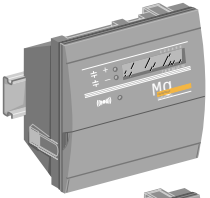


Varlogic R12, RC12

power factor controller / *régulateur varmétrique* / Blindleistungsregler / *regulador de energia reactiva*

user manual / *notice d'utilisation* / Gebrauchsanleitung / *guia de utilización*

Contents GB

Inhaltsverzeichnis D

Sommaire F

Indice E

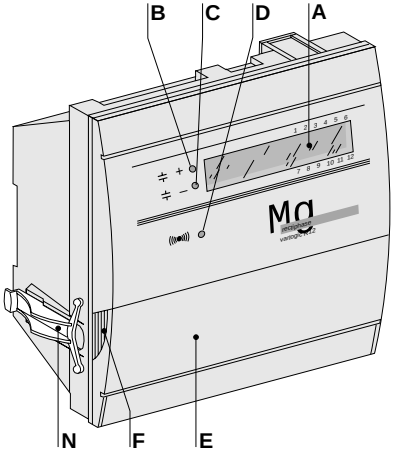
(1) type RC12 only / *type RC12 seulement*
nur für Regler RC12 / *modelo RC12 únicamente.*

GROUPE SCHNEIDER

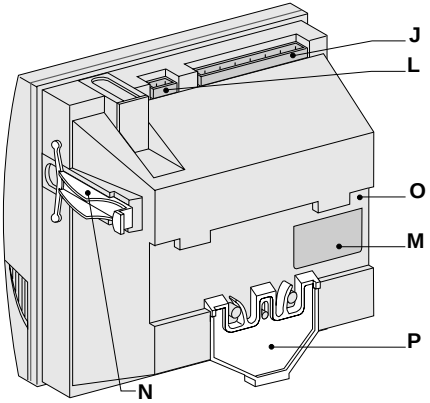
Merlin Gerin ■ Square D ■ Telemecanique

1 - description / *description* / allgemeine Beschreibung / *descripción*

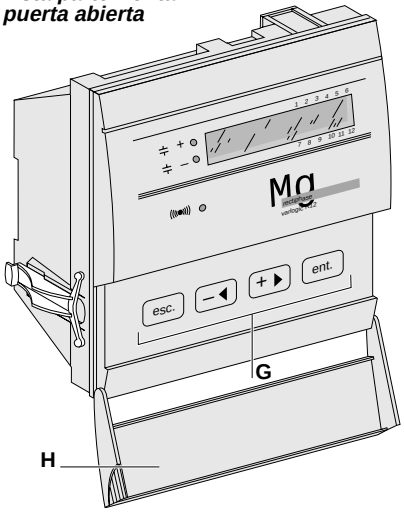
front view / *vue face avant*
Frontseitenansicht / *vista parte frontal*



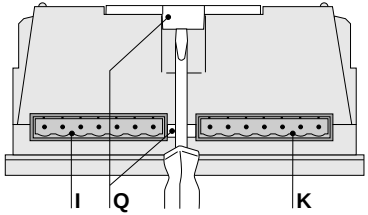
rear view / *vue face arrière*
Rückseitenansicht / *vista parte posterior*



front view door opened
vue face avant porte ouverte
Frontseitenansicht bei geöffneter Tür
vista parte frontal
puerta abierta



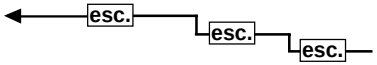
view from below / *vue de dessous*
Ansicht von unten / *vista inferior*



legend GB

A - display
B - L.E.D.: connection about to occur
C - L.E.D.: disconnection about to occur
D - alarm signalling L.E.D.
E - door
F - opening of door
G - keys
H - alarm codes
I - current / voltage connection inputs
J - step outputs (1 to 6)
K* - step outputs (7 to 12)
L - alarm output
M - specification label
N - mounting bracket for panel mounting installation
O - DIN rail mounting installation area
P - fixing spring for DIN rail mounting installation
Q - screw driver guide

(*) the last output (12th), if free, is programmed as a fan output. Refer to alarm A9 in chapter 9.



DISPLAY mode

+ ▶ **MEASUREMENT mode**
- ent. load current
  - + ▶ reactive current
  - + ▶ total harmonic distortion
  - + ▶ step status

+ ▶ **COMMISSIONING mode**

2s ent. target cos φ
- + ▶ C/K auto
- + ▶ C/K manuel
- response currents
  - ent. inductive value
    - + ▶ capacitive value
- + ▶ CT ratio
- + ▶ manual override
- + ▶ interface language

PROGRAMMING mode

ent. number of steps
- + ▶ step program
- + ▶ connection type
- + ▶ delay
- + ▶ phase polarity detection
- + ▶ input voltage
- + ▶ capacitor loss set up
  - ent. CT ratio
    - + ▶ step voltage
    - + ▶ step power
- + ▶ step configuration (DOL setup)

+ ▶ **ALARM mode**

ent. alarm 1
- + ▶ alarm 2

...
- + ▶ alarm 8
- + ▶ alarm 9

...
- + ▶ alarm 12

MAINTENANCE mode

ent. settings
- + ▶ Irms/I_n alarm threshold
- + ▶ THD(U) alarm threshold
- + ▶ fan switching threshold
- + ▶ temperature alarm threshold
- + ▶ reset settings

