



警告！

- 安装或使用前，请仔细阅读本手册。
- 本设备只能由合格人员根据现行标准进行安装，以避免造成损坏或安全危害。

- 对设备进行任何维护操作前，请消除测量和电源输入的所有电压，并中断 CT 输入端子。
 - 此处说明的产品可能会有变更，恕不提前通知。
 - 我们竭力确保本档中技术数据和说明的准确性，但对于错误、遗漏或由此产生的意外事件，我们概不负责。
 - 建筑物的电气装置中必须装有断路器。断路器必须安装在靠近设备且方便操作人员触及的地方。
- 还必须将断路器标记为设备的断开装置：IEC /EN 61010-1 § 6.11.2.1。
- 请使用柔软的干布清洁设备；切勿使用研磨剂、洗涤剂或溶剂。



WARNING!

- Carefully read the manual before the installation or use.
- This equipment is to be installed by qualified personnel, complying to current standards, to avoid damages or safety hazards.

- Before any maintenance operation on the device, remove all the voltages from measuring and supply inputs and short-circuit the CT input terminals.
- Products illustrated herein are subject to alteration and changes without prior notice.
- Technical data and descriptions in the documentation are accurate, to the best of our knowledge, but no liabilities for errors, omissions or contingencies arising there from are accepted.
- A circuit breaker must be included in the electrical installation of the building. It must be installed close by the equipment and within easy reach of the operator. It must be marked as the disconnecting device of the equipment: IEC /EN 61010-1 § 6.11.2.1.
- Clean the instrument with a soft dry cloth; do not use abrasives, liquid detergents or solvents.

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简介

DCRL 自动功率因数控制设备设计用于为功率因数补偿应用提供最先进的功能。该设备采用专用组件制造，外形精致小巧；不仅易于安装，其前面板的设计也非常时尚，并且通过在背面插入一个 EXP 系列模块还可进行扩展。LCD 屏幕提供清晰直观的用户界面。

Introduction

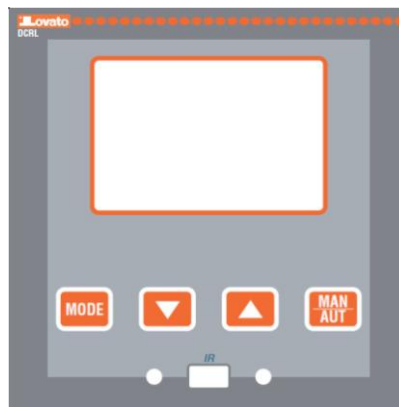
The DCRL automatic power factor control unit has been designed to offer state-of-the-art functions for power factor compensation applications. Built with dedicated components and extremely compact, the DCRL combines the modern design of the front panel with practical installation and the possibility of expansion from the rear, where one EXP series module can be slotted. The LCD screen provides a clear and intuitive user interface.

说明

- 自动功率因数控制器。
- 面板式安装，采用标准的 96x96mm 外壳。
- 背光 LCD 屏幕。
- 型号：
 - DCRL3 (带 3 个继电器，最多可扩展至 5 个)。
 - DCRL5 (带 5 个继电器，最多可扩展至 7 个)。
- 4 个导航键用于实现功能和设置。
- 警报消息支持 6 种语言。
- 扩展总线及 1 个 EXP 系列扩展模块插槽：
 - RS232、RS485、USB 通信接口。
 - 附加继电器输出。
- 高精度 TRMS 测量。
- 多种电气测量选择，包括电压和电流总谐波失真，最多可进行 15 次谐波分析。
- 电压输入与电源分开，适用于中等电压应用中的电压互感器连接。
- 大范围电源 (100-440VAC)。
- 前面板光学编程接口：电位隔离、高速、防水，兼容 USB 和 WiFi 加密狗。
- 可通过前面板、PC 或平板电脑/智能手机编程。
- 对设置采用 2 级密码保护。
- 原始调试设置备份。
- 内置温度传感器。
- 免工具面板安装。

Description

- Automatic power factor controller.
- Flush-mount, standard 96x96mm housing.
- Backlit LCD screen.
- Versions:
 - DCRL3 with 3 relays, expandable to 5 max.
 - DCRL5 with 5 relays, expandable to 7 max.
- 4 navigation keys for function and settings.
- Alarm messages in 6 languages.
- Expansion bus with 1 slot for EXP series expansion modules:
 - RS232, RS485, USB communications interface.
 - Additional relay outputs.
- High accuracy TRMS measurements.
- Wide selection of electrical measures, including voltage and current THD with harmonic analysis up to 15th order.
- Voltage input separated from power supply, suitable for VT connection in medium voltage applications.
- Wide-range power supply (100-440VAC).
- Front optical programming interface: galvanically isolated, high speed, waterproof, USB and WiFi dongle compatible.
- Programming from front panel, from PC or from tablet/smartphone.
- 2-level password protection for settings.
- Backup copy of original commissioning settings.
- Built-in temperature sensor.
- Tool-less panel mount.



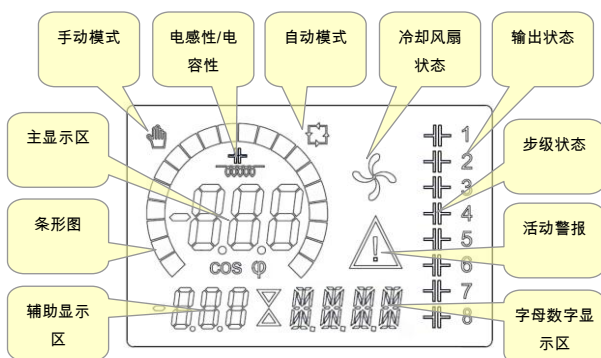
前面板键盘

- MODE 键** - 用于选择可用测量值。也可用于访问编程菜单。
- ▲ 和 ▼ 键** - 用于设置值和选择步级。
- MAN-AUT 键** - 用于在手动和自动操作模式之间切换。

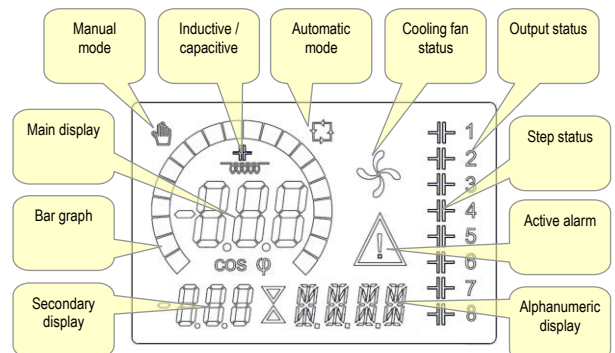
Front keyboard

- MODE Key** - Used to select among available measurements. Used also to access programming menus.
- ▲ and ▼ keys** - Used to set values and to select steps.
- MAN-AUTkey** - Used to select operating mode between manual and automatic.

显示屏说明



Display indications

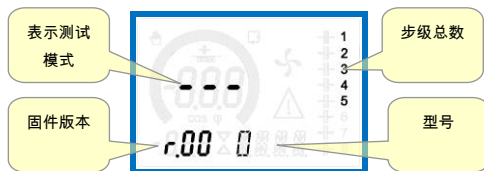


操作模式

本设备有如下三种操作模式：

测试模式

- 如果设备是全新的且从未进行过编程，就会自动进入测试模式，安装人员在此模式下可手动激活各个继电器输出，以便验证面板的布线是否正确。
- 测试模式使用显示于主显示区的三个破折号 (---) 表示。
- 按 ▲ 和 ▼ 按钮可直接激活和停用输出，无需考虑重新连接时间。
- 参数编程完毕后将自动退出测试模式（参见“参数设置”章节）。

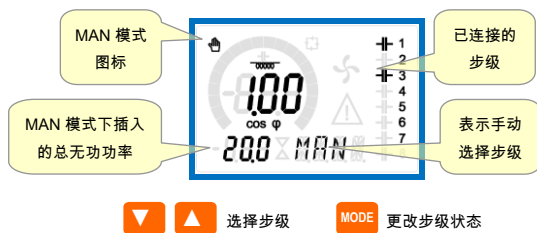


MAN 和 AUT 模式

- 图标 AUT 和 MAN 表示操作模式是自动还是手动的。
 - 若要更改模式，可按住 MAN/AUT 按钮 1 秒钟。
- 即使消除并再次加载电源电压，操作模式仍将保留。

MAN 模式

- 当设备处于手动模式时，您可以选择一个步骤并手动连接或断开它。
- 除了特定图标之外，字母数字显示区还会显示 MAN 以突出显示手动模式状态。按 MODE 可照常查看其他测量值。
- 当显示屏显示 MAN 时，可选择要投切的步骤。若要选择步骤，可使用 ▲ 或 ▼ 按钮。所选步骤将快速闪烁。
- 按 MODE 可激活或停用所选步骤。
- 如果所选步骤尚未耗尽重新连接时间，MAN 图标将闪烁，表示转换操作已受理并将尽快执行。
- 即使消除了电源电压，步骤的手动配置仍将保留。当电力恢复时，将返回步骤的原始状态。



AUT 模式

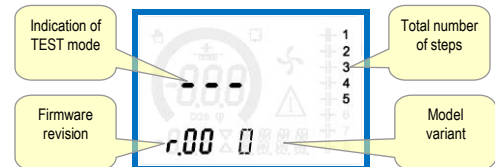
- 在自动模式下，控制器会计算电容器步骤的最佳配置，以便达到设置的 $\cos \varphi$ 。
- 选择标准考虑了诸多变量，例如：每一步的功率、操作次数、使用总时长、重新连接时间等。
- 控制器通过闪烁相应的标识数字（左侧）来显示即将连接或断开的步骤。如果因重新连接时间（电容器的放电时间）而无法插入步骤，数字将持续闪烁。
- 当所需的平均无功功率 (delta-kvar) 高于最小步骤的 50%，且测量的功率因数与设定值不同时，设备将开始自动校正。

Operating modes

There are three possible operating modes, listed below:

TEST Mode

- When the unit is brand new and has never been programmed, it automatically enters in TEST mode that allows the installer to manually activate the individual relay outputs, so you can verify the correct wiring of the panel.
- The TEST mode is indicated by three dashes --- shown on the main display.
- The activation and deactivation of the outputs is done directly by pushing ▲ and ▼ buttons, but without considering the reconnection time.
- The TEST mode is automatically left after the parameter programming is done (see *Parameter setting* chapter).

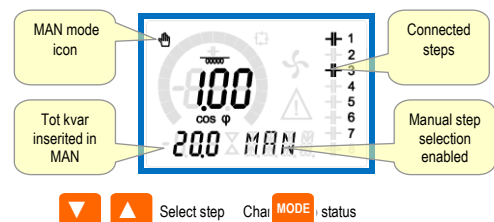


MAN and AUT Modes

- The icons AUT and MAN indicate the operating mode automatic or manual.
- To change the mode, press the MAN / AUT button for 1 sec in a row.
- The operating mode remains stored even after removing and reapplying the power supply voltage.

