CIRCUTOR

MODEM PERIPHERAL WITH MEMORY

CVM-COM 2.4 & CVM-COM 14.4

(Code   7 70 232 & 7 70 233)

INSTRUCTION MANUAL

(M 981 319   / 97 B)

(c) CIRCUTOR S.A.

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CVM-COM 2.4 & CVM-COM 14.4 PERIPHERICAL

1.-   BASIC INSTRUCTIONS
1.1.- Delivery spot check

This manual is issued to help all the **CVM-COM** users to install and use it in order to get the best from it. After receiving the unit please check the following points:

   (a) Does this device corresponds to your order specifications?
   (b) Check if any damage was done during the shipment process.
   (c) Verify that it includes *One instruction manual .

1.2.- Connection procedures

The manual you hold in your hands contains information and warnings that the user should respect in order to guarantee a proper operation of all the instrument functions and keep its safety conditions.

1.3.- CVMk family : Masters & Modules & PERIPHERALS

The CVMk model measuring instrument can be complemented with several modules and peripherals.

☑ **MODULES** are all the additional systems (plug-in cards) which are placed inside the own CVMk (for example, the CVM/ER-485 energy and communication module).

☑ **PERIPHERALS** are the autonomous systems which work with data provided by a **CVMk or CVM-BD.**

☑ For the connection of any of these PERIPHERALS to the CVMk (panel mounting) is **essential to fit into the CVMk the CVM/REDxxx module.** This module has ENERGY + RS-485 serial main communication + a second RS-485 serial output ("*RS-485 Network"*). The peripherals have to be connected to this second RS-485 output, which is independent from the former: pins   3, 4 & 5.

```
1  ①  ------  TX  --
2  ②  ------  TX  +
3  ③  ------  TX  --
4  ④  ------  TX  +
5  ⑤  ------  GND
```

The peripherals connected to this 2nd RS-485 line will receive every second the values of all the parameters measured and calculated by the CVM unit, with independence of their programming.

The transmission speed of this 2nod output is programmed in the own CVM. The peripherals recognize any speed: 2400, 4800 or 9600 bauds. The default speed is of 4800 bauds. The other parameters are fixed (8 / 1 / EVEN).

2.- CVM-COM   PERIPHERAL

The *CVM-COM* is **a memory peripheral WITH MODEM ,** with the ability of storing data provided by one of the measuring instruments (MASTERS) of the CVM family (panel mounting CVMk or DIN rail mounting CVM-B__).
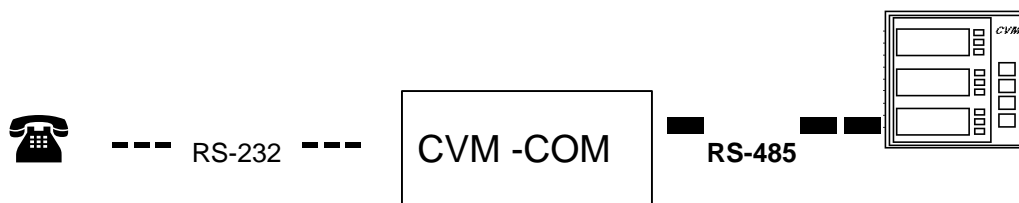
It consists of following elements :

a.- RS-232 communication through the phone line (Full duplex). This RS-232 port is connected to the phone line through a **RJ-11 connector**.

b.- **Internal memory** with a storage capacity of 128 kbytes.

c.- 2 digital inputs, free voltage contacts.

d.- COM1 : RS-232 serial port for a direct link to the PC.

e.- COM2 : RS-485 serial port for a link with the CVM meter ("Network").

Network input CVM "RS-485 Network" : (+) (-) and GND to connect a CVM master.

<u>Communication protocols</u> :

- Ability of working in Full - Duplex with ZMODEM protocol.
Use of **ZMODEM** protocol to inquiry data files from memory.

- The communication protocol of the CVM-M memory peripheral is hold either for the configuration commands and the data inquiry commands.

- Ability of a SET-UP in blocks (although the ZMODEM protocol cannot be used for writing and reading the SET-UP block).

<u>Modem types</u> :

- Modem   ***CVM-COM 2.4*** of 2.400 bauds   (code. 7 70 232)
- Modem   ***CVM-COM 14.4*** of 14.400 bauds. (code. 7 70 233)

3.- INSTALLATION AND STARTUP   ⚠

   The manual you hold in your hands contains information and warnings that the user should respect in order to guarantee a proper operation of all the instrument functions and keep its safety conditions.

   The instrument must not be powered and used until its definitive assembly on the cabinet's door.

> **Whether the instrument is not used as manufacturer's specifications, the protection of the instrument can be damaged.**

When any protection failure is suspected to exist (for example, it presents external visible damages), the instrument must be immediately powered off. In this case contact a qualified service representative.

3.1.- INSTALLATION

Before applying AC power to the, check following points :

(a) Supply voltage :   **230 V a.c.** (+ 10 % / --15 %)
                           terminals A1 - A2 (1 and 28).

(b) Frequency   : 50 ... 60 Hz

(c) Instrument burden : 7 VA

(d) Operation conditions :

- Operating temperature : 0 to 50º C
- Humidity   : 25 to 75 % R.H. noncondensing

(e) Safety : Designed to meet protection class II as per EN 61010.

Mounting: ⚠

Instrument is to be mounted on DIN rail mounting device with low dimensions.
All connections keep inside the cabinet.

Note that with the instrument powered on, the terminals could be dangerous to touching and cover opening actions or elements removal may allow accessing dangerous parts. Therefore, the instrument must not be used until this is completely installed.

