		Cold Load Pickup	COLD LD						
2821	“	Function	FUNCTION	0~1	1	[Disable]	F100	--	R/W
2822	“	Pickup	PICKUP	1A : 0.10~0.50 5A : 0.50~2.50	0.01 0.05	0.50 2.50	INT16U	A	R/W
2823	“	OP Delay Time	OP DELAY	0~18000	1	1000	INT16U	sec	R/W
2824	“	Reset Delay Time	RST DELAY	0~18000	1	1000	INT16U	sec	R/W
2825	“	OC Pickup Mutiplier	OC PKP MUL	1.00~10.00	0.01	1.00	INT16U	sec	R/W

2826	“	Block	BLOCK	0~59	1	[L_OFF]	F109	--	R/W
		Inrush Detection(I2/I1)	INRUSH						
2827	“	Function	FUNCTION	0~1	1	[Disable]	F100	--	R/W
2828	“	2nd Harmonics of I2/I1	I2/I1	10~100	1	100	INT16U	%	R/W
2830	“	Minimum Current	MIN I1	1A : 0.10~0.50 5A : 0.50~2.50	0.01 0.05	0.50 2.50	INT16U	A	R/W
2831	“	Operating Delay Time	DELAY	0.00~60.00	0.01	60.00	INT16U	sec	R/W
2832		Reset Delay Time	RST DELAY	0.00~60.00	0.01	0.00	INT16U	sec	R/W
2833	“	Block	BLOCK	0~59	1	[L_OFF]	F109	--	R/W
2834~ 3699	“	Reserved							

Setting(SG1)

Addr	Func Code	Description	LCD Test	Range	Step	Default	Format	Unit	Access
3700 ~3833									
3834~ 4699		Reserved							

Setting(SG2)

Addr	Func Code	Description	LCD Test	Range	Step	Default	Format	Unit	Access
4700 ~4833									
4834~ 5699		Reserved							

Setting(SG3)

Addr	Func Code	Description	LCD Test	Range	Step	Default	Format	Unit	Access
5700 ~5833									
6834~ 9999		Reserved							

Setting(Logic)									
Addr	Func Code	Description	LCD Test	Range	Step	Default	Format	Unit	Access
		User Logic	USER LOGIC						
10000 ~10011	0x06	User Logic1	USER LOGIC#1	CO/LED reference	--	--	<u>REF</u>	--	R/W
10012 ~10023		User Logic2	USER LOGIC#2	CO/LED reference	--	--	<u>REF</u>	--	R/W
10024 ~10035		User Logic3	USER LOGIC#3	CO/LED reference	--	--	<u>REF</u>	--	R/W
10036 ~10047		User Logic4	USER LOGIC#4	CO/LED reference	--	--	<u>REF</u>	--	R/W
		Contact Output	CONTACT OUTPUT						
10048 ~10059		Contact Output1	CONT OUT#1	CO/LED reference	--	--	<u>REF</u>	--	R/W
10060 ~10071	“	Contact Output2	CONT OUT#2	CO/LED reference	--	--	<u>REF</u>	--	R/W
10072 ~10083	“	Contact Output3	CONT OUT#3	CO/LED reference	--	--	<u>REF</u>	--	R/W
10084 ~10095	“	Contact Output4	CONT OUT#4	CO/LED reference	--	--	<u>REF</u>	--	R/W
10096 ~10107	“	Contact Output5	CONT OUT#5	CO/LED reference	--	--	<u>REF</u>	--	R/W
		LED	LED						
10108 ~10119	“	LED1	LED#1	CO/LED reference	--	--	<u>REF</u>	--	R/W
10120 ~10131	“	LED2	LED#2	CO/LED reference	--	--	<u>REF</u>	--	R/W
10132 ~10143	“	LED3	LED#3	CO/LED reference	--	--	<u>REF</u>	--	R/W
10144 ~10155	“	LED4	LED#4	CO/LED reference	--	--	<u>REF</u>	--	R/W
10156 ~10167	“	LED5	LED#5	CO/LED reference	--	--	<u>REF</u>	--	R/W
10168 ~10179	“	LED6	LED#6	CO/LED reference	--	--	<u>REF</u>	--	R/W
		Contact Input	CONTACT INPUT						
10180	“	Contact Input#1~4	CONT IN#1	0~5	1	[Not Connected]	<u>F116</u>	--	R/W

