SMART POWER FACTOR CONTROLLER
เครื่องควบคุมการทำงานของคาปาซิเตอร์แรงต่ำ

RG-T/B Series เป็นรุ่นที่ใช้งานร่วมกับ CT 1 ชุด สำหรับการชดเชยค่า P.F.ให้กับระบบไฟฟ้า และเฟสที่มีโหลดสมดุลย์ (balance loads)พร้อมทั้งยังสามารถวัดค่าทางไฟฟ้าอื่นๆ ได้อีกด้วย

Power Factor Controller 12 Steps
RG -12T (144 x 144 mm.)

RG-T/BS Series : Power Factor Controller + Network Analyzer + Protection

- Measurement of **A, V, PF, Cosφ , W, VAr, VA, THDV , THD I , 19th HD V , 19th HD I**
- Smart Capacitor Switching
- Connect with 1 CT
- 3-Phase Capacitor Use
- Dual Target cosφ Adjustment (MAIN & GEN)
- 10 Different Program (Linear/Circular/Unbalance)
- Change Over Alarm Contact
- Generator Input 110-250VAC/50Hz
- Programmable THD Protection
- Programmable Overvoltage Protection
- Programmable Energy Ratio Alarm
- Compensation Alarm
- Programmable Temperature Control
- Internal Temp External Sensor (RG-12BS)
- Password Protection
- RS-485 Communication
- IEC 61000-6-2, IEC 61000-6-4, IEC 61010-1

PF Control | Measurement | Modbus | Harmonics | Alarm Contact | Temperature Control | Unbalance Load

Power Factor Controller 12 Steps
RG-12BS (144 x 144 mm.)

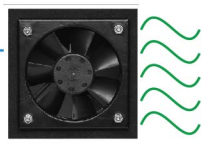
Ethernet MODBUS Gateway

ADSL MODEM

MRT Soft professional
(Energy Management Software)

Generator Input 110-250 VAC

Internal Thermocouple



Fan Ventilation

OPERATION DIAGRAM

General design **RG-BS Series** relays with 12 steps, you can control **unbalance capacitors**.

Communication Systems

Transformer (kVA)

Modbus
RS-485

Power Factor Controller

Connected x 1 CT

Inductive Loads

ENTES Capacitors

Special Feature for RG-12BS

Smart Switching
Cap Bank Unbalance 4 Pattern 12 Steps

Phase.....	R S T	R S T	R S T	R S T
Capacitor steps	1-2	3-4-5	6-7-8	9-10-11-12
Capacitor	3-Phase	3-Phase	3-Phase	3-Phase
Capacitor Size / step	10kVAR	20KVAR	30kVAR	50kVAR
R S T (3-Phase)	20kVAR	60kVAR	90kVAR	200kVAR

Note : # above table for example only

programmable steps

MODELS	RG-T Series				RG-B Series
SPECIFICATIONS					
Electrical Parameters					
Current (I)	●				●
Voltage (V)	●				●
Cos phi (Cos ϕ)	●				●
Active Power (W)	●				●
Reactive Power (Var)	●				●
Apparent Power (VA)	●				●
Harmonic Distortion for Voltage 19th					●
Harmonic Distortion for Current 19th					●
Specification	**RG-6T-230VAC**	**RG-6T-380VAC**	**RG-12T-230VAC**	**RG-12T-380VAC**	**RG-12BS**
Operating Voltage (Un)	*230 VAC±10%; 50/60 Hz	*380 VAC±10%; 50/60 Hz	*230 VAC±10%; 50/60 Hz	*380 VAC±10%; 50/60 Hz	*230 VAC±10%; 50/60 Hz
Connection Systems	3 Phase - 4 Wire (STAR)				3 Phase - 4 Wire (STAR) 3 Phase - 3 Wire (DELTA , Japan)
Operating Current	100 mA - 5.5 A				
Capacitor Steps	**6 STEPS**		**12 STEPS**		**12 STEPS**
Network Type	**3-phase with 1 CT**				
Accuracy	1% ±1digit (V , I , Cosφ) ; 2%±1digit (W , VAr , VA)				
Current Transformer Ratio	5 - 10000 / 5A				
Cosφ Setting	0.80 < cosφ < 1.00 (inductive)				0.80 < cos φ < 1.00 (inductive/capacitive)
C/k Setting	0.02 - 1.00				-
Automatic Energy Correction	-				●
Automatic Disconnection of Damaged Capacitor Steps	-				●
Time Delay Between Steps	2 - 1800 sec (for switch - ON & switch OFF separeted)				1 - 1800 sec (for switch - ON & switch OFF separeted)
Discharge Time (Reconnection Time)	2 - 1800 sec				1 - 1800 sec
Over Voltage Setting	-				240 - 275 VAC
Output Contact	-				5A , 1250VA
Mechanical Parameters					
Equipment Protection	Double Insulation (⧈), Measurement Category III				
Ambient Operating Temperature	-5°C, +55°C				
Ambient Humidity	95%				
Degree of Protection	IP40 (front panel)				
มาตรฐานรองรับ	IEC 61000-6-2 , IEC 61000-6-4 , IEC 61010-1				
Panel Cut Out (mm.)	139 x 139 mm.				
Feature					
Programmable THD Protection	-				Up to 19th harmonic for Current & Voltage
Programmable Discharge Time	-				●
Automatic Power Calculation	-				●
Calculation of (Inductive/Active) and (Capacitive/Active) Power Ratios	-				●
Password Protection for Setup Mode	-				●
RS-485 Communication	-				●
Alarm Contact Output : (Over Voltage , Temperature , Harmonic)	-				●
Temperature Control (Internal Sensor)	-				●