The instrument must be connected to a power supply circuit protected with gl type (IEC 269) or M type fuses rated between 0.5 and 2 A. This circuit should be provided with an automatic switch (I / O) or any equivalent element to connect (ON) or disconnect (OFF) the instrument from the power supply network. The supply and measuring voltage circuits will be both connected through a wire with a minimum cross-section of 1 mm^2.

3.2.- CVM-COM Connection terminal
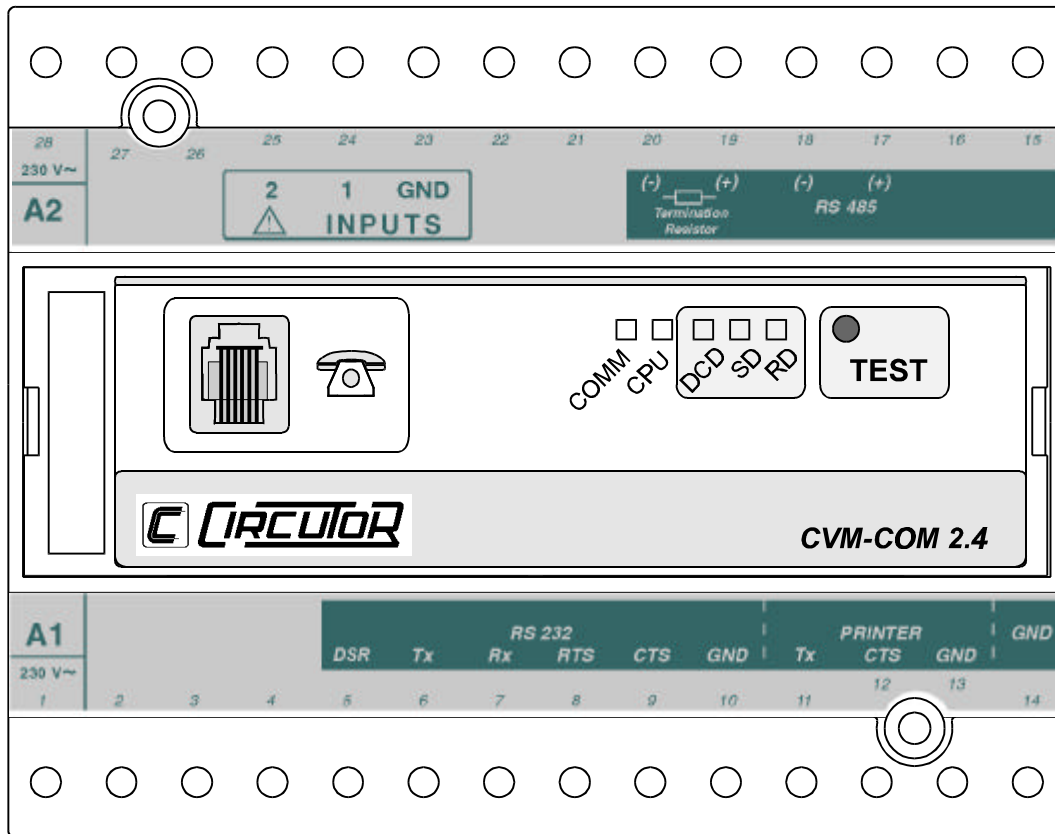
Terminal Nr	Designation	Concept
1 - 28	A1 - A2	supply voltage : 230 V a.c.
23 24 25	GND 1 2	Voltage free inputs common Input Nr 1 Input Nr 2
20 - 19	Termination resistor (RT)	240 ê resistor: adaptation of the line final impedance (bridge 20 -- 18 and 19 -- 17)
18 17 14	-- + GND	RS-485 connection to the RED module in the CVMk or RS-485 input CVM-B__ ("network").
5 6 7 8 9 10	DSR Tx Rx RTS CTS GND	RS-232 connection to the PC Data set ready Transmitted data Received data Request to send Clear to send Common
11 to 13	PRINTER	Not in use

3.3.- CONNECTION CVM-COM to CVMk (panel mounting).