MAN Mode

- When the unit is in manual mode, you can select one of the steps and manually connected or disconnect it.
- In addition to the specific icon, the alphanumeric display shows MAN in order to highlight the manual mode condition. Press MODE to view the other measurements as usual.
- While the display shows MAN, it is possible to select the step to be switched on or off. To select a step, use the ▲ or ▼ buttons. The selected step will flash quickly.
- Press MODE to activate or deactivate the selected step.
- If the selected step has not yet exhausted the reconnection time, the MAN icon will flash to indicate that the transaction has been accepted and will be conducted as soon as possible.
- Manual configuration of the steps is maintained even when the power supply voltage is removed. When the power returns, the original state of the steps is restored.



AUT Mode

- In automatic mode, the controller calculates the optimum configuration of capacitor steps in order to reach the set $\cos \varphi$.
- The selection criteria takes into account many variables such as: the power of each step, the number of operations, the total time of use, the reconnection time, etc.
- The controller displays the imminent connection or disconnection of the steps with the flashing of their identification number (left). The flashing can last in cases in which the insertion of a step is not possible due to the reconnection time (discharge time of the capacitor).
- The device initiates automatic corrections when there is an average reactive power request (delta-kvar) higher than 50% of the smallest step, and the measured $\cos \varphi$ is different from the setpoint.

测量值

- DCRL 会显示一组测量值 (显示于字母数字显示区) 和当前功率因数 (显示于主显示区)。
- 按 **MODE** 键可滚动浏览测量值。
- 如果不按任何按钮, 30 秒后显示内容将自动恢复为通过 P.47 定义的默认测量值。
- 如果 P.47 设置为 ROT, 那么测量值将每 5 秒钟自动轮流显示。
- 通过所列测量值下方的按钮, 可设置功率因数的设定值, 该值应与通过 P.19 设置的值相同。
- 下表列出了所显示的测量值。

测量值	图标	说明
Delta-kvar	Δ kvar	达到功率因数设定值所需的无功功率。如果 delta-kvar 为正, 则需要插入电容器; 如果为负, 则需要断开连接。
	kvar	工厂的总无功功率。
	Δ STEP	所需的步级数量。
MODE		
电压	V	工厂电流的均方根电压。
	V HI	测量值的最大峰值。
MODE		
电流	A	工厂电压的均方根电流。
	A HI	测量值的最大峰值。
MODE		
每周功率因数	WPF	每周平均功率因数。
	PF	瞬时总功率因数。
MODE		
电容器电流	%C.CU	计算的电容器电流, 表示为其标称值的 %。
	%C.HI	测量值的最大峰值。
MODE		
温度	$^{\circ}$ C $^{\circ}$ F	内部传感器的温度。
	$^{\circ}$ CHI $^{\circ}$ FHI	测量值的最大峰值。
MODE		
电压总谐波失真	THDV	工厂电压的总谐波失真 % (THD)。
	VH02... ...VH15	从第 2 次到最高第 15 次的电压谐波量 %
MODE		
电流总谐波失真	THDI	工厂电流的总谐波失真 % (THD)。
	IH02... ...IH15	从第 2 次到最高第 15 次的电流谐波量 %
MODE		
功率因数设定值	IND CAP	设置所需的功率因数设定值 (与 P.19 相同) 。
MODE		
步级功率	%	① 步级剩余功率, 表示为设置的额定功率的百分比。
MODE		
步级计数器	OPC	① 运行步级计数器。
MODE		
步级小时数	H	① 插入步级小时计。

① 只有当启用了“步级调整”功能 (P.25 = ON), 且使用并输入了高级密码时, 这些测量值才会显示。

Measures

- The DCRL provides a set of measurements displayed on the alphanumeric display, in conjunction with the current cosphi that is always displayed on the main display.
- Press the **MODE** key to scroll through the measures in rotation.
- After 30 seconds without pressing any buttons, the display automatically returns to the default measurement defined by P.47.
- If P.47 is set on the ROT, then the measures rotate automatically every 5 seconds.
- At the bottom of the list of measures it is possible to set the setpoint of the cosphi, acting on the same value set with P.19.
- Below is a table with the measurements displayed.

Measure	Icon	Description
Delta-kvar	Δ kvar	Kvars needed to reach the cosphi setpoint. If delta-kvar is positive capacitors need to be inserted, if negative to be disconnected.
	kvar	Total kvar of the plant.
	Δ STEP	Number of equivalent steps.
MODE		
Voltage	V	RMS voltage of the plant current.
	V HI	Maximum peak of measure.
MODE		
Current	A	RMS current of the plant voltage.
	A HI	Maximum peak of measure.
MODE		
Weekly PF	WPF	Weekly average power factor.
	PF	Instantaneous total power factor.
MODE		
Cap. current	%C.CU	Calculated capacitor current, in % of their nominal.
	%C.HI	Maximum peak of measure.
MODE		
Temperature	$^{\circ}$ C $^{\circ}$ F	Temperature of internal sensor.
	$^{\circ}$ CHI $^{\circ}$ FHI	Maximum peak of measure.
MODE		
Voltage THD	THDV	Total harmonic distortion % (THD) of plant voltage.
	VH02... ...VH15	% voltage harmonic content from 2.nd up to 15.th order
MODE		
Current THD	THDI	Total harmonic distortion % (THD) of plant current.
	IH02... ...IH15	% Current harmonic content from 2.nd up to 15.th order
MODE		
Cosphi setpoint	IND CAP	Setting of desired cosphi setpoint (same as P.19).
MODE		
Step power	%	① Step residual power, as a percentage of the set rated power.
MODE		
Step counter	OPC	① Operation counter of the step.
MODE		
Step hours	H	① Hour meter of the step insertion.

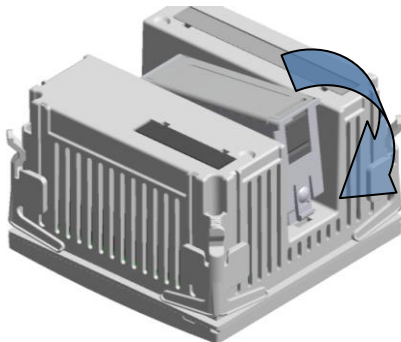
① These measures are shown only if the *Step trimming* function is enabled (P.25=ON) and the advanced password is enabled and entered.

小键盘锁定

- 该功能可阻止对工作参数进行任何修改；但无论在何种情况下仍可查看测量值。
- 若要锁定和解锁小键盘，按住 **MODE** 键。然后按 **▲** 键三次，按 **▼** 键两次，之后释放 **MODE**。
- 当小键盘锁定时，显示屏将显示 **LOC**；当小键盘解锁时，将显示 **UNL**。
- 当启用锁定时，无法进行以下操作：
 - 在自动和手动模式之间切换
 - 访问设置菜单
 - 更改功率因数设定值
- 如果尝试进行上述操作，显示屏将显示 **LOC**，表示小键盘处于锁定状态。

可扩展性

- 借助扩展总线，DCRL 可通过一个 EXP 系列模块进行扩展。
- 支持的 EXP 模块分为以下几类：
 - 附加步级
 - 通信模块
 - 数字 I/O 模块
- 若要插入扩展模块：
 - 断开 DCRL 的电源连接。
 - 拆下扩展插槽的防护盖。
 - 将模块上部的钩子插入扩展插槽顶部的固定孔。
 - 向下转动模块主体，将接头插入总线。
 - 推动模块主体，直到底部的夹子卡入外壳。



- 当 DCRL 加电时，将自动识别已安装的 EXP 模块。
- 通过专用设置菜单可使用扩展模块提供的额外功能。
- 始终可访问与扩展相关的设置菜单，即便实际并未安装扩展模块。
- 下表说明了受支持的扩展模块型号：

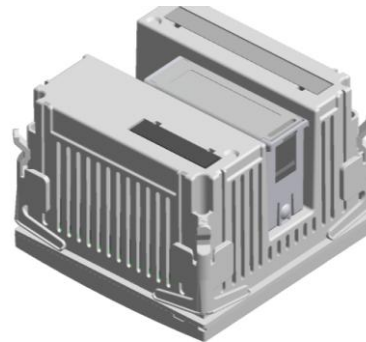
模块类型	代码	功能
附加步级	EXP 10 06	2 个步级继电器
数字 I/O	EXP 10 03	2 C/O 继电器
通信	EXP 10 10	USB
	EXP 10 11	RS-232
	EXP 10 12	RS-485

Keypad lock

- A function to exclude all modification to operating parameters can be enabled; measurement viewing is still provided in any case.
- To lock and unlock the keypad, press and keep MODE key pressed. Then press the **▲** key three times and the **▼** key twice and after that release MODE.
- The display will show **LOC** when the keypad is locked and **UNL** when it is unlocked.
- When the lock is enabled, it is not possible to make the following operations:
 - Operation between automatic and manual mode
 - Access to set-up menus
 - Change of cosphi set-point
- By attempting to conduct the above operations, the display will view **LOC** to indicate the locked keypad state.

Expandability

- Thanks to expansion bus, the DCRL can be expanded with one EXP... series module.
- The supported EXP modules can be grouped in the following categories:
 - additional steps
 - communication modules
 - digital I/O modules
- To insert an expansion module:
 - remove the power supply to DCRL.
 - remove the protecting cover of the expansion slot.
 - insert the upper hook of the module into the fixing hole on the top of the expansion slot.
 - rotate down the module body, inserting the connector on the bus.
 - push until the bottom clip snaps into its housing.



- When the DCRL is powered on, it automatically recognises the EXP module that have been mounted.
- The expansion modules provide additional resources that can be used through the dedicated setup menus.
- The setup menus related to the expansions are always accessible, even if the expansion modules are not physically fitted.
- The following table indicates which models of expansion modules are supported:

MODULE TYPE	CODE	FUNCTION
ADDITIONAL STEPS	EXP 10 06	2 STEP RELAYS
DIGITAL I/O	EXP 10 03	2 RELAY C/O
COMMUNICATION	EXP 10 10	USB
	EXP 10 11	RS-232
	EXP 10 12	RS-485

IR 编程端口

- DCRL 的参数可通过以下途径配置：前面板光学端口、使用 IR-USB 代码 CX01 编程加密狗或 IR-WiFi 代码 CX02 加密狗。
- 该编程端口具有以下优势：
 - 无需接触设备背面或打开配电板即可配置和维护 DCRL。
 - 与 DCRL 的内部电路电位隔离，可最大程度保障操作人员的安全。
 - 高速数据传输。
 - IP54 前面板保护。
 - 由于必须使用 CX01 或 CX02 加密狗，因此减少了未经授权访问设备配置的可能性。
- 只需将 CX.. 加密狗的插头连接到前面板上的相应接口即可，如果编程加密狗上的 LINK LED 闪烁绿色，即表示设备被识别。



USB 编程加密狗代码 CX01
USB programming dongle code CX01

通过 PC 设置参数

- 您可以使用“DCRG 远程控制”软件将（预编程）设置参数从 DCRL 传输到 PC 硬盘，反之亦然。
- 从 PC 传输到 DCRL 时，可能只会传输部分参数，即指定菜单的参数。

通过前面板设置参数

若要访问编程菜单（设置）：

- 若要进入参数编程，设备必须处于**测试模式**（首次编程）或**MAN**模式。
- 在正常的测量值显示状态下，按住 **MODE** 3 秒钟可调用主菜单。主显示区将显示 **SET**。
- 如果您设置了密码 (P.21 = ON)，显示屏上将显示 **PASSET**。使用 **▲ ▼** 设置数字密码，然后按 **MAN-AUT** 移动到下一个数字。
- 如果密码正确，设备将根据输入的密码级别（用户或高级）显示 **OK U** 或 **OK A**。可使用参数 P.22 和 P.23 定义密码，其出厂默认值分别是 001 和 002。
- 如果输入的密码错误，设备将显示 **ERR**。
- 输入密码后即可进行访问，除非设备被重新初始化或持续 2 分钟未按任何键。
- 输入密码后，重复以上步骤即可访问参数设置。
- 按 **▲ ▼** 可选择所需子菜单 (**BAS**→**ADV**→**ALA** ...，显示于字母数字显示区)。



IR programming port

- The parameters of the DCRL can be configured through the front optical port, using the IR-USB code CX01 programming dongle, or with the IR-WiFi code CX02 dongle.
- This programming port has the following advantages:
 - You can configure and service the DCRL without access to the rear of the device or having to open the electrical panel.
 - It is galvanically isolated from the internal circuits of the DCRL, guaranteeing the greatest safety for the operator.
 - High speed data transfer.
 - IP54 front panel protection.
 - Limits the possibility of unauthorized access with device config, since it is necessary to have the CX01 or CX02 dongles.
- Simply hold the CX.. dongle up to the front panel, connecting the plugs to the relevant connectors, and the device will be acknowledged as shown by the LINK LED on the programming dongle flashing green.