+ ▶ measurements
- + ▶ voltage
- + ▶ current
- + ▶ reactive power
- + ▶ active power
- + ▶ apparent power
- + ▶ phase
- + ▶ Irms/I_n overload
- + ▶ harmonic spectrum
- + ▶ temperature

+ ▶ bank test

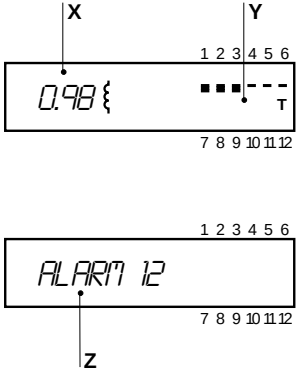
user interface GB

How to use the four interface keys ?
The interface is made of 6 main modes each of them including display or setting fields. The display mode is the main interface mode. Keys + ▶ and − ◀ allow you to move within one same interface level. Keys ent. and esc. allow you to go from one interface level to another one. On an editor level (defined by a horizontal dash) + ▶ and − ◀ keys allow you to increment or decrement a field value, while the ent. key allows you to enter the selected value.

How to change the interface language ?
The interface language can be selected between the five following options:
english,
french,
spanish,
german,
finnish.
To change the interface language follow the user interface menu in the relevant language, enter the commissioning mode and get to the last field by pressing several times on + ▶ . Press ent. and look for the correct language using keys + ▶ and − ◀ . Press ent. to enter then esc. to get out of the commissioning mode.

grey characters: only concern RC12 type

2 - cos φ and connected step display (display mode) / *affichage cos φ et gradins (mode affichage)* / Cos φ - und Schaltstufenanzeige / *visualización cos φ y escalones conectados (menú usuario)*



The display mode includes 3 pieces of information:

- **cos φ display "X"**
  - inductive network
  - capacitive network
- **connected step and contact configuration** (type RC12) **display "Y"**
  - disconnected step
  - connected step
  - fixed step
  - step not used in regulation free output
  - fan output (temperature alarm)
- when necessary display of alarm and warning codes (flashing with cos φ) **"Z"**.

Drei Informationen können im Display angezeigt werden:

- **Cos φ "X"**
  - Netz induktiv
  - Netz kapazitiv
- **zugeschaltete Kondensatorstufen und Ausgangsbelegung** (nur bei RC12) **"Y"**
  - nicht eingeschaltete Stufe
  - eingeschaltete Stufe
  - definierte Feststufe
  - nicht im Regelkreis einbezogene Ausgänge oder freie nicht belegte Ausgänge
  - Lüfterausgang (Temperatur Alarm)
- nach belieben kann die Anzeige so programmiert werden, daß entweder der Alarm- und Fehlermeldecode oder der Cos φ-Wert angezeigt wird **"Z"**.

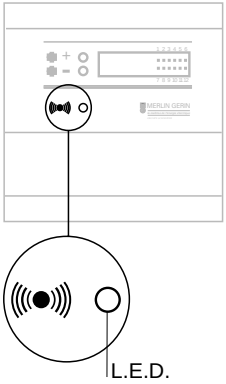
Le mode affichage comprend 3 types d'information :

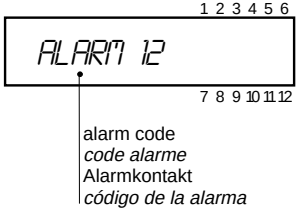
- ***l'affichage du cos φ, "X"***
  - *réseau inductif*
  - *réseau capacitif*
- ***l'affichage du nombre de gradins enclenchés** et de la configuration des contacts (type RC12), "Y"*
  - *gradin déclenché*
  - *gradin enclenché*
  - *gradin fixe*
  - *gradin exclu de la régulation contact non utilisé*
  - *contact ventilateur (alarme temp.)*
- *le cas échéant, l'affichage des codes d'alarmes et avertissements (en alternance avec le cos φ), **"Z"**.*

El menú usuario contiene 3 tipos de información:

- ***visualización del cos φ, "X"***
  - *red inductiva*
  - *red capacitiva*
- ***visualización del número de escalones conectados** y configuración de salidas (modelo RC12) "Y"*
  - *escalón desconectado*
  - *escalón conectado*
  - *escalón fijo*
  - *escalón excluido de la regulación, contacto no utilizado*
  - *contacto ventilador (alarma temp.)*
- *si es necesario, la visualización de códigos de alarmas y avisos (alternando con el cos φ) **"Z"**.*

3 - alarms and warnings / *alarmes et avertissements*
Alarm- und Fehlermeldungen / *alarmas y avisos*





GB

Controllers R12 and RC12 type respectively include 8 and 12 alarms and 3 warnings the description of which is given in chapter 9.

■ when an alarm condition is detected the appropriate alarm code flashes on display, a red L.E.D. is switched on and the alarm relay closes. Once the fault has cleared the red L.E.D. is switched off, the alarm relay opens but display of alarm code is kept till manual reset (using [– ◀] key).

■ when a warning condition is detected a warning code is displayed and disappears when the fault has cleared.

■ Alarms A1 to A8 are initially active. Alarms A9 to A12 are initially de-activated (see page 22).