CVMk + CVM-REDxx

3 -

4 +

5

- 18   17 +

A1

RJ-11

☎

COMM CPU DCD SD RD   TEST

CVM-COM x.x

TELEPHONE LINE

A2   14
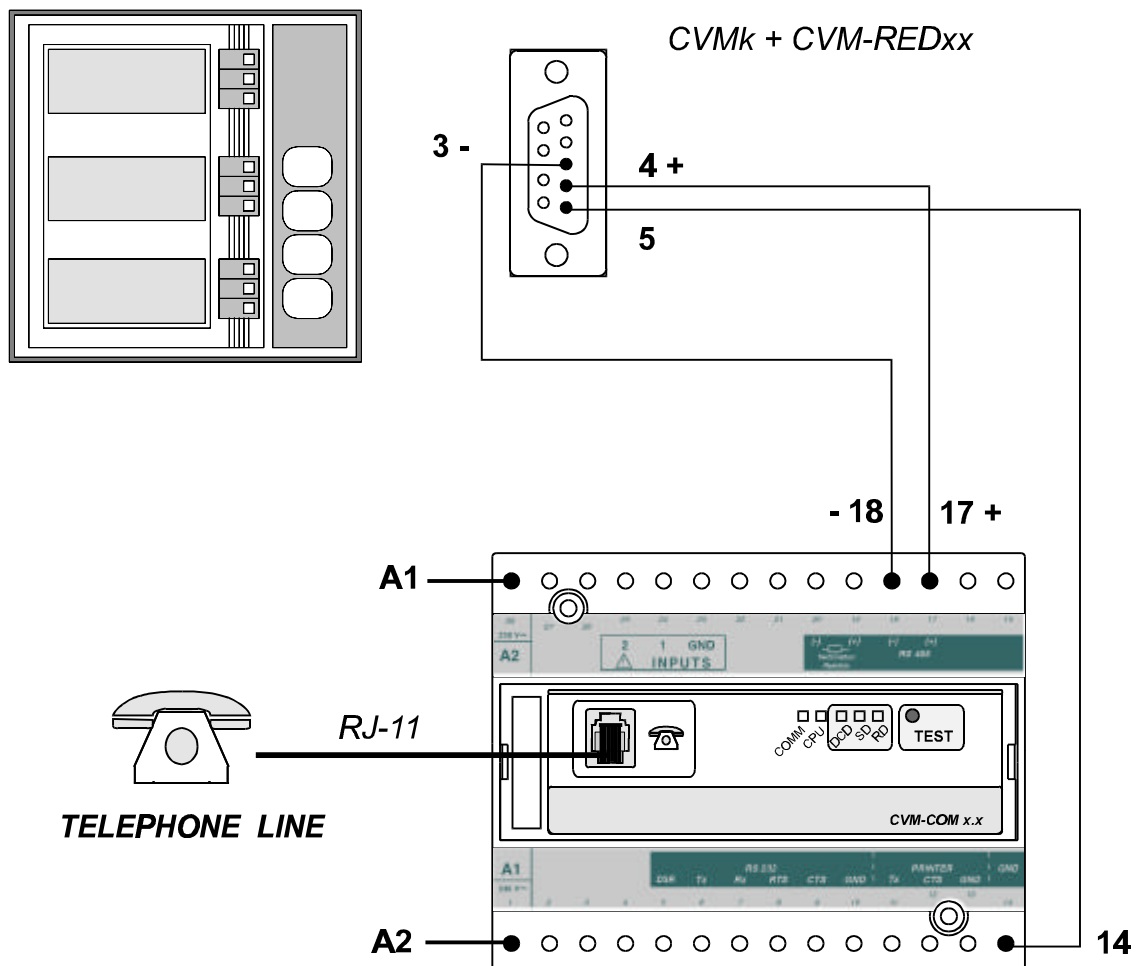
3.3.2- CONNECTION CVM-COM to CVM-BD (DIN rail mounting)
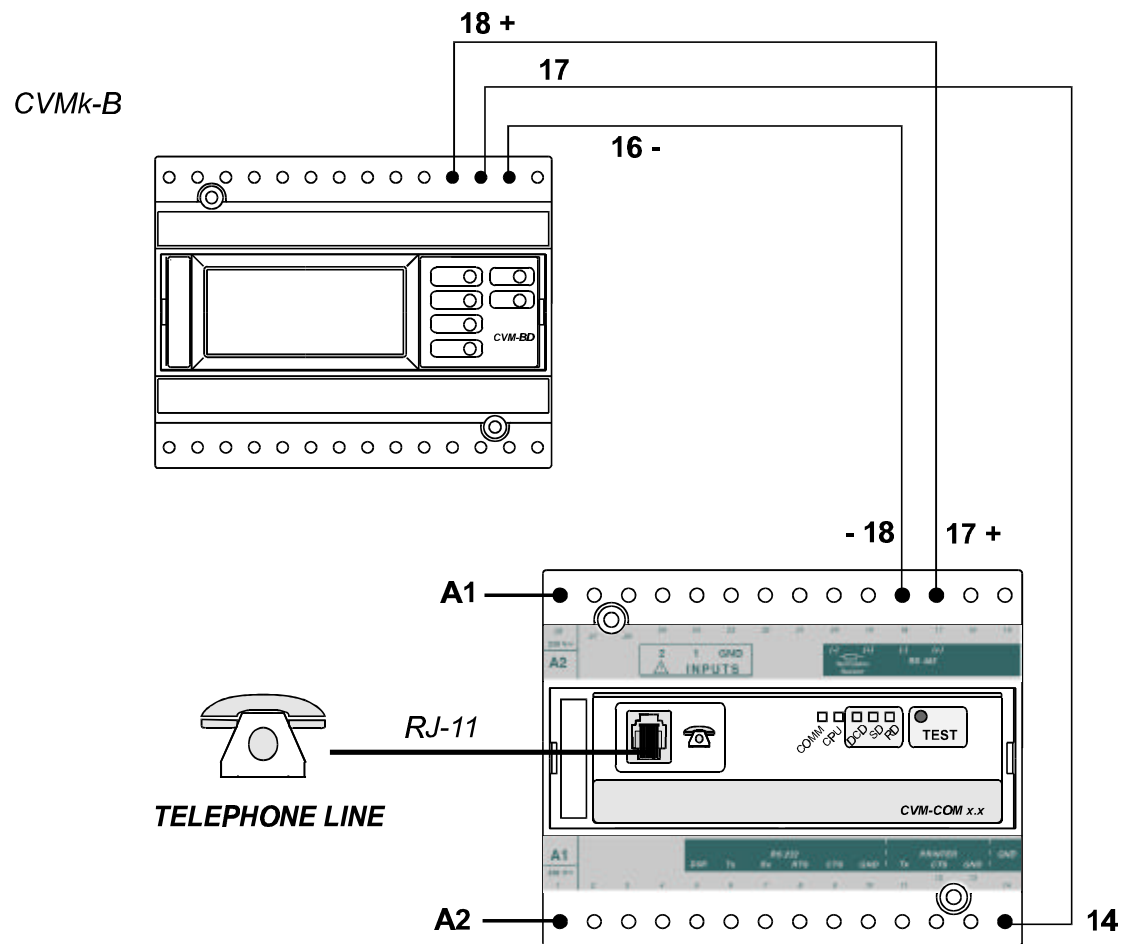
3.4.- Lighting indications of the CVM-COM
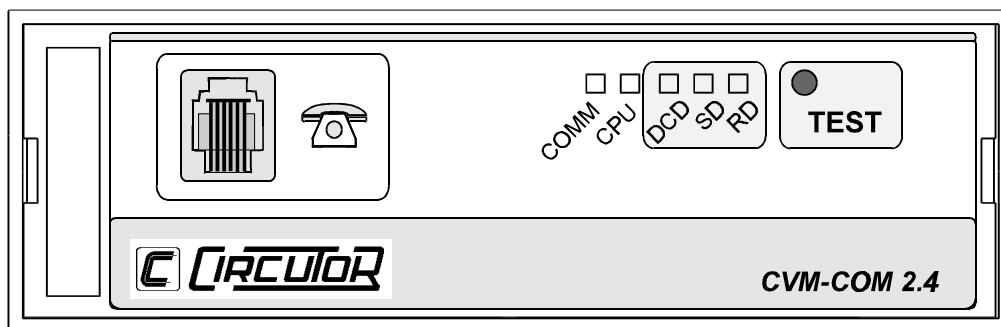
   a.- "**COMM**" LED: This led blinks when the peripheral is receiving data from the CVM ("Network") or from the PC. When no communication exists the led is lit off.