WiFi 编程加密狗代码 CX02
WiFi programming dongle code CX02

Parameter setting with PC

- You can use the *DCRG Remote control* software to transfer (previously programmed) set-up parameters from the DCRL to the hard drive of the PC and vice versa.
- The parameter may be partially transferred from the PC to the DCRL, transferring only the parameters of the specified menus.

Parameter setting (setup) from front panel

To access the programming menu (setup) :

- To enter parameter programming the unit must be in **TEST** mode (first programming) or in **MAN** mode.
- From the normal measurement display, press **MODE** for 3 seconds to recall the main menu. **SET** is displayed on the main display.
- If you have set the password (P.21 = ON) instead of **SET** the display shows **PAS** (password entry request). Set the numeric password using **▲ ▼** and then press **MAN-AUT** to move to next digit.
- If the password is correct the unit will show **OK U** or **OK A** depending on the entered password is user or the advanced level. The password can be defined with parameters P.22 and P.23. Factory default is 001 and 002 respectively.
- If the entered password is wrong the unit will show **ERR**.
- After having entered the password, the access is enabled until the unit is re-initialized or for 2 minutes without pressing any key.
- After having entered the password, repeat the procedure to access the parameter setting.
- Press **▲ ▼** to select the desired submenu (**BAS**→**ADV**→**ALA** ...) that is shown on the alphanumeric display.



- 下表列出了可用的子菜单：

代码	说明
BAS	访问基础菜单
ADV	访问高级菜单
ALA	访问警报菜单
CMD	访问命令菜单
CUS	访问自定义菜单
SAVE	退出时保存修改。
EXIT	退出时不保存（取消）

- 按 **MAN-AUT** 可访问子菜单。
- 当您进入子菜单时，主显示区将显示所选参数的代码（例如 **P.01**），而屏幕底部的数字/字母显示区将显示参数值和/或说明。
- 按 **MAN-AUT** 可继续选择项目（例如滚动显示参数 **P.01** → **P.02** → **P.03...**），或按 **MODE** 返回上一个参数。
- 选择参数后，使用 **▲ ▼** 可增加/减小其值。



- 到达菜单的最后一个参数时，再次按 **MAN-AUT** 将返回子菜单选择状态。
- 使用 **▲ ▼** 选择 **SAVE** 可保存更改，或选择 **EXIT** 取消。



- 此外，在编程过程中，按住 **MAN-AUT** 3 秒钟，将直接保存更改并退出。
- 如果用户超过 2 分钟未按任何键，系统将自动退出设置并返回正常查看状态，不会保存对参数所做的更改（与 **EXIT** 类似）。
- 注意：可将设置数据（可使用键盘修改的设置）备份保存在 DCRL 的 eeprom 内存中。必要时可在工作内存中恢复此数据。数据备份“copy”和“restore”命令可在“命令菜单”中找到。

快速 CT 设置

- 如果 CT 值未知且仅在安装时使用，CT 一次电流的 P.01 参数可保持设置为 OFF，而其他所有参数均可编程。
- 在这种情况下，在系统安装过程中和控制器加电后，显示屏将闪烁显示 CT（电流互感器）。按 **▲ ▼** 可直接设置 CT 一次电流。
- 编程完成后，按 **MAN/AUT** 进行确认。设备会将设置保存到 P.01，并直接重启进入自动模式。



- The following table lists the available submenus:

Cod	Description
BAS	Access to Base menu
ADV	Accesso to Advanced menu
ALA	Accesso to Alarm menu
CMD	Access to Command menu
CUS	Access to Custom menu
SAVE	Exits saving modifications.
EXIT	Exits without saving (cancel)

- Press **MAN- AUT** to access the submenu.
- When you are in a submenu, the main display shows the code of the selected parameter (eg **P.01**), while the numeric/alphanumeric displays at the bottom of the screen shows the parameter value and/or description.
- Press **MAN- AUT** to advance in the selection of items (such as scroll through parameters **P.01** → **P.02** → **P.03...**), or press **MODE** to go back to the previous parameter.
- While a parameter is selected, with **▲ ▼** you can increase/decrease its value.



- Once you reach the last parameter of the menu, by pressing **MAN-AUT** once more will return you to the submenu selection.
- Using **▲ ▼** select **SAVE** to save the changes or **EXIT** to cancel.



- Alternatively, from within the programming, holding **MAN- AUT** for three seconds will save the changes and exit directly.
- If the user does not press any key for more than 2 minutes, the system leaves the setup automatically and goes back to normal viewing without saving the changes done on parameters (like **EXIT**).
- N.B.: a backup copy of the setup data (settings that can be modified using the keyboard) can be saved in the eeprom memory of the DCRL. This data can be restored when necessary in the work memory. The data backup 'copy' and 'restore' commands can be found in the *Commands menu*.

Rapid CT set-up

- When the CT value is not known and only used at the moment of the installation, the P.01 parameter for CT primary can remain set at OFF while all the others can be programmed.
- In this case, during the system installation and once the controller is powered up, the display will show a flashing **CT** (Current Transformer). By pressing **▲ ▼** the CT primary can be set directly.
- Once programmed, press **MAN/AUT** to confirm. The unit will store the setting into P.01, and directly restart in automatic mode.



参数表

- 下表列出了所有编程参数。对于每个参数，都列出了可用设置范围和出厂默认值，以及参数功能的简短说明。由于字符数限制，在某些情况下显示屏上显示的参数说明可能与表中的描述不同。但可使用参数代码作为参考。
- 注意：**表中以阴影背景显示的参数对系统操作“至关重要”，因此它们是操作所需的最基本的编程语言。

基础菜单

代码	说明	访问级别	度量单位	默认值	范围
P.01	CT 一次电流	用户	A	OFF	OFF / 1...10.000
P.02	CT 二次电流	用户	A	5	1 / 5
P.03	CT 读取相位	用户		L3	L1 L2 L3
P.04	CT 接线极性	用户		Aut	Aut Dir Inv
P.05	电压读取相位	用户		L1-L2	L1-L2 L2-L3 L3-L1 L1-N L2-N L3-N
P.06	最小步级功率	用户	Kvar	1.00	0.10 ... 10000
P.07	电容器额定电压	用户	V	400V	50 ... 50000
P.08	标称频率	用户	Hz	Aut	Aut 50Hz 60Hz Var
P.09	重新连接时间	高级	秒	60	1 ... 30000
P.10	灵敏度	用户	秒	60	1 ... 1000
P.11	步级 1 功能	用户		OFF	OFF 1...32 ON NOA NCA FAN MAN AUT A01...A13
P.12	步级 2 功能	用户		OFF	=
P.13	步级 3 功能	用户		OFF	=
P.14	步级 4 功能	用户		OFF	=
P.15	步级 5 功能	用户		OFF	=
P.16	步级 6 功能	用户		OFF	=
P.17	步级 7 功能	用户		OFF	=
P.19	功率因数设定值	用户		0.95 IND	0.50 Ind – 0.50 Cap
P.20	警报消息语言	用户		ENG	ENG ITA FRA SPA POR DEU

Parameter table

- Below are listed all the programming parameters in tabular form. For each parameter are indicated the possible setting range and factory default, as well as a brief explanation of the function of the parameter. The description of the parameter shown on the display can in some cases be different from what is reported in the table because of the reduced number of characters available. The parameter code can be used however as a reference.
- Note:** the parameters shown in the table with a shaded background are *essential* to the operation of the system, thus they represent the minimum programming required for operation.

BASE MENU

COD	DESCRIPTION	ACC	UoM	DEF	RANGE
P.01	CT primary	Usr	A	OFF	OFF / 1...10.000
P.02	CT secondary	Usr	A	5	1 / 5
P.03	CT read phase	Usr		L3	L1 L2 L3
P.04	CT wiring polarity	Usr		Aut	Aut Dir Inv
P.05	Voltage read phase	Usr		L1-L2	L1-L2 L2-L3 L3-L1 L1-N L2-N L3-N
P.06	Smallest step power	Usr	Kvar	1.00	0.10 ... 10000
P.07	Rated capacitor voltage	Usr	V	400V	50 ... 50000
P.08	Nominal frequency	Usr	Hz	Aut	Aut 50Hz 60Hz Var
P.09	Reconnection time	Adv	sec	60	1 ... 30000
P.10	Sensitivity	Usr	sec	60	1 ... 1000
P.11	Step 1 function	Usr		OFF	OFF 1...32 ON NOA NCA FAN MAN AUT A01...A13
P.12	Step 2 function	Usr		OFF	=
P.13	Step 3 function	Usr		OFF	=
P.14	Step 4 function	Usr		OFF	=
P.15	Step 5 function	Usr		OFF	=
P.16	Step 6 function	Usr		OFF	=
P.17	Step 7 function	Usr		OFF	=
P.19	Cos-phi setpoint	Usr		0.95 IND	0.50 Ind – 0.50 Cap
P.20	Alarm messages language	Usr		ENG	ENG ITA FRA SPA POR DEU

P.01 - CT 一次电流的值。示例：CT 变流比为 800/5 时设定值为 800。如果设置为 OFF，在加电后，设备将提示您设置 CT 并允许直接访问此参数。

P.02 - CT 二次电流的值。示例：CT 变流比为 800/5 时设定值为 5。

P.03 - 定义设备在哪个相位读取当前信号。电流输入的接线必须与此参数设置的值匹配。支持与参数 P.05 的所有可用组合。

P.04 - CT 连接极性的读数。
AUT = 加电时自动检测极性。只能在仅使用一个 CT 且系统没有发电机时使用。
Dir = 禁用自动检测。直接连接。
Inv = 禁用自动检测。反向接线（交叉）。