D

In den Reglern R12 und RC12 sind 8 bzw. 12 Alarmmeldungen und 3 Fehlermeldungen integriert (nähere Angaben dazu im Kapitel 9):

■ Wird eine Alarmfunktion ausgelöst, so wird sie auf dem Display und durch eine rote L.E.D. angezeigt, der Alarmkontakt wird geschlossen. Wird die Störung behoben, so öffnet sich der Alarmkontakt und die rote L.E.D. erlischt, die Alarmfunktion im Display muß aber manuell zurückgesetzt werden (durch Tastendruck [– ◀]).

■ Wird eine Fehlfunktion festgestellt, so wird sie im Display signalisiert, erlischt aber sofort, sobald die Störung behoben ist.

■ A1 bis A8 sind aktive Alarmmeldungen. A9 bis A12 sind Alarmmeldungen mit autom. Rücksetzung (nähere Informationen s.S. 23).

F

Les régulateurs type R12 et RC12 incluent respectivement 8 et 12 alarmes et 3 avertissements dont la description est donnée chapitre 9.

■ *lorsqu'une condition d'alarme est détectée, le code d'alarme approprié clignote à l'écran, la D.E.L. rouge s'allume et le contact d'alarme se ferme. Lorsque le défaut disparaît la D.E.L. rouge s'éteint, le contact d'alarme s'ouvre mais l'affichage du code d'alarme est maintenu jusqu'à affranchissement manuel (par pression sur la touche [– ◀]).*

■ *lorsqu'une condition d'avertissement est détectée, seul le code d'avertissement est affiché jusqu'à la disparition du défaut.*

■ *les alarmes A1 à A8 sont initialement actives. Les alarmes A9 à A12 sont initialement désactivées (voir page 22).*

E

Los reguladores R12 y RC12 incluyen respectivamente 8 y 12 alarmas y 3 avisos cuya descripción se da en el capítulo 10.

■ *Cuando se detecta una situación de alarma, el código de la alarma parpadea sobre la pantalla, el L.E.D. rojo se enciende y el contacto de la alarma se cierra. Cuando el defecto desaparece se apaga el L.E.D. rojo abriéndose el contacto de alarma, pero la visualización de alarma se mantiene hasta la realización de un reset manual (mediante presión sobre la tecla [– ◀])*

■ *Cuando se detecta una situación de aviso, sólo se visualiza el código del aviso mientras permanece el defecto.*

■ *En el modelo RC12 las alarmas A9 y A12 están inicialmente desactivadas (ver página 23).*

4 - display of currents, harmonic distorsion and step state (measurement mode)
affichage courants, distorsion harmonique et état des gradins (mode mesure)

English

Français

RC12 type only GB

The measurement mode may be entered from the display mode by pressing [+▶]. It is defined on the display by symbol "⁞⁞". This mode does not include any editor field.

■ load and reactive currents are displayed in Amps if the CT ratio has been entered during commissioning. If not values are given in % of 5A.

■ The total voltage harmonic distortion is displayed in %.

■ Display of step status makes it easy to identify steps which have lost a significant amount of their nominal power:

- ■ step in normal condition,
- ⁘ step with reduced output power.

Type RC12 uniquement F

Le mode mesure est accessible à partir du mode affichage par pression sur la touche [+▶] . Il est caractérisé sur l'écran par le symbole "⁞⁞".
Ce mode ne contient pas de champ éditeur.

■ *les valeurs de courant apparent et courant réactif sont donnés en Ampères si le ratio du TC a été paramétré lors de la mise en service. Dans le cas contraire les valeurs sont affichées en % de 5 A.*

■ *le taux de distorsion harmonique en tension ou THD (U) est donné en %.*

■ *l'affichage de l'état des gradins permet d'identifier les gradins qui ont une perte de puissance significative :*

- ■ *gradin en état de fonctionnement normal,*
- ⁘ *gradin ayant perdu de la puissance.*

5 - connection of controller / *raccordement du régulateur* Regleranschlußbedingungen / *conexión del regulador*

GB

The current transformer must be installed upstream of capacitor bank and loads.

Standard programming of the controller makes it insensitive to phase rotation and CT polarities.

Two different connections may be used:

■ **LL connection type**

Voltage is measured between two phases. Current is measured from the phase that is not used for voltage connection. Refer to drawings on page 11.

■ **LN connection type**

Voltage is measured between one phase and neutral. Current is measured from the same phase. Refer to drawings on page 11.

Warning: connection type used must be in conformity with programming of controller.

On a network with a voltage below 110 V or above 415 V use a transformer to connect controller voltage inputs. In such case transformer specifications must include a limited phase variation.

Warning: on generator applications (type RC12 only) automatic detection of phase rotation polarity must be de-activated (to be done in programming mode - see chapter 7). In this particular case phase rotation and CT polarities must be correct.

F

Le transformateur de courant doit être impérativement installé en amont de la batterie de condensateurs et des récepteurs.

Le paramétrage normal du régulateur le rend insensible au sens de rotation des phases et au sens de raccordement du transformateur de courant.

Le régulateur peut être raccordé de deux manières :

■ ***raccordement type PP***

La mesure de tension est réalisée entre deux phases. La mesure du courant est réalisée sur une phase différente des deux phases précédemment utilisées. Voir shéma électrique page 11.

■ ***raccordement type PN***

La mesure de tension est réalisée entre une phase et le neutre. La mesure du courant est réalisée à partir de la même phase. Voir shéma électrique page 11.

Attention : le type de raccordement utilisé doit être cohérent avec le paramétrage du régulateur.

Sur un réseau de tension inférieure à 110 V ou supérieure à 415 V utiliser un transformateur pour alimenter les entrées tension de mesure du régulateur. Ce transformateur utilisé ne doit induire qu'un déphasage minimum.