  b.- "**CPU**" LED: Indicates that the CVM-COM is operating.

  c.- LEDs indicating the Modem operation:
- " **DCD**" : Indicates data carrier detect (Data Carrier Detect)
- "**SD**"   :   Sending data
- "**RD**"   :   Receiving data (some commands are sent to the modem)

3.5.- CVM-COM push-buttons

- **TEST** : allows to configure the <u>default</u> communication parameters (PC) . The RS-232 serial port of the CVM-COM is then configured with the following standard values:

Baud = 2.400 / Parity = NO / Bits =8 / Stop bits = 1 / Peripheral = 99

4.- Storage in MEMORY

4.1.- FEATURES

The **CVM-COM** has an internal clock, with date and time, which allows selecting (by means of the **SETUP** *program previously loaded in the PC*) a periodical data recording process in its internal memory.

✎ *Remarks*

The internal memory is a battery type one: the **CVM-COM** stores data in that memory until it will be full. At this moment, when a new register is recorded the oldest one will be lost, so filling the memory with the newest data.

Data format in the internal memory and the features of the available data processing software are detailed in the software user's guide.

4.2.- TYPE OF FILES

The **CVM-M** stores data according to the selected recording period (possible period from 1 second to 240 minutes (4 hours)). This period, as well as the clock & date, are programmed from the PC (through the *CVM_ST program,* for example).

The own instrument performs the integration of all the data measured by the CVM, and calculates the average, maximum and minimum value of the selected period.

- The **possible files** that can be stored in the memory are the following ones:

Extension	Size of one record	DATA saved in this File
xx.CVM	200 bytes	It stores all the read and calculated data (according to the period programmed through the PC)
xx.CVM	400 bytes	Four quadrants CVM-4 case. A double record will be provided : only if there are positive and negative power for the same period (so, some records can be doubled and other ones not)
xx.CVT	variable	It only stores the selected parameters, from 1 to 180 parameters : instantaneous, maximum and/or minimum values. They are programmed from the PC.

<u>Other files</u> :

xx.CVP	6 bytes	COM ON - COM OFF (DATE - TIME) : if any communication failure with the CVM occurs for more than 2 s, the date-time of the interruption and of the communication reset is saved. As well as for a power supply lack.
xx.CVX	10 bytes	This file contains : - The maximum diary value of the DEMAND METER. (according to the selected parameter kW, kVA or A III) - Date when this maximum occurred - If the CVM/RED-MAX module is used, up to three demand parameters can be saved.
xx.CVE	9 bytes	Saves the status of the digital INPUTS with DATE-TIME.

Remarks :

- The format of the xx.CVM record is equal to the AR.4M power meter one.

- The CVM-COM... receives each second the values of all the parameters that the CVM measures and calculates, regardless the way it has been programmed.

- Data in the internal memory can be directly read from a PC, either via RS-232 or through the telephone line.

4.3.- MEMORY CAPACITY

The number of records that can be saved in the internal memory according to the memory peripheral model and the selected record are listed below:

File	Description	Size of one record	CVM-COM (128 kbytes)
xx.CVM	Standard	200 bytes	600 rec.
xx.CVM	4 quadrants Standard	400 bytes	minimum 300 records
xx.CVT	variable	variable	variable
xx.CVP	ON-OFF com.	6 bytes	40 rec.
xx.CVX	demand meter	10 bytes	40 rec.
xx.CVE	inputs	9 bytes	200 rec.

xxx.CVT FILE :

The size of each record will depend on the number of parameters selected in the SETUP option : from 1 to 180. It is possible to select average, maximum and minimum during the period for the all CVMk parameters , and also the energy counters. Each record will have a size as per the following formulae:

[size (Bytes) = (*Nr of parameters* x 4) + 10]

The memory assigned to this file in CVM-COM is 120.000 bytes

Note: 192 bytes are used by the file header.