~10183									
10184 ~10186	“	Contact Input#5~7	CONT IN#4	0~5	1	[Not Connected]	<u>F116</u>	--	R/W
10187 ~	“	Reserved							

Fault Information									
Addr	Func Code	Description	LCD Test	Range	Step	Default	Format	Unit	Access
		The latest fault 1							
20000	0x04	Year	--	2000~2100	1	--	<u>INT16U</u>	--	R/O
20001	“	Month	--	1~12	1	--	<u>INT16U</u>	--	R/O
20002	“	Day	--	1~31	1	--	<u>INT16U</u>	--	R/O
20003	“	Hour	--	0~23	1	--	<u>INT16U</u>	--	R/O
20004	“	Minute	--	0~59	1	--	<u>INT16U</u>	--	R/O
20005	“	Second	--	0~59	1	--	<u>INT16U</u>	--	R/O
20006	“	Millisecond	--	0~999	1	--	<u>INT16U</u>	--	R/O
20007 ~20008	“	Operated protection flag	--	--	--	--	<u>F702</u>	--	R/O
20009	“	Phase A primary fault current	--	0~65.535	0.001	--	<u>INT16U</u>	kA	R/O
20010	“	Phase B primary fault current	--	0~65.535	0.001	--	<u>INT16U</u>	kA	R/O
20011	“	Phase C primary fault current	--	0~65.535	0.001	--	<u>INT16U</u>	kA	R/O
20012	“	Phase N primary fault current	--	0~65.535	0.001	--	<u>INT16U</u>	kA	R/O
20013 ~20015	“	Reserved							
		The latest fault 2							
20000+(16*1) ~20015+(16*1)	“						
		The latest fault 50							
20000+(16*49)	0x04	Year	--	2000~2100	1	--	<u>INT16U</u>	--	R/O

20001+(16*49)	“	Month	--	1~12	1	--	<u>INT16U</u>	--	R/O
20002+(16*49)	“	Day	--	1~31	1	--	<u>INT16U</u>	--	R/O
20003+(16*49)	“	Hour	--	0~23	1	--	<u>INT16U</u>	--	R/O
20004+(16*49)	“	Minute	--	0~59	1	--	<u>INT16U</u>	--	R/O
20005+(16*49)	“	Second	--	0~59	1	--	<u>INT16U</u>	--	R/O
20006+(16*49)	“	Millisecond	--	0~999	1	--	<u>INT16U</u>	--	R/O
20007+(16*49) ~20008+(16*49)	“	Operated protection flag	--	--	--	--	<u>F702</u>	--	R/O
20009+(16*49)	“	Phase A primary fault current	--	0~65.535	0.001	--	<u>INT16U</u>	kA	R/O
20010+(16*49)	“	Phase B primary fault current	--	0~65.535	0.001	--	<u>INT16U</u>	kA	R/O
20011+(16*49)	“	Phase C primary fault current	--	0~65.535	0.001	--	<u>INT16U</u>	kA	R/O
20012+(16*49)	“	Phase N primary fault current	--	0~65.535	0.001	--	<u>INT16U</u>	kA	R/O
20013+(16*49) ~20015+(16*49)	“	Reserved							