Attention en utilisation 4 quadrants** (type RC12 seulement) **la détection automatique du sens de rotation des phases doit être désactivée (à effectuer dans le mode paramétrage - voir chap. 7). Dans ce cas particulier il faut donc respecter le sens de connexion du TC et le sens de rotation des phases .

D

Der Wandler muß so ins Kundennetz eingebaut werden, daß die Stromrichtung durch den Wandler entgegengesetzt zur Kompensationsanlage ist.

Keine Funktionsbeeinträchtigungen entstehen dem Regler durch Phasenvertauschung oder falschem Wandleranschluß.

Zwei Anschlußmöglichkeiten sind möglich:

■ **Außenleiter-Außenleiter-Anschluß**

Die Spannung wird zwischen zwei Außenleitern gemessen. Die Strommessung erfolgt in dem Außenleiter, der nicht zur Spannungsmessung genutzt wird. Gemäß Anschlußschema auf Seite 11.

■ **Außenleiter-Nulleiter-Anschluß**

Die Spannung wird zwischen dem Außen- und Nulleiter gemessen. Die Strommessung erfolgt im gleichen Pfad. Gemäß Anschlußschema auf Seite 11.

Achtung: Reglerprogrammierung- und anschluß müssen konform sein.

Für den Reglerbetrieb in Netzen mit abweichenden Spannungsniveaus gegenüber den Standardbemessungs-spannungen unterhalb von 110 V oder oberhalb von 415 V werden Anpassungstransformatoren benötigt. Achtung : Spezifikation der Anpassungstransformatoren für den richtigen Netzbetrieb auslegen.

Vorsicht: Bei Generatorbetrieb (RC12) muß die automatische Phasenrotationskennung deaktiviert werden (im Programm Reglerprogrammierung s. Kapitel 7) Hierbei sind Korrekturen der Phasenlage und der Wandlerpolarität vorzunehmen.

E

El transformador de intensidad debe de estar obligatoriamente instalado aguas arriba de la batería de condensadores y de la carga.

El regulador funciona correctamente sin tener en cuenta el sentido de rotación de fases ni el sentido de conexión del transformador de intensidad.

El regulador se puede conectar de dos maneras:

■ ***conexión tipo FF***

La medida de tensión se realiza entre dos fases. La medida de intensidad debe tomarse de en una fase distinta de las dos fases utilizadas anteriormente. Ver esquema eléctrico página 11.

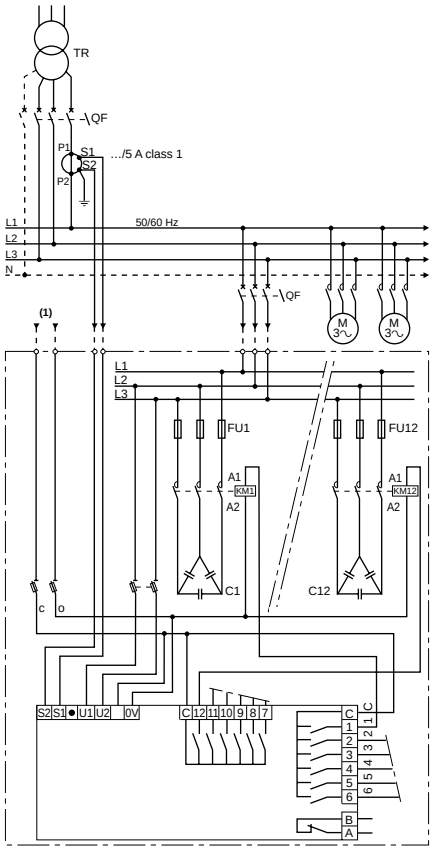
■ ***conexión tipo FN***

La medida de tensión se realiza entre una fase y el neutro. La medida de intensidad debe tomarse en la misma fase. Ver esquema eléctrico página 11.

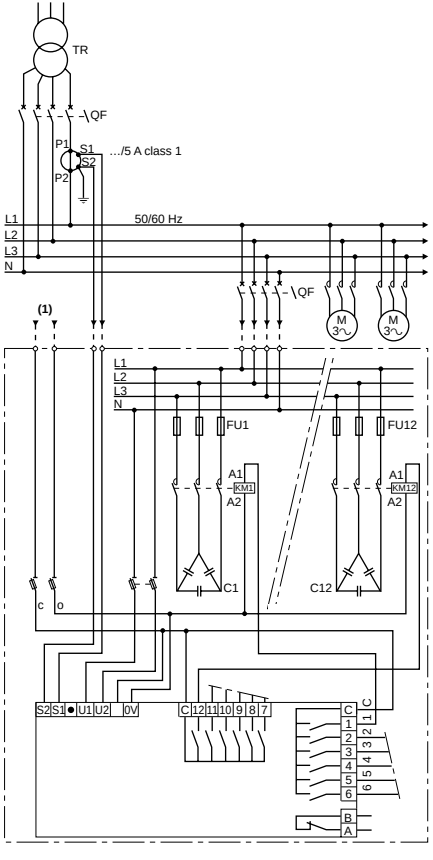
Importante: el tipo de conexión utilizada debe ser coherente con la programación del regulador

En una red de tensión distinta de 220/240 V ó 380/415 V, utilizar un transformador para alimentar las entradas de tensión del regulador. El transformador utilizado debe inducir un desfase mínimo.