Example: We have a CVM-M128 and **5** parameters are selected.

$$\text{Nr of records} = \frac{120000 -- 192}{(\mathbf{5} \times 4 + 10)} = \quad \textit{3993 records}$$

As you can see, the number of available records is considerably increased if only the parameters of our interest are selected to be saved.

5.- CVM-COM SETUP

5.1.- SET- UP DESCRIPTION

The **CVM-COM** will be configured by means of a PC.

The program CVM_ST to read the SETUP saved in the own **CVM-COM** have to be run in the PC. Following can be selected with that program:

parameter	description
Period between records	1 second to 4 hours
FILE name	Maximum 8 characters
FILE type	Standard (.CVM) or Variable (.CVT) Should the .CVT type is selected, the desired parameters are to be programmed (from 1 to the available 180 ones)
Trigger parameter	Any parameter measured by the CVM
Trigger value	Maximum and minimum
Time trigger	ON date - OFF date

5.2.- SETUP CONFIGURATION: CONNECTION INSTRUCTIONS

- Connect the power supply of the instrument, 230 V a.c. (+ 10 % / - 15 %), to the terminals marked as A1 - A2 (1 and 28).

- Connect the RS-232 output of the CVM-COM to one of the serial ports of the computer PC.

```
        CVM -COM        <--------------------->        PC ( DB-9 )

DSR        Data set ready   ( 5 )                        .
 Tx        Transmitted data ( 6 ) -------------------> 2
 Rx        Received data    ( 7 ) -------------------> 3
RTS        Request to send  ( 8 ) ----|                .
CTS        Clear to send    ( 9 ) ----|                .
GND        common          ( 10 ) -------------------> 5
```

- Load the CVM_ST program in the PC.
Act according to the instructions indicated in the own program.

NOTE : If you do not know the configuration of the CVM-COMxxx, proceed as follows: Remove the power supply of the CVM-COM. Pressing its "*TEST*" button at the same time that it is again supplied, the RS-232 serial port of the CVM-COM is then configured with the following standard values:
Baud = 2.400 / Parity = NO / Bits =8 / Stop bits = 1 / Peripheral = 99

5.3.- FIXING THE PERIOD BETWEEN RECORDS IN MEMORY

All data measured by the CVM is automatically integrated by the CVM-COM and periodically stored in memory. For each record, the average values measured during the period are saved. The period between two successive records can be fixed from 1 sec. to 4 hours .

5.4.- FIXING FILE   (see section 4.-)

The name and type of the file to be recorded is also set:
Standard (. CVM) or Variable - especial - (. CVT)

For the case of the standard file (*.CVM) most of the parameters measured by the CVM are stored. Only if type .CVT is selected the parameters to be stored are defined (from 1 to 180 available ones).

The rest of the files take the same name with a different extension: *.CVP , *CVX and *.CVE.

5.5.- FIXING TRIGGER CONDITIONS

  In this option *several trigger conditions can be fixed* so that the records are saved in the memory only when those conditions happen.
  Two type of trigger conditions are available:

  1) **Time conditions**: DATE/TIME of ON (start of the measurements) and/or OFF (end of the measurements).

  2) **Parameter conditions**: it allows to fix a **maximum** (the value has to be higher than that) and/or a **minimum** (the value has to be lower than that) threshold, from which the analysis and recording of the results is carried out (if the voltage is higher than a certain level, or the current is lower than another level, etc.).

  The parameters that can be controlled are the following ones:
                    Vn, A, kW, kvarL, kvarC, P.F., Hz, kVA, Vc

  If the defined conditions happen, the **CVM-COM** saves the data in its internal memory; if, on the contrary, they do not happen, then nothing is saved in the memory.

TO KEEP ON MIND:

a) To annul the time TRIGGER all the values have to be zero.

b) If only the ON and OFF TIME is defined (that is, the two DATES are valued with zeros) this established time will be cyclically repeated.

c) If the voltage, current or any of the power is the selected parameter, when the maximum and minimum values are fixed, the measuring units of the CVM have to be considered.

d) The trigger condition is fulfilled when either the instantaneous value of any of the three phases (L1, L2 or L3) or the three phase value of the selected parameter is higher than the maximum defined or lower than the minimum defined (it changes from the STORE OFF position to the STORE ON one).

```
         Minimum                    Maximum
      STORE ON <------  ......STORE OFF......  -----> STORE ON
      any lower value                          any higher value
```

- If no TRIGGER condition wants to be defined, when the parameter has to be chosen, select - **NO** - at this position.

e) Data will be saved in memory provided the two TRIGGER conditions are simultaneously fulfilled: *Time* (ON-OFF) and *Parameter* (maximum and minimum). If any of those conditions do not happen, no data will be stored (STORE OFF).

- If the trigger conditions are annulled (ON and OFF at zero, and parameter at NO) all measured values are <u>always</u> stored in memory according to the previously fixed recording period.

- If the trigger conditions happen at any moment during the selected period, the average values corresponding to the whole period are saved in memory.

