Certificate of EMC

ISO 9001 : 2000

ISO 14001 : 1996

NUMERICAL PROTECTION RELAY

PAC-E Series

PAC-E100

Over Current & Earth Fault Relay

PAC-E150

Over Current & Sensitive Ground Fault Relay

PAC-E500

Over Voltage & Under Voltage Relay

PNC TECHNOLOGIES

P&C Technologies Co., Ltd.

PAC-E Series

Model List

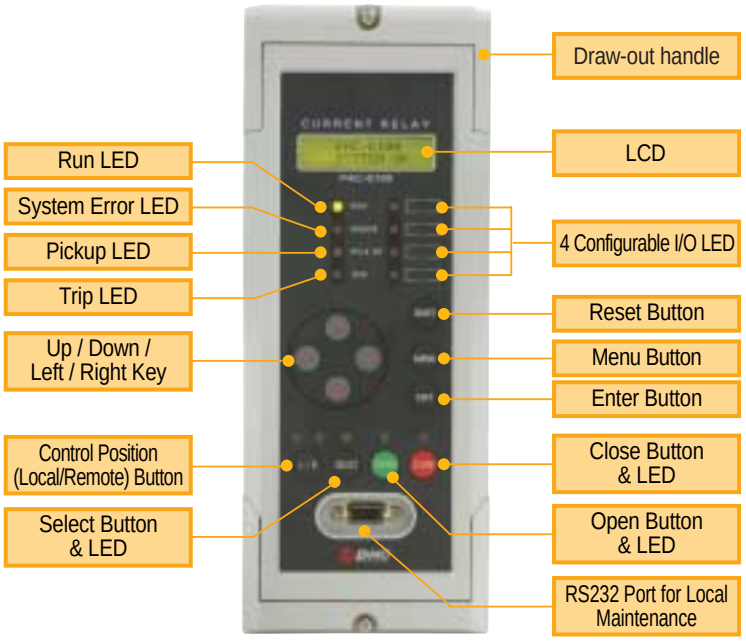
Type	Model Name
PAC-E100	Over Current & Earth Fault Relay
PAC-E150	Over Current & Sensitive Ground Fault Relay
PAC-E500	Over Voltage & Under Voltage Relay

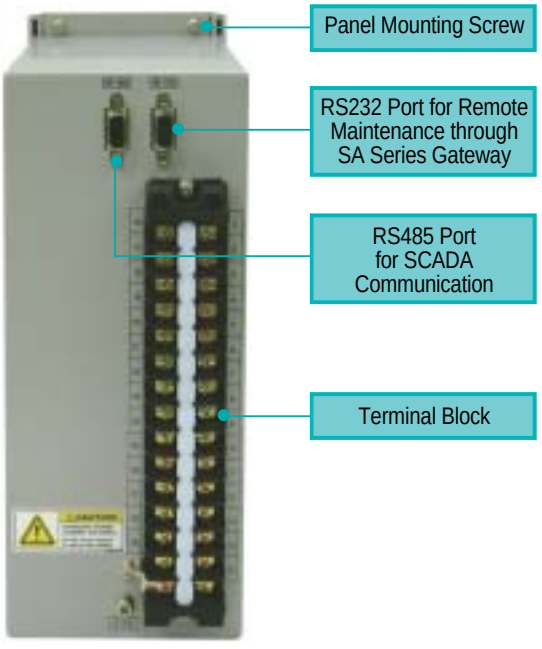
Ordering Information

PAC – E 1 0 0 – I □ – P □ – C □

- Option: Communication [1: Modbus, 2: DNP 3.0, 3: IEC870-5-103]
- Option: Power Supply [1 : 24~48Vdc, 2 : 80~300Vdc or 110Vac / 220Vac]
- Option: Rated Current [1 : 1A, 2 : 5A]
- Version Information
- 0 : OCR, 5 : SGR
- 1 : Current Relay, 5 : Voltage Relay
- Series Model Name
- Protection, Control & Communication

Front & Rear Panel Operator Interface





General Specifications

Power Supply	Input	110~220Vac±20%(50/60Hz), 80~300Vdc
	Power Consumption	<30VA
Phase Current Input (E100, E150)	Nominal Frequency	50/60Hz
	Phase CT Secondary	5A
	Ground CT Secondary	5A (E100)
	Input Range	0.1~250A
	Burden	< 0.5VA per phase
	Current Withstand	1 sec at 40 times rated, 2 sec at 20 times rated, continuous at 3 times rated
Sensitive Current Input (E150)	Nominal Frequency	50/60Hz
	Input Range	1~1300mA
	Burden	<0.5VA
Voltage Input (E150, E500)	Nominal Frequency	50/60Hz
	Input Range	1~220V
	Burden	<0.5VA
	Voltage Withstand	Continuous at 220V
Contact Input	Number	4, configurable
	Voltage Range	250Vdc Maximum
	Recognition Time	10msec
Contact Output	Number	2NO, 2NC, configurable
	Make and Carry	6A, continuous
		10A, 0.3sec, AC250, Resistive Load, 30A, 0.3sec, DC250, Resistive Load
	Breaking Capacity	1A, 0.1(PF), AC250, 1A, L/R of 25msec, DC125
Communication Interface	Front Panel	RS232, 19200bps (fixed), 8/N/1, Modbus protocol
	Rear Panel	RS232, physically identical port to front panel RS232
		Galvanic isolated RS485, 8/N/1, 300~38400bps, Modbus protocol
Environmental	Operating Temperatures	-20℃ ~70℃
	Humidity (non-condensing)	up to 100%
	Altitude	up to 2000m
Type Test	Insulation	IEC 60255-5,ANSI/IEEE C37.90.0
	Oscillatory Transient	IEC 60255-22-1, ANSI/IEEE C37.90.1
	Surge Immunity	IEC 60255-22-5 class IV
	Fast Transient	IEC 60255-22-4 class IV, ANSI/IEEE C37.90.1
	Electrostatic Discharge	IEC 60255-22-2 class III
	RFI Susceptibility	IEC 60255-22-3 class III, ANSI/IEEE C37.90.2
	Vibration	IEC 60255-21-1 class II
	Shock	IEC 60255-21-2 class II