Atención: en utilización 4 cuadrantes** (solo RC12) **la detección automática del sentido de rotación de las fases debe ser desactivada (realizar en el menú programación - ver capítulo 7). En este caso en concreto se debe respetar el sentido de conexión del TI y la rotación de fases.



connection drawing (LL) - ex. 380/415 V network
schéma de racc. (PP) - ex. réseau 380/415 V
Regleranschluß an (LL) - ca. 380/415 V
esquema de conexión (FF) - ejemplo: red 380/415 V



connection drawing (LN) - ex. 380/415 V network
schéma de racc. (PN) - ex. réseau 380/415 V
Regleranschluß an (LN) - ca. 380/415 V
esquema de conexión (FN) - ejemplo: red 380/415 V

(1) control voltage / *tension auxiliaire*
Bemessungssteuerspannung / *tensión auxiliar*

6 - commissioning settings (commissioning mode)

Commissioning settings are done in the commissioning mode which may be entered from the measurement mode by pressing [+ ▶] for 2s. The commissioning mode is defined on the display by symbol " ◌".

■ **target cos φ setting**
digital setting from 0.80 inductive to 0.90 capacitive.

■ **setting of C/K or response currents**
The C/K value defines the reactive current threshold from which the controller connects one step. It equals value of current in the first step divided by ratio of primary and secondary currents of the current transformer. Hence it does not take account of values of other steps.
The C/K value can be automatically searched ("C/K AUTO" field) or manually set ("C/K MAN." field on type R12 and "RESP VALUES" field on type R12).

Automatic search of C/K takes between 2 and 8 minutes: the controller connects then disconnects the first step several times and measures the network reactive power variation.

Display shows "C/K SEARCH" and the cumulative number of first step connections. When a value is found display shows "OK" and the C/K value.
If for reasons of important load variations the controller cannot find a proper C/K value "C/K SEARCH ERROR" appears on display and C/K manual setting must be used.
Automatic search of C/K can be stopped by pressing **esc.**, display then shows "C/K SEARCH STOP".

Manual setting of C/K on type R12 is digital (0...1.99).

Examples of C/K calculation
a) 400 V network, 500/5A CT,
10 kvar first step
current in first step:
$10000/400/\sqrt{3}$ = 14.4 A
CT ratio: K = 500/5 = 100
C/K = 14.4/100 = 0.14
b) 600 V network, 1500/5A CT,
50 kvar first step
current in first step:
$50000/600/\sqrt{3}$ = 48.1A
CT ratio: K = 1500/5 = 300
C/K = 48.1/300 = 0.16

Manual setting of response currents on type RC12 may allow you to define two different connection and disconnection thresholds (setting of inductive and capacitive values). This makes it possible to adapt the regulation curve to specific applications.

Examples: no overcompensation, minimum cos φ guaranteed.

Warning: the sum of the two response current values must be at least 2 times the true C/K value to avoid regulation unstability which would lead to contactor hunting.

Standard settings:
inductive value = capacitive value = C/K.

Warning: both values must be entered.

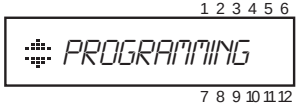
■ **CT ratio setting** (type RC12)
digital setting from 100/5 to 3000/5.

■ **manual override**
This makes possible manual step connection and disconnection. After five minutes the controller comes back to automatic regulation. Connection and disconnection order depends on the regulation program selected. Connection delay depends on the programmed delay between successive connections of same step.

■ **interface language**
The interface language can be selected between the following options: english, french, german, spanish or finnish.

7 - programming of controller (programming mode)

GB



This paragraph is dedicated to capacitor bank manufacturers.
The programming mode may be entered from the commissioning mode by pressing [+ ▶] and [– ◀] simultaneously for 2 s.
It is defined on the display by symbol "⊹".

■ **number of steps** [12]
This the number of physical steps of the capacitor bank.

■ **regulation program** [n]
There are two main types of regulation sequences:
□ the linear sequence
□ the circular sequence
Each of the four possible regulation programs of this controller use one of these two sequences as their main principle.
(see page 20).

■ **connection type** [LL]
This is the connection type used for voltage inputs. The two options are LL or LN. Refer to drawings on page 11.

■ **delay** [50 s]
This is the safety delay between successive connections of same step.

Warning: if a short delay is used capacitors and contactors may be damaged. Never use a shorter delay than recommended by the capacitor manufacturer.

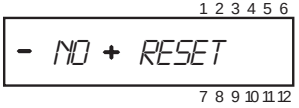
The response time before connection or disconnection is automatically set at one fifth of the above delay with a minimum value of 10 s.

■ **phase rotation polarity** [ON]
(type RC12)
In its normal configuration (ON) the controller is insensitive to phase rotation polarity.
For generator applications this must be changed to OFF.

■ **input voltage** [400 V]
This is the voltage used as a reference for undervoltage and overvoltage alarms.

■ **capacitance loss set up**
(type RC12)
This programming submenu includes all settings required to set up the capacitor loss survey function :
□ current transformer ratio [%]
□ step voltage [400 V]
This is the voltage at which capacitor power outputs are defined. It may be greater than the network voltage.
□ step power 1…12 [0]
Power outputs of all steps must be defined in kvar at the above step voltage.
The interface makes it compulsory to view all step values. Use keys [+ ▶] and [– ◀] to change values. Enter and view the next step by pressing [ent.].

