

PROGRAMMABLE LOGIC CONTROLLER FOR MISCELLANEOUS OUTPUTS

C ← BUS

PLE 608 C3 Eng.



- **6 On-Off relay outputs associated with freely-programmable logical functions and independent timed programming.**
- **12 digital inputs associated with logical functions as required.**
- **C-Bus for telemanagement.**
- **DIN rail mounting.**



1. APPLICATION

PLE 608 C3 is designed for use with electrical devices where, for special requirements, it is necessary to have timed controls linked to external events.

A common situation in all types of building: houses and flats, office blocks, industrial (e.g. timed stairway lights, programmed garden irrigation, control of automatic gates) or in HVAC plants (e.g. control of pumps, fans, refrigerators, boilers).

2. FUNCTIONS

The principal functions of PLE 608 C3 are:

- Six On-Off programmable relay outputs, each with:
 - Seven 24hour programs
 - Two 7day programs;
 - One Special Period with date;
 - Two freely-programmable logical functions
- 12 digital inputs for acquiring status to associate with the logical functions for control of outputs.
- Transmission alarm signals for eight inputs and six outputs.
- Three delays for switching On and Off for use in compiling the functions.
- Data logger for recording events.

3. TECHNICAL DATA

Power supply	230 V~ ± 10%	Ambient humidity	Class F DIN 40040
Frequency	50...60 Hz	Dimensions	105 x 115 x 71.5
Consumption	5 VA	Weight	0.6 kg
Protection	IP40	6 programmable voltage-free On-Off output:	
Radiodisturbances	VDE0875/0871	with SPDT switches	2 (U3-U4)
Vibration test	with 2g (DIN 40 046)	with SPST switch	4 (U1-U2-U5-U6)
Construction standards	Italian Electrotech. Committee (CEI)	send alarms	for active or non-active output
Enclosure	DIN 6E module	maximum switching voltage	250 V~
Mounting	on DIN 35 rail	maximum switching current	5 (1) A.
Materials:		12 On-Off inputs :	
Base	NYLON	for control status and/or send alarms	8 (A...M)
Cover	ABS	for control status	4 (N...R)
Ambient temperature:		send alarms	for open or closed switch
Operating	0...45 °C	Applicable delays	3
Storage	- 25...+ 60 °C	Delay at On and/or Off	00.00.00...23.59.59 h/min/s

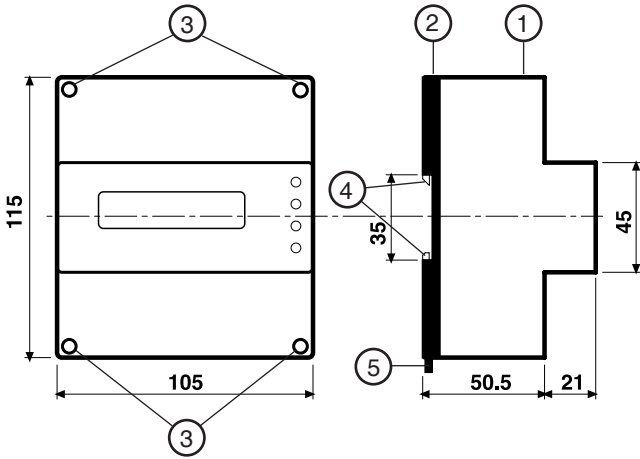
4. NETWORK DISTURBANCES

Should the mains supply fail for a very short period (presence of disturbances in network) the outputs may change status very briefly (recovering in one or two seconds). All the programmed delays will be cancelled.

Should the power supply fail for a few seconds, all the relays will go to the rest position and return to the set position when the power comes back. All the delays will be cancelled.

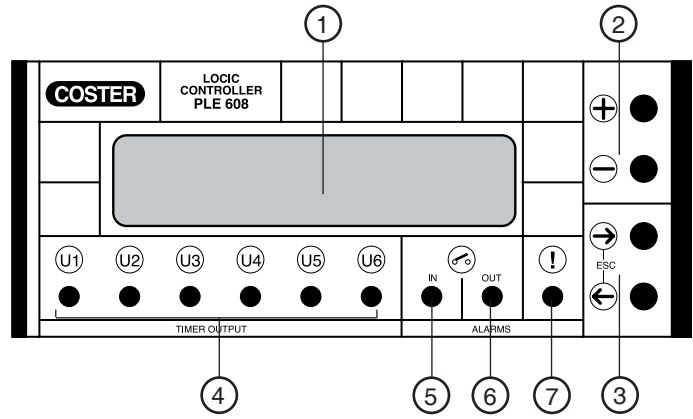
In the case of applications with "memory-based special operators" (Section 13.4), this behaviour may be critical, therefore a filtering unit and UPS units should be used.

5. OVERALL DIMENSIONS



- 1 – Protective cover for electronic components
- 2 – Base with transformer, relay and terminal blocks
- 3 – Screws for securing base and cover
- 4 – DIN rail securing elements
- 5 – DIN rail release lever

6. FACIA



- 1 – Backlighted alphanumeric two-line display
- 2 – + and – keys
- 3 – ← and → keys
- 4 – On-Off control LEDs
- 5 – Input alarms LED
- 6 – Output alarms LED
- 7 – Fault LED

7. SITING CONTROLLER

The controller must be installed in a dry location that meets the ambient conditions given under "3.TECHNICAL DATA".

It must be connected to an electrical installation constructed according to standard IEC 79-14 (CEI EN 60079-14) and sited in a non-hazardous area meeting standard IEC 79-10 (CEI EN 60079-14); that is, an area in which there is no potentially explosive quantity of gas requiring special measures for the construction, installation and use of electrical plant.

It can be installed on DIN rail and housed in a DIN modular enclosure.