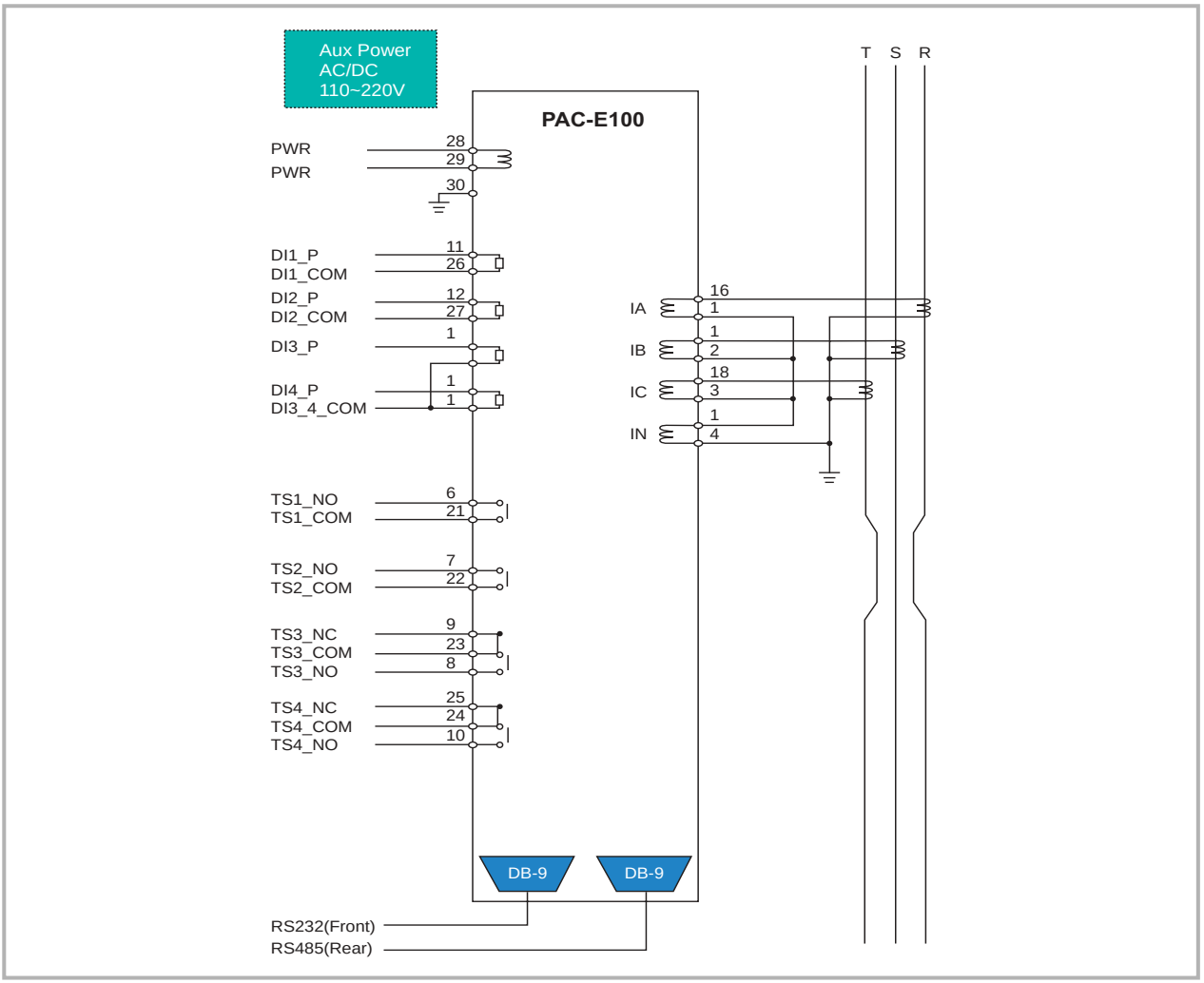
PAC-E100 (OCR/OCGR)

Technical Data

PAC-E100			
Definite/Inverse Time OCR, NSOCR, UCR, Thermal Overload			
Protection	Definite Time Over Current (50_1, 50_2, 50N_1, 50N_2)	**Setting** • Pickup Current : 0.50~100.00A, 0.05 step • Operating Delay : 0.00~60.00sec, 0.01 step	**Accuracy** • Pickup Current: 2% of setting value or 70mA • Operating Time :3% or ±35msec of setting value @ 2xPickup current, delay time 0.00~0.03 • Dropout Level: 96~98% of pickup current • Dropout Time:< 40msec
	Inverse Time Over Current (51, 51N)	**Setting** • Pickup Current : 0.50~100.00A, 0.05 step • Time Multiplier : 0.00~10.00sec, 0.01 step **Trip Characteristic Curve** • IEC 60255-3 • ANSI/IEEE • KEPCO	**Accuracy** • Pickup Current: 2% of setting value or 35msec • Operating Time : 3% or ±35msec of setting value @ 2xPickup current, delay time 0.00~0.03 • Dropout Level: 96~98% of pickup current • Dropout Time:< 40msec
	Negative Phase Sequence Over Current (46)	**Setting** • Pickup Current : 0.50~100.00A, 0.05 step • Operating Delay : 0.00~180.00sec, 0.01 step	**Accuracy** • Pickup Current: 2% of setting value or 70mA • Operating Time : 3% or ±35msec of setting value @ 2xPickup current, delay time 0.00~0.03 • Dropout Level: 96~98% of pickup current • Dropout Time:< 40msec
	Under Current (37)	**Setting** • Pickup Current : 0.10~5.00A, 0.05 step • Operating Delay : 0.00~180.00sec, 0.01 step	**Accuracy** • Pickup Current: 2% of setting value or 70mA • Operating Time : 3% or ±35msec of setting value @ 0xPickup current, delay time 0.00~0.03 • Dropout Level: 102~104% of pickup current • Dropout Time:< 40msec
	Thermal Overload (49)	**Setting** • K-Factor for IEC 60255-8 : 0.10~4.00, 0.01 step • Time Constant(τ) : 1.0~999.9min, 0.01 step • Thermal Alarm : 50~100%, 1 step	**Accuracy** • Pickup Current: 2% of setting value or 70mA • Operating Time: 10% or ±2sec of setting value • Dropout Level: 98~100% of Thermal
Circuit Breaker Control	**Setting** • Trip Pulse Time 0.1~5.0sec, 0.1 step • Close Pulse Time 0.1~5.0sec, 0.1 step		
Measurement	**Current** • Phase, Ground Current RMS • Input Range: 0.5~250A • Accuracy (for In=5) : ±2%(0.5~1A), ±0.5%(1~6A)	**Sequence Current** • Positive/Negative/Zero Sequence Current RMS **Frequency** • Range: 40Hz~70Hz, Phase A Current **Accuracy** • ± 0.03Hz at Nominal current input	
Programmable Logic	**Contact Output, LED** • Logic: OR8 (8 input OR), HALF-OR8 (Non inverting 4 input & inverting 4 input OR), AND8 (8 input AND), HALF-AND8 (Non inverting 4 input & inverting 4 input AND) • Input: Reference PAC-E100 Logic Input Diagram • Reset Type: Self (latched until delay timer is expired), Manual (latched until annunciator reset is issued) • Reset Delay: 0.00~60.00sec(0.01sec step) **Contact Input** • Function: Not Connected, CB Open, CB Close, Remote Annunciator Reset, Protection Block, General Input		

