

Product Brochure

Medium Voltage switchgear || iPanel Cloud Management System || Low Voltage Switchgear



iPanel Cloud Management System

Introduction

"iPanel Cloud Management System" is the application that combines traditional switchgear with contemporary computing technology and communication technology.

「Smart iPanel」 indicates switchgear can self-analyze and auto adjust control functions. In practical, smart iPanel increases switchgear reliability and reduces labor force. It brings a great benefit to clients.

Feature

Safety	Increase switchgear safety and reliability, prevent damage while operation.
Cost	Reduce or without labor force to monitor for switchgear in substation, greatly decreasing enterprise cost.
Efficiency	Consolidated statistic function on power consumption and electricity cost enhances the efficiency of electricity management.
Alarm	Potential switchgear accident warning.
Message	Abnormal info. notification shorten the duration of troubleshooting and power outage.
Analysis	Switchgear operation condition can be daily or monthly analyzed in the format of chart or report.
Maintenance	Efficient regular maintenance can be planed with the statistics and analysis data which decreases maintenance cost.
Optimization	Optimize energy consumption distribution on the basis of historical power parameter and distribute power stably to system.
Remote Control	In case of natural disasters and inevitable accidents, switchgear can set "Trip" by APP with authorized account.
Database	Cloud system provides enterprises with an efficient and relible platform for data storage and sharing which greatly influences modern business management.

Cloud Management System

Structure



System Specification

Item	iPanel monitor items	Equipment
	Voltage, current, frequency	Power Meter
	Real power(R), Apparent power(S), Reactive power(Q)	Power Meter
Power value	KWH, KVARH, Demand	Power Meter
	Power factor, Voltage harmonic, Current harmonic	Power Meter
	Other power value	Power Meter
	CB operation & TRIP condition	DIO Controller
	CB overcurrent message (50/51, 50N/51N)	Protective Relay
Control value	CB fault voltage message (27/59)	Protective Relay
Control value	CB reclosing message (79)	Auto. reclosing relay
	DS/ PT trolley/ Earthing switch condition	DIO Controller
	Other control value	Controller
	Temp of CB contactor , cable connector, busbar joint point.	Wireless Temp. and Humi. monitor device
	Partial discharge value	Wireless Temp. and Humi. monitor device
	Temp. & Humi. of compartment	Temp. and Humi. detector
	Ambient Temp. & Humid. of substation	Temp. and Humi. detector
Safaty value	Capacitor Surface Temp.	Temp. detector
Salety value	Reactor Core Temp.	Temp. detector
	Transformer Core Temp.	49 Relay
	Capacitor massage(degradation value, on-line capacity, closing time)	iAPFR
	UPS massage(battery capacity, remaining supply time)	UPS
	Other safety value	Sensor

System Interface

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Safety init	Equipment operation redio.				
nene se			4	Electric meter	Information chart
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B. Computer operation interface (Web)







	Substation energy consumpti	on overview
Switchgear	Hourly cumulative energy consumption (KWh)	'Today's cumulative energy consumption (kWh)
MCB	149.6	382.62
CB1	94.62	275.31
CB2	54.68	97.75
MP220	52.68	83.72

	Maintenance notice	
switchboard	Inspection item (part)	Date to be inspected
	Maintenance-free data	

Switchgear health (AI diagnosis) Health indication:

Green Switchgear health is "Normal"

- Orange Switchgear health is "Warning"
- Red Switchgear health is "Abnormal"

2. Substation and switchgear management



All switchgear are in the online condition.

Red One of the switchgear is disconnected.



Tab	le of abno	rmal occurre	nce in this	s month
Region	District	Unprocessed	Processed	Completed
Tainan	Client A	16	13	11
Taiwan	Client B	7	5	3
Vietnam	Client C	10	5	2
Thailand	Client D	11	8	5

Tab	le of abno	rmal occurrenc	ce in this month
Region	District	Event alarm	Number of trip
Teiwer	Client A	16	13
Taiwan	Client B	7	5
Vietnam	Client C	10	5
Thailand	Client D	11	8



4. Switchgear device management board

2019-03-21 15:00:43	03-21 150104 201 iUPS 117.40 Input voltage(v) , 4	9-03-21 13.01.05 高壓盤氣室溫速度 26.70 Temperature(*c) ,	2019-03-21 15:00:09 修壓380融氣室通速度 29.10 Temperature(*c)	2915-03-21 10:00.07 220V_SC1 28.60
Device IP Address	Input voltage(v)	Temperature(*C)	<pre>Temperature(*C)</pre>	
		<u>۵</u>	۵ ái	Temperature(*c)
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	Table 2000/03/2000/03/2000/03/ Table 4	() Equip Inte	c	
	H		Equipment Type	Schneider relay protect station S20