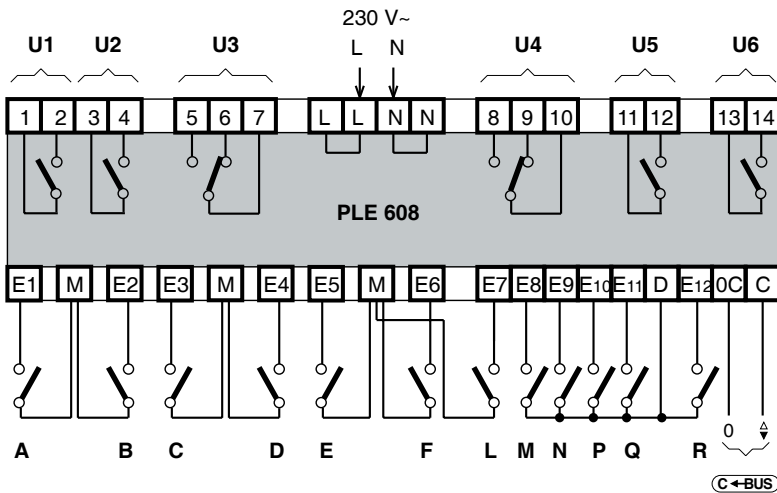
8. ELECTRICAL CONNECTIONS

Proceed as follows:

- Separate base from cover (loosen the securing screws)
- Mount the base on the DIN rail and check that it is firmly anchored by the securing elements (5.4)
- Carry out the wiring according to the diagram and in compliance with current electrical regulations and using :
 - 1.5 mm² cables for power supply and relay control outputs.
 - 1 mm² cables for the detectors.
 - 1 mm² cables for C-Bus. For length limits see data sheet T 021.
- Apply power (230 V~) and check its presence across terminals L and N.
- Remove power, replace cover on base/terminal block and secure it with the four screws (5.3).

You are advised not to insert more than two cables in a single terminal of the controller and, if necessary, to use an external junction box.

9. WIRING DIAGRAM



The output relay contacts are shown with the coil switched off

- U 1...6 – On-Off controls
- A...M – On-Off input contacts for control and/or sending alarms
- N...R – On-Off input contacts for control
- C-Bus – Transmission data via telemanagement

10. COMMUNICATION

10.1 C-Bus communication for telemanagement (for detailed information please see data sheet T 021)

Via C-Bus output PLE 608 C3 can be telemanaged (two-way transmission of data) using one or more local PCs and/or a central PC via telephone land lines.

From the PC(s) you can :

- see and/or modify the data/values on the display pages of the controller and the configuration data of the units dedicated exclusively to the telemanagement (see 3. TECHNICAL DATA);
- status of the plant components (pumps, auxiliaries in general)
- acquire alarms coming from the plant

10.2 Telemanagement address

23.2

Address : 1
Group : -

In telemanagement, in order for the controllers to be identified by the central PC and/or by the local PCs, they must be assigned progressive address numbers:

If required, the controllers can be divided into groups according to shared features.

When telemanagement is not scheduled, leave the address in memory (- - -).

To cancel the values, keep + and - keys pressed at the same time.

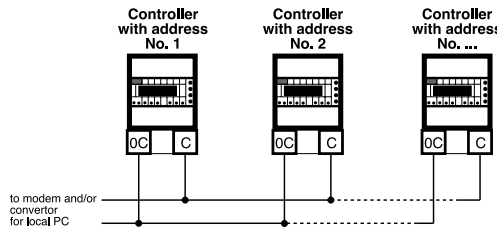
10.3 Sending alarms

23.1

Send Alarms : NO
PassWTeleman : NO

- **Send Alarms** : NO = alarms not transmitted.
YES = alarms are transmitted to central PC and indicated by controller LEDs flashing.
- **PassWTeleman** : NO = password not entered.
YES = password enabled.

10.4 C-Bus electrical connections



11. OPERATION

PLE 608 C3 is a microprocessor-based digital controller for :

- controlling, with 24hour, 7day and annual programs, and using logical functions, six outputs;
- signalling operating status and alarms.

Via the C-Bus connection the controller can communicate with a local PC or, using a modem and land lines, with a PC dedicated to telemanagement.

To configure PLE 608 C3 see the sections SEQUENCE OF DISPLAY PAGES.

11.1 Choice of operating program

In the following pages are described the operating programs for each output: there is a choice between the timed programs or the functions created specially for each of these..

The controller accepts the programs immediately and starts to execute them without the need for confirmation.

19.3

O1 : - - - - -
24 HOUR 1

- O1 ... O6 = Number of output in use. Press + or - to see another without scrolling all the display pages.
 - - - - - - = Identifying name of output set in 23.9.
 - Operating program for output displayed:
 - 24 HOUR 1 ... 7; - 7 DAY 1 - 2; - NORMAL ;
 - SETBACK; - NORMAL+SETBACK; - ALWAYS ON; - ALWAYS OFF.
- In place of program the following may appear::
- SPECIAL = the controller has the special period running

The program running is indicated on the controller by:

19.4

O1: Mode
NORMAL

- Operating mode in use:
 - NORMAL: controller using NORMAL mode.
 - SETBACK : controller using SETBACK mode.
 - NORMAL+SETBACK: controller using NORMAL + SETBACK mode.
 - ALWAYS ON: controller using ALWAYS ON mode.
 - ALWAYS OFF: controller using ALWAYS OFF mode.

11.2 Signalling of status

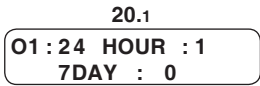
19.2

Status Inputs
AbCDef IMNPqr

- Status of the outputs indicated by LEDs on facia (6.4):
 - LED On = output On;
 - LED Off = output Off.
- Status of the inputs::
 - Capital letter = input closed;
 - Small letter = input open.