PAC-E100 (OCR/OCGR)

External Connection Diagram



Description	No
IA+	16
IB+	17
IC+	18
IN+	19
--	20
TS1_COM	21
TS2_COM	22
TS3_COM	23
TS4_COM	24
TS4_NC	25
DI1_COM	26
DI2_COM	27
PWR+	28
PWR-	29
FG	30

No	Description
1	IA-
2	IB-
3	IC-
4	IN-
5	--
6	TS1_NO
7	TS2_NO
8	TS3_NO
9	TS3_NC
10	TS4_NO
11	DI1_P
12	DI2_P
13	DI3_P
14	DI4_P
15	DI3_4_COM

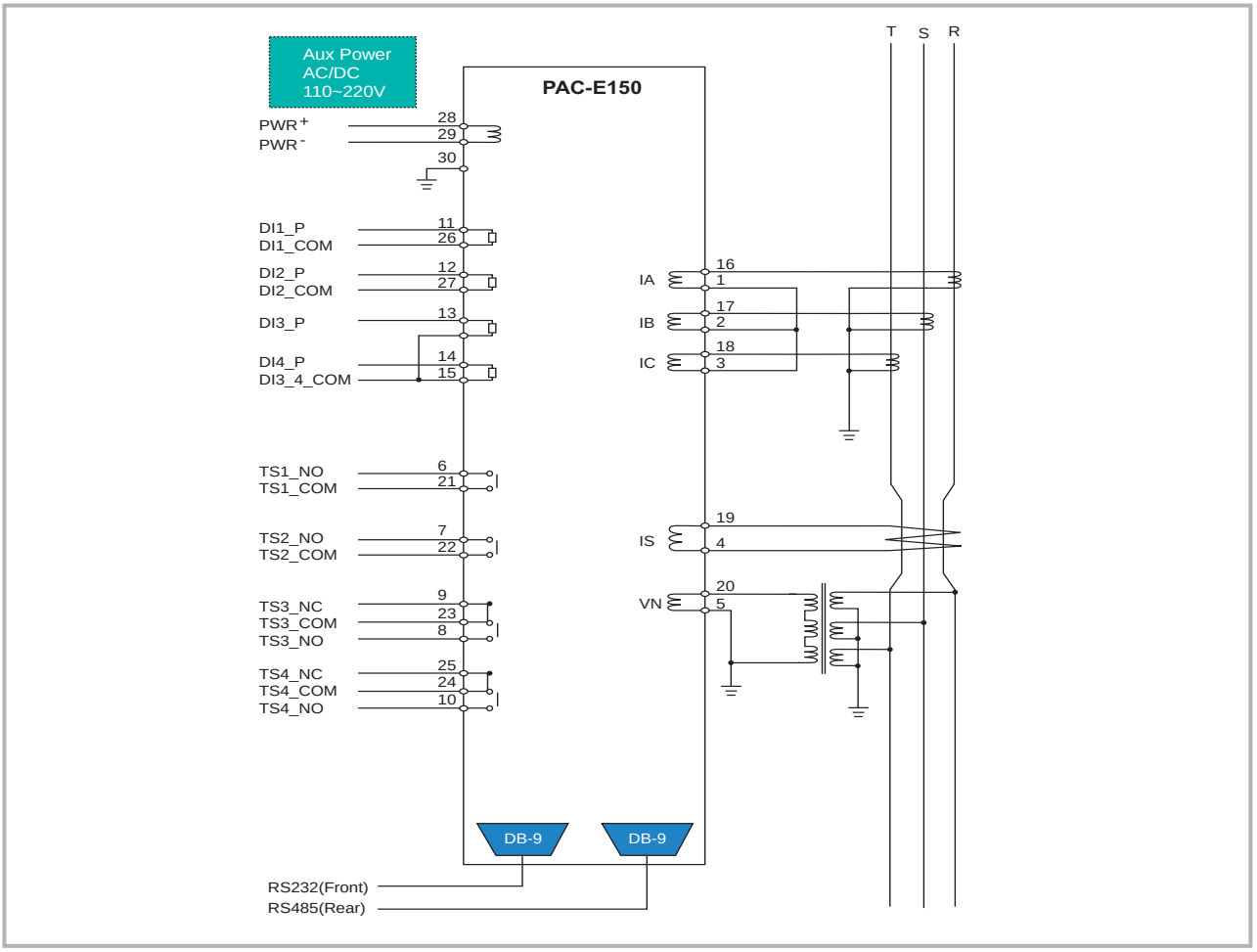
PAC-E150 (OCR/SGR)