5.6.- CAUTION WHEN THE SETUP PARAMETERS ARE CHANGED

When the name of the file or the recording mode is changed in the SETUP option, the CVM-COM will automatically delete the internal memory.

```
┌──────────────────┐
│ Does the file name│        NO
│ or the recording  │──────────────┐
│ mode change?      │              │
└──────────────────┘              ▼
         │              ┌──────────────────────────┐   NO
         │              │  Recording mode = CVT ?   │──────────┐
         │              └──────────────────────────┘          │
         ▼ YES                     │ YES                       │
                        ┌──────────────────────────┐  NO       │
                        │ Does the record configuration │──────▶│
                        │ or the recording period       │       │
                        │ change ?                       │       │
                        └──────────────────────────┘          │
                                    │ YES                       │
                        ┌──────────────────┐                   ▼
         └─────────────▶│ The internal memory│──────▶  ( END )
                        │   is deleted       │
                        └──────────────────┘
```
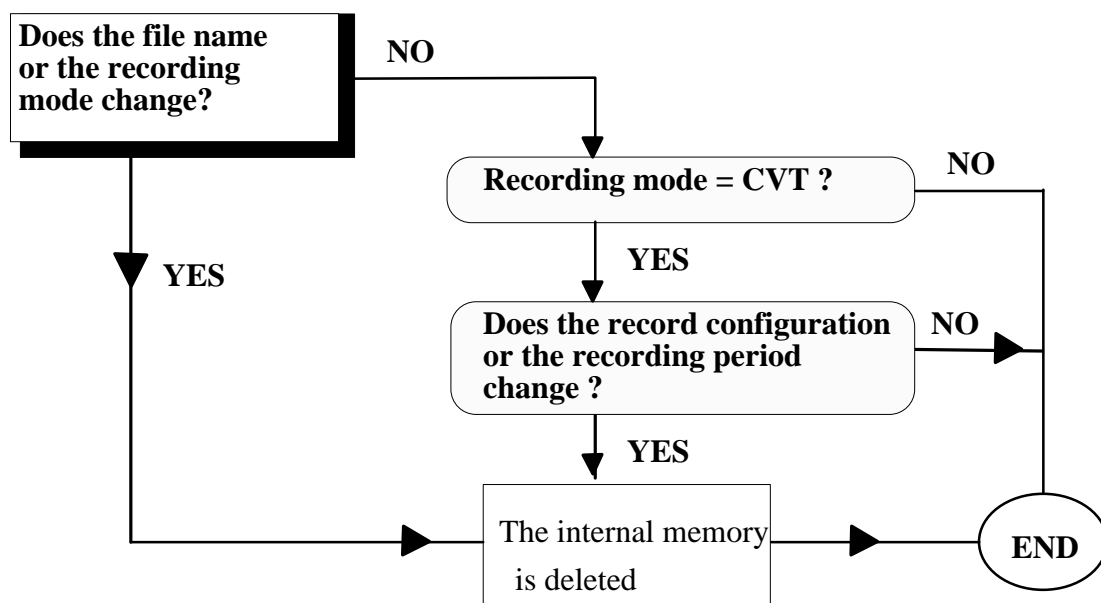
6.- TECHNICAL CHARACTERISTICS

Power supply :

Voltage	Single phase 230 V a.c.
Voltage tolerance	+10 % / -15 %
Frequency	50 ... 60 Hz
Power consumption	7 VA
Operation temperature	0 to 50 ºC

Internal Memory :	memory of 128 Kb
Digital inputs	2 free voltage contacts

Constructive characteristics :

Box type	Self-extinguishing, plastic casing
Connection	Metallic terminals with "posidraft" screws
Fixing	Fitted onto symmetrical DIN 46277 (EN 50022) rail
	Possibility of screwing them down (Ø 4,2 mm hole)
Frontal cover	Lexan
Protection	Built-in relay : IP 41
	Terminals : IP 20
Dimensions	140 x 70 x 110 mm (8 modules relay as per DIN 43 880)

Security	Category II , EN-61010

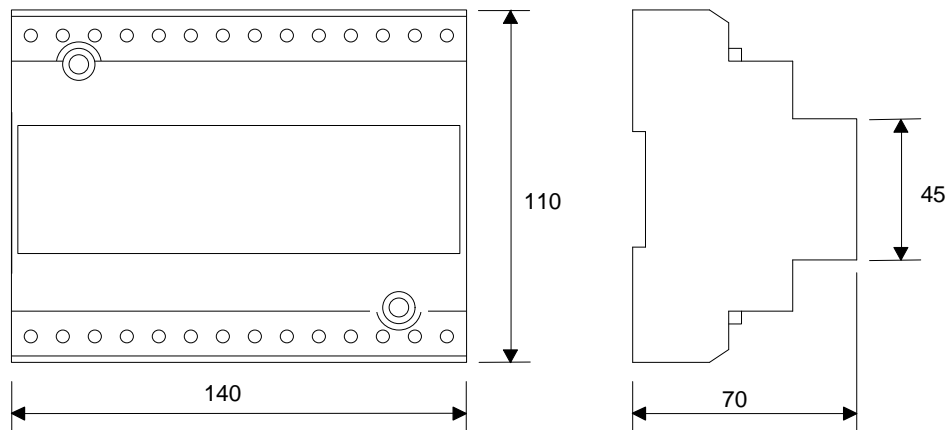|	
Standards :	IEC 664, VDE 0110, UL 94

<u>Dimensions</u> :

7.- SAFETY CONSIDERATIONS

All installation specification described at the previous chapters named INSTALLATION AND STARTUP, INSTALLATION MODES and TECHNICAL CHARACTERISTICS

Note that with the instrument powered on, the terminals could be dangerous to touching and cover opening actions or elements removal may allow accessing dangerous parts. This instrument is factory-shipped at proper operation condition.

8.- MAINTENANCE

The CVM-COM does not require any special maintenance. No adjustment, maintenance or repairing action should be done over the instrument open and powered and, should those actions are essential, high-qualified operators must perform them.

Before any adjustment, replacement, maintenance or repairing operation is carried out, the instrument must be disconnected from any power supply source.

When any protection failure is suspected to exist, the instrument must be immediately put our of service. The instrument's design allow a quick replacement in case of any failure.