Factory Utility									
Addr	Func Code	Description	LCD Test	Range	Step	Default	Format	Unit	Access
59000	0x04	CAL Factor IA Low	IA_LO	0.8500~1.1500	--	--	<u>INT16U</u>	--	R/O
59001	“	CAL Factor IA High	IA_HI	0.8500~1.1500	--	--	<u>INT16U</u>	--	R/O
59002	“	CAL Factor IB Low	IB_LO	0.8500~1.1500	--	--	<u>INT16U</u>	--	R/O
59003	“	CAL Factor IB High	IB_HI	0.8500~1.1500	--	--	<u>INT16U</u>	--	R/O
59004	“	CAL Factor IC Low	IC_LO	0.8500~1.1500	--	--	<u>INT16U</u>	--	R/O
59005	“	CAL Factor IC High	IC_HI	0.8500~1.1500	--	--	<u>INT16U</u>	--	R/O
59006	“	CAL Factor IN Low	IC_LO	0.8500~1.1500	--	--	<u>INT16U</u>	--	R/O
59007	“	CAL Factor IN High	IC_HI	0.8500~1.1500	--	--	<u>INT16U</u>	--	R/O
59006 ~59099	-	reserved	-	-	-	-	-	--	-
59100	0x06	Trip Counter Set	TRIP CNT	0~65535	--	--	<u>INT16U</u>	--	W/O
59101	“	Calibration Low	--	FF00 only	--	--	<u>INT16U</u>	--	W/O

59102	“	Calibration High	--	FF00 only	--	--	<u>INT16U</u>	--	W/O
59105	“ “	Calibration Data	CAL DATA	Lo : 0.10~15.00	0.05	1.00	<u>INT16U</u>	A	W/O
			[E100/E110]	Hi : 15.00~200.00					
			[E100H]	Lo : 0.02~3.00	0.01	0.2	<u>INT16U</u>	A	W/O
				Hi : 3.00~40.00					
[E110IR]	Lo : 0.10~1.50	0.01	1.00	<u>INT16U</u>	A	W/O			
	Hi : 1.50~20.00								
[E500]	Lo : 0.1~15.0	0.5	10.0	<u>INT16U</u>	V	W/O			
	Hi : 15.0~200.0								

File						
Add (dec)	Func Code	Description	Range	Access	Format	Units
60500		File Name(ID)		W/O	<u>FN0</u>	--
60520		File Open Operation	RD(0)/WR(1)/RW(2)/AP(3)	W/O	<u>INT16U</u>	--
60521		File Close Operation	RD(0)/WR(1)/RW(2)/AP(3)	W/O	<u>INT16U</u>	--
60522		File Status	OK(0)/EOF(1)	R/O	<u>INT16U</u>	--
*60523		Seek position	0~File size	R/W	<u>INT32U</u>	--
60525		File rewind		W/O	<u>INT16U</u>	--
60526		File size	0~4294967295	R/W	<u>INT32U</u>	--
60528		File Attribute	??????????	R/W	<u>INT16U</u>	--
60529 ~60599		--
60600		Buf Valid Byte Length		R/W	<u>INT16U</u>	--
60601		File buffer[0]		R/W	<u>FN9</u>	--
...		--
60724		File buffer[123]		R/W	<u>FN9</u>	--

Seek service

Seek position register(60523)를 read 하면 현재 file position 을 리턴하고 write 하면 file position 을 이동한다. Seek position 은 0 보다 크고 file size 보다 작아야 한다.

[REF] CO/LED/User Logic Setting

No.	Setting Item	Range	Format
1	Logic Type	[OR8]	<u>F110</u>
2	Logic Input1	[L_OFF]	<u>F109</u>
3	Logic Input2	[L_OFF]	<u>F109</u>
4	Logic Input3	[L_OFF]	<u>F109</u>
5	Logic Input4	[L_OFF]	<u>F109</u>
6	Logic Input5	[L_OFF]	<u>F109</u>
7	Logic Input6	[L_OFF]	<u>F109</u>
8	Logic Input7	[L_OFF]	<u>F109</u>
9	Logic Input8	[L_OFF]	<u>F109</u>
10	Reset Type	[Self]	<u>F107</u>
11	Reset Input	[ANN_RESET]	<u>F106</u>
12	Reset Delay	0.00~60.00[0.00]	<u>INT16U</u>