Technical Data

PAC-E150			
Definite/Inverse Time OCR, NSOCR, UCR, Thermal Overload, SGR, OVGR			
Protection	Definite Time Over Current (50_1, 50_2)	**Setting** • Pickup Current : 0.50~100.00A, 0.05 step • Operating Delay : 0.00~60.00sec, 0.01 step	**Accuracy** • Pickup Current: 2% of setting value or 70mA • Operating Time : 3% or ±35msec of setting value @ 2xPickup current, delay time 0.00~0.03 • Dropout Level: 96~98% of pickup current • Dropout Time: < 40msec
	Inverse Time Over Current (51)	**Setting** • Pickup Current : 0.50~100.00A, 0.05 step • Time Multiplier : 0.01~10.00sec, 0.01 step **Trip Characteristic Curve** • IEC 60255-3 • ANSI/IEEE, KEPCO	**Accuracy** • Pickup Current: 2% of setting value or 70mA • Operating Time : 3% or ±35msec of setting value @ 2xPickup current, delay time 0.00~0.03 • Dropout Level: 96~98% of pickup current • Dropout Time: < 40msec
	Negative Phase Sequence Over Current (46)	**Setting** • Pickup Current : 0.50~100.00A, 0.05 step • Operating Delay : 0.00~180.00sec, 0.01 step	**Accuracy** • Pickup Current: 2% of setting value or 70mA • Operating Time : 3% or ±35msec of setting value @ 2xPickup current, delay time 0.00~0.03 • Dropout Level: 96~98% of pickup current • Dropout Time: < 40msec
	Under Current (37)	**Setting** • Pickup Current : 0.10~5.00A, 0.05 step • Operating Delay : 0.00~180.00sec, 0.01 step	**Accuracy** • Pickup Current: 2% of setting value or 70mA • Operating Time : 3% or ±35msec of setting value @ 0xPickup current, delay time 0.00~0.03 • Dropout Level: 102~104% of pickup current • Dropout Time: < 40msec
	Thermal Overload (49)	**Setting** • K-Factor for IEC 60255-8 : 0.10~4.00, 0.01 step • Time Constant(τ) : 1.0~999.9min, 0.1 step • Thermal Alarm : 50~100%, 1 step	**Accuracy** • Pickup Current: 2% of setting value or 70mA • Operating Time : 10% or ±2sec of setting value • Dropout Level: 98~100% of Thermal
	Sensitive Ground Over Current (67N)	**Setting** • Pickup Current: 1~999mA, 1 step • Pickup Voltage: 5~170V, 1 step • Operating Delay : 0.00~60.00sec, 0.01 step • Direction : Disable/Forward/Reverse • Maximum Torque Angle : -90~90°, 1 step	**Accuracy** • Pickup Current: 3% of setting value or 0.2mA • Operating Time : 3% or ±35sec of setting value @ 2xPickup current, delay time 0.00~0.03 • Dropout Level: 96~98% of pickup current • Dropout Time: < 40msec • Angle Accuracy: ±3°
	Ground Over Voltage (59G_1, 59G_2, 59G_3)	**Setting** • Pickup Voltage: 5~170V, 1 step • Time Multiplier : 0.01~10.00, 0.01 step • Operating Delay (DT) : 0.00~60.00sec, 0.01 step **Trip Characteristic Curve** • Trip Inverse, Alarm Inverse	**Accuracy** • Pickup Voltage: 2% of setting value • Operating Time : 3% or ±35sec of setting value @ 2xPickup Voltage, delay time 0.00~0.03 • Dropout Level: 96~98% of pickup Voltage • Dropout Time: < 40msec

Circuit Breaker Control	**Setting** • Trip Pulse Time 0.1~5.0sec, 0.1 step • Close Pulse Time 0.1~5.0sec, 0.1 step
Measurement	**Current** • Phase, Ground Current RMS • Input Range: 0.5~250A • Accuracy (for In=5) : ± 2%(0.5~1A), ±0.5%(1~6A) **Sequence Current** • Positive/Negative/Zero Sequence Current RMS **Frequency** • Range: 40Hz~70Hz, Phase A Current **Accuracy** • ± 0.03Hz at Nominal current input
Programmable Logic	**Contact Output, LED** • Logic OR8 (8 input OR), HALF-OR8 (Non inverting 4 input & inverting 4 input OR), AND8 (8 input AND), HALF-AND8 (Non inverting 4 input & inverting 4 input AND) • Input Reference PAC-E150 Logic Input Diagram • Reset Type Self (latched until delay timer is expired), Manual (latched until annunciator reset is issued) • Reset Delay 0.00~60.00sec(0.01sec step) **Contact Input** • Function Not Connected, CB Open, CB Close, Remote Annunciator Reset, Protection Block, General Input

External Connection Diagram



Description	No
IA+	16
IB+	17
IC+	18
Is+	19
VN+	20
TS1_COM	21
TS2_COM	22
TS3_COM	23
TS4_COM	24
TS4_NC	25
DI1_COM	26
DI2_COM	27
PWR+	28
PWR-	29
FG	30

No	Description
1	IA-
2	IB-
3	IC-
4	Is-
5	VN-
6	TS1_NO
7	TS2_NO
8	TS3_NO
9	TS3_NC
10	TS4_NO
11	DI1_P
12	DI2_P
13	DI3_P
14	DI4_P
15	DI3_4_COM