P.05 - 定义设备读取哪相和几个相的电压信号。电压输入的接线必须与此参数的设置匹配。支持与参数 P.03 的所有可用组合。

P.06 - 已设置的最小步级的值，单位为 kvar（相当于步级权数 1）。在 P.07 指定的额定电压下电容器组的额定功率，即三相应用中三个电容器的总额定功率。

P.07 - 电容器的额定电压，与 P.06 指定的功率有关。如果电容器的电压不同于（低于）标称值，设备将自动重新计算所产生的功率。

P.08 - 系统的工作频率：
Aut = 加电时自动在 50 Hz 和 60 Hz 之间选择。
50Hz = 固定为 50 Hz。
60Hz = 固定为 60 Hz。
Var = 变量，持续测量并调整。

P.09 - 在 MAN 模式或 AUT 模式下断开一个步级与随后重新连接之间必须相隔的最短时间。在此期间，主页上的步级数会不停闪烁。

P.10 - 连接灵敏度。此参数用于设置控制器的反应速度。P.10 值越小，校准越快（更接近设定值，但步级投切次数也更多）。值越大，校准反应越慢，步级投切次数也越少。反应的延迟时间与达到设定值所需的步级数成反比：等待时间 =（灵敏度/所需步级数）。

示例：将灵敏度设置为 60 秒，如果您需要插入一个步级（权数 1），则预计等待时间为 60 秒（60/1 = 60）。如果总共使用 4 步，则预计等待时间为 15 秒（60/4 = 15）。

P11 ... P18 - 输出继电器 1 ... 8 的功能：
OFF = 未使用。
1 .. 32 = 步级权数。该继电器驱动一组电容器，其功率是参数 P.06 定义的最小功率的 n 倍（n = 1...32）。
ON = 始终开启。
NOA = 正常失电警报。当产生任何具有“全局警报”属性的警报时，继电器得电。
NCA = 正常得电警报。当产生任何具有“全局警报”属性的警报时，继电器失电。
FAN = 继电器控制冷却风扇。
MAN = 当设备处于 MAN 模式时，继电器得电。
AUT = 当设备处于 AUT 模式时，继电器得电。
A01 ... A13 = 当指定警报激活时，继电器得电。

P.19 - 功率因数的设定值（目标值）。用于标准应用。

P.20 - 显示警报消息的语言。

P.01 - The value of the primary current transformer. Example: with CT 800/5 set 800. If set to OFF, after the power-up the device will prompt you to set the CT and allow direct access to this parameter.

P.02 - Value of the secondary of the current transformers. Example: with CT 800/5 set 5.

P.03 - It defines on which phase the device reads the current signal. The wiring of current inputs must match the value set for this parameter. Supports all possible combinations of parameter P.05.

P.04 - Reading the connection polarity of the CT.
AUT = Polarity is automatically detected at power up. Can only be used when working with only one CT and when the system has no generator device.
Dir = Automatic detection disabled. Direct connection.
Inv = Automatic detection disabled. Reverse wiring (crossover).

P.05 - Defines on which and on how many phases the device reads the voltage signal. The wiring of voltage inputs must match the setting for this parameter. Supports all possible combinations of parameter P.03.

P.06 - Value in kvar of the smallest step installed (equivalent to the step weight 1). Rated power of the capacitor bank provided at the rated voltage specified in P.07 and referred to the total of the three capacitors for three-phase applications.

P.07 - Rated plate capacitor, which is delivered in specified power P.06. If the capacitors are used to a voltage different (lower) than nominal, the resulting power is automatically recalculated by the device.

P.08 - Working frequency of the system:
Aut = automatic selection between 50 and 60 Hz at power on.
50Hz = fixed to 50 Hz.
60Hz = fixed to 60 Hz.
Var = variable, measured continuously and adjusted.

P.09 - Minimum time that must elapse between the disconnection of one step and the subsequent reconnection both in MAN or AUT mode. During this time the number of the step on the main page is blinking.

P.10 - Connection sensitivity. This parameter sets the speed of reaction of the controller. With small values of P.10 the regulation is fast (more accurate around the setpoint but with more step switchings). With high values instead we'll have slower reactions of the regulation, with fewer switchings of the steps. The delay time of the reaction is inversely proportional to the request of steps to reach the setpoint: waiting time = (sensitivity / number of steps required).

Example: setting the sensitivity to 60s, if you request the insertion of one step of weight 1 are expected 60s (60/1 = 60). If instead serve a total of 4 steps will be expected 15s (60/4 = 15).

P11 ... P18 - Function of output relays 1 ... 8:
OFF = Not used.
1 .. 32 = Weight of the step. This relay drives a bank of capacitors which power is n times (n = 1...32) the smallest power defined with parameter P.06.
ON = Always on.
NOA = Alarm normally de-energized. The relay is energized when any alarm with the *Global alarm* property arises.
NCA = Alarm normally energized. The relay is de-energized when any alarm with the *Global alarm* property arises.
FAN = The relay controls the cooling fan.
MAN = Relay is energized when device is in MAN mode.
AUT = Relay is energized when device is in AUT mode.
A01 ... A13 = The relay is energized when the alarm specified is active.

P.19 - Setpoint (target value) of the cosphi. Used for standard applications.

P.20 - Language of scrolling alarm messages.

高级菜单

代码	说明	访问级别	度量单位	默认值	范围
P.21	密码启用	高级		OFF	OFF ON
P.22	用户密码	用户		001	0-999
P.23	高级密码	高级		002	0-999
P.24	接线类型	用户		3PH	3PH 三相 1PH 单相
P.25	步级调整	用户		OFF	ON 启用 OFF 禁用
P.26	设定值容差 +	用户		0.00	0 - 0.10
P.27	设定值容差 -	用户		0.00	0 - 0.10
P.28	步级插入模式	用户		STD	STD 标准 Lin 线性
P.29	热电联产 cosφ 设定值	用户		OFF	OFF / 0.50 IND - 0.50 CAP
P.30	断开灵敏度	用户	秒	OFF	OFF / 1 - 600
P.31	MAN 模式下的步级断开时间	用户		OFF	OFF 禁用 ON 启用
P.32	电容器电流过载警报阈值	高级	%	125	OFF / 100...150

ADVANCED MENU

COD	DESCRIPTION	ACC	UoM	DEF	RANGE
P.21	Password enable	Adv		OFF	OFF ON
P.22	User password	Usr		001	0-999
P.23	Advanced password	Adv		002	0-999
P.24	Wiring type	Usr		3PH	3PH three-phase 1PH single-phase
P.25	Step trimming	Usr		OFF	ON Enabled OFF Disabled
P.26	Setpoint clearance +	Usr		0.00	0 - 0.10
P.27	Setpoint clearance -	Usr		0.00	0 - 0.10
P.28	Step insertion mode	Usr		STD	STD Standard Lin Linear
P.29	Cogeneration cosφ setpoint	Usr		OFF	OFF / 0.50 IND - 0.50 CAP
P.30	Disconnection sensitivity	Usr	sec	OFF	OFF / 1 - 600
P.31	Step disconnection passing in MAN	Usr		OFF	OFF Disabled ON Enabled
P.32	Capacitor current overload alarm threshold	Adv	%	125	OFF / 100...150

P.33	电容器过载立即断开阈值	高级	%	150	OFF / 100.. 200
P.34	VT 一次电压	用户	V	OFF	OFF / 50-50000
P.35	VT 二次电压	用户	V	100	50-500
P.36	温度度量单位	用户		°C	°C 摄氏度 °F 华氏度
P.37	风扇启动温度	高级	°	55	0...212
P.38	风扇停止温度	高级	°	50	0...212
P.39	温度警报阈值	高级	°	60	0...212
P.40	步级故障警报阈值	高级	%	OFF	OFF / 25...100
P.41	最大电压警报阈值	高级	%	120	OFF / 90...150
P.42	最小电压警报阈值	高级	%	OFF	OFF / 60..110
P.43	总谐波失真电压警报阈值	高级	%	OFF	OFF / 1..250
P.44	总谐波失真电流警报阈值	高级	%	OFF	OFF / 1..250
P.45	维护时间间隔	高级	h	9000	1 - 30000
P.46	条形图功能	用户		Kvar ins/tot	Kvar ins/tot Corr att/nom Delta kvar att/tot
P.47	默认辅助测量	用户		Delta kvar	Deltakvar V A Week TPF Cap. Current Temp THDV THDI ROT
P.48	警报背光闪烁	用户		OFF	OFF ON
P.49	串行节点地址	用户		01	01-255
P.50	串行速度	用户	bps	9.6k	1.2k 2.4k 4.8k 9.6k 19.2k 38.4k
P.51	数据格式	用户		8位 - n	8位, 无奇偶校验 8位, 奇 8位, 偶 7位, 奇 7位, 偶
P.52	停止位	用户		1	1-2
P.53	协议	用户		Modbus RTU	Modbus RTU Modbus ASCII
<p>P.21 - 如果设置为 OFF, 密码管理被禁用, 任何人都可以访问设置和命令菜单。</p> <p>P.22 - 如果 P.21 启用, 通过本代码指定的值可激活用户级访问。请参见“密码访问”章节。</p> <p>P.23 - 与 P.22 类似, 通过本代码指定的值可激活高级访问。</p> <p>P.24 - 功率校正面板的相位数。</p> <p>P.25 - 启用对步级实际功率的测量, 每次投入步级时执行。测量值会经过计算, 因为当前测量值是指工厂的整体负载。每次投切后都会调整步级的测量功率, 并在步级寿命统计页面显示。当此功能启用时, 一个步级与下一个步级投切之间会有 15 秒停顿时间, 用于测量无功功率变化。</p> <p>P.26 - P.27 - 设定值容差。当功率因数处于这些参数限定的范围内时, 即使 delta-kvar 大于最小步级, 在 AUT 模式下设备也不会连接/断开步级。</p> <p>注意: + 表示“偏向电感性”, - 表示“偏向电容性”。</p>					