8. Register Formats

No.	Format Name	Description
FN0	File ID	0x0000: Event log File 0x0100: Waveform recording #1 .cfg(config) file 0x0101: Waveform recording #1 .dat(data) file 0x0200: Waveform recording #2 .cfg(config) file 0x0201: Waveform recording #2 .dat(data) file 0x0300: Waveform recording #3 .cfg(config) file 0x0301: Waveform recording #3 .dat(data) file 0x0400: Waveform recording #4 .cfg(config) file 0x0401: Waveform recording #4 .dat(data) file 0x0500: Waveform recording #5 .cfg(config) file 0x0501: Waveform recording #5 .dat(data) file 0x0600: Waveform recording #6 .cfg(config) file 0x0601: Waveform recording #6 .dat(data) file 0x0700: Waveform recording #7 .cfg(config) file 0x0701: Waveform recording #7 .dat(data) file 0x0800: Waveform recording #8 .cfg(config) file 0x0801: Waveform recording #8 .dat(data) file ... 0x1000: Panel Bit Map File ...
FN3	DNP Date & Time Format	A most significant number holds the number of minutes since 1/1/70. A least significant number holds the number of mill-seconds in the current minute. 1 st word: Most significant(high word) 2 nd word: Most significant(low word) 3 rd word: Least significant
FN6	File Attributes	<u>Bit Description</u> 0: Read 1: Write
FN7	File Mode	Open mode 0: Read Only 1: Write Only 2: Read/Write 3: Append
FN8	File Error Codes	0: No errors 1: Not Exist 2: No Permission 3: Already Opened 4: Not Opened
FN9	File Buffer	2 Bytes assemble into a word H-L order 0x12-0x34 ->0x3412
F001	INT8U	UNSIGNED 8 BIT INTEGER(0~255)

F002	INT8S	SIGNED 8 BIT INTEGER(-128~+128)
F003	INT16U	UNSIGNED 16 BIT INTEGER(0~65535)
F004	INT16S	SIGNED 16 BIT INTEGER(-32767~+32767)
F005	INT32U	UNSIGNED 32 BIT INTEGER(0~+4294967295)
F006	INT32S	SIGNED 32 BIT INTEGER(-2147483647~+2147483647)
F007	FLOAT	IEEE floating point(32bits)
F010	Contact Input /User Logic /User LED	Contact Input:7, User Logic :4, User LED:6 Bit field, bit0~bit15(0: Off, 1: On) Bit 0 : 1st Bit 1 : 2nd Bit 2 : 3rd Bit 3 : 4th ... Bitn~Bit 15 : reserved(value:0)
F011	Contact Output	Bit field, bit0~bit15(0: DeEnergized, 1:Energized) Bit 0 : Contact Output 1 Bit 1 : Contact Output 2 Bit 2 : Contact Output 3 Bit 3 : Contact Output 4 Bit 4 : Contact Output 5 Bit 5~Bit 15 : reserved(value:0)
F012	Front LED	Bit field, bit0~bit15(0: Off, 1: On) Bit 0 : System Error Bit 1 : Pickup Bit 2 : Trip Bit 3 : 79 Enabled Bit4~Bit 15 : reserved(value:0)
F013	Self-diagnosis	Bit field, bit0~bit15(0: OK, 1: Fail) Bit 0 : Memory Bit 1 : Setting Bit 2 : A/D Bit 3 : Calibration Bit 4 : TCS Bit 5 : reserved(value:0) Bit 6~Bit 15 : reserved(value:0)
F014	1 Phase Protection	Bit field, bit0~bit15(0: NOP, 1: Pickup or Operation) Bit 0 : Operation Bit 1 : Pickup Bit 2~Bit 15 : reserved(value:0)
F015	3 Phase Protection	Bit field, bit0~bit15(0: NOP, 1: Pickup or Operation) Bit 0 : A Phase Operation Bit 1 : B Phase Operation Bit 2 : C Phase Operation Bit 3 : A Phase Pickup Bit 4 : B Phase Pickup Bit 5 : C Phase Pickup Bit 6~Bit 15 : reserved(value:0)
F016	1 Phase Monitor	Bit field, bit0~bit15(0: NOP, 1: Alarm or Operation) Bit 0 : Operation Bit 1 : Alarm Bit 2~Bit 15 : reserved(value:0)
F017	3 Phase Monitor	Bit field, bit0~bit15(0: NOP, 1:Alarm) Bit 0 : A Phase Alarm Bit 1 : B Phase Alarm Bit 2 : C Phase Alarm Bit 3~Bit 15 : reserved(value:0)
F018	AREL(79) Status	Bit field, bit0~bit15(0: NOP, 1:each status) Bit 0 : Ready Bit 1 : In Progress Bit 2 :Fail Bit 3~Bit 15 : reserved(value:0)