* Different operating voltages are available upon request. Please notify VOLTAGE ( ) with the order.

ENTES® RG 3 Series

GENIUS POWER FACTOR CONTROLLER
เครื่องควบคุมการทำงานของคาปาซิเตอร์แรงต่ำ

RG3-CS/CLS Series เป็นรุ่นที่ใช้งานร่วมกับ CT 3 ชุด สำหรับการชดเชยค่า P.F.ให้กับระบบไฟฟ้าและเฟสที่มีโหลดไม่สมดุลย์(Unbalance loads) พร้อมทั้งระบบป้องกันปัญหาด้านคุณภาพไฟฟ้า (Total Harmonic Distortion Protection) อีกทั้งฟังชั่นค์อื่นๆ อีกมากมาย

Power Factor Controller 12 Steps
RG3-12CS-T(144x144 mm.)

PF Control | Measurement | Modbus | Harmonics | Alarm Contact | Temperature Control | Unbalance Load


Ethernet MODBUS Gateway

ADSL MODEM

Information


MRT Soft professional (Energy Management Software)


Generator Input 110-250 VAC


External Thermocouple Type "J" (Option)

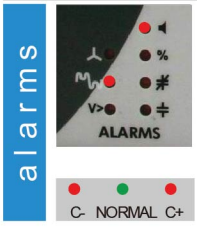

Fan Ventilation

RG-T/BS Series : Power Factor Controller + Network Analyzer + Protection

- Measurement of **A, V, PF, Cosφ, W, VAr, VA, ΣkWh, ΣkVArh , ΣW, ΣVA,ΣVAr , THDV , THD I , 19th HD V , 19th HD I**
- Smart Capacitor Switching
- Connect with 3 CT
- 1 & 3-Phase Capacitor Use
- Dual Target cosφ Adjustment (MAIN & GEN)
- 10 Different Program (Linear/Circular/Unbalance)
- Change Over Alarm Contact
- Generator Input 110-250VAC/50Hz
- Programmable THD Protection
- Programmable Overvoltage Protection
- Programmable Energy Ratio Alarm
- Compensation Alarm
- Programmable Temperature Control
- 3 Phase Parameter Displays
- Password Protection
- RS-485 Communication
- 15 steps (12 steps for capacitor + 3 steps for shunt reactor)
- Shunt reactor control
- Activates/deactivates necessary capacitors and shunt reactors according to the load
- Controls the power factor of each phase separately
- Automatically recognizes three-phase and single-phase capacitors
- IEC 61000-6-2, IEC 61000-6-4, IEC 61010-1

Power Factor Controller 15 Steps
RG3-15CLS (144 x 144 mm.)

OPERATION DIAGRAM



RG3-Series relays with 12- steps, you can control both **unbalance capacitors** and **shunt reactors** .