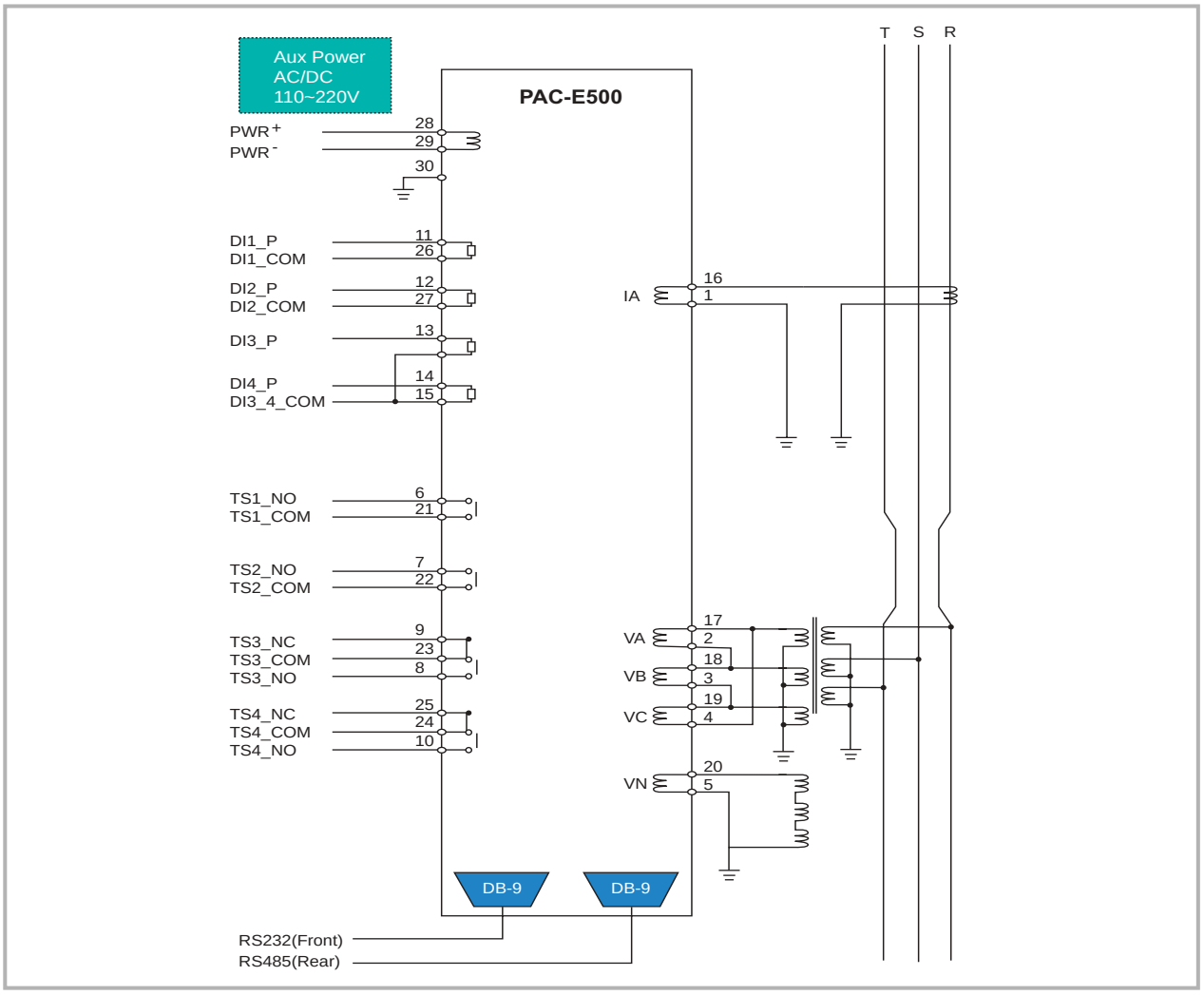
PAC-E500 (OVR/UVR)

Technical Data

PAC-E500			
OVR, UVR, OVGR, NSOVR, Underfrequency			
Protection	Phase Over Voltage (59_1, 59_2)	**Setting** • Pickup Voltage: 5~170V, 1 step • Time Multiplier : 0.01~10.00, 0.01 step • Operating Delay (DT) : 0.00~60.00sec, 0.01 step	**Accuracy** • Pickup Voltage: 2% of setting value • Operating Time : 3% or ±35msec of setting value @ 2x Pickup voltage, delay time 0.00~0.03 • Dropout Level: 96~98% of pickup voltage • Dropout Time:< 40msec
	Phase Under Voltage (27_1, 27_2)	**Setting** • Pickup Voltage: 5~170V, 1 step • Time Multiplier : 0.01~10.00, 0.01 step • Operating Delay (DT) : 0.00~60.00sec, 0.01 step	**Accuracy** • Pickup Voltage: 2% of setting value • Operating Time : 3% or ±35msec of setting value @ 2x Pickup voltage, delay time 0.00~0.03 • Dropout Level: 102~104% of pickup voltage • Dropout Time: < 40msec
	Ground Over Voltage (59G_1, 59G_2, 59_3)	**Setting** • Pickup Voltage: 5~170V, 1 step • Time Multiplier : 0.01~10.00, 0.01 step • Operating Delay (DT) : 0.00~60.00sec, 0.01 step **Trip Characteristic Curve** • Trip Inverse, Alarm Inverse	**Accuracy** • Pickup Voltage: 2% of setting value • Operating Time : 3% or ±35msec of setting value @ 2x Pickup voltage, delay time 0.00~0.03 • Dropout Level: 96~98% of pickup voltage • Dropout Time:< 40msec
	Negative Sequence Over Voltage (47)	**Setting** • Pickup Voltage: 5~170V, 1 step • Operating Delay (DT) : 0.00~60.00sec, 0.01 step	**Accuracy** • Pickup Voltage: 2% of setting value • Operating Time : 3% or ±35msec of setting value @ 2x Pickup voltage, delay time 0.00~0.03 • Dropout Level: 96~98% of pickup voltage • Dropout Time:< 40msec
	Underfrequency (81)	**Setting** • Pickup Under Voltage : 5~170V, 1 step • Pickup Over Current : 0.5~100.00A, 0.05 step • Pickup dF/dT : -10.00~-0.10Hz/s, 0.01 step • Pickup Frequency : 45.00~65.00Hz, 0.01 step • Operating Delay : 0.00~180.00sec, 0.01 step	**Accuracy** • Pickup Under Voltage: 2% of setting value • Pickup Over Current: 2% of setting value • Pickup dF/dT: 2% of setting value • Pickup Frequency: 0.03Hz • Operating Time : 3% or ±35msec of setting value • Dropout Level: +0.03Hz of pickup Frequency • Dropout Time:< 40msec
Circuit Breaker Control	**Setting** • Trip Pulse Time: 0.1~5.0sec, 0.1 step, • Close Pulse Time: 0.1~5.0sec, 0.1 step		
PT Fuse Failure Monitor	**Setting** • Positive Seq. UV Pickup : 5~170V,1 step • Negative Seq. OV Pickup : 5~170V,1 step • Operate Time Delay : 0.00~60.00sec,0.01 step	**Accuracy** • Operating Time Accuracy : 3% or ±35msec of setting value	
Measurement	**Voltage** • Line to Line Voltage, Phase, Ground Voltage RMS • Input Range: 0.5~220V • Accuracy (for In=5) : ±2%(0.5~1V), ±0.5%(1~220V)	**Sequence Voltage** • Positive/Negative/Zero Sequence Voltage RMS **Frequency** • Range: 40Hz~70Hz, Phase A Voltage **Accuracy** • ±0.03Hz at Nominal Voltage input	
Programmable Logic	**Contact Output, LED** • Logic : OR8 (8 input OR), HALF-OR8 (Non inverting 4 input & inverting 4 input OR), AND8 (8 input AND), HALF-AND8 (Non inverting 4 input & inverting 4 input AND) • Input : Reference PAC-E500 Logic Input Diagram • Reset Type : Self (latched until delay timer is expired), Manual (latched until annunciator reset is issued) • Reset Delay : 0.00~60.00sec(0.01sec step) **Contact Input** • Function : Not Connected, CB Open, CB Close, Remote Annunciator Reset, Protection Block, General Input		