F100	Disabled/Enabled	ENUMERATION 0: Disabled 1: Enabled
F101	Confirm No/Yes	ENUMERATION 0: No 1: Yes
F102	Frequency	ENUMERATION 0: 60Hz 1: 50Hz
F103	CT Secondary	ENUMERATION 0: 1A 1: 5A
F104	Ground Voltage	ENUMERATION 0: External 1: Internal
F105	PT Connection	ENUMERATION 0: Wye 1: Delta
F106	Reset Input	ENUMERATION 0: ANN_RESET 1: CONT_IN#1 ~ 7: CONT_IN#7 8: CONT_OUT#1 9: CONT_OUT#2 10: CONT_OUT#3 11: CONT_OUT#4 12: CONT_OUT#5 13: USER_LOGIC#1 14: USER_LOGIC#2 15: USER_LOGIC#3 16: USER_LOGIC#4
F107	Reset Type	ENUMERATION 0: Self 1: Manual
F108	Direction	ENUMERATION 0: None 1: Forward 2: Reverse

F109	CO, LED, User Logic Gate input	ENUMERATION							
		0	L_OFF	34	50_2_PKP_OR	56	37_PKP_OR		
		1	L_ON	35	50_2_PKP_A	57	37_PKP_A		
		2	ANN_RESET	36	50_2_PKP_B	58	37_PKP_B		
		3	CB_OPEN_CTL	37	50_2_PKP_C	59	37_PKP_C		
		4	CB CLOSE CTL	38	50_2_OP_OR	60	37_OP_OR		
		5	CONT_IN#1~7	39	50_2_OP_A	61	37_OP_A		
		~		40	50_2_OP_B	62	37_OP_B		
		11		41	50_2_OP_C	63	37_OP_C		
		12	CONT_OUT#1~5	42	51_PKP_OR	64	49_ALARM		
		~		43	51_PKP_A	65	49_OP		
		16		44	51_PKP_B				
		17	USER_LOGIC#1~4	45	51_PKP_C	66	46_PKP		
		~		46	51_OP_OR	67	46_OP		
		20		47	51_OP_A				
		21	SYS_ERR	48	51_OP_B	68	79_READY		
		22	TCS_ALM	49	51_OP_C	69	79_IN_PROG		
		23	CB_MON_ALM			70	79_FAIL		
		24	PROT_PKP_OR	50	50N_1_PKP	71	50BF_OP		
		25	PROT_OP_OR	51	50N_1_PKP				
		26	50_1_PKP_OR	52	50N_2_PKP	72	COLD_LD_PKP		
		27	50_1_PKP_A	53	50N_2_PKP	73	COLD_LD_OP		
		28	50_1_PKP_B						
		29	50_1_PKP_C	54	51N_PKP	74	I2/I_OP		
		30	50_1_OP_OR	55	51N_PKP				
		31	50_1_OP_A						
		32	50_1_OP_B						
		33	50_1_OP_C						
		F110	CO, LED, User Logic Input gate	ENUMERATION 0: OR8 : L_OFF all 1: HALF-OR8 : 1~4 : L_OFF, 5~8 : L_ON 2: AND8 : L_OFF all 3: HALF-AND8 : 1~4 : L_OFF, 5~8 : L_ON					
		F111	CONT IN connection	ENUMERATION 0: NOT CONNECTED 1: CB OPENED 2: CB CLOSED 3: ANNUN RESET 4: PROT BLOCK 5: GENERAL INPUT					
		F112	Contact Input Connection	ENUMERATION 0: NOT CONNECTED 1: CB OPENED 2: CB CLOSED 3: ANNUN RESET 4: TCS INPUT 5: GENERAL INPUT					
		F113	Contact Output	ENUMERATION 0: CONT OUT#1 1: CONT OUT#2 2: CONT OUT#3 3: CONT OUT#4					
		F114	AREL(79) Prepare Condition	ENUMERATION 0: L_ON 1: CONT IN#1 2: CONT IN#2 3: CONT IN#3 4: CONT IN#4					