To exit the cap loss set up submenu press [esc.]. Display shows



Pressing [+ ▶] will reset the memory including results of connections / disconnections used to detect steps with reduced power. This is required if step values have been modified. Pressing [– ◀] will avoid such reset.

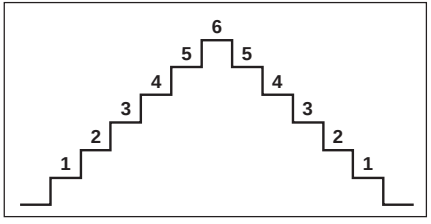
■ **step configuration (DOL setup)** [AUTO]
(type RC12)
Each step of the capacitor bank may be programmed in one of the three following options:
□ fixed step (1),
□ step not used in regulation (0),
□ normal step (AUTO).
All steps must be viewed. Use keys [+ ▶] and [– ◀] to change an option. Enter and / or view the next step by pressing [ent.].

Warning: step configurations must suit the sequence of the program selected. When programming fixed steps we recommend (if possible) that last steps are selected in priority in order to avoid a change in regulation program.

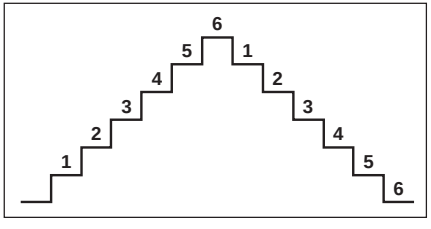
[ ] initial settings

step combination *gradinage* Schaltkombination *escalonamiento*	possible programs *programmes possibles* Regelprogrammarten *programas posibles*
1.1.1.1.1.1	CA/n/S
1.1.2.2.2.2	n
1.1.2.3.3.3	n
1.2.2.2.2.2	Cb/n
1.2.3.3.3.3	n
1.2.3.4.4.4	n
1.2.4.4.4.4	n

linear sequence / *séquence linéaire*
Standard Regelung (linear) / *secuencia lineal*



circular sequence / *séquence circulaire*
Kreisregelung / *secuencia circular*



GB

■ **possible regulation programs**
→ normal program
(n)
Suits all step combinations
Common combinations:
1.2.4.4.4.4 or 1.1.2.2.2.2.
Linear sequence from the third step, the first two steps being used as adjustment steps (the contoller always first connects or disconnects the first step then the second).

→ A type circular program
(CA)
Step combination: 1.1.1.1.1.1.
Circular sequence.
Warning: this program will correctly operate only if the total number of steps in the bank is correctly set.

→ B type circular program
(Cb)
Step combination: 1.2.2.2.2.2.
Circular sequence from the second step the first step being used as an adjustment step.
Warning: this program will correctly operate only if the total number of steps in the bank is correctly set.

→ Stack program
(S)
Step combination: 1.1.1.1.1.1.
Linear sequence.
For harmonic filtering applications

F

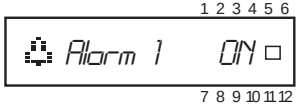
■ ***programmes de régulation possibles***
→ programme normal
(n)
Convient pour tout type de gradinage.
Gradinages courants :
1.2.4.4.4.4 ou 1.1.2.2.2.2
Séquence linéaire à partir du troisième gradin, les deux premiers gradins étant utilisés comme gradins d'ajustement (le régulateur commence toujours par enclencher ou déclencher le premier gradin puis le second).

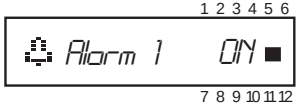
→ programme circulaire A
(CA)
Gradinage : 1.1.1.1.1.1
Séquence circulaire.
Attention, ce programme ne fonctionne de manière optimale que si le nombre de gradins de la batterie a été correctement paramétré.

→ programme circulaire B
(Cb)
Gradinage : 1.2.2.2.2.2
Séquence circulaire à partir du second gradin, le premier étant utilisé comme gradin d'ajustement.
Attention, ce programme ne fonctionne correctement que si le nombre de gradins de la batterie a été correctement paramétré.

→ programme linéaire
(S)
Gradinage : 1.1.1.1.1.1
Séquence linéaire.
Application filtrage d'harmoniques

8 - activating - de-activating alarms (alarm mode)
activation - désactivation des alarmes (mode alarmes)





GB

The alarm mode may be entered from the programming mode by pressing [+▶].
It is defined on display by symbol "🔔".

This mode defines each alarm state:
ON: alarm activated
OFF: alarm de-activated
■ : alarm condition obtained

Initially only alarms A1 to A8 are activated. De-activating one alarm may be desirable when frequent alarm conditions occur and their origin is known and not considered as being serious.

Warning: the capacitor overload alarm (type RC12) has been designed to protect capacitor banks which do not include detuned reactors. It must be de-activated when the controller is installed in a detuned bank.

F

Le mode alarme est accessible à partir du mode paramétrage en appuyant sur la touche [+▶]. Il est caractérisé sur l'écran par le symbole "🔔".

Ce mode permet de définir l'état de chaque alarme :
ON : l'alarme est activée
OFF : l'alarme est désactivée
■ : *conditions de déclenchement obtenues.*

Seules les alarmes A1 à A8 sont initialement activées.
La désactivation d'une alarme peut être souhaitée dans les cas de déclenchements fréquents dont l'origine est connue et sans caractère de gravité.