12. TIMED PROGRAMS & PERIODS

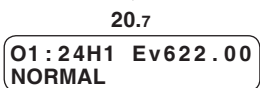
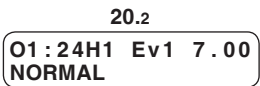
Each of the six outputs can provide seven 24hour programs, two 7day programs and one special program; these can be used in any desired quantity.



- O1 ÷ O6 = number of output in use. Press + or – to see another without scrolling all the display pages .
- Number of 24hour programs you wish to use for the output = from 1 to 7.
- Number of 7day programs you wish to use for the output = from 0 to 2.

Only the 24hour and 7day programs of each output as entered on page 20.1 are displayed.

12.1 24 HOUR programs

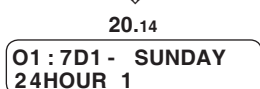
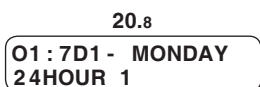


In each 24hour program (24H1...24H7) you can set a maximum of six event start times (Ev1...Ev6), assigning to each one of following modes:

- NORMAL = control of output according to instructions from NORMAL mode.
- SETBACK = control of output according to instructions from SETBACK mode.
- NORMAL+SETBACK = control of output according to instruction from NORMAL and SETBACK modes
- ALWAYS ON = output always On.
- ALWAYS OFF = output always Off.

The event start times must be entered in increasing order.
The unused event times should be excluded by pressing + and – keys at the same time (- - -).
Unused times (- - -) must not be left between programmed times.

12.2 7 DAY programs

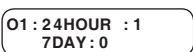
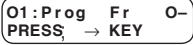

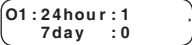


In each 7day program you can assign to each day of the week one of following programs:

- 24 HOUR 1...7;
- NORMAL;
- SETBACK;
- NORMAL+SETBACK
- ALWAYS ON;
- ALWAYS OFF.

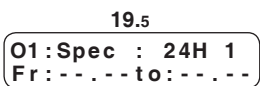
12.3 Copying 24HOUR and 7DAY programs from one output to another

If you wish to link the programs of one output to those of another output by copying them automatically proceed as follows::

- in  select the output to be programmed;
- press repeatedly → key until you reach page ;
- enter number of the output from which to copy the programs, then press → key.
- there will appear a new page  press “+” key to copy programs.
- when the data are copied, go to page .
- press again → in order to check and, if necessary, modify the programs copied.

12.4 Special period

This is a period in which, for each output, an operating program is set which replaces temporarily the one running in order to meet particular requirements.

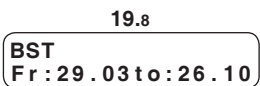


- O1 ... O6 = Display of output in use.
- Choice of program to use during special period:
 - 24 H 1 ... 7; - 7 DAY 1 - 2; - NORMAL;
 - SETBACK; - NORMAL+SETBACK; - ALWAYS ON; - ALWAYS OFF.
- Fr - - - - to - - - - = day and month of start and end of special period.

To cancel the special period keep + and – keys pressed at the same time.

12.5 BST (British Summer Time)

The controller changes the current time automatically according to the British Summer Time period.



- Fr - - - - = set date of the last Saturday in March: during the night the clock is automatically put forward by one hour..
- to - - . - - = set date of last Saturday in October: during the night the clock is automatically put back by one hour.

To cancel the period keep + and – keys pressed at the same time.

13. THE FUNCTIONS

22.1

O1NF :

22.2

O1SF :

Each output can use two functions: one called "Normal" (represented by "NF") **22.1** and one called "Setback" (represented by "SF") **22.2**; they can be linked to timed programs. In each of them 27 spaces are available for entering the instructions represented by the "letters" indicating the inputs concerned and the "operators" indicating the logical operations to be carried out..

No spaces must be left inside a function; the empty space tells PLE 608 C3 that the function is terminated.

The functions are none other than electrical diagrams represented in the form of Boolean logic; they indicate a sequence of events which bring about, at the respective output, the On or Off status.

Warning: when the "FUNCTIONS" menu pages are displayed, the functions in course of execution are not carried out and the status of the outputs does not change until you exit the pages.

13.1 Definition of the status of the inputs

Each of the 12 digital inputs is shown on the wiring diagram by a capital letter (A, B, C, D, E, F, L, M, N, P, Q, R.). The inputs have:

logical status = 1 : switch closed;

logical status = 0 : switch open.

13.2 Definition of the status of the outputs

- active output = LED lit, relay powered.
- output not active = LED unlit, relay not powered.

13.3 Logic operators

Function	Example of formulae	Symbol Operator	Wiring diagram Inputs	Wiring diagram Operator	Logic table Inputs - Res.																																				
YES	O1NF = A	capital letter		(direct) 	<table border="1"> <tr> <th>"A"</th> <th>Res.</th> </tr> <tr> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> </tr> </table>	"A"	Res.	0	0	1	1																														
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NOT (NEGATION)	<p>• of an input: O1NF = - A = a WARNING: the negation of an input is expressed only by small letter.</p> <p>• of a function: O1NF = - (function)</p>	small letter -		(inverter) 	<table border="1"> <tr> <th>"A"</th> <th>Res.</th> </tr> <tr> <td>0</td> <td>1</td> </tr> <tr> <td>1</td> <td>0</td> </tr> </table>	"A"	Res.	0	1	1	0																														
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AND	O1NF = A * B * C	*			<table border="1"> <tr> <th>"A"</th> <th>"B"</th> <th>"C"</th> <th>Res.</th> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>1</td> </tr> </table>	"A"	"B"	"C"	Res.	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	1	1	0	1	1	0	0	1	0	1	0	1	1	1	1
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OR	O1NF = A + B + C	+			<table border="1"> <tr> <th>"A"</th> <th>"B"</th> <th>"C"</th> <th>Res.</th> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>1</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td>1</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> <td>1</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>1</td> </tr> </table>	"A"	"B"	"C"	Res.	0	0	0	0	1	0	0	1	0	1	0	1	0	0	1	1	0	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1
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OPEN BRACKETS CLOSED BRACKETS	function = (..... function =)	()	<p>Example</p> <p>1) (function) = this function is carried out with priority.</p> <p>2) ((function 1) function 2) = function 1 is carried out first, the result of function 1 is carried out of function 2</p> <p>3) (((function 1) function 2) function 3) = first function 1 is executed, then the result of function 1 is executed with function 2 and the result executed with function 3.</p>																																						