F115	AREL(79) Start Condition	ENUMERATION 0: CONT IN#1 1: CONT IN#2 2: CONT IN#3 3: CONT IN#4 4: CONT OUT#1 5: CONT OUT#2 6: CONT OUT#3 7: CONT OUT#4
F116	Contact Input Connection	ENUMERATION 0: GENERAL INPUT 1: CB OPENED 2: CB CLOSED 3: ANNUN RESET 4: SG SEL0 5: SG SEL1
F117	Contact Output	ENUMERATION 0: CONT OUT#1 1: CONT OUT#2 2: CONT OUT#3 3: CONT OUT#4 3: CONT OUT#5
F118	AREL(79) Prepare Condition	ENUMERATION 0: L_ON 1: CONT IN#1 2: CONT IN#2 3: CONT IN#3 4: CONT IN#4 5: CONT IN#5 6: CONT IN#6 7: CONT IN#7
F119	AREL(79) Start Condition	ENUMERATION 0: CONT IN#1 1: CONT IN#2 2: CONT IN#3 3: CONT IN#4 4: CONT IN#5 5: CONT IN#6 6: CONT IN#7 7: CONT OUT#1 8: CONT OUT#2 9: CONT OUT#3 10: CONT OUT#4 11: CONT OUT#5
F200	Wave Recording Type	ENUMERATION 0: 2*240 1: 4*120 2: 8*60
F201	Waveform Recording Type	ENUMERATION 0: 10*12 1: 20*6
F202	Waveform Recording Type	ENUMERATION 0: 16*50 1: 8*100 2: 4*200
F300	Protocol	ENUMERATION 0: DNP3.0 1: MODBUS 2: IEC870-5-103

F301	BPS	ENUMERATION 0: 300 1: 1200 2: 2400 3: 4800 4: 9600 5: 19200 6: 38400 7: 57600
F302	DNP Link Confirm	ENUMERATION 0: NEVER 1: ALWAYS 2: SOMETIMES
F411	Trigger Source	ENUMERATION 0 : TRIP 1 : EXT_L_H 2 : EXT_H_L
F490	Inverse Time Overcurrnt Curve	ENUMERATION 0- DT ----- Definite Time 1 – IEC_NI ----- (IEC Normal Inverse) 2 – IEC_VI ----- (IEC Very Inverse) 3 – IEC_EI ----- (IEC Extremely Inverse) 4 – IEC_LI ----- (IEC Long Inverse) 5 – ANSI_I ----- (ANSI Inverse) 6 – ANSI_SI ---- (ANSI Short Inverse) 7 – ANSI_LI ---- (ANSI Long Inverse) 8 – ANSI_MI ----(ANSI Moderately Inverse) 9 – ANSI_VI ---- (ANSI Very Inverse) 10 – ANSI_EI ---- (ANSI Extremely Inverse) 11- ANSI_DI ---- (ANSI Definite Inverse) 12- KNI ----- (KEPCO Normal Inverse) 13- KVI ----- (KEPCO Very Inverse)
F500	Inverse Time Overcurrnt Curve	ENUMERATION 0 – IEC_NI ----- (IEC Normal Inverse) 1 – IEC_VI ----- (IEC Very Inverse) 2 – IEC_EI ----- (IEC Extremely Inverse) 3 – IEC_LI ----- (IEC Long Inverse) 4 – ANSI_I ----- (ANSI Inverse) 5 – ANSI_SI ---- (ANSI Short Inverse) 6 – ANSI_LI ---- (ANSI Long Inverse) 7 – ANSI_MI ----(ANSI Moderately Inverse) 8 – ANSI_VI ---- (ANSI Very Inverse) 9 – ANSI_EI ---- (ANSI Extremely Inverse) 10- ANSI_DI ---- (ANSI Definite Inverse) 11- KNI ----- (KEPCO Normal Inverse) 12- KVI ----- (KEPCO Very Inverse)
F501	Voltage Mode	ENUMERATION 0: DEFINITE TIME 1: INVERSE CURVE
F502	OVGR Mode	ENUMERATION 0: INST 1: TIMED
F503	Inverse Time Overcurrnt Reset Type	ENUMERATION 0 - INSTI 1 - TIMED
F506	Ground Overvoltage Mode	ENUMERATION 0: DEFINITE TIME 1: INVERSE TRIP 2: INVERSE ALARM