PAC-E500 (OVR/UVR)

External Connection Diagram

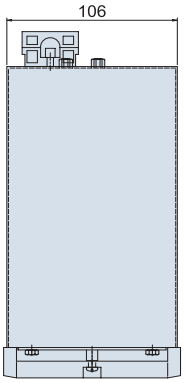


Description	No
IA+	16
VA+	17
VB+	18
VC+	19
VN+	20
TS1_COM	21
TS2_COM	22
TS3_COM	23
TS4_COM	24
TS4_NC	25
DI1_COM	26
DI2_COM	27
PWR+	28
PWR-	29
FG	30

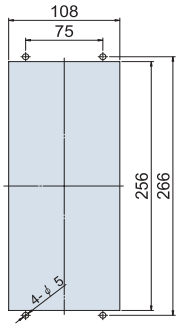
No	Description
1	IA-
2	VA-
3	VB-
4	VC-
5	VN-
6	TS1_NO
7	TS2_NO
8	TS3_NO
9	TS3_NC
10	TS4_NO
11	DI1_P
12	DI2_P
13	DI3_P
14	DI4_P
15	DI3_4_COM

PAC-E Series

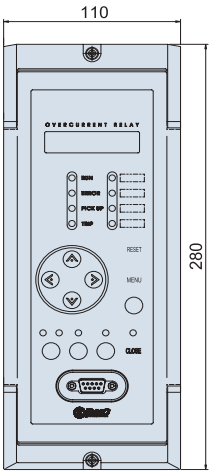
Dimensioned Drawings



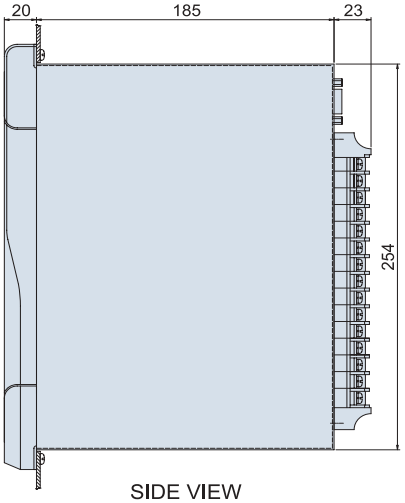
TOP VIEW



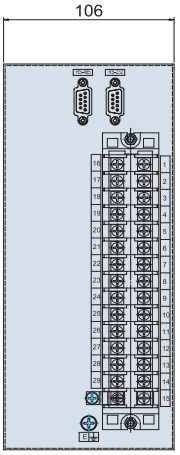
PANEL CutOut



FRONT VIEW



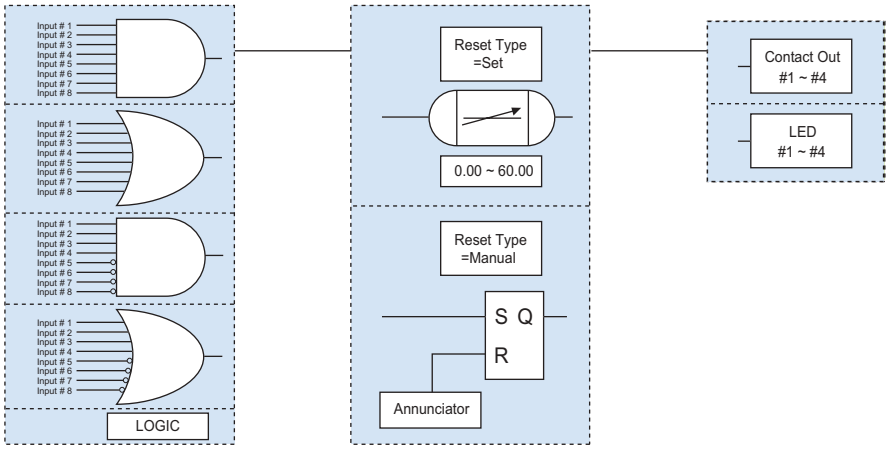
SIDE VIEW



REAR VIEW

Logic Configuration

Logic Design (Contact Output & LED)