Function	Examples of formulae	Symbol operator	Wiring diagram Inputs	Wiring diagram Operator	Logic table Inputs - Result																																				
XOR	$O1NF = (A * b) + (a * B) = A , B$,		<p>double switch</p>	<table border="1"> <thead> <tr> <th>"A"</th> <th>"B"</th> <th>Res.</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>0</td></tr> </tbody> </table>	"A"	"B"	Res.	0	0	0	1	0	1	0	1	1	1	1	0																					
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NOR	$O1NF = -(A + B + C)$ or $O1NF = a * b * c$	- (... + ...)		<p>or</p>	<table border="1"> <thead> <tr> <th>"A"</th> <th>"B"</th> <th>"C"</th> <th>Res.</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>0</td></tr> </tbody> </table>	"A"	"B"	"C"	Res.	0	0	0	1	1	0	0	0	0	1	0	0	0	0	1	0	0	1	1	0	1	1	0	0	1	0	1	0	1	1	1	0
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NAND	$O1NF = -(A * B * C)$ or $O1NF = a + b + c$	- (... * ...)		<p>or</p>	<table border="1"> <thead> <tr> <th>"A"</th> <th>"B"</th> <th>"C"</th> <th>Res.</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>0</td></tr> </tbody> </table>	"A"	"B"	"C"	Res.	0	0	0	1	1	0	0	1	0	1	0	1	0	0	1	1	0	1	1	1	1	1	0	1	1	0	1	1	1	1	1	0
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13.4 Special operators in memory

Function	Examples of formulae	Symbol operator	Wiring diagram Inputs	Wiring diagram Operator	Notes
LATCHING RELAY Start - Stop	$O1NF = ((A ; B) i)$;			Apply only to two different inputs.
RELAY STEP BY STEP	$O1NF = ((A : A) i)$:			Apply only to the same input

- N. B. :**
- = index number of the special function e.g. : $((A : A) 1)$ or $((C ; D) 2)$ and so on.
 - Each different function must have a different index number..
 - The different functions that can be constructed are maximum eight and accordingly the indexes will go from **1** to **8**.
 - Each function corresponding to a certain index number can be used several times provided it always remains equal to itself.
 - For the special functions, including the delays, the same switch cannot be used for different functions.

Priority

The functions are carried out according to the priority of the operators which are:

1st priority: ":", ";", ":", "***".

2nd priority: "+".

With equal priority the operators are carried out in the order in which they are written starting from the left.

The functions grouped in brackets are executed with absolute priority.

The symbol "-" is applied as a negation of that which follows it (single input or function if in brackets).

13.5 Delays

21.1

Delay : K
h 00.00.00

PLE 608 C3 processes up to three delays to apply to single inputs or to functions:

- K : choice of delay counter displayed: K; W; Y.
- 00.00.00 : value expressed in hours, minutes and seconds of delay on timer displayed.

The start of the three delay timers (K; W; Y) can be applied at On, at Off or at On and Off: that is, according to the symbol placed between the function to be delayed and the timer to be used:

- $A > K$: "greater than" symbol indicates that the start of the timer is applied at the On,
 - $A < K$: "smaller than" symbol indicates that the start of the timer is applied at the Off,
 - $A \# K$: "hash" sign indicates that the start of the timer is applied at the On and at the Off.
- where: A = example of input to be delayed;
K = example of timer applied;

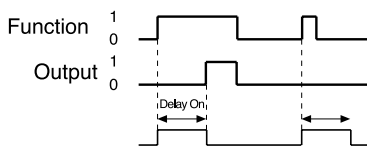
By using capital letters K, W, Y, for the delay counter, the counter will not reset the count if during the set delay new impulses are detected (opening and shutting off of the input terminals).
By using lower case letters k, w, y, the counter can be reset and the count started again by a new impulse (opening and shutting off of the input terminals)..

The delays can be applied also to functions, e.g.:

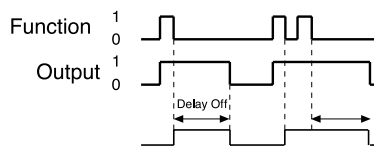
- $(A * B + C) \# W$, where $(A * B + C)$ represents the function to be delayed, # is the delay symbol both at On and at Off and W is the timer to be used.

Warning : Each timer (K, W and Y) can be applied to only one input or function (therefore a maximum of three inputs or functions can be delayed).
The inputs or the functions delayed can be used several times provided they remain always equal to themselves.

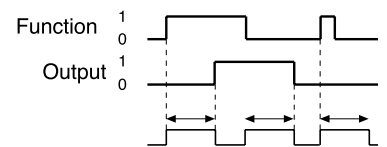
Example 1, Delay at ON : $A > K$



Example 2, Delay at OFF : $A < K$

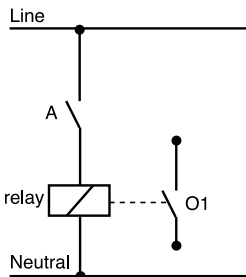


Example 3, Delay at ON and at OFF : $A \# K$



14. EXAMPLES OF APPLICATION

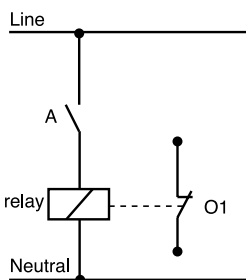
14.1 Example 1 : "Direct function"



When the input switch (indicated by "A") is closed this brings about the closure of output 1 (defined "O1").