- Harmonic Alarm
- Over Temperature Alarm
- Improper Capacitor Alarm
- Wrong Connection Alarm
- Insufficient Compensation Alarm
- Over Compensation Alarm
- Over Voltage Alarm

Transformer (kVA)

Communication Systems

Modbus RS-485

Power Factor Controller 15 Steps

Connected x 3 CT


Capacitive Loads


Inductive Loads


ENTES Capacitors


Shunt Reactor

Special Feature for RG3-C , CS , CS-T , CL , CLS only

Example : TR-1000 kVA Request Cap Bank more than 300 kVAR 12 Steps

Phase.....	RST	R	S	T	RST
Capacitor steps	1-2-3-4-5-6	7-8	9	10-11-12	13-14-15
Capacitor	3-Phase	1-Phase	1-Phase	1-Phase	3-Phase
Capacitor Size / step	45kVAR	20-20kVAR	30kVAR	15-15-20kVAR	-
Shunt Reactor / step	-	-	-	-	1-1.5-2kVAR
RST (3-Phase)	270kVAR	-	-	-	4.5kVAR
R (1-Phase)	-	40kVAR	-	-	-
S (1-Phase)	-	-	30kVAR	-	-
T (1-Phase)	-	-	-	50kVAR	-

Note : # above table for example only programmable steps

GENIUS POWER FACTOR CONTROLLER
เครื่องควบคุมการทำงานของคาปาซิเตอร์แรงต่ำ

RG 3 Series

ENTES®

MODELS	RG3-12C Series			RG3-15C Series			new
SPECIFICATIONS							
Electrical Parameters							
Current (I)	●			●			
Voltage (V)	●			●			
Cos phi (Cos ϕ)	●			●			
Active Power (W)	●			●			
Reactive Power (Var)	●			●			
Apparent Power (VA)	●			●			
TOTAL Active Power (ΣW)	●			●			
TOTAL Reactive Power (ΣVAr)	●			●			
TOTAL Apparent Power (ΣVA)	●			●			
Energy : ΣkWh, ΣkVArh	●			●			
Harmonic Distortion for Voltage 19th	●			●			
Harmonic Distortion for Current 19th	●			●			
Specification	RG3-12C	RG3-12CS	RG3-12CS-(TEMP)	RG3-15C	RG3-15CS	RG3-15CL	RG3-15CLS
Operating Voltage (Un)	*230 VAC ±10% ; 50/60 Hz						
Connection Systems	3 Phase 4 Wire (STAR)						
Operating Current	100 mA - 5.5 A						
Capacitor Steps	12 STEPS			15 STEPS		12 STEPS CAP + 3 SHUNT	
Network Type	3-phase with 3 CT						
Accuracy	1% ± 1digit (V,I,Cosφ) ; 2% ± 1digit (W , VAr , VA)						
Current Transformer Ratio	5 - 10000 / 5A						
Cosφ Setting	0.85 < cosφ < 1.00 (inductive/capacitive)						
C/k Setting	-						
Automatic Energy Correction	●						
Automatic Disconnection of Damaged Capacitor Steps	●						
Time Delay Between Steps	1 - 1800 sec (for switch - ON & switch OFF separeted)						
Discharge Time (Reconnection Time)	1 - 1800 sec						
Over Voltage Setting	240 - 275 VAC						
Output Contact	5A , 1250VA						
Mechanical Parameters							
Equipment Protection	Double Insulation (⧈), Measurement Category III						
Ambient Operating Temperature	-5°C, +55°C						
Ambient Humidity	95%						
Degree of Protection	IP40 (front panel)						
มาตรฐานรองรับ	IEC 61000-6-2 , IEC 61000-6-4 , IEC 61010-1						
Panel Cut Out (mm.)	139 x 139 mm.						
Feature							
Programmable THD Protection	Up to 19th harmonic for Current & Voltage						
Programmable Discharge Time	●			●			
Automatic Power Calculation	●			●			
Energy Measurement	●			●			
Calculation of (Inductive/Active) and (Capacitive/Active) Power Ratios	●			●			
Compensation of Each Phase	●			●			
Password Protection for Setup Mode	●			●			
RS-485 Communication	-	●		-	●	-	●
Alarm Contact Output : (Over Voltage , Temperature , Harmonic)	●			●			
Temperature Control (External Sensor)	-		O	-			

● Standard
O Option
None

* Different operating voltages are available upon request. Please notify VOLTAGE ( ) with the order.

ENTES®