P.33	Capacitor overload immediate disconnection threshold	Adv	%	150	OFF / 100.. 200
P.34	VT primary	Usr	V	OFF	OFF / 50-50000
P.35	VT secondary	Usr	V	100	50-500
P.36	Temperature UoM	Usr		°C	°C °Celsius °F °Fahrenheit
P.37	Fan start temperature	Adv	°	55	0...212
P.38	Fan stop temperature	Adv	°	50	0...212
P.39	Temperature alarm threshold	Adv	°	60	0...212
P.40	Step failure alarm threshold	Adv	%	OFF	OFF / 25...100
P.41	Maximum voltage alarm threshold	Adv	%	120	OFF / 90...150
P.42	Minimum voltage alarm threshold	Adv	%	OFF	OFF / 60..110
P.43	THD V alarm threshold	Adv	%	OFF	OFF / 1..250
P.44	THD I alarm threshold	Adv	%	OFF	OFF / 1..250
P.45	Maintenance interval	Adv	h	9000	1 - 30000
P.46	Bar-graph function	Usr		Kvar ins/tot	Kvar ins/tot Corr att/nom Delta kvar att/tot
P.47	Default auxiliary measure	Usr		Delta kvar	Deltakvar V A Week TPF Cap. Current Temp THDV THDI ROT
P.48	Backlight flashing on alarm	Usr		OFF	OFF ON
P.49	Serial node address	Usr		01	01-255
P.50	Serial speed	Usr	bps	9.6k	1.2k 2.4k 4.8k 9.6k 19.2k 38.4k
P.51	Data format	Usr		8 bit - n	8 bit, no parity 8 bit, odd 8bit, even 7 bit, odd 7 bit, even
P.52	Stop bits	Usr		1	1-2
P.53	Protocol	Usr		Modbus RTU	Modbus RTU Modbus ASCII
<p>P.21 - If set to OFF, password management is disabled and anyone has access to the settings and commands menu.</p> <p>P.22 - With P.21 enabled, this is the value to specify for activating user level access. See Password access chapter.</p> <p>P.23 - As for P.22, with reference to Advanced level access</p> <p>P.24 - Number of phases of the power correction panel.</p> <p>P.25 - Enables the measurement of the actual power of the step, performed each time they are switched in. The measure is calculated, as the current measurement is referred to the whole load of the plant. The measured power of the steps is adjusted (trimmed) after each switching and is displayed on the step life statistic page. When this function is enabled, a 15 sec pause is inserted between the switching of one step and the following, necessary to measure the reactive power variation.</p> <p>P.26 - P.27 - Tolerance around the setpoint. When the cosphi is within the range delimited by these parameters, in AUT mode the device does not connect / disconnect steps even if the delta-kvar is greater than the smallest step.</p> <p>Note: + means 'towards inductive', while - means 'towards capacitive'.</p>					

P.28 - 选择插入步骤的模式。
标准模式 - 正常操作，自由选择步级
线性模式 - 步级仅根据步级数和 LIFO (后进先出) 逻辑从左到右相继连接。当系统步级额定值不同时，控制器将不会连接步级，如果连接下一个步级，则会超出设定值。

P.29 - 系统为供应商生成有功功率时所使用的设定值 (与负向有功功率/功率因数有关)。

P.30 - 断开灵敏度。与前面的参数相同，但与断开有关。如果设置为 OFF，断开的反应时间与前面参数设置的连接反应时间相同。

P.31 - 如果设置为 ON，当从 AUT 模式切换为 MAN 模式时，步级会依次断开。

P.32 - 电容器过载保护的跳闸阈值 (警报 A08)，在积分延迟时间后产生，与过载值成反比。
注意：只有当电容器未装配电抗器或类似的滤波设备时，才能使用此保护。

P.33 - 超出此阈值，过载跳闸警报的积分延迟时间就会被清零，进而导致立即产生警报 A08。

P.34 - P.35 - 接线图最终使用的电压互感器数据。

P.36 - 温度的度量单位。

P.37 - P.38 - 面板冷却风扇的启动和停止温度，以通过 P.36 设置的单位表示。当温度 \geq P.37 时，冷却风扇启动；当温度 $<$ P.38 时停止。

P.39 - 生成警报 "A08 面板温度过高" 的阈值。

P.40 - 剩余步级功率与常规菜单中编程的原始功率相比的阈值百分比。低于此阈值将生成警报 "A10 步级故障"。

P.41 - 最大电压警报阈值，与通过 P.07 设置的额定电压相关，超出此阈值将生成警报 "A06 电压过高"。

P.42 - 欠压警报阈值，与通过 P.07 设置的额定电压相关，低于此阈值将生成警报 "A05 电压过低"。

P.43 - 最大工厂电压总谐波失真警报阈值，超出此阈值将生成警报 "A10 总谐波失真电压过高"。

P.44 - 最大工厂电流总谐波失真警报阈值，超出此阈值将生成警报 "A05 电压过低"。

P.45 - 维护时间间隔，单位为小时。此时间过后将生成警报 "A12 维护时间间隔"。只要设备通电，小时数就会增加。

P.46 - 半圆条形图的功能。
Kvar ins/tot：条形图表示与面板中设置的总无功功率相比实际插入的无功功率。
Curr act/nom：与最大 CT 电流相比工厂实际电流的百分比。
Delta kvar：条形图，中间为零。它表示与设置的总无功功率相比达到设定值所需的正/负 delta-kvar。

P.47 - 辅助显示区显示的默认测量值。将参数设置为 ROT 时，将轮流显示不同的测量值。

P.48 - 如果设置为 ON，当出现一个或多个活动警报时，显示屏背光将闪烁。

P.49 - 通信协议的串行 (节点) 地址。

P.50 - 通信端口传输速度。

P.51 - 数据格式。7 位设置只可用于 ASCII 协议。

P.52 - 停止位数。

P.53 - 选择通信协议。

P.28 - Selecting mode of steps insertion.
Standard mode - Normal operation with free selection of the steps
Linear mode - the steps are connected in progression from left towards right only following the step number and according to the LIFO (Last In First Out) logic. The controller will not connect a step when the system steps are of different ratings and by connecting the next step, the set-point value would be exceeded.

P.29 - Setpoint used when the system is generating active power to the supplier (with negative active power / power factor).

P.30 - Disconnection sensitivity. Same as the previous parameter but related to disconnection. If set to OFF the disconnection has the same reaction time of connection set with the previous parameter.

P.31 - If set to ON, when switching from AUT mode to MAN mode, steps are disconnected in sequence.

P.32 - Trip threshold for the capacitors overload protection (alarm A08), that will arise after an integral delay time, inversely proportional to the value of the overload.
Note: You can use this protection only if the capacitors are not equipped with filtering devices such as inductors or similar.

P.33 - Threshold beyond which the integral delay for tripping of the overload alarm is zeroed, causing the immediate intervention of the A08 alarm.

P.34 - P.35 - Data of VTs eventually used in the wiring diagrams.

P.36 - Unit of measure for temperature.

P.37 - P.38 - Start and stop temperature for the cooling fan of the panel, expressed in the unit set by P.36. The cooling fan is started when the temperature is \geq to P.37 and it is stopped when it is $<$ than P.38.

P.39 - Threshold for generation of alarm A08 Panel temperature too high.

P.40 - Percentage threshold of the residual power of the steps, compared with the original power programmed in general menu. Below this threshold the alarm A10 step failure is generated.

P.41 - Maximum voltage alarm threshold, referred to the rated voltage set with P.07, beyond which the alarm A06 Voltage too high is generated.

P.42 - Undervoltage alarm threshold, referred to the rated voltage set with P.07, below which the alarm A05 voltage too low is generated.

P.43 - Maximum plant voltage THD alarm threshold, beyond which the alarm A10 THDV too high is generated.

P.44 - Maximum plant current THD alarm threshold beyond which the alarm A05 voltage too low is generated.

P.45 - Maintenance interval in hours. When it is elapsed, the alarm A12 maintenance interval will be generated. The hour count increments as long as the device is powered.

P.46 - Function of the semi-circular bar-graph.
Kvar ins/tot: The bar graph represents the amount of kvar actually inserted, with reference to the total reactive power installed in the panel.
Curr act/nom: Percentage of actual plant current with reference to the maximum current of the CT.
Delta kvar: bar graph with central zero. It represents the positive/negative delta-kvar needed to reach the setpoint, compared to the total kvar installed.

P.47 - Default measure shown on the secondary display. Setting the parameter to ROT, the different measures will be shown with a sequential rotation.

P.48 - If set to ON, the display backlight flashes in presence of one or more active alarms.

P.49 - Serial (node) address of the communication protocol.

P.50 - Communication port transmission speed.

P.51 - Data format. 7 bit settings can only be used for ASCII protocol.

P.52 - Stop bit number.

P.53 - Select communication protocol.

警报菜单

代码	说明	访问级别	度量单位	默认值	范围
P.61	A01 警报启用	高级		ALA	OFF ON ALA DISC A+D
P.62	A01 警报延迟	高级		15	0-240
P.63	A01 延迟度量单位	高级		分钟	分钟 秒
...
P.97	A13 警报启用	高级		ALA	OFF ON ALA DISC A+D
P.98	A13 警报延迟	高级		120	0-240
P.99	A13 延迟度量单位	高级		秒	分钟 秒

ALARM MENU

COD	DESCRIPTION	ACC	UoM	DEF	RANGE
P.61	A01 Alarm enable	Adv		ALA	OFF ON ALA DISC A+D
P.62	A01 alarm delay	Adv		15	0-240
P.63	A01 delay uom	Adv		min	Min Sec
...
P.97	A13 Alarm enable	Adv		ALA	OFF ON ALA DISC A+D
P.98	A13 alarm delay	Adv		120	0-240
P.99	A13 delay uom	Adv		sec	Min Sec

P.61 - 启用警报 A01, 并定义警报激活时控制器的行为:
OFF - 警报禁用
ON - 警报启用, 仅可视
ALA - 警报启用, 全局警报继电器得电 (如设置)
DISC - 警报启用, 步级断开
A + D = 警报继电器得电, 步级断开。
注意: 当您访问 **P.61**、**P.64**、**P.67** 等参数时, 辅助显示区将显示相应的警报代码。
P.62 - 延迟警报 A01。
P.63 - 延迟警报 A01 的单位。

P.64 - 相当于警报 A02 的 P.61。
P.65 - 相当于警报 A02 的 P.62。
P.66 - 相当于警报 A02 的 P.63。
 ...
P.97 - 相当于警报 A13 的 P.61。
P.98 - 相当于警报 A13 的 P.62。
P.99 - 相当于警报 A13 的 P.63。

P.61 - Enable alarm A01 and defines the behavior of the controller when the alarm is active:
OFF - Alarm disabled
ON - Alarm enabled, only visual
ALA - Alarm enabled, global alarm relay energized (if set)
DISC - Alarm enabled, logoff step
A + D = Alarm relay energized and disconnection of the steps.
Note: When you access the parameters **P.61**, **P.64**, **P.67**, etc., the auxiliary display shows the relative alarm code.
P.62 - Delay alarm A01.
P.63 - Unit of delay alarm A01.

P.64 - Like P.61 for alarm A02.
P.65 - Like P.62 for alarm A02.
P.66 - Like P.63 for alarm A02.
 ...
P.97 - Like P.61 for alarm A13.
P.98 - Like P.62 for alarm A13.
P.99 - Like P.63 for alarm A13.