9.- TECHNICAL SERVICE

For any inquiry about the instrument performance or whether any failure happens, contact to CIRCUTOR's technical service.

CIRCUTOR S.A. - Aftersales Service
c / Lepanto , 49
08223 - TERRASSA - SPAIN
Tel - 34 - 3 - 786 19 00

APPENDIX A.- CVM-COM COMMUNICATIONS

The **CVM-COM** can be directly read from a PC, either via RS-232 or through the telephone line.

PROTOCOL: Question / Answer

A.1.- DEMAND FORMAT

The demand format is: **$PPCCCAA.... ch [LF] (example = $00RVI75)**
The answer format is : **$PPAA.... ch [LF]**

$	Any message starts with this symbol (ASCII- 36)
PP	Peripheral number (00 a 99) corresponding to the CVM (decimal-ASCII)
CCC	COMMAND
AA	ARGUMENT: (Decimal-ASCII)
ch	CHECK-SUM : Check-sum of all the elements forming the message. It is calculated with the decimal sum of all the previous bytes in ASCII and translating the result to hexadecimal. **Two digits are taken**. <u>example</u> = $00RVI --> 36 + 48 + 48 +82 + 86 + 73 =373 373 decimal ≡ 175 hexad. CHECK-SUM = **75 ---->** $00RVI75 [LF]
[LF]	LINE FEED indicates the end of the message (ASCII 10)

A.2.- COMMANDS

A.2.2.- CONFIGURATION COMMANDS

COM MAND	CONCEPT	QUESTION	ANSWER
DEF	Write default parameters	$pp DEF ch	$PP ACK ch
RRS	Read communications (*)	$pp RRS ch	$pp 13 digits ch
WRS	Write communications (*)	$pp 13 digits ch	$PP ACK ch

(*) NOTE : The RRS / WRS command (communications):

 - 2 digits peripheral number / 1 digit Parity / 1 digit length / 1 digit Stop bits/
   4 digits Baud rate SERIAL RS-232 output / 4 digit Baud rate 2nd RS-485 input

RPA	Read recording period and file name	$pp RPA ch	$pp 5 dig. Period (sec) + 12 dig.file name ch
WPA	Write recording period and file name (without extension)	$pp WPA 5 dig. period + 8 file name ch	$pp ACK ch
RNF	Read file name and extension	$pp RNF ch	$pp 12 dig. file name ch
WNF	Write file name (without extension)	$pp WNF 8 file name ch	$pp ACK ch

COM MAND	CONCEPT	QUESTION	ANSWER
RTR	Read variable trigger (files *.CVM & *.CVT)	$pp RTR ch	$pp 2 dig. variable trigger + 9 dig. trigger maximum + 9 trigger minimum + ch
WTR	Write variable trigger (files *.CVM & *.CVT)	$pp WTR + 2 dig. variable trigger + 9 dig. Maximum + 9 trigger minimum + ch	$pp ACK ch
RTD	Read date trigger ON/OFF	$pp RTD ch	$pp 2 dig. variable trigger + 17 dig. date ON + 17 dig. date OFF + ch
WTD	Write date trigger ON/OFF	$pp 2 dig. variable + 17 dig. ON + 17 dig. OFF + ch	$pp ACK ch
RCR	Read record configuration	$pp RCR + 3 dig offset + 3 dig num. elements ch	$pp 1 dig. mode + 3 dig num. active variables + 3 x n variables code ch
VER	Read version of CVM-COM	$pp VER ch	$pp 4 digits ch
INI	Reset	$pp INI ch	-------
CLM	Delete internal memory	$pp CLM ch	$pp ACK ch
RST	Read status, whether it is recording or not	$pp RST ch	$pp x ch 0 - no recording 1 – recording
RNR	Read number of rings	$pp RNR ch	$pp 2 dig + ch
WNR	Write number of rings	$pp WNR 2 dig ch	$pp ACK ch

A.2.3.- COMMANDS FOR THE CVMk PARAMETER READING
 (*) negative energies only for the CVMk- 4C (four quadrants).

COMMAND	CONCEPT	QUESTION	ANSWER	UNITS
RVI	Read V ph.-neutral INST	$pp RVI ch	$pp 4 x 9 digits ch	V
ROI	Read V phase-ph. INST	$pp ROI ch	$pp 4 x 9 digits ch	V
RAI	Read Current INST	$pp RAI ch	$pp 4 x 9 digits ch	mA
RPI	Read Active power INST	$pp RPI ch	$pp 4 x 9 digits ch	W
RFI	Read P.F. INST	$pp RFI ch	$pp 4 x 3 digits ch	x 100
RWH (*)	Read active energy (positive, negative - absolute value -)	$pp RWH ch	$pp 1 x 9 digits ch $pp 2 x 9 digits ch	W. h
RLH (*)	Read inductive energy (positive, negative - absolute value -)	$pp RLH ch	$pp 1 x 9 digits ch - For the CVMk-4C $pp 2 x 9 digits ch	varh . L
RCH (*)	Read capacitive energy (positive, negative - absolute value)	$pp RCH ch	$pp 1 x 9 digits ch - For the CVMk-4C: $pp 2 x 9 digits ch	varh. C
RCL	Read date and time dd/mm/yy hh:mm:ss	$pp RCL ch	$pp 17 characters ch	
RMD	Read maximum demand value: DATE, MAXIMUM (from the last reset), LAST PERIOD MAXIMUM	$pp RMD ch	$pp 35 digits ch xx/xx/xx xx:xx:xx + 9 dig + 9 dig	
CMD	Delete maximum demand value pd=0	$pp CMD ch	$pp ACK ch	