The function to apply in this situation is : $O1NF = A$

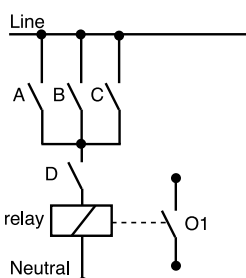
14.2 Example 2 :



When the input inverting switch (indicated by "A") is opened this brings about the closure of output 1 (defined "O1").

The function to apply in this situation is : $O1NF = a$.

14.3 Example 3 : "inverting" function

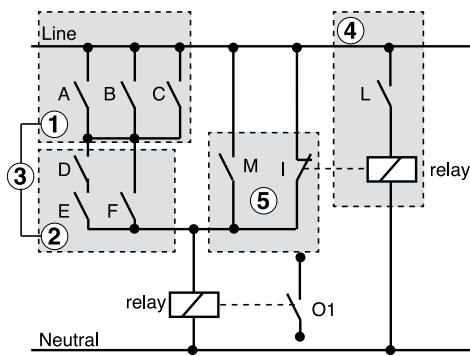


When the input switch A or B or C is closed, provided the input switch D is also closed, the closure of output "O1" takes place).

The function to apply in this situation is: $O1NF = (A + B + C) * D$.

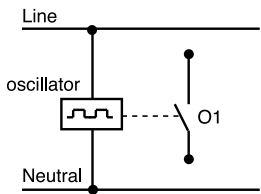
14.4 Example 4

To determine the correct operation of more complex wiring systems it is advisable to split these into several parts; determine the function of each part and then unite the functions of the individual parts so as to obtain the function of the whole system, as in the following example:



- **1** : The switches **A**, **B** and **C** are connected in parallel.
The function is = **A + B + C**.
- **2** : the switches **D** and **E** are connected in series and in parallel with **F**.
The function is = **D * E + F**.
- **3** : the parts **1** and **2** are connected in series and so the respective functions are expressed by the function = **(A + B + C) * (D * E + F)**.
- **4** : the switch **L** is inverted by a relay and is expressed in the function by the small letter **l**.
- **5** : part **4** is in parallel with switch **M**.
The function is = **l + M**.
- since part **5** is in parallel with part 3, the resulting function at output **O1** is:
O1NF = (A + B + C) * (D * E + F) + l + M.

14.5 Example 5: oscillator with adjustable period

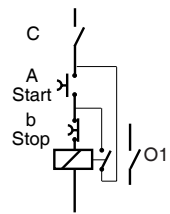


An oscillator function is obtained (relay flashing) by using the special operator "latching relay" together with a delay:

O1NF = ((A : a)1)#K, where :

- **((A:a)1)** = the function which expresses the oscillator;
- **#K** = the delay at On and at Off which determines the oscillator frequency;

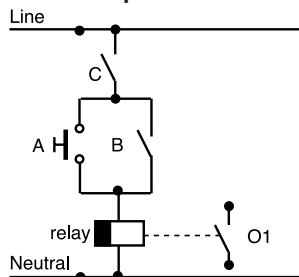
14.6 Example 6 : latching relay with start safety switch



In this example, with the safety switch **C** open it is impossible for the relay to start; and when switch **C** is opened if the relay is switched on it will be switched off.

To obtain this application the following function has to be entered: : **U1FN = C * ((A ; b)1)** .

14.7 Example 7 : functions with delays (e.g. stairway lights).

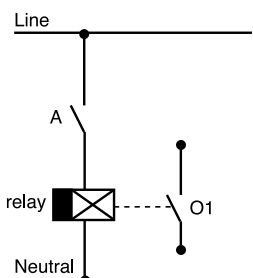


In some situations it is necessary to introduce a delay to the application of a function or of a single input. The delays can be applied at On, at Off or at both.

A typical application of the delay function is the control of timed switches for stairway lights. We can use one of the three timers available on PLE 608 C3 (e.g. "K") and to this we assign a value of three minutes. We start at the Off of input "A" controlled by a switch. This timed control is bypassed by a second control which, in this instance, represents a lockable control of the lights, indicated by input "B". Everything depends on the OK coming from a darkness indicator sited outside and represented by input "C".

The function representing this application is accordingly the following: **O1NF = ((A<K) + B)*C**

14.8 Example 8 : functions with delays – "control burners.



In the example on the left is shown a N.O. switch "A" which represents a thermostat which controls the switching on of a boiler O1. To avoid switching on and off too frequently a switching delay can be introduced.

The function representing this application is: **O1NF = A#W**, "A" where "A" is the input to be delayed, the symbol # is the delay both at On and at Off and W is the timer used.

14.9 Example 9 :automation of three boilers with alarms for burner lockout

The functions we wish to obtain are

- Two boilers out of three must be in operation with the third in reserve.
- By means of an external switch the pair of boilers which must operate normally is selected.
- The alarm signals for burner lockouts will have three levels of importance:
 - minimum importance = 1 boiler lockout;
 - normal importance = 2 boilers lockout;
 - maximum importance = 3 boilers lockout.

Definition of the inputs:

- **A** : voltage-free switch of boiler 1 burner lockout.
- **B** : voltage-free switch of boiler 2 burner lockout.
- **C** : voltage-free switch of boiler 3 burner lockout
- .
- **D** : voltage-free switch to choose: boiler 1 and 2 in operation, boiler 3 in reserve.
- **E** : voltage-free switch to choose: boiler 1 and 3 in operation, boiler 2 in reserve.
- **F** : voltage-free switch to choose: boiler 2 and 3 in operation, boiler 1 in reserve

Definition of the outputs:

- **O1** : control boiler 1 (to put in series with safety and operational thermostats).
- **O2** : control boiler 2 (to put in series with safety and operational thermostats)
- **O3** : control boiler 3 (to put in series with safety and operational thermostats).
- **O4** : to signal lockout one boiler (minimum importance).
- **O5** : to signal lockout two boilers (normal importance).
- **O6** : to signal lockout three boilers (maximum importance).