Logic Input Configuration

PAC-E100 Logic Input Table

Input Group	Input	Description
Logic	L_OFF	Logic '0'
	L_ON	Logic '1'
CB Control	CB_OPEN_CTL	CB Open Control (Local or Remote)
	CB_CLOSE_CTL	CB Close Control (Local or Remote)
Contact Inputs	CONT_IN #1	Contact input#1 status
	- - -	- - -
	CONT_IN #4	Contact input#4 status
System	SYS_ERR	Self-diagnosis error is occurred
Protection Elements	PROT_PKP_OR	Any protection element is picked up
	PROT_OP_OR	Any protection element is operated
	50_1_PKP_OR	At least 1 phase of 50_1 is picked up
	50_1_PKP_A	Phase A of 50_1 is picked up
	50_1_PKP_B	Phase B of 50_1 is picked up
	50_1_PKP_C	Phase C of 50_1 is picked up
	50_1_OP_OR	At least phase of 50_1 is operated
	50_1_OP_A	Phase A of 50_1 is operated
	50_1_OP_B	Phase B of 50_1 is operated
	50_1_OP_C	Phase C of 50_1 is operated
	50_2_PKP_OR	At least 1 phase of 50_2 is picked up
	50_2_PKP_A	Phase A of 50_2 is picked up
	50_2_PKP_B	Phase B of 50_2 is picked up
	50_2_PKP_C	Phase C of 50_2 is picked up
	50_2_OP_OR	At least phase of 50_2 is operated
	50_2_OP_A	Phase A of 50_2 is operated
	50_2_OP_B	Phase B of 50_2 is operated
	50_2_OP_C	Phase C of 50_2 is operated
	51_PKP_OR	At least 1 phase of 51 is picked up
	51_PKP_A	Phase A of 51 is picked up
	51_PKP_B	Phase B of 51 is picked up
	51_PKP_C	Phase C of 51 is picked up
	51_OP_OR	At least phase of 51 is operated
	51_OP_A	Phase A of 51 is operated
	51_OP_B	Phase B of 51 is operated
	51_OP_C	Phase C of 51 is operated
	50N_1_PKP	50N_1 is picked up
	50N_1_OP	50N_1 is operated
	50N_2_PKP	50N_2 is picked up
	50N_2_OP	50N_2 is operated
	51N_PKP	51N is picked up
	51N_OP	51N is operated
	37_PKP_OR	At least 1 phase of 37 is picked up
	37_PKP_A	Phase A of 37 is picked up
	37_PKP_B	Phase B of 37 is picked up
	37_PKP_C	Phase C of 37 is picked up
	37_OP_OR	At least phase of 37 is operated
	37_OP_A	Phase A of 37 is operated
	37_OP_B	Phase B of 37 is operated
	37_OP_C	Phase C of 37 is operated
	49_ALARM	49 is alarmed
	49_OP	49 is operated
	46_PKP	46 is picked up
	46_OP	46 is operated

Logic Input Configuration

PAC-E150 Logic Input Table

Input Group	Input	Description
Logic	L_OFF	Logic '0'
	L_ON	Logic '1'
CB Control	CB_OPEN_CTL	CB Open Control (Local or Remote)
	CB_CLOSE_CTL	CB Close Control (Local or Remote)
Contact Inputs	CONT_IN #1	Contact input#1 status
	- - -	- - -
	CONT_IN #4	Contact input#4 status
System	SYS_ERR	Self-diagnosis error is occurred
Protection Elements	PROT_PKP_OR	Any protection element is picked up
	PROT_OP_OR	Any protection element is operated
	50_1_PKP_OR	At least 1 phase of 50_1 is picked up
	50_1_PKP_A	Phase A of 50_1 is picked up
	50_1_PKP_B	Phase B of 50_1 is picked up
	50_1_PKP_C	Phase C of 50_1 is picked up
	50_1_OP_OR	At least phase of 50_1 is operated
	50_1_OP_A	Phase A of 50_1 is operated
	50_1_OP_B	Phase B of 50_1 is operated
	50_1_OP_C	Phase C of 50_1 is operated
	50_2_PKP_OR	At least 1 phase of 50_2 is picked up
	50_2_PKP_A	Phase A of 50_2 is picked up
	50_2_PKP_B	Phase B of 50_2 is picked up
	50_2_PKP_C	Phase C of 50_2 is picked up
	50_2_OP_OR	At least phase of 50_2 is operated
	50_2_OP_A	Phase A of 50_2 is operated
	50_2_OP_B	Phase B of 50_2 is operated
	50_2_OP_C	Phase C of 50_2 is operated
	51_PKP_OR	At least 1 phase of 51 is picked up
	51_PKP_A	Phase A of 51 is picked up
	51_PKP_B	Phase B of 51 is picked up
	51_PKP_C	Phase C of 51 is picked up
	51_OP_OR	At least phase of 51 is operated
	51_OP_A	Phase A of 51 is operated
	51_OP_B	Phase B of 51 is operated
	51_OP_C	Phase C of 51 is operated
	67N_PKP	67N is picked up
	67N_OP	67N is operated
	37_PKP_OR	At least 1 phase of 37 is picked up
	37_PKP_A	Phase A of 37 is picked up
	37_PKP_B	Phase B of 37 is picked up
	37_PKP_C	Phase C of 37 is picked up
	37_OP_OR	At least phase of 37 is operated
	37_OP_A	Phase A of 37 is operated
	37_OP_B	Phase B of 37 is operated
	37_OP_C	Phase C of 37 is operated
	49_ALARM	49 is alarmed
	49_OP	49 is operated
	46_PKP	46 is picked up
	46_OP	46 is operated
	59G_1_PKP	59G_1 is picked up
	59G_1_OP	59G_1 is operated
	59G_2_PKP	59G_2 is picked up
	59G_2_OP	59G_2 is operated
	59G_3_PKP	59G_3 is picked up
	59G_3_OP	59G_3 is operated