A.2.4.- COMMAND to read all the CVMk parameters

COMMAND	CONCEPT	QUESTION	ANSWER SIZE
RAL	Read TOTAL	$pp RAL ch	$pp + 244 bytes + ch

With this parameter all the parameters are requested: 30 x 8 bytes in hexa-ASCII format in the following order:

[0] L12	[1] L23	[2] L31	[3] Av	Voltage phase-phase
[4] L1	[5] L2	[6] L3	[7] Av	Voltage phase-neutral
[8] L1	[9] L2	[10] L3	[11] Av	Current
[12] L1	[13] L2	[14] L3	[15] III	Active power
[16] L1	[17] L2	[18] L3	[19] III	Inductive power
[20] L1	[21] L2	[22] L3	[23] III	Capacitive power
[24] L1	[25] L2	[26] L3	[27] Av	Power factor
			[28]	Frequency
			[29] III	Apparent power

- 2 bytes : current units 00 - mA / 01 - A
- 2 bytes : power units   00 - W / 01 - kW

(*) - Power factor (x 100) : When is capacitive it adds 200

        0 --------------------------- 100 --------------------------- 200
          +0.0   Ind.   1.0   Cap.   -0.00

**A.2.5.- COMMUNICATIONS COMMANDS WITH THE THREE billing periods
(CVM / RED-MAX MODULE)
(*) negative energies only for the CVMk- 4C (four quadrants).**

COM MAND	CONCEPT	QUESTION	ANSWER	UNITS
RWHXn **(*)**	Read active energy (positive, negative - absolute value -)	$pp RWHXn ch	$pp a x 9 digits ch $pp 2a x 9 dig ch	W. h
RLHXn **(*)**	Read inductive energy (positive, negative - absolute value -)	$pp RLHXn ch	$pp a x 9 digits ch - For the CVMk-4C : $pp 2a x 9 dig. ch	varh . L
RCHXn **(*)**	Read capacitive energy (positive, negative - absolute value)	$pp RCHXn ch	$pp a x 9 digits ch - For the CVMk-4C : $pp 2a x 9 dig. ch	varh. C
CMDXn	Delete maximum demand value pd=0	$pp CMDXn ch	$pp ACK ch	
RMDXn	Read maximum demand value: DATE, MAXIMUM (from the last reset), LAST PERIOD MAXIMUM	$pp RMDXn ch	$pp a x 35 digits ch xx/xx/xx xx:xx:xx xxxxxxxxx (9 dig) xxxxxxxxx (9 dig)	

☞ - "**n**" is the tariff number :

        0 -------------- Tariff 1
        1 --------------- Tariff 2
        2 -------------- Tariff 3
        3 -------------- The three tariffs

   - "**a**" (the size of the answer)
           a = 1 if n = 0, 1 or 2
           a = 3 if the value n = 3

A.3.- COMMANDS FOR READING FILES IN ZMODEM PROTOCOL

Some commands to inquiry data from the CVM-COM internal memory in ZMODEM protocol are available.

COM MAND	CONCEPT	QUESTION	ANSWER

SZC	Inquiry a whole file	$pp SZC file name ch	$ pp beginning date (DD/MM/AA hh:mm:ss) + ending date + ch
			
			 $ pp ERR whether the file does not exist

SZP	Inquiry a part of a file	$ pp SZP +
		file name + beginning date
		(DD/MM/AA hh:mm:ss)
		+ ending date ch
			$ pp ACK ch (the CVM-COM starts sending in ZMODEM)
			
			$ pp ERR whether the file does not exist or beginning date > ending date

DIF	Consult a file content	$ pp DIF file name. ext (12dig) + ch	$ pp name (12 dig) + beginning date (DD/MM/YY hh:mm:ss) + ending date + bytes-ASCII (10 dig) + ch

ANNEX B .- USING A TERMINAL EMULATING SOFTWARE

Setting communication with the CVM-COM :

- Configure the local serial port of the PC with the same parameters of the modem at the other side of the phone line.

- Enter the calling command ATD<phone number of the CVM-COM><Cr>
   (Cr : carriage return)

- Wait for a CONNECT message on the screen, coming from the modem. When this message appears, command of the CVM-COM can then be entered.

- Active the local echo to see those all being sent to the CVM-COM: Select the echo option.

To set the communication :

- A < Ctrl + J > (press the J key simultaneously with the Ctrl one) is sent to the CVM-COM peripheral.

- The demand format is: **#PPCCCAA< Ctrl + J >.**

All commands start with #PP, where PP stands for the peripheral number.

NOTE : Whether the peripheral number is not known, the command can be sent with the number of peripheral 00, since for the CVM-COM only exists one remote peripheral.

- The answer format is: #PPAA... CRLF

The commands with this special character # allowed are only those that do not modify any critical parameter of the SET-UP. For that case the instrument does not check the check-sum. The answer always ends in CRLF to make easier its visualisation.

Freeing the communication with the peripheral :

To end the communication is necessary to free the line; to do that act as follows:

- Active the command mode in the local modem.
        Type +++ (three + characters). After few seconds, the message 'OK', coming from the modem, should appear on display. This indicates that the this modem will be the receiver of the commands from now on. Whether 'OK' does not appear, it will try it again.

- Unable the local echo or other wise, all characters typed from now on will be doubly displayed. Deselect the option > Echo .

- Hung the line typing the modem command ATH<Cr>.
The led "CD" in the CVM-COM will be off. The modem will answer an 'OK'.