Cloud Management System



- A. Power consumption statistics

Mor	nth Energy Co	nsumption	M	onth Electricity	Ranking		Month EUI Rankir	na
Rank	Factory	Consumption (kWh)	Rank	Factory	Electricity Price(\$)	Rank	Factory	EUI
1	B1變電站	32,012.55	1	B1變電站	149,385.0	1	宿舍能源管理	225.49
2	宿舍能源管理	1,727.25	2	宿舍能源管理	11,054.7	2	Taiwan Demo case	64.59
3	Taiwan Demo case	494.70	3	Taiwan Demo case	1,731.5	3	B1變電站	33.43
4	Thailand Demo Case	8.20	4	CPM-1	107.0	4	Thailand Demo Case	1.07
5	CPM-1	0.60	5	Thailand Demo Case	28.7	5	CPM-1	0.08
6	展示間	0.00	6	展示間	0.0	250	-	
40k			175 150	k		200		
30k			125	k -		150	-	
20k	-		100	k –		100	k	
105			75 50	k		50	H .	
TUK			25	k -		0	1 2 3 4	5
0	1 2 3	4 5 6	8	0 1 2 3	4 5 6		EUI	
J	Consumptio	on (kWh)		Electricity P	rice(\$)			

B. Power consumption chart



C. Demand analysis

				nt 😫 Export	Search				
MC	8盤總表 2019-03-01 ~ 2019-03	21 Monthly Demand Report	(Three Stage Price)	1					
	Energy Consumption(kWh)	Maximum Deman	d(kW)	Time of Maximum	n Demand				
Full Period	32,303 60	329.28		2019-03-11 11:00	0~11:15				
Peak	25,836.64	329.28		2019-03-11 11:00	0 ~ 11:15	1			
Semi-Peak	12 managements			(F)		5			
Semi-Peak on Saturday	1,063 95	40.96		2019-03-09 09:45	5~10:00	Daile		la a a rivat	i.e.e.
Off-Peak	5,403,21	50.44		2019-03-07 07:18	5~07:30	Dally	report s	upscript	10[1]:
Full Period	Peak	Semi-Peak Semi-Peak	Semi-Peak on Saturday		Off-Peak	Daily	[,] mails ar	e deliver	red to
Maximum Demand(kW)		Avg Domand(kWh)		Jemand Percent/5	%)	clien	t mailbo>	k automa	atically.
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800000000000	si Perind teli Sens-Pask	22983-80 22008-94 22028-94	2016-03-11 11:00 - 11:15 2016-03-11 11:00 - 11:15	14.09 114:50	1947 54.87				
600.00 kW	Services on Set	nawy 1963.85 94.85 8403.31 58.44	2014-03-09 09-45 - 10-90 2014-03-07 07 16 - 07-90	72.64 73.89	972 %31		Mary Street		1000
	Lafa 0.6 1(FR) 0.92(73-7)	Energy Consumptor (30V) Vectors Demand(3) 582 (6 \$135 523 (4 52 45	A) Energy Extracorptics(WVN) 547.62	Habolmann Dennand (Kr) 151.29	W) Energy Consumption(Wh) Haven	un General (07) Drengy Consum	sterven statuty rator(UV) Vasinum Dena \$25.56	end(kW) Energy Consumption Stat Stat Stat Stat Stat Stat Stat Stat	Bri(WW) Hassman Dan 154.77 152.43
400.00 kW	5453(924) 3394(704) 346(706)	520102 52 01 5205-00 520.00 5220-10 500.00	2005.25 5000.00	263.00 565.02		07/05		980.92 932.46 947.74	52 01 54 05 54 45
	0.44(WED) 0.07(7HA) 0.08(7RD)	216687 29510 2211-49 590-46 315924 374-64	7996 19 5002.17 1943.62	295.10 580.48 174.54		Real or	Same -	219.68 216.63 205.42	14,79 96,44 96,19
200 00 100	OrtaSUN OrtaSUN OrtaSUN	543.18 51.66 243.59 525.28 545.59 525.28	\$191.07 9750.08	529.20		00.11	-12.05	54319 517.42	13.95 Na 70
200.00 KW	0/15(WED) 0/14(THA) 0/15/76	7824-00 777.54 7965-13 21021 5978-56 58	1714.18 1879.67 1819.09	577.54 510.21 511.50				219.00 215.48 211.47	56.21 58.82 56.49
	0/10(547) 0/17(568) 0/18(10(4))	303.08 31.70 306.58 32.87 5278.80 544.85	3472.31	jikasi.		76,852	נואל	197.83 535.50 59.91	5170 5287 58.37
0.00 kW	SCRWITC)	2151.37 215.48 2516.43 565.74	1941.02 1800.08	215.46 595.74				210.08	18.49 56.07
03-02	03-04 03-06 03-08 03-	10 03-12 03-14 03- Time	10 03-18 03-2	0	A	vailable to	o export	Daily / M	onthly i