警报

- 当警报生成时, 显示屏将以所选语言显示警报图标、警报的代码和说明。
- 如果按下页面中的导航键, 显示警报说明的滚动消息将暂时消失, 30 秒后再次显示。
- 只要生成警报的警报条件消失, 警报就会自动重置。
- 在存在一个或多个警报的情况下, DCRL 的行为取决于活动警报的“属性”设置。

警报说明

代码	警报	说明
A01	欠补偿	在自动模式下, 所有可用的步级均连接, 但功率因数与设定值相比仍偏向于电感性。
A02	过补偿	在自动模式下, 所有可用的步级均断开, 但功率因数与设定值相比仍偏向于电容性。
A03	电流过低	电流输入中的电流低于最小测量范围。 这一情况通常在工厂无负载时发生。
A04	电流过高	电流输入中的电流高于最小测量范围。
A05	电压过低	测量电压低于通过 P.42 设置的阈值。
A06	电压过高	测量电压高于通过 P.41 设置的阈值。
A07	电容器电流过载	计算的电容器电流过载高于通过 P.32 和 P.33 设置的阈值。警报条件消失后, 警报消息会继续显示 5 分钟, 除非用户按下前面板的某个键。
A08	温度过高	面板温度高于通过 P.39 设置的阈值。
A09	失压跳闸	线电压输入发生失压跳闸, 持续时间超过 8 ms。
A10	电压总谐波失真过高	工厂电压的总谐波失真高于通过 P.43 设置的阈值。
A11	电流总谐波失真过高	工厂电流的总谐波失真高于通过 P.44 设置的阈值。
A12	维护请求	通过 P.45 设置的维护时间间隔已过。若要重置警报, 请使用命令 C.01 (参见“命令”菜单)。
A13	步级故障	一个或多个步级的剩余功率低于通过 P.40 设置的最小阈值。

Alarms

- When an alarm is generated, the display will show an alarm icon, the code and the description of the alarm in the language selected.
- If the navigation keys in the pages are pressed, the scrolling message showing the alarm indications will disappear momentarily, to reappear again after 30 seconds.
- Alarms are automatically resetted as soon as the alarm conditions that have generated them disappear.
- In the case of one or more alarms, the behaviour of the DCRL depends on the *properties* settings of the active alarms.

Alarm description

COD	ALARM	DESCRIPTION
A01	Undercompensation	In automatic mode, all the available steps are connected but the cosphi is still more inductive than the setpoint.
A02	Overcompensation	In automatic mode, all the steps are disconnected but the cosphi is still more capacitive than the setpoint.
A03	Current too low	The current flowing in the current inputs is lower than minimum measuring range. This condition can occur normally if the plant has no load.
A04	Current too high	The current flowing in the current inputs is higher than minimum measuring range.
A05	Voltage too low	The measured voltage is lower than the threshold set with P.42.
A06	Voltage too high	The measured voltage is higher than the threshold set with P.41.
A07	Capacitor current overload	The calculated capacitor current overload is higher than threshold set with P.32 and P.33. After the alarm conditions have disappeared, the alarm message remains shown for the following 5 min or until the user presses a key on the front.
A08	Temperature too high	The panel temperature is higher than threshold set with P.39.
A09	No-Voltage release	A no-voltage release has occurred on the line voltage inputs, lasting more than 8ms.
A10	Voltage THD too high	The THD of the plant voltage is higher than the threshold set with P.43.
A11	Current THD too high	The THD of the plant current is higher than the threshold set with P.44.
A12	Maintenance requested	The maintenance interval set with P.45 has elapsed. To reset the alarm use the command C.01 (see Command menu).
A13	Step failure	The residual power of one or more steps is lower than minimum threshold set with P.40.

默认警报属性

代码	说明	启用	警报继电器 断开	延迟
A01	欠补偿	•	•	15 分钟
A02	过补偿	•		120 秒
A03	电流过低	•	•	5 秒
A04	电流过高	•		120 秒
A05	电压过低	•	•	5 秒
A06	电压过高	•	•	15 分钟
A07	电容器电流过载	•	•	180 秒
A08	温度过高	•	•	30 秒
A09	失压跳闸	•	•	0 秒
A10	电压总谐波失真过高	•	•	120 秒
A11	电流总谐波失真过高	•	•	120 秒
A12	维护请求	•		0 秒
A13	步级故障	•	•	0 秒

Default alarm properties

Cod.	Description	Enable	Alarm relay	Disconnection	Delay
A01	Undercompensation	•	•		15 min
A02	Overcompensation	•			120 s
A03	Current too low	•		•	5 s
A04	Current too high	•			120 s
A05	Voltage too low	•	•		5 s
A06	Voltage too high	•	•		15 min
A07	Capacitor current overload	•	•	•	180 s
A08	Temperature too high	•	•	•	30 s
A09	No-Voltage release	•		•	0 s
A10	Voltage THD too high	•	•	•	120 s
A11	Current THD too high	•	•	•	120 s
A12	Maintenance requested	•			0s
A13	Step failure	•	•		0s

命令菜单

- 通过命令菜单可以执行一些非经常性操作，例如峰值读数重置、计数器清零、警报重置等。
- 如果输入了高级密码，可通过命令菜单执行有益于设备配置的自动操作。
- 下表列出了命令菜单中的可用功能，按所需访问级别划分。
- 当控制器处于 MAN 模式时，按住 MODE 按钮 5 秒钟。
- 按 ▲ 选择 **CMD**。
- 按 MAN-AUT 访问命令菜单。
- 使用 **MODE** 或 **MAN-AUT** 选择所需命令。
- 如果您想执行所选命令，按住 ▲ 3 秒钟。DCRL 会显示 **OK?** 并开始倒计时。
- 如果您按住 ▲ 直到倒计时完，将执行命令，如果您在这之前松开按键，将取消命令。

代码	命令	密码访问级别	说明
C01	重置维护	高级	重置维护服务时间间隔。
C02	重置步级计数	高级	重置步级操作计数器。
C03	重置步级调整	高级	将原始编程的功率重新载入步级调整。
C04	重置步级小时数	高级	重置步级操作小时计。
C05	重置最大值	高级	重置最大峰值。
C06	重置每周 TPF	高级	重置每周总功率因数历史。
C07	设置为默认值	高级	将设置编程重置为出厂默认值。
C08	设置备份	高级	对用户设置参数设置进行备份。
C09	设置恢复	高级	使用用户设置备份重新加载设置参数。

Commands menu

- The commands menu allows executing some occasional operations like reading peaks resetting, counters clearing, alarms reset, etc.
- If the Advanced level password has been entered, then the commands menu allows executing the automatic operations useful for the device configuration.
- The following table lists the functions available in the commands menu, divided by the access level required.
- With controller in MAN mode, press the MODE button for 5 seconds.
- Press ▲ to select **CMD**.
- Press MAN-AUT to access the *Commands menu*.
- Select the desired command with **MODE** or **MAN-AUT**.
- Press and hold for three seconds ▲ if you want to execute the selected command. DCRL shows **OK?** with a countdown.
- If you press and hold ▲ until the end of the countdown the command is executed, while if you release the key before the end, the command is canceled.

COD	COMMAND	PWD. ACCESS LEVEL	DESCRIPTION
C01	RESET MAINTENANCE	Advanced	Reset maintenance service interval.
C02	RESET STEP COUNT	Advanced	Reset step operation counters.
C03	RESET STEP TRIMMING	Advanced	Reload originally programmed power into step trimming.
C04	RESET STEP HOURS	Advanced	Reset step operation hour meters.
C05	Reset max VALUES	Advanced	Reset maximum peak values.
C06	RESET WEEKLY TPF	Advanced	Resets weekly total power factor history.
C07	SETUP TO DEFAULT	Advanced	Resets setup programming to factory default.
C08	SETUP BACKUP	Advanced	Makes a backup copy of user setup parameters settings.
C09	SETUP RESTORE	Advanced	Reloads setup parameters with the backup of user settings.

CX02 加密狗用法

- CX02 加密狗提供 WiFi 接入点功能，用于连接 PC、平板电脑或智能手机。除了这一功能，它还可以与 DCRL 互传数据并存储。
- 将接口 CX02 插入 DCRL 前面板上的 IR 端口。
- 按住按钮 2 秒钟启动 CX02。
- 等待一会，直至 *LINK* LED 闪烁橙色。
- 连续快速按加密狗按钮 3 次。
- 此时，DCRL 的显示屏将显示前 6 个可用命令 (D1...D6)。
- 按 ▲ ▼ 可选择所需命令。
- 按 **MAN-AUT** 可执行所选命令。设备将显示确认提示 (OK?)。再按一次 **MAN-AUT** 确认或按 **MODE** 取消。
- 下表列出了可用命令：

代码	命令	说明
D1	设置设备 → CX02	将设置从 DCRL 复制到 CX02。
D2	设置 CX02 → 设备	将设置从 CX02 复制到 DCRL。
D3	克隆设备 → CX02	将设置和工作数据从 DCRL 复制到 CX02。
D4	克隆 CX02 → 设备	将设置和工作数据从 CX02 复制到设备。
D5	信息数据 CX02	显示关于存储到 CX02 的数据的信息。
D6	退出	退出加密狗菜单。

- 有关其他详细信息，请参见 CX02 操作手册。

CX02 Dongle usage

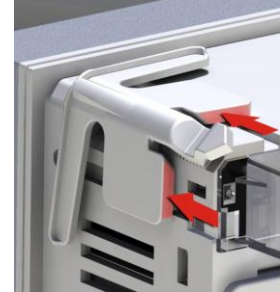
- The CX02 dongle offers WiFi Access point capability for connection to PC, Tablet or smartphones. In addition to this function it also offer the possibility to store and transfer a block of data from/to the DCRL.
- Insert the interface CX02 into the IR port of DCRL on the front plate.
- Switch CX02 on by pressing the button for 2 sec.
- Wait until the *LINK* LED becomes orange flashing.
- Press 3 times consecutively and fast the dongle button.
- At this point the display of the DCRL shows the first of the 6 possible commands (D1...D6).
- Press ▲ ▼ to select the desired command.
- Press **MAN-AUT** to execute the selected command. The unit will prompt for a confirmation (OK?). Press once again **MAN-AUT** to confirm or **MODE** to cancel.
- The following table lists the possible commands:

COD	COMMAND	DESCRIPTION
D1	SETUP DEVICE → CX02	Copies Setup settings from DCRL to CX02.
D2	SETUP CX02 → DEVICE	Copies Setup settings from CX02 to DCRL.
D3	CLONE DEVICE → CX02	Copies Setup settings and working data from DCRL to CX02.
D4	CLONE CX02 → DEVICE	Copies Setup settings and working data from CX02 to DCRL.
D5	INFO DATA CX02	Shows information about data stored into CX02.
D6	EXIT	Exits from dongle menu.

- For additional details see CX02 Operating manual.