In this event it is possible to derive the functions without having to consult wiring diagrams but merely by reasoning on the basis of the descriptions of the inputs and outputs:

• functions of the outputs controlling boilers :

$$O1 = D + E + B + C$$

$$O2 = D + F + A + C$$

$$O3 = E + F + A + B$$

• functions of outputs signalling alarms for burner lockouts

$$O4 = A + B + C$$

$$O5 = (A * B) + (A * C) + (B * C).$$

$$O6 = A * B * C$$

(minimum importance = 1 boiler lockout)

(normal importance = 2 boiler lockouts)

(maximum importance = 3 boiler lockouts)

15. COMPLEMENTARY FUNCTIONS

15.1 Access keynumber

23.7

Choice keynumber

Choice and enabling of access keynumber that prevents the use of + and keys and consequently any modification of the data. Enter the number (1900...1999) using + and – keys. To cancel keynumber press + and – at the same time until the dashes re-appear.

Access keynumber

When keynumber is enabled, if you press + or – keys there will appear on the display the request to enter the keynumber. Only after having keyed in the exact number can the + and – keys be used. If for 15 minutes no key is pressed the keynumber is automatically enabled.

15.2 Name of plant site and of the outputs

23.8

Name plant

Entering name of plant site which appears on first page of display **19.1**. Each dash can be replaced, using the + and – keys, by a letter of the alphabet (A...Z) or by a number (0...9). The → key serves to position the cursor.

23.9

U..:Name output

Entering the name of each single output which appears on the display pages (e.g. **19.2**). Each dash can be replaced, using the + and – keys, by a letter of the alphabet (A...Z) or by a number (0...9). The → keys serves to position the cursor.

15.3 Recorder

PLE 608 C3 can record 24 series of data regarding the status of the inputs and outputs. The recordings are made at each change of status of the inputs and outputs selected:

23.5

Record Inputs

- choice inputs:
Factory setting: all disabled.
With + and – keys enable the inputs which at change of status trigger a recording.

23.6

Record Outputs
1 2 3 4 5 6

- choice outputs:
Factory setting: all enabled.
With + and – keys enable the outputs which at change of status trigger a recording .

The most recent recording cancels the oldest one. They are filed on the menu page "RECORDER". Use + and – keys to scroll the data which is displayed in the following way:

24.1

1 h12:18 - 23/04
AbCDe f IMNPqr

- the inputs:
 - number of recording;
 - time and date of recording
 - status of inputs: input capital letter = 1, closed status ;
 input small letter = 0, open status.
- the outputs by means of the LEDs on the facia of the controller **6.4**:
 - LED off, output = 0, output not active;
 - LED on, output = 1, output active.

16. ALARMS

The alarms processed by PLE 608 C3 are of three types:

- input alarms;
- output alarms.
- fault alarms

The alarm status is indicated by the LEDs on the facia and by the word **ALARM** appearing on the display when the alarm is transmitted to the PC and is identified, on the configuration page, by the appearance of the asterisk "*" with the letter of the input or the number of the output as the case may be.

With C-Bus the alarms can be transmitted to a local PC and/or to the telemanagement PC.

16.1 Input alarms

The input alarms can be triggered by the closure or opening of one or more inputs up to a maximum of eight (**ABCDEF**LM).

Factory setting: all disabled.

Using + and – keys enable the alarms and choose between:

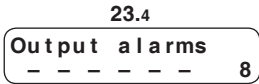
- capital letter = alarm with switch closed;
- small letter = alarm with switch open.

The alarm status is shown on the controller by the flashing of LED **6.5**.

23.3

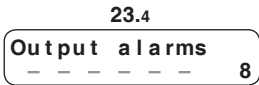
Input alarms

16.2 Output alarms



The output alarms can be triggered by the closure or opening of one or more outputs (1...6).
 Factory setting: all disabled.
 Using + and – keys enable the alarms and choose between:
 – capital number = alarm with switch closed;
 – small number = alarm with switch open.
 The alarm status is shown on the controller by the flashing of LED 6.6.

16.3 Timer alarm

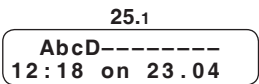


This is indicated by the number 8 on the display page “OUTPUT ALARMS”. It cannot be disabled. It is transmitted when the timer assumes incoherent values.
 The status of the alarm is sent to the PC and shown on the controller by the flashing of LED 6.6.

16.4 Fault alarm

Indicates that the controller has a fault and requires checking at the factory.
 This alarm is not sent to the PC and is shown on the controller by the flashing of LED 6.7.