D. Current flow analysis

Г

necule List Subclule	Load Name	Electricity(kWh)	Percentage(%) E	Electricity in the Previous Period(kWh) Percentage(
Main Circuit Breaker	MP380_姚锜[Low-Pressure Panel-Board]	699.29	100	1250.14	100
ub Circuit Breakers(No.1)	MP380_配電鑑事業處電錶[Manufacture Process]	91.48	13.08	188.17	15.05
ub Circuit Breakers(No.2)	MP380_匯流排事業處電錶[Machinery]	101.45	14.51	184.91	14.79
ub Circuit Breakers(No.3)	MP380_公用電錶[Public Electricity]	326.41	46.68	586 45	46.91
ub Circuit Breakers(No.4)	配電盤湛升設備[Manufacture Process]	0.00	0.00	0.00	0.00
ub Circuit Breakers(No.5)	罐流排電阻焊[Machinery]	0.00	0.00	3.60	0.29
ub Circult Breakers(No.6)	地下層通風盤[Public Electricity]	7.90	1.13	15.70	1.26
ub Circuit Breakers(No.7)	ACP空調盤[Public Electricity]	59.68	8.53	27.60	2.21
ub Circuit Breakers(No.8)	AIP空壓設備盤[Public Electricity]	100.38	14.35	213.40	17.07
ub Circuit Breakers(No.9)	PR健身后動力艙[Public Electricity]	11.80	1.69	24.20	1.94
ub Circuit Breakers(No.10)	匯流排3FMP380[Machinery]	0.00	0.00	1.60	0.13
ub Circuit Breakers(No.11)	匯流排剪角機[Machinery]	0.20	0.03	2.40	0.19
Other	Other	34 34	10	2.11	0.17
Anarysis 0 No. 13.1	Period	А	Na.1: 15.05%	Electricity Percentage in Period	the
No.2: 14.51% No.9: 1.69% No.8: 14.35%	Period Period Manufacture Process Machinery Public Bectmenty	A Ne 14	No.1: No.1: 15.05% No.9: 1.94%	Electricity Percentage in Previous Period	3- 91% 5: 5:

The cloud system can quickly analyze the proportion of electricity flow per unit in the plant, such as production process/mechanical/public class. And the information can be compared with the previous one.

Solution of switehgear Electricity Safety

Switchgear Internal Temperature Rise Problem

Switchgear plays the role as mankind, when body gets fever (heat-up), the brain (detector) will instruct body (switchgear) to take a break (power-off), and go to see a doctor (maintenance engineering company) in time.



Temperature and Humidity Online Monitoring

A. Wireless thermal monitoring

Wireless thermal monitoring device, composed of wireless sensors, antenna and reader adopts Surface Acoustic Wave (SAW) to sense temperature variation. Indoor arrangement in the medium voltage switchgear, it features in continuous circuit breaker temperature online monitoring.



Battery-free

Wireless transmission

Sensitive temp. sensing

Insulating protection unrequired

Permanently maintenance-free

Partial discharge detecting

Adopting surface acoustic wave technique (SAW), self-powered by piezoelectric material.

Wireless reception and transmission with application of SAW.

Fast temperature measurement and free power consumption.

Compact sensor which can be installed directly on medium voltage conductor.

Battery-free sensor. Data reader is DC supply, no need to power off during replacement.

Ultra-high frequency (UHF) detecting function is used as an estimation of insulating degradation in the compartment, which enhances switchgear safety.

Temperature and Humidity Online Monitoring

B. Ambient temperature & humidity of substation monitoring

Humidity Sensor Reader (HSR) measures ambient temperature and relative humidity of substation. Value measured by HSR is adopted as an estimation on insulation degradation in the switchgear. It is equipped with RS-485 Modbus remote control.





C. Temperature and Humidity Monitoring on switchgear compartment (Standard IEC 62271-200)

Equipped with 3-circuit sensors which can monitor and control temperature and humidity of three compartments (CB room < Cable room < Busbar room) at the same time. Additionally, it can automatically heat up, dehumidify, and cool down inside of the switchgear to prevent accidents result from moisture, creepage, and flashover. Thus, safety in power system is increased.

	Equipment Monitoring	*
-	地下願道風發	
	0.00 W	200
	ACPEREN	-
	26.40 KW	1
-	A.中三期1294期間	-
	10.50 KW	1
-	面流环的角线	
÷.	0.00 W	1
	(#5不斷電技備)計	
	0.00 W	1
-	PR健康県轄力館	-
	1.73 WW	74
-	IE30283/MP300	-
	0.00 W	74
-	BODD#1PMP220A	-
	AT D1 KW	1
	建进和3FMP220	-
	23.01 KW	7



Temperature monitoring on breaker contactor



VCB claw type contactor temp. detection



Contactor temp. detection



VCB Copper contactor temp. detection

Temperature monitoring on cable



Temp. detection between cable and busbar joint point



Temp. detection between cable and busbar joint point



Temp. detection between cable and busbar joint point

Temperature monitoring on transformer busbar



Joint point of transformer extending busbar temp. detection



Joint point of transformer extending busbar temp. detection



Joint point of transformer extending busbar temp. detection

Temperature monitoring on busbar



Main busbar temp. detection



Busbar joint point temp. detection



Extending busbar temp. detection

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