安装

- DCRL 设计为面板式安装。正确安装能确保前面板保护等级 IP54。
- 在面板内侧，将四个固定夹分别放入两个滑动导轨中的一个，然后按住固定夹的棱脊，直到将其卡入到第二个导轨。
- 按住固定夹的两侧向前推，让它滑入导轨，直到完全紧贴面板的内表面。



- 有关电气连接，请参见特定章节中的接线图以及技术特性表中说明的要求。

Installation

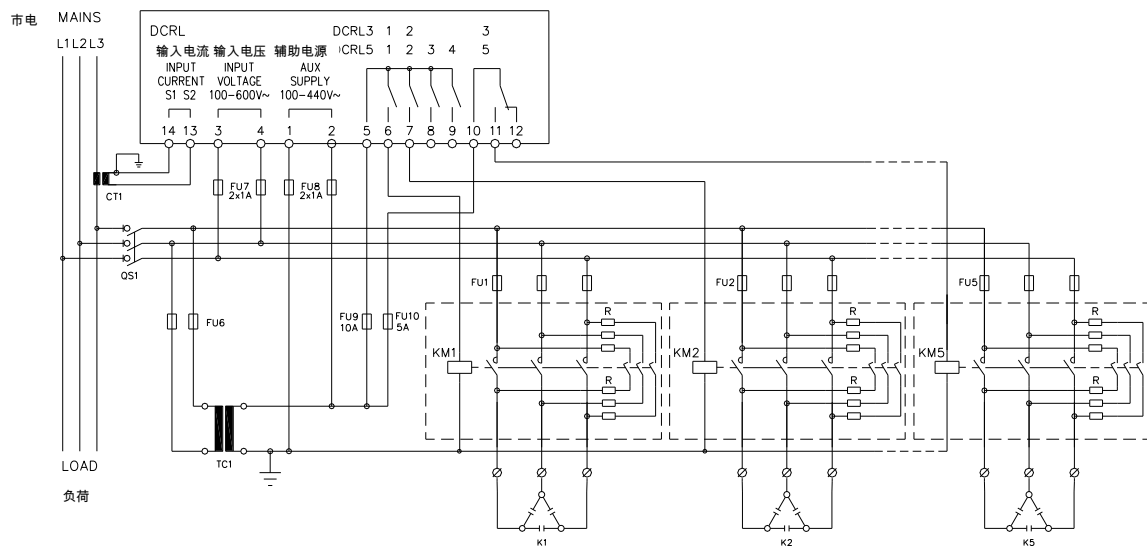
- DCRL is designed for flush-mount installation. With proper mounting, it guarantees IP54 front protection.
- From inside the panel, for each four of the fixing clips, position the clip in one of the two sliding guide, then press on the clip corner until the second guide snaps in.
- Push the clip forward pressing on its side and making it slide on the guides until it presses completely on the internal surface of the panel.

- For the electrical connection see the wiring diagrams in the dedicated chapter and the requirements reported in the technical characteristics table.

接线图

Wiring diagrams

	警告！	WARNING!
	对端子进行操作时，请断开电线和电源。	Disconnect the line and the supply when operating on terminals.
标准三相接线		Standard Three-phase wiring



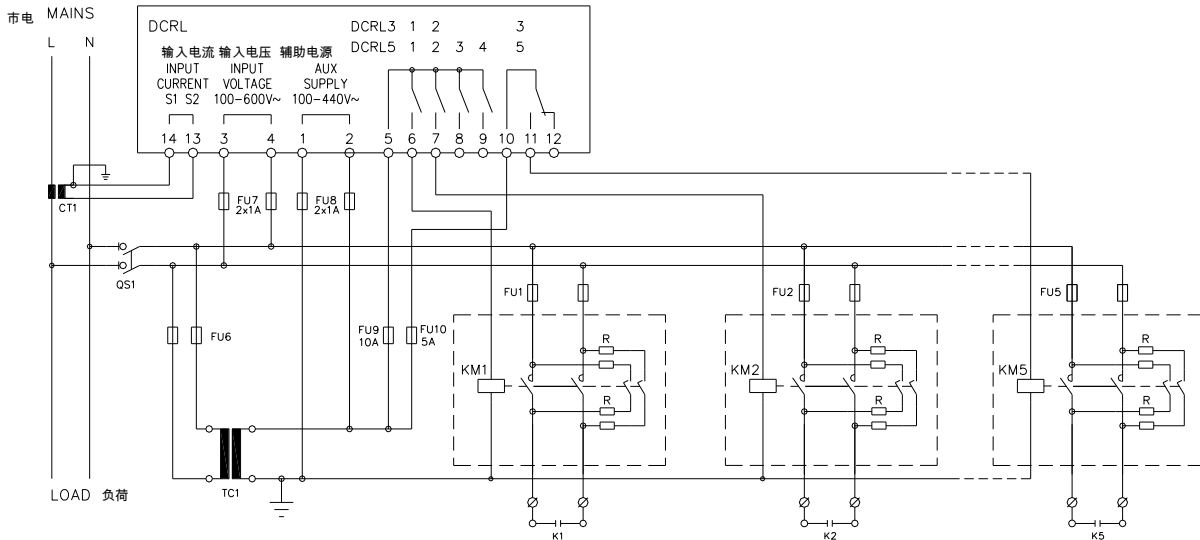
三相标准连接 (默认)	
标准应用的默认接线配置。	
电压测量	一相相间电压读数 L1-L2
电流测量	L3 相
相角偏移	电压 (L1-L2) 与电流 (L3) 之间 $\Rightarrow 90^\circ$
电容器过载电流测量	根据 L1-L2 计算的一个读数
参数设置	P.03 = L3 P.05 = L1-L2 P.24 = 3PH

THREE-PHASE STANDARD CONNECTION (default)	
Default wiring configuration for standard applications.	
Voltage measure	1 ph-to-ph voltage reading L1-L2
Current measure	L3 phase
Phase angle offset	Between V (L1-L2) and I (L3) $\Rightarrow 90^\circ$
Capacitor overload current measure	1 reading calculated on L1-L2
Parameter setting	P.03 = L3 P.05 = L1-L2 P.24 = 3PH

	注释	NOTES
	<ul style="list-style-type: none"> • 对于三相连接，电压输入必须采用相间连接，电流互感器必须连接到剩余相。 • 电流/电压输入的极性无关紧要。 	<ul style="list-style-type: none"> • For three-phase connection, the voltage input must be connected phase to phase; the current transformer must be connected to the remaining phase. • The polarity of the current/voltage input is indifferent.

单相接线

Single-phase wiring



单相连接

单相应用的接线配置

电压测量	一相电压读数 L1-N
电流测量	L1 相
相角偏移	电压 (L1-N) 与电流 (L1) 之间 $\Rightarrow 0^\circ$
电容器过载电流测量	根据 L1-N 计算的一个读数
参数设置	P.03 = L1 P.05 = L1-N P.24 = 1PH

SINGLE-PHASE CONNECTION

Wiring configuration for single-phase applications

Voltage measure	1 phase voltage reading L1-N
Current measure	L1 phase
Phase angle offset	Between V (L1-N) and I (L1) $\Rightarrow 0^\circ$
Capacitor overload current measure	1 reading calculated on L1-N
Parameter setting	P.03 = L1 P.05 = L1-N P.24 = 1PH



注释

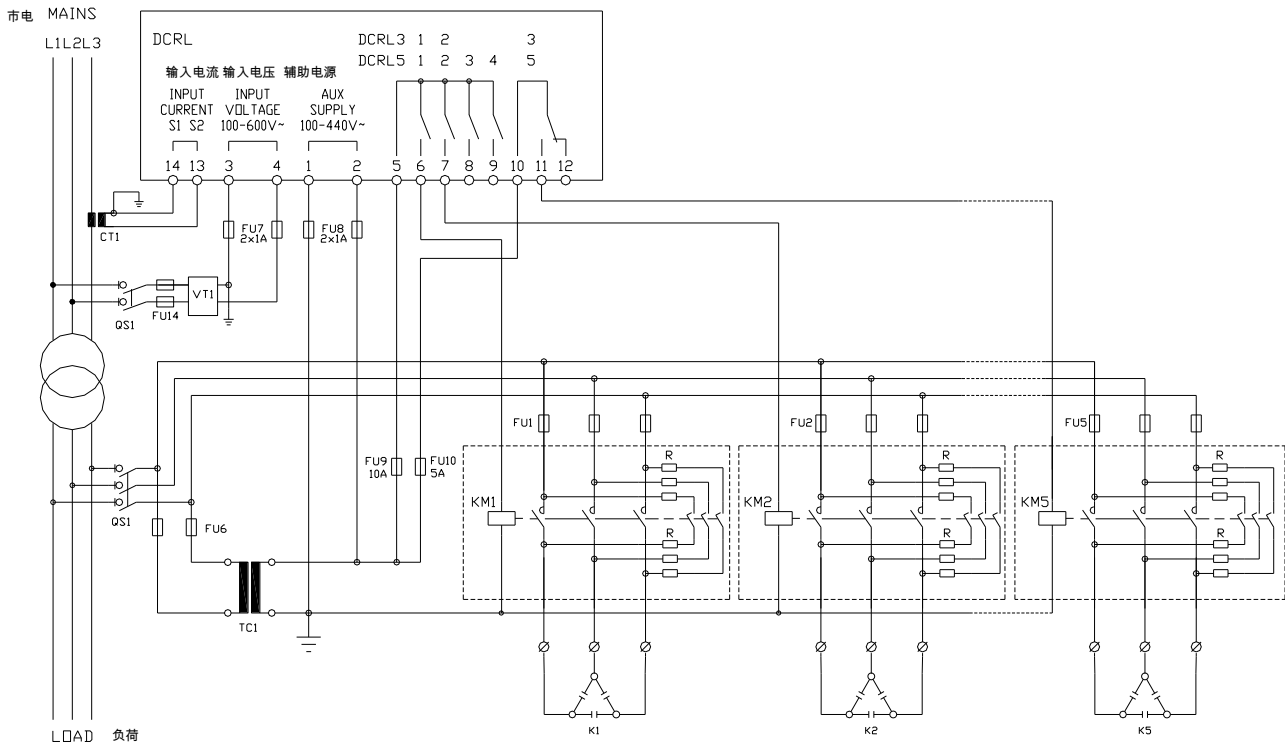
- 重要!**
- 电流/电压输入的极性无关紧要。

NOTES

- IMPORTANT!**
- The polarity of the current/voltage input is indifferent,

MV 接线

MV wiring



MV 测量和校正配置

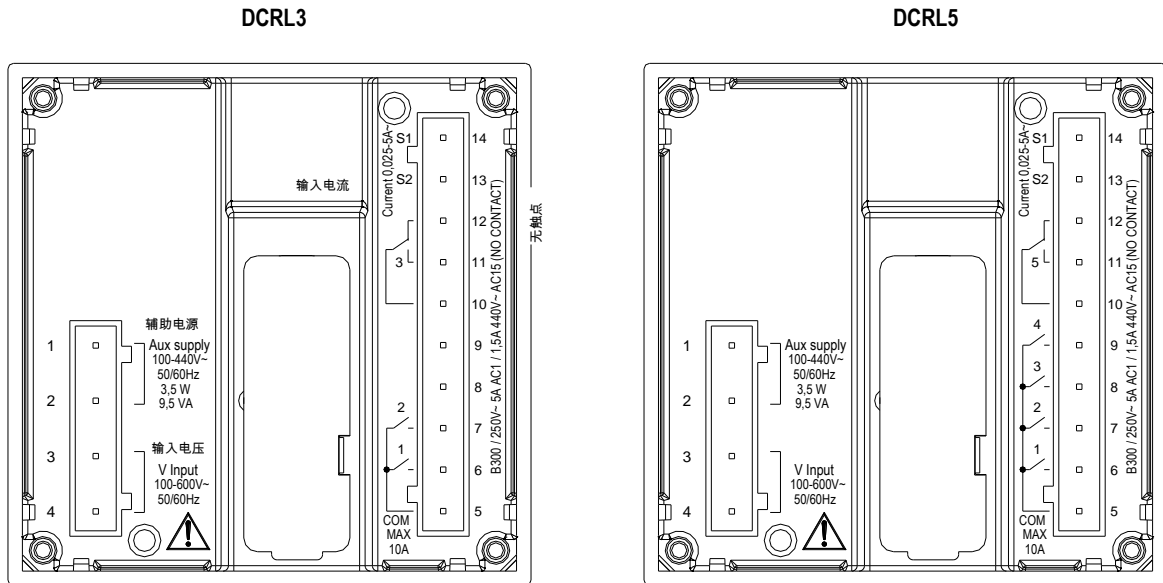
电压测量	3 相间电压读数, MV 侧的 L1-L2、L2-L3、L3-L1
电流测量	L1-L2-L3 相
相角偏移	90°
电容器过载电流测量	禁用
参数设置	P.03 = L3 P.05 = L1-L2 P.24 = 3PH P.34 = VT 一次电压 P.35 = VT 二次电压