F507	Power Polarity	ENUMERATION 0: Positive 1: Negative
F508	OPR Curve	ENUMERATION 0: DT 1: INV1 2: INV2
F509	Polarizing	ENUMERATION 0: Voltage 1: Current 2: Dual
F600	TEXT12, 12ASCCII characters	12ASCII characters(6words Address Allocation) 2 Bytes assemble into a word ex) “Breaker#1 ”(12Bytes) -> “rB”, “ae”, “ek”, “#r”, “ 1”, “ ”(6Words) order
F601	CH4	4 ASCII characters(4 Address Allocation,Low Byte Only)
F602	CH12	12 ASCII characters(12 Address Allocation,Low Byte Only)
F700	Setting Flag,32bits	BITFIELD :HH-HL-LH-LL(Bit32...Bit0) order 0 –SET_POWER_SYS_FLAG 1 –SET_CB_CTL_FLAG 2 - SET_PT_FUSE_MTR_FLAG 3 –SET_COM_FLAG 4 –SET_DNP_FLAG 5 –SET_CONT_IN_FLAG 6 –SET_CONT_OUT_FLAG 7 –SET_LED_OUT_FLAG 8 –SET_PWD_FLAG 9 –SET_50_1_FLAG 10–SET_50_2_FLAG 11–SET_51_FLAG 12–SET_50N_1_FLAG 13– SET_50N_2_FLAG 14–SET_51N_FLAG 15–SET_67N_FLAG 16–SET_37_FLAG 17–SET_49_FLAG 18–SET_46_FLAG 19–SET_59_1_FLAG 20–SET_59_2_FLAG 21–SET_27_1_FLAG 22–SET_27_2_FLAG 23–SET_59G_1_FLAG 24–SET_59G_2_FLAG 25–SET_59G_3_FLAG 26–SET_47_FLAG 27–SET_81_FLAG 28~31- Reserved

F701	Setting Flag 32bits (PAC-E100ST)	BITFIELD :HH-HL-LH-LL(Bit32...Bit0) order 0 -SET_POWER_SYS_FLAG 1 - SET_WAVE_FLAG 2 - SET_RTC_FLAG 3 -SET_CB_CTL_FLAG 4 -SET_COM_FLAG(COM1) 5 -SET_DNP_FLAG 6 -SET_CONT_IN_FLAG 7 -SET_CONT_OUT_FLAG 8 -SET_LED_OUT_FLAG 9 -SET_PWD_FLAG 10 -SET_50_1_FLAG 11-SET_50_2_FLAG 12-SET_51_FLAG 13-SET_50N_1_FLAG 14- SET_50N_2_FLAG 15-SET_51N_FLAG 16-SET_37_FLAG 17-SET_49_FLAG 18-SET_46_FLAG 19- SET_79_FLAG 20- SET_50BF_FLAG 21- SET_COLD_LD_FLAG 22- SET_INRUSH_FLAG 23- SET_CAL_FLAG 24- SET_TCP_IP_FLAG 25- SET_TCS_FLAG 26- SET_CB_MON_FLAG 27- SET_USER_LOGIC_FLAG 28 -SET_COM2_FLAG 29~31 - Reserved
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F702	Operated protection 32 bits flag	BITFIELD :HH-HL-LH-LL(Bit32...Bit0) order 0 -50_1 A Operated 1 - 50_1 B Operated 2 - 50_1 C Operated 3 -50_2 A Operated 4 - 50_2 B Operated 5 - 50_2 C Operated 6 -51 A Operated 7 - 51 B Operated 8 - 51 C Operated 9 -50N_1 Operated 10 - 50N_2 Operated 11 - 51N Operated 12 -37 A Operated 13 - 37 B Operated 14 - 37 C Operated 15 -49 Operated 16 - 46 Operated 17 - 50BF Operated 18 -COLD LD Operated 19 - INRUSH Operated 20~31 - Reserved
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9. Event Recording File Format