Attention : l'alarme de surcharge en courant (type RC12) a été conçu pour protéger des batteries de condensateurs sans self anti-harmoniques ; elle doit donc être désactivée dans le cas de batteries avec self anti-harmoniques.

9 - troubleshooting

code	faults	possible origin	necessary actions	automation
A1	**low power factor** the controller has connected all steps. target cos φ is not reached.	■ wrong voltage connection set LL/LN;	■ check voltage connection setting LL/LN;	alarm
		■ wrong connection;	■ refer to drawings on page 11;	
		■ contactors or fuses do not operate; ■ capacitors are not effective;	■ check contactors and fuses; ■ measure current on each capacitor terminals;	
		■ bank is undersized;	■ consider bank extension;	
		■ target cos φ occasionaly not reached;	■ alarm can be de-activated see page 22;	
A2	**hunting** unstable regulation making contactors hunt.	■ C/K setting too low;	■ set correct value of C/K or use automatic search function;	alarm
		■ load variations too fast;	■ modify the bank to adapt it to your site;	
A3	**abnormal cos φ** lower than 0,5 inductive or 0,8 capacitive.	■ wrong voltage connection set LL/LN;	■ check voltage connection setting LL/LN and controller connections;	alarm
		■ wrong connection;	■ refer to drawings page 11; ■ check location of CT;	
		■ small load;	■ alarm can be de-activated see page 22	
A4	**undervoltage** lower than 80% of input voltage for Is.			alarm fast disconnection of all steps until voltage becomes normal again automatic reconnection.
A5	**overcapacitive** controller has disconnected all steps. display shows capacitive cos φ.	■ wrong voltage connection set LL/LN;	■ check voltage connection setting LL/LN;	alarm
		■ wrong connection;	■ refer to drawings on page 11;	
		■ capacitive network (presence of fixed capacitors at small load).	■ reduce reactive power at small load; ■ alarm can be de-activated see page 22.	
A6	**frequency not detected during start up** 50 or 60 Hz ± 2 Hz.			alarm regulation does not start.
A7	**overcurrent** greater than 6A for 180 s on CT secondary side.	■ installation overloaded;		alarm
		■ CT undersized.	■ replace CT.	
A8	**overvoltage** voltage greater than input voltage setting 10% above for 30 minutes (RC12 type) 20% above for 1 minute.		■ consider oversizing capacitors.	alarm disconnection of all steps (RC12 type) automatic reconnection after 10 minutes.
(RC12 type)	**overtemperature** temperature inside the bank greater than threshold 1. **35°C**			activation of fan output contact (if available).
A9 (RC12 type)	**overtemperature** temperature inside the bank greater than threshold 2. **50°C**	■ cooling defective; ■ ambiant temperature too high.	■ check cooling of bank and ambiant temperature.	alarm disconnection of all steps till temperature comes back to an acceptable level. Automatic reconnection.

code	faults	possible origin	necessary actions	automation
A10 (RC12 type)	**THD(U) high** greater than threshold for 2 min. **7%**	■ high level of harmonic pollution; ■ resonance.	■ think about installing detuned banks or filters.	alarm
A11 (RC12 type)	**capacitor overload** Irms/I_n greater than threshold for 2 min. **1,5**	■ resonance.	■ make an harmonic survey.	alarm disconnection of all steps automatic reconnection after 10 minutes.
A12 (RC12 type)	**capacitor output low** one step has lost a significant amount of capacity		■ look for the weak step in the measurement mode; ■ measure the capacity of the weak step; ■ replace defective capacitors.	alarm
I.Low	**low load current** lower than 0.24 A (0.05 A RC12 type) for 2s on CT secondary side.	■ small load;		warning
		■ defective CT circuit.	■ check CT circuit using an ammeter.	
I.High	**high load current** greater than 5.5A for 30s on CT secondary side.	■ CT undersized.	■ replace CT.	warning
U.Low	input voltage not detected during start up.	■ wrong connection;	■ check connection and network voltage.	warning
		■ input voltage out of specifications.		
	cos φ display is not stable.	■ wrong voltage connection set LL/LN;	■ check voltage connection setting LL/LN;	
		■ wrong connection.	■ refer to drawings on page 11; ■ check that CT has been correctly selected (secondary: 5A).	
	display is blank and does not react to any key.	■ wrong connection; ■ input voltage out of specifications; ■ protection fuses defective.	■ check connection of controller, voltage input and state of protection fuses.	
	controller does not disconnect any step at small load.	■ C/K setting is too high;	■ enter correct C/K or use automatic search function.	
		■ wrong target cos φ setting (capacitive).	■ set correct target cos φ.	
	display shows that some steps are connected but connections are not effective.	■ control circuit defective;	■ check control circuit of contactors.	
		■ contactors or fuses defective.	■ check contactors and fuses.	
C/K Search Error	automatic search of C/K does not succeed.	■ network is not stable;	■ wait for network stabilisation or set C/K manually.	
		■ wrong connection;	■ check connection.	
		■ contactors or fuses defective.	■ check contactors and fuses.	

preprogrammed and recommanded threshold

10 - maintenance (maintenance mode) / *maintenance (mode maintenance)* Überwachungsprogramm / mantenimiento (menú mantenimiento)

English

1 2 3 4 5 6

MAINTENANCE

7 8 9 10 11 12

1 2 3 4 5 6

Fan 35°C

7 8 9 10 11 12

1 2 3 4 5 6

Bank test

7 8 9 10 11 12

Français

1 2 3 4 5 6

MAINTENANCE

7 8 9 10 11 12

1 2 3 4 5 6

ventil. 35°C

7 8 9 10 11 12

1 2 3 4 5 6

test batterie

7 8 9 10 11 12

Type RC12 only GB

Warning: this mode is an expert level. There is no need to enter this mode during commissioning. In particular alarm threshold initial settings are results of experience.