17. TESTING AT COMMISSIONING

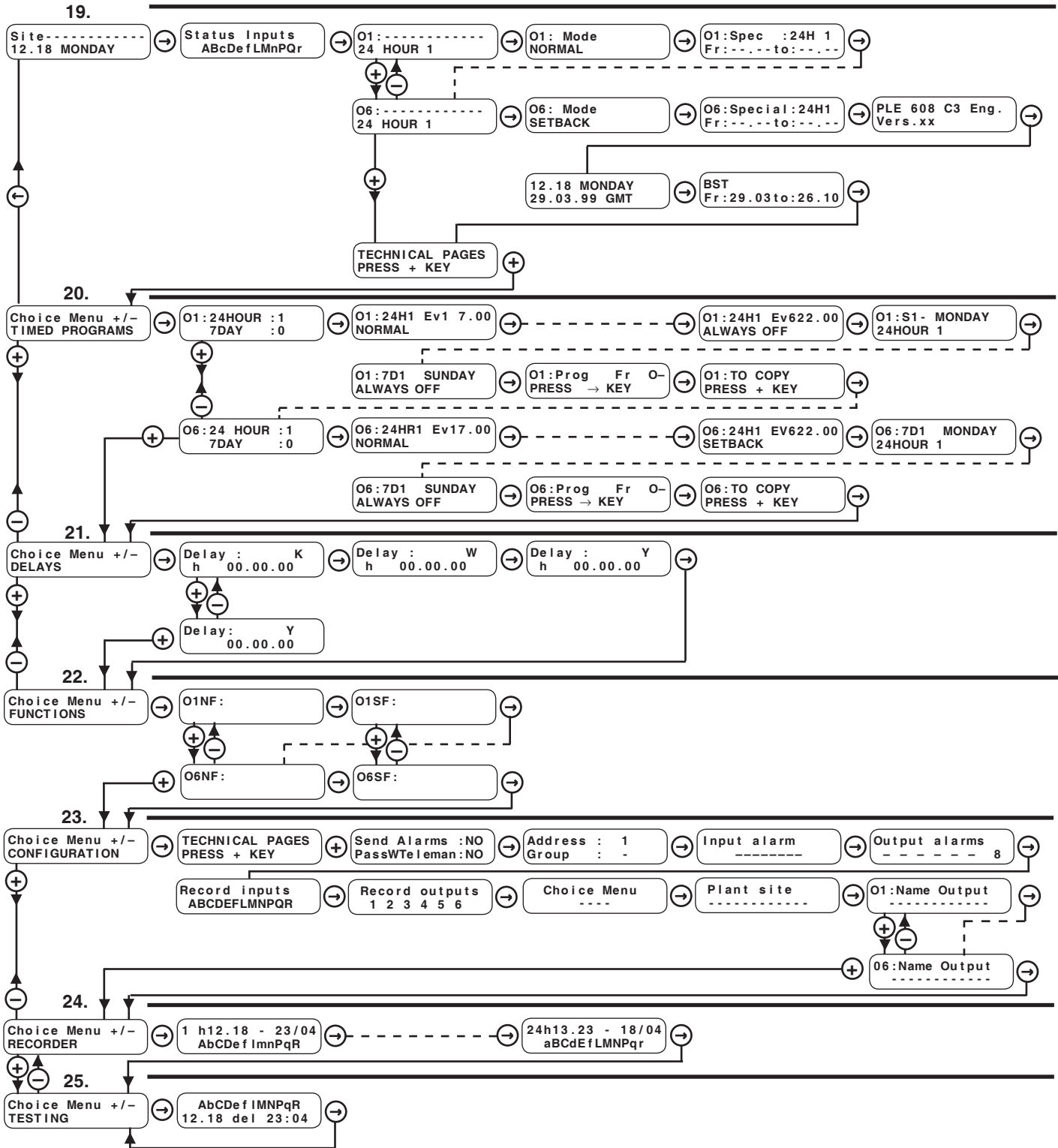


On the “TESTING” page it is possible to check if the controller is operating correctly whilst carrying out the programs entered to change the status of the inputs.
 To do this you must, using + and – keys:
 – enter the simulated status of the inputs, remembering that:

- capital letter input = 1, status closed;
- small letter input = 0, status open.

 – correct the current time and date with the desired values for testing
 Check that the operations and programs set for the outputs function correctly by means of the six LEDs.
 Warning: changes to the time and date will be restored within a minute as soon as you exit the “TESTING” menu.

18. SEQUENCE OF DISPLAY PAGES (the datas and functions are those in memory at delivery)



⬅ ➡ Keys for scrolling the display pages and positioning the cursor ■ on adjustable data on the pages.

The adjustable data, in the following descriptive list of display pages, are highlighted thus ■

By pressing these keys at the same time (or in any event after 15 minutes) the first page returns to the screen

O1:-----
24HOUR 1

⊖ ⊕ Keys for : – adjusting the values indicated by the cursor ■

– seeing the configuration options of a function, e.g :

O1NF: []

or




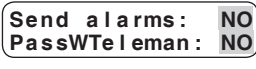




O1SF: []

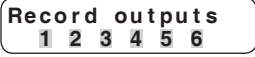

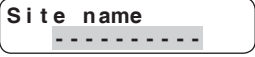
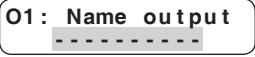


– passing directly from one output to another without scrolling all the display pages.

– passing directly from one menu (series of pages) to another.

19. NORMAL USE				
Ref.	Display	Description	Notes	Sect.
19.1	Site----- 12.18 MONDAY	Name plant site Current time & date.	Set in 23.8 Set in 19.7	
19.2	Status Inputs ABCDEFGHIJKLMNPQR	Readout of status of inputs: – capital letter = switch closed – small letter = switch open		11.2
19.3	O1:----- 24HOUR 1	Number & name of output in use (1...6). Choice of program: 24HOUR 1-7; 7DAY 1-2; NORMAL; SETBACK. SETBACK; NOR- MAL + SETBACK; ALWAYS ON; ALWAYS OFF.	+ and – keys to pass quickly to other outputs Name entered in 23.9. Instead of program there may appear: SPECIAL.	11.1
19.4	O1: Mode NORMAL	Number & name of output in use (1...6). Mode in use: NORMAL; SETBACK NORMAL + SETBACK; ALWAYS ON; ALWAYS OFF.		11.2
19.5	O1: Spec :24HR 1 Fr:----to:----	Number & name of output in use (1...6). Choice program: 24HR 1...7; 7D 1-2; NF; SF; NF+SF; ON; OFF. Dates of start & end of special period.	+ and – keys to change: – program in use during the period. – dates of start & end of special period.	12.4
19.6	PLE 608 C3 Eng. Vers.xx	Identifying data of controller.		
19.7	10.30 WEDNESDAY 24.03.99 GMT	Setting: Time, day of week & date. Current time period: GMT or BST	Dates BST set in 19.8	
19.8	BST Fr:29.03to:26.10	Dates of start & end of BST period.		12.5