Type 0 Event Format

<TYPE>,<DATE/TIME>,<EVENT ID>,<CR/LF>

ex) 0,2001/05/08,20:16:24.999,System Reset-Power On<CR,LF> → 52 characters

Type 1 Event Format

<TYPE>,<DATE/TIME>,<EVENT ID>,<Field#1>,<Field#2>,...,<Field#n><CR/LF>

ex) 1,2001/05/08,20:16:24.999, IOCR Start-(A/ /)

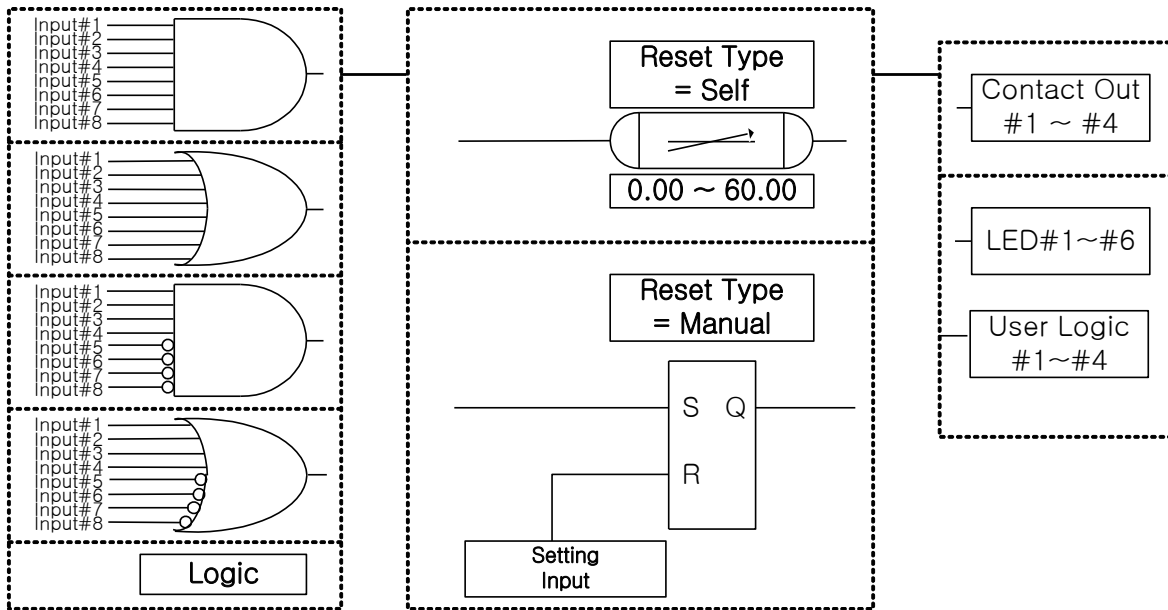
,Ia:5.00A,0.0',Ib:1.00.0.0',Ic:0.00A,0.0',In:12.00A,0.0' → Max.52*4 characters

10. Waveform Recording File Format

COMTRADE File Format

Configuration and Data File supported

11. Logic Design(Contact Output&LED Output)



<Cont Output/LED/User Logic Function Block>