The maintenance mode may be entered from the alarm mode by pressing keys **esc.** and **ent.** simultaneously for 2 s. It is defined on the display by symbol " " . This mode gives access to:

■ **programming of thresholds used:**
□ in capacitor overload alarm,
□ in THD(U) alarm,
□ to close the fan contact,
□ in temperature alarm.

■ reinitialization of settings of commissioning, programming, alarm and maintenance modes (return to initial settings).

■ **display of measurements that may be used for maintenance or troubleshooting purposes:**
□ voltage,
□ load current (secondary of CT),
□ reactive power (secondary of CT),
□ active power (secondary of CT),
□ apparent power (secondary of CT),
□ phase,
□ Irms/I_n overload,
□ voltage harmonic spectrum,
□ temperature.

■ a capacitor bank test (successive connections and disconnections of contactors).

Type RC12 uniquement F

Attention : ce mode est un niveau expert du menu. Il n'est pas nécessaire d'y accéder lors de la mise en service de la batterie de compensation. En particulier les préréglages initiaux des seuils d'alarmes ont été déterminés par expérience.

*Le mode maintenance est accessible à partir du mode alarme en appuyant sur les touches **esc.** et **ent.** simultanément pendant 2 s . Il est caractérisé sur l'écran par le symbole " ". Il permet :*

■ ***le paramétrage des seuils :***
□ *de déclenchement de l'alarme surcharge,*
□ *de déclenchement de l'alarme harmonique,*
□ *d'activation du contact ventilateur,*
□ *de déclenchement de l'alarme température.*

■ *la réinitialisation des réglages des modes installation, paramétrage, alarmes et maintenance (retour aux préréglages initiaux),*

■ ***l'affichage de mesures utiles à la maintenance ou au diagnostic de défaut de l'équipement de compensation :***
□ *tension,*
□ *courant (secondaire TC),*
□ *puissance réactive (secondaire TC),*
□ *puissance active (secondaire TC),*
□ *puissance apparente (secondaire TC),*
□ *déphasage,*
□ *surcharge Irms/I_n,*
□ *spectre des tensions harmoniques,*
□ *température.*

■ *la réalisation d'une procédure de test de fonctionnement de la batterie (enclenchements puis déclenchements successifs des contacteurs).*

11 - technical specifications GB

■ connection type;	□ line/line or line/neutral (see drawings)
■ connection features;	□ insensitive to CT direction □ insensitive to phase rotation polarity
■ supply voltage;	□ standard: 220/240 V (198...264V) □ type RC12V120: 110/120 V (99...132 V)
■ input voltage;	□ 110-415 V (99…456 V)
■ momentary no voltage function;	□ disconnection of all steps after voltage loss greater than 15 ms, automatic reconnection
■ frequency;	□ 50/60 Hz (±2 Hz)
■ voltage circuit consumption;	□ 7 VA
■ current input;	□ for CT ... /5A class 1, min. type R12 0,18 A min. type RC12 0.036 A
■ current circuit consumption;	□ 0.7 VA
■ overloads;	□ current 10 In 5 s □ voltage 2 Un 5 s
■ generator application;	□ type RC12 only
■ no of step output contacts;	□ 12
■ output contact specifications; (step and alarm contacts)	□ volt free contacts 2 A, 400 V ac 2 A, 250 V ac 2 A ,120 V ac 0.3 A, 110 V dc 0.6 A, 60 V dc 2 A, 24 V dc
■ alarms and warnings;	□ see chapter 9

■ power factor setting;	□ digital (0.80 ind ... 0.90 cap)
■ response current setting;	□ automatic search of C/K □ manual setting of C/K □ inductive and capacitive values
■ regulation programs;	□ normal, circular (2 versions), linear
■ step combinations;	1.1.1.1 1.2.2.2 1.1.2.2 1.2.3.3 1.1.2.3 1.2.3.4 1.2.4.4
■ programming of step configuration;	□ on type RC12 (auto, fixed, not used)
■ safety delay between successive connections of same step;	□ digital setting
■ processing;	□ digital (microcontroler)
■ accuracy class;	□ type R12 2.5% □ type RC12 1.5%
■ display;	□ 16 characters
■ user interface;	□ 4 keys on front face 4 access levels 5 languages (english, french, german, spanish, finnish)
■ temperature;	□ working condition 0...50°C □ in storage -20...+60°C
■ protection class;	□ DIN rail mounting IP 20 panel mounting IP 40
■ enclosure;	□ UL94 V0 class
■ colour;	□ RAL 7021
■ dimensions;	□ 144 x 144 mm (DIN 43700), ...depth 90 mm
■ panel cut out;	□ 138 x 138 mm -0, +1 mm
■ DIN rail mounting;	□ according to EN 50022
■ weight;	□ 1 kg
■ standards;	□ EN 50082-2, EN 50081-2 IEC 664, VDE 0110, IEC 1010-1 EN 61010-1

Schneider Electric SA

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12/1996