Configuration with MV measurement and correction

Voltage measure	3 ph-to-ph voltage reading L1-L2, L2-L3, L3-L1 on MV side
Current measure	L1-L2-L3 phase
Phase angle offset	90°
Capacitor overload current measure	deactivate
Parameter setting	P.03 = L3 P.05 = L1-L2 P.24 = 3PH P.34 = VT primary P.35 = VT secondary

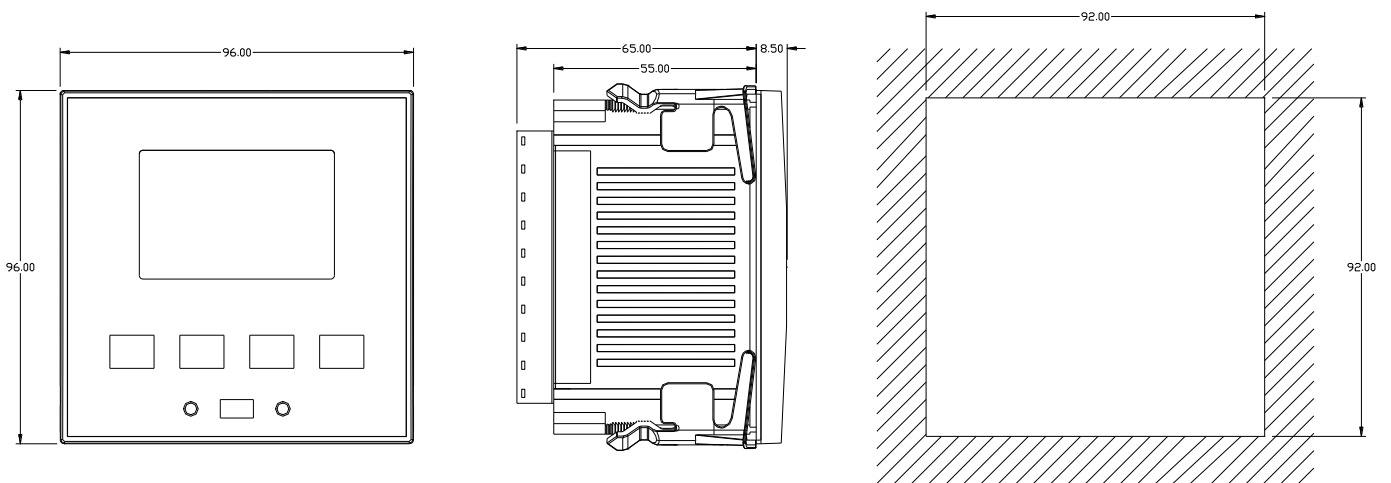
端子位置

Terminals position



机械尺寸和屏柜开孔尺寸 (mm)

Mechanical dimensions and front panel cutout (mm)



技术规格

Technical characteristics

电源		Supply	
额定电压 Us	100 - 440V~ 110 - 250V=	Rated voltage Us	100 - 440V~ 110 - 250V=
工作电压范围	90 - 484V~ 93.5 - 300V=	Operating voltage range	90 - 484V~ 93.5 - 300V=
频率	45 - 66Hz	Frequency	45 - 66Hz
功耗	3.5W - 9.5VA	Power consumption/dissipation	3.5W - 9.5VA
失压跳闸	>= 8ms	No-voltage release	>= 8ms
微破裂的抗扰时间	<= 25ms	Immunity time for microbreakings	<= 25ms
推荐使用保险丝	F1A (快速)	Recommended fuses	F1A (fast)
电压输入		Voltage inputs	
最大额定电压 Ue	600VAC L-L (346VAC L-N)	Maximum rated voltage Ue	600VAC L-L (346VAC L-N)
测量范围	50...720V L-L (415VAC L-N)	Measuring range	50...720V L-L (415VAC L-N)
频率范围	45...65Hz	Frequency range	45...65Hz
测量方法	真均方根	Measuring method	True RMS
测量输入阻抗	> 0.55MΩ L-N > 1.10MΩ L-L	Measuring input impedance	> 0.55MΩ L-N > 1.10MΩ L-L
接线模式	单相、两相、三相，不带或带中性点或平衡三相系统。	Wiring mode	Single-phase, two-phase, three-phase with or without neutral or balanced three-phase system.
测量精度	1% ±0.5 位	Accuracy of measurement	1% ±0.5 digit
推荐使用保险丝	F1A (快速)	Recommended fuses	F1A (fast)

电流输入		Current inputs	
额定电流 I _e	1A~ 或 5A~	Rated current I _e	1A~ or 5A~
测量范围	5A : 0.025 - 6A~ 1A : 0.025 - 1.2A~	Measuring range	For 5A scale: 0.025 - 6A~ For 1A scale: 0.025 - 1.2A~
输入类型	外部电流互感器提供的分路 (低电压)。最大 5A	Type of input	Shunt supplied by an external current transformer (low voltage). Max. 5A
测量方法	真均方根	Measuring method	True RMS
过载容量	+20% I _e	Overload capacity	+20% I _e
过载峰值	50A, 1秒	Overload peak	50A for 1 second
测量精度	± 1% (0.1...1.2In) ±0.5 位	Accuracy of measurement	± 1% (0.1...1.2In) ±0.5 digit
功耗	<0.6VA	Power consumption	<0.6VA
测量精度		Measuring accuracy	
线电压	±0.5% f.s. ±1 位	Line voltage	±0.5% f.s. ±1digit
继电器输出: DCRL3 输出 1-2/DCRL5 输出 1-4		Relay output: DCRL3 OUT 1-2 / DCRL5 OUT 1-4	
触点类型	DCRL3 2 x 1 常开 + 公共触点 DCRL5 4 x 1 常开 + 公共触点	Contact type	DCRL3 2 x 1 NO + contact common DCRL5 4 x 1 NO + contact common
UL 等级	B300 30V= 1A Pilot Duty	UL Rating	B300 30V= 1A Pilot Duty
最大额定电压	440V~	Max rated voltage	440V~
额定电流	AC1-5A 250V~ AC15-1.5A 440V~	Rated current	AC1-5A 250V~ AC15-1.5A 440V~
公共触点的最大电流	10A	Maximum current at contact common	10A
机械/电气寿命	1x10 ⁷ /1x10 ⁵ ops	Mechanical / electrical endurance	1x10 ⁷ / 1x10 ⁵ ops
继电器输出: DCRL3 输出 3/DCRL5 输出 5		Relay output: DCRL3 OUT 3 / DCRL5 OUT 5	
触点类型	1 个转换触点	Contact type	1 changeover
UL 等级	B300/30V= 1A pilot duty	UL Rating	B300 / 30V= 1A pilot duty
最大额定电压	415V~	Max rated voltage	415V~
额定电流	AC1-5A 250V~ AC15-1.5A 440V~ (仅常开)	Rated current	AC1-5A 250V~ AC15-1.5A 440V~ (NO only)
机械/电气寿命	1x10 ⁷ /1x10 ⁵ 次	Mechanical / electrical endurance	1x10 ⁷ / 1x10 ⁵ ops
绝缘电压		Insulation voltage	
额定绝缘电压 U _i	600V~	Rated insulation voltage U _i	600V~
额定冲击耐受电压 U _{imp}	9.5kV	Rated impulse withstand voltage U _{imp}	9.5kV
工频耐压	5.2kV	Power frequency withstand voltage	5.2kV
环境工作条件		Ambient operating conditions	
工作温度	-20 - +60°C	Operating temperature	-20 - +60°C
存储温度	-30 - +80°C	Storage temperature	-30 - +80°C
相对湿度	<80% (IEC/EN 60068-2-78)	Relative humidity	<80% (IEC/EN 60068-2-78)
最大污染度	2	Maximum pollution degree	2
过电压类别	3	Overvoltage category	3
测量类别	III	Measurement category	III
气候顺序	ZI/ABDM (IEC/EN 60068-2-61)	Climatic sequence	ZI/ABDM (IEC/EN 60068-2-61)
耐冲击性	15g (IEC/EN 60068-2-27)	Shock resistance	15g (IEC/EN 60068-2-27)
抗振性	0.7g (IEC/EN 60068-2-6)	Vibration resistance	0.7g (IEC/EN 60068-2-6)
连接件		Connections	
端子类型	插入式/可拆卸	Terminal type	Plug-in / removable
电缆截面 (最小...最大)	0.2...2.5 mm ² (24...12 AWG)	Cable cross section (min... max)	0.2...2.5 mm ² (24...12 AWG)
UL 等级	0.75...2.5 mm ² (18...12 AWG)	UL Rating	0.75...2.5 mm ² (18...12 AWG)
电缆截面 (最小...最大)	0.75...2.5 mm ² (18...12 AWG)	Cable cross section (min... max)	0.75...2.5 mm ² (18...12 AWG)
上紧扭矩	0.56 Nm (5 LBin)	Tightening torque	0.56 Nm (5 LBin)
外壳		Housing	
型号	面板式安装	Version	Flush mount
材质	聚碳酸酯	Material	Polycarbonate
防护等级	前面板为 IP54 - 端子为 IP20	Degree of protection	IP54 on front - IP20 terminals
重量	320g	Weight	320g
认证及合规性		Certifications and compliance	
cULus	申请中	cULus	Pending
参考标准	IEC/EN 61010-1, IEC/EN 61000-6-2 IEC/EN 61000-6-4 UL508 和 CSA C22.2-N°14	Reference standards	IEC/EN 61010-1, IEC/EN 61000-6-2 IEC/EN 61000-6-4 UL508 and CSA C22.2-N°14
UL 标志	仅使用 60°C/75°C 铜导体 (CU) AWG 范围: 18 - 12 AWG 多股或单股绞线 现场接线端子上紧扭矩: 4.5lb.in 安装在 Type 1 外壳上的平板	UL Marking	Use 60°C/75°C copper (CU) conductor only AWG Range: 18 - 12 AWG stranded or solid Field Wiring Terminals Tightening Torque: 4.5lb.in Flat panel mounting on a Type 1 enclosure
① 连接到线路的辅助电源, 相-中性线电压 ≤300V		① Auxiliary supply connected to a line with a phase-neutral voltage ≤300V	

手册修订记录

版本	日期	注释
00	2014 年 3 月 4 日	• 第一版

Manual revision history

Rev	Date	Notes
00	04/03/2014	• First release