Logic Input Configuration

PAC-E500 Logic Input Table

Input Group	Input	Description
Logic	L_OFF	Logic '0'
	L_ON	Logic '1'
CB Control	CB_OPEN_CTL	CB Open Control (Local or Remote)
	CB_CLOSE_CTL	CB Close Control (Local or Remote)
Contact Inputs	CONT_IN #1	Contact input#1 status
	- - -	- - -
	CONT_IN #4	Contact input#4 status
System	SYS_ERR	Self-diagnosis error is occurred
Protection Elements	SYS_ERR	Self-diagnosis error is occurred
	PROT_PKP_OR	Any protection element is picked up
	PROT_OP_OR	Any protection element is operated
	59_1_PKP_OR	At least 1 phase of 59_1 is picked up
	59_1_PKP_A	Phase A of 59_1 is picked up
	59_1_PKP_B	Phase B of 59_1 is picked up
	59_1_PKP_C	Phase C of 59_1 is picked up
	59_1_OP_OR	At least phase of 59_1 is operated
	59_1_OP_A	Phase A of 59_1 is operated
	59_1_OP_B	Phase B of 59_1 is operated
	59_1_OP_C	Phase C of 59_1 is operated
	59_2_PKP_OR	At least 1 phase of 59_2 is picked up
	59_2_PKP_A	Phase A of 59_2 is picked up
	59_2_PKP_B	Phase B of 59_2 is picked up
	59_2_PKP_C	Phase C of 59_2 is picked up
	59_2_OP_OR	At least phase of 59_2 is operated
	59_2_OP_A	Phase A of 59_2 is operated
	59_2_OP_B	Phase B of 59_2 is operated
	59_2_OP_C	Phase C of 59_2 is operated
	27_1_PKP_OR	At least 1 phase of 59_1 is picked up
	27_1_PKP_A	Phase A of 59_1 is picked up
	27_1_PKP_B	Phase B of 59_1 is picked up
	27_1_PKP_C	Phase C of 59_1 is picked up
	27_1_OP_OR	At least phase of 59_1 is operated
	27_1_OP_A	Phase A of 59_1 is operated
	27_1_OP_B	Phase B of 59_1 is operated
	27_1_OP_C	Phase C of 59_1 is operated
	27_2_PKP_OR	At least 1 phase of 59_2 is picked up
	27_2_PKP_A	Phase A of 59_2 is picked up
	27_2_PKP_B	Phase B of 59_2 is picked up
	27_2_PKP_C	Phase C of 59_2 is picked up
	27_2_OP_OR	At least phase of 59_2 is operated
	27_2_OP_A	Phase A of 59_2 is operated
	27_2_OP_B	Phase B of 59_2 is operated
	27_2_OP_C	Phase C of 59_2 is operated
	59G_1_PKP	59G_1 is picked up
	59G_1_OP	59G_1 is operated
	59G_2_PKP	59G_2 is picked up
	59G_2_OP	59G_2 is operated
	59G_3_PKP	59G_3 is picked up
	59G_3_OP	59G_3 is operated
	47_PKP	47 is picked up
	47_OP	47 is operated
	81_PKP	81 is picked up
	81_OP	81 is operated
	PT_FUSE_FAIL	PT_FUSE_FAIL is operated

Protection, Control & Metering System Solution

SCADA System

PYLON : Windows NT based HCI/SCADA System

RTU & Communication Gateway (SA Series for Substation Automation)

SA-G30: Communication Gateway (3U chassis)
1 CPU Module& up to 4 Serial Communication Module

Up to 40 Serial Ports (RS232 or RS485)

▶**CPU: SA-MPC**
- Freescale MPC8260 300MHz
- VME Master
- FLASH ROM: 64MByte
- Expandable Flash Disk - up to 1GByte
- SDRAM: 128Mbyte
- Ethernet 10/100 base: 3 ports (up to 6 ports)
- RS232: 2 ports
- USB master: 2 ports
- Linux 2.4

▶**Serial Communication Module** : SA-CCU10
- CPU: SH7051 20MHz
- SRAM: 512KByte
- DPRAM: 32Kbyte
- VME Slave
- Serial Port: RS232 10ports
- Baud rate: 300~115200bps

▶ **Dual Power Supply:**
- 80~265 VAC/DC(Free Voltage)

Numerical Protection Relays

PAC-P100
Feeder Protection & Control Unit

PDP-T100
Transformer Protection Relay

G5R Series

PAC-E Series
PAC-E100
PAC-E150
PAC-E500

Digital Power Meter

DPM-B100

Digital Power Meter (DPM-B100)

Front Panel Operator Interface

Technical Specifications

General Specifications

Wiring		1P2W, 1P3W, 3P3W, 3P4W
Rating	Current	5A, 1A (Option)
	Voltage	100-380 V
	Control Source	85~264V (Free Voltage: AC/DC)
	Frequency	45~65Hz
	Power Consumption	< 10W
	Burden	PT: < 0.5VA, CT: < 0.1 VA
Environment	Service Temperature	-20~70℃
	Storage Temperature	-30~80℃
	Humidity	5~95%
Communication	RS485	Rear 1 channel
Insulation Resistance		> DC 500V 100㏁
Dielectric test Voltage		AC 2 kV, Applied Time: 1 min
Impulse test Voltage		AC 5kV, Applied Waveform: 1.2x50 ㎲
Thermal Withstand Capacity	Current	2 times of rated value (Applied Time: 3 hour)
		20 times of rated value (Applied Time: 1 sec)
	Voltage	1.15 times of rated value (Applied Time: 3 hour)
Standards		IEC Standards

Functions

Measurement	Voltage	RMS
	Current	RMS
	Power	Active, Reactive
	Energy	Active, Reactive
	Power Factor	Lead, Lag
	Load Factor	LED Bar Display
	Frequency	Metering
Communication	RS-485	Modbus
Pulse Out	Energy	Wh, Varh
I / O	Digital In	1
	Digital Out	1

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