20. TIMED PROGRAMS				
Ref.	Display	Description	Notes	Sect.
20.1	O1: 24HOUR: 1 7DAY: 0	Output number (1...6) in use. Choice number of 24HOUR (1...7) & 7DAY (0-2) programs to use.	Keys + and – for: – pass quickly to other outputs; – set number of 24hour & 7day programs to be used.	12
20.2	O1: 24H1 Ev1 6.00 NORMAL	Number of program, number of event & time of start event in program. Choice mode to assign to period: NORMAL; SETBACK; NORMAL + SETBACK; ALWAYS ON; ALWAYS OFF. Other groups of 6 pages according figure in 20.1	Max 6 events. To cancel an unused event press + and – together : - - - - appears Events must be in increasing order. Do not leave - - - - between programmed events	12.1
20.7	U1: 24H1 EV622.00 ALWAYS OFF			
20.8	O1: 7D1 MONDAY 24HOUR 1	Program for each day of week: 24 HOUR 1...7; NORMAL; SETBACK; NORMAL + SETBACK; ALWAYS ON; ALWAYS OFF. Further 7 pages for 7D2 if 20.1 is 2	Appears only if in 20.1 is greater than "0".	12.2
20.14	O1: 7D1 SUNDAY 24HOUR 1			
20.15	O1: Prog Fr U- PRESS → KEY O1: TO COPY PRESS + KEY	Choose output from which to copy programs. Press → key. Press + key to copy programs	Keys + and/or – for: – choose output from which to copy programs; – copy programs.	12.3
Further pages follow for 24H & 7D programs for other outputs.				

21. DELAYS				
Ref.	Display	Description	Notes	Sect.
21.1		Display shows one of 3 available delays: K; W; Y. Value of period delay displayed.	+ and – keys for : - display desired delay; - set hours, minutes & seconds delay.	13.4 13.5
22. FUNCTIONS				
Ref.	Display	Description	Notes	Sect.
22.1		Number of output (1..6) "NORMAL" function: 27 spaces available to enter desired mode, bearing in mind that: capital letters = inputs closed; small letters = inputs open; "*" sign = series (sequence of events) - AND; "+" sign = parallel (alternative events) - OR; "(" sign = groups of operations; "-" sign = input or operation refuted; "," sign = XOR function; ":" and ";" sign =functions "latching relay and "toggle". letters "K, W, Y" = delays; "<" sign =delay applied to Off ">" sign =delay applied to On "#" sign =delay applied to On and Off;	+ and – keys for : - pass quickly to other outputs; -enter in spaces desired characters ←and → keys to move cursor. Empty space is interpreted as end function	13
22.2				
23. CONFIGURATION				
Ref.	Display	Description	Notes	Sect.
23.1		Enabling alarms to send to teleman. PC Enabling telemanagement password.	To change use + and – keys. Only if connected in C-Bus.	10.3
23.2		Telemanagment address of controller Group to wich assigned	To change use + and – keys Only if connected in C-Bus.	10.2
23.3		Enabling transmission alarms replace dashes with : capital letter = send alarm with switch closed; small letter = send alarm with switch open Factory setting: all disabled.	Use + and – keys to enter desired characters,in the spaces use ←and → to move cursor. The alarms will be sent with a fixed delay of about a minute.	16.1
23.4		To enable sending alarms replace dashes with: large number = send alarm with switch closed; small number = send alarm with switch open. Factory setting: all disabled. Alarm 8 = timer fault (factory setting : enabled).	Use + and – keys to enter desired characters in the spaces ←and → to move cursor . The alarms will be sent with a fixed delay of about a minute.	16.2
23.5		Choice of inputs which, at change of status, bring about a recording of old files. Factory setting: all enabled Replace letter or number with a dash to disable the corresponding input.	Use + and – keys to enter desired characters in the spaces; use ←and → to move cursor.	15.3

23. CONFIGURATION				
Ref.	Display	Description	Notes	Sect.
23.6		Choice of outputs which, at change of status, bring about a recording of old files Factory setting: all enabled. Replace letter or number with a dash to disable the corresponding outputs.	Use + and – keys to enter desired characters in the spaces; use ←and → to move cursor .	15.3
23.7		Choice keynumber to prevent use of + and – keys. – 1900 ... 1999.	To cancel keynumber press + and – keys at the same time.	15.1
23.8		Entering name of plant site.	Use + and – keys to enter desired characters in the spaces; use ←and → to move cursor .	15.2
23.9		Number of output (1...6) Entering name output 1 Further 5 pages follow regarding delays for other outputs.	+ and – keys for: - passing quickly to other outputs; - entering desired characters in the spaces. ←and → keys for moving cursor .	15.2
24. RECORDER				
Ref.	Display	Description	Notes	Sect.
24.1		Time, day and month of recording. Status of inputs; and of outputs is shown by respective LEDs on controller facia. Further n pages of recording follow. The most recent is always displayed first and cancels the oldest.	Capital letters = input switch closed; Small letters = input switch open. LED lit = input closed; LED off = input open.	15.3
25. TESTING				
Ref.	Display	Description	Notes	Sect.
25.1		When this page is displayed the controller carries out the testing procedure. – With + and – keys set the status simulated by the inputs. – Set the time and date of the testing simulation. – Check that the outputs carried out the desired functions. The modified time and date are replaced by the current time and date one minute after exiting the testing procedure.	Capital letter = 1, input status: closed; Small letter = 0, input status: open.	17

Amendment to data sheet

Date	Revision No.	Page	Section	Details of amendment	Firmware version	Software version
12.05.06 LB		2	9.WIRING DIAGRAM	Amendment of description of On-Off input contacts		
12.11.07 LB	01	All	All 14.6 Example 6: ...	New C3 version Amended formula	≥ 16	≥ 0.98.2295
12.01.10 VM	02	7	13.5 Delays	Amended section about K,W,Y.	≥ 16	≥ 0